DEVELOPMENT AND ASSESSMENT OF RESPONSE AND STRENGTH MODELS FOR BOLTED STEEL CONNECTIONS USING REFINED NONLINEAR 3D FINITE ELEMENT ANALYSIS

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DEVELOPMENT AND ASSESSMENT OF RESPONSE AND STRENGTH MODELS FOR BOLTED STEEL CONNECTIONS USING REFINED NONLINEAR 3D FINITE ELEMENT ANALYSIS

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In memory of my father Prof. Ergin Çıtıpıtıoğlu, Ph.D., P.E.

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LIST OF SYMBOLS AND ABBREVIATIONS

2D	Two dimensional
3D	Three dimensional
α	SMCS material property; Prying leg moment ratio
Δ	Connected beam tip displacement
ε_{eq}^{p}	Plastic equivalent strain
$d\varepsilon_p$	Equivalent plastic strain differential, $d\varepsilon_p = \sqrt{\frac{2}{3} d\varepsilon_p^{ij} . d\varepsilon_p^{ij}}$
η	Void growth material property
δ	Prying flange net and gross section ratio
γ_p	Plastic specific surface energy
γ_s	Specific surface energy
ρ	Radius of curvature of crack
ϕ	Connection rotation
σ	Stress
σ_m	Mean stress, $\sigma_{ii}/3$
$\sigma_{\max}$	Maximum stress
a	Half crack length
a, a'	Prying member hinge locations
a_o, b_o, c_o, d_o	Parametric RA coefficient fitted constants
A_b	Bolt nominal shank cross section area
A_e	Bolt effective shank cross section area
A_g	Gross cross section area
A_{gv}	Gross shear section area
A_{nt}	Net tensile section area
A_{nv}	Net shear section area
ASD	Allowable Stress Design
AISC	American Institute of Steel Construction
ASTM	American Society for Testing and Materials
b	Neural network node bias
b, b'	Prying member hinge locations
B	Bolt force
C1, C2	Bolt head to shaft clearance
C3	Bolt washer radius

CTOD	Crack tip opening displacement
d	Connection member tip displacement
d_b	Bolt diameter
d_{bh}	Bolt hole diameter
d_s	Increment distance along J-integral surface contour
E	Modulus of elasticity
EPFM	Elastic plastic fracture mechanics
f	friction coefficient
F	Force
$\overline{F}$	Normalized force
F_o	Normalization force parameter
F_t	Bolt nominal effective tensile strength
f_t	Bolt tensile stress
F_v	Bolt nominal effective shear strength
f_v	Bolt shear stress
Fb	Tension bolt axial force
Fb1, Fb2	Bearing force in bolts 1 and 2
Fc	Clamping force between bolted plates
FE	Finite element
Fh1, Fh2	Bolt head traction force
F_y	Steel material yield strength
Fs	Shear force
F_u	Steel material ultimate strength
g	Bolt gage
G	Energy release rate
g1	Tension bolt gage
g2, g3	Shear bolt gage
G_c	Critical energy release rate
H1	Bolt head thickness
H2	Bolt shaft extension
IW	Neural network input layer weight matrix
ΔK	Stress intensity range
k1	Beam section k-zone
K_1	Connection initial stiffness
K_I	Stress intensity factor for mode 1 failure

K_{1n}	Connection normalized initial stiffness
K_p	Connection plastic stiffness
K_{pn}	Connection normalized plastic stiffness
K_t	Stress concentration factor
ℓ	Length of connected beam
L	Angle or T-stub component length
LEFM	Linear elastic fracture mechanics
LRFD	Load and Resistance Factor Design
LW	Neural network layer weight matrix
m, n	Eurocode prying member hinge locations
M	Moment
M_p	Plastic moment capacity
n	Shape parameter in the Richard-Abbott function; or number of data points
NN	Neural network
p	Neural network input parameter
p	Component tributary length for tension bolts
p_i	Geometric or topographical parameters in the parametric RA coefficients
p_{min}, $p_{\max}$	Neural network input parameter minimum and maximum values
PR	Partially restrained
Q	Prying force
r_i	Residual value
R	Void diameter
RA	Richard-Abbott function
RCSC	Research Council on Steel Connections
R_n	Nominal strength
$(\phi R_n)_t$	Bolt design tension strength
$(\phi R_n)_v$	Bolt design shear strength
s1	Tension bolt spacing
s2	Shear bolt spacing
S	Summed squares of the residuals
SMCS	Stress modified critical strain
t, t_a	Angle leg thickness
t_f	Flange thickness
T	Stress triaxiality, σ_m/σ_e

T_i	Traction vector on the boundary J-integral of the contour
T_u	Bolt tension strength
u_i	Displacement vector
U	Shear lag factor
U	Potential energy of material body with crack
U_o	Potential energy of material body without crack
U_{bs}	Bolt shear distribution factor
$ULCF$	Ultra low cycle fatigue
V_u	Bolt shear strength
VGM	Void growth method
w	Angle member with
w	Neural network scalar weight
W	Strain energy density
y_i	Observed data values
$\hat{y}_i$	Fitted data values

SUMMARY

The difficulty in developing bolted connection designs lies in the limitations in existing methods to characterize their strength and typically nonlinear response due to the complex interaction of the bolts and structural components. Yet it is necessary for the engineer to be able to determine the three main connection response characteristics: stiffness, strength, and ductility to account for their influence on the overall structural response behavior. The need for better connection response characterization becomes even more crucial in a performance based design approach or when designing partially-restrained moment frames. Several welded moment resisting frame connections were found to have serious failures following the 1994 Northridge earthquake leading to more interest and research on bolted connections as an alternative. In this study a refined three dimensional nonlinear finite element modeling approach to accurately simulate the response of bolted connections is presented. Sensitivity studies of modeling parameters are also performed. A nonlinear response dataset of over 400 connection cases is generated using this approach with a parametric bolted angle connection model. The use of a parametric Richard-Abbott type function and a neural network, calibrated using the response dataset, as practical tool to model the nonlinear stiffness response of bolted connections under monotonic loading is demonstrated and assessed. Failure criteria that can be practically used in conjunction with the refined three dimensional finite element models without any additional modeling requirements are developed. The stress modified critical strain (SMCS) criterion based on the void growth and coalescence mechanism initiating ductile fracture in steel is used for determining failure in the connection member. The bolt failure criterion developed is a mechanics based model using the elliptical interaction of the tensile and shear capacity. Failure criteria and bolted angle response dataset is combined to assess in detail the impact of geometry and topography of the bolted angle connections on the following response characteristics: strength, initial stiffness, plastic stiffness, and absolute ductility or the displacement capacity. Finally, using the dataset of bolted angle connection response, along with their capacities and failure modes determined using the developed failure criteria, the prying strength models in the AISC LRFD Specifications, Eurocode, and a hybrid model are assessed and found to be very conservative for some cases. Based on these results a modified Eurocode and hybrid prying strength model is proposed which greatly improves the prying strength prediction. These prying models are assessed and verified using experimental data found in literature.

CHAPTER 1

INTRODUCTION

1.1 Motivation of Research

Connecting structural members using rivets and later high strength bolts has been a common approach ever since iron and steel began to be used in building structures. This dissertation aims to provide enhanced understanding and models for the analysis and design of bolted steel connections.

In the past the lack of welding and large structural shapes required the intricate assembly of several shapes and plates using a large number of rivets to form the desired structure, particularly for the connections of moment resisting frames in buildings. Welding technology eventually replaced the need for the use of rivets, yet connections were designed such that they still required the field welding of several steel sections and plates. The use of rivets and welds is particularly impractical on-site as it requires skilled labor and extensive quality control. Eventually the use of high strength bolts replaced the use of rivets and introduced an alternative load transfer mechanism by pretensioning which connects members together through friction and clamping, rather than or in addition to direct bearing and direct tension as is the case for rivets.

Using welds in moment resisting frame connections remained as a common practice becoming ever more compact by using less and less connecting members, to the point that before the 1994 Northridge earthquake, connections were essentially designed as a direct weld between the beam flange and column flange. These connections were considered to be inherently ductile and thus safe due to the capacity of the steel itself to undergo large deformations, and dissipate seismic energy through yielding and strain hardening.

Following the 1994 Northridge earthquake, many such welded moment resisting frame connections were found to have serious failures and premature cracks which were not expected under the moderate seismic demands of that event. These finding led to the extensive investigations led by the SAC Joint Venture [90] which determined that the failures in the pre-Northridge moment resisting welded connections were primarily due to (a) stress risers and flaws due to the geometry of the welds, and (b) the reliance on weld material with low toughness to transfer the cyclic seismic demand [20, 28]. All these studies led design codes to adopt more strict design practices and requirements for testing or for the pre-qualification of welded connections.

The findings on the flaws of welded connections and stricter design practices created interest in studying alternative connections and repairs using high strength bolts. Tests have shown that bolted connections can attain full moment capacity of the connecting beams when designed properly [55]. Compared to welding, the use of high strength bolts has several advantages. Because bolts are pre-manufactured off site with high quality control measures it is much easier and cheaper to achieve reliable strength and behavior of the component, installing bolts does not need skilled labor and specialty quality control measures, and installation is simple, requiring minimum tools.

Compared to welded connections, which are considered rigid, bolted connections have traditionally been considered semi-rigid (or partially restrained) due to the lack of direct attachment achieved through welding This lack of direct load path results in lower stiffness for bolted joints. In the design of steel framed structures the non-lateral force resisting framing, where the connections are usually simple bolted connections, the influence of the bolted connection stiffness on the overall structure response is ignored.

Aside from achieving full moment resisting frames using bolted connections as mentioned above there has also been interest in designing steel structures taking advantage of bolted connections distributed about the structure. This supplements the lateral force resist-

ing system for seismic forces or creates a cheaper lateral load resisting system using only semi-rigid bolted connections for non-seismic lateral forces (wind).

Yet with all the advantages of bolted connections, the complex interaction of the bolts and structural elements make it challenging to determine their strength and typically nonlinear load-deformation response. The need for better connection response characterization becomes crucial when a performance based design approach is used in the design and retrofit of structures. In such cases rather than using prescriptive code based strength limits to size members and design connections, the structure is designed to perform in defined fashion by accounting for the response and failure mechanisms of all components.

For structures in high seismic regions only pre-qualified connections or connections tested, to verify that performance requirements are met, can be used. Recently, there have been proprietary bolted connections pre-qualified for the use in seismic regions for moment resisting frames, only after extensive studies and testing.

The difficulty in developing bolted connection designs whether for full moment or semi-rigid connections lies in the limitations in existing approaches to characterize their response. Connections can be classified by three main response characteristics: stiffness, strength, and ductility response [66] and it necessary for the engineer to be able to determine all three to account for their influence on the overall structural response.

Computer simulations to determine the response of bolted connections in research has been promising, but it is still yet not a practical tool for a practicing engineer to actually model and perform analysis on every connection designed. Faster computers, better elements libraries, solvers, and interaction routines enable designers to model the physics of a problem with as few assumptions as possible. Software is getting better, making it easier to assemble large models with several components and hardware is getting faster making it possible to run large connection analyses quicker.

There is great value in computer simulations as a supplement to the physical testing of bolted connections either for pre-designing test connections or expanding test results using parametric simulations to understand the influence of variations in the connection. Furthermore, an analytical model once verified against physical tests can reveal greater information as the entire stress-strain field is part of the analysis solution while output from tests are limited to point measurements. A greater fidelity of information can be gained from computer simulations, which can expand our understanding of bolted connection nonlinear behavior and its underlying mechanisms. This way current design equations and assumptions modeling connection behavior can be assessed and further developed based on accurate models.

What is lacking in computer simulations for bolted connections is verification of modeling practices against a large test dataset and generation of connection models of an even greater dataset to generalize the results of various types bolted connection analyses. Determination of connection failure from analyses is another essential part of characterizing connection behavior from analyses. Using simplistic engineering mechanics to assess failure limits is not always sufficient or accurate. There are practical failure criteria which make use of the greater fidelity of information available from analysis which has yet to be verified against a wide range of bolted connection test data.

With methods to accurately simulate the behavior of bolted connections under externally applied loads and determine failure, it is possible to not only enhance current design tools, but develop new ones. Integrating advance analysis of bolted connections into current practice in this manner will help idealize the overall structural behavior and thus, the trend in structural engineering from a prescriptive code based design approach to a performance based approach.

1.2 Scope and Objectives

This thesis presents several approaches to model and characterize the stiffness, strength, and ductility of bolted steel connections. Detailed three dimensional nonlinear finite element models are used as a means to directly or indirectly determine bolted connection response. To this end, this study has the following objectives:

- Develop a general detailed three dimensional finite element modeling approach which includes material nonlinearity, contact between all connection parts, and bolt pretension to capture realistic response of bolted steel connections. This approach will be verified against existing experimental data.
- Analyze a large parametric dataset of bolted angle connections to generate response data for changes in geometry and topography of the connection to assess the impact of such changes in connection response and failure mode. These studies will also be used as a basis for studies to verify and generalize connection response models.
- Assess the use of fitted functions and neural networks as a means to model the nonlinear force-displacement response bolted connections using the parametric bolted angle connection dataset under monotonically increasing loads, ignoring loading-rate effects.
- Develop and verify failure criteria to determine the strength and failure mode of bolted connections from detailed finite element models.
- Examine the current strength design equations and models using the parametric bolted angle connection data set and propose enhancements if necessary.

The accumulation of these objectives will provide means to better understand and determine the behavior of bolted connections, allowing to more accurately reflect their influence on the overall structural response. This understanding of such an important component is essential in a performance based design.

1.3 Outline

Chapter 2 of this thesis provides background information by introducing previous various approaches to model the response and failure of bolted connections. Three main methods to model the nonlinear response of connections reviewed in literature can be listed as: *empirical models* where the response of connections has been fitted to different types of parametric equations; *finite element models* where the geometry and material response is modeled to varying degrees of complexity; and *component based models* where the response of the connection components are individually derived based either on testing or analytical derivations and assembled to form the overall connection response. Work on failure models relevant to bolted connections is also reviewed. These models range from mechanics based models typically used in design codes to micromechanics based models which directly deal with stress and strain fields initiating failure.

Chapter 3 presents a detailed three dimensional nonlinear finite element modeling approach to accurately simulate the response of bolted connections. The results of this approach for top and bottom clip angle connections are compared with tests. These simulations were used for verification and assessment of this approach. Sensitivity studies on the friction, bolt pretension and bolt placement are performed to determine the degree of influence on simulation results. Using the level of information available from analytical models, the mechanism for force transfer in bolted angle connections is studied in detail. The simplification of using a single or assembly of components the approximate the full connection response is also studied.

In Chapter 4 two empirical modeling schemes, a parametric Richard-Abbott type function and a neural network both fitted and trained using the bolted angle connection response dataset, are assessed and compared. The two schemes are assessed by comparing predictions for both cases not used in the development of the empirical models and experimental data.

Chapter 5 introduces both classical mechanics and micromechanics based strength models for steel components. A failure criterion that can be practically used in conjunction with the refined three dimensional finite element models without any additional modeling requirements is developed to determine failure in connection analyses. The stress modified critical strain (SMCS) criterion which is based on the void growth and coalescence mechanism initiating ductile fracture in steel is used for determining failure in the connection member. The bolt failure criterion developed is a mechanics based model using the elliptical interaction of the tensile and shear capacity envelope. T-stub and angle components tested by Swanson [103] are used to calibrate and validate the failure criteria.

In Chapter 6 the developed failure criteria is applied to a dataset consisting of 405 bolted angle connection analyses. The nonlinear force-displacement response is combined with the determined capacity and failure mode to assess in detail the impact of geometry and topography of the bolted angle connections on the following response characteristics: strength, initial stiffness, plastic stiffness, and absolute ductility or the displacement capacity. These response characteristics are graphically presented along with visual examples of deformed contour plots a subset of analyses.

In Chapter 7 the prying strength models in the AISC LRFD Specifications, Eurocodes, and a hybrid model as proposed by Swanson and Gao are assessed for accuracy and consistency using the dataset of bolted angle connection analyses capacities and failure modes determined using the developed failure criteria. Based on the results a modified Eurocode and hybrid prying strength model is proposed. All these models are assessed using experimental data found in literature.

Chapter 8 presents a summary and conclusion of work along with possibilities of future research based on the expansion and application of this study. Finally, the bulk data generated in this study based on the parametric bolted angle connection dataset analyses is clearly organized for reference and use for future research in the appendices.

CHAPTER 2

BACKGROUND

The effect of partially-restrained (PR) connections, also known as semi-rigid connections, on the behavior of steel frames and their potential economy has been noted in many studies [119, 72, 9]. However, connections are simplified as either fixed or pinned in many structural analysis and design approaches. This assumption is mainly due to convenience and the lack of common analysis and design approaches that address the nonlinear response of bolted connections. Failures of the welded pre-Northridge connections created interest in alternative bolted connections. These alternatives are inherently partially restrained, but when properly detailed it is possible to achieve a response with PR connections that is close to that provided by a fixed connection [39, 55].

Connection response is generally characterized with its moment-rotation curve, which is nonlinear for bolted PR connections. The use of such connections has long been recognized by both AISC ASD and the LRFD specifications [7, 8]. It is assumed that these connections cannot maintain the initial angle between the intersecting members . The design of a PR construction requires detailed knowledge of the connection response and ultimate limits states. In addition there are serviceability requirements as it is possible that bolted connections may behave nonlinear for service loads as well [100].

There are various types of bolted connections that have been studied in the last several decades. Prior to the introduction of high strength steel bolts in the 1950s, these connections were assembled using rivets. Compilations of the results of these experiments have been created and assessed by various investigators [74, 42, 58].

Goverdhan [42] generated a database of moment-rotation responses of several experimental tests, of which Kishi and Chen [58] expanded to over 300 test records. The con-

nections in their database were classified into seven connection types. Important information, such as material properties and bolt pretension values were missing for most of the test data [66]. Kim and Chen [56] developed design tables for engineers to determine the size, configuration, and nonlinear moment-rotation response for top and seat angle with double web angle connections for a given beam size and loads when designing frames with semi-rigid connections.

Connections which are assembled using only bolts that do not require any welds can be listed as follows: single/double web angle, top and seat angle with/without double web angle, extended/flush end plate, and header plate and t-stub connections. In the following sections experimental and analytical work on the response and failure of bolted connections will be reviewed.

2.1 Experimental Work on Bolted Connections

Numerous experimental studies have been carried out for a variety of bolted connections. Only a selected few will be highlighted here as they provided the calibration data for some of the work in this dissertation. While some of these experimental studies are full scale, some focus on the behavior of the individual components. Azizinamini [17, 18] studied the effect of varying geometrical parameters on top and bottom seat angle connections with web angles. The experimental setup was a cruciform type where two beams are connected to a central column stub using identical connections. Load was applied to the column stub while the free ends of the beams were pin supported. Eight static tests were conducted to study the effect of bolt diameter and flange angle thickness on the connection response. Sixteen constant amplitude cyclic tests were conducted to understand the cyclic behavior of these connections. The data obtained from these tests were used to form a damage model to predict the low-cycle fatigue cycle life. In addition, three low to high and two high to low, displacement sequences were tested to verify the prediction model. Two double angle component pull tests were also conducted along with two top and bottom seat angle beam to column con-

nections. The response of the angle component pull tests were converted to a moment-rotation connection response and compared with these full beam to column connection tests.

Kasai et al. [55] summarizes the results of 38 full scale bolted beam-to-column connection tests in order to investigate the feasibility of using bolted rigid and PR connections for seismic applications. Four bolted rigid connection types were evaluated. These connections were of top and bottom haunch brackets, pipe brackets, and top flange welds with bottom haunch or pipe brackets. These tests were conducted with both small and large section beams. Bolted retrofit techniques for pre-Northridge welded connections were examined where the top welded flange is assumed to be intact and the bottom weld to have fractured. Large and small haunch brackets were used to reinforce the bottom beam flange along with different variations of double angle brackets for the top beam flange.

Bolted PR connections with the aim of achieving high stiffness, strength and ductility were also tested by Kasai et al. [55]. W24x76 beams and W14x257 columns were used in these tests. Grade 50 high strength steel was used for connecting the members in order to obtain high moment capacities. Angles and T-stubs were used with the expectation that all yielding occur in the connectors, keeping the beam elastic. Fourteen top and bottom seat angle connections and 10 T-stub connections were tested both with shear tabs having 3 or 4 bolts. The connections were subjected to constant peak displacement loading with small, medium and high amplitudes, ATC-24 loading and one connection to several strong earthquake loading history. The connections were found to have relatively high stiffness and strength as well as being very ductile. One of the connections tested survived 17 earthquakes with the probability of occurrence of 2% in 50 years.

Smallidge [98] conducted full scale tests of six T-stub connections. The experimental setup was a cantilever type with the beam loaded at its tip by an actuator. W14x145 columns were connected to W21X44 beams via T-stubs and shear tabs where the number and size of the bolts varied for both connecting components, along with the size of the T-stub.

Grade 50 steel was used for all of the connection components except for one case were an A36 steel beam was used. The connection assembly was loaded with stepwise increasing loading cycles prescribed by the SAC protocol. The rotation in all six tests exceeded 0.03 radians with less than 20% of maximum strength loss, which is the AISC requirement for ductility. These tests showed that it is possible to achieve full strength connections because failure occurred in the beam in 4 out of the 6 tests. The other tests experienced tearing failure that occurred in the last row of bolts connecting the T-stub.

Shen and Astaneh [92] tested 8 bolted angle component pull test assemblies in order to study the inelastic cyclic behavior, failure modes, and energy dissipation capacity of bolted angles. Parameters such as bolt size, angle size and thickness, gage distances and clearances were varied. The specimens were subjected to a three phase cyclic loading history which covered low and high constant amplitudes and low to high amplitude loading except in two test which were monotonically loaded. Two deformation patterns were distinguished based on the relative strength of the angle and bolts. Four failure modes were observed along with secondary modes for each case. These modes were: fracture at the toe of the fillet in the angle on either leg connected to the column side or beam side depending on the deformation pattern, bolt shear failure, and net section failure. The tests demonstrated that bolted-angle connections had a stable cyclic response with a reliable energy dissipation capacity. Large ductility and considerable strength increase was observed due to large deformations and material strain hardening.

Swanson and Leon [103, 105] conducted a series of well documented component tests to evaluate and characterize the strength, stiffness and ductility of 48 bolted T-stubs and 10 (clip) angles. All but four cases were subjected to cyclic loading. Focus was on T-stubs with 8 tension bolts. Heavy one inch thick angles were tested as alternatives to weaker T-stubs. Components were fabricated from A572 Grade 50 steel. Four different T-stub sizes and 2 different angle leg sizes were used. The clip angles were relatively thicker than those commonly used to be comparable with the T-stub components. The results were used

to compare existing models that determine failure modes such as tension bolt fracture due to prying forces, net section fracture, shear bolt fracture and block shear failure. Furthermore a Eurocode like component spring model was developed which assembled various stiffness contributions of different parts of the connection which were derived from the component tests. Based on testing an analytical cyclic connection model was also developed, and finally recommendations were made to design ductile bolted beam column connections.

2.2 Connection Modeling

Full scale connection testing may be the most direct way to determine connection behavior, but usually resource and time considerations limit the number of tests. Limitation of test specimens and the range of parameters that may be varied in a testing program makes testing impractical to understand the behavior of a connection type in a broad sense, although experimental data is essential as a benchmark for any model that may be developed to predict the behavior of connections. In the following sections various approaches that has been developed to model the response of connections analytically are presented.

2.2.1 Empirical Models

Experimental full-scale and component test data have been used to generate moment-rotation curves. A common practice to describe the moment-rotation behavior connections analytically is to curve-fit experimental results to simple mathematical relations. Several models have been proposed for this purpose, ranging from relatively simple to complex functions. Ideally such models involve as little terms as possible to make their use feasible for a designer. Good reviews of the different models have been made for beam-to-column steel connections by Sherbourne and Bahaari [94], Faella et al. [38], Chan and Chui [26], Abdalla and Chen [2], and Chen [27].

A simple approach of modeling the response of connections as linear has been used by Rathburn [81] and by Lightfoot and LeMessurier [68] were the stiffness of the connection

is a certain proportion of the connected beam stiffness [27]. This approach ignores any non-linear response that the connection may have with large rotations. To include the change in connection stiffness at larger rotations bi-linear and multi-linear models have been used, among others, where points of physical meaning such as yield moment and plastic moment of the connection are defined [38, 69, 71].

Frye and Morris [40] used an odd power polynomial model with 3 fitting constants based on Sommer's model [99] to obtain smooth nonlinear moment-rotation curves. This model occasionally gave intermediate negative slopes causing the curve to be wavy which is invalid for connection response. Azizinamini [17] modified this model to overcome this problem by using a nonlinear least squares approach. Jones [53] used B-splines to fit experimental results. This approach fits data in cubic polynomial segments and enforces smooth continuity at the end of each segment. This approach requires a larger data set compared to other methods.

Several so called power models have been used which ensures smooth nonlinear curves that avoid the undesired negative stiffness observed with polynomial models. Krishnamurthy [61] used a simple two parameter power model. Colson and Louveau [31], and Kishi and Chen [57] proposed three parameter models, both with two physical parameters and one curve fitting parameter [27].

Two well known formulas have been used to model connection response. The Ramberg-Osgood [80] formula which was derived originally for modeling nonlinear stress strain relationships was used for connection moment-rotation response by Ang and Morris [10]. The Ramberg-Osgood formula includes three independent variables, the initial stiffness and two shape parameters. The Richard-Abbott [83] formula was also used to model connection response by Richard et al. [86] which uses four independent variables [15]: the initial stiffness, plastic stiffness, a shape parameter and a reference plastic moment. Both formulas have

been successfully used, but the latter is advantageous in that it can model negative plastic stiffness and be differentiated to obtain the tangent stiffness.

Lui and Chen [69] proposed to use an exponential model for connection response. This resulted with comparable accuracy with B-spline models, however, it includes summation of a number of terms which require several curve-fitting terms. Kishi and Chen [58] modified the model to include linear components by using a set of Heavside step functions. Yee and Melcher [123] used a simpler four parameter exponential model: three physical parameters and a curve fitting parameter. All these models are differentiable and yield tangent stiffness [26].

Fitted equations are only as good as the experimental data they are based on [5] and are limited to the specific connection configuration, material properties, bolt size and topology of the tests used to calibrate the equations. Caution is needed while interpolating the physical parameters in tests used to calibrate the fitted equations. Parameters should not be extrapolated as different failure modes may govern which would drastically change the behavior of the connection [66].

2.2.2 Component Based Models

A more general approach to model connections is by recognizing the individual responses of the components that form the connection and assemble them to obtain the overall behavior. There are various ways to obtain component stiffness and strength characteristics, such as experimentation, numerical simulations, or simplified analytical models based on mechanics and first principals [52]. Unlike empirical models, this approach has a transparent formulation that clearly expresses the influence of geometry and material behavior.

Richard et al. [86] developed a component model for double web angle connections based on the responses of assembled bolt segments. Each bolt segment was used to model 3 inch strips of the web angle. The individual response of these bolt segments were analyti-

cally modeled with the Richard-Abbott equation using four parameters. The equation was calibrated using simple angle pull tests. The plane of the beam web was assumed to remain plane, no interaction was included between the segments and shear was ignored in the angles. Force and moment equilibrium equations were used to iteratively determine the moment and the center of rotation for a given rotation of the connection.

Kishi and Chen [57] developed models for predicting the initial stiffness and ultimate strength of connections with bolted angles. To determine the initial stiffness, the angles were modeled considering the angle leg connected to the column as a shear deformable cantilever beam with the fixed end located at the inner side of the tension bolt head. Two simple double plastic hinge mechanisms were assumed for the determination of the ultimate strength of the angle. In one case, both hinges are assumed to be on the column connected leg of the angle, one at the inner side of the bolt head and the other at the heel of the angle. In the other case one of the hinges was assumed on the beam flange side of the angle heel at a location based on the beam column gap. The formulations developed for single angles could be modified to be used for top and bottom seat angle connections with or without single and double web angle connections. Liew et al. [67] used these formulations to determine the nonlinear moment-rotation response using a power law model which includes the initial stiffness, ultimate strength and a shape parameter. A relation for the shape parameter for each connection configuration was given based on experimental data. The plastic stiffness was assumed to be zero. This model only considered deformations occurring in only the angle [38].

Tschemmernegg [113] developed a component model for fully welded endplate connections which took into account the deformation in the panel zone and the beam flanges. Two different types of springs were used for this purpose, one for beam flange deformations named “introduction springs” and one for the panel zone named “shear springs”. For endplate connection an additional type of springs were added, named “connection springs”. The characteristics of these springs were determined by experiments and assembled to produce the overall connection response. The component model of similar type has been codified

in the Eurocode [25] where several component response have been defined for fully welded, endplate and top and bottom seat angle connections [38].

Azizinamini [16] proposed two models to calculate the initial stiffness of bolted seat angles and web angles in tension. Similar to the Kishi and Chen model, the column side leg of the angle was idealized as an assemblage of beams. The first model idealized the seat angle with beams spanning from the tension bolt to the angle heel and to the midpoint of the angle leg connection to the beam flange. The bolt side was modeled as fixed at the bolt and at the beam flange end both displacement and rotation degrees of freedom are defined emulating the rotation of the beam. The web angle was modeled similarly with only the displacement degree of freedom defined. Beams were used to also model bolts, at the locations of the bolts in the web angle. The second model used two types of beams in the assemblage which are in similar fashion to the first model. The angle was divided into strips along its length to account for restraint due to the presence of a bolt. The strips with bolt restraint were modeled with a "stiff beam" which spans the length between the tip of the bolt hole to the mid-plane of the beam leg of the angle. The bolt end of the beam was modeled as fixed while the beam end restrained for rotational and free for displacement. "Flexible beams" modeled the locations in between the "stiff beams" accounting for the area of the angles unrestrained by a bolt. These beams spanned from the free end of the column leg to the midpoint of the of the beam flange side. The end along the bolt line was pinned and the beam flange end restrained for rotation. The number of beams used to model each angle depended on the number of bolts. The stiffness of the angle component assembly was sufficient to predict the initial stiffness of the connection.

Taylor [107] developed a nonlinear analysis framework for PR composite structural systems. Within this framework the development of the initial stiffness and ultimate strength of seat and web angles was described for the PR connections. The component models were derived similar to those by Azizinamini [16] using "stiff" and "flexible" beams. Some modifications were made which includes a finite joint size at the heel of the angle to allow model-

ing the influence of the beam gap. A simple strength mechanism was used to determine the strength of the angle components using yield lines at the bolt line and along the bolt hole edge. The bottom yield line was be located at or above the mid-plane of the heel depending on the gap size between the beam and column. The overall response of the angle was generated from the component response of the seat angle using a series of springs accounting for the column web, the column flange bending and the bolt shear. Similarly, the web angle was assembled using multiple equivalent seat angle models connected at length of the angle. An iterative procedure was used to determine the total deformation of the connection components to update the forces in each spring.

Swanson [105] used the results of his experimental work to calibrate a component based spring model for T-stub connections. The model included the inelastic behavior of the bolts, bending of the T-flange, elongation of the T-stem, relative slip between the T-stub and beam flange, and bearing deformation of the T-stem and the beam flange. The T-flange model also included shear deformations. Roller supports at the tip of the flanges accounted for the prying effect. Various combinations of partial and fully plastic hinge formations were considered with this model. A rational bi-linear stem model was developed to approximate the complex behavior of the T-stem. For the shear bolts, a bearing deformation model based on the Richard-Abbott equation was used. Plate bending and shear effects were also added to the last row of bolts as this was observed to be critical from experiments. A bi-linear slip model was used and combined iteratively with the bearing behavior. The total deformation response of the T-stub was constructed by assembling the deformations of the individual mechanisms under a given load.

2.2.3 Finite Element Models

One of the early studies aimed at using finite elements (FE) to analyze bolted connections was reported by Krishnamurthy [60]. This study recognized the complexity of a refined three dimensional finite element connection model and investigated appropriate cor-

relation factors to relate the results from simplified 2D models for bolted end plate connections. As was the case in early studies using finite elements, many simplifications had to be made due to computational limitations. Correlation factors between the 2D and 3D models for the displacement, rotation, average and maximum stress were determined using thirteen endplate connections having two rows of bolts per flange with design parameters commonly used in practice. Constant strain triangles and eight noded brick elements were used to model the connections. Krishnamurthy [61] also used 2D finite element models to calibrate equations for top and bottom seat angle, T-stub, and end plate connections. The material nonlinearity was modeled using a tri-linear material hardening curve. The bolts were idealized as having square heads and pretension was applied by displacing the nodes at the bolt stub to a predetermined distance. Only the tension bolts were modeled in this study.

Azizinamini [16, 17, 18] used simplified 3D FE models for bolted double angle pull-tests. A quarter of the a flange angle in the connection was modeled with 3D elements possibly due to symmetry. The force-displacement results were converted to a moment-rotation relation in order to examine the role of angles connected to a beam flange and its impact on the overall behavior of a connection. Furthermore approximating the overall response of the connection using pull-test models was investigated. Different assumptions and simplifications were made in the study to reduce the computational effort.

Bursi and Jaspart discussed modeling issues of endplate connections using finite elements using the FE code ABAQUS. Different element formulations were used in ABAQUS with varying friction coefficients, bolt pretension, mesh discretization and boundary conditions. A bolt model made of a “spin” assemblage of beam elements was examined and compared to a bolt model made of continuum elements in order to reduce complicated modeling. An isolated 3D endplate connection was modeled to determine stiffness and strength

behavior. A research code LAGAMINE [23, 24] originally developed to simulate the metal forming process was used in this study to compare with the ABAQUS results.

Sherbourne and Bahari presented work on modeling various configurations of endplate and T-stub connections using the finite element code ANSYS. Plastic quadrilateral shell elements were used to model web and flange of the beam and column. The bolt heads were modeled with 8-noded brick elements and six truss elements were used to model the bolt shank [93, 94, 95]. The connection models were subjected to pure bending to examine patterns of deformation, stress and prying forces [96]. Sherbourne and Bahari [97] used their FE models to evaluate previous empirical functions which predict connection moment response.

Kokan [59] used both 2D and 3D nonlinear FE models to study T-stub connections. Three models were studied. The first consisted of a full 3D T-stub mode with 8 node brick elements. Bolt pretension and contact between the parts were considered. The second was a 2D model of a T-stub flange modeled using 8-node quadrilateral plane strain elements. The bolts were modeled using two beam elements. This model was used to examine various deformation mechanisms in the flange including the prying forces. The third was also a 2D model of the T-stub where circular rigid bodies were used to model the bolts. The analytical responses were compared to experimental data. The effect of modeling the bolts perfectly aligned to the center of the bolt holes or placed in various patterns on the T-stub response was studied. Compared to the experimental response where gradual slipping was observed between the connection elements the FE models predicted sharp abrupt slippage. This difference in behavior was attributed to various shortcomings of the model.

Wanzek and Gebbeken [117] studied modeling parameters and practices for reliable analysis of endplate connections. These included mesh convergence studies for the flange discretization, minimum element number through the thickness, contact formulations, mate-

rial nonlinearity (hardening), imperfections, residual stresses and the connection sensitivity to bolt stiffness.

Yang et al. [122] studied the response of double-web angle connections under axial and shear loads. The angles were bolted to column flanges and welded to the beam web. The bolts and angles were modeled with ABAQUS using 3D finite elements including the weld region. Contact was included between the bolt head and angle. However, the contact between the bolt shank and hole was ignored. The models were compared to tested connections were the angle thickness were varied.

Recent studies using finite elements in modeling connections have focused on end plate connections [24, 22, 41, 93, 97]. Two dimensional (2D) and 3D models are used with various simplifications in the geometry of members, the bolts, and contact conditions. The effect of friction on the response of end plate connections is usually neglected [24, 41]. The studies on end plate connections and double web angle connections have bolts that transfer the loads axially. This eliminates the need for combined contact and friction modeling between the bolts and members. On the other hand, top-bottom bolted seat angle connections transfer the forces not only by direct tension, but through friction by clamping the parts together with the bolts as well. Modeling this additional mechanism requires the inclusion of contact and slip between the connection members.

2.3 Bolted Connection Failure Mechanisms

2.3.1 Block Shear Failure

Block shear involves the complex interaction of shear and tension. This failure mode can occur in gusset plates, at webs of coped beams, angles and tees. In the case of gusset plates there are two shear planes and one tension plane, whereas at web coped beam web connections members there is usually only one of each. The current AISC LRFD Specification

handles both cases with the same approach, whereas in the Eurocode the two cases are handled through separate formulas [106,64].

Yura et al. [124] conducted experimental studies on bolted shear web connections, most of them with coped beams. While the AISC LRFD Specification predictions for the single row bolted web connections were satisfactory, for the double row web connections they were found to be unconservative. Based on the results more tests were done on double row bolted web beam connections were all the specimens failed in block shear [87]. To understand the mechanism a finite element analysis was carried out using elastic plane stress elements. Based on the stress distribution observed in the model a modified block shear failure model which showed good results was proposed.

More recently Kulak and Grondin [64] compared design rules of the AISC LRFD Specification, the Canadian code, Eurocode, and the Japanese code for block shear. It is shown that while the LRFD Specification gives good prediction for the block shear in angles, it is significantly non-conservative for webs of coped beams. The LRFD Specification considers two modes of failure: tension fracture on the net area and shear yielding on the gross area; or tension yielding on the gross area along with the shear fracture on the net area. The last case is unlikely to occur due to the relative ductile nature of shear compared to tension. The study concludes that an important aspect that affects coped beam failures is ignored.

FE analysis was utilized by several researchers in order to explain the block shear mechanism and the factors that affect its limit load in connection members. Epstein and Chamarajanagar [36] used nonlinear brick elements to study the effect of shear length and bolt stagger on the block shear capacity in angle brace tension members. Epstein and McGinnis [35] used 3D shell elements to model structural tee shapes in tension to both correlate to experimental results and compare to design code predictions. In both of these studies the initiation of failure was determined by the strains calculated from the node displacements at the edge of the section nearest to the lead bolt hole where tearing occurred in the experiments.

Orbison et al. [75] studied the effect of eccentricity on the load capacity for bolted tee tension members. It was shown that the current shear lag factor (U) in the AISC LRFD Specification is only valid for connections with small eccentricities. The studies showed that large eccentricities limited the net section rupture of the bolted members and a correction in the shear lag factor was needed which includes the effect of larger eccentricity (greater than 1.75 in.). To complement this study Barth et al. [21] developed finite element models to estimate the failure loads and the load-displacement response of these bolted tee connections with eccentricity. Brick elements were used to model a series of previous experimental studies as to verify the model. The failure loads of the models were simply the loads corresponding to the load limit point observed by experimental results.

2.3.2 Prying Effect in Clip Angle and T-stub Components

Another important phenomenon governing the load carrying capacity of bolted connections is prying. Additional loads imposed on bolts due to prying leads to failure at a lower externally applied load and lower bolt fatigue life. There are several models in literature [33, 3, 4, 73, 11, 108, 102] that are based on various assumed mechanisms which cause the prying forces.

The current model used in the LRFD Specification is based on the model described by Kulak et al. [63]. The formulation is based on the moment and force equilibrium of the forces in the angle leg or T-stub flange. The ultimate bolt capacity is defined using a tributary width of the connected angle leg or flange. The model considers three failure mechanisms at which the prying loads are calculated: a flange mechanism with hinges at the face of the T-stub stem and under the bolt head; a mixed mechanism with a single hinge at the T-stub leg; and bolt tension fracture. The prying load is assumed to act as a point load at the angle leg or flange tip.

Prying is dealt with similarly in the Eurocode. The key difference is the assumed hinge locations and for clip angles the effect of the gap (setback) on the location of the hinge

at the angle stem is recognized. Unlike the LRFD Specification the effect of the bolt hole is ignored and gross area of the angle leg or flange is used for both hinges. The hinge location is shifted away from the angle stem face by 80% of the fillet radius recognizing the stiffening effect of the fillet and k-zone, and the centerline of the bolts are used instead of the location under the bolt head as done in the Kulak model. When modified for calculating the prying force for a clip angles the hinge is assumed to form at the angle stem when the gap (setback) greater than 40% of the thickness of the angle thickness. The modification made in the Eurocode for some cases results in a lower capacity when compared to the AISC-LRFD model [102].

Swanson and Gao [102] proposed a combination of the LRFD Specification and the Eurocode models by using the parameter definitions of the Eurocode within the LRFD Specification equations. The proposed model was compared against experimental results which resulting in more accurate predictions. The LRFD model yielded unconservative capacities by average of about 13% and the Eurocode was conservative by about 15%. The experimental results used for comparison were of heavy clip angles all thicker than typical thicknesses used in practice and all had a setback greater than 40% of the angle thickness limit the generalization of these conclusions.

2.4 Micromechanical Based Failure Models

Studies which go beyond traditional fracture and fatigue methods and relate structural component failure directly to the material micromechanical level failure mechanisms using void nucleation and coalescence in structural steel have been based on the work of Rice [84] and Tracey [111] whom related the growth rate of a void in a ductile medium. The mechanism of void growth leading to ductile fracture was presented by Hancock and Mackenzie [47], and Panontin and Sheppard [77].

Gurson [46] and later Tvergaard [114] described a yield function which models material softening due to progressive void growth commonly referred as the Gurson-Tvergaard

(GT) constitutive model. Researchers have incorporated the GT model within computational cells embedded in finite elements to model crack propagation through element removal (element extinction). Xin and Shin [121] presented the framework to implement such ductile failure in large numerical analyses. Ruggieri, Panontin, and Dodds [89] investigated the use of the GT model and crack propagation modeling to compute J-curves for metals.

More recently Kanvide and Deierlein [54], calibrated failure criteria based on the void growth mechanism, namely the Void Growth Method (VGM) and the Stress Modified Critical Strain (SMCS) using round smooth notched tensile specimens made from several grades of structural steels. They demonstrated the practical implementation of these methods to predict the failure of several types of geometry and furthermore extended the failure criteria to cyclically loaded specimens.

CHAPTER 3

A REFINED NUMERICAL MODELING APPROACH FOR BOLTED CONNECTIONS

In this chapter a refined three dimensional (3D) finite element modeling approach for bolted connections which captures the interaction between connection components is presented and verified with tests followed by sensitivity studies on various modeling parameters to the analytical model response. The modeling approach is general and capable of modeling various types of geometries of bolted connections by using parametric meshing techniques. A calibration method for the pretension of the bolts is also presented for cases where the software used to model connections lack to functionality to impose pretension across a defined cross section. In this method, parametric solutions are first generated separately for a single bolt clamping a semi-infinite plate. These solutions are used to specify initial pretension values for the bolts in the full connection. The correct pretension values can then be examined and corrected in the full connection model to achieve accurate final pretension values. It is shown in this study that the nonlinear response of the bolted connections can be sensitive to the level of pretension, thus correctly modeling pretension is important to capture the true mechanisms transferring force through the connection members.

3.1 Proposed Modeling Approach

Displacement-based 3D finite element models are used to predict the behavior of bolted connections. The geometry and mesh is established through a parametric mesh generator program. The general purpose nonlinear finite element software ABAQUS [1] is used to carry out the 3D finite element analysis. A large number of parametric analyses are performed to study connection model response sensitivity to various parameters using experi-

mental data from Azizinamini [17]. The parametric investigation demonstrates the capability of the finite element models to efficiently generate connection responses based on experimental data.

Each analytical part in the connection model is created and assembled using the mesh generating software, TrueGrid [112]. The process of creating a mesh and geometry is separated within TrueGrid. Making a part is analogous to sculpting. A meshed block is defined using parameters for both geometry and mesh density. Excess volumes within the block are removed to match the general shape of the part. Portions of the resulting shape are projected to reference surfaces defined separately which accurately controls the geometry of the resulting model. Both the meshed block and the surface geometry are parametric allowing parametric modeling. Important features such as holes, fillets, surface definitions for contact and node definitions for boundary conditions are also included in the part definition which follows any parametric changes.

Different structural shapes are generated using the structured programming approach of TrueGrid unlike traditional preprocessors which are controlled by user interaction with through the graphical user interphase which limits a parametric structure. A program library of parametric structural shapes and bolts is generated as a part of this study. Generation of the specific components of the connection and the assembly of these components to form the full connection model is all executed within TrueGrid. The versatility of this approach allows for a wide range of parametric studies to be conducted without time-consuming preprocessing. In the following sections, this approach is applied to model tested connections for evaluation and verification.

3.1.1 Previous Experimental Work

The test setup by Azizinamini [17] is illustrated in Figure 3.1. It consisted of a pair of beams connected to a central stub column via top and seat angles bolted to the flanges of

the beam and column. The double web angles were bolted to both the beam web and column flanges using A325 high strength bolts and nuts and hardened washers. The ends of the beams were pin supported while an actuator loaded the central stub column.

Azizinamini computed the moment-rotation responses using the force-displacement data acquired from the tests. The objective of these tests was to investigate the effects of different geometric parameters on the connection response. These parameters included the angle thickness (t), angle lengths (L and L_c), bolt size, bolt spacing (p) and the bolt gage on the column leg of the connection angles (g). Two test configurations were used: W14x38 and W8x21 beams tested with W12x96 and W12x58 column-stub respectively. Double web angles were connected with three bolts in the first test setup (W14x38 beam). The second test setup (W8x21 beam) included two bolts through the double web angles. The column used in the experiments had relatively thick flanges so little or no plastic deformation was observed in the column and beams. Hence, the column and beams were reused throughout the tests. The test configurations are described in Table 3.1.

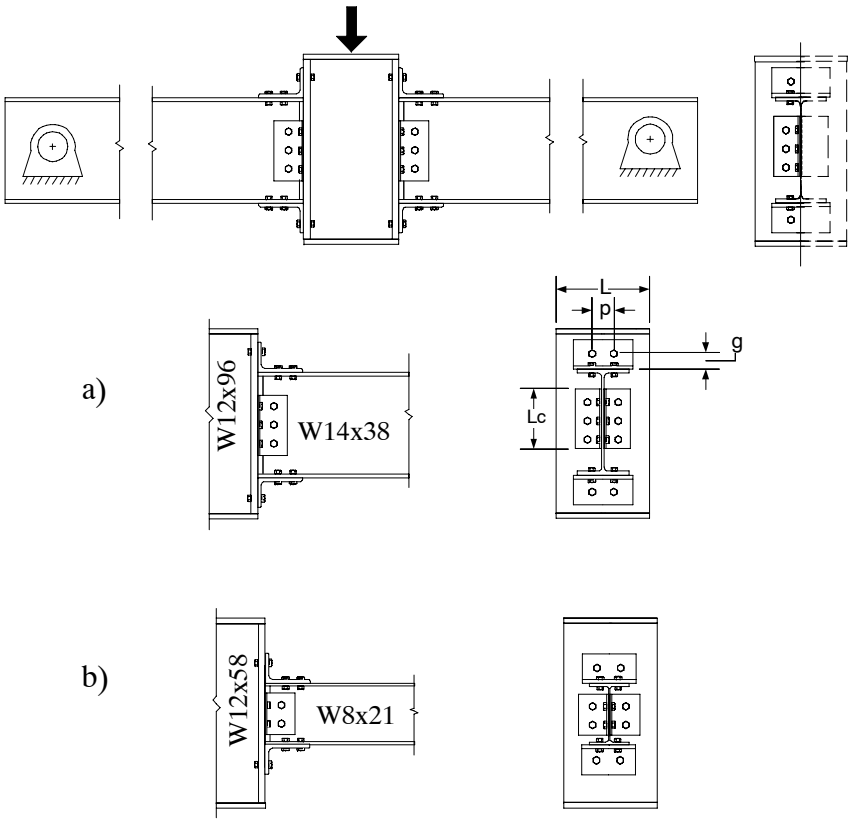


Figure 3.1 Schematic representation of the connection test set-up used by Azizinamini et. al. (1985, 1989); (a) 14S and (b) 8S type configuration.

Table 3.1. Schedule of test specimens (Azizinamini [17])								
			Top and Bottom Flange Angles				Web Angles	
Specimen Number	Bolt Size (in. dia.)	Beam Section	Angle	Length (in.)	Gauge in Leg on Column Flange "g" (in.)	Bolt Spacing on Column Flange "p" (in.)	Angle	Length (in.)
14S1	3/4	W14x38	L6x4x3/8	8	2-1/2	5-1/2	2L4x3-1/2x1/4	8-1/2
14S2	3/4	W14x38	L6x4x1/2	8	2-1/2	5-1/2	2L4x3-1/2x1/4	8-1/2
14S3	3/4	W14x38	L6x4x3/8	8	2-1/2	5-1/2	2L4x3-1/2x1/4	5-1/2*
14S4	3/4	W14x38	L6x4x3/8	8	2-1/2	5-1/2	2L4x3-1/2x3/8	8-1/2
14S5	7/8	W14x38	L6x4x3/8	8	2-1/2	5-1/2	2L4x3-1/2x1/4	8-1/2
14S6	7/8	W14x38	L6x4x1/2	8	2-1/2	5-1/2	2L4x3-1/2x1/4	8-1/2
14S8	7/8	W14x38	L6x4x5/8	8	2-1/2	5-1/2	2L4x3-1/2x1/4	8-1/2
8S1	3/4	W8x21	L6x3-1/2x5/16	6	2	3-1/2	2L4x3-1/2x1/4	5-1/2
8S2	3/4	W8x21	L6x3-1/2x3/8	6	2	3-1/2	2L4x3-1/2x1/4	5-1/2
8S3	3/4	W8x21	L6x3-1/2x5/16	8	2	3-1/2	2L4x3-1/2x1/4	5-1/2
8S4	3/4	W8x21	L6x6x3/8	6	4-1/2	3-1/2	2L4x3-1/2x1/4	5-1/2
8S5	3/4	W8x21	L6x4x3/8	8	2-1/2	5-1/2	2L4x3-1/2x1/4	5-1/2
8S6	3/4	W8x21	L6x4x5/16	6	2-1/2	3-1/2	2L4x3-1/2x1/4	5-1/2
8S7	3/4	W8x21	L6x4x3/8	6	2-1/2	3-1/2	2L4x3-1/2x1/4	5-1/2
8S8	7/8	W8x21	L6x3-1/2x5/16	6	2	3-1/2	2L4x3-1/2x1/4	5-1/2
8S9	7/8	W8x21	L6x3-1/2x3/8	6	2	3-1/2	2L4x3-1/2x1/4	5-1/2
8S10	7/8	W8x21	L6x3-1/2x1/2	6	2	3-1/2	2L4x3-1/2x1/4	5-1/2
* Two bolts at 3 inch spacing, mounted on top two holes on stub column.								

3.1.2 Finite Element Models

Three-dimensional refined finite element models are used to generate the effective moment-rotation response of the bolted connections tested by Azizinamini [17]. This is done in order to critically examine the ability of the proposed 3D modeling approach to capture the overall experimental response of bolted connections.

A representative 3D FE model of a top and bottom seat angle connection with double web angles is shown in Fig. 3.2. Half of the connection is modeled by using symmetry about

the plane of the web. Only the flange of the column is modeled assuming that it is a sufficiently rigid due to the stiffeners used in the column. The hex bolt heads are modeled as cylinders, taking in to account the washers by averaging the diameters. The bolt holes are assumed to be standard size bolt holes and modeled 1/16 in. larger than the nominal bolt diameter.

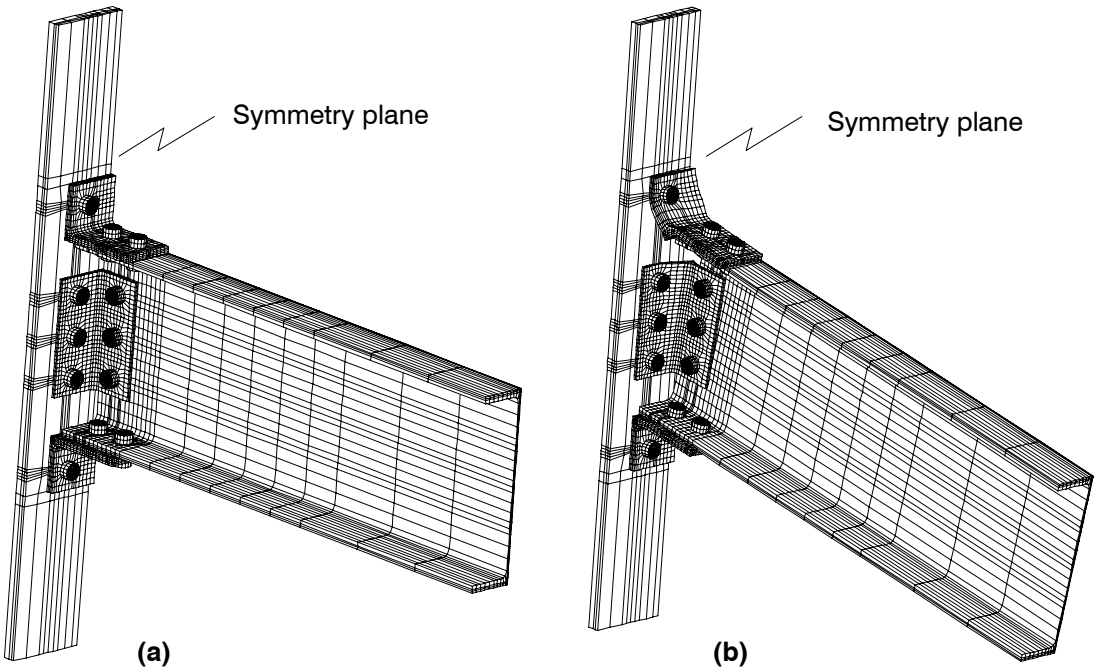


Figure 3.2 3D finite element model of bolted top and bottom seat angle connection web angle tested by Azizinamini, shown (a) unloaded and (b) loaded.

The connection model is discretized using C3D8I eight-node brick elements with full integration and incompatible modes [1]. The performance of this continuum element has been compared with other formulations by Bursi and Jaspart [24] and has shown to give better results for bending-dominated problems with relatively small plate thickness. Linear continuum elements are chosen due to the convergence issues when using quadratic elements such as the C3D20 in conjunction with solutions involving contact constraints in ABAQUS [1]. C3D6 six-node wedge elements are also used to model the core of the bolts. Wanzek and Gebbeken [117] suggest using a minimum of three elements through the thickness of

plates in bending to capture through-thickness deformation, therefore at least three elements through the thickness in the beam and columns are used. This is particularly important in capturing the clamping of the connection members due to bolt pretension. The connection model includes five structural components and twelve bolts in the case of the 14S type test configurations with a total of 17,762 continuum elements. Whereas, in the case of the 8S models the five structural components and ten bolts are composed of 16,296 continuum elements.

The material uniaxial stress-strain response for the FE models is taken from coupon tests performed by Azizinamini [17]. A trilinear stress-strain curve is used to define the steel material response as shown in Fig. 3.3 with a modulus of elasticity of 30,000 ksi, 40.1 ksi yield stress, and a Poisson's ratio of 0.3. The bolts are modeled as elastic components in order to ease convergence problems that are occasionally encountered due to severe localized plastic strains occurring at the edge of the bolt heads. Little or no effect on the overall connection response is observed when compared to results from the models with elastic-plastic bolt material.

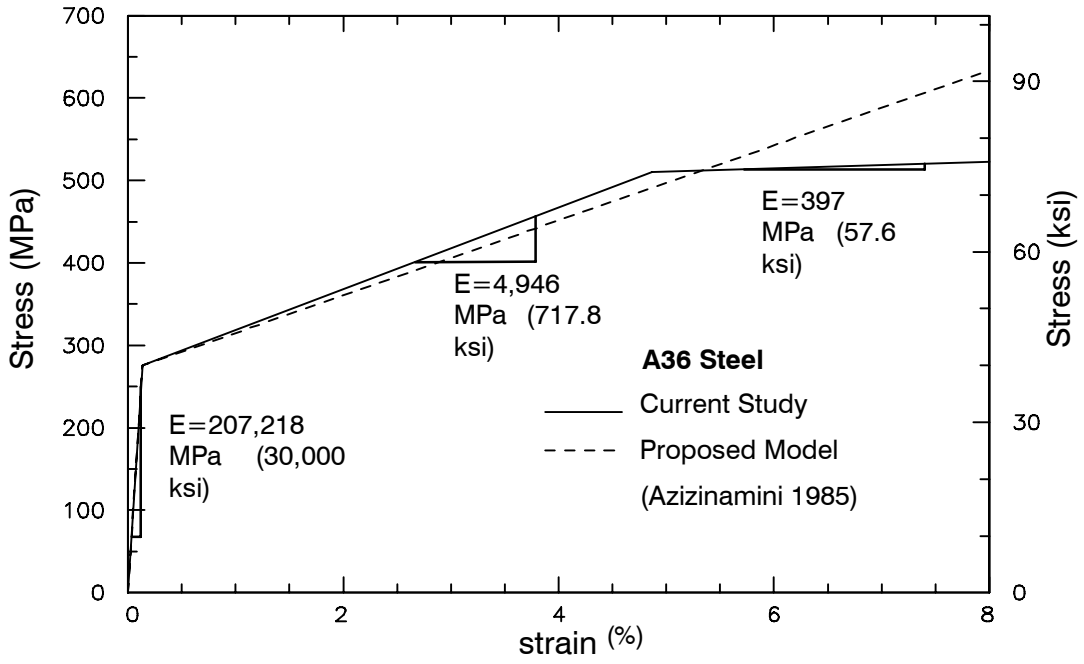


Figure 3.3 3D uniaxial stress-strain curve.

The nodes at the free end of the beam are constrained to a master node to which an external displacement is applied while the nodes along the length of the column flange at the web are fixed. This loading is consistent with what is transmitted to the end of the beam through the pins as shown in Figure 3.1. The force-displacement response of the connection is converted to the moment-rotation response using the simple relations: $M = F \cdot \ell$, $\phi = \arctan(\Delta/\ell)$; where M, is the moment, ϕ is the rotation of the connection, F is the force, ℓ is the length of the beam, and Δ is the tip displacement of the beam.

Contact between all parts is explicitly modeled. Contact between the bolt head and components are defined to achieve pretension and also between the bolt shank and bolt holes to capture bolt bearing in the event slippage occurs. The bolts clamping mechanism enables force translation by friction between the connection components to resist the overall applied forces which has a important effect on the connection response. The contact surfaces are defined and paired through the mesh generator program including areas anticipated to be in contact due to slippage. The general contact formulation used in ABAQUS involves a "mas-

ter-slave" type algorithm [1]. This formulation recognizes the surfaces that are in contact and imposes constraints on the nodes of the slave surface such that they do not penetrate the master surface and in proportion to normal forces inplane frictional forces are developed.

3.1.3 Bolt Pretension Modeling

Bolt pretension and the resulting friction are critical parameters to transfer forces in bolted connections. Forces are transferred through friction due to clamping between the members caused by the pretensioning of the bolts. No explicit information on how much pretension was applied to the bolts during the experimental study as well as the condition of the faying surfaces was reported. Azizinamini [17] reported tightening the bolts with an air wrench using the turn-of-the-nut method therefore approximate common design values are used to model bolt pretension: 30 kips for the 3/4 in and 40 kips for the 7/8 in diameter A325 bolts specified in the AISC LRFD Specification. A friction coefficient of 0.33 is used assuming a Class A faying surface [115, 63, 5].

Some finite element software have pretensioning schemes readily available. In general, these schemes achieve pretension by subjecting a reference cross-section surface for continuum elements or a node in the case beam elements are used, to a tensile force or displacement while keeping the nodes of the opposing surface of node(s) fixed [1]. These forces or displacements applied on the pretension cross section are applied through an independently defined master node through boundary conditions. The pretension is maintained by fixing the reference master node in subsequent analysis steps.

For software lacking the functionality to directly impose pretension a general modeling approach can be applied where the bolt pretension is modeled in two steps. The first step employs bolts with shaft lengths shorter by a predetermined amount compared to the total thickness of the connected plates. Both bolt heads initially overlapping with the plates equally when both bolt heads are displaced enough to clear the overlap. In the second step, the

contact between the displaced bolt heads and respective surfaces are activated and the imposed displacement is released, thus forming the desired clamping between the parts via the bolt.

The overall stiffness “seen” by a bolt is affected by several factors, such as the deformation of the connected members, the bolt heads, interaction between the bolts and boundary conditions among others. Therefore it is not sufficient to use the simple elastic force-displacement relation for the bolt shaft to determine the initial amount of length to be shortened that would induce the desired pretension value in the bolts in the method described above. A method to predict this amount is introduced can was presented by Citipitioglu et al. [30]. In this method, separate models of a plate with a single headed bolt are created to determine the bolt force-displacement relation for different plate thickness. The contact forces between the bolt head and the plate are computed by displacing the bottom of the bolt shaft gives the force-displacement relationship needed to determine the length at which the shaft needs to displace to achieve the desired pretension.

This is a close approximation of the actual pretension force in the connection model that simplifies the numerical process, which would otherwise require separate two step FE analyses for each data point on the curve which is otherwise obtained by the single step approach described above. Each curve obtained by the separate model of the bolt pulled against a semi-infinite plate is plotted for a certain total plate thickness of two plates connected by a particular size bolt as shown in Figure 3.4. For each bolt size a new group of curves must be created. The bolt geometry is the same used the actual connection model.

The calibration bolt pretension curves computed are doubly interpolated to extract the correct pre-displacement (bolt shortening) for each bolt in the connection as a function of the total plate thickness and the desired pretension force. The targeted pretension is verified in the actual full connection model. In the case the correct pretension is not attained, a ’first order’ correction is imposed on the displacement value as a function of the force dif-

ference (pretension error) that has been found. The process is schematically illustrated in Figure 3.5.

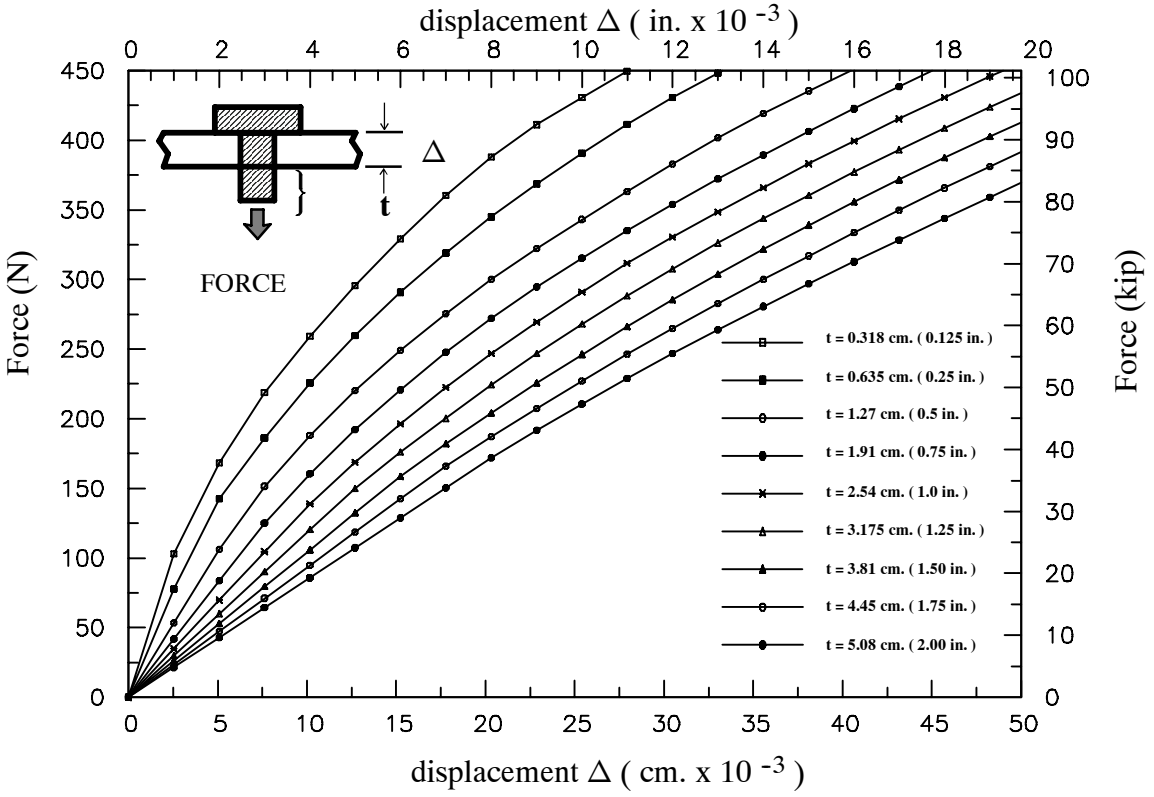


Figure 3.4 Bolt pretension calibration curves for 3/4 in diameter bolts used in the FE model.

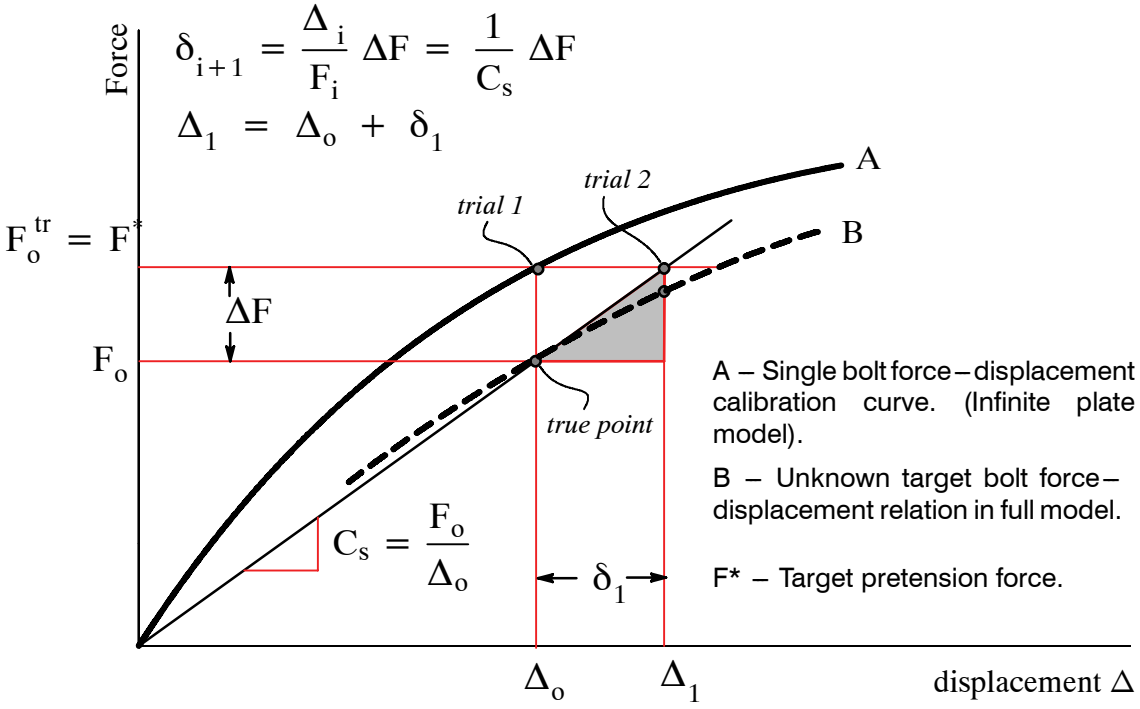


Figure 3.5. Schematic representation of the proposed method for calibrating bolt pretension.

3.2 Modeling Verification

The connection responses reported by Azizinamini are presented in comparison with the FE model analyses and together in Figures 3.6 and 3.7 for the 14S and 8S specimens, respectively. Azizinamini [17] reports reduced moments during the testing of specimen 14S2 shown in Figure 3.6 (b) while slippage in the bolts occur until the bolt begin to bear on to the plate; along with an abnormality in the initial stiffness in test 8S2 shown in Figure 3.7 (b). The initial stiffness in general is predicted well by the proposed models. Slippage is observed in the 14S test specimens due to the higher flange forces involved which causes abrupt decreases in the stiffness. The results demonstrate the general performance of the analytical models in predicting the response of a bolted connection where so many parts interact to affect the overall connection response.

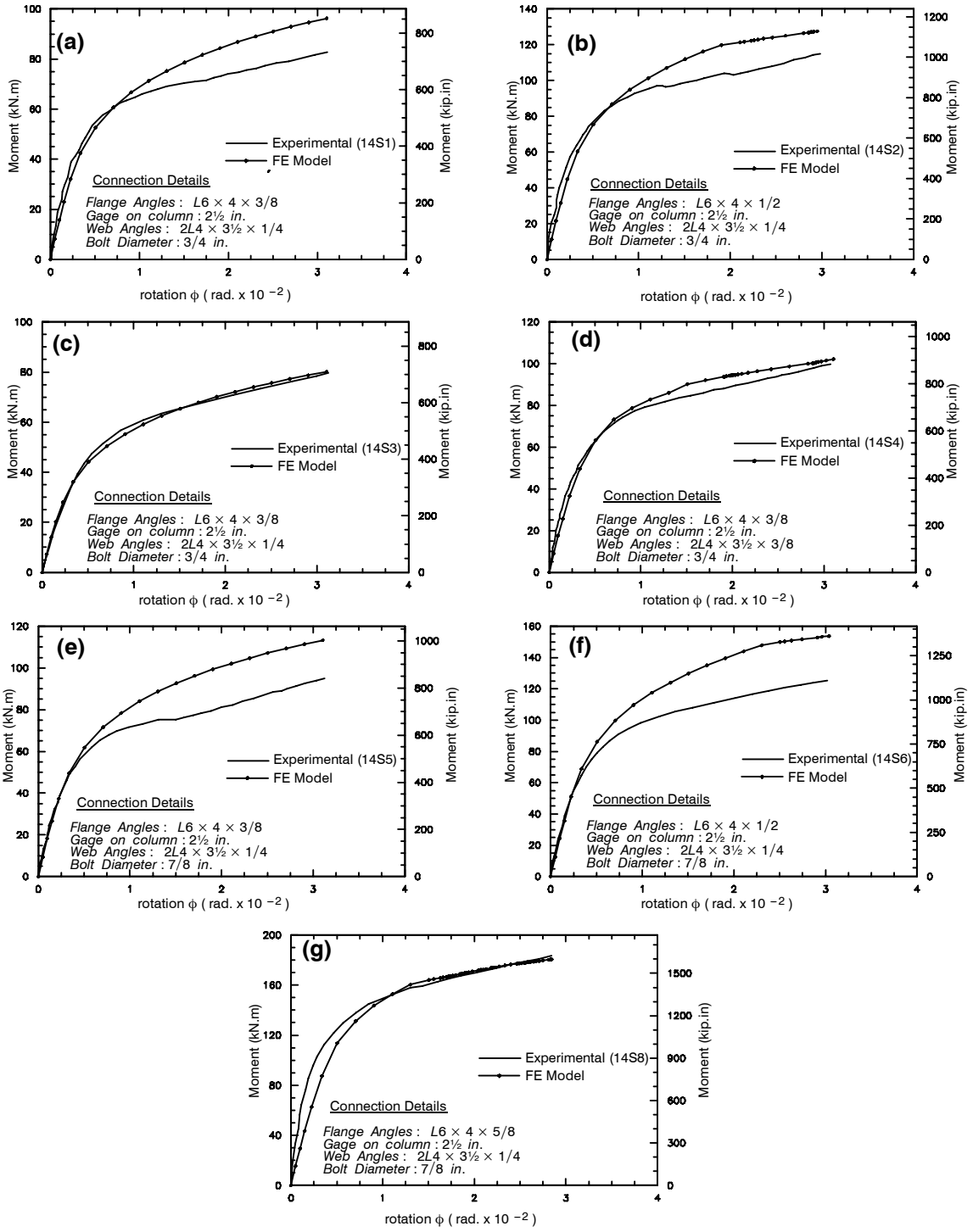


Figure 3.6 Experimental and analytical moment-rotation response comparison of 14S connection specimens tested by Azizinamini [17].

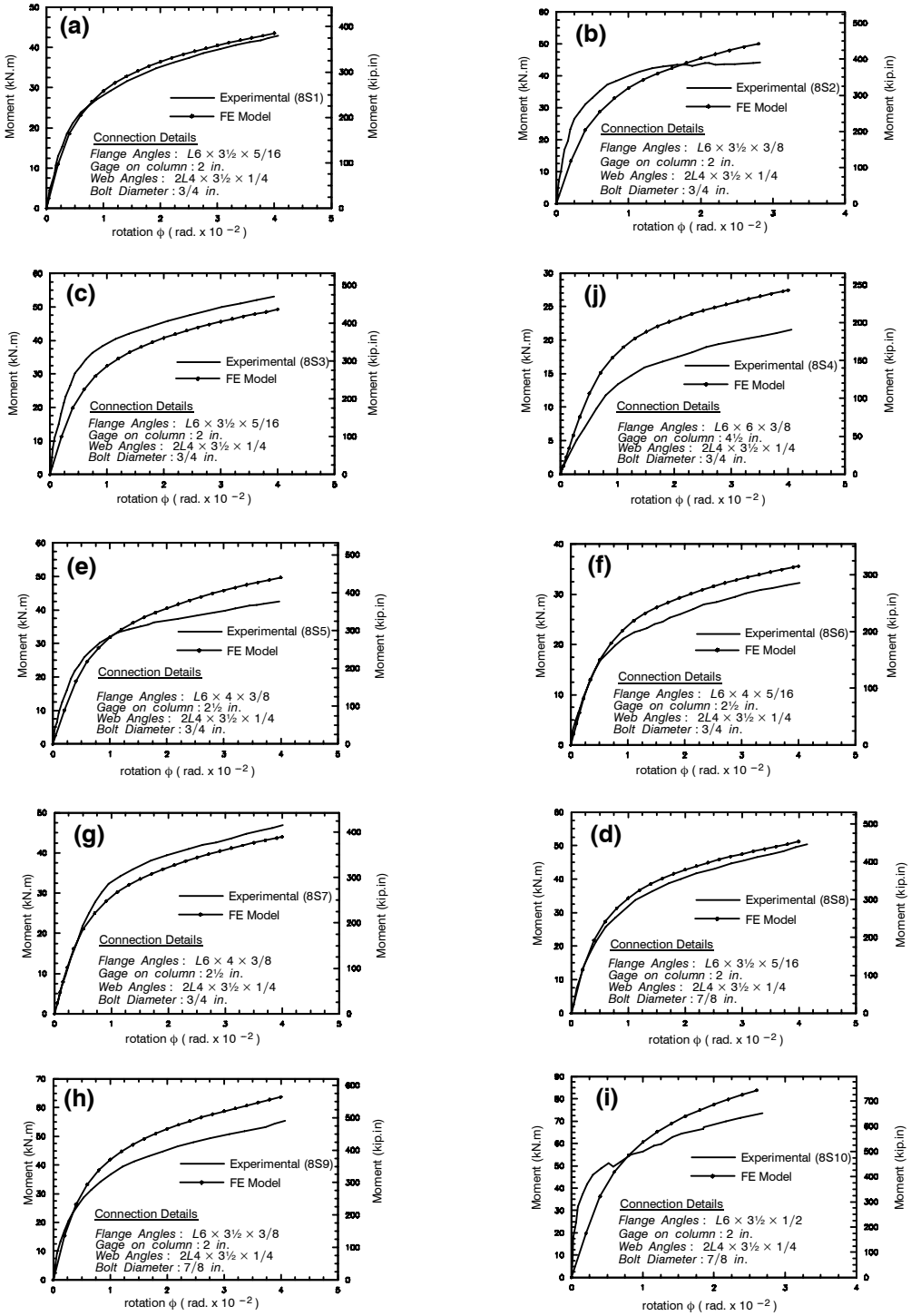


Figure 3.7 Experimental and analytical moment-rotation response comparison of 8S connection specimens tested by Azizinamini [17].

The highly nonlinear behavior observed in these connections is related to several factors: friction, bolt pretension, material properties (strain hardening), connection geometry and topography which are not easy to accurately quantify variations in an idealized analytical model for a specific connection test.

3.3 Sensitivity Studies

Using the capability of the predicting bolted connection response using the finite element modeling approach discussed above, it is possible to extend the experimental study to investigate various parameters which effect connection response. A parametric study is presented here to evaluate the effect of bolt pretension, friction, and bolt alignment. The 14S2 and 8S1 tests are used because they contrast in terms of beam depth and beam flange angle. The 14S2 connection has a deeper beam with a thicker, thus stiffer beam flange angle which provides more restraint in the connection compared to the 8S1 connection.

3.3.1 Effect of Friction on Connection Response

The models developed in the previous sections are used to study the effect of friction on the overall response of bolted connections. Two connection configurations are compared by varying the friction coefficient from 0.25 to 0.5 while keeping the bolt pretension value constant in all cases. In the 14S2 connection analysis a friction coefficient value of 0.255 is used instead of 0.25 to capture the experimental response at the lower bound of the friction range. The variation in the connection response due to the change in the friction coefficient is shown as the shaded region in Figs. 3.8 and 3.9. Comparing the two figures, the variation in the response is about 20 times higher in the 14S2 configuration than in the other case. This shows that friction and slip has more effect on the response of connections with higher moments and stiffer connecting elements forces more abrupt slippage occur between the connection and and beam components.

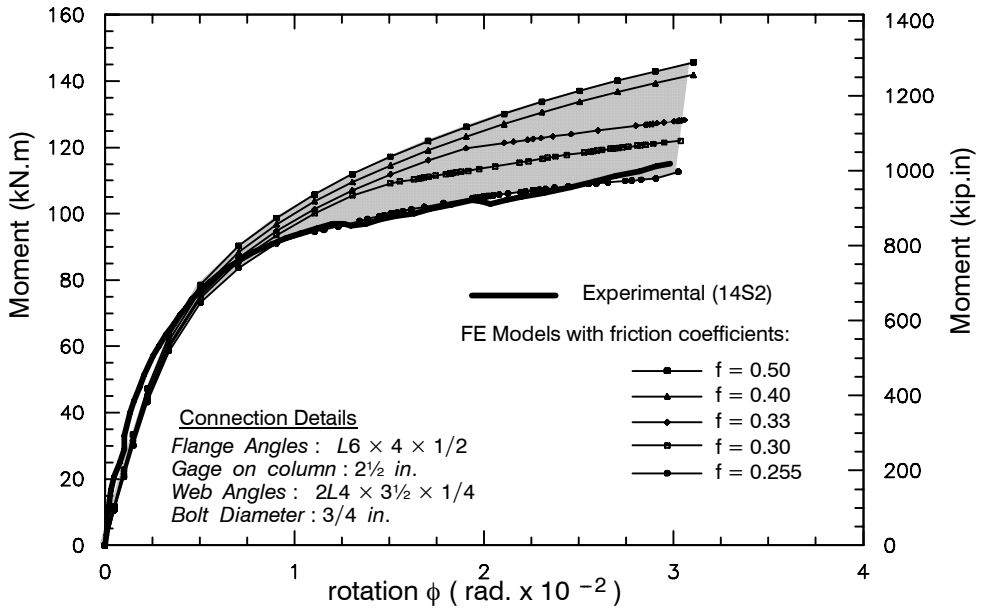


Figure 3.8 Moment-rotation response of 14S2 connections with varying friction coefficients.

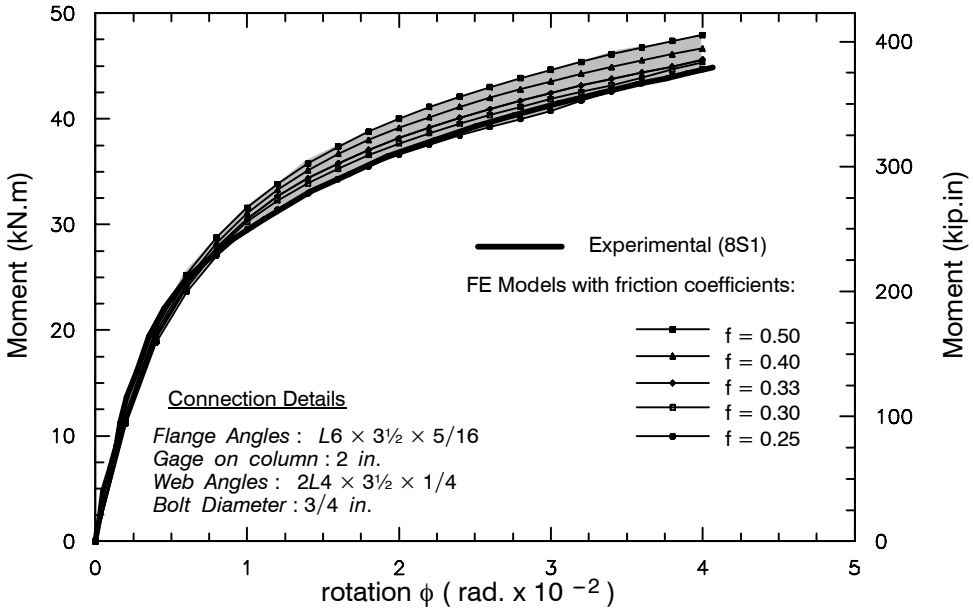


Figure 3.9 Moment-rotation response of 8S1 connections with varying contact friction coefficients.

3.3.2 Effect of Bolt Pretension on Connection Response

The pretension value of the bolts is found to have a similar effect on the response of the bolted connections as was observed with friction. Figure 3.10 shows the result of a parametric study using the 14S2 connection while varying the pretension value of the bolts from 25 kips to 40 kips while keeping friction coefficient constant at 0.33 in all these cases. Results indicate that the effect of pretension is important and can vary the ultimate moment-rotation by 25 percent specially in cases where slippage between the components is forced.

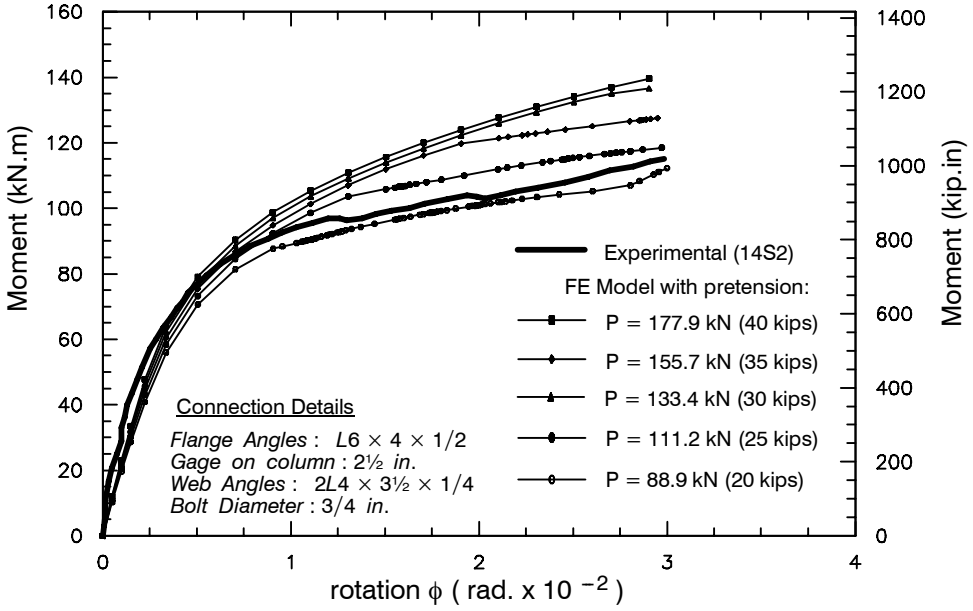


Figure 3.10 Moment-rotation response of 14S2 connections with varying bolt pretension

3.3.3 Effect of Bolt Alignment on Connection Response

The effect of bolt alignment and the idealization of the modeling bolts perfectly centered to their respective holes in the connections is studied in this section. Bolt holes are typically fabricated 1/16 in larger than the nominal bolt diameter per code [5] to accommodate construction tolerance and allow room for the bolts to be placed during connection assembly. Bolts in the connection models are placed centered to the hole where in reality this is not the

case. The force-displacement response of the connections with the ideal centered bolts is compared with models where the bolts are placed in four different positions with the bolts initially in bearing with the angle as shown in Figure 3.11. For this study two similar bolted angle components with different gage lengths, 2 and 3 inches, are analyzed. The angles are 1/2 in thick and connected with 3/4 in. diameter bolts. On the pulled leg the angle is connected with 2 bolts with a typical 3 in gage to a pull plate representing a beam flange.

The first comparison case has an initial placement where the bolts on the pull leg of the angle is initially in bearing with the bolt hole side in the pull direction, while in the second case both are in bearing in the opposite side in the direction of loading. In the third case the bolts are initially in bearing away from each other, and finally in the fourth case the bolts are initially in bearing with the bolt hole side towards each other in the direction of loading.

For both connections, the initial placement of the bolts do not have a great impact on the connection initial stiffness. This is consistent with the findings presented in following section where during the initial loading of the connection the forces are transferred between the components through clamping and the effect of bolt bearing come into effect later on with higher loads.

The first connection shown in Figure 3.11 (a) is stiffer in response due to its lower tension bolt gage which leads to abrupt slippage for the original “centered bolt” case and the first bolt placement case where both bolts are place away from the hole edge they would bear to after slippage occurs. Due to the initial bearing in the other cases this abrupt slipping is not observed. In the second connection configuration shown in Figure 3.11 (b) all cases but the fourth bolt placement case has about the same nonlinear response with no abrupt slippage observed. This difference in the response in the fourth case merits further study, but in connections with more bolts in the tension leg of the connection component it can be expected that the impact of the connection to be less and even less likely to have such a placement of bolts when it is a random event.

The variation of the bolt alignment does not drastically change the overall connection response, with the exception of the second connections fourth case, due the existence of the clamping force which is not affected by the initial bolt alignment. More cases would need to be checked for a wider range of connection configurations to assess the effect of bolt placement on both connection response and capacity.

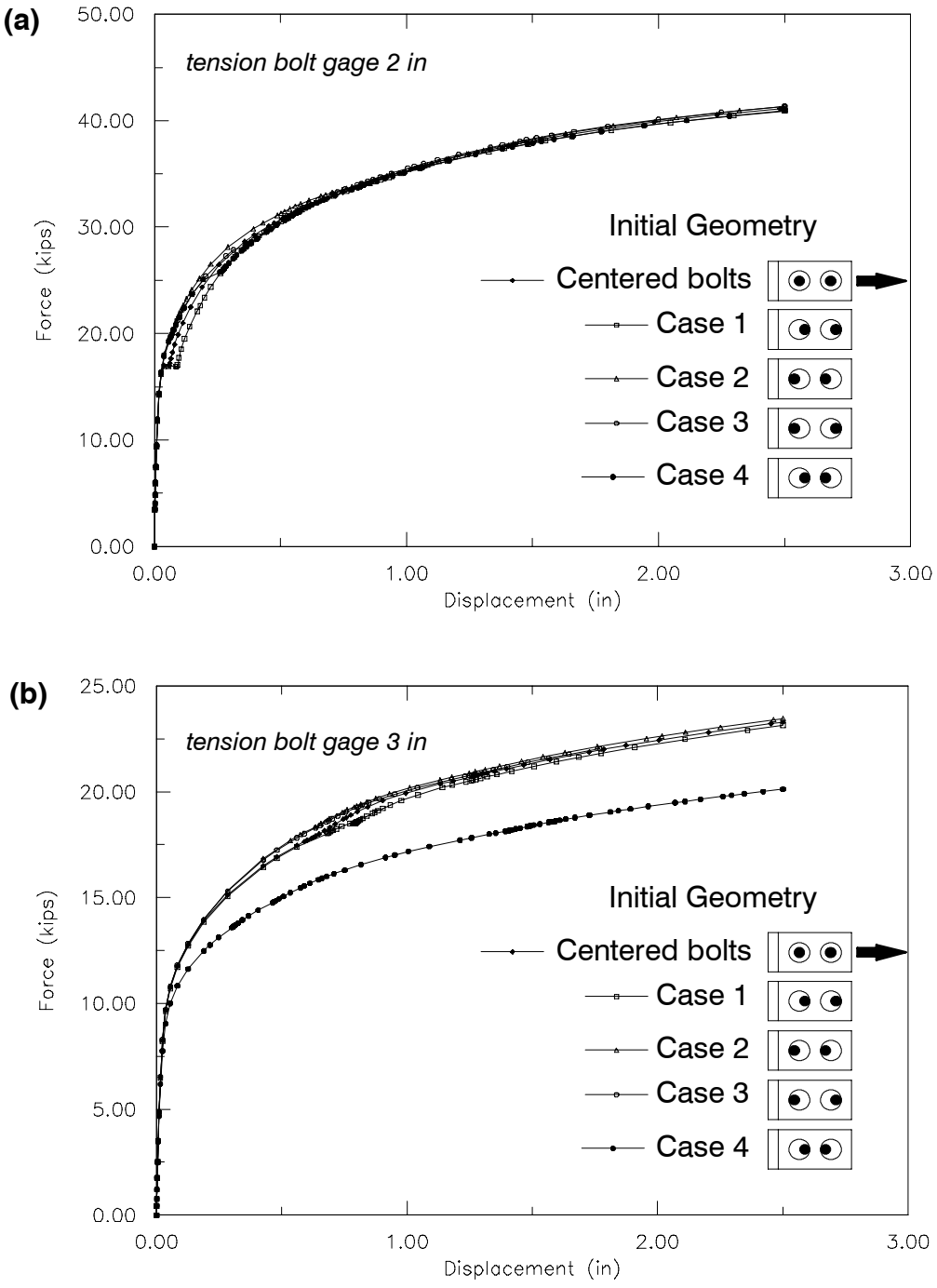


Figure 3.11 Connection force-displacement response for bolted angle connection components with (a) 2 in and (b) 3 in tension bolt gage with different initial placement cases for bolts on the angle pull leg.

3.4 Mechanism Studies

3.4.1 Bolted Angle Force Transfer Mechanisms

The proposed refined 3D modeling approach makes it possible to critically interrogate the force transfer mechanisms of bolted connections. A Fortran code was developed to extract data directly from the FE results in order to gain further insight of connection behavior. In this section as used in the previous section, two similar bolted angle components with different gage lengths, 2 and 3 inches, are analyzed. The angles are 1/2 in thick and connected with 3/4 in. diameter bolts. On the pulled leg the angle is connected with 2 bolts with a typical 3 in gage to a pull plate representing a beam flange. Pull test simulations are performed with two geometries in order to examine the force transfer mechanisms under different conditions with bolt bearing and slip. The angle with the lower tension bolt gage will have a greater stiffeners which more prominently forces slippage between the angle member and the pull plate.

The applied force (F) to the connections through the pull plate and the force components of the force transfer between the angle and the pull plate for the two connection configurations are plotted against the connection displacement in Figures 3.12 (a) and (b). The shear force (Fs) is transferred by traction between the plate and the angle due to clamping imposed by bolt pretension. Forces Fb1 and Fb2 result from bearing between the bolts and the holes when slippage occurs.

In the first case (Fig. 3.12a), with the smaller tension bolt gage the angle is relatively stiffer. This leads to slipping between the angle and pull plate to occur earlier in the loading seen by the abrupt change in the stiffness on the force-displacement curve. The slipping causes the bolts to bear on the pull plate and the forces are carried almost equally by both the plate traction and bolt bearing. In the second case (Fig. 3.12b), with the larger tension bolt gage, slipping occurs later in the loading around when axial displacement reaches 0.6

inches. Prior to this point, the external force is transferred solely by plate traction (Fs) and the slipping occurs gradually which causes the bolts to engage and take over part of the resisting force later on in the loading. As the force is increased and the bolts begin to bear on the pull plate the first bolt close to the angle leg tip takes on an increasing amount of bearing load compared to the other bolt.

Next, the force transfer mechanisms into the angle component is presented. The magnitude and force definitions are depicted in Figures 3.13 (a) and (b) for both connection cases. In addition to the plate traction (Fs) and bolt bearing (Fb1 and Fb2) onto the angle there are also traction forces between the bolt heads and the angle (Fh1 and Fh2). For the first connection in Figure 3.13 (a), the early slip is causes traction between the bolt heads and the angle. The bolts go into bearing at around 0.7 inches of connection displacement. After this point the traction (Fh2) begins to gradually decrease as the bearing loads level out. As for the second case shown in Figure 3.13 (b) the force is resisted by the plate traction (Fs) alone up to 0.7 inches of displacement. After then the bolt head traction (Fh1 and Fh2) begins to pick up some of the load. Both bolts apparently do not bear on the angle no force is transferred by this means in this case. It is interesting to see how relatively small changes in the connection geometry has an influence on the load transfer mechanism in the connection.

The axial forces in the bolts (Fb1 and Fb2) and the total clamping force (Fc) on the pulled angle leg for the two cases are shown in Figure 3.14. In contrast to the previous figures, which show quite different force transfer mechanisms for the two connection configurations, here we see the two connections to be quite similar. The axial force in the bolt closer to the angle knee (Fb2) gradually increases while the force in the other bolt (Fb1) slightly decreases. The increase in Fb2 in due to the deformation in the angle where the angle heel is forced upwards to accommodate the angle displacement. The total clamping force (Fc) between the pull plate and angle is fairly constant.

The effect of prying on the tension bolts which is an important mechanism studied in detail in Chapters 5 and 7, is shown in Figure 3.15. Prying increases the axial load on the tension bolt (Fb) in addition to the external loads applied to the connection due to the bearing of the outer end of the angle leg. Prying forces must be taken into consideration as the additional load on the bolt may cause the bolt to fail prematurely. For the two cases the bolt force (Fb) and the contact force (Q) between the angle and reaction plate which is representative of a column flange, are in equilibrium at the prescribed pretension. The contact force initially begins to drop due to separation between the two surfaces. After deformation occurs in the angle leg the contact force settle to almost a constant value for both cases (a) and (b). This contact force (Q) is the additional force on the bolt namely the prying force which causes the deviation seen in the bolt force vs. applied force plot in Figs. 3.16 (a) and (b).

In the absence of prying forces the bolt force equals the pretension value. The bolt force than increases 5 to 10% for practical cases depending on the ratio of the stiffness of the bolt and angle plate [63] until complete separation occurs where ideally the bolt force overcome the pretension and becomes equal to the applied force. The ideal separation point is where the two dash lines intersection in Figs. 3.16 (a) and (b). However, due to the effect of the prying force, the curve deviates from this idealized dashed curve. The difference between the curve and the idealized curve is defined as the prying force.

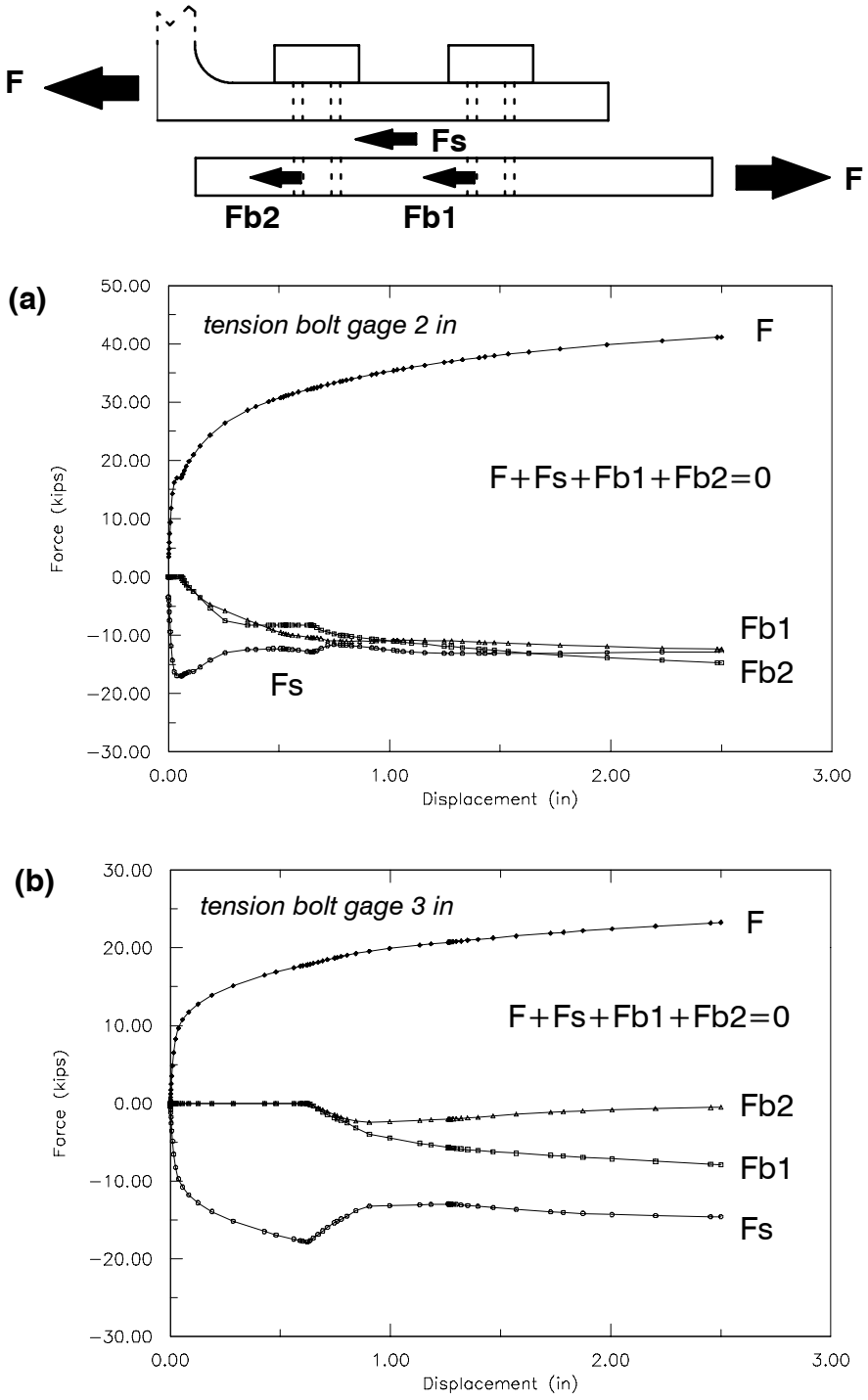


Figure 3.12 Force (F) transfer mechanism through the pulling plate to the angle by means of the plate traction (Fs) due to the pretensioned bolts clamping and bolt bearing (Fb) plotted against applied displacement for the case angle with (a) 2 in and (b) 3 in tension bolt gage.

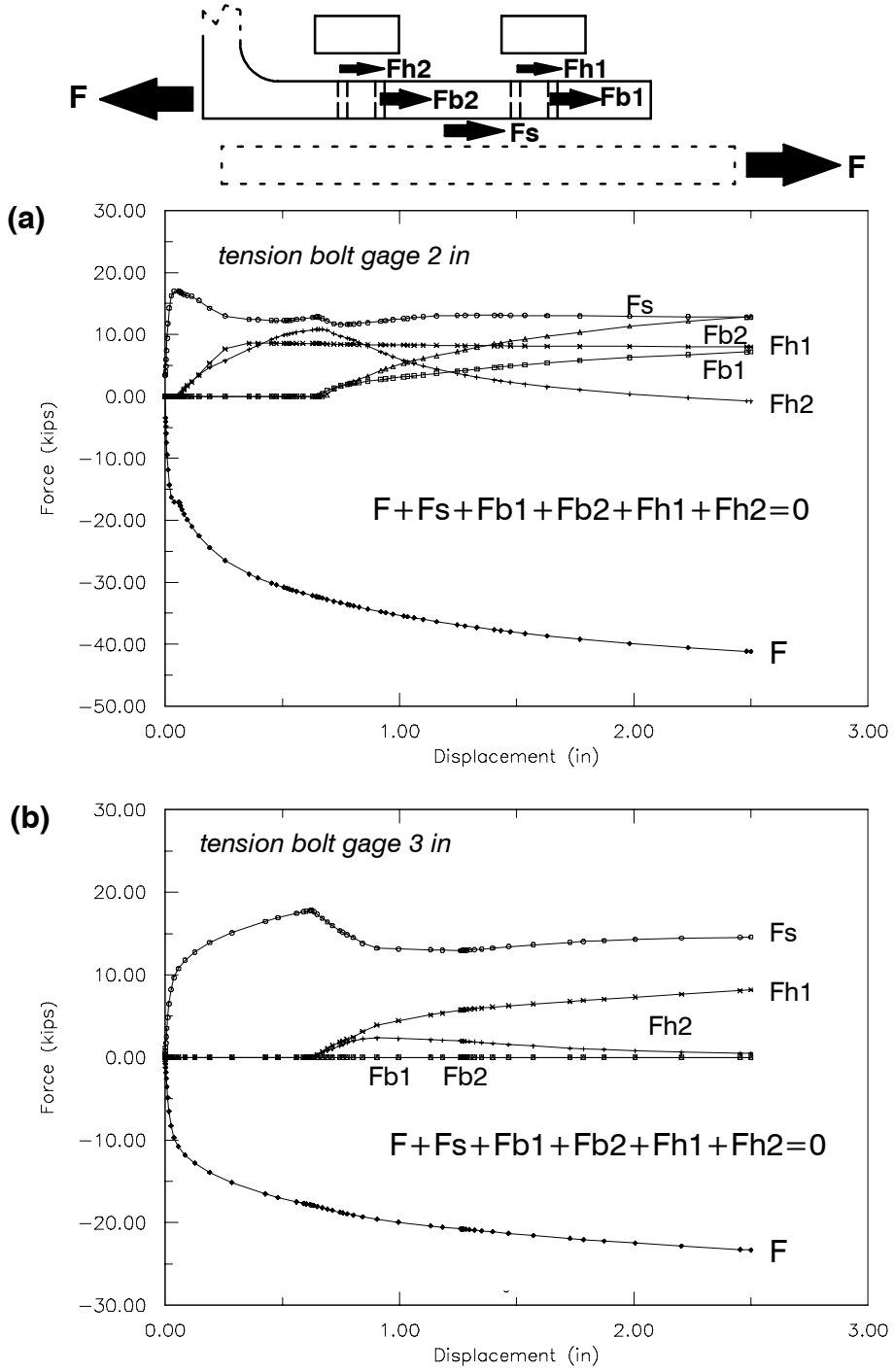


Figure 3.13 Force (F) transfer mechanism through the angle from the pulling plate by means of the plate traction (Fs) due to the pretensioned bolts, bolt bearing (Fb), and traction between bolt head and angle (Fh) plotted against applied displacement for case angle with (a) 2 in and (b) 3 in tension bolt gage.

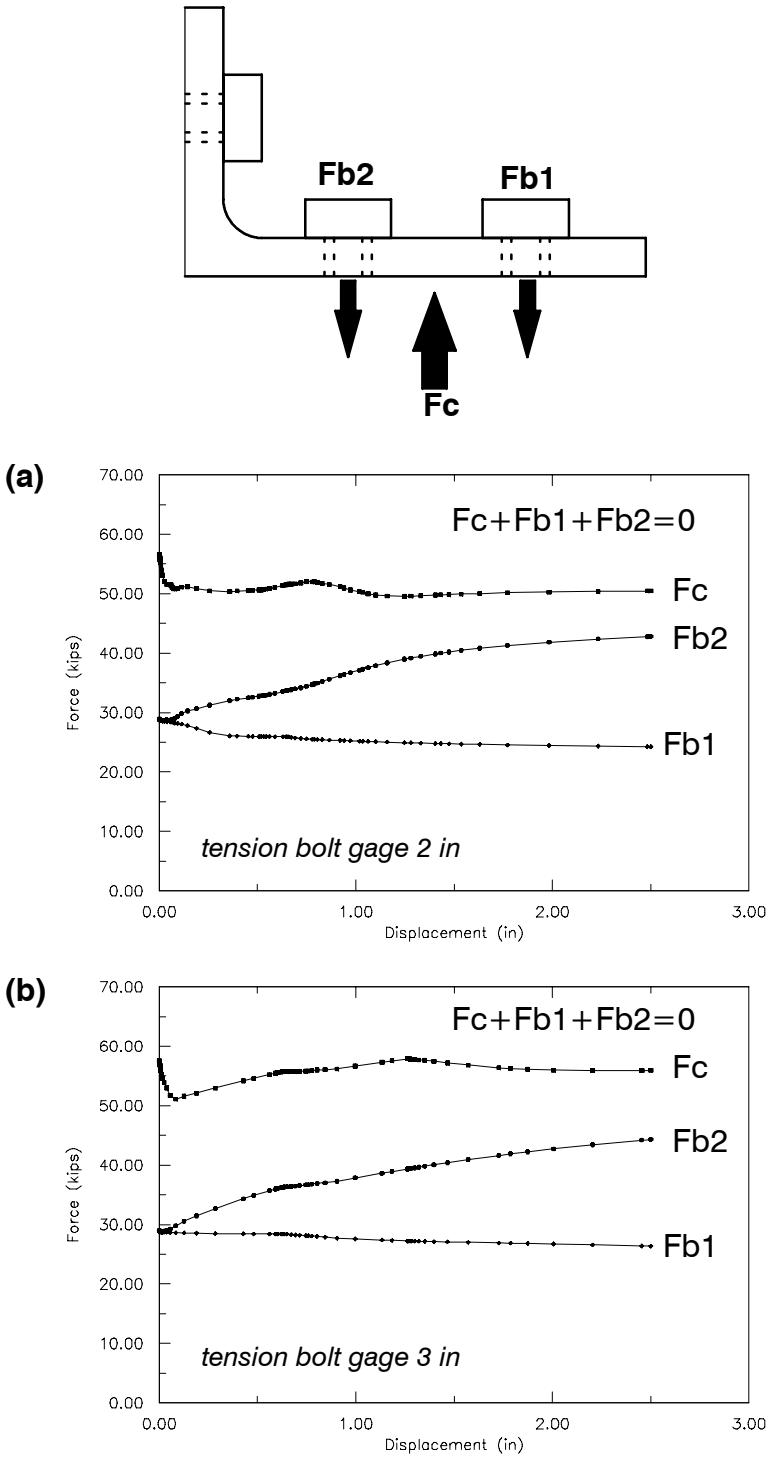


Figure 3.14 Bolt forces (Fb) and total clamping force (Fc) on angle leg plotted against applied displacement for case angle with (a) 2 in and (b) 3 in tension bolt gage.

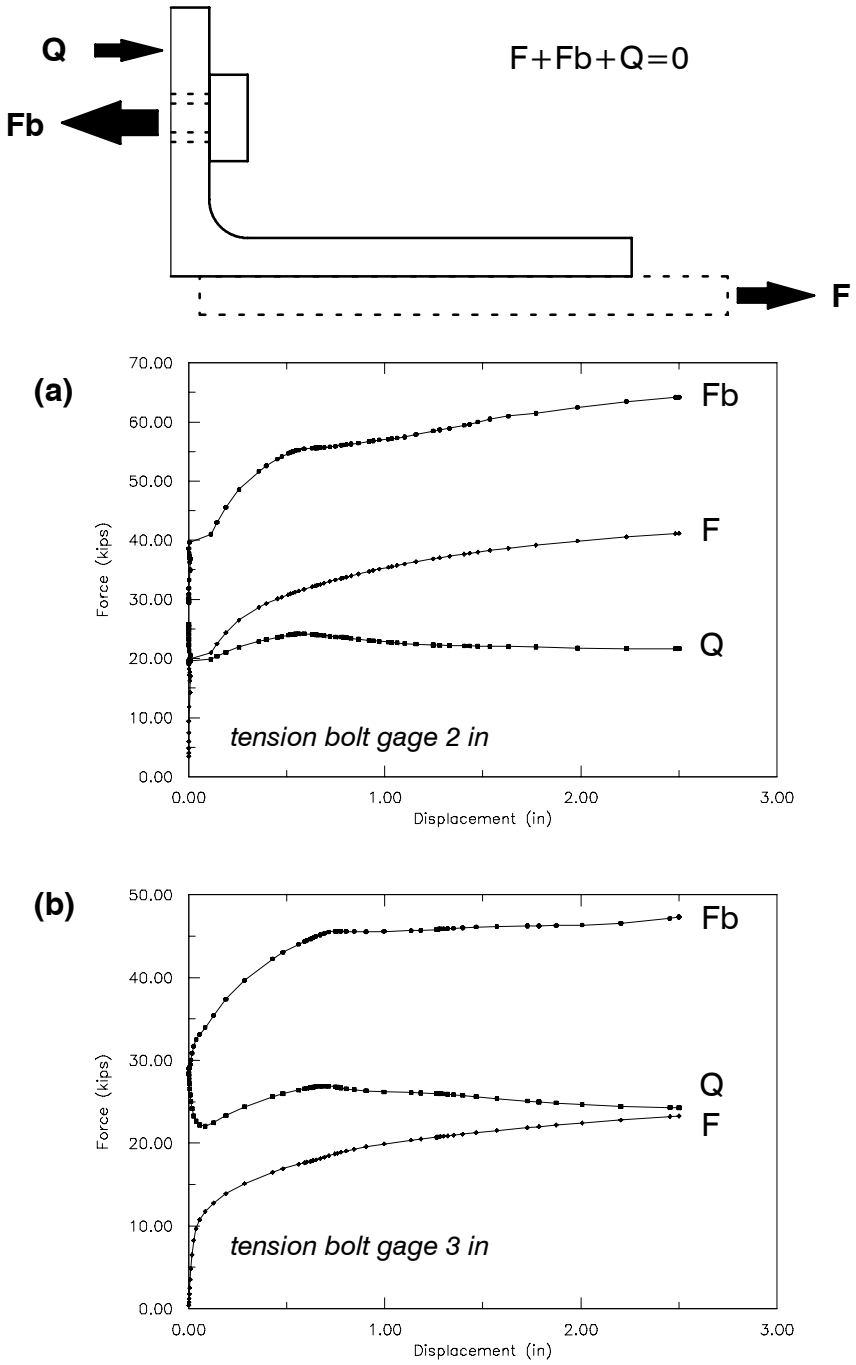


Figure 3.15 Contact force (Q), bolt force (Fb) and applied force (F) plotted against applied displacement for case angle with (a) 2 in and (b) 3 in tension bolt gage.

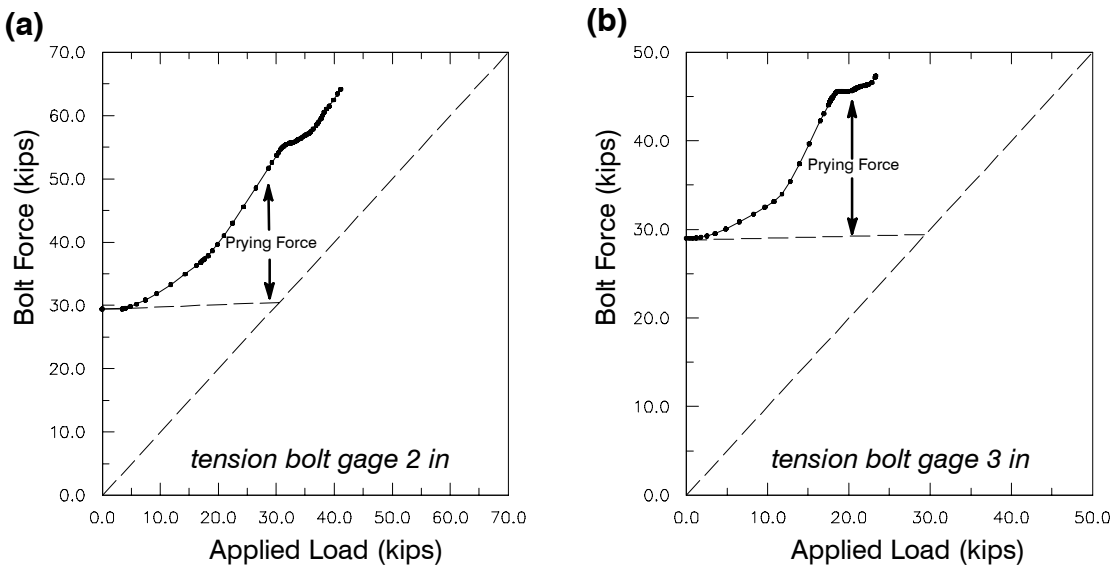


Figure 3.16 Bolt force versus the externally applied connection load demonstrating the effect of the prying force for case angle with (a) 2 in and (b) 3 in tension bolt gage.

3.4.2 Pull Test Approximation

The connection response predictions using detailed 3D finite element connection models presented in Section 3.2 demonstrate the general performance of the analytical models. Modeling the full connection geometry requires some considerable effort which may not always be practical in a design office setting. A simpler approach in predicting connection response by focusing on the components which are key to the overall response maybe more desirable. In this section predicting the response of top and bottom seat angle connections with no web angles using simple angle pull tests is examined. The basis of this approach is that the response of the angle under tension is the least stiff member in this type of connection and its response would govern the overall connection response.

Two connections tested by Azizinamini [17] with the same configurations of test cases 14S5 and 14S6, but without the web angles are used in this section to assess the approximation of the overall connection using the pull response of the connection angle component.

The FE model and its deformed shape under applied load are shown below in Fig. 3.17 where a plate represents the column flange and half of the connection is modeled making use of symmetry.

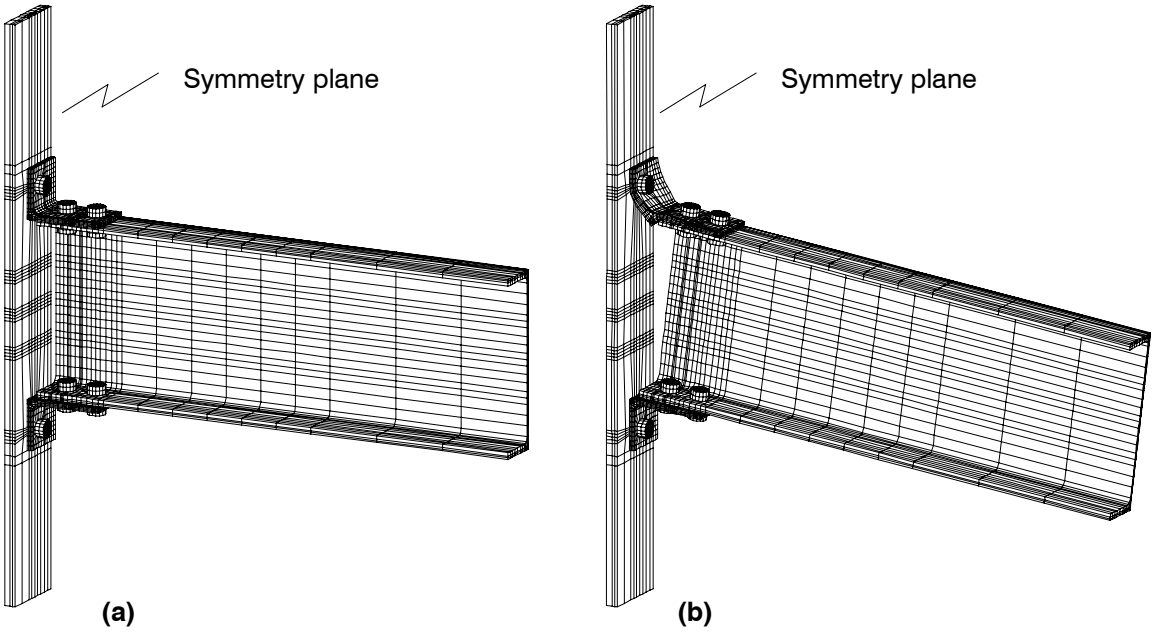


Figure 3.17 3D finite element model of bolted top and bottom seat angle connection with no web angle tested by Azizinamini, shown (a) unloaded and (b) loaded.

Two angle component pull-test FE models are created using identical seat angle models of the full connections mentions above, with thicknesses of 3/8 in and 1/2 in. They are assembled as shown in Fig. 3.18. The force-displacement response of the pull tests are converted to approximate the moment-rotation response of the connection using the relations: $M = F \cdot d$; $\phi = \arctan(\Delta/d)$; where M is the moment of the connection, ϕ is the rotation of the connection, F is the beam flange force, d is the depth of the beam, and Δ is the displacement of the pull plate in the angle component pull models representing the beam flange.

The converted moment-rotation responses of the pull tests are compared to the response of the full top and bottom seat angle connections in Figs. 3.19 and 3.20. It is shown that the pull test models are successful in predicting the initial stiffness of the overall connec-

tion as it is expected that the initial stiffness of the full connection is governed by the response of the angle component under tension. The converted response of the pull angle model begins to diverge from the full connection response as the loading increases.

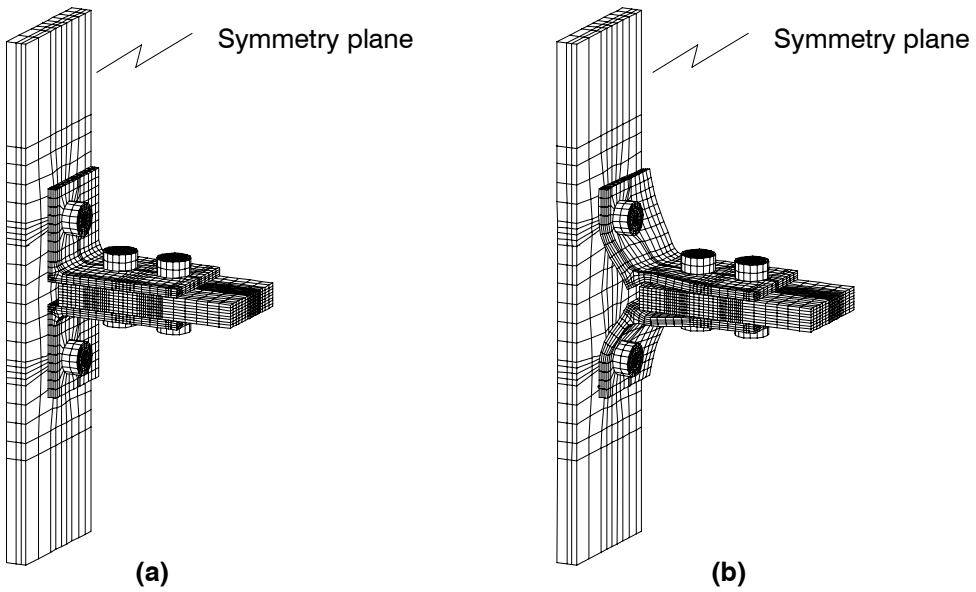


Figure 3.18 3D finite element model of bolted angle component pull test, shown (a) unloaded and (b) loaded.

The displacement in the pull tests are monitored at both the heel of the angle (A - Figs. 3.19 & 3.20) and the tip of the plate pulled (B - Figs 3.19 & 3.20). The two curves (A and B) shows slippage between the angle and the plate. Similar to the findings in the previous parametric friction study, when comparing the two connection configurations the slipping is more pronounced when the connecting members are thicker (stiffer), in this case for the same beam size. The converted pull tests show a softer response at higher connection rotations when compared to the full connection model response. This difference is greater in the case where more slipping occurs in the angle component pull model while no slippage is observed in the full top and bottom seat angle connection model.

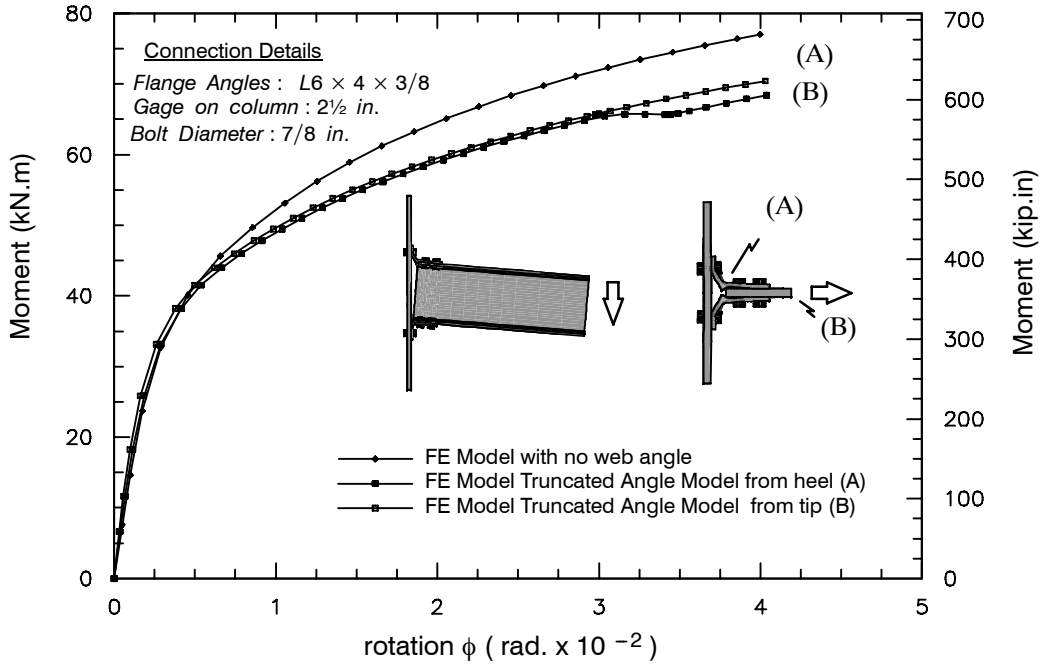


Figure 3.19 Comparison of connection model response for test case 14S5 without web angle and approximated response using angle component pull test model.

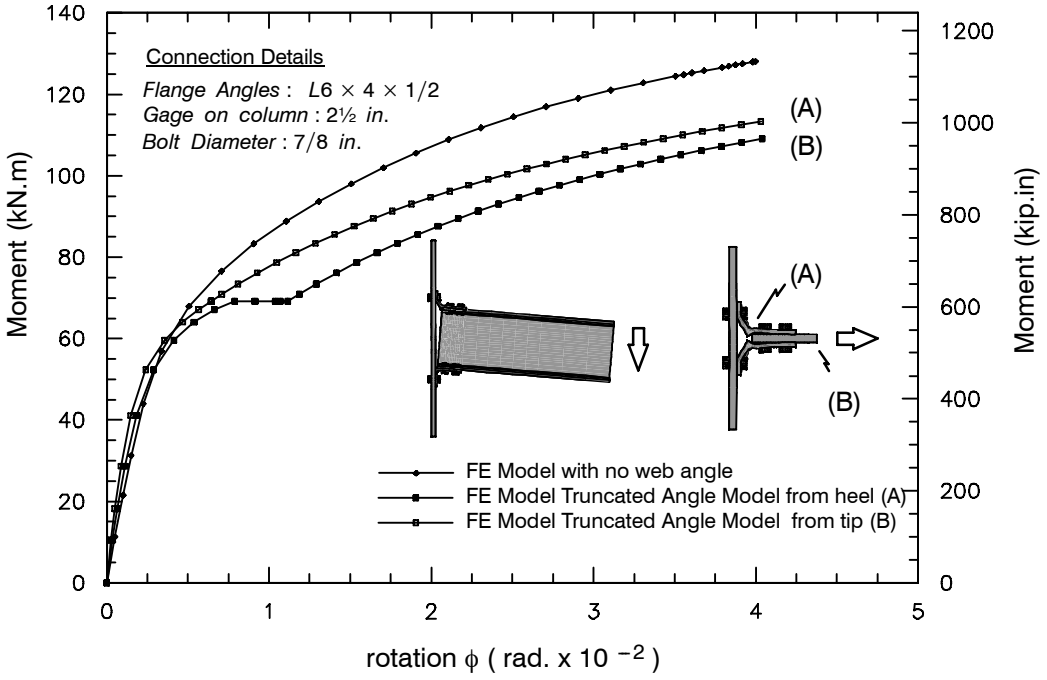


Figure 3.20 Comparison of connection model response for test case 14S6 without web angle and approximated response using angle component pull test model.

In order to further investigate the difference between the response of the full connection model and the converted angle pull model response, the plastic equivalent strain fields are compared for the effective top seat angle in tension as shown in Figure 3.21 at three different levels of loading for the 14S5 connection configuration without web angles shown in Figure 3.19. The maximum plastic strain values are essentially the same both models until slip occurs, at around 3.0 E -2 radians in the angle pull test model.

After slip occurs in the angle pull test model the strains drop as does the equivalent moment response. This may be attributed to the fact that the deformation of the angle in the pull test is limited to a horizontal motion and lacks rotation that exists in the actual connection. The deformation of the angle in the full connection model is more constrained due to the beam flange rotation which leads to greater deformations and higher strain values. This can be seen by comparing the deformed horizontal angle legs in Figure 3.21 (c) and (f).

As a result, it is shown that it is possible to predict the beam to column top and bottom seat angle connection initial stiffness using an equivalent angle component pull test model. In the absence of severe slippage the angle component pull test model can furthermore predict the overall response of the full connection with reasonable accuracy.

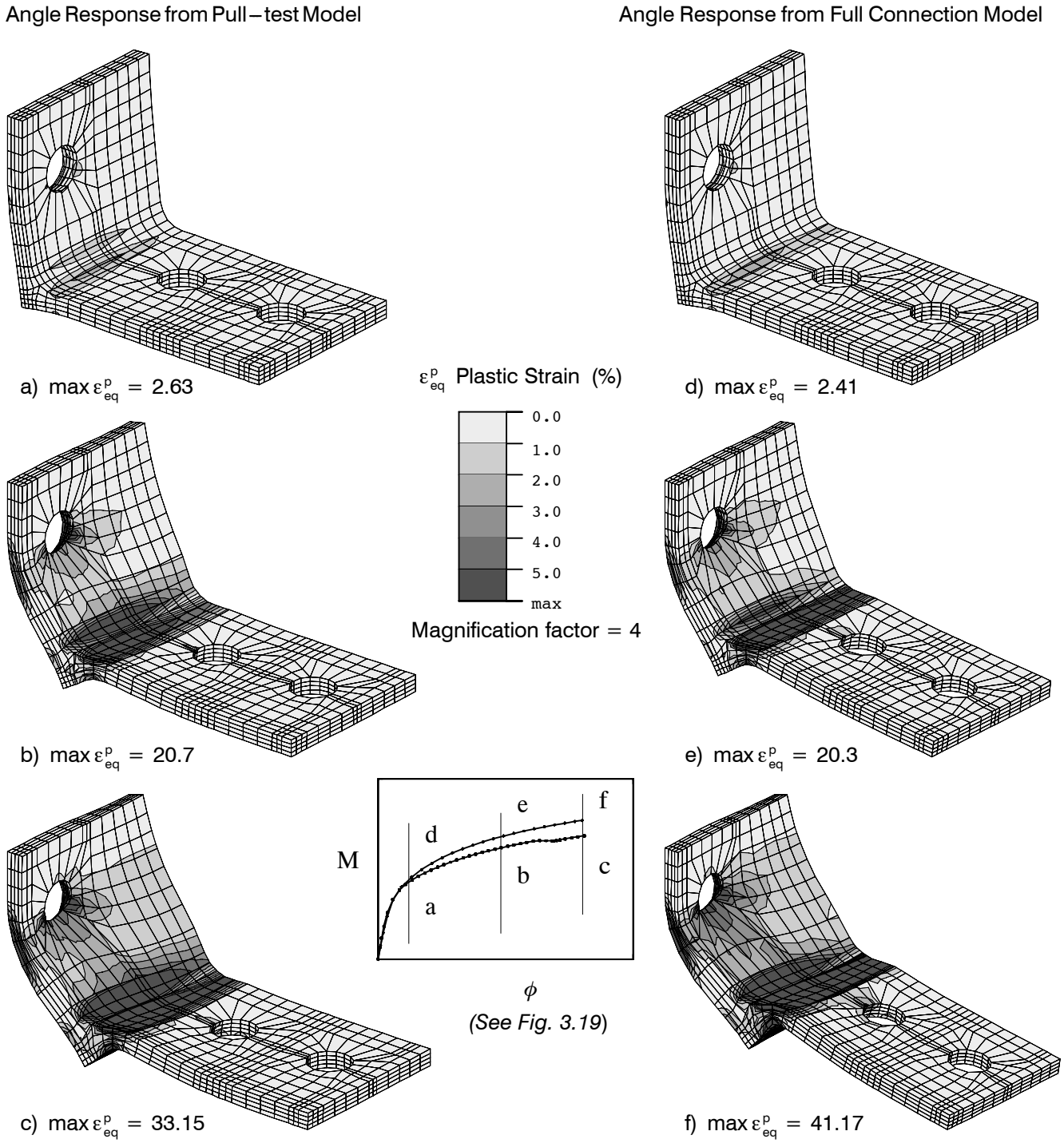


Figure 3.21 Comparison of the Plastic Deformation in the Angles from the FE Models.

3.4.3 Equivalence of Superimposing Connection Response

This section deals with examining the equivalence of superimposing the response from models with different connection sub-configurations to that obtained from the full connection models. The response of a top and bottom seat angle connection with web angles is compared to the results superimposing the response of its sub-configurations, namely a web angle connection and top and bottom seat angle connection without a web angle.

Two connections with relatively soft and stiff responses are used, both connections are modeled with a 21 in deep beam and a 0.25 in thick web angle connected with 4 bolts. The first connection has top and bottom clip angles with a thickness of 0.25 in while the second connection has 0.75 in thick clip angles.

The response for the three connection configurations, along with the superimposed "equivalent" response from the web angle and the top and bottom seat angle connections are shown in Figures 3.22 and 3.23. It can be seen that the initial stiffness of the superimposed responses are close to that of the full connection for both connection cases. However, in both cases the superimposed response diverges from the full connection response at higher loads.

The instantaneous center of rotation for each connection is monitored in order to understand the reason why the superimposed sub-configurations response diverges from the full connection response. The connection center of rotations are measured by fitting a line through the displaced nodes lying along the beam edge at the connection. The instantaneous center of rotation determined by locating the point at which the fitted line intersects its original horizontal position.

The instantaneous center of rotation is plotted against the connection rotation for the two connections in Figures 3.24 and 3.25. The two figures display that the instantaneous center of rotations shift throughout the loading of the connection. In both connections the top and bottom angle seat angle connection rotates approximately about the bottom edge of

the beam whereas the web only connection rotates somewhere below the centroid of the beam. The trend for the instantaneous center to shift below the beam centroid is because the tension stiffness in both the beam flange angle and the web angle is less than its compression stiffness. In order to balance the forces caused by the loads on the connection the center of rotation ends up shifting below the center.

For the connection with .25 in clip angle thickness, the center of rotations quickly settle to a constant in all configurations, as shown in Figure 3.24. The instantaneous center of the full connection becomes close to that of the top and bottom seat angle connection as the thin web angle does little to restrain the connection rotation.

As for the connection with the .75 in thick angles, the instantaneous center of the full top and bottom seat angle connection lies somewhere in between those of its sub-configurations as the thicker web angle provides greater constraint to the rotation of the connection. The center of rotations do not settle to a constant value due to the slip between the members. The center of rotation crawls up while components are slipping in the full connection.

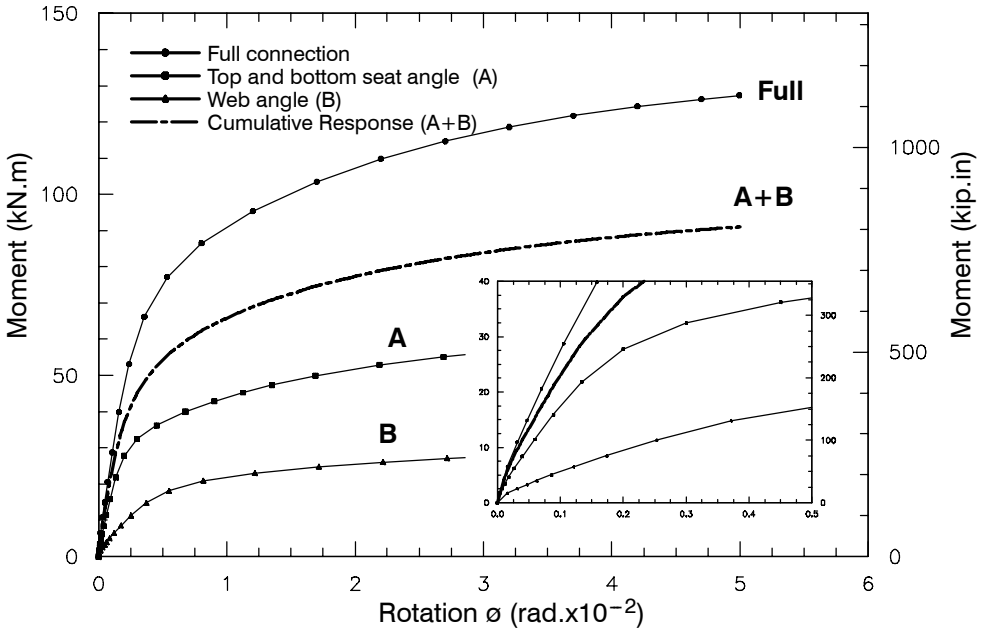


Figure 3.22 Comparison of the connection response to its equivalent added response for connection with 0.25 in. thick clip angles. (Inset shows zoomed view of initial stiffness).

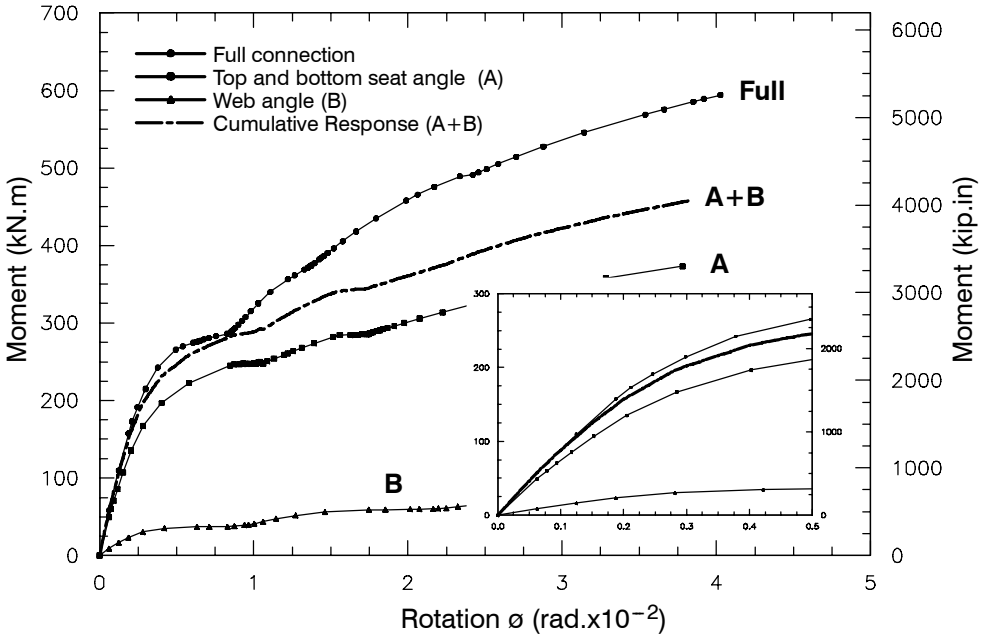


Figure 3.23 Comparison of the connection response to its equivalent added response for connection with 0.75 in. thick clip angles. (Inset shows zoomed view of initial stiffness).

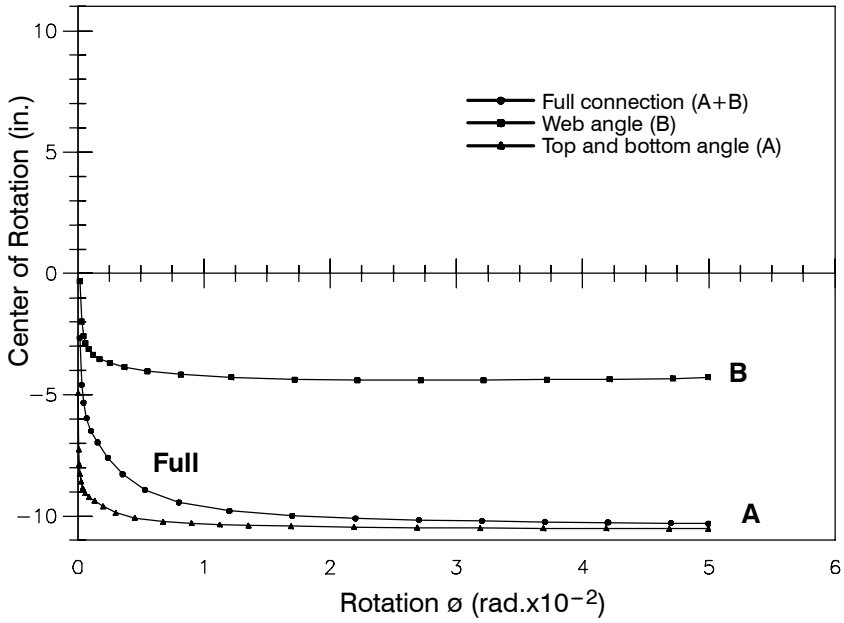


Figure 3.24 Comparison of the center of rotation plotted along the beam depth for the connection and its sub-configurations with 0.25 in. thick clip angles.

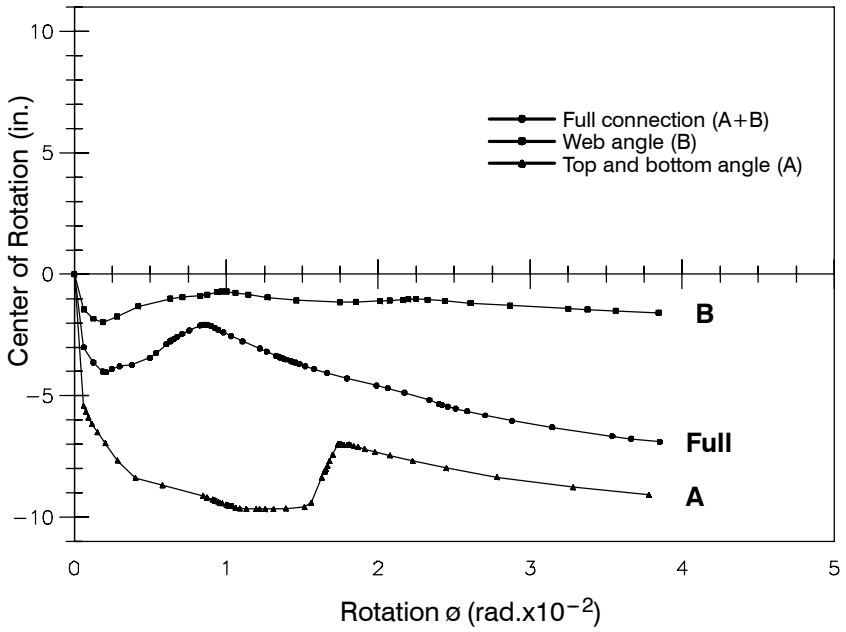


Figure 3.25 Comparison of the center of rotation plotted along the beam depth for the connection and its sub-configurations with 0.75 in. thick clip angles.

Finally, to further examine the behavior of the two connections and their sub-configurations their deformed geometry with the Mises stress contours are shown in Figures 3.26 and 3.27 at connection rotations of approximately 0.01, 0.02 and 0.03 radians. The stress magnitudes for the full connections are greater than observed in their respective sub-configurations due to the greater stiffness and restraint. Caution must be exercised when assembling the response of individual components using different models to capture the sum response of the intended full connection.

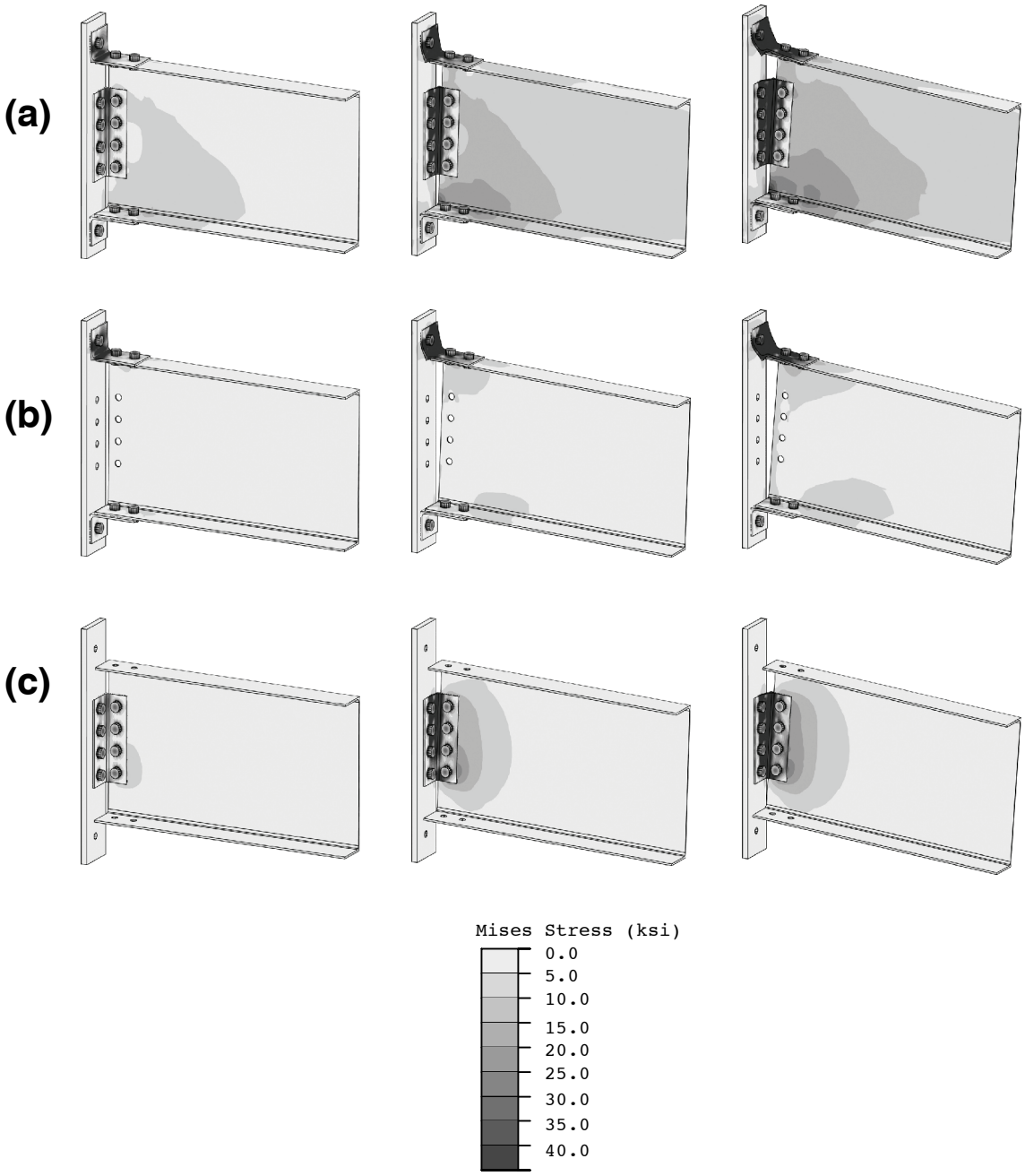


Figure 3.26 Mises stress contours at rotations approximately 0.01, 0.02, and 0.03 radians for the (a) top and bottom seat angle connection with web angles and its sub-configurations; (b) top and bottom seat angle connection; and (c) the web angle connection with 0.25 in. thick clip angles.

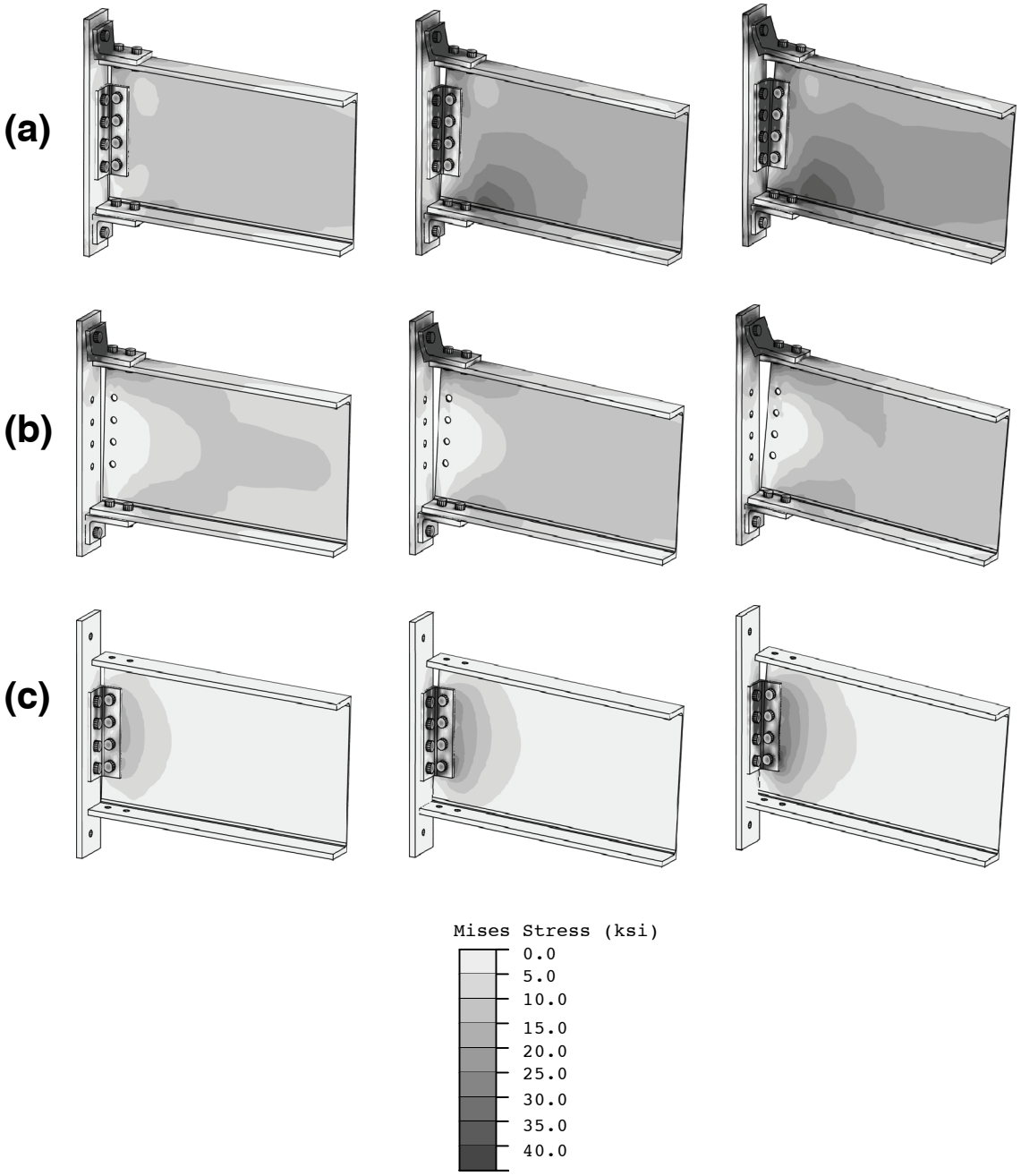


Figure 3.27 Mises stress contours at rotations approximately 0.01, 0.02, and 0.03 radians for the (a) top and bottom seat angle connection with web angles and its sub-configurations; (b) top and bottom seat angle connection; and (c) the web angle connection with 0.75 in. thick clip angles.

3.5 Summary

This chapter begins by presenting a refined three dimensional finite element modeling approach for predicting the response of bolted steel connections. A two step approach to model bolt pretension is presented as part of the refined modeling. To assess the prediction capabilities of the refined modeling approach several full size top and bottom seat angle connections with web angles tested by Azizinamini [17] are modeled and analyzed. The variation in matching the tested connection response is presented and concluded that the connection response can be captured fairly well in most cases. Select models are used to perform parametric studies on the effect of friction, bolt pretension and bolt alignment modeling on the analytical connection response. Using bolted angle component models, force transfer mechanisms through the individual components are presented in detail. Finally, generalizing the use of individual angle component pull test models in predicting the response of full connections and the equivalence of superimposing component and sub-configurations of connection to generate full connection response is studied. While the refined modeling approach is quite successful in predicting the response a fully modeled bolted connection; the studies presented in this chapter call for caution while attempting to approximate connection response by assemblage of its smaller components and sub-configurations. Using the refined three dimensional finite element modeling approach is an extremely valuable tool in understanding to underlying mechanisms to be used in the design or assessment whether modeling the full bolted connection or its key components.

CHAPTER 4

STIFFNESS MODELS- NONLINEAR RESPONSE OF BOLTED CLIP ANGLE CONNECTIONS

There are many empirical equations that have been proposed to describe the behavior of steel connections. Most, if not all, have been calibrated using experimental data. In this section refined models for bolted steel angles are generated to create a large data set which is used to parametrically define their force-displacement response. The data set is be chosen to be representative of the range commonly used and valid per design code and its parameters are set to comply with design limitations.

In the first part of this chapter a dataset of clip angle configurations are presented based on common design parameters. The generation of these models is discussed. The force-displacement response of all the connection analytical models in the dataset are used to empirically generalize two parametric functions. The limitations of using functions to empirically predict connection response is demonstrated and a neural-network approach is presented as an improved empirical approach to generate the nonlinear response of bolted connections.

4.1 Connection Topography

The geometrical and topological parameters used to create the data set are explained in this section. Table 1-7 in the AISC LRFD Specification [5] lists all the geometrical properties of angles available for use in structural steel connection design.

The aim is to create a rational data set of bolted angle geometry and topography that covers a wide range of parameters used in design practice. Bolted angles are commonly used

as connection components to connect the top and bottom flange and web of a beam to the web or flange of a column. A common bolted angle connection component configuration, as shown in Figure 4.1 is used in this study which two tension bolts usually connecting the angle to a column; and four bolts usually connecting the angle to a beam .

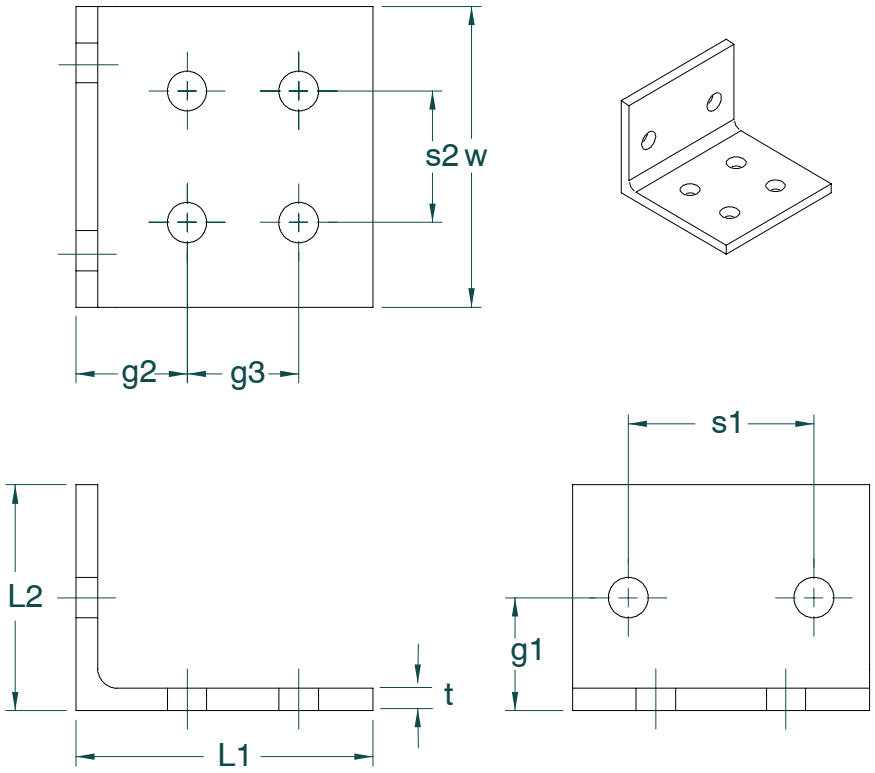


Figure 4.1 Bolted Angle Connection Topography and Parameters.

The angle sizes and bolt gage govern the size of bolts that can be used in a connection base on whether it can be accommodated in the mentioned configuration. Based on the angle profile and bolt size a topography is determined per AISC LRFD Specifications.

4.2 High-Strength Bolts

Bolted connections used to connect columns and beams are commonly specified as *slip-critical*. The bolts are pretensioned to prevent the connecting components from slipping relative to each other by the friction created between them due to clamping. This en-

ables the connection to transfer the forces without the bolts coming to bear on to the bolt holes. Bolt bearing significant reduces the capacity of the connection specially under cyclic loading due to the localized deformation and damage.

A325 and A490 high strength steel bolts are used in order to achieve the required pre-tension. Although geometrically identical A490 bolts have higher strength and stiffness qualities than A325 bolts. The available nominal bolt diameters start at 1/2 inches and go up 1-1/2 inches in 1/8 inch intervals. The size of bolts in this study are limited to 1 inch diameter and less. Larger bolts are not practical to fit the available angle sizes for the connection configuration used in this study.

4.2.1 Bolt Hole Size

Nominal bolt sizes are determined by the type of hole specified. The holes in this study are limited to standard holes which is typical for this type of connection. The hole size is determined by adding 1/16 inches to the nominal bolt diameter in order to accommodate adjustments for fit while erecting the connection.

4.2.2 Bolt Spacing and Edge Distance

By tradition and experience the spacing between the centers of bolts in the line of force is recommended to be a minimum of 2-2/3 times the bolt diameter spacing (Salmon and Johnson [91]). While this is a minimum to ensure maximum bearing stress is achieved, the AISC LRFD Specification recommends the spacing to be 3 times the bolt diameter. The minimum and preferred center to center bolt spacing for various bolt sizes used in this study is listed in Table 4.1. The spacing between bolts in the traverse direction of force is usually a matter of workmanship and fit; and has no notable effect on strength of the connection.

Table 4.1 Center to Center Bolt Spacing			
Bolt Diameter, in.		**minimum (in.)**	**preferred (in.)**
1/2	0.500	1.333	1.500
5/8	0.625	1.667	1.875
3/4	0.750	2.000	2.250
7/8	0.875	2.333	2.650
1	1.00	2.667	3.000

The AISC LRFD Specification also requires a minimum distance between the center of the bolt hole and the edge of the connected part, in the line of force to prevent rupture. These requirement varies depending on the condition of the edge of the connected part. For a bolted angle the edge in the line of force would be the uncut rolled edge. Table 4.2 lists the minimum allowable edge distance for bolts sizes used in this study per AISC LRFD Specification.

Table 4.2 Center to Edge Bolt Minimum Edge Distance, in			
Bolt Diameter		**Sheared Edges**	**Rolled Edges**
1/2	0.500	0.875	0.750
5/8	0.625	1.125	0.875
3/4	0.750	1.250	1.000
7/8	0.875	1.500 *	1.125
1	1.00	1.750 *	1.250
** Permitted to be 1.250 at the ends of beam connection angles and shear end plates.*			

4.2.3 Entering and Tightening Clearance

Unlike bolt spacing and edge spacing in the force line direction which are controlled by strength considerations, the gage distances *g1* and *g2* along with bolt spacing such as *sp1,* shown in Figure 4.1 are usually controlled by constructability issues such as being able to fit a socket wrench to tighten the bolt to its prescribed pretension. Based on the size of the bolts, the socket size governs gage *g1*. The orientation of the bolts effect how the socket will need to enter and tighten the nut of the bolt. In this study the bolts in the connection are as-

sumed to be oriented such that the bolt head of the tension bolts which usually connect the angle to the column are in contact with the angle component while the nuts of the shear bolts which are usually connecting the angle to the beam flange are in contact with the angle.

Equation 4.1 and 4.2 govern the bolt gage and spacing. The parameters are based on the values in Table 4.3 which are described in Figure 4.2. The other parameters are the angle thickness, t_a; the width across the flats of the bolt head, F; and k-zone width of the web of the connected beam, *k1*. While the gage distance *g1* can be decreased by staggering the bolts, this is ignored and it is assumed that the bolts may be aligned to each other.

$$g1 \geqq H2 + C2 + t_a \qquad \text{Eqn 4.1}$$

$$g2 \geqq H1 + C1 + t_a \qquad \text{Eqn 4.2}$$

$$s2 \geqq F + 2 \times k1 \qquad \text{Eqn 4.3}$$

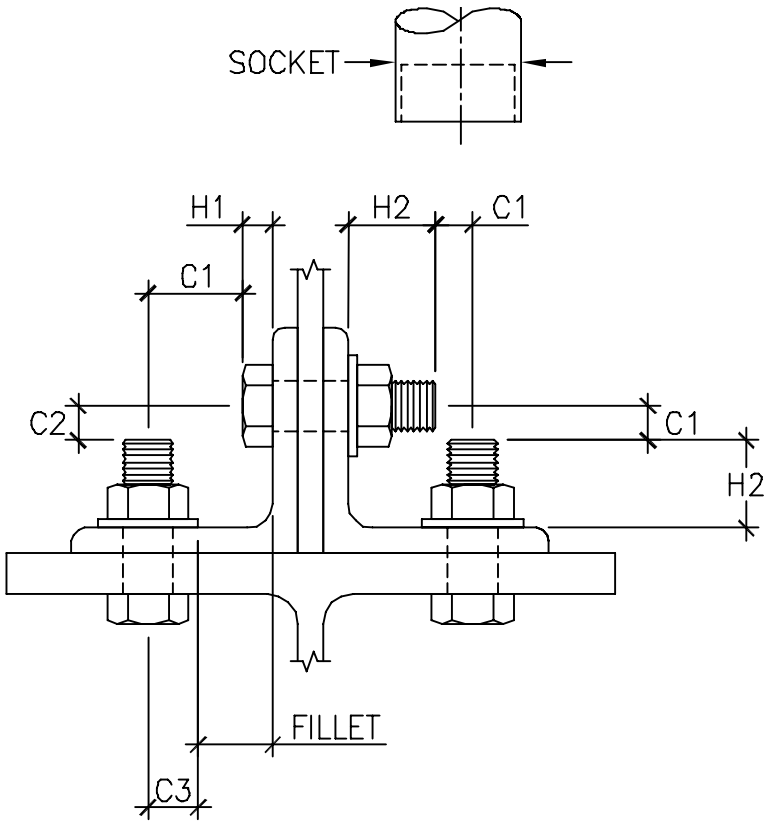


Figure 4.2 Entering and Tightening Clearance Parameters [5].

Table 4.3 Entering and Tightening Clearance for Aligned Bolts, in.

Bolt Diameter		Socket Diameter	H1	H2	C1	C2	C3
5/8	0.625	1.750	0.391	1.250	1.000	0.688	0.688
3/4	0.750	2.250	0.469	1.375	1.250	0.750	0.750
7/8	0.875	2.500	0.547	1.500	1.375	0.875	0.875
1	1.000	2.625	0.609	1.625	1.438	0.938	1.000

4.3 Construction of Parametric Data Set Variables

The parameters that describe the topography of the bolts on the angle are a function of the size of the bolt and the size of the angle chosen for the connection. Bolt sizes from 1/2 inch to 1 inch are used in this study. The full range of each parameter per angle and bolt size is determined and included in the data set. All common angles sizes reasonable for a

connection are used in this study. Table 4.4 lists the geometric and topographic parameters of angles in the dataset which are analyzed to creating a large dataset of connection responses. Although a total of 405 bolted angle pull test analyses were performed, no significant difference in force-displacement response was observed between the 8 in wide angles with equal or staggered bolt gages (***s1*** and ***s2***) so only the cases with equal bolt gages are included in the dataset used to fit the model response. This results in a dataset of 270 analyses.

The gage and spacing of the bolts are determined using the largest bolt applied to each shape. The the gages ***g2***, and ***g3*** are both set to 3 inches for the L8 angles and 2.5 and 2.25 inches respectively for L6 angles. These values are within the design specifications mentioned above. The beam bolt spacing ***s2*** was set to 3.5 inches using Equation 4.3 considering the ***k1*** value of average sized beams. The distance between the face of the column and the end of the beam referred to as the setback is set to 0.5 inches in all the connection which is common in practice.

The refined three dimensional finite element modeling for the bolted angle connections follow the principals outlined in the previous chapter. The connection geometry is discretized using C3D8I eight-node brick elements with full integration and incompatible modes [1]. Each connection model is generated using a script which loops through all cases of geometry and creates the finite element mesh using the library of structural parts created in Truegrid where the mesh discretization is adjusted based on the changes in topology.

Using this mesh data created in Truegrid a script creates an ABAQUS [1] input file which includes all the definitions for material, contact, boundary and loading conditions. A typical discretized connection model is shown in Figure 4.3. The models consists of the angle component, the bolts, a reaction plate, and a pull plate. Half of the angle assembly is modeled with the 1-2 plane forming the symmetry plane with a normal parallel to the -2 axis. The symmetry plane of the vertical reaction plate is fixed, forming the reaction boundary

condition of the connection which would be the column flange to web junction in the context of a beam-column connection. Symmetry boundary conditions are imposed to the nodes of the angle and horizontal reaction plate on the symmetry planes. The nodes in these planes are constrained from moving in the y-direction.

The horizontal pull plate in the context of a beam-column connection represents the beam flange. The nodes at the +1 face of this plate are constrained to a master node. The connection is loading by displacing the master node along the +1 axis.

Pretensioning the bolts is achieved using an the routine within ABAQUS in which the nodes of a designated surface are constrained to a master node, which is displaced towards the adjacent surface which is internally constrained at the mid length of the bolt shaft, until the desire loading is achieved. Minimum bolt pretension values per the AISC LRFD Specification for different bolt sizes are shown in Table 4.5. In the analyses the bolts are pretensioned up to the value listed in this table plus one kip the ensure the pretension in the model exceeds the prescribed minimum. The idealized stress-strain relationships used to model the material behavior for the A36 structural steel angle and the A490 high-strength steel bolts are shown in Figure 4.4. The force response of the connections were obtained by imposing a displacement to the edge of the pull plate connected to the angle.

Table 4.4 Connection Design Set Parameters									
Angle	Thickness	Bolt Diameter	Tension gage (g1)	Bolt gage (g2)	Bolt gage (g3)	Width (w)	Bolt column spacing (s1)	Bolt beam spacing (s2)	Number of Runs
L8x8	1/2 5/8 7/8	3/4 7/8 1	2.50 4.50 6.75	3	3	6	3.5	3.5	81
						8	5.5 5.5	5.5 3.5	
	1	3/4 7/8 1	2.635 4.500 6.750	3	3	6	3.5	3.5	27
						8	5.5 5.5	5.5 3.5	
L8x6	1/2 3/4 1	3/4 7/8 1	2.500 3.625 4.750	3	3	6	3.5	3.5	81
						8	5.5 5.5	5.5 3.5	
L8x4	1/2 3/4 1	3/4 7/8 1	2.50 2.75	3	3	6	3.5	3.5	54
						8	5.5 5.5	5.5 3.5	
L6x6	5/16 1/2 3/4	1/2 3/4	2.2500 3.5625 4.8750	2.5	2.25	6	3.5	3.5	54
						8	5.5 5.5	5.5 3.5	
	5/16 3/8 1/2	7/8	2.2500 3.5625 4.8750	2.5	2.25	6	3.5	3.5	27
						8	5.5 5.5	5.5 3.5	
L6x4	5/16 1/2 3/4	1/2 3/4	2.2500 2.5625 2.8750	2.5	2.25	6	3.5	3.5	54
						8	5.5 5.5	5.5 3.5	
	5/16 3/8 1/2	7/8	2.2500 2.5625 2.8750	2.5	2.25	6	3.5	3.5	27
						8	5.5 5.5	5.5 3.5	

Table 4.5 Minimum Bolt Pretension, kips			
Bolt Diameter, in.		**A325**	**A490**
1/2	0.500	12	15
5/8	0.625	19	24
3/4	0.750	28	35
7/8	0.875	39	49
1	1.00	51	64

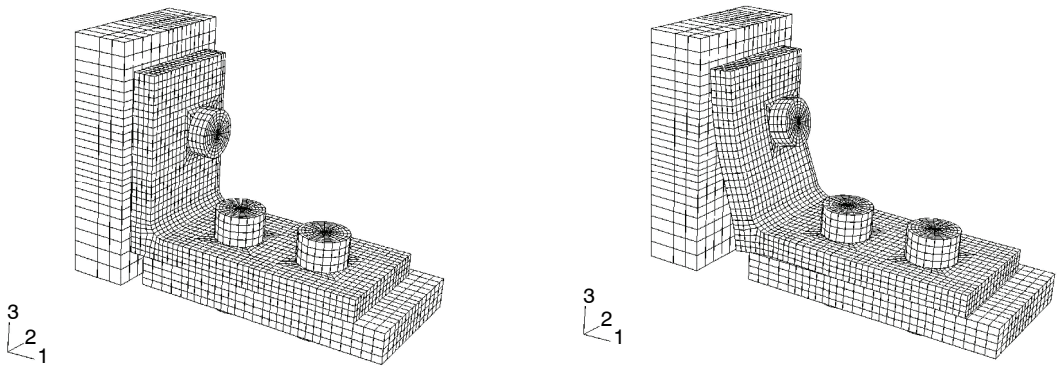


Figure 4.3 Typical discretized half symmetry bolted angle connection model in initial and loaded condition.

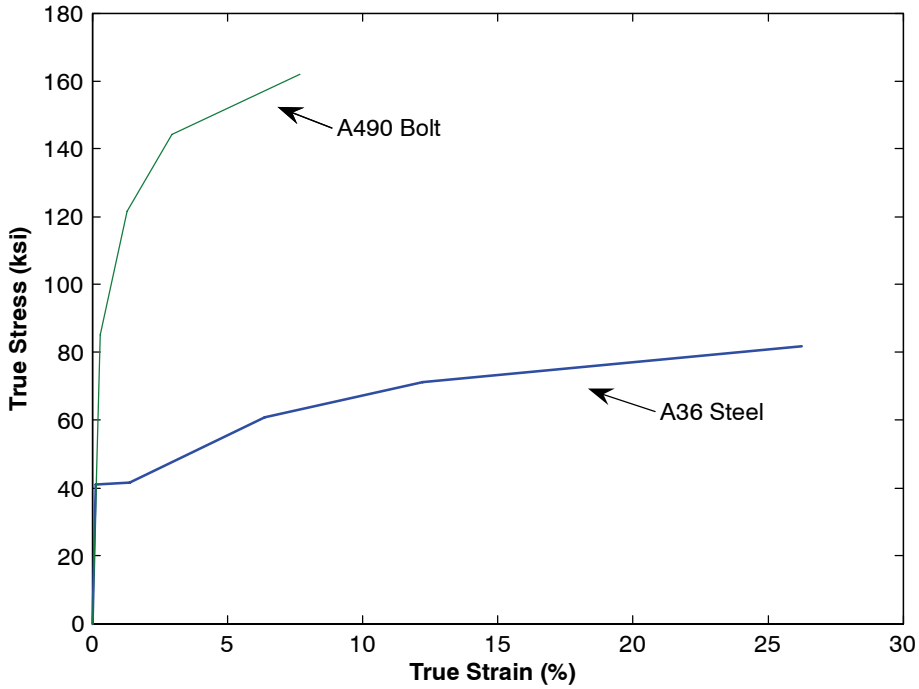


Figure 4.4 Material stress-strain relationships used in connection models for angle and bolts.

4.4 Curve Fitting Based Connection Response Prediction

Several studies have used various parametric formulas to fit the moment-rotation response of various types of connections. While using empirical fitted formulae the range of parameters used must be those for which the results are valid. Such fitted equations are usually only reliable in the range of parameters they were fitted with. The availability of experimental data for specific connections are usually limited because of the difficulty and cost involved and this inherently reduces the usefulness of fitted functions based on test data. Using connection simulations validated by experimental data can be used to expand the range of parameters used in developing empirical relations to predict connection response.

4.4.1 Modeling Approach using the Richard-Abbott Function

The bolted angle connection response dataset created using the refined 3D finite element simulations give a considerably wider range of data to work with to fit a parametric function which predicts connection response. Following a similar methodology followed by Bahaari and Sherbourne [19], the Richard-Abbott function [85] shown in Equation 4.4 is used to characterize the force-displacement response of the bolted angle connections.

$$F(K_1, K_p, F_o, n, d) = K_1 \frac{d}{\left[1 + \left| K_1 \frac{d}{F_o} \right|^n\right]^{(1/n)}} + K_p d \qquad \text{Eqn 4.4}$$

F is the force on the connection, K_1 the initial stiffness minus the plastic stiffness ($K_1 = K_i - K_p$), K_p the plastic stiffness, F_o the normalization force parameter, n the shape or sharpness parameter of the curve, and d is the displacement of the connection measured at the tip of the pulling plate or beam flange of the connection. The advantages of the Richard-Abbott function is that there are only four parameter to fit the and they are tangible to physical aspects of the nonlinear curve shown in Figure 4.5.

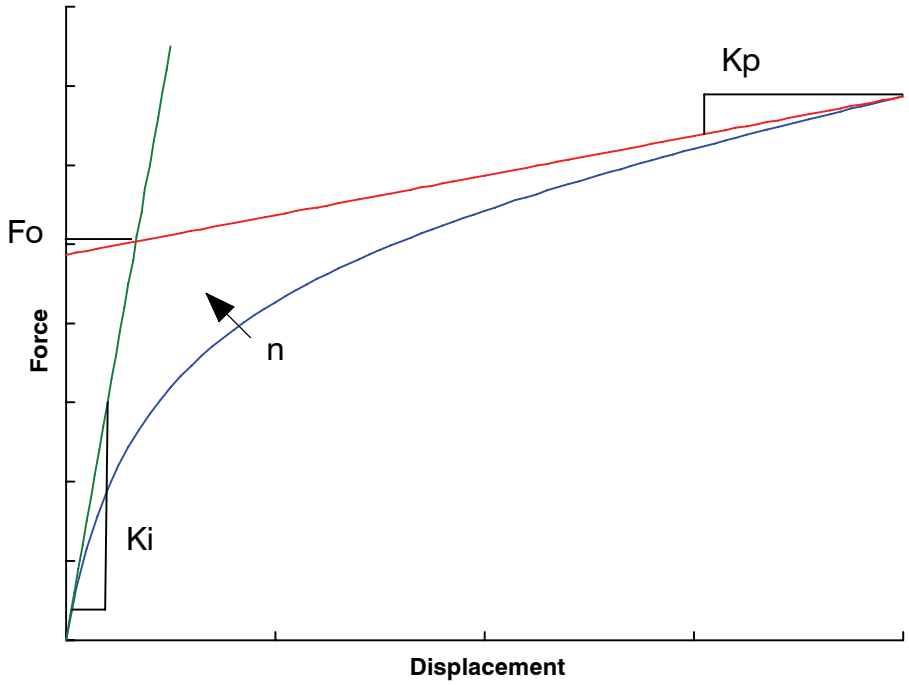


Figure 4.5 Description of the Richard-Abbott Equation parameters.

For each analysis the normalization force parameter, F_o is determined for the nonlinear force-displacement response and each curve is normalized per its specific F_o value. The normalized Richard-Abbott (RA) function takes the form of Equation 4.5. The normalized force-displacement response curve for each individual connection analysis is fitted to the RA function using the nonlinear least squares method utilized in Matlab, a high-performance language environment for technical computing [70].

$$\overline{F}(K_{1n}, K_{pn}, n, d) = K_{1n}\frac{d}{\left[1 + |K_{1n}d|^{n}\right]^{(1/n)}} + K_{pn}d \qquad \text{Eqn 4.5}$$

where,

$$\overline{F} = \frac{F}{F_o} \qquad K_{1n} = \frac{K_1}{F_o} = \frac{(K_i - K_p)}{F_o} \qquad K_{pn} = \frac{K_p}{F_o}$$

The fitting process involves determining the coefficients of a model that maps the input data to output data which match the actual expected response; in this case the angle

response determined by analysis. The general concept of a least squares approach is used where the coefficients of the model which minimizes the summed square of residuals are sought. The residual r_i is the difference between the observed values, y_i and the fitted values $\hat{y}_i$. The summed squares of the residuals, S can be then expressed as :

$$S = \sum_{i=1}^{m} r_i^2 = \sum_{i=1}^{m} (y_i - \hat{y}_i)^2 \qquad \text{Eqn 4.6}$$

where m is the number of observed data points used in to fit the model.

In this case the "model" is the normalized Richard-Abbott equation, and the coefficients to be determined are K_{In}, K_{pn}, and n. The process of determining the coefficients which minimizes the summed square of residuals is iterative. The first iteration is started with guessed coefficients values. The actual initial and plastic stiffness values, K_i and K_p respectively, determined from the response curves of the actual analysis are used as the initial guesses for the two coefficients and for the parameter, n a value between 0.5 and 1.0 is used. In each iteration the coefficients are adjusted, the summed squares of residuals is evaluated and checked against a convergence criterion. This process continues until the criterion is achieved.

The "Trust Region" algorithm is used to determine the magnitude and direction of the adjustments made to the coefficients in each iteration. This algorithm is a widely used minimization tool where the function f to be minimized takes vector arguments and returns scalars. In this case the function f is the summed squares of the residuals, S. The goal is to minimize f in the n-space vector of the Richard-Abbott coefficients. The method approximates f with a simpler function q which reasonably reflects the behavior of function f in a neighborhood N around the current iteration point x. This neighborhood is the trust region. A trial step s is computed by approximately minimizing over N. The point is updated in the iteration by $x+s$ if $f(x+s) < f(x)$, otherwise the neighborhood is shrunk and the iteration is repeated.

The error for each individually fitted case in the dataset is calculated. The mean average of the square root of the summed squares of the residual is used as the error criteria, shown as follows:

$$\text{Error} = \frac{\left[\sum_{i=1}^{n}(y_i - \hat{y}_i)^2\right]}{n} \qquad \text{Eqn 4.7}$$

The average error of all 270 analyses cases fitted individually to the Richard Abbott equation is 0.61 which means in general the function fits the data quite well. The error per analysis is plotted in Figure 4.6. The plot is divided per angle size of the connection cases used in this study. The worst poorest fits for each angle occur consistently at the ends of each angle size dataset group. The poorest fit for each angle size is identified in the figure by labels A, B, C, D, and E. The parameters of these poor fits are presented in Table 4.6.

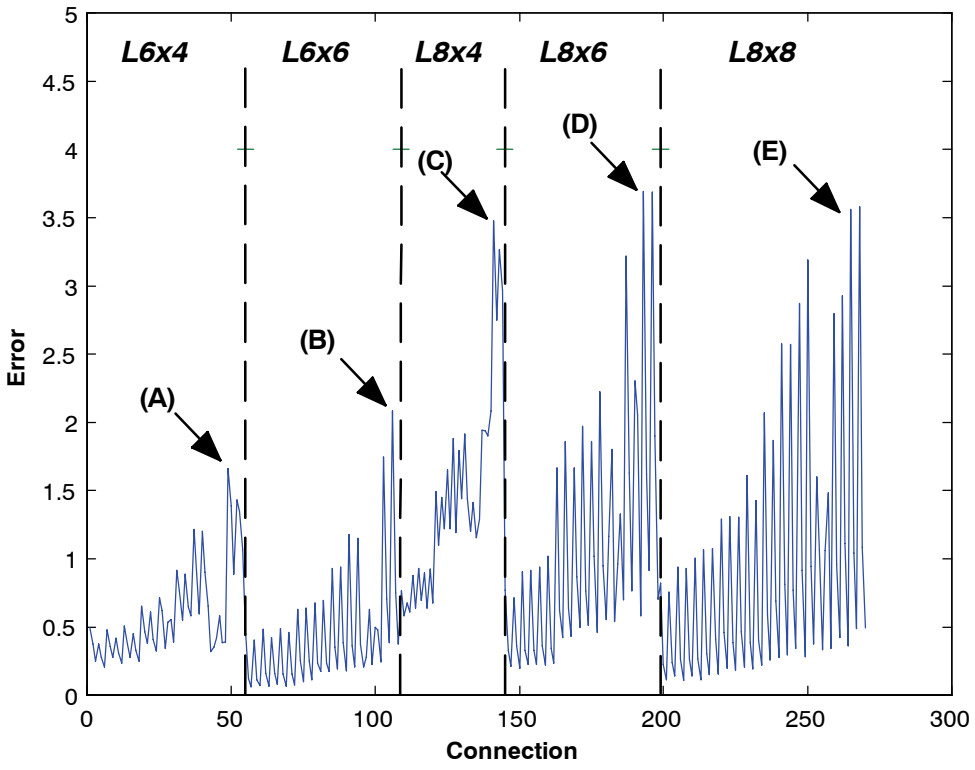


Figure 4.6 Comparison of the mean average of the square root of the summed squares of the residual between the simulated bolted angle connections response and the individually fitted Richard-Abbot Functions.

Table 4.6 Connection Parameters of Poorly Fitted Curves						
Figure 4.6 Label	Angle	Thickness	Bolt Diameter	Tension gage (g1)	Width	Error
A	**L6x4**	0.75	0.75	2.25	6	1.66
B	**L6x6**	0.75	0.75	2.25	8	2.08
C	**L8x4**	1.00	1.00	2.50	6	3.48
D	**L8x6**	1.00	1.00	2.50	6	3.69
E	**L8x8**	1.00	1.00	2.625	8	3.58

The trend of the parameters of the most poorly fitted bolted angle response listed in Table 4.6 reveals that all of these angles are those with the lowest tension gage ***(g1)***, greatest thickness in each angle size, and greatest bolt size used for that specific angle thickness. The deformation modes for these bulky angles are quite different in which slipping occurs due to the high stiffness of the angle.

Although the error in the function predictions of the angle connection response compared to the analysis models are not too large, the inherent limitation of using functions to fit the response of angles are evident. Simple functions do not have the flexibility to be representative for the response all the connection cases. The best and worst bolted angle connection response prediction of the fitted Richard-Abbott function for both the L6x4 and L8x8 angles are compared to the analytical response to present the variation in the quality of fit in Figure 4.7.

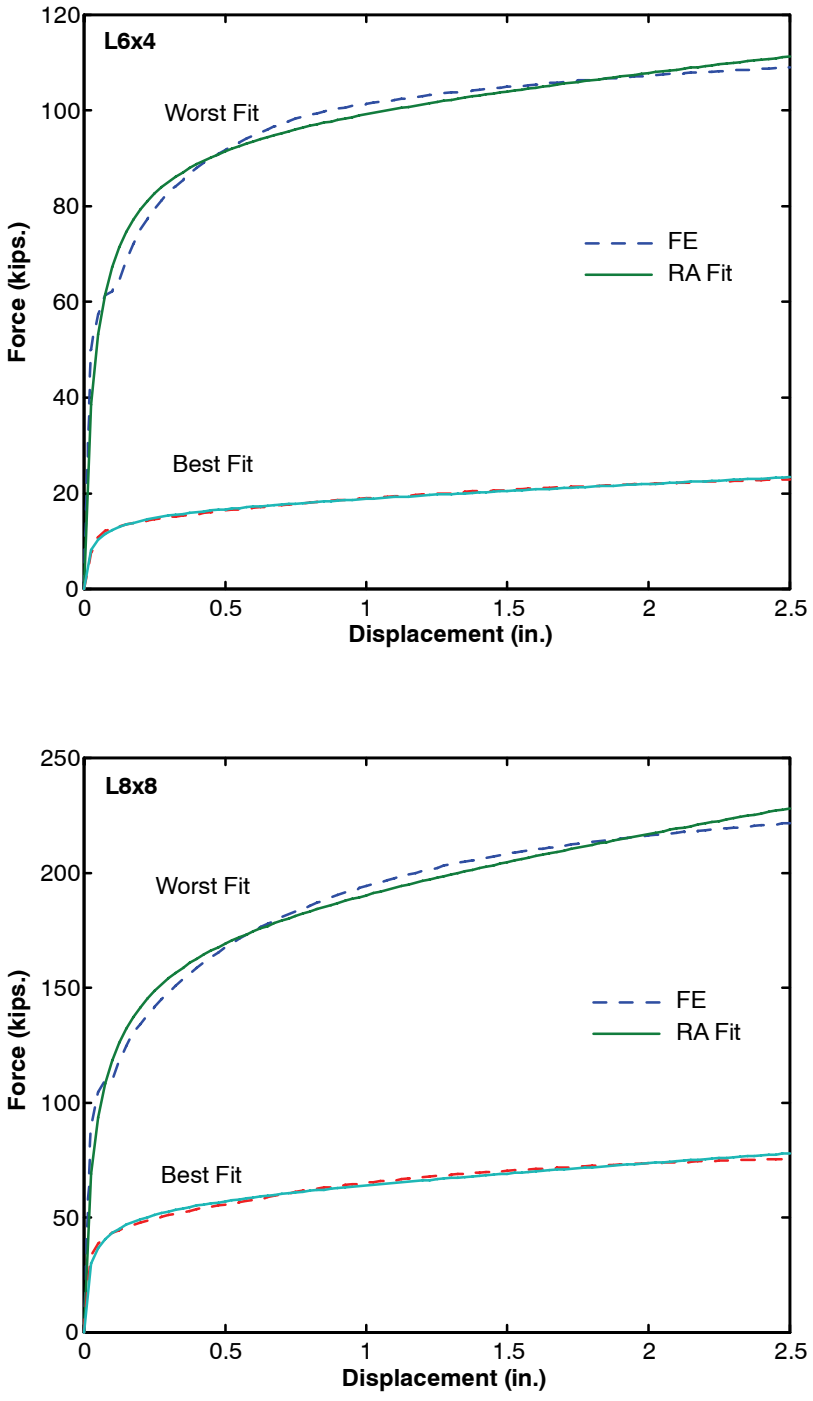


Figure 4.7 Best and worst case of fitted Richard-Abbot equation prediction of the force-displacement response of L6x4 and L8x8 size angles.

4.4.2 Fitted Parametric Richard-Abbott Function for General Connection Response Prediction

Each analysis response is individually normalized and then the Richard-Abbott equation is fitted, so for each case there is a set of coefficients, namely K_{1n}, K_{pn}, n, and Fo, as was shown in Equation 4.5. To create a fitted parametric bolted angle response function to generalize the response prediction to the full dataset, these four coefficients must be related to their respective geometric and topographical parameters shown above in Figure 4.1; these relations are formulated as follows:

$$F_o = a_o \prod_{i=1}^{6} p_i^{a_i} \qquad K_{1n} = b_o \prod_{i=1}^{6} p_i^{b_i}$$
$$K_{pn} = c_o \prod_{i=1}^{6} p_i^{c_i} \qquad n = d_o \prod_{i=1}^{6} p_i^{d_i} \qquad \text{Eqn 4.8}$$

Multiplicative models of this form are often used to represent the combined effects of variables. By expanding the above equations and taking the logarithms of both sides, the relation between the Richard-Abbott coefficients and geometric parameters become a linear relationship.

$$\begin{aligned}
\log F_o &= \log a_o + a_1 \log p_1 + a_2 \log p_2 + \ldots + a_6 \log p_6 \\
\log K_{1n} &= \log b_o + b_1 \log p_1 + b_2 \log p_2 + \ldots + b_6 \log p_6 \\
\log K_{pn} &= \log c_o + c_1 \log p_1 + c_2 \log p_2 + \ldots + c_6 \log p_6 \\
\log n &= \log d_o + d_1 \log p_1 + d_2 \log p_2 + \ldots + d_6 \log p_6
\end{aligned} \qquad \text{Eqn 4.9}$$

The six geometric parameters p_i in the above Equations 4.8 and 4.9 uniquely define each angle in the dataset. These parameters are the beam side angle leg length, column side angle leg length, the angle thickness, bolt diameter, angle width, and the tension bolt gage. Using multiple linear regression the regression coefficients a_i, b_i, c_i, d_i in Equation 4.9 are determined.

The regression coefficients for the parametrized Richard-Abbott function in Equation 4.8 are listed in Table 4.7. The geometric parameters related to the listed regression coefficients are shown in the first row of the table. These geometric parameters are also shown graphically in Figure 4.1. The parametric Richard-Abbott function coefficients are simply plugged into Equation 4.5. The equation generates the nonlinear curve by incrementing the displacement variable, ***d***. The equations were fitted to capture connection responses for displacements up to 2.5 inches.

Table 4.7 Coefficient Values for Parametric Connection in Equation 4.8

Geometric Parameter		p_1	p_2	p_3	p_4	p_5	p_6
	see Figure 4.1	L1	L2	t	db	w	g1

F_o	a_0	a_1	a_2	a_3	a_4	a_5	a_6
	204.47	0.10529	0.1111	1.6259	0.54773	0.49579	−1.5578

K_{1n}	b_0	b_1	b_2	b_3	b_4	b_5	b_6
	319.08	0.5785	−0.27527	−0.75808	2.118	−0.90616	−0.12849

K_{pn}	c_0	c_1	c_2	c_3	c_4	c_5	c_6
	0.03282	0.34959	−0.06021	−0.53918	0.64535	−0.16309	0.59603

n	d_0	d_1	d_2	d_3	d_4	d_5	d_6
	0.39038	−0.1656	0.065924	0.25108	−0.63746	0.28084	0.062665

Using the fitted parametric equation with these coefficients together which model the response of all the bolted angle connections in the dataset, each connection force-displacement response is generated and compared to the response generated by the analytical models. The mean error of the fitted parametric equation predictions is 5.76; this can be interpreted as the average difference between the force response predicted by the parametric fitted curve and that generated by the analytical model in kip units. When the error for all the individual connection response is plotted, there are distinctive peaks for each angle size in the first plot seen Figure 4.8. By inspection all the connection cases with high error low ***g1*** to ***t*** ratios. The fitted function is found to be effective when limited to connections with ***g1*** to ***t*** ratios

greater than 3.5. The error for all cases and those filtered cases are compared in Figure 4.8, it can be seen that by limiting the use of the parametric fitted equation the predictions with high errors are reduced and the average error is reduced from 5.76 to 3.81.

Cases that have $g1$ to t ratios less than 3.5 are found to have slippage which in turn changes the nature of the curve and invalidates the fitting assumptions of Equation 4.8. The assumption is that the log of the equation coefficient and the log of the geometrical parameter have a linear relationship. To verify this limitation of the parametric fitted equations for cases with $g1$ to t ratios less than 3.5, the data for all the L8x6 angles are used to plot the relation between $\log(K_{1n})$ and $\log(g1)$ in Figure 4.9. The curves are plotted with respect to the thickness, t in the third axis. The regression coefficients in Table 4.7 are basically fitted slopes to these curves per each parameter - in this the slope of the log-log curves shown in the figure is the fitted regression coefficient, b_6. It can be seen that the linear relationship is lost for the said $g1$ to t ratios less than 3.5. The variations of the nonlinear response limits the prediction of fitted equation to be generalized for a wide range of connections.

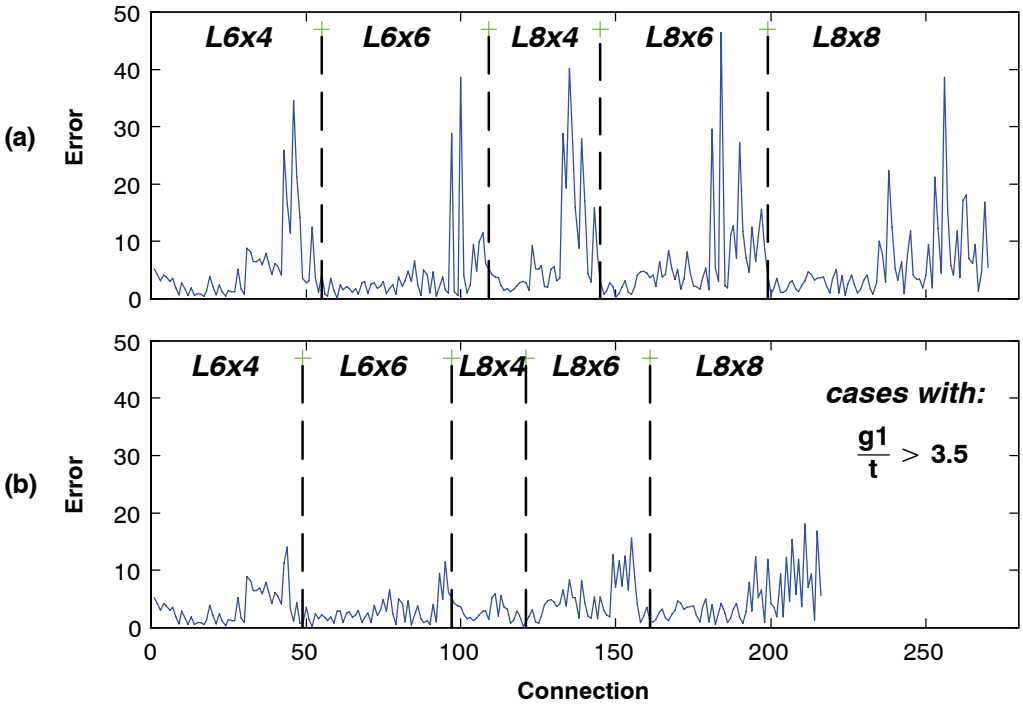


Figure 4.8 Comparison of the mean average of the square root of the summed squares of the residual between the simulated bolted angle connections response and the fitted parametric Richard-Abbot Function and for (a) the entire dataset and (b) filtered cases.

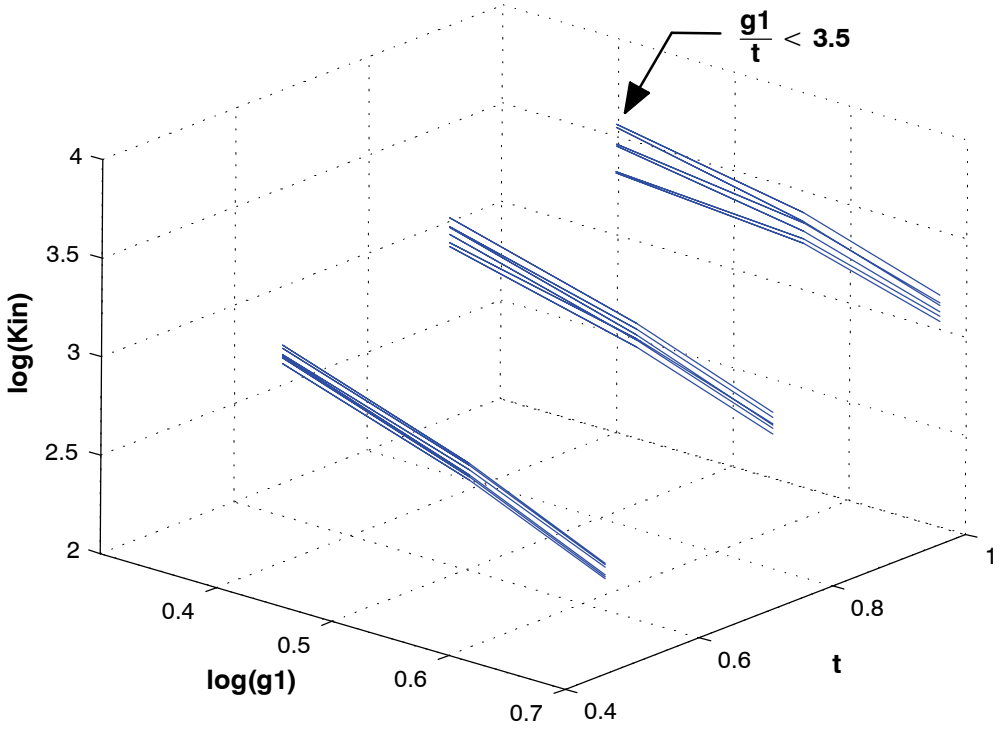


Figure 4.9 Plot of log(K_{1n}) vs. log($g1$) curves per connection thickness for L8x6 angles.

4.5 Neural Networks Based Connection Response Prediction

4.5.1 Neural Network Modeling

An alternative approach to generalize the behavior of the bolted connections is the use of a neural network. The methodology of a neural network is inspired by actual biological nervous systems that consists of a number of neurons connected to each other. The neuron, also referred to as a node, is the building block of the network which is a simple mathematical function which takes a scalar input and converts it to a desired output. By linking these neuron in layers the cumulative behavior of a network of neurons can be tailored to take inputs and process them to lead to a desired behavior. The study and use of neural networks are relatively new with many aspects and applications of the method still under development [70]. The basic mechanics of how neural networks work are explained in this section. Although there are many complex configurations of neural networks possible for even more complex problems, it will be shown that simple neural network architecture can create very effective predictions of bolted connection response.

A single neuron, shown in Figure 4.10, individually takes on one or more input, $\boldsymbol{p}$ which are multiplied by a scalar weight, $\boldsymbol{w}$. All the weighted inputs are summed and a scalar bias, $\boldsymbol{b}$ is added to forms the argument, $\boldsymbol{n}$ for the transfer function, $\boldsymbol{f}$. The transfer function , also known as an activation function, is usually a step function or a sigmoid which gives the final output, $\boldsymbol{a}$ for the individual neuron.

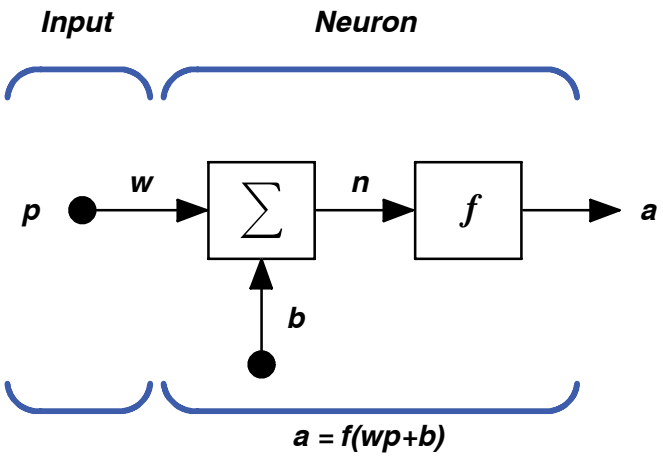


Figure 4.10 Schematic representation of the mathematical functioning of a neuron.

The weight adjusts the effect of an input to a particular node while the bias adjusts the cumulative input into the transfer function of a particular node. The act of adjusting the weights and bias so the output of a neuron or a network matches the targeted response is referred as *training*. Usually the objective of the training is to minimize the mean square error (MSE) between the output and the target data. Once the neural network is trained for a given set of data it is expected to give reasonable output for cases (input) it has not encountered during the training process - so the network can be used to predict the behavior of systems with limited available data.

While a single node alone is not really effective in representing complex relationships, a multiple-layer network is quite powerful. A commonly used architecture in which many nodes are assembled is known as a *multilayered feedforward network,* where the outputs of each intermediate layer of nodes are the inputs to the following layer of nodes as seen in the schematic shown in Figure 4.11.

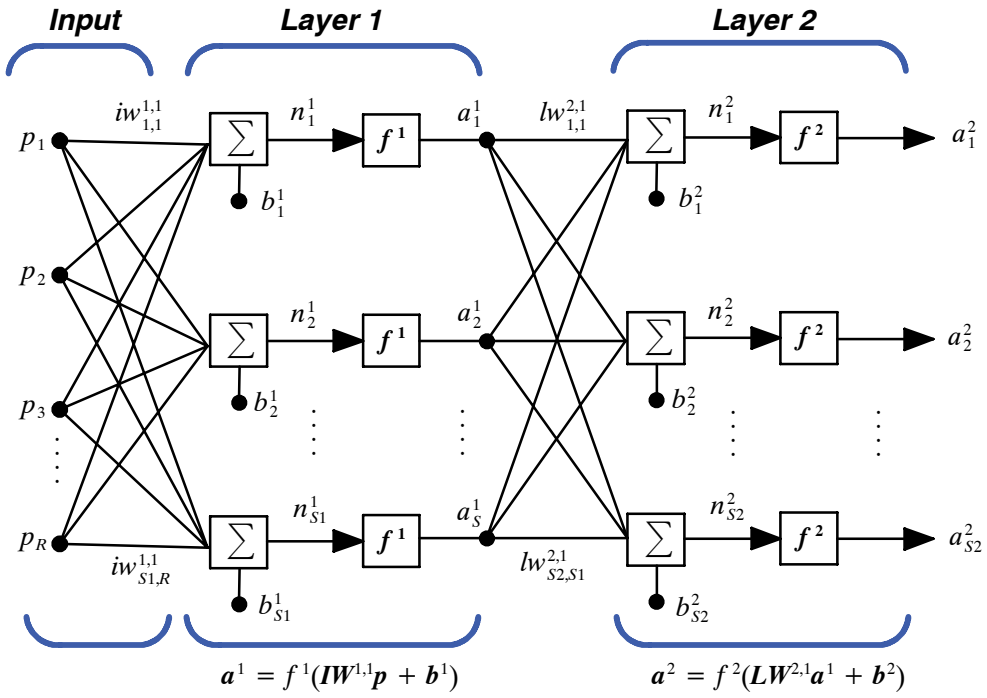


Figure 4.11 Schematic representation of multilayered feedforward neural network.

The number of layers, the number of nodes in each layer, and the type of transfer function used for each layer is by design. The required amount of input and output data is a constraint of the problem to be solved, but the number of layers and nodes are independent. Once the architecture is determined each input variable is individually connected to the nodes on the first layer. The output of the first layer is fed into the second layer and so forth.

Once the architecture along with the numerical values of the weights and biases are known, the application of a neural network mathematically is straight forward. The challenge is determining the suitable architecture of the neural network for a given problem and than train the network in which the numerical values of the weights and biases are determined which minimizes the mean square error between the output of the network and the target data.

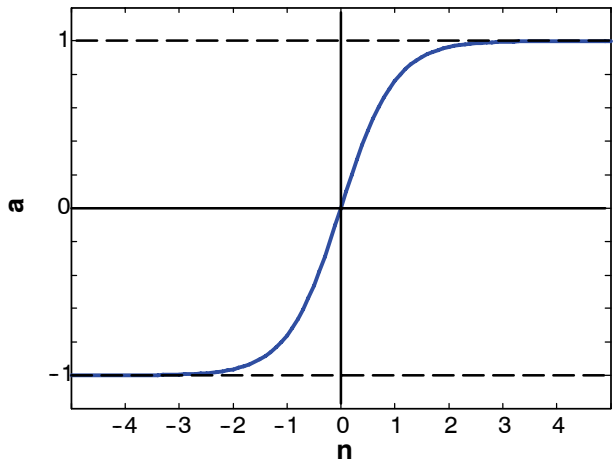
There are many training algorithms developed in literature which is beyond the scope of this study, though all these training algorithms use the gradient of the performance function (the mean square error) iteratively to adjust the weights and biases in order to minimize

the performance function. In each iteration the weights and biases are adjusted in the direction of the negative gradient of the performance function. A technique named *backpropagation* is used where the computations are performed backwards through the network using the derivatives of the network error to determine this gradient. Various optimization methods are implemented to speed up the training process.

The architecture and method of training affects the success of a network to "fit" the data. Some trial and error with the architecture is necessary to determine which leads to the best fit. While having a larger neural network means more computation time for training, more nodes and layers does not particularly mean a better fit. The balance of the number of layers and nodes of the network are important as these affect the overall fitting and prediction performance.

The problem of developing a generalized network which can predict a wide range and number of parameters is analogous to fitting polynomial functions. Having too many nodes may lead to *overfitting* which is like fitting data with a polynomial that has a degree too high for the problem where the high degree polynomial passes through the data points oscillating between positive and negative slopes. Whereas not using enough nodes leads to the opposite case of *underfitting* - using a lower degree polynomial to fit data which requires a higher degree polynomial.

As noted previously, the sigmoid transfer function is commonly used in multilayer networks. The function takes input, $\boldsymbol{n}$ from an infinite range and compresses it into a finite output range for a of [-1,1]. The expression for the hyperbolic tangent sigmoid function used in this study and its representative plot is shown in Figure 4.12.



$$a(n) = \frac{2}{(1 + exp^{-2n})} - 1$$

Figure 4.12 Hyperbolic tangent sigmoid transfer function.

In order to have the transfer functions work efficiently all data used in training the network are condensed to the range of [-1,1]. This means that the weights and biases are tuned to handle normalized input data. The minimum and maximum data values of each parameter are required to make use of the neural network. The simple relationship shown in Equation 4.10 is used to preprocess the input parameter, ***p*** by condensing it between the minimum and maximum value scaled to a range between -1 and 1 while Equation 4.11 post process the output data by mapping the output value, ***p*** to its actual numerical value.

$$p_n = 2\frac{(p - p_{min})}{(p_{max} - p_{min})} - 1 \qquad \text{Eqn 4.10}$$

$$p_{un} = 0.5(p + 1)(p_{max} - p_{min}) + p_{min} \qquad \text{Eqn 4.11}$$

The input parameters used to train the neural network using the bolted angle connection response dataset generated from finite element simulations are the same used in the previous section to fit the parametric Richard-Abbott function. These input parameters are as follows: ***L1***, the beam side leg length of the angle; ***L2***, the column side leg length of the angle; ***t***, the thickness of the angle; ***db***, the bolt diameter; ***w***, the angle width; ***g1***, the tension

bolt gage; and ***d***, the displacement of the connected pull plate bolted to the angle which are mapped to the force response by the neural network.

4.5.2 Trained Neural Network for Connection Response

The neural network architecture capable to generalize the bolted angle connection behavior of the connections without overfitting is a 3 layer network with the first two layers having 7 nodes, each with a sigmoid transfer function and the third layer having single node with a linear transfer function. The last single nodal layer gives the corresponding force to the specific displacement entered in the input vector for a given connection. The neural network works the same as a function which maps the given displacement to the force response point by point to construct the overall nonlinear response.

The minimum and maximum value vectors of the input parameters shown in Equation 4.12 are necessary to map the input vector, $\boldsymbol{p_n}$ using Equation 4.10. Figure 4.1 shows the geometrical correspondence of each input variable. Variable ***d*** is the displacement of the bolted angle which is set to a range of 0 to 2.5 inches in this study. Similarly, the minimum and maximum values in Equation 4.13 are necessary to unnormalize the force output for a given displacement using the relationship for $\boldsymbol{p_{un}}$ in Equation 4.11.

The weights between the input layer and first layer are given by the 7x7 $\boldsymbol{IW^{1,1}}$ matrix shown in Equation 4.14. These weight values relate the input nodes to the first layer nodes column by column. The first column of the $\boldsymbol{IW^{1,1}}$ matrix relates the first input source node to each of the seven nodes in the first layer. The 7x7 $\boldsymbol{LW^{2,1}}$ matrix given in Equation 4.15 similarly gives the weights between the nodes in the first and second hidden layers. Finally, the 1x7 $\boldsymbol{LW^{3,2}}$ matrix gives the weights between the seven nodes in the hidden second layer and the single node output layer of the neural network.

Using the equations shown in the bottom of Figure 4.11 for each layer the weight matrix is multiplied by the input vector and summed with a bias. Equation 4.17 gives the bias

values for all three layers, one for each node. At every level the output of this operation is passed through a transfer function becoming the input of the next layer. As previously noted, the architecture of this neural network uses the sigmoid function shown in Figure 4.12 for the hidden layers and a simple linear transfer function for the output layer.

$$p = \begin{Bmatrix} L1 \\ L2 \\ t \\ db \\ w \\ g1 \\ d \end{Bmatrix} \qquad p_{min} = \begin{Bmatrix} 6.0 \\ 4.0 \\ 0.3125 \\ 0.5 \\ 6.0 \\ 2.25 \\ 0 \end{Bmatrix} \qquad p_{max} = \begin{Bmatrix} 8.0 \\ 8.0 \\ 1.0 \\ 1.0 \\ 8.0 \\ 6.75 \\ 2.5 \end{Bmatrix} \qquad \text{Eqn 4.12}$$

$$f_{min} = \{ 0 \} \qquad f_{max} = \{ 221.66 \} \qquad \text{Eqn 4.13}$$

$$IW^{1,1} = \begin{bmatrix} -9.2949e-03 & -2.3363e-03 & 3.2209e-01 & 5.7958e-02 & 7.4493e-03 & -8.2541e-01 & -9.4140e-03 \\ 5.7716e-03 & 7.7493e-01 & -1.0662e+00 & 9.0034e-01 & -1.3951e-01 & 1.1172e-01 & -2.7095e-01 \\ -8.9598e-03 & 2.8439e-02 & 4.3011e-01 & 1.7497e-02 & 3.1336e-02 & -6.1448e-01 & -6.2392e-01 \\ 5.5178e-03 & 4.7227e-02 & 3.2548e-01 & -1.3060e-03 & 6.0043e-02 & -3.0730e-01 & 7.4289e-02 \\ 3.5722e-03 & 2.3253e-02 & -2.8827e-02 & -1.1207e-01 & -1.4010e-03 & 1.6256e-03 & -8.9809e-03 \\ -1.1503e-02 & -2.5148e-02 & 1.6036e-01 & -5.7560e-02 & -3.6942e-02 & 3.4671e-01 & -7.2420e-02 \\ -5.1555e-03 & -4.0536e-03 & 1.8636e-01 & 9.7689e-02 & 9.0623e-03 & -2.0649e-01 & -9.8108e+00 \end{bmatrix} \qquad \text{Eqn 4.14}$$

$$LW^{2,1} = \begin{bmatrix} 3.4489E+00 & -8.7356E-02 & 3.3919E+01 & 4.9325E+00 & 9.6414E+00 & 4.5368E+00 & -9.1602E+00 \\ -6.1752E-01 & 7.6718E-02 & 2.7598E+00 & -4.6614E+00 & -1.5284E+01 & 1.2800E+00 & -6.0508E+00 \\ 5.7098E+01 & -7.3301E-02 & -6.4352E+01 & 7.3562E+01 & 3.7002E+01 & 2.3694E+01 & 8.6821E+00 \\ 3.9269E-01 & 7.6054E-02 & 1.9058E+00 & -2.8954E+00 & -1.5368E+01 & 1.5236E+00 & -6.5538E+00 \\ -5.5981E+00 & -5.8615E-01 & -2.7616E+00 & -4.9857E+00 & -1.5872E+01 & 2.4126E+00 & 1.7379E-01 \\ -1.3225E+01 & 3.5202E-01 & 1.4254E+01 & -2.3250E+01 & -2.2385E+01 & -3.8846E+00 & -2.3306E+00 \\ -1.6078E+01 & 3.7971E-01 & 1.6711E+01 & -2.7406E+01 & -2.6175E+01 & -4.5362E+00 & -2.5224E+00 \end{bmatrix} \qquad \text{Eqn 4.15}$$

$$LW^{3,2} = \begin{bmatrix} 1.5332E+00 & -5.2877E+01 & 3.8710E-01 & 4.7227E+01 & 1.7550E+00 & 2.0776E+01 & -1.5451E+01 \end{bmatrix} \qquad \text{Eqn 4.16}$$

$$b^1 = \begin{Bmatrix} -3.0699E+00 \\ 5.8391E-01 \\ -3.5791E+00 \\ -2.8396E+00 \\ 1.8368E+00 \\ 2.2911E+00 \\ -1.1178E+01 \end{Bmatrix} \qquad b^2 = \begin{Bmatrix} 2.0754E+01 \\ 4.4315E+00 \\ 1.6454E+01 \\ 5.6858E+00 \\ -1.2452E-02 \\ 7.5637E-01 \\ 3.1786E-01 \end{Bmatrix} \qquad b^3 = \{ -4.5405E+00 \} \qquad \text{Eqn 4.17}$$

The mean average of the square root of the summed squares of the residual between the simulated response and the predicted response from the trained neural network for all of the bolted angle connections in the dataset is 0.57. This is roughly one tenth of the mean error of the predictions obtained using the fitted Richard-Abbott function described in the pre-

vious section. A comparison of the mean square errors for the predictions from the neural network and the fitted parametric Richard-Abbott function is given in Figure 4.13 for all of the bolted angle connection cases in the dataset. Unlike for the fitted function the neural network prediction accuracy is homogeneous for all of the connections in the dataset which reflects no bias to any certain connection geometry.

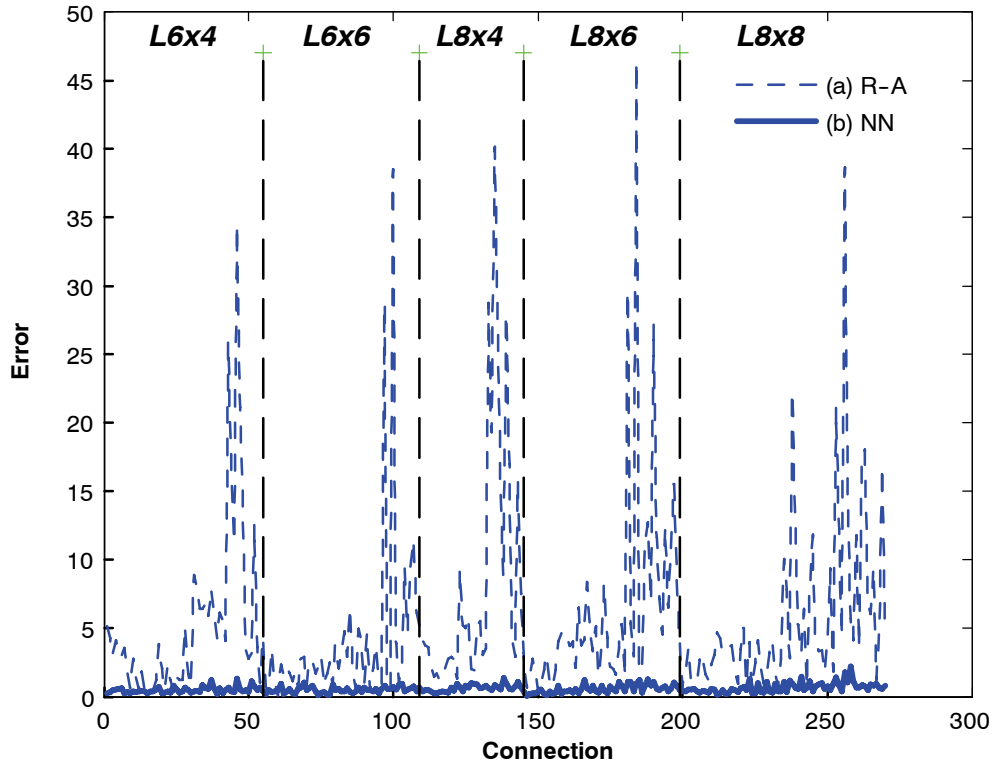


Figure 4.13 Comparison of the mean average of the square root of the summed squares of the residual between the simulated bolted angle connections response and the (a) the fitted parametric Richard-Abbot function and (b) the trained neural network predictions.

4.6 Model Verification and Prediction

4.6.1 Verification of Model Predictions Using Analysis Data

The response of connection configurations not used in calibrations are predicted by both the fitted Richard-Abbott function and neural network model and compared to assess their true prediction performance. The verification cases used in this study is given in Table

4.8. The variables used in the verification cases are in bold in comparison with the variables used in training the models.

All extreme and median combinations of the essential geometrical variables, namely the thickness, bolt size, and tension bolt gage (***g1***) are utilized in this verification. In total 18 connection configurations are simulated and compared to the function and neural network predictions and presented in Figure 4.14. Both modeling approaches are successful in predicting the initial stiffness of the connections. While the neural network predictions for all 18 cases are fairly accurate; the parametric fitted function in most cases under predicts the connection strength in the nonlinear response of the connections.

Table 4.8 Connection Verification Set Parameters									
Angle	Thickness	Bolt Diameter	Tension gage (g1)	Bolt gage (g2)	Bolt gage (g3)	Width	Bolt column spacing	Bolt beam spacing	Number of Runs
L8x8	1/2 ***9/16*** 5/8 ***3/4*** 7/8	3/4 ***7/8**** 1	2.50 ***3.00*** 4.50 ***4.00*** 6.75	3	3	6	3.5	3.5	4
L8x6	1/2 ***5/8*** 3/4 ***7/8*** 1	***3/4**** 7/8 1	2.50 ***3.00*** 3.625 ***4.00*** 4.75	3	3	8	5.5	3.5	4
L8x4	1/2 ***5/8*** 3/4 ***7/8*** 1	3/4 7/8 ***1****	2.50 ***2.60*** 2.70	3	3	6	3.5	3.5	2
L6x6	5/16 ***3/8*** 1/2 ***5/8*** 3/4	1/2 ***5/8*** 3/4	2.50 ***3.00*** 3.5625 ***4.00*** 4.875	2.5	2.25	8	5.5	3.5	4
L6x4	5/16 ***3/8*** 1/2 ***5/8*** 3/4	1/2 ***5/8*** 3/4	2.25 ***2.50*** 2.5625 ***2.75*** 2.8750	2.5	2.25	6	3.5	3.5	4

** bolt diameter used in calibration set all others not used.*

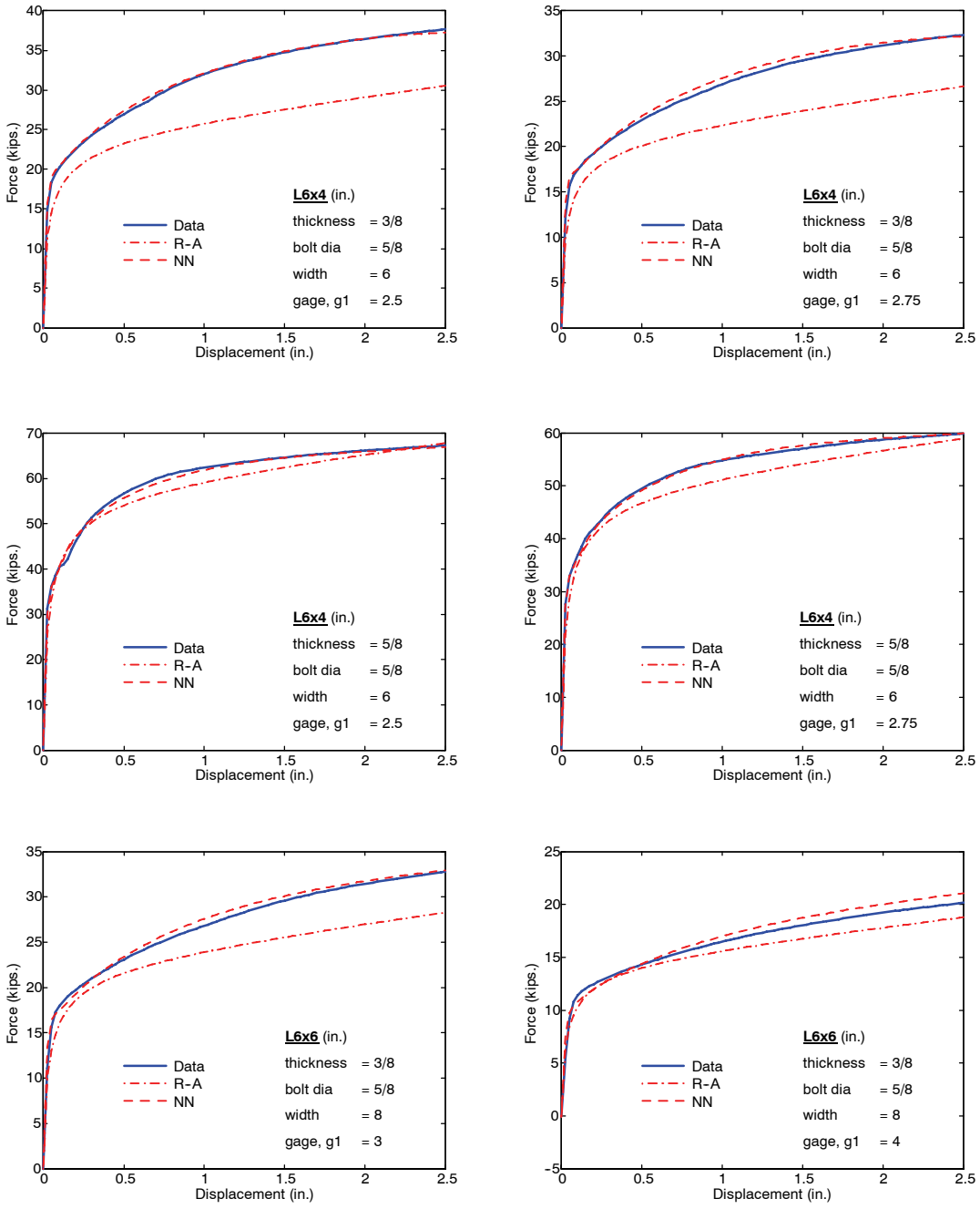


Figure 4.14 The behavior of bolted steel angle connections for various geometry generated by FE simulation (Data) *predicted* by the fitted Richard-Abbot (R-A) equation and the trained neural network (NN) for cases not used in the fitting and training as shown in Table 4.8.

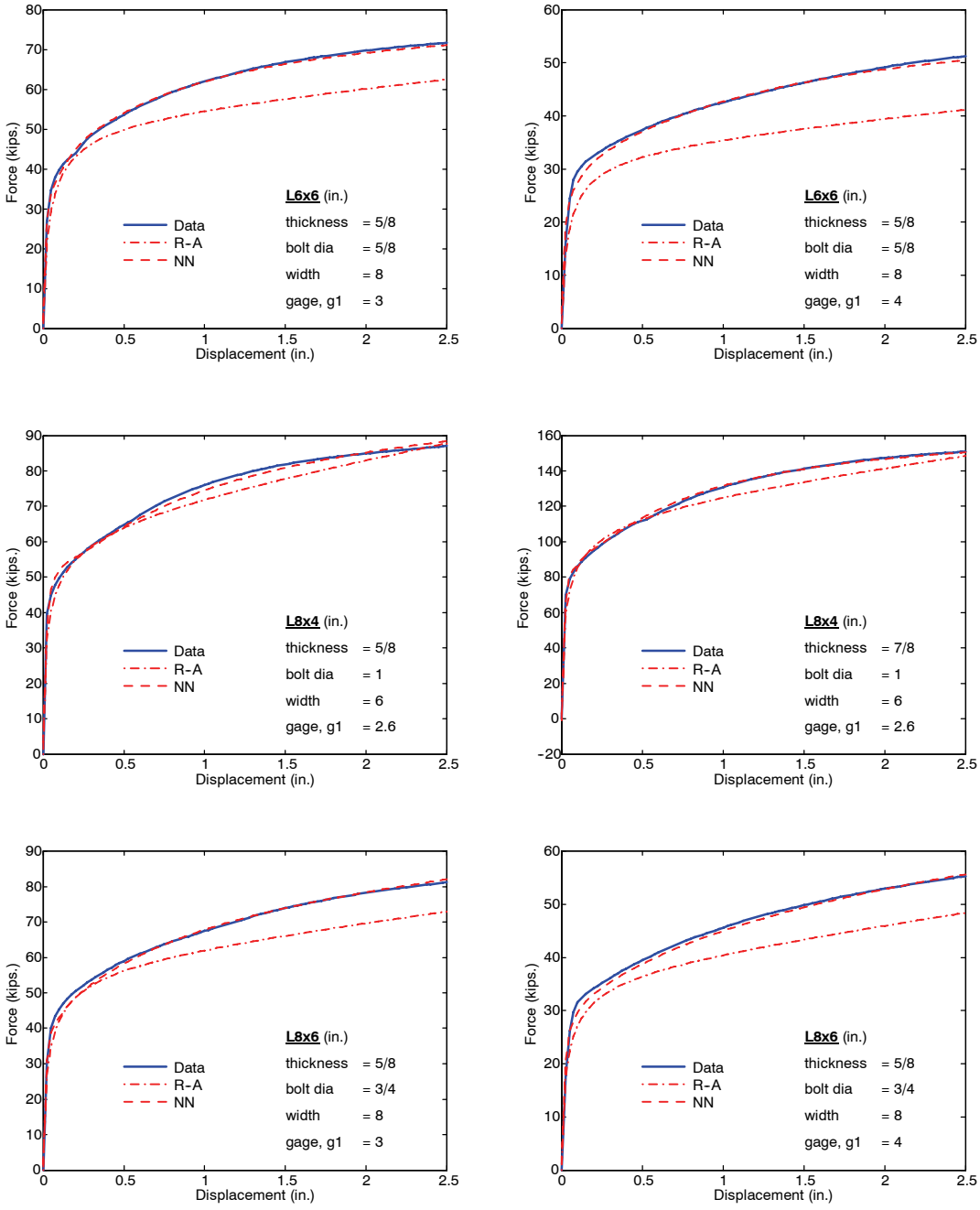


Figure 4.14 (*continued*) The behavior of bolted steel angle connections for various geometry generated by FE simulation (Data) *predicted* by the fitted Richard-Abbot (R-A) equation and the trained neural network (NN) for cases not used in the fitting and training as shown in Table 4.8.

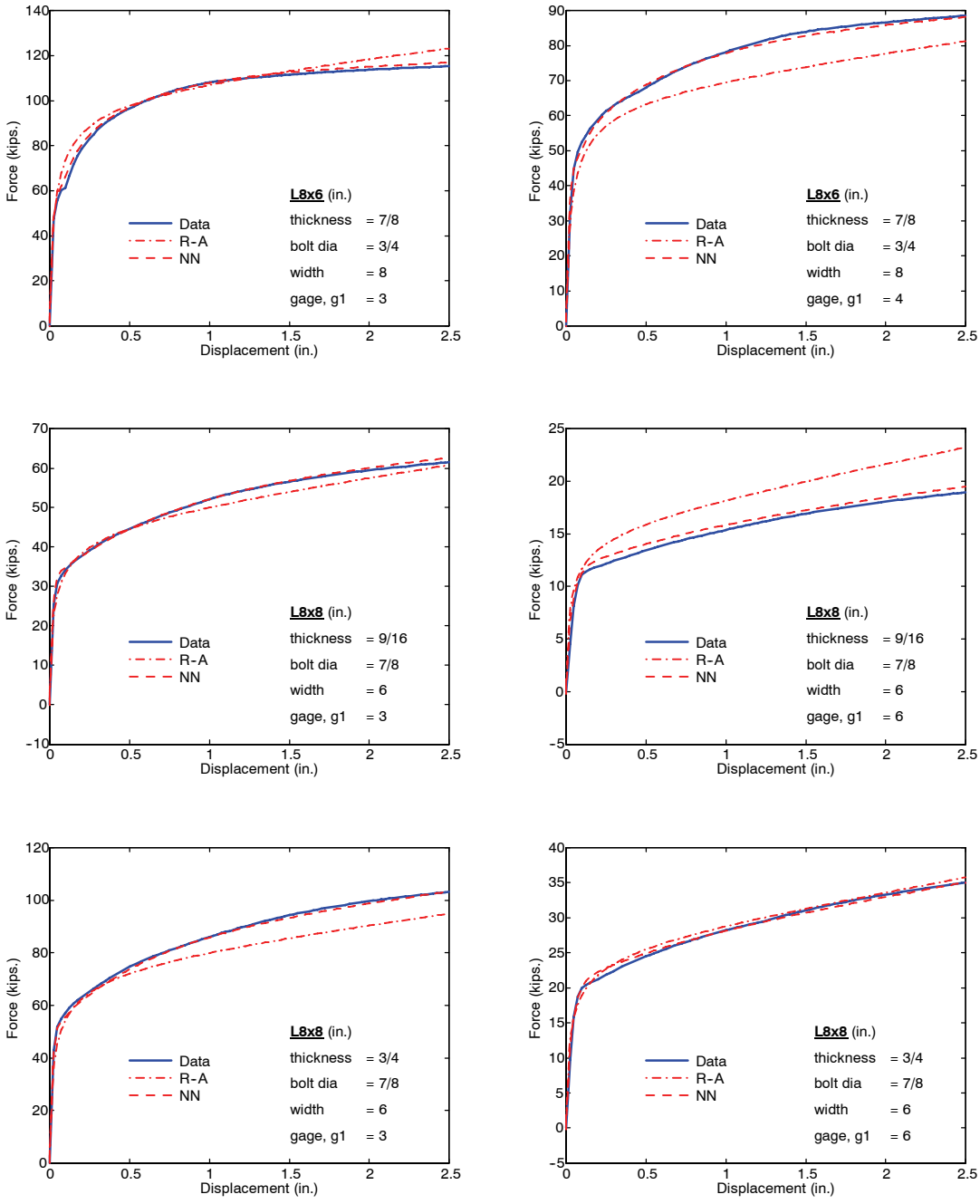


Figure 4.14 (*continued*) The behavior of bolted steel angle connections for various geometry generated by FE simulation (Data) *predicted* by the fitted Richard-Abbot (R-A) equation and the trained neural network (NN) for cases not used in the fitting and training as shown in Table 4.8.

4.6.2 Model Prediction of Experimental Data

In this section both the parametric fitted Richard-Abbott function and trained neural network are used to predict the response of tested bolted angle connection members to truly assess their prediction capability and practical usefulness beyond the simulations they are based on.

As part of the extensive experimental work done by Swanson [103] on T-stub connections which involved testing individual steel connection components under cyclic loading, thick angle components were also tested as possible alternatives to using T-stubs. The geometry and topography of the tested angles are within the scope of the fitted equation and trained neural network and offers an ideal test bed for their performance in predicting bolted angle response. The angles were designed to be connected within a beam-column assembly with a pair of tension bolts on the column side leg and four bolts on the beam side leg as shown in Figure 4.15.

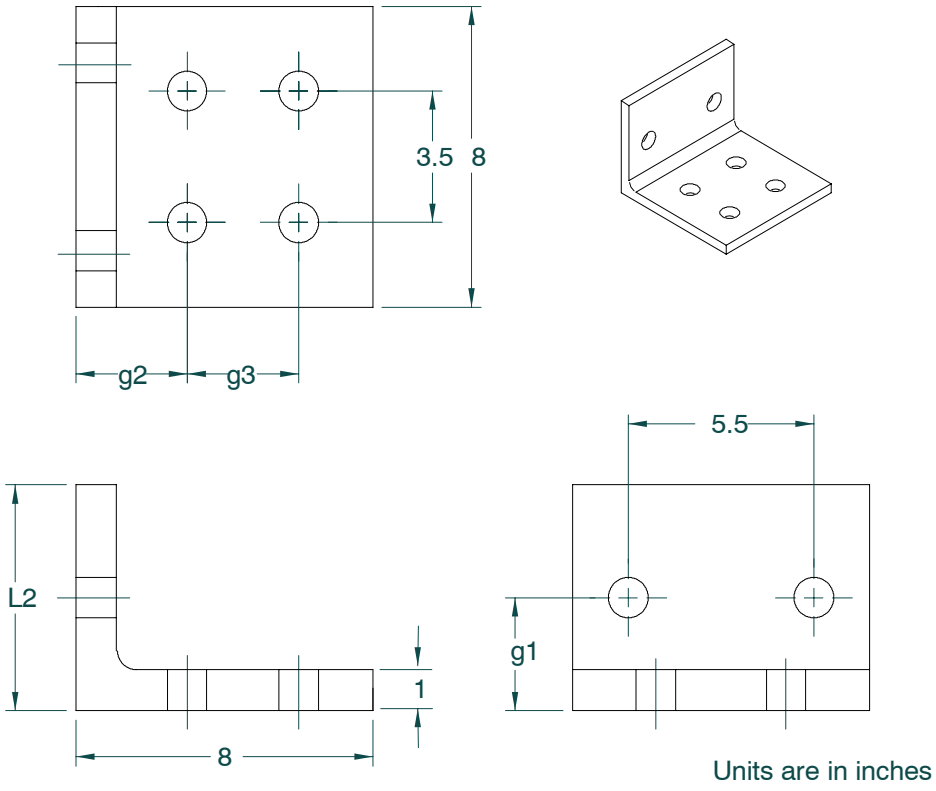


Figure 4.15 Bolted Angle Connection Topography and Parameters tested by Swanson.

All of the angles tested were of A572 grade 50 steel and had a thickness of one inch. The beam leg was 8 inches while the column leg had a varying length of 4 and 6 inches. Bolt sizes of 7/8 and 1 inch were used and based on the diameter bolt spacing on the beam side leg were varied slightly. The geometrical parameters of each test specimen are listed in Table 4.9. The majority of the tested specimens have A490 grade bolts, but to compare the effects of bolt grade specimens with the same geometry of specimens CA10 and CA12 were tested with A325 grade bolts and identified as CA14 and CA16, respectively.

The strength of the grade 50 angles were determined to be 55 ksi by testing as a part of the experimental program. The analytical models used to fit and train the prediction function and neural network were modeled with a material strength of 41 ksi typical for grade 36 steel.

Aside from the difference in material strength the largest variation in geometry between test specimens and those in the simulated dataset is the connection setback. The setback is the gap between the end of the beam and the flange of the column. A half inch setback is used in the simulated dataset models which is typical in connections whereas in the specimens tested by Swanson the setback was greater to account test setup for the larger size members. The setback in the tests varied from 1-1/2 in to 1-7/8 in depending on the bolt diameter. Another slight difference exists between the bolt gages ***g2*** and ***g3*** on the beam side angle leg for tested connections with 7/8 in diameter bolts and the simulated dataset connections. For the test connections with 1 in diameter bolts these gage values are the same.

Table 4.9 Experiment Specimens used for Model Predictions [103]

Specimen	Angle	Bolt Diameter	Bolt Grade	Setback(in)	Tension gage (g1)	Gage (g2)	Gage (g3)
CA01	L8x4x1	7/8	A490	1.875	2.5	3.1875	2.625
CA02	L8x6x1	7/8	A490	1.875	2.5	3.1875	2.625
CA04	L8x6x1	7/8	A490	1.875	4.0	3.1875	2.625
CA09	L8x4x1	1	A490	1.5	2.5	3.0	3.0
CA10	L8x6x1	1	A490	1.5	2.5	3.0	3.0
CA12	L8x6x1	1	A490	1.5	4.0	3.0	3.0
CA14	L8x6x1	1	A325	1.5	2.5	3.0	3.0
CA16	L8x6x1	1	A325	1.5	4.0	3.0	3.0

The specimens test by Swanson were subjected to cyclic axial loads following a protocol consisting several constant cycles of increasing displacement amplitudes. The target pull displacements of the angle components in tension where determined based on expected connection rotations of the beam flange which the angle would be connecting. The simulated connection models in the dataset on the other hand is monotonically loaded which as shown by tests generate the envelope of the cyclic response, so can be used to compare with the cyclic test results. Figure 4.16 compare the predicted monotonic response from using the fitted Richard-Abbot (RA) equation and trained neural network (NN) to the cyclic response of the tested steel angle specimens.

The neural network successfully predicted the envelope of the cyclic response of the tested bolted angle connection, including bolt slippage seen as the plateau in the response curves. Although the fitted RA equation does not predict bolt slippage, it too gives a fairly good envelope prediction.

Given the fact the fitted parametric equation and trained neural network were calibrated with analytical models with different material grade and in some cases different bolt grade, than those in the tested cases yet predict response envelopes fairly accurately in all test cases indicates that the nonlinear angle response not sensitive to variation in material grades. This insensitivity will potentially give some leeway in using such calibrated predictive models to approximate the response of bolted connection components which perhaps not exactly match the intended material and geometry.

The use of the parametric Richard-Abbott function is straight forward, a detailed step by step example demonstrating the application of the Neural Network model to generate a bolted angle connection response is demonstrated in Appendix A.

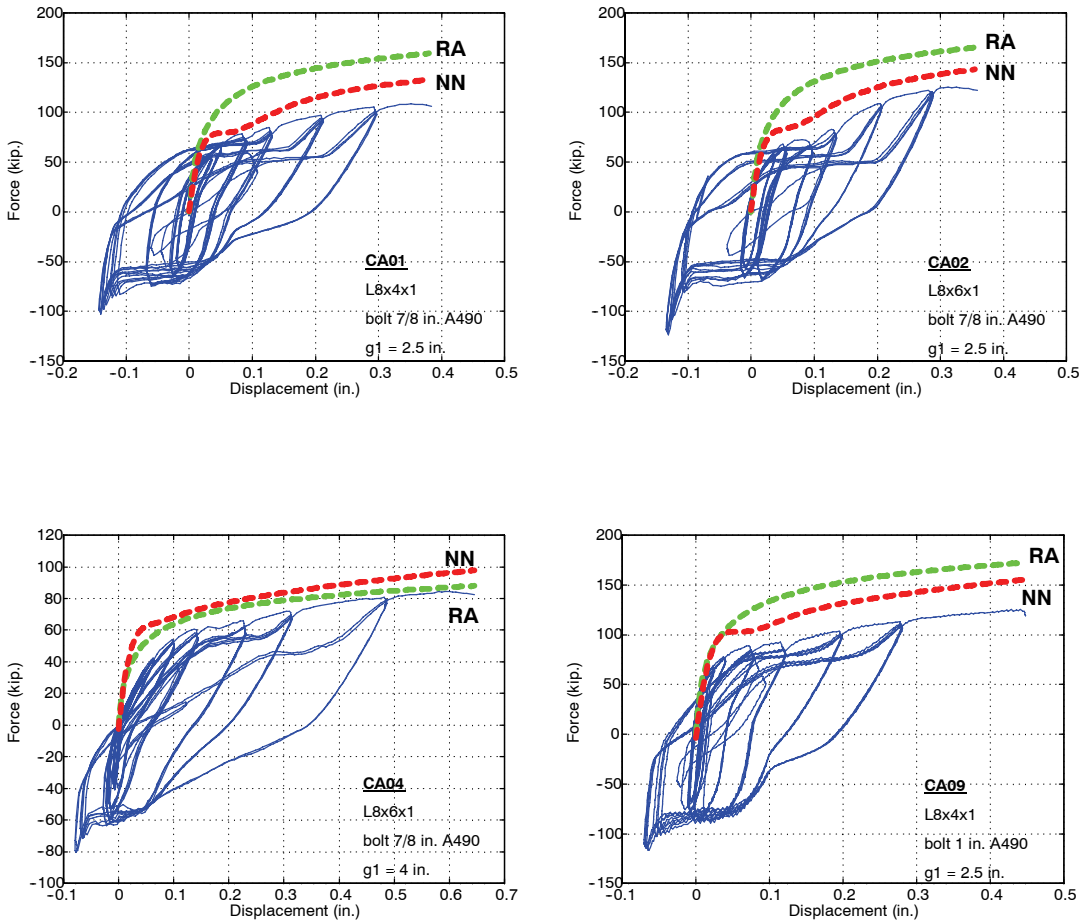


Figure 4.16 The fitted Richard-Abbott (RA) equation and trained Neural Network (NN) monotonic response compared to the cyclic response angle component specimens tested by Swanson (103).

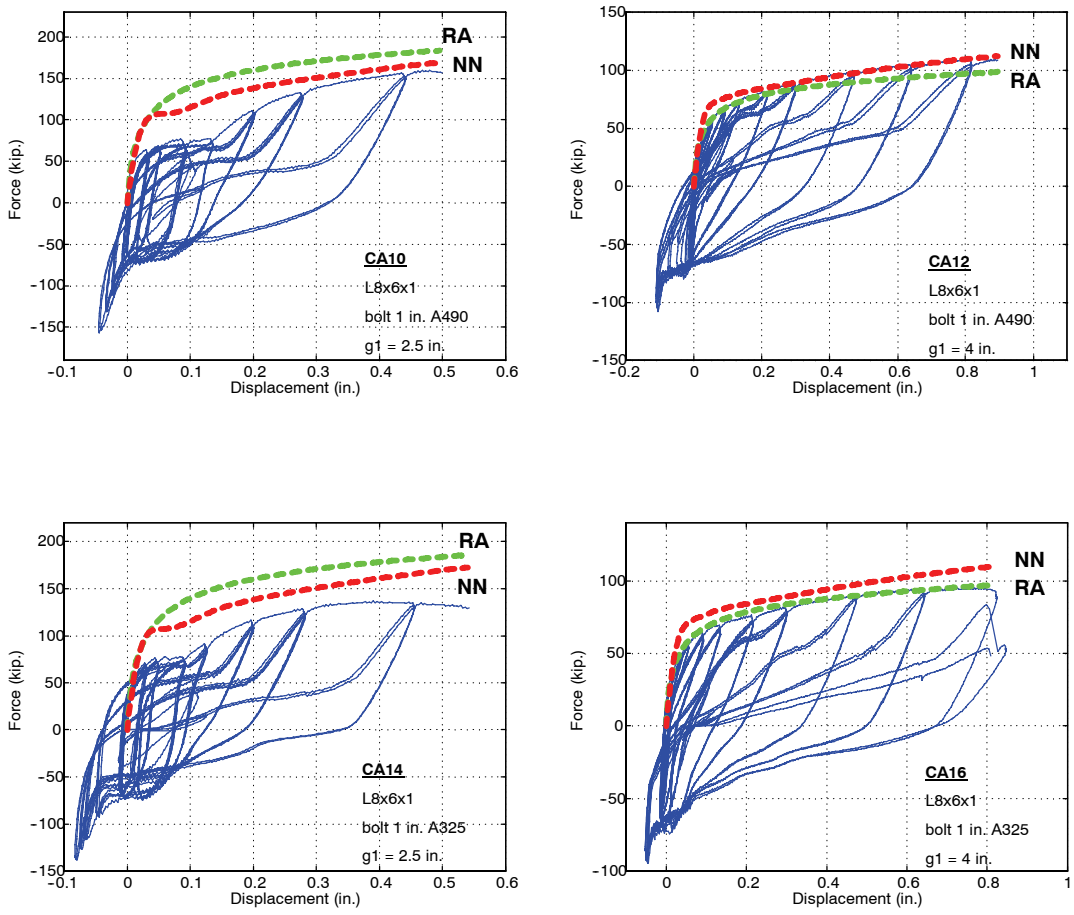


Figure 4.16 (*continued*) The fitted Richard-Abbott (RA) equation and trained Neural Network (NN) monotonic response compared to the cyclic response angle component specimens tested by Swanson (103).

4.7 Summary

In this chapter a large dataset of 405 nonlinear bolted angle connection force-displacement response is generated using parametric refined three dimensional finite element models. The parameters of the bolted angles is representative of the range commonly seen in practice and complies with design limitations per code. The response dataset is used to fit a parametric Richard-Abbott function as well as train a neural network to demonstrate their use to practically predict the response of bolted angle connections. The two approaches can be used to consolidate a wide array of test and analytical data into a practical tool to predict connection response. Comparing predictions of the function and neural network of the response of cases not included in the dataset demonstrate that both approaches are good at predicting of the connection initial stiffness. The trained neural network is particularly successful in predicting the full nonlinear connection response and even capable in predicting the impact of bolt slippage to the overall connection response with the fitted Richard-Abbott function is limited in the range of connections where it can predict the connection response accurately. Finally the two prediction approaches are applied to tested bolted which slightly vary in parameters and material grade than the connections simulated in the dataset angles and cyclically loaded. Despite this fact, the predictions envelope the cyclic test response fairly well. This indicates that the nonlinear connection response is not sensitive to variations in material grade and connection configuration. This is promising for expanding the use of such methods for a wider range of connections were a neural network approach is clearly superior that that of a fitted equation.

CHAPTER 5

STRENGTH MODELS - IDENTIFYING CONNECTION FAILURE

The previous chapter presented alternative ways to model the nonlinear response of bolted angle connections. This knowledge alone does not fully describe the connection response without the capacity and mode at which the connection fails. To assess connection failure and consequently the connection capacity requires the identification of the possible failure modes and assessment at each load level to determine if the demand exceeds the connection capacity.

Knowledge of structural component nonlinear response, failure strength, failure mode and consequently the ductility is fundamental to apply *performance based design*. Post Northridge design specifications for moment steel connections force designers to consider not only strength, but also ductility. Furthermore, interest in bolted connections peaked due to the inherent consistency in performance of bolts which also lack the material and quality control difficulties associated with welding.

In this chapter failure modes for bolted angle connections will be identified and the methods to calculate them will be presented. Finally, a rational procedure to determine failure using analytical connection models will be calibrated and validated with tested connections.

5.1 Limit States Hierarchy

Limit states define the change or elimination of the force transfer path through the connection such as bolt slippage or fracture. In general, limit states do not always imply fail-

ure or an undesirable behavior. A limit state can be characterized as brittle or ductile based on the manner to which the limit is achieved.

Brittle limit states are sudden events with little or no prior deformations to warn of its occurrence. Fracturing of a component is a brittle limit state which leads to the elimination of the load path and in the design of connections it is considered to be an ultimate limit state which is to be avoided as a primary mechanism for failure.

Ductile limits states are relatively gradual events accompanied with deformations which enable the redistribution of loading paths warning the onset of the limit. Not all ductile limit states are failures in the real sense, but may be a limit for serviceability and performance goals. It is desirable that a ductile limit states precede brittle limits states leading to complete failure of the connection.

Table 5.1 lists the limit states for bolted angle connections loaded in tension, listing both the manner in which the limit is achieve (brittle or ductile) and the type of the limit whether it is a design limit or an ultimate limit which leads to full loss of force carrying capacity.

Table 5.1 Bolted Angle Component Limit States

Limit State	Brittle/ Ductile	Design/Ultimate
Slippage of bolts	Ductile	Design
Angle Leg Mechanism in Bending	Ductile	Design
Yielding of Angle Leg in Tension	Ductile	Design
Block Shear	Ductile	Ultimate
Angle Leg Fracture	Brittle	Ultimate
Shear Bolt Fracture	Brittle	Ultimate
Tension Bolt Fracture	Brittle	Ultimate

Models used to calculate limit states will reviewed in the following sections. First, mechanics based strength models described in the AISC LRFD Specification [6] and other

literature are presented. These models reflect current design practice. Following that micro-mechanics based models are presented, one of which is used to predict the failure of the clips angles from the output of the refined three dimensional finite element analyses. These models are calibrated from T-stub and clip angle pull tests performed by Swanson [103].

5.2 Mechanics Based Strength Modeling

5.2.1 Bolt Strength

Structural bolts can be grouped as common and high strength [62]. Common bolts are designated by ASTM LRFD Specification A307 [12]. This type of bolt is generally used for direct force transfer through the bolt with no pretension with loads that are relatively low and static without vibration or load reversal. These types of bolts are not used in the structural connections within the scope of this study.

High Strength bolts on the other hand are generally pretensioned and at service loads are meant to transfer the forces between different components through clamping. This makes the connection better suited to resist cyclic loads with minimum impact on the bolt force until the forces overcome the clamping and slipping occurs. There are two grades of high strength bolts designated by ASTM LRFD Specifications A325 [13] and A490 [14]. The application of these two grade bolts are meant for connections assembled per the requirements of the Research Council on Structural Connections (RCSC) Specification [82].

A325 bolts range from 1/2 inch to 1-1/2 inch diameters. The minimum specified strength for bolt diameters 1 inch and less is 120 ksi, above 1 inch is 105 ksi. The difference in specified strength with respect to diameter was due to metallurgical restrictions which do not exist anymore although the distinction in the specification remains [62]. There are two types available for this grade bolt. Type 1 is made of medium carbon, carbon boron, or medium carbon allow steel, while Type 3 is made of corrosion resistant weathering steel which

is used in structures made of steel with the same characteristics. Type 2 is not defined in the specification anymore.

A490 bolts also range from 1/2 inch to 1-1/2 inch diameters. This grade bolt is heat treated and has a greater minimum specified strength of 150 ksi. Like the A325 bolts, there are two types available. Type 1 is made of alloy steel, while Type 3 is atmospheric corrosion resistant intended to be used in structures made of material with the same corrosion resistant characteristics. Type 2 A490 bolts are no longer manufactured [62]. Figure 5.1 shows the comparison of stress-strain response of material samples taken from the two bolt grades. Note that while A490 bolt material achieves greater strength per specification it is less ductile compared to the A325 bolt material. This is true when comparing the total force response of the two grade bolts in tension as well.

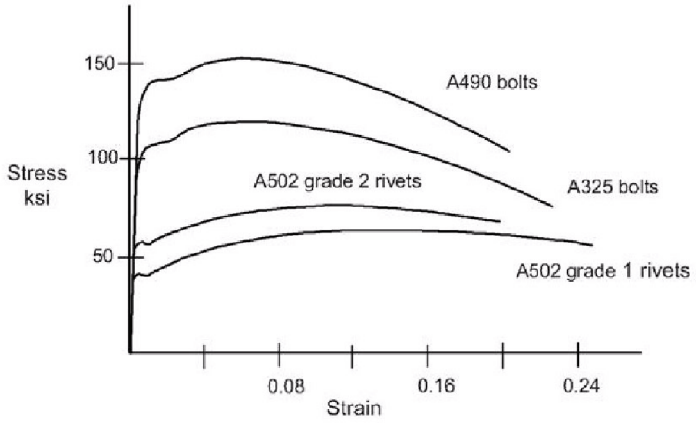


Figure 5.1 Typical Stress vs. Strain of material coupons taken from A325 and A490 grade bolts and rivets [62].

High strength bolts are designed to failure in the bolt shaft rather than in the threads of the bolt or nut. Nuts conforming to ASTM A563 are designed so that failure occurs in the bolt shaft and threads on both the bolt and nuts do not strip. Washers may or may not be required per the RCSC Specification and when used they must conform to ASTM F436 [82].

The minimum required pretension force is based on 70 percent of the bolt tensile strength [82]. There are several pretensioning methods to achieve the required clamping force in the AISC LRFD Specification. The turn-of-the-nut method is simple yet relatively unreliable where the bolt is initially snug tightened then the nut is further rotated to a predetermined angle to achieve the required pretension. The use of a calibrated torque wrench which applies sufficient torque determined by calibration to achieve the desired pretension load in the bolt is another method; the wrench may be either manual, electric or pneumatic. Tension control or twist-off bolts are tightened with a special wrench which torques the bolt through an extension at the end of the shaft until it shears off. The torque that shears off the extension is calibrated by the manufacturer to pretension the bolt to the required level. A more direct method is the use of special direct tension washers which have dimples that flatten and squirt paint to indicate that required pretension load is reached.

As seen in Table 5.1 bolt failures are brittle ultimate limit states which mean full loss of force transfer when this limit is reached. This makes the strength of the bolts a critical parameter in the design of connections. Different modes of bolt failures are presented in the following sections.

5.2.1.1 Tensile Strength

A bolt subjected to tensile forces is expected to fail at a reduced cross-section, within the range of the threaded area and the nominal shank area. Bolt tensile capacity is calculated by multiplying the bolt material ultimate strength with the bolt cross-section area. There are several equations to calculate an effective bolt cross-section area (A_e) which account for bolt thread size and pitch to estimate bolt strength. Rather than calculating an effective bolt cross-section the AISC LRFD Specification uses the nominal bolt shank cross-section area with an effective nominal tensile strength which is 75% of the ultimate tensile strength. This percentage of area is about the same as the calculated effective cross-sectional bolt area for typical high strength bolts [82].

Using the AISC LRFD approach, bolt tensile capacity is calculated as

$$R_n = F_t A_b \qquad \text{Eqn 5.1}$$

where R_n is the bolt nominal tension strength.

F_t = effective nominal tensile strength of the bolt material, $F_t \sim 0.75F_u$

A_b = nominal bolt shank area

The effective nominal tensile strength is 90 ksi and 113 ksi for A325 and A490 bolts, respectively. For design capacity the nominal bolt tensile strength is reduced by the resistance factor, ϕ=0.75.

5.2.1.2 Shear Strength

The same approach to calculate the bolt tensile strength is taken for the bolt shear strength. The nominal bolt material shear strength is multiplied by the bolt cross-sectional area in the shear plane. Based on single high strength bolts tested in shear the nominal shear strength was found to be 0.62 times the nominal tensile strength [63].

For joints with multiple bolts in the line of force the shear force distribution is not uniform due to the non-uniform deformation of the connection material between then bolts. The longer the connection, the more variation in shear among the bolts in a line of force. In the AISC LRFD Specification, to account for this in a simple manner the shear strength is reduced by a factor of 0.8. If the threads are included in the shear plane the shear strength is further reduced, again by a factor of 0.8 [82].

Using the AISC LRFD approach, bolt shear capacity is calculated as

$$R_n = F_v A_b \qquad \text{Eqn 5.2}$$

where R_n is the bolt nominal shear strength.

F_v = effective nominal shear strength of the bolt material.

A_b = nominal bolt shank area

For bolts with threads excluded from the shear plane the nominal shear strength is 60 ksi and 75 ksi for A325 and A490 bolts, respectively. For bolts with threads included in the shear plane the nominal shear strength is 48 ksi and 60 ksi for A325 and A490 bolts, respectively. For design capacity the nominal bolt shear strength is reduced by the resistance factor, ϕ=0.75.

5.2.1.3 Combined Loading

Bolts in connections like bolted clip angles experience both tensile and shear loading simultaneously. Tests on single high strength bolts A325 and A354 grade BD, which is nearly identical to A490 bolts, subjected to tensile and shear loading showed that an elliptical interaction equation [62] best represented the bolt failure envelope which is given in the RCSC Specification as

$$\left[\frac{T_u}{(\phi R_n)_t}\right]^2 + \left[\frac{V_u}{(\phi R_n)_v}\right]^2 \leq 1 \qquad \text{Eqn 5.3}$$

where

T_u = the required strength in tension

V_u = the required strength in shear

$(\phi R_n)_t$ = the design strength in tension

$(\phi R_n)_v$ = the design strength in shear

ϕ=0.75 if T_u and V_u are factored loads; otherwise ϕ=1.0

Tests revealed that the length of the both was another factor of the interaction between the two modes of loading. The shear strength slightly increases as the length of the bolt increases as shear area increases due to bending in the longer bolt. This effect is ignored in the interaction equation which is a conservative assumption.

5.2.2 Angle Strength

Clip angle connectors themselves may fail in a ductile or brittle manner depending on the connection geometry and topography. Ductile failures in the angles are associated with large areas of the material yielding allowing for relative large deformations before complete loss of force transfer. Whereas, brittle failures are associated with sudden fracture of the angle material with little or no deformations announcing complete loss of capacity.

The ultimate strength of a connection is related to the fracturing of either the bolts or clip angle; yielding in the angle material leads to the redistribution of the force path which is naturally captured by nonlinear finite element analysis and leads to eventual fracture in the material. Various angle failure limit states are presented in the following sections.

5.2.2.1 Section Strength

The tensile strength of the angle leg, which in the scope of an beam-column connection would be connected to the beam flange, is determined by the material property limit state and an associated effective cross section area.

The AISC LRFD Specification defines two limit states to determine the lower bound tensile capacity of the angle leg. The first is the yield capacity of the angle leg calculated by assuming the whole gross leg section reaches yielding using the following equation.

$$R_n = F_y A_g \qquad \text{Eqn 5.4}$$

where R_n is the angle tensile yielding strength.

F_y = yield strength of angle material

A_g = gross cross section of angle leg ($w * t$)

w = angle width

t = angle thickness

The second limit state is the rupture capacity of the angle calculated by assuming the net effective area of the angle, which excludes the area of bolt holes from the gross cross-

section area of the angle leg, all reach the ultimate material strength *simultaneously* with a uniform stress distribution and ruptures using the following equation.

$$R_n = F_u A_e \qquad \text{Eqn 5.5}$$

where R_n is the angle tensile rupture strength.

F_u = ultimate strength of angle material

A_e = effective cross-section of angle with two lines of bolts, $(w - 2 * d_{bh}) * t$

w = angle width

t = angle thickness

d_{bh} = bolt hole diameter

Connector elements which are large compared to the bolted area will not have a uniform stress distribution, the stress will be concentrated around the individual bolts. This causes the rupture capacity to be lower than that calculated using Equation 5.5, which is based on the assumption of an uniform stress distribution across the loaded net section. Swanson [103] demonstrates the stress concentration around bolt holes using strain gage measurements on T-stub stems subjected to tensile forces as shown in Figure 5.2.

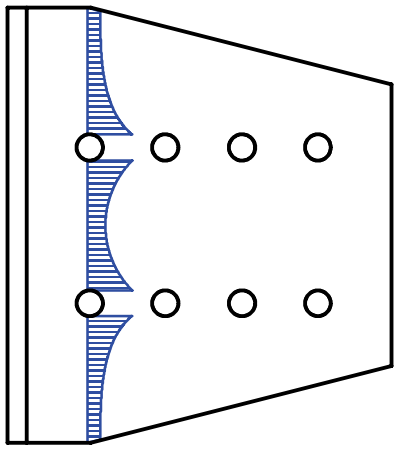


Figure 5.2 Stress distribution in T-stub stem subjected to tensile forces [103].

Based on tests with gusset plate connections, Whitmore [116] determined that the maximum tensile and compressive forces can be approximated more accurately using a cross-section area with an effective width normal to the axis of connection loading. The effective width is determined by assuming that the force fans out 30 degrees from the start of the joint at each side to the end of the joint alone the line line of force. The resulting width at the end of the joint is the width of the Whitmore section, l_w. This width is obviously limited by the physical width of the connection. Figure 5.3 illustrates the determination of the Whitmore section width.

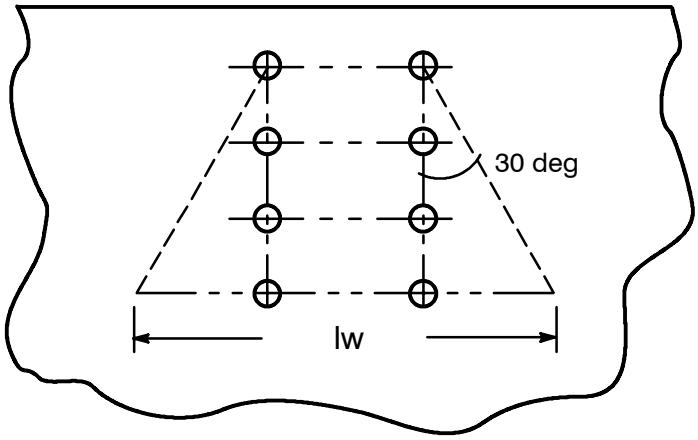


Figure 5.3 Determining the width of the Whitmore section, l_w.

Applying the Whitmore section width to determine to theoretical net section fracture capacity of the T-stubs he tested, Swanson observed that for two series of specimens with the same topology and geometry except their stem thickness (series TA and TD with stem thicknesses 9/16 in and 3/8 in, respectively), the prediction of the specimens with thinner stems had a greater deviation from the experimental results.

Swanson found that for the specimen with a stem thickness of 3/8 inch, an angle of 22.5 degrees to determine the Whitmore section produced better predictions for net section fracture. Based on this result Swanson proposed a modified Whitmore model where the

angle defining the Whitmore section is a function of the connecting plate thickness which is 30 degrees for plates 1/2 inch thick and greater, and 15 degrees for plates 1/4 inch thick and less. The effective angle varies linearly between 15 and 30 degrees for plates with thickness between 1/4 and 1/2 inches. The thinnest stem thickness the specimens Swanson based this modified model had was 3/8 inch, so there was no comparison for thinner specimens.

5.2.2.2 Block Shear Strength

Another strength limit to be considered is the failure of the connection as a "block", tearing the material inbetween the force transfer elements, the bolts or welds, from the connection as a whole. Block shear is considered an ultimate limit state involving tensile fracturing of the connection material accompanied by either shear fracturing or shear yielding as shown in Figure 5.4.

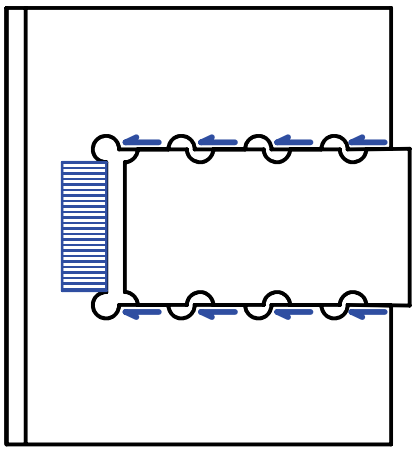


Figure 5.4 Block shear failure mechanism for bolted connections.

The AISC LRFD Specification defines the block shear strength as the sum of the fracture tensile capacity of the net section of material at the end of the connection line perpendicular to the force line and the shear fracture strength of the net shear section on both sides of the connection. In the case in which the shear yield capacity of the gross shear section governs, the strength is limited to the sum of the net section tensile strength and the gross shear section yielding as shown in Equation 5.6.

$$R_n = 0.6F_uA_{nv} + U_{bs}F_uA_{nt} \leqq 0.6F_yA_{gv} + U_{bs}F_uA_{nt} \qquad \text{Eqn 5.6}$$

where R_n is the angle tensile rupture block shear strength.

F_u = ultimate strength of angle material

F_y = yield strength of angle material

A_{nv} = net shear section area

A_{nt} = net tensile section area

A_{gv} = gross shear section area

U_{bs} = distribution factor (=1 for clip angle connections)

Block shear failure may occur in many different connections like clip angle connections in tension as well as simple web angle connections in coped beams. It is recognized that the tensile stress leading to the tensile fracture in the equation given above may not be uniformly distributed, such as in a coped beam web with two rows of bolts where the first bolts would be taking more loads than the second bolt line. The distribution factor, U_{bs}, takes the variation in the stress distribution into account. In the scope of clip angles connections under tensile forces this factor is equal to unity.

5.2.3 Prying

Tension bolts connecting an clip angle or T-stub may experience forces greater than the externally applied loads due to the deformations of the connected leg which acts like a lever using the tip of the leg as a fulcrum. The reaction at the tip of the leg adds additional force to the bolt as shown in Figure 5.6. This phenomenon is known as prying.

There are two modes of failure in relation to prying. One is the failure of bolts in tension due to the combination of external and prying forces on the bolt. Figure 5.5 shows the influence of prying on a pretensioned bolt under external axial loads. A bolt externally

loaded with stiff enough connecting elements to exclude prying forces will experience a slight increase of tensile force no greater than 5 to 10 % until overcoming the pretension load after which the bolt force will increase in proportion with the externally applied force. The slight increase of force in the bolt before overcoming pretension is due to the deformations under compression in the connecting plates related to relative out of plane stiffness. When prying forces exist, the bolt forces quickly exceed the externally applied force which greatly reduces the effective capacity of the bolt.

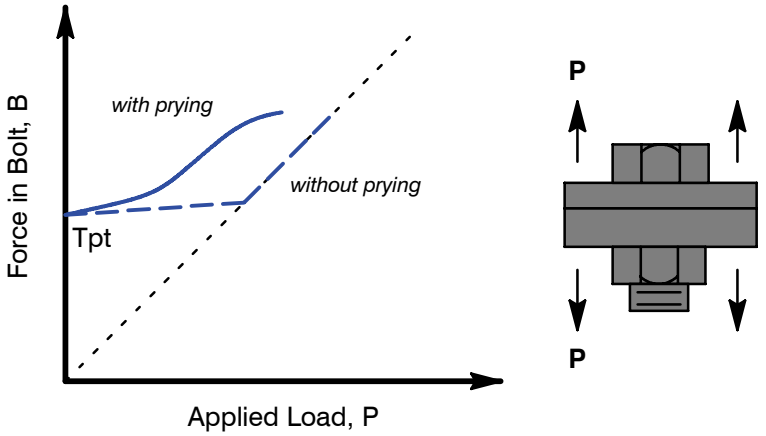


Figure 5.5 Influence of prying on a pretensioned bolt under external axial loads.

The second mode of failure related to prying is the formation of plastic hinges at the face of the stem and at the bolt line of the connected flange of angle leg. The order of these two failures are independent of each other and depend on the topology and geometry of the connecting member.

The development of the equations to calculate the prying force in the AISC LRFD Specification is due to Kulak et al. [63], Thornton [108] with enhancements from Astaneh [11]. The basis model of the prying equations, shown in Figure 5.6 assumes the flange of a T-stub as a beam fixed at the stem and simply supported at the bolt line and flange tip.

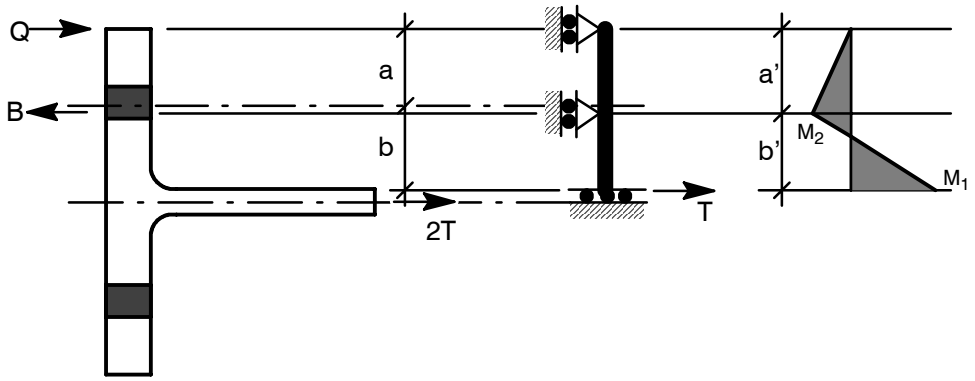


Figure 5.6 Beam model for flange prying.

Bending occurring in the flange during the loading of the T-stub cause the centroid of the contact stress between the bolt head and flange to shift towards the stem. Based on this, the bolt reaction line is assumed to be shifted away from the bolt centerline a half bolt diameter towards the stem. The updated dimensions shown in Figure 5.6 are used to develop equilibrium equations, related to geometrical variables as follows.

$$a' = \left(a + \frac{d_b}{2}\right) \qquad \text{Eqn 5.7}$$

$$b' = \left(b - \frac{d_b}{2}\right) \qquad \text{Eqn 5.8}$$

where d_b is the bolt diameter.

To develop mechanism failure in the flange it is necessary to form a plastic hinges. The maximum moment at the face of the stem, M_1 in Figure 5.6, can defined with the following equation.

$$M_p = \left(\frac{pt_f^2}{4}\right)F_y \qquad \text{Eqn 5.9}$$

where M_p is the plastic moment capacity of the net section of the flange.

p = T-stub width tributary to bolt

t_f = flange thickness

F_y = yield strength of T-stub material

Kulak et al [63] defines two parameters, δ and α which relate the two moments M_1 and M_2 shown in Figure 5.6. The parameter δ defined in Equation 5.10, scales the moment at the bolt line to account for the existence of holes compared to the gross section at the stem face. The parameter is the ratio of the net section through the bolt line and the gross section at the stem face to account for the difference in section stiffness.

$$\delta = 1 - \frac{d_h}{p} \qquad \text{Eqn 5.10}$$

where

d_h = bolt hole diameter

p = T-stub width tributary to bolt

The parameter α relates the moment M_2 as a fraction of M_1. This parameter reflects the level of prying which is related to the topology and stiffness of the connection leg. Physically, α has a value between 0 and 1. When $\alpha = 0$, the connection leg is stiff enough to separate from its connected plate (i.e. column flange) with the bolts experiencing tension without additional prying, bending in the flange is single curvature. When $\alpha = 1$, double curvature bending occurs in the connection flange where prying is maximized and plastic hinges form at both locations of M_1 and M_2. Finally, when $0 \leq \alpha \leq 1$ a combination of flange hinging and bolt prying occurs.

Based on the discussion above the moment in the connection line defined at the bolt line, M_2 may be expressed in term of the moment defined at the face of the stem, M_1 as:

$$M_2 = \alpha\delta M_1 \qquad \text{Eqn 5.11}$$

Free body diagrams of the leg to develop the equations defining the connection leg capacity is given in Figure 5.7. The relation between the prying force, Q, and the applied external force, T can be derived considering equilibrium in the connection flange.

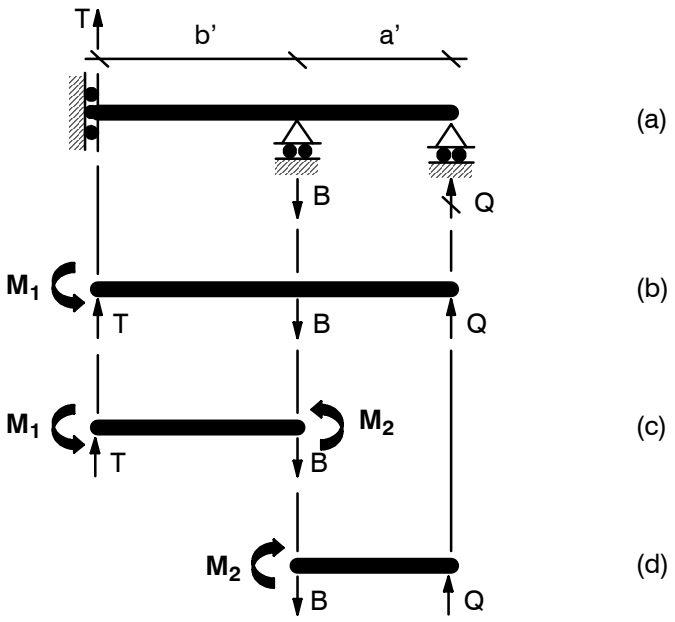


Figure 5.7 Connection leg free body diagrams to define equilibrium equations.

Vertical force equilibrium for the T-stub flange shown in Figure 5.7(b) leads to the following equation.

$$T + Q - B = 0 \qquad \text{Eqn 5.12}$$

Calculating the moment equilibrium on the portion of the connection flange shown in the Figure 5.7(c) about the bolt line with Equation 5.11 we obtain the following relation.

$$M_1(1 + \alpha\delta) - Tb' = 0 \qquad \text{Eqn 5.13}$$

Using moment equilibrium on the portion of the connection flange shown in the Figure 5.7(d), about the the bolt line with Equation 5.11 with we obtain the following relation.

$$Qa' - \alpha\delta M_1 = 0 \qquad \text{Eqn 5.14}$$

Combining Equations 5.13 and 5.14 we can express the prying force, Q in terms of the externally applied force, T.

$$Q = T\left(\frac{\alpha\delta}{1 + \alpha\delta}\right)\left(\frac{b'}{a'}\right) \qquad \text{Eqn 5.15}$$

A relation to define the parameter α can be derived by rearranging Equation 5.13 and use Equation 5.9 as follows.

$$\alpha = \left(\frac{1}{\delta}\right)\left[\frac{4Tb'}{pt_f^2F_y} - 1\right] \qquad \text{Eqn 5.16}$$

The ultimate capacity of the connection leg, loaded by external load, T can be defined as a function of the flange thickness, t_f based on given topology and material property, Fy. When plotted altogether, capacity equations developed based on the different possible failure modes as presented in the discussion on the α parameter above, define a design envelope. Assuming $\alpha = 1$ which implies the plastic hinges forming a mechanism in the connection leg, the first relation defining part of the capacity envelope can be derived by rearranging Equation 5.13 and substituting Equation 5.9 for M_1 as follows.

$$T = \frac{(1 + \delta)}{4b'}pF_yt_f^2 \qquad \text{Eqn 5.17}$$

To define the capacity envelope for a flange failure where connection flange hinging occurs in combination with bolt prying where $0 \leq \alpha \leq 1$, Astaneh [11] developed the following equation which eliminates the α parameter by using the moment equilibrium for the flange shown in Figure 5.7(b) about the bolt line and substituting Equation 5.9 for M_1 as follows.

$$T = \frac{Ba'}{a' + b'} + \frac{pF_y}{4(a' + b')}t_f^2 \qquad \text{Eqn 5.18}$$

By eliminating the α parameter the calculation becomes straightforward without having to solve for it iteratively. For greater flange thickness, t_f, where the leg is stiff enough

to transfer the load without prying the bolt capacity becomes equal to the connection capacity.

$$T = B \qquad \text{Eqn 5.19}$$

When considering fatigue for connections undergoing several cycles of load reversal is it desirable to exclude prying. By setting $\alpha = 0$ in Equation 5.13 and substituting Equation 5.9 for M_1, an expression reflecting a reduced connection leg capacity with greater fatigue resistance is obtained.

$$T = \frac{pF_y}{4b'}t_f^2 \qquad \text{Eqn 5.20}$$

Using Equations 5.17, 5.18, 5.19, and 5.20 Swanson [103] constructed the connection prying capacity force, T vs. flange thickness envelope as shown below in Figure 5.8 similar to the strength envelope presented by Thornton [108]. Any solution laying on and below the curve ABCD defines an valid capacity. An optimum design which leads to the greatest capacity with the less possible material lies on the curve ABCD.

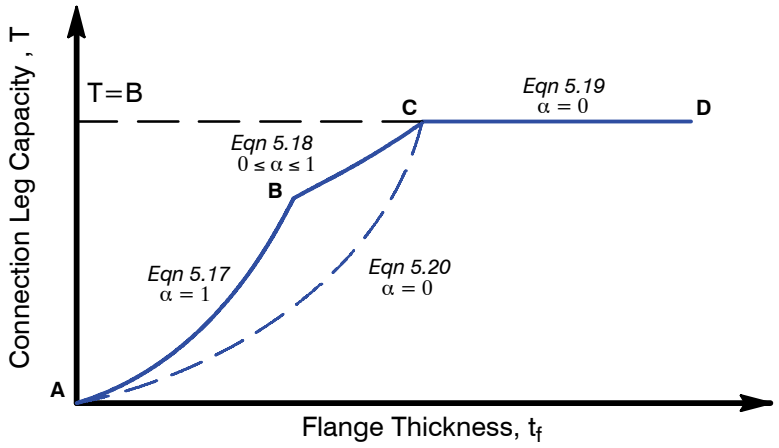


Figure 5.8 Connection leg capacity envelope.

Swanson and Gao [102] reviewed the difference between prying equations in the AISC LRFD Specification based on the Kulak model and that in Annex J of the Eurocode

3 [37] specifically for clip angles and proposed a combination of the two approaches. The topographical dimension definitions used to calculate the prying force as shown in Figure 5.6 are defined differently in Eurocode 3. In the Eurocode 3 model shown in Figure 5.9, there is no reduction in the connection leg to account for the bolt hole. Also, the beam setback which is the distance between the heel of the angle and the end of the beam or pull plate, determines the location of the plastic hinge. If the setback is less than 40% of the angle thickness the hinge is assume to form at a distance 80% of the angle radii from the face of the leg, otherwise the hinge is assume to form in the pull leg, rather than only in the leg with the tension bolt as discussed above in the Kulak model.

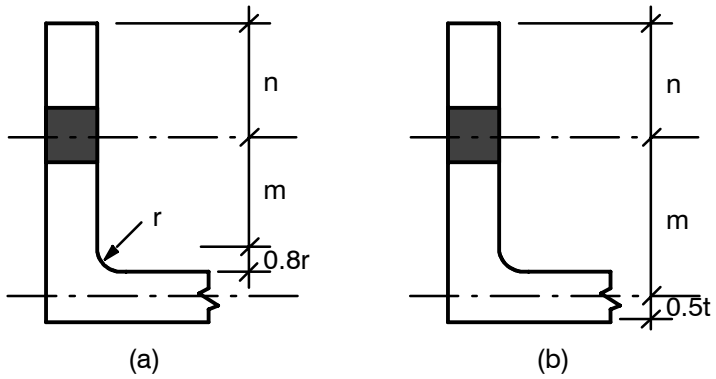


Figure 5.9 Eurocode 3 clip angle prying leg dimension definitions for beam setback (a) less than 0.4 times, and (b) greater than 0.4 times the angle leg thickness.

Swanson and Gao took the feature of the Eurocode where the beam setback influences the hinge location and combined it with the Kulak model used in the AISC LRFD Specification. The combined model proposed is shown in Figure 5.10. Using bolted heavy 1 inch thick clip angle pull tests performed by Swanson, the proposed combined approach was shown to be superior in determining prying failure compared to the code equations.

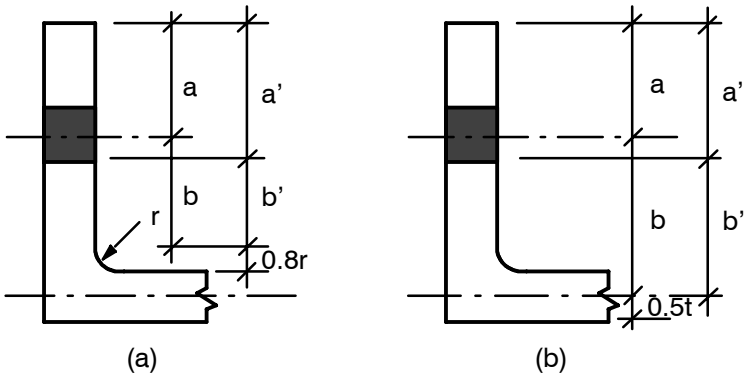


Figure 5.10 Swanson and Gao clip angle prying leg dimension definitions for beam setback (a) less than 0.4 times, and (b) greater than 0.4 times the angle leg thickness.

5.3 Micromechanics Based Strength Modeling

The major motivation of this section is to use the material state variables obtained by the refined three dimensional finite element bolted angle connection models to predict fracture in the connection in a practical manner.

Equations used in design to determine the capacity of components are based on simplified models of mechanics ignore the underlying material mechanisms leading to the loss of load carrying capacity. In structural engineering design where large-scale plasticity and complex geometry are involved as in connections, the use of fracture mechanics to predict failure is not practical.

Following the Northridge earthquake where fractures were discovered in welded moment connections, Chi et al [29] applied traditional fracture mechanics to simulate the failure mechanism observed in pre-Northridge type connections. It is not possible to generalize such an approach where the cracking mechanisms need to be defined a priori. Furthermore, the failure of connections under earthquake induced loads after less than ten or twenty cycles, characterized as an Ultra Low Cycle Fatigue (ULCF) problem, involve fracture-fatigue interaction.

Kanvinde and Deierlein [54] focus on the void growth and coalescence mechanism as a basis for predicting fracture and ULCF. They use the Stress Modified Critical Strain (SMCS) and Void Growth Model(VGM) in their study to determine ductile crack initiation in various grades of structural steel materials used in several typical design configurations. These micromechanical models are demonstrated to be general and suitable to implement with computational simulations once the material specific properties are calibrated.

Current practice in determining the performance of steel connections under earthquake loading is limited to full scale testing and semi-empirical models. The use of computational simulations are occasionally used to supplement test data or design to accurately determining load paths in the connection components determining the overall connection

nonlinear response. The use of micromechanical based models can greatly enhance the usefulness of detailed computational simulations of connections to inform the onset of failure based on material mechanisms rather than the use mechanics based engineering limit states which may not reflect the true mode of failure.

Fracture and fatigue are very broad topics in themselves which cover a range of materials and mechanisms describing material failure. The focus of this study is limited to low carbon structural steels typically used in building structures. The nature of failure in this class of material varies from ductile tearing to brittle fracturing depending on loading, geometry and microscale properties.

Fracture and fatigue look at the failure of a material beginning with a crack. In determining fracture, the main concern is whether a crack will grow given the loading causes the stress to exceed a critical threshold which is a defined material property. Conversely, in determining fatigue, the rate of growth under repeated loading is of interest. Fatigue is failure due to the propagation of cracks under several hundreds to millions of cycles of loading. In the following sections the mechanisms and prediction models for fracture and fatigue will be reviewed to place the concepts of void growth and coalescence mechanism used in this study in context.

5.3.1 Fracture in Structural Steel

Fracturing is the separation of material which can present itself ranging from ductile tearing to sudden brittle failure depending on the material microstructure, loading situation and geometry. Ideally civil structures are designed to ensure that any failure would occur in a ductile manner where cracking would be gradual and apparent warning the onset of complete failure. In properly designed steel structures it is common that large scale plasticity is followed by *ductile fracture* which is the main mode of failure focused in this study: ductile crack initiation based on the micro void growth and coalescence.

The role of microvoid mechanisms in ductile fracture were demonstrated in early experiments [79, 110]. When external loads are applied to steel inclusions or second phase particles, such as carbides found in the steel matrix they nucleate by either decohesion at the matrix-particle interface or by fracturing of the particle.

Increased loading causes void growth to the point that the material between voids forms ligaments which neck and fracture causing coalescence, the formation of a fracture path. This process is shown in Figure 5.11. Stress and strain fields in the material govern the growth of the voids which in turn lead to the coalescence and fracturing of the material. The relation between stress-strain fields and void growth will be defined and used as a predictor for ductile fracture in structural steel.

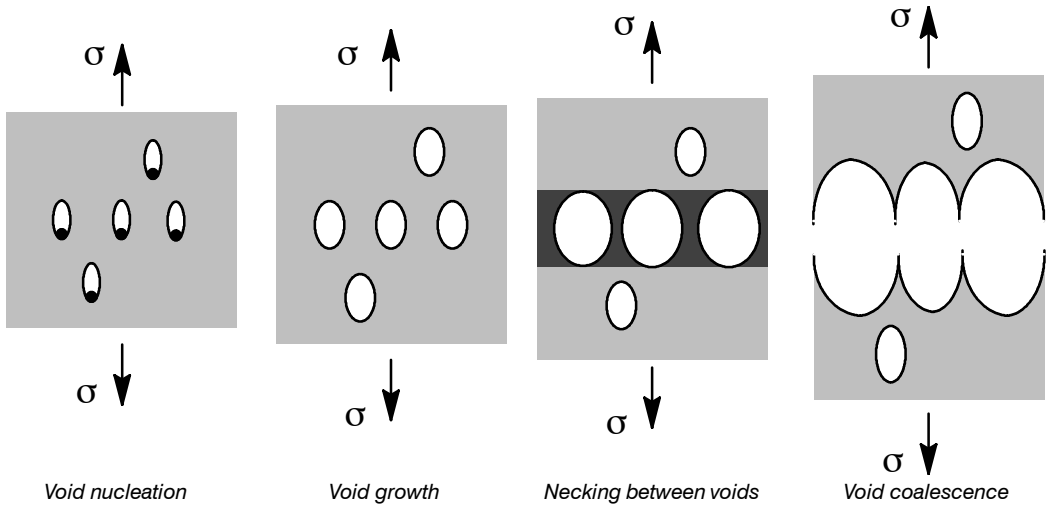
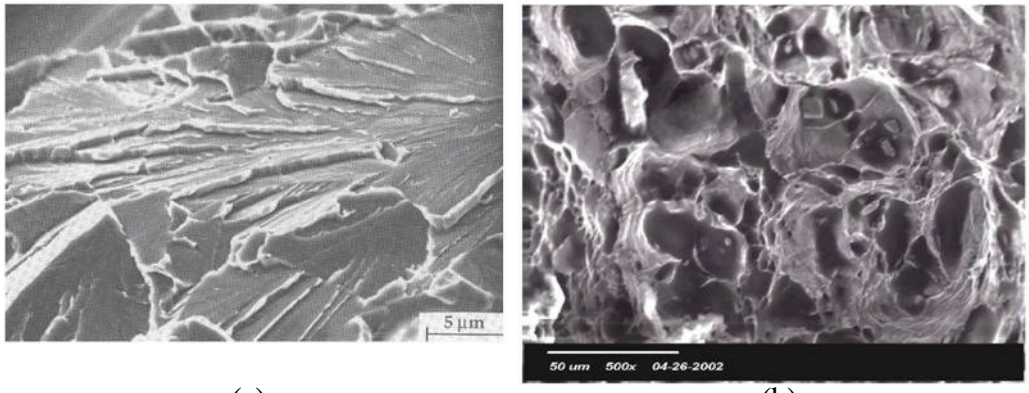


Figure 5.11 Void growth and coalescence.

In contrast, *cleavage fracture* is a brittle and sudden type of fracture where cracking is due local stress around a microscopic discontinuities in the material exceeding the bond strength causing material separation across the weakest crystallographic plane. This type of crack may propagate quickly with its sharp crack tip carrying a high stress ahead or may arrest at a grain boundary.

Cleavage fractures are distinctive with faceted shiny surface due to the separated crystal planes. Under the microscope these faceted surfaces twist and turn as the crystal plane varies per grain. Conversely, in ductile fractures, the enlarging voids prior to material separation cause the exposed fracture surface to be rough and dimpled. The images of the two types fracture surfaces taken with an electron microscope are shown in Figure 5.12.



(a) (b)

Figure 5.12 Scanning Electron Micrograph of surface fractured due to (a) cleavage fracture, and (b) microvoid coalescence [54].

While the mechanisms of the two types of fracture are different, it is common that ductile fracturing initiates as void growth and suddenly transitions to a cleavage type fracture. This transition is caused by critical discontinuities, randomly distributed in the material, acting as a local stress riser triggering the transition from ductile to a cleavage fracture. The randomness of the fracturing is attributed to the random distribution of these critical discontinuities. There is a strong relation between the toughness of a material and the statistical distribution of these critical discontinuities [49].

While not common under normal conditions, *intragranular fracturing* may occur along grain boundaries weakened due to metallurgical or environmental factors. High temperature deformations may weaken grain boundaries while intrusion of gas and liquids may lead to deposits at grain boundaries, such as hydrogen embrittlement leading to this type of fracturing.

5.3.2 Traditional Methods to Predict Fracture

In the early twentieth century it was known that the presence of a flaw or crack in the material would cause a stress concentration which initiated fracture. Inglis [50] idealized a crack as an elliptical void in an infinite material shown in Figure 5.13 and derived the expression shown in Equation 5.21 which relates the stress concentration due to an external stress loaded perpendicular to the major axis of the void.

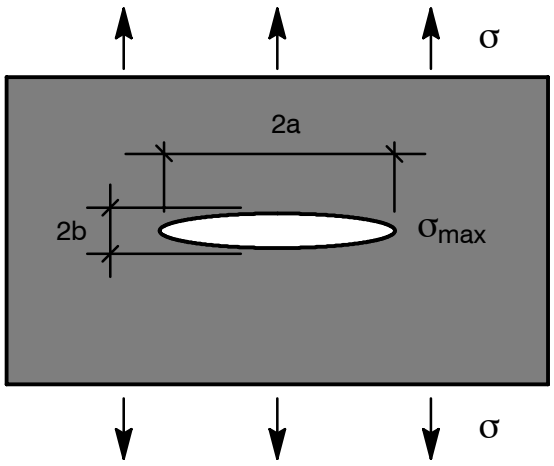


Figure 5.13 Stress concentration due to elliptical crack in infinitely large plate.

$$\sigma_{max} = \sigma\left(1 + 2\sqrt{\frac{a}{\rho}}\right) \qquad \text{Eqn 5.21}$$

where ρ is the radius of curvature:

$$\rho = \frac{b^3}{a} \qquad \text{Eqn 5.22}$$

The additional term in the bracket in Equation 5.21 reflects the increase in stress due to the existence of the crack and is known as the *stress concentration factor*:

$$K_t = 2\sqrt{\frac{a}{\rho}} \qquad \text{Eqn 5.23}$$

As the radius of the elliptical crack reached zero to identify a sharp crack the concentrated stress at the tip of the crack reported by this equation went to infinity. This limited

the use of the equation as an predictor of fracture. To develop a quantitative relationship determining fracture, Griffith [43] postulated the use of the elastic energy release rate. This approach is an indirect way to identify fracture which is actually governed by the stress state, thus is valid as long as energy release rate maintains a relation to the stress field at the crack tip field.

To define the energy release rate of the crack shown in Figure 5.13 as defined by Inglis, the change in potential energy of the cracked plate is defined using the term $\gamma_s(2a.2.t)$, defining specific surface energy times the total crack surface area and $\pi\sigma^2a^2t/E$, defining the decrease in potential energy due to the work done by external loads as follows:

$$U - U_o = -\pi\sigma^2a^2\frac{t}{E} + 4at\gamma_s \qquad \text{Eqn 5.24}$$

where

U = potential energy of material body with crack

Uo = potential energy of material body without crack

σ = externally applied load

a = half crack length

t = material thickness

E = modulus of elasticity

γ_s = specific surface energy

By rewriting Equation 5.24 and differentiating the potential energy U and setting it to zero the equilibrium condition of the crack where the critical stress required to initiate fracture can be extracted, resulting in Equation 5.28.

$$U = 4at\gamma_s - \pi\sigma^2a^2\frac{t}{E} + U_o \qquad \text{Eqn 5.25}$$

$$\frac{\partial U}{\partial a} = 4t\gamma_s - \frac{2\pi\sigma^2at}{E} = 0 \qquad \text{Eqn 5.26}$$

$$2\gamma_s = \frac{2\pi\sigma^2 a}{E} \qquad \text{Eqn 5.27}$$

$$\sigma = \sqrt{\frac{2E\gamma_s}{\pi a}} \qquad \text{Eqn 5.28}$$

This approach is valid modeling brittle fracture for very sharp cracks in an elastic material where the near tip stress exceeds the material cohesive strength. Orowan [76] extended this concept to metals by explicitly adding a term to account for the plastic energy in the surface energy term, γ_p. Irwin [51] re-phrased the critical fracture stress by Griffith as in Equation 5.29 in terms of energy release rate, G which is valid for both linear and non-linear deformation.

$$\sigma = \sqrt{\frac{2EG}{\pi a}} \qquad \text{Eqn 5.29}$$

where

$$G = 2(\gamma_s + \gamma_p) \qquad \text{Eqn 5.30}$$

G is also referred to as the crack driving force. Fracture occurs when G reaches the critical energy release rate "G_c" which is measurable material property using sharp notched test specimens. G_c is also related to the material toughness.

The basis of traditional fracture mechanics is defining methods to determine the demand or capacity energy release rate for different material, geometry and loading situations. The classical approaches break down when the relation between the crack tip stress fields lose the assumed correlation to far field loading forces. More recently it is possible to obtain the crack tip stress fields directly using computer simulation.

Traditional *linear elastic fracture mechanic*s (LEFM) and *elastic-plastic fracture mechanics* (EPFM) will be presented as a prelude to the micromechanical models which are of interest in this study.

5.3.2.1 Linear Elastic Fracture Mechanics (LEFM)

One approach developed to predict fracture in linear elastic materials with an existing flaw or crack is based on the elastic solution of the stress field around the crack tip using stress analysis developed by Westgaard [120]. There are three modes of fracture based on crack surface displacements:

Mode I: Tensile opening mode

Mode II: Inplane sliding mode

Mode III: Tearing or anti-plane shear mode

The analytical solutions relating the crack tip stress field to the externally applied far field stress differ for each fracture mode. Mode I fracture is the most common mode of fracture encountered in engineering structures as well as in bolted connections failing with net section fracture or block shear failure. Equation 5.31 defines the stress field distribution components about the crack tip for a Mode I crack opening within the coordinate system shown in Figure 5.14.

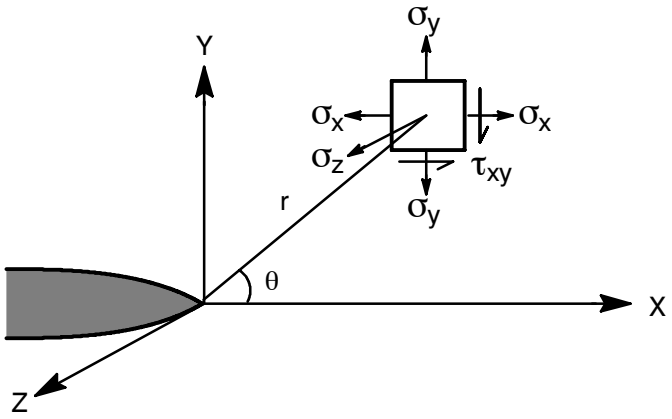


Figure 5.14 Stress distribution coordinate definition in vicinity of crack tip.

$$\sigma_{ij} = \frac{K_I}{\sqrt{2\pi r}} f_{ij}(\theta) \qquad \text{Eqn 5.31}$$

Essentially the stress distribution about a crack tip is similar in any structure, but varies in magnitude depending on the configuration of the cracked component. K_1 is the *stress intensity factor* for a mode I type crack which essentially serves as a scale factor to the magnitude of the crack tip stress field singularity, $f(\theta)$ is an angular function scaling the singularity magnitude about the near crack field and r is the distance ahead of the crack tip. For the σ_{yy} component of the crack stress the $f(\theta)$ component is the following trigonometric function.

$$f_{22}(\theta) = \cos\frac{\theta}{2}\left(1 + \sin\frac{\theta}{2}\sin\frac{3\theta}{2}\right) \qquad \text{Eqn 5.32}$$

The stress intensity factor, K is generally a function of the crack length and load magnitude and can be found in many texts on fracture for several common geometry and configurations. Computational simulations can also be used to relate the crack tip stress field to far field loads. For a test specimen with a configuration that has a known stress intensity factor, the critical K value at which fracture occurs can be identified. This critical K value is known as the *fracture toughness* of the material. Thus the following analogy can be made: what stress is to the strength of the material, the stress intensity factor is that to the fracture toughness of the material.

It is important to differentiate the *stress intensity factor,* K from the *stress concentration factor* K_t in that the latter accounts for geometrical variables of the crack whereas the former in addition to geometrical information includes the stress level.

Using the relation in Equation 5.31 the engineer can design against component fracture in several ways. Such as in material selection for a component in which the cracking can be tolerated to a length at which it could be detected with inspection before it fractures.

The basis of linear fracture mechanics is that stress level at the crack tip uniquely corresponds to the externally applied stress and the condition of this relation in a lab specimen and in the actual structure is the same. If plasticity dominates and is not closely contained within the crack tip region the unique relation between the applied far field stress and crack

tip stress is not valid and the stress begins to be dependant on the structure geometry, leading to the assumptions of LEFM to break down.

5.3.2.2 Elastic-Plastic Fracture Mechanics (EPFM)

Another approach to determine fracture energy for conditions involving both elastic and plastic deformation in an elastic-plastic material was proposed by Rice [83] using a path independent contour integral about the crack tip known as the J-integral. The J-integral estimates the energy release rate due to crack extension in a nonlinear elastic material taking into account a much greater zone of influence which far exceeds the limitations of the LEFM approach discussed above. The contour integral is evaluated along an arbitrary path beginning from the bottom surface of the crack traveling around the crack tip to the top surface of the crack as shown in Figure 5.15.

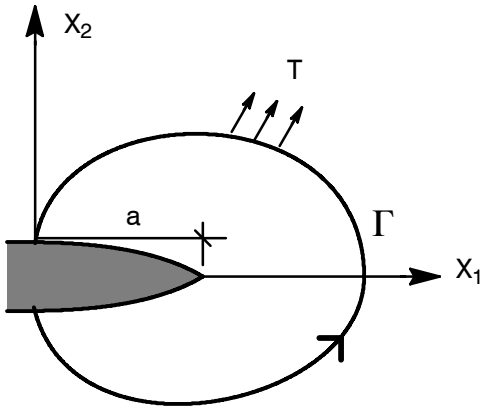


Figure 5.15 Calculating the J-integral using an arbitrary path around the crack tip.

The J-integral equation derived by Rice as follows:

$$J = -\frac{d\Pi}{da} = -\int_A \frac{dW}{da} dA + \int_\Gamma T_i \frac{du_i}{da} ds \qquad \text{Eqn 5.33}$$

which can be simplified to

$$J = -\frac{d\Pi}{da} = \int_{\Gamma} W.dx_2 - T_i \frac{\partial u_i}{\partial x_i} ds \qquad \text{Eqn 5.34}$$

where

W = strain energy density

T_i = traction vector on the boundary of the contour

u_i = displacement vector

ds = increment distance along the contour

x_1, x_2 = direction coordinates as shown in Figure 5.15

As with the LEFM there are caveats using the J-integral to predict fracture. The J-integral is inherently two-dimensional and cannot capture the influence of constraint due to thickness which is an issue in thicker specimens. Also, as cracks propagate the material in the crack path is plastically loaded then elastically unloads which violates the nonlinear elastic material assumption which brings into question the accuracy of the energy release rate when using the J-integral to compute a crack growth resistance curve. Finally, like the LEFM approach the measure of fracture is based on the energy release rate of the crack which is an indirect measure of fracture rather than the stress and strain fields in the material around the crack.

Due to the contour path used in calculating the J-integral a much larger zone of influence is accounted in relating the fracture toughness to the crack tip singularity compared to the LEFM approach, increasing the applicability of the J-integral approach. Large zones of plasticity about the crack tip, at a much larger scale than that which limits LEFM approach, eventually destroy the correspondence of crack tip stresses to far field stresses for the J-integral approach as well.

Before the development of the J-integral, the use of *crack tip opening displacement* (CTOD) was being investigated as a means to relate to the crack tip stress field by Wells [118]

which would be used as a fracture toughness criterion where fracture would occur when a critical CTOD is reached. Later studies showed that J-integral and the CTOD are essentially equivalent.

The methods to predict fracture described above have been studied extensively and further developed beyond the scope of this study. While computer simulations have help develop these methods, the application of these methods to predict fracture for generalized cases with computer simulations is inherently limited by the assumptions in the theory as well as practical reasons of the difficulty arising from a modeling point of view with the necessity of assuming flaws in the material a priori.

Subsequent sections will cover micromechanics based methods which are relatively recent and utilize the power of computers to relate fracture criteria directly to the underlying mechanisms rather than indirect measures as is done with traditional methods. This will lead to the formulation and calibration of the failure criterion used in this study to predict failure in the finite element models of bolted angle connections.

The failure of connections which occur after a relatively low number of earthquake load cycles have been characterized as an ultra low cycle fatigue (ULCF) failure. The cyclic nature of the induced load leading to failure invokes the use of the term fatigue, but ULCF is more of a fracture type problem and so is the manner in which the underlying mechanism will be modeled using void growth and coalescence.

5.3.3 Fatigue in Structural Steel

Fatigue is the eventual failure of a material due to crack propagation under cyclic loading. The fatigue behavior depends greatly the number of cycles, magnitude of stress imposed on the crack tip and component geometry. Based on the range of stress and strain imposed, fatigue is broadly defined as being *high-cycle fatigue* where hundreds of thousands

of low range stress cycles cause failure and *low-cycle fatigue* where greater stress range cycles cause failure in tens of thousands of cycles.

Crack tip stress range or alternatively the range of the stress intensity factor governs the characterization of fatigue. When the growth rate of the crack, da/dN and the range of the stress (intensity factor) are plotted against each other on a log-log scale plot three distinctive regions emerge as seen in Figure 5.16. The three zones of the curve is termed as Stage I, II, and III fatigue.

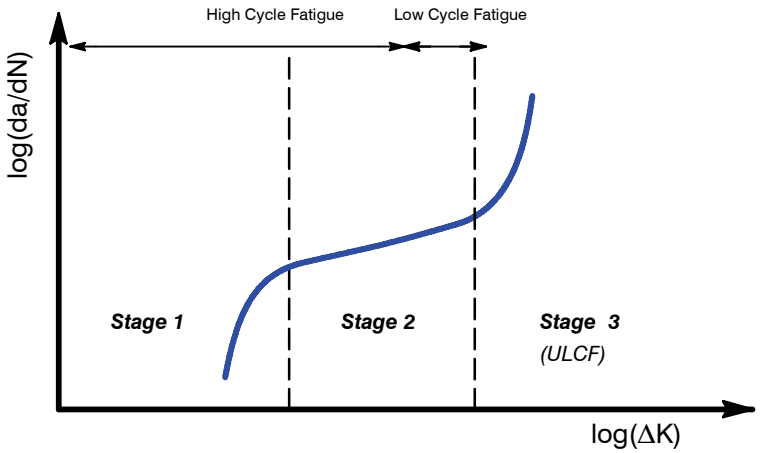


Figure 5.16 Stages of fatigue growth.

In *stage I*, above the fatigue threshold, the crack growth rate is sensitive to the stress intensity range, small increases in the range increase the crack growth rate. The low stress range limits crack tip plasticity to be confined within the neighborhood of grain in which the tip exists. Thus, the deformation at the crack tip is highly localized to a single shear band where damage accumulates due to the cyclic loading which results in the crack extending in a zig-zag path. Due to this localized mechanism, stage I fatigue is greatly influenced by the material grain structure.

A further increase in the stress intensity range brings the fatigue to the *stage II* region where there is a linear relationship with the crack growth rate on the log-log scale. This is

also known as a Paris type fatigue. The crack growth mechanism of this type of fatigue is based on slip and decohesion which is not greatly influenced by the microstructure of the material, so different types of ductile material with similar plastic flow properties would respond similarly.

Laird [65] proposed a mechanism which describes stage II fatigue through plastic blunting of the crack tip. When tensile load is applied across the crack path, the crack expands forming a plastic stretch zone ahead of the crack tip causing the tip to blunt. Load reversal closes the crack and the blunt tip folds and re-sharpens the crack tip. The closure of the crack does not fully reverse the blunting of the tip where slip and decohesion occurs, so at each tensile cycle the crack grows. The cycling creates small ridges, stridations, perpendicular to the crack path. The different steps of the crack growth mechanism for stage II fatigue is shown in Figure 5.17.

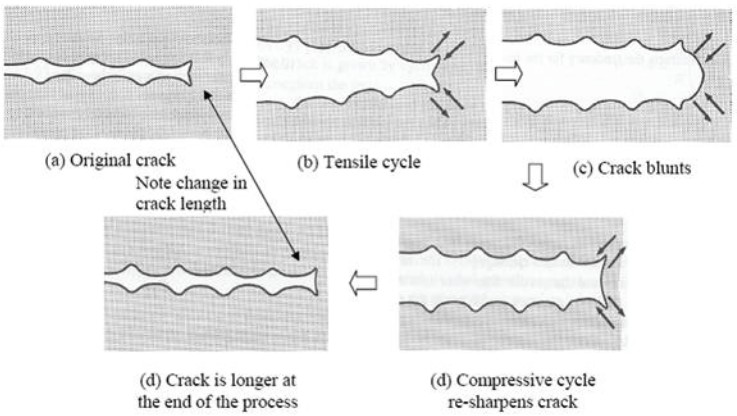


Figure 5.17 Idealization of plastic blunting and re-sharpening leading to stage II type fatigue crack growth [54].

At greater stress intensity ranges mechanisms of fracture, such as void coalescence and cleavage fracture, begin to combine with fatigue mechanisms mentioned above where failure occurs within a number of cycles on the order of ten; this is defined as *stage III* fatigue. At an even greater stress intensity range, fracture mechanisms take over where failure occurs

after only a few cycles. This type of failure is termed as *ultra low cycle fatigue* (ULCF). As in fracture, material microstructure greatly influence this type of fracture-fatigue behavior.

5.3.4 Traditional Methods to Predict Fatigue

The fatigue life for very low stress range cyclic loading that is defined as stage I fatigue can be tens of millions of cycles which is usually so great that it exceeds the lifetime of the structure to be of practical interest. As mentioned above, the low stress range confines the crack tip plastic zone within a single grain of the metal which makes this type of fatigue dependant on material microstructure and environmental effects. For this reason general models defining this type of fatigue is not common. In stage I fatigue the crack growth rate is less than the material crystal lattice spacing and below a certain stress range the growth rate dips to practically zero growth rate at which the *threshold stress intensity factor range*, ΔK_o is defined, as seen at the left end of the curve in Figure 5.16. Below this threshold crack growth is considered to be non existent or non-detectable [101].

On the other hand, stage II fatigue is more commonly observed and is not as sensitive to the material microstructure. The mechanism of sharpening and blunting of the crack tip with crack growth occurring each cycle due to slip and decohesion of the material ahead of the crack under shear strains implies a relation between crack growth rate and local strain range. If the crack loading is elastic, the far field stress can be related to the local crack tip strain for a given geometry using the appropriate LEFM solution through the use of the stress intensity factor. Paris and Erdogan [78] showed the power law relationship between crack growth rate and the stress intensity factor range as:

$$\frac{da}{dN} = C(\Delta K)^m \qquad \text{Eqn 5.35}$$

where

da/dN = crack extension per loading cycle

ΔK = stress intensity factor range, $K_{max} - K_{min}$, maximum and minimum values of the stress intensity factor.

C, m = material constants

When non-proportional loading invalidates the correspondence between the far field and crack tip stress defined by the stress intensity factor, Dowling and Begley [34] proposed the use of the cyclic J-integral or J-integral range, ΔJ instead of ΔK to relate the far field stresses to local plastic strain about the crack tip. Even when spread yielding in the specimen would appear to violate the basis of the J-integral this approach provides good crack growth characterization. The use of ΔJ in the relation given in Equation 5.35 is a mean to determine fatigue based crack growth and does not imply a different underlying mechanism.

The cases in the above discussion in which J-field dominates the relationship between far field loads and local strain define *low-cycle fatigue* where cracks grow within hundreds or thousands of cycles to cause failure. Several well established models defining crack growth life models characterized as stage II fatigue can be found in general text books on fatigue [101].

Stage III fatigue where large strains produce failure after 10 to 15 cycles has not been of much interest in the scope of fatigue as it can be viewed as a fracture problem. Failure after so few cycles under large strains characterize the loading in structural members during an earthquake and is appropriately named *ultra low cycle fatigue* (ULCF). Under such conditions fracture and fatigue mechanisms work together. With fatigue, cyclic loading is what drives the growth of a crack without which the crack growth stops, whereas with fracture without any cyclic loading material separation occurs under monotonic stresses causing large strains. As mentioned previously this mechanism of material separation can be defined through void growth or cleavage. On the extreme far right side of the curve in Figure 5.16,

in the region of ULCF, the rate of crack growth curve goes to infinity which implies that fracture occurs without the need for load cycles and that fracture mechanism dominate.

Kanvinde and Deierlein [54] study the ULCF problem in the scope of earthquake like loading using the micromechanical based void growth model (VGM) and the stress modified critical strain (SMCS) criteria. Their approach enables one to define the fracture capacity under static loading and to look at ULCF as an extension of fracture where the material fracture capacity degrades under cyclic loading. In their study they develop their criteria and with extensive testing, calibrate and validate their approach for various types of steel. The framework of determining failure using VGM and SMCS criteria do not suffer the limitations of traditional methods and utilize common nonlinear computational analysis without the burden of additional runtime procedures. Failure can be assessed using relatively simple post-analysis routines.

A distinction should be made for qualifying the behavior as ductile and brittle for the mechanism initiating fracture and the failure mode of a component in the sense of overall behavior. The fact that the fracture mechanism initiating failure is due to ductile crack initiation (void growth and coalescence) does not imply that the overall failure of the component is ductile. Ductility of a component or structure refers to the total magnitude of yielding before failure occurs which is despite the nature of the mechanism initiating the failure. The existence of stress triaxiality in highly stressed regions of components have reduced ductility due to ductile crack formation, essentially damaging the material which under continued loading extend to usually rapid and complete failure of a member.

In the following section, the failure criteria based on micromechanical models are presented. In further sections of this study, they will be applied to assess failure of the bolted angles in the dataset formed as part of the parametric study. The development of such failure criteria extend the use the finite element analyses of the bolted angle connections to investigate mechanisms of failure and ductility.

5.3.5 Micromechanical Models to Predict Fracture

In most ductile or tough materials such as structural steel the main mechanism which generally dominates fracture is void growth and coalescence. Thus the primary focus will in this section be on will be on failure criteria based on such mechanisms and which are practical to apply to refined three dimensional finite element analyses without additional modeling effort. Other well known micromechanics based models developed to model crack propagation will also be briefly discussed.

5.3.5.1 Void Growth Model (VGM)

The starting point of developing a criterion based on void growth is a measure of void growth under a strain field. Such derivation for the growth of idealized spherical voids in an elastic perfectly plastic material was presented by Rice [84] and Tracey [111] which related the *void growth rate* exponentially to the triaxial stress state of the material:

$$\frac{dR}{R} = 0.283 \exp\left(1.5 \frac{\sigma_m}{\sigma_y}\right) d\varepsilon_p \qquad \text{Eqn 5.36}$$

where

R = void diameter

σ_m = mean stress, $\frac{1}{3}\sigma_{ii}$

σ_y = yield stress

$d\varepsilon_p$ = equivalent plastic strain differential, $d\varepsilon_p = \sqrt{\frac{2}{3} d\varepsilon_p^{ij} . d\varepsilon_p^{ij}}$

The total void growth due to a certain plastic loading can be determined through the ratio of the final to initial void size, determined by integrating both sides of Equation 5.36.

$$\ln\left(\frac{R}{R_o}\right) = 0.283 \int_0^{\varepsilon_p} \exp\left(1.5 \frac{\sigma_m}{\sigma_y}\right) d\varepsilon_p \qquad \text{Eqn 5.37}$$

Equation 5.37 is limited to elastic-perfectly plastic material through the use of the yield stress in the denominator of the exponent term. D'Escata and Devaux [32] replaced yield stress with the effective (Mises) stress to account for material hardening which results in the following form:

$$\ln\left(\frac{R}{R_o}\right) = 0.283 \int_0^{\varepsilon_p} \exp\left(1.5\frac{\sigma_m}{\sigma_e}\right) d\varepsilon_p \qquad \text{Eqn 5.38}$$

where

σ_e = effective (Mises) stress, $\sqrt{\frac{2}{3}s^{ij}.s^{ij}}$ (s^{ij} are deviatoric stress components)

The ratio of the mean stress to the effective stress in the exponent term in Equation 5.38 is know as the *stress triaxiality,* $T = \sigma_m/\sigma_e$ which is a measure of constraint due to the stress field. Kanvinde and Deierlein [54] extended the use of the *Void Growth Model* (VGM) as a failure criterion. Used in the context of nonlinear finite element models of ductile steel specimens ductile crack initiation is flagged when a critical void size is reached due to an imposed plastic stress-strain history as reflected in the following equation.

$$\ln\left(\frac{R}{R_o}\right) = \ln\left(\frac{R}{R_o}\right)_{critical} = 0.283 \int_0^{\varepsilon_p} \exp(1.5T) d\varepsilon_p \qquad \text{Eqn 5.39}$$

Equation 5.39 relates the growth of a single spherical void to a critical size ignoring interaction between neighboring voids which leads to necking instability between voids forming the mechanism for ductile crack initiation. Yet the growth of a single void to a certain size can imply the critical point in which this interaction begins.

The constant term 0.283 in the equation above, determined by Rice using curve fitting, can be combined with the critical void size ratio term to form a single material parameter, η. This material parameter can be estimated through a combination of testing and nonlinear three dimensional finite element analysis which is explained in a subsequent section.

$$\eta = \frac{\ln\left(\frac{R}{R_o}\right)_{critical}}{c} = \int_0^{\varepsilon_p} \exp(1.5T)d\varepsilon_p \qquad \text{Eqn 5.40}$$

A formal failure criterion can be obtained by reorganizing Equation 5.40. Fracture initiation is triggered once the calibrated material property, η is exceeded by the stress-plastic strain history obtained by integration of plastic strain steps over a *characteristic length*, l_c in the finite element models. The mechanism of void growth and intervoid necking implies that the critical condition must be reached within a finite volume rather than a singularity. Failure is judge when material points sampled within l_c reach the the critical condition. The characteristic length is based on the specific microstructure of the material.

$$\int_0^{\varepsilon_p} \exp(1.5T)d\varepsilon_p - \eta > 0 \qquad \text{for } r \le l_c \qquad \text{Eqn 5.41}$$

5.3.5.2 Stress Modified Critical Strain (SMCS)

Having to perform integration on the stress triaxiality term with respect to the plastic strain increment at each material point at each finite element analysis increment makes the implementation of the VGM based failure criterion cumbersome. This difficulty can be alleviated by the fact that the stress triaxiality is dependent on geometry and for many situations independent of the plastic strain. With the assumption that the triaxiality term remains constant with the plastic strain increment, the integration can be approximated by a product, as shown below.

$$\ln\left(\frac{R}{R_o}\right)_{critical} = C\exp(1.5T)\varepsilon_p^{critical} \qquad \text{Eqn 5.42}$$

As with the VGM based criterion, failure is attributed to voids reaching a critical size. Manipulating Equation 5.42 the critical plastic strain term can be extracted as the failure criterion itself which becomes a function of the stress triaxiality term and some constants shown in Equation 5.43.

$$\varepsilon_p^{critical} = \frac{\ln\left(\frac{R}{R_o}\right)_{critical}}{C\exp(1.5T)} = \frac{\ln\left(\frac{R}{R_o}\right)_{critical}}{C}\exp(-1.5T) \qquad \text{Eqn 5.43}$$

Where the void size term and constant coefficient preceding the exponential term are combined to form a material specific parameter, α reducing the critical plastic strain as shown in Equation 5.44. Hancock and Mackenzie [47] were first in providing a similar critical plastic fracture strain equation defining the failure locus of the critical combinations of plastic strain and stress triaxiality for a given ductile material with two parameters. In their criterion, in addition to α, the multiplier, 1.5 on the stress triaxiality term T in Equation 5.44 was the second parameter, β. Panontin and Sheppard [77] later described a complete study on calibrating the parameters for this failure criterion from notched tensile specimen tests in which they refer the given relationship as the *Stress Modified Critical Strain* (SMCS).

$$\varepsilon_p^{critical} = \alpha\exp(-1.5T) \qquad \text{Eqn 5.44}$$

where

$$\alpha = \frac{\ln\left(\frac{R}{R_o}\right)_{critical}}{C}$$

The resulting relation defining the critical plastic strain as a function of stress terms is the basis of the SMCS criterion which is formally presented in Equation 5.45. The concept of a characteristic length requirement applies as discussed in the VGM based failure criterion.

$$\varepsilon_p - \varepsilon_p^{critical} = \varepsilon_p - \alpha\exp(-1.5T) > 0 \qquad \text{for } r \le l_c \qquad \text{Eqn 5.45}$$

As long as the assumption that increase in plastic strain does not greatly influence the stress triaxiality, the current level of triaxiality is sufficient to define the critical plastic strain, ignoring the history of the triaxiality as captured in the integration term in the VGM based criterion. Unless large geometry changes occur which would influence the stress triax-

iality history which is not commonly the case in bolted connection members of interest in this study, the use of the SMCS criterion is preferred due to its simplicity.

Kanvinde and Deierlein [54] demonstrate that there is a strong correlation between both the material parameters, η and α defined for the VGM and SMCS models which are shown in the Equations 5.40 and 5.44, respectively and the Charpy V-notch energy.

5.3.6 Other Micromechanics Based Models

Other models and approaches incorporating the idea of void growth mechanisms to define material response and strength exist. The work of Gurson [46] and later Tvergaard [114] describe a yield function which models material softening due to progressive void growth commonly referred as the Gurson-Tvergaard (GT) constitutive model.

Researchers have incorporated the GT model within computational cells embedded in finite element models to describe crack fronts to model crack propagation by defining criteria which material separation is achieved through element removal (element extinction). Xin and Shin [121] present framework to implement such ductile failure in large numerical analyses. Ruggieri, Panontin, and Dodds [89] investigate the use of the GT model and crack propagation modeling to compute J-curves for metals. Ruggieri [88] uses the computational cell method including the GT model for material softening and the SMCS criterion for void coalescence to study the influence of constraint effects on ductile fracture. Gullerud et. al. [44] studies the key issues in modeling crack propagation using the computational cell methodology.

Several disadvantages and limitations are associated with these approaches to capture fracture in the bolted angle connections. A large number of parameters are need to be calibrated in the GT material softening model and specialized numerical techniques are needed to implement the computational cells and element extinction scheme which is not of interest in the scope of this study.

5.4 Summary and Direction of Work

The main interest of this study is to develop failure criteria for bolted clip angle connection models that can be used in conjunction with refined three dimensional nonlinear finite element analyses. Once failure criteria are determined, these will be applied to the models analyzed in the parametric study dataset to correlate the influence of geometry and topography on the response of bolted clip angle connections.

Up to this point an overview of both mechanics based limit states, most of which are codified in design specifications and micromechanical based models which can numerically predict the initiation of ductile fracture is presented. The later is preceded by an overview of different mechanisms leading to fracture and fatigue and traditional calculation methods used to predict these events.

Traditional fracture and fatigue calculations are geared towards simplistic analysis which are indirect in determining these phenomenon and do not fully utilize the capabilities of current computational models to directly deal with stress and strain fields initiating these failure events. On the other hand, mechanistic based models can oversimplify the mechanisms which initiate failure and give incorrect results. Due to its simplicity in calibration and implementation within the framework of finite element models, the SMCS based failure criterion will be calibrated and used in the remainder of this study to determine fracture in the angle component.

The performance of bolts are better predicted due to the simple geometry and uniformity in their production which alleviates performance inconsistencies associated with welding where skill and site conditions may greatly alter the resulting weld capacity. In this study the demands on bolts will be directly extracted from the finite element models and compared to the capacity envelope based on the elliptical tension-shear interaction relationship. The tension and shear capacities of the bolts will be calibrated from tests.

5.5 Failure Criteria Calibration

Failure criteria for bolts and clip angles used in this study will be presented in this section and calibrated using test data from Swanson [103]. T-stub and clip angles subjected to axial loading will be used to directly calibrate the failure criteria. The large number of tests, with a wide range of geometry and topography of the bolted connections provide an ideal basis for validation.

The cases which bolt fracture occurred in Swanson's test will be used to calibrate the bolt failure criterion using the tension-shear elliptical interaction equation described in Equation 5.3. Test cases in which fracture occurred in the T-stub or clip angles will be used to calibrate the SMCS material parameter, α shown in Equation 5.44. The SMCS parameter calibration and comparisons presented by Kanvinde and Deierlein [54] will also be reviewed and followed to calibrate the material parameter to be used for the angles on the dataset.

5.5.1 Swanson T-stub and Clip Angle Tests

As part of a larger study on bolted moment connections as an alternative to welded pre-Northridge connections, Swanson tested 48 T-stub and 10 heavy clip angles to augment the lack of experimental data of bolted T-stub components with 8 tension bolts. The heavy clip angles with large bolts were tested as alternatives to the lighter T-stubs. The test data provides another opportunity to display the capability of the detailed three dimensional finite element modeling approach presented in Chapter 3 in capturing the response of bolted connections accurately.

Every aspect of the tests by Swanson were well documented and the test program provides a wide range of geometry, topology and failure modes making the data ideal for calibrating failure criteria to be used in this current study. The test program is described including the key geometric and material properties followed by comparison of the analysis and test results.

5.5.1.1 Test Program

The Swanson test program consisted of four series of T-stubs based on the I-beam used to fabricate the components and a single series of heavy clip angles fabricated from L8x8x1 angles. Geometry information for the component series is shown in Table 5.2. All the components were fabricated using A572 Grade 50 structural steel. The T-stub angles where designed as full moment connection components for W18 to W27 beam sections or alternatively as partial strength connections for larger beams.

All the bolt holes were standard size and drilled. The T-stubs and clip angles were saw cut while the edges of the stem were flame cut and grounded. One important exception is the TD series T-stubs which were fabricated at a separate shop with noticeably poorer workmanship. The edges were hand flame cut and not grounded as well as the other tested components which were cut with computer controlled flame, this resulted in abnormal performance. This will also be evident in the calibration of the SMCS material parameter in Section 5.5.3 for the TD series specimens.

Table 5.2 Swanson Component Test Specimen Information

Component Series	Designation	Flange Width (in)	Tension Flange Depth (in)	Tension Flange Thickness (in)	Stem Length (in)	Stem Width (in)	Stem Thickness (in)	Beam Setback (in)
TA	W16x100	15 1/8	10 3/8	1	15 1/8, 14	6	9/16	2
TB	W21x93		8 3/8	15/16	15 1/8, 17	7	9/16	2
TC	W33x169		11 1/2	1 1/4	18, 20 1/4	9 1/2	11/16	2 1/4
TD	W16x45		7	9/16	12 1/2, 14	6	3/8	2
CA	L8x6x1	8	6	1	8	8	1	1 7/8
	L8x4x1		4					1 1/2

The typical geometry and topography of a T-stub component is shown in Figure 5.18 for a case with 8 tension bolts and 10 shear bolts. The number of tension bolts and shear bolts varied in different combinations in each group. A typical clip angle specimen is shown in Figure 5.19 with two tension bolts and four shear bolts.

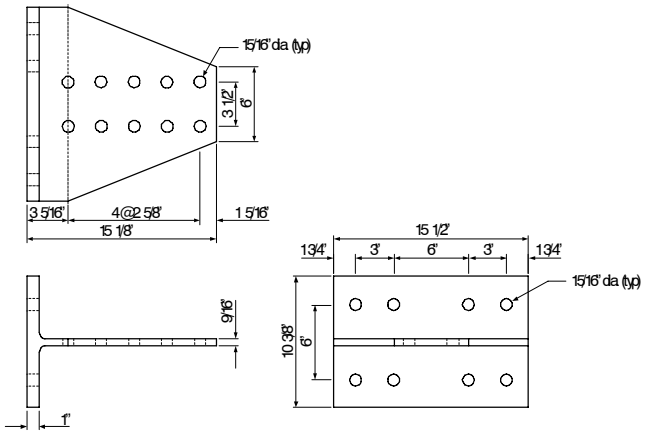


Figure 5.18 Typical T-stub geometry [103].

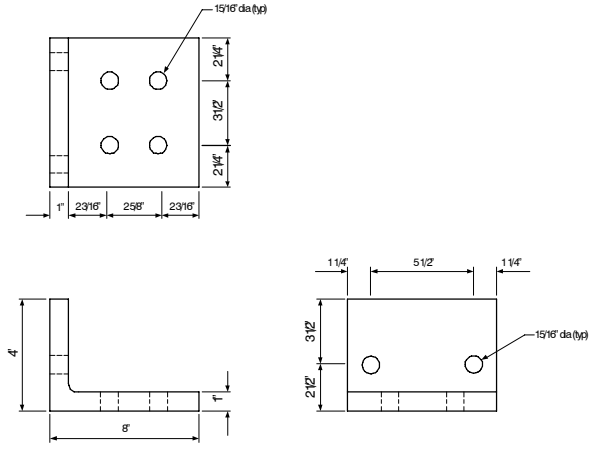


Figure 5.19 Typical clip angle geometry [103].

A detailed overview on the T-stub and clip angle component test program is listed in Tables 5.3 and 5.4. In these tests the bolt size, grade, count, spacing, and gage were varied to study their impact on component response. The test component series were further broken down into groups of common geometry with the same bolt size, count, and spacing, but the gage of the tension bolts were varied to study prying, and in some groups the grade of the bolts, and the length of the tension bolts were varied as well, to further study the influence of these variables. In the clip angle tests the vertical leg connected by the tension bolt was also varied along with the tension bolt gage to study the influence of these variables on bolt

prying. The maximum load and positive displacement along with the observed failure modes observed in the component tests are also listed in these tables. The different mode of failures observed were net section (Net Sec), tension bolt (T-bolt), and shear bolt (S-bolt) failure.

Cyclic loading with constant cycles applied in steps in which the displacement amplitude increased was typically applied. Some intermediate reduced amplitude cycles were also applied to assess loss in connection stiffness during the test. In a few of the test groups (i.e. 3, 9, and 10) reference specimens were monotonically loaded to compare with the backbone of their cyclicly loaded counterpart. Such variability in the tests validate the success of refined three dimensional finite element modeling and analysis approach in successfully capture the underlying mechanisms influencing overall connection behavior.

Table 5.3 Swanson T–stub Component Test Program

Group	Test ID	Load	Tension Bolts					Shear Bolts					Max-Load (kip)	Max Disp (in)	Failure Mode
			Type	Dia	Number	Spacing (in)	Gage (in)	Type	Dia	Number	Spacing (in)	Gage (in)			
1	TA17	Cyclic	A490	7/8	4	8	4	A490 X	7/8	10	2 5/8	3 1/2	315.4	0.202	T–Bolt
	TA18	Cyclic					5						291.7	0.197	T–Bolt
	TA19	Cyclic					6						257.4	0.173	T–Bolt
	TA20	Cyclic					7						234.7	0.229	T–Bolt
2	TB09	Cyclic	A490	7/8	4	8	4	A490 X	7/8	10	2 5/8	4	315.1	0.258	T–Bolt
	TB10	Cyclic					5						277.1	0.208	T–Bolt
3	TA01	Cyclic	A490	7/8	8	3	4	A490 X	7/8	10	2 5/8	3 1/2	486.7	0.615	Net Sec
	TA02	Cyclic					5						456.4	0.623	Net Sec
	TA03	Cyclic					6						451.1	0.809	T–Bolt
	TA04	Cyclic					7						388.9	0.660	T–Bolt
	TA05	Mono					4						473.3	0.767	Net Sec
	TA07	Mono					6						434.0	0.665	T–Bolt
4	TA09	Cyclic	A490	1	8	3	4	A490 X	1	8	3	3 1/2	432.5	0.608	Net Sec
	TA10	Cyclic					5						426.5	0.620	Net Sec
	TA11	Cyclic					6						424.9	0.759	Net Sec
	TA12	Cyclic					7						424.3	0.974	Net Sec
	TA13	Cyclic	A325				4	A325 X					428.0	0.670	Net Sec
	TA15	Cyclic					6						425.3	0.767	Net Sec
	TA25	Cyclic	A490				4	A490 X				2 2/3	414.0	0.649	Net Sec
	TA26	Cyclic					4					2 1/2	399.2	0.619	Block S
5	TB01	Cyclic	A490	7/8	8	3	4	A490 X	7/8	10	2 5/8	4	506.3	0.854	S–Bolt
	TB02	Cyclic					5						464.8	0.558	T–Bolt
	TB03	Cyclic	A325				4	A325 X					474.0	0.647	S–Bolt
	TB04	Cyclic					5						405.7	0.497	T–Bolt
6	TB05	Cyclic	A490	1	8	3	4	A490 X	1	10	3	4	502.8	0.739	Net Sec
	TB06	Cyclic					5						496.8	0.782	Net Sec
	TB07	Cyclic	A325				4	A325 X					496.9	0.683	Net Sec
	TB08	Cyclic					5						493.8	0.936	Net Sec
7	TC01	Cyclic	A490	7/8	8	3	5	A490 X	7/8	12	2 5/8	5	584.7	0.383	T–Bolt
	TC02	Cyclic					6						525.4	0.290	T–Bolt
	TC03	Cyclic					7						468.2	0.263	T–Bolt
	TC04	Cyclic					8						417.0	0.381	T–Bolt
	TC05	Cyclic	A325				5	A325 X					543.4	0.440	T–Bolt
	TC07	Cyclic					7						446.3	0.383	T–Bolt

Table 5.3 (cont.) Swanson T–stub Component Test Program

Group	Test ID	Load	Tension Bolts					Shear Bolts					Max-Load (kip)	Max Disp (in)	Failure Mode
			Type	Dia	Number	Spacing (in)	Gage (in)	Type	Dia	Number	Spacing (in)	Gage (in)			
8	TC09	Cyclic	A490	1	8	3	5	A490 X	1	12	3	5	663.0	0.656	Net Sec
	TC10	Cyclic					6						651.7	0.777	Net Sec
	TC11	Cyclic					7						580.7	0.449	T–Bolt
	TC12	Cyclic					8						512.6	0.560	T–Bolt
	TC13	Cyclic	A325				5	A325 X					633.2	0.619	T–Bolt
	TC15	Cyclic					7						516.4	0.565	T–Bolt
9	TD01	Mono	A325	7/8	8	3 1/2	4	A325 X	7/8	8	2 5/8	3 1/2	246.0	0.313	Net Sec
	TD02	Cyclic											247.2	0.356	Net Sec
	TD03	Cyclic											253.8	0.397	Net Sec
	TD04	Cyclic	A490					A490X					246.5	0.334	Net Sec
10	TD05	Mono	A325	1	8	3 1/2	4	A325 X	1	8	3	3 1/2	256.2	0.332	Net Sec
	TD06	Cyclic											259.5	0.313	Net Sec
	TD07	Cyclic											259.0	0.269	Net Sec
	TD08	Cyclic	A490					A490X					254.5	0.242	Net Sec

Table 5.4 Swanson Clip Angle Component Test Program

Group	Test ID	Load	Angle	Tension Bolts *				Shear Bolts *				Max-Load (kip)	Max Disp (in)	Failure Mode
				Type	Bolt Size (in)	Spacing (in)	Gage (in)	Type	Dia (in)	Spacing (in)	Gage (in)			
11	CA01	Cyclic	L8x4x1	A490	7/8 x 4 1/2	3 1/2	2 1/2	A490 X	7/8	2 5/8	3 1/2	108.3	0.384	T–Bolt
	CA02	Cyclic	L8x6x1				2 1/2					125.3	0.359	T–Bolt
	CA04	Cyclic	L8x6x1				4					84.3	0.645	T–Bolt
	CA17	Cyclic	L8x6x1		7/8 x 4 1/4		2 1/2					120.9	0.387	T–Bolt
	CA18	Cyclic	L8x6x1		7/8 x 4		21/2					119.2	0.354	T–Bolt
12	CA09	Cyclic	L8x4x1	A490	1 x 4	3 1/2	2 1/2	A490 X	1	2 5/8	3 1/2	125.2	0.448	T–Bolt
	CA10	Cyclic	L8x6x1				2 1/2					159.3	0.499	T–Bolt
	CA12	Cyclic	L8x6x1				4					109.2	0.896	T–Bolt
	CA14	Cyclic	L8x6x1	A325			2 1/2	A325X				136.8	0.543	T–Bolt
	CA16	Cyclic	L8x6x1				4					95.2	0.823	T–Bolt

(*) All clip angles are tested with 2 tension bolts and 4 shear bolts.

5.5.1.2 Component Modeling and Analysis

The refined three dimensional finite element modeling approach for the T-stub and clip angles follows the same basic principals outlined in the previous chapters. The connection geometry is discretized using C3D8I eight-node brick elements with full integration and

incompatible modes [1]. Each connection model is generated using a library of structural parts created in Truegrid where the mesh discretization is adjusted based on the changes in topography.

Of the 48 T-stub and 10 clip angle components tested, 28 T-stubs and 6 clip angles were modeled and analyzed excluding tests which were repeated with lower grade bolts or loaded monotonically.

All of the unique test cases listed below where analyzed:

- Group 1: TA17, TA18, TA19, TA20
- Group 2: TB09, TB10
- Group 3: TA01, TA02, TA03, TA04
- Group 4: TA10, TA11, TA12
- Group 5: TB01, TB02
- Group 6: TB05, TB06
- Group 7: TC01, TC02, TC03, TC04
- Group 8: TC09, TC10, TC11, TC12
- Group 9: TD04
- Group 10: TD08
- Group 11: CA01, CA02, CA04
- Group 12: CA09, CA10, CA12

The post test photos, loaded analytical models, and the force-displacement response from both the test and analysis is compared for each connection modeled are shown in Figures 5.21 through 5.54.

A typical discretized connection models half of the connection assembly cut at the symmetry plane - the 1-3 plane seen in the figures. The nodes on symmetry plane of the reaction plate where the tension bolts connect the pull member is fixed, forming the reaction boundary condition of the connection. In the context of a beam-column connection this would be the junction of the column flange and web. Symmetry boundary conditions are imposed on the symmetry planes of the component and pull plate. Nodes in these planes are

constrained from moving in the 3-direction. The horizontal plate in the context of a beam-column connection represents the beam flange. The nodes at the +1 face of the pull plate are constrained to a master node. Loading on the connection is achieved by displacing the master node along the +1 axis.

Pretensioning the bolts is achieved using the available routine within ABAQUS in which the nodes of two surfaces at mid point of the shaft length are drawn towards each other causing pretension forces in the bolt. Design pretension values for different bolt sizes are shown in Table 4.5. In the simulations bolts are pretensioned up to the value listed in this table plus one kip. The idealized stress-strain relationships used to model the material behavior for the structural steel material and the A490 high-strength steel bolts are based on test measurements and are shown in Figure 5.20.

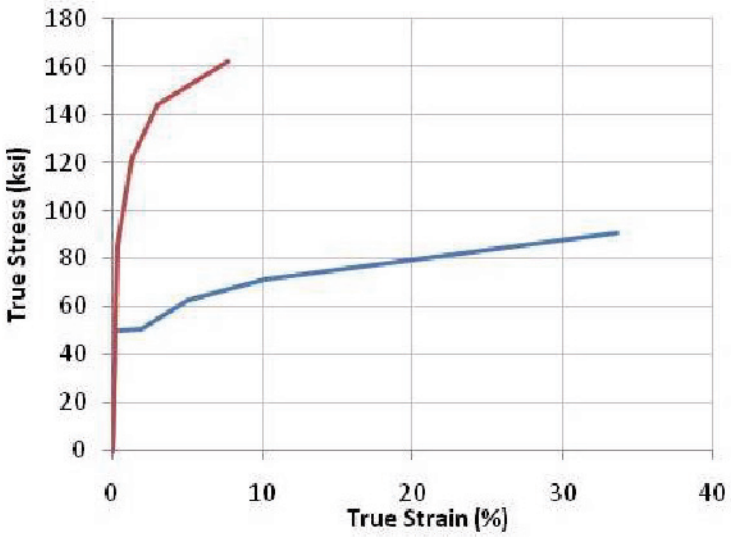


Figure 5.20 Material stress-strain relationships used in connection models.

In the post-test photos of the failed specimens in Figures 5.21 through 5.54 the dark areas on the white wash are areas which experienced excessive plastic deformations causing the white wash to spall. The discretization and the deformed shape of the analytical model under the applied load is also shown in these figures. The regions with red contours are areas

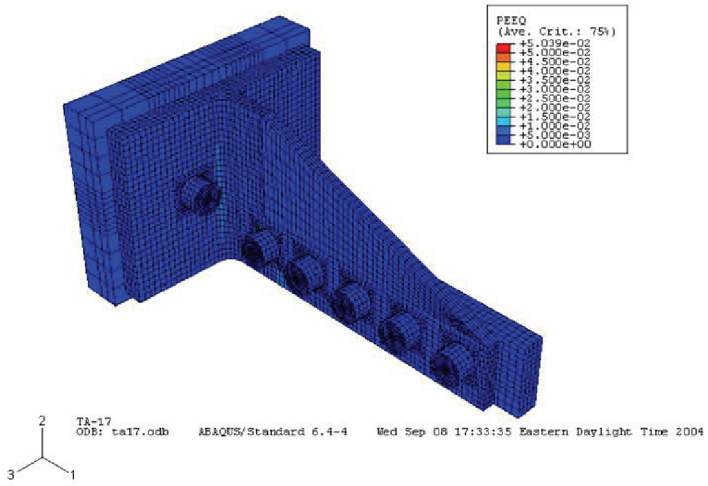
of high equivalent plastic strain which correspond well with the areas with spalled white-wash in the test photos, specifically in the T-stub cases which failed with stem fracture this is the area along the first line of shear bolts. This reflects the success of the analytical models capturing the underlying deformation mechanisms in the tested specimens.

Furthermore, in the following figures the cyclic test force-displacement response is plotted in comparison to the monotonic force-displacement response of the analytical models. As part of the test program some of the components were separately tested under both cyclic and monotonic loads to demonstrate the monotonic response is equivalent to the backbone of the cyclic response curve. The analysis comparison is made in the same spirit. Looking at the figures it can seen that along with the stiffness and strength of the connection the effect of bolt slippage is also captured, such as in specimen TA01.

In some cases the effect of bolt slip in the analysis occurs at lower force levels of that in the tests, this can be attributed to the difference in loading (i.e. cyclic vs monotonic). Under greater displacements the bolts begin to bear on the bolt hole and and the connection component continues to deform. At the displacement of maximum loading at which failure occurs in the test, the analysis force is in good correlation. Calibration for failure criteria parameters using the analytical model will be carried out at the displacement of the maximum load observed in the tests.

(a)

(b)



(c)

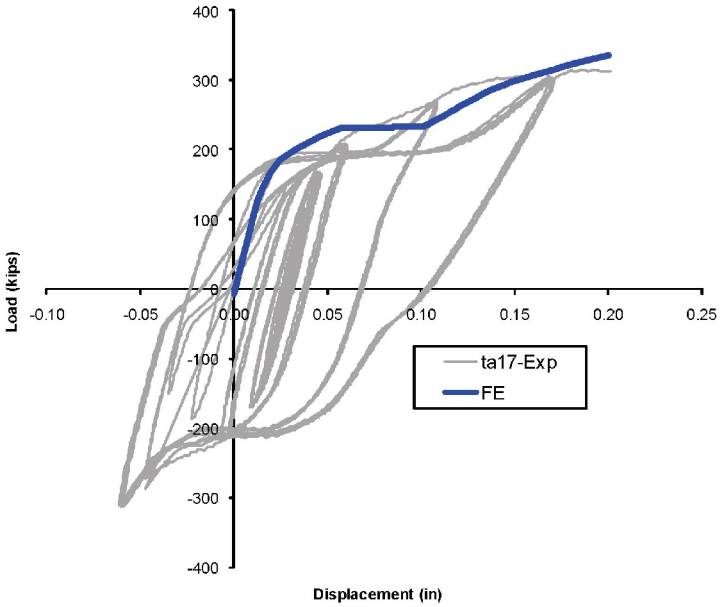
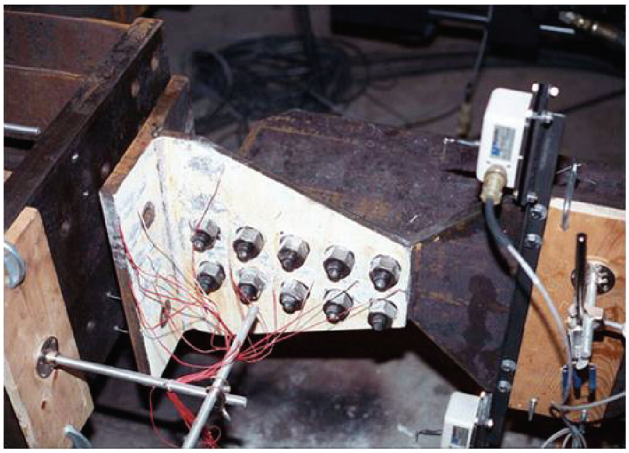
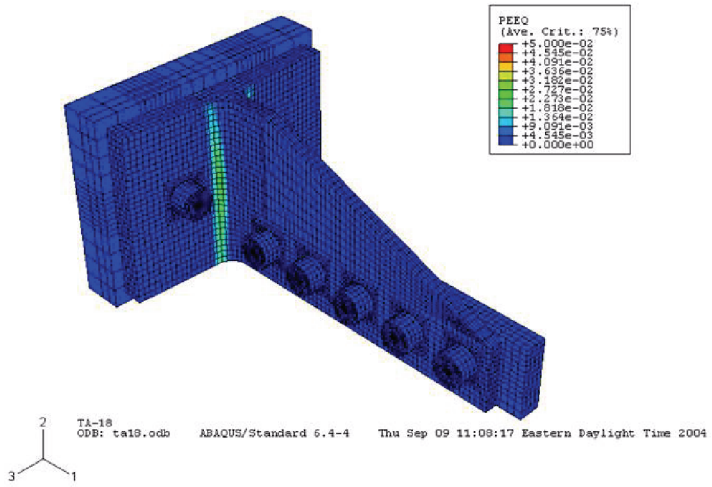


Figure 5.21 Group 1 Specimen TA-17 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

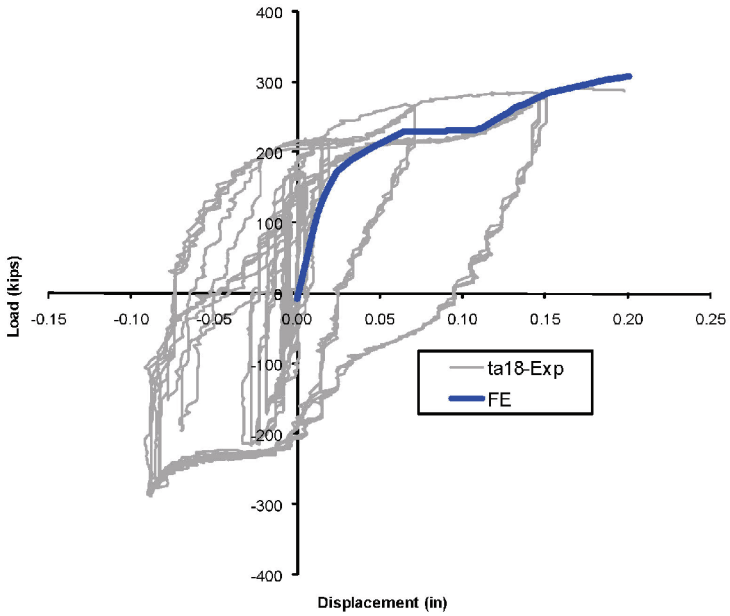
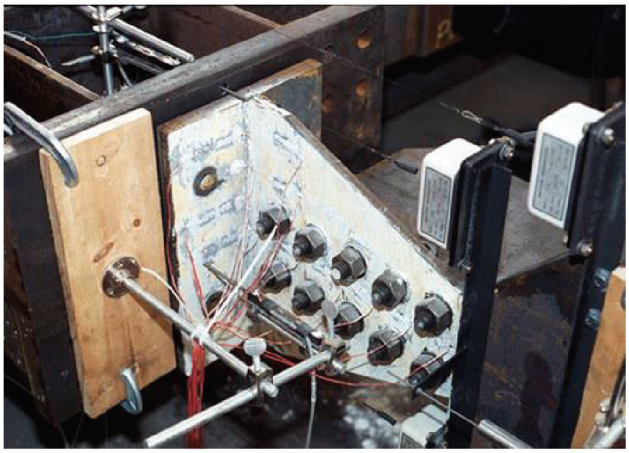
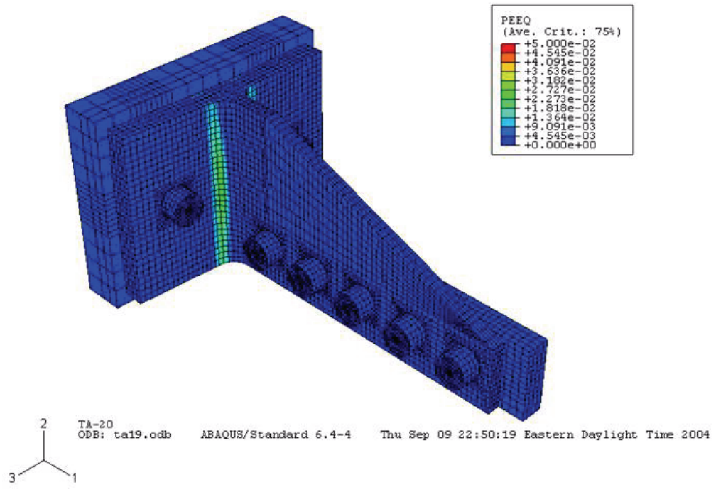


Figure 5.22 Group 1 Specimen TA-18 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

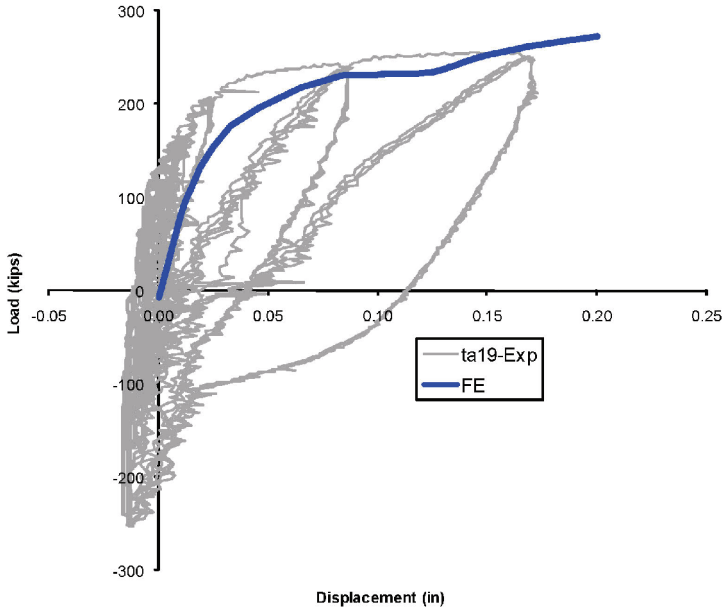
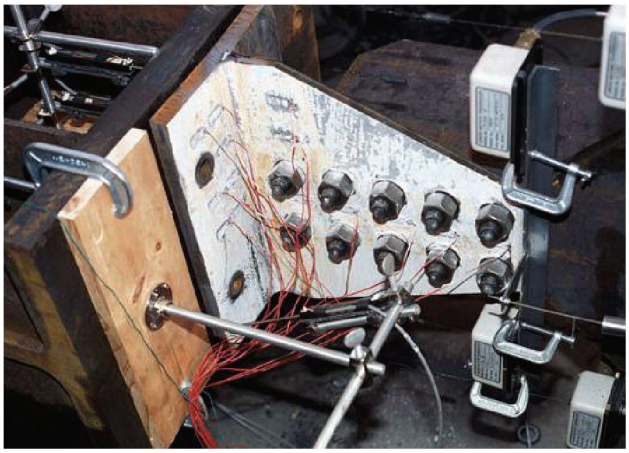
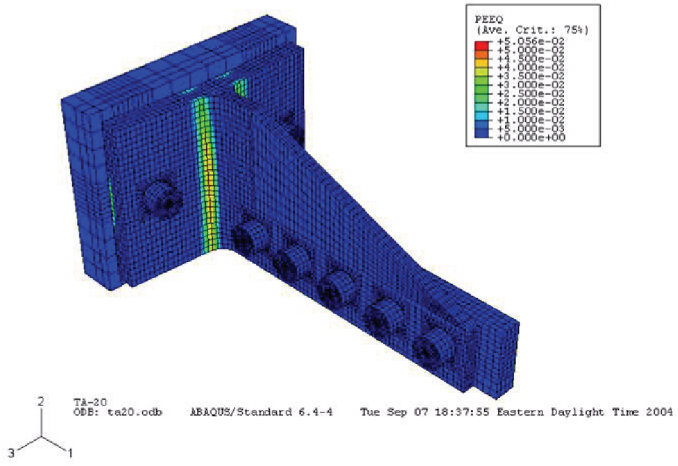


Figure 5.23 Group 1 Specimen TA-19 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

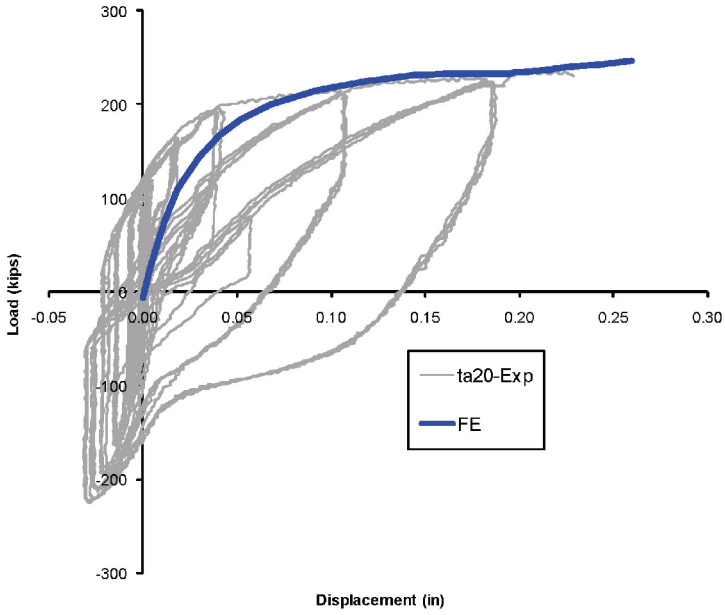
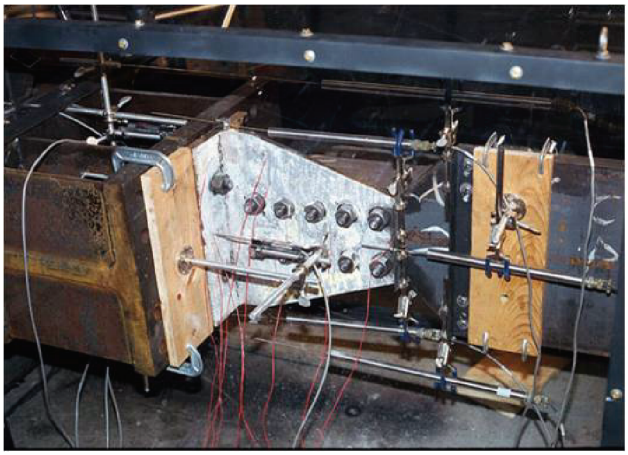
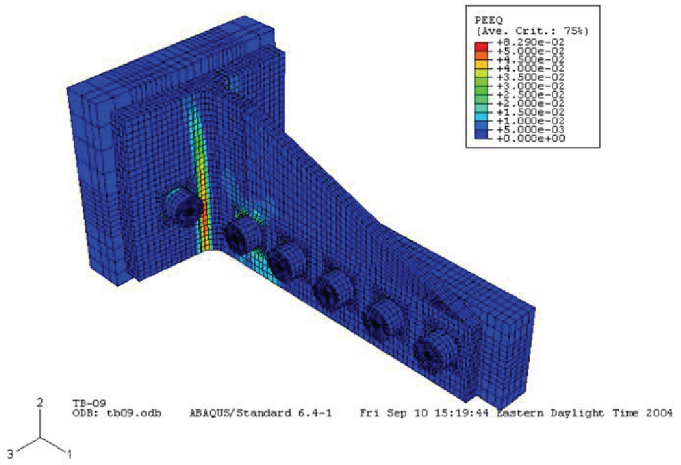


Figure 5.24 Group 1 Specimen TA-20 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

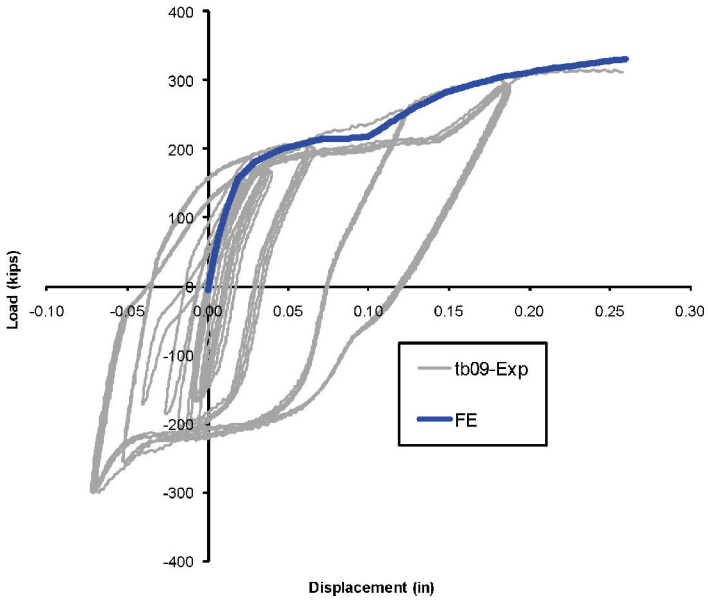
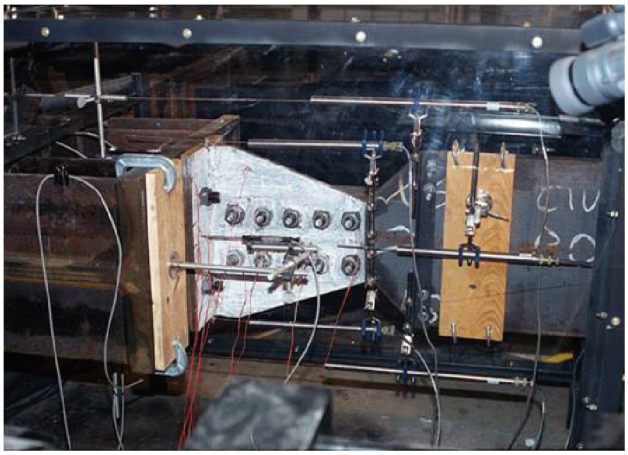
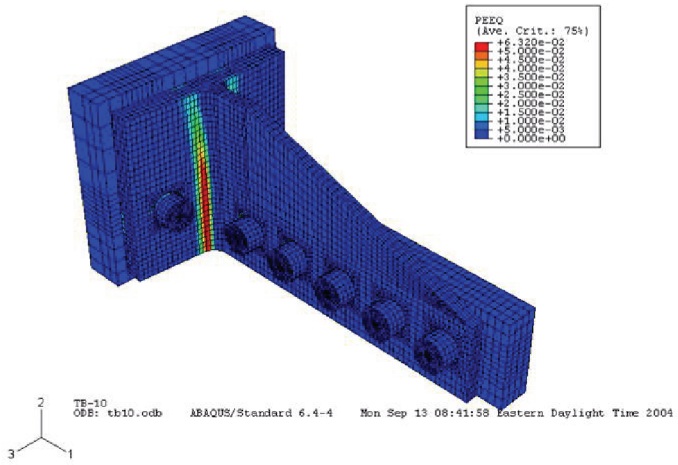


Figure 5.25 Group 2 Specimen TB-09 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

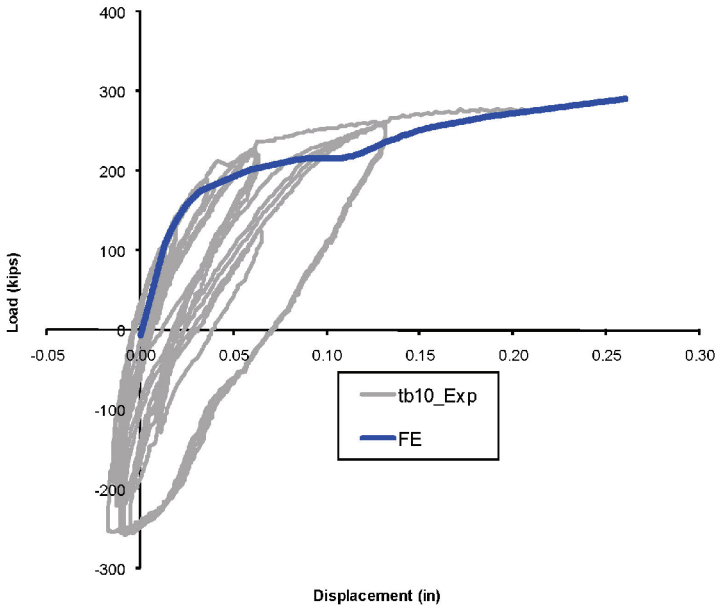
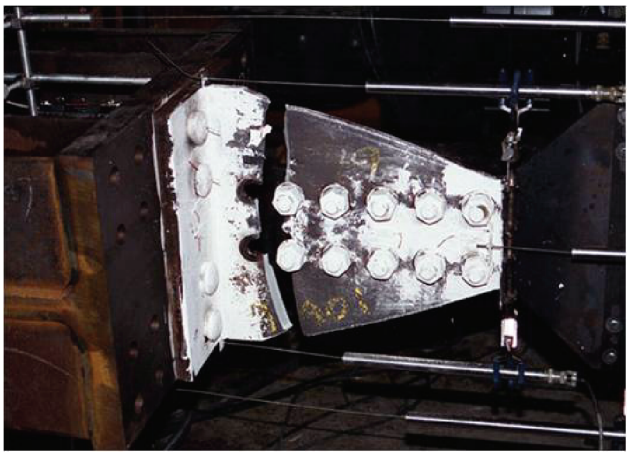
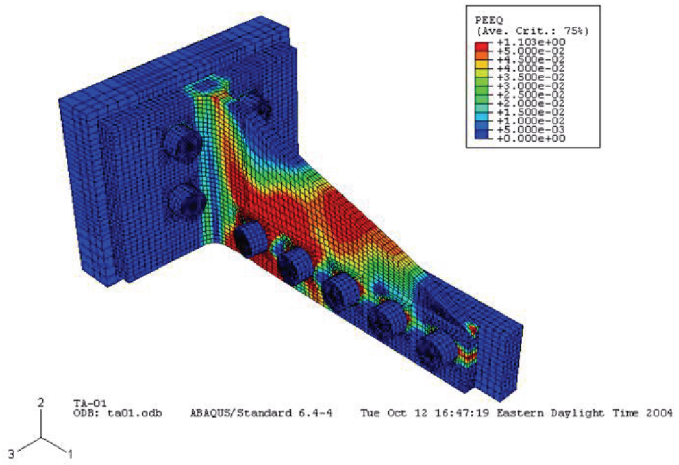


Figure 5.26 Group 2 Specimen TB-10 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

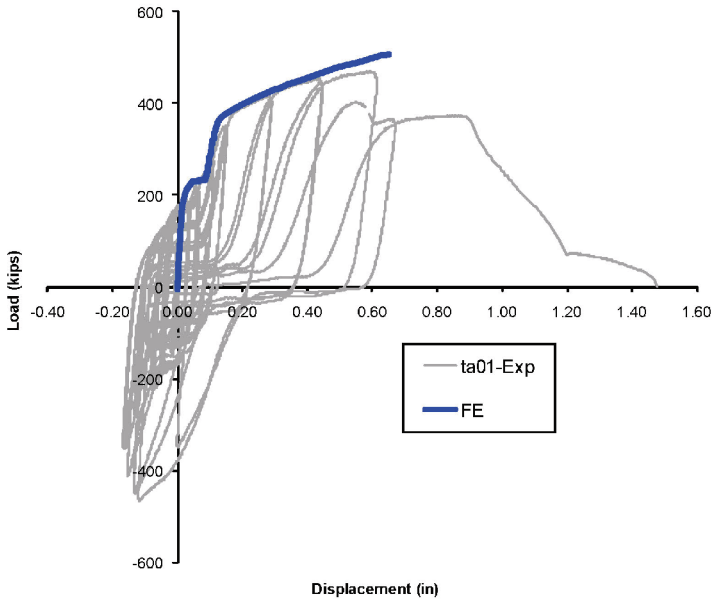
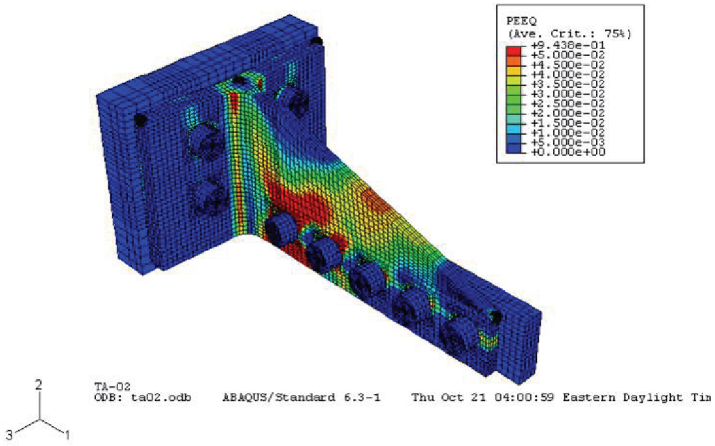


Figure 5.27 Group 3 Specimen TA-01 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)

(b)



(c)

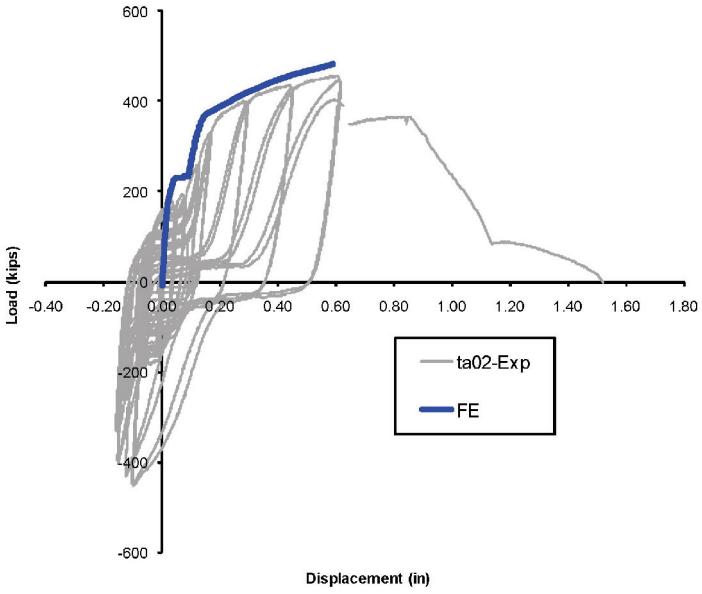
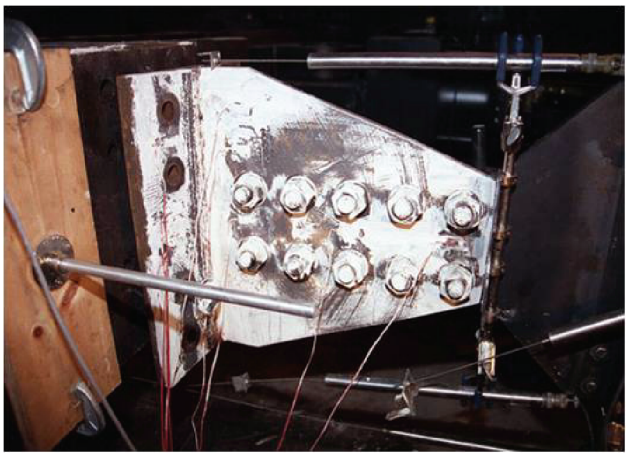
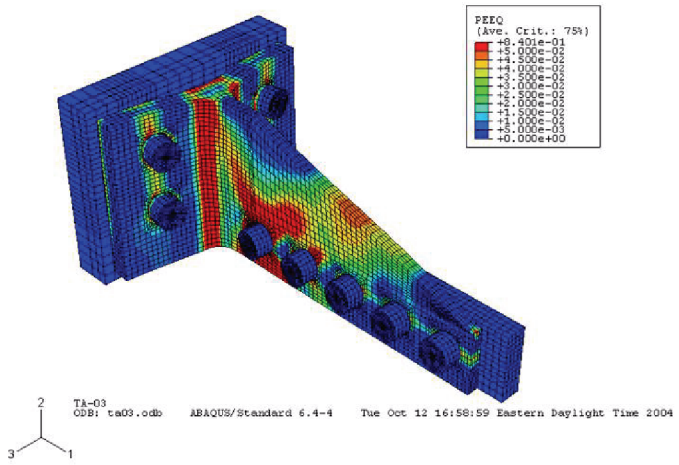


Figure 5.28 Group 3 Specimen TA-02 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

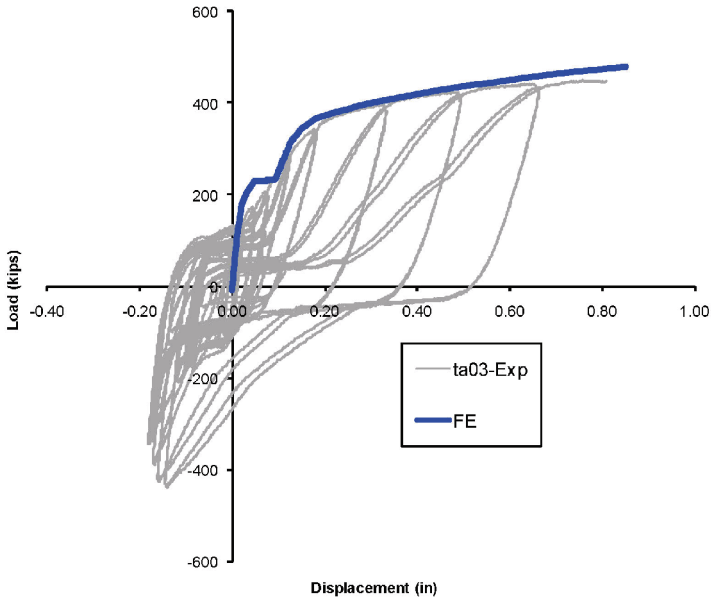
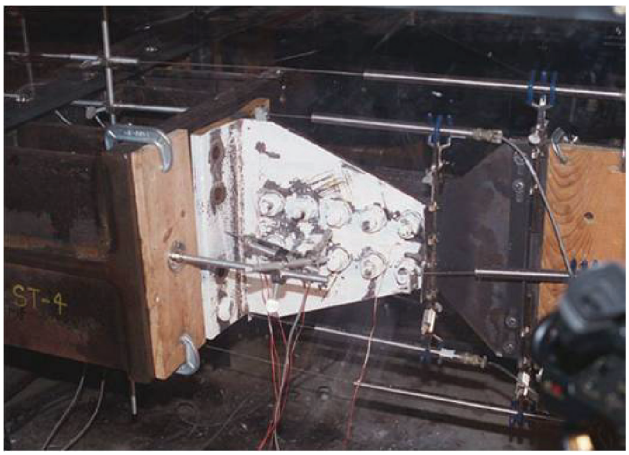
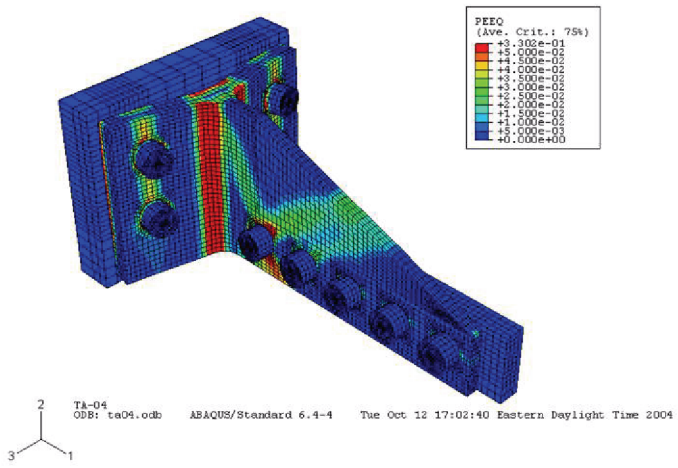


Figure 5.29 Group 3 Specimen TA-03 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

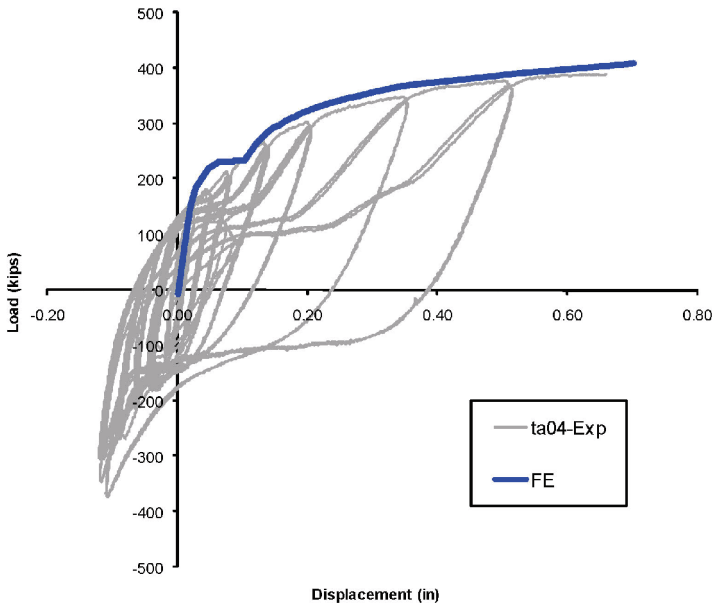
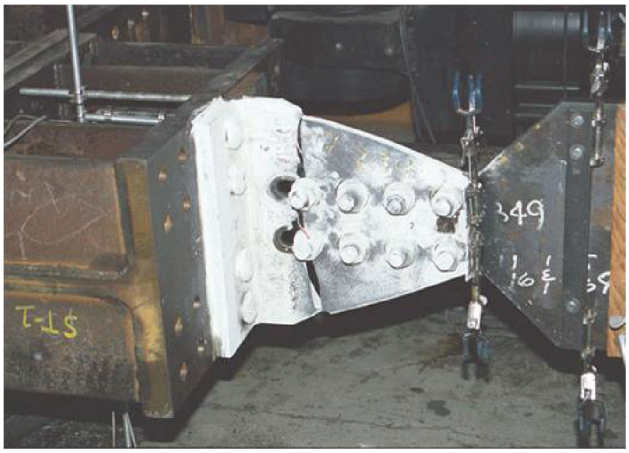
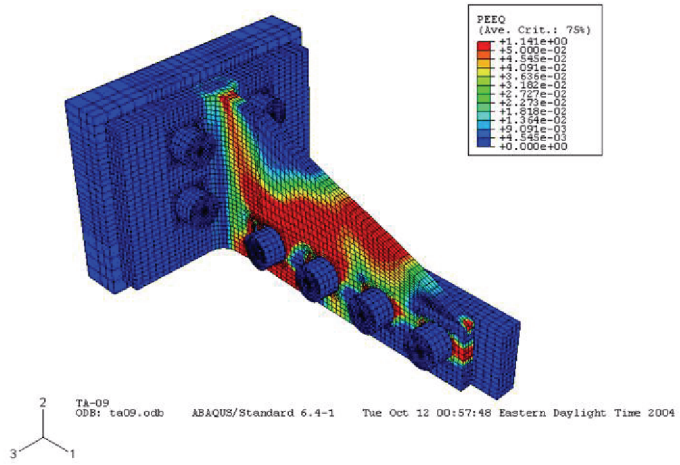


Figure 5.30 Group 3 Specimen TA-04 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

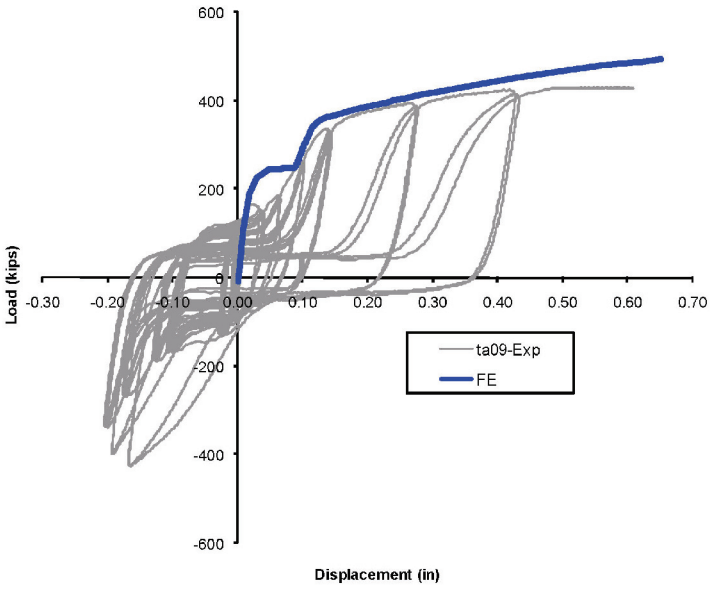
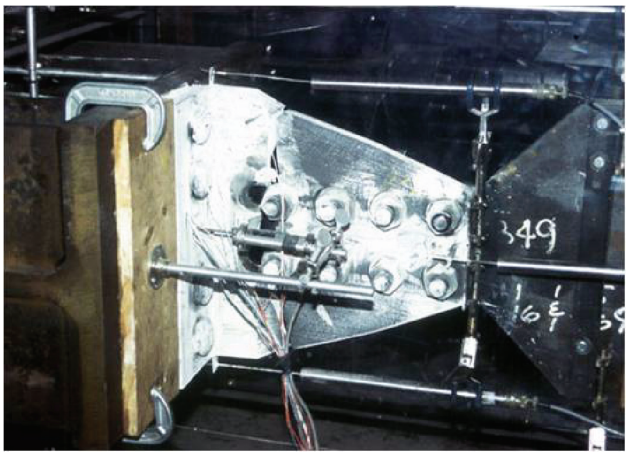
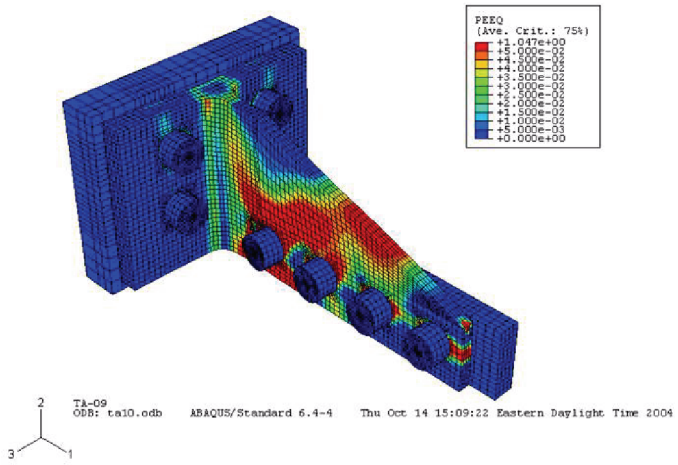


Figure 5.31 Group 4 Specimen TA-09 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

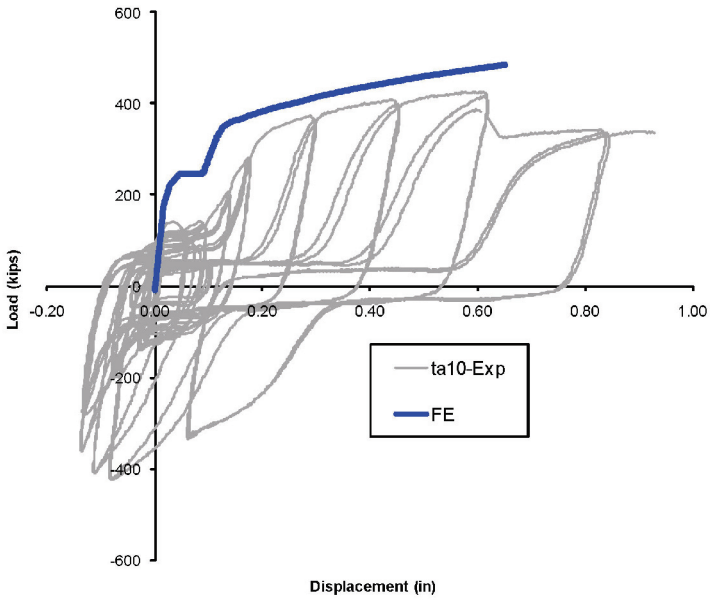
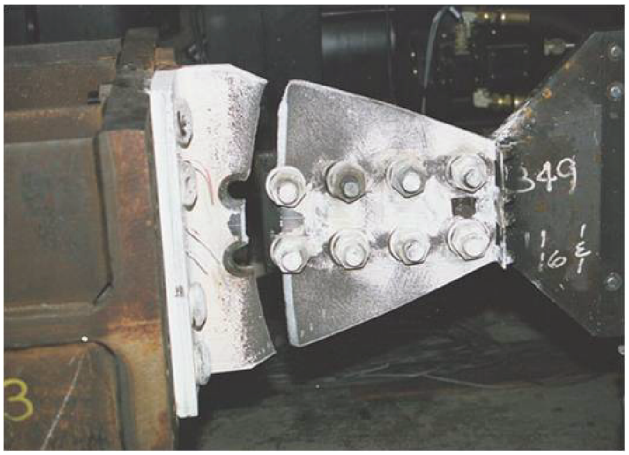
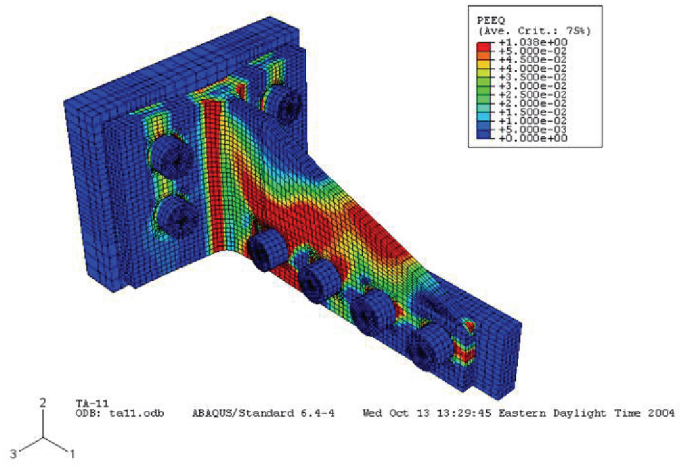


Figure 5.32 Group 4 Specimen TA-10 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

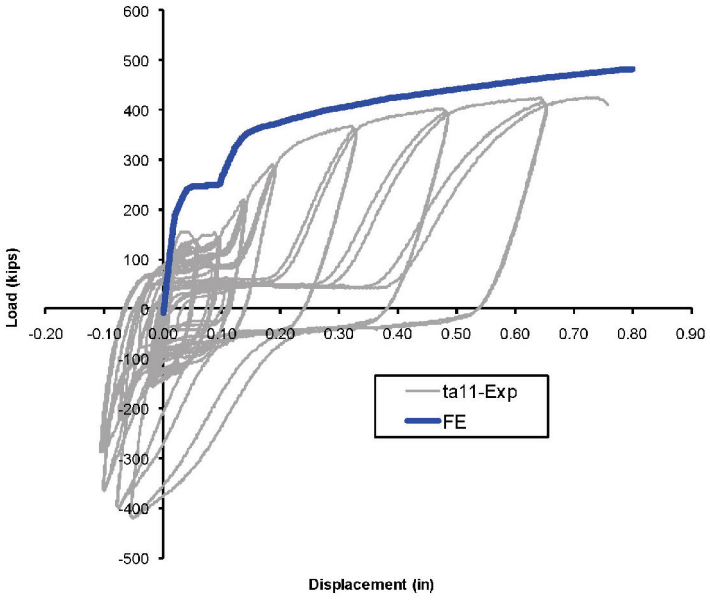
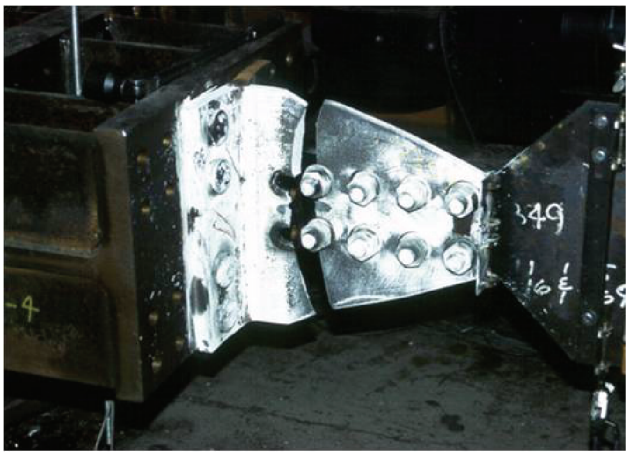
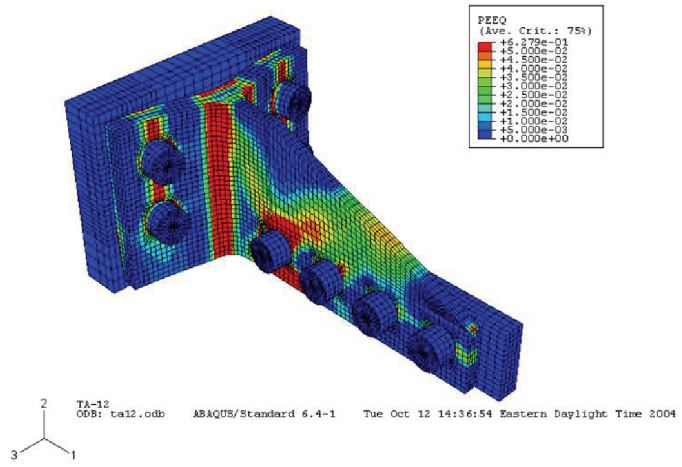


Figure 5.33 Group 4 Specimen TA-11 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

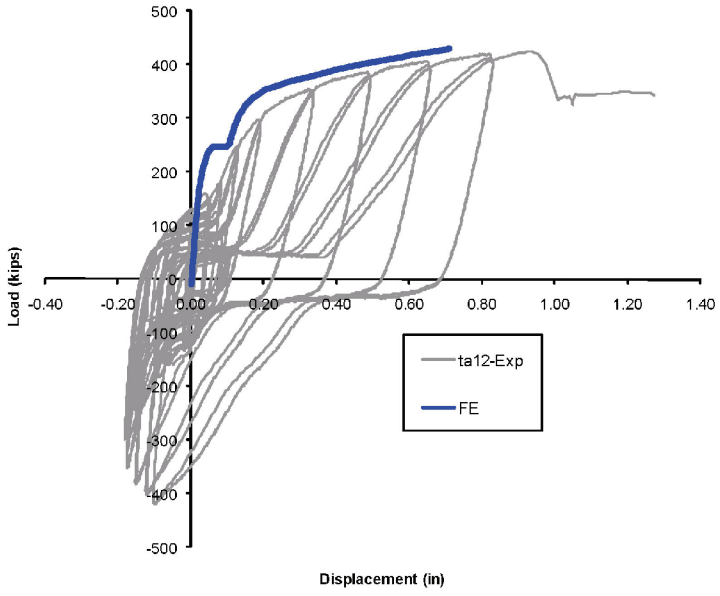
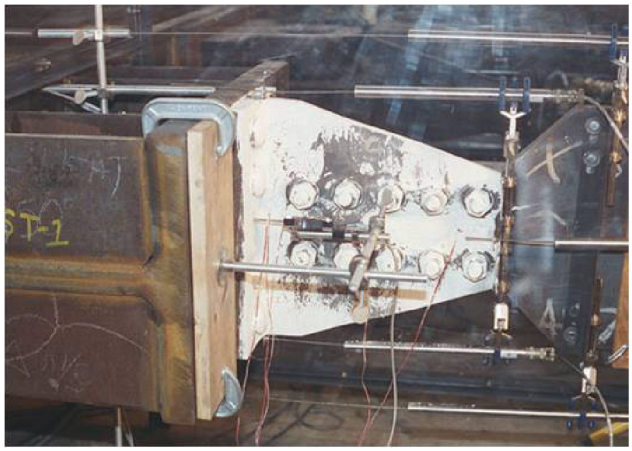
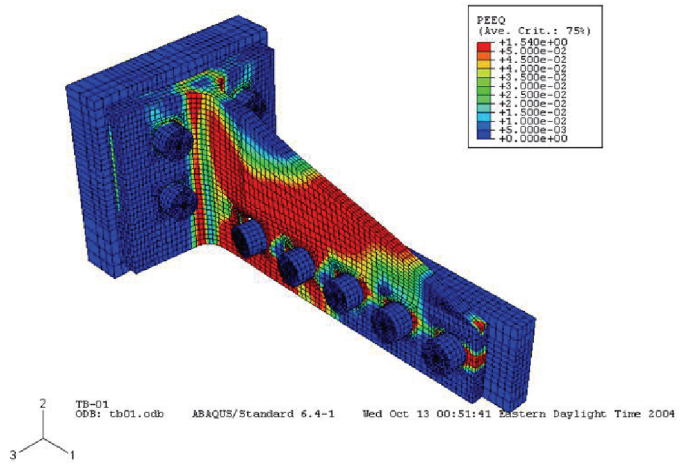


Figure 5.34 Group 4 Specimen TA-12 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

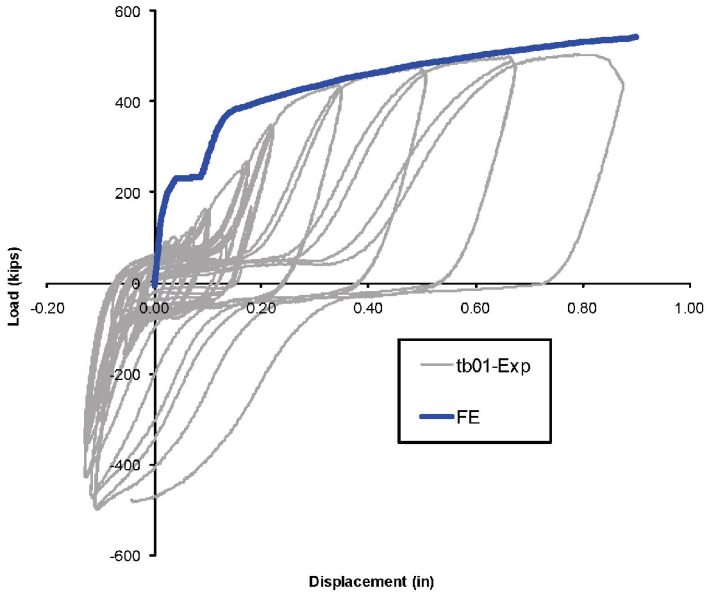
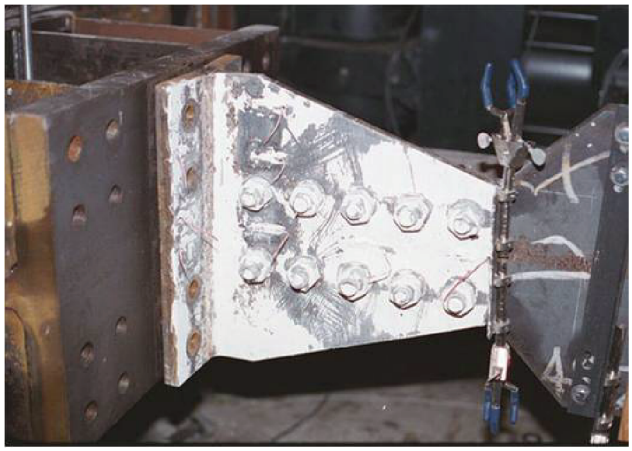
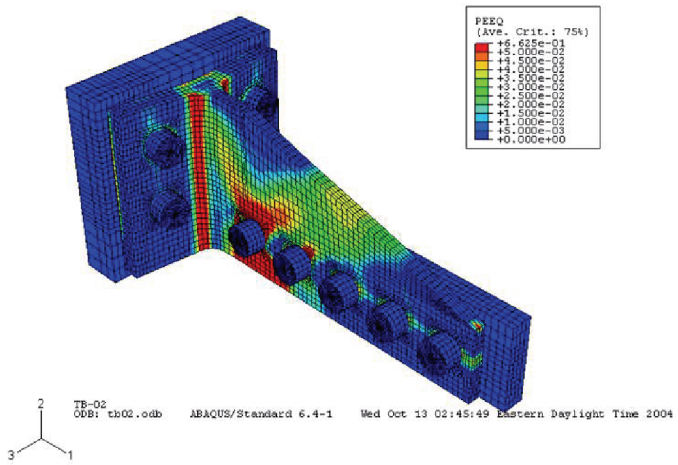


Figure 5.35 Group 5 Specimen TB-01 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

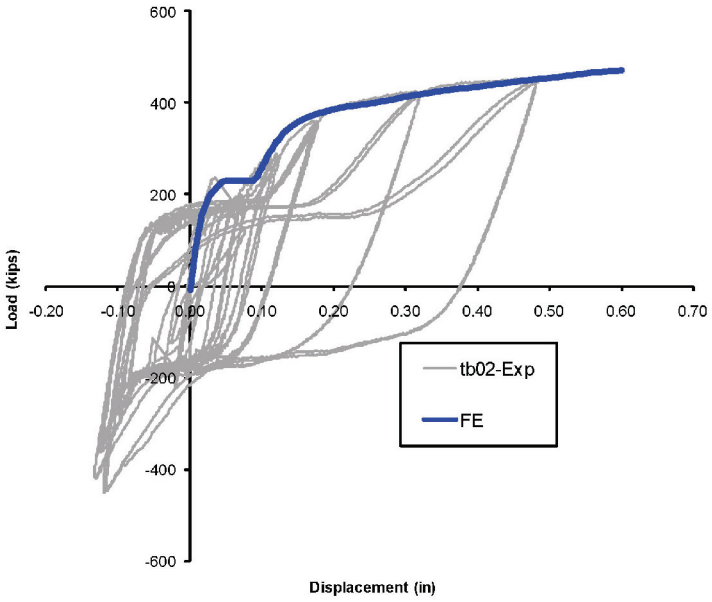
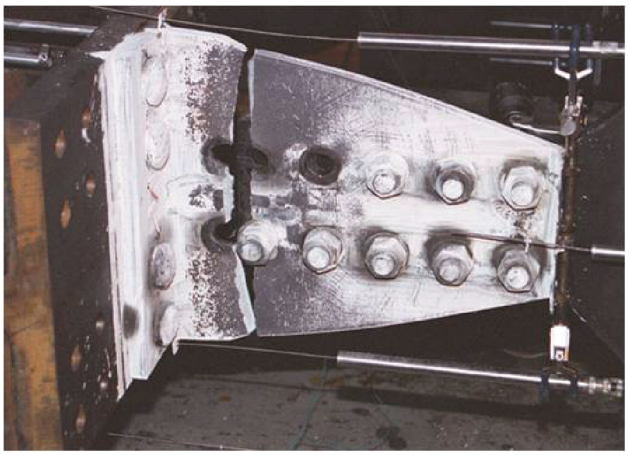
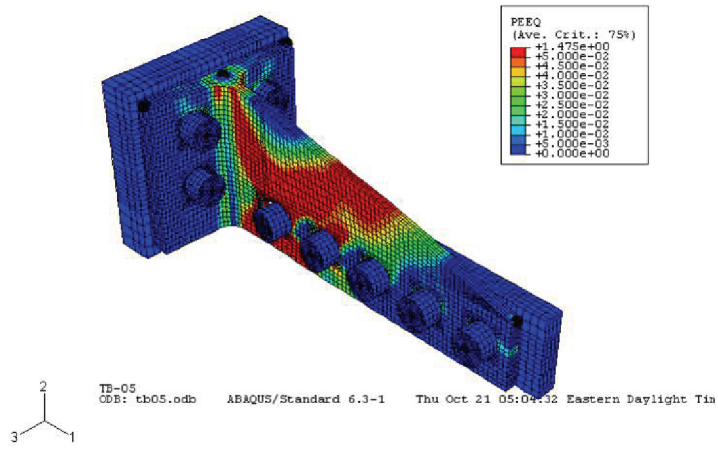


Figure 5.36 Group 5 Specimen TB-02 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

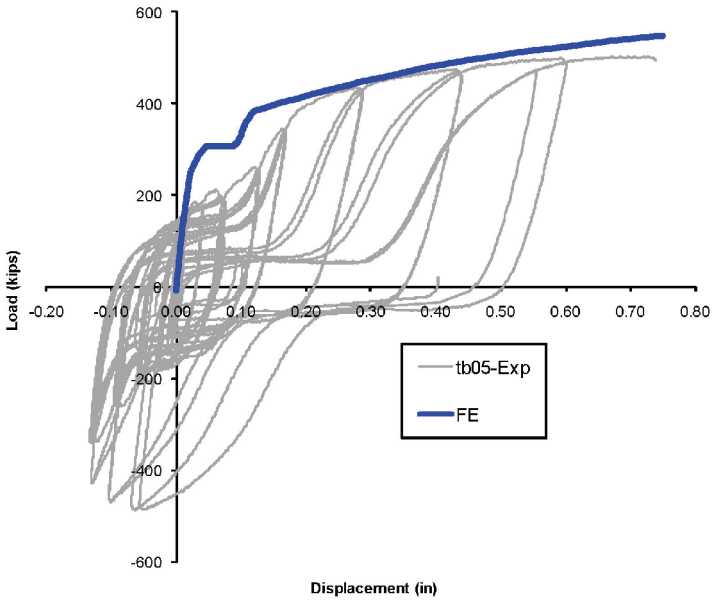
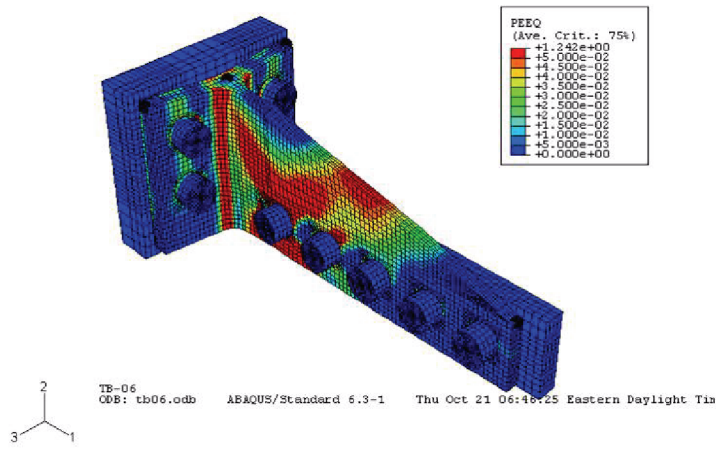


Figure 5.37 Group 6 Specimen TB-05 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)

(b)



(c)

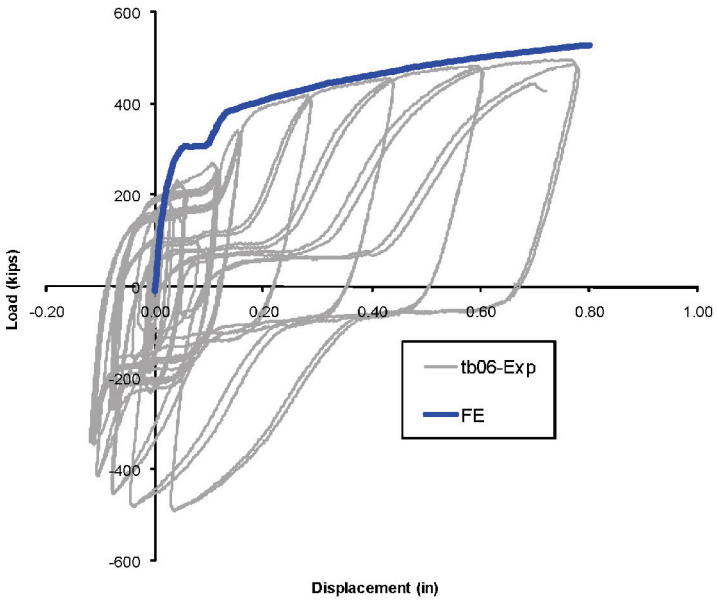
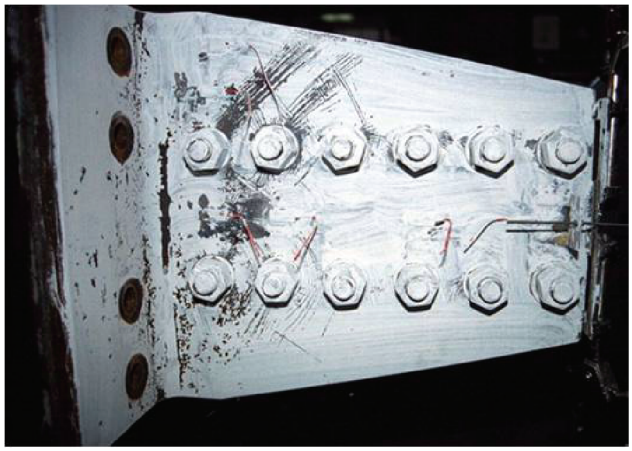
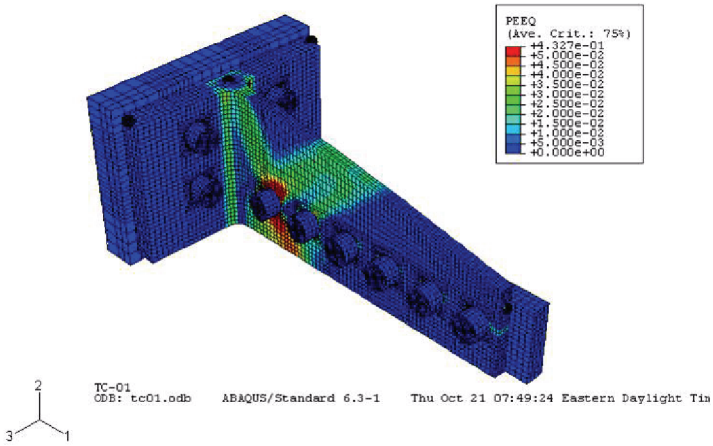


Figure 5.38 Group 6 Specimen TB-06 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

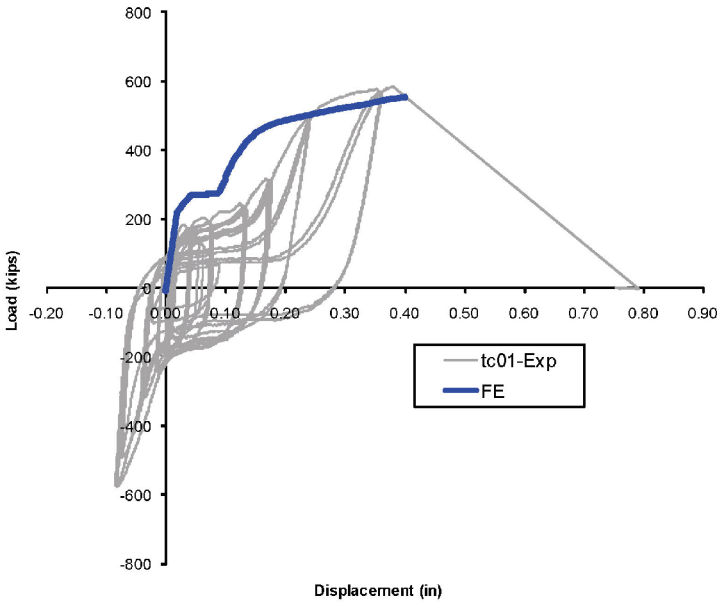
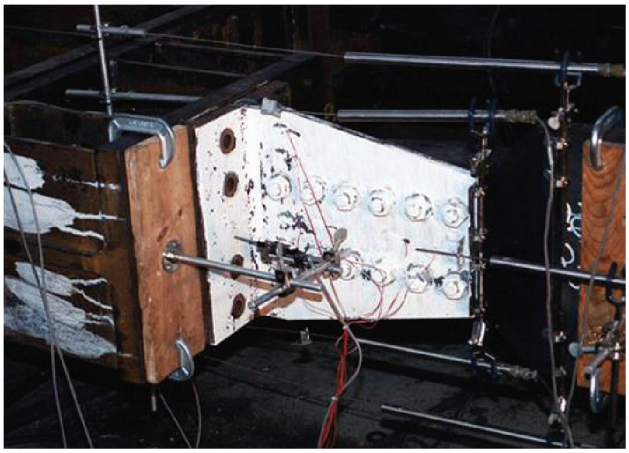
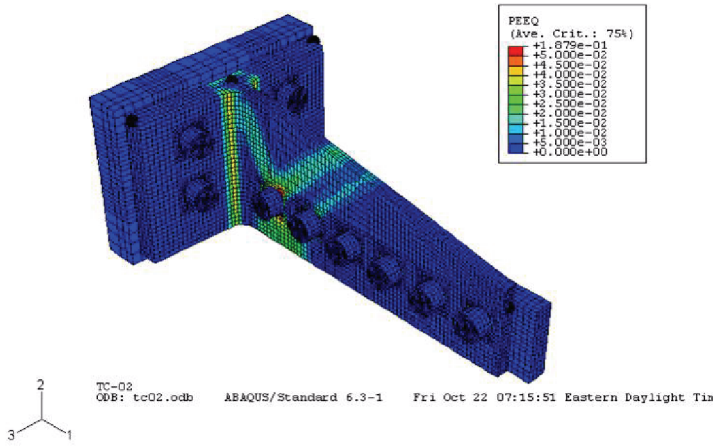


Figure 5.39 Group 7 Specimen TC-01 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

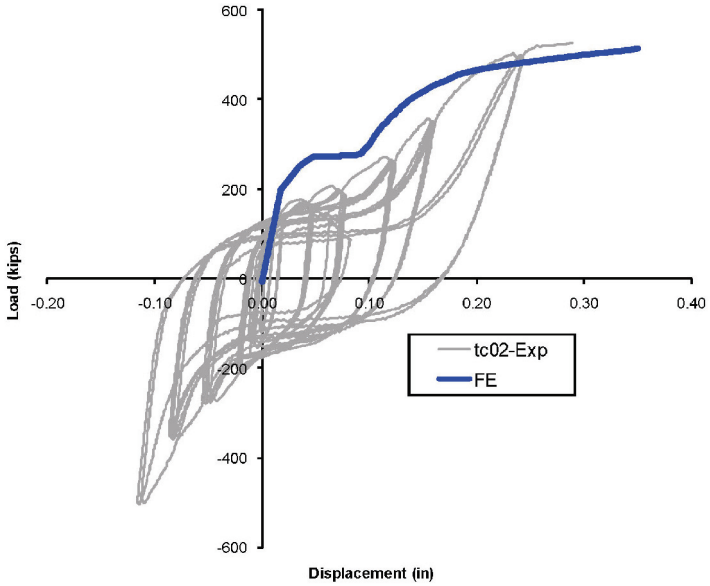
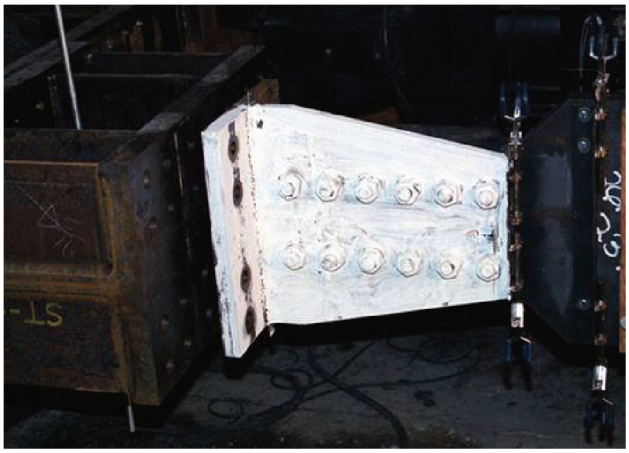
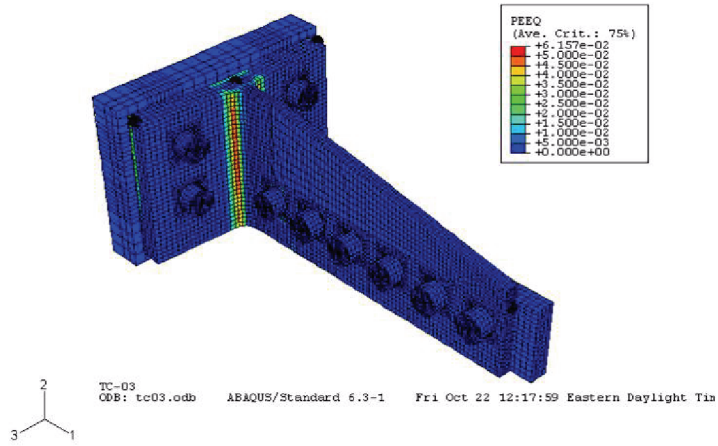


Figure 5.40 Group 7 Specimen TC-02 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

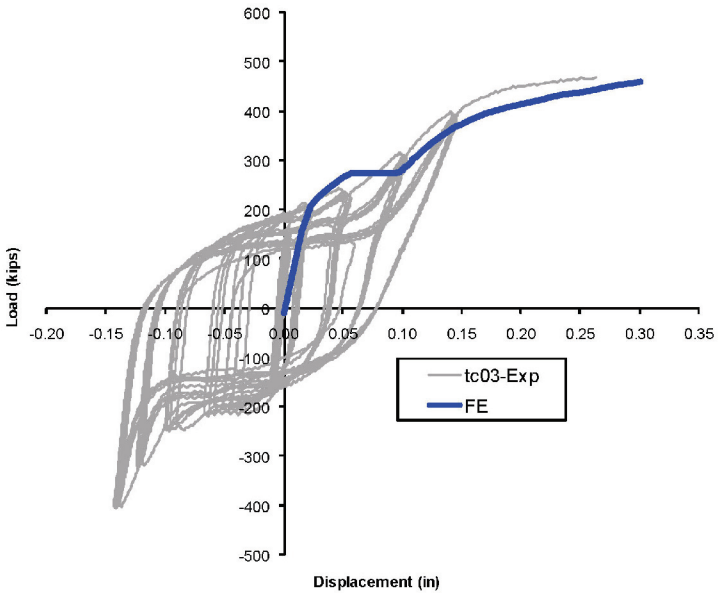
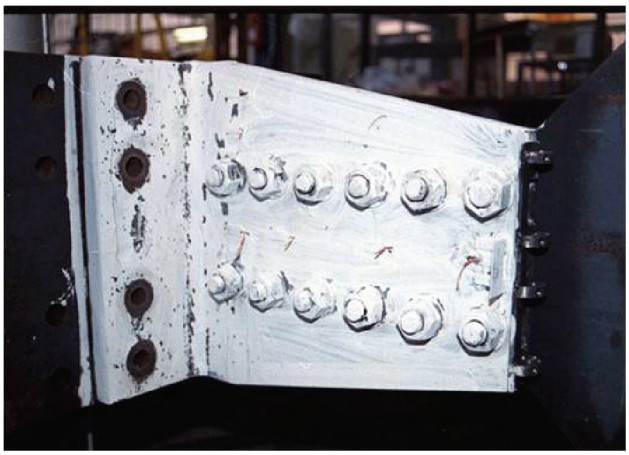
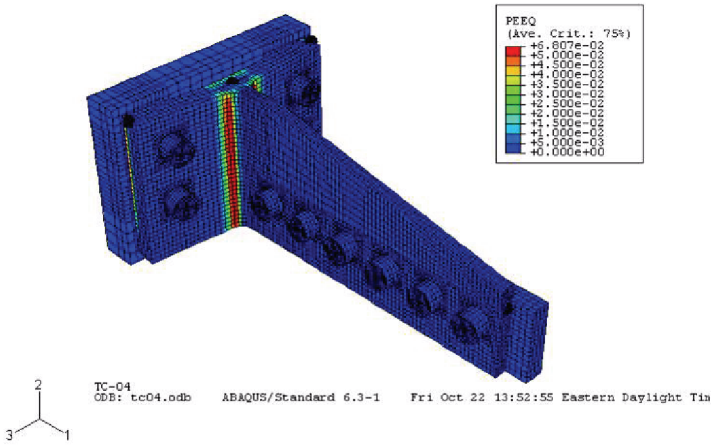


Figure 5.41 Group 7 Specimen TC-03 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

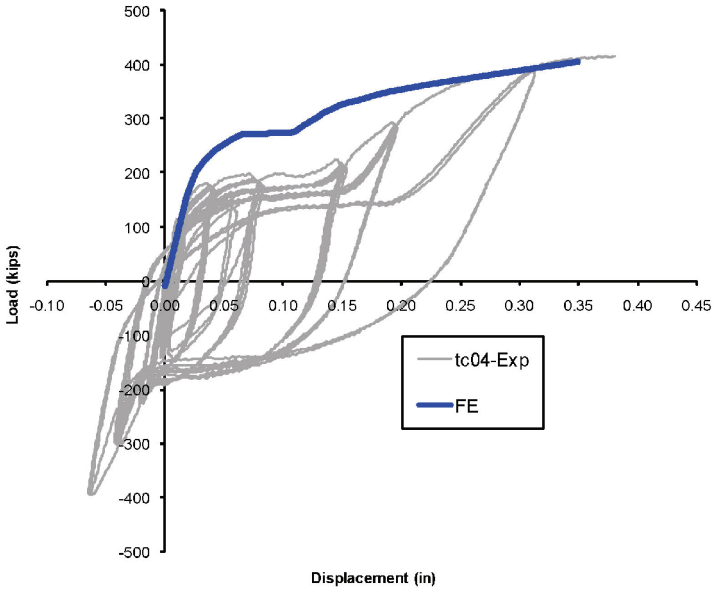
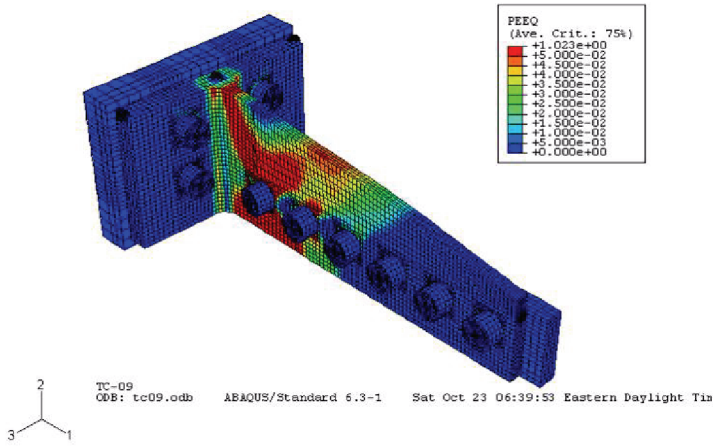


Figure 5.42 Group 7 Specimen TC-04 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)

(b)



(c)

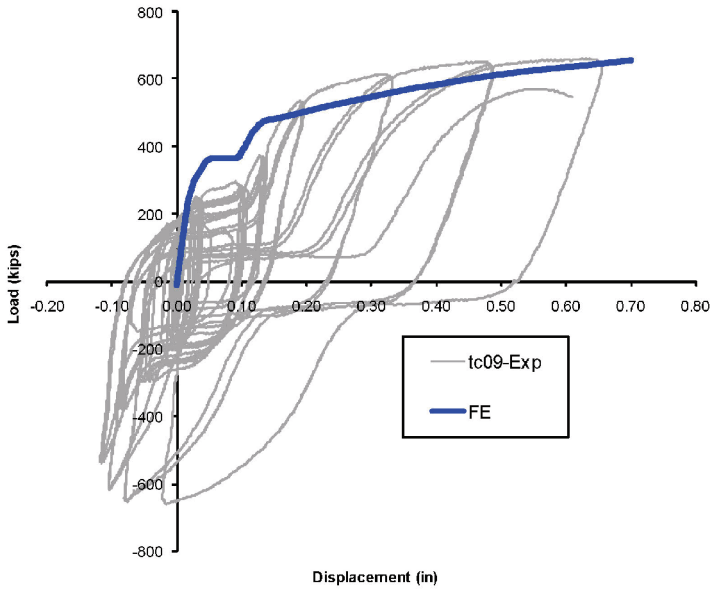
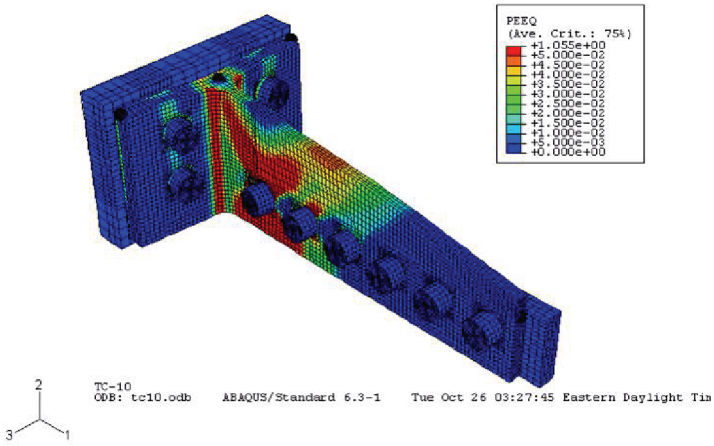


Figure 5.43 Group 8 Specimen TC-09 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)

(b)



(c)

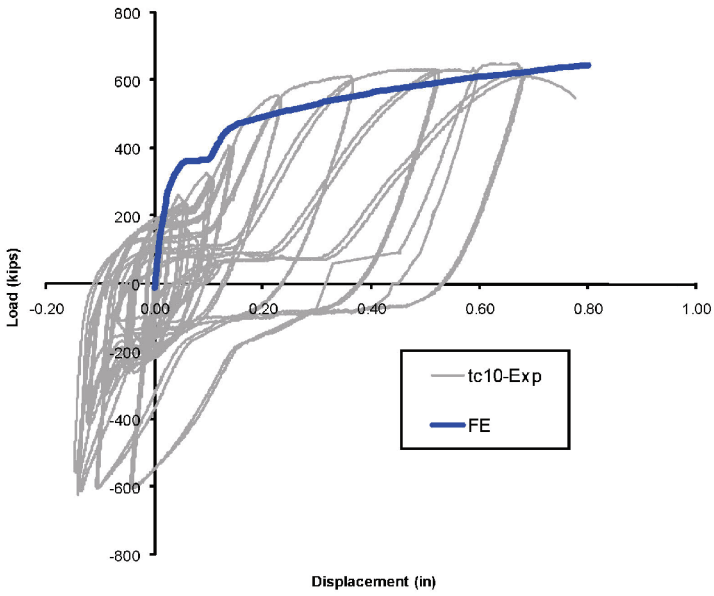
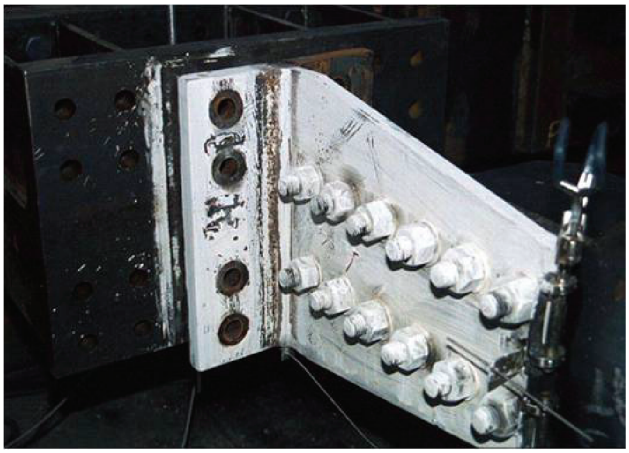
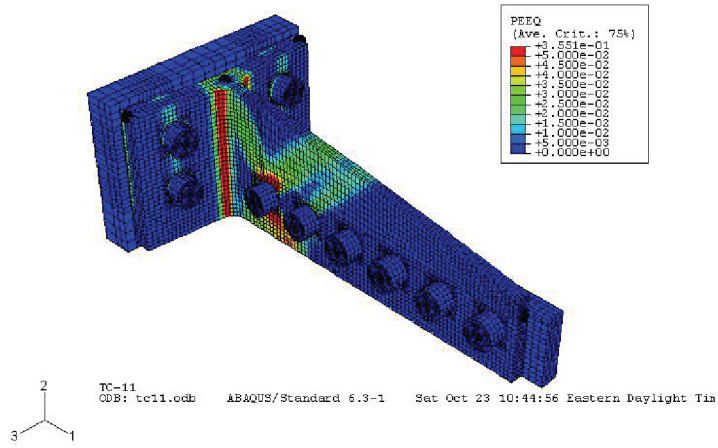


Figure 5.44 Group 8 Specimen TC-10 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

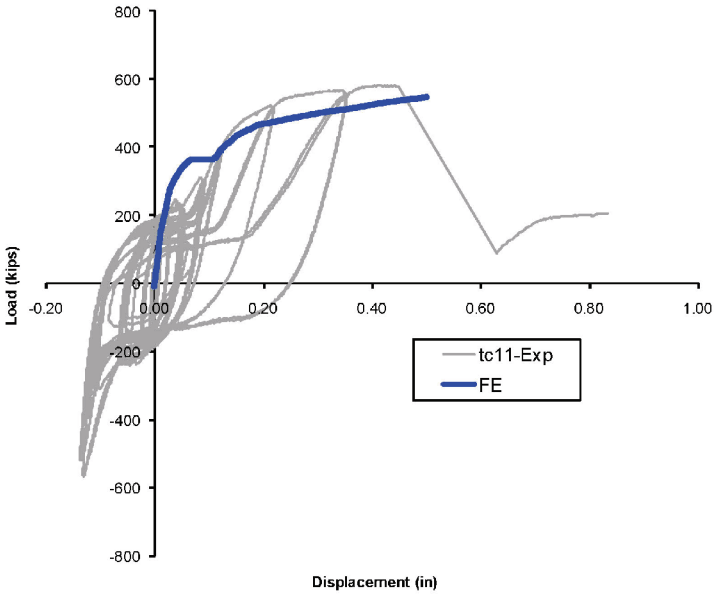
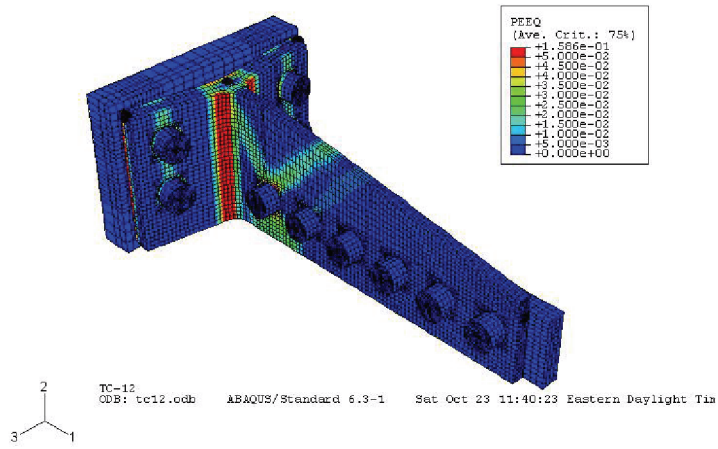


Figure 5.45 Group 8 Specimen TC-11 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)

(b)



(c)

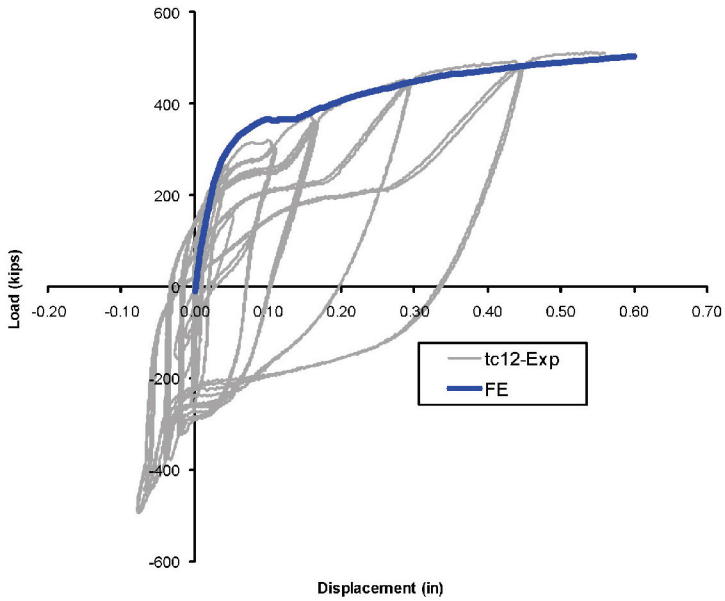
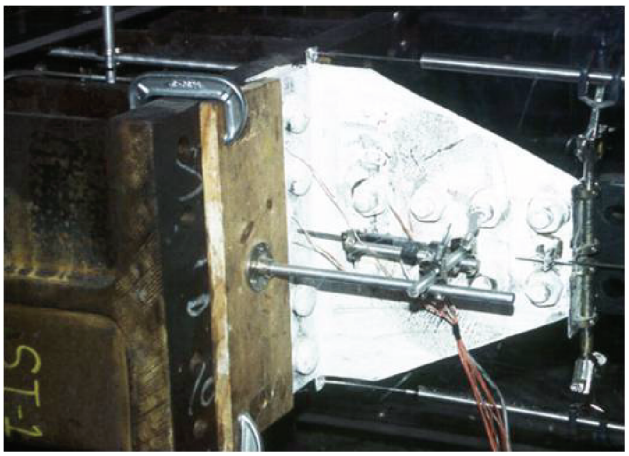
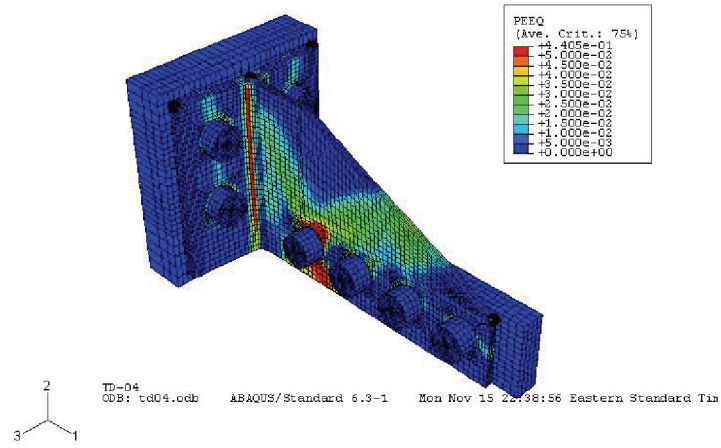


Figure 5.46 Group 8 Specimen TC-12 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

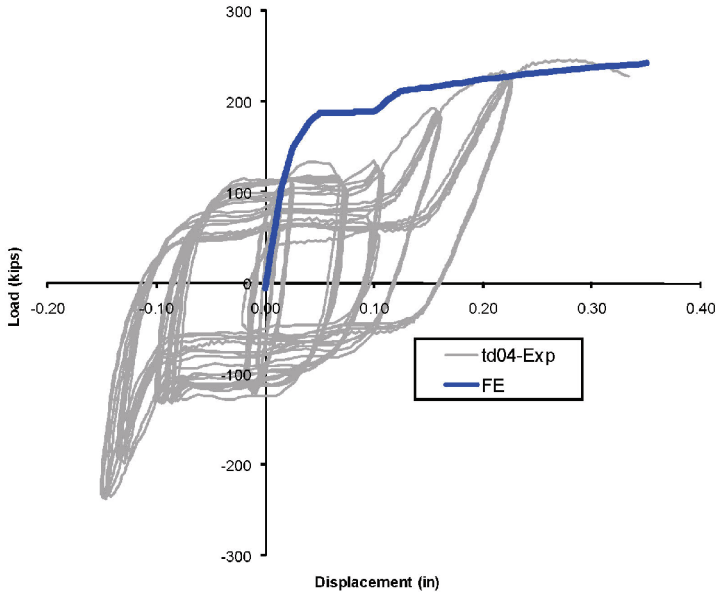
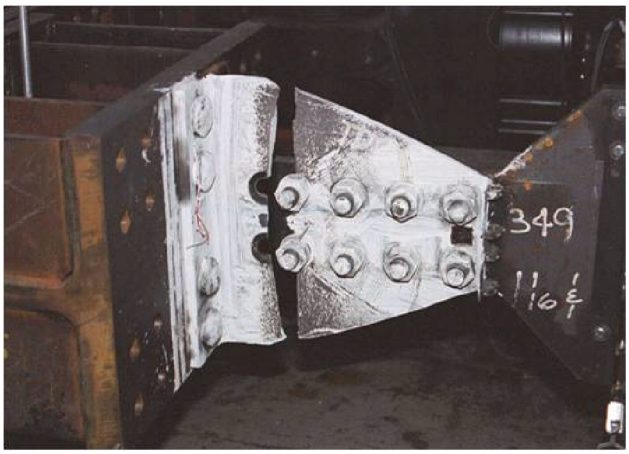
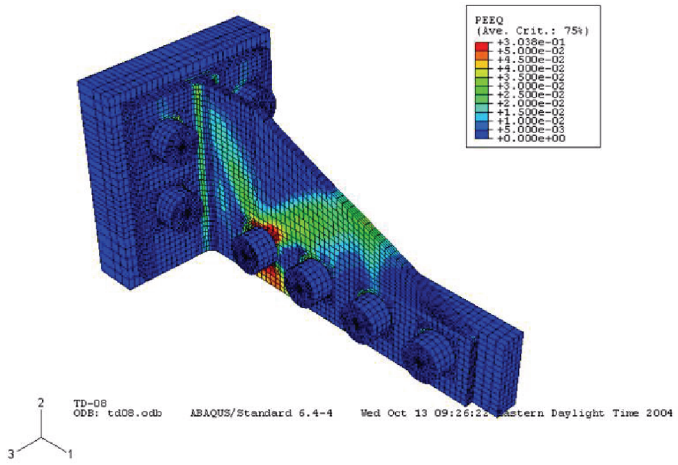


Figure 5.47 Group 9 Specimen TD-04 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

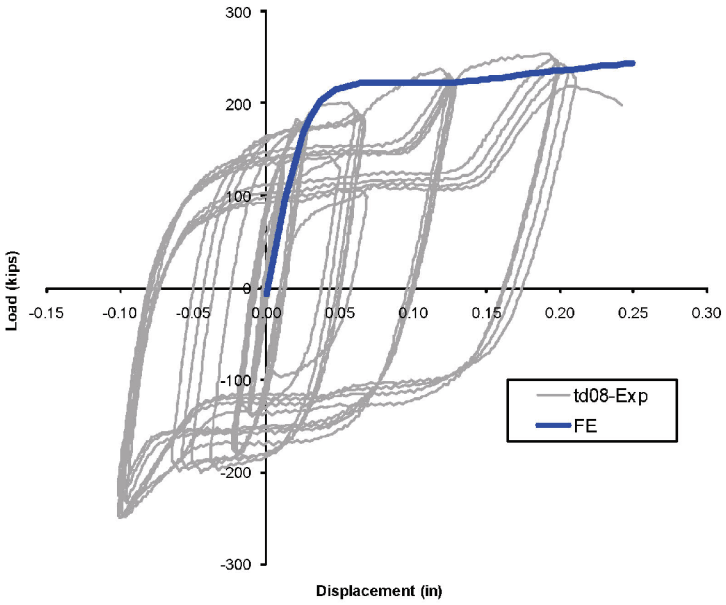
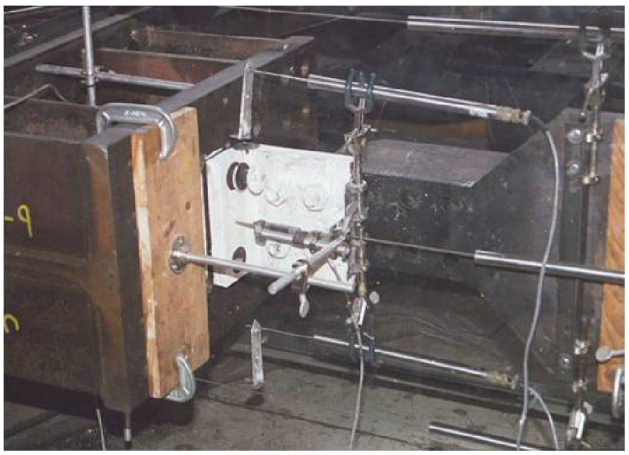
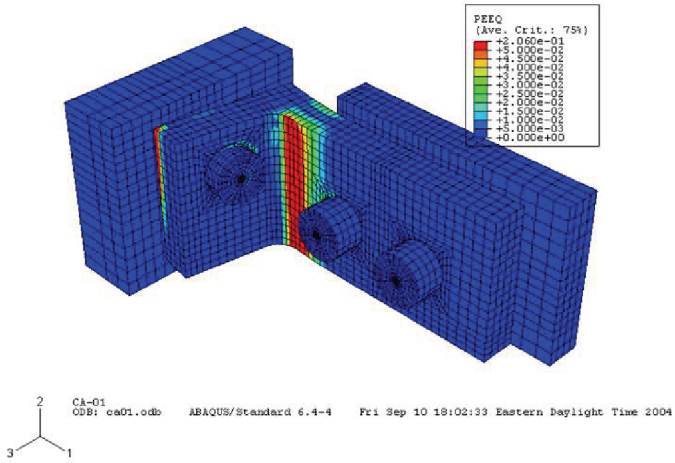


Figure 5.48 Group 10 Specimen TD-08 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

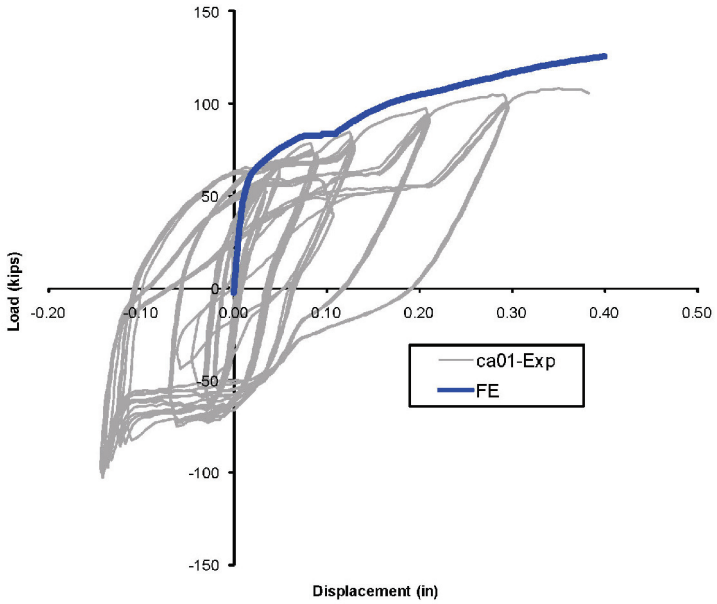
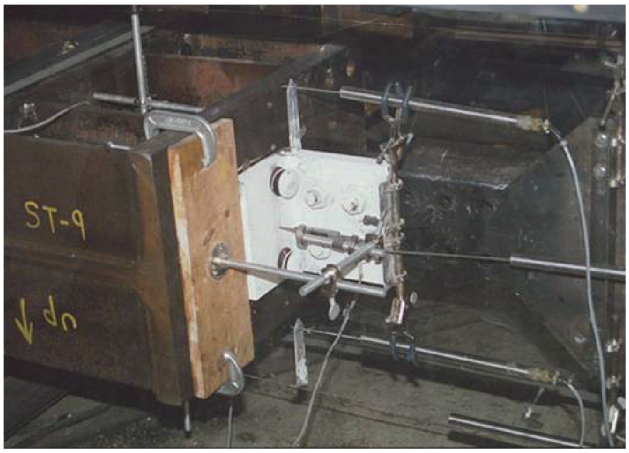
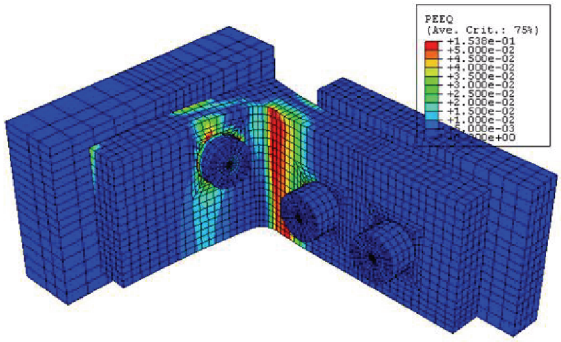


Figure 5.49 Group 11 Specimen CA-01 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

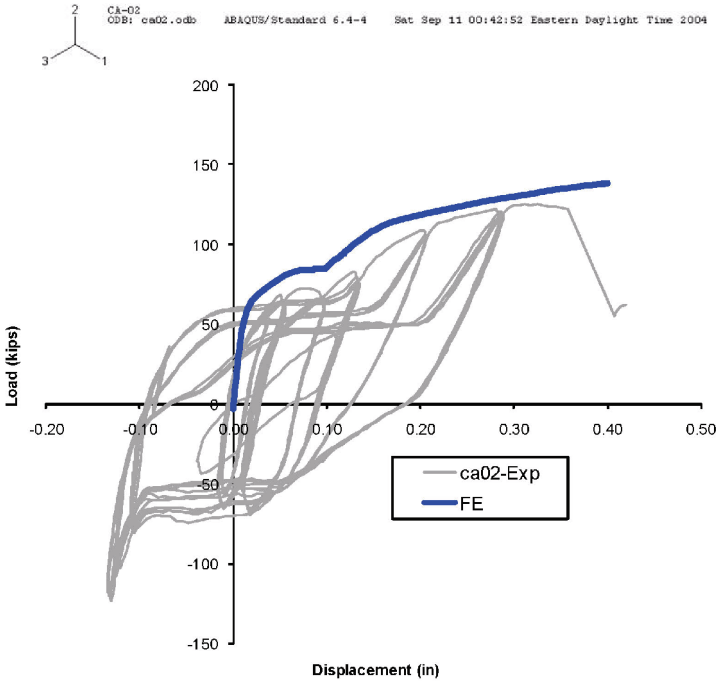
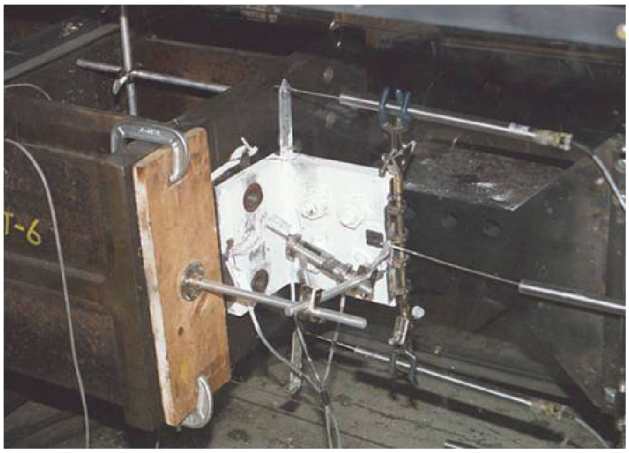
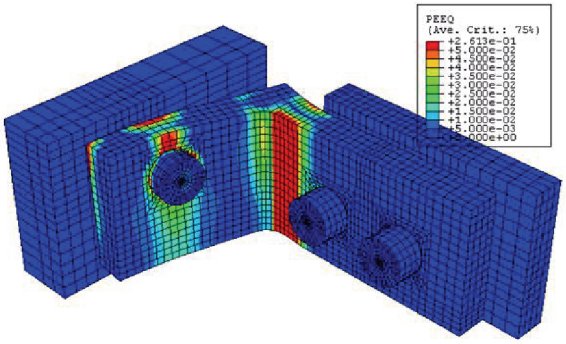


Figure 5.50 Group 11 Specimen CA-02 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

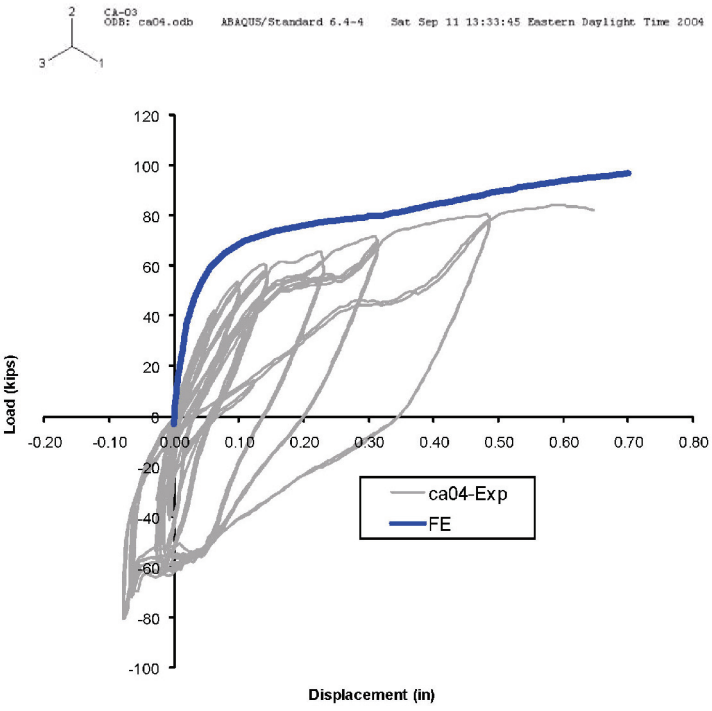
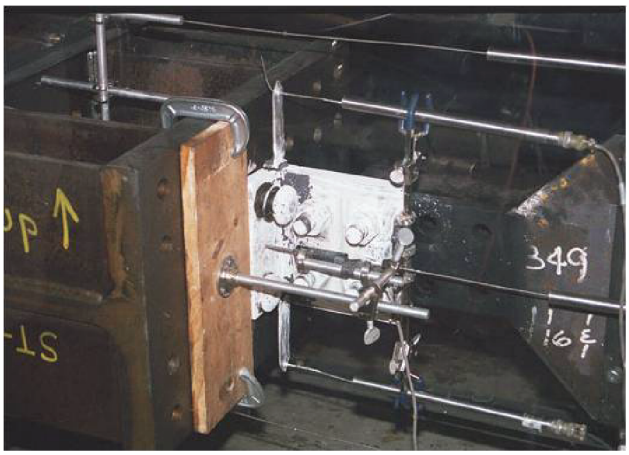
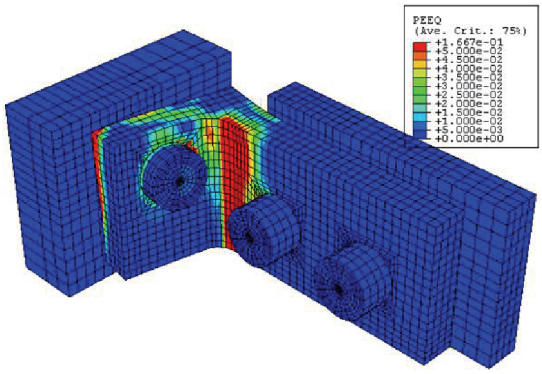


Figure 5.51 Group 11 Specimen CA-04 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

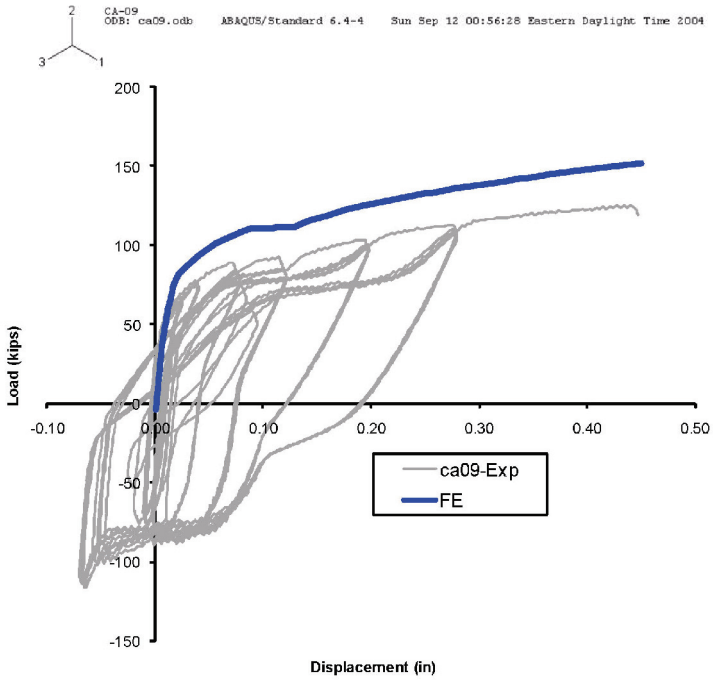
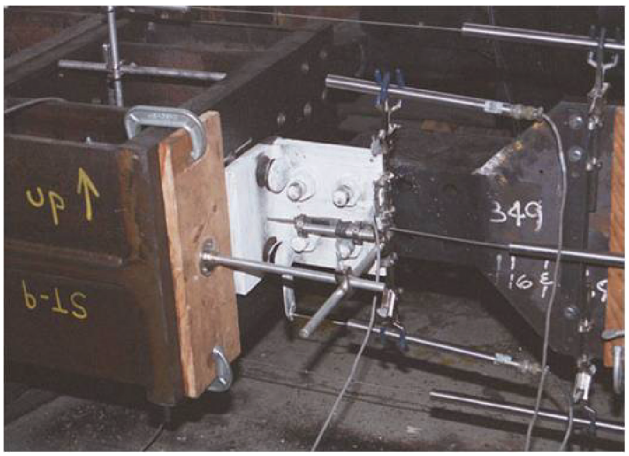
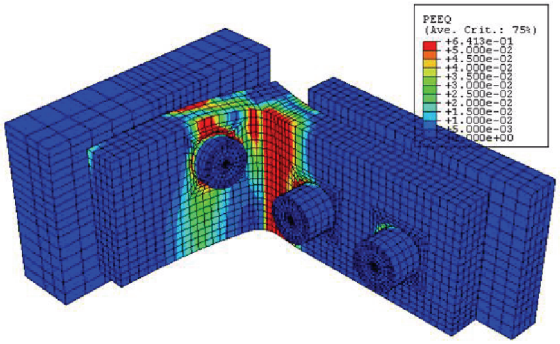


Figure 5.52 Group 12 Specimen CA-09 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

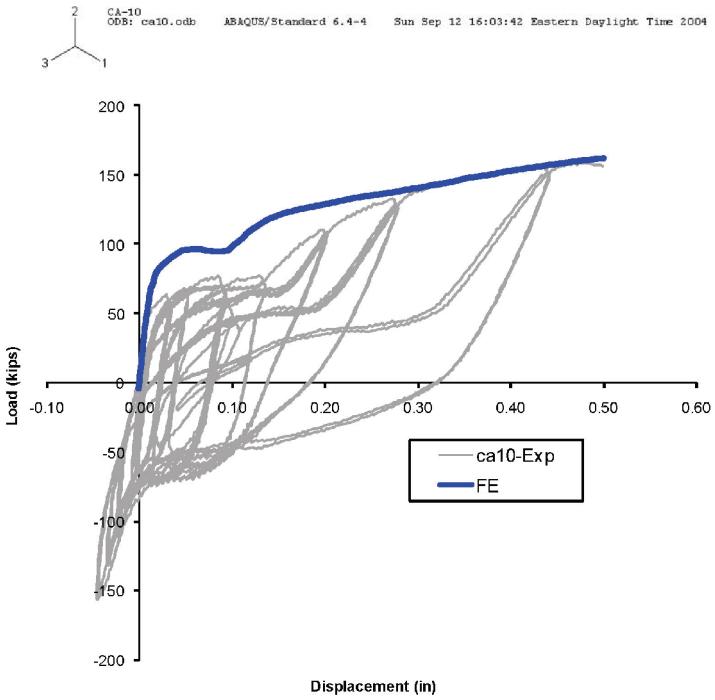
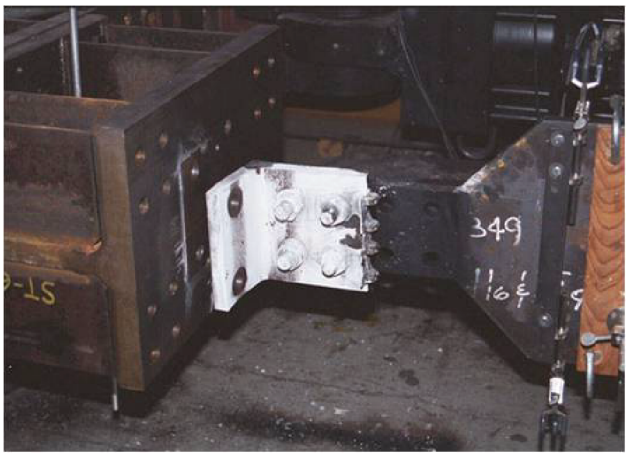
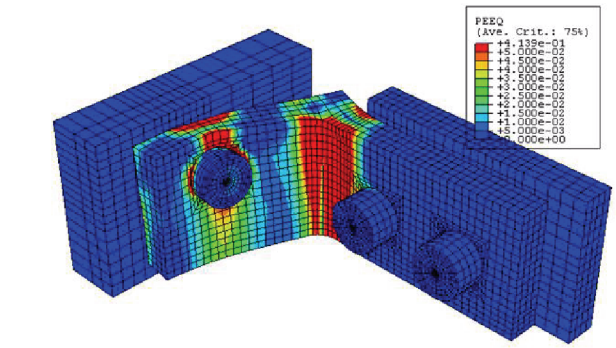


Figure 5.53 Group 12 Specimen CA-10 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

(a)



(b)



(c)

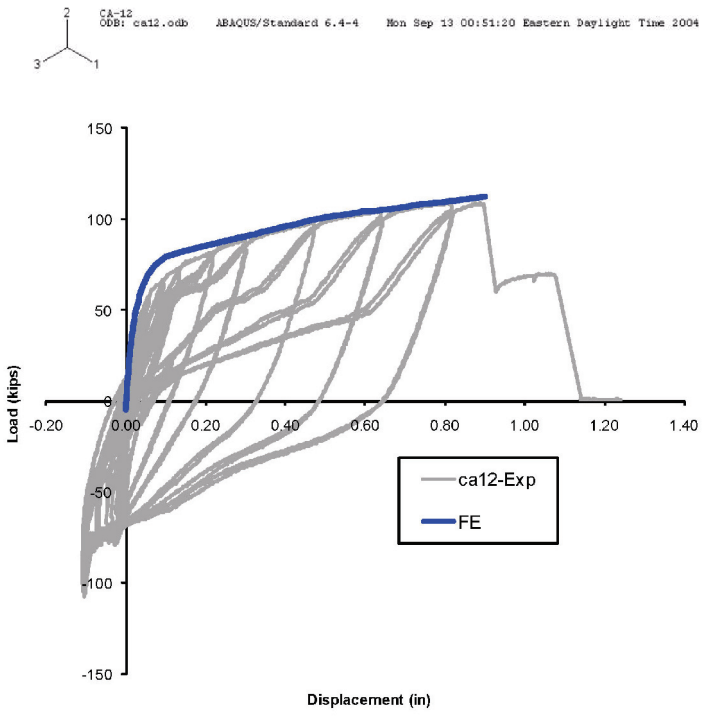


Figure 5.54 Group 12 Specimen CA-12 (a) test specimen photo [103], (b) analytical model, and (c) test vs. FE model axial pull force-displacement response.

5.5.2 Bolt Failure Calibration

Bolt strength and the AISC LRFD Specification design equations were discussed in Section 5.2.1. As part of the component tests, Swanson [103] tested several bolts of the same batch used in the component tests to verify the manufacturer's certification for strength among other properties. Bolts with 7/8 and 1 inch diameter of both A325 and A490 grades where tested. As a result of the direct tension tests, Swanson found the ultimate bolt strength of his bolt specimens were on average 8% higher than on the manufacturers certifications with a standard deviation of 4%.

Furthermore, the average bolt strengths reported by the manufacturers where 140 ksi for the A325 bolts with a standard deviation of 3.4 ksi, and 167.7 ksi for the A490 bolts with a standard deviation of 2.7 ksi. The specified ultimate bolt strengths, ignoring the reduction which takes into account the effective bolt section area are 120 ksi and 150 ksi for A325 and A490 bolts, respectively. This means the ultimate strengths reported by the manufacturer are higher than the nominal by an average of 16.7% and 8.5% for A325 and A490 bolts, respectively.

Both the bolt tension and shear forces during loading and at the pull displacement at which failure occurs in each connection is available from the detailed analytical models. The tension forces for each bolt are obtained from the model by monitoring the normal contact forces between the bolt head and the connection member. The shear forces are obtained by monitoring and summing the contact traction forces between the bolt head and the connection member and the normal contact forces between the bolt shank and the bolt hole.

Rather than directly prescribing bolt strength, the bolt tensile and shear stress state at connection failure will be used to calibrate an elliptical interaction equation similar to Equation 5.3. Among the test cases analyzed, specimens which failed as a result of bolt fracture are listed in Table 5.5. The bolt forces from the analyses at the displacement of failure during the tests are converted to corresponding stress values.

Table 5.5 Swanson Component Test Analyses Bolt Failure Calibration Data

Test ID	Bolt Diameter (in)	Failed Bolt Type	Bolt Force at Failure(kips)		Bolt Stress State at Failure (ksi)	
			Tension, P	Shear, V	Tensile, f_t	Shear, fv
CA01	0.875	Tension	84.80	10.82	141.01	17.99
CA02	0.875	Tension	83.82	6.86	139.39	11.40
CA04	0.875	Tension	78.13	17.27	129.93	28.72
CA09	1.000	Tension	106.97	13.17	136.19	16.77
CA10	1.000	Tension	99.41	26.73	126.57	34.03
CA12	1.000	Tension	95.08	36.26	121.06	46.16
TA03	0.875	Tension	86.76	1.01	144.28	1.68
TA04	0.875	Tension	86.67	1.13	144.12	1.88
TA17	0.875	Tension	83.97	0.18	139.64	0.30
TA18	0.875	Tension	79.04	0.52	131.45	0.86
TA19	0.875	Tension	73.78	0.55	122.70	0.91
TA20	0.875	Tension	77.46	0.87	128.82	1.44
TB01	0.875	Shear	14.92	48.30	24.81	80.32
TB02	0.875	Tension	83.09	0.75	138.18	1.25
TB09	0.875	Tension	83.67	0.61	139.14	1.01
TB10	0.875	Tension	77.23	0.78	128.43	1.29
TC01	0.875	Tension	78.25	0.54	130.14	0.90
TC02	0.875	Tension	77.79	0.59	129.37	0.97
TC03	0.875	Tension	78.25	0.61	130.14	1.02
TC04	0.875	Tension	83.86	0.63	139.46	1.05
TC11	1.000	Tension	103.48	1.31	131.75	1.67
TC12	1.000	Tension	110.99	1.21	141.32	1.54

The bolt tensile and shear stress state at failure for each test case listed in Table 5.5 are used to calibrate the tensile-shear stress elliptical interaction equation which is the bolt failure criterion. To ensure a better fit for cases which failed with greater interaction, the points with shear stress less than 10 ksi was excluded from the calibration process. The fitted constants are the maximum tensile and shear stress capacity for the bolts. The resulting bolt failure criterion is shown in Equation 5.46.

$$\left(\frac{f_t}{141.1}\right)^2 + \left(\frac{f_v}{81.6}\right)^2 \leq 1 \qquad \text{Eqn 5.46}$$

where

f_t = bolt tensile stress (ksi)

f_v = bolt shear stress (ksi)

Figure 5.55 shows the comparison of the bolt failure criterion equation (Equation 5.46) plotted against the bolt stress state at failure extracted from the analyses of the test cases which experienced bolt failure.

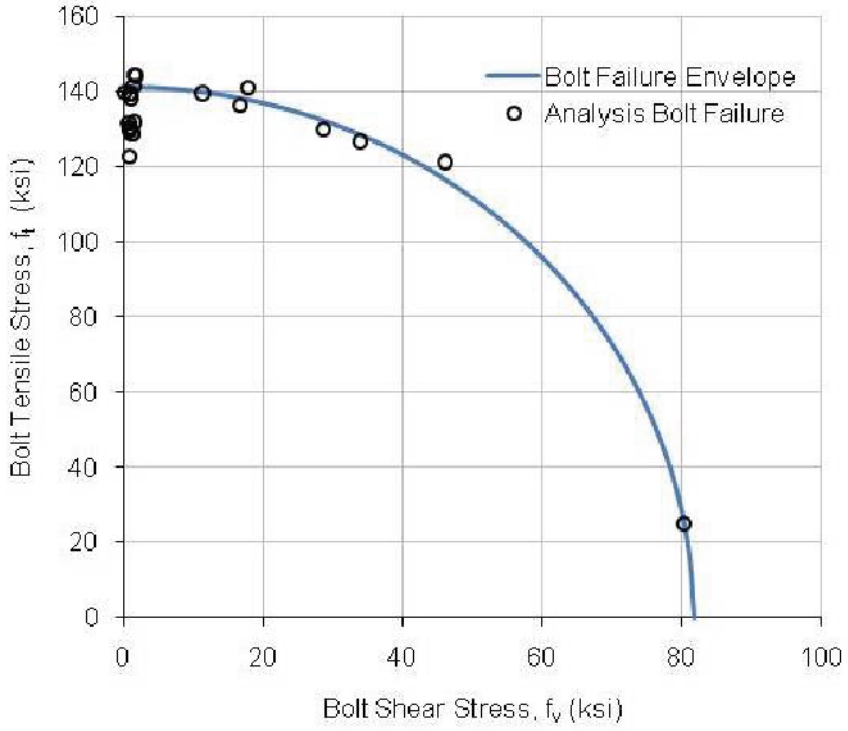


Figure 5.55 Bolt failure criterion Equation 5.46 plotted against Swanson component test analyses bolt failure calibration data points extracted from analytical models.

5.5.3 Angle Component Failure Calibration

5.5.3.1 SMCS Material Property Calibration Methodology and Example

The Stress Modified Critical Strain (SMCS) criterion was calibrated to predict the failure of different grades of structural steel under different loading conditions by Kanvinde

and Deierlein [54]. In their study, the SMCS material parameter, α was calibrated using smooth notched round bar tensile specimens shown in Figure 5.56 with three different notch radii to create different triaxiality stress states in the notch while maintaining the minimum section area for all cases.

Finite element simulations of the test specimens were used to match the test response and determine the stress-strain state in the notch. The specimens where modeled using two-dimensional axisymmetric elements with material plasticity and analyzed using ABAQUS. The material stress-strain response was determined using round tensile specimens for each grade steel.

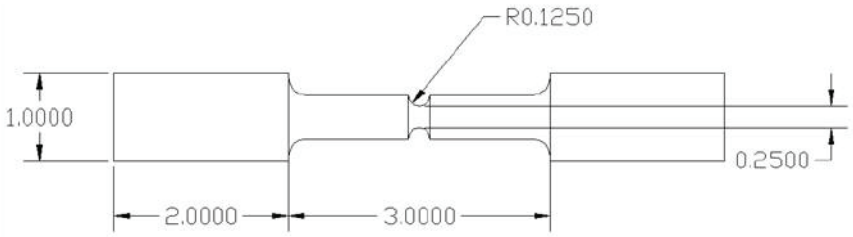


Figure 5.56 Notched round tension bar specimen; notch radii 0.125 inches shown [54].

Cup-cone failure was the typical failure observed in these notched tension bars, occurring at the center of the notch where the ductile cracks form and grows, leading to full section failure. Halves of the failed specimens are shown in Figure 5.57. The rough castellated surface in the notch is indicative of failure due to void growth and coalescence.

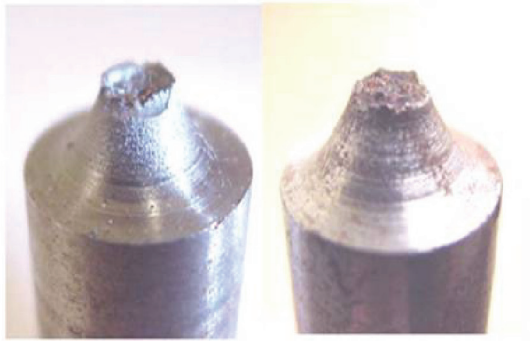


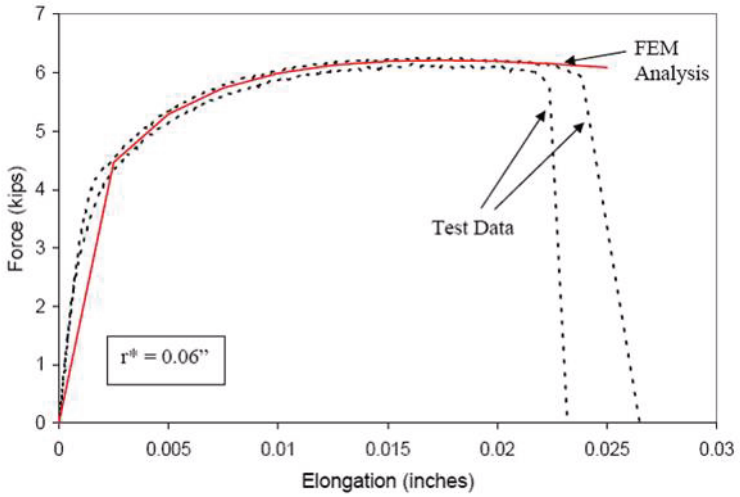
Figure 5.57 .Close-up of notched tension bar specimens with cup-cone fracture at notch [54].

The physical tests offer both the nonlinear response of the tensile specimen and a point of failure (i.e. tensile displacement at failure). The stress-strain state in the specimen at the displacement where failure occurs determined by analytical models enable the calibration of the SMCS material parameter, α. Figure 5.58 shows the comparison of test versus analysis data for specimens machined from 1 inch thick A572 Grade 50 plates with three different notch radius.

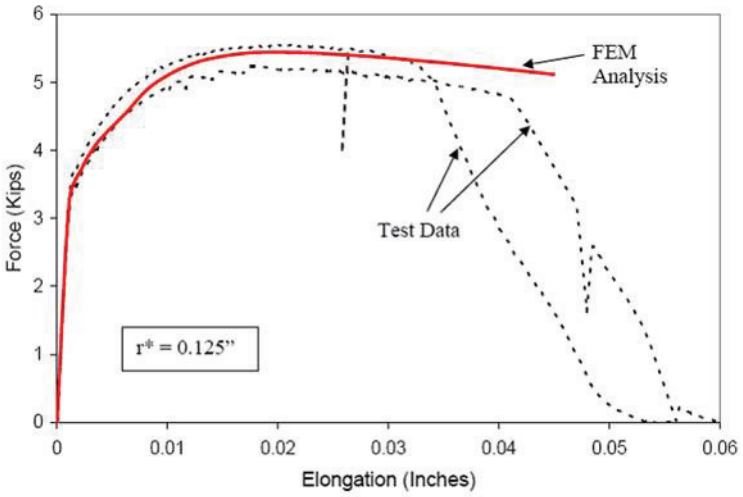
Two test curves are shown for each specimen which fail at unique displacements at which calibrations are made. The calibrated material parameters for all the tests are averaged for the specific material parameter. Among the various grades of American and Japanese steel used for the notched round bar tensile tests, machined from structural shapes as well as plates, this plate material is the closest to that of the T-stub material tested by Swanson in terms of their yield strength and elongation.

Using data from the analytical models for the specimens, Kanvinde and Deierlein made comparisons, shown in Figure 5.59, of the distribution of equivalent plastic strain, stress triaxiality, and the SMCS from the bar axis to outer notch radius across the fracture plane at the increment where the tensile pull displacement is equal to that registered at failure in the tests.

(a)



(b)



(c)

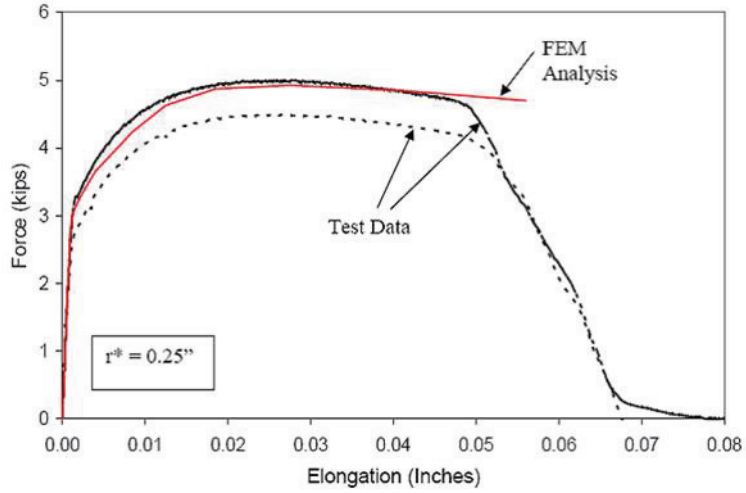
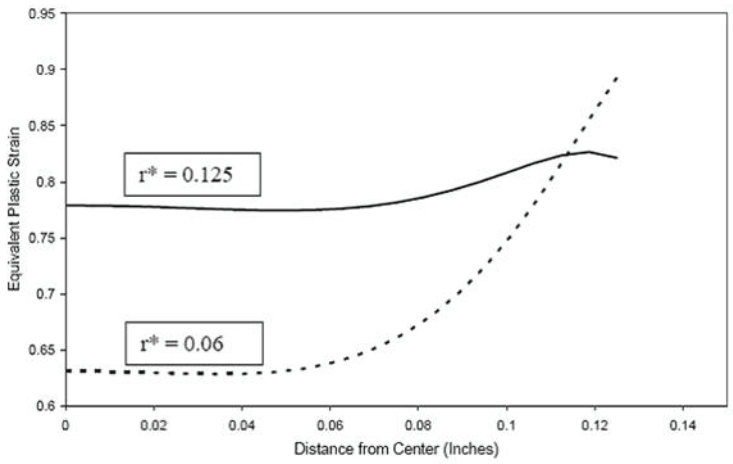
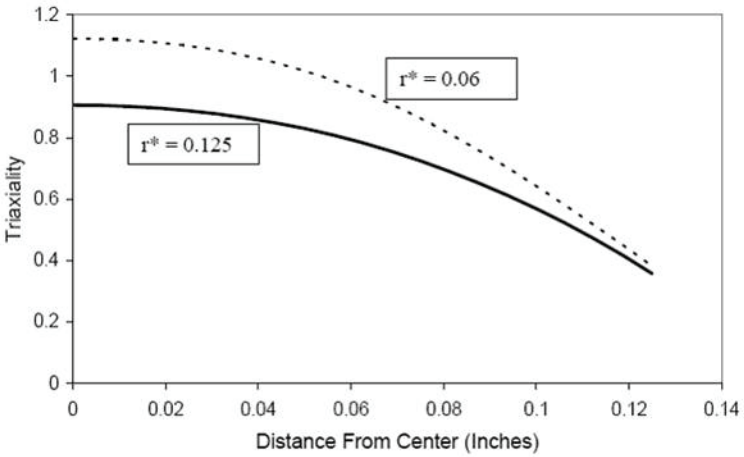


Figure 5.58 Comparison of FEM and test data for notch round bar with radius of (a) 0.06, (b) 0.125, and (c) 0.25 inches machined from a A572 Grade50 one inch thick steel plate [54].

(a)



(b)



(c)

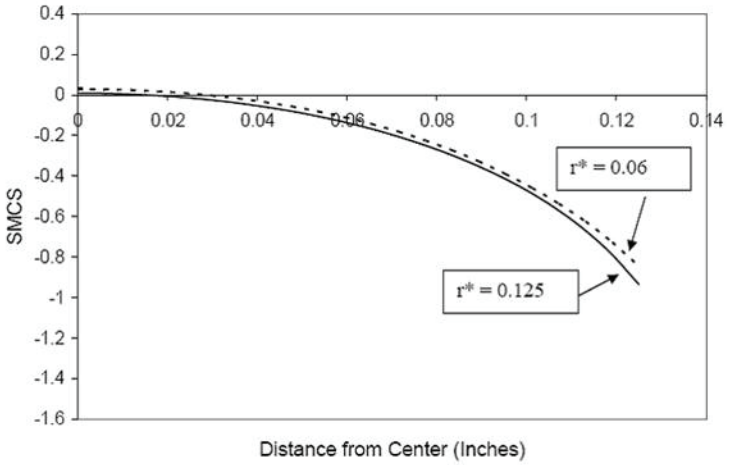


Figure 5.59 Comparison of (a) Equivalent plastic strain, (b) stress triaxiality, and (c) SMCS distribution across notch cross section failure surface for specimens with 0.06 and 0.125 inch notch radii [54].

Important observations can be made from the different comparison plots shown in Figure 5.59.:

- Although the cup-cone failure initiates in the center of the notch (zero inches from the center on the x-axis) the maximum equivalent plastic strain is at the outer surface of the notch. Also, the maximum magnitude of the equivalent plastic strain for the two different specimens are different. This means that equivalent plastic strain alone is not a sound failure criterion. It not only fails to predict the correct location where failure initiates, it is also not consistent. The maximum plastic strain values for the two specimens with different notch geometry varies.
- The stress triaxiality distributions shows that the greatest constraint in the material exist at the center of the notch where failure initiates. This is consistent with the SMCS model where the value of critical plastic strain decreases with an increase in the triaxiality term in the exponent.
- Most importantly, the SMCS magnitude for both specimens, calculated using the relation in Equation 5.45 with the calibrated material property, α, meets the failure criterion: SMCS = $\varepsilon_p - \varepsilon_p^{critical} > 0$ consistently at their respective failure points. This demonstrates the success of SMCS failure criterion in predicting failure and its location of initiation in all three cases.

While presenting the VGM and SMCS models the characteristic length associated with the mechanism of void growth and intervoid necking was described as part of the failure criterion that critical condition must be reached within a finite volume rather than a singularity as shown in Figure 5.60. The determination of the characteristic length is based on averages of several microstructural measurements by observing the fractured surface at a 45-degree angle under a scanning electron microscope revealing the dimples formed by voids and the plateaus in between these dimples. These dimple features can be seen in Figure 5.12 (b).

A lower bound definition of the material characteristic length is two times the average dimple diameters while an upper bound definition is the length of the largest plateau measured between the dimples. The measured lower and upper bound characteristic materi-

al length of the A572-Grade 50 tested steel plate material is given by Kanvinde and Deirleien as 0.0033 and 0.017 inches respectively with and average of 0.007 inches. The SMCS distribution in the smooth notched tensile tests shown in Figure 5.59 (c) has a fairly flat gradient at the areas where failure initiates. Thus, the failure criterion is not sensitive to the SMCS values calculated at the nodal points of the finite elements which is quite larger compared to the characteristic length. The mesh size becomes significant only in geometry which have sharp cracks creating high gradients in the stress-strain values. In geometry with large areas of strain with multiple potential failure zones the failure criterion should still be checked within a certain finite volume to avoid two nodes at different parts of the model representing different failure mechanisms to flag failure.

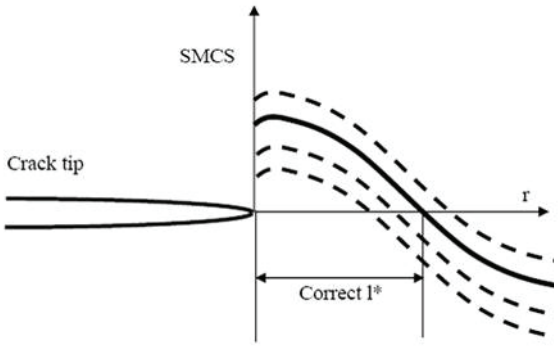


Figure 5.60 .Characteristic length measure in calibrating and applying SMCS [54].

The test results of the notched tensile specimens with the different notch size, fabricated from A572-Grade 50 rolled steel plates and the calibrated SMCS material constants at failure is summarized in Table 5.6. The mean and median calibrated SMCS material constant of all nine test specimens, 1.19 and 1.18, respectively are close which implies a normal distribution. The different notch size in these tests produce distinctly different displacements at failure although all have the same minimum section area. This reflects the relation between the magnitude of stress triaxiality and ductility at failure. A simple strength based

failure criterion would not be able to determine the difference in ductility between these specimens.

Table 5.6 Summary of the smooth notch tensile tests for SMCS material constant calibration for A572−Grade 50 steel plate.

Notch Size	Test ID	Failure Displacement (in)	SMCS Material Constant
r=0.125 in.	1	0.0412	1.44
	2	0.0355	1.17
	3	0.0372	1.32
r=0.06 in.	1	0.0218	0.84
	2	0.0238	1.16
r=0.25 in.	1	0.0490	1.18
	2	0.0502	1.19
		Mean	1.19
		Std. Dev	0.18
		Median	1.18

To calibrate the SMCS material property, the same approach used by Kanvinde and Deierlein presented above with smooth notched tensile tests is followed only using the bolted T-stub and clip angle tests by Swanson [103] in conjunction with their analytical simulations also previously presented. For each test case the stress-strain data at each node is interpolated to their value at the connection displacement reported at failure.

Stress-strain values for each node interpolated at the failure displacement of the connection is applied to the unfactored SMCS equation (Equation 5.45 with the material parameter, α=1) and ordered starting with the node with the largest unfactored SMCS value. To ensure that the failure is not a singularity and the failure is located within a finite volume indicating a local mechanism, the two nodes with highest unfactored SMCS values within an inch of each other is used. The values of the second node of the pair is used to calibrate the SMCS material property, α.

5.5.3.2 SMCS Material Property Calibration

In Figure 5.61 the nodal equivalent plastic strain, unfactored SMCS and fitted SMCS curves are plotted against the connection displacement for test cases TA01, TB06, and TC10. The displacement at which failure occurs in the test connection is marked with a vertical line and circle. The SMCS failure criterion is satisfied when the equivalent plastic strain at the node equals the stress modified critical equivalent plastic strain as defined in Equation 5.44. Given the stress-strain values of the node of interest, the unfactored SMCS is plotted as shown in the figure with a dashed line and the material parameter is backcalculated so the SMCS curve intersects the equivalent plastic strain curve at the displacement of failure.

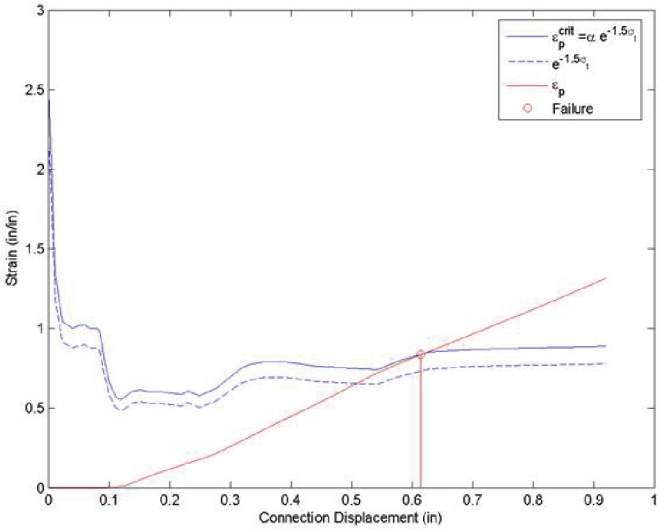
The results of the backcalculated SMCS material properties are tabulated in Table 5.7 for all the components tested by Swanson which failed by fracture in the T-stub component. As noted while introducing the tests by Swanson, the TD series test specimens were fabricated with noticeably poor workmanship at a separate shop later in the testing program. The poor workmanship reflected on the test results as well as the calibrated SMCS material property ending up significant lower than the other cases. The mean of the calibrated material property, η excluding the TD series is 1.17 with a standard deviation of 0.24. This is quite close to the mean 1.19 determined by Kanvinde and Deierlein even though the test specimens used in both studies to calibrate these values are very different.

The mean and median for the calibrated material properties based on the Swanson component tests are 1.17 and 1.12 respectively. The median of the material property for both excluding and including the outlier cases from the TD series analyses are fairly close. This indicates a bias in the distribution of the fitted parameter away from having a uniform distribution. Thus, using the median would be more appropriate in this case. The difference in distribution can be explained through the fact that the smooth notched test specimens are more common in geometry and where machined from the same plate material whereas the

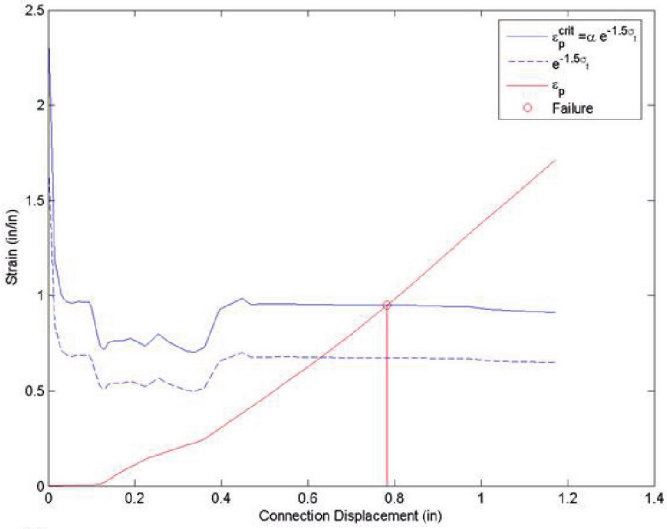
T-stubs specimens were machined from different I-beams and varied in terms geometry and topography.

Based on this result, for this study the median of the fitted SMCS material properties, 1.12 will be used in the connector failure criterion which results in Equation 5.47. As with in the calibration process, failure of the component will be determined by at least two nodes within a certain vicinity meeting the failure criterion. In most cases the element size in a model will be much larger than the characteristic length of the material. The minimum distance to check between two nodes which meet the failure criterion will be the typical elements size. As previously discussed, SMCS has a low gradient in models without any sharp cracks which justifies the use of the typical element size rather than modeling the component with elements equal or smaller than the material characteristic length.

(a)



(b)



(c)

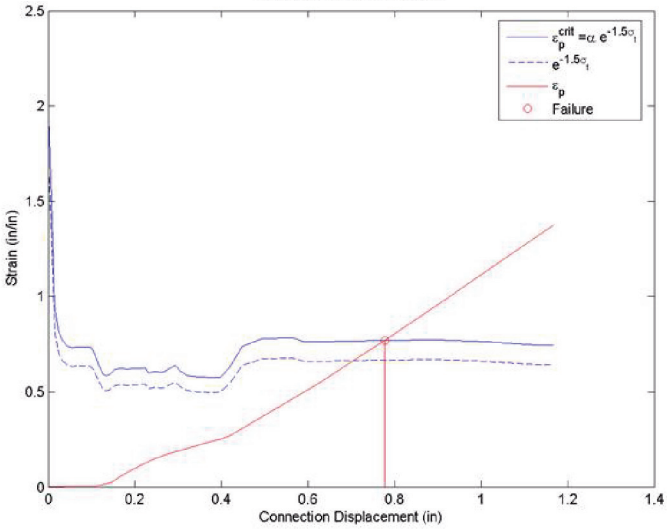


Figure 5.61 SMCS material parameter fit for node with second highest ranking unfactored SMCS value of pair within each other vicinity showing nodal equivalent plastic strain, unfactored SMCS, and fitted SMCS at test failure for test cases (a) TA01, (b) TB06, and (c) TC10.

Table 5.7 Summary of Swanson component tests for SMCS material constant calibration.

Test ID	SMCS Material Constant
TA01	1.141
TA02	1.010
TA09	1.097
TA10	1.063
TA11	1.115
TA12	0.833
TB05	1.708
TB06	1.409
TC09	1.119
TC10	1.156
TD04	0.420 *
TD08	0.296 *
Mean	1.17
Std Dev	0.24
Median	1.12

(*) These cases were excluded from the calibration set as the noticeably poor workmanship of the test specimens impacted capacity.

$$\text{SMCS} = \varepsilon_p - \varepsilon_p^{\text{critical}} = \varepsilon_p - 1.12\exp(-1.5T) > 0 \quad \text{for } r \le l_c \qquad \text{Eqn 5.47}$$

5.5.4 Failure Criteria Verification

With the bolt and component failure criteria calibrated (Equations 5.46 and 5.47), the test analyses are interrogated to demonstrate the capability to determine the mode of failure as well as the connection strength and ductility. For each test case Figures 5.62 through 5.95 show the processed connection analysis information ran through the failure criteria at each increment and compared to the test data at hand. The first failure encountered is registered and plotted on the analysis response curve which is plotted along with the test response curve on the lower pane of the figures.

On the lower right pane of the figures the tension-shear response for each individual bolt in the connection is plotted against the bolt tension-shear interaction envelope which

is the bolt failure criterion. The half symmetry connection model nodal geometry is plotted in its top and side views in the top right pane. Finally, connection information and summary of the failure mode and magnitudes is given in the top left pane of the figures.

At each analysis increment all the nodes in the connector element are checked against the calibrated SMCS failure criterion. In the instance where two nodes within the critical length which is set to be 0.25 inches, meet the criterion SMCS value of the minor node is used to interpolate the true displacement at which failure is predicted to occur. This point is marked on the connection analysis force-displacement response curve with a red triangle. The two nodes which meet the SMCS criterion are marked on the nodal geometry plots in the upper right pane to point at the location failure initiates. Furthermore, the tensile-shear force state in each bolt when failure is predicted is registered with red squares in the lower right pane on the bolt tensile-shear interaction force plots.

In the event the bolt failure criterion is met for a single bolt the bolt shear force is used to interpolate the true displacement at which failure is predicted to occur. This point is marked on the connection analysis force-displacement response curve with a blue triangle. The tensile-shear force state in each bolt is registered with red squares in the lower right pane on the bolt tensile-shear force plots at the instance first bolt failure is predicted.

In the event bolt failure precedes failure in the connector element and is registered within the extent of analysis data, that point of bolt failure is also plotted on the connection force-displacement response curve for reference to visually mark the unused potential ductility in that connection.

The summary of the predicted failure capacity and modes for each analysis case is presented in Table 5.8 and compared to the test values. The analysis to test ratios of the connection maximum force capacity and maximum displacement at failure are calculated in the far right columns in this table. The mean and standard deviation of the analysis to test ratios of the connection maximum force capacity are 1.06 and 0.06, respectively. The mean and

standard deviation of the analysis to test ratios of the connection maximum force capacity failure displacement are 1.09 and 0.22, respectively.

The failure criteria predicted the correct failure mode for all the test cases except for TB01. Both failure points predicted by the SMCS criterion and the bolt failure criterion for the test case TB01 are shown in Figure 5.76. It is seen in this figure that in absence of the connector failure, a shear bolt failure is predicted which coincides with the mode of failure reported in the test. The difference can be attributed to the distribution in the SMCS material property, η.

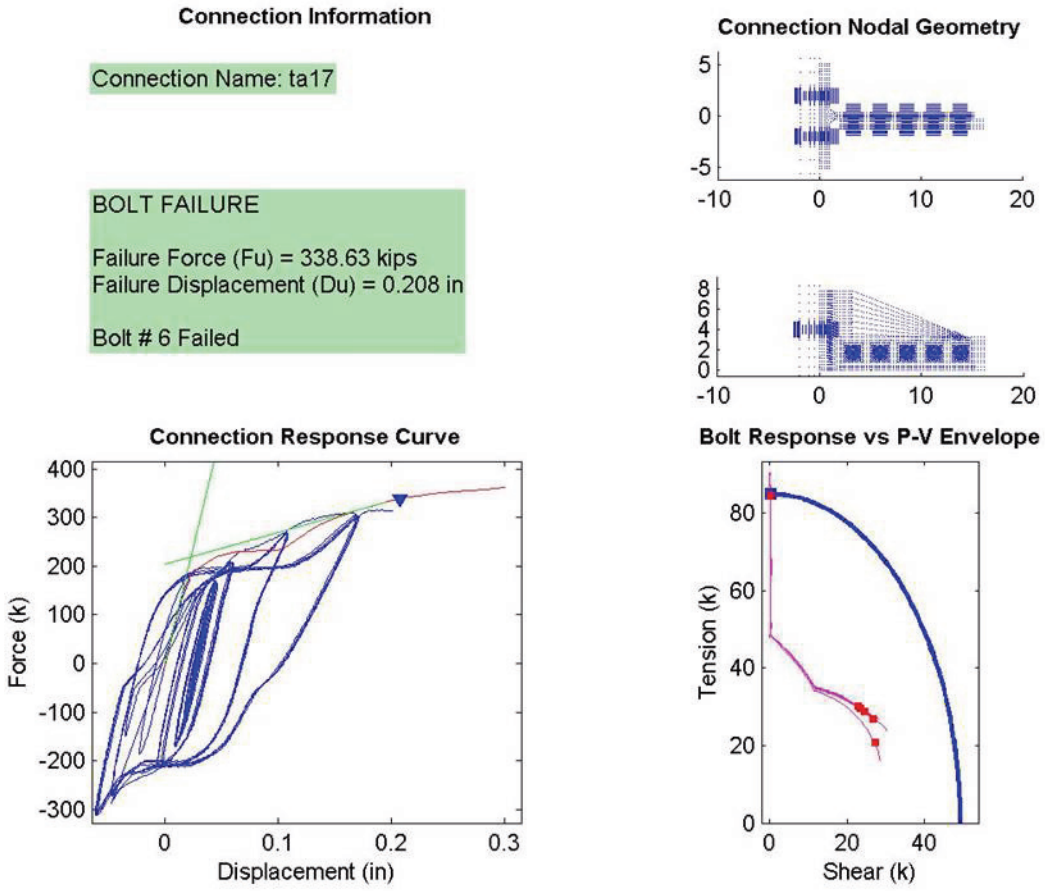


Figure 5.62 Connection test case TA17 analysis and calibrated failure criteria prediction.

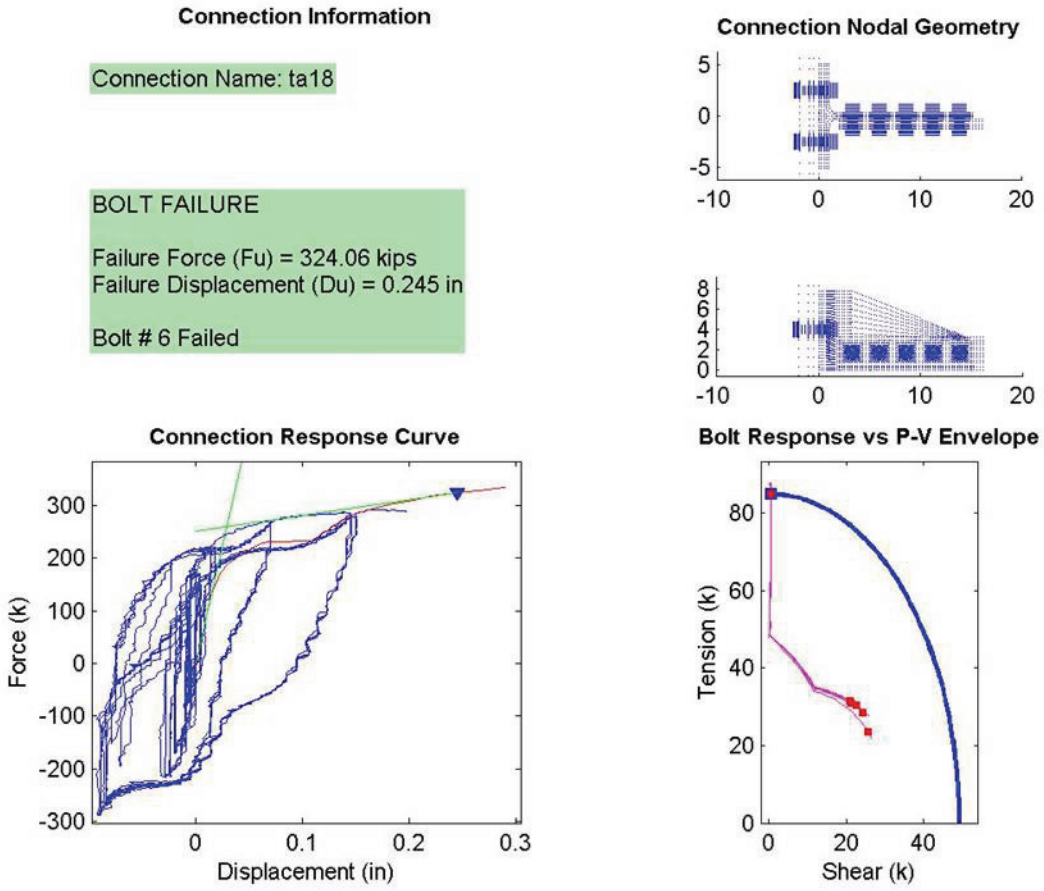


Figure 5.63 Connection test case TA18 analysis and calibrated failure criteria prediction.

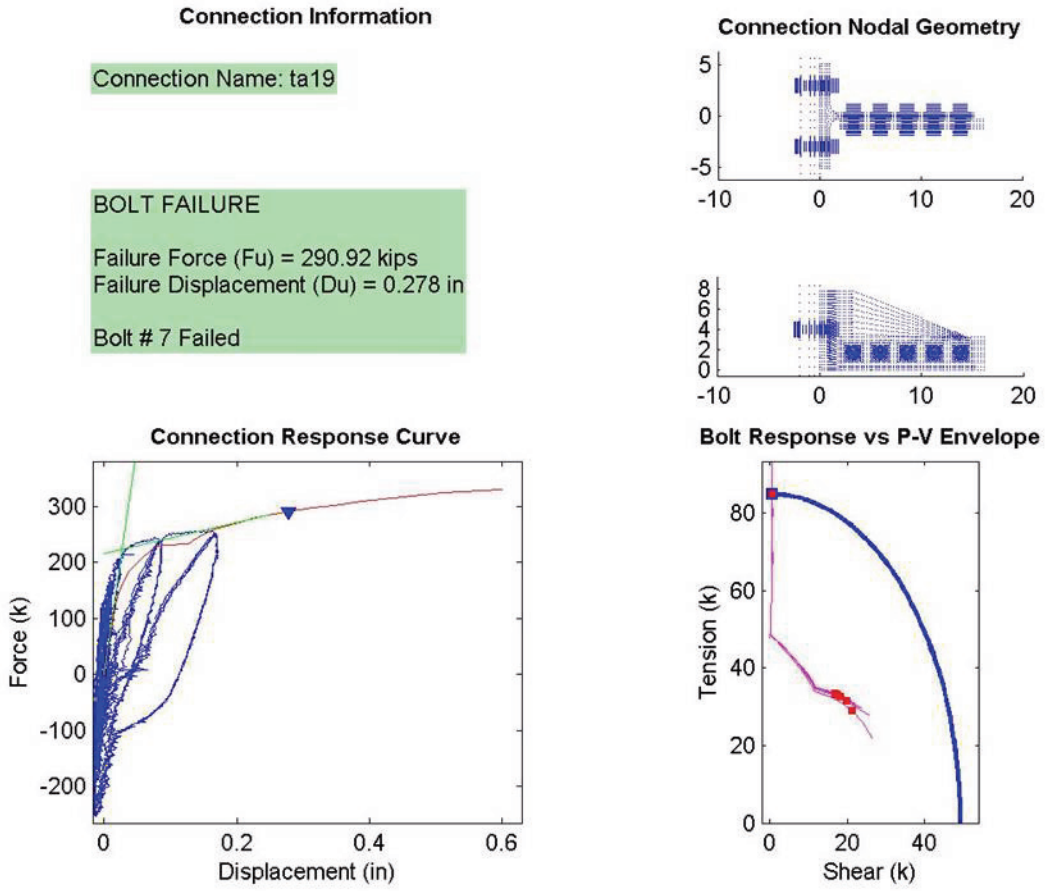


Figure 5.64 Connection test case TA19 analysis and calibrated failure criteria prediction.

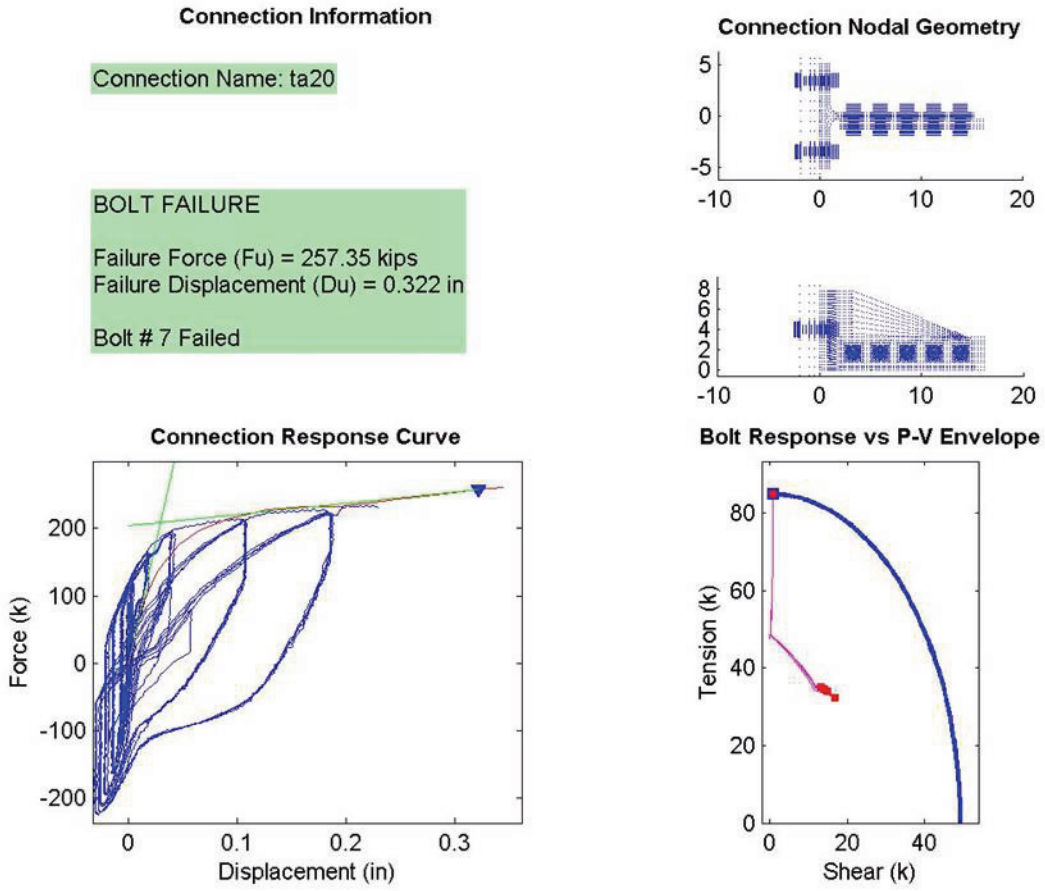


Figure 5.65 Connection test case TA20 analysis and calibrated failure criteria prediction.

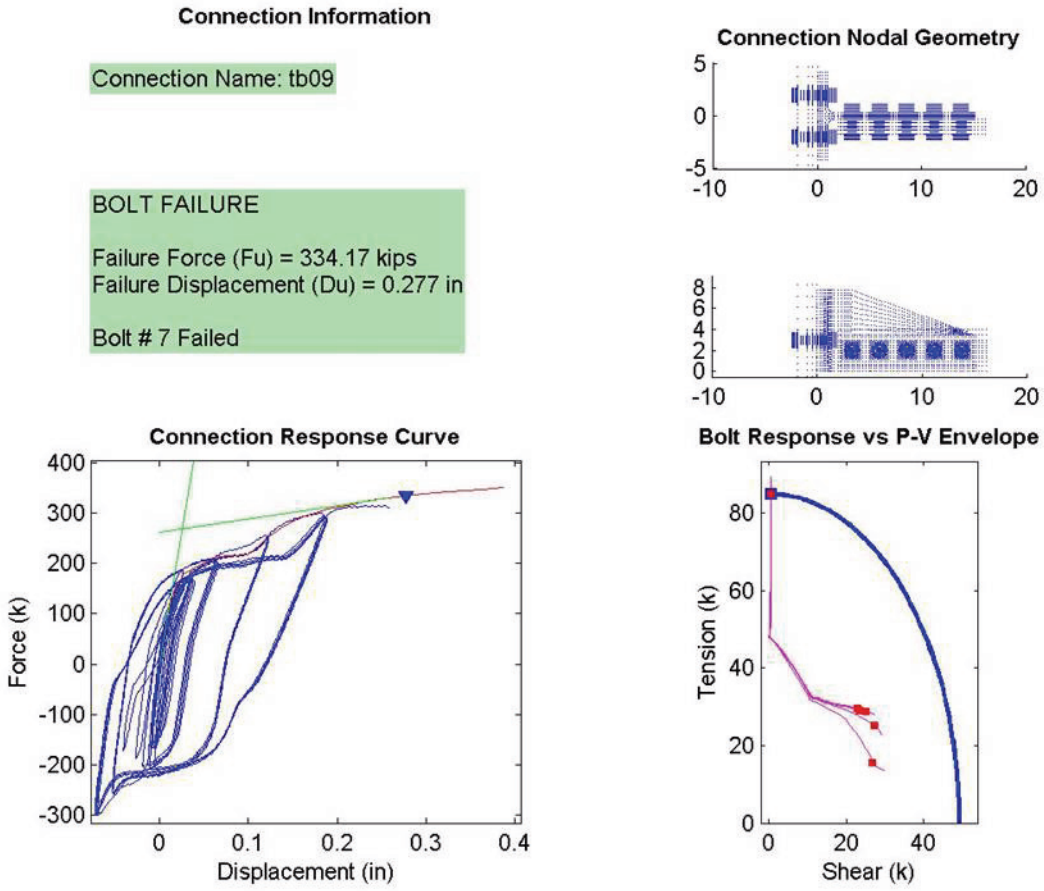


Figure 5.66 Connection test case TB09 analysis and calibrated failure criteria prediction.

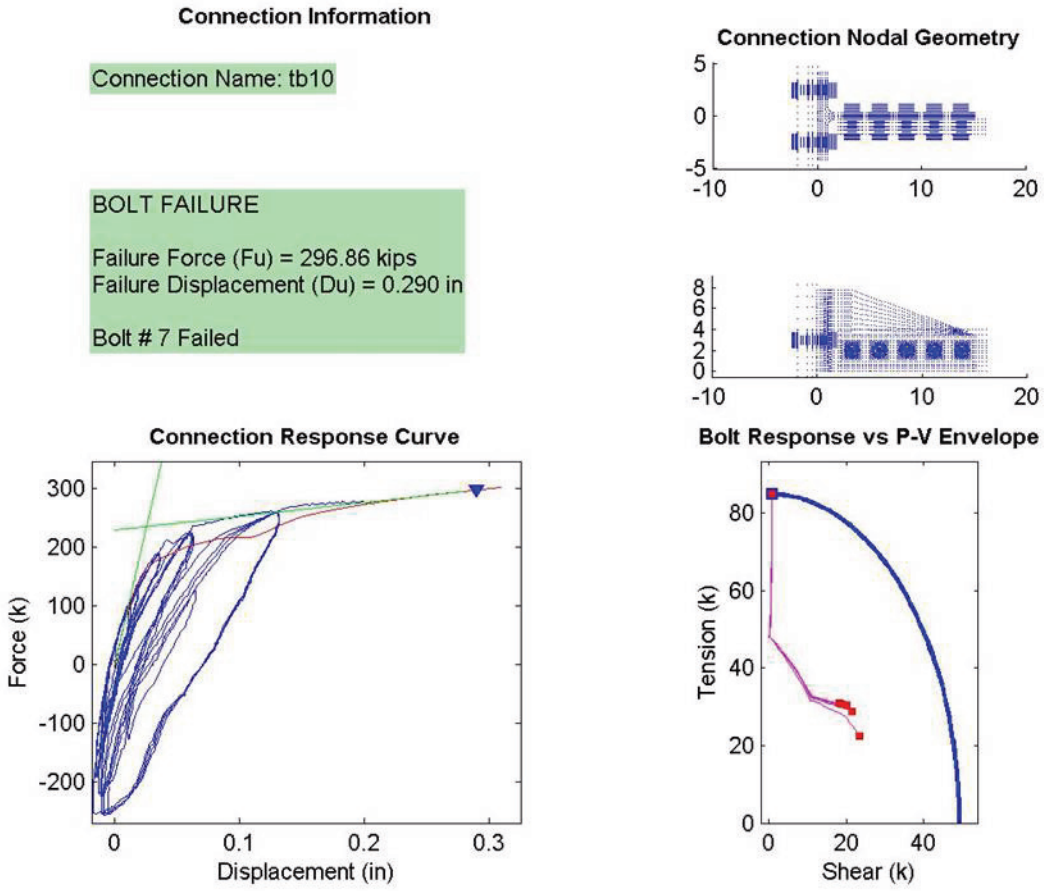


Figure 5.67 Connection test case TB10 analysis and calibrated failure criteria prediction.

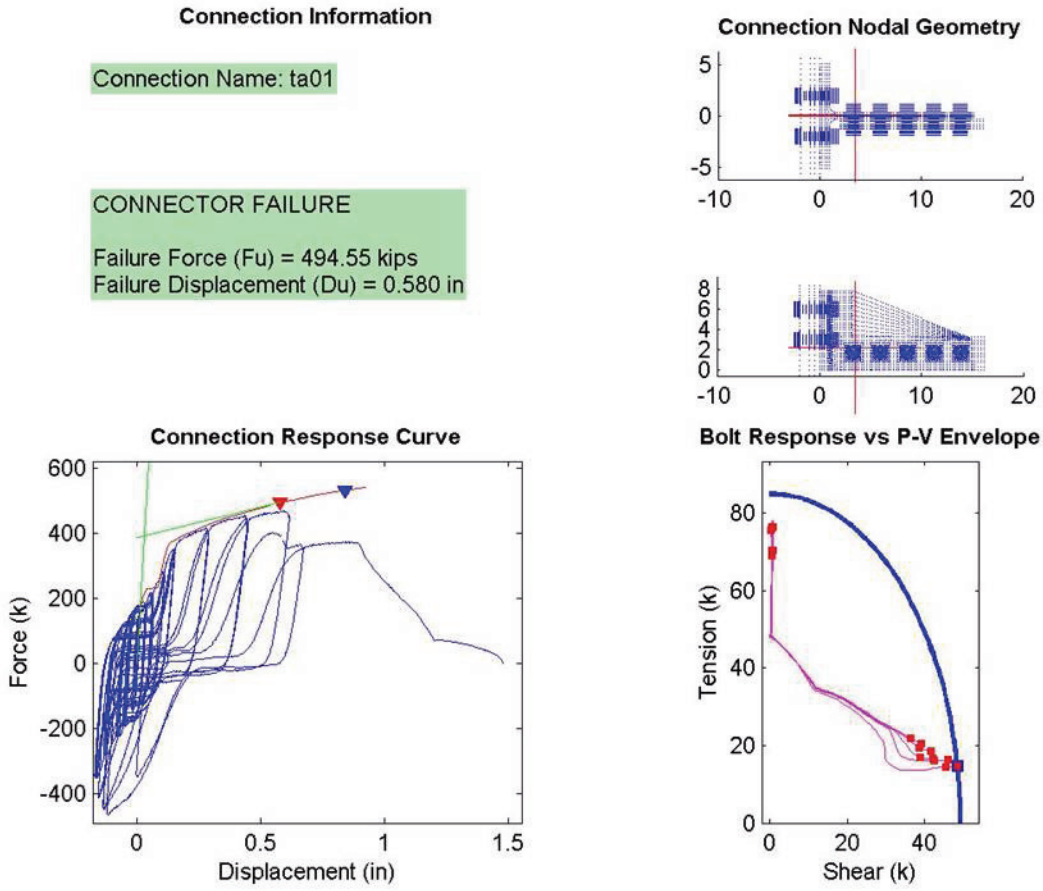


Figure 5.68 Connection test case TA01 analysis and calibrated failure criteria prediction.

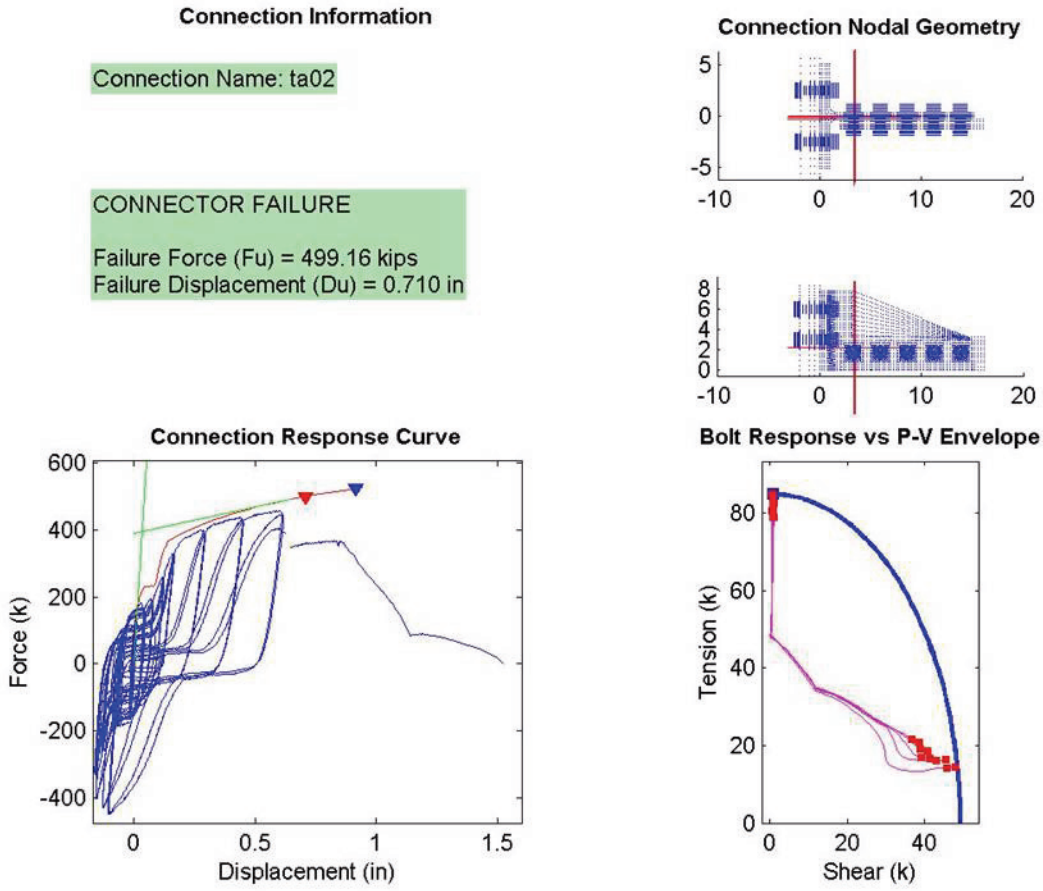


Figure 5.69 Connection test case TA02 analysis and calibrated failure criteria prediction.

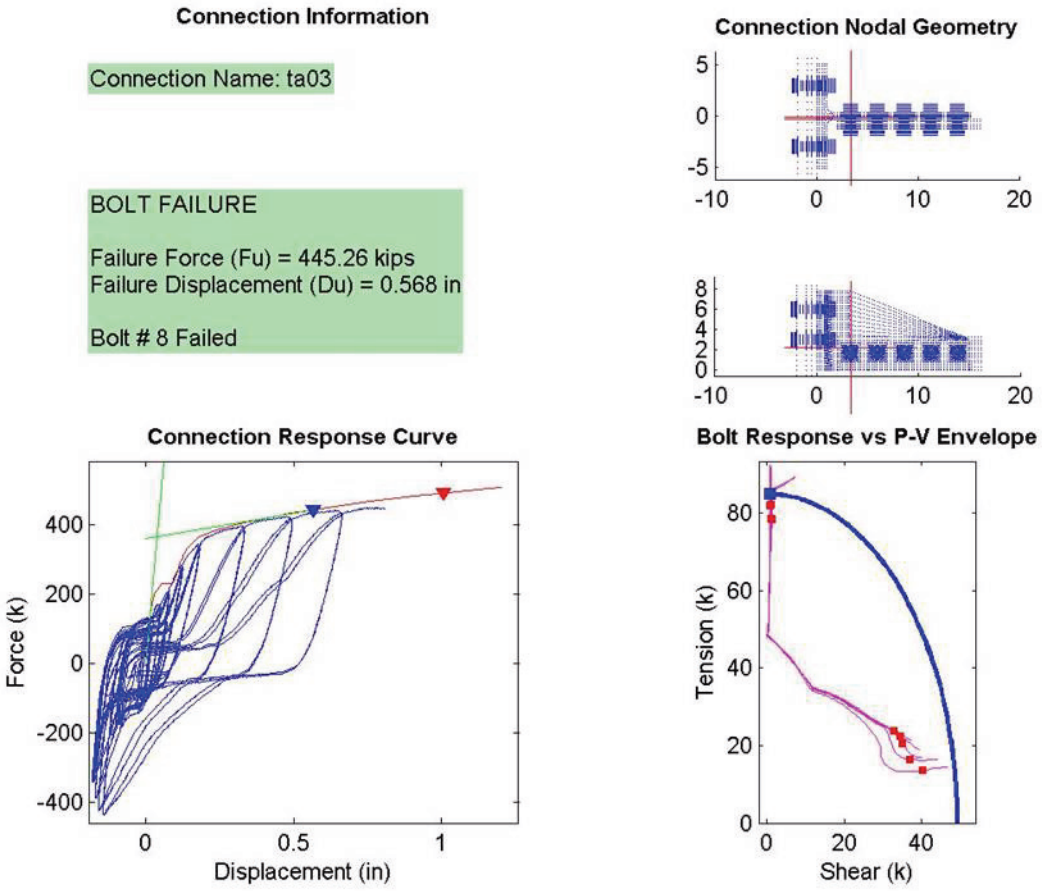


Figure 5.70 Connection test case TA03 analysis and calibrated failure criteria prediction.

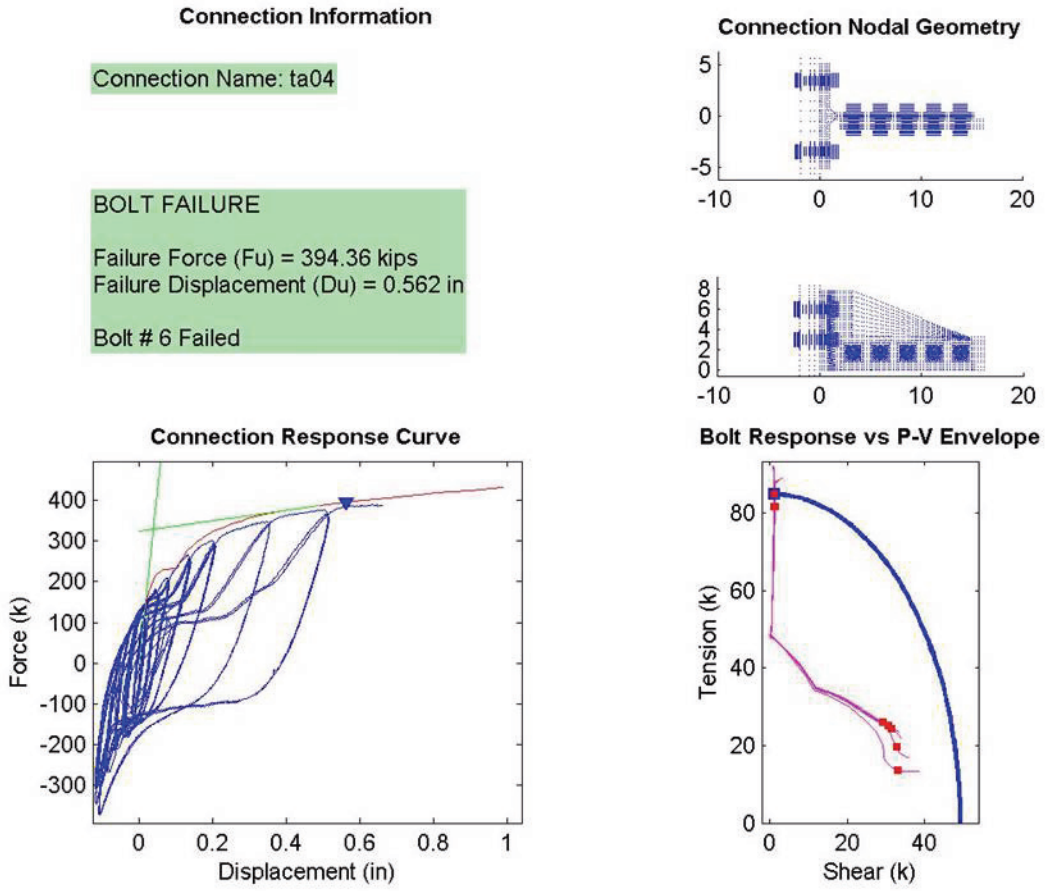


Figure 5.71 Connection test case TA04 analysis and calibrated failure criteria prediction.

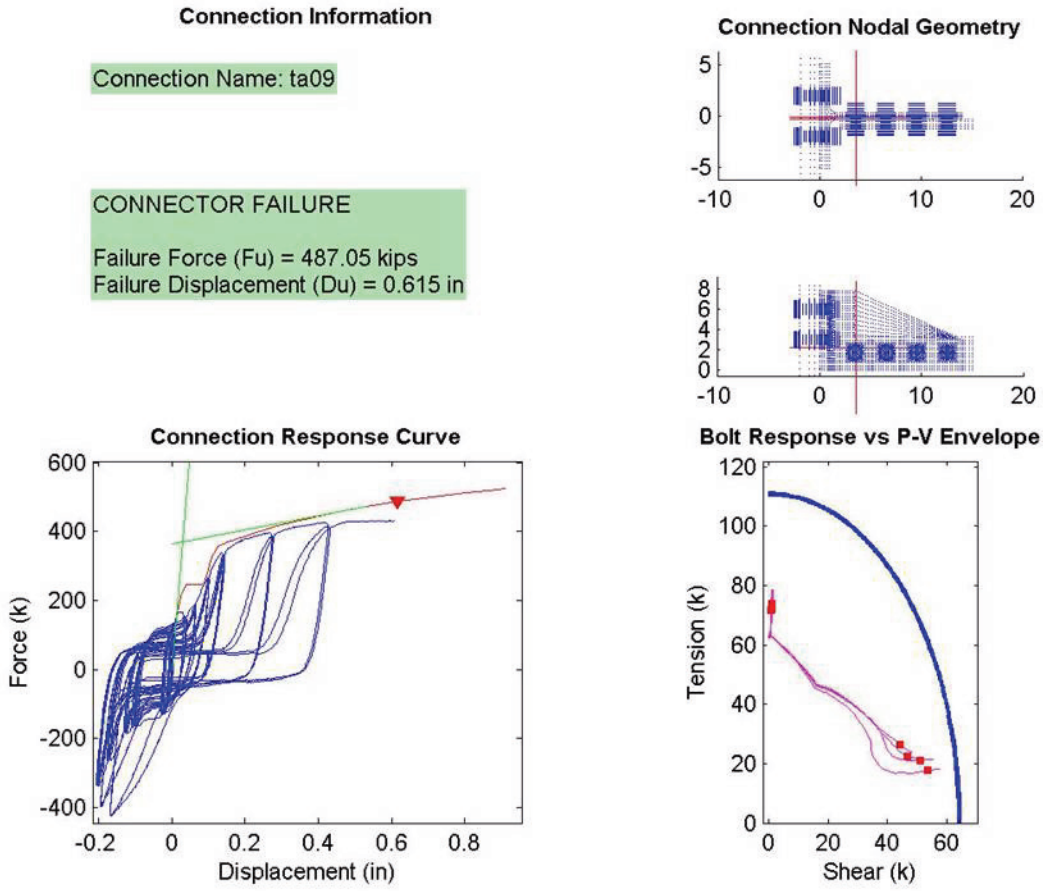


Figure 5.72 Connection test case TA09 analysis and calibrated failure criteria prediction.

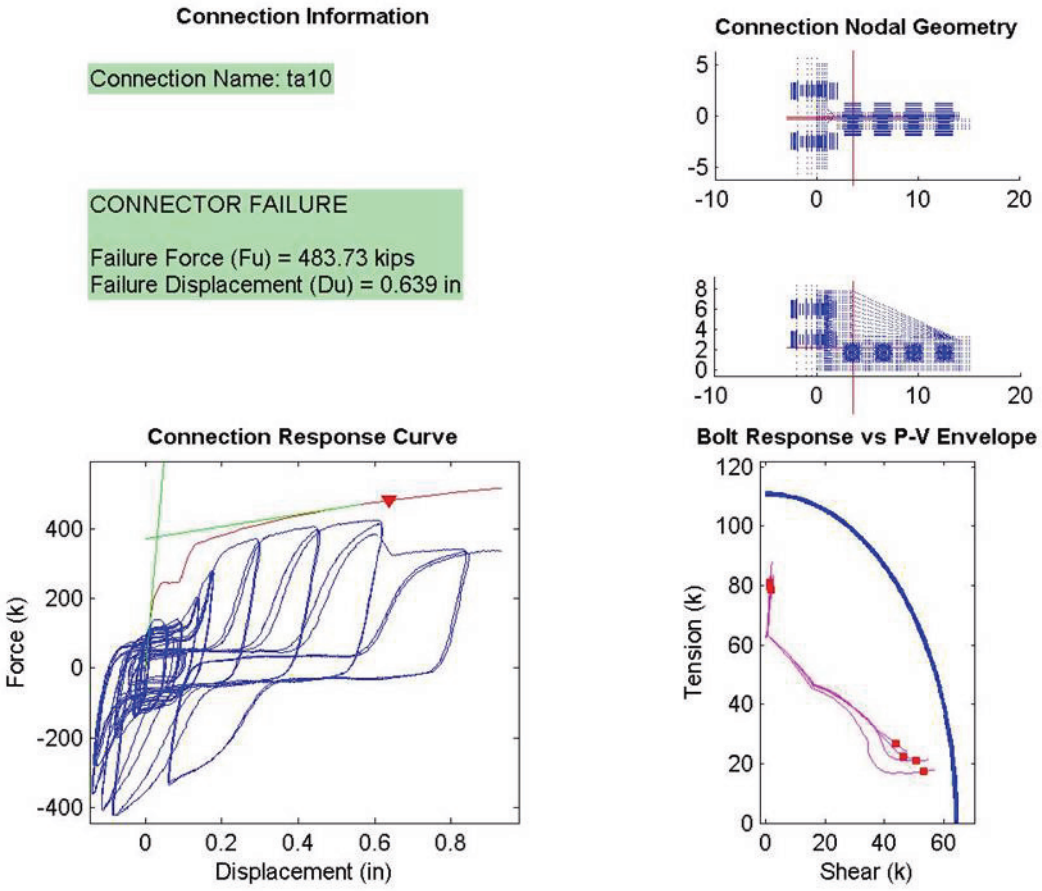


Figure 5.73 Connection test case TA10 analysis and calibrated failure criteria prediction.

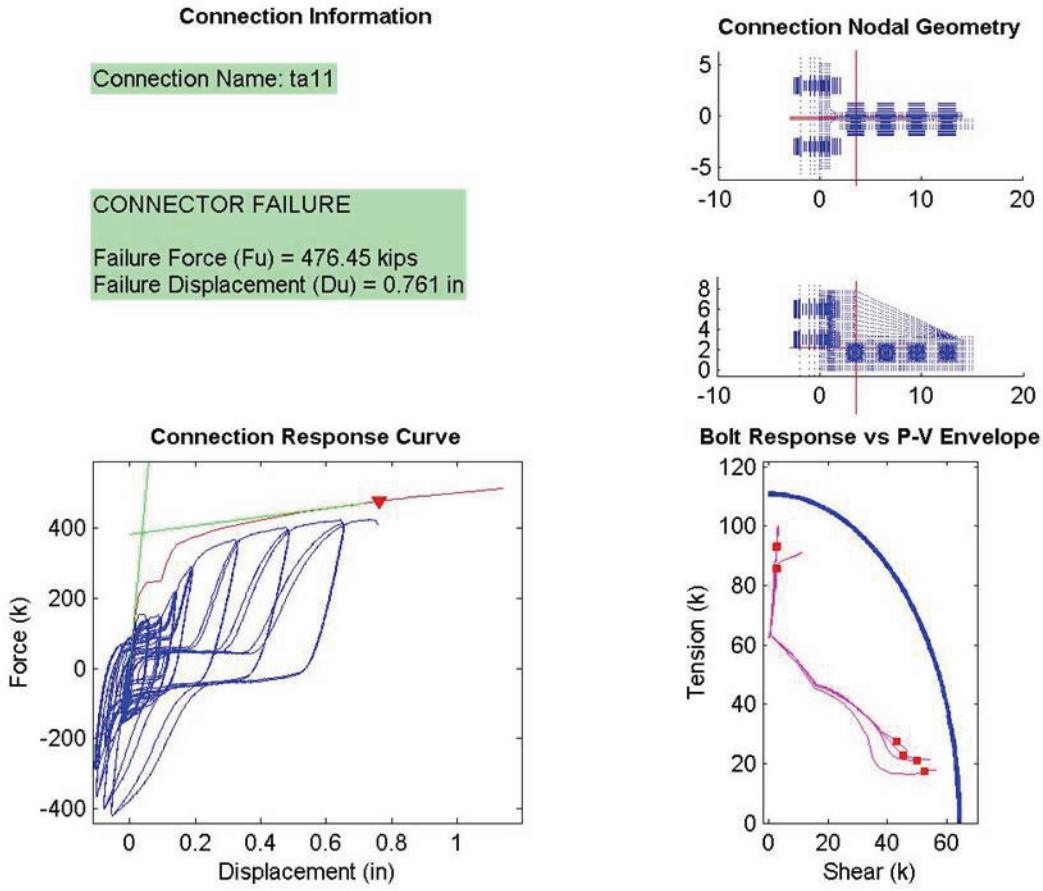


Figure 5.74 Connection test case TA11 analysis and calibrated failure criteria prediction.

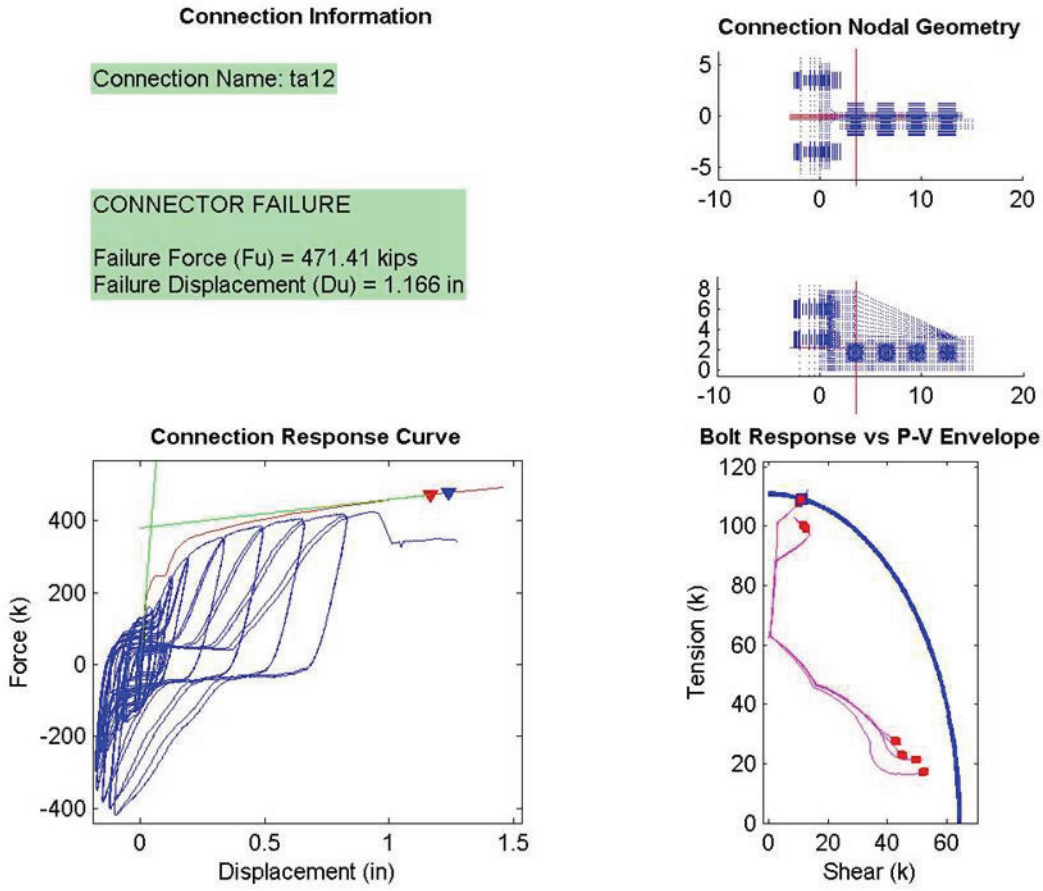


Figure 5.75 Connection test case TA12 analysis and calibrated failure criteria prediction.

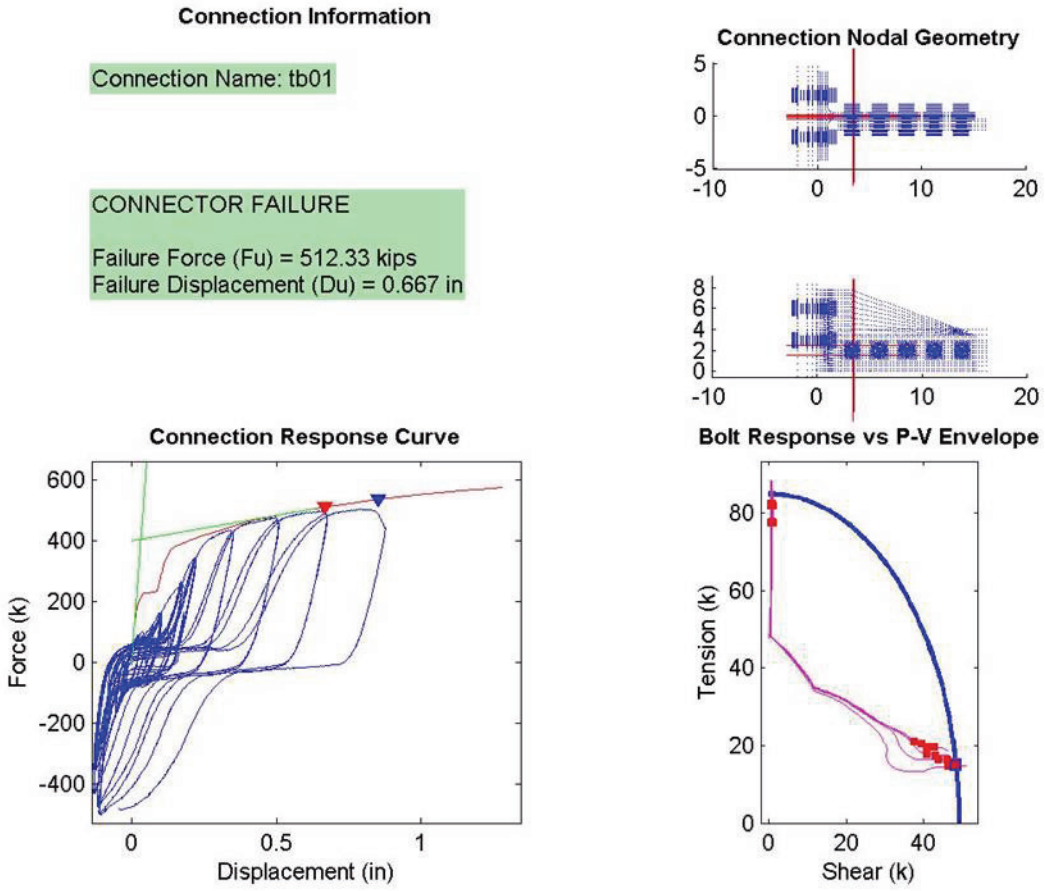


Figure 5.76 Connection test case TB01 analysis and calibrated failure criteria prediction.

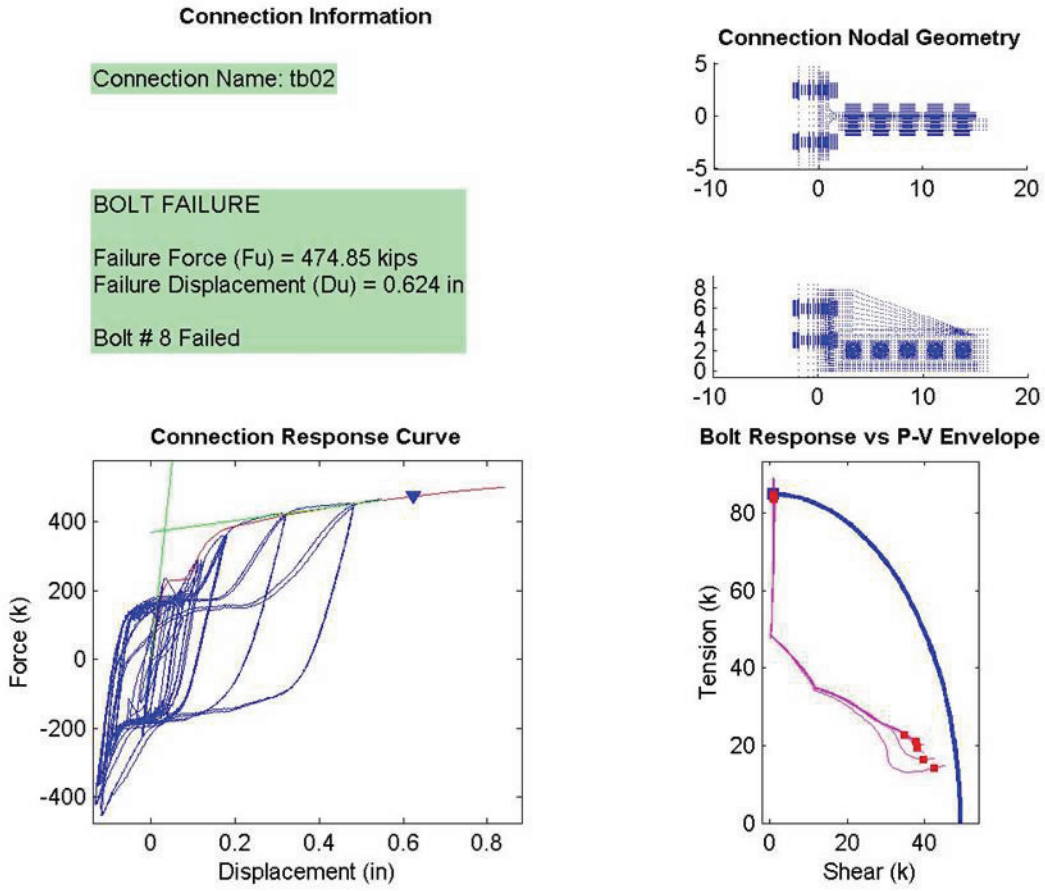


Figure 5.77 Connection test case TB02 analysis and calibrated failure criteria prediction.

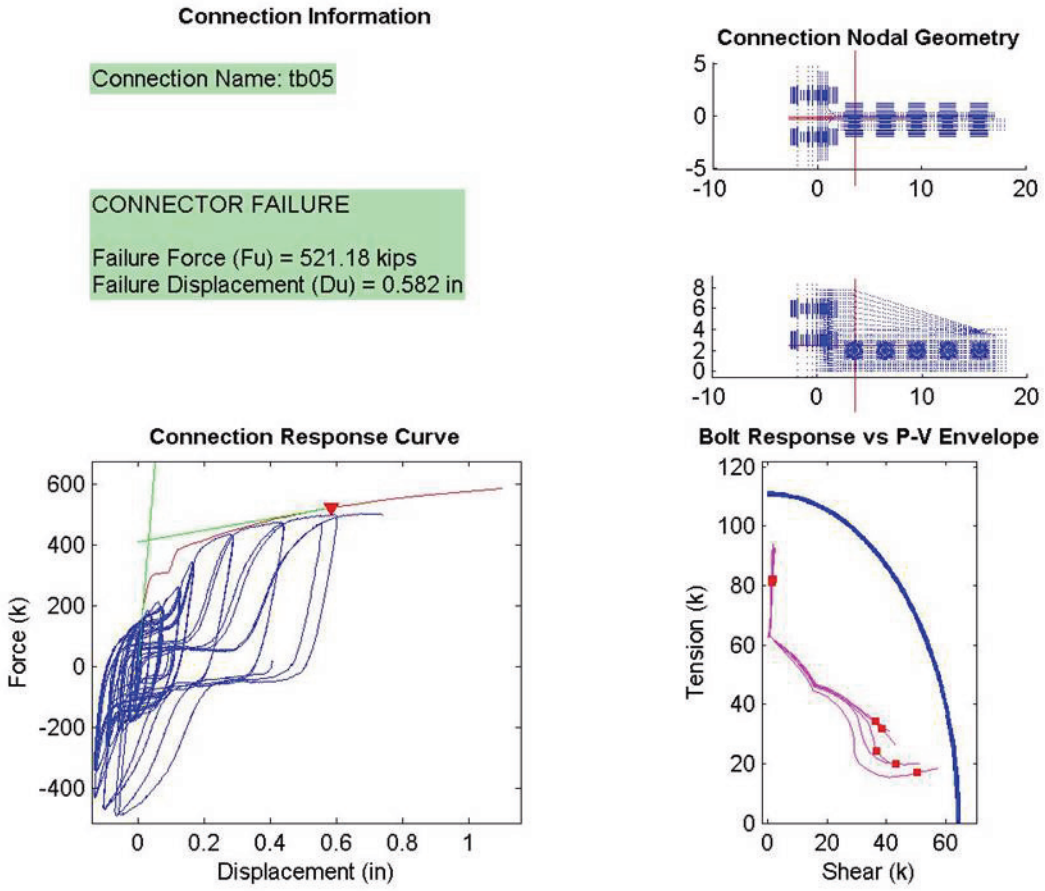


Figure 5.78 Connection test case TB05 analysis and calibrated failure criteria prediction.

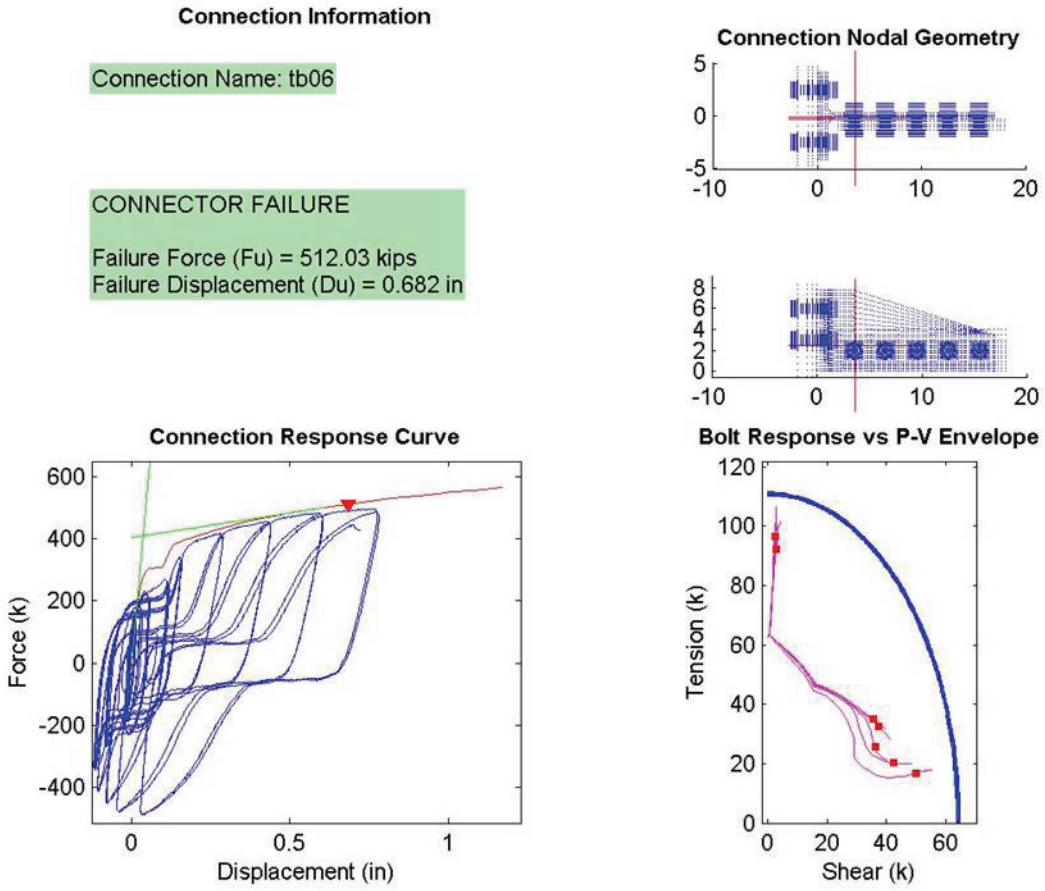


Figure 5.79 Connection test case TB06 analysis and calibrated failure criteria prediction.

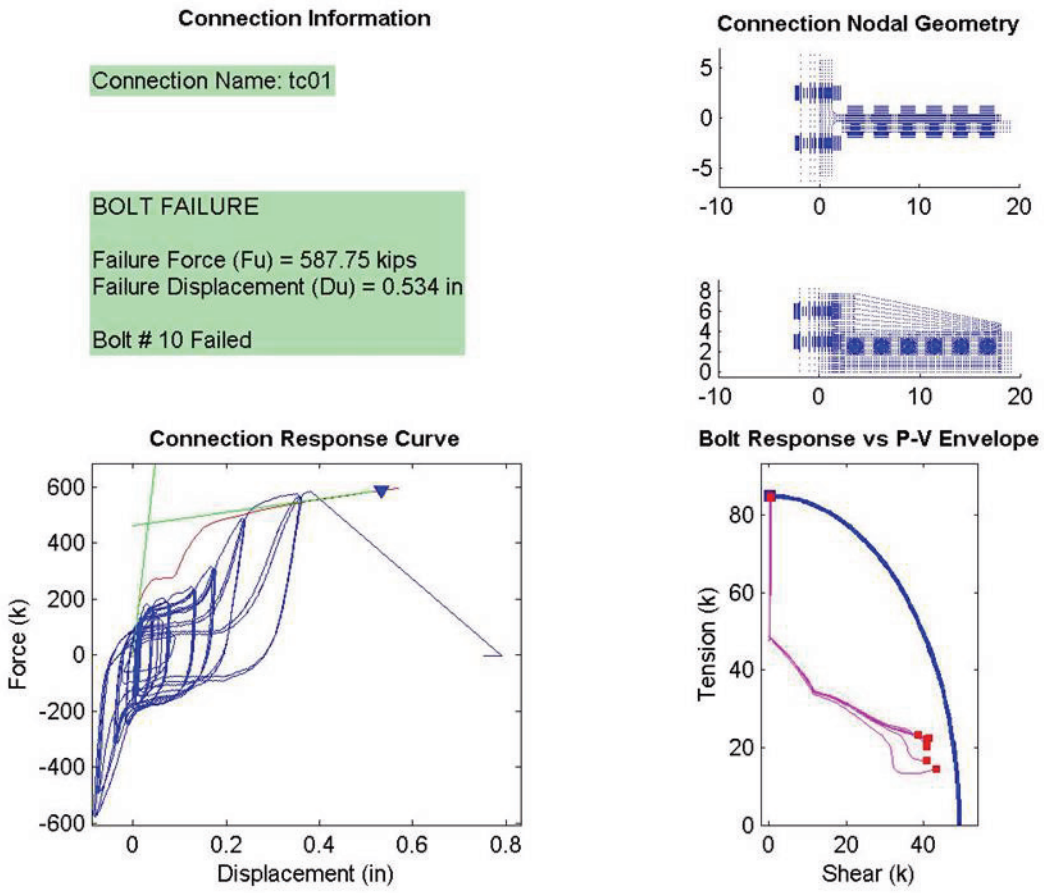


Figure 5.80 Connection test case TC01 analysis and calibrated failure criteria prediction.

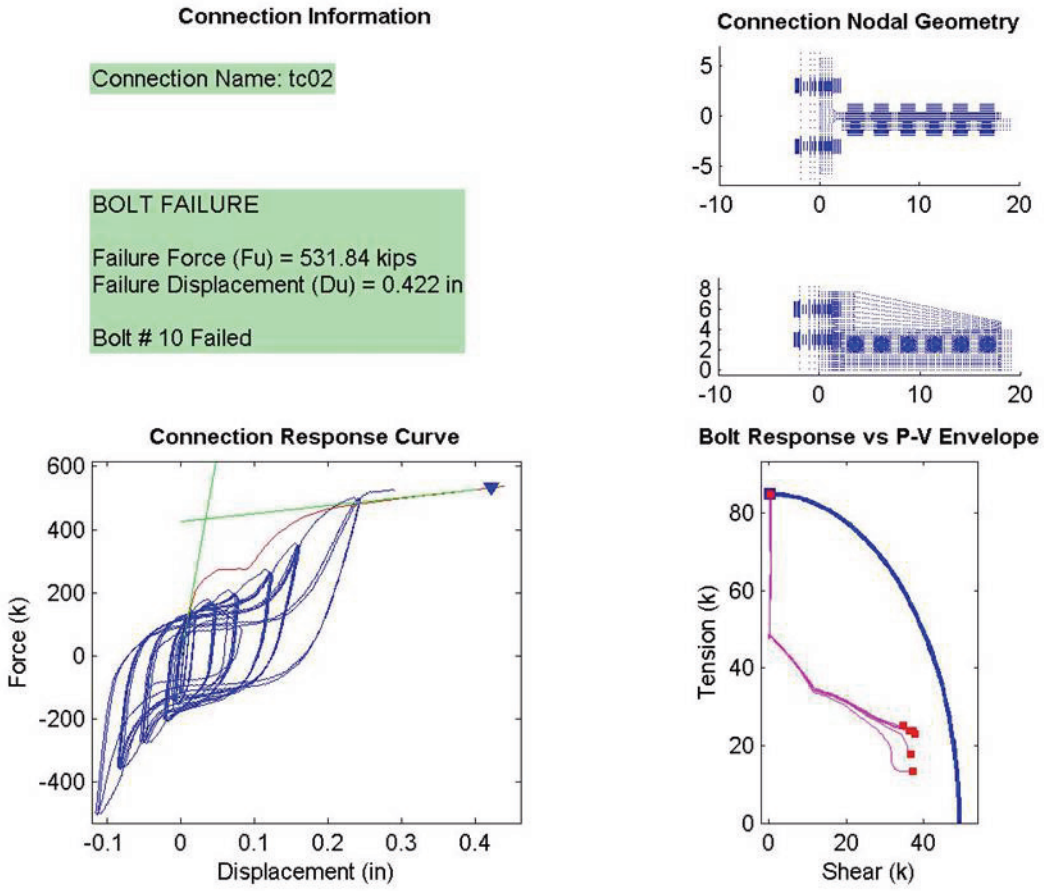


Figure 5.81 Connection test case TC02 analysis and calibrated failure criteria prediction.

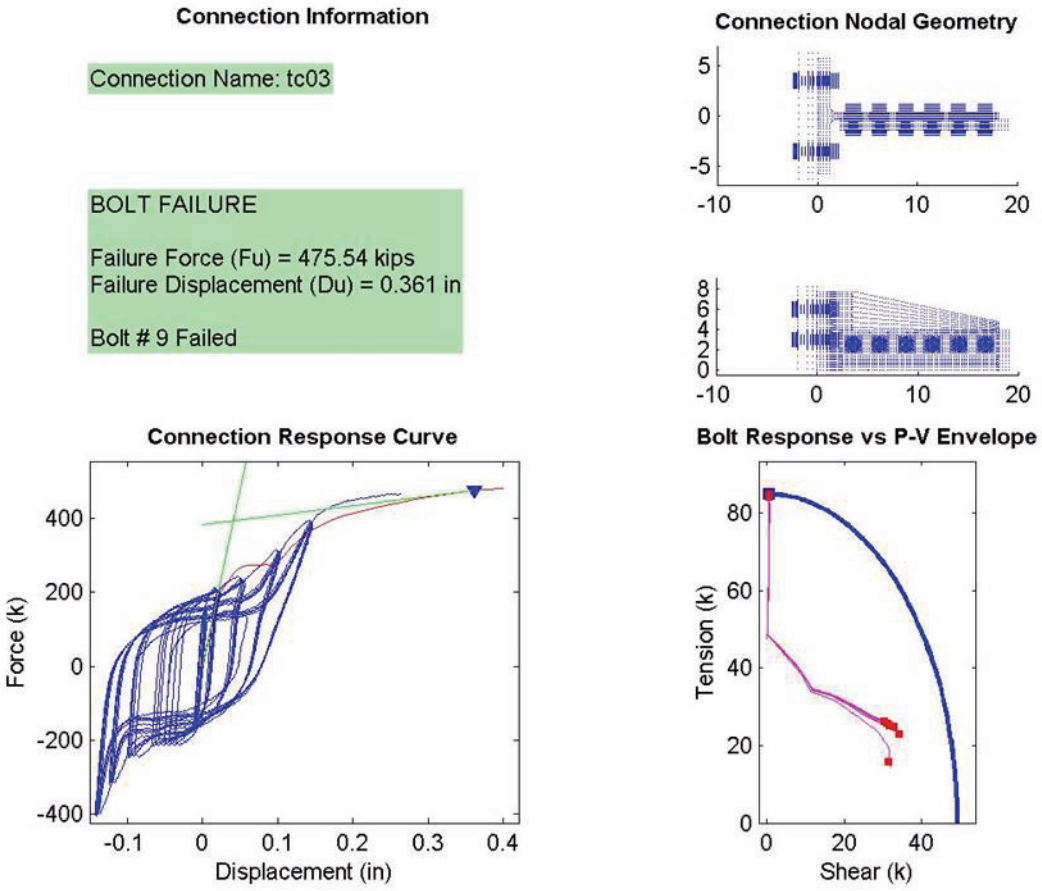


Figure 5.82 Connection test case TC03 analysis and calibrated failure criteria prediction.

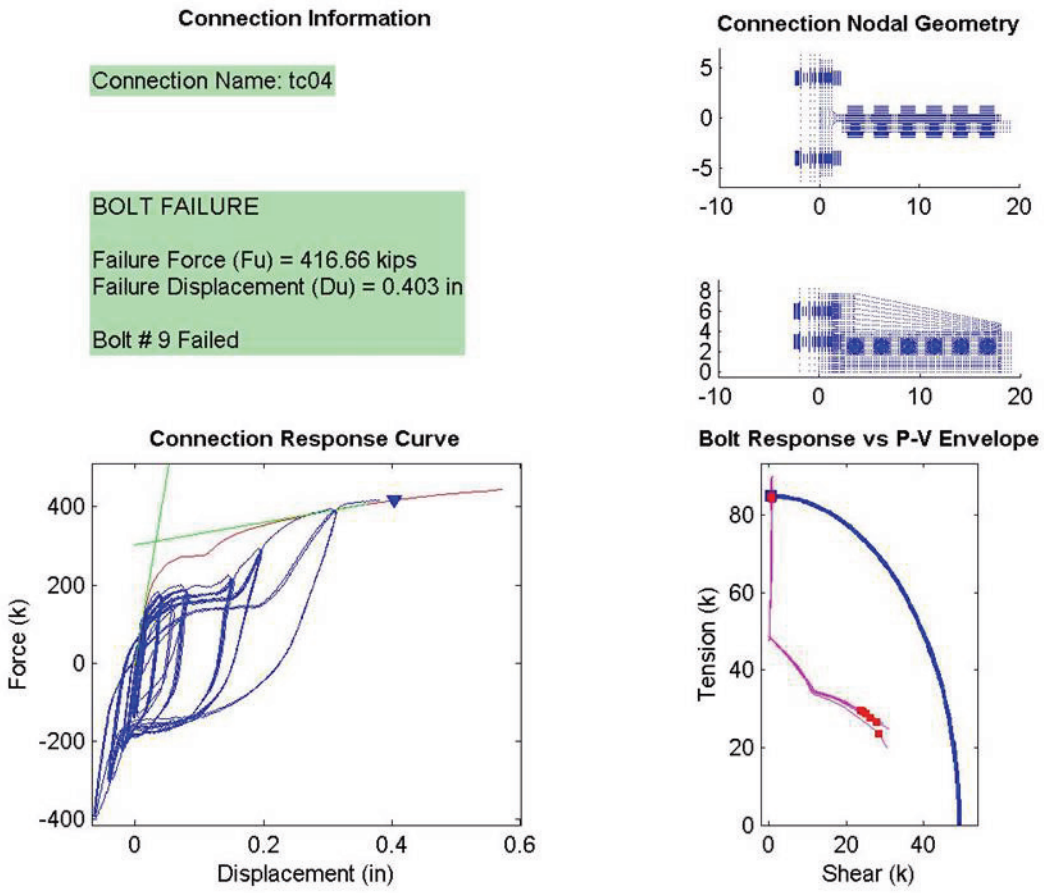


Figure 5.83 Connection test case TC04 analysis and calibrated failure criteria prediction.

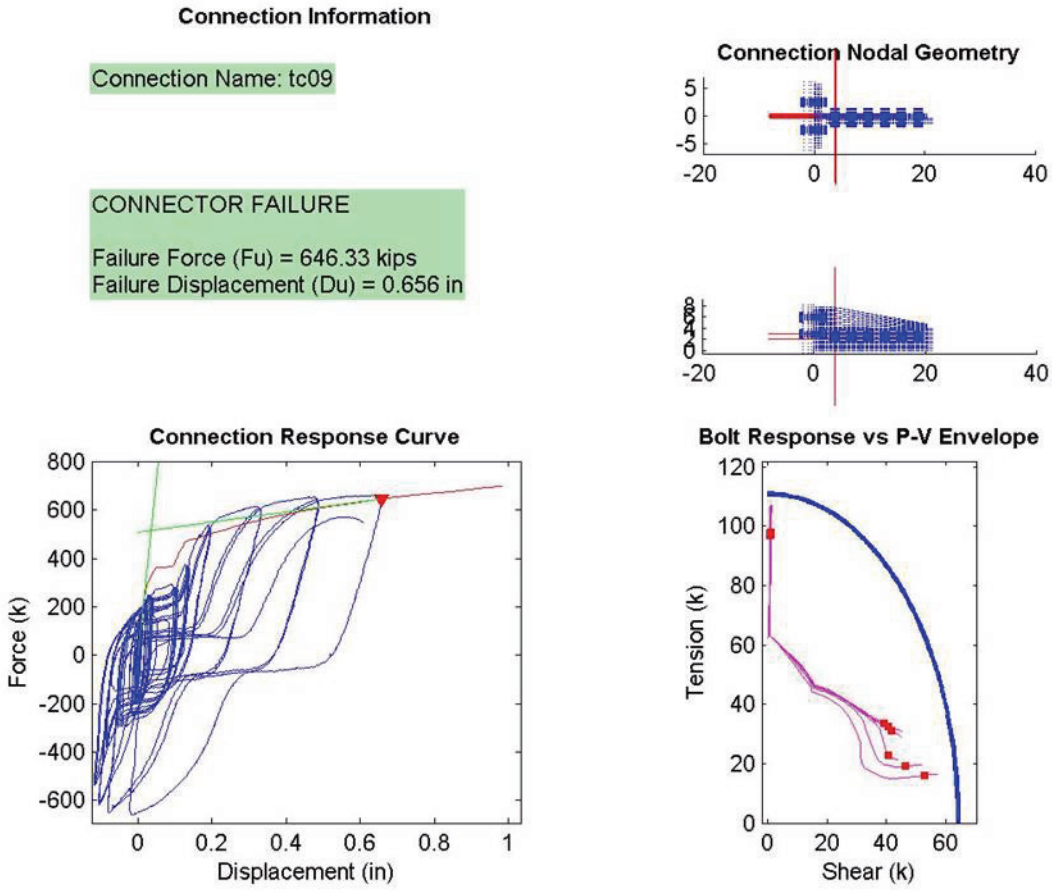


Figure 5.84 Connection test case TC09 analysis and calibrated failure criteria prediction.

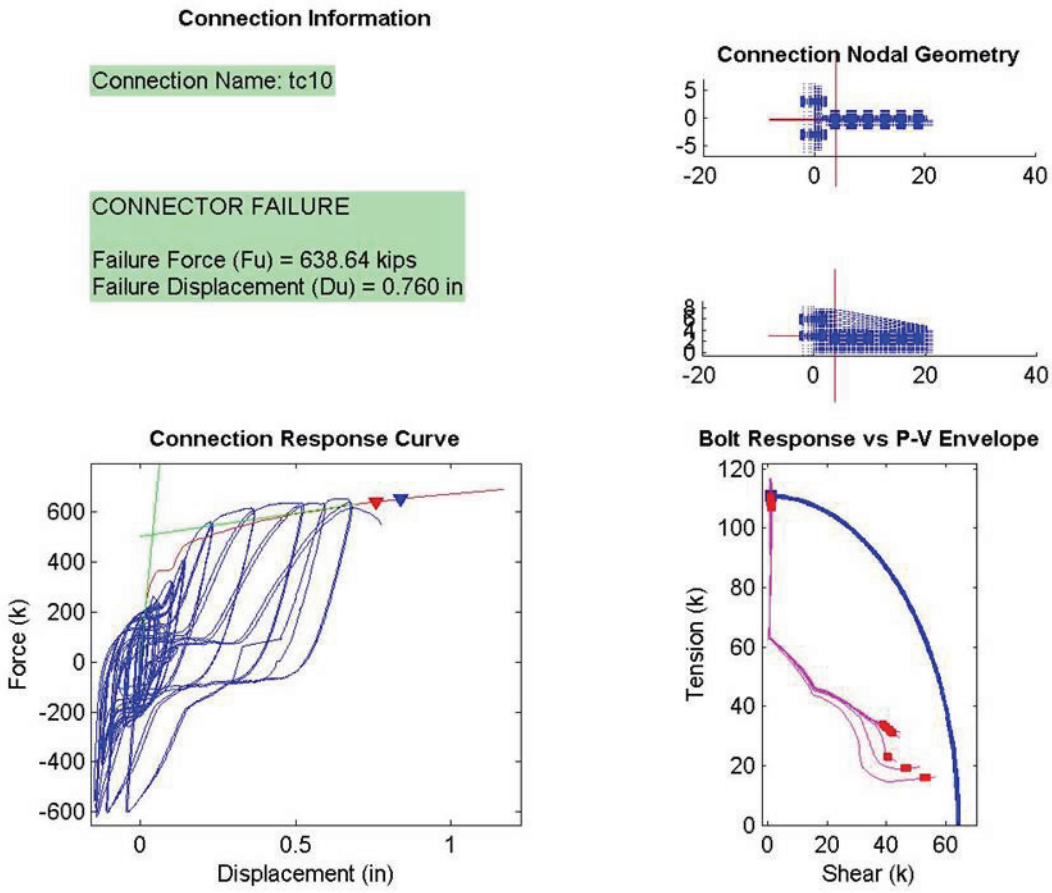


Figure 5.85 Connection test case TC10 analysis and calibrated failure criteria prediction.

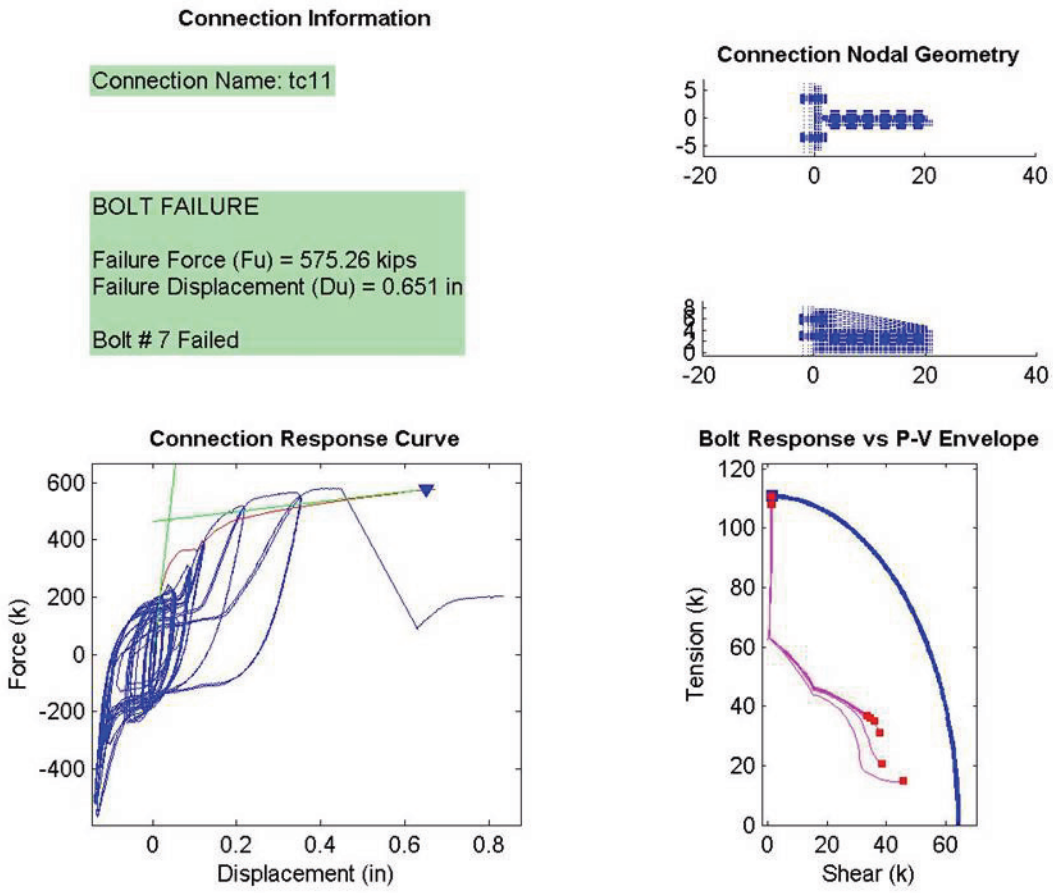


Figure 5.86 Connection test case TC11 analysis and calibrated failure criteria prediction.

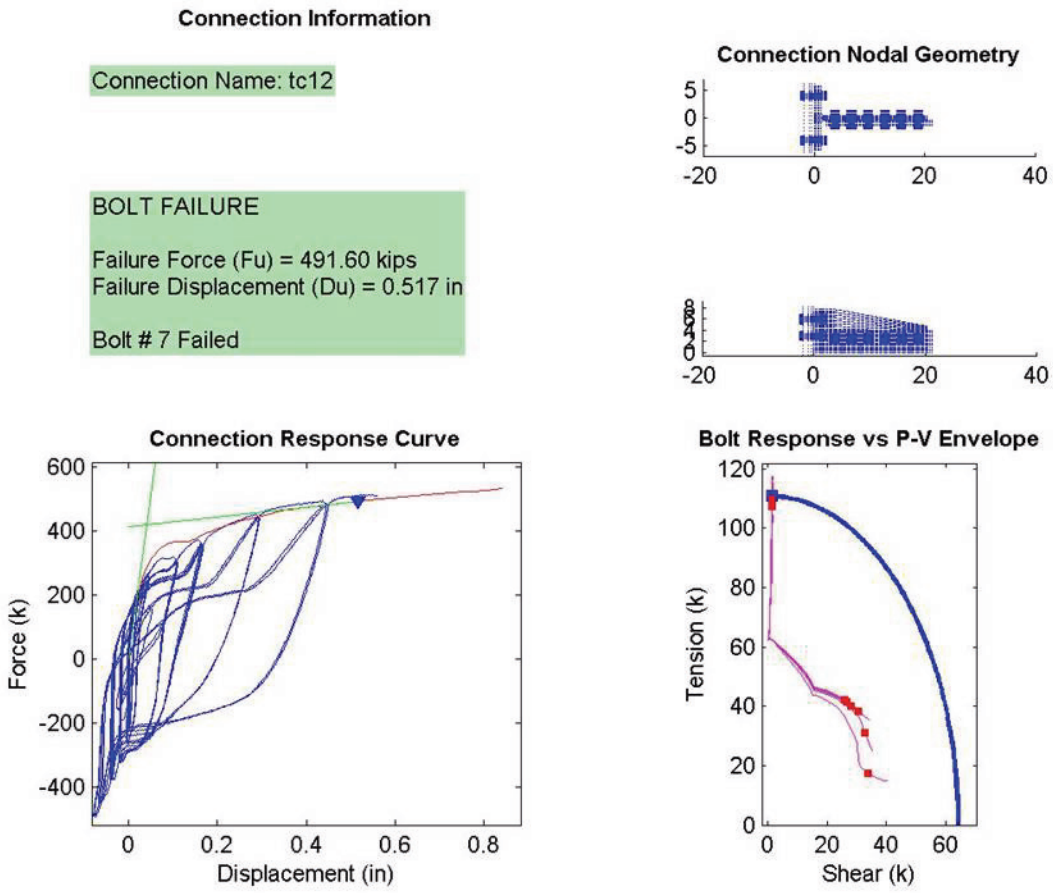


Figure 5.87 Connection test case TC12 analysis and calibrated failure criteria prediction.

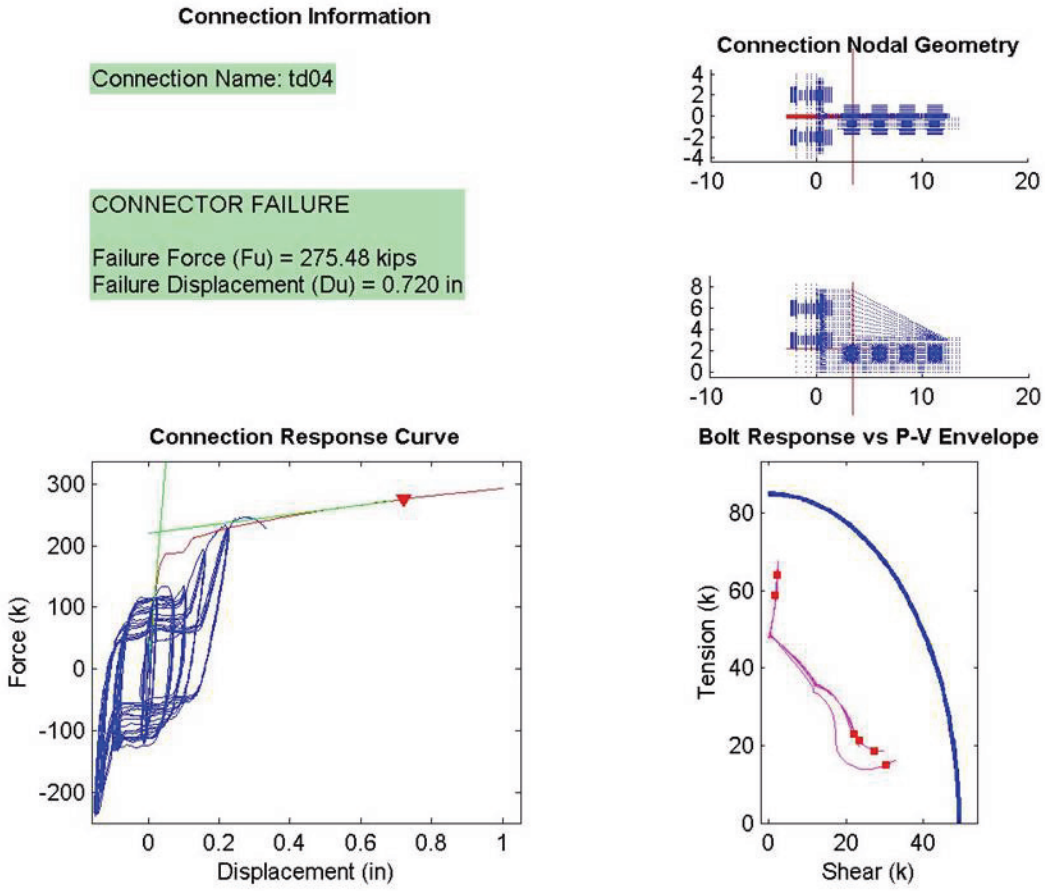


Figure 5.88 Connection test case TD04 analysis and calibrated failure criteria prediction.

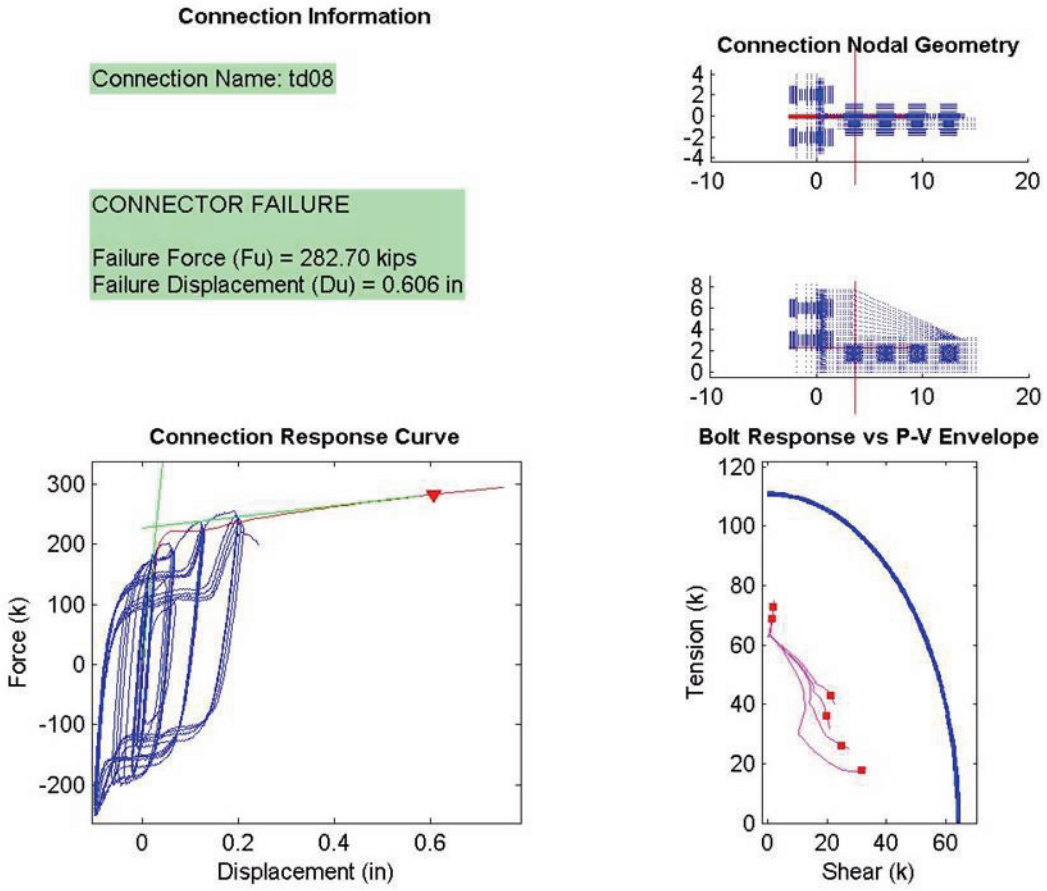


Figure 5.89 Connection test case TD08 analysis and calibrated failure criteria prediction.

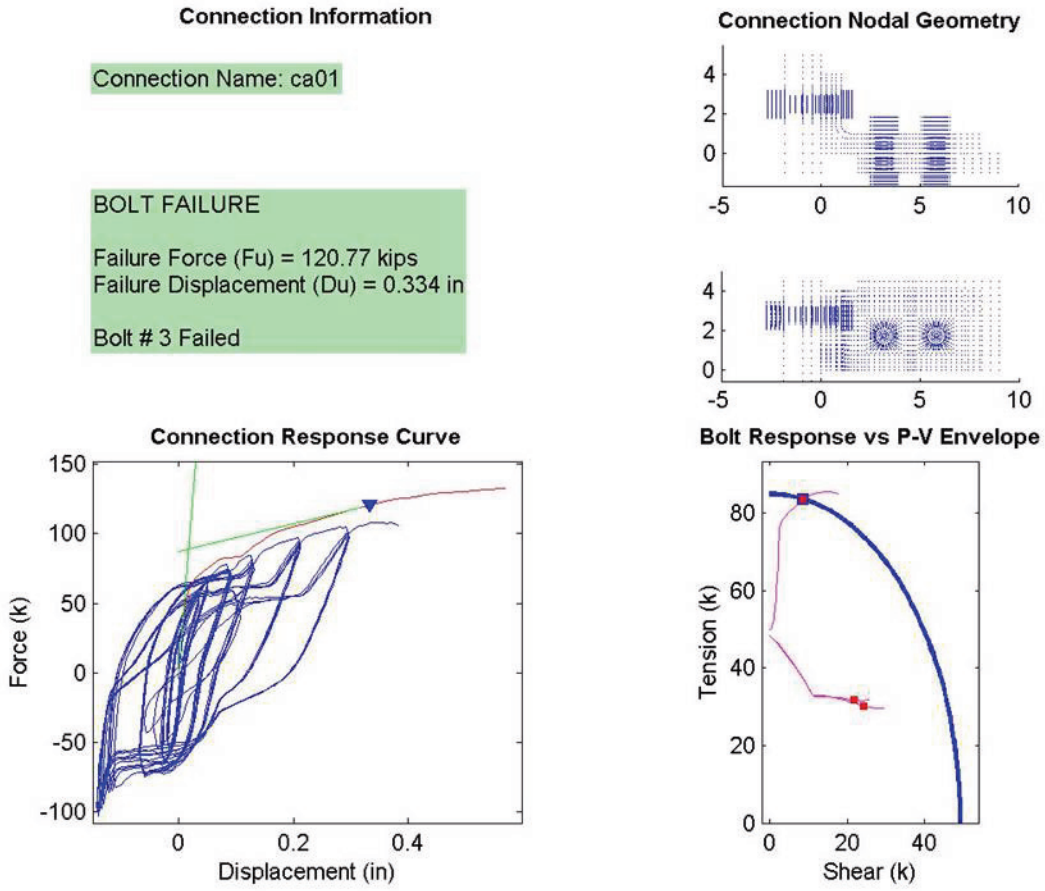


Figure 5.90 Connection test case CA01 analysis and calibrated failure criteria prediction.

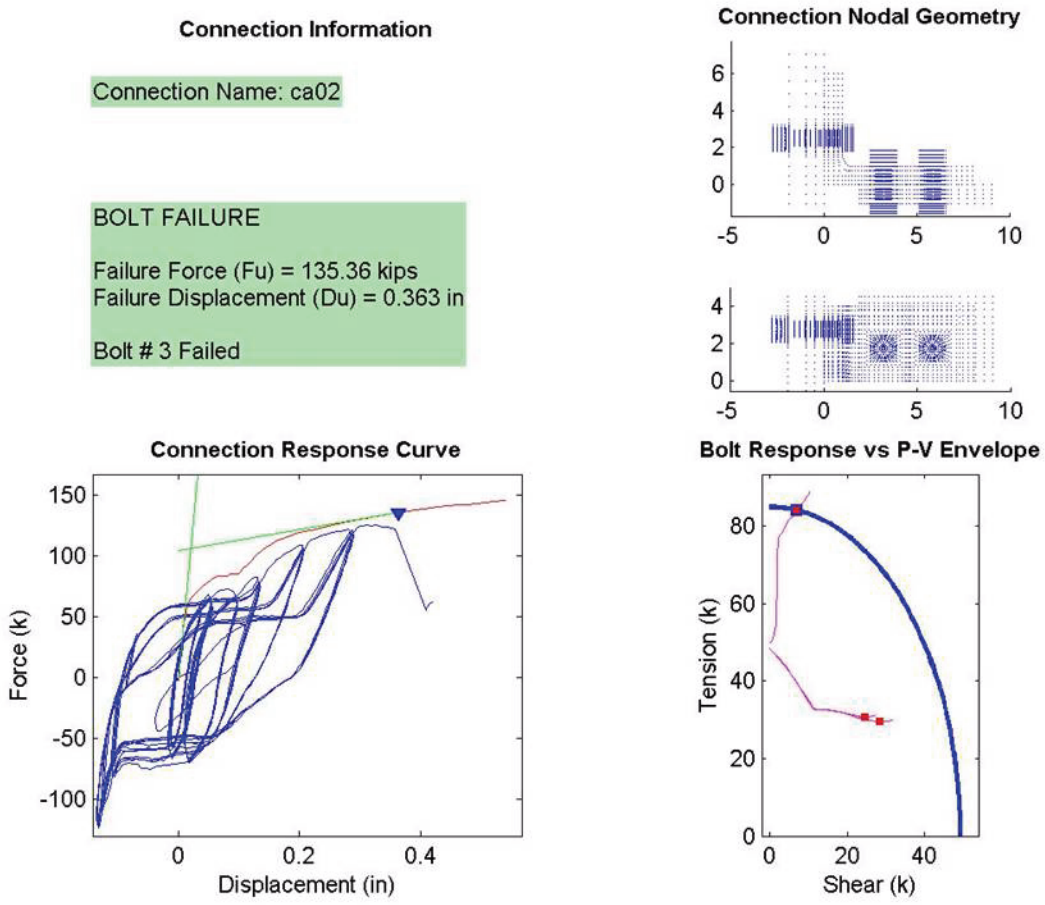


Figure 5.91 Connection test case CA02 analysis and calibrated failure criteria prediction.

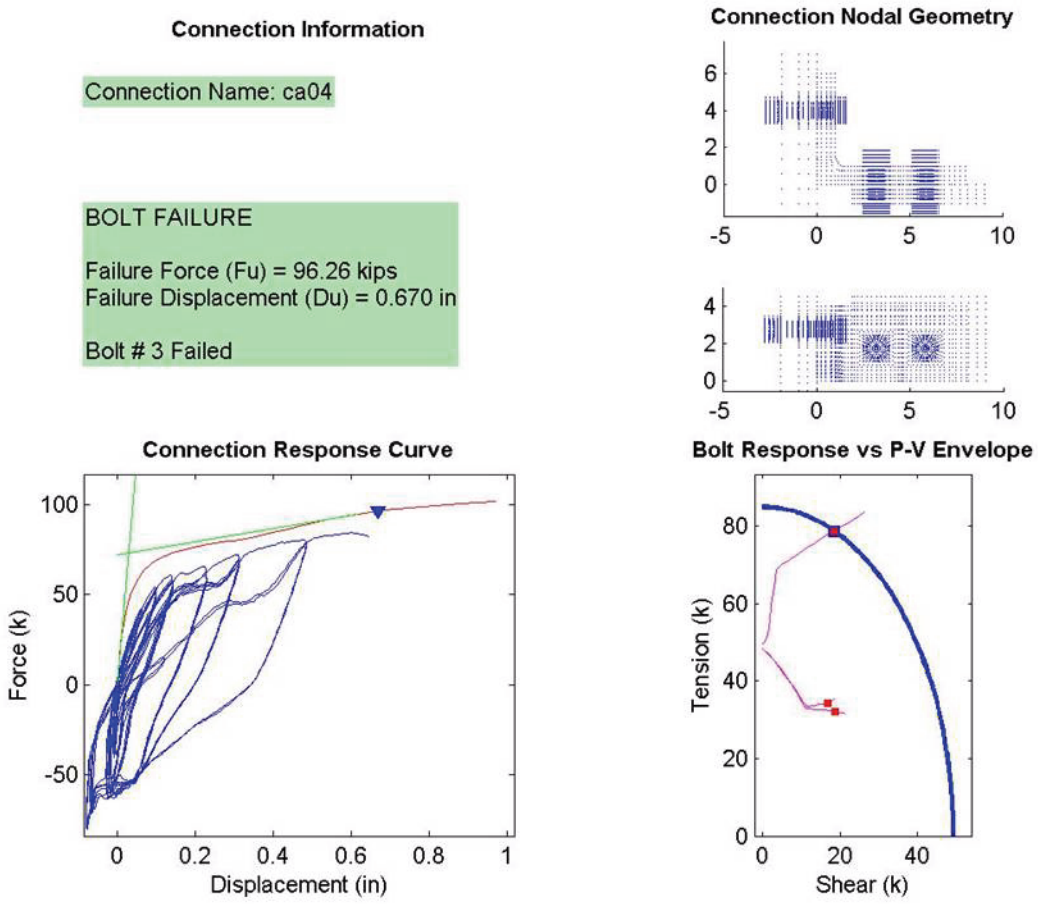


Figure 5.92 Connection test case CA04 analysis and calibrated failure criteria prediction.

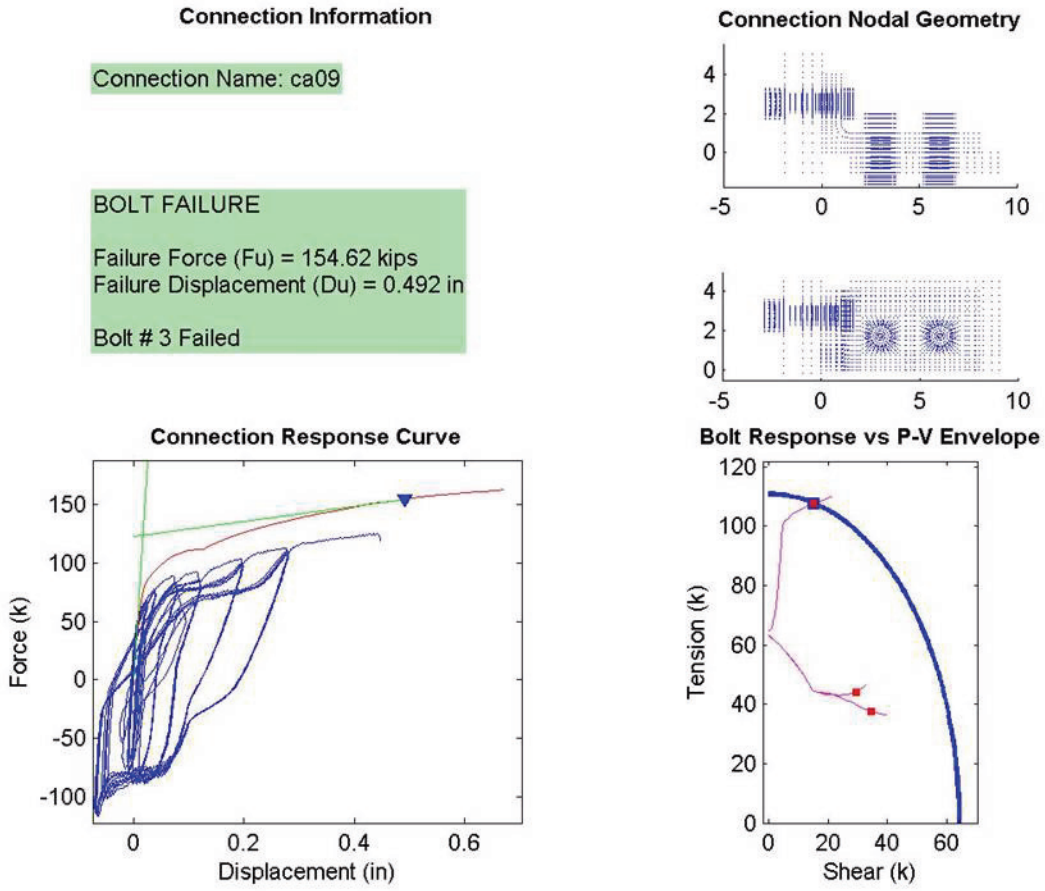


Figure 5.93 Connection test case CA09 analysis and calibrated failure criteria prediction.

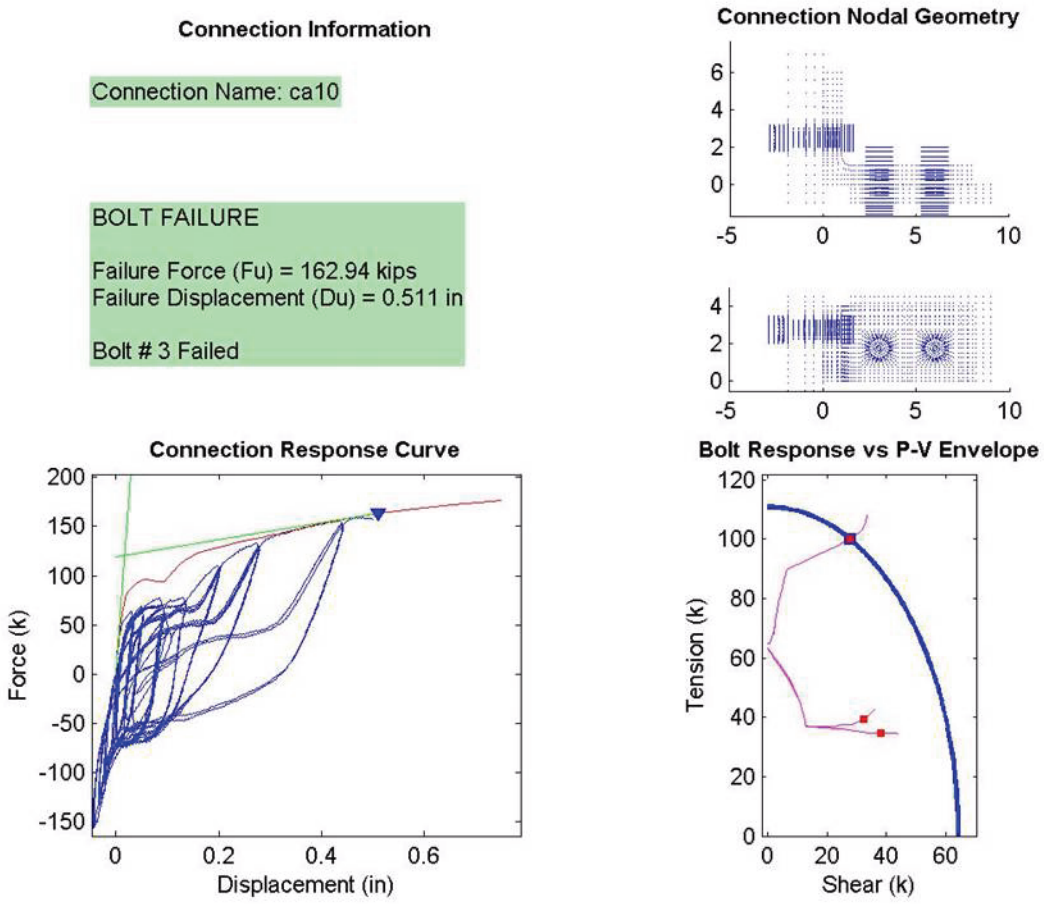


Figure 5.94 Connection test case CA10 analysis and calibrated failure criteria prediction.

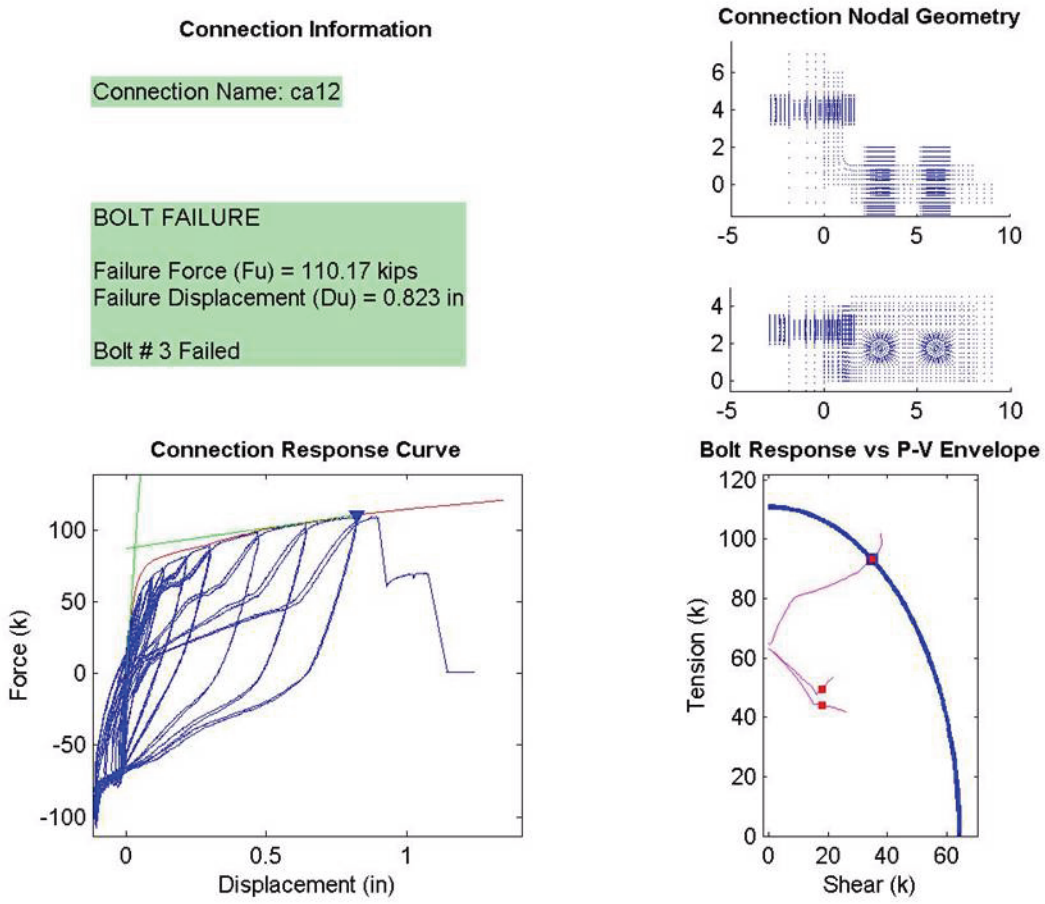


Figure 5.95 Connection test case CA12 analysis and calibrated failure criteria prediction.

Table 5.8 Failure Criteria Verification Comparison

Group	Test ID	Test Results			Analysis Results				Max Load	Max Disp
		MaxLoad (kip)	Max Disp (in)	Failure Mode	MaxLoad (kip)	Max Disp (in)	Failure Mode	Ductility Dy/Df	Analysis/ Test	Analysis/ Test
1	TA17	315.4	0.202	T–Bolt	338.6	0.208	T–Bolt	9.1	1.07	1.03
	TA18	291.7	0.197	T–Bolt	324.1	0.245	T–Bolt	8.3	1.11	1.24
	TA19	257.4	0.173	T–Bolt	290.9	0.278	T–Bolt	10.3	1.13	1.61
	TA20	234.7	0.229	T–Bolt	257.4	0.322	T–Bolt	10.8	1.10	1.41
2	TB09	315.1	0.258	T–Bolt	334.2	0.277	T–Bolt	10.9	1.06	1.07
	TB10	277.1	0.208	T–Bolt	296.9	0.290	T–Bolt	11.3	1.07	1.39
3	TA01	486.7	0.615	Net Sec	494.6	0.580	Net Sec	18.6	1.02	0.94
	TA02	456.4	0.623	Net Sec	499.2	0.710	Net Sec	20.6	1.09	1.14
	TA03	451.1	0.809	T–Bolt	445.3	0.568	T–Bolt	14.8	0.99	0.70
	TA04	388.9	0.660	T–Bolt	394.4	0.562	T–Bolt	14.4	1.01	0.85
4	TA09	432.5	0.608	Net Sec	487.1	0.615	Net Sec	21.8	1.13	1.01
	TA10	426.5	0.620	Net Sec	483.7	0.639	Net Sec	20.2	1.13	1.03
	TA11	424.9	0.759	Net Sec	476.5	0.761	Net Sec	20.2	1.12	1.00
	TA12	424.3	0.974	Net Sec	471.4	1.166	Net Sec	27.2	1.11	1.20
5	TB01	506.3	0.854	S–Bolt	512.3	0.667	Net Sec	20.8	1.01	0.78
	TB02	464.8	0.558	T–Bolt	474.9	0.624	T–Bolt	18.7	1.02	1.12
6	TB05	502.8	0.739	Net Sec	521.2	0.582	Net Sec	18.5	1.04	0.79
	TB06	496.8	0.782	Net Sec	512.0	0.682	Net Sec	19.6	1.03	0.87
7	TC01	584.7	0.383	T–Bolt	587.8	0.534	T–Bolt	16.1	1.01	1.39
	TC02	525.4	0.290	T–Bolt	531.8	0.422	T–Bolt	12.5	1.01	1.46
	TC03	468.2	0.263	T–Bolt	475.5	0.361	T–Bolt	8.9	1.02	1.37
	TC04	417.0	0.381	T–Bolt	416.7	0.403	T–Bolt	12.7	1.00	1.06
8	TC09	663.0	0.656	Net Sec	646.3	0.656	Net Sec	18.7	0.97	1.00
	TC10	651.7	0.777	Net Sec	638.6	0.760	Net Sec	19.4	0.98	0.98
	TC11	580.7	0.449	T–Bolt	575.3	0.651	T–Bolt	16.7	0.99	1.45
	TC12	512.6	0.560	T–Bolt	491.6	0.517	T–Bolt	12.7	0.96	0.92
9	TD04	246.5	0.334	Net Sec	275.5	0.720	Net Sec	22.4	1.12 *	2.16 *
10	TD08	254.5	0.242	Net Sec	282.7	0.606	Net Sec	21.1	1.11 *	2.50 *
11	CA01	108.3	0.384	T–Bolt	120.8	0.334	T–Bolt	19.4	1.12	0.87
	CA02	125.3	0.359	T–Bolt	135.4	0.363	T–Bolt	18.1	1.08	1.01
	CA04	84.3	0.645	T–Bolt	96.3	0.670	T–Bolt	22.4	1.14	1.04
12	CA09	125.2	0.448	T–Bolt	154.6	0.492	T–Bolt	29.1	1.23	1.10
	CA10	159.3	0.499	T–Bolt	162.9	0.511	T–Bolt	30.0	1.02	1.02
	CA12	109.2	0.896	T–Bolt	110.2	0.823	T–Bolt	25.5	1.01	0.92
								Mean	1.06	1.09
								Std. Dev	0.06	0.22

(*) These cases were excluded from the mean and std. dev calculation as the noticeably poor workmanship of the test specimens impacted capacity.

5.6 Summary

In this chapter mechanics based strength models as codified in design specifications and micromechanics based strength models for bolted connections are reviewed. As a prelude to the micromechanics based approach, mechanisms leading to fracture and fatigue and traditional calculation methods used to predict these events are also presented. The main objective is to develop practical failure criteria to detect both bolt and connection component failure from detailed three dimensional finite element models without the need for any further refinement than what is necessary to simulate the nonlinear response of the connection.

Mechanics based strength models can oversimplify the mechanisms which initiate failure and give incorrect results while traditional fracture and fatigue calculations do not fully utilize the capabilities of current analytical models to directly deal with stress and strain fields initiating these failure events in a practical way.

A failure criteria for the bolts and the connection components are directly calibrated in this work by comparing the bolted T-stub and angle component tests performed by Swanson at failure to the stress state in the connection component and the force state in the bolts in each connections respective analytical model. This failure criteria is used to assess the strength and failure models of the bolted angle connection dataset in the following chapter.

The failure criterion for bolts is developed based on the elliptical interaction of the tension and shear capacity envelope. This rather mechanistic approach is used for bolts as their performance is better predicted due to the simple geometry and uniformity in production. The demands on bolts are directly extracted from the finite element models and compared to the capacity envelope. The tension and shear stress capacity for A490 grade bolts used in the bolted angle connection dataset are directly calibrated from Swanson's T-stub and angle tests.

Due to its simplicity in calibration and implementation within the framework of finite element models, the Stress Modified Critical Strain (SMCS) based failure criterion is

also calibrated using Swanson's component tests. The SMCS criterion is a simplified extension of the Void Growth Method (VGM) which models ductile fracture based on micro void growth and coalescence in the steel.

The failure criteria developed is applied to the analytical models of the 28 T-stubs and 6 clip angles component tested by Swanson, used in calibrating the failure criteria; to assess the success in predicting the failure load, displacement and mode of failure. The predictions of the connection capacity using the failure criteria with the finite element models are excellent. The mean value of the maximum analysis to test failure load ratio is 1.06 with a standard deviation of 0.06 and mean value of the maximum analysis to test displacement at failure ratio is 1.09 with a standard deviation of 0.22. The failure mode is predicted correctly in all but one connection where the bolt and component failure capacity were very close to each other.

CHAPTER 6

INFLUENCE OF CONNECTION TOPOGRAPHY AND GEOMETRY ON CONNECTION RESPONSE

A dataset of the nonlinear response of parametric bolted clip angle connection models is presented in Chapter 4 and the methodology to determine failure and the mode of failure from these analytical simulations is presented in Chapter 5. Combining the nonlinear response and failure the impact of geometry and topography of the bolted connection across all the cases in the dataset will be assessed in this chapter. The main parameters of interest involving the response of the bolt clip angle connections are the strength, the initial stiffness, the plastic stiffness, and the absolute ductility or the displacement capacity of the bolted angle connections.

It is desirable for the connection to be sized to perform in a ductile manner. The limit states for bolted clip angle connections are listed in Table 5.1 and the equations to calculate these limit states codified in design manuals are presented in Section 5.2. The force applied to the bolted clip angle flows through the shear bolts in to the clip angle itself and finally through the tension bolts. The least desirable failure mode is the failure of the tension bolts. Ideally the angle would be sized to provide a mechanism to ensure ductile failure. Thus it is important to be able to accurately distinguish the failure mechanism whether it is at the bolt or clip angle.

Another measure of connection performance is the efficiency which is the ratio of the utilized bolt tensile capacity. The efficiency of the connection is calculated by taking ratio of the angle connection capacity to bolt tensile capacity. For all practical angle and bolt sizes assessed, it will be shown that it is rare if not unfeasible to size a clip angle connection which achieves a hundred percent efficiency. The impact of prying as discussed in the pre-

vious chapter reduce the bolt tensile capacity available for external loads. Prying will be studied in greater detail in Chapter 7.

6.1 Connection Response Assessment

For each analysis case in the bolted angle connection dataset the connection response and failure criteria prediction is presented in detail in Appendix B in the same format as the failure prediction criteria verifications presented previously in Figures 5.62 through 5.95. The figures for each analysis case gives thorough information regarding both the analysis response and failure prediction per the failure criteria described in Chapter 5. There are four panes in each figure:

- all connection geometric and failure information is given in the top left pane.
- nodal geometry of the analytical connection model is plotted for both the side and top view in the top right pane.
- connection force-displacement response with the failure point marked on the response curve is given in the bottom left pane.
- tension-shear response for each bolt is plotted and compared to the bolt capacity interaction envelope in the bottom right pane.

Furthermore, the connection initial and plastic stiffness, and the full analysis response vectors for the connection force and displacement; and shear and tension response for each bolt is given for each analysis.

In Appendix C the connection geometry and topographical dimensions along with the analytically predicted analysis response and failure mode are tabulated in Table C.1 for each bolted angle connection analyzed. For each analysis the connection capacity, displacement, initial and plastic stiffness, and failure mode is presented. In the case the connection fails due to bolt fracture the bolt is identified or if failure is predicted to occur in the angle the zone of failure is given in the far right column of each row in Table C.1. The bolt numbering and zoning of the angle, to identify the location of failure initiation is given in Figure 6.1.

The values in this table are visually summarized in the following sections to assess the behavior of the bolted angle connections per connection geometry and topography. Of the 405 connection configurations analyzed, bolt failure in the tension bolt, identified as bolt 3 in Figure 6.1, is detected in 185 cases while failure in the angle is detected in 220 of the analysis cases. Angle failure is detected in: zone 1 (as defined in Figure 6.1) in 47 cases, zone 3 in 172 cases, and zone 4 in 1 case.

In addition to the analytically predicted analysis response mentioned above, the calculated nominal limit state capacities based on mechanics based models which are discussed in Chapter 5 Section 5.2 are calculated for each analysis case and tabulated in Appendix E. In Table E.1 the connection geometry and topographical dimensions, analytically predicted analysis response, failure mode, and connection efficiency; and the following calculated limit state capacities are listed:

- Connection tension bolt failure
- Connection shear bolt failure
- Gross angle section yield
- Net angle section fracture
- Whitemore section yield
- Modified Whitemore section yield
- Block shear failure
- Prying

In all the 405 connections the calculated governing failure is due to prying with failure occurring in either the bolt in direct tension (Bolt #3 in Figure 6.1), or is in the angle leg affixed to that bolt. Both the analytically predicted failure based on the failure criteria, and the calculated nominal limit states identify the prying behavior as the major mechanism governing failure mode for the bolted angle connections.

In the following sections the connection response characteristics of strength, initial and plastic stiffness, absolute ductility and efficiency are graphically presented. The values derived in these figures are based on analysis results and the predicted capacity using the ana-

lytical failure criteria. This presentation of data enables the global assessment of the influence of the connection geometry and topography on the overall connection behavior of all the parametric bolted angle connections in the dataset.

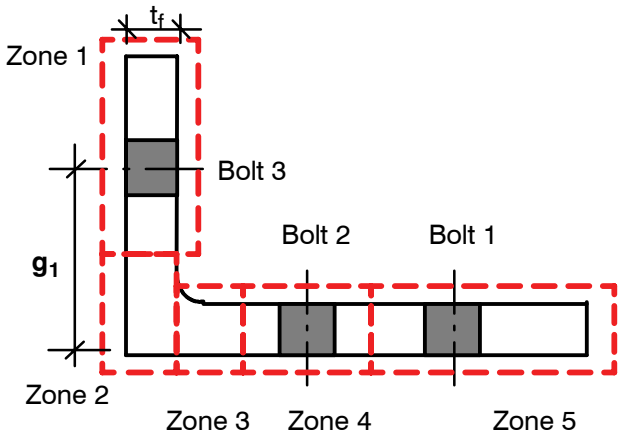


Figure 6.1 Bolted angle connection model bolt and angle failure zone identification.

Each connection response characteristic mentioned above for all the the analyses are presented in a matrix of plots in Figure 6.2 through 6.6. The column of plots are for connections with common angle leg size affixed by the tension bolts and the row of plots are for connections with common bolts size. There are three columns of plots in each figure for angles with 4 in, 6 in, and 8 in legs affixed to the tension bolts, ordered left to right. There are four row of plots in each figure for connections with bolt sizes 1 in, 7/8 in, 3/4 in, and 1/2 in, ordered top to bottom. This organization enables to effectively assess the impact of the different variables on the plotted connection response characteristic visually.

In each individual plot the response characteristic is plotted against the tension bolt gage to angle leg thickness ratio (g_1/t_f). This ratio is used as a non-dimensional term defining the relative stiffness and strength of the tension bolt and angle member which are the main critical components of the connection. Low (g_1/t_f) ratios imply connections having a rela-

tively stiffer angle leg with a lower bolt gage and a greater angle thickness in comparison with those having high (g_1/t_f) ratios.

The individual plots in the figures do not differentiate the connection angle width and the size of the horizontal angle leg (L_2) and its connecting shear bolt details, but nevertheless a strong dependency of the angle response is observed to the tension bolt gage to angle leg thickness ratio (g_1/t_f) for all the plotted response characteristics. Another layer of information regarding the response of the connection is given by the color and shape of the plot symbol in these figures. Data plotted with a blue circle identifies the response of a connection which failed due to tension bolt failure, and the solid red symbols identify fracture of the connection angle. The shape of red symbols identify the location at which the angle failure is initiated as shown in the legend in each figure.

6.2 Connection Strength

The strength of all the bolted angle connections are summarized in a matrix of plots, as described above, in Figure 6.2. The strength of each connection is determined by applying the failure criteria described Chapter 5 to the connections in the analyses dataset.

In all the plots, bolt failure occurs in the connections with low (g_1/t_f) ratios. This is generally the case for all the angle leg sizes in the data with (g_1/t_f) ratios less than 5 that are connected with bolt diameters greater than in 1/2 in. Bolt failure is detected in almost all the angles studied that have 1/2 inch bolts. This size bolt is generally not used in regular structural beam column connections. Connections with higher (g_1/t_f) ratios are determined to fail in the angle component. The majority of the angle failure is detected to occur in zone 3 – this is the case for connections with a bolt diameters 3/4 inches and larger.

Looking at Figure 6.2 a strong relationship between the strength and the (g_1/t_f) ratio can be seen. A general trend can be observed; starting from low (g_1/t_f) ratios where bolt failure governs the connection, the strength decreases roughly linearly as the (g_1/t_f) ratio in-

creases and prying forces increasingly reduce the effective tensile capacity of the tension bolts. Eventually angle failure begins to govern and the reduction in connection strength displays an exponential relationship with increasing (g_1/t_f) ratio.

The highest connection capacity in each plot noted by the data point with the least (g_1/t_f) ratio is near the full tensile capacity of the bolt reduced slightly by prying forces which is dependent on the angle geometry and topography. From the top row of plots of connection strength with 1 in diameter bolts the maximum capacity of the connections in each plot in each row is closely related to the bolt size and decreases progressively for the data plots in each row below. The cases for which bolt failure is detected reach higher (g_1/t_f) ratios where at the very bottom row of plots which are for connections with 1/2 in bolts, in almost all the cases bolt failure dominates.

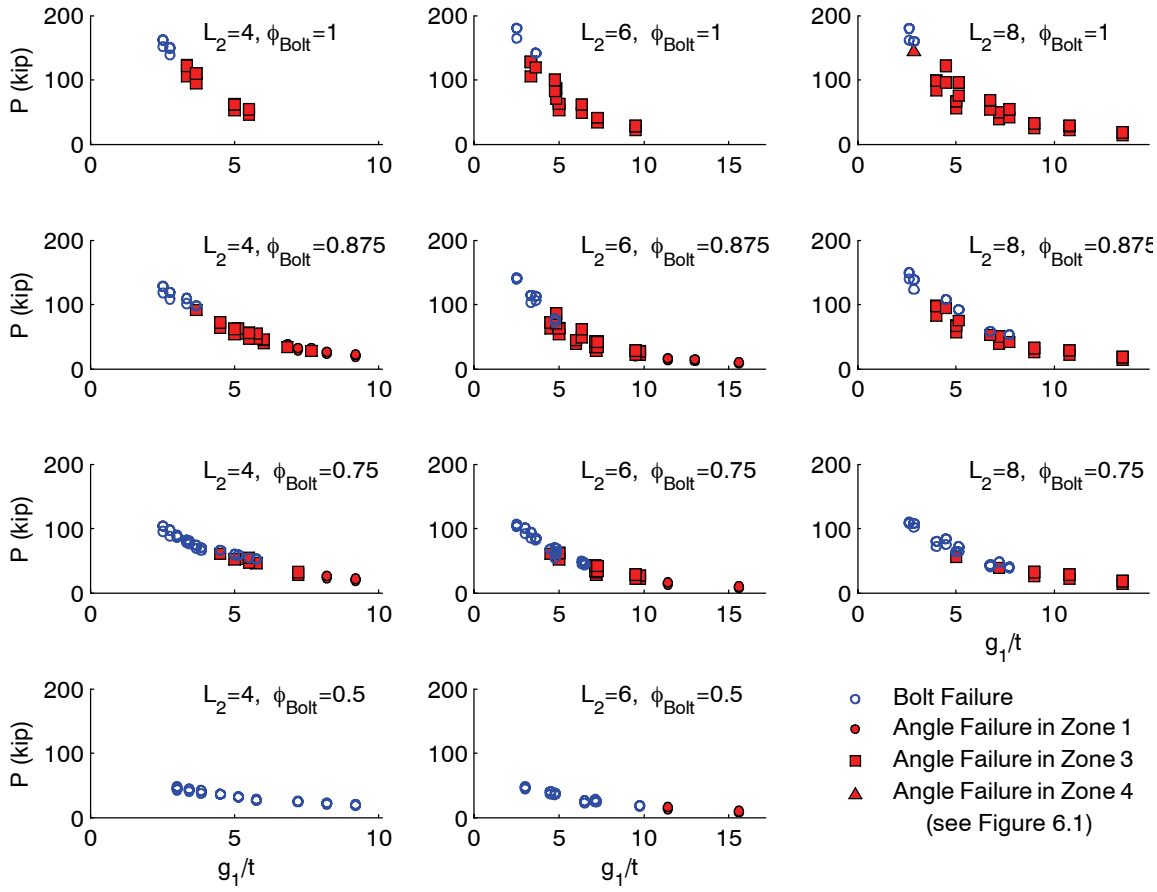


Figure 6.2 .Bolted angle connection capacity versus tension bolt gage-angle thickness ratio plotted for all different angle leg and bolt diameter size groups with failure mode identified.

Looking at the plots in Figure 6.2 from left to right the data is grouped per the angle leg size connected to the tension bolt. The (g_1/t_f) ratio range is greater as the leg size increases, but given the same (g_1/t_f) ratio and bolt size, the angle leg size seems to have little effect on the connection strength. This validates the limitation on the effective distance of the prying force from the tension bolt designated by a' in Figure 5.6.

6.3 Connection Ductility

The connection displacement ductility of all the bolted angle connections are summarized in a matrix of plots in Figure 6.3, in the same manner described previously. The

displacement of each connection is plotted at which failure is detected per the failure criteria described Chapter 5 from the connection analysis.

For all the connections with bolt sizes greater than 1/2 in there is linear relationship between the displacement ductility of the and the (g_1/t_f) ratio of the connection. The displacement ductility increases as the (g_1/t_f) ratio increases. In all the cases with low (g_1/t_f) ratios where bolt failure governs the displacement ductility is low. This is consistent with the assumption that bolt failure is a relatively brittle limit which occurs with little deformation in the connection.

When comparing the different columns of plots from left to right where the angle leg size connected to the tension bolt increases, from 4 in to 8 in, the slope formed by the the data points slightly increase. All the data points in the far left column plots for connections with 8 in leg and high (g_1/t_f) ratios have high displacement ductility and angle failure, all of which is detected in zone 3 of the angle, as defined in Figure 6.1. The greater the angle leg connected to the tension bolt, the more room there for greater bolt gages which allow for more deformation.

Shown in the columns to the left, for the connections with shorter angle legs and bolt sizes of 7/8 in and 3/4 in, the location at which angle failure is detected shifts from zone 3 to zone 1 as the (g_1/t_f) ratio increase. Bolt failure was detected for the majority of connections with 1/2 in diameter bolts, plotted at the bottom row. All these connections with a (g_1/t_f) ratios less and around 5 have extremely low ductility.

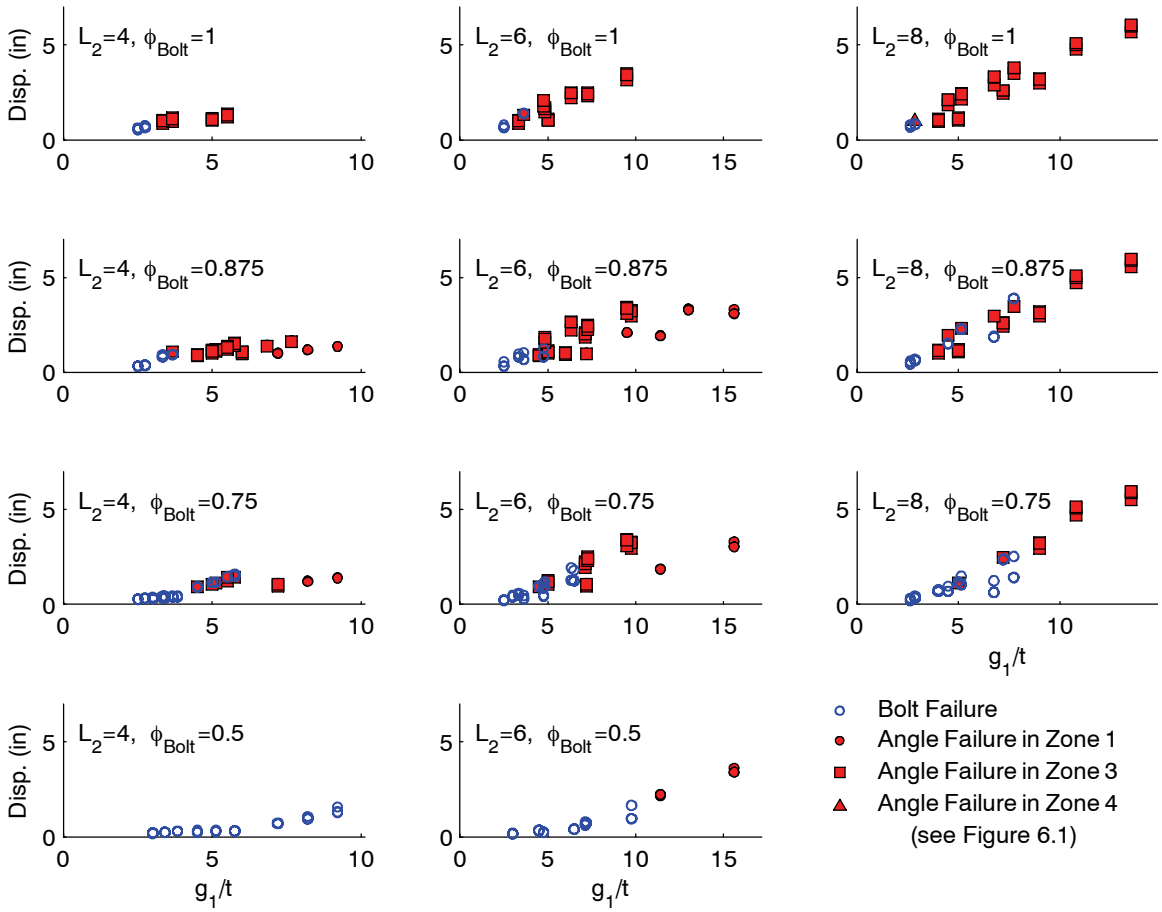


Figure 6.3 Bolted angle connection displacement ductility versus tension bolt gage-angle thickness ratio plotted for all different angle leg and bolt diameter size groups with failure mode identified.

6.4 Connection Stiffness

The initial stiffness and the plastic stiffness measured at the point of failure on the force-displacement response curve of all the bolted angle connections in the dataset are summarized in a matrix of plots in Figures 6.4 and 6.5, respectively. In general both the initial and plastic stiffness of the connections display an exponential relationship with increasing (g_1/t_f) ratio.

Similar to the plots in Figure 6.2 which summarize the strength of the connections; the greatest initial stiffness, shown in Figure 6.4, occurs in connections with the lowest (g_1/t_f) ratio in each plot in which all these stiffer connections, failure is governed by the tension bolt.

Comparing the row of plots with common bolt sizes, greater stiffness can be achieved using connections with larger bolt size and lower (g_1/t_f) ratio. As with the strength of the connections, given the same (g_1/t_f) ratio and bolt size, the angle leg size seems to have little effect on the initial stiffness of the connection.

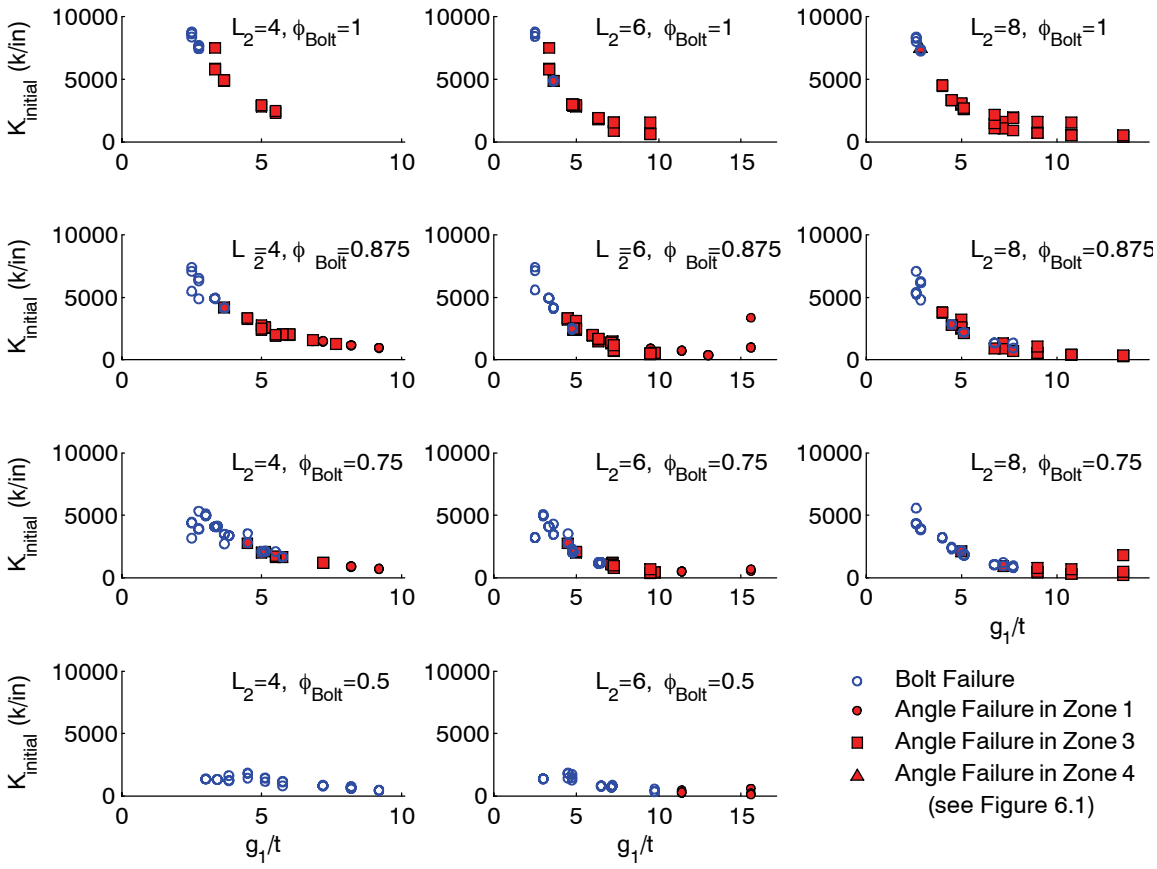


Figure 6.4 Bolted angle connection initial stiffness versus tension bolt gage-angle thickness ratio plotted for all different angle leg and bolt diameter size groups with failure mode identified.

The connection plastic stiffness per their (g_1/t_f) ratio are summarized in Figure 6.5. While the connections with lower (g_1/t_f) ratios have the greatest plastic stiffness albeit much lower compared to the initial stiffness, there is a clear distinction between connections with different governing failure modes. When bolt failure governs the plastic stiffness exponentially drops as the (g_1/t_f) ratios of the connection increase. In almost all the cases where angle failure governs the plastic stiffness is very small. This can be attributed to the fact that these

connections have greater displacement ductilities due to the formation of a plastic mechanism.

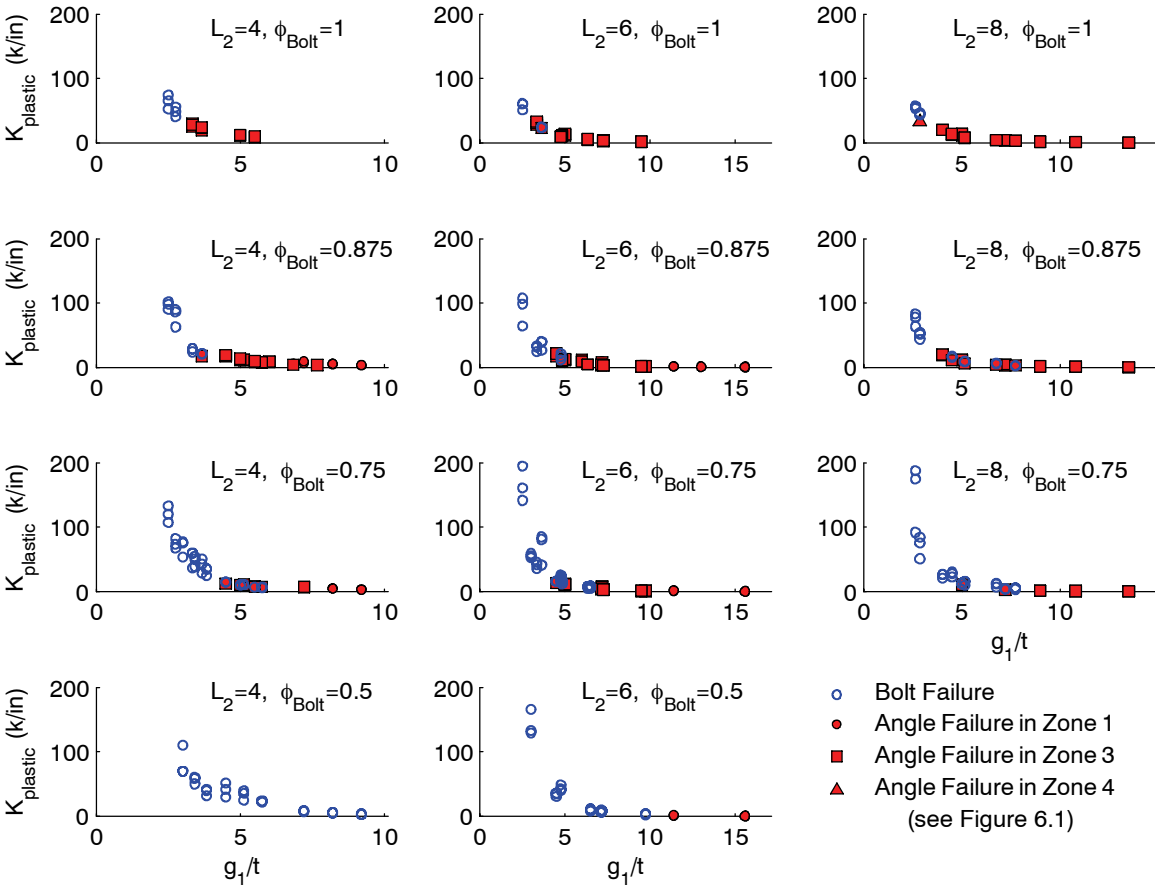


Figure 6.5 Bolted angle connection plastic stiffness versus tension bolt gage-angle thickness ratio plotted for all different angle leg and bolt diameter size groups with failure mode identified.

6.5 Connection Efficiency

Another measure of performance is connection efficiency. How much of the tensile bolt capacity is utilized, is measured by the ratio of the connection capacity to the total tensile bolt capacity. Ideally a connection would be as strong as the bolts it is connected with. Though the true actual connection capacity is reduced by the behavior of the connection member, in this case the angle, and its impact on the response of the tensile bolt. Bolt prying

is the major mechanism which reduces the connection efficiency. Prying was previously described and will be studied in greater detail in the following chapter.

The efficiency of all the bolted angle connections are summarized in a matrix of plots in Figure 6.6. One immediate conclusion looking at the plots is that no bolted angle connection in the dataset is able to utilize the full capacity of the tension bolts. The greatest efficiency achieved for all the connections in the dataset is 0.88. The connection which achieved the greatest efficiency is the 8 in wide L8x8x1 angle connection with a 3/4 in bolt at a 2.625 in gage.

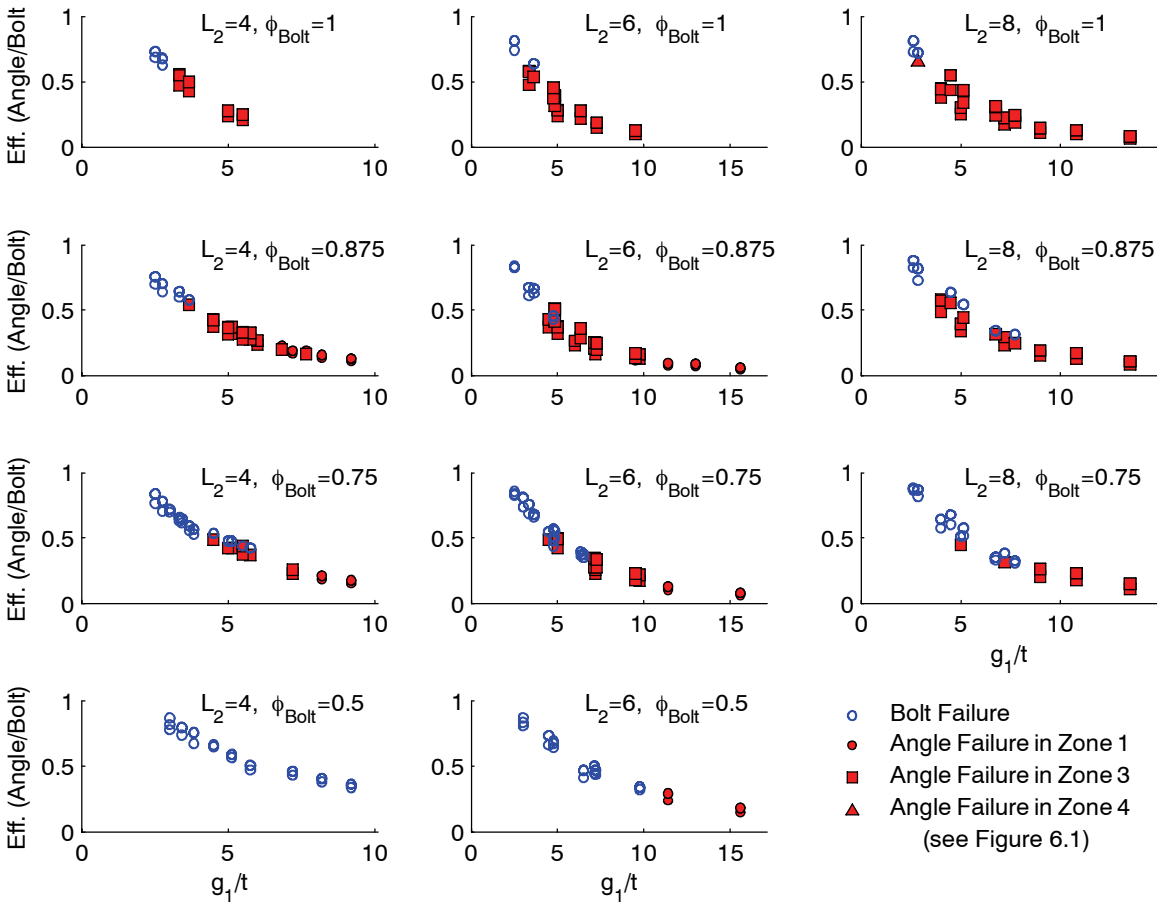


Figure 6.6 Bolted angle connection efficiency versus tension bolt gage-angle thickness ratio plotted for all different angle leg and bolt diameter size groups with failure mode identified.

Surveying the results in Figure 6.6 the greatest levels of connection efficiency is achieved at the lowest (g_1/t_f) ratios where prying forces are the lowest. As the (g_1/t_f) ratio increase the connection efficiency drops exponentially.

Looking at the plots in Figure 6.6 from left to right where the data is grouped per the angle leg size connected to the tension bolt, there is a slight increase in the efficiency of the connections as the angle leg size increases for connections with the same (g_1/t_f) ratio. The same is true when comparing the row of plots with common bolt sizes; the efficiency of the connections slightly increase for connections with the same angle leg size and (g_1/t_f) ratio as the bolt size is reduced.

Reviewing the response summaries presented in Figures 6.2 through 6.6, some general assessments maybe made on the impact of topography and geometry of the bolted angle connections to their structural response. Ideally a connection will have sufficient strength and stiffness to transfer forces, yet also have sufficient ductility to accommodate excessive deformation demands. For bolted angle connections with bolts 3/4 in and greater, tension bolt failure can be avoided by designing the connection with a (g_1/t_f) ratio 5 or greater. Although the connection efficiency achieved for such a design does not exceed 0.5, meaning only half of the bolt capacity is being utilized in the connection due to prying forces.

6.6 Visual Assessment of the Influence of Topography and Geometry on Connection Response

In the previous section, all the connection response data were summarized graphically to survey the response of bolted angle connections in relation to their geometry and topography. The various connection response characteristics were found to have a strong dependency on the connection (g_1/t_f) ratio, namely the tension bolt gage to angle thickness ratio. In this section a cross-section of the angles from the analyzed dataset is presented to visually compare the independent impact of extreme changes of the two governing factors.

A range of all size angles used in the dataset is presented in these comparison figures: L6x4, L6x6, L8x4, L8x6, and L8x8 angles connected with 3/4 in bolts with either 6 or 8 inch widths. Table 6.1 lists the subset of cases used in this section for visually presenting the different comparisons. In the first section the impact of angle thickness is visually compared, followed by the impact of the tension bolt gage on the bolted angle connection capacity.

Table 6.1 Subset of angles used in visual connection response comparisons

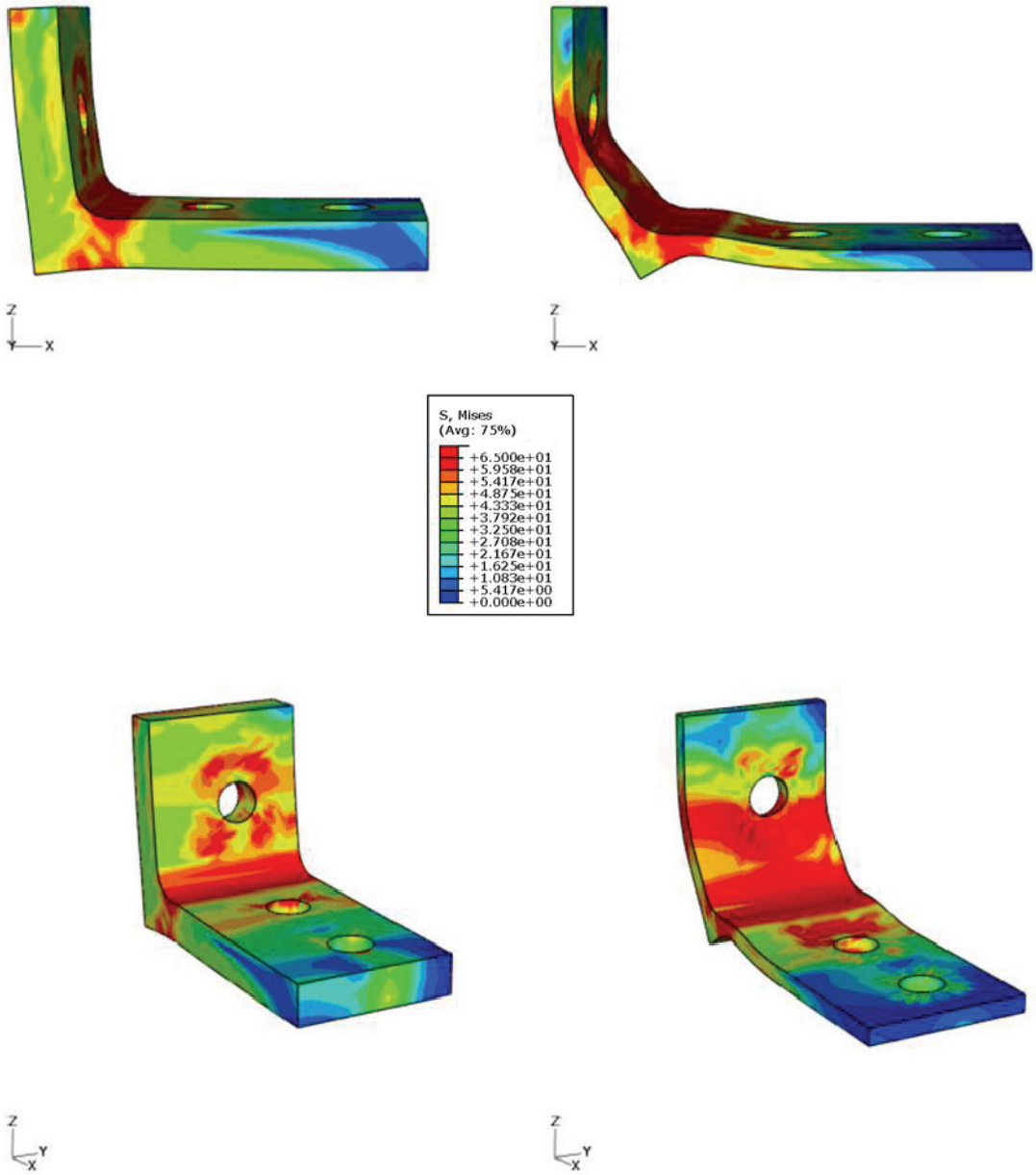
Angle Size	Angle Thickness (in)	Tension Bolt Gage (in)	Angle Width (in)	Bolt Diameter (in)
L6x4	5/16 3/4	2.25 2.875	6	3/4
L6x6	5/16 3/4	2.25 4.875	8	
L8x4	1/2 1	2.5 2.7	6	
L8x6	1/2 1	2.5 4.75	8	
L8x8	1/2 7/8	2.5 6.75	6	

6.6.1 Influence of Angle Thickness

In Figures 6.7 through 6.16 the influence of connection thickness is visually compared between connections with the same geometry and topography, except angle thickness. In these figures numerical information about the connection and its response is given. The deformed shape of the connections are plotted with the Mises stress contour at the point at which failure is detected using the analytical failure criteria. The maximum stress contour shown with red is set the nominal ultimate stress of the connection material.

In all the comparison cases for the subset, failure in the angle is detected for the connections with the minimum angle thickness while bolt failure is detected in all the connections with the maximum angle thickness. The thicker angles by definition have lower (g_1/t_f) ratios. Consistent with our findings in the previous sections the thicker angles failed at low displacements, but have greater capacities compared to the thinner angles which allow for greater deformations which result in greater connection displacement and lower capacities.

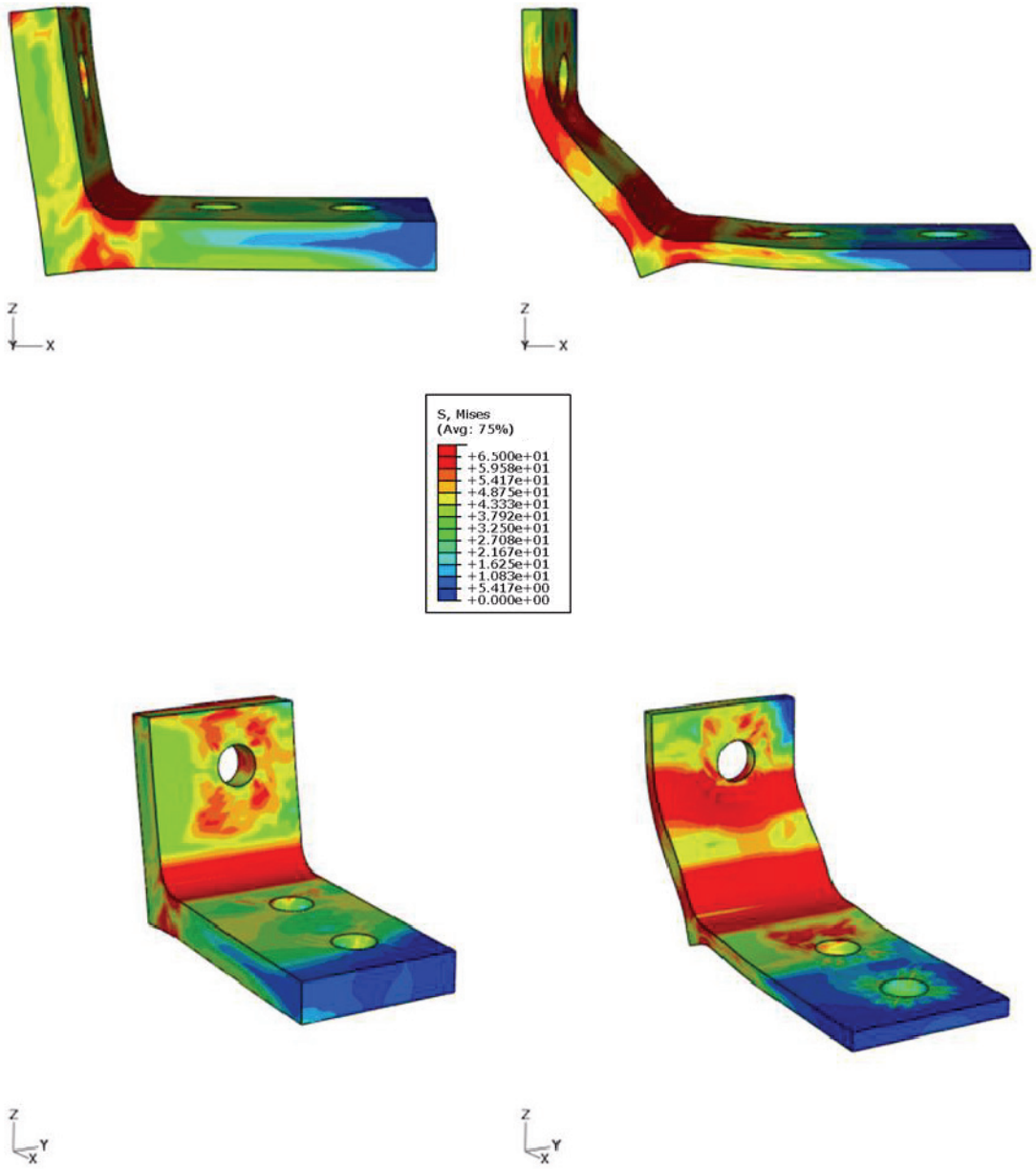
In the thinner angles for all the cases there are high stresses at both around the tension bolt hole and at the angle heel where the thicker connections for most cases have high stresses if any at the angle heel. This is instructive about the force transfer mechanism of the angles. The low deformations in the thicker angles with lower (g_1/t_f) ratios have greater prying effects on the tension bolts. The thinner angles with greater (g_1/t_f) ratios form plastic mechanisms thus lower connection capacity and efficiency.



(a) t = 0.75 in
g_1 / t = 3.0
Capacity =87.1 kips
Displacement = 0.38 in
Failure Mode = Bolt

(b) t = 0.3125 in
g_1 / t = 7.2
Capacity = 28.4 kips
Displacement = 0.96 in
Failure Mode = Angle

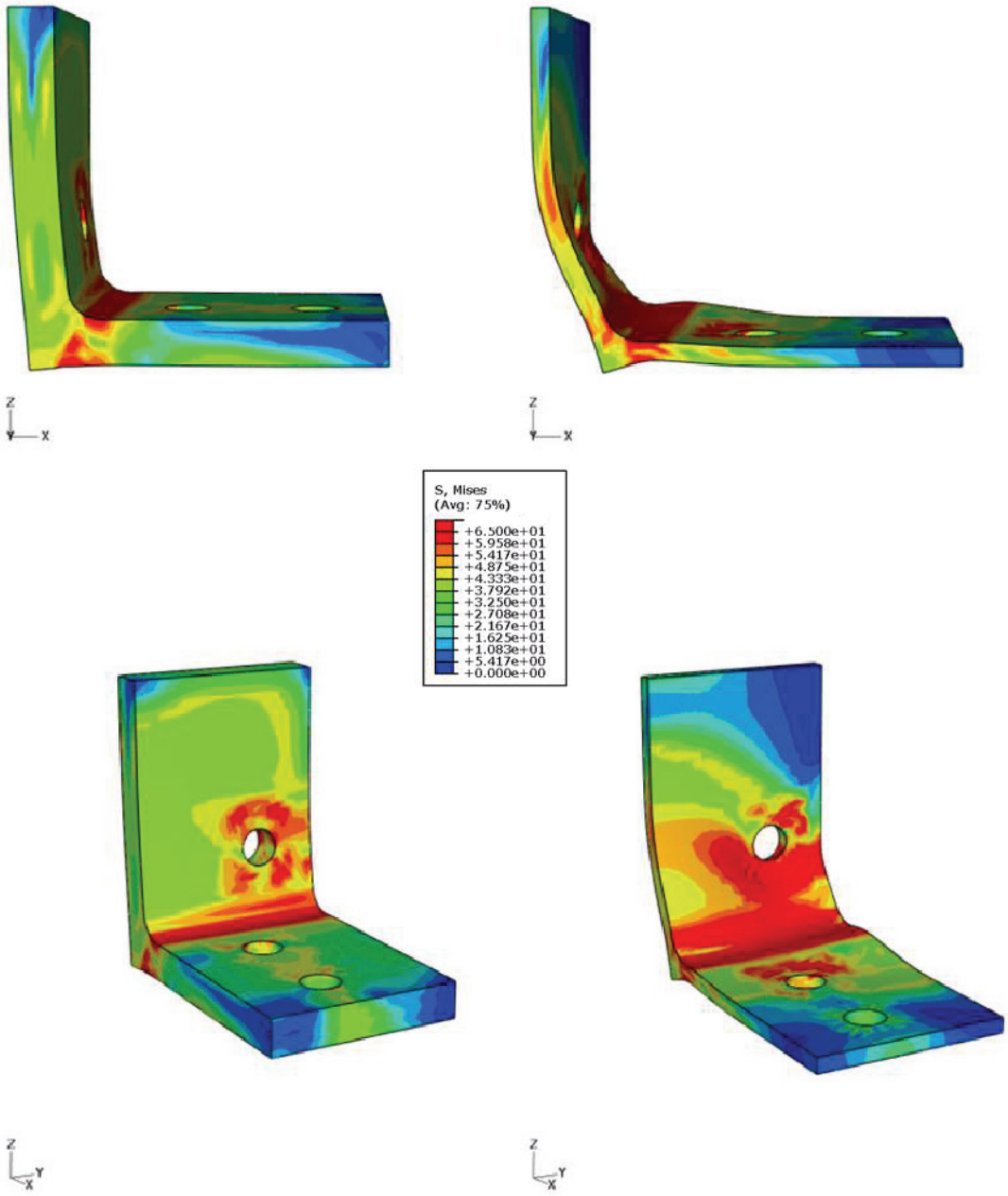
Figure 6.7 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of angle thickness on connection response for L6x4 angles, 6 inches wide, connected with 3/4 in diameter bolts with 2.25 in gage and (a) 0.75 in, (b) 0.3125 in thick. (Shown half symmetry model about x-z plane)



(a) t = 0.75 in
g_1 / t = 3.8
Capacity = 65.9 kips
Displacement = 0.45 in
Failure Mode = Bolt

(b) t = 0.3125 in
g_1 / t = 9.2
Capacity = 19.3 kips
Displacement =1.43 in
Failure Mode = Angle

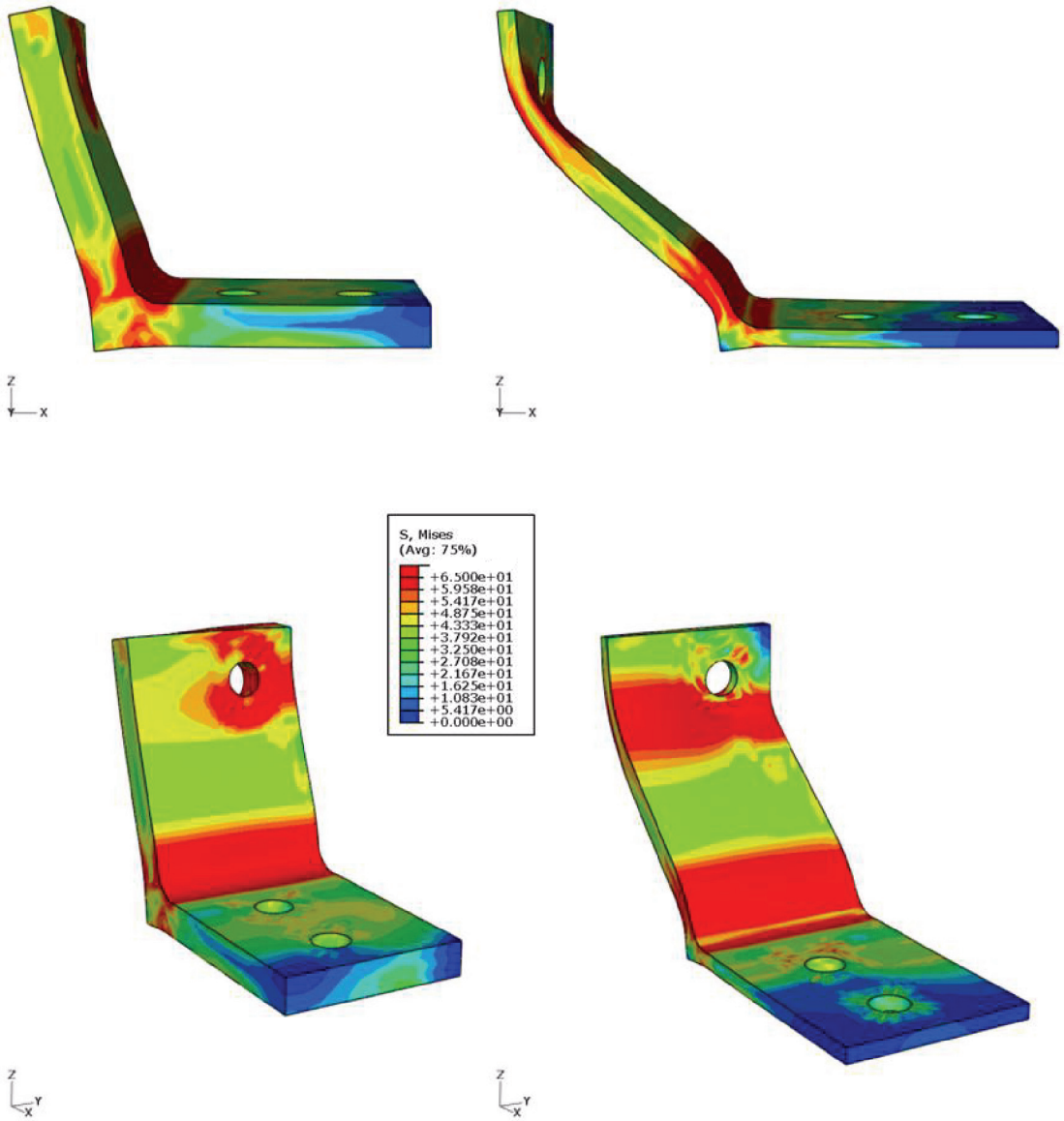
Figure 6.8 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of angle thickness on connection response for L6x4 angles, 6 inches wide, connected with 3/4 in diameter bolts with 2.875 in gage and (a) 0.75 in, (b) 0.3125 in thick. (Half symmetry model about x-z plane)



(a) t = 0.75 in
g_1 / t = 3.0
Capacity = 101. kips
Displacement = .41 in
Failure Mode = Bolt

(b) t = 0.3125 in
g_1 / t = 7.2
Capacity = 32.5 kips
Displacement = 1.1in
Failure Mode = Angle

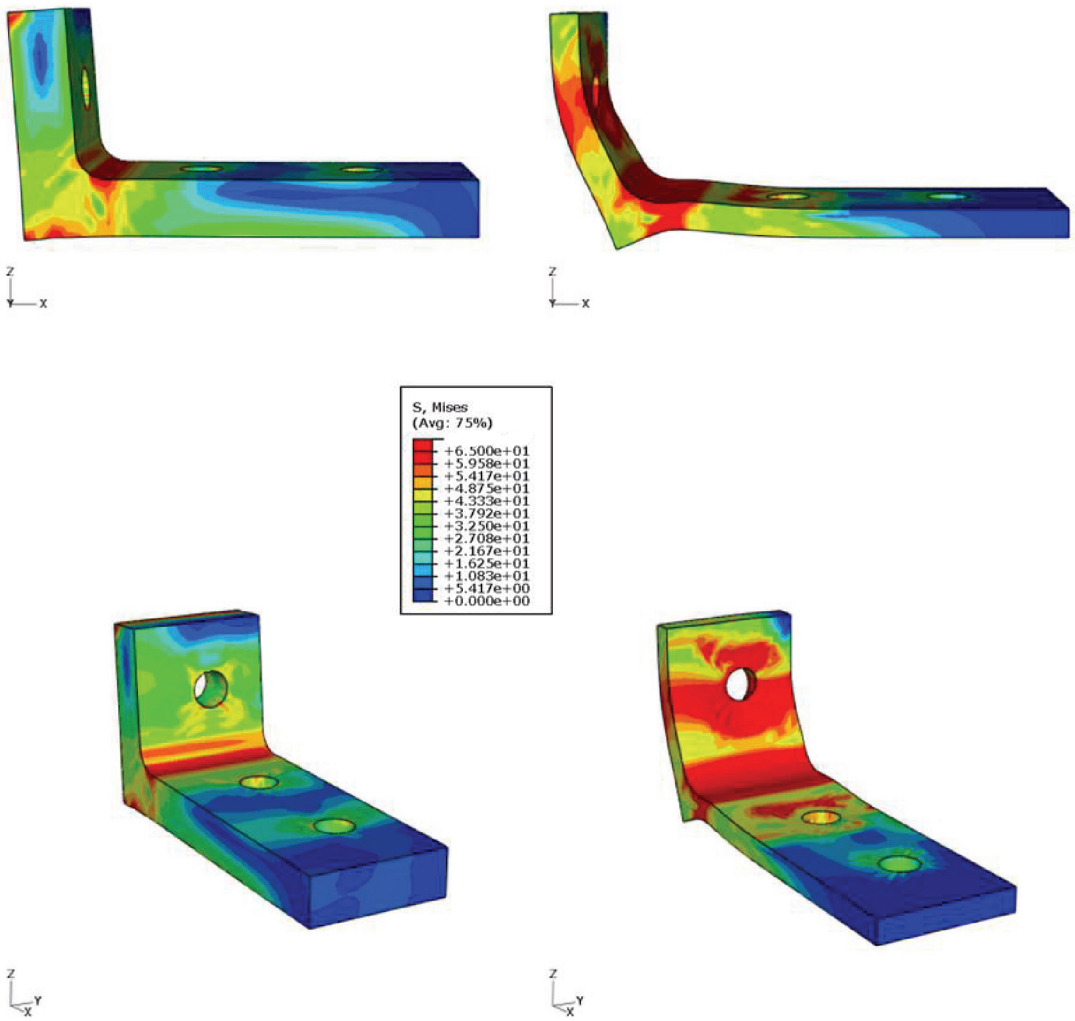
Figure 6.9 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of angle thickness on connection response for L6x6 angles, 8 inches wide, connected with 3/4 in diameter bolts with 2.25 in gage and (a) 0.75 in, (b) 0.3125 in thick. (Half symmetry model about x-z plane)



(a) t = 0.75 in
g_1 / t = 6.5
Capacity = 46.9 kips
Displacement = 1.24 in
Failure Mode = Bolt

(b) t = 0.3125 in
g_1 / t = 15.6
Capacity = 10.1 kips
Displacement = 3.04 in
Failure Mode = Angle

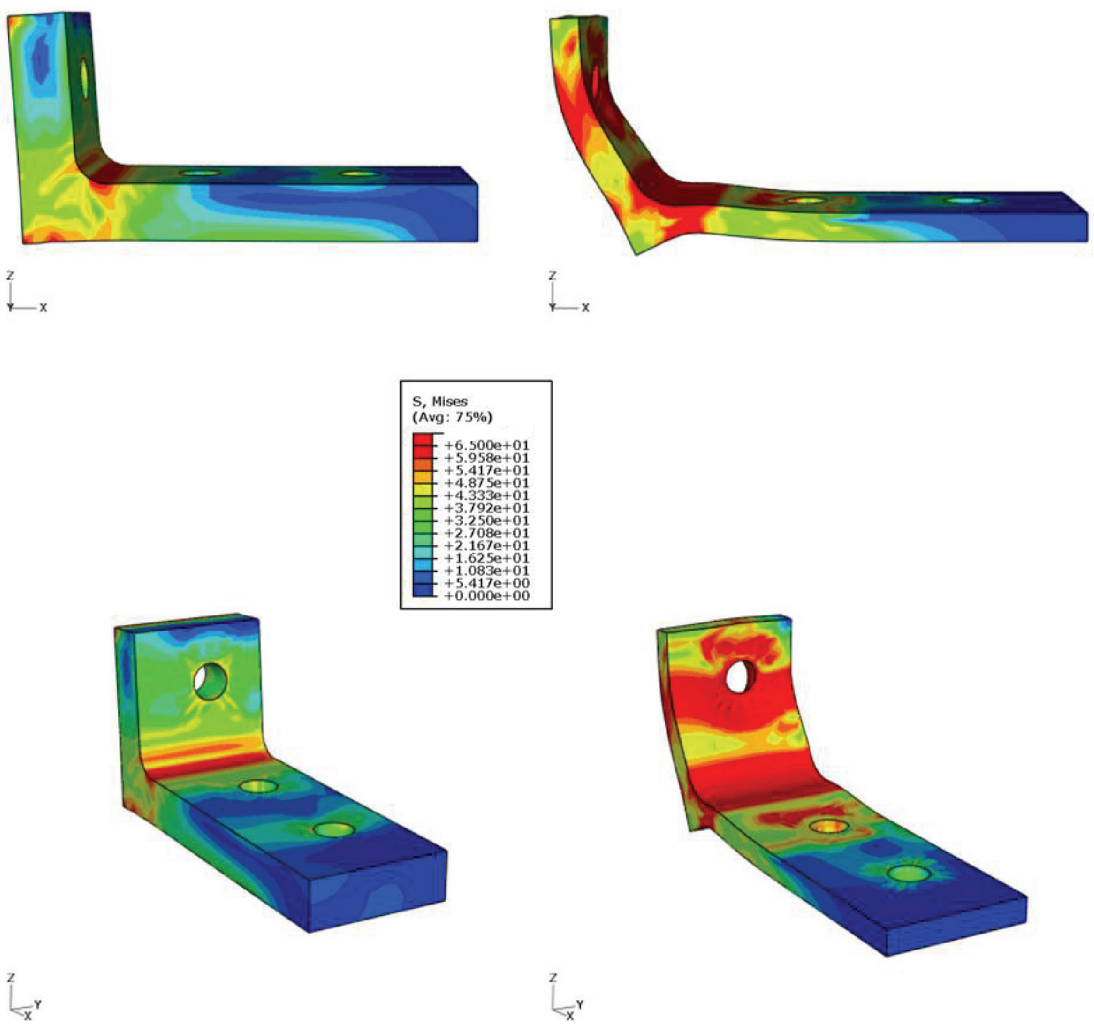
Figure 6.10 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of angle thickness on connection response for L6x6 angles, 8 inches wide, connected with 3/4 in diameter bolts with 4.875 in gage and (a) 0.75 in, (b) 0.3125 in thick. (Half symmetry model about x-z plane)



(a) t = 1.0 in
g_1 / t = 2.5
Capacity = 95.7 kips
Displacement = 0.29 in
Failure Mode = Bolt

(b) t = 0.5 in
g_1 / t = 5.0
Capacity = 52.7 kips
Displacement = 1.07 in
Failure Mode = Angle

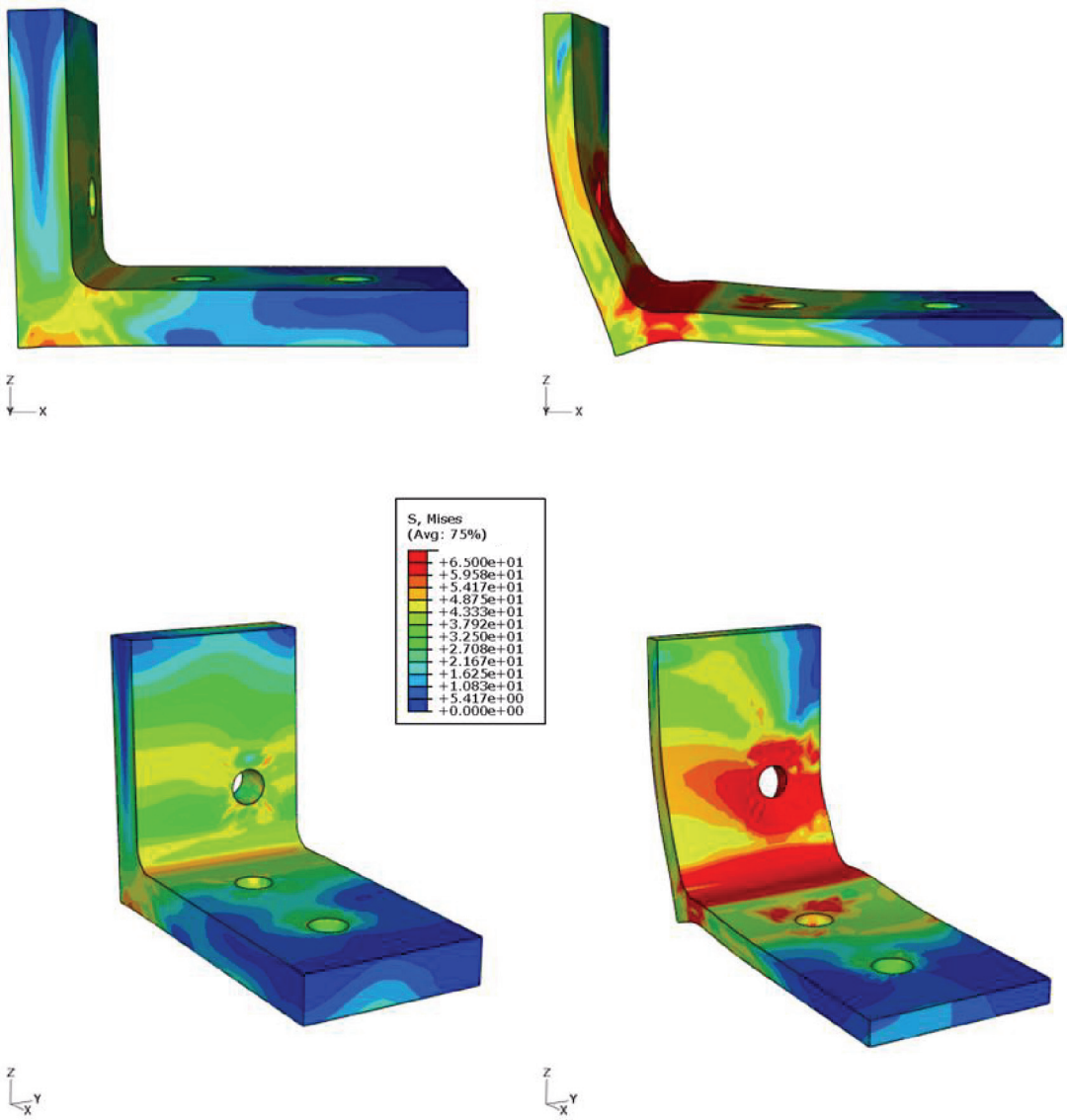
Figure 6.11 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of angle thickness on connection response for L8x4 angles, 6 inches wide, connected with 3/4 in diameter bolts with 2.5 in gage and (a) 1.0 in, (b) 0.5 in thick. (Half symmetry model about x-z plane)



(a) t = 1.0 in
g_1 / t = 2.75
Capacity = 87.9 kips
Displacement = 0.32 in
Failure Mode = Bolt

(b) t = 0.5 in
g_1 / t = 5.5
Capacity = 46.9 kips
Displacement = 1.25 in
Failure Mode = Angle

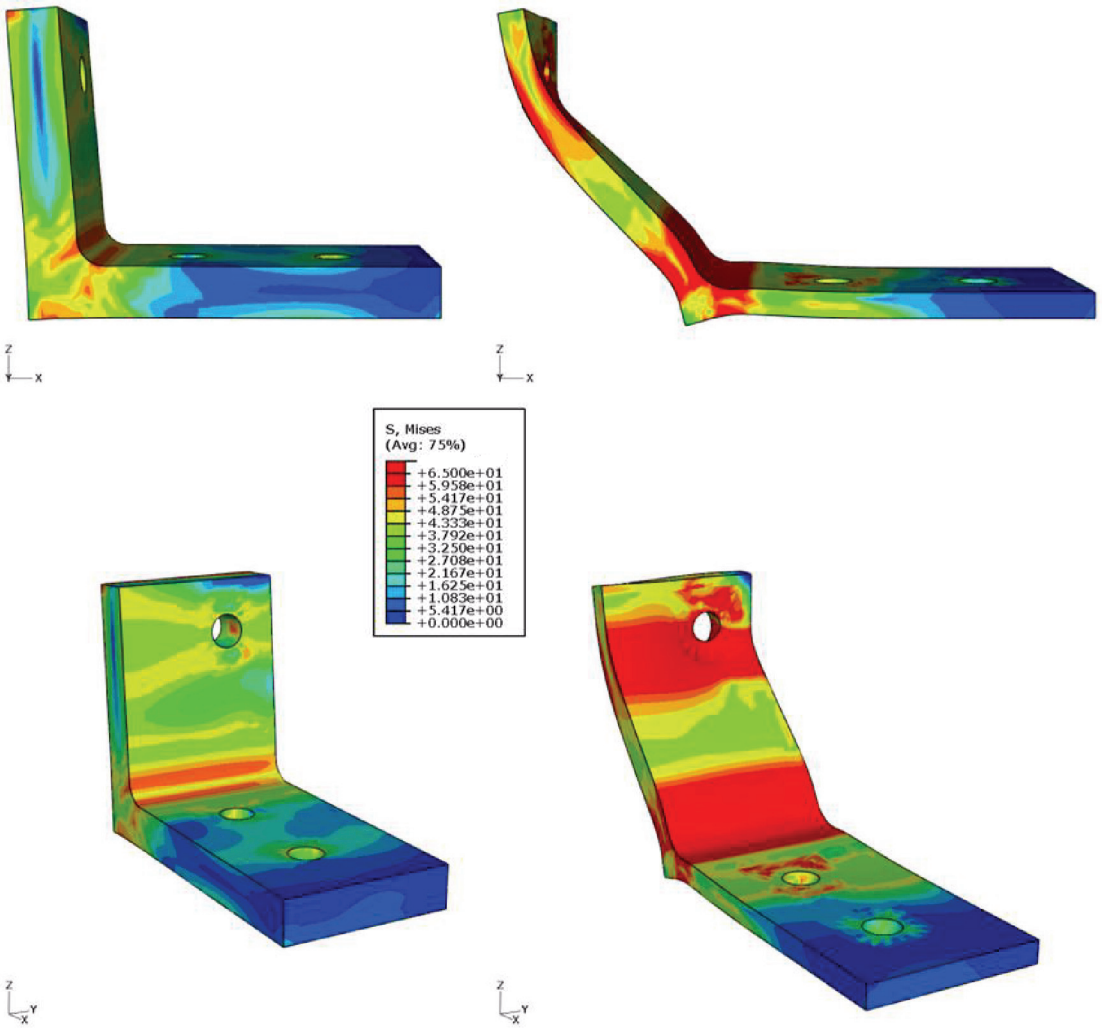
Figure 6.12 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of angle thickness on connection response for L8x4 angles, 6 inches wide, connected with 3/4 in diameter bolts with 2.75 in gage and (a) 1.0 in, (b) 0.5 in thick. (Half symmetry model about x-z plane)



(a) t = 1.0 in
g_1 / t = 2.5
Capacity = 107.0 kips
Displacement = 0.23 in
Failure Mode = Bolt

(b) t = 0.5 in
g_1 / t = 5.0
Capacity = 62.4 kips
Displacement = 1.26 in
Failure Mode = Angle

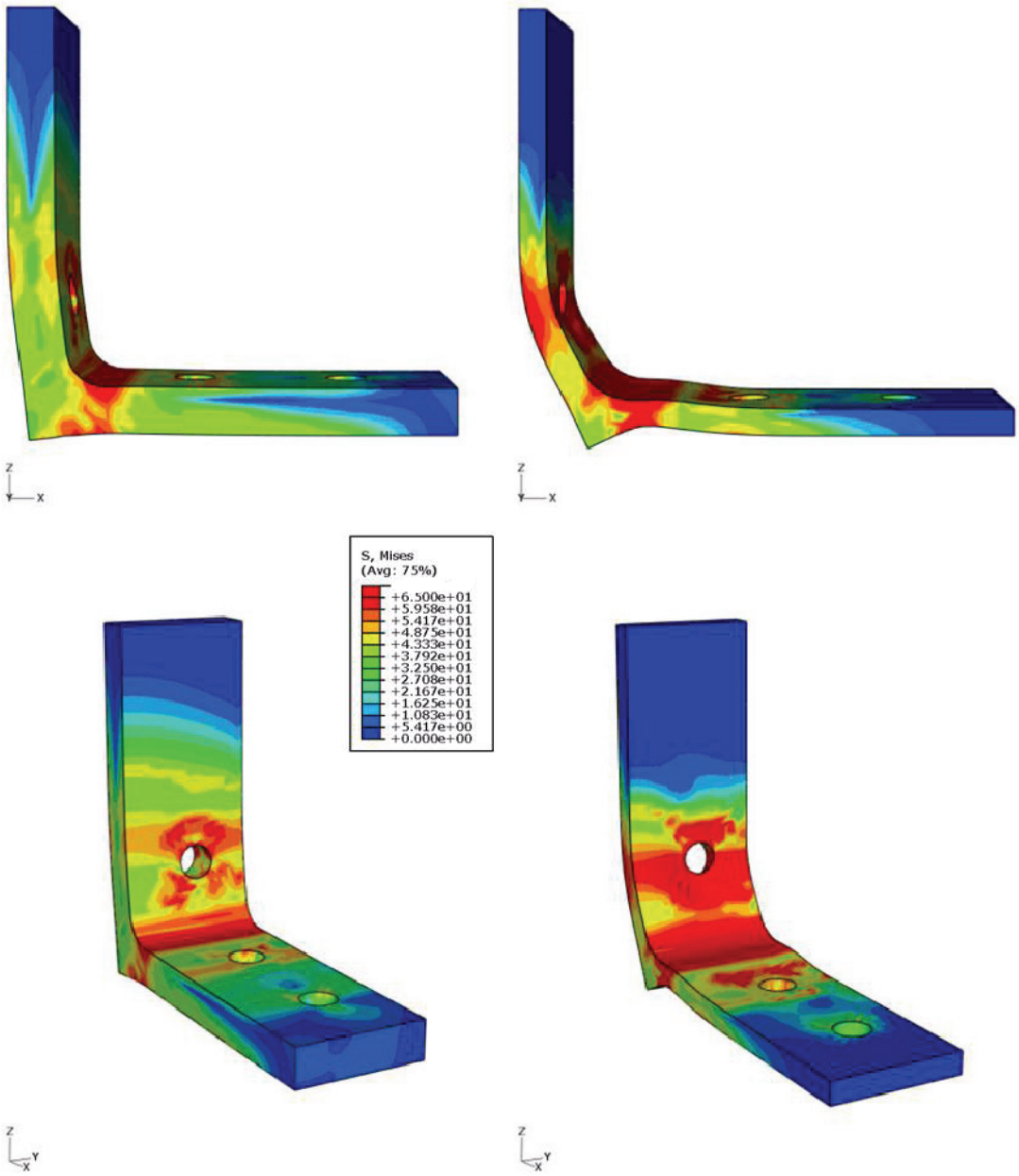
Figure 6.13 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of angle thickness on connection response for L8x6 angles, 8 inches wide, connected with 3/4 in diameter bolts with 2.5 in gage and (a) 1.0 in, (b) 0.5 in thick. (Half symmetry model about x-z plane)



(a) t = 1.0 in
g_1 / t = 4.75
Capacity = 60.1 kips
Displacement = 0.45 in
Failure Mode = Bolt

(b) t = 0.5 in
g_1 / t = 9.5
Capacity = 28.7 kips
Displacement = 3.42 in
Failure Mode = Angle

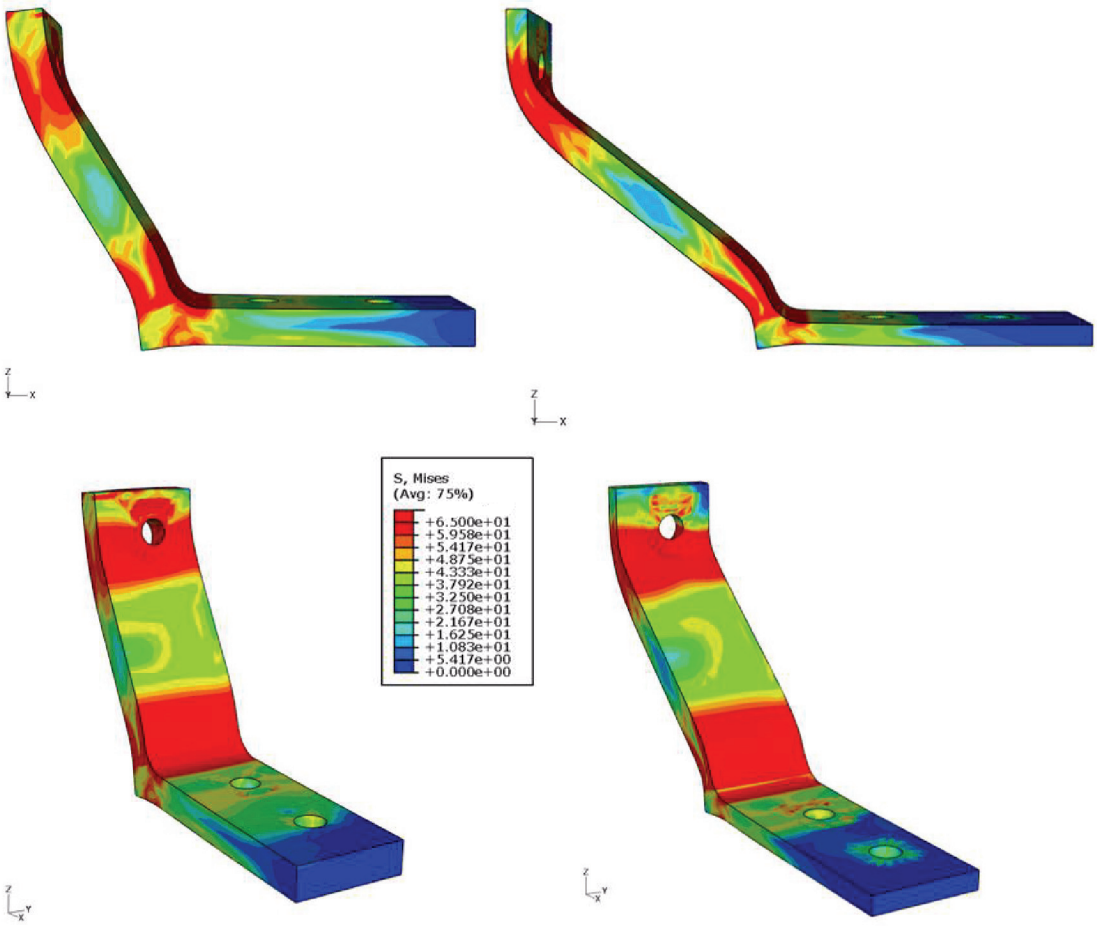
Figure 6.14 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of angle thickness on connection response for L8x6 angles, 8 inches wide, connected with 3/4 in diameter bolts with 4.75 in gage and (a) 1.0 in, (b) 0.5 in thick. (Half symmetry model about x-z plane)



(a) t = 0.875 in
g_1 / t = 2.86
Capacity = 102.0 kips
Displacement = 0.46 in
Failure Mode = Bolt

(b) t = 0.5 in
g_1 / t = 5.0
Capacity = 56.1 kips
Displacement = 1.13 in
Failure Mode = Angle

Figure 6.15 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of angle thickness on connection response for L8x8 angles, 6 inches wide, connected with 3/4 in diameter bolts with 2.5 in gage and (a) 0.875 in, (b) 0.5 in thick. (Half symmetry model about x-z plane)



(a) t = 0.875 in
g_1 / t = 7.71
Capacity = 38.3 kips
Displacement = 2.52 in
Failure Mode = Bolt

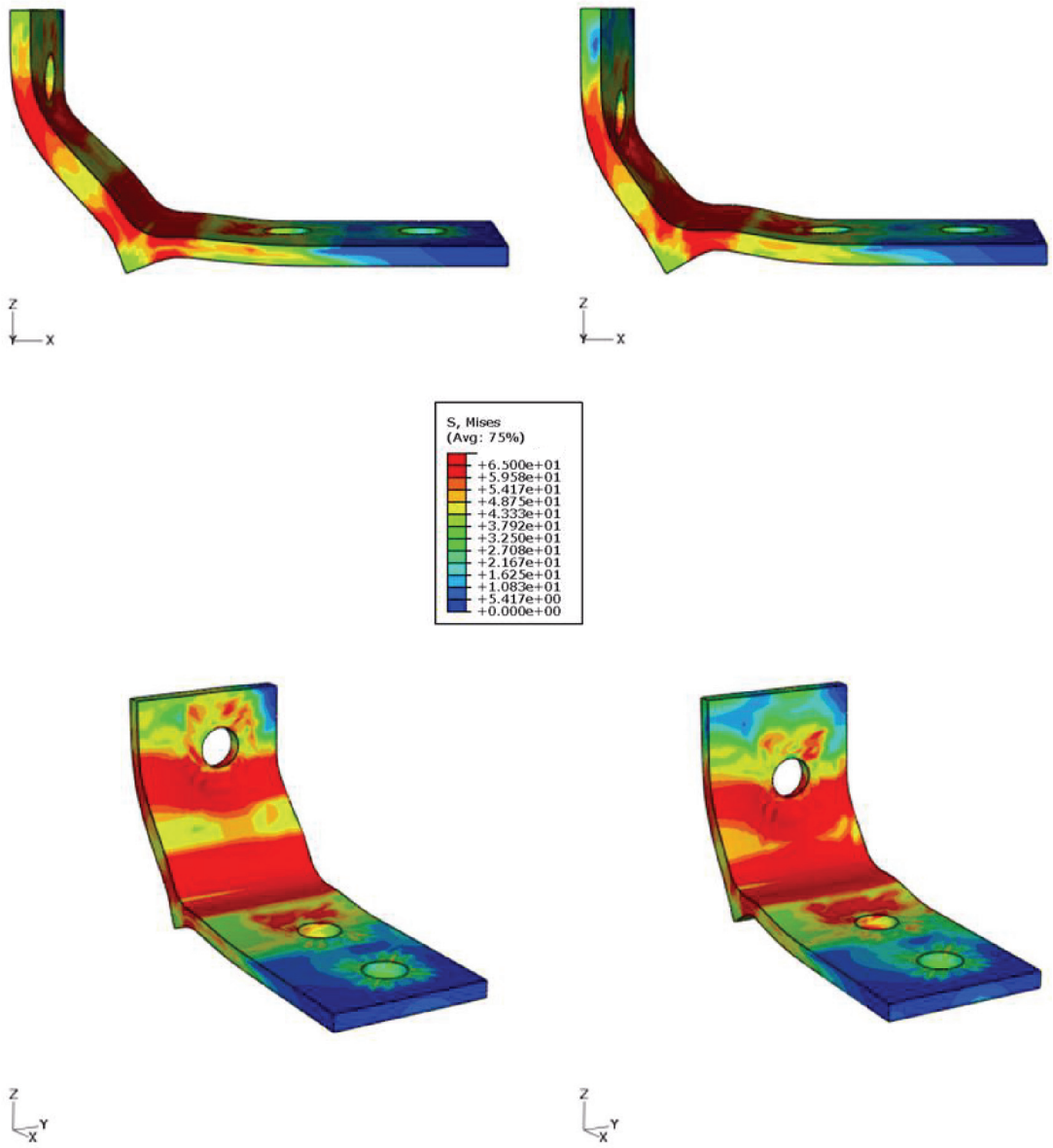
(b) t = 0.5 in
g_1 / t = 13.5
Capacity = 14.2 kips
Displacement = 5.50 in
Failure Mode = Angle

Figure 6.16 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of angle thickness on connection response for L8x8 angles, 6 inches wide, connected with 3/4 in diameter bolts with 6.75 in gage and (a) 0.875 in, and (b) 0.5 in thick. (Half symmetry model about x-z plane)

6.6.2 Influence of Tension Bolt Gage

In Figures 6.17 through 6.26 the influence of tension bolt gage is visually compared between connections with the same geometry and topography. As was done in the figures in the previous section numerical information about the connection and its response is given in each figure for each connection. The deformed shape of the connections are plotted with the Mises stress contour at the point at which failure is detected using the analytical failure criteria. The maximum stress contour shown with red is set the nominal ultimate stress of the connection material.

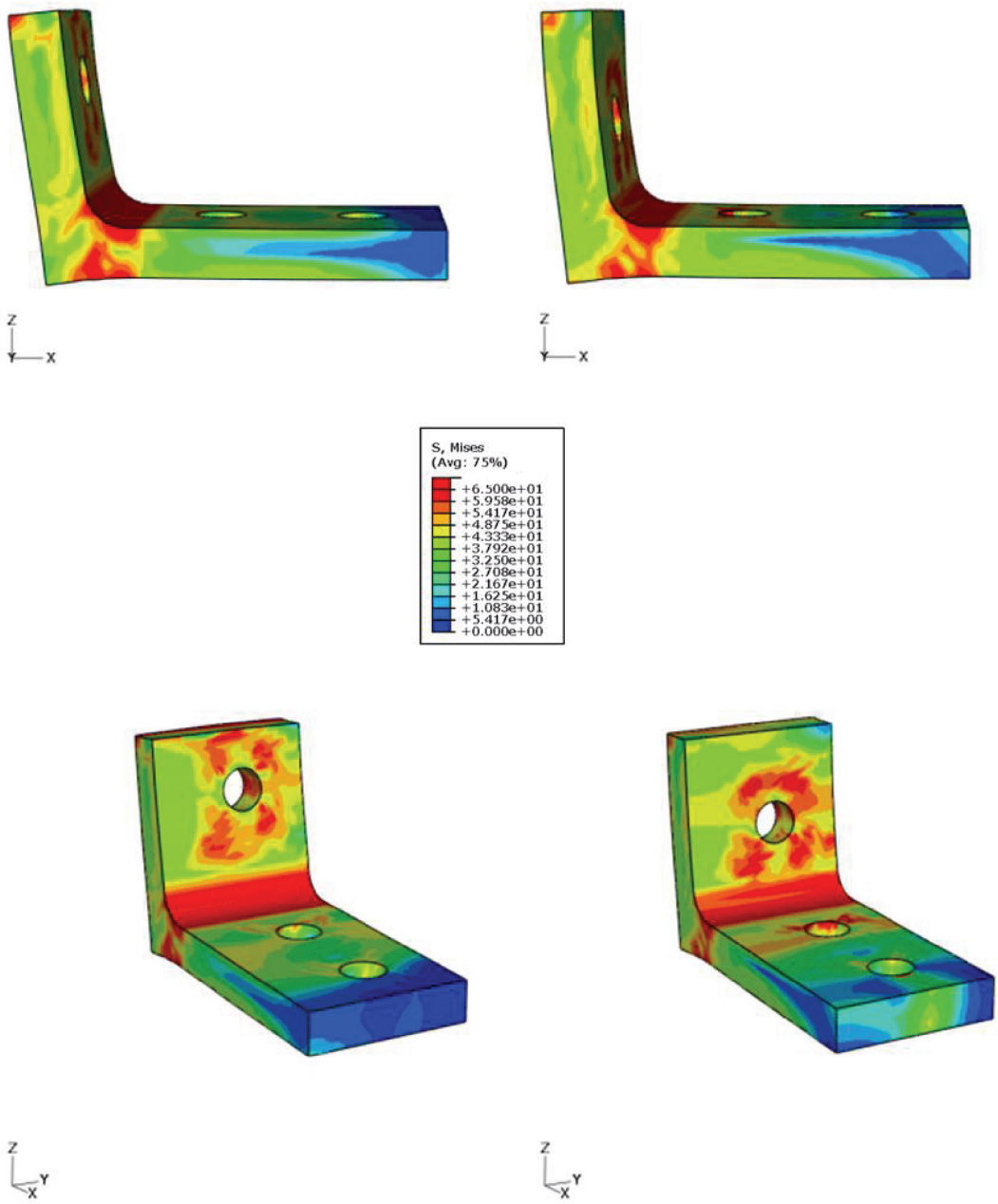
In the comparisons in this section the angle with greater tension bolt gage (g_1) by definition have greater (g_1/t_f) ratios. Consistent with our findings in the previous sections the connection with greater (g_1/t_f) ratios have achieve greater displacements, but have lower capacities.



(a) g_1 = 2.875 in
g_1 / t = 9.2
Capacity = 19.3 kips
Displacement = 1.43 in
Failure Mode = Angle

(b) g_1 = 2.25 in
g_1 / t = 7.2
Capacity = 28.4 kips
Displacement = 0.96 in
Failure Mode = Angle

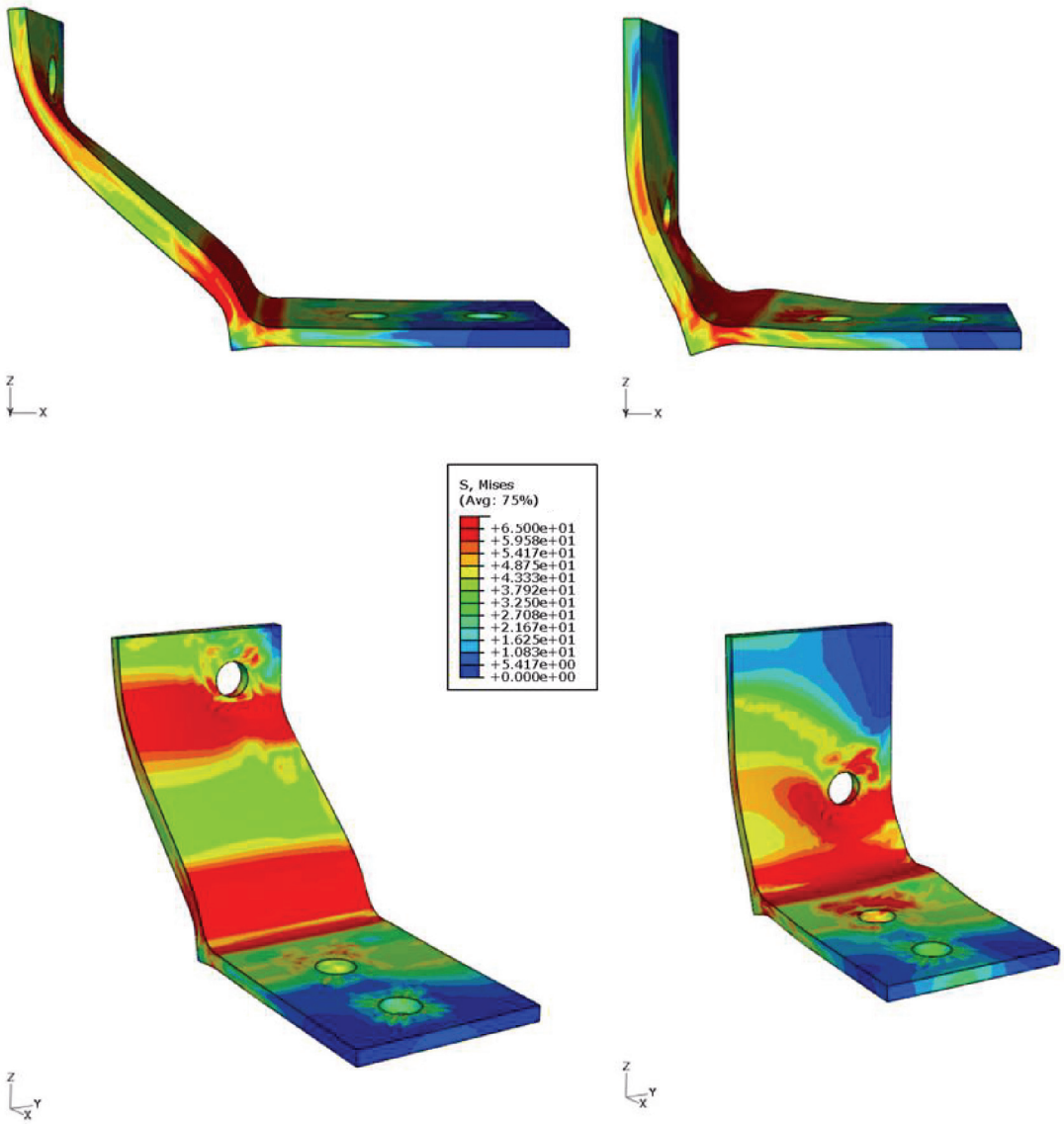
Figure 6.17 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of tension bolt gudgeon connection response for L6x4 angles, 6 inches wide, 0.3125 in thick, connected with 3/4 in diameter bolts with tension bolt gage of (a) 2.875 in, and (b) 2.25 in. (Half symmetry model about x-z plane)



(a) g_1 = 2.875 in
g_1 / t = 3.83
Capacity = 65.9 kips
Displacement = 0.45 in
Failure Mode = Bolt

(b) g_1 = 2.25 in
g_1 / t = 3.0
Capacity = 87.1 kips
Displacement = 0.38 in
Failure Mode = Bolt

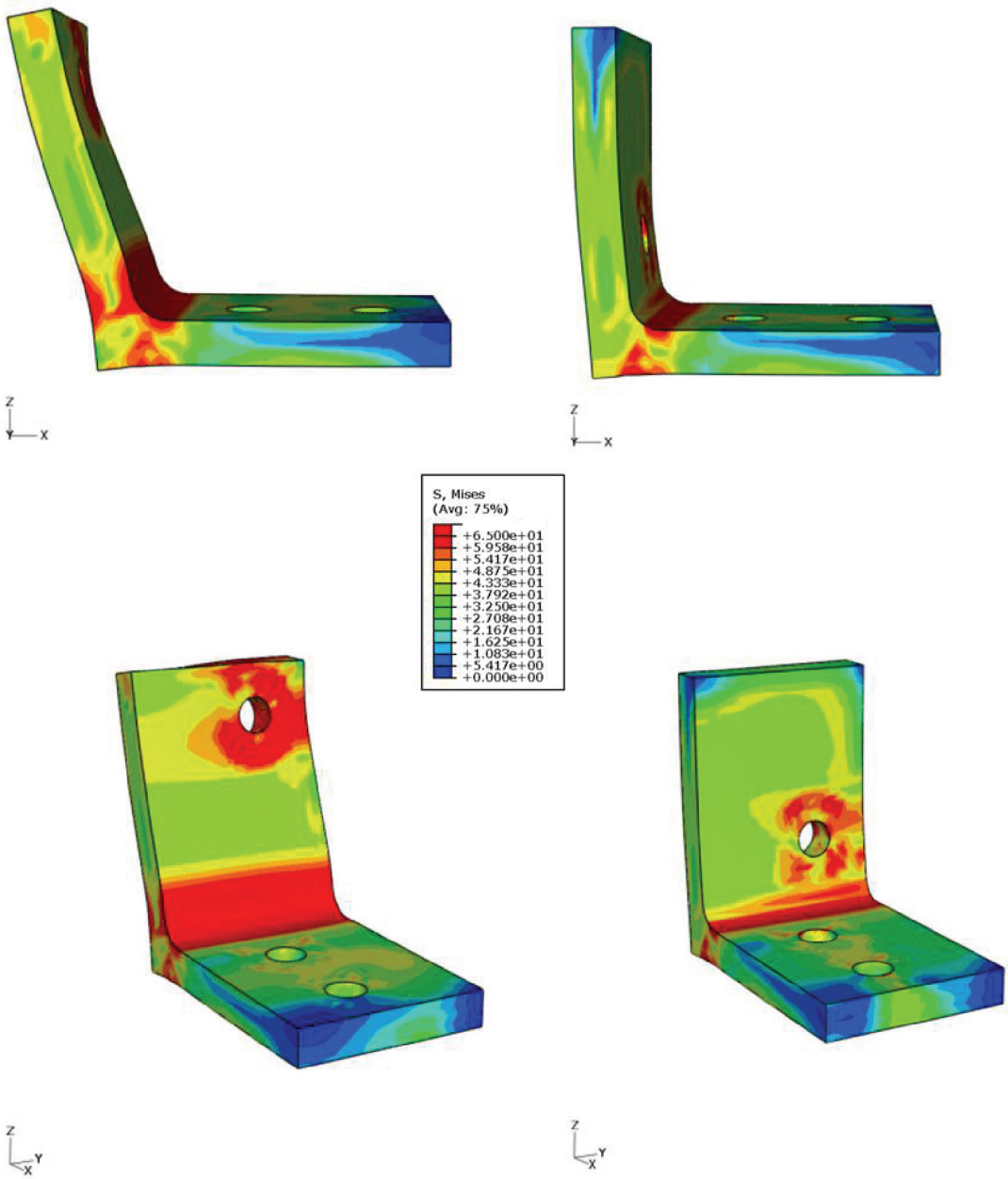
Figure 6.18 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of tension bolt gage on connection response for L6x4 angles, 6 inches wide, 0.75 in thick, connected with 3/4 in diameter bolts with tension bolt gage of (a) 2.875 in, and (b) 2.25 in. (Half symmetry model about x-z plane)



(a) g_1 = 4.875 in
g_1 / t = 15.6
Capacity = 10.1 kips
Displacement = 3.04 in
Failure Mode = Angle

(b) g_1 = 2.25 in
g_1 / t = 7.2
Capacity = 32.5 kips
Displacement = 1.10 in
Failure Mode = Angle

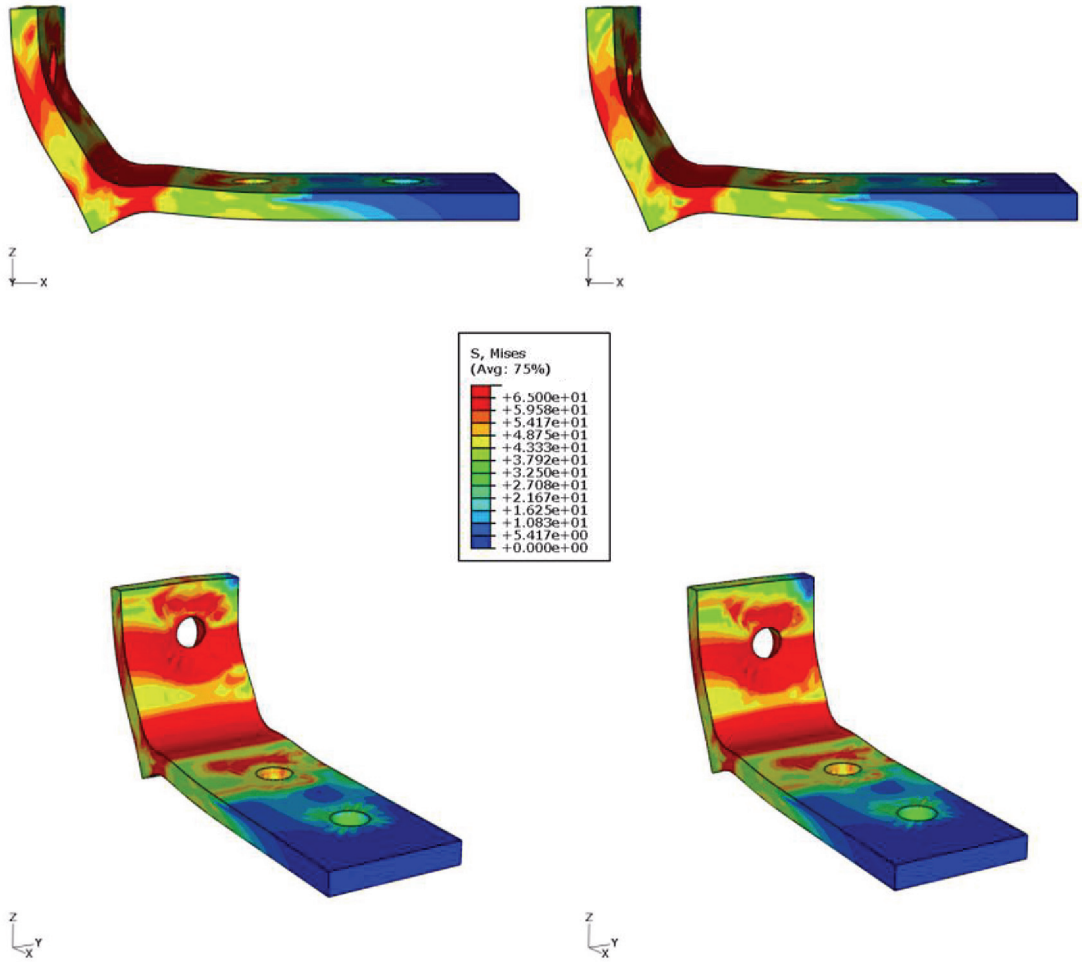
Figure 6.19 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of tension bolt gage on connection response for L6x6 angles, 8 inches wide, 0.3125 in thick, connected with 3/4 in diameter bolts with tension bolt gage of (a) 4.875 in, and (b) 2.25 in. (Half symmetry model about x-z plane)



(a) g_1 = 4.875 in
g_1 / t = 6.5
Capacity =46.9 kips
Displacement =1.24 in
Failure Mode = Bolt

(b) g_1 = 2.25 in
g_1 / t = 3.0
Capacity =101.0 kips
Displacement =0.41 in
Failure Mode = Bolt

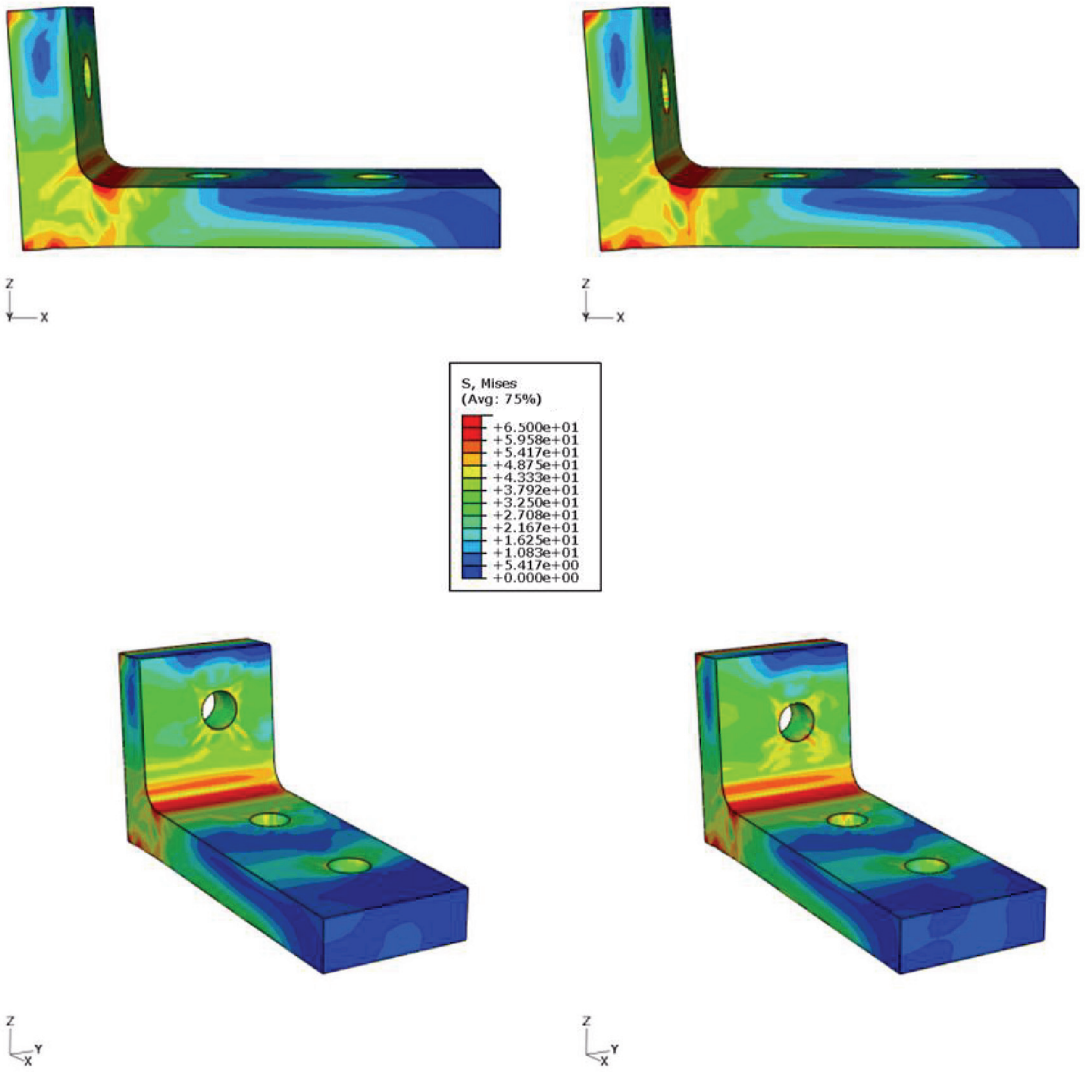
Figure 6.20 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of tension bolt gage on connection response for L6x6 angles, 8 inches wide, 0.75 in thick, connected with 3/4 in diameter bolts with tension bolt gage of (a) 4.875 in, and (b) 2.25 in. (Half symmetry model about x-z plane)



(a) g_1 = 2.75 in
g_1 / t = 5.5
Capacity = 46.9 kips
Displacement = 1.25 in
Failure Mode = Angle

(b) g_1 = 2.5 in
g_1 / t = 5
Capacity =52.7 kips
Displacement = 1.07 in
Failure Mode = Angle

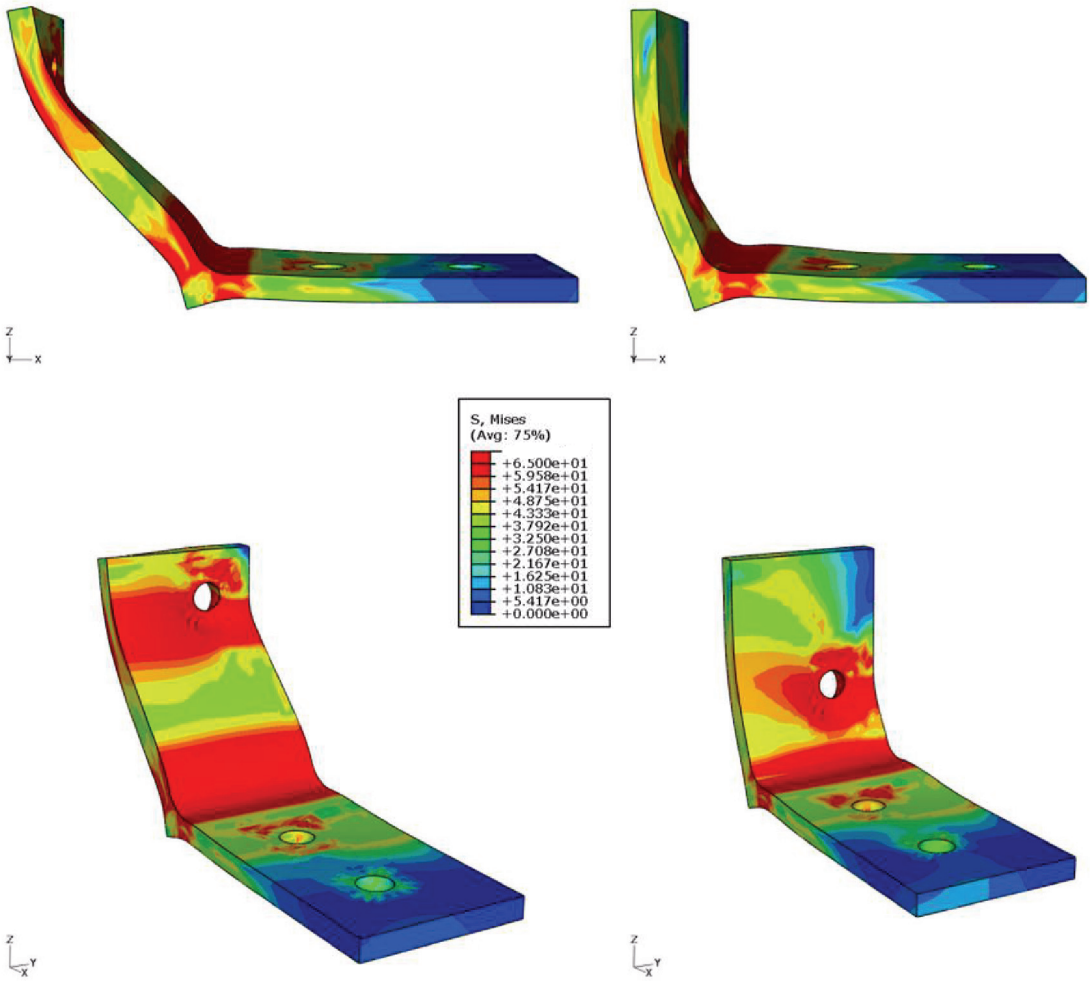
Figure 6.21 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of tension bolt gage on connection response for L8x4 angles, 6 inches wide, 0.5 in thick, connected with 3/4 in diameter bolts with tension bolt gage of (a) 2.75 in, and (b) 2.5 in. (Half symmetry model about x-z plane)



(a) g_1 = 2.75 in
g_1 / t = 2.75
Capacity = 87.9 kips
Displacement = 0.32 in
Failure Mode = Bolt

(b) g_1 = 2.5 in
g_1 / t = 2.5
Capacity = 95.7 kips
Displacement = 0.29 in
Failure Mode = Bolt

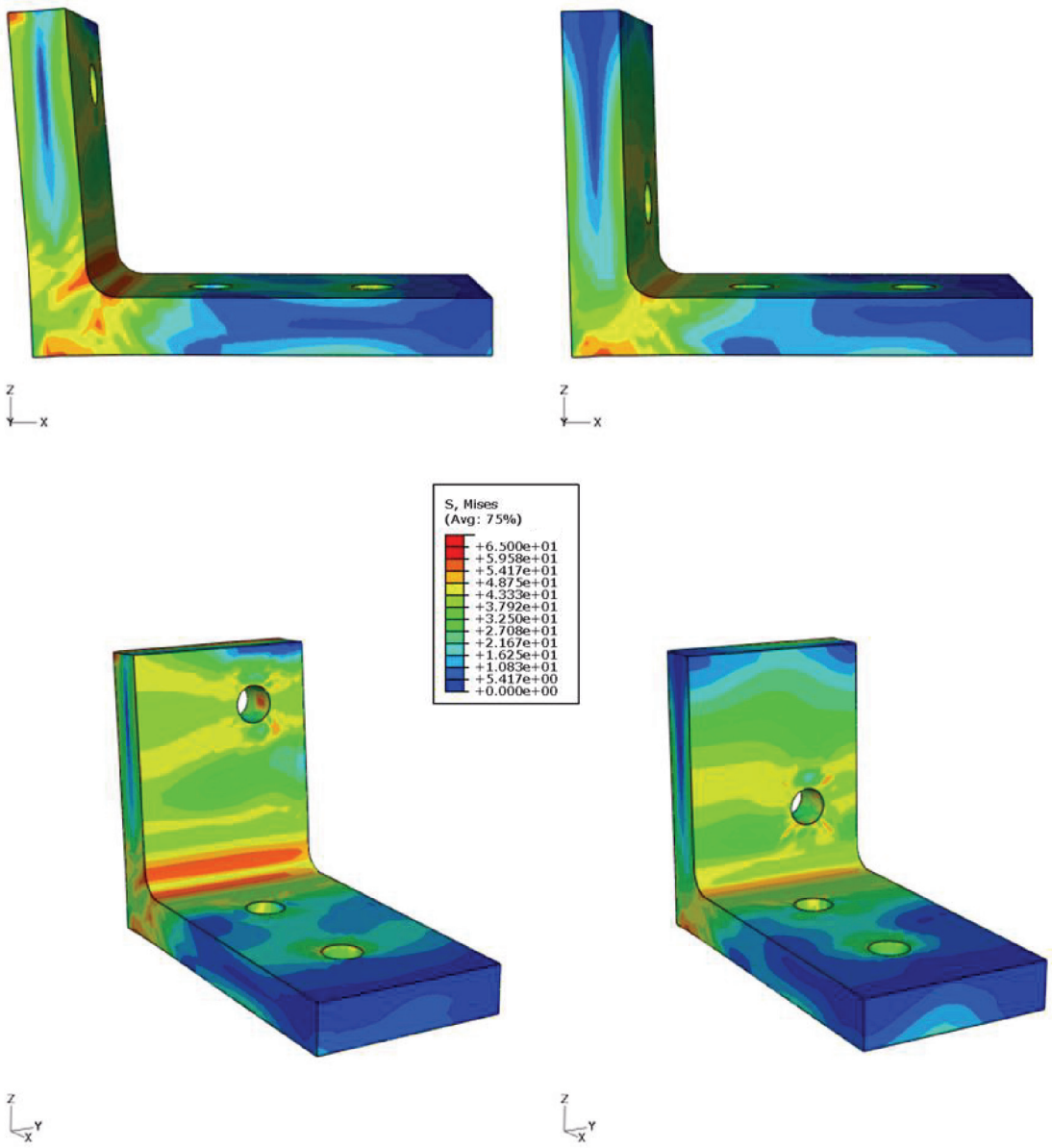
Figure 6.22 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of tension bolt gage on connection response for L8x4 angles, 6 inches wide, 1.0 in thick, connected with 3/4 in diameter bolts with tension bolt gage of (a) 2.75 in, and (b) 2.5 in. (Half symmetry model about x-z plane)



(a) g_1 = 4.75 in
g_1 / t = 9.5
Capacity = 28.7 kips
Displacement = 3.42 in
Failure Mode = Angle

(b) g_1 = 2.5 in
g_1 / t = 5.0
Capacity = 62.4 kips
Displacement = 1.26 in
Failure Mode = Angle

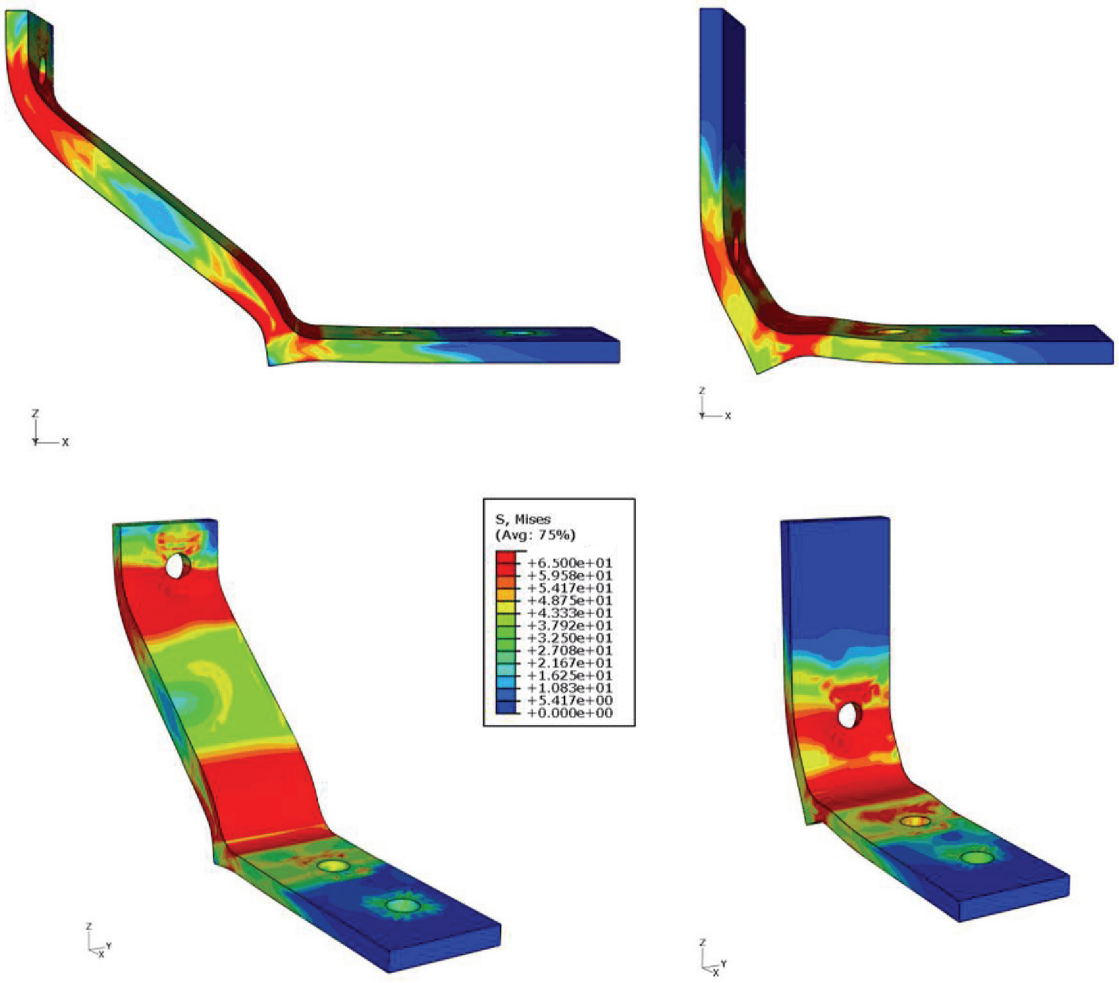
Figure 6.23 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of tension bolt gage on connection response for L8x6 angles, 8 inches wide, 0.5 in thick, connected with 3/4 in diameter bolts with tension bolt gage of (a) 4.75 in, and (b) 2.5 in. (Half symmetry model about x-z plane)



(a) g_1 = 4.75 in
g_1 / t = 4.75
Capacity = 60.1 kips
Displacement = 0.45 in
Failure Mode = Bolt

(b) g_1 = 2.5 in
g_1 / t = 2.5
Capacity = 107.0 kips
Displacement = 0.23 in
Failure Mode = Bolt

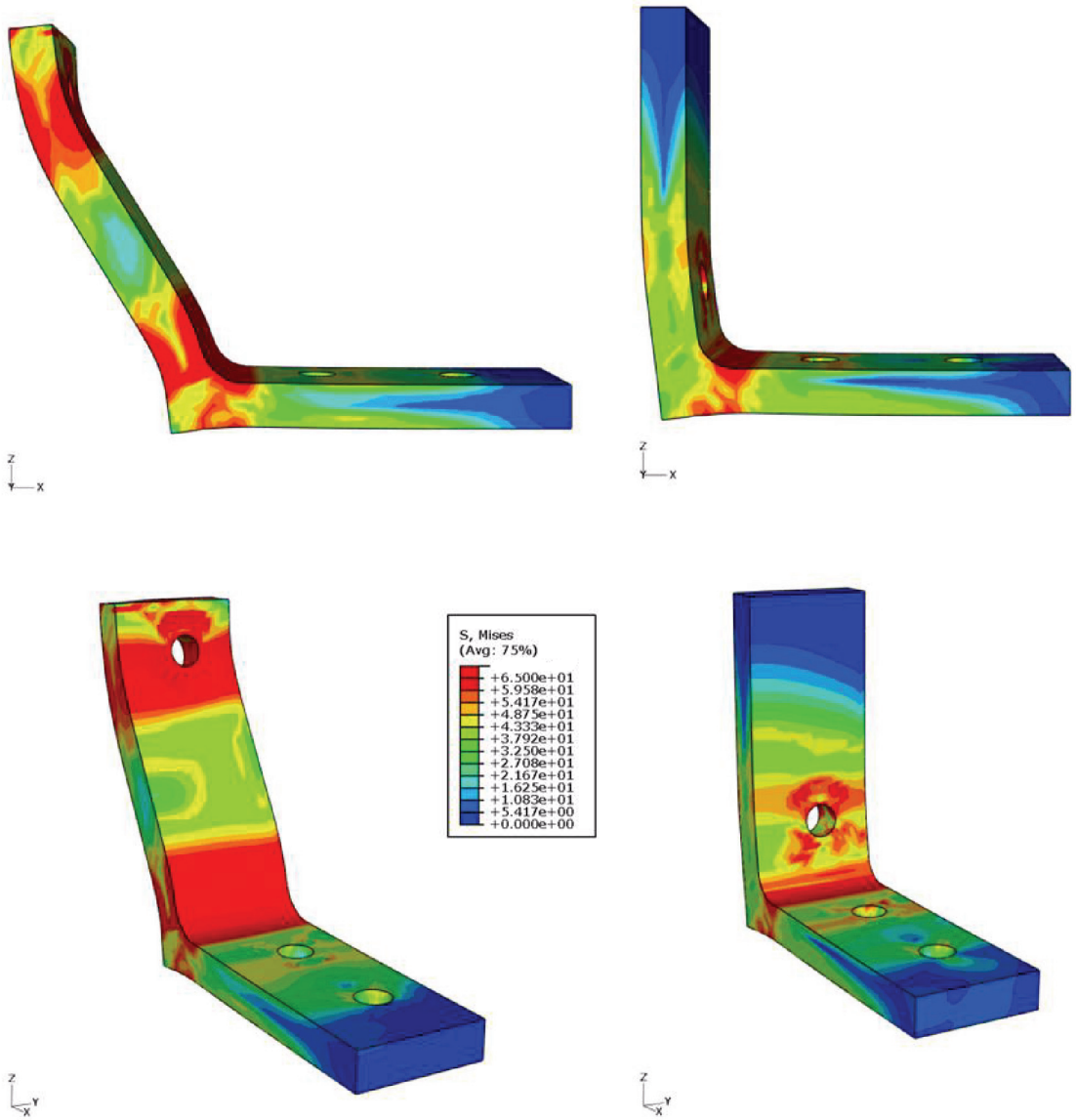
Figure 6.24 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of tension bolt gage on connection response for L8x6 angles, 8 inches wide, 1.0 in thick, connected with 3/4 in diameter bolts with tension bolt gage of (a) 4.75 in, and (b) 2.5 in. (Half symmetry model about x-z plane)



(a) g_1 = 6.75 in
g_1 / t = 13.5
Capacity = 14.2 kips
Displacement = 5.5 in
Failure Mode = Angle

(b) g_1 = 2.5 in
g_1 / t = 5.0
Capacity = 56.1 kips
Displacement = 1.13 in
Failure Mode = Angle

Figure 6.25 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of tension bolt gage on connection response for L8x8 angles, 6 inches wide, 0.5 in thick, connected with 3/4 in diameter bolts with tension bolt gage of (a) 6.75 in, and (b) 2.5 in. (Half symmetry model about x-z plane)



(a) g_1 = 6.75 in
g_1 / t = 7.7
Capacity = 38.3 kips
Displacement = 2.52 in
Failure Mode = Bolt

(b) g_1 = 2.5 in
g_1 / t = 2.9
Capacity = 102.0 kips
Displacement = 0.46 in
Failure Mode = Bolt

Figure 6.26 Deformed shape, stress contour (Mises) and numerical comparison demonstrating the effect of tension bolt gage on connection response for L8x8 angles, 6 inches wide, 0.875 in thick, connected with 3/4 in diameter bolts with tension bolt gage of (a) 6.75 in, and (b) 2.5 in. (Half symmetry model about x-z plane)

6.7 Summary

In this chapter the failure criteria developed in Chapter 5 is applied to the dataset of the nonlinear response of parametric bolted clip angle connection models presented in Chapter 4 to assess the impact of geometry and topography of the bolted connections on the following response characteristics: strength, initial stiffness, plastic stiffness, and absolute ductility or the displacement capacity.

The response characteristics for each connection for all the connections are presented in a matrix of plots where the column of plots are for connections with common angle leg size affixed by the tension bolts and the row of plots are for connections with common bolts size. This organization enables to effectively assess the impact of the different variables on the plotted connection response characteristic visually.

The individual plots in the matrix plots the response characteristic is plotted against the tension bolt gage to angle leg thickness ratio (g_1/t_f). These plots do not differentiate the connection angle width or the size of the horizontal angle leg (L_2) and connecting shear bolt details, but nevertheless a strong dependency on the (g_1/t_f) ratio is observed for all the response characteristics assessed.

In addition to the graphical presentation of the response characteristics, a representative cross-section of the dataset connections are used to visually demonstrate separately the impact of the angle thickness and tension bolt gage on the bolted angle connection response. The deformed shape with Mises stress contour of the connections with contrasting parameters, for either angle thickness or bolt gage, are compared side by side.

Angle failure governs for connections with the minimum angle thickness while bolt failure governs in connections with the maximum angle thickness for the subset of connections used in the figures. Consistent with the graphical plots, thicker angles failed at low displacements, but have greater capacity compared to the thinner angles which allow for greater deformations which result in greater connection displacement and lower capacities.

The thinner angles with greater (g_1/t_f) ratios form plastic mechanisms thus lower connection capacity and efficiency. Furthermore angles with greater tension bolt gage (g_1) by definition have greater (g_1/t_f) ratios and again consistent with the findings in the graphical plots connections with greater (g_1/t_f) ratios have achieve greater displacements, but have lower capacities.

CHAPTER 7

ULTIMATE STRENGTH PRYING MODELING

Prying forces greatly influence the overall failure capacity of a connection depending on the relative flexibility of the tension bolt and the angle leg fastened to it. Additional forces on the tension bolt are added to the externally applied forces on the connection due to prying forces arising from the bearing of the leg edge. The prying phenomenon in bolted connections was presented in detail in Chapter 5 along with the strength models used in the AISC LRFD Specification [6] and the Eurocode [37] along with a hybrid of the two approaches proposed by Swanson and Gao [102].

In this chapter the prediction of these prying models will be assessed against the results from the parametric analytical study. The current prying strength models are not successful in predicting the failure for the angles which have high bolt gage to leg thickness ratios. A modification to both the Eurocode model and the hybrid approach proposed by Swanson and Gao are presented which consistently predict the strength and failure mode across the range of the bolted angle connection dataset geometry and topography. The proposed prying strength models are compared to several experimental data found in literature and are shown to successfully predict the connection capacity in comparison to the existing models.

7.1 Review of Prying Models

7.1.1 AISC Specification Prying Model

The prying strength model in the AISC LRFD Specification [7] is based on the mechanism described by Kulak [63] and further developed by Astaneh [11] and Thornton [108]

which have been described in Figure 5.6 in Section 5.2.3. In this model three failure mechanisms are calculated depending on the relative stiffness and strengths of the bolt and angle. The mechanism with the lowest capacity governs the prying strength of the bolted connection.

The angle leg, or in the case of a T-stub the flange, connected to the tension bolt is modeled as a beam spanning between the bolt and heel. If the flange is relatively slender compared to the bolt the behavior idealized by the beam model is assumed to bend with a double curvature and the strength based on a flange mechanism is calculated using Equation 5.17. If the flange is stiff enough to prohibit deformations which cause prying forces to develop, bolt strength governs, given in Equation 5.19. In between these two mechanisms a mixed mode mechanism of the flange and bolt failure governs, given in Equation 7.2.

$$T = \frac{(1 + \delta)}{4b'} pF_y t_f^2 \qquad \text{Eqn 7.1}$$

$$T = \frac{Ba'}{a' + b'} + \frac{pF_y}{4(a' + b')} t_f^2 \qquad \text{Eqn 7.2}$$

$$T = B \qquad \text{Eqn 7.3}$$

where

F_y = material yield strength (ksi)

B = Bolt tensile strength (kips)

t_f = angle leg or flange thickness (in)

p = width tributary to bolt (in)

a' and b' are topographic dimensions identifying the bolt placement defined in Figure 7.1 for T-stub components and modified for angle components. Among these dimension in the figure the bolt edge distance dimension a is limited to 1.25b when calculating

a'. Variable δ in Equation 7.1 is the ratio of the net flange section at the bolt line and the gross flange section adjacent to the heel as defined in Equation 5.10.

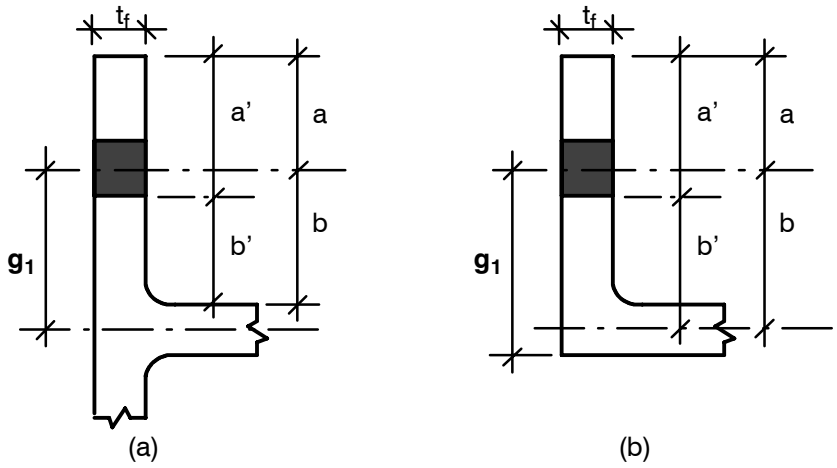


Figure 7.1 AISC Specification prying strength model leg dimension definitions for (a) T-stubs and (b) angles.

Thornton [109] proposed modifications to the AISC Specification prying equations to predict the connection yield strength for serviceability and the ultimate strength for capacity. For prying strength prediction he proposed using the material ultimate strength which was implemented in the most recent AISC LRFD Specification [8] rather than the yield strength used previously in the same relations. This approach will also be assessed in the following sections.

7.1.2 Eurocode Specification Prying Model

The prying strength model in the Eurocode is based on the same simple beam model approach used in the AISC Specification, but with different topological and geometric definitions and recognition of the effect of the setback on the hinge location in the angle leg. The three failure mechanisms are calculated with the following equations.

$$T = \frac{pF_y t_f^2}{2m} \qquad \text{Eqn 7.4}$$

$$T = \frac{nB}{m + n} + \frac{pF_y t_f^2}{4(m + n)} \qquad \text{Eqn 7.5}$$

$$T = B \qquad \text{Eqn 7.6}$$

where variables are the same used in the AISC equations given in the previous section and the topographic dimensions m and n, identifying the bolt placement defined in Figure 5.9. The setback in a beam-column connection is be the space between the column flange and the beam end. When the setback is less than 0.4 times the leg thickness (t_f), the parameter m is measured from the bolt hole center to 0.8 times the angle or T-stub radii away from the leg surface. When the setback is larger than $0.4(t_f)$ the hinge is assumed to occur in the leg which tension is applied in plane.

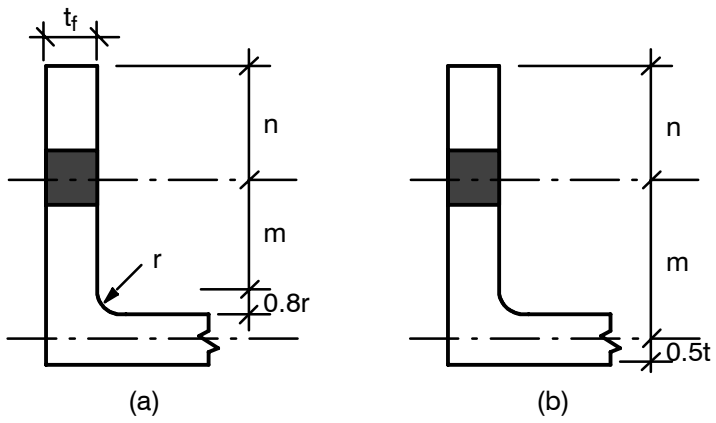


Figure 7.2 Eurocode prying strength model leg dimension definitions for beam setback (a) less than 0.4 times, and (b) greater than 0.4 times the angle leg thickness.

7.1.3 AISC and EuroCode Hybrid Prying Model

Swanson and Gao [102] proposed to combine topographical dimension definitions of the AISC LRFD Specification with the consideration of the setback influence on the hinge location from the EuroCode. They compare all three prying strength models to test data of one inch thick heavy clip angles previously tested by Swanson [103]. For the 10 tests they compare the three prying strength models they found that the error between the test data and

the AISC, EuroCode and hybrid model is -13.1%, 15.5%, and -0.3% , respectively. Clearly, the hybrid prying strength model was more successful in predicting the test capacities, yet the authors acknowledge the tests they compare to is limited in range and needed further scrutiny with a larger set of data.

The AISC LRFD Specification Equations 7.1 through 7.3 for the three failure mechanisms are used with the topographic dimensions defined in Figure 5.10.

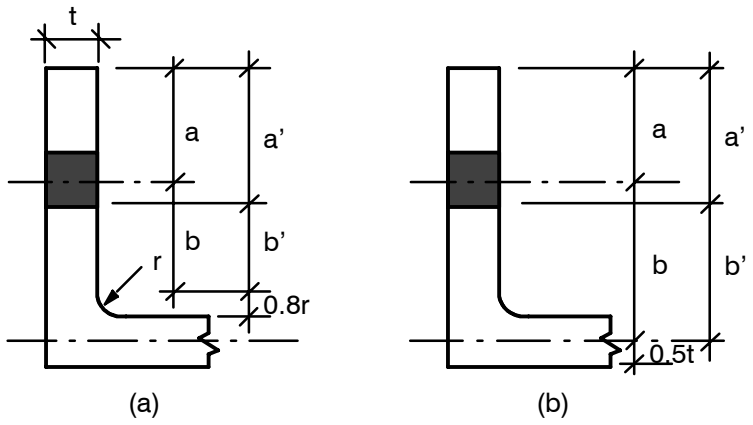


Figure 7.3 Swanson and Gao prying strength leg dimension definitions for beam setback (a) less than 0.4 times, and (b) greater than 0.4 times the angle leg thickness.

7.2 Assessing Prying Strength Models and Proposed Enhancement

The analytical parametric bolted angle dataset which covers a large range of angle size, angle thickness, angle width, bolt diameter, and bolt gages resulting in 405 cases was presented in detail in Chapter 4. Based on the failure criteria developed in Chapter 5 the connection capacities and failure modes for each analysis case was predicted in Chapter 6. The failure mode for all the bolt angles in the data set were either bolt fracture or fracturing of the angle leg connected by the tension bolt, thus it is appropriate to use all of the cases to assess the predictions of the prying strength models.

For each analysis case the ratio of the predicted failure capacity, using the failure criteria to the calculated prying strength using the four models described above, namely the:

- AISC LRFD Specification model [7]
- New AISC LRFD Specification model using ultimate material strength per Thornton [8, 109]
- Eurocode model [37]
- AISC-Eurocode hybrid model per Swanson and Gao [102]

are plotted against the connection tension bolt diameter to leg thickness ratio (ϕ_{BOLT}/t_l) which is a measure of relative strength of the tension bolt and angle leg bending strength, in Figure 7.4. In these plots the bolt failure and angle leg failure modes predicted by the failure criteria are differentiated by the symbol used to plot each case. Looking at these plots, as one would intuitively expect, the cases where the bolt diameter to leg thickness is large, leg failure occurs while bolt failure occurs in cases where this ratio is low.

Another observation is that for the cases where angle leg/flange failure occur, the analytically predicted leg capacity to equation capacity is consistently fairly conservative for all the prying strength models. Whereas for the cases where bolt failure is predicted this ratio tends to decrease as the bolt diameter to angle leg thickness ratio decrease.

All of the prying strength models presented above may be plotted as a connection strength to angle thickness solution space envelope. These plots are a function of the angle width, strength, bolt diameter and strength, and bolt gage. Several cases in the parametric database share the same values with varying thickness and can be plotted on a single envelope plot. Consequently all of the 405 analysis cases can be plotted in 90 separate prying strength versus angle leg thickness plots. Two of these plots are shown in Figures 7.5 (a) and (b) where the prying strength vs thickness capacity envelopes are calculated using the four models mentioned above and compared with individual analytically predicted failure capacities. The jump in the prying strength envelopes for the Eurocode and Hybrid models are due to the change in hinge location definition when the setback exceeds 0.4 times the angle leg thickness, this is not an issue for T-stubs due to symmetry in the two flanges, which precludes the possibility of an alternative hinge forming in the pulled stub. The mode of failure is differentiated in these plots by the shape of the datapoint as defined in the legend.

The first two equations are also plotted in these figures for the AISC, Eurocode, and Hybrid prying models. The first equation in each prying model identifies the capacity of the angle leg failing in single curvature and the second equation identifies a mixed mode failure of the bolt and angle leg. As the angle gets thicker the capacity plateaus at the tension bolt capacity where the angle leg is stiff enough to transmit the loads without deformation which cause prying forces that limit the efficiency of the connection.

In both figures for all four prying models the datapoints of cases which are predicted to have tension bolt failure follow or are above the curve plotted using the second equation, marked as "Eq 2" in the legend. This is the case even when the capacity envelope drawn with the heavy line for each model indicate angle leg failure. Swanson observed this while comparing the capacities of the T-stub and clip angles pull tests he performed to prying strength models. So much so, Swanson and Gao [102] ignored the capacities calculated using the first equations which indicate angle leg and focused on the second equation which predicts mixed mode failure while they demonstrate the hybrid prying strength model predictions. All the tests they use in their comparisons resulted with tension bolt failure.

While the cases which are predicted to have angle leg failure do fall in the thickness range which is limited by the curve plotted using the first equation, marked as "Eq 1" in the legends, the prying strength models are in most cases extremely conservative. An exception is the AISC prying strength model calculated using the ultimate material strength (F_u), rather than the yield strength (F_y) as proposed by Thornton. Though, this strength model can be unconservative for cases with bolt failure as seen in Figure D.1 in Appendix D where all the bolted angle connection response dataset are plotted against all the prying strength model envelopes discussed in this chapter.

In the light of the discussion above and clearly shown in Figure 7.4, all the prying strength models are fairly conservative in predicting angle leg or T-stub flange failure. It is clear that a modification is necessary to the prying models equation predicting angle leg

failure. The prying strength models should envelope the capacity of the connection and it is not desirable to be unconservative, so the ratio of the predicted or tested capacity of an angle or T-stub to an ideal prying strength model would lie on or closely above the line marking unity, shown by the continuous line in each plot in Figure 7.4. Clearly none of the models provide such prediction.

There is a distinct lower limit in diamond shaped datapoints representing cases of angle leg failure, specifically for both the Eurocode and hybrid model plots in Figure 7.4. The goal of any strength model is to predict the failure certainly without being unconservative and neither too conservative which results in uneconomic designs. In the case of the prying strength models the first equation which predict angle leg failure needs to be scaled up to bring the datapoints closer to unity in these two models. Taking the average of the data points indicating angle leg failure as a scale would create several unconservative cases. However, the mode of the ratios of the data points identifying connections with angle leg failure predicted shown with dashed lines in Figure 7.4, proves to be an ideal measure to use as a scale. The mode of a dataset is the value that occurs the most often. The mode in both the Eurocode and hybrid model can be approximated as three to scale for the first equations.

All the models are based on a simple beam model which deforms via plastic hinging at subscribed locations. The main difference between the prying strength models are the assumptions to where these hinges occur. The discrepancy between the current prying strength models can be attributed to material hardening and catenary action in the angle leg or T-stub flange. In reality, as the connection is loaded, the area between the tension bolts and the heel of the angle leg begin acting like a constrained plate deforming. When large displacements occur in the angle leg compared to the thickness the pure bending assumption does not hold; tension occurs at the neutral surface of the angle leg due to catenary action. This effect is shown to be valid when displacements are in the the order of the angle leg thickness (dis-

placement/thickness >1) [48]. Also, the prying strength models are based on the material yield strength and ignore material hardening which would occur under large deformations.

In Figure 7.6, the pull angle analyses which have deformations in the order of magnitude of the angle leg thickness or greater are marked in the hybrid model plot recreated from Figure 7.4. It is seen that for all cases predicted to have angle leg failure and which the prying strength model predictions are conservative are all marked indicating to have large deformation. Based on these results a new prying strength model is proposed and assessed against the analytical parametric data set and test data.

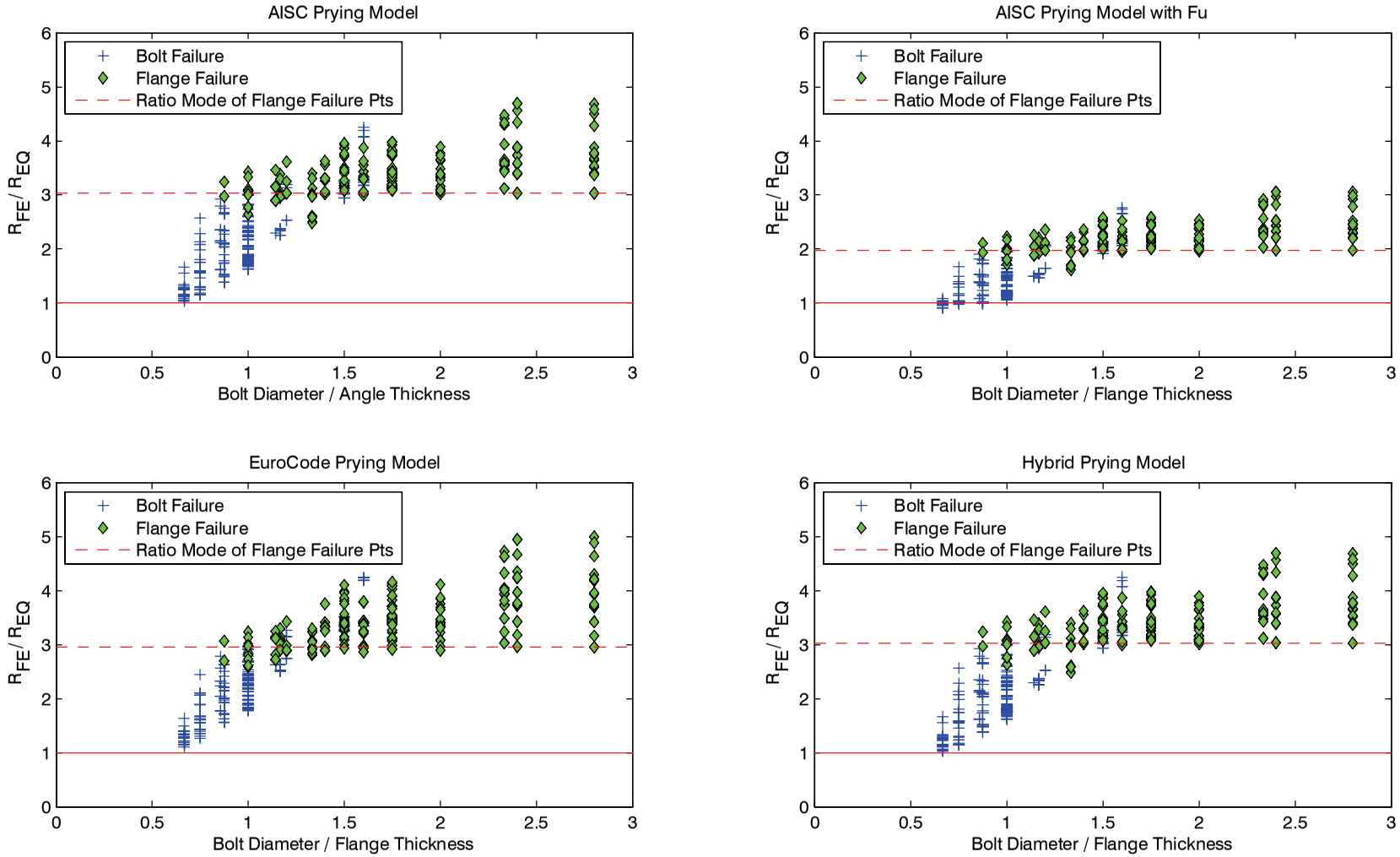


Figure 7.4 Ratio of analysis failure to prying strength capacity plotted against bolt diameter to angle leg thickness ratio for different prying strength models for all the parametric analysis dataset cases with failure mode identified for each data point.

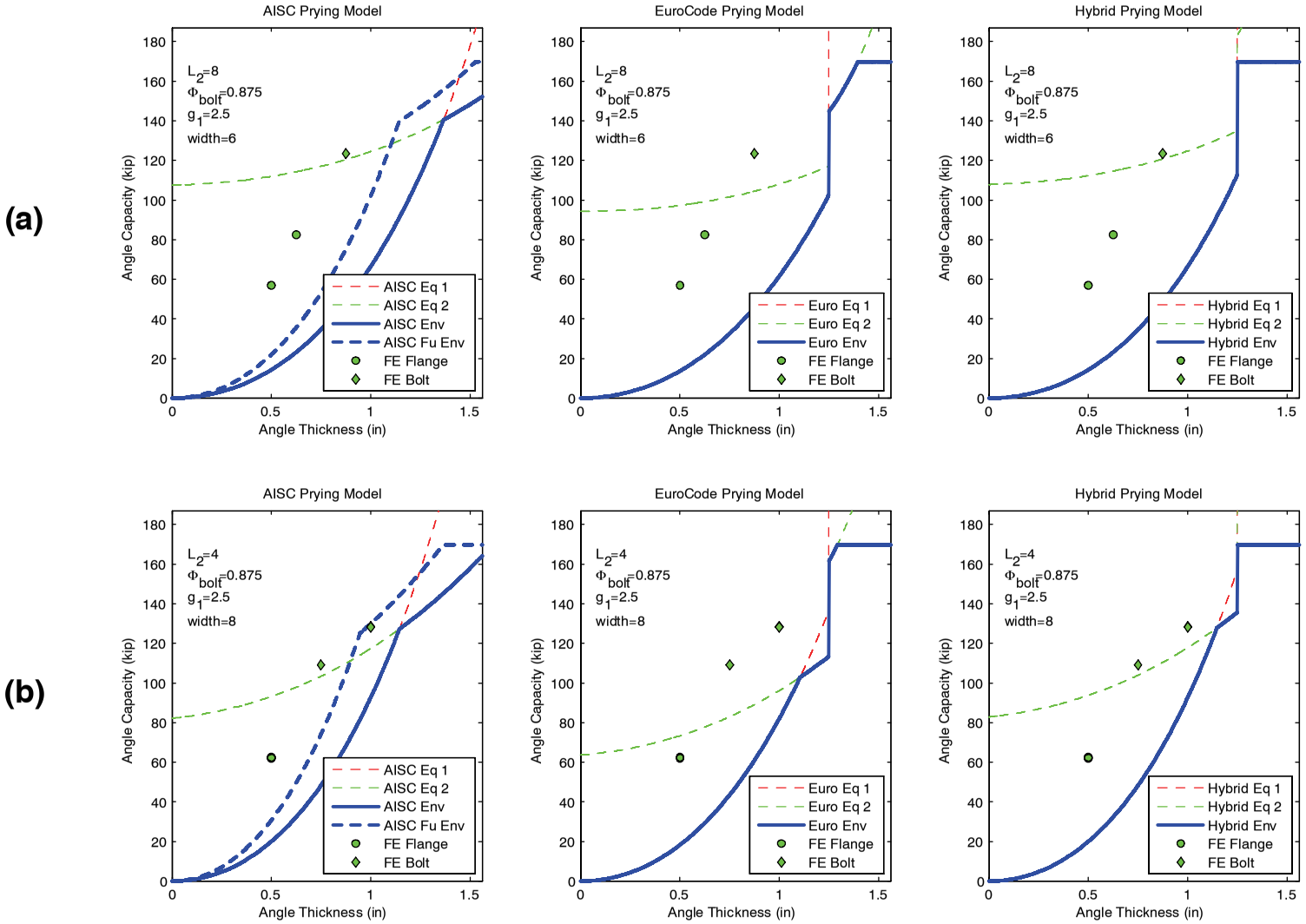


Figure 7.5 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 8 in. leg, 0.875 in. bolt diameter, 2.5 in. gage, and 6 in. width; and (b) 4 in. leg, 0.875 in. bolt diameter, 2.5 in. gage, and 8 in. width.

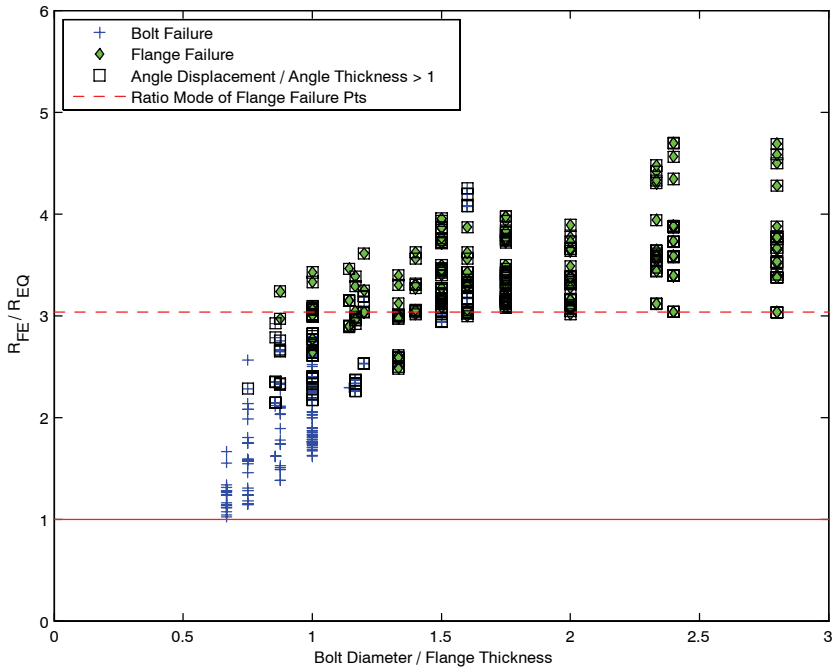


Figure 7.6 Ratio of analysis failure to prying strength capacity plotted against bolt diameter to angle leg thickness ratio for the hybrid prying strength model with failure mode identified for each data point and cases with large deformations marked with square symbol.

7.2.1 Proposed Modification to the Eurocode and Hybrid Prying Strength Model

Based on the observations in the previous section, the Eurocode and Hybrid prying strength models presented in Section 7.1.3 are modified by scaling the first equation which defines the angle leg failure by the mode of the ratio of the analytically predicted capacity to the model strength for all data points representing such failure mode. The mode these of these ratios for the models is approximately 3, and is identified in the plots with dashed lines for comparison in Figure 7.4. The line marking the mode value in the plot agrees fairly well with the bottom limit of all the data points which represent angle leg failure.

Applying this modification to the Eurocode prying strength model, the proposed "Modified Eurocode" prying strength model is presented in the following equations with the definitions of the topographical dimensions given in Figure 7.2:

$$T = \frac{3pF_y t_f^2}{2m} \qquad \text{Eqn 7.7}$$

$$T = \frac{nB}{m + n} + \frac{pF_y t_f^2}{4(m + n)} \qquad \text{Eqn 7.8}$$

$$T = B \qquad \text{Eqn 7.9}$$

Alternatively, applying this modification to the Hybrid prying strength model, the proposed "Modified Hybrid" prying strength model is as follows:

$$T = \frac{3(1 + \delta)}{4b'} pF_y t_f^2 \qquad \text{Eqn 7.10}$$

$$T = \frac{Ba'}{a' + b'} + \frac{pF_y}{4(a' + b')} t_f^2 \qquad \text{Eqn 7.11}$$

$$T = B \qquad \text{Eqn 7.12}$$

The definitions of the topographical dimensions is given in Figure 7.7. These are the same with the hybrid model definitions, but in Figure 7.7 (a) where the setback is less than 0.4 times the angle leg thickness the hinge location is 0.5 rather than 0.8 times the angle radius away from the pull leg. This is based on Swanson's recommendation and while there is little difference, it favors better predictions [104].

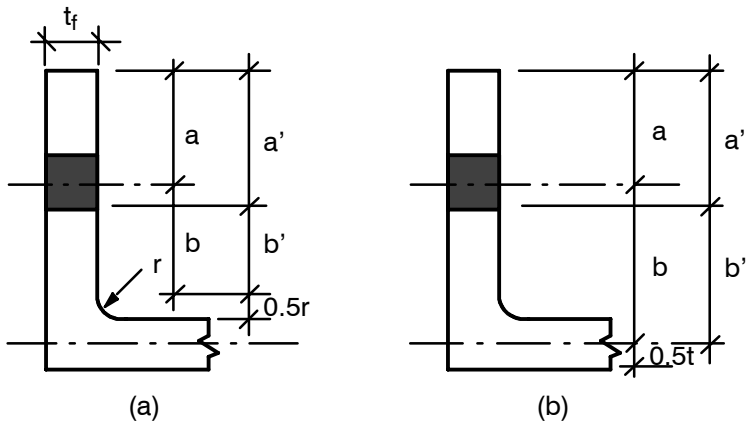


Figure 7.7 Proposed prying strength model leg dimension definitions for beam setback (a) less than 0.4 times, and (b) greater than 0.4 times the angle leg thickness.

The ratios of analysis failure to predicted strength model capacities for all the cases in the analytical data set is compared between the AISC, Eurocode and Hybrid prying strength models; and the Modified Eurocode and Modified Hybrid models in Figures 7.8 and 7.9, respectively.

The statistics of the analytically predicted prying strength to model prediction ratios for all the prying models and the proposed prying strength model is presented in Table 7.1. The ratio of an ideal prying strength model prediction would be unity or closely above unity for a safe design. The proposed modifications are clearly more consistent in predicting the ultimate prying strength of the bolted connections and removes the extreme conservatism observed in the current models. The Modified Hybrid model results with a analysis to model ratio mean of 1.10, closest to unity among all models and the lowest standard deviation of 0.11. The Modified Eurocode model results with a mean ratio of 1.22, not far off from unity compared to other currently used models.

Among the two proposed modifications the Modified Eurocode model is relatively simpler and the lowest analysis to model ratio is 0.95 compared to 0.85 from the Modified Hybrid model. This means that the Modified Eurocode model is relatively less unconservative and within 5% of unity which would make it an acceptable model.

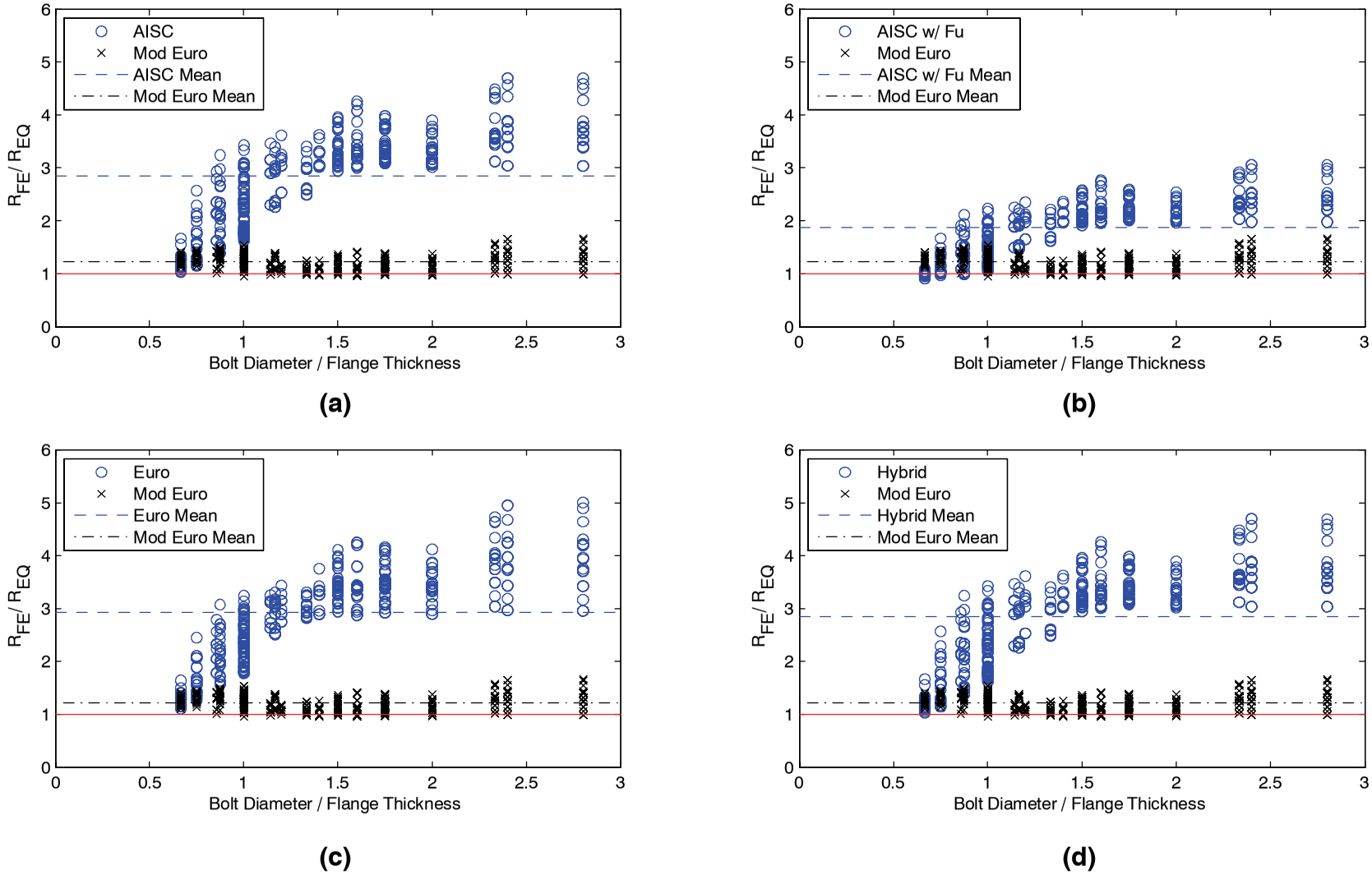


Figure 7.8 Ratio of analysis failure to proposed Modified Eurocode prying strength model capacity plotted against bolt diameter to angle leg thickness ratio and compared to the (a) AISC, (b) AISC with Fu, (c) Eurocode, and (c) Hybrid prying strength models.

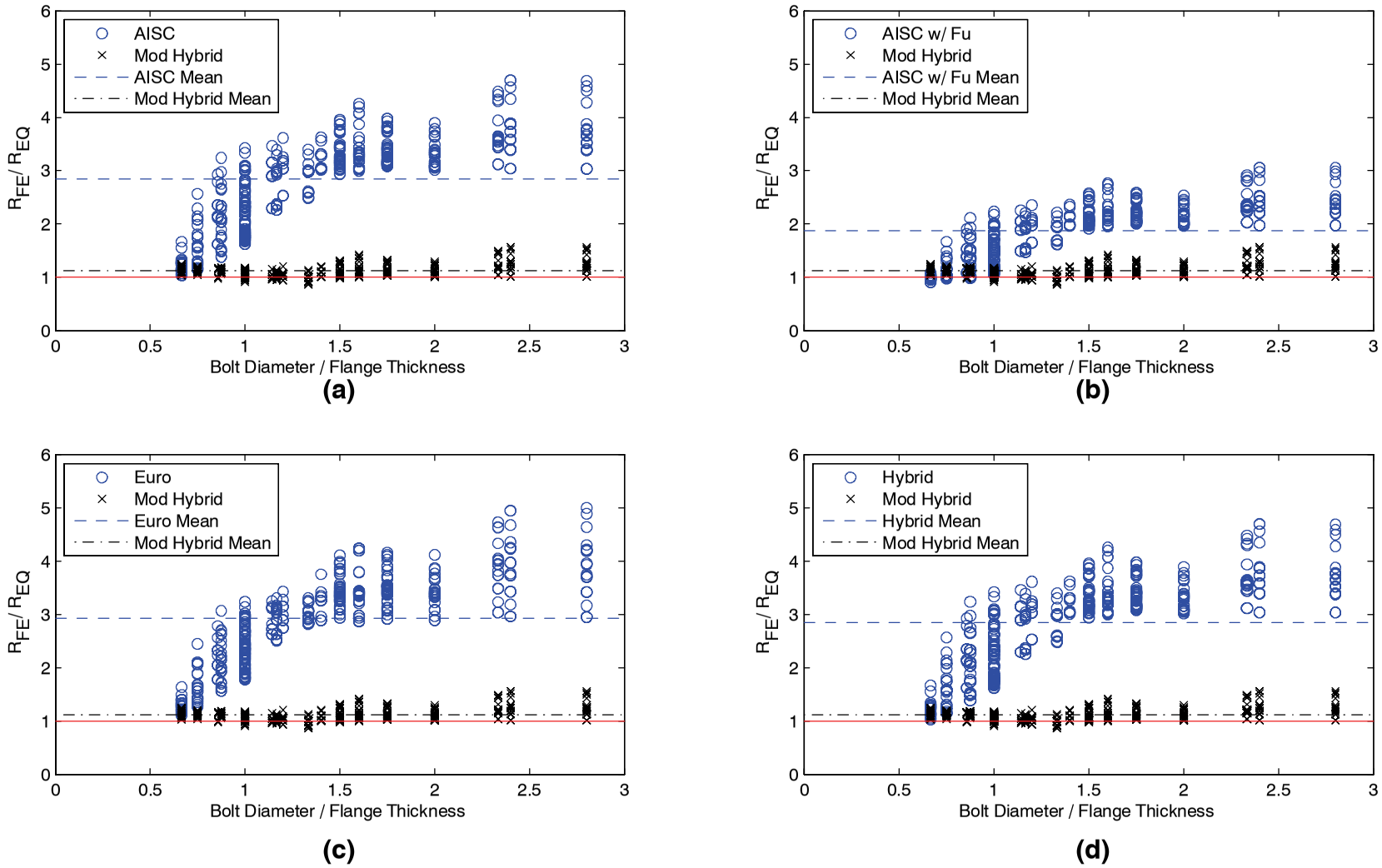


Figure 7.9 Ratio of analysis failure to proposed Modified Hybrid prying strength model capacity plotted against bolt diameter to angle leg thickness ratio and compared to the (a) AISC, (b) AISC with Fu, (c) Eurocode, and (c) Hybrid prying strength models.

Table 7.1 Summary of Prying Strength Models Prediction R_{FE}/R_{EQ} Ratios for Analytical Data				
Prying Strength Model	**Min**	**Max**	**Mean**	**Standard Deviation**
AISC	1.03	4.70	2.85	0.82
AISC using F_u	0.91	3.06	1.87	0.51
Eurocode	1.11	5.00	2.93	0.83
Hybrid	1.03	4.70	2.85	0.82
Modified EuroCode	0.95	1.67	1.22	0.14
Modified Hybrid	0.86	1.57	1.12	0.11

The prying strength envelopes presented for two sets of specific geometric and topographical variables plotted against analytically determined connection strengths in Figures 7.5 (a) and (b) are repeated in the Figures 7.10 (a) and (b), but this time including the proposed modified prying strength model envelopes. These plots graphically demonstrate, not only the prediction of the modified prying strength models, but also their success in predicting the correct failure mode.

The two equations which construct the prying strength capacity envelope are also plotted in the figures with dash lines. The mechanism behind the first equation implies a angle leg failure while the second equation implies a mix mode failure of the angle leg and bolt fracture. Each point in the figures represent the analytically calculated capacity for the given angle thickness. The shape of the data point reflects the predicted mode of failure; round and diamond markers are leg failure and bolt fracture, respectively. For the modified prying strength models presented in the mentioned figures the relevant equation predicting the capacity for each case is consistent with the predicted failure mode observed analytically.

Up to this point the prediction of the bolted angle prying strength models were compared numerically. Using the subset of connections which is a cross-section of all size angles used in the analytical dataset previously listed in Table 6.1 are used to visually compare the deformed shape and stress contour state of the analytical models at the predicted load capacities determined analytically from the model failure criteria, using the modified hybrid, and the AISC prying strength models in Figures 7.11 through 7.30.

The deformed shape of the connections are plotted with the Mises stress contour at the point at which failure is detected using the analytical failure criteria. The maximum stress contour shown with red is set the nominal ultimate stress of the connection material.

These figures demonstrate that the AISC prying strength model in almost all cases predicts a capacity which significantly under utilizes the angle strength by determining failure at a load level at which yielding in the angle is hardly exists.

Comparison for the whole dataset against all the prying strength model envelopes are presented in Appendix D. The development of the modified prying strength models is possible due to the large parametric dataset enabling a large range of variables to be assessed against current models. In the next section all these models are compared against real experimental test data of bolted angle and T-stub component pull tests given in literature. The assessment with real experimental data gives confidence in the prediction of the proposed prying strength model modifications and also demonstrates the conservatism in the current models.

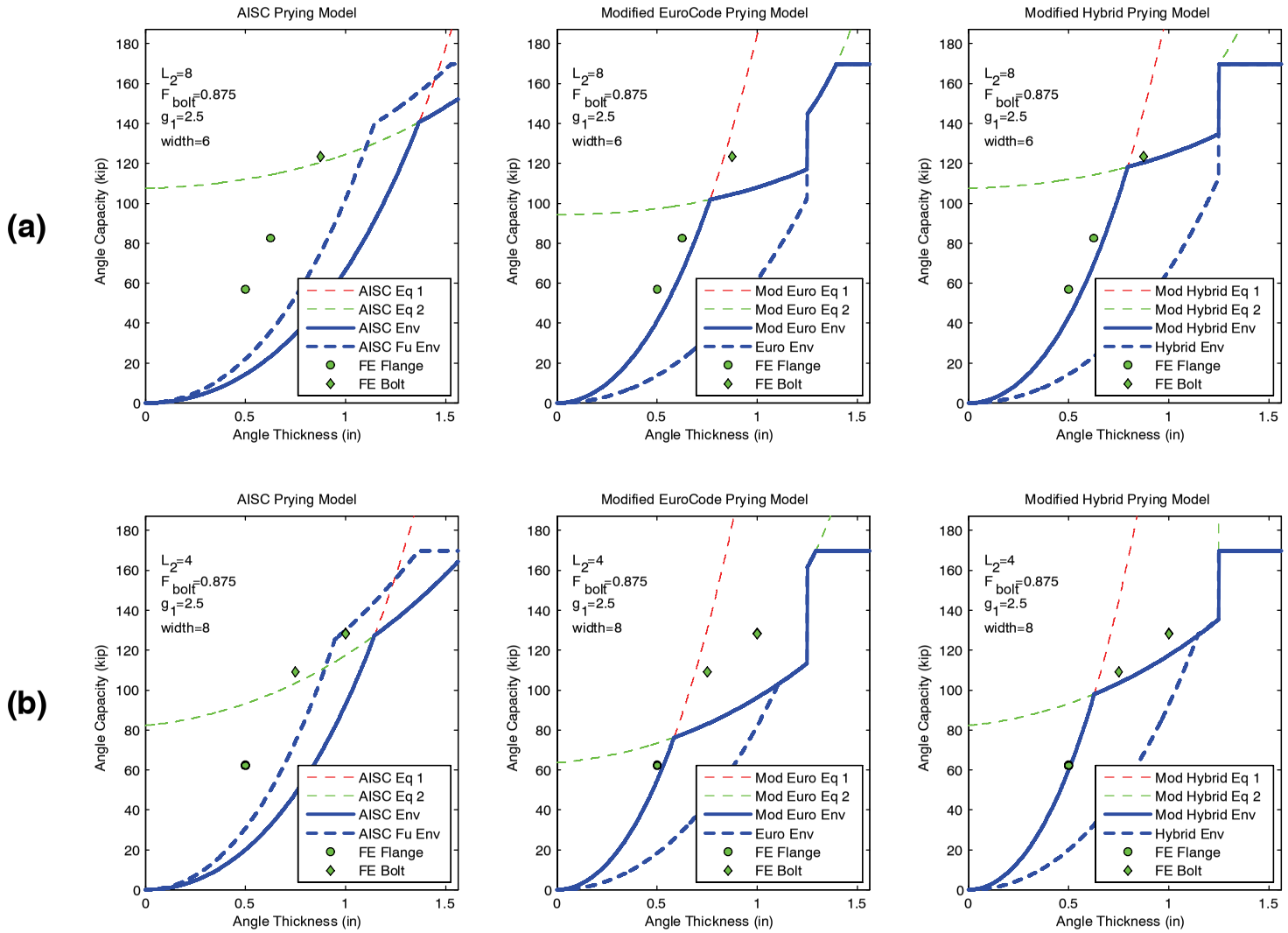


Figure 7.10 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 8 in. leg, 0.875 in. bolt diameter, 2.5 in. gage, and 6 in. width; and (b) 4 in. leg, 0.875 in. bolt diameter, 2.5 in. gage, and 8 in. width.

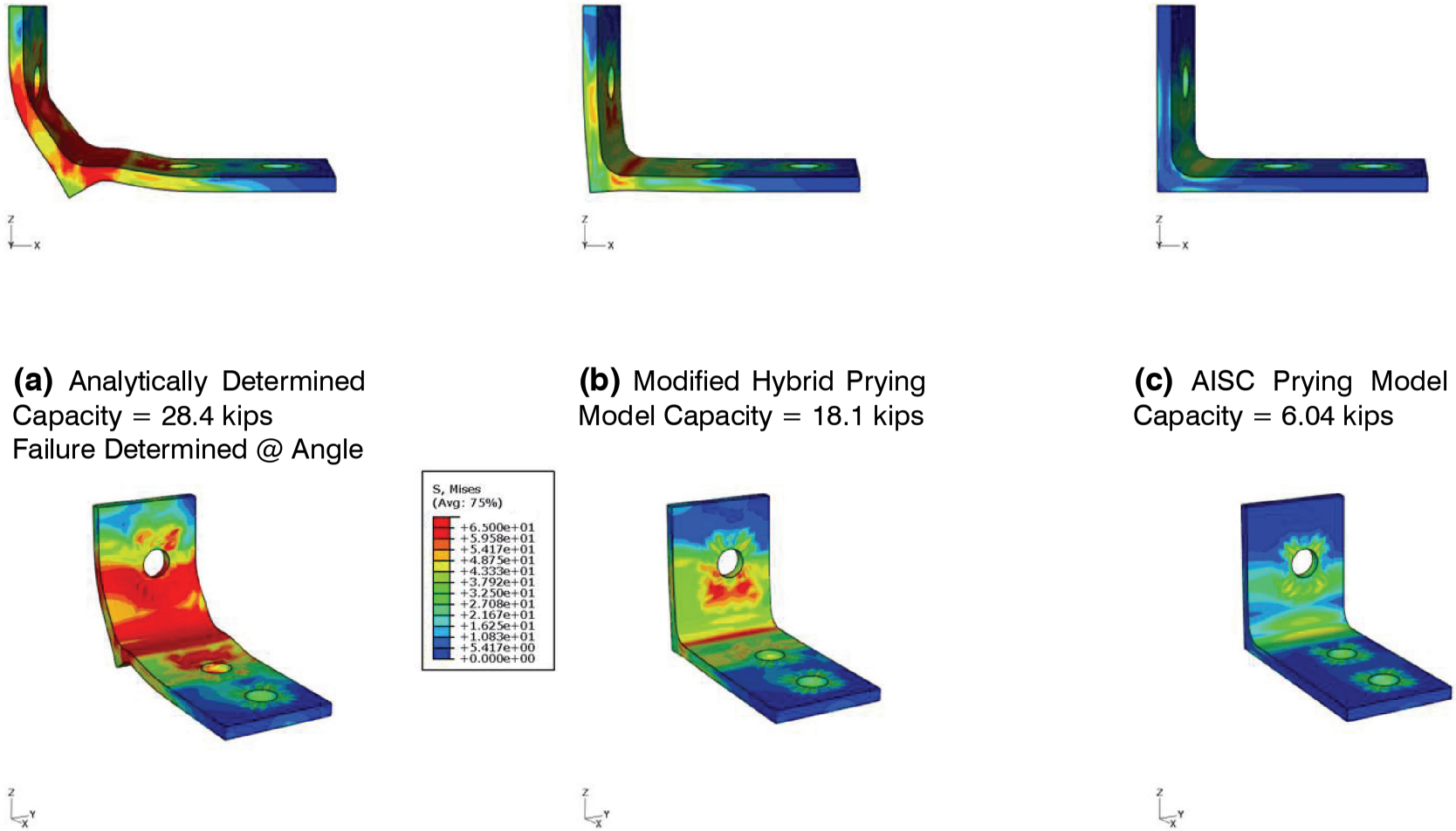


Figure 7.11 Deformed shape and stress contour (Mises) for a L6x4 angle model, 6 inches wide, 0.3125 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 2.25 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

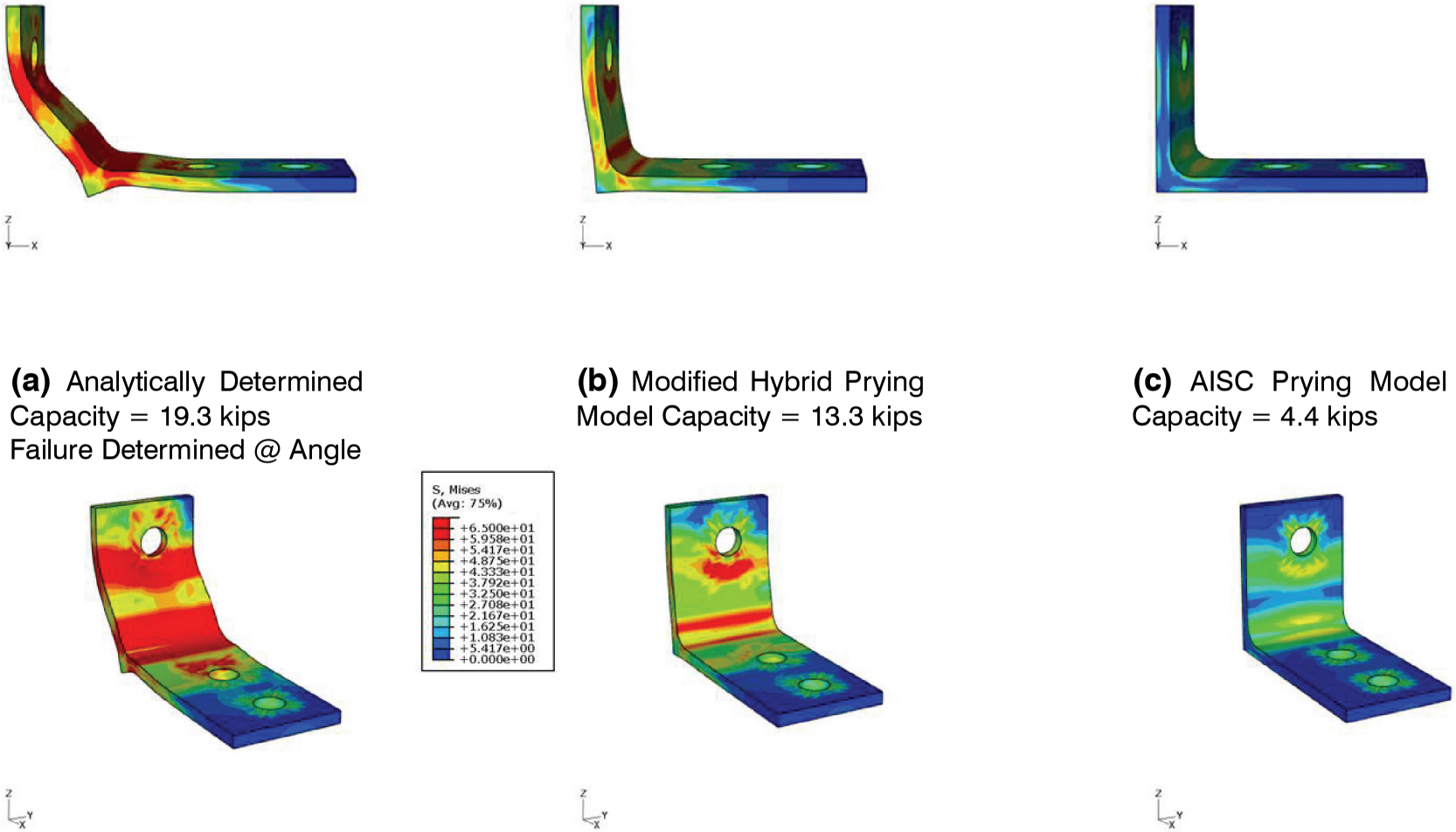


Figure 7.12 Deformed shape and stress contour (Mises) for a L6x4 angle model, 6 inches wide, 0.3125 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 2.875 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

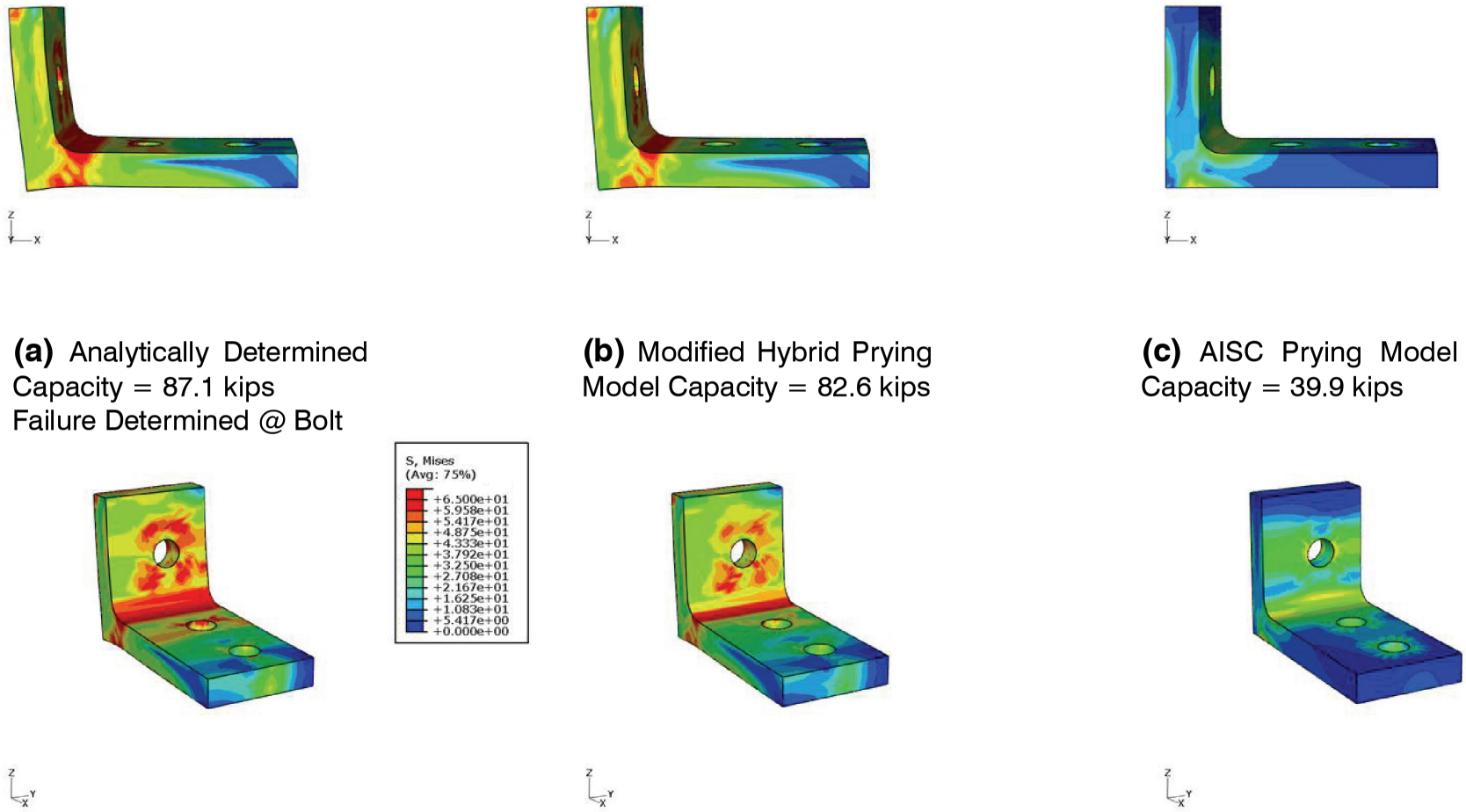


Figure 7.13 Deformed shape and stress contour (Mises) for a L6x4 angle model, 6 inches wide, 0.75 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 2.25 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

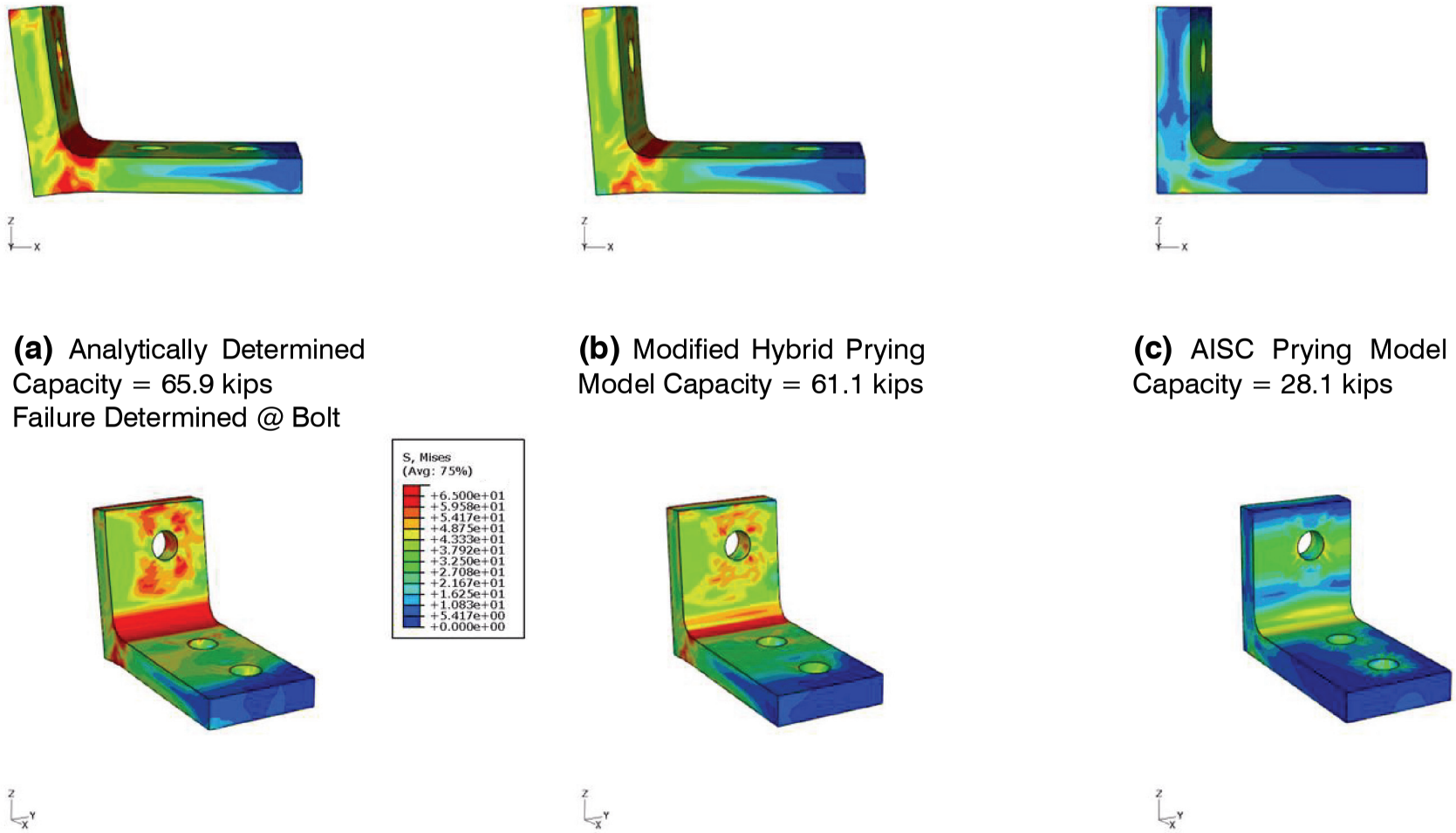


Figure 7.14 Deformed shape and stress contour (Mises) for a L6x4 angle model, 6 inches wide, 0.75 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 2.875 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

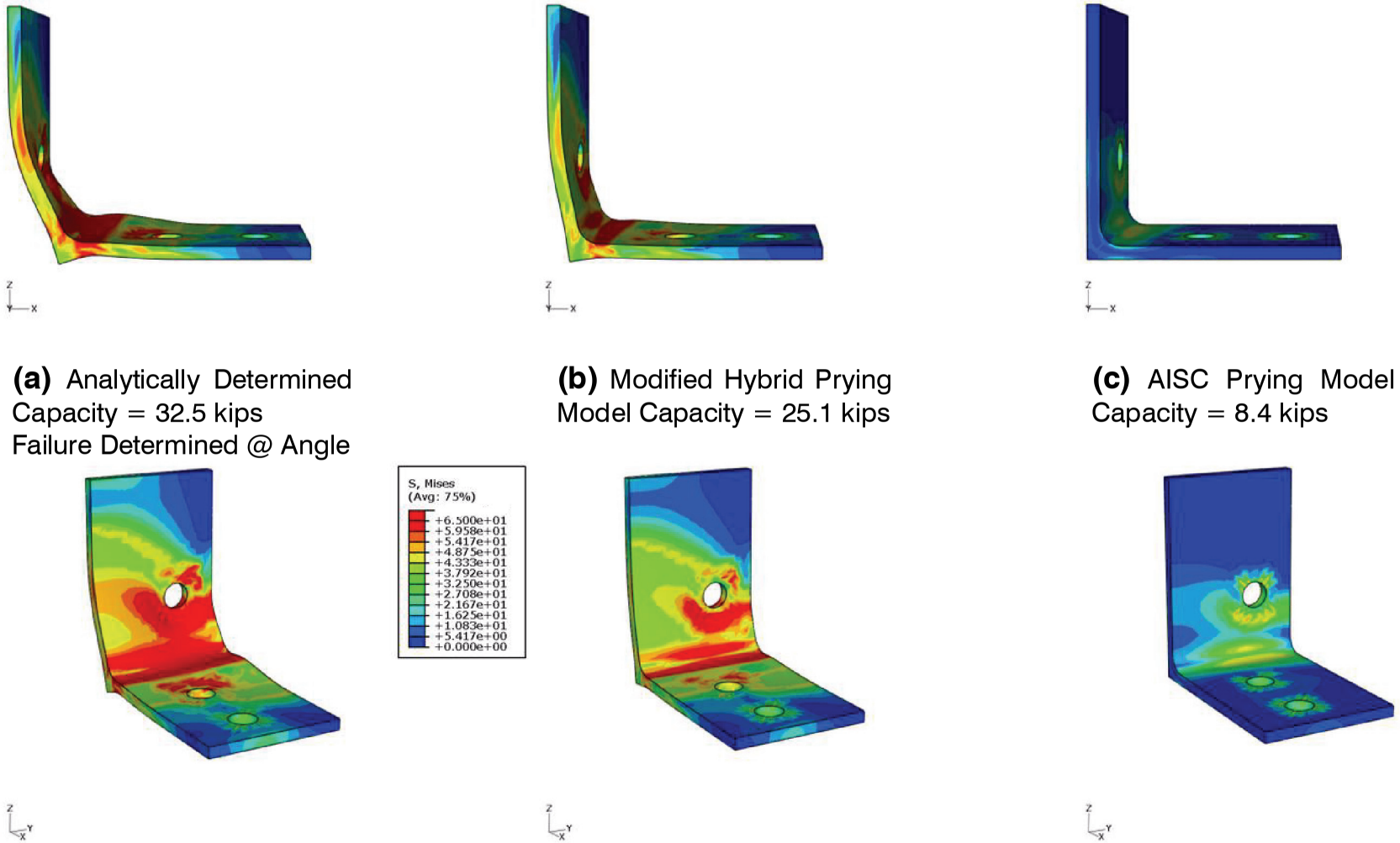


Figure 7.15 Deformed shape and stress contour (Mises) for a L6x6 angle model, 8 inches wide, 0.3125 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 2.25 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

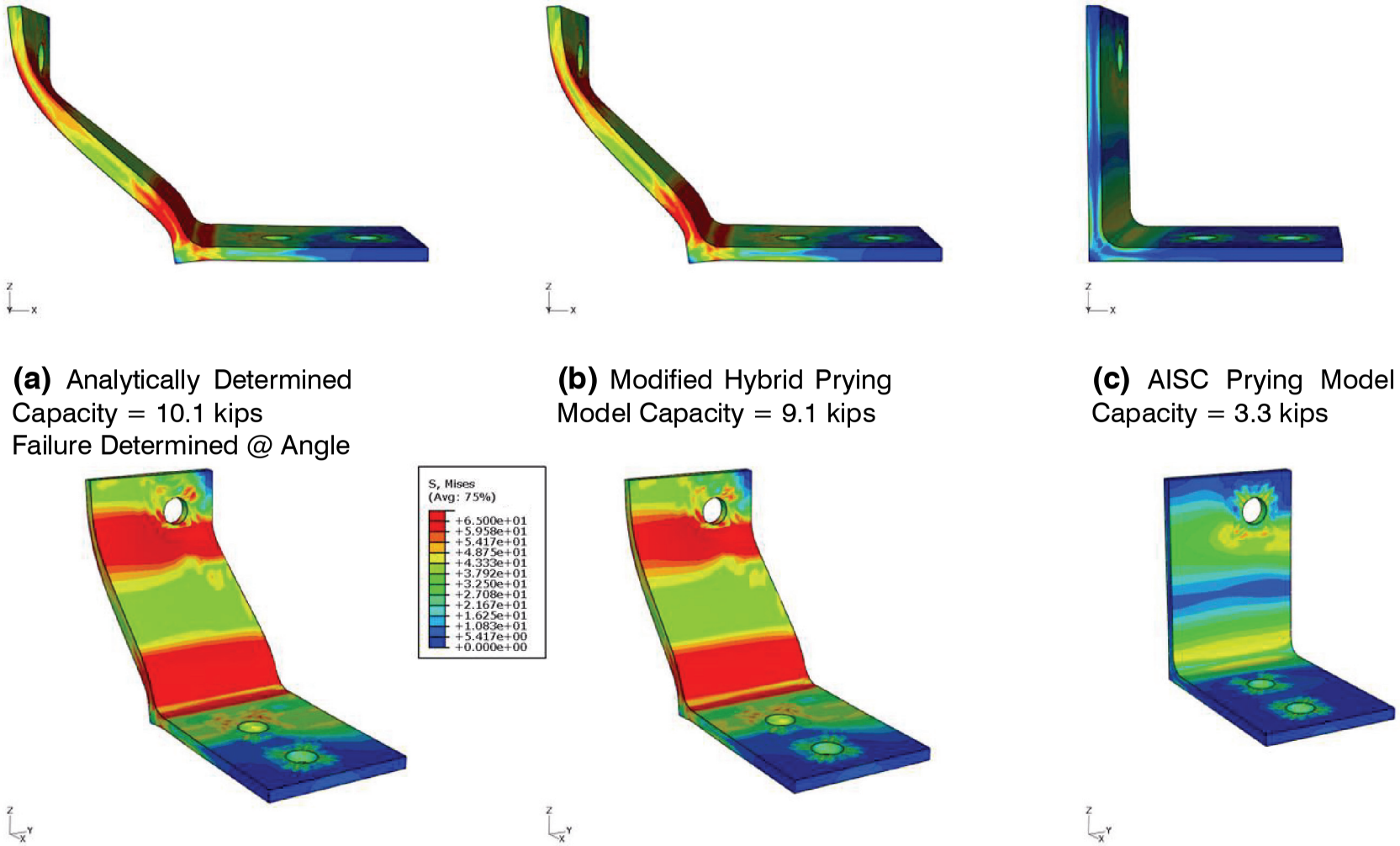


Figure 7.16 Deformed shape and stress contour (Mises) for a L6x6 angle model, 8 inches wide, 0.3125 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 2.875 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

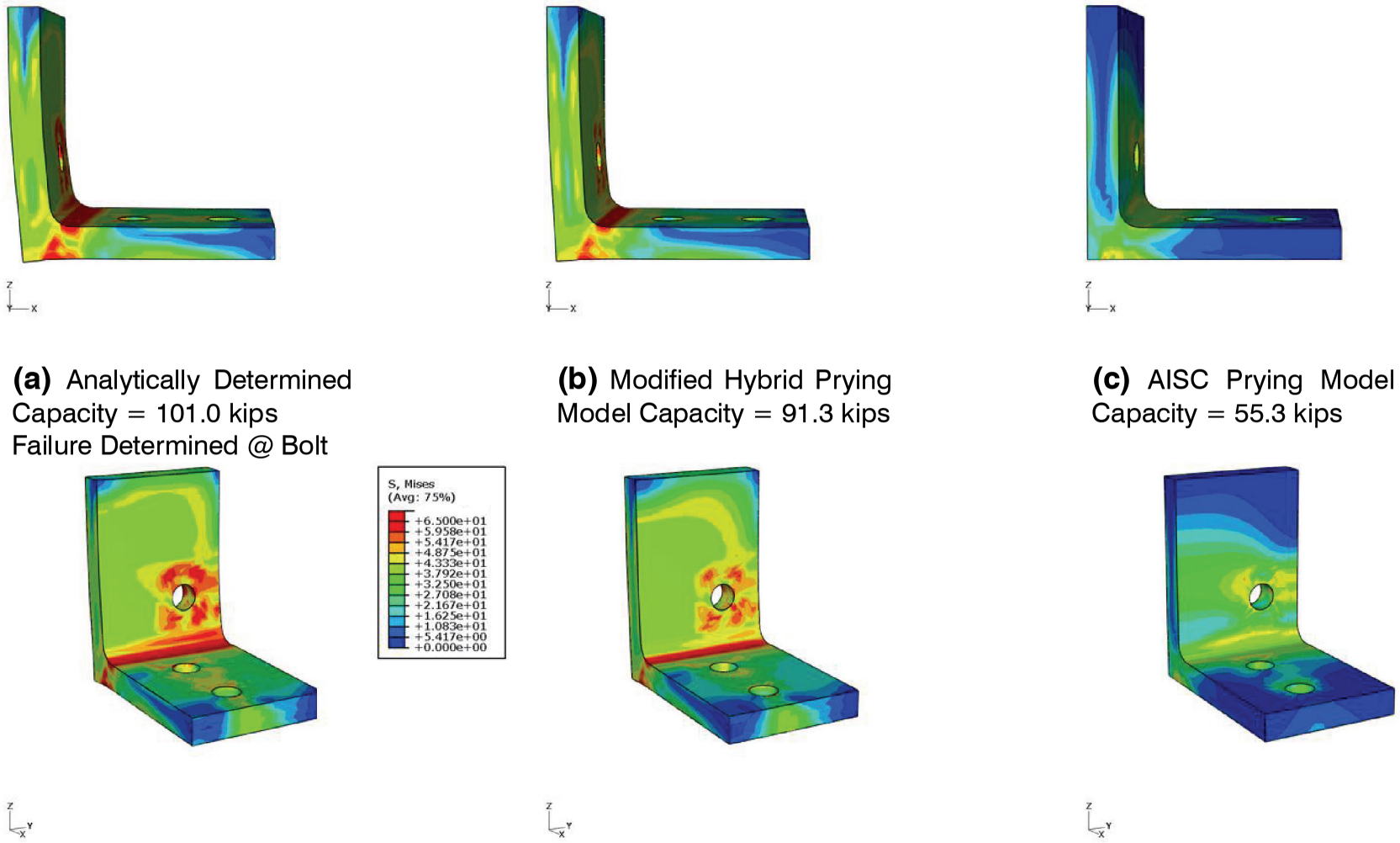
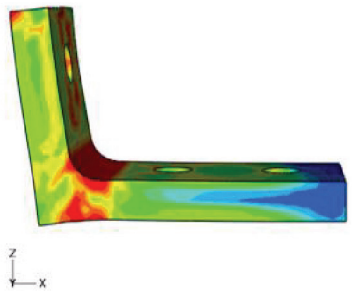
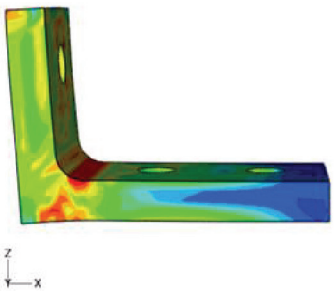


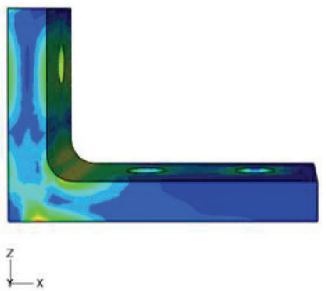
Figure 7.17 Deformed shape and stress contour (Mises) for a L6x6 angle model, 8 inches wide, 0.75 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 2.25 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)



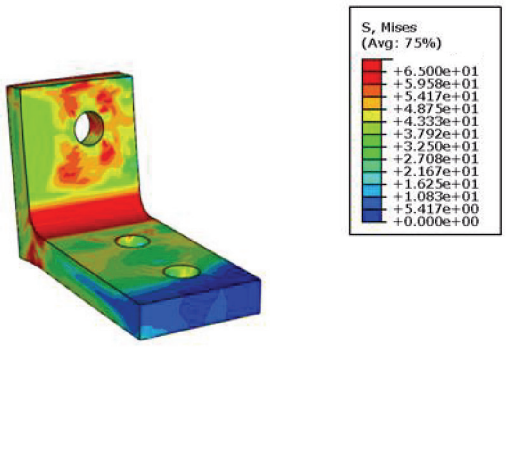
(a) Analytically Determined
Capacity = 65.9 kips
Failure Determined @ Bolt

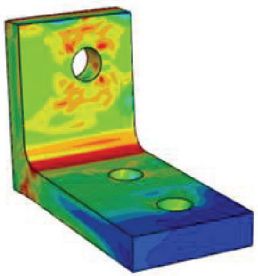


(b) Modified Hybrid Prying
Model Capacity = 61.1 kips



(c) AISC Prying Model
Capacity = 28.1 kips





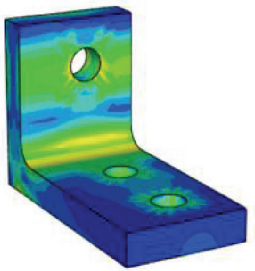


Figure 7.18 Deformed shape and stress contour (Mises) for a L6x4 angle model, 6 inches wide, 0.75 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 2.875 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

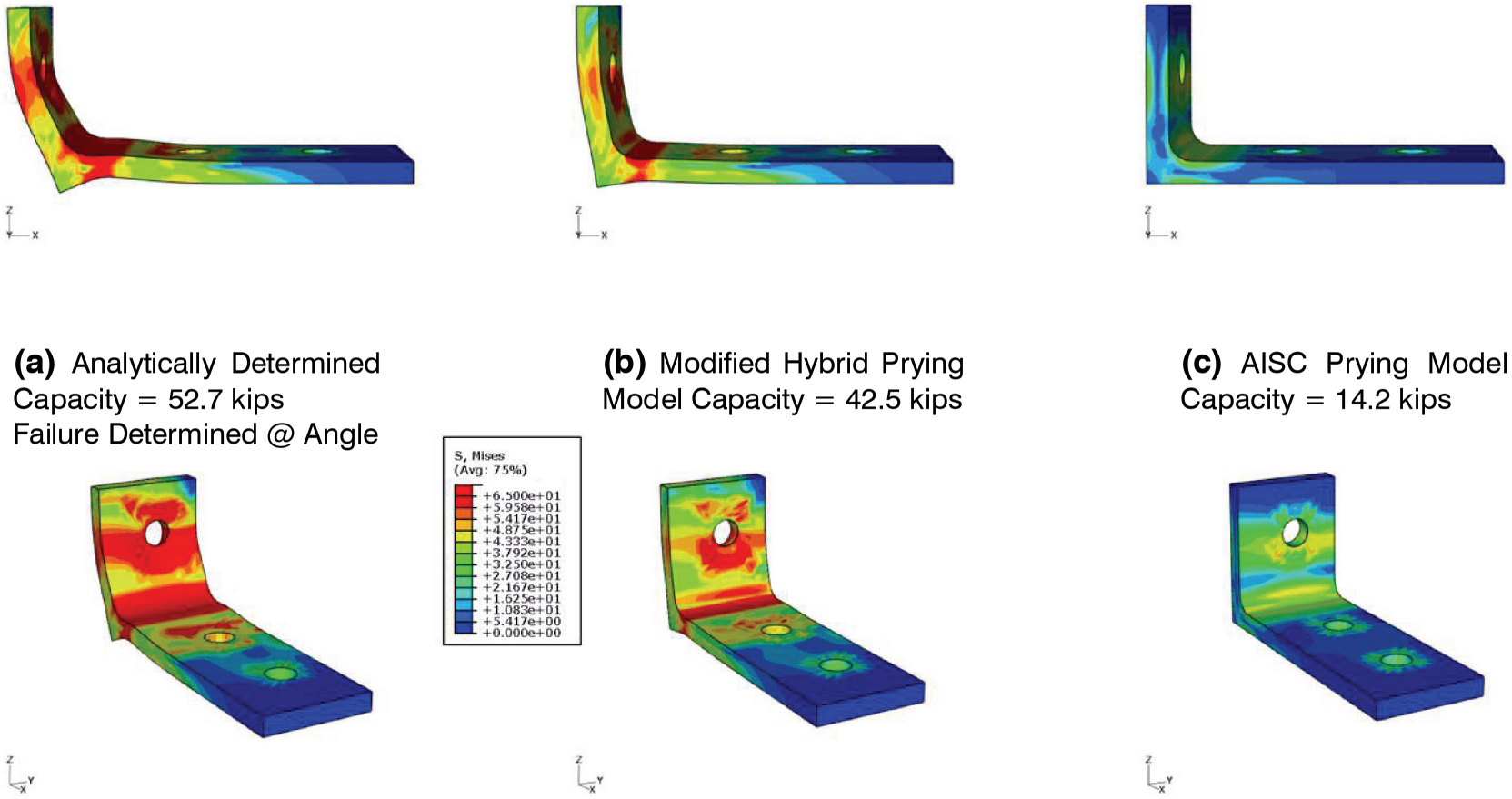


Figure 7.19 Deformed shape and stress contour (Mises) for a L8x4 angle model, 6 inches wide, 0.5 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 2.5 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

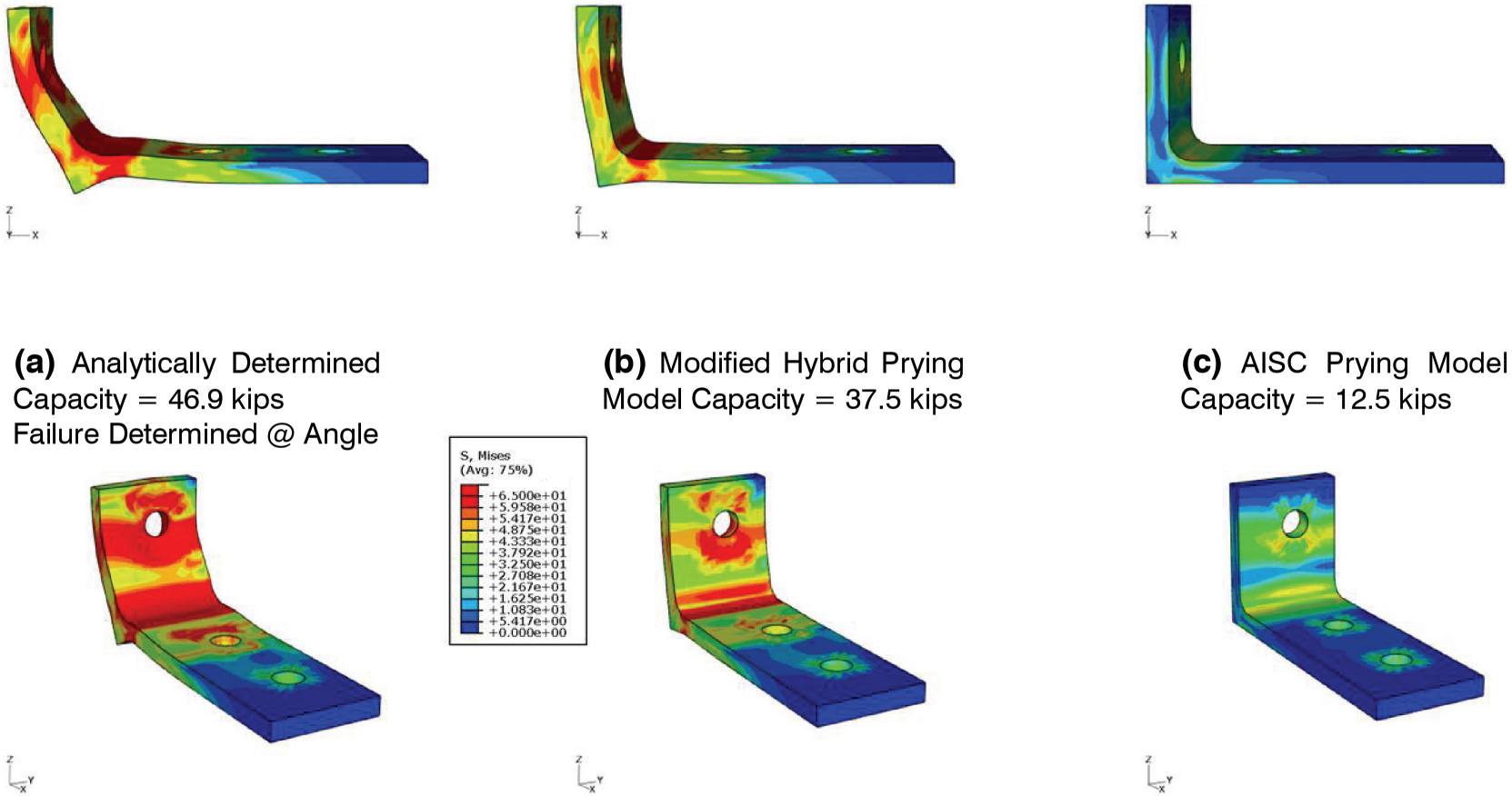


Figure 7.20 Deformed shape and stress contour (Mises) for a L8x4 angle model, 6 inches wide, 0.5 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 2.75 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

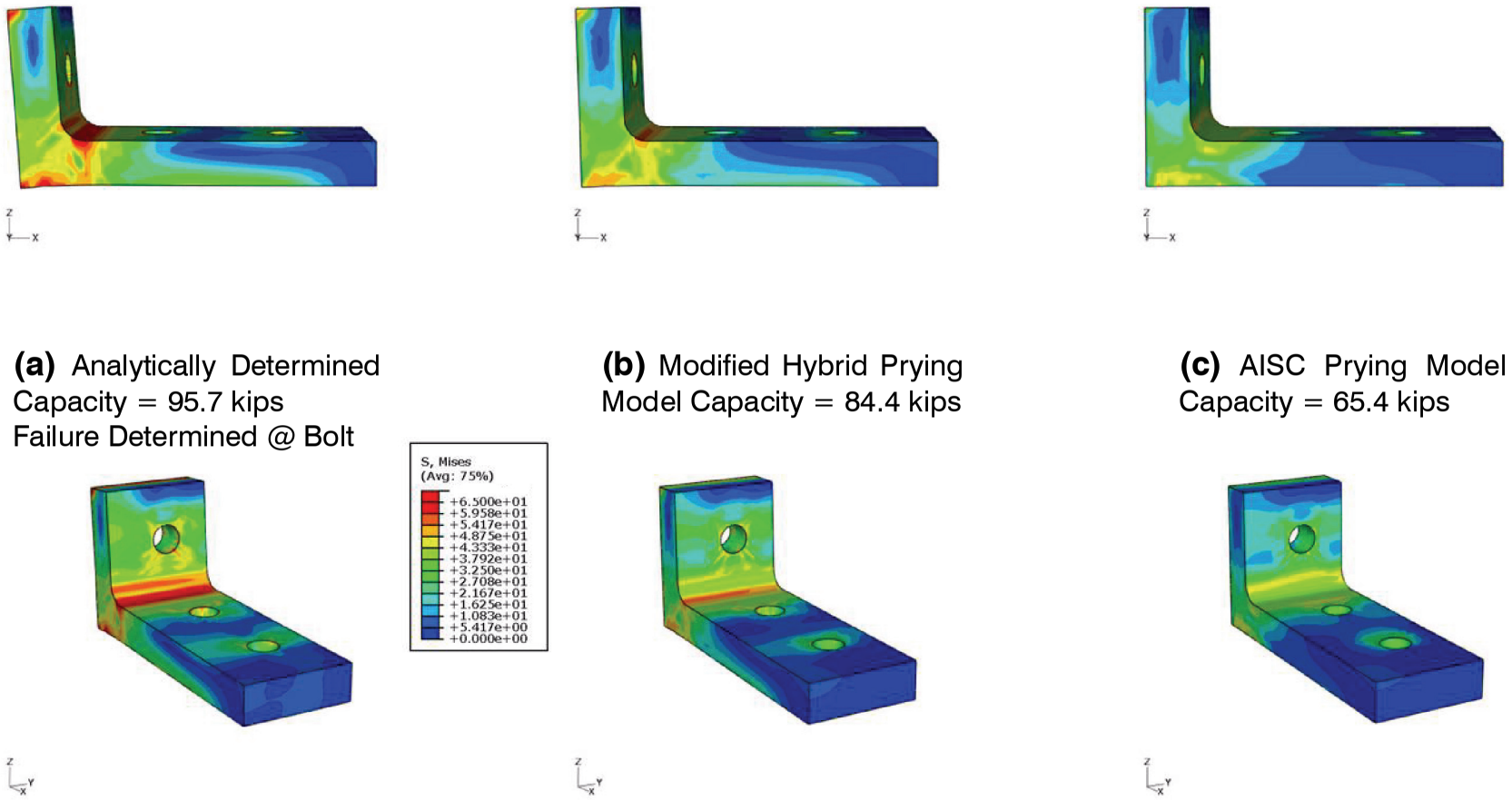


Figure 7.21 Deformed shape and stress contour (Mises) for a L8x4 angle model, 6 inches wide, 1.0 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 2.5 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

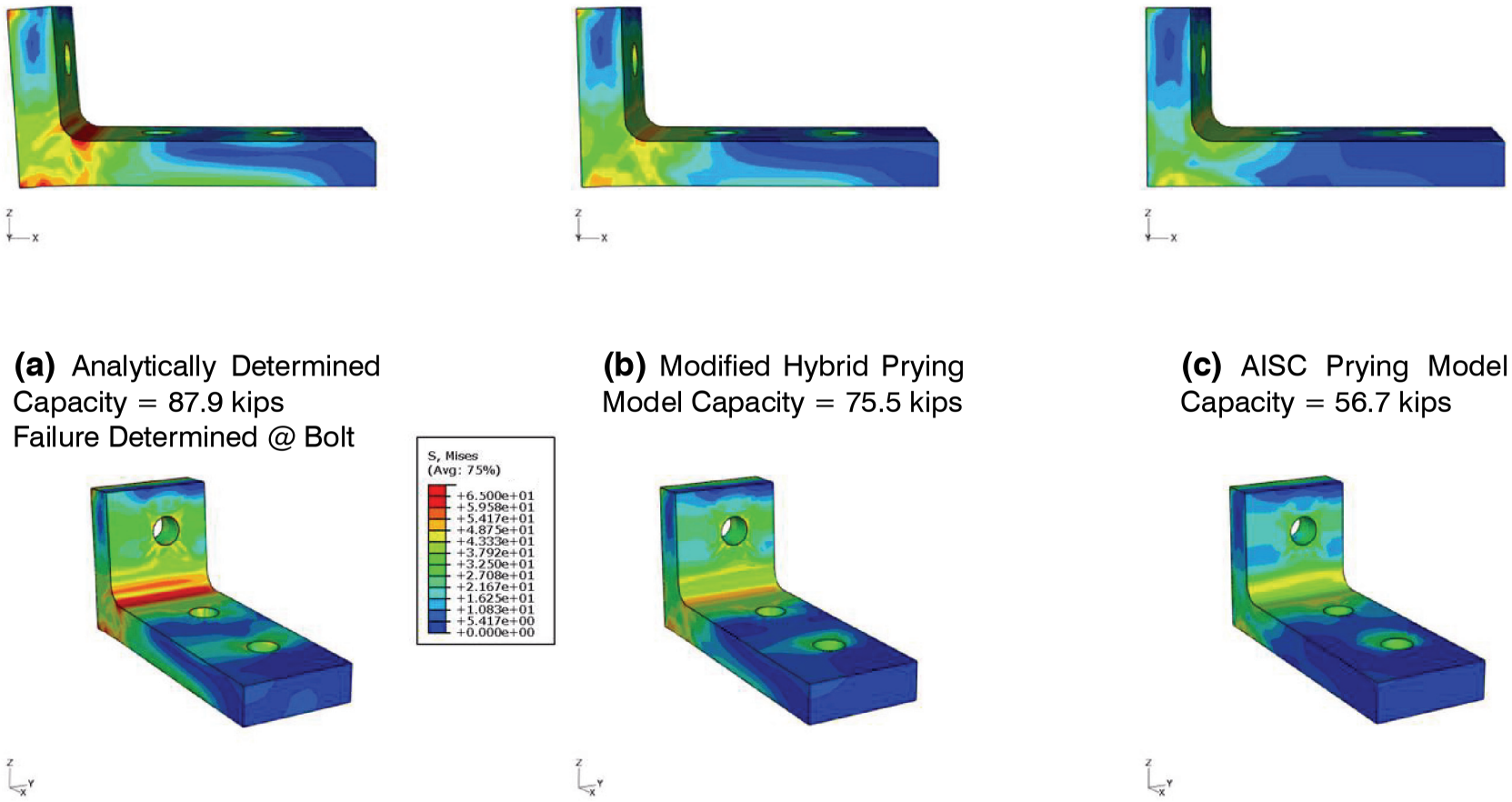


Figure 7.22 Deformed shape and stress contour (Mises) for a L8x4 angle model, 6 inches wide, 1.0 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 2.75 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

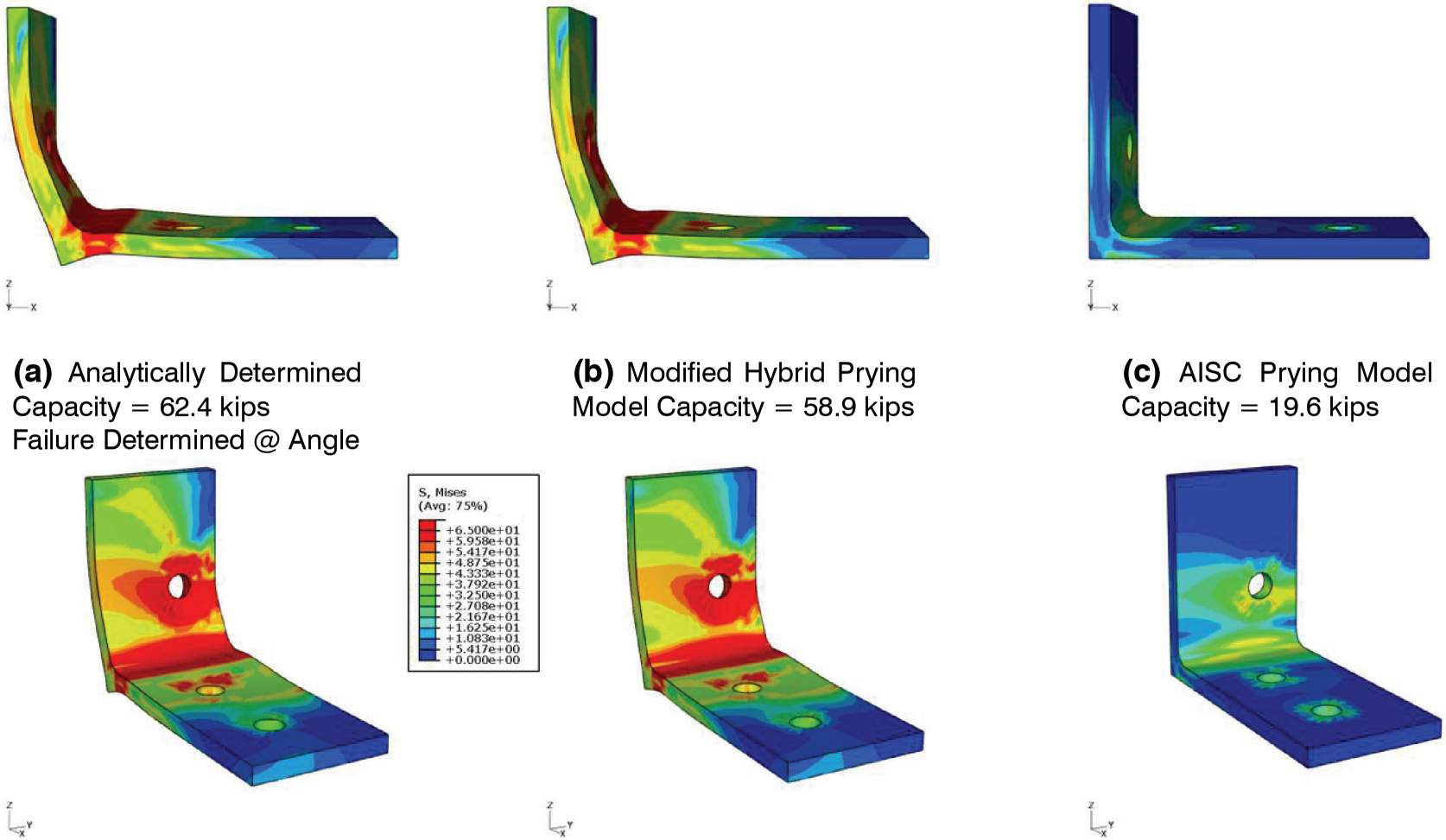


Figure 7.23 Deformed shape and stress contour (Mises) for a L8x6 angle model, 8 inches wide, 0.5 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 2.5 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

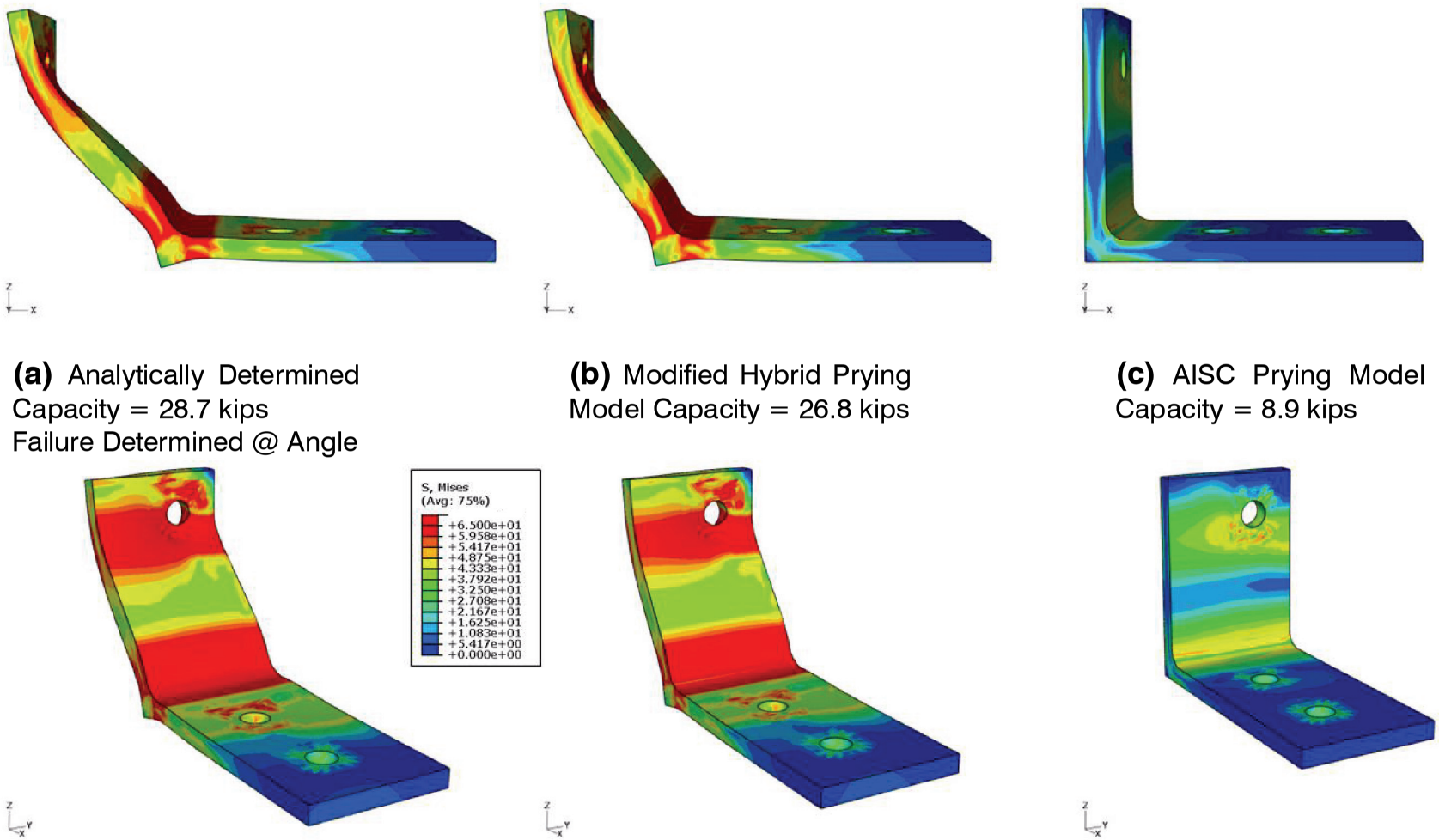


Figure 7.24 Deformed shape and stress contour (Mises) for a L8x6 angle model, 8 inches wide, 0.5 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 4.75 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

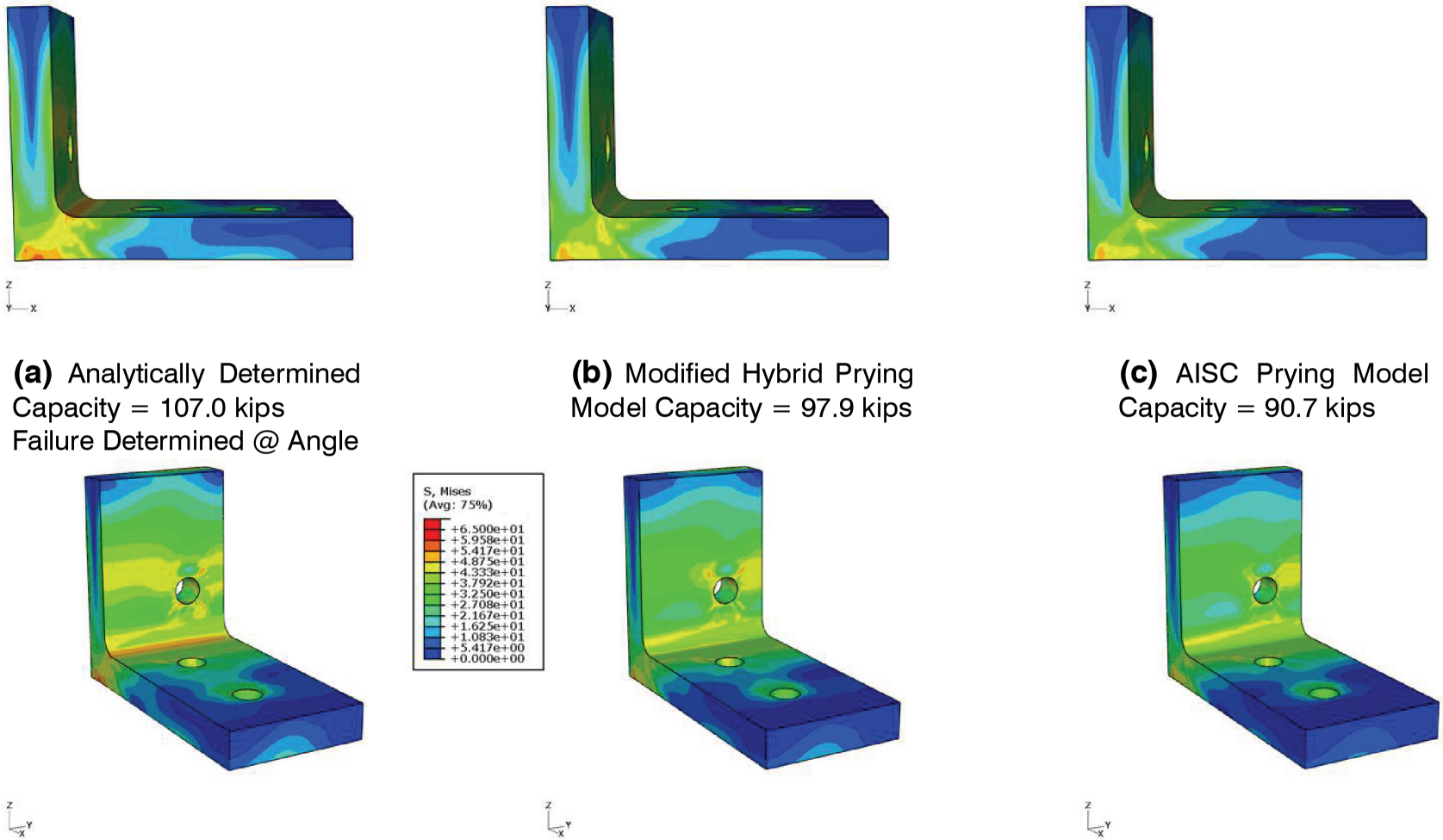


Figure 7.25 Deformed shape and stress contour (Mises) for a L8x6 angle model, 8 inches wide, 1.0 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 2.5 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

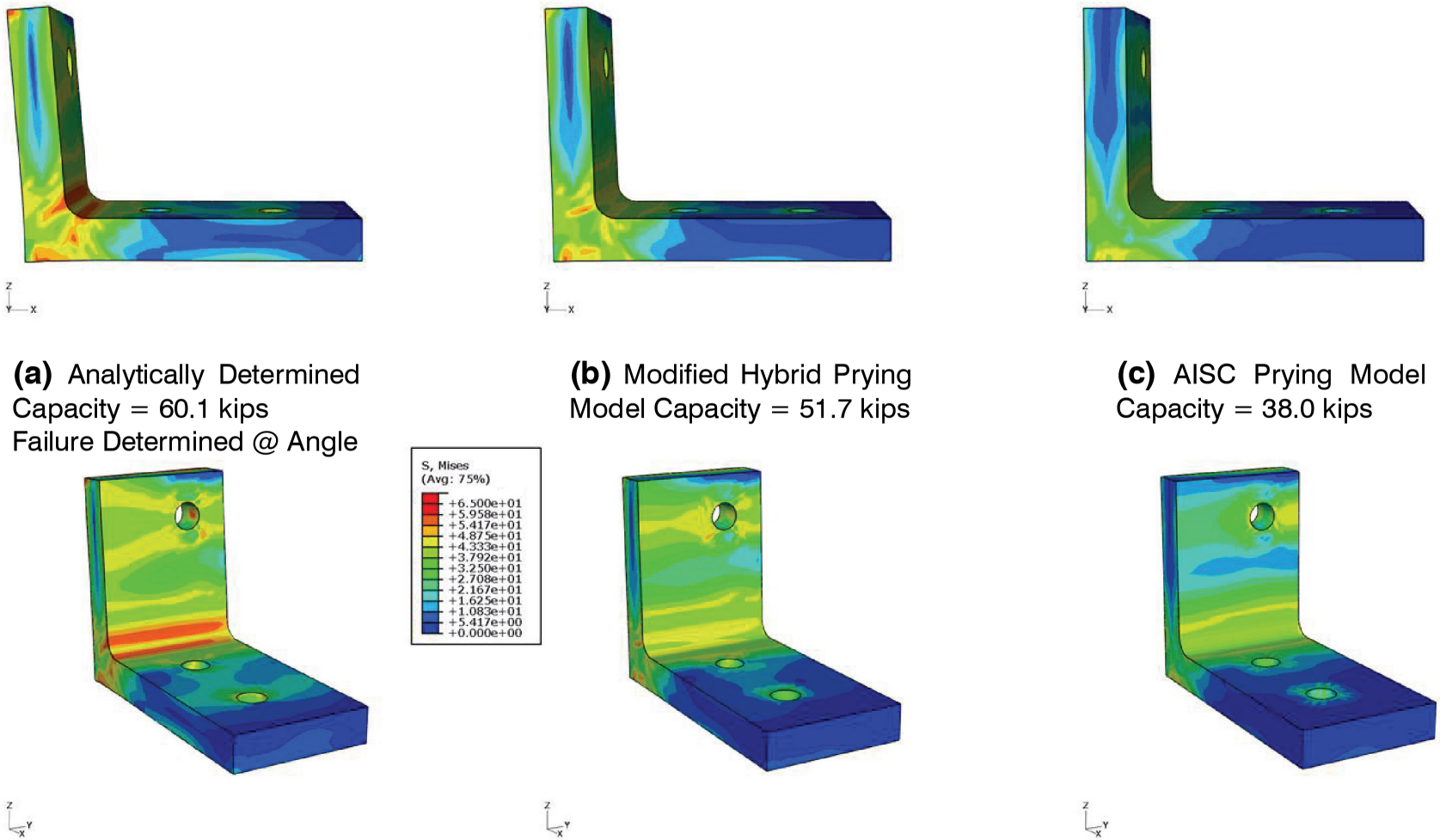


Figure 7.26 Deformed shape and stress contour (Mises) for a L8x6 angle model, 8 inches wide, 1.0 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 4.75 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

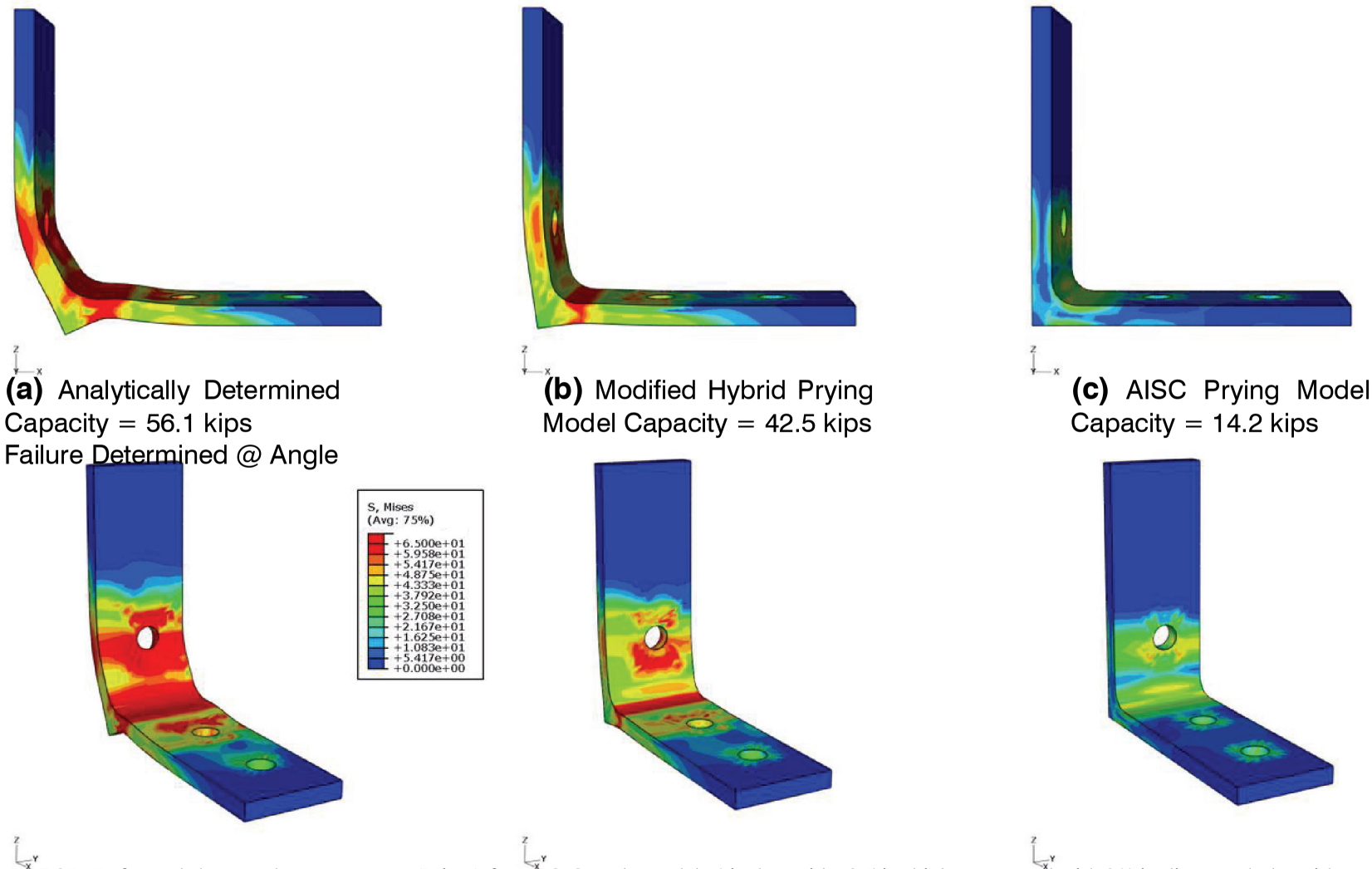


Figure 7.27 Deformed shape and stress contour (Mises) for a L8x8 angle model, 6 inches wide, 0.5 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 2.5 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

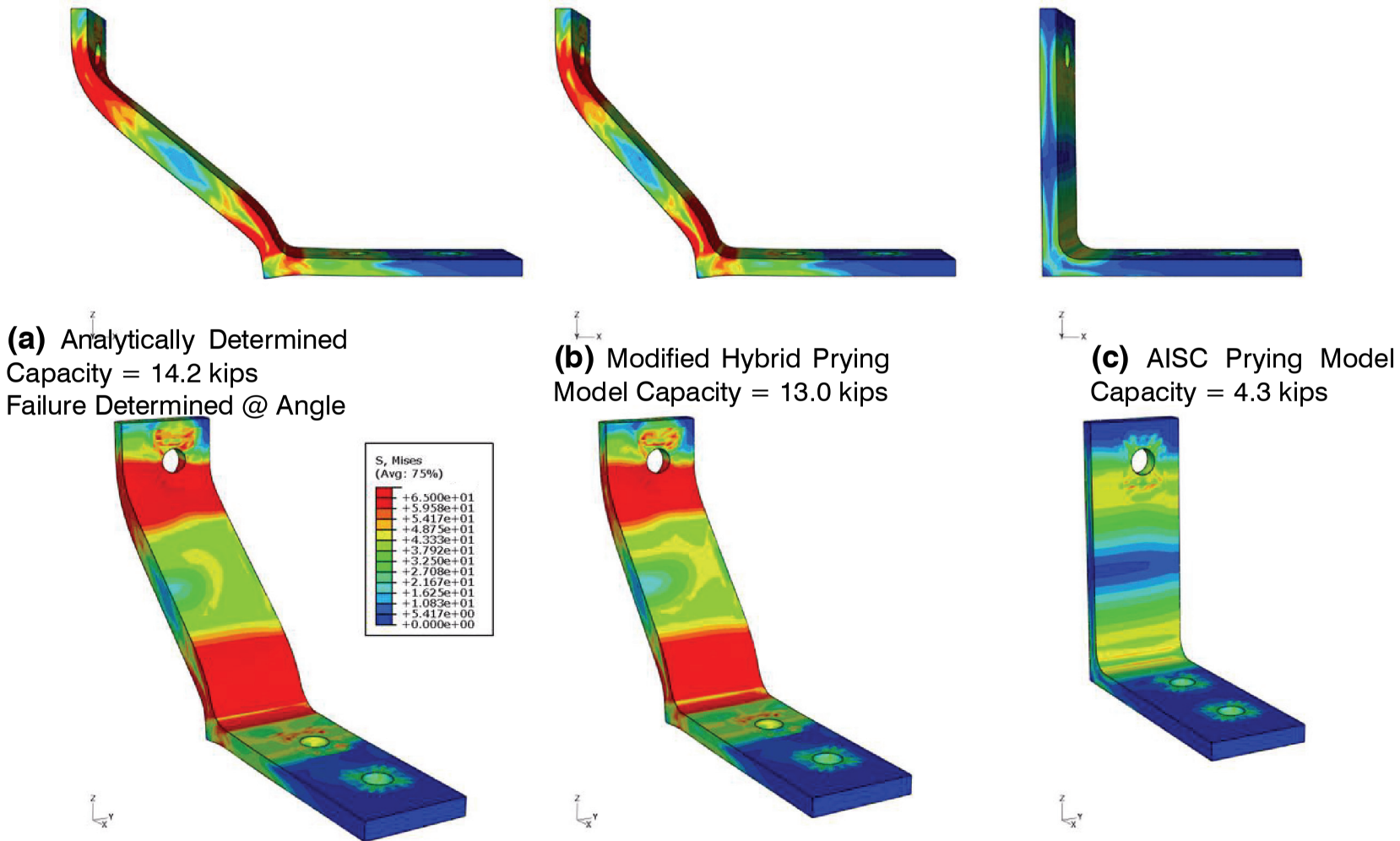


Figure 7.28 Deformed shape and stress contour (Mises) for a L8x8 angle model, 6 inches wide, 0.5 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 6.75 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

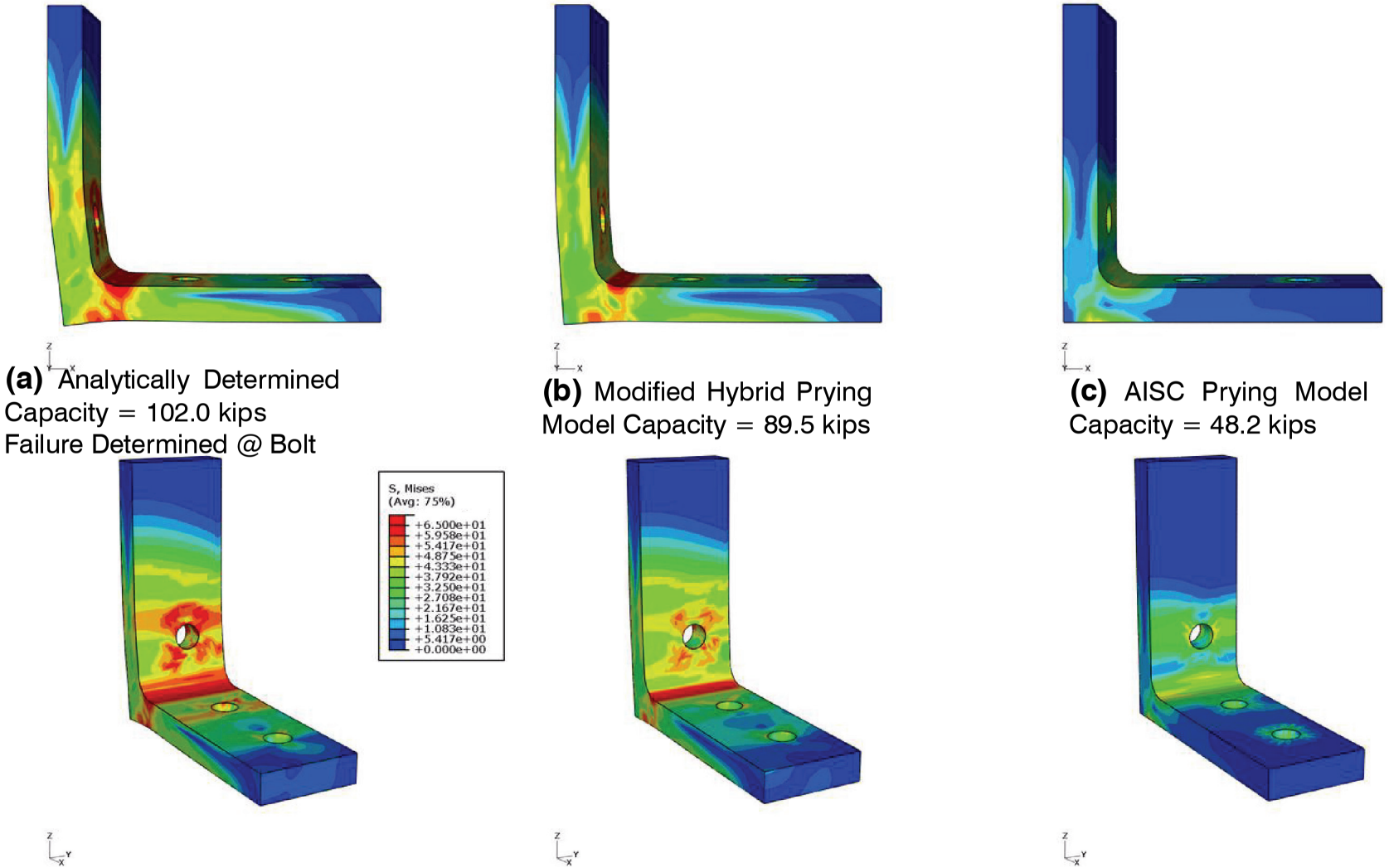


Figure 7.29 Deformed shape and stress contour (Mises) for a L8x8 angle model, 6 inches wide, 0.875 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 2.5 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

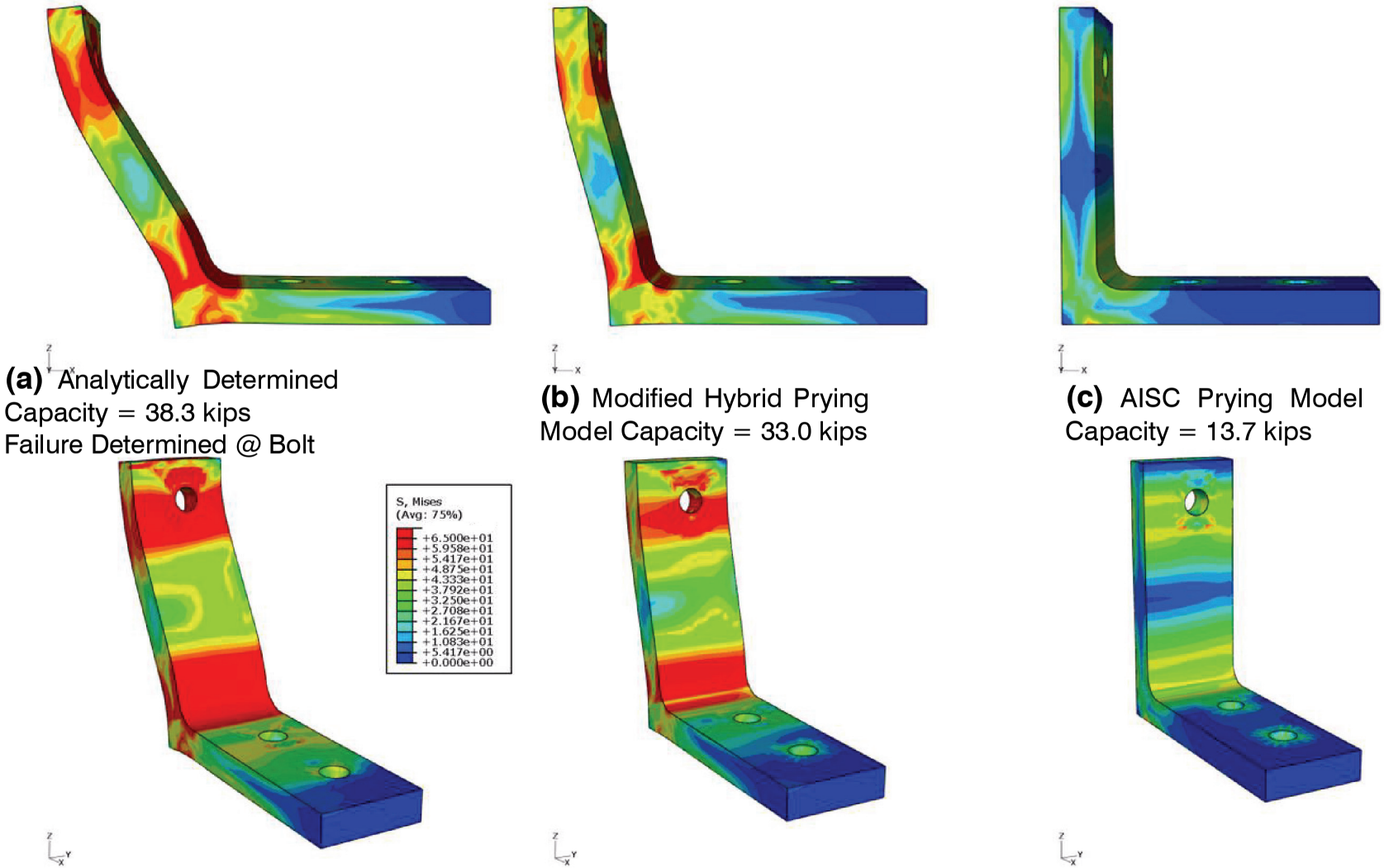


Figure 7.30 Deformed shape and stress contour (Mises) for a L8x8 angle model, 6 inches wide, 0.875 in thick, connected with 3/4 in diameter bolts with tension bolt gage of 6.75 in at given force levels calculated using the (a) analytical failure criteria, (b) modified hybrid prying model, and (c) AISC prying model. (Half symmetry model about x-z plane)

7.3 Verification of Prying Strength Modeling with Experimental Data

Several bolted angle and T-stub components tested under monotonic and cyclic loading in literature are gathered to assess the prying strength models presented in the previous section and verify the performance of the modified prying strength models. Relevant test cases which failed by either bolt fracture or angle leg or T-stub flange failure is included in this assessment. Test cases with other failure modes are excluded. Bolted angle and T-stub component tests used in this section are from Swanson [103], Shen and Astaneh [92], Guravich and Dawe [45], and Douty and McGuire [33].

Swanson tested individual one inch thick heavy clip angle and T-stub components with cyclic and monotonic loads. Shen and Astaneh tested double angles with their legs connected to a single pull plate and loaded under cyclic loads. Guravic and Dawe tested angles in a similar configuration to those in Shen and Astaneh's study, but their objective was to study tension and shear interaction. Their specimens were relatively light angles with both legs connected with single row of bolts - these cases serve as a validation to the modification of the first equation which predicts the leg failure with single curvature. Finally, Douty and McGuire tested T-stubs cut from wide flange shapes as well some fabricated by welded plates.

The geometric and topological dimensions, material and bolt strength, loading type, failure mode and capacities for each test case is presented in Table 7.2. The tested component capacities are listed and compared to the seven prying strength models in Table 7.3. The test case specimens labeled in these tables are listed and attributed to their source as follows:

- CA, TA, TB, TC test specimens per Swanson
- SA test specimens per Shen and Astaneh
- A test specimens per Douty and McGuire
- H210, H208 test specimen per Guravic and Dawe

In Figure 7.31 the tested capacity to calculated strength ratio, using the proposed Modified Eurocode prying strength model for each test case is plotted and compared to the ratio of the said tested capacities to the following prying strength models: the AISC model, the AISC model using the ultimate strength, and the Eurocode model.

Similarly, in Figure 7.32 the tested capacity to calculated strength ratio, using the proposed modified Hybrid prying strength model for each test case is plotted and compared to the ratio of the said tested capacities to, again, the following prying strength models: the AISC model, the AISC model using the ultimate strength, and the Eurocode model.

Both figures clearly demonstrates the conservatism of the current prying strength models, specifically for the predictions in the cases with large bolt diameter to angle leg (or flange) thickness ratios. The mean of the ratios per each prying strength model is plotted with dashed lines in each plot, the mean of the proposed model predictions are much closer to unity for all of the datapoints, compared to the current model predictions.

The statistics of the tested versus calculated strength ratios are given in Table 7.4. In this table the maximum and minimum ratio reflects the range of error in the predictions by the prying strength models, while the mean and the standard deviation reflects the general accuracy of the predictions. The mean of the two proposed prying strength models are not only the closest to unity, but also have the lowest standard deviation. Among the two proposed models the Modified Hybrid prying strength model has the prediction strength ratio mean closest to unity. In comparison the use of the proposed Modified Eurocode model has less variables to calculate and is thus easier to use. Both models resulted with the same standard deviation of 0.24 for their prediction strength ratios which is much lower than the other models.

The prying strength model envelope for each individual test case is plotted and compared to the test data point for visual comparison in Figures 7.33 through 7.61. Three plots are presented in each figure. In each plot the primary prying strength model envelope

is plotted with a heavy line while the relevant secondary prying model is plotted with a heavy dashed line.

The plot on the left side of each figure compares the test data point to the AISC prying strength model and also the AISC strength model computed using the material ultimate strength rather than the yield strength as proposed by Thornton. The middle plot compares the test data point primarily to the proposed Modified Eurocode prying strength model and also the original Eurocode prying strength model. Finally, the plot on the right hand side of each figure compares the test data point primarily to the proposed modified Hybrid prying strength model and also the original Hybrid prying strength model. For each of the primary prying strength model plotted in the figures the first and second equations are also plotted with light dashed lines.

The data point symbol distinguishes the mode of failure for each test. The test cases which failed by leg or flange failure are plotted with a circle and diamond symbol is used for the test cases which resulted with bolt failure. Also the failure mode observed in each test is noted in the legend. This enables comparison between the the failure mode of the test case to the particular prying strength model equation predicting the failure envelope for a given test case. The first equations of the prying strength models a on a single curvature flange or angle leg failure while the second equation reflects a mixed mode bolt or angle leg/ flange failure.

The prediction of the proposed modified prying strength models are consistent with the experimentally observed failure modes in all the test cases while this may not the case for the AISC prying strength model. This can be seen in the comparison of the prediction from the AISC prying strength model and the proposed prying strength models for the clip angle test CA-04 shown in Figure 7.34(a). The AISC prying strength model is both non-conservative and also predicting the wrong mode of failure as the limiting case is identified

with the first equation. The proposed models predict the capacity consistent with the second equations which predict a mix mode of failure and the predicted strength are conservative.

Table 7.2 Summary of Bolted Angle and T–Stub Component Experimental Pull Tests Used to Assess Prying Strength Models

Test Case	Component	Load	Leg/ Flange Size (in)	Leg Thick-ness (in)	Bolt Dia. (in)	Width (in)	Tension Bolts	Bolt Gage (in)	Set-back (in)	Com-ponent radii (in)	Fy (ksi)	Fu (ksi)	Bolt Cap. (kip)	Failure Mode
CA–01	L8x4x1	Cyclic	4.000	1.000	0.875	8.0	2	2.50	1.875	0.500	55.0	76.5	74.5	Bolt
CA–02	L8x6x1	Cyclic	6.000	1.000	0.875	8.0	2	2.50	1.875	0.500	55.0	76.5	74.5	Bolt
CA–04	L8x6x1	Cyclic	6.000	1.000	0.875	8.0	2	4.00	1.875	0.500	55.0	76.5	74.5	Bolt
CA–09	L8x4x1	Cyclic	4.000	1.000	1.000	8.0	2	2.50	1.500	0.500	55.0	76.5	99.6	Bolt
CA–10	L8x6x1	Cyclic	6.000	1.000	1.000	8.0	2	2.50	1.500	0.500	55.0	76.5	99.6	Bolt
CA–12	L8x6x1	Cyclic	6.000	1.000	1.000	8.0	2	4.00	1.500	0.500	55.0	76.5	99.6	Bolt
CA–14	L8x6x1	Cyclic	6.000	1.000	1.000	8.0	2	2.50	1.500	0.500	55.0	76.5	83.9	Bolt
CA–16	L8x6x1	Cyclic	6.000	1.000	1.000	8.0	2	4.00	1.500	0.500	55.0	76.5	83.9	Bolt
CA–17	L8x6x1	Cyclic	6.000	1.000	0.875	8.0	2	2.50	1.875	0.500	55.0	76.5	74.5	Bolt
CA–18	L8x6x1	Cyclic	6.000	1.000	0.875	8.0	2	2.50	1.875	0.500	55.0	76.5	74.5	Bolt
TA–03	W16x100	Cyclic	5.188	1.000	0.875	15.5	8	3.00	0.000	0.969	46.1	66.7	76.6	Bolt
TA–04	W16x100	Cyclic	5.188	1.000	0.875	15.5	8	3.50	0.000	0.969	46.1	66.7	76.6	Bolt
TA–07	W16x100	Mono	5.188	1.000	0.875	15.5	8	3.00	0.000	0.969	46.1	66.7	76.6	Bolt
TA–17	W16x100	Cyclic	5.188	1.000	0.875	15.5	4	2.00	0.000	0.969	46.1	66.7	76.6	Bolt
TA–18	W16x100	Cyclic	5.188	1.000	0.875	15.5	4	2.50	0.000	0.969	46.1	66.7	76.6	Bolt
TA–19	W16x100	Cyclic	5.188	1.000	0.875	15.5	4	3.00	0.000	0.969	46.1	66.7	76.6	Bolt
TA–20	W16x100	Cyclic	5.188	1.000	0.875	15.5	4	3.50	0.000	0.969	46.1	66.7	76.6	Bolt
TB–02	W21x93	Cyclic	4.188	0.938	0.875	15.5	8	2.50	0.000	0.781	52.5	72.3	76.6	Bolt
TB–04	W21x93	Cyclic	4.188	0.938	0.875	15.5	8	2.50	0.000	0.781	52.5	72.3	65.0	Bolt
TB–09	W21x93	Cyclic	4.188	0.938	0.875	15.5	4	2.00	0.000	0.781	52.5	72.3	76.6	Bolt

Table 7.2 (cont.) Summary of Bolted Angle and T−Stub Component Experimental Pull Tests Used to Assess Prying Strength Models

Test Case	Component	Load	Leg/ Flange Size (in)	Leg Thick-ness (in)	Bolt Dia. (in)	Width (in)	Tension Bolts	Bolt-Gage (in)	Set-back (in)	Com-ponent radii (in)	Fy (ksi)	Fu (ksi)	Bolt Cap. (kip)	Failure Mode
TB−10	W21x93	Cyclic	4.188	0.938	0.875	15.5	4	2.50	0.000	0.781	52.5	72.3	76.6	Bolt
TC−01	W33x169	Cyclic	5.750	1.250	0.875	15.5	8	2.50	0.000	1.000	56.5	75.9	75.8	Bolt
TC−02	W33x169	Cyclic	5.750	1.250	0.875	15.5	8	3.00	0.000	1.000	56.5	75.9	75.8	Bolt
TC−03	W33x169	Cyclic	5.750	1.250	0.875	15.5	8	3.50	0.000	1.000	56.5	75.9	75.8	Bolt
TC−04	W33x169	Cyclic	5.750	1.250	0.875	15.5	8	4.00	0.000	1.000	56.5	75.9	75.8	Bolt
TC−05	W33x169	Cyclic	5.750	1.250	0.875	15.5	8	2.50	0.000	1.000	56.5	75.9	65.6	Bolt
TC−07	W33x169	Cyclic	5.750	1.250	0.875	15.5	8	3.50	0.000	1.000	56.5	75.9	65.6	Bolt
TC−11	W33x169	Cyclic	5.750	1.250	1.000	15.5	8	3.50	0.000	1.000	56.5	75.9	97.1	Bolt
TC−12	W33x169	Cyclic	5.750	1.250	1.000	15.5	8	4.00	0.000	1.000	56.5	75.9	97.1	Bolt
TC−13	W33x169	Cyclic	5.750	1.250	1.000	15.5	8	2.50	0.000	1.000	56.5	75.9	81.9	Bolt
TC−15	W33x169	Cyclic	5.750	1.250	1.000	15.5	8	3.50	0.000	1.000	56.5	75.9	81.9	Bolt
SA−1	2L3.5x4x3/8	Cyclic	4.000	0.375	0.750	6.0	4	3.00	0.500	0.500	49.0	72.0	50.0	Leg
SA−2	2L3.5x4x1/2	Cyclic	4.000	0.500	0.750	6.0	4	3.00	0.500	0.500	49.0	72.0	50.0	Leg
SA−3	2L3.5x4x3/8	Cyclic	4.000	0.375	0.750	6.0	4	2.60	0.500	0.500	49.0	72.0	50.0	Leg
SA−4	2L3.5x4x3/8	Mono	4.000	0.375	0.750	6.0	4	2.60	0.500	0.500	49.0	72.0	50.0	Leg
SA−5	2L4x6x1/2	Cyclic	6.000	0.500	1.000	6.0	4	4.00	0.750	0.500	45.0	67.0	83.9	Leg
SA−6	2L4x6x3/4	Cyclic	6.000	0.750	1.000	6.0	4	4.00	0.750	0.500	41.0	63.0	83.9	Leg
SA−7	2L4x6x3/4	Cyclic	6.000	0.750	1.000	6.0	4	3.60	0.750	0.500	41.0	63.0	83.9	Leg
SA−8	2L4x6x3/4	Mono	6.000	0.750	1.000	6.0	4	3.60	0.750	0.500	41.0	63.0	83.9	Leg

Table 7.2 (cont.) Summary of Bolted Angle and T–Stub Component Experimental Pull Tests Used to Assess Prying Strength Models

Test Case	Component	Load	Leg/ Flange Size (in)	Leg Thick-ness (in)	Bolt Dia. (in)	Width (in)	Tension Bolts	Bolt Gage (in)	Set-back (in)	Com-ponent radii (in)	Fy (ksi)	Fu (ksi)	Bolt Cap. (kip)	Failure Mode
A1	18WF70	Mono	4.375	0.750	0.875	8.5	4	2.25	0.000	0.656	34.5	65.0	56.0	Bolt
A3	36WF300	Mono	8.313	1.688	0.875	8.5	4	2.25	0.000	0.469	26.0	65.0	62.0	Bolt
A4	2"Fl–1"Web	Mono	4.250	2.000	0.875	8.5	4	2.25	0.000	0.000	31.1	65.0	59.0	Bolt
A5	18WF70	Mono	4.375	0.750	1.125	8.5	4	2.25	0.000	0.656	33.3	65.0	102.0	Flange
A7	36WF300	Mono	8.313	1.688	1.125	8.5	4	2.25	0.000	0.469	27.0	65.0	102.0	Bolt
A9	18WF70	Mono	4.375	0.750	0.875	8.5	4	2.25	0.000	0.656	34.5	65.0	56.0	Bolt
A10	24 I 105.9	Mono	3.938	1.125	0.875	8.5	4	2.25	0.000	0.313	31.1	65.0	61.0	Bolt
A10S	24 I 105.9	Mono	3.938	1.125	0.875	8.5	4	2.25	0.000	0.313	31.1	65.0	61.0	Flange
A11	36WF300	Mono	8.313	1.688	0.875	8.5	4	2.25	0.000	0.469	26.0	65.0	61.7	Bolt
A11S	36WF300	Mono	8.313	1.688	0.875	8.5	4	2.25	0.000	0.469	26.0	65.0	61.7	Bolt
A12	2"Fl–1"Web	Mono	4.250	2.000	0.875	8.5	4	2.25	0.000	0.000	31.1	65.0	59.7	Bolt
A15	36WF300	Mono	8.313	1.688	1.125	8.5	4	2.25	0.000	0.469	27.0	65.0	100.0	Bolt
H210–8	2L4x4x3/8	Mono	4.000	0.375	0.750	6.0	4	2.50	0.500	0.375	54.0	78.0	50.0	Leg
H210–9	2L4x4x3/8	Mono	4.000	0.375	0.750	6.0	4	2.50	0.500	0.375	54.0	78.0	50.0	Leg
H210–12	2L4x4x3/8	Mono	4.000	0.375	0.750	6.0	4	2.50	0.500	0.375	54.0	78.0	50.0	Leg
H208–12	2L4x4x5/16	Mono	4.000	0.313	0.750	6.0	4	2.50	0.500	0.375	48.0	72.0	50.0	Leg
H208–15	2L4x4x5/16	Mono	4.000	0.313	0.750	6.0	4	2.50	0.500	0.375	48.0	72.0	50.0	Leg
H208–16	2L4x4x5/16	Mono	4.000	0.313	0.750	6.0	4	2.50	0.500	0.375	48.0	73.0	50.0	Leg
H208–17	2L4x4x5/16	Mono	4.000	0.313	0.750	6.0	4	2.50	0.500	0.375	48.0	73.0	50.0	Leg

Table 7.3 Comparison of Bolted Angle and T–Stub Component Experimental Pull Tests Ultimate Capacity with Prying Models

Test Case	Component	Loading	Failure Mode	Capacity (kip)	AISC Model (kip)	AISC w/ Fu Model (kip)	Eurocode Model (kip)	Hybrid Model (kip)	Modified Eurocode Model (kip)	Modified Hybrid Model (kip)
CA–01	L8x4x1	Cyclic	Bolt	108.3	113.9	126.2	95.3	113.9	95.3	113.9
CA–02	L8x6x1	Cyclic	Bolt	125.3	121.7	131.3	107.2	121.7	107.2	121.7
CA–04	L8x6x1	Cyclic	Bolt	84.3	63.4	88.2	62.9	63.4	74.2	86.0
CA–09	L8x4x1	Cyclic	Bolt	125.2	127.2	157.5	110.0	127.2	116.8	145.3
CA–10	L8x6x1	Cyclic	Bolt	159.3	127.2	166.8	110.0	127.2	135.1	157.2
CA–12	L8x6x1	Cyclic	Bolt	109.2	63.6	88.5	62.9	63.6	92.4	110.6
CA–14	L8x6x1	Cyclic	Bolt	136.8	127.2	145.9	110.0	127.2	117.7	136.3
CA–16	L8x6x1	Cyclic	Bolt	95.2	63.6	88.5	62.9	63.6	81.0	96.3
CA–17	L8x6x1	Cyclic	Bolt	120.9	121.7	131.3	107.2	121.7	107.2	121.7
CA–18	L8x6x1	Cyclic	Bolt	119.2	121.7	131.3	107.2	121.7	107.2	121.7
TA–03	W16x100	Cyclic	Bolt	451.1	275.3	398.4	429.8	507.6	436.0	474.8
TA–04	W16x100	Cyclic	Bolt	388.9	225.8	326.8	330.4	364.1	361.4	400.8
TA–07	W16x100	Mono	Bolt	434.0	275.3	398.4	429.8	507.6	436.0	474.8
TA–17	W16x100	Cyclic	Bolt	315.4	297.3	306.4	306.4	306.4	306.4	306.4
TA–18	W16x100	Cyclic	Bolt	291.7	268.0	300.5	306.4	306.4	306.4	306.4
TA–19	W16x100	Cyclic	Bolt	257.4	236.8	269.3	265.7	301.6	265.7	280.5
TA–20	W16x100	Cyclic	Bolt	234.7	205.5	238.1	227.1	261.9	227.1	243.5
TB–02	W21x93	Cyclic	Bolt	464.8	353.0	459.4	461.5	552.3	461.5	513.2
TB–04	W21x93	Cyclic	Bolt	405.7	353.0	409.0	410.0	487.0	410.0	452.2
TB–09	W21x93	Cyclic	Bolt	315.1	297.4	306.4	306.4	306.4	306.4	306.4

Table 7.3 (cont.) Comparison of Bolted Angle and T–Stub Component Experimental Pull Tests Ultimate Capacity with Prying Models

Test Case	Component	Loading	Failure Mode	Capacity (kip)	AISC Model (kip)	AISC w/ Fu Model (kip)	Eurocode Model (kip)	Hybrid Model (kip)	Modified Eurocode Model (kip)	Modified Hybrid Model (kip)
TB–10	W21x93	Cyclic	Bolt	277.1	258.2	292.8	291.3	306.4	291.3	306.4
TC–01	W33x169	Cyclic	Bolt	584.7	532.6	581.0	606.4	606.4	606.4	606.4
TC–02	W33x169	Cyclic	Bolt	525.4	484.1	527.5	537.9	606.4	537.9	569.7
TC–03	W33x169	Cyclic	Bolt	468.2	428.0	471.5	480.6	542.9	480.6	507.2
TC–04	W33x169	Cyclic	Bolt	417.0	371.9	415.4	409.5	471.7	409.5	440.7
TC–05	W33x169	Cyclic	Bolt	543.4	479.9	524.8	524.8	524.8	524.8	524.8
TC–07	W33x169	Cyclic	Bolt	446.3	387.4	430.9	437.5	491.4	437.5	459.1
TC–11	W33x169	Cyclic	Bolt	580.7	444.5	565.1	570.6	661.7	570.6	618.2
TC–12	W33x169	Cyclic	Bolt	512.6	374.1	493.3	479.4	570.6	479.4	533.0
TC–13	W33x169	Cyclic	Bolt	633.2	572.6	621.0	655.2	655.2	655.2	655.2
TC–15	W33x169	Cyclic	Bolt	516.4	444.5	503.3	506.4	583.2	506.4	544.9
SA–1	2L3.5x4x3/8	Cyclic	Leg	53.1	14.7	21.6	14.7	14.7	44.1	44.0
SA–2	2L3.5x4x1/2	Cyclic	Leg	98.0	26.8	39.3	26.7	26.8	63.1	80.3
SA–3	2L3.5x4x3/8	Cyclic	Leg	55.1	17.5	25.8	17.1	17.5	51.4	52.6
SA–4	2L3.5x4x3/8	Mono	Leg	70.1	17.5	25.8	17.1	17.5	51.4	52.6
SA–5	2L4x6x1/2	Cyclic	Leg	78.0	17.1	25.5	18.0	17.1	54.0	51.3
SA–6	2L4x6x3/4	Cyclic	Leg	132.2	36.4	56.0	38.2	36.4	114.5	109.3
SA–7	2L4x6x3/4	Cyclic	Leg	150.2	41.8	64.2	42.9	41.8	128.7	125.4
SA–8	2L4x6x3/4	Mono	Leg	148.2	41.8	64.2	42.9	41.8	128.7	125.4

Table 7.3 (cont.) Comparison of Bolted Angle and T–Stub Component Experimental Pull Tests Ultimate Capacity with Prying Models

Test Case	Component	Loading	Failure Mode	Capacity (kip)	AISC Model (kip)	AISC w/ Fu Model (kip)	Eurocode Model (kip)	Hybrid Model (kip)	Modified Eurocode Model (kip)	Modified Hybrid Model (kip)
A1	18WF70	Mono	Bolt	176.0	92.1	173.5	128.1	172.7	152.9	178.5
A3	36WF300	Mono	Bolt	256.0	243.4	248.0	248.0	248.0	248.0	248.0
A4	2"Fl–1"Web	Mono	Bolt	219.0	236.0	236.0	236.0	236.0	236.0	236.0
A5	18WF70	Mono	Flange	224.0	93.3	182.0	123.7	188.9	254.2	319.2
A7	36WF300	Mono	Bolt	392.0	365.5	408.0	381.6	408.0	381.6	408.0
A9	18WF70	Mono	Bolt	177.0	92.1	173.5	128.1	172.7	152.9	178.5
A10	24 I 105.9	Mono	Bolt	240.0	189.2	239.5	189.1	223.9	189.1	217.3
A10S	24 I 105.9	Mono	Flange	220.0	189.2	239.5	189.1	223.9	189.1	217.3
A11	36WF300	Mono	Bolt	256.0	242.6	246.8	246.8	246.8	246.8	246.8
A11S	36WF300	Mono	Bolt	254.0	242.6	246.8	246.8	246.8	246.8	246.8
A12	2"Fl–1"Web	Mono	Bolt	245.0	238.8	238.8	238.8	238.8	238.8	238.8
A15	36WF300	Mono	Bolt	404.0	359.9	400.0	377.1	400.0	377.1	400.0
H210–8	2L4x4x3/8	Mono	Leg	65.0	20.3	29.4	19.7	20.3	59.1	61.0
H210–9	2L4x4x3/8	Mono	Leg	59.0	20.3	29.4	19.7	20.3	59.1	61.0
H210–12	2L4x4x3/8	Mono	Leg	62.0	20.3	29.4	19.7	20.3	59.1	61.0
H208–12	2L4x4x5/16	Mono	Leg	80.0	12.4	18.5	12.0	12.4	36.0	37.1
H208–15	2L4x4x5/16	Mono	Leg	79.0	12.4	18.5	12.0	12.4	36.0	37.1
H208–16	2L4x4x5/16	Mono	Leg	55.0	12.4	18.8	12.0	12.4	36.0	37.1
H208–17	2L4x4x5/16	Mono	Leg	57.0	12.4	18.8	12.0	12.4	36.0	37.1

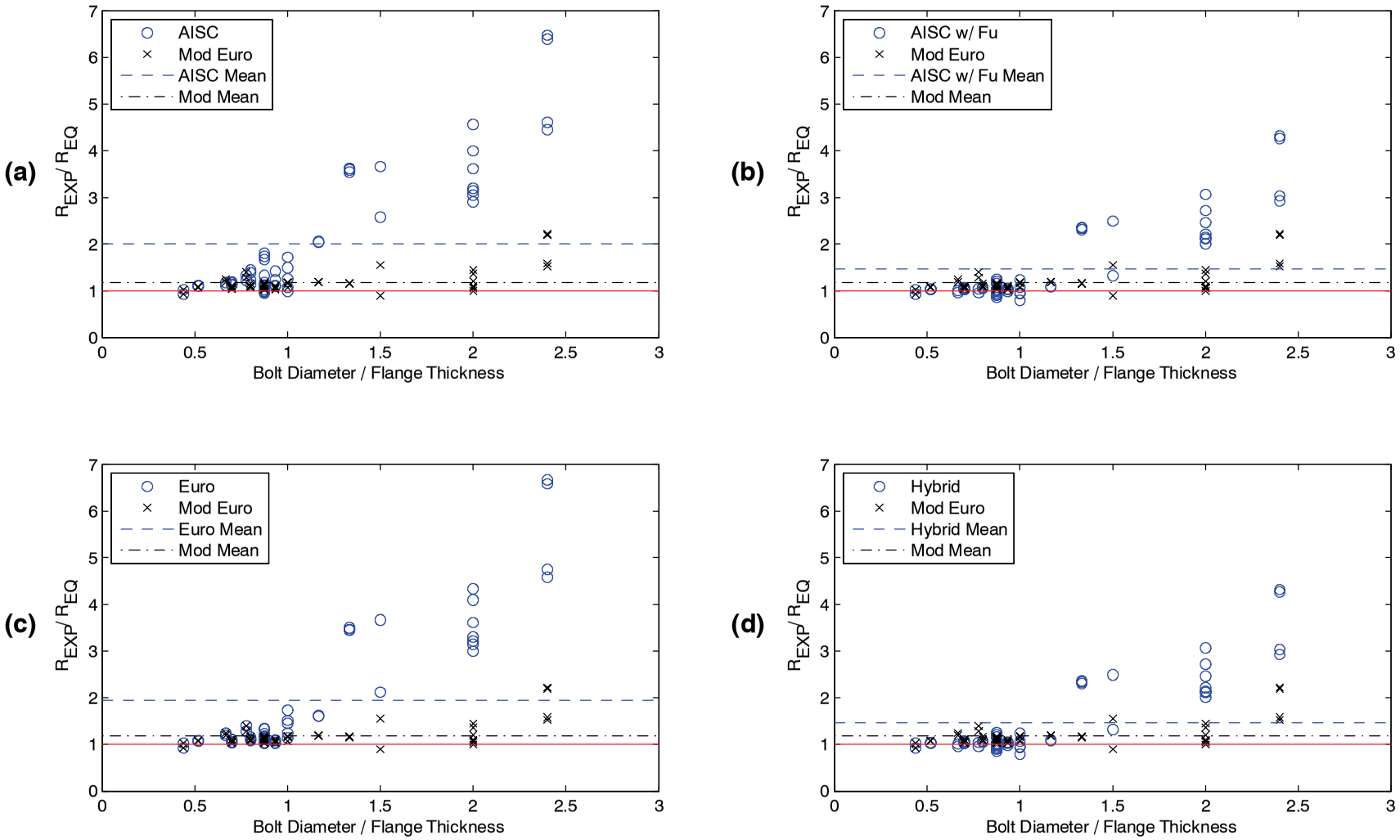


Figure 7.31 Ratio of tested strength to proposed Modified Eurocode prying strength model capacity plotted against bolt diameter to angle leg thickness ratio and compared to the (a) AISC, (b) AISC with Fu, (c) Eurocode, and (d) Hybrid prying strength models.

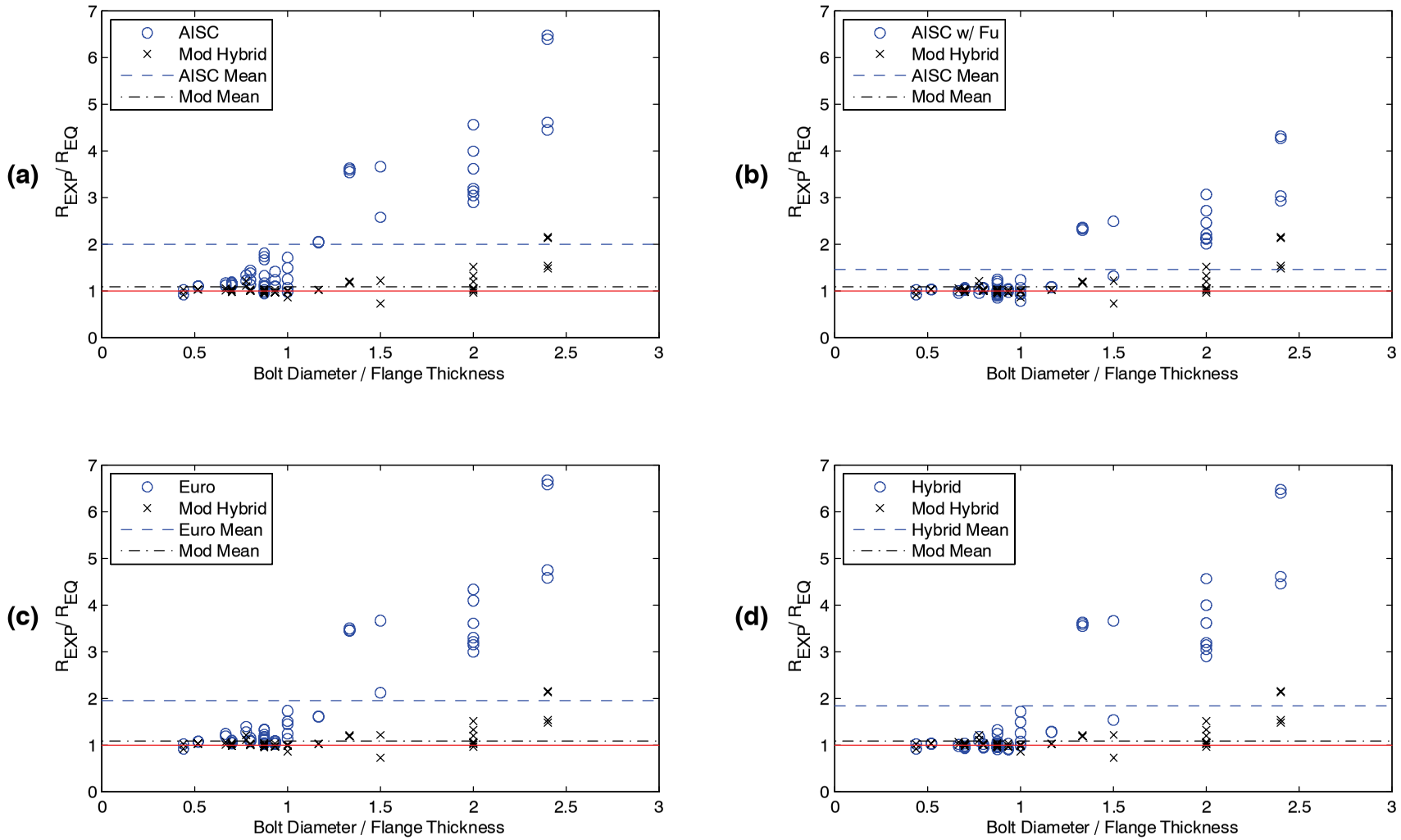
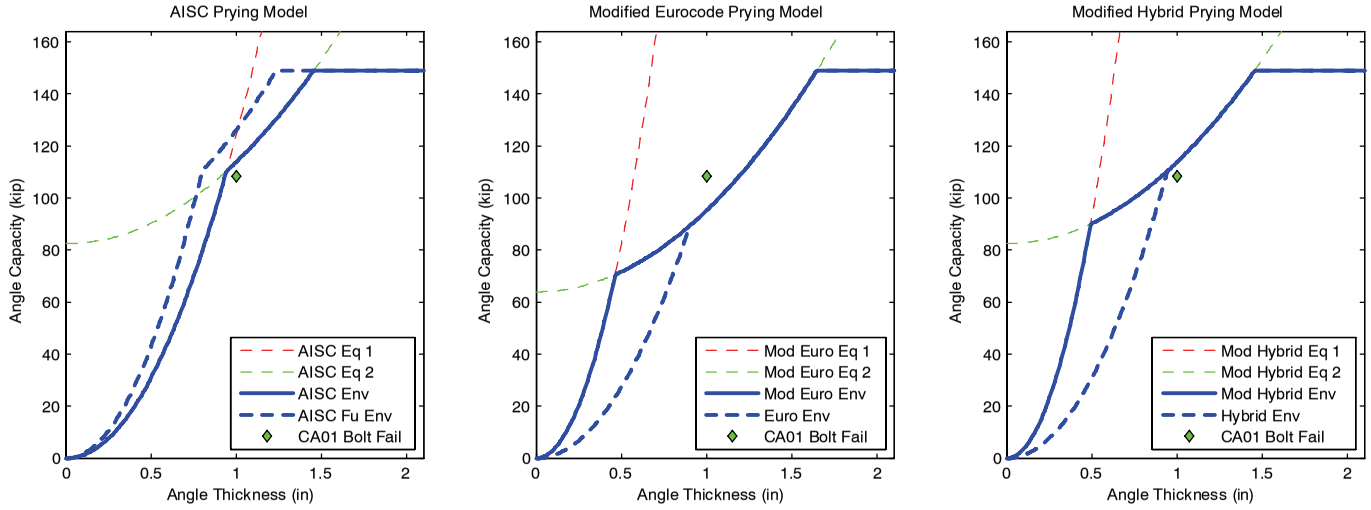


Figure 7.32 Ratio of tested strength to proposed Modified Hybrid prying strength model capacity plotted against bolt diameter to angle leg thickness ratio and compared to the (a) AISC, (b) AISC with Fu, (c) Eurocode, and (d) Hybrid prying strength models.

Table 7.4 Summary of Prying Strength Models Prediction R_{EXP}/R_{EQ} Ratios Experimental Data				
Prying Strength Model	**Min**	**Max**	**Mean**	**Standard Deviation**
AISC	0.93	6.48	2.00	1.37
AISC using F_u	0.79	4.32	1.47	0.83
Eurocode	0.93	6.67	1.95	1.41
Hybrid	0.90	6.48	1.84	1.44
Modified Eurocode	0.90	2.22	1.18	0.24
Modified Hybrid	0.73	2.16	1.09	0.24

(a)



(b)

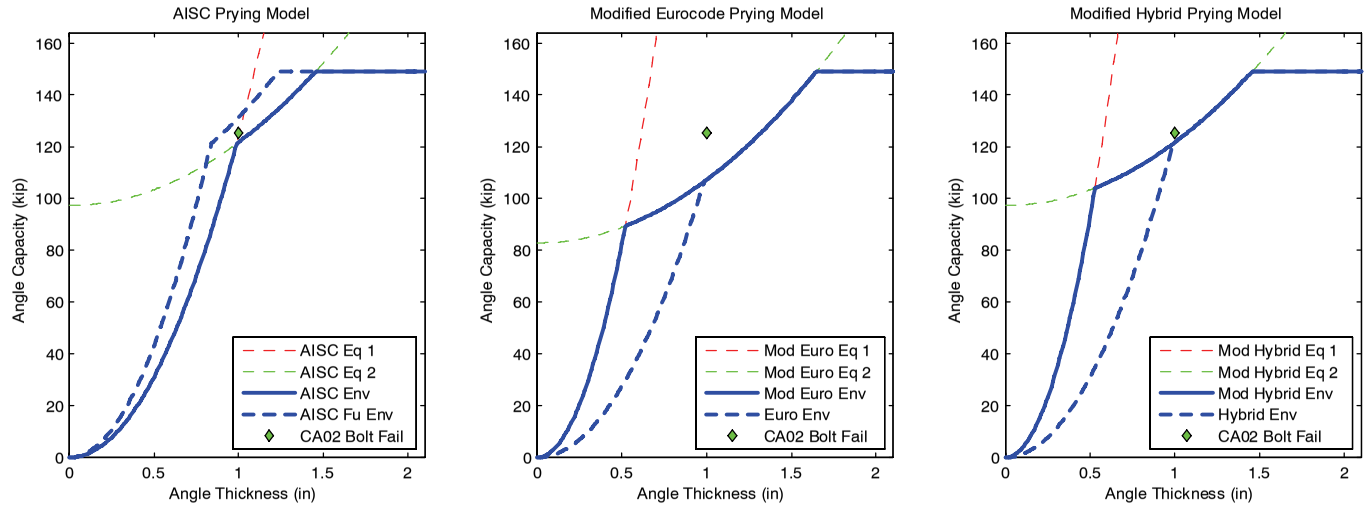


Figure 7.33 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) CA-01 and (b) CA-02 per Swanson [103].

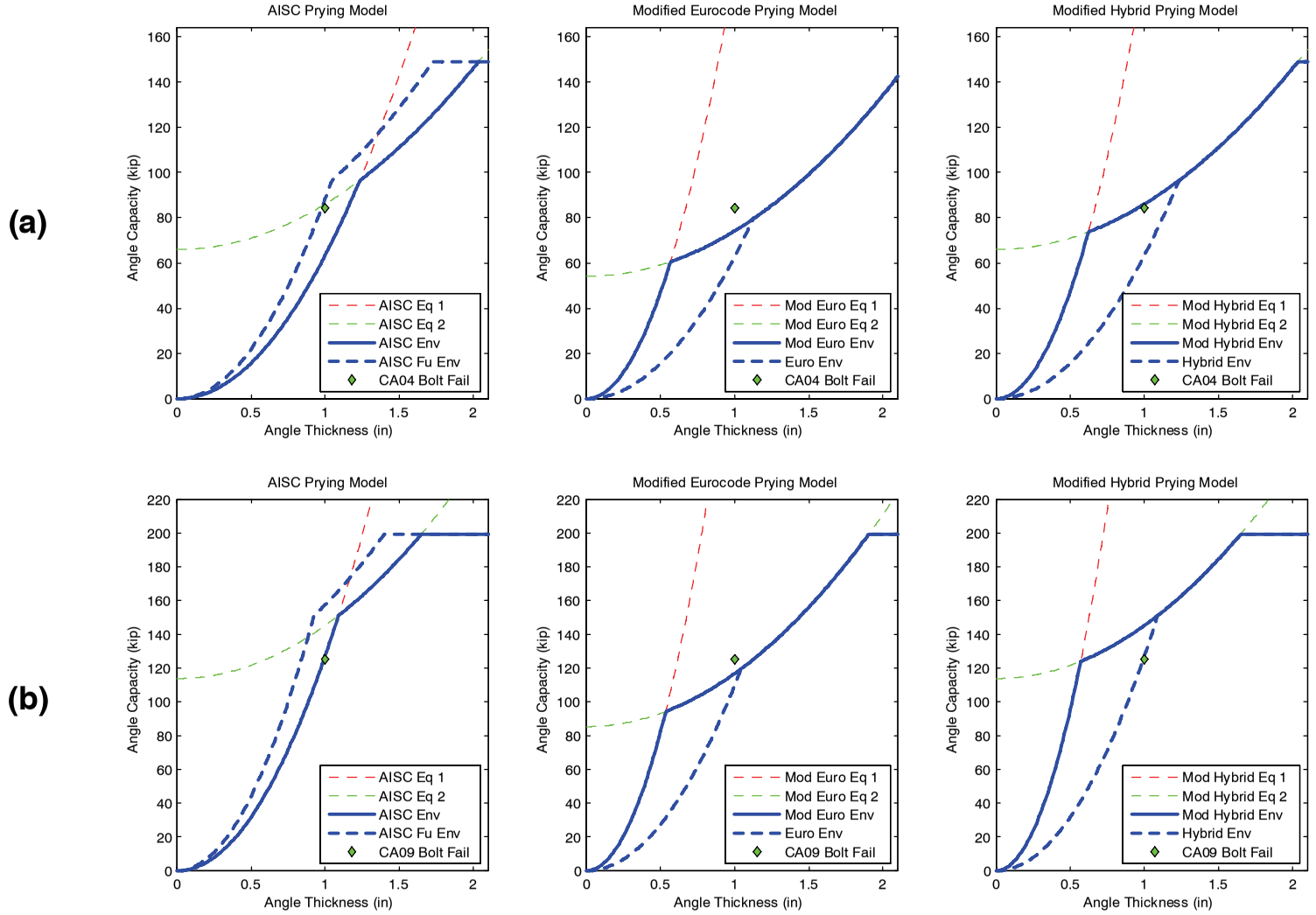


Figure 7.34 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) CA-04 and (b) CA-09 per Swanson [103].

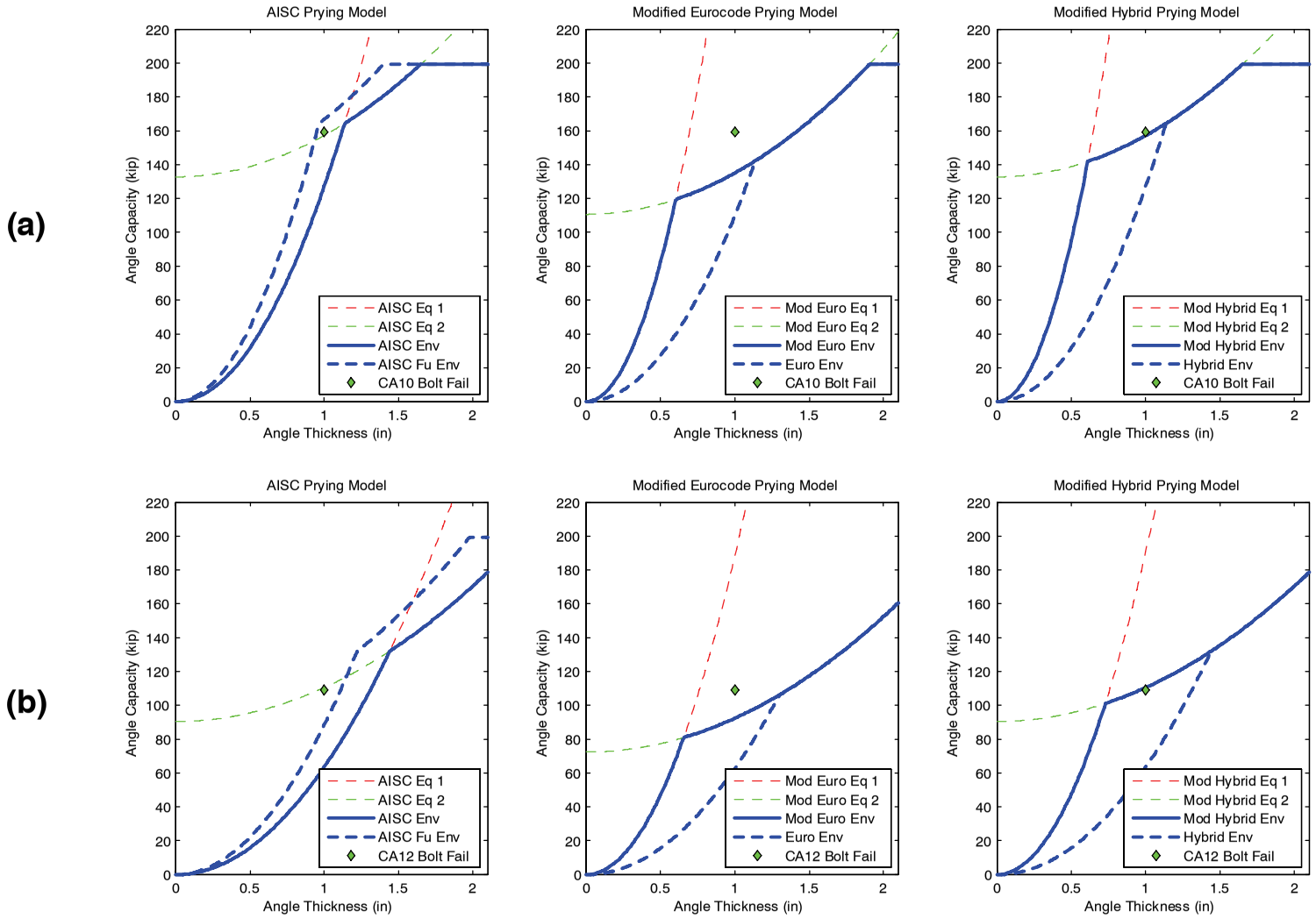
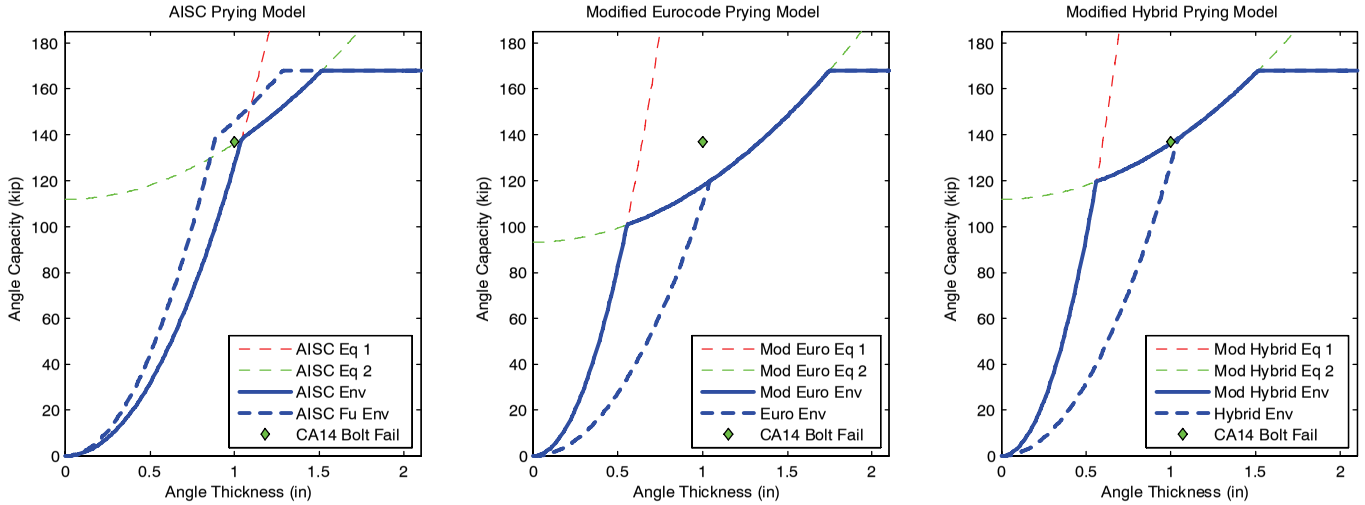


Figure 7.35 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) CA-10 and (b) CA-12 per Swanson [103].

(a)



(b)

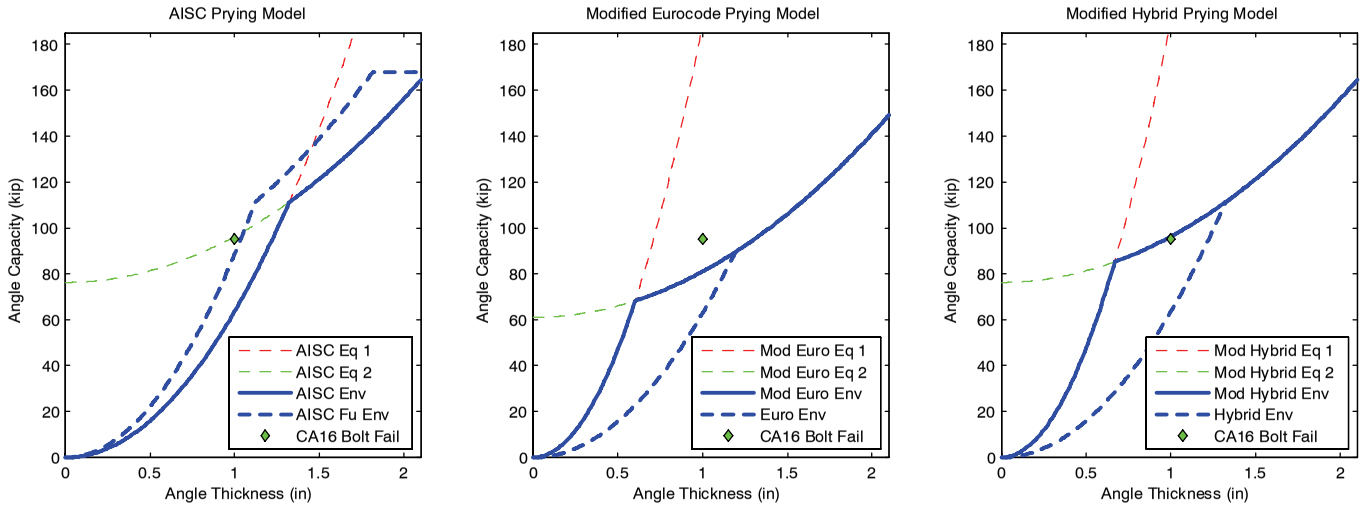
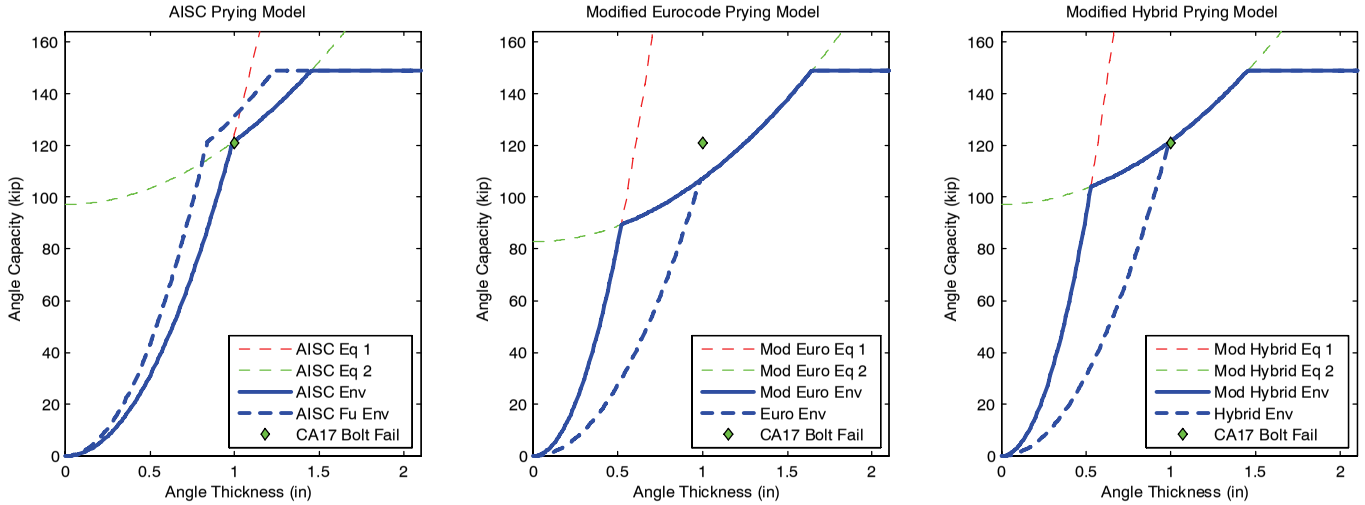


Figure 7.36 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) CA-14 and (b) CA-16 per Swanson [103].

(a)



(b)

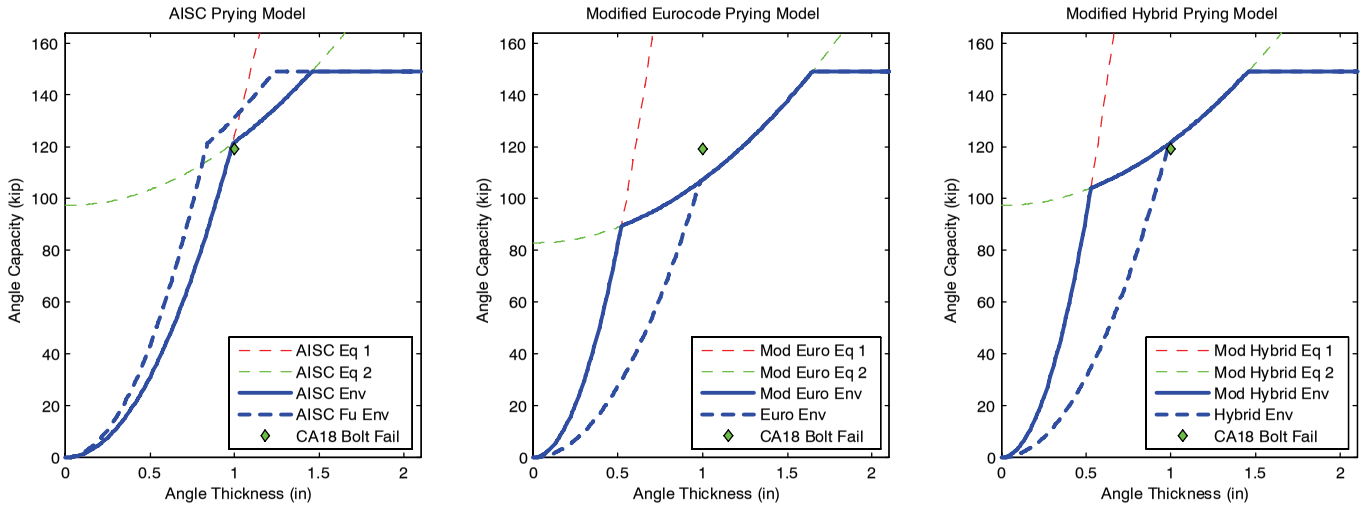


Figure 7.37 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) CA-17 and (b) CA-18 per Swanson [103].

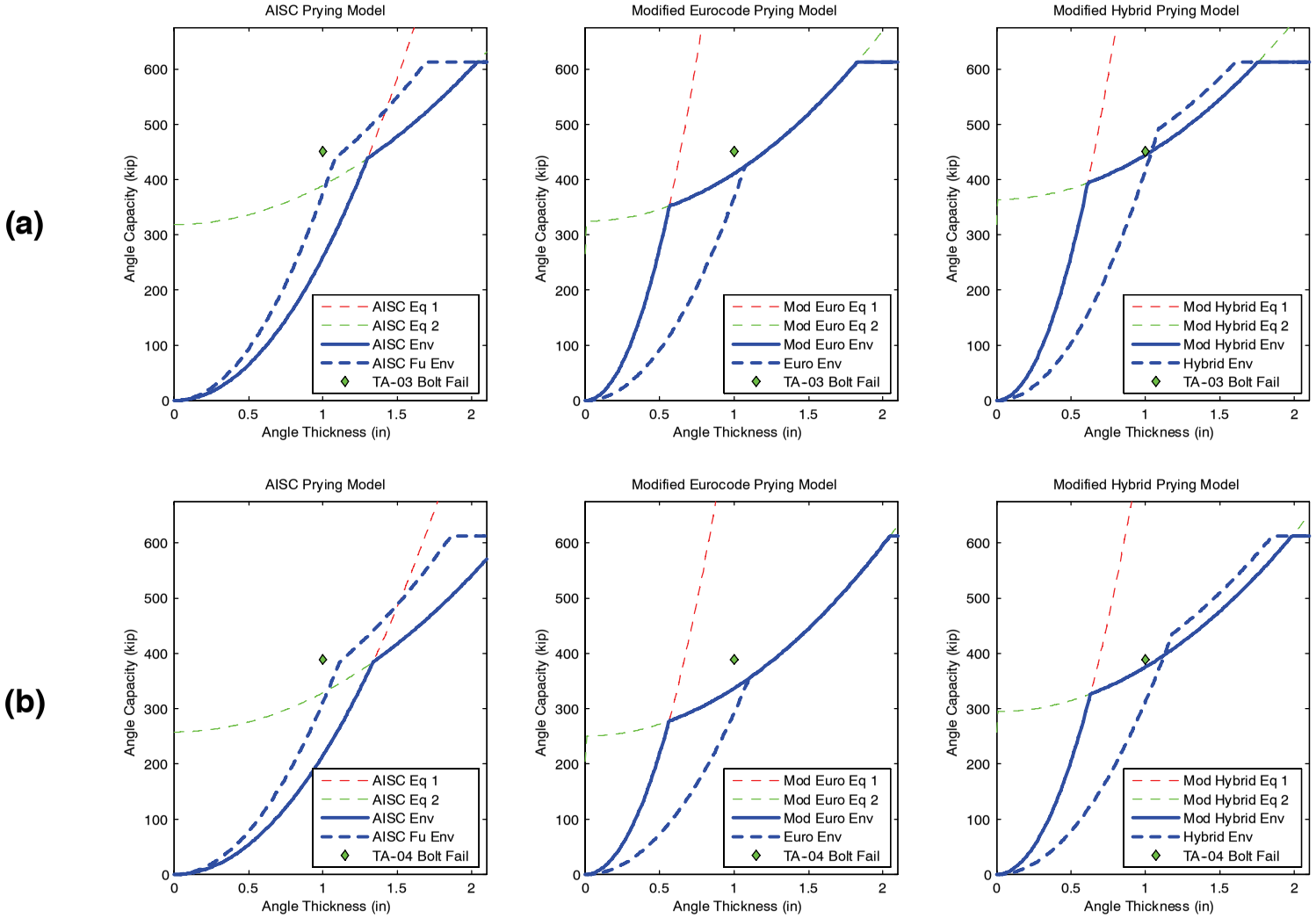


Figure 7.38 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) TA-03 and (b) TA-04 per Swanson [103].

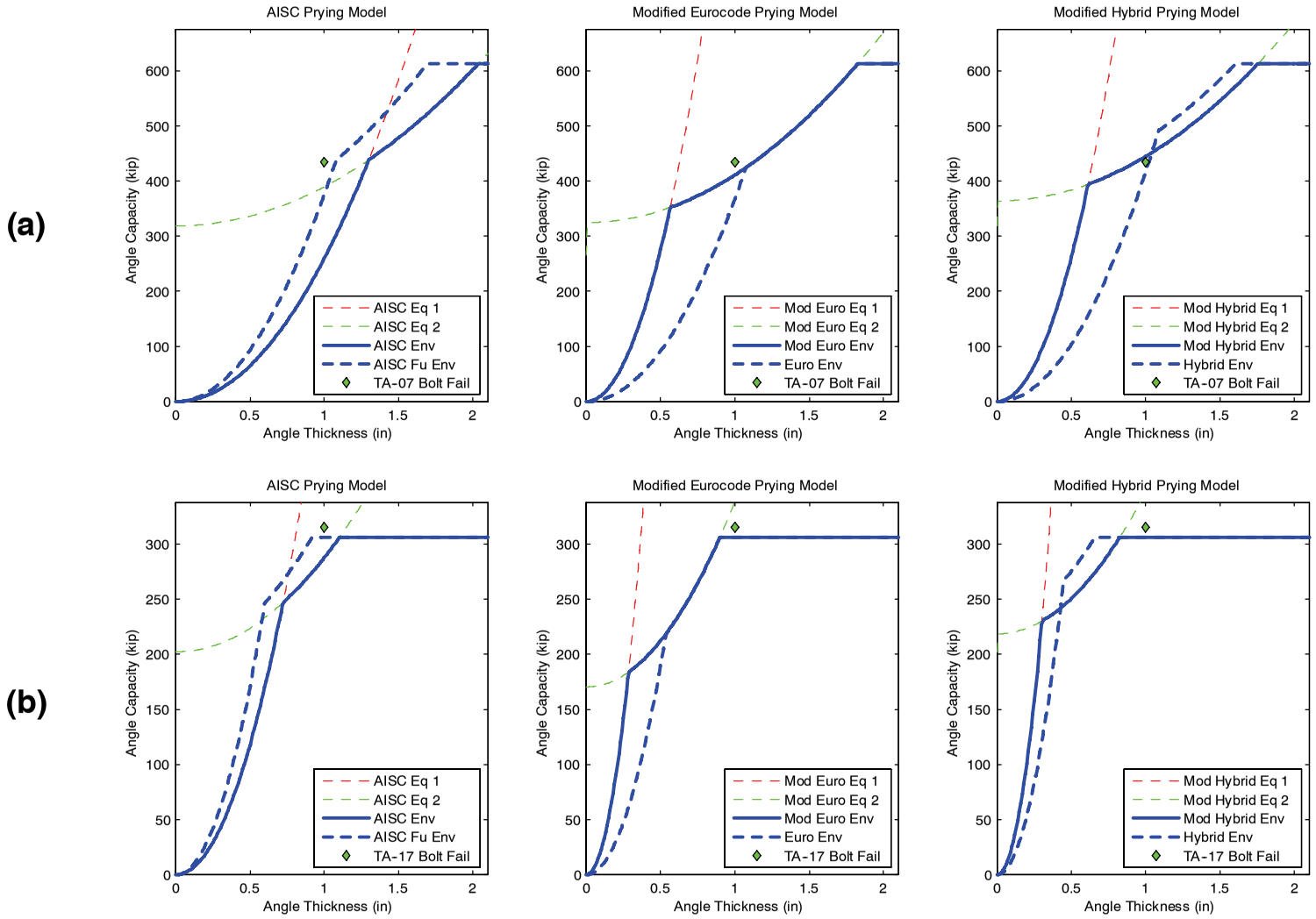


Figure 7.39 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) TA-07 and (b) TA-17 per Swanson [103].

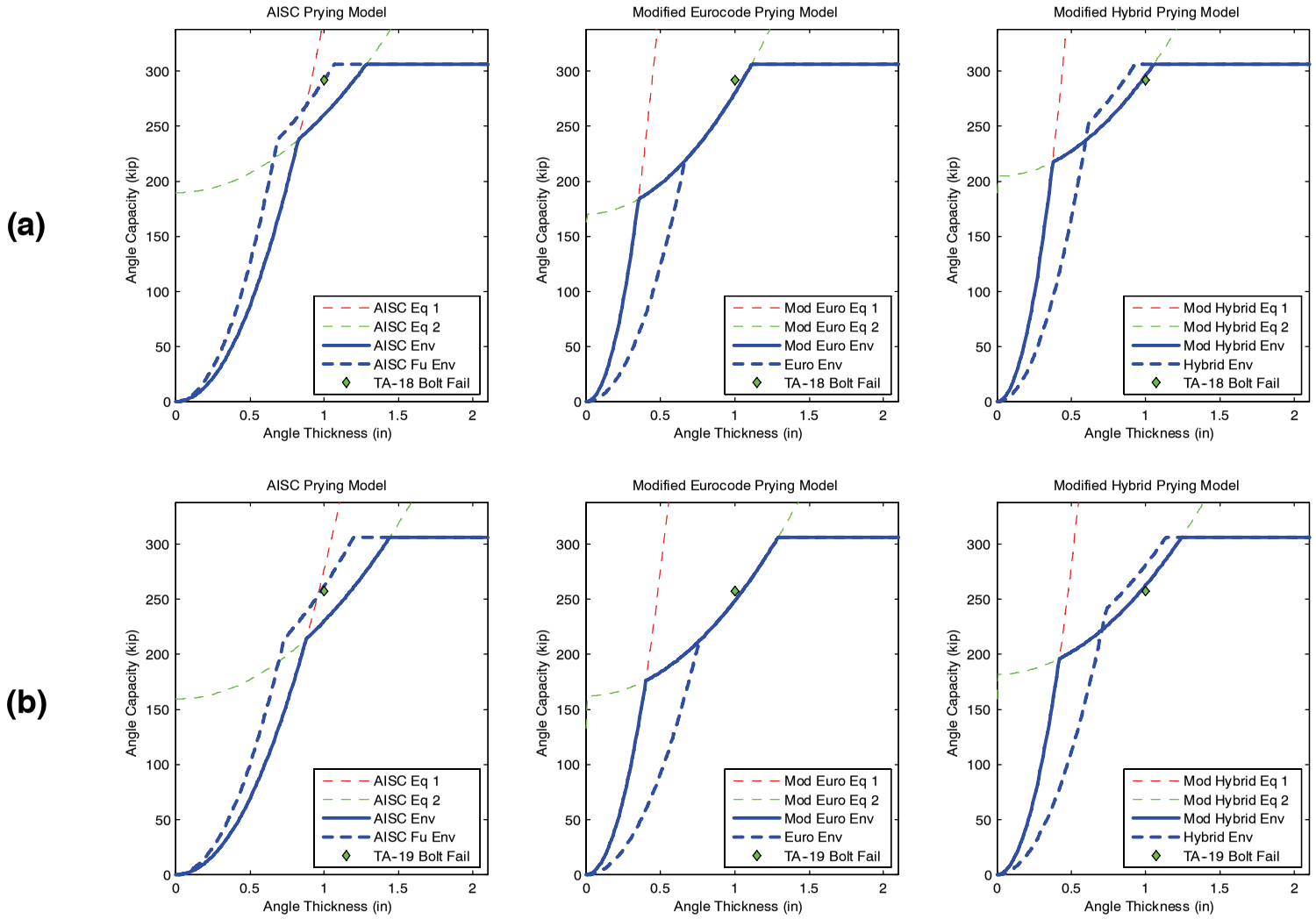
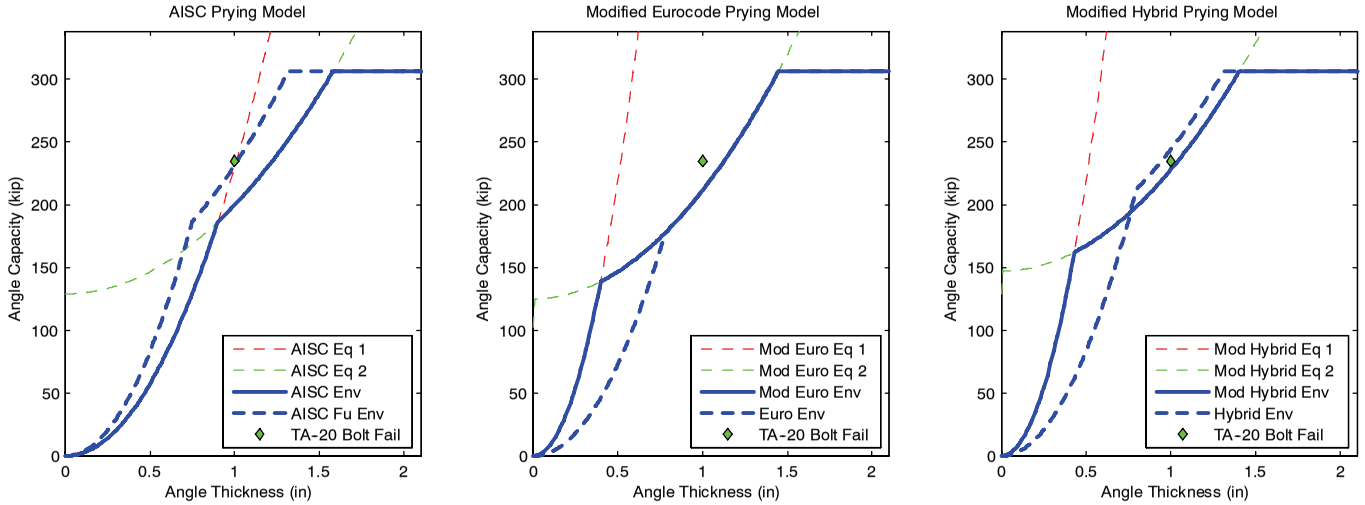


Figure 7.40 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) TA-18 and (b) TA-19 per Swanson [103].

(a)



(b)

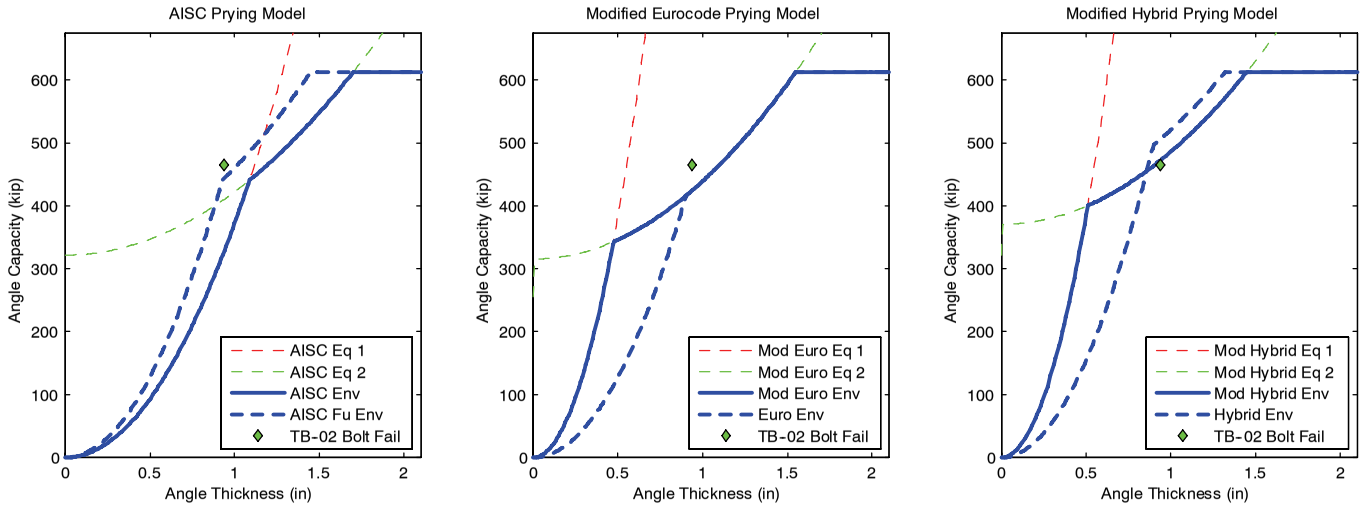


Figure 7.41 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) TA-20 and (b) TB-02 per Swanson [103].

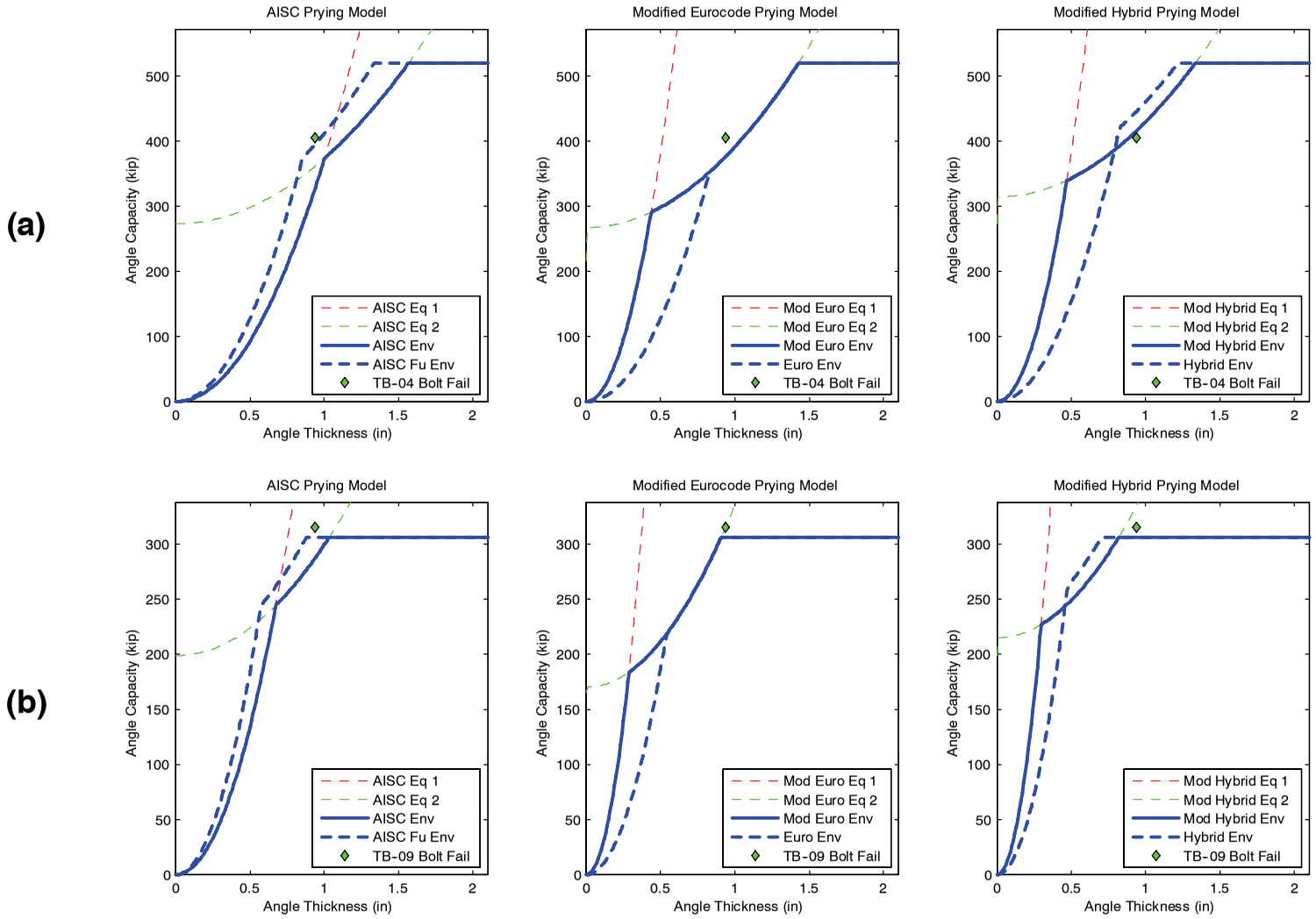
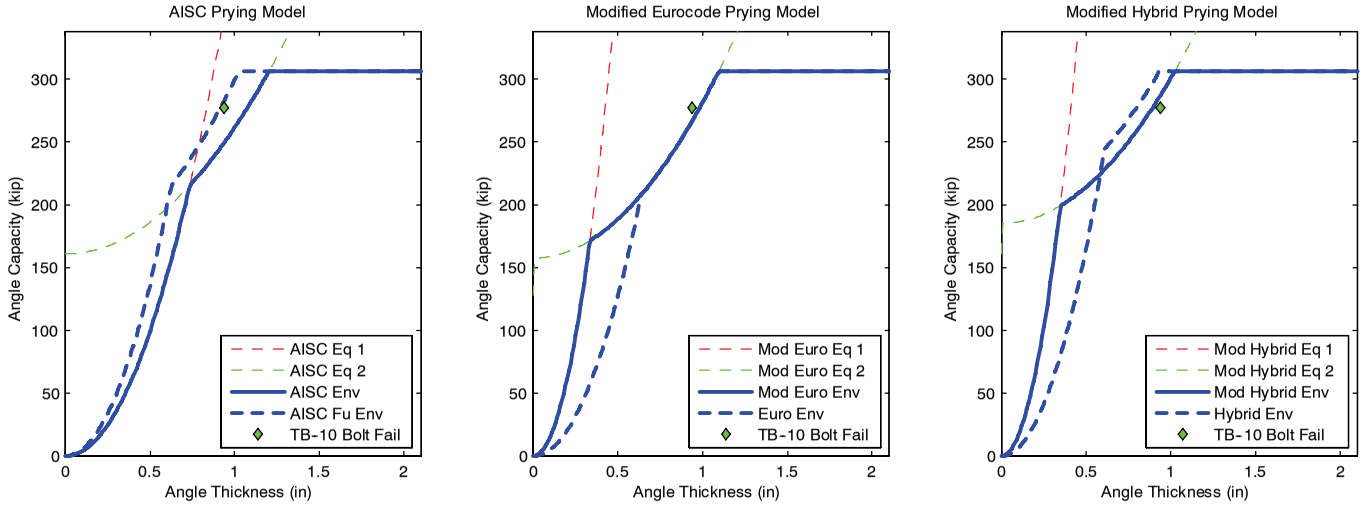


Figure 7.42 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) TB-04 and (b) TB-09 per Swanson [103].

(a)



(b)

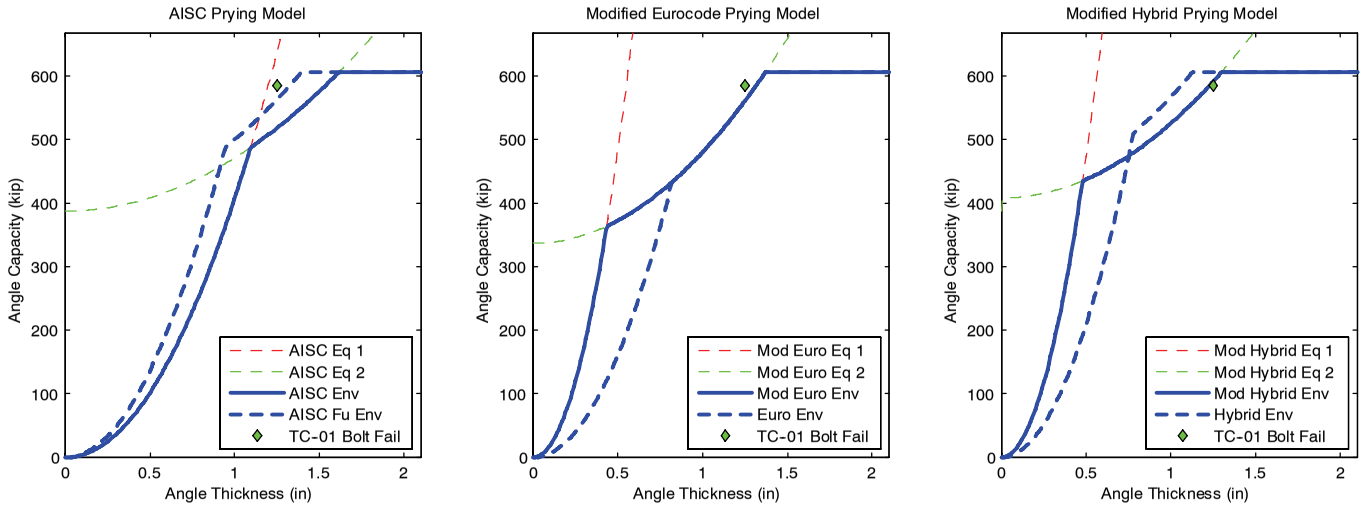


Figure 7.43 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) TB-10 and (b) TC-01 per Swanson [103].

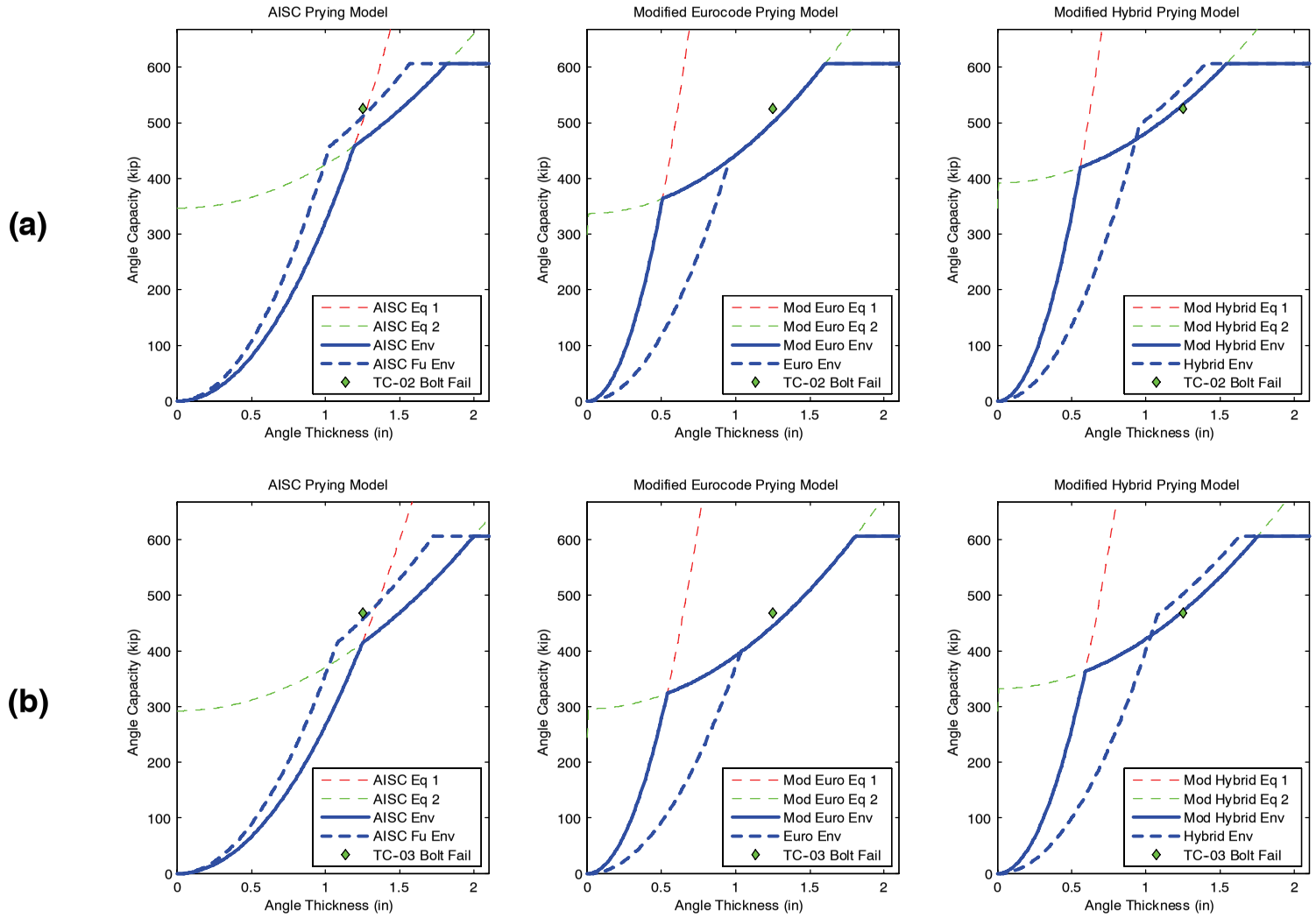
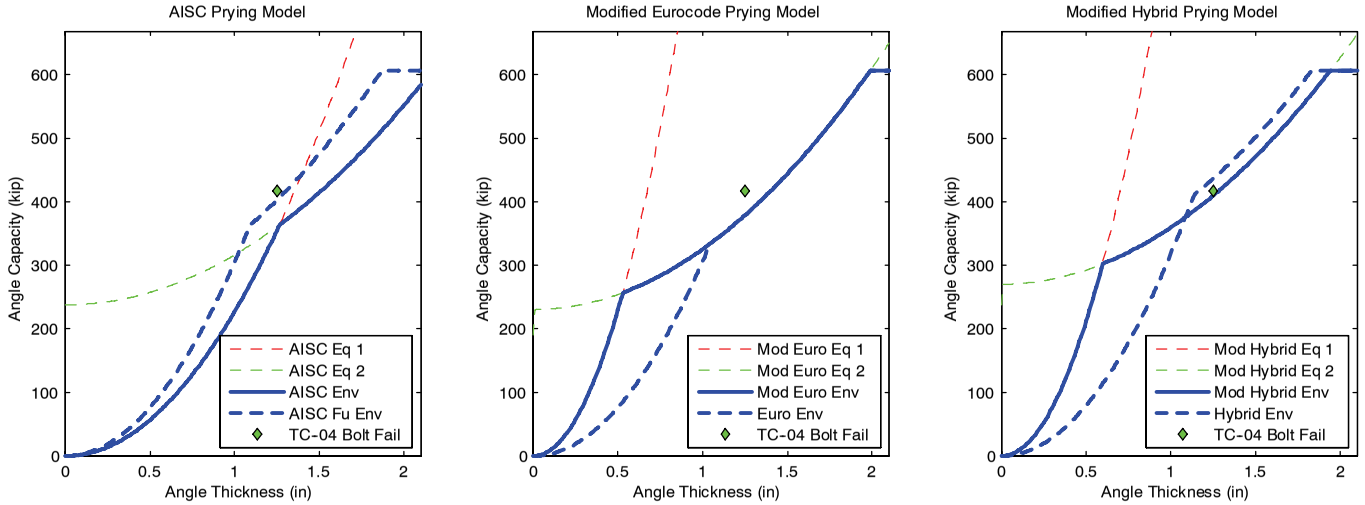


Figure 7.44 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) TC-02 and (b) TC-03 per Swanson [103].

(a)



(b)

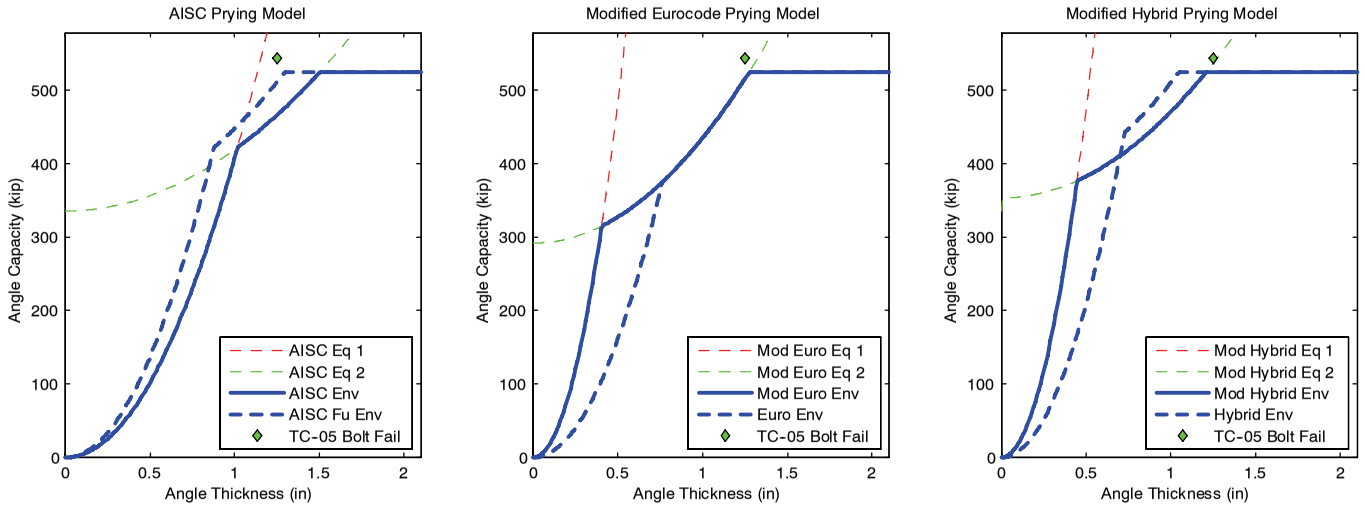
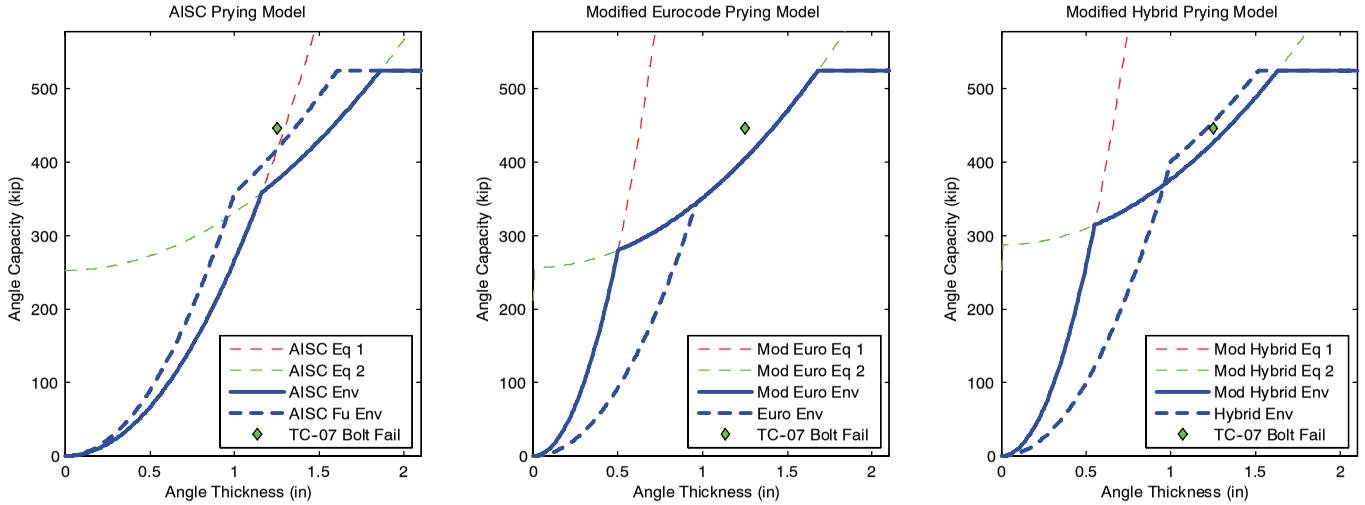


Figure 7.45 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) TC-04 and (b) TC-05 per Swanson [103].

(a)



(b)

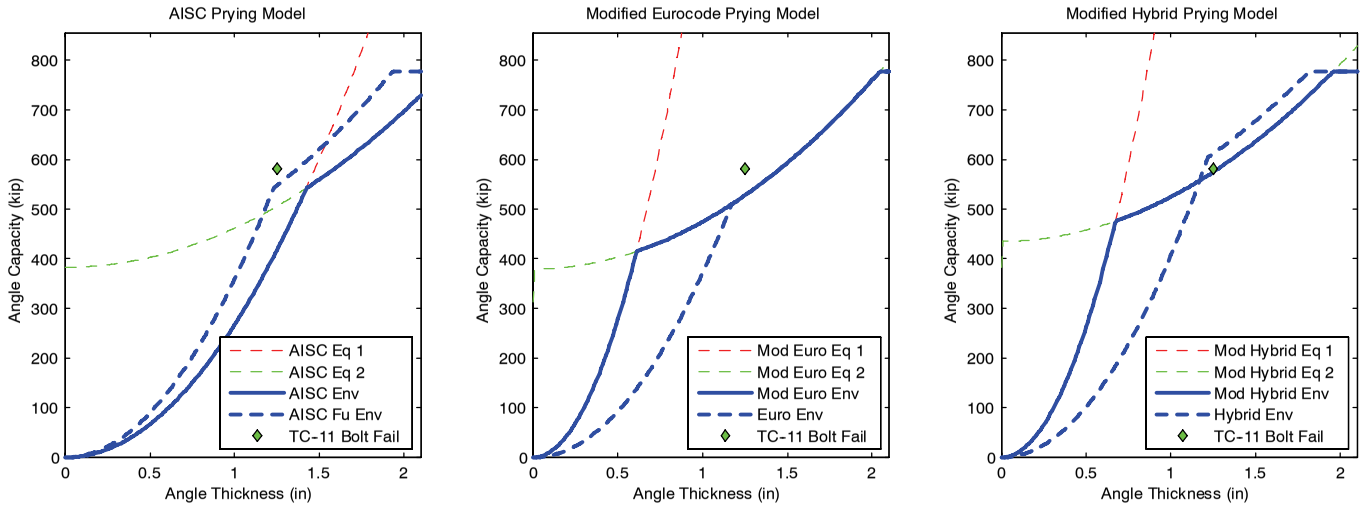


Figure 7.46 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) TC-07 and (b) TC-11 per Swanson [103].

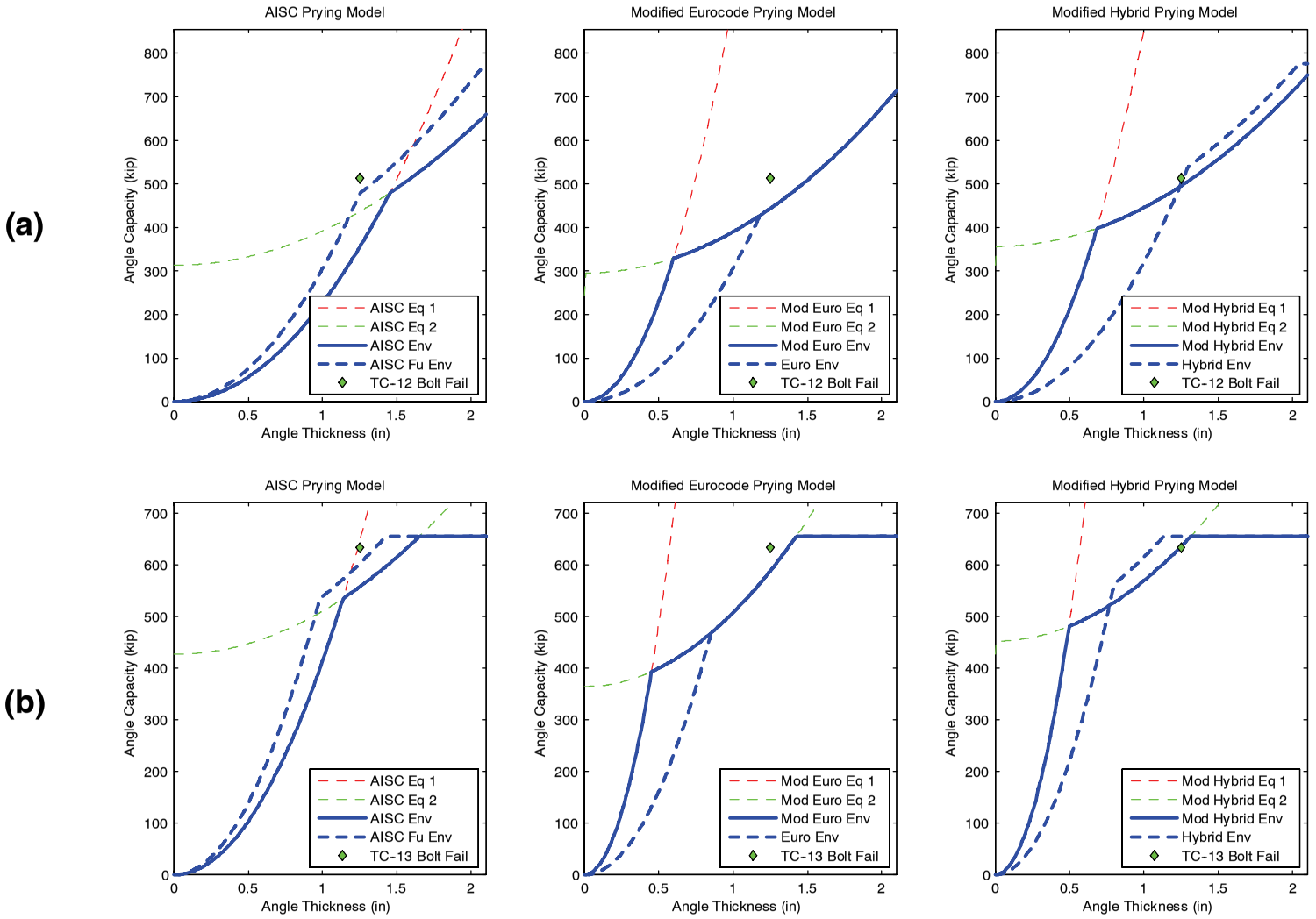
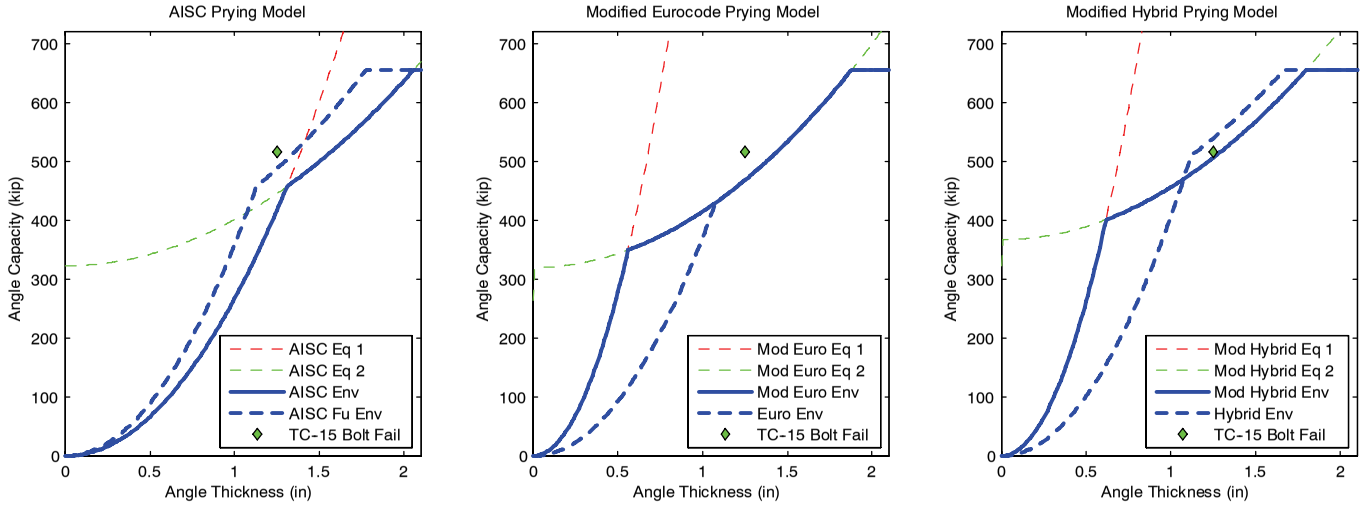


Figure 7.47 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) TC-12 and (b) TC-13 per Swanson [103].

(a)



(b)

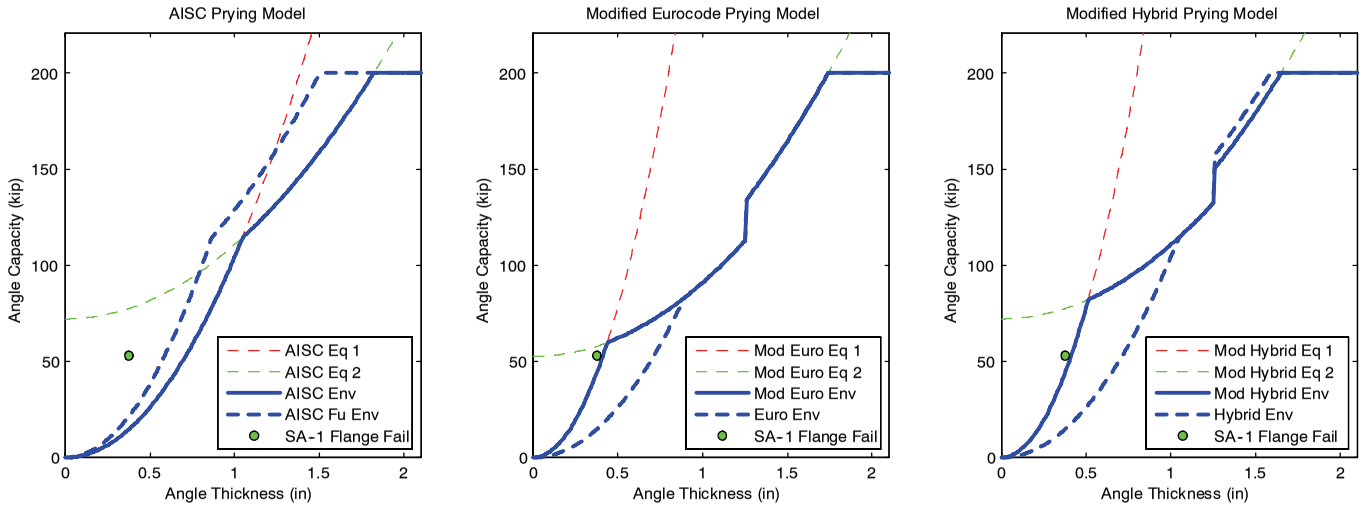


Figure 7.48 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) TC-15 per Swanson [103] and (b) SA-1 per Shen and Astaneh [92].

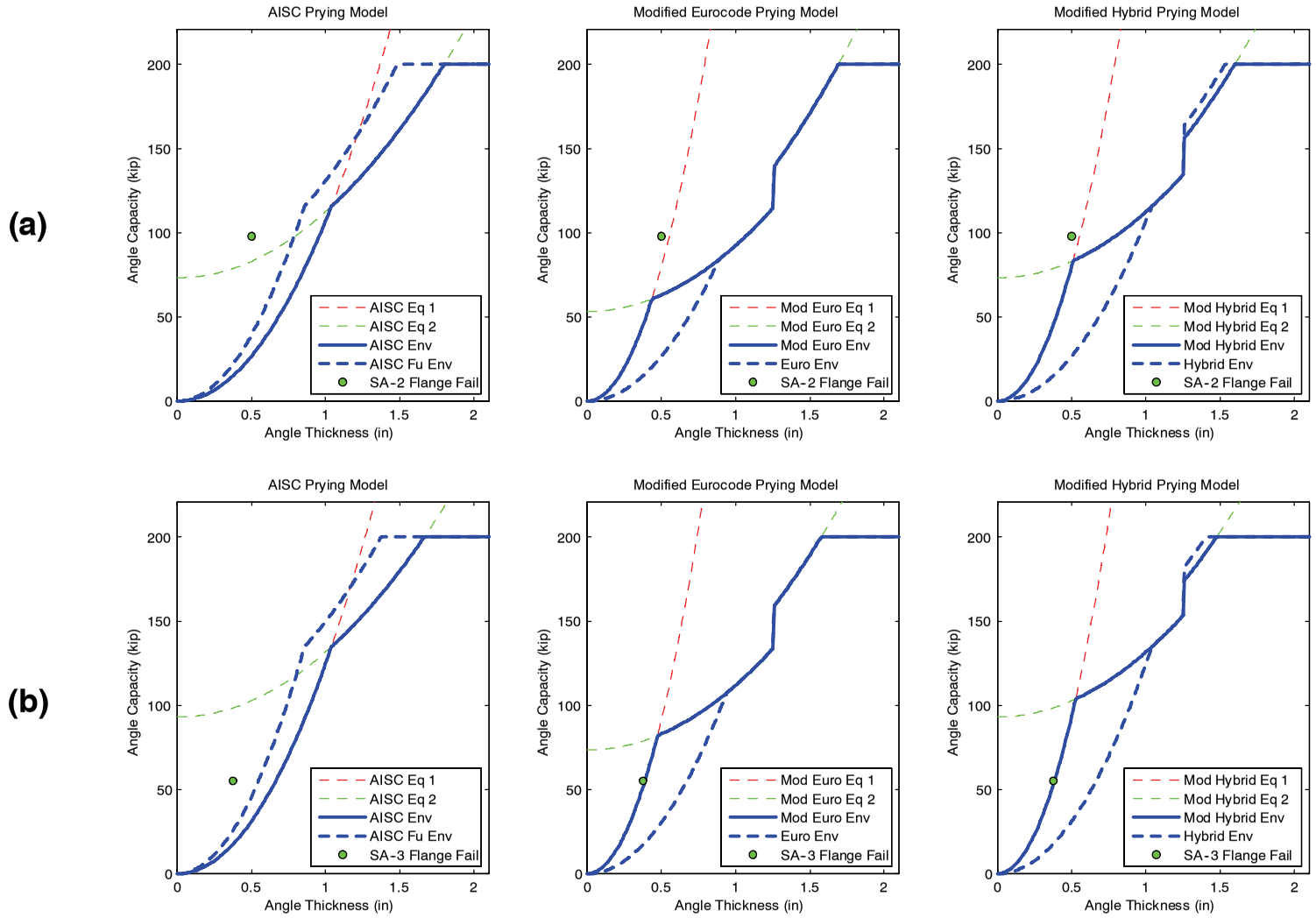


Figure 7.49 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) SA-2 and (b) SA-3 per Shen and Astaneh [92].

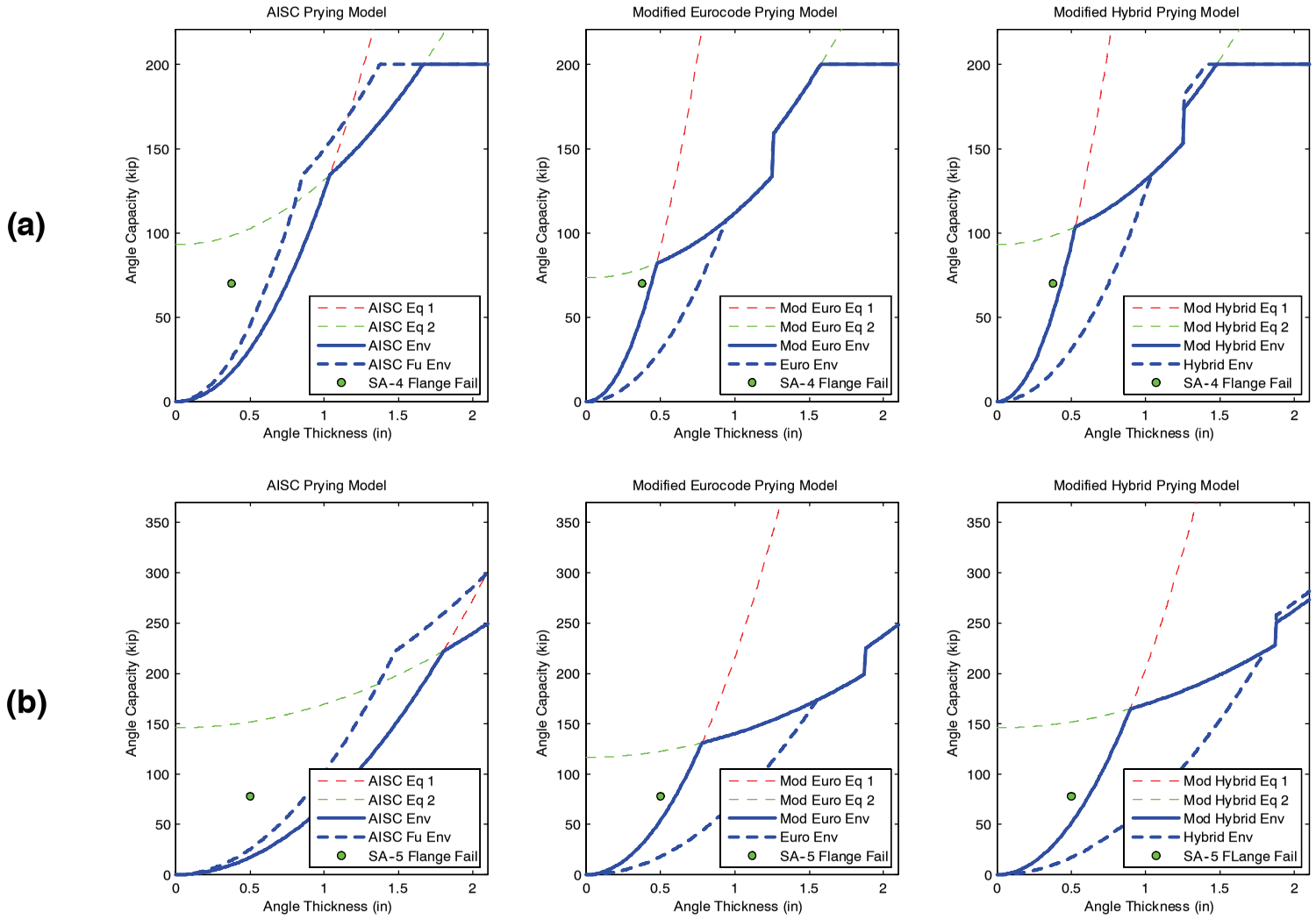


Figure 7.50 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) SA-4 and (b) SA-5 per Shen and Astaneh [92].

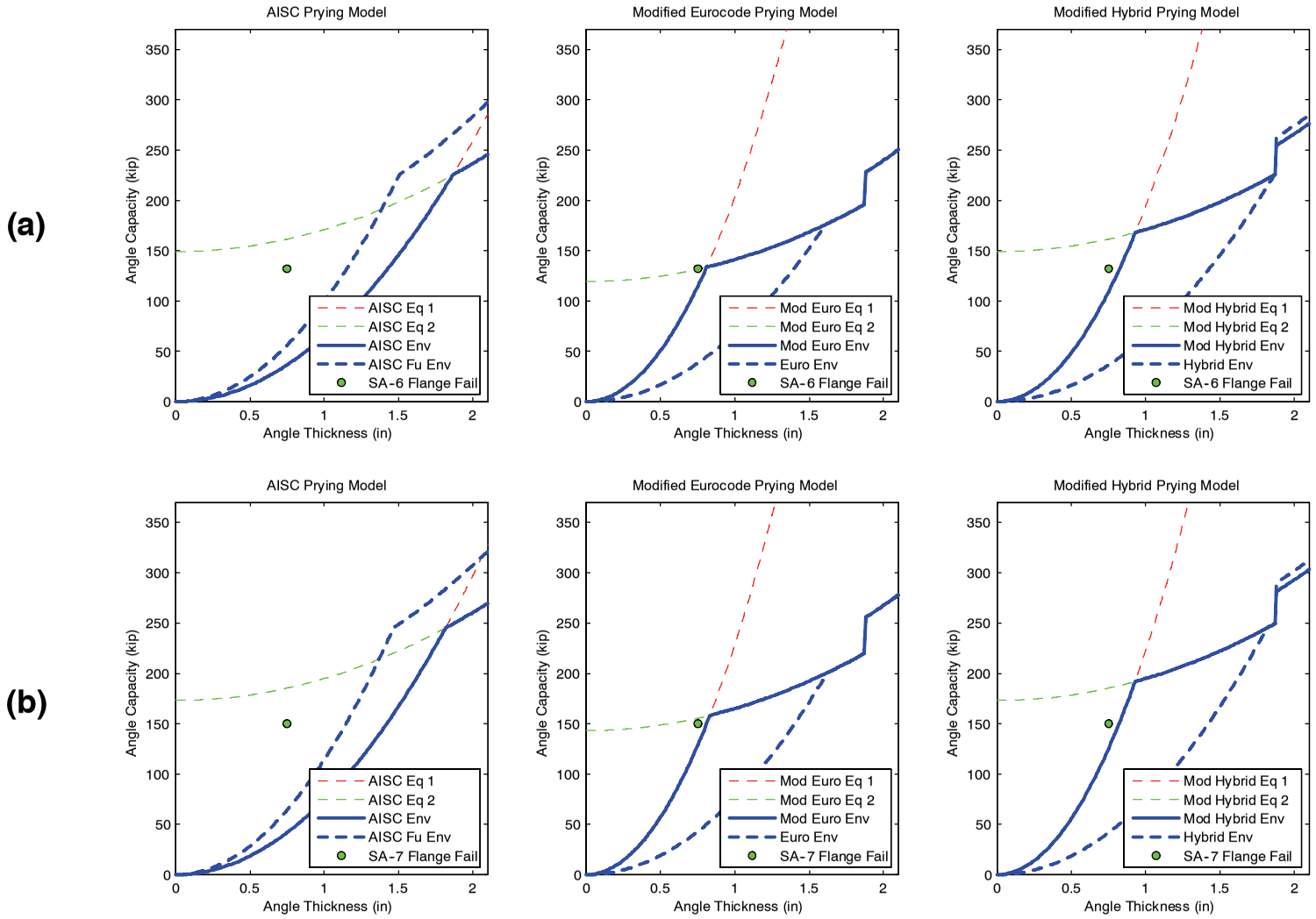


Figure 7.51 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) SA-6 and (b) SA-7 per Shen and Astaneh [92].

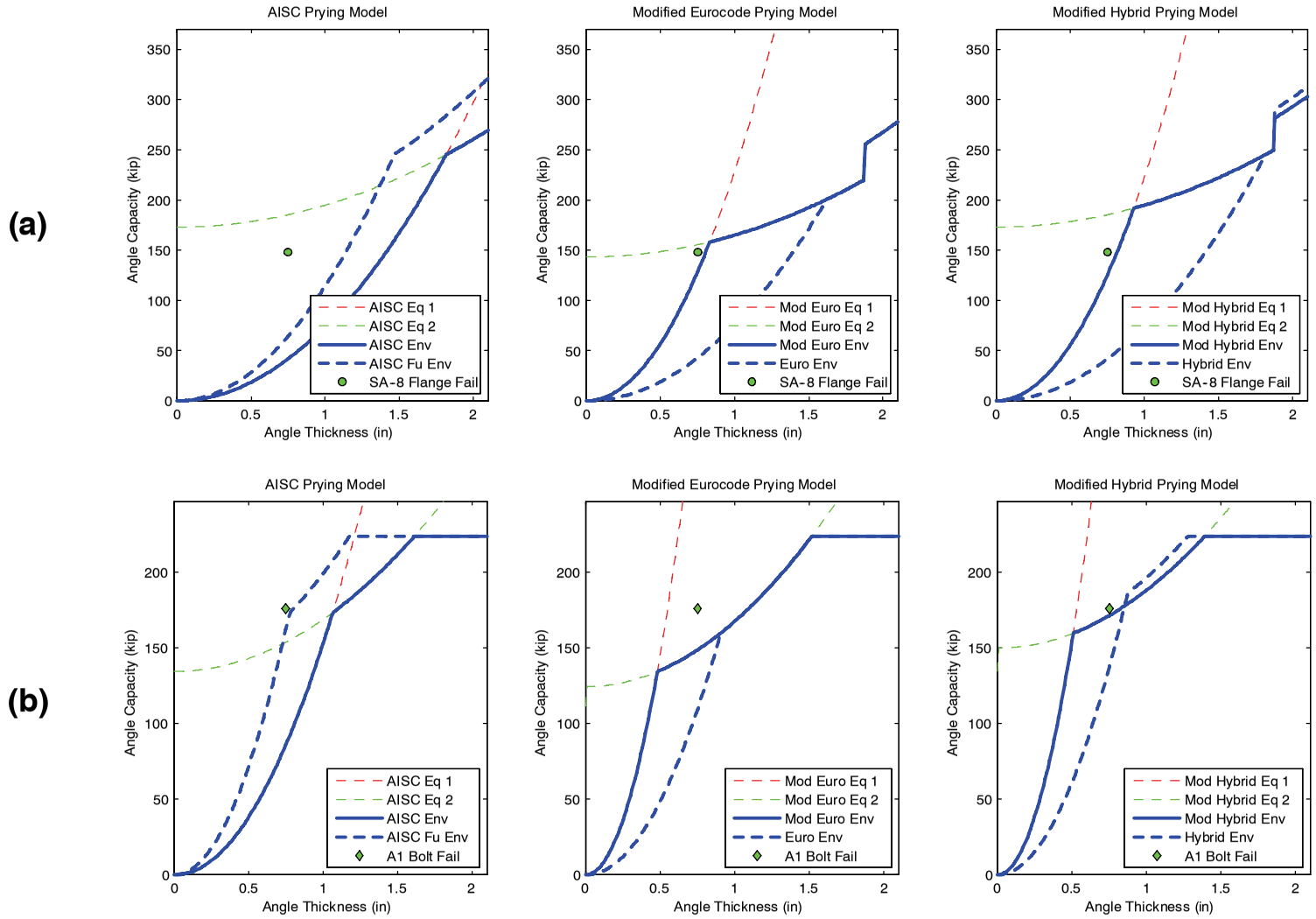


Figure 7.52 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) SA-8 per Shen and Astaneh [92] and (b) A1 per Douty and McGuire [33].

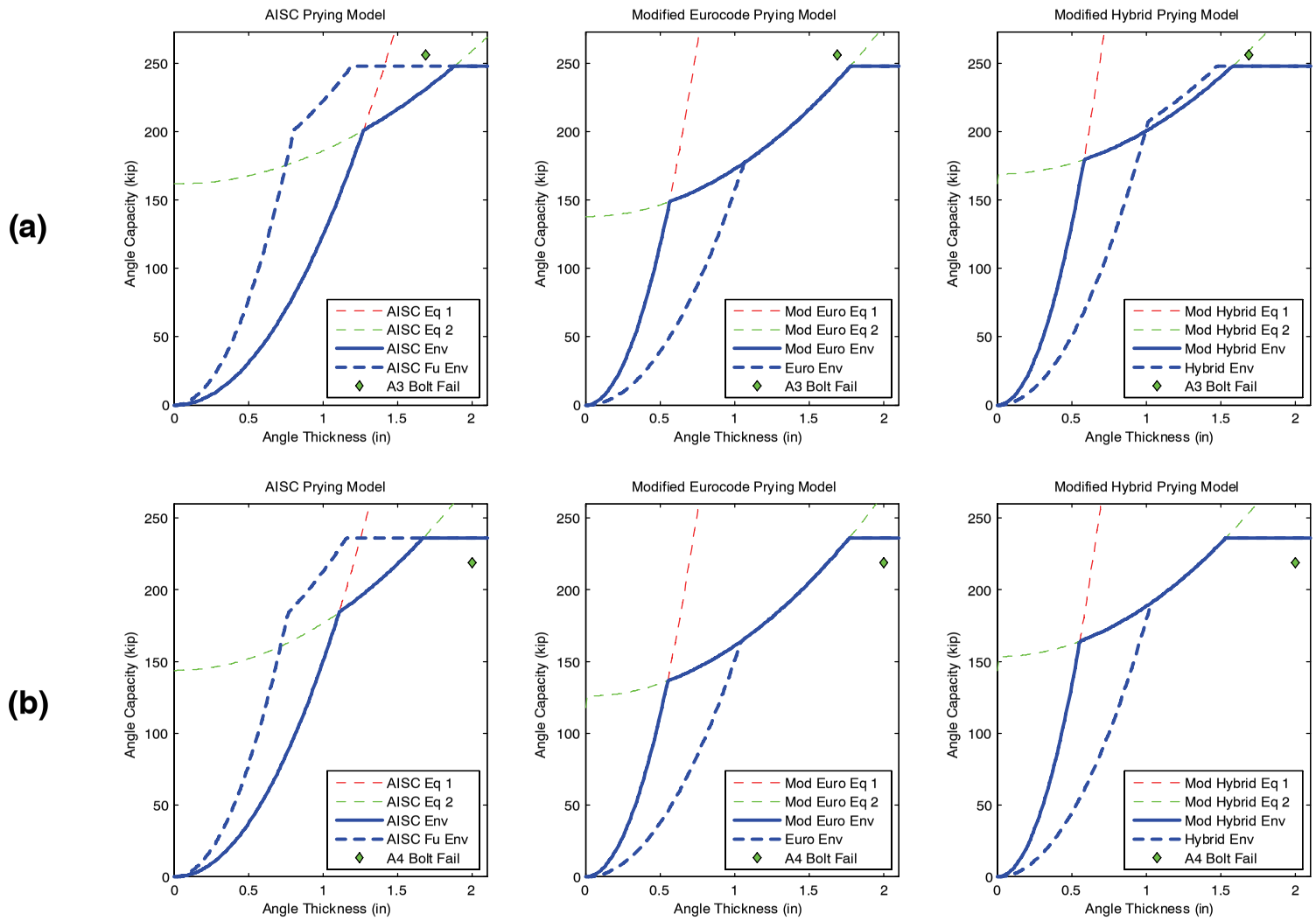


Figure 7.53 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) A3 and (b) A4 per Douty and McGuire [33].

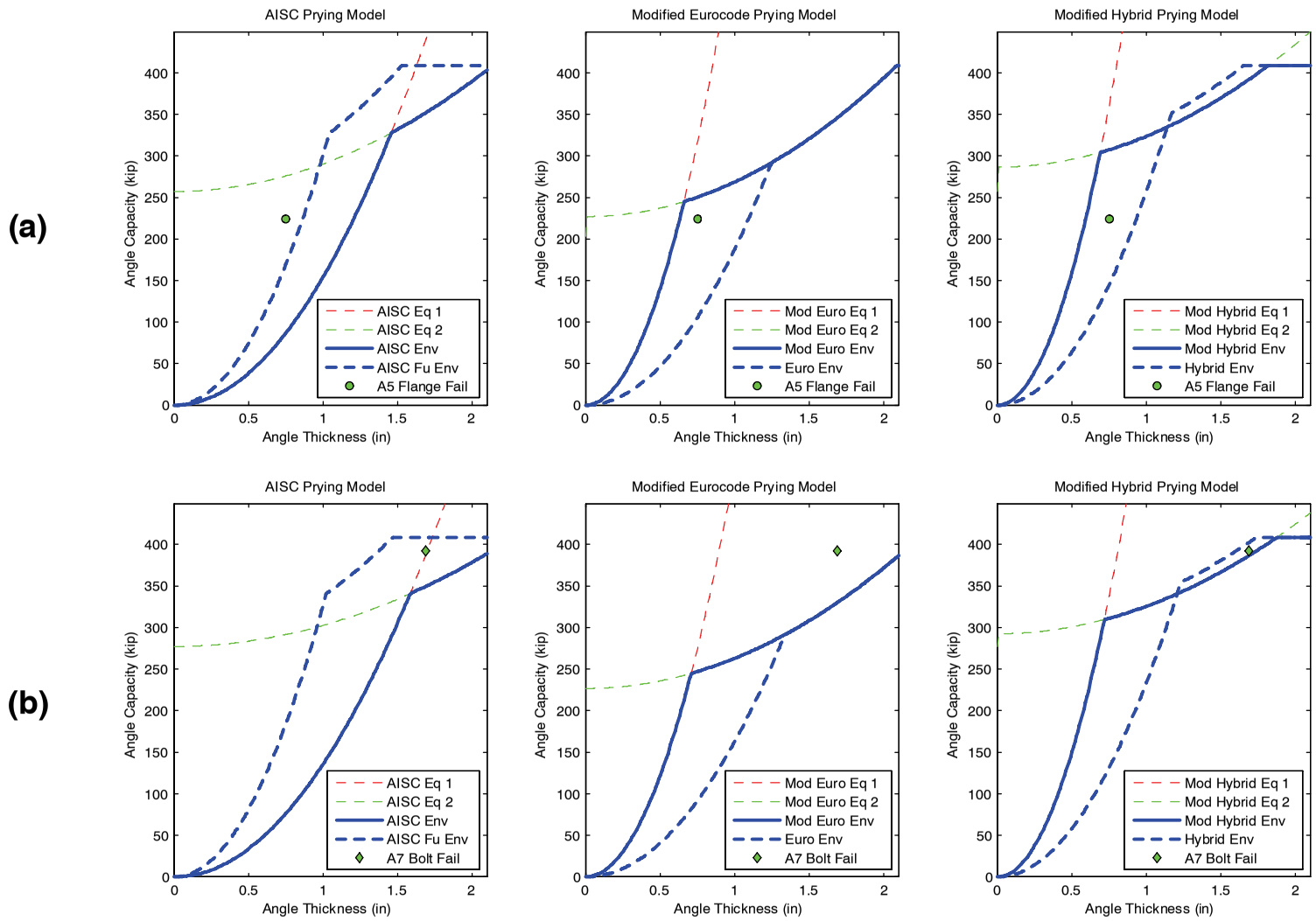


Figure 7.54 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) A5 and (b) A7 per Douty and McGuire [33].

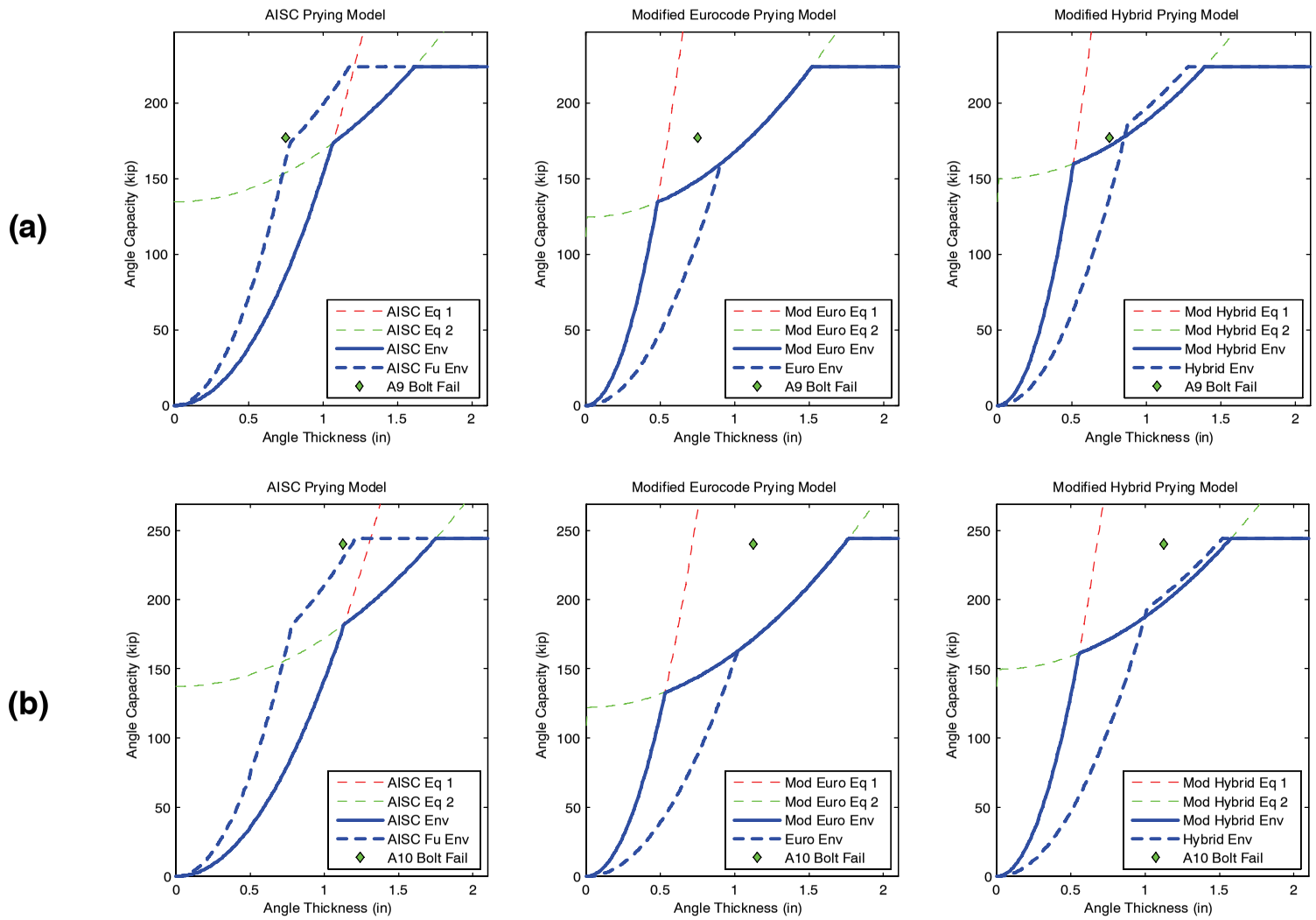
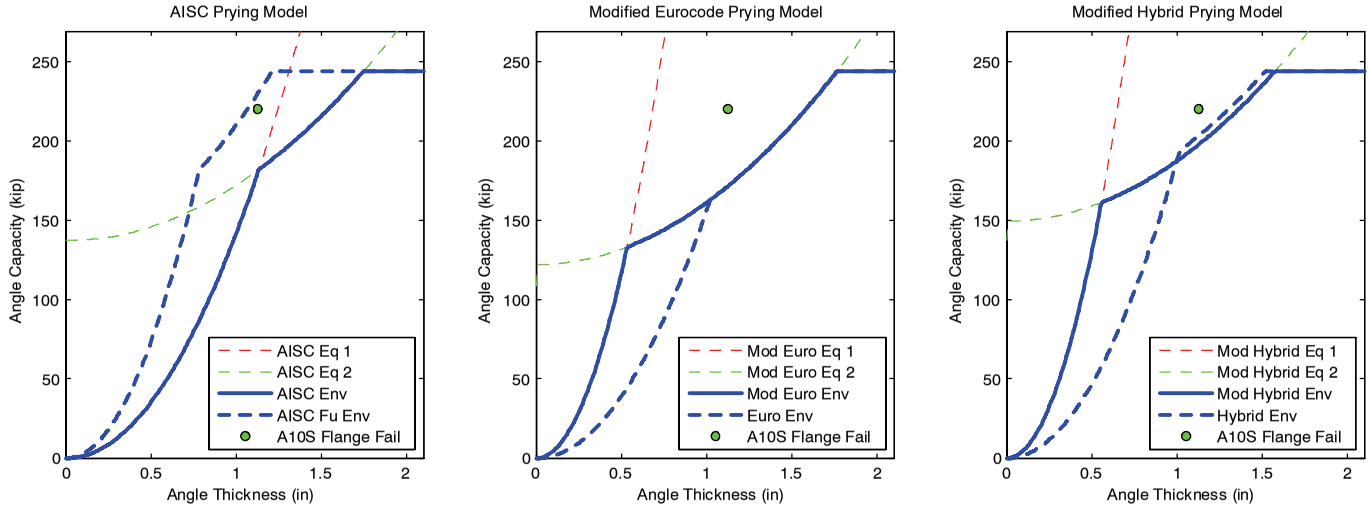


Figure 7.55 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) A9 and (b) A10 per Douty and McGuire [33].

(a)



(b)

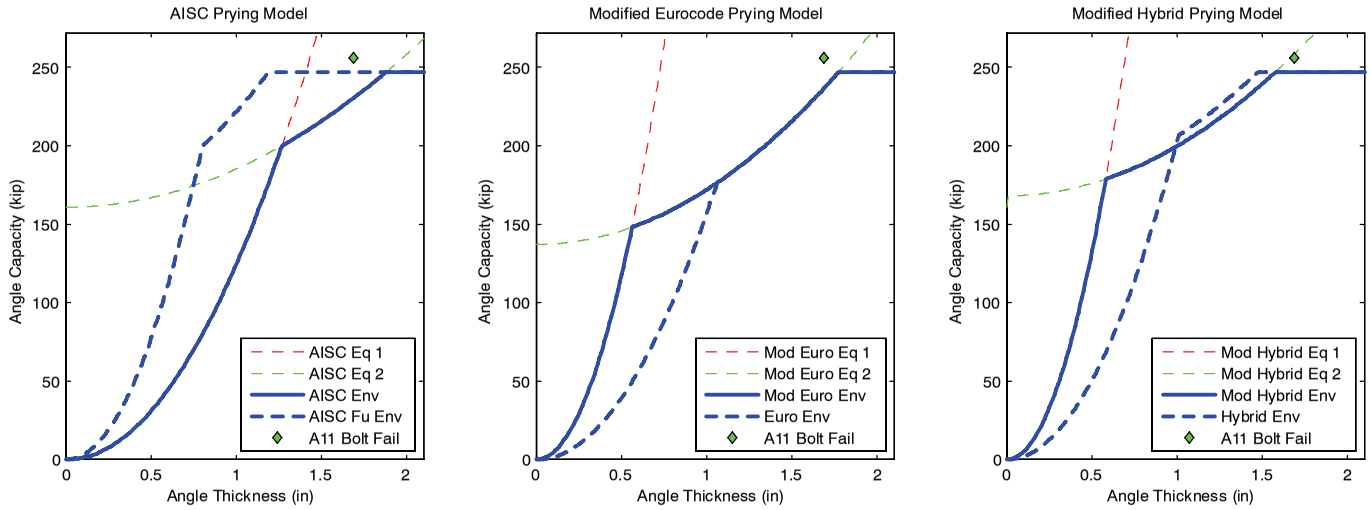


Figure 7.56 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) A10S and (b) A11 per Douty and McGuire [33].

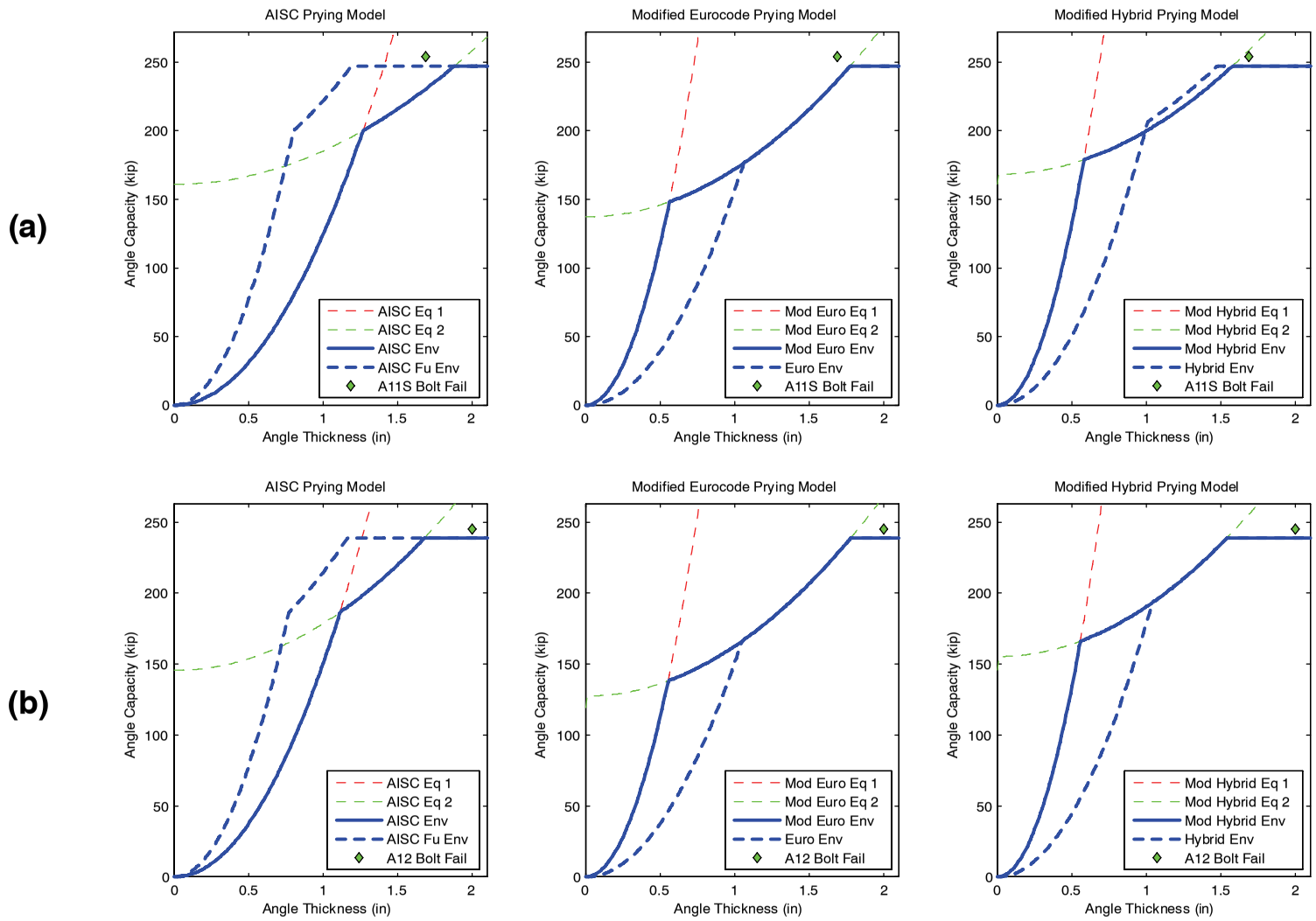


Figure 7.57 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) A11S and (b) A12 per Douty and McGuire [33].

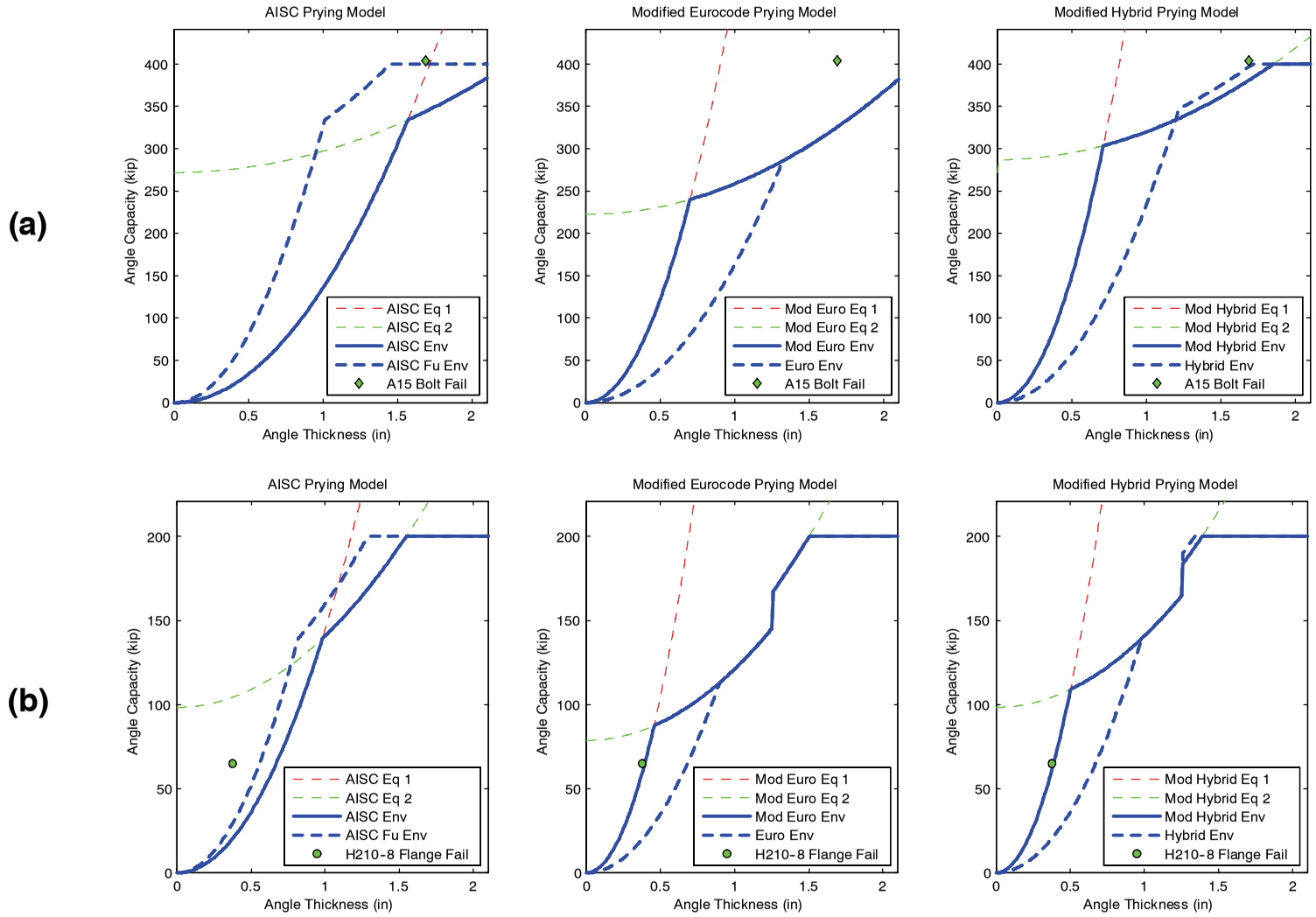


Figure 7.58 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) A15 per Douty and McGuire [33] and (b) H210-8 per Guravich and Dawe [45].

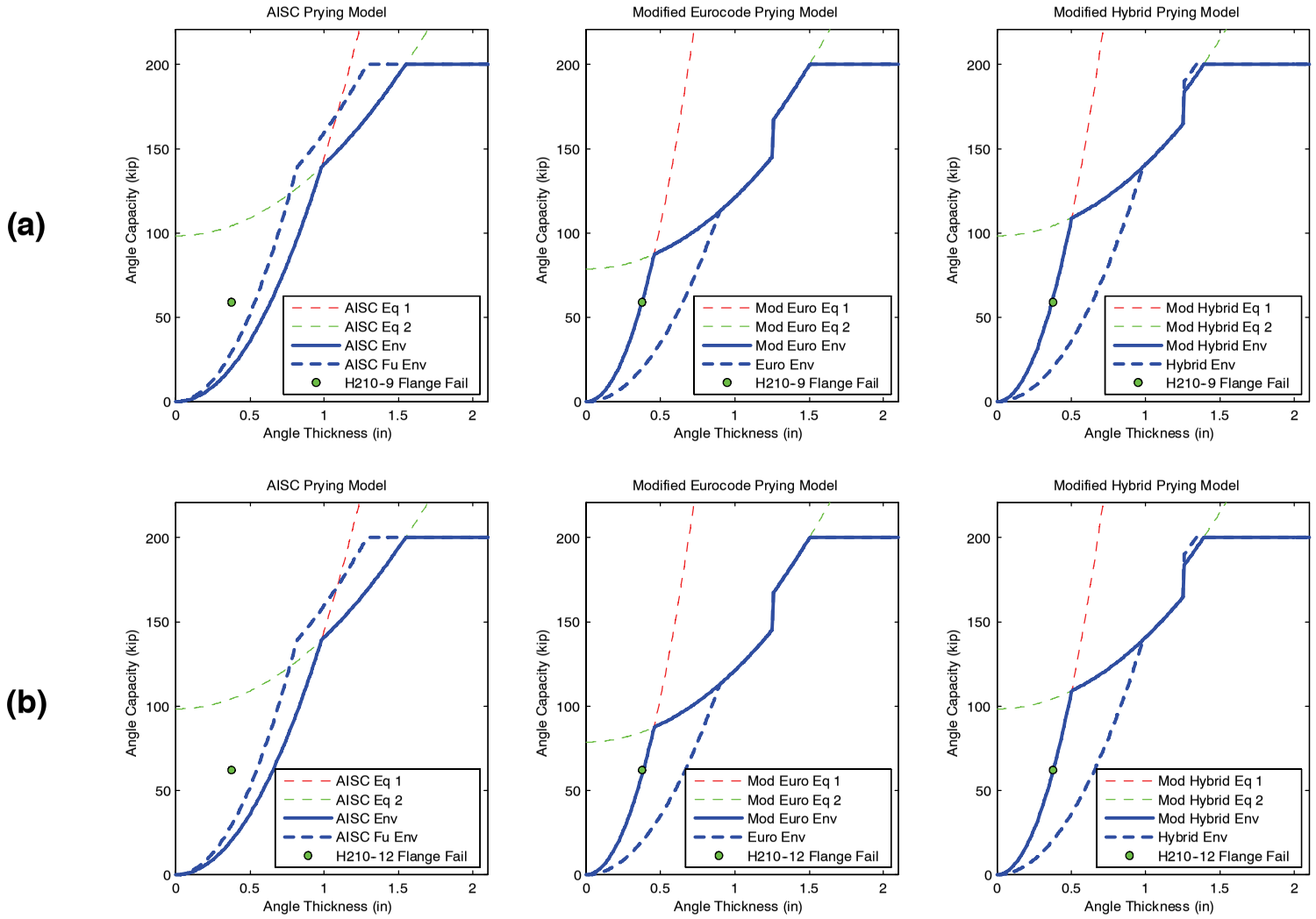
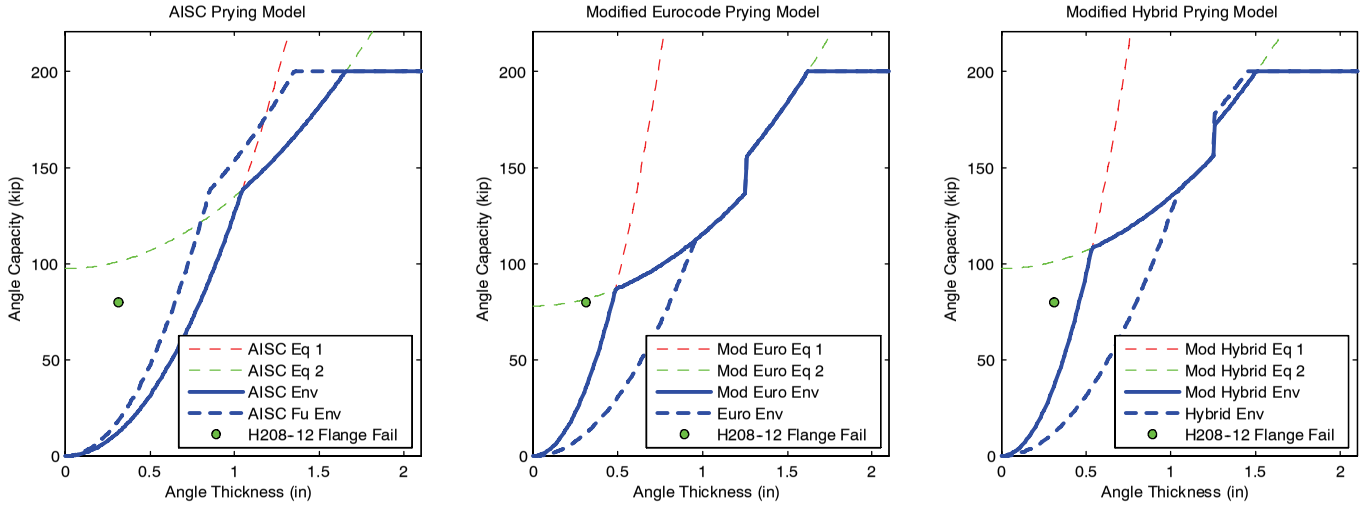


Figure 7.59 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) H210-9 and (b) H210-12 per Guravich and Dawe [45].

(a)



(b)

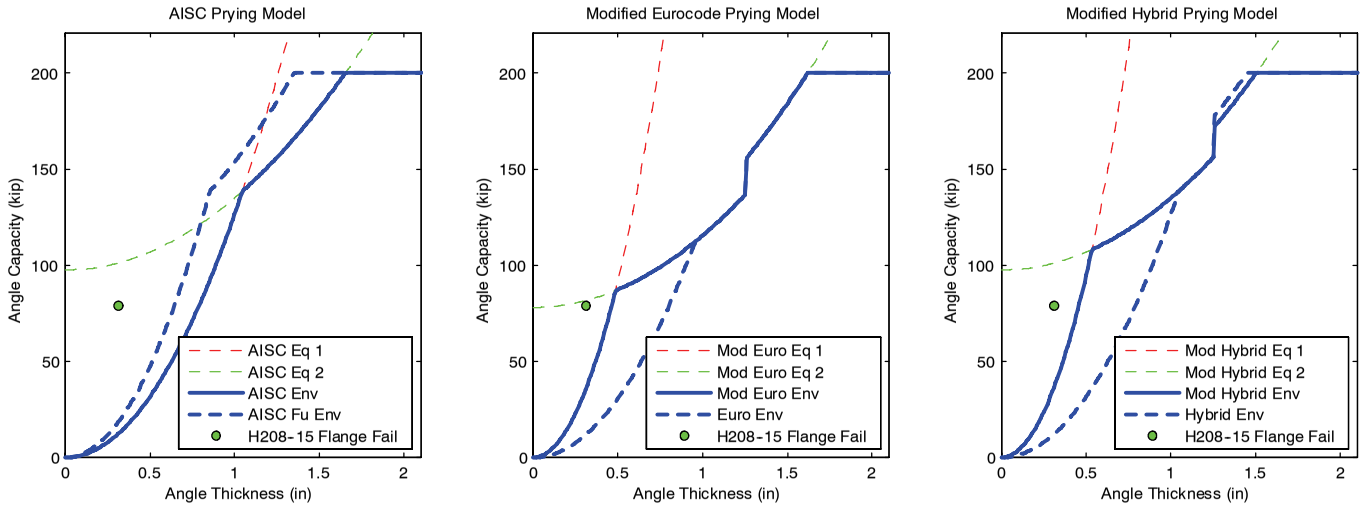


Figure 7.60 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) H208-12 and (b) H208-15 per Guravich and Dawe [45].

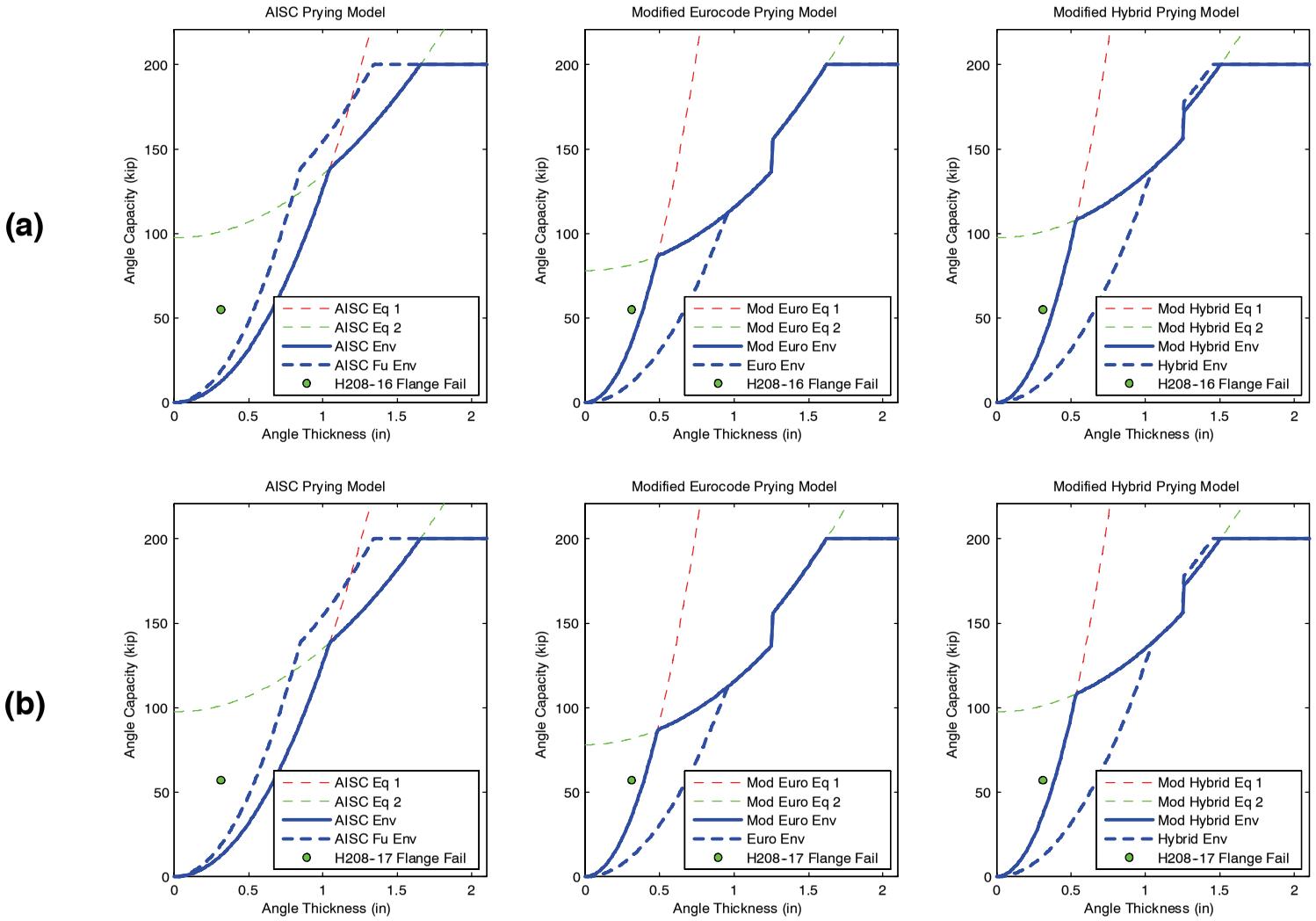


Figure 7.61 Bolted angle connection prying strength models versus angle leg or T-stub flange thickness capacity envelope plotted against test cases (a) H208-16 and (b) H208-17 per Guravich and Dawe [45].

7.4 Summary

In this chapter prying strength models are assessed using the capacities and failure response of the analytical bolted angle connection dataset evaluated using the failure criteria, all of which were developed in previous chapters. The prying strength models used in the AISC LRFD Specification, the Eurocode and a Hybrid of the two models as proposed by Swanson are assessed.

All of the prying strength models are based on modeling the response of a T-stub flange or angle leg as simple beam which deforms under externally applied loads via plastic hinging at subscribed locations. These models identify three modes of prying failure using three different equations. the first equation identifies the capacity of the angle leg failing in single curvature and the second equation identifies a mixed mode failure of the bolt and angle leg. Where the angle leg is stiff enough to transmit the loads without deformation prying is eliminated and the bolt tension capacity governs. The main difference between the prying strength models is the assumption to where the plastic hinges are placed in the flange or angle leg beam model.

As part of the assessment of the prying models the ratio of the analytically predicted prying strength and the prediction from the prying strength models for all in the analytical bolted angle connection dataset are plotted. The ratio of the cases where angle leg fracture is determined there is a clear conservatism in all the models. The mode of all these ratios for the Eurocode model and the Hybrid model is approximately three. The correct the conservatism observed the first equation of these models which model the failure of the angle leg in single curvature, is modified by a multiplier equal to the mode value of three. The capacity of the connections governed by this failure is increased either directly by the increase in the output of the first equation or by the fact that the second equation which models a mixed bolt-angle leg failure in double curvature becomes the governing equation due to the increase of the latter.

The higher capacity per the modified prying strength models can be attributed to the over simplification of the actual mechanism in the angle leg by a simple beam model approach. In reality, as the connection is loaded, the area between the tension bolts and the heel of the angle leg begin acting like a constrained plate deforming. When large displacements occur in the angle leg compared to the thickness the pure bending assumption does not hold; tension occurs at the neutral surface of the angle leg due to catenary action.

The modified Eurocode and Hybrid prying strength models are applied to the bolted angle connection dataset as well as several experimental data found in literature. When comparing the statistics of the analytically predicted or tested prying strength to model prediction ratios between the existing and modified models; the modified models have means much closer to unity and much lower standard deviations which mean better response predictions all all-round without the extreme conservatism.

CHAPTER 8

CONCLUSIONS AND FUTURE WORK

8.1 Summary and Conclusions

Various methods to model and characterize the stiffness, strength, and ductility of bolted connections were investigated. A detailed three dimensional nonlinear finite element modeling approach to accurately simulate the response of bolted connections was presented based on beam to column top and bottom clip angle connection with web angle tests. These simulations were used for verification and assessment of this approach. Sensitivity studies of several modeling parameters were performed to determine the degree of influence on simulation results. Using the level of information available by analytical models the mechanism for force transfer in bolted angle connections was studied in detail. The simplification of using a single or assembly of components to approximate the full connection response was also studied.

Based on the presented modeling approach a parametric bolted angle connection model was used to generate a nonlinear response dataset of 405 connection cases. The bolted angle connection size and topographical parameters used covers a wide range typically used in practice within design code limitations. This bolted connection nonlinear response dataset was used extensively in other parts of this thesis as described below. Key tasks that have been conducted in this thesis can be summarized as follows.

Two empirical modeling schemes to practically model the nonlinear stiffness response under monotonic loading are assessed and compared: A parametric Richard-Abbott type function and a neural network both fitted and trained using the bolted angle connection

response dataset, respectively. The two schemes are assessed by comparing predictions for both cases not used in the development of the empirical models and experimental data.

Both classical mechanics based and micromechanics based strength models are reviewed. A micromechanics based failure criterion is developed to determine failure in connection members, such as the angles, using the stress modified critical strain (SMCS) criterion which is based on the void growth and coalescence mechanism initiating ductile fracture in steel. The bolt failure criterion developed is based on a mechanics based model using the elliptical interaction of the tensile and shear capacity envelope. The failure criteria can practically used in conjunction with the refined three dimensional finite element models without any additional modeling requirements. Swanson component tests are used to calibrate and validate the failure criteria.

The developed failure criteria is applied to the dataset of 405 bolted angle connection analyses. The nonlinear force-displacement response is combined with the determined capacity and failure mode to assess in detail the impact of geometry and topography of the bolted angle connections on the following response characteristics: strength, initial stiffness, plastic stiffness, and absolute ductility or the displacement capacity. These response characteristics are graphically presented along with visual examples of deformed contour plots a subset of analyses.

Using the dataset of bolted angle connection response, along with their capacities and failure modes determined using the developed failure criteria, the prying strength models in the AISC LRFD Specifications, Eurocode, and a hybrid model as proposed by Swanson and Gao are assessed for accuracy and consistency. A modified Eurocode and hybrid prying strength model is proposed based on the results . All these models are assessed using experimental data found in literature.

Several conclusions can be drawn based on all the studies mentioned above:

Modeling bolt pretension is essential to accurately capture the influence of the force transfer mechanism on the nonlinear response of connections where force is transferred primarily through friction generated by the bolt pretension clamping the connection members together. The connection response may be quite sensitive to the bolt pretension magnitude as well as the friction coefficient depending on the connection configuration.

The nonlinear response of bolted connections, which in some cases may be discontinuous due to the connection members slipping relative to each other, can be both captured and later predicted very successfully using a neural network. Both analytical and experimental test data can be combined to train a neural network which can be practically used in a design office setting. Fitted functions are highly constrained compared to neural networks and based on the comparisons using a fitted parametric Richard-Abbott function, it is not possible to accurately predict the nonlinear response of connections exhibiting slippage.

The micromechanics based SMCS failure criterion can be used in conjunction with the detailed nonlinear 3D finite element models without additional refinements to accurately predict both the capacity and failure mode of bolted connections. Using an elliptical bolt tension-shear interaction envelope to determine bolt failure is proven to be sufficient to predict bolt failure. Using the combination of failure criteria and modeling approach enables the critical assessment of structural component performance which is necessary in performance based design.

Combining the detailed bolted connection modeling approach with the failure criteria a large dataset of bolted angle connection response was generated to assess current prying strength models. These models are quite conservative when compared to both the analytically generated dataset and test data. A simple modification to a hybrid prying strength model based on the current AISC LRFD and Eurocode model is proposed which better predicts the prying strength and correctly determines the failure mode of the connection.

8.2 Recommendations for Future Work

The presented body of work creates a wide range of possibilities of application to simulated and study the behavior of structural components. The following are items of future work which can be continued as an extension of the presented material:

Application of the detailed 3D finite element modeling approach to a wide range of bolted connections to expand current connection response databases which are compiled for the use in a design office setting to assist in connection and steel frame design.

Neural networks can be trained using a combination of existing experimental and simulated connection response for different types of connections as a practical tool for design and research.

The connection methodology and the developed micromechanics based SMCS failure criterion can be implemented for various types of connections and structural components, such as gusset plate connections. By simulating their response in the similar manner presented for the bolted angle connections design practices and equations can be assessed and developed.

Innovative design enhancements can be developed, which increase structural performance and ductility without compromising strength with only minor detailing changes, can be investigated using parametric studies.

Further studies on the presented prying models are possible to assess the hinge location assumptions. Currently the hinge location is shifted from the angle leg connected to the tension bolt to the pulled leg when the angle thickness exceeds 0.4 times the beam setback. This creates a jump in the connection capacity envelope which needs to further studied.

DEVELOPMENT AND ASSESSMENT OF RESPONSE AND STRENGTH MODELS FOR BOLTED STEEL CONNECTIONS USING REFINED NONLINEAR 3D FINITE ELEMENT ANALYSIS

VOLUME II

A Thesis
Presented to
The Academic Faculty

by

Ahmet Muhtar Çıtıpıtıoğlu

In Partial Fulfillment
of the Requirements for the Degree
Ph.D. in the
School of Civil and Environmental Engineering

Georgia Institute of Technology
December 2009

APPENDIX A

APPLICATION OF NEURAL NETWORK TO PREDICT BOLTED ANGLE CONNECTION NON-LINEAR FORCE-DISPLACEMENT RESPONSE

The full architecture of the 3 layer 7-7-1 node neural network (NN) which simulates the force-displacement of a bolted steel angle connection component is shown schematically in Figure A.1. The input is an array of variables which describes the various properties of the angle shown in Equation A.1 . The input vector, $\boldsymbol{p}$ includes the displacement, $\boldsymbol{d}$ in inches as a component for which the NN computes a response force $\boldsymbol{F}$ in kips. To create a response curve the displacement, $\boldsymbol{d}$ in the input vector is looped from 0 up to 2.5 inches is inputted to the NN at a desired increment resulting in each loop giving a single point on the curve.

The vectors $\boldsymbol{p_{min}}$ and $\boldsymbol{p_{max}}$ describe the boundaries for the input variables with which the NN was trained. These vectors are used to scale the input before entering them into the NN using Equation A.2(a) . Similarly, the output $\boldsymbol{F_n}$ needs to be scaled up using the minimum and maximum values given in Equation A.3 using the relation in Equation A.2(b).

$$p = \begin{Bmatrix} L1 \\ L2 \\ t \\ db \\ w \\ g1 \\ d \end{Bmatrix} \qquad p_{min} = \begin{Bmatrix} 6.0 \\ 4.0 \\ 0.3125 \\ 0.5 \\ 6.0 \\ 2.25 \\ 0 \end{Bmatrix} \qquad p_{max} = \begin{Bmatrix} 8.0 \\ 8.0 \\ 1.0 \\ 1.0 \\ 8.0 \\ 6.75 \\ 2.5 \end{Bmatrix} \qquad \text{Eqn A.1}$$

The normalized input vector is multiplied with the input weight matrix, $\boldsymbol{IW^{1,1}}$ which relates the input to the first hidden layer. The resulting nodal values are summed with their

respective bias and processed by the sigmoid transfer function given in Eqn A.4, this function essentially compresses the output of each node into a range of [-1,1]. These set of operations results in the hidden layer vector, $\boldsymbol{a^1}$. The same operations are repeated by multiplying the $\boldsymbol{a^1}$vector with the layer weight matrix $\boldsymbol{LW^{2,1}}$ which relates the second hidden layer to the first. Again the summed nodal values are summed up with their respective bias values and processed by the transfer function. This results in second hidden layer, $\boldsymbol{a^1}$. The output has a single node, so the layer weights form a vector $\boldsymbol{LW^{3,2}}$. Summing the result with the bias gives the scaled output. The last node is set so the transfer function is a simple linear relation which requires no function transformation. All the layer weights and bias are given in the Equations A.5 to A.8.

$$p_n = 2\frac{(p - p_{min})}{(p_{max} - p_{min})} - 1 \qquad \text{(a)} \qquad \text{Eqn A.2}$$

$$p_{un} = 0.5(p + 1)(p_{max} - p_{min}) + p_{min} \qquad \text{(b)}$$

$$f_{min} = \{ 0 \} \qquad f_{max} = \{ 221.66 \} \qquad \text{Eqn A.3}$$

The algorithm to compute a single point on the force-displacement using the NN as described above is presented compactly with Equation A.9. This algorithm can simply be implemented in a code with the angle variables entered parametrically and placed in a loop with the displacement variable plotting point by point the nonlinear force response of a bolted angle connection.

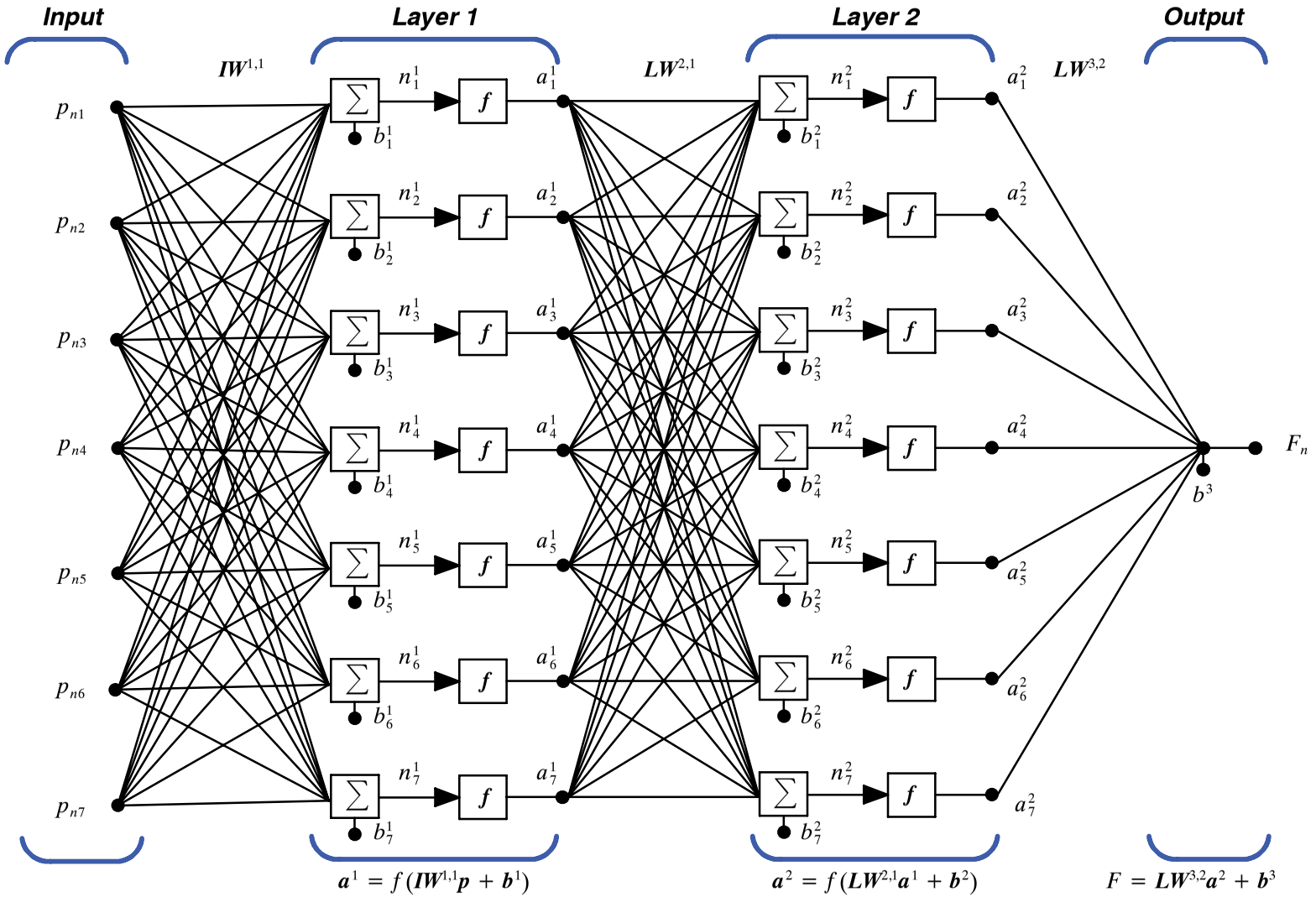


Figure A.1 . Schematic representation of trained neural network for simulating the force-displacement response of bolt steel angle components.

$$f(n) = \frac{2}{\left(1 + exp^{-2n}\right)} - 1 \qquad \text{Eqn A.4}$$

$$IW^{1,1} = \begin{bmatrix} -9.2949e-03 & -2.3363e-03 & 3.2209e-01 & 5.7958e-02 & 7.4493e-03 & -8.2541e-01 & -9.4140e-03 \\ 5.7716e-03 & 7.7493e-01 & -1.0662e+00 & 9.0034e-01 & -1.3951e-01 & 1.1172e-01 & -2.7095e-01 \\ -8.9598e-03 & 2.8439e-02 & 4.3011e-01 & 1.7497e-02 & 3.1336e-02 & -6.1448e-01 & -6.2392e-01 \\ 5.5178e-03 & 4.7227e-02 & 3.2548e-01 & -1.3060e-03 & 6.0043e-02 & -3.0730e-01 & 7.4289e-02 \\ 3.5722e-03 & 2.3253e-02 & -2.8827e-02 & -1.1207e-01 & -1.4010e-03 & 1.6256e-03 & -8.9809e-03 \\ -1.1503e-02 & -2.5148e-02 & 1.6036e-01 & -5.7560e-02 & -3.6942e-02 & 3.4671e-01 & -7.2420e-02 \\ -5.1555e-03 & -4.0536e-03 & 1.8636e-01 & 9.7689e-02 & 9.0623e-03 & -2.0649e-01 & -9.8108e+00 \end{bmatrix} \qquad \text{Eqn A.5}$$

$$LW^{2,1} = \begin{bmatrix} 3.4489E+00 & -8.7356E-02 & 3.3919E+01 & 4.9325E+00 & 9.6414E+00 & 4.5368E+00 & -9.1602E+00 \\ -6.1752E-01 & 7.6718E-02 & 2.7598E+00 & -4.6614E+00 & -1.5284E+01 & 1.2800E+00 & -6.0508E+00 \\ 5.7098E+01 & -7.3301E-02 & -6.4352E+01 & 7.3562E+01 & 3.7002E+01 & 2.3694E+01 & 8.6821E+00 \\ 3.9269E-01 & 7.6054E-02 & 1.9058E+00 & -2.8954E+00 & -1.5368E+01 & 1.5236E+00 & -6.5538E+00 \\ -5.5981E+00 & -5.8615E-01 & -2.7616E+00 & -4.9857E+00 & -1.5872E+01 & 2.4126E+00 & 1.7379E-01 \\ -1.3225E+01 & 3.5202E-01 & 1.4254E+01 & -2.3250E+01 & -2.2385E+01 & -3.8846E+00 & -2.3306E+00 \\ -1.6078E+01 & 3.7971E-01 & 1.6711E+01 & -2.7406E+01 & -2.6175E+01 & -4.5362E+00 & -2.5224E+00 \end{bmatrix} \qquad \text{Eqn A.6}$$

$$LW^{3,2} = \begin{Bmatrix} 1.5332E+00 & -5.2877E+01 & 3.8710E-01 & 4.7227E+01 & 1.7550E+00 & 2.0776E+01 & -1.5451E+01 \end{Bmatrix} \qquad \text{Eqn A.7}$$

$$b^1 = \begin{Bmatrix} -3.0699E+00 \\ 5.8391E-01 \\ -3.5791E+00 \\ -2.8396E+00 \\ 1.8368E+00 \\ 2.2911E+00 \\ -1.1178E+01 \end{Bmatrix} \quad b^2 = \begin{Bmatrix} 2.0754E+01 \\ 4.4315E+00 \\ 1.6454E+01 \\ 5.6858E+00 \\ -1.2452E-02 \\ 7.5637E-01 \\ 3.1786E-01 \end{Bmatrix} \quad b^3 = \begin{Bmatrix} -4.5405E+00 \end{Bmatrix} \qquad \text{Eqn A.8}$$

$$\boldsymbol{F}_n = \boldsymbol{LW}^{3,2}(\, f\,(\boldsymbol{LW}^{2,1}(\, f\,(\boldsymbol{IW}^{1,1}\boldsymbol{p} + \boldsymbol{b}^1)\,) + \boldsymbol{b}^2)\,) + \boldsymbol{b}^3 \qquad \text{Eqn A.9}$$

A.2 Example

To demonstrate the usage of the NN a single point on the response curve at 1 inch displacement will be calculated for the angle of given variables:

$$\mathrm{p} = \begin{Bmatrix} 8 \\ 6 \\ 1 \\ 7/8 \\ 8 \\ 2.5 \\ 1 \end{Bmatrix} \qquad \mathrm{p}_{\min} = \begin{Bmatrix} 6.0 \\ 4.0 \\ 0.3125 \\ 0.5 \\ 6.0 \\ 2.25 \\ 0 \end{Bmatrix} \qquad \mathrm{p}_{\max} = \begin{Bmatrix} 8.0 \\ 8.0 \\ 1.0 \\ 1.0 \\ 8.0 \\ 6.75 \\ 2.5 \end{Bmatrix} \qquad \text{Eqn A.10}$$

The input vector is normalized per given min max range using Equation A.2(a) for each input:

$$\mathrm{p}_n = \begin{Bmatrix} 1 \\ 0 \\ 1 \\ 0.5 \\ 1 \\ -0.889 \\ -0.2 \end{Bmatrix} \qquad \text{Eqn A.11}$$

The normalized input is multiplied with the input layer weight matrix and the resultant is summed with the bias vector :

$$\boldsymbol{IW}^{1,1}\boldsymbol{p} + \boldsymbol{b}^1 = \begin{Bmatrix} -1.986 \\ -0.212 \\ -2.448 \\ -2.192 \\ 1.755 \\ 2.079 \\ -8.794 \end{Bmatrix} \qquad \text{Eqn A.12}$$

The members of the vector in Equation A.12 are individually passed through the sigmoid transfer function, Equation A.4 :

$$f(\boldsymbol{IW}^{1,1}\boldsymbol{p} + \boldsymbol{b}^1) = \begin{Bmatrix} -0.963 \\ -0.208 \\ -0.985 \\ -0.975 \\ 0.942 \\ 0.969 \\ -1 \end{Bmatrix} \qquad \text{Eqn A.13}$$

The same steps are repeated for the next layer using the resultant vector of Equation A.14:

$$\boldsymbol{LW}^{2,1}(f(\boldsymbol{IW}^{1,1}\boldsymbol{p} + \boldsymbol{b}^1)) + \boldsymbol{b}^2 = \begin{Bmatrix} 1.862 \\ -0.267 \\ 2.265 \\ -0.206 \\ 0.3 \\ -0.466 \\ -0.539 \end{Bmatrix} \qquad \text{Eqn A.14}$$

$$f(\boldsymbol{LW}^{2,1}(f(\boldsymbol{IW}^{1,1}\boldsymbol{p} + \boldsymbol{b}^1)) + \boldsymbol{b}^2) = \begin{Bmatrix} 0.953 \\ -0.261 \\ 0.979 \\ -0.203 \\ 0.292 \\ -0.435 \\ -0.492 \end{Bmatrix} \qquad \text{Eqn A.15}$$

Again, for the last output node the same steps are repeated using the resultant vector of Equation A.15:

$$\boldsymbol{LW}^{3,2}(f(\boldsymbol{LW}^{2,1}(f(\boldsymbol{IW}^{1,1}\boldsymbol{p} + \boldsymbol{b}^1)) + \boldsymbol{b}^2)) + \boldsymbol{b}^3 = 0.573 \qquad \text{Eqn A.16}$$

Using Equation A.15, the output is scaled up to give the resisting force of the bolted angle displaced 1 inch :

$$F = 0.5(0.573 + 1)(221.66 - 0) + 0 = \mathbf{174.336} \qquad \text{Eqn A.17}$$

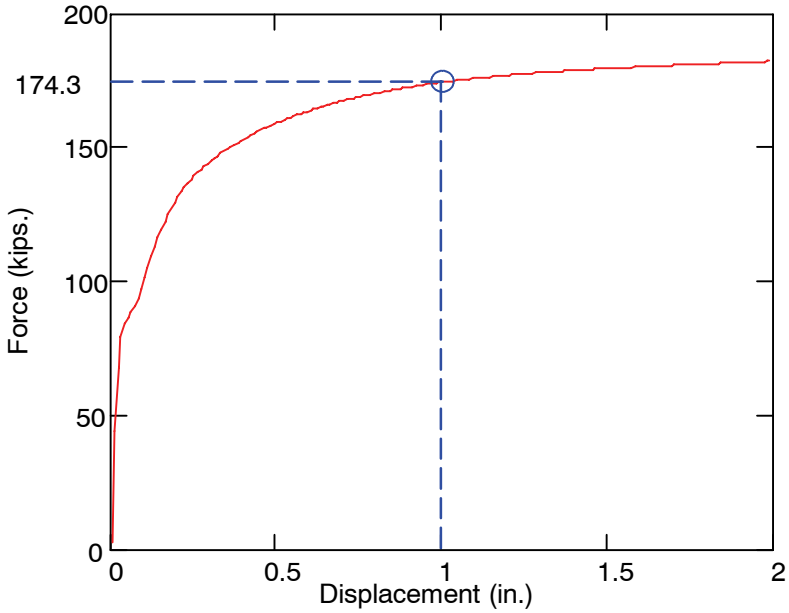


Figure A.2 Neural Network generated point shown on angle response curve computed by looping through the NN varying the displacement.

APPENDIX B

PARAMETRIC BOLTED ANGLE CONNECTION DATA AND ANALYSIS OUTPUT

Detailed numerical information is given about the response and failure determined by the analysis of each connection in the bolted angle connection dataset. There are four panes in each figure:

- connection identification, geometry and failure information is given in the top left pane.
- nodal geometry of the analytical connection model is plotted for both the side and top view in the top right pane.
- connection force-displacement response with the failure point marked on the response curve is given in the bottom left pane
- tension-shear response for each bolt is plotted and compared to the bolt capacity interaction envelope in the bottom right pane.

In addition to the connection initial and plastic stiffness, the full analysis response vectors for the connection force and displacement along the shear and tension response for each bolt is given for each analysis.

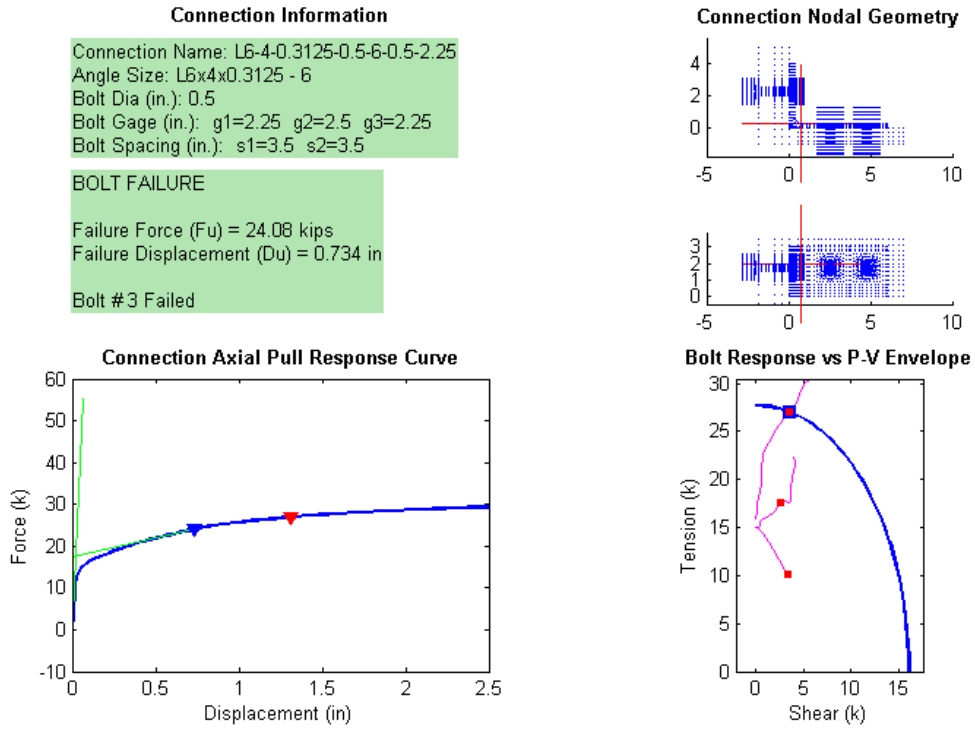


Figure B.1 Connection L6_4_0.3125_0.5_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.5_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 817.6860

Plastic Stiffness (k/in): 8.9399

Displacement (in): [5.3927e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.34052 ; 0.34448 ; 0.35042 ; 0.35933 ; 0.37269 ; 0.39274 ; 0.4228 ; 0.46791 ; 0.53556 ; 0.56093 ; 0.57044 ; 0.58471 ; 0.60612 ; 0.63823 ; 0.65027 ; 0.66833 ; 0.69542 ; 0.73606 ; 0.79701 ; 0.81987 ; 0.85416 ; 0.90559 ; 0.98274 ; 1.0985 ; 1.1419 ; 1.207 ; 1.3046 ; 1.4511 ; 1.506 ; 1.5883 ; 1.7119 ; 1.8973 ; 2.0827 ; 2.129 ; 2.1985 ; 2.3028 ; 2.3419 ; 2.4005 ; 2.4885 ; 2.5]

Force (kips): [-0.179893 ; 0.726803 ; 1.41715 ; 2.0425 ; 2.90452 ; 4.0351 ; 5.28254 ; 6.41526 ; 7.13031 ; 7.63013 ; 8.10637 ; 8.62557 ; 9.25089 ; 9.98883 ; 10.0042 ; 10.027 ; 10.0609 ; 10.1111 ; 10.199 ; 10.3359 ; 10.5277 ; 10.7807 ; 11.1038 ; 11.2367 ; 11.2816 ; 11.3489 ; 11.4504 ; 11.6099 ; 11.669 ; 11.7504 ; 11.8715 ; 12.0474 ; 12.2714 ; 12.3472 ; 12.4527 ; 12.6023 ; 12.7958 ; 13.0474 ; 13.1462 ; 13.2852 ; 13.4758 ; 13.703 ; 13.7783 ; 13.8832 ; 14.0224 ; 14.2073 ; 14.3639 ; 14.4017 ; 14.4625 ; 14.5443 ; 14.5761 ; 14.6183 ; 14.6776 ; 14.6865]

Bolt 1 - Tensile Force (kips): [15.1201 ; 15.0978 ; 15.0785 ; 15.0598 ; 15.0318 ; 14.9889 ; 14.9345 ; 14.8785 ; 14.8375 ; 14.7985 ; 14.7423 ; 14.3845 ; 13.4889 ; 12.3122 ; 12.2856 ; 12.2459 ; 12.1865 ; 12.0985 ; 11.9958 ; 11.8713 ; 11.7042 ; 11.4356 ; 11.0364 ; 10.8808 ; 10.8256 ; 10.7405 ; 10.6088 ; 10.4198 ; 10.3677 ; 10.2813 ; 10.1509 ; 10.0988 ; 10.1041 ; 10.1061 ; 10.109 ; 10.1132 ; 10.1195 ; 10.1295 ; 10.1336 ; 10.1398 ; 10.0898 ; 10.0499 ; 10.0587 ; 10.072 ; 10.0921 ; 10.1226 ; 10.1531 ; 10.1607 ; 10.1722 ; 10.1895 ; 10.196 ; 10.1852 ; 10.1755 ; 10.1757]

Bolt 1 - Shear Force (kips): [0.015665 ; 0.034536 ; 0.06617 ; 0.095945 ; 0.13812 ; 0.19466 ; 0.25934 ; 0.32208 ; 0.36677 ; 0.40865 ; 0.46682 ; 0.75902 ; 1.3766 ; 2.1106 ; 2.1264 ; 2.1501 ; 2.1853 ; 2.2373 ; 2.298 ; 2.3712 ; 2.469 ; 2.6224 ; 2.8422 ; 2.9258 ; 2.9552 ; 3.0002 ; 3.069 ; 3.1666 ; 3.1935 ; 3.2376 ; 3.3039 ; 3.3325 ; 3.3343 ; 3.335 ; 3.336 ; 3.3374 ; 3.3394 ; 3.3427 ; 3.3441 ; 3.3461 ; 3.3924 ; 3.4328 ; 3.4299 ; 3.4252 ; 3.4181 ; 3.4074 ; 3.3967 ; 3.394 ; 3.3901 ; 3.3841 ; 3.3818 ; 3.4781 ; 3.5947 ; 3.6038]

Bolt 2 - Tensile Force (kips): [15.1308 ; 15.1008 ; 15.0773 ; 15.0593 ; 15.0357 ; 15.0074 ; 14.992 ; 14.9976 ; 15.0529 ; 15.2277 ; 15.5841 ; 15.8594 ; 16.1209 ; 16.5259 ; 16.5336 ; 16.545 ; 16.5614 ; 16.5854 ; 16.6303 ; 16.7046 ; 16.8295 ; 16.9889 ; 17.2015 ; 17.2638 ; 17.2883 ; 17.3216 ; 17.3661 ; 17.4405 ; 17.4794 ; 17.5318 ; 17.6036 ; 17.6501 ; 17.695 ; 17.7028 ; 17.7054 ; 17.692 ; 17.6305 ; 17.6252 ; 17.9158 ; 18.3158 ; 18.8658 ; 19.5097 ; 19.7066 ; 19.9616 ; 20.3177 ; 20.7758 ; 21.1481 ; 21.2418 ; 21.4304 ; 21.7232 ; 21.8317 ; 22.0393 ; 22.3257 ; 22.3592]

Bolt 2 - Shear Force (kips): [0.017187 ; 0.043036 ; 0.080335 ; 0.11557 ; 0.16525 ; 0.23183 ; 0.30914 ; 0.38479 ; 0.43777 ; 0.48421 ; 0.53985 ; 0.79816 ; 1.3207 ; 1.8829 ; 1.8946 ; 1.9121 ; 1.9381 ; 1.9762 ; 2.0188 ; 2.0668 ; 2.1175 ; 2.1985 ; 2.3134 ; 2.3606 ; 2.3769 ; 2.4028 ; 2.4432 ; 2.499 ; 2.5114 ; 2.5338 ; 2.5713 ; 2.6606 ; 2.8009 ; 2.8557 ; 2.941 ; 3.0873 ; 3.328 ; 3.6171 ; 3.6439 ; 3.6848 ; 3.7167 ; 3.7664 ; 3.7974 ; 3.8476 ; 3.907 ; 3.9914 ; 4.0683 ; 4.0953 ; 4.1461 ; 4.1852 ; 4.2005 ; 4.1166 ; 4.015 ; 4.0097]

Bolt 3 - Tensile Force (kips): [16 ; 15.9862 ; 15.9905 ; 16.0133 ; 16.0737 ; 16.2196 ; 16.5547 ; 17.0563 ; 17.5942 ; 18.1268 ; 18.7621 ; 19.6223 ; 20.8861 ; 22.5541 ; 22.5882 ; 22.6392 ; 22.7152 ; 22.8281 ; 23.0288 ; 23.3676 ; 23.8723 ; 24.5132 ; 25.2073 ; 25.4515 ; 25.5294 ; 25.6415 ; 25.8207 ; 26.1317 ; 26.236 ; 26.3872 ; 26.6471 ; 27.0375 ; 27.4434 ; 27.5717 ; 27.7399 ; 28.0145 ; 28.3746 ; 28.82 ; 28.9914 ; 29.2562 ; 29.6343 ; 29.9652 ; 30.0598 ; 30.1834 ; 30.3184 ; 30.5119 ; 30.6621 ; 30.7276 ; 30.8555 ; 31.0051 ; 31.0803 ; 31.1423 ; 31.2245 ; 31.2475]

Bolt 3 - Shear Force (kips): [0.0085587 ; 0.0077949 ; 0.022626 ; 0.038139 ; 0.060656 ; 0.090965 ; 0.12998 ; 0.17272 ; 0.2344 ; 0.3305 ; 0.44949 ; 0.57762 ; 0.69114 ; 0.77618 ; 0.77753 ; 0.77947 ; 0.78213 ; 0.78581 ; 0.92127 ; 1.1784 ; 1.4588 ; 1.7576 ; 2.1195 ; 2.3084 ; 2.369 ; 2.4548 ; 2.5816 ; 2.8388 ; 2.9589 ; 3.0868 ; 3.2592 ; 3.5468 ; 3.9139 ; 4.0329 ; 4.1874 ; 4.3742 ; 4.47 ; 4.5939 ; 4.6853 ; 4.7924 ; 4.9274 ; 5.1281 ; 5.2396 ; 5.3921 ; 5.5261 ; 5.7724 ; 5.9403 ; 5.9572 ; 5.9805 ; 5.9556 ; 5.9942 ; 6.0292 ; 6.0549 ; 6.0409]

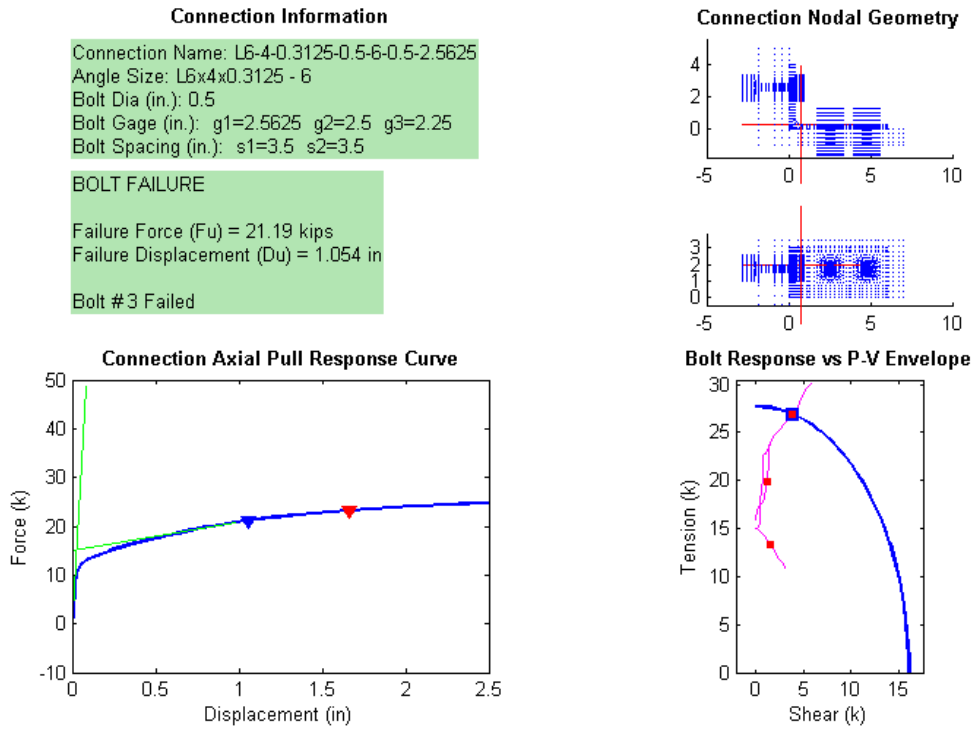


Figure B.2 Connection L6_4_0.3125_0.5_6_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.5_6_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 590.9361

Plastic Stiffness (k/in): 5.9927

Displacement (in): [5.5258e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.50682 ; 0.52245 ; 0.54588 ; 0.58104 ; 0.63377 ; 0.71288 ; 0.74254 ; 0.75366 ; 0.77035 ; 0.79538 ; 0.83292 ; 0.88923 ; 0.9737 ; 1.1004 ; 1.2271 ; 1.3538 ; 1.5439 ; 1.7939 ; 2.0439 ; 2.2939 ; 2.3454 ; 2.4227 ; 2.5]

Force (kips): [-0.17465 ; 0.491735 ; 0.979522 ; 1.4328 ; 2.07105 ; 2.9499 ; 4.0368 ; 5.09915 ; 5.86091 ; 6.25984 ; 6.62358 ; 7.02772 ; 7.51213 ; 8.08756 ; 8.79166 ; 8.85412 ; 8.95269 ; 9.09513 ; 9.29437 ; 9.57373 ; 9.67352 ; 9.71041 ; 9.77381 ; 9.86075 ; 9.97788 ; 10.1508 ; 10.4039 ; 10.7099 ; 10.9656 ; 11.1818 ; 11.4559 ; 11.7696 ; 12.0278 ; 12.2355 ; 12.2744 ; 12.331 ; 12.3822]

Bolt 1 - Tensile Force (kips): [15.1201 ; 15.1042 ; 15.0913 ; 15.0785 ; 15.0595 ; 15.0307 ; 14.9887 ; 14.9417 ; 14.9047 ; 14.8787 ; 14.8432 ; 14.8134 ; 14.7872 ; 14.7525 ; 14.2028 ; 14.1598 ; 14.1261 ; 14.0677 ; 13.9697 ; 13.8093 ; 13.7474 ; 13.7266 ; 13.7061 ; 13.6657 ; 13.5973 ; 13.5067 ; 13.4072 ; 13.2432 ; 12.9928 ; 12.7031 ; 12.322 ; 11.8634 ; 11.4622 ; 11.1287 ; 11.0649 ; 10.972 ; 10.8887]

Bolt 1 - Shear Force (kips): [0.015431 ; 0.02466 ; 0.046127 ; 0.067313 ; 0.098029 ; 0.14184 ; 0.19755 ; 0.2549 ; 0.29954 ; 0.33205 ; 0.37514 ; 0.41361 ; 0.45153 ; 0.50097 ; 0.93689 ; 0.96869 ; 0.99486 ; 1.0392 ; 1.112 ; 1.2279 ; 1.2719 ; 1.2867 ; 1.302 ; 1.3311 ; 1.3793 ; 1.4435 ; 1.5158 ; 1.6321 ; 1.7994 ; 1.9878 ; 2.2313 ; 2.5179 ; 2.7608 ; 2.9593 ; 2.9968 ; 3.0513 ; 3.1002]

Bolt 2 - Tensile Force (kips): [15.1307 ; 15.1086 ; 15.092 ; 15.0783 ; 15.0638 ; 15.0451 ; 15.0343 ; 15.0465 ; 15.1007 ; 15.247 ; 15.5603 ; 16.0093 ; 16.6263 ; 17.372 ; 18.1197 ; 18.1821 ; 18.2779 ; 18.4125 ; 18.6012 ; 18.8531 ; 18.9399 ; 18.9723 ; 19.0219 ; 19.0997 ; 19.2169 ; 19.3952 ; 19.66 ; 20.0393 ; 20.4608 ; 20.8623 ; 21.4137 ; 22.1194 ; 22.7408 ; 23.2865 ; 23.3943 ; 23.5547 ; 23.7111]

Bolt 2 - Shear Force (kips): [0.016878 ; 0.031635 ; 0.057238 ; 0.082536 ; 0.11938 ; 0.17133 ; 0.23788 ; 0.30812 ; 0.36488 ; 0.40208 ; 0.44566 ; 0.48177 ; 0.51658 ; 0.56016 ; 0.88497 ; 0.90751 ; 0.92416 ; 0.95285 ; 0.99997 ; 1.073 ; 1.0997 ; 1.1084 ; 1.1163 ; 1.1324 ; 1.1569 ; 1.1816 ; 1.1973 ; 1.2238 ; 1.2672 ; 1.3187 ; 1.3701 ; 1.4118 ; 1.4388 ; 1.4502 ; 1.4511 ; 1.4515 ; 1.4496]

Bolt 3 - Tensile Force (kips): [16 ; 15.9853 ; 15.9833 ; 15.9921 ; 16.0212 ; 16.1013 ; 16.3089 ; 16.6757 ; 17.0548 ; 17.2912 ; 17.5144 ; 18.0253 ; 18.994 ; 20.5288 ; 22.3883 ; 22.5543 ; 22.8381 ; 23.2621 ; 23.8549 ; 24.604 ; 24.8273 ; 24.8974 ; 25.0223 ; 25.201 ; 25.4273 ; 25.8036 ; 26.4604 ; 27.1172 ; 27.6844 ; 28.1188 ; 28.5898 ; 29.2031 ; 29.6373 ; 29.8932 ; 29.9381 ; 30.0049 ; 30.0433]

Bolt 3 - Shear Force (kips): [0.008879 ; 0.0047743 ; 0.016055 ; 0.028027 ; 0.046357 ; 0.072377 ; 0.10734 ; 0.14805 ; 0.19691 ; 0.29558 ; 0.43315 ; 0.56798 ; 0.68559 ; 0.74777 ; 0.81118 ; 0.8756 ; 1.0483 ; 1.27 ; 1.542 ; 1.9282 ; 2.0683 ; 2.1273 ; 2.2749 ; 2.4533 ; 2.656 ; 2.9788 ; 3.5097 ; 4.1046 ; 4.4116 ; 4.5742 ; 4.8083 ; 5.0951 ; 5.384 ; 5.6549 ; 5.74 ; 5.7819 ; 5.8558]

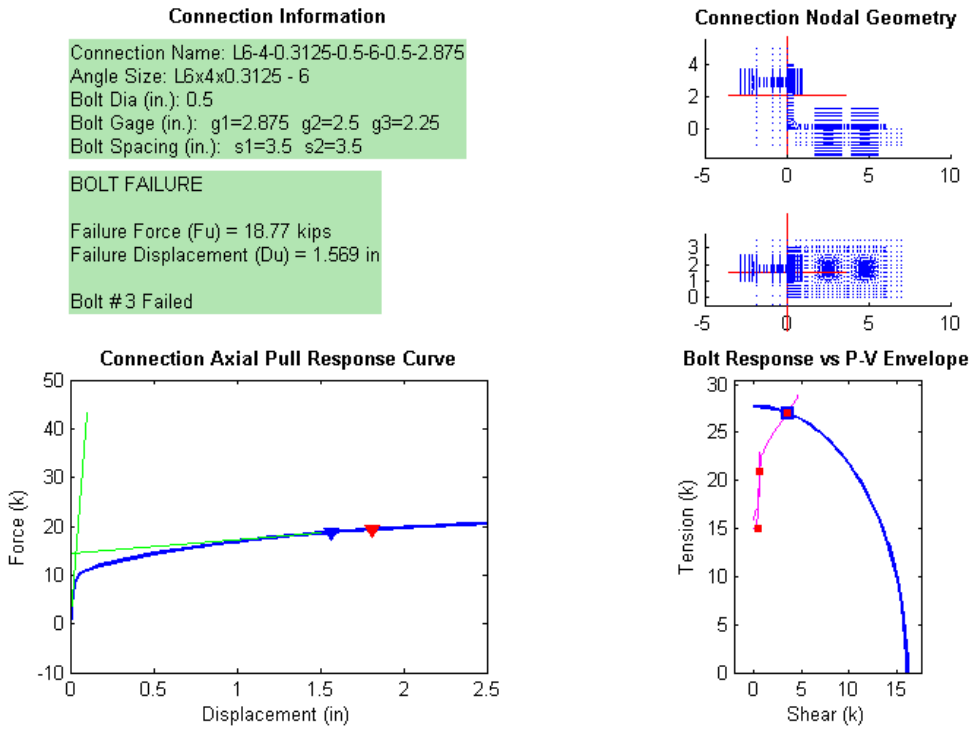


Figure B.3 Connection L6_4_0.3125_0.5_6_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.5_6_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 443.4801

Plastic Stiffness (k/in): 2.8705

Displacement (in): [5.3881e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.50682 ; 0.75682 ; 0.77245 ; 0.79588 ; 0.83104 ; 0.88377 ; 0.96288 ; 0.99254 ; 1.037 ; 1.1038 ; 1.2039 ; 1.3541 ; 1.5042 ; 1.6544 ; 1.8797 ; 2.1296 ; 2.3796 ; 2.5]

Force (kips): [-0.171658 ; 0.341097 ; 0.694514 ; 1.02913 ; 1.50154 ; 2.16844 ; 3.06852 ; 4.04604 ; 4.82309 ; 5.24595 ; 5.5209 ; 5.82271 ; 6.15667 ; 6.60152 ; 7.18048 ; 7.85284 ; 7.89211 ; 7.95171 ; 8.039 ; 8.16314 ; 8.34571 ; 8.41004 ; 8.50774 ; 8.64683 ; 8.83237 ; 9.08967 ; 9.3052 ; 9.49592 ; 9.74777 ; 9.97451 ; 10.1637 ; 10.2474]

Bolt 1 - Tensile Force (kips): [15.1201 ; 15.1082 ; 15.0993 ; 15.0904 ; 15.0772 ; 15.0572 ; 15.0271 ; 14.9885 ; 14.9549 ; 14.935 ; 14.9136 ; 14.8941 ; 14.8807 ; 14.8712 ; 14.8665 ; 14.8726 ; 14.8744 ; 14.8776 ; 14.8824 ; 14.8892 ; 14.8998 ; 14.9037 ; 14.9097 ; 14.9187 ; 14.9315 ; 14.9512 ; 14.9711 ; 14.9902 ; 15.0188 ; 15.0368 ; 15.0275 ; 15.0196]

Bolt 1 - Shear Force (kips): [0.015308 ; 0.018934 ; 0.033476 ; 0.048639 ; 0.070956 ; 0.1036 ; 0.14949 ; 0.20114 ; 0.2447 ; 0.27319 ; 0.30444 ; 0.3362 ; 0.36499 ; 0.39567 ; 0.43028 ; 0.46642 ; 0.4673 ; 0.46805 ; 0.46908 ; 0.47111 ; 0.47368 ; 0.47472 ; 0.47619 ; 0.47819 ; 0.48226 ; 0.48755 ; 0.49238 ; 0.49793 ; 0.50615 ; 0.53015 ; 0.57782 ; 0.60205]

Bolt 2 - Tensile Force (kips): [15.1307 ; 15.1136 ; 15.1015 ; 15.091 ; 15.08 ; 15.0681 ; 15.0598 ; 15.071 ; 15.1222 ; 15.2295 ; 15.4705 ; 15.8151 ; 16.1658 ; 16.7485 ; 17.6455 ; 18.7763 ; 18.832 ; 18.9098 ; 19.0226 ; 19.1864 ; 19.4106 ; 19.4916 ; 19.6075 ; 19.7705 ; 20.0228 ; 20.3909 ; 20.7458 ; 21.0922 ; 21.5686 ; 22.1344 ; 22.6505 ; 22.8783]

Bolt 2 - Shear Force (kips): [0.016704 ; 0.024822 ; 0.042537 ; 0.060798 ; 0.087839 ; 0.12739 ; 0.18229 ; 0.24545 ; 0.30225 ; 0.33912 ; 0.37319 ; 0.40524 ; 0.43523 ; 0.46766 ; 0.50494 ; 0.5556 ; 0.55773 ; 0.56037 ; 0.56411 ; 0.56955 ; 0.57668 ; 0.5793 ; 0.58296 ; 0.58771 ; 0.59607 ; 0.60523 ; 0.60845 ; 0.60547 ; 0.60507 ; 0.60789 ; 0.61664 ; 0.62162]

Bolt 3 - Tensile Force (kips): [16 ; 15.9863 ; 15.9816 ; 15.9821 ; 15.9963 ; 16.0418 ; 16.1581 ; 16.4229 ; 16.7493 ; 16.9116 ; 16.9576 ; 17.1305 ; 17.8149 ; 18.9817 ; 20.5991 ; 22.507 ; 22.6271 ; 22.822 ; 23.1186 ; 23.5533 ; 24.1567 ; 24.3516 ; 24.6379 ; 25.0452 ; 25.5167 ; 26.2378 ; 26.8064 ; 27.2995 ; 27.9139 ; 28.3946 ; 28.7448 ; 28.9115]

Bolt 3 - Shear Force (kips): [0.0091723 ; 0.0031307 ; 0.011255 ; 0.020536 ; 0.03511 ; 0.056799 ; 0.086754 ; 0.12365 ; 0.16147 ; 0.23609 ; 0.36797 ; 0.50697 ; 0.56226 ; 0.63232 ; 0.7195 ; 0.80572 ; 0.86069 ; 0.96364 ; 1.1122 ; 1.294 ; 1.5969 ; 1.7042 ; 1.8825 ; 2.1579 ; 2.5058 ; 3.0246 ; 3.4034 ; 3.7267 ; 4.1737 ; 4.3943 ; 4.5628 ; 4.6361]

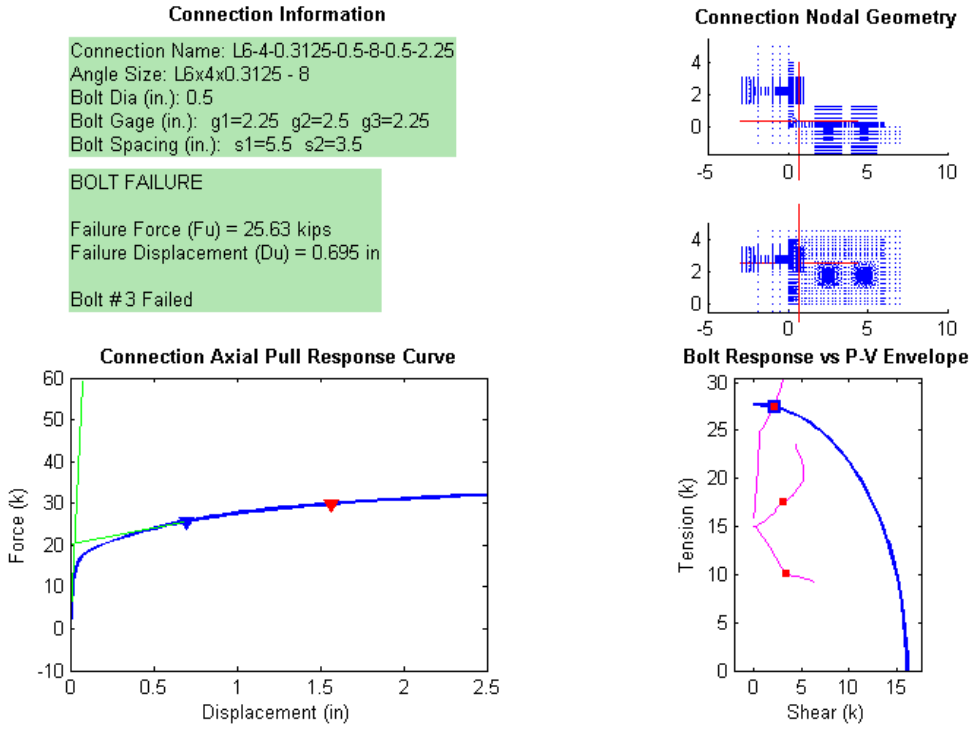


Figure B.4 Connection L6_4_0.3125_0.5_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.5_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 806.0933

Plastic Stiffness (k/in): 7.6509

Displacement (in): [6.0282e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0078125 ; 0.010742 ; 0.015137 ; 0.021729 ; 0.031616 ; 0.046448 ; 0.068695 ; 0.10207 ; 0.15212 ; 0.22721 ; 0.33983 ; 0.38207 ; 0.39791 ; 0.42167 ; 0.4573 ; 0.51075 ; 0.59093 ; 0.621 ; 0.6661 ; 0.68302 ; 0.70839 ; 0.74644 ; 0.76071 ; 0.78212 ; 0.81423 ; 0.86239 ; 0.88045 ; 0.90754 ; 0.9177 ; 0.93294 ; 0.9558 ; 0.99009 ; 1.0415 ; 1.0608 ; 1.0897 ; 1.1331 ; 1.1982 ; 1.2959 ; 1.4423 ; 1.4973 ; 1.5178 ; 1.5487 ; 1.5951 ; 1.6646 ; 1.7689 ; 1.9252 ; 2.1599 ; 2.4099 ; 2.5]

Force (kips): [-0.150821 ; 0.723568 ; 1.42358 ; 2.06374 ; 2.66229 ; 3.49438 ; 4.55825 ; 5.76784 ; 6.92868 ; 7.8714 ; 8.55649 ; 9.12207 ; 9.67219 ; 10.308 ; 11.0814 ; 11.3267 ; 11.4128 ; 11.5416 ; 11.75 ; 12.0437 ; 12.4136 ; 12.5362 ; 12.7065 ; 12.7712 ; 12.8714 ; 13.0142 ; 13.0668 ; 13.1363 ; 13.25 ; 13.4044 ; 13.4594 ; 13.5361 ; 13.5635 ; 13.6131 ; 13.6801 ; 13.7771 ; 13.9151 ; 13.9626 ; 14.0311 ; 14.1338 ; 14.2774 ; 14.4729 ; 14.7214 ; 14.8106 ; 14.841 ; 14.8893 ; 14.9625 ; 15.0777 ; 15.2222 ; 15.4237 ; 15.6866 ; 15.9212 ; 15.9999]

Bolt 1 - Tensile Force (kips): [15.1153 ; 15.0917 ; 15.0702 ; 15.0493 ; 15.0282 ; 14.9955 ; 14.9479 ; 14.8878 ; 14.8222 ; 14.7584 ; 14.6972 ; 14.4356 ; 13.8011 ; 12.9504 ; 11.8039 ; 11.4025 ; 11.2552 ; 11.0361 ; 10.7163 ; 10.2644 ; 10.0793 ; 10.0821 ; 10.0863 ; 10.088 ; 10.0906 ; 10.0946 ; 10.0961 ; 10.0984 ; 10.1018 ; 10.107 ; 10.1089 ; 10.1117 ; 10.1127 ; 10.1145 ; 10.1172 ; 10.1211 ; 10.1269 ; 10.1291 ; 10.0666 ; 9.98613 ; 9.99821 ; 10.0163 ; 10.0435 ; 10.0536 ; 10.0575 ; 10.0377 ; 10.003 ; 9.90059 ; 9.77743 ; 9.62502 ; 9.48377 ; 9.31825 ; 9.26387]

Bolt 1 - Shear Force (kips): [0.014163 ; 0.037111 ; 0.072033 ; 0.10488 ; 0.13603 ; 0.17974 ; 0.23661 ; 0.30372 ; 0.37223 ; 0.43514 ; 0.49296 ; 0.70663 ; 1.1559 ; 1.7061 ; 2.3963 ; 2.6249 ; 2.7062 ; 2.8252 ; 2.995 ; 3.2273 ; 3.3256 ; 3.3266 ; 3.3283 ; 3.3289 ; 3.3298 ; 3.3312 ; 3.3317 ; 3.3324 ; 3.3335 ; 3.3353 ; 3.3359 ; 3.3368 ; 3.3372 ; 3.3378 ; 3.3386 ; 3.3399 ; 3.3419 ; 3.3426 ; 3.3905 ; 3.4483 ; 3.4452 ; 3.4403 ; 3.4328 ; 3.4299 ; 3.4289 ; 3.5586 ; 3.7571 ; 4.1624 ; 4.5907 ; 5.0115 ; 5.587 ; 6.1826 ; 6.3582]

Bolt 2 - Tensile Force (kips): [15.1239 ; 15.0942 ; 15.0696 ; 15.048 ; 15.0311 ; 15.006 ; 14.9802 ; 14.9626 ; 14.9631 ; 14.9954 ; 15.1588 ; 15.315 ; 15.4492 ; 15.8559 ; 16.4295 ; 16.6194 ; 16.6905 ; 16.7952 ; 16.9318 ; 17.1162 ; 17.3319 ; 17.4009 ; 17.4985 ; 17.5322 ; 17.5744 ; 17.6359 ; 17.6576 ; 17.6915 ; 17.73 ; 17.7816 ; 17.7954 ; 17.7797 ; 17.7081 ; 17.7772 ; 17.8789 ; 18.0259 ; 18.2178 ; 18.2803 ; 18.3855 ; 18.5676 ; 18.7977 ; 19.1439 ; 19.6134 ; 19.7508 ; 19.7989 ; 19.9229 ; 20.1041 ; 20.4042 ; 20.764 ; 21.3274 ; 22.3184 ; 23.2189 ; 23.4947]

Bolt 2 - Shear Force (kips): [0.012984 ; 0.043582 ; 0.083392 ; 0.12073 ; 0.15616 ; 0.2055 ; 0.27015 ; 0.34643 ; 0.4248 ; 0.49704 ; 0.55836 ; 0.7553 ; 1.1504 ; 1.5971 ; 2.1035 ; 2.2602 ; 2.3137 ; 2.3868 ; 2.4904 ; 2.6322 ; 2.834 ; 2.9051 ; 3.0054 ; 3.0415 ; 3.0971 ; 3.1752 ; 3.2034 ; 3.2435 ; 3.3068 ; 3.398 ; 3.4333 ; 3.5015 ; 3.5604 ; 3.6361 ; 3.7446 ; 3.9013 ; 4.0907 ; 4.1504 ; 4.2297 ; 4.3564 ; 4.5142 ; 4.7655 ; 5.1223 ; 5.2399 ; 5.28 ; 5.2828 ; 5.2883 ; 5.2498 ; 5.2548 ; 5.2879 ; 4.9128 ; 4.5125 ; 4.3998]

Bolt 3 - Tensile Force (kips): [16 ; 15.9866 ; 15.9917 ; 16.0157 ; 16.0555 ; 16.1401 ; 16.3397 ; 16.724 ; 17.3083 ; 18.0395 ; 18.8477 ; 19.7398 ; 20.7975 ; 22.1619 ; 23.9346 ; 24.4526 ; 24.628 ; 24.8812 ; 25.2795 ; 25.9085 ; 26.6732 ; 26.914 ; 27.2406 ; 27.366 ; 27.5733 ; 27.8634 ; 27.9736 ; 28.1017 ; 28.3242 ; 28.6213 ; 28.7208 ; 28.8649 ; 28.9101 ; 29.0158 ; 29.136 ; 29.3093 ; 29.5671 ; 29.652 ; 29.767 ; 29.9538 ; 30.2157 ; 30.5557 ; 30.9137 ; 31.0706 ; 31.1135 ; 31.1703 ; 31.2755 ; 31.4678 ; 31.6482 ; 31.9408 ; 32.3414 ; 32.6787 ; 32.8061]

Bolt 3 - Shear Force (kips): [0.0089158 ; 0.0062741 ; 0.018686 ; 0.032089 ; 0.045629 ; 0.064566 ; 0.090891 ; 0.12381 ; 0.15713 ; 0.19627 ; 0.27923 ; 0.38067 ; 0.47683 ; 0.56317 ; 0.61207 ; 0.62067 ; 0.6234 ; 0.66987 ; 0.9704 ; 1.3703 ; 1.7689 ; 1.8824 ; 2.0135 ; 2.0674 ; 2.1572 ; 2.274 ; 2.3159 ; 2.3547 ; 2.4494 ; 2.5518 ; 2.6017 ; 2.6595 ; 2.7003 ; 2.7436 ; 2.7732 ; 2.8286 ; 2.9049 ; 2.926 ; 2.9428 ; 2.9922 ; 3.0618 ; 3.1948 ; 3.2019 ; 3.2316 ; 3.2371 ; 3.2378 ; 3.2855 ; 3.1714 ; 3.0835 ; 3.024 ; 2.9783 ; 3.0161 ; 3.0871]

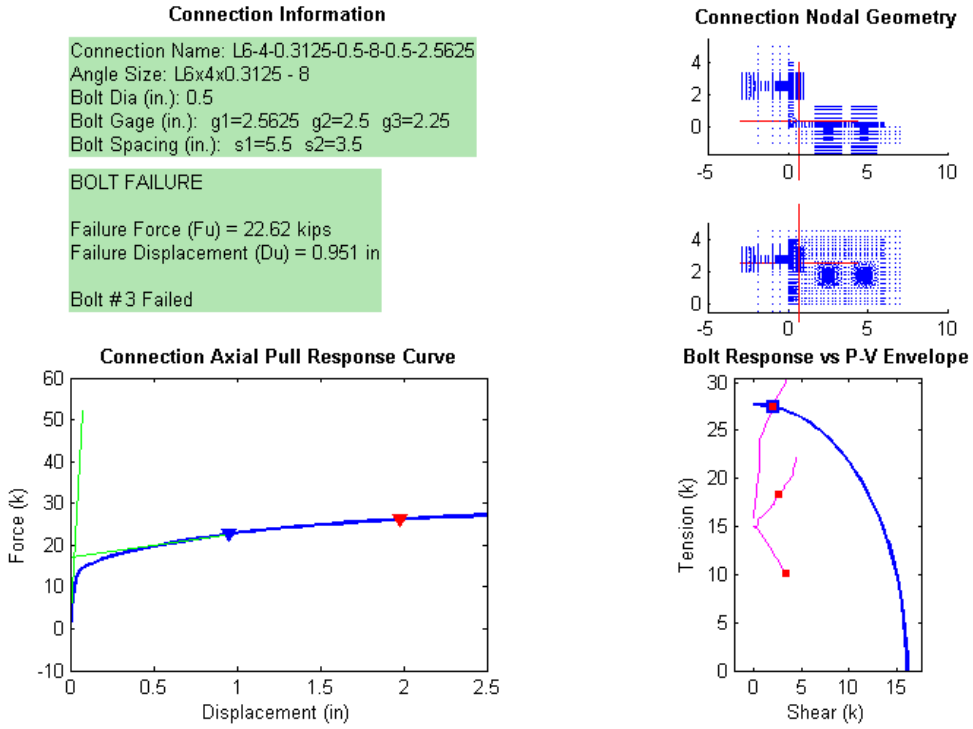


Figure B.5 Connection L6_4_0.3125_0.5_8_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.5_8_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 739.9830

Plastic Stiffness (k/in): 5.6375

Displacement (in): [7.193e-037 ; 0.00048828 ; 0.00097656 ; 0.0014648 ; 0.0021973 ; 0.0032959 ; 0.0049438 ; 0.0074158 ; 0.011124 ; 0.016685 ; 0.025028 ; 0.037542 ; 0.056314 ; 0.08447 ; 0.12671 ; 0.19006 ; 0.21382 ; 0.24945 ; 0.3029 ; 0.38309 ; 0.50336 ; 0.54846 ; 0.61611 ; 0.71759 ; 0.86981 ; 0.92689 ; 0.98397 ; 1.0411 ; 1.0625 ; 1.0946 ; 1.1427 ; 1.215 ; 1.3233 ; 1.364 ; 1.4249 ; 1.5164 ; 1.5507 ; 1.6021 ; 1.6792 ; 1.7082 ; 1.7516 ; 1.8167 ; 1.9143 ; 2.0608 ; 2.1157 ; 2.1981 ; 2.2804 ; 2.3628 ; 2.4864 ; 2.5]

Force (kips): [-0.144657 ; 0.0641092 ; 0.216663 ; 0.360464 ; 0.561975 ; 0.846716 ; 1.25503 ; 1.82956 ; 2.63238 ; 3.70015 ; 4.90633 ; 6.02377 ; 6.8539 ; 7.38021 ; 7.84562 ; 8.31955 ; 8.46833 ; 8.67777 ; 8.97103 ; 9.36441 ; 9.87258 ; 10.0483 ; 10.3102 ; 10.6545 ; 11.0882 ; 11.2491 ; 11.3971 ; 11.5405 ; 11.5936 ; 11.6689 ; 11.7775 ; 11.9243 ; 12.1257 ; 12.1972 ; 12.2988 ; 12.4432 ; 12.4967 ; 12.5804 ; 12.6941 ; 12.735 ; 12.7934 ; 12.876 ; 12.999 ; 13.1619 ; 13.2213 ; 13.3088 ; 13.3865 ; 13.4592 ; 13.5693 ; 13.5811]

Bolt 1 - Tensile Force (kips): [15.1153 ; 15.1102 ; 15.1062 ; 15.1023 ; 15.0966 ; 15.0883 ; 15.0758 ; 15.0574 ; 15.0294 ; 14.9858 ; 14.929 ; 14.8686 ; 14.8151 ; 14.7682 ; 14.7039 ; 14.3056 ; 14.0995 ; 13.7935 ; 13.3501 ; 12.723 ; 11.8786 ; 11.6008 ; 11.2548 ; 10.753 ; 10.1134 ; 10.1182 ; 10.1237 ; 10.1295 ; 10.1317 ; 10.135 ; 10.1401 ; 10.1477 ; 10.1592 ; 10.1636 ; 10.1703 ; 10.1803 ; 10.1841 ; 10.1897 ; 10.1979 ; 10.19 ; 10.1237 ; 10.1355 ; 10.153 ; 10.1792 ; 10.1892 ; 10.2041 ; 10.219 ; 10.2338 ; 10.2559 ; 10.2583]

Bolt 1 - Shear Force (kips): [0.013859 ; 0.011187 ; 0.014771 ; 0.020405 ; 0.029601 ; 0.043453 ; 0.063998 ; 0.093656 ; 0.13603 ; 0.19356 ; 0.26105 ; 0.3284 ; 0.38602 ; 0.4351 ; 0.49905 ; 0.81505 ; 0.96273 ; 1.1744 ; 1.4673 ; 1.8632 ; 2.3716 ; 2.5331 ; 2.7289 ; 3.0021 ; 3.3356 ; 3.3381 ; 3.3403 ; 3.3425 ; 3.3432 ; 3.3444 ; 3.3461 ; 3.3487 ; 3.3525 ; 3.3539 ; 3.3562 ; 3.3595 ; 3.3607 ; 3.3626 ; 3.3653 ; 3.3748 ; 3.4251 ; 3.4219 ; 3.4167 ; 3.4088 ; 3.4059 ; 3.4015 ; 3.3971 ; 3.3927 ; 3.3859 ; 3.3852]

Bolt 2 - Tensile Force (kips): [15.1238 ; 15.1172 ; 15.1118 ; 15.1066 ; 15.0995 ; 15.0891 ; 15.0753 ; 15.0577 ; 15.0374 ; 15.0153 ; 15.0096 ; 15.0317 ; 15.0968 ; 15.3259 ; 15.7035 ; 15.9935 ; 16.0879 ; 16.2423 ; 16.469 ; 16.7902 ; 17.2228 ; 17.3683 ; 17.5865 ; 17.8928 ; 18.2751 ; 18.386 ; 18.4881 ; 18.5833 ; 18.617 ; 18.6666 ; 18.7393 ; 18.8406 ; 18.9892 ; 19.0417 ; 19.1195 ; 19.2511 ; 19.3565 ; 19.5298 ; 19.7862 ; 19.8728 ; 19.9974 ; 20.2088 ; 20.5301 ; 20.9276 ; 21.1157 ; 21.3668 ; 21.572 ; 21.7864 ; 22.1292 ; 22.1645]

Bolt 2 - Shear Force (kips): [0.012599 ; 0.011614 ; 0.017282 ; 0.024344 ; 0.035204 ; 0.051211 ; 0.074876 ; 0.10895 ; 0.1576 ; 0.22317 ; 0.30109 ; 0.37955 ; 0.44708 ; 0.4979 ; 0.55519 ; 0.8301 ; 0.95544 ; 1.1314 ; 1.3683 ; 1.6697 ; 2.0218 ; 2.1259 ; 2.2334 ; 2.3759 ; 2.5769 ; 2.6583 ; 2.7383 ; 2.8147 ; 2.8427 ; 2.8836 ; 2.9404 ; 3.024 ; 3.1376 ; 3.1778 ; 3.236 ; 3.3146 ; 3.4029 ; 3.5521 ; 3.7582 ; 3.8208 ; 3.8911 ; 3.9969 ; 4.0849 ; 4.1927 ; 4.2255 ; 4.2798 ; 4.3356 ; 4.3842 ; 4.4526 ; 4.4591]

Bolt 3 - Tensile Force (kips): [16 ; 15.9952 ; 15.9912 ; 15.9879 ; 15.985 ; 15.9839 ; 15.9871 ; 16.0082 ; 16.0688 ; 16.2278 ; 16.595 ; 17.1108 ; 17.7245 ; 18.3173 ; 19.0182 ; 20.0143 ; 20.3798 ; 20.9046 ; 21.6567 ; 22.6852 ; 24.0114 ; 24.4483 ; 25.1167 ; 25.9502 ; 26.9455 ; 27.3347 ; 27.6729 ; 27.9966 ; 28.1101 ; 28.2736 ; 28.5007 ; 28.7799 ; 29.1384 ; 29.2687 ; 29.4433 ; 29.6921 ; 29.7763 ; 29.9331 ; 30.1127 ; 30.177 ; 30.2597 ; 30.371 ; 30.5796 ; 30.8207 ; 30.917 ; 31.0708 ; 31.1843 ; 31.2791 ; 31.4744 ; 31.4971]

Bolt 3 - Shear Force (kips): [0.00917 ; 0.0059456 ; 0.0034302 ; 0.0024639 ; 0.0051071 ; 0.01059 ; 0.01924 ; 0.03298 ; 0.05344 ; 0.081518 ; 0.1167 ; 0.1526 ; 0.19339 ; 0.28015 ; 0.39503 ; 0.50642 ; 0.53731 ; 0.57458 ; 0.61498 ; 0.6502 ; 0.66269 ; 0.74536 ; 1.0691 ; 1.4394 ; 1.8019 ; 1.9762 ; 2.1165 ; 2.2578 ; 2.2973 ; 2.3625 ; 2.5072 ; 2.6597 ; 2.8836 ; 2.9615 ; 3.0544 ; 3.2168 ; 3.2571 ; 3.3378 ; 3.3888 ; 3.4037 ; 3.4278 ; 3.4621 ; 3.5176 ; 3.5873 ; 3.6641 ; 3.6591 ; 3.6781 ; 3.6846 ; 3.708 ; 3.7169]

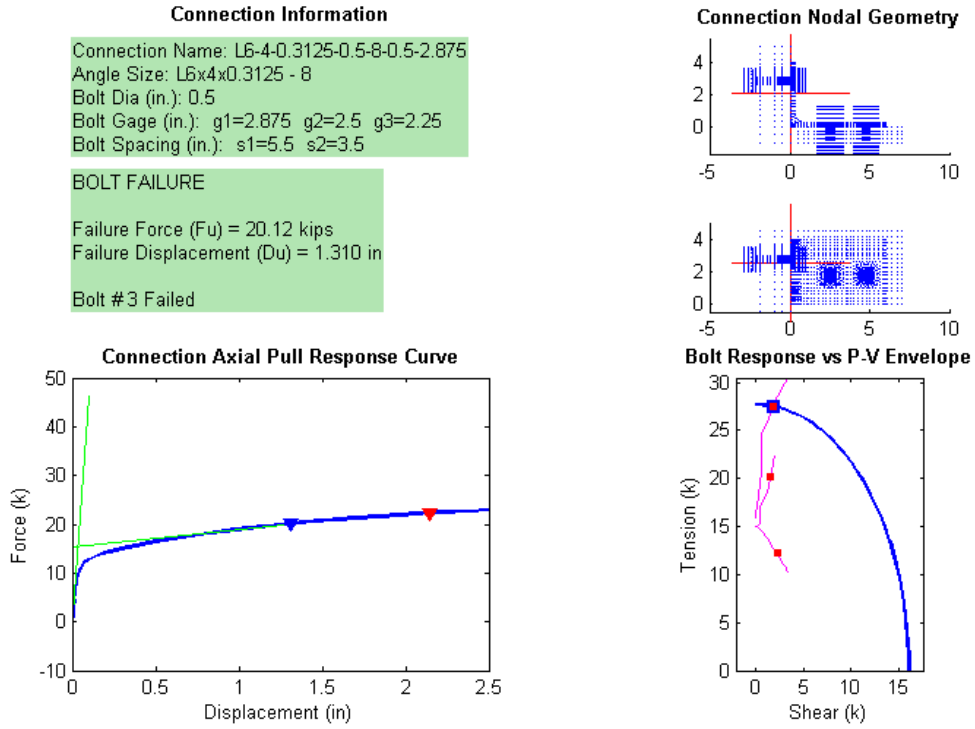


Figure B.6 Connection L6_4_0.3125_0.5_8_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.5_8_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 442.8749

Plastic Stiffness (k/in): 3.5991

Displacement (in): [8.5919e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.50682 ; 0.75682 ; 0.81932 ; 0.91307 ; 1.0537 ; 1.2646 ; 1.3271 ; 1.3506 ; 1.3857 ; 1.4385 ; 1.4582 ; 1.4879 ; 1.5324 ; 1.5991 ; 1.6992 ; 1.8494 ; 2.0747 ; 2.1372 ; 2.2309 ; 2.3716 ; 2.5]

Force (kips): [-0.143555 ; 0.349462 ; 0.721435 ; 1.07347 ; 1.57327 ; 2.27845 ; 3.22859 ; 4.30568 ; 5.27897 ; 5.98144 ; 6.39753 ; 6.77299 ; 7.15986 ; 7.62826 ; 8.22591 ; 8.92045 ; 9.08339 ; 9.30811 ; 9.60325 ; 9.98283 ; 10.0927 ; 10.135 ; 10.1952 ; 10.2803 ; 10.3106 ; 10.3569 ; 10.4217 ; 10.5133 ; 10.643 ; 10.8235 ; 11.0709 ; 11.1378 ; 11.2271 ; 11.3474 ; 11.4534]

Bolt 1 - Tensile Force (kips): [15.1153 ; 15.1027 ; 15.0923 ; 15.0818 ; 15.0663 ; 15.0426 ; 15.0062 ; 14.9574 ; 14.9073 ; 14.865 ; 14.8286 ; 14.7792 ; 14.7496 ; 14.7195 ; 14.3302 ; 13.3798 ; 13.2524 ; 13.0599 ; 12.7706 ; 12.3044 ; 12.1756 ; 12.1286 ; 12.0529 ; 11.9352 ; 11.8915 ; 11.8264 ; 11.7275 ; 11.58 ; 11.388 ; 11.1009 ; 10.6701 ; 10.5662 ; 10.4106 ; 10.2854 ; 10.2954]

Bolt 1 - Shear Force (kips): [0.013814 ; 0.020007 ; 0.037403 ; 0.054965 ; 0.080726 ; 0.11798 ; 0.16973 ; 0.23055 ; 0.29024 ; 0.34003 ; 0.38305 ; 0.43874 ; 0.47748 ; 0.52026 ; 0.83925 ; 1.5014 ; 1.5883 ; 1.7181 ; 1.9103 ; 2.2095 ; 2.291 ; 2.3205 ; 2.3678 ; 2.4404 ; 2.4672 ; 2.507 ; 2.5668 ; 2.6547 ; 2.768 ; 2.9339 ; 3.1744 ; 3.2317 ; 3.3167 ; 3.39 ; 3.3957]

Bolt 2 - Tensile Force (kips): [15.1238 ; 15.1067 ; 15.0933 ; 15.0815 ; 15.0671 ; 15.0523 ; 15.039 ; 15.0454 ; 15.0853 ; 15.1707 ; 15.417 ; 15.7774 ; 16.2791 ; 16.9523 ; 17.7093 ; 18.5758 ; 18.7891 ; 19.0844 ; 19.4978 ; 20.0597 ; 20.2139 ; 20.27 ; 20.35 ; 20.466 ; 20.5093 ; 20.5731 ; 20.6682 ; 20.8188 ; 21.052 ; 21.3745 ; 21.7921 ; 21.904 ; 22.0611 ; 22.2433 ; 22.348]

Bolt 2 - Shear Force (kips): [0.012524 ; 0.023983 ; 0.044539 ; 0.064991 ; 0.094884 ; 0.13826 ; 0.19765 ; 0.26867 ; 0.3395 ; 0.39956 ; 0.4445 ; 0.49563 ; 0.52744 ; 0.5619 ; 0.81064 ; 1.2833 ; 1.3317 ; 1.4005 ; 1.4875 ; 1.5924 ; 1.6181 ; 1.6271 ; 1.6427 ; 1.6674 ; 1.6763 ; 1.6894 ; 1.7092 ; 1.7368 ; 1.7647 ; 1.809 ; 1.8805 ; 1.8953 ; 1.9194 ; 1.9809 ; 2.0686]

Bolt 3 - Tensile Force (kips): [16 ; 15.9864 ; 15.9819 ; 15.9832 ; 15.9996 ; 16.0507 ; 16.1929 ; 16.5259 ; 16.9955 ; 17.4871 ; 17.9247 ; 18.5084 ; 19.4541 ; 20.846 ; 22.6562 ; 24.5807 ; 25.0094 ; 25.601 ; 26.3478 ; 27.3018 ; 27.589 ; 27.6982 ; 27.8562 ; 28.0729 ; 28.1419 ; 28.2476 ; 28.3886 ; 28.5685 ; 28.8236 ; 29.182 ; 29.663 ; 29.8205 ; 29.9887 ; 30.1792 ; 30.3703]

Bolt 3 - Shear Force (kips): [0.0094208 ; 0.0026989 ; 0.0099518 ; 0.018329 ; 0.031616 ; 0.0516 ; 0.079087 ; 0.11298 ; 0.14768 ; 0.18778 ; 0.2759 ; 0.39722 ; 0.50475 ; 0.5743 ; 0.62319 ; 0.64999 ; 0.87301 ; 1.1505 ; 1.4774 ; 1.8063 ; 1.9253 ; 1.9878 ; 2.0583 ; 2.1444 ; 2.1688 ; 2.1985 ; 2.2438 ; 2.3166 ; 2.4398 ; 2.6075 ; 2.8726 ; 2.9567 ; 3.0545 ; 3.166 ; 3.2585]

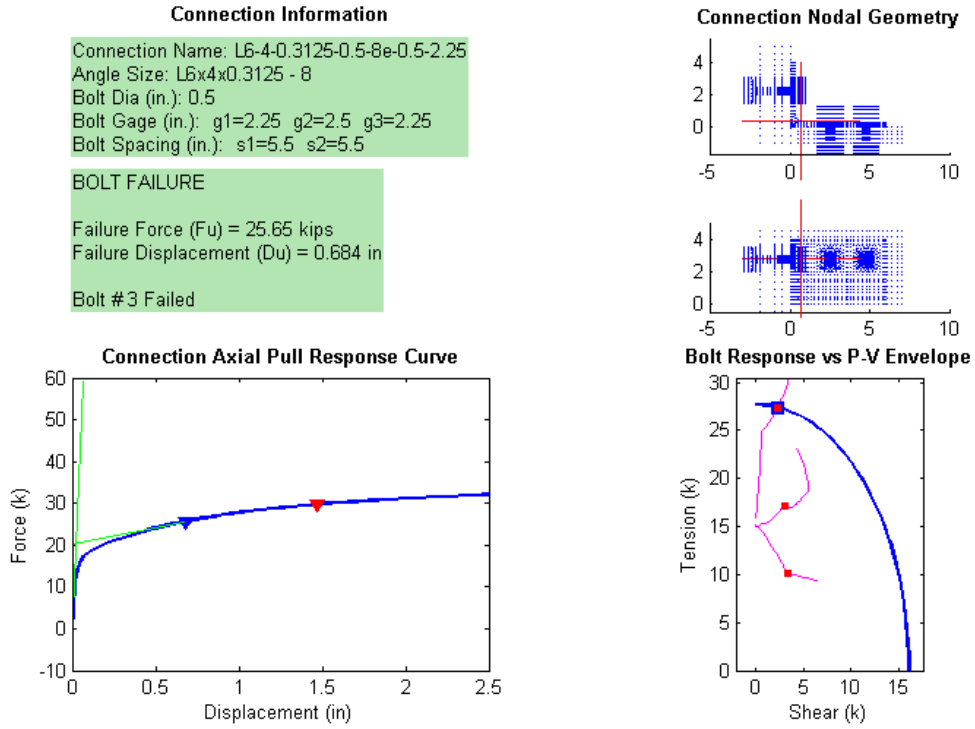


Figure B.7 Connection L6_4_0.3125_0.5_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.5_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 841.5534

Plastic Stiffness (k/in): 8.0357

Displacement (in): [5.7249e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0078125 ; 0.010742 ; 0.015137 ; 0.021729 ; 0.031616 ; 0.046448 ; 0.068695 ; 0.10207 ; 0.15212 ; 0.22721 ; 0.33983 ; 0.38207 ; 0.39791 ; 0.42167 ; 0.43057 ; 0.44394 ; 0.46398 ; 0.49405 ; 0.53915 ; 0.6068 ; 0.63217 ; 0.67023 ; 0.6845 ; 0.70591 ; 0.73801 ; 0.78618 ; 0.80424 ; 0.83133 ; 0.84149 ; 0.85673 ; 0.87959 ; 0.91387 ; 0.9653 ; 0.98459 ; 1.0135 ; 1.0569 ; 1.122 ; 1.2196 ; 1.2563 ; 1.3112 ; 1.3936 ; 1.4245 ; 1.4554 ; 1.4863 ; 1.5326 ; 1.6021 ; 1.7064 ; 1.7455 ; 1.8041 ; 1.8921 ; 2.0241 ; 2.222 ; 2.42 ; 2.5]

Force (kips): [-0.201929 ; 0.72651 ; 1.44173 ; 2.09092 ; 2.69841 ; 3.54219 ; 4.60499 ; 5.7902 ; 6.92166 ; 7.87323 ; 8.5791 ; 9.14891 ; 9.69296 ; 10.3131 ; 11.0866 ; 11.3343 ; 11.4213 ; 11.5569 ; 11.6122 ; 11.6943 ; 11.8148 ; 11.9876 ; 12.2176 ; 12.5145 ; 12.6153 ; 12.7682 ; 12.8275 ; 12.9138 ; 13.0353 ; 13.2108 ; 13.2777 ; 13.3668 ; 13.3956 ; 13.4493 ; 13.5283 ; 13.6381 ; 13.786 ; 13.8416 ; 13.9189 ; 14.0279 ; 14.1807 ; 14.3917 ; 14.4669 ; 14.5698 ; 14.7083 ; 14.762 ; 14.8182 ; 14.8757 ; 14.9512 ; 15.056 ; 15.2051 ; 15.2611 ; 15.3371 ; 15.4421 ; 15.5952 ; 15.7908 ; 15.9781 ; 16.0455]

Bolt 1 - Tensile Force (kips): [15.148 ; 15.1221 ; 15.0997 ; 15.0777 ; 15.0556 ; 15.0209 ; 14.972 ; 14.9116 ; 14.8458 ; 14.7812 ; 14.7187 ; 14.4187 ; 13.7835 ; 12.9463 ; 11.7834 ; 11.3679 ; 11.2155 ; 10.9888 ; 10.9057 ; 10.7828 ; 10.6027 ; 10.3387 ; 10.0871 ; 10.0945 ; 10.0972 ; 10.1018 ; 10.1036 ; 10.1064 ; 10.1105 ; 10.1171 ; 10.1196 ; 10.1235 ; 10.125 ; 10.127 ; 10.1299 ; 10.1343 ; 10.1408 ; 10.1433 ; 10.0807 ; 9.99456 ; 10.008 ; 10.0282 ; 10.0358 ; 10.0475 ; 10.0652 ; 10.0465 ; 10.0313 ; 9.97685 ; 9.91028 ; 9.85717 ; 9.78137 ; 9.75231 ; 9.71665 ; 9.67383 ; 9.61726 ; 9.5041 ; 9.38971 ; 9.35405]

Bolt 1 - Shear Force (kips): [0.013797 ; 0.040198 ; 0.076066 ; 0.10951 ; 0.14135 ; 0.18593 ; 0.24329 ; 0.30978 ; 0.37716 ; 0.43974 ; 0.49817 ; 0.73871 ; 1.1847 ; 1.7239 ; 2.422 ; 2.6567 ; 2.7401 ; 2.8623 ; 2.9066 ; 2.9714 ; 3.0652 ; 3.2001 ; 3.3278 ; 3.3309 ; 3.3319 ; 3.3335 ; 3.3341 ; 3.335 ; 3.3364 ; 3.3386 ; 3.3394 ; 3.3407 ; 3.3413 ; 3.3419 ; 3.3429 ; 3.3443 ; 3.3464 ; 3.3473 ; 3.3921 ; 3.453 ; 3.4509 ; 3.447 ; 3.4456 ; 3.4435 ; 3.4404 ; 3.5667 ; 3.6839 ; 3.9122 ; 4.1836 ; 4.4085 ; 4.677 ; 4.7645 ; 4.866 ; 5.0187 ; 5.307 ; 5.7803 ; 6.2201 ; 6.3683]

Bolt 2 - Tensile Force (kips): [15.1749 ; 15.1429 ; 15.1173 ; 15.0965 ; 15.0784 ; 15.0517 ; 15.0266 ; 15.0094 ; 15.0112 ; 15.0385 ; 15.1857 ; 15.2801 ; 15.3506 ; 15.6866 ; 16.2137 ; 16.3851 ; 16.4453 ; 16.5337 ; 16.563 ; 16.6076 ; 16.6727 ; 16.7658 ; 16.8886 ; 17.0237 ; 17.0621 ; 17.1067 ; 17.1175 ; 17.1276 ; 17.143 ; 17.1404 ; 17.1239 ; 17.0073 ; 16.8731 ; 16.9428 ; 17.0356 ; 17.1816 ; 17.3657 ; 17.4241 ; 17.5363 ; 17.6723 ; 17.8548 ; 18.2084 ; 18.3518 ; 18.5176 ; 18.7135 ; 18.8351 ; 18.9464 ; 19.1002 ; 19.2976 ; 19.5861 ; 20.1277 ; 20.3013 ; 20.538 ; 20.9059 ; 21.4564 ; 22.2168 ; 22.8723 ; 23.1138]

Bolt 2 - Shear Force (kips): [0.02126 ; 0.042252 ; 0.08158 ; 0.11893 ; 0.15454 ; 0.20446 ; 0.26922 ; 0.34438 ; 0.42132 ; 0.49318 ; 0.55622 ; 0.78168 ; 1.1789 ; 1.6213 ; 2.1392 ; 2.3038 ; 2.3614 ; 2.4397 ; 2.468 ; 2.5093 ; 2.5687 ; 2.6541 ; 2.777 ; 2.9586 ; 3.0252 ; 3.1242 ; 3.162 ; 3.2195 ; 3.3011 ; 3.4268 ; 3.479 ; 3.5978 ; 3.6808 ; 3.7686 ; 3.8888 ; 4.0655 ; 4.2794 ; 4.3514 ; 4.458 ; 4.5901 ; 4.7743 ; 5.0822 ; 5.2055 ; 5.3557 ; 5.5441 ; 5.5576 ; 5.5751 ; 5.5494 ; 5.5372 ; 5.5202 ; 5.3564 ; 5.315 ; 5.2757 ; 5.1988 ; 5.0132 ; 4.6937 ; 4.4092 ; 4.308]

Bolt 3 - Tensile Force (kips): [16 ; 15.9874 ; 15.992 ; 16.0164 ; 16.0571 ; 16.1419 ; 16.3426 ; 16.7213 ; 17.3011 ; 18.0387 ; 18.8575 ; 19.7667 ; 20.8272 ; 22.1957 ; 23.9592 ; 24.4725 ; 24.6465 ; 24.8992 ; 24.9968 ; 25.1514 ; 25.3925 ; 25.7672 ; 26.241 ; 26.827 ; 27.0142 ; 27.3077 ; 27.4245 ; 27.5818 ; 27.8183 ; 28.1462 ; 28.2778 ; 28.4506 ; 28.5023 ; 28.5872 ; 28.7345 ; 28.9301 ; 29.1792 ; 29.2834 ; 29.4159 ; 29.6041 ; 29.8816 ; 30.2411 ; 30.3709 ; 30.5404 ; 30.7471 ; 30.8179 ; 30.918 ; 31.0117 ; 31.1057 ; 31.2521 ; 31.464 ; 31.5626 ; 31.6737 ; 31.8032 ; 32.0388 ; 32.2621 ; 32.5985 ; 32.7108]

Bolt 3 - Shear Force (kips): [0.014653 ; 0.0016686 ; 0.014198 ; 0.028744 ; 0.043255 ; 0.062937 ; 0.090095 ; 0.12372 ; 0.15706 ; 0.19658 ; 0.2806 ; 0.38189 ; 0.4776 ; 0.56276 ; 0.61474 ; 0.6244 ; 0.62746 ; 0.72092 ; 0.81959 ; 0.96229 ; 1.1688 ; 1.4084 ; 1.6943 ; 1.9883 ; 2.0774 ; 2.214 ; 2.2717 ; 2.357 ; 2.4583 ; 2.6398 ; 2.7067 ; 2.7937 ; 2.838 ; 2.9016 ; 2.9828 ; 3.0578 ; 3.1499 ; 3.1916 ; 3.2211 ; 3.2799 ; 3.3567 ; 3.4141 ; 3.4485 ; 3.4517 ; 3.4334 ; 3.4226 ; 3.4223 ; 3.4054 ; 3.3872 ; 3.4193 ; 3.553 ; 3.5228 ; 3.5075 ; 3.5696 ; 3.5775 ; 3.5751 ; 3.5353 ; 3.5199]

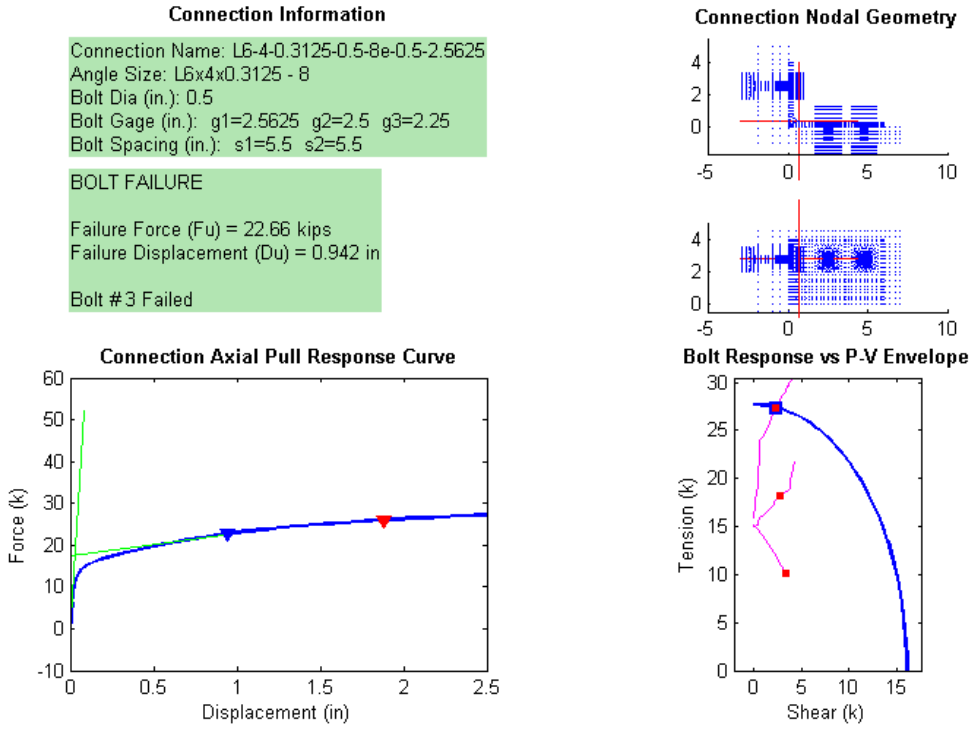


Figure B.8 Connection L6_4_0.3125_0.5_8e_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.5_8e_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 615.1762

Plastic Stiffness (k/in): 5.4364

Displacement (in): [5.1986e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.50682 ; 0.51073 ; 0.51659 ; 0.52538 ; 0.53856 ; 0.55834 ; 0.588 ; 0.63249 ; 0.69924 ; 0.79935 ; 0.83689 ; 0.8932 ; 0.91432 ; 0.946 ; 0.99351 ; 1.0648 ; 1.1717 ; 1.2118 ; 1.2719 ; 1.3621 ; 1.4974 ; 1.5482 ; 1.6243 ; 1.7384 ; 1.7813 ; 1.8455 ; 1.9418 ; 2.0863 ; 2.1405 ; 2.2217 ; 2.3436 ; 2.5]

Force (kips): [-0.193556 ; 0.496923 ; 1.00796 ; 1.48531 ; 2.1567 ; 3.0828 ; 4.22647 ; 5.3972 ; 6.39933 ; 7.0941 ; 7.58005 ; 8.03698 ; 8.52181 ; 9.13141 ; 9.8766 ; 9.89271 ; 9.9194 ; 9.95867 ; 10.0164 ; 10.1006 ; 10.2232 ; 10.3912 ; 10.6187 ; 10.9223 ; 11.0319 ; 11.1972 ; 11.2546 ; 11.3391 ; 11.4648 ; 11.6526 ; 11.8858 ; 11.9674 ; 12.0801 ; 12.238 ; 12.4584 ; 12.5402 ; 12.6544 ; 12.8158 ; 12.8723 ; 12.9569 ; 13.0692 ; 13.2215 ; 13.2794 ; 13.3592 ; 13.4692 ; 13.6004]

Bolt 1 - Tensile Force (kips): [15.148 ; 15.1292 ; 15.1137 ; 15.0985 ; 15.0756 ; 15.04 ; 14.9884 ; 14.9288 ; 14.8698 ; 14.8203 ; 14.7698 ; 14.6927 ; 14.1091 ; 13.1843 ; 11.8955 ; 11.8696 ; 11.8388 ; 11.7929 ; 11.7228 ; 11.6173 ; 11.4614 ; 11.2236 ; 10.886 ; 10.3888 ; 10.2092 ; 10.1304 ; 10.1325 ; 10.1361 ; 10.1415 ; 10.1503 ; 10.1638 ; 10.1689 ; 10.1767 ; 10.1884 ; 10.2052 ; 10.2112 ; 10.2202 ; 10.2337 ; 10.1856 ; 10.1753 ; 10.1949 ; 10.2244 ; 10.2356 ; 10.2525 ; 10.2776 ; 10.3098]

Bolt 1 - Shear Force (kips): [0.013406 ; 0.029552 ; 0.054652 ; 0.07911 ; 0.11423 ; 0.16389 ; 0.2267 ; 0.29472 ; 0.35812 ; 0.40961 ; 0.46146 ; 0.53486 ; 0.97502 ; 1.5903 ; 2.377 ; 2.3921 ; 2.4103 ; 2.4372 ; 2.4781 ; 2.5391 ; 2.6281 ; 2.7607 ; 2.945 ; 3.2061 ; 3.2978 ; 3.3417 ; 3.3428 ; 3.3442 ; 3.3463 ; 3.3494 ; 3.354 ; 3.3557 ; 3.3583 ; 3.3621 ; 3.3677 ; 3.3697 ; 3.3726 ; 3.3771 ; 3.4145 ; 3.4289 ; 3.4251 ; 3.4193 ; 3.4172 ; 3.4139 ; 3.4089 ; 3.4025]

Bolt 2 - Tensile Force (kips): [15.1748 ; 15.1508 ; 15.1323 ; 15.1168 ; 15.0992 ; 15.0757 ; 15.0609 ; 15.0654 ; 15.101 ; 15.2158 ; 15.4898 ; 15.8771 ; 16.1166 ; 16.553 ; 17.1401 ; 17.1522 ; 17.1723 ; 17.2017 ; 17.2433 ; 17.3019 ; 17.391 ; 17.524 ; 17.711 ; 17.9571 ; 18.0344 ; 18.1198 ; 18.1473 ; 18.186 ; 18.2409 ; 18.3137 ; 18.4103 ; 18.4451 ; 18.4927 ; 18.5583 ; 18.7254 ; 18.8733 ; 19.1673 ; 19.5994 ; 19.7562 ; 19.9676 ; 20.3031 ; 20.7074 ; 20.8391 ; 21.023 ; 21.3678 ; 21.7207]

Bolt 2 - Shear Force (kips): [0.020723 ; 0.031184 ; 0.05817 ; 0.085292 ; 0.12479 ; 0.18027 ; 0.25121 ; 0.32889 ; 0.40259 ; 0.46076 ; 0.51037 ; 0.57527 ; 0.95314 ; 1.4491 ; 2.0166 ; 2.0269 ; 2.0387 ; 2.0562 ; 2.0827 ; 2.1222 ; 2.1757 ; 2.2482 ; 2.3483 ; 2.4936 ; 2.549 ; 2.6446 ; 2.6813 ; 2.7352 ; 2.8121 ; 2.9203 ; 3.0731 ; 3.1253 ; 3.2034 ; 3.3144 ; 3.55 ; 3.6879 ; 3.7897 ; 3.8467 ; 3.8539 ; 3.895 ; 3.9523 ; 4.0457 ; 4.0795 ; 4.1289 ; 4.1858 ; 4.2668]

Bolt 3 - Tensile Force (kips): [16 ; 15.9861 ; 15.9848 ; 15.9941 ; 16.0269 ; 16.1164 ; 16.3528 ; 16.7898 ; 17.3445 ; 17.9622 ; 18.5718 ; 19.3972 ; 20.5446 ; 22.1028 ; 23.9942 ; 24.0314 ; 24.0938 ; 24.1891 ; 24.3344 ; 24.5535 ; 24.8795 ; 25.2882 ; 25.8149 ; 26.5028 ; 26.7459 ; 27.1251 ; 27.2524 ; 27.4324 ; 27.7155 ; 28.1565 ; 28.5985 ; 28.7517 ; 28.9417 ; 29.2057 ; 29.562 ; 29.6972 ; 29.8753 ; 30.1375 ; 30.2281 ; 30.3865 ; 30.5583 ; 30.7746 ; 30.8762 ; 30.9992 ; 31.1508 ; 31.3548]

Bolt 3 - Shear Force (kips): [0.014926 ; 0.0034041 ; 0.0083547 ; 0.01959 ; 0.037144 ; 0.062119 ; 0.095197 ; 0.13218 ; 0.16675 ; 0.22486 ; 0.32928 ; 0.44124 ; 0.54958 ; 0.63771 ; 0.6816 ; 0.69476 ; 0.74687 ; 0.8181 ; 0.91174 ; 1.0343 ; 1.2018 ; 1.4081 ; 1.6554 ; 1.9206 ; 2.025 ; 2.2026 ; 2.2581 ; 2.3366 ; 2.4757 ; 2.7102 ; 3.0004 ; 3.1146 ; 3.231 ; 3.4106 ; 3.6093 ; 3.6719 ; 3.7482 ; 3.8927 ; 3.9426 ; 3.9947 ; 4.0568 ; 4.1771 ; 4.2281 ; 4.27 ; 4.2905 ; 4.3303]

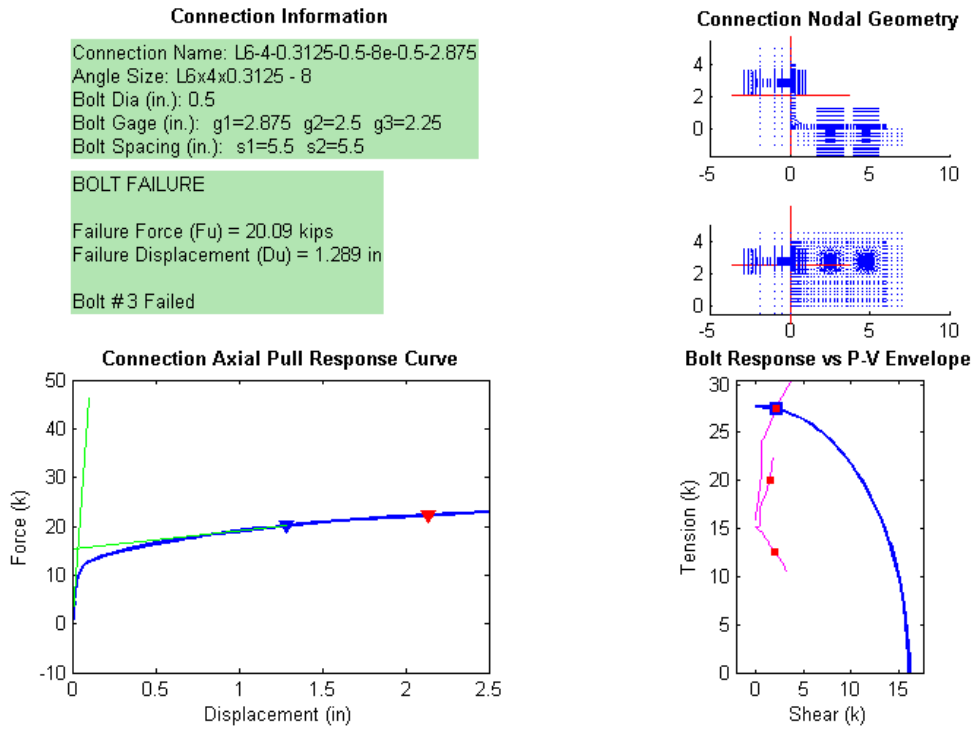


Figure B.9 Connection L6_4_0.3125_0.5_8e_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.5_8e_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 466.7494

Plastic Stiffness (k/in): 3.7374

Displacement (in): [6.0483e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.50682 ; 0.56932 ; 0.66307 ; 0.69823 ; 0.71141 ; 0.73119 ; 0.76085 ; 0.80534 ; 0.87209 ; 0.9722 ; 1.1224 ; 1.1787 ; 1.2632 ; 1.2711 ; 1.283 ; 1.3008 ; 1.3275 ; 1.3676 ; 1.4077 ; 1.4478 ; 1.5079 ; 1.5981 ; 1.7334 ; 1.9364 ; 2.1864 ; 2.2489 ; 2.3426 ; 2.4832 ; 2.5]

Force (kips): [-0.188124 ; 0.347006 ; 0.723496 ; 1.07966 ; 1.5833 ; 2.29471 ; 3.2484 ; 4.30638 ; 5.25978 ; 5.97414 ; 6.38914 ; 6.75684 ; 7.14327 ; 7.61739 ; 8.21459 ; 8.41036 ; 8.67601 ; 8.76765 ; 8.80107 ; 8.85684 ; 8.93877 ; 9.05663 ; 9.21918 ; 9.44361 ; 9.73979 ; 9.84211 ; 9.99938 ; 10.0142 ; 10.0364 ; 10.0695 ; 10.1167 ; 10.1853 ; 10.2501 ; 10.3139 ; 10.4031 ; 10.53 ; 10.7055 ; 10.9421 ; 11.1954 ; 11.2535 ; 11.3341 ; 11.4512 ; 11.4663]

Bolt 1 - Tensile Force (kips): [15.148 ; 15.1338 ; 15.1227 ; 15.1118 ; 15.0956 ; 15.0709 ; 15.0327 ; 14.9831 ; 14.9328 ; 14.8903 ; 14.8545 ; 14.8105 ; 14.7831 ; 14.7562 ; 14.4786 ; 14.2717 ; 13.9213 ; 13.7931 ; 13.7457 ; 13.7187 ; 13.67 ; 13.5842 ; 13.4543 ; 13.2553 ; 12.941 ; 12.8227 ; 12.6533 ; 12.6383 ; 12.6158 ; 12.5791 ; 12.5223 ; 12.439 ; 12.3547 ; 12.2799 ; 12.1661 ; 12.0041 ; 11.7784 ; 11.4364 ; 11.0332 ; 10.9329 ; 10.7872 ; 10.5847 ; 10.5596]

Bolt 1 - Shear Force (kips): [0.013166 ; 0.022877 ; 0.040803 ; 0.058771 ; 0.084946 ; 0.12291 ; 0.17529 ; 0.23577 ; 0.29473 ; 0.34373 ; 0.38519 ; 0.43524 ; 0.47176 ; 0.51152 ; 0.75043 ; 0.90581 ; 1.156 ; 1.2446 ; 1.2771 ; 1.2971 ; 1.3321 ; 1.3924 ; 1.4826 ; 1.6186 ; 1.8292 ; 1.9074 ; 2.0186 ; 2.0284 ; 2.043 ; 2.0667 ; 2.1032 ; 2.1567 ; 2.2103 ; 2.2582 ; 2.3306 ; 2.433 ; 2.5742 ; 2.7812 ; 3.0173 ; 3.0746 ; 3.1568 ; 3.2704 ; 3.2843]

Bolt 2 - Tensile Force (kips): [15.1749 ; 15.1561 ; 15.1423 ; 15.1305 ; 15.1168 ; 15.1019 ; 15.0896 ; 15.0965 ; 15.1377 ; 15.2196 ; 15.4449 ; 15.793 ; 16.2766 ; 16.9585 ; 17.759 ; 17.9983 ; 18.3172 ; 18.4323 ; 18.4746 ; 18.5468 ; 18.6506 ; 18.7965 ; 19.0035 ; 19.2896 ; 19.673 ; 19.8125 ; 20.0165 ; 20.0351 ; 20.0629 ; 20.1029 ; 20.1615 ; 20.248 ; 20.3323 ; 20.417 ; 20.5459 ; 20.7435 ; 21.034 ; 21.4306 ; 21.8725 ; 21.9742 ; 22.1262 ; 22.3444 ; 22.3684]

Bolt 2 - Shear Force (kips): [0.020388 ; 0.024643 ; 0.043232 ; 0.062928 ; 0.092228 ; 0.13508 ; 0.19372 ; 0.26268 ; 0.3313 ; 0.38977 ; 0.43133 ; 0.47575 ; 0.5045 ; 0.53637 ; 0.7216 ; 0.84115 ; 1.0267 ; 1.0903 ; 1.1132 ; 1.1245 ; 1.1451 ; 1.1809 ; 1.2326 ; 1.307 ; 1.4108 ; 1.4417 ; 1.4813 ; 1.4846 ; 1.4895 ; 1.498 ; 1.5114 ; 1.5301 ; 1.5487 ; 1.5637 ; 1.5858 ; 1.6148 ; 1.6502 ; 1.7052 ; 1.7668 ; 1.7826 ; 1.8038 ; 1.8324 ; 1.8364]

Bolt 3 - Tensile Force (kips): [16 ; 15.9871 ; 15.9827 ; 15.9837 ; 16.0003 ; 16.0514 ; 16.1919 ; 16.5174 ; 16.9781 ; 17.4788 ; 17.9137 ; 18.4846 ; 19.4092 ; 20.7757 ; 22.5807 ; 23.1386 ; 23.8759 ; 24.1164 ; 24.2014 ; 24.3577 ; 24.591 ; 24.9198 ; 25.3429 ; 25.9344 ; 26.6761 ; 26.9274 ; 27.3346 ; 27.3696 ; 27.4203 ; 27.505 ; 27.6281 ; 27.8002 ; 27.9541 ; 28.0983 ; 28.2917 ; 28.5726 ; 28.9197 ; 29.3678 ; 29.8356 ; 29.9411 ; 30.0677 ; 30.2696 ; 30.3058]

Bolt 3 - Shear Force (kips): [0.015156 ; 0.0055511 ; 0.0042007 ; 0.012838 ; 0.026782 ; 0.047888 ; 0.076995 ; 0.11233 ; 0.14739 ; 0.18505 ; 0.27444 ; 0.39784 ; 0.51416 ; 0.59734 ; 0.64978 ; 0.66078 ; 0.66991 ; 0.67302 ; 0.67484 ; 0.77467 ; 0.90369 ; 1.0655 ; 1.2821 ; 1.5403 ; 1.8208 ; 1.9116 ; 2.0934 ; 2.1135 ; 2.1455 ; 2.194 ; 2.2545 ; 2.3215 ; 2.3705 ; 2.4341 ; 2.5234 ; 2.6787 ; 2.8891 ; 3.1623 ; 3.4217 ; 3.4909 ; 3.5734 ; 3.6748 ; 3.6892]

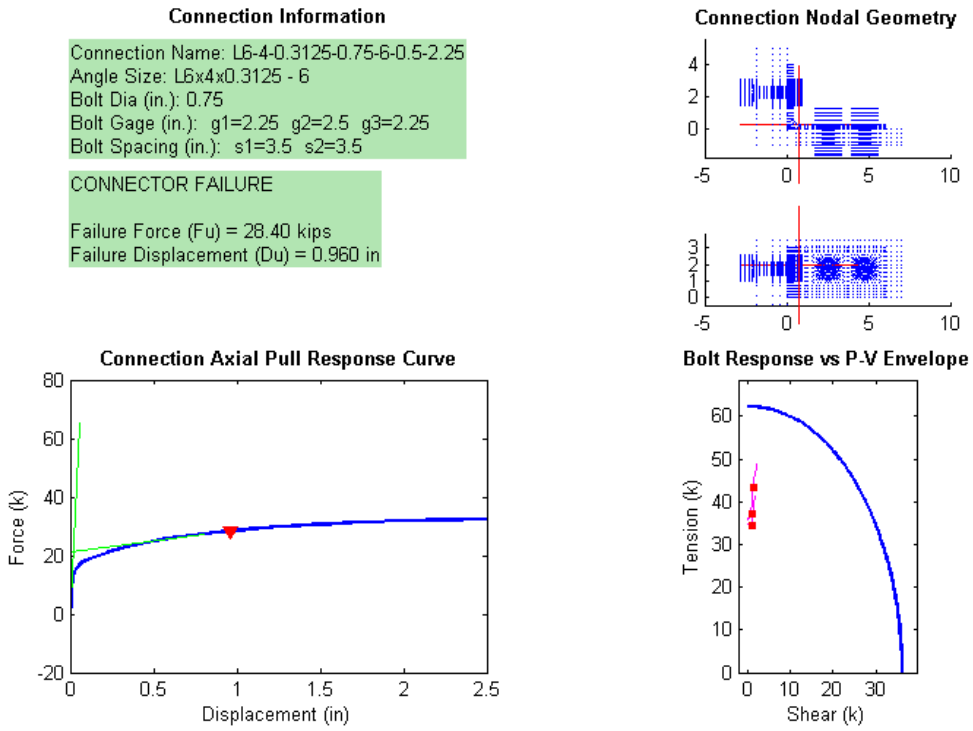


Figure B.10 Connection L6_4_0.3125_0.75_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.75_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.1992e+003

Plastic Stiffness (k/in): 7.5250

Displacement (in): [2.9415e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.56737 ; 0.66112 ; 0.80174 ; 1.0127 ; 1.2627 ; 1.5127 ; 1.7627 ; 2.0127 ; 2.2627 ; 2.322 ; 2.411 ; 2.5]

Force (kips): [-0.68912 ; 0.750105 ; 1.65306 ; 2.85352 ; 4.42592 ; 6.13692 ; 7.33213 ; 7.98467 ; 8.5799 ; 9.16776 ; 9.78812 ; 10.5302 ; 11.4465 ; 12.4627 ; 12.7763 ; 13.1919 ; 13.721 ; 14.3547 ; 14.9266 ; 15.3458 ; 15.6549 ; 15.8918 ; 16.0806 ; 16.1211 ; 16.1757 ; 16.227]

Bolt 1 - Tensile Force (kips): [34.872 ; 34.8347 ; 34.8115 ; 34.7787 ; 34.7327 ; 34.6799 ; 34.6442 ; 34.6288 ; 34.6164 ; 34.6057 ; 34.5954 ; 34.5847 ; 34.5726 ; 34.5669 ; 34.5675 ; 34.5709 ; 34.5799 ; 34.6017 ; 34.636 ; 34.6786 ; 34.726 ; 34.7758 ; 34.8273 ; 34.8395 ; 34.8581 ; 34.8767]

Bolt 1 - Shear Force (kips): [0.053479 ; 0.05659 ; 0.10048 ; 0.16573 ; 0.25547 ; 0.35548 ; 0.42498 ; 0.46078 ; 0.49548 ; 0.5322 ; 0.57424 ; 0.62648 ; 0.69513 ; 0.77392 ; 0.7976 ; 0.82822 ; 0.86674 ; 0.90979 ; 0.9455 ; 0.96618 ; 0.976 ; 0.97837 ; 0.9762 ; 0.97564 ; 0.97433 ; 0.97297]

Bolt 2 - Tensile Force (kips): [34.8829 ; 34.8174 ; 34.7755 ; 34.7205 ; 34.6599 ; 34.6122 ; 34.6179 ; 34.6854 ; 34.8265 ; 35.0429 ; 35.2173 ; 35.3882 ; 35.6298 ; 36.0522 ; 36.2192 ; 36.4673 ; 36.8408 ; 37.4122 ; 38.0863 ; 38.7757 ; 39.454 ; 40.1307 ; 40.8152 ; 40.978 ; 41.2186 ; 41.4594]

Bolt 2 - Shear Force (kips): [0.057063 ; 0.089205 ; 0.15982 ; 0.25981 ; 0.39677 ; 0.55449 ; 0.67565 ; 0.75372 ; 0.82404 ; 0.86109 ; 0.87029 ; 0.87971 ; 0.88288 ; 0.90191 ; 0.92375 ; 0.95793 ; 1.0141 ; 1.1016 ; 1.2046 ; 1.3102 ; 1.4096 ; 1.4982 ; 1.57 ; 1.5815 ; 1.5969 ; 1.6081]

Bolt 3 - Tensile Force (kips): [36 ; 35.9574 ; 35.9394 ; 35.9471 ; 36.0067 ; 36.1071 ; 36.2021 ; 36.2815 ; 36.3697 ; 36.5294 ; 36.8796 ; 37.469 ; 38.2541 ; 39.66 ; 40.2074 ; 41.0264 ; 42.24 ; 43.8237 ; 45.2905 ; 46.3918 ; 47.2439 ; 47.9199 ; 48.4361 ; 48.5279 ; 48.643 ; 48.723]

Bolt 3 - Shear Force (kips): [0.027075 ; 0.020842 ; 0.053139 ; 0.10705 ; 0.18902 ; 0.28836 ; 0.36438 ; 0.41511 ; 0.4715 ; 0.52976 ; 0.58154 ; 0.66504 ; 0.81247 ; 0.94308 ; 0.98114 ; 1.0618 ; 1.1622 ; 1.3129 ; 1.4956 ; 1.6567 ; 1.7936 ; 1.9112 ; 2.0276 ; 2.0608 ; 2.1019 ; 2.1491]

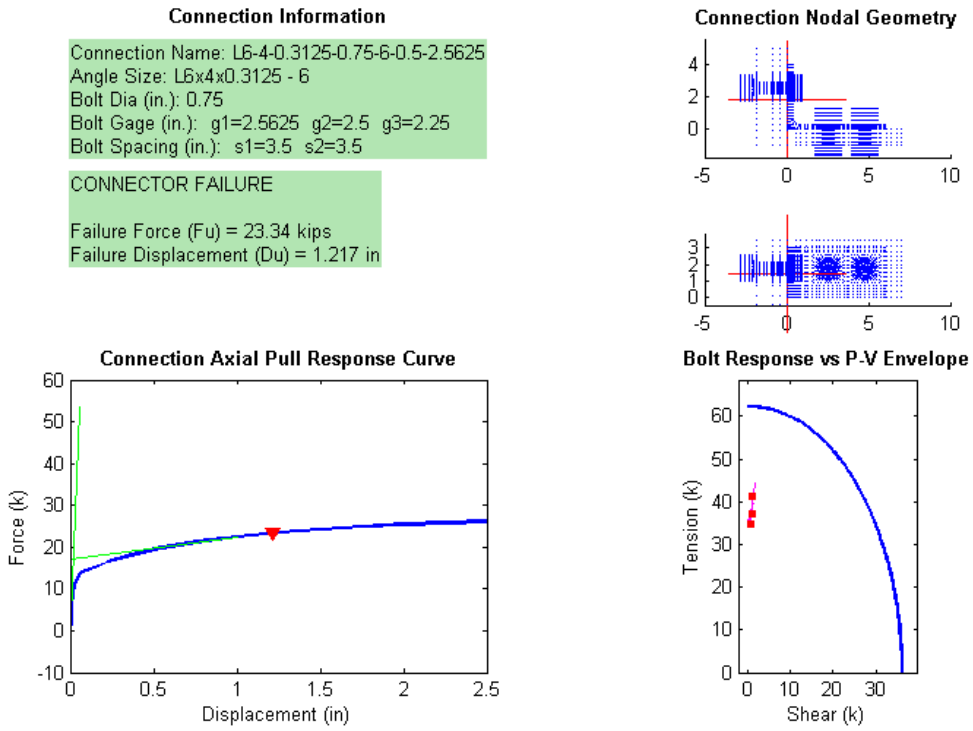


Figure B.11 Connection L6_4_0.3125_0.75_6_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.75_6_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 902.8173

Plastic Stiffness (k/in): 5.2064

Displacement (in): [2.7459e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.5049 ; 1.7549 ; 2.0049 ; 2.2549 ; 2.5]

Force (kips): [-0.686855 ; 0.451154 ; 1.07646 ; 1.90894 ; 3.04767 ; 4.4659 ; 5.66929 ; 6.34065 ; 6.81763 ; 7.24223 ; 7.66758 ; 8.20926 ; 8.90033 ; 9.71885 ; 10.6028 ; 11.2536 ; 11.7479 ; 12.1334 ; 12.4424 ; 12.6889 ; 12.8889 ; 13.0461]

Bolt 1 - Tensile Force (kips): [34.872 ; 34.8426 ; 34.8271 ; 34.8061 ; 34.7752 ; 34.7346 ; 34.7009 ; 34.6859 ; 34.6791 ; 34.6756 ; 34.6748 ; 34.6746 ; 34.6771 ; 34.6858 ; 34.7081 ; 34.7396 ; 34.7776 ; 34.8201 ; 34.8657 ; 34.9134 ; 34.9627 ; 35.0121]

Bolt 1 - Shear Force (kips): [0.053442 ; 0.045629 ; 0.071402 ; 0.1138 ; 0.17637 ; 0.25742 ; 0.3256 ; 0.36113 ; 0.38553 ; 0.4087 ; 0.43365 ; 0.46865 ; 0.51436 ; 0.57205 ; 0.6366 ; 0.68178 ; 0.71407 ; 0.73707 ; 0.75342 ; 0.76409 ; 0.76993 ; 0.77194]

Bolt 2 - Tensile Force (kips): [34.883 ; 34.8307 ; 34.8003 ; 34.7616 ; 34.7121 ; 34.6723 ; 34.661 ; 34.7198 ; 34.824 ; 34.9831 ; 35.1524 ; 35.3387 ; 35.5595 ; 35.8548 ; 36.3165 ; 36.8091 ; 37.2955 ; 37.7647 ; 38.2209 ; 38.6832 ; 39.1448 ; 39.5889]

Bolt 2 - Shear Force (kips): [0.056819 ; 0.0696 ; 0.11659 ; 0.18543 ; 0.28416 ; 0.41342 ; 0.53403 ; 0.61273 ; 0.67612 ; 0.72549 ; 0.75543 ; 0.76708 ; 0.76648 ; 0.75203 ; 0.76208 ; 0.81198 ; 0.87111 ; 0.93561 ; 0.99978 ; 1.0667 ; 1.1344 ; 1.1957]

Bolt 3 - Tensile Force (kips): [36 ; 35.9621 ; 35.9359 ; 35.9268 ; 35.9442 ; 35.9975 ; 36.0466 ; 36.0737 ; 36.09 ; 36.1422 ; 36.282 ; 36.5874 ; 37.1567 ; 37.8697 ; 38.9352 ; 40.1909 ; 41.316 ; 42.2358 ; 42.9938 ; 43.6073 ; 44.0967 ; 44.4819]

Bolt 3 - Shear Force (kips): [0.027681 ; 0.016044 ; 0.036372 ; 0.075457 ; 0.13716 ; 0.22335 ; 0.30693 ; 0.3564 ; 0.39577 ; 0.43483 ; 0.46501 ; 0.51476 ; 0.60098 ; 0.7358 ; 0.91373 ; 0.97998 ; 1.0846 ; 1.242 ; 1.4051 ; 1.5577 ; 1.6994 ; 1.8259]

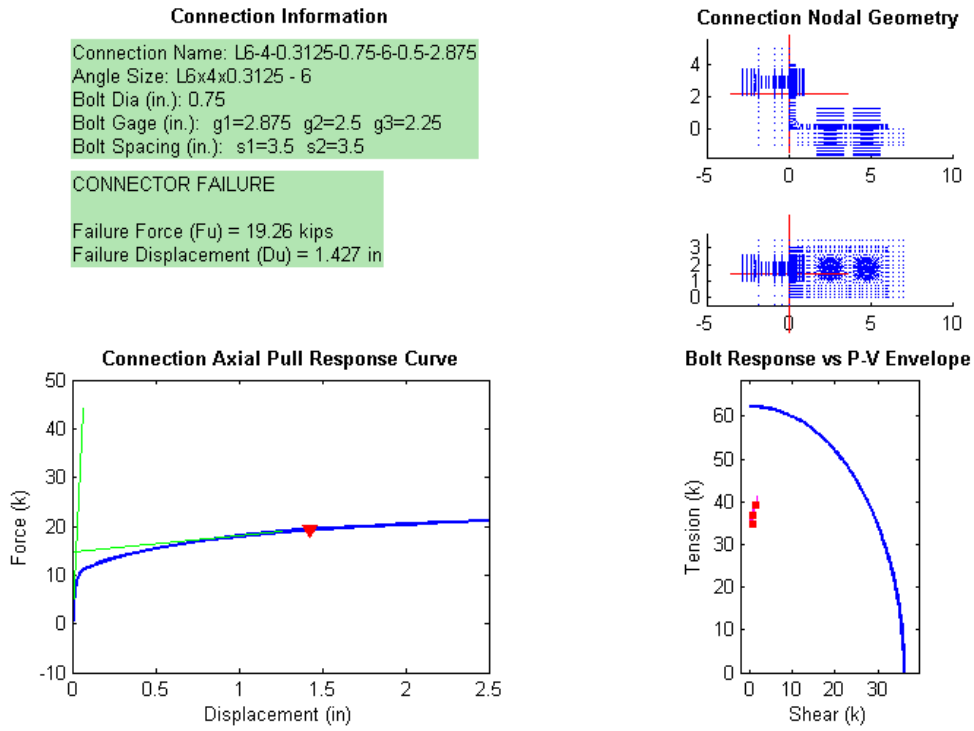


Figure B.12 Connection L6_4_0.3125_0.75_6_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.75_6_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 718.9340

Plastic Stiffness (k/in): 3.3024

Displacement (in): [2.0568e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.5049 ; 1.7549 ; 2.0049 ; 2.2549 ; 2.5]

Force (kips): [-0.684955 ; 0.279847 ; 0.719213 ; 1.31841 ; 2.14939 ; 3.25899 ; 4.39197 ; 5.12868 ; 5.52359 ; 5.81679 ; 6.13295 ; 6.55867 ; 7.0948 ; 7.73872 ; 8.4578 ; 8.99094 ; 9.40374 ; 9.73239 ; 9.99788 ; 10.2152 ; 10.3971 ; 10.5448]

Bolt 1 - Tensile Force (kips): [34.8721 ; 34.8471 ; 34.8366 ; 34.8221 ; 34.8014 ; 34.7718 ; 34.7412 ; 34.7249 ; 34.7214 ; 34.7221 ; 34.7258 ; 34.7324 ; 34.7431 ; 34.7613 ; 34.7952 ; 34.8335 ; 34.8758 ; 34.9208 ; 34.9676 ; 35.0159 ; 35.065 ; 35.1136]

Bolt 1 - Shear Force (kips): [0.053456 ; 0.041132 ; 0.055663 ; 0.083188 ; 0.12657 ; 0.18801 ; 0.25233 ; 0.29128 ; 0.30943 ; 0.32399 ; 0.34018 ; 0.36278 ; 0.39509 ; 0.43664 ; 0.48365 ; 0.52004 ; 0.54736 ; 0.56844 ; 0.58466 ; 0.59644 ; 0.60545 ; 0.61208]

Bolt 2 - Tensile Force (kips): [34.8833 ; 34.8391 ; 34.8162 ; 34.7874 ; 34.7496 ; 34.7141 ; 34.6963 ; 34.7185 ; 34.7951 ; 34.8599 ; 34.9613 ; 35.1668 ; 35.43 ; 35.6986 ; 36.0227 ; 36.3235 ; 36.6414 ; 36.9577 ; 37.2529 ; 37.5488 ; 37.8194 ; 38.0565]

Bolt 2 - Shear Force (kips): [0.056691 ; 0.059339 ; 0.09062 ; 0.13939 ; 0.21106 ; 0.31158 ; 0.42161 ; 0.50417 ; 0.55669 ; 0.59459 ; 0.63442 ; 0.67787 ; 0.69412 ; 0.6879 ; 0.66236 ; 0.65147 ; 0.66967 ; 0.69416 ; 0.72029 ; 0.75173 ; 0.78162 ; 0.80989]

Bolt 3 - Tensile Force (kips): [36 ; 35.9676 ; 35.9421 ; 35.9218 ; 35.9151 ; 35.9347 ; 35.9674 ; 35.9713 ; 35.9696 ; 35.9777 ; 36.0158 ; 36.1328 ; 36.4272 ; 36.9689 ; 37.6384 ; 38.205 ; 38.7858 ; 39.3245 ; 39.834 ; 40.3202 ; 40.7664 ; 41.1709]

Bolt 3 - Shear Force (kips): [0.02847 ; 0.016103 ; 0.026405 ; 0.054589 ; 0.10124 ; 0.17082 ; 0.25158 ; 0.31153 ; 0.33958 ; 0.3522 ; 0.37247 ; 0.40916 ; 0.4774 ; 0.56889 ; 0.71244 ; 0.89824 ; 1.1148 ; 1.3157 ; 1.4741 ; 1.586 ; 1.674 ; 1.7378]

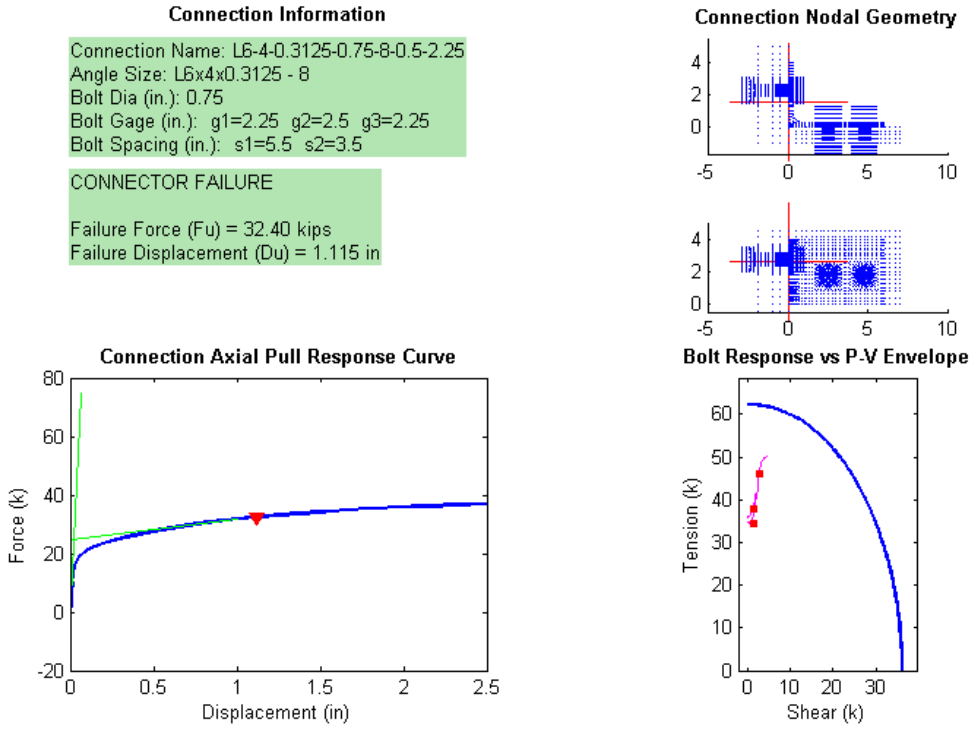


Figure B.13 Connection L6_4_0.3125_0.75_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.75_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.1537e+003

Plastic Stiffness (k/in): 6.9913

Displacement (in): [1.8425e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.50682 ; 0.75682 ; 1.0068 ; 1.2568 ; 1.5068 ; 1.5693 ; 1.6631 ; 1.8037 ; 2.0146 ; 2.0771 ; 2.1709 ; 2.3115 ; 2.5]

Force (kips): [-0.614571 ; 0.731913 ; 1.63876 ; 2.45429 ; 3.59317 ; 5.09322 ; 6.73784 ; 8.09522 ; 9.026 ; 9.73608 ; 10.4299 ; 11.1446 ; 11.9266 ; 12.8318 ; 13.8648 ; 15.0329 ; 15.9068 ; 16.587 ; 17.1233 ; 17.243 ; 17.4098 ; 17.6393 ; 17.9243 ; 18.0014 ; 18.1081 ; 18.2545 ; 18.4247]

Bolt 1 - Tensile Force (kips): [34.8672 ; 34.8291 ; 34.8028 ; 34.7775 ; 34.7403 ; 34.6881 ; 34.6278 ; 34.579 ; 34.5482 ; 34.5269 ; 34.5062 ; 34.4859 ; 34.4655 ; 34.4432 ; 34.4232 ; 34.4137 ; 34.4235 ; 34.4464 ; 34.4786 ; 34.4877 ; 34.5023 ; 34.526 ; 34.5648 ; 34.5767 ; 34.5948 ; 34.6225 ; 34.6604]

Bolt 1 - Shear Force (kips): [0.053138 ; 0.062563 ; 0.11279 ; 0.16219 ; 0.23389 ; 0.33141 ; 0.44114 ; 0.53188 ; 0.59395 ; 0.64357 ; 0.69594 ; 0.7528 ; 0.81753 ; 0.89587 ; 0.98986 ; 1.0934 ; 1.1654 ; 1.2168 ; 1.2538 ; 1.2615 ; 1.2715 ; 1.2839 ; 1.2963 ; 1.2993 ; 1.303 ; 1.3074 ; 1.3116]

Bolt 2 - Tensile Force (kips): [34.8761 ; 34.8158 ; 34.7728 ; 34.734 ; 34.6805 ; 34.6189 ; 34.5665 ; 34.5436 ; 34.5656 ; 34.657 ; 34.867 ; 35.1638 ; 35.4449 ; 35.6914 ; 36.0275 ; 36.6887 ; 37.4077 ; 38.1493 ; 38.8858 ; 39.0696 ; 39.3461 ; 39.7624 ; 40.3749 ; 40.5553 ; 40.8234 ; 41.2263 ; 41.7828]

Bolt 2 - Shear Force (kips): [0.046101 ; 0.082663 ; 0.15743 ; 0.2269 ; 0.32612 ; 0.46103 ; 0.61667 ; 0.7566 ; 0.86341 ; 0.95299 ; 1.0332 ; 1.0819 ; 1.1106 ; 1.1406 ; 1.1758 ; 1.245 ; 1.3382 ; 1.439 ; 1.5347 ; 1.5597 ; 1.5976 ; 1.656 ; 1.7413 ; 1.764 ; 1.796 ; 1.835 ; 1.8675]

Bolt 3 - Tensile Force (kips): [36 ; 35.9568 ; 35.938 ; 35.9414 ; 35.9658 ; 36.0368 ; 36.1351 ; 36.2489 ; 36.3909 ; 36.5799 ; 36.8496 ; 37.3357 ; 38.0517 ; 38.8696 ; 40.6181 ; 43.2415 ; 45.3695 ; 47.0911 ; 48.409 ; 48.6589 ; 48.9459 ; 49.2638 ; 49.5747 ; 49.6887 ; 49.8207 ; 50.0045 ; 50.161]

Bolt 3 - Shear Force (kips): [0.029654 ; 0.019806 ; 0.049983 ; 0.084414 ; 0.13818 ; 0.21705 ; 0.31011 ; 0.40608 ; 0.4881 ; 0.56682 ; 0.66926 ; 0.79049 ; 0.96975 ; 1.4523 ; 1.8804 ; 2.2399 ; 2.4956 ; 2.7057 ; 2.9123 ; 2.9722 ; 3.0727 ; 3.26 ; 3.5336 ; 3.628 ; 3.7875 ; 4.0815 ; 4.4126]

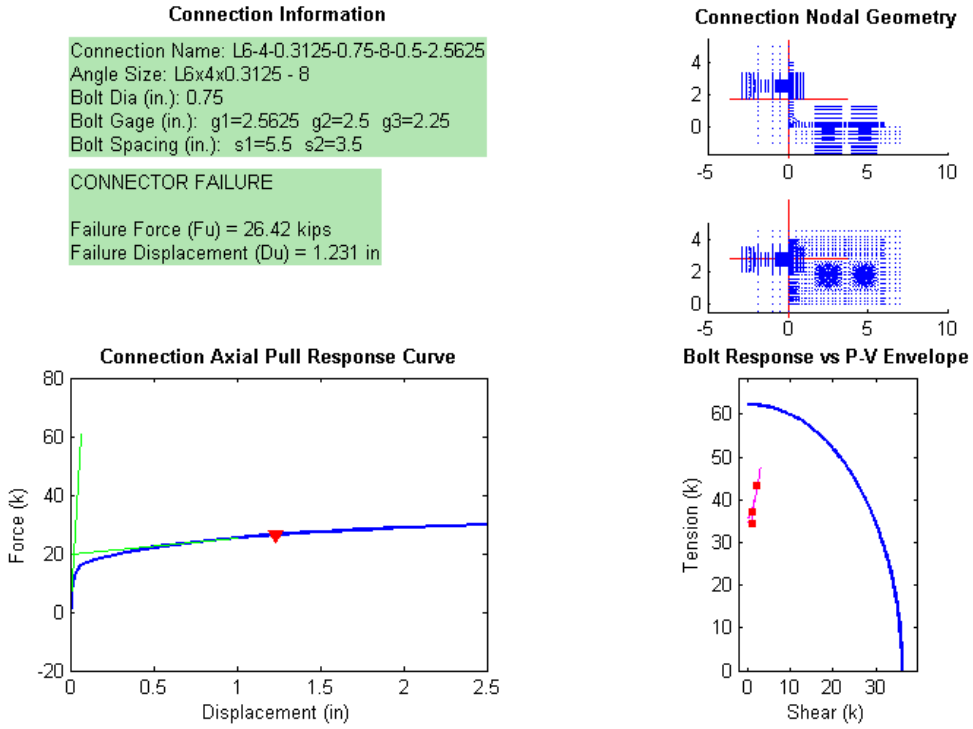


Figure B.14 Connection L6_4_0.3125_0.75_8_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.75_8_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 870.6739

Plastic Stiffness (k/in): 5.7408

Displacement (in): [1.8382e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.50682 ; 0.75682 ; 1.0068 ; 1.2568 ; 1.5068 ; 1.7568 ; 2.0068 ; 2.2568 ; 2.5]

Force (kips): [-0.613105 ; 0.44611 ; 1.08743 ; 1.66229 ; 2.48113 ; 3.60386 ; 4.99167 ; 6.28734 ; 7.24329 ; 7.8777 ; 8.40522 ; 8.91674 ; 9.49831 ; 10.2168 ; 11.0532 ; 11.9852 ; 12.7028 ; 13.2706 ; 13.7326 ; 14.1122 ; 14.4313 ; 14.6983 ; 14.9206]

Bolt 1 - Tensile Force (kips): [34.8671 ; 34.8375 ; 34.8195 ; 34.803 ; 34.7779 ; 34.7416 ; 34.6939 ; 34.6486 ; 34.6193 ; 34.6035 ; 34.5935 ; 34.5854 ; 34.578 ; 34.5717 ; 34.5693 ; 34.5772 ; 34.5961 ; 34.6244 ; 34.659 ; 34.6991 ; 34.7423 ; 34.7885 ; 34.8353]

Bolt 1 - Shear Force (kips): [0.053084 ; 0.050069 ; 0.081198 ; 0.11416 ; 0.16378 ; 0.23486 ; 0.32555 ; 0.41139 ; 0.47145 ; 0.51221 ; 0.54795 ; 0.58537 ; 0.62976 ; 0.6858 ; 0.75552 ; 0.83739 ; 0.89963 ; 0.945 ; 0.97898 ; 1.0038 ; 1.023 ; 1.0369 ; 1.0455]

Bolt 2 - Tensile Force (kips): [34.8761 ; 34.8281 ; 34.7957 ; 34.7673 ; 34.7285 ; 34.6768 ; 34.6326 ; 34.6081 ; 34.6172 ; 34.6975 ; 34.8396 ; 35.0428 ; 35.3084 ; 35.6205 ; 35.9503 ; 36.3735 ; 36.8812 ; 37.4087 ; 37.9424 ; 38.4733 ; 38.9956 ; 39.506 ; 39.9902]

Bolt 2 - Shear Force (kips): [0.045982 ; 0.06157 ; 0.11381 ; 0.16314 ; 0.23492 ; 0.33609 ; 0.46649 ; 0.59832 ; 0.70798 ; 0.79048 ; 0.86269 ; 0.91979 ; 0.96105 ; 0.9849 ; 0.99819 ; 1.0105 ; 1.0432 ; 1.1034 ; 1.1717 ; 1.2448 ; 1.3147 ; 1.3828 ; 1.4511]

Bolt 3 - Tensile Force (kips): [36 ; 35.9617 ; 35.9347 ; 35.9274 ; 35.9263 ; 35.9579 ; 36.0102 ; 36.076 ; 36.1238 ; 36.2031 ; 36.3246 ; 36.5872 ; 37.0961 ; 37.8315 ; 38.8025 ; 40.407 ; 42.0413 ; 43.4529 ; 44.6343 ; 45.5985 ; 46.4155 ; 47.0974 ; 47.6125]

Bolt 3 - Shear Force (kips): [0.02984 ; 0.01597 ; 0.034716 ; 0.060036 ; 0.1005 ; 0.1623 ; 0.2454 ; 0.33257 ; 0.41801 ; 0.47868 ; 0.55241 ; 0.63306 ; 0.74729 ; 0.91122 ; 1.2234 ; 1.6523 ; 1.9508 ; 2.1783 ; 2.3687 ; 2.5432 ; 2.7045 ; 2.8545 ; 3.0316]

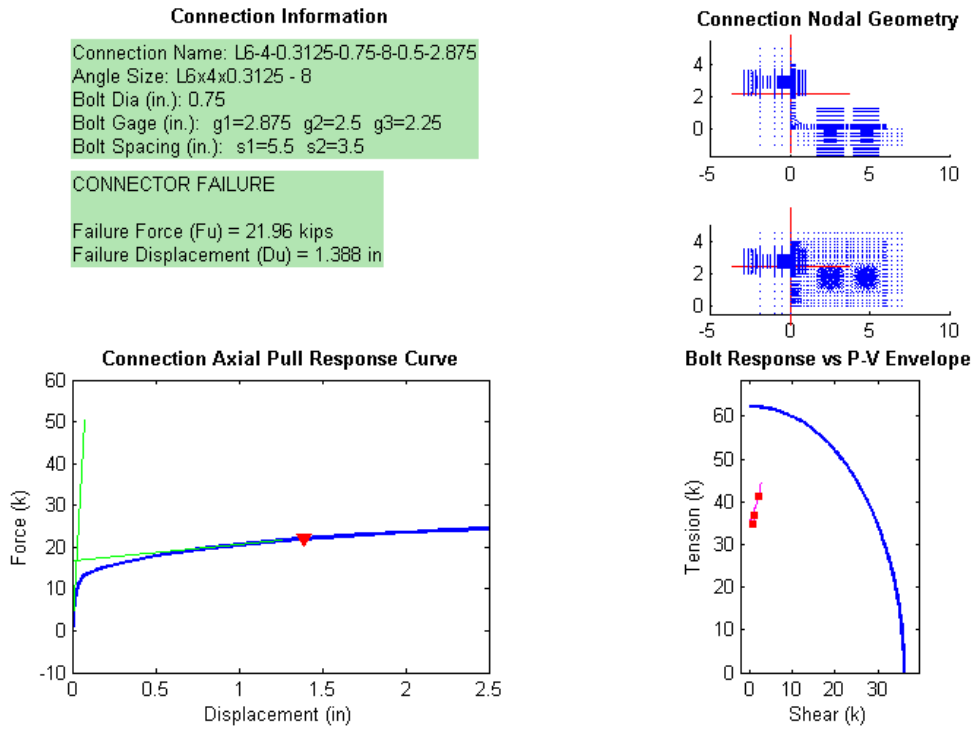


Figure B.15 Connection L6_4_0.3125_0.75_8_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.75_8_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 691.7473

Plastic Stiffness (k/in): 3.8104

Displacement (in): [1.8403e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.5049 ; 1.7549 ; 2.0049 ; 2.2549 ; 2.5]

Force (kips): [-0.613756 ; 0.280031 ; 0.737313 ; 1.36396 ; 2.23746 ; 3.41457 ; 4.7185 ; 5.76674 ; 6.4475 ; 6.8943 ; 7.26783 ; 7.70946 ; 8.2737 ; 8.95428 ; 9.70938 ; 10.2934 ; 10.7697 ; 11.1637 ; 11.4917 ; 11.7693 ; 12.0076 ; 12.2105]

Bolt 1 - Tensile Force (kips): [34.8672 ; 34.8423 ; 34.8298 ; 34.8125 ; 34.7867 ; 34.7496 ; 34.7061 ; 34.6727 ; 34.6575 ; 34.6515 ; 34.6506 ; 34.6521 ; 34.6563 ; 34.6665 ; 34.689 ; 34.7172 ; 34.7501 ; 34.7872 ; 34.8279 ; 34.8712 ; 34.9167 ; 34.9626]

Bolt 1 - Shear Force (kips): [0.053157 ; 0.044511 ; 0.063087 ; 0.096799 ; 0.1488 ; 0.2231 ; 0.30852 ; 0.37641 ; 0.41538 ; 0.44293 ; 0.46769 ; 0.49839 ; 0.53941 ; 0.59066 ; 0.6505 ; 0.69944 ; 0.73989 ; 0.77219 ; 0.79709 ; 0.81712 ; 0.83267 ; 0.84465]

Bolt 2 - Tensile Force (kips): [34.8763 ; 34.8359 ; 34.8111 ; 34.7792 ; 34.7369 ; 34.6859 ; 34.6555 ; 34.653 ; 34.6916 ; 34.7798 ; 34.8758 ; 35.0461 ; 35.3643 ; 35.7477 ; 36.1218 ; 36.4308 ; 36.7658 ; 37.1246 ; 37.4781 ; 37.8235 ; 38.1745 ; 38.5021]

Bolt 2 - Shear Force (kips): [0.0461 ; 0.049744 ; 0.086196 ; 0.14034 ; 0.21834 ; 0.32728 ; 0.45508 ; 0.57032 ; 0.65692 ; 0.71765 ; 0.76755 ; 0.82274 ; 0.87331 ; 0.89858 ; 0.90184 ; 0.8968 ; 0.89667 ; 0.91624 ; 0.95059 ; 0.98637 ; 1.0287 ; 1.0709]

Bolt 3 - Tensile Force (kips): [36 ; 35.967 ; 35.9411 ; 35.9212 ; 35.9117 ; 35.9398 ; 35.9712 ; 36.005 ; 36.0176 ; 36.0803 ; 36.2148 ; 36.5092 ; 37.0333 ; 37.7692 ; 38.8704 ; 39.9557 ; 40.9386 ; 41.8101 ; 42.6082 ; 43.3352 ; 43.9828 ; 44.551]

Bolt 3 - Shear Force (kips): [0.030217 ; 0.015823 ; 0.025033 ; 0.053569 ; 0.10126 ; 0.1733 ; 0.26048 ; 0.34357 ; 0.41174 ; 0.45329 ; 0.5011 ; 0.58028 ; 0.7219 ; 0.91983 ; 1.2381 ; 1.5653 ; 1.8677 ; 2.1164 ; 2.2871 ; 2.4085 ; 2.5054 ; 2.5855]

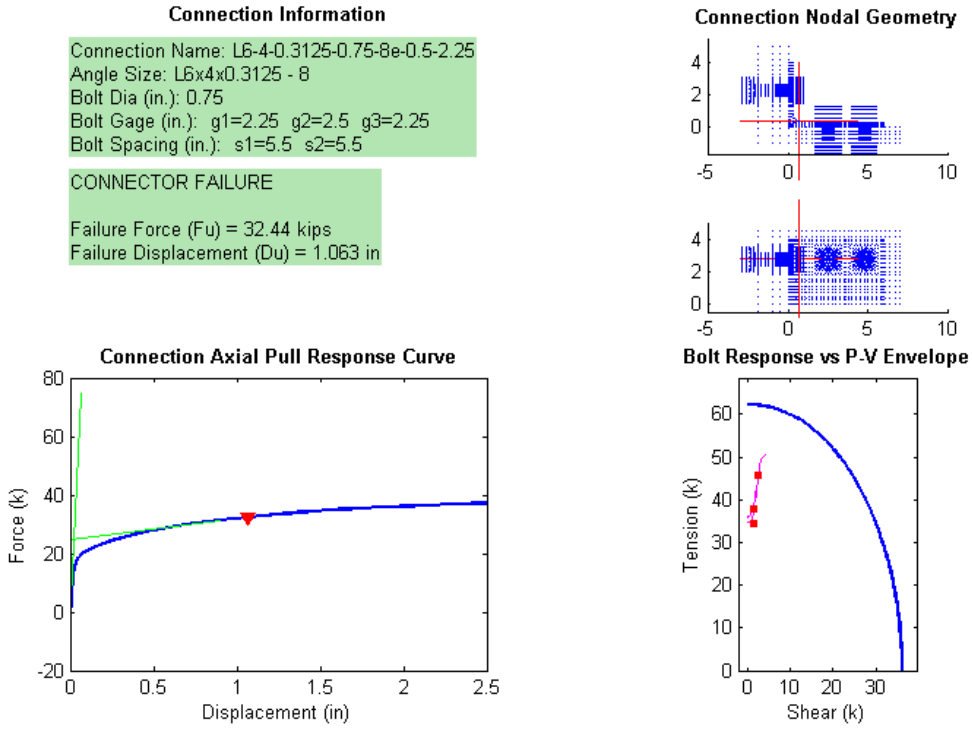


Figure B.16 Connection L6_4_0.3125_0.75_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.75_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.1988e+003

Plastic Stiffness (k/in): 7.7067

Displacement (in): [2.1201e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.072601 ; 0.10597 ; 0.15603 ; 0.23111 ; 0.34374 ; 0.38598 ; 0.44933 ; 0.54436 ; 0.6869 ; 0.90072 ; 1.1507 ; 1.4007 ; 1.4632 ; 1.557 ; 1.6507 ; 1.7445 ; 1.8851 ; 1.9378 ; 2.0169 ; 2.1356 ; 2.3136 ; 2.5]

Force (kips): [-0.704247 ; 0.710098 ; 1.63724 ; 2.47151 ; 3.63101 ; 4.6666 ; 5.56944 ; 6.60085 ; 7.63157 ; 8.53987 ; 9.26293 ; 9.8913 ; 10.5199 ; 11.209 ; 12.0382 ; 12.9976 ; 13.2934 ; 13.6937 ; 14.2255 ; 14.91 ; 15.7339 ; 16.4843 ; 17.0711 ; 17.1975 ; 17.3769 ; 17.5445 ; 17.6957 ; 17.8962 ; 17.9661 ; 18.0632 ; 18.1981 ; 18.3759 ; 18.5373]

Bolt 1 - Tensile Force (kips): [34.9074 ; 34.8651 ; 34.8367 ; 34.8097 ; 34.7702 ; 34.7332 ; 34.6998 ; 34.6614 ; 34.6236 ; 34.5934 ; 34.5742 ; 34.5575 ; 34.5408 ; 34.5221 ; 34.4973 ; 34.4686 ; 34.4603 ; 34.4504 ; 34.4397 ; 34.4305 ; 34.4303 ; 34.4448 ; 34.471 ; 34.479 ; 34.4918 ; 34.5054 ; 34.5199 ; 34.5429 ; 34.5518 ; 34.5658 ; 34.5872 ; 34.6198 ; 34.6543]

Bolt 1 - Shear Force (kips): [0.040357 ; 0.069996 ; 0.12531 ; 0.17746 ; 0.25209 ; 0.31991 ; 0.37991 ; 0.44917 ; 0.51811 ; 0.57496 ; 0.616 ; 0.65684 ; 0.69999 ; 0.75173 ; 0.82156 ; 0.90678 ; 0.93396 ; 0.97083 ; 1.0187 ; 1.0778 ; 1.1455 ; 1.2039 ; 1.2454 ; 1.2538 ; 1.2653 ; 1.2755 ; 1.2841 ; 1.2946 ; 1.2981 ; 1.3026 ; 1.3084 ; 1.3152 ; 1.3207]

Bolt 2 - Tensile Force (kips): [34.9344 ; 34.8668 ; 34.8218 ; 34.7816 ; 34.7266 ; 34.6862 ; 34.6554 ; 34.6255 ; 34.6034 ; 34.6045 ; 34.6386 ; 34.7321 ; 34.9272 ; 35.2113 ; 35.5085 ; 35.8257 ; 35.9332 ; 36.1023 ; 36.3844 ; 36.8164 ; 37.4619 ; 38.2079 ; 38.9443 ; 39.1296 ; 39.4039 ; 39.6757 ; 39.9436 ; 40.3331 ; 40.4784 ; 40.6942 ; 41.0132 ; 41.483 ; 41.9714]

Bolt 2 - Shear Force (kips): [0.067642 ; 0.081765 ; 0.15331 ; 0.22281 ; 0.3226 ; 0.41474 ; 0.49726 ; 0.59576 ; 0.70213 ; 0.80705 ; 0.90001 ; 0.9839 ; 1.0544 ; 1.0947 ; 1.123 ; 1.1503 ; 1.1553 ; 1.1629 ; 1.1781 ; 1.222 ; 1.2994 ; 1.3864 ; 1.4848 ; 1.51 ; 1.5492 ; 1.5889 ; 1.6279 ; 1.6816 ; 1.7009 ; 1.7269 ; 1.7649 ; 1.8147 ; 1.856]

Bolt 3 - Tensile Force (kips): [36 ; 35.9578 ; 35.9406 ; 35.9456 ; 35.9766 ; 36.0306 ; 36.0874 ; 36.1513 ; 36.2428 ; 36.3428 ; 36.4641 ; 36.6517 ; 36.9563 ; 37.4627 ; 38.2021 ; 39.1086 ; 39.4612 ; 40.0726 ; 41.0885 ; 42.6302 ; 44.6333 ; 46.534 ; 48.061 ; 48.3931 ; 48.7893 ; 49.076 ; 49.3096 ; 49.5993 ; 49.7118 ; 49.8523 ; 50.0547 ; 50.355 ; 50.5942]

Bolt 3 - Shear Force (kips): [0.038149 ; 0.012569 ; 0.035006 ; 0.067613 ; 0.1197 ; 0.17176 ; 0.22001 ; 0.27767 ; 0.34471 ; 0.41874 ; 0.49315 ; 0.56509 ; 0.65121 ; 0.75623 ; 0.92057 ; 1.3678 ; 1.5307 ; 1.7334 ; 1.9504 ; 2.1666 ; 2.3961 ; 2.6017 ; 2.7773 ; 2.8206 ; 2.8961 ; 2.9976 ; 3.1028 ; 3.2229 ; 3.2766 ; 3.3445 ; 3.4772 ; 3.7106 ; 3.9454]

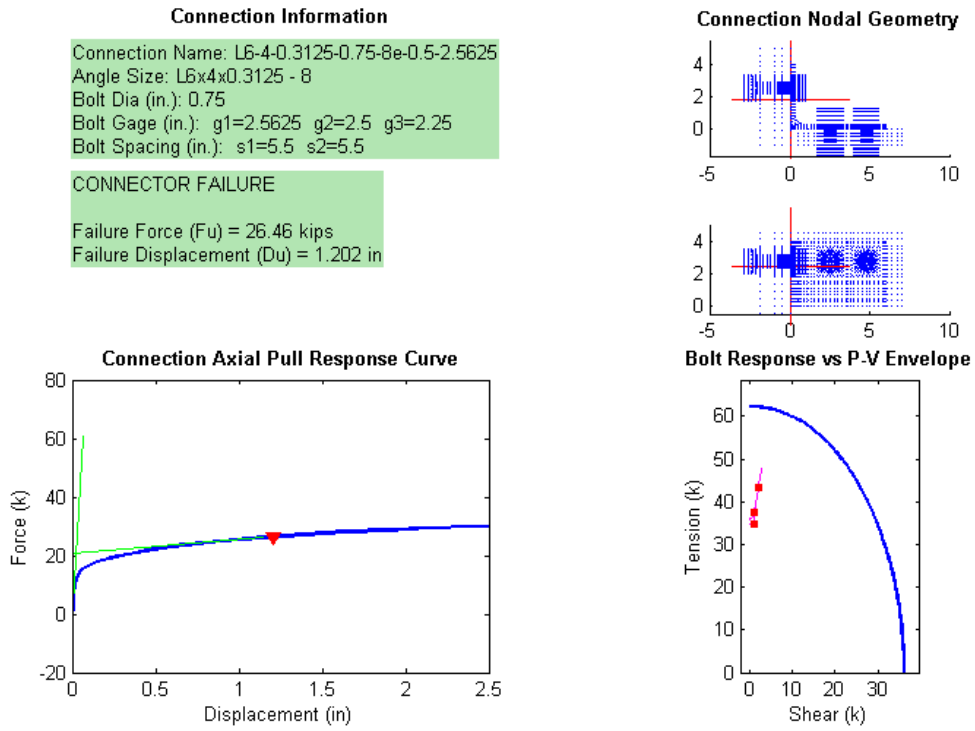


Figure B.17 Connection L6_4_0.3125_0.75_8e_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.75_8e_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 902.9130

Plastic Stiffness (k/in): 5.0231

Displacement (in): [2.0733e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.38012 ; 0.44347 ; 0.5385 ; 0.68104 ; 0.89486 ; 1.1449 ; 1.3949 ; 1.6449 ; 1.8949 ; 2.1449 ; 2.3949 ; 2.5]

Force (kips): [-0.689662 ; 0.4217 ; 1.07384 ; 1.65814 ; 2.48748 ; 3.62389 ; 4.99321 ; 6.24305 ; 7.18986 ; 7.83566 ; 8.35655 ; 8.89468 ; 9.50851 ; 10.2518 ; 10.4951 ; 10.8249 ; 11.26 ; 11.8142 ; 12.4895 ; 13.1174 ; 13.62 ; 14.0276 ; 14.3651 ; 14.6432 ; 14.8767 ; 14.9641]

Bolt 1 - Tensile Force (kips): [34.9073 ; 34.8742 ; 34.855 ; 34.8369 ; 34.8102 ; 34.7717 ; 34.7227 ; 34.6779 ; 34.6489 ; 34.6379 ; 34.6291 ; 34.6212 ; 34.6133 ; 34.6044 ; 34.6015 ; 34.5981 ; 34.5951 ; 34.5953 ; 34.6044 ; 34.6252 ; 34.6544 ; 34.6893 ; 34.7296 ; 34.7732 ; 34.8185 ; 34.8382]

Bolt 1 - Shear Force (kips): [0.039559 ; 0.054689 ; 0.091702 ; 0.12736 ; 0.1797 ; 0.25373 ; 0.34492 ; 0.42875 ; 0.48669 ; 0.51727 ; 0.5486 ; 0.58343 ; 0.62705 ; 0.68557 ; 0.70604 ; 0.73415 ; 0.77171 ; 0.82061 ; 0.87796 ; 0.92827 ; 0.96642 ; 0.99513 ; 1.0165 ; 1.0318 ; 1.0429 ; 1.0466]

Bolt 2 - Tensile Force (kips): [34.9344 ; 34.8801 ; 34.8465 ; 34.8175 ; 34.7783 ; 34.7298 ; 34.6895 ; 34.6704 ; 34.6886 ; 34.7495 ; 34.8847 ; 35.1177 ; 35.4259 ; 35.7278 ; 35.823 ; 35.9606 ; 36.1549 ; 36.4425 ; 36.9256 ; 37.4803 ; 38.0409 ; 38.576 ; 39.0904 ; 39.6103 ; 40.0986 ; 40.2978]

Bolt 2 - Shear Force (kips): [0.066488 ; 0.06435 ; 0.11091 ; 0.15854 ; 0.22932 ; 0.33017 ; 0.45784 ; 0.58593 ; 0.69967 ; 0.79046 ; 0.86427 ; 0.92756 ; 0.96601 ; 0.98742 ; 0.99186 ; 0.99553 ; 0.99725 ; 0.99926 ; 1.0289 ; 1.0856 ; 1.1394 ; 1.1982 ; 1.2605 ; 1.3278 ; 1.3954 ; 1.4229]

Bolt 3 - Tensile Force (kips): [36 ; 35.9624 ; 35.9363 ; 35.9297 ; 35.9321 ; 35.9681 ; 36.0347 ; 36.1111 ; 36.1668 ; 36.2248 ; 36.349 ; 36.6016 ; 37.1085 ; 37.8646 ; 38.1246 ; 38.5026 ; 39.0715 ; 39.9906 ; 41.4656 ; 43.0407 ; 44.3636 ; 45.4395 ; 46.3181 ; 47.0423 ; 47.6621 ; 47.9007]

Bolt 3 - Shear Force (kips): [0.038663 ; 0.015506 ; 0.021136 ; 0.043492 ; 0.081211 ; 0.14006 ; 0.21976 ; 0.30191 ; 0.3807 ; 0.45228 ; 0.52041 ; 0.60451 ; 0.7205 ; 0.88012 ; 0.94286 ; 1.0414 ; 1.2259 ; 1.474 ; 1.746 ; 1.9832 ; 2.1692 ; 2.3323 ; 2.4848 ; 2.6256 ; 2.7534 ; 2.803]

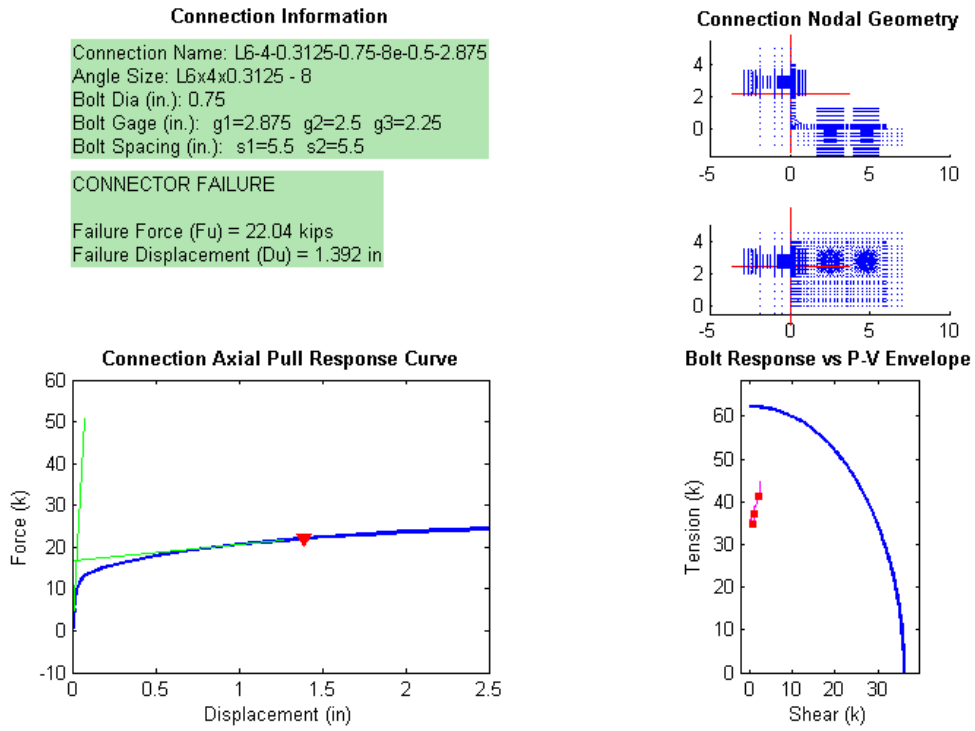


Figure B.18 Connection L6_4_0.3125_0.75_8e_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.75_8e_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 718.6396

Plastic Stiffness (k/in): 3.7808

Displacement (in): [2.4945e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.50682 ; 0.56932 ; 0.66307 ; 0.8037 ; 1.0146 ; 1.2646 ; 1.5146 ; 1.7646 ; 2.0146 ; 2.2646 ; 2.5]

Force (kips): [-0.682778 ; 0.257836 ; 0.720815 ; 1.15018 ; 1.75108 ; 2.60464 ; 3.72116 ; 4.87624 ; 5.79808 ; 6.42721 ; 6.87671 ; 7.27147 ; 7.71883 ; 8.28599 ; 8.97505 ; 9.19166 ; 9.48313 ; 9.86579 ; 10.3505 ; 10.8231 ; 11.2132 ; 11.5356 ; 11.808 ; 12.0394 ; 12.2273]

Bolt 1 - Tensile Force (kips): [34.9075 ; 34.8794 ; 34.866 ; 34.8534 ; 34.8349 ; 34.8073 ; 34.7696 ; 34.7289 ; 34.6986 ; 34.686 ; 34.6846 ; 34.6852 ; 34.6874 ; 34.692 ; 34.7 ; 34.7037 ; 34.7097 ; 34.7203 ; 34.7403 ; 34.769 ; 34.8029 ; 34.8407 ; 34.8822 ; 34.9253 ; 34.9675]

Bolt 1 - Shear Force (kips): [0.039239 ; 0.046819 ; 0.071387 ; 0.096811 ; 0.13395 ; 0.18875 ; 0.26248 ; 0.34068 ; 0.40115 ; 0.43432 ; 0.45224 ; 0.47232 ; 0.50009 ; 0.53762 ; 0.5897 ; 0.60677 ; 0.63038 ; 0.66213 ; 0.70264 ; 0.74123 ; 0.77142 ; 0.79524 ; 0.81424 ; 0.82938 ; 0.84082]

Bolt 2 - Tensile Force (kips): [34.9348 ; 34.8885 ; 34.8631 ; 34.8411 ; 34.8114 ; 34.7708 ; 34.7356 ; 34.7144 ; 34.7271 ; 34.7763 ; 34.8604 ; 34.9794 ; 35.1663 ; 35.502 ; 35.8623 ; 35.9708 ; 36.1249 ; 36.336 ; 36.6403 ; 37.0242 ; 37.4057 ; 37.7741 ; 38.1377 ; 38.4832 ; 38.7849]

Bolt 2 - Shear Force (kips): [0.066025 ; 0.056079 ; 0.085752 ; 0.1193 ; 0.16977 ; 0.24465 ; 0.34762 ; 0.46163 ; 0.56556 ; 0.65268 ; 0.7213 ; 0.77794 ; 0.83399 ; 0.87921 ; 0.89797 ; 0.8986 ; 0.89807 ; 0.89487 ; 0.8885 ; 0.90069 ; 0.93224 ; 0.96109 ; 0.99149 ; 1.0228 ; 1.0523]

Bolt 3 - Tensile Force (kips): [36 ; 35.9676 ; 35.9424 ; 35.9267 ; 35.9202 ; 35.9232 ; 35.9658 ; 36.0079 ; 36.0493 ; 36.0711 ; 36.1034 ; 36.2168 ; 36.5131 ; 37.052 ; 37.8036 ; 38.0642 ; 38.4677 ; 39.0929 ; 40.0207 ; 41.0213 ; 41.8992 ; 42.7248 ; 43.453 ; 44.1014 ; 44.653]

Bolt 3 - Shear Force (kips): [0.039105 ; 0.019449 ; 0.01514 ; 0.028444 ; 0.056062 ; 0.1012 ; 0.16785 ; 0.24432 ; 0.31517 ; 0.37464 ; 0.4309 ; 0.48864 ; 0.56671 ; 0.7002 ; 0.89088 ; 0.96272 ; 1.0759 ; 1.2647 ; 1.5383 ; 1.8369 ; 2.0778 ; 2.2299 ; 2.3468 ; 2.4368 ; 2.5033]

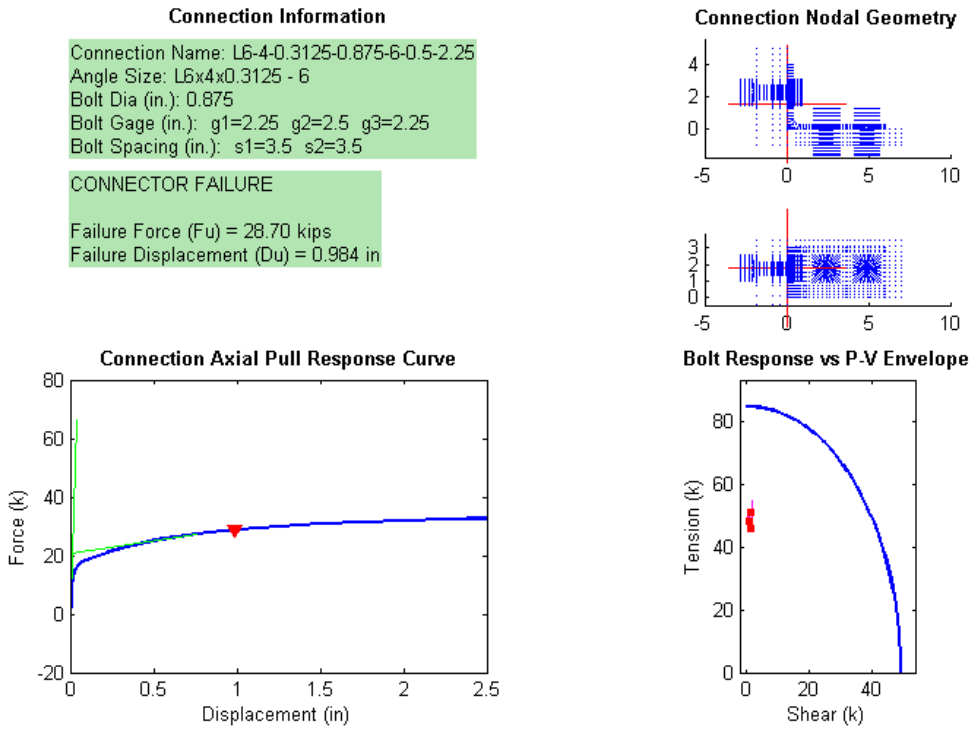


Figure B.19 Connection L6_4_0.3125_0.875_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.875_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.5175e+003

Plastic Stiffness (k/in): 8.8344

Displacement (in): [4.9153e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.5049 ; 1.7549 ; 2.0049 ; 2.2549 ; 2.5]

Force (kips): [-1.2302 ; 0.692135 ; 1.7337 ; 3.04115 ; 4.72677 ; 6.41543 ; 7.4928 ; 8.12084 ; 8.67983 ; 9.23104 ; 9.82388 ; 10.5764 ; 11.4926 ; 12.5282 ; 13.6325 ; 14.4141 ; 14.9844 ; 15.4042 ; 15.7169 ; 15.9527 ; 16.1396 ; 16.2886]

Bolt 1 - Tensile Force (kips): [48.6796 ; 48.6158 ; 48.582 ; 48.5386 ; 48.4805 ; 48.4216 ; 48.386 ; 48.3679 ; 48.3529 ; 48.3385 ; 48.3257 ; 48.3102 ; 48.2932 ; 48.2815 ; 48.2874 ; 48.3138 ; 48.3532 ; 48.4001 ; 48.4514 ; 48.5057 ; 48.5618 ; 48.618]

Bolt 1 - Shear Force (kips): [0.08899 ; 0.069191 ; 0.11047 ; 0.17528 ; 0.26637 ; 0.35885 ; 0.41413 ; 0.44506 ; 0.47534 ; 0.51331 ; 0.55746 ; 0.61758 ; 0.69455 ; 0.78397 ; 0.87399 ; 0.92864 ; 0.96129 ; 0.98157 ; 0.99357 ; 0.99979 ; 1.0022 ; 1.0023]

Bolt 2 - Tensile Force (kips): [48.692 ; 48.5774 ; 48.5102 ; 48.4256 ; 48.3114 ; 48.1868 ; 48.0357 ; 47.8461 ; 47.5886 ; 47.199 ; 46.7931 ; 46.3072 ; 45.7731 ; 45.3625 ; 45.3447 ; 45.8551 ; 46.5808 ; 47.3334 ; 48.0691 ; 48.715 ; 49.2562 ; 49.714]

Bolt 2 - Shear Force (kips): [0.088494 ; 0.127 ; 0.22117 ; 0.34786 ; 0.51776 ; 0.6974 ; 0.82343 ; 0.90173 ; 0.95294 ; 0.95234 ; 0.93572 ; 0.92735 ; 0.91239 ; 0.92862 ; 1.0419 ; 1.1754 ; 1.2955 ; 1.383 ; 1.4519 ; 1.5105 ; 1.5728 ; 1.6347]

Bolt 3 - Tensile Force (kips): [50 ; 49.9289 ; 49.8653 ; 49.7827 ; 49.6242 ; 49.3891 ; 49.0922 ; 48.7334 ; 48.2626 ; 47.7675 ; 47.4881 ; 47.5345 ; 48.1605 ; 49.2393 ; 50.4804 ; 51.3373 ; 52.2275 ; 52.9885 ; 53.6041 ; 54.0975 ; 54.4992 ; 54.8279]

Bolt 3 - Shear Force (kips): [0.045418 ; 0.029424 ; 0.063274 ; 0.11953 ; 0.19709 ; 0.28242 ; 0.34309 ; 0.37675 ; 0.41384 ; 0.45029 ; 0.49604 ; 0.57919 ; 0.72713 ; 0.92148 ; 1.1926 ; 1.4107 ; 1.4915 ; 1.5598 ; 1.6181 ; 1.6706 ; 1.7162 ; 1.7531]

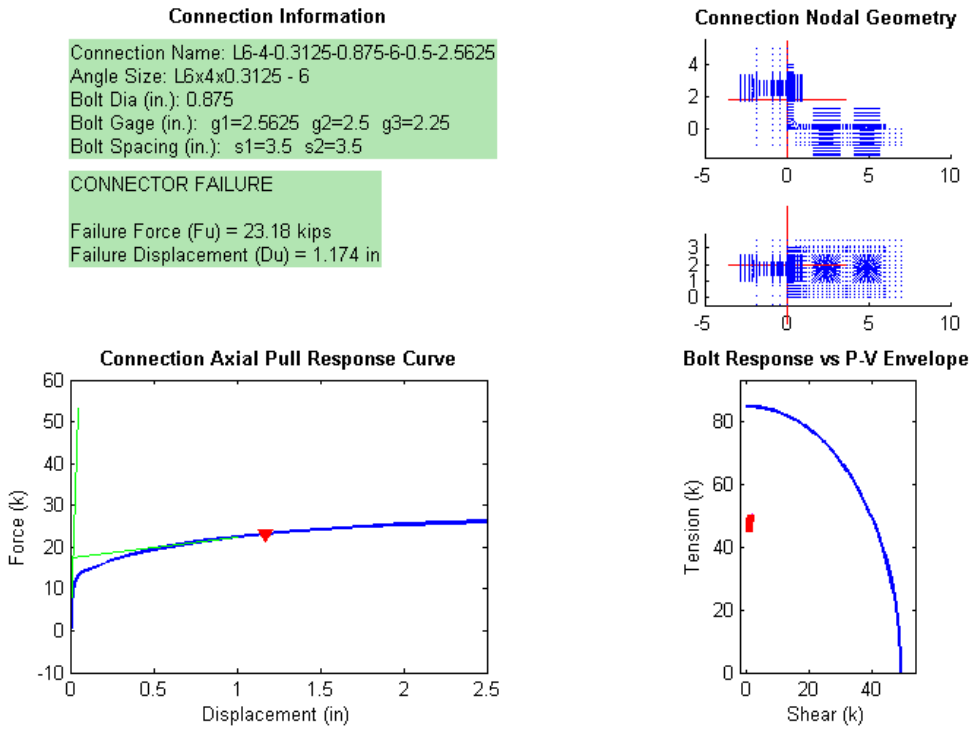


Figure B.20 Connection L6_4_0.3125_0.875_6_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.875_6_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.1762e+003

Plastic Stiffness (k/in): 5.1760

Displacement (in): [3.6805e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.5049 ; 1.7549 ; 2.0049 ; 2.2549 ; 2.5]

Force (kips): [-1.22635 ; 0.376688 ; 1.07082 ; 1.9958 ; 3.20601 ; 4.64517 ; 5.78176 ; 6.43058 ; 6.87155 ; 7.23707 ; 7.65418 ; 8.21135 ; 8.91096 ; 9.72223 ; 10.6079 ; 11.2549 ; 11.7503 ; 12.1329 ; 12.4371 ; 12.6796 ; 12.8723 ; 13.029]

Bolt 1 - Tensile Force (kips): [48.6796 ; 48.6263 ; 48.6043 ; 48.5746 ; 48.5347 ; 48.4859 ; 48.4491 ; 48.4316 ; 48.423 ; 48.4189 ; 48.4165 ; 48.4144 ; 48.4152 ; 48.422 ; 48.444 ; 48.4764 ; 48.5168 ; 48.5636 ; 48.6145 ; 48.6679 ; 48.7235 ; 48.7789]

Bolt 1 - Shear Force (kips): [0.088942 ; 0.061863 ; 0.0824 ; 0.12247 ; 0.18323 ; 0.26046 ; 0.3183 ; 0.34659 ; 0.36556 ; 0.38367 ; 0.4083 ; 0.44496 ; 0.49446 ; 0.5591 ; 0.63092 ; 0.68282 ; 0.72012 ; 0.74529 ; 0.76135 ; 0.77236 ; 0.77882 ; 0.78361]

Bolt 2 - Tensile Force (kips): [48.6921 ; 48.5966 ; 48.5493 ; 48.4879 ; 48.4067 ; 48.3108 ; 48.2145 ; 48.0827 ; 47.9531 ; 47.8266 ; 47.6117 ; 47.2738 ; 46.8373 ; 46.3623 ; 46.047 ; 45.9897 ; 46.1531 ; 46.4816 ; 46.9145 ; 47.3375 ; 47.7594 ; 48.134]

Bolt 2 - Shear Force (kips): [0.088092 ; 0.10245 ; 0.16438 ; 0.25377 ; 0.37657 ; 0.52885 ; 0.66215 ; 0.74799 ; 0.80686 ; 0.84471 ; 0.8644 ; 0.85695 ; 0.83208 ; 0.79607 ; 0.77748 ; 0.80922 ; 0.8546 ; 0.90343 ; 0.95413 ; 1.0017 ; 1.0393 ; 1.0691]

Bolt 3 - Tensile Force (kips): [50 ; 49.9398 ; 49.8855 ; 49.8084 ; 49.6784 ; 49.4318 ; 49.082 ; 48.6848 ; 48.1806 ; 47.5604 ; 46.9766 ; 46.5675 ; 46.5561 ; 47.1572 ; 48.2265 ; 48.9941 ; 49.5391 ; 49.9158 ; 50.175 ; 50.3992 ; 50.6334 ; 50.8315]

Bolt 3 - Shear Force (kips): [0.046027 ; 0.027131 ; 0.043724 ; 0.083771 ; 0.14122 ; 0.20858 ; 0.26507 ; 0.29241 ; 0.29217 ; 0.28249 ; 0.28628 ; 0.3395 ; 0.45423 ; 0.63625 ; 0.83628 ; 0.99671 ; 1.1515 ; 1.3032 ; 1.4497 ; 1.5716 ; 1.6527 ; 1.7236]

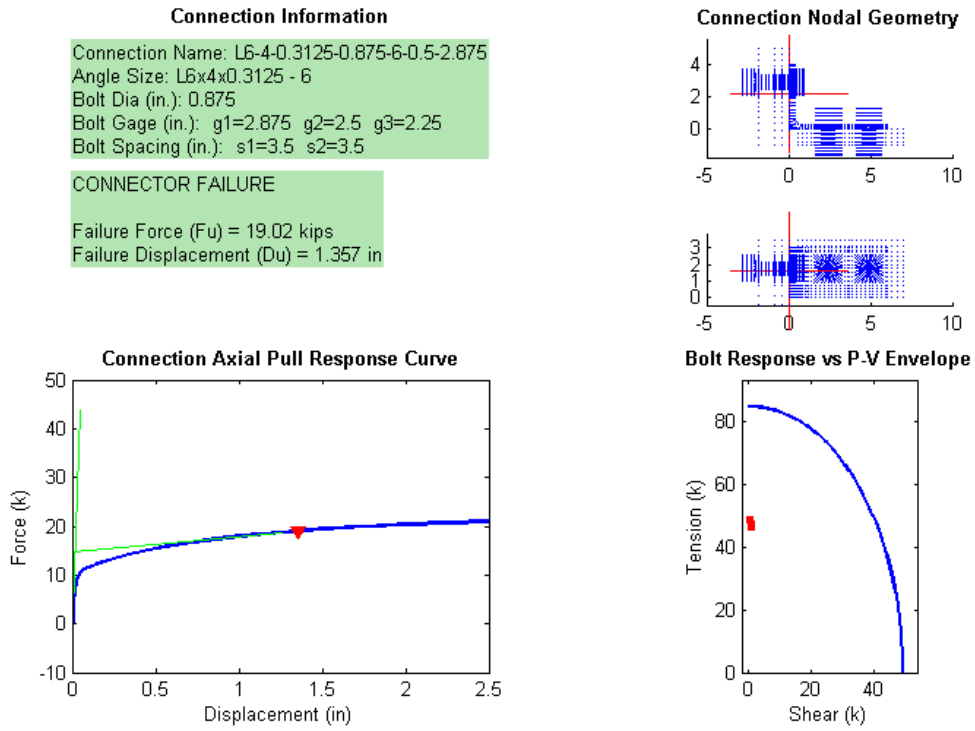


Figure B.21 Connection L6_4_0.3125_0.875_6_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.875_6_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 977.2078

Plastic Stiffness (k/in): 3.2435

Displacement (in): [3.6341e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.56737 ; 0.66112 ; 0.80174 ; 1.0127 ; 1.2627 ; 1.5127 ; 1.7627 ; 2.0127 ; 2.2627 ; 2.5]

Force (kips): [-1.22093 ; 0.204679 ; 0.687679 ; 1.3539 ; 2.22855 ; 3.37677 ; 4.47122 ; 5.16864 ; 5.53406 ; 5.80261 ; 6.11224 ; 6.53493 ; 7.0822 ; 7.72563 ; 7.92699 ; 8.19866 ; 8.5484 ; 8.9828 ; 9.38824 ; 9.71052 ; 9.96511 ; 10.1753 ; 10.3452 ; 10.4772]

Bolt 1 - Tensile Force (kips): [48.6797 ; 48.632 ; 48.6171 ; 48.5962 ; 48.5686 ; 48.531 ; 48.4957 ; 48.4766 ; 48.4713 ; 48.4716 ; 48.475 ; 48.4807 ; 48.4907 ; 48.5109 ; 48.5194 ; 48.5327 ; 48.5536 ; 48.589 ; 48.6354 ; 48.6848 ; 48.7373 ; 48.7914 ; 48.8469 ; 48.9006]

Bolt 1 - Shear Force (kips): [0.088862 ; 0.059484 ; 0.069806 ; 0.093788 ; 0.13343 ; 0.19194 ; 0.2491 ; 0.28043 ; 0.2933 ; 0.30439 ; 0.31764 ; 0.33748 ; 0.36909 ; 0.41085 ; 0.42464 ; 0.44441 ; 0.47247 ; 0.50577 ; 0.53647 ; 0.56115 ; 0.57936 ; 0.59346 ; 0.60374 ; 0.61094]

Bolt 2 - Tensile Force (kips): [48.6925 ; 48.6081 ; 48.5737 ; 48.5271 ; 48.4673 ; 48.3893 ; 48.3187 ; 48.2444 ; 48.1669 ; 48.1116 ; 48.0311 ; 47.8826 ; 47.5785 ; 47.1968 ; 47.0698 ; 46.8968 ; 46.6926 ; 46.5154 ; 46.4223 ; 46.4054 ; 46.4549 ; 46.5516 ; 46.6778 ; 46.8024]

Bolt 2 - Shear Force (kips): [0.087691 ; 0.089377 ; 0.13189 ; 0.19614 ; 0.28535 ; 0.40707 ; 0.53121 ; 0.62309 ; 0.67538 ; 0.7098 ; 0.74944 ; 0.79219 ; 0.7985 ; 0.76723 ; 0.75329 ; 0.73213 ; 0.70573 ; 0.67211 ; 0.66961 ; 0.67474 ; 0.6831 ; 0.69523 ; 0.70762 ; 0.71935]

Bolt 3 - Tensile Force (kips): [50 ; 49.9498 ; 49.903 ; 49.8333 ; 49.7282 ; 49.5168 ; 49.1787 ; 48.7353 ; 48.2649 ; 47.6957 ; 47.0515 ; 46.4181 ; 45.9478 ; 45.9253 ; 45.9899 ; 46.1615 ; 46.4996 ; 46.9972 ; 47.385 ; 47.6166 ; 47.7399 ; 47.807 ; 47.8556 ; 47.8942]

Bolt 3 - Shear Force (kips): [0.047049 ; 0.030032 ; 0.035362 ; 0.061999 ; 0.10535 ; 0.16102 ; 0.20877 ; 0.2304 ; 0.21304 ; 0.17533 ; 0.15497 ; 0.17312 ; 0.24819 ; 0.39671 ; 0.44749 ; 0.5226 ; 0.62364 ; 0.76872 ; 0.92912 ; 1.0963 ; 1.2595 ; 1.4219 ; 1.5639 ; 1.6818]

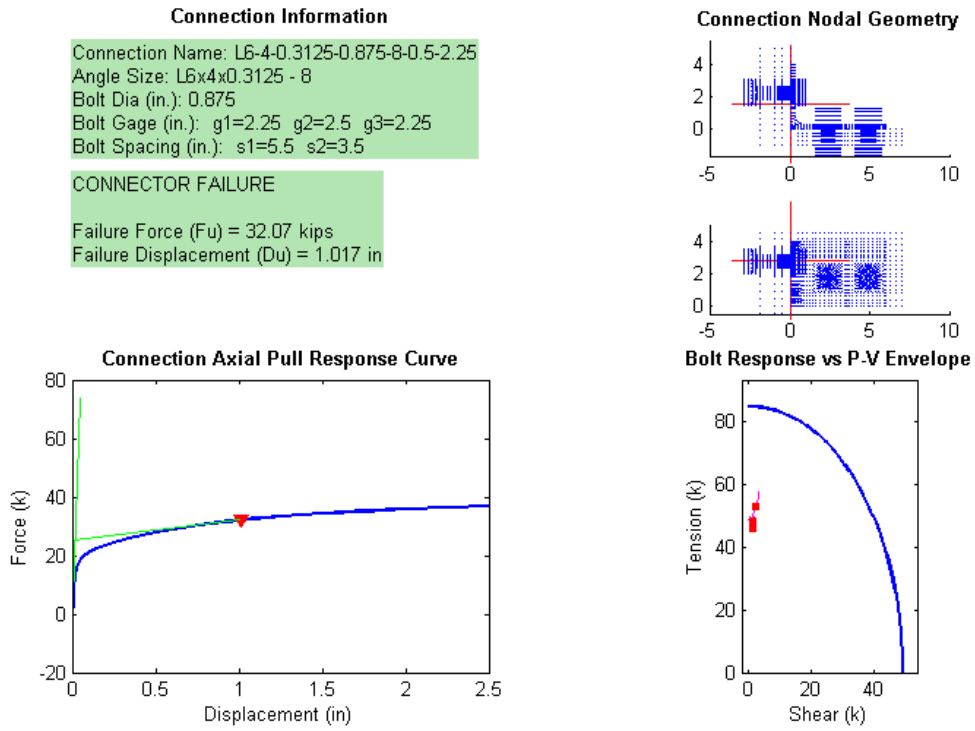


Figure B.22 Connection L6_4_0.3125_0.875_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.875_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.4469e+003

Plastic Stiffness (k/in): 6.9088

Displacement (in): [3.405e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.5049 ; 1.7549 ; 2.0049 ; 2.2549 ; 2.5]

Force (kips): [-1.13439 ; 0.655537 ; 1.69165 ; 3.00074 ; 4.72335 ; 6.59513 ; 8.07294 ; 9.05662 ; 9.77349 ; 10.4615 ; 11.165 ; 11.9561 ; 12.8879 ; 13.9639 ; 15.1417 ; 16.0053 ; 16.6684 ; 17.1854 ; 17.5937 ; 17.9224 ; 18.1899 ; 18.4089]

Bolt 1 - Tensile Force (kips): [48.675 ; 48.6105 ; 48.5726 ; 48.523 ; 48.4552 ; 48.3784 ; 48.3192 ; 48.2827 ; 48.255 ; 48.2267 ; 48.1973 ; 48.1673 ; 48.1359 ; 48.105 ; 48.0873 ; 48.0929 ; 48.1141 ; 48.1469 ; 48.187 ; 48.232 ; 48.2807 ; 48.331]

Bolt 1 - Shear Force (kips): [0.093984 ; 0.082053 ; 0.12992 ; 0.20468 ; 0.31164 ; 0.43312 ; 0.5267 ; 0.58658 ; 0.63599 ; 0.69145 ; 0.7571 ; 0.83395 ; 0.92653 ; 1.0371 ; 1.1533 ; 1.2323 ; 1.2876 ; 1.3259 ; 1.3531 ; 1.3725 ; 1.3855 ; 1.394]

Bolt 2 - Tensile Force (kips): [48.6853 ; 48.5827 ; 48.5155 ; 48.4294 ; 48.314 ; 48.1718 ; 48.0152 ; 47.825 ; 47.5833 ; 47.2549 ; 46.8343 ; 46.3923 ; 45.9104 ; 45.485 ; 45.5364 ; 45.9271 ; 46.496 ; 47.1922 ; 47.907 ; 48.5825 ; 49.1938 ; 49.7376]

Bolt 2 - Shear Force (kips): [0.073189 ; 0.11308 ; 0.21141 ; 0.34117 ; 0.51655 ; 0.71545 ; 0.886 ; 1.009 ; 1.1007 ; 1.1572 ; 1.1654 ; 1.1632 ; 1.1682 ; 1.1973 ; 1.2977 ; 1.4157 ; 1.5217 ; 1.6161 ; 1.6959 ; 1.7685 ; 1.839 ; 1.9068]

Bolt 3 - Tensile Force (kips): [50 ; 49.9285 ; 49.8643 ; 49.7831 ; 49.6182 ; 49.3958 ; 49.0679 ; 48.6821 ; 48.2369 ; 47.7881 ; 47.5787 ; 47.8089 ; 48.7388 ; 50.0374 ; 51.5036 ; 52.7705 ; 53.9296 ; 54.9437 ; 55.8013 ; 56.5138 ; 57.1139 ; 57.6128]

Bolt 3 - Shear Force (kips): [0.050932 ; 0.028918 ; 0.057293 ; 0.11023 ; 0.18487 ; 0.27603 ; 0.36911 ; 0.45173 ; 0.52909 ; 0.64491 ; 0.78337 ; 0.93568 ; 1.1329 ; 1.4214 ; 1.8533 ; 2.2224 ; 2.5001 ; 2.729 ; 2.9223 ; 3.0801 ; 3.2098 ; 3.3233]

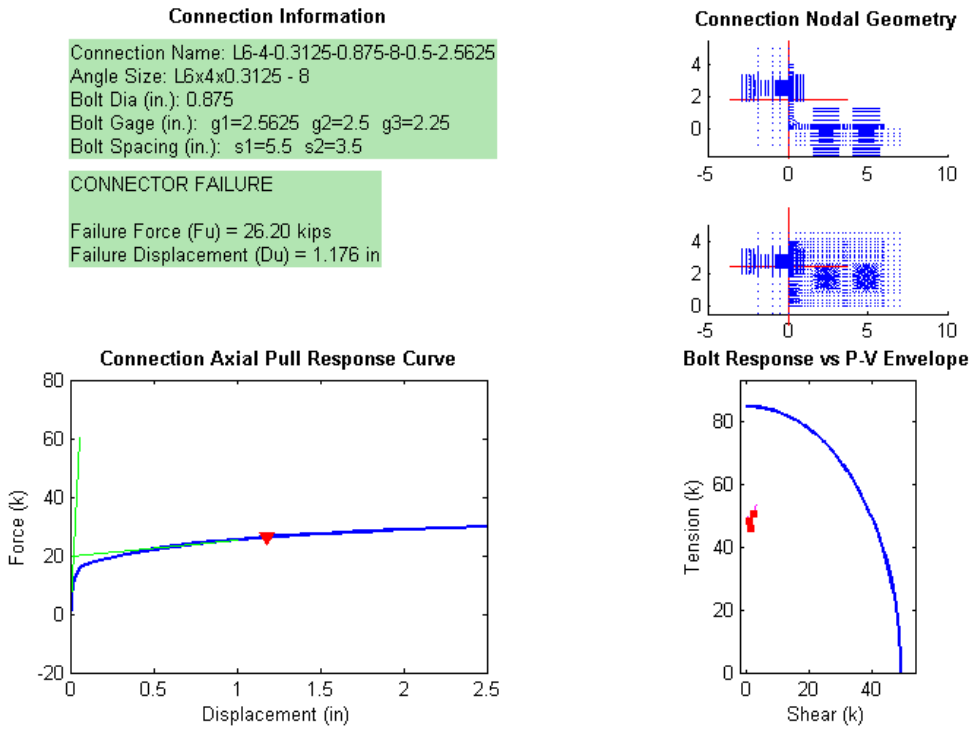


Figure B.23 Connection L6_4_0.3125_0.875_8_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.875_8_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.1245e+003

Plastic Stiffness (k/in): 5.7176

Displacement (in): [3.3965e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.5049 ; 1.7549 ; 2.0049 ; 2.2549 ; 2.5]

Force (kips): [-1.13178 ; 0.360092 ; 1.06459 ; 2.0092 ; 3.24993 ; 4.7972 ; 6.21182 ; 7.23414 ; 7.88618 ; 8.39479 ; 8.88776 ; 9.48125 ; 10.2099 ; 11.057 ; 12.0035 ; 12.7182 ; 13.2752 ; 13.7268 ; 14.0967 ; 14.4067 ; 14.666 ; 14.879]

Bolt 1 - Tensile Force (kips): [48.675 ; 48.6214 ; 48.5962 ; 48.5617 ; 48.5146 ; 48.4535 ; 48.397 ; 48.3605 ; 48.34 ; 48.3255 ; 48.3131 ; 48.2989 ; 48.2854 ; 48.2774 ; 48.2805 ; 48.2966 ; 48.3241 ; 48.3594 ; 48.4003 ; 48.4451 ; 48.4932 ; 48.5423]

Bolt 1 - Shear Force (kips): [0.09387 ; 0.073231 ; 0.09879 ; 0.14697 ; 0.21932 ; 0.31653 ; 0.40661 ; 0.46492 ; 0.50198 ; 0.53535 ; 0.57324 ; 0.62446 ; 0.69065 ; 0.77107 ; 0.86475 ; 0.93649 ; 0.98786 ; 1.027 ; 1.0567 ; 1.0795 ; 1.0964 ; 1.109]

Bolt 2 - Tensile Force (kips): [48.6854 ; 48.6004 ; 48.5517 ; 48.4862 ; 48.4004 ; 48.2905 ; 48.1744 ; 48.0317 ; 47.8612 ; 47.6958 ; 47.5037 ; 47.189 ; 46.79 ; 46.3564 ; 46.0013 ; 45.9595 ; 46.1645 ; 46.4541 ; 46.8053 ; 47.1987 ; 47.629 ; 48.0478]

Bolt 2 - Shear Force (kips): [0.073041 ; 0.087268 ; 0.15501 ; 0.24983 ; 0.37838 ; 0.54361 ; 0.70587 ; 0.83872 ; 0.92893 ; 0.9967 ; 1.0401 ; 1.058 ; 1.0506 ; 1.0338 ; 1.0241 ; 1.0439 ; 1.0997 ; 1.1652 ; 1.2181 ; 1.2666 ; 1.3127 ; 1.3537]

Bolt 3 - Tensile Force (kips): [50 ; 49.9394 ; 49.8842 ; 49.8077 ; 49.6761 ; 49.42 ; 49.076 ; 48.6006 ; 48.0545 ; 47.4148 ; 46.8682 ; 46.6035 ; 46.9012 ; 47.8599 ; 49.1431 ; 50.0431 ; 50.7011 ; 51.333 ; 51.9368 ; 52.5114 ; 53.0437 ; 53.513]

Bolt 3 - Shear Force (kips): [0.050537 ; 0.02791 ; 0.040421 ; 0.078705 ; 0.13499 ; 0.20505 ; 0.27709 ; 0.35268 ; 0.40226 ; 0.46164 ; 0.55185 ; 0.69946 ; 0.90491 ; 1.1617 ; 1.4765 ; 1.7964 ; 2.1233 ; 2.3791 ; 2.5741 ; 2.7205 ; 2.8291 ; 2.9142]

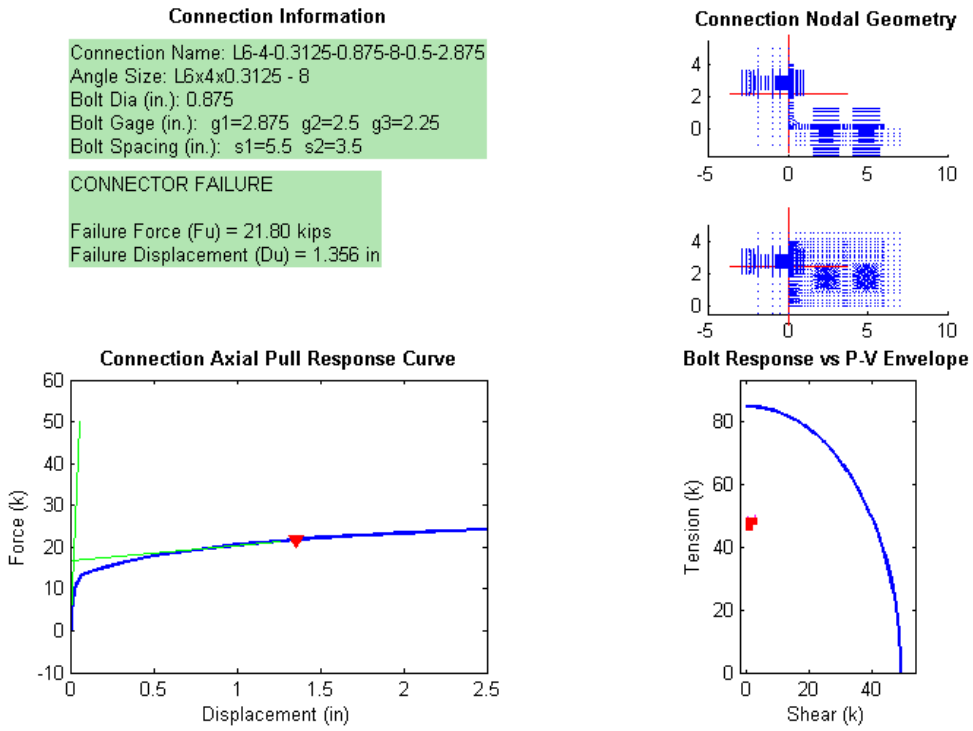


Figure B.24 Connection L6_4_0.3125_0.875_8_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.875_8_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 934.6253

Plastic Stiffness (k/in): 3.7336

Displacement (in): [3.394e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.5049 ; 1.7549 ; 2.0049 ; 2.2549 ; 2.5]

Force (kips): [-1.13113 ; 0.194975 ; 0.69431 ; 1.38919 ; 2.29816 ; 3.52027 ; 4.80363 ; 5.81844 ; 6.46225 ; 6.87646 ; 7.23756 ; 7.68104 ; 8.25337 ; 8.93399 ; 9.69722 ; 10.2785 ; 10.7452 ; 11.1284 ; 11.4443 ; 11.7116 ; 11.9426 ; 12.1347]

Bolt 1 - Tensile Force (kips): [48.675 ; 48.6274 ; 48.6099 ; 48.5851 ; 48.5518 ; 48.5053 ; 48.455 ; 48.4171 ; 48.3992 ; 48.3914 ; 48.3882 ; 48.3866 ; 48.3854 ; 48.391 ; 48.4113 ; 48.4401 ; 48.4751 ; 48.5141 ; 48.5574 ; 48.6041 ; 48.6529 ; 48.7018]

Bolt 1 - Shear Force (kips): [0.093873 ; 0.069803 ; 0.083796 ; 0.11431 ; 0.16311 ; 0.23618 ; 0.31757 ; 0.37956 ; 0.41077 ; 0.43196 ; 0.45477 ; 0.48484 ; 0.52985 ; 0.58792 ; 0.65672 ; 0.71151 ; 0.75716 ; 0.79516 ; 0.82449 ; 0.8479 ; 0.86711 ; 0.88401]

Bolt 2 - Tensile Force (kips): [48.6856 ; 48.6114 ; 48.5746 ; 48.5236 ; 48.4577 ; 48.3706 ; 48.2758 ; 48.1736 ; 48.0619 ; 47.9593 ; 47.8655 ; 47.7269 ; 47.448 ; 47.0907 ; 46.7104 ; 46.447 ; 46.2996 ; 46.2767 ; 46.3545 ; 46.4892 ; 46.6431 ; 46.8199]

Bolt 2 - Shear Force (kips): [0.073144 ; 0.072452 ; 0.12098 ; 0.19162 ; 0.28746 ; 0.41931 ; 0.56486 ; 0.69266 ; 0.78731 ; 0.84585 ; 0.89344 ; 0.94698 ; 0.98177 ; 0.97704 ; 0.95036 ; 0.92436 ; 0.90429 ; 0.89904 ; 0.91432 ; 0.93747 ; 0.9642 ; 0.9939]

Bolt 3 - Tensile Force (kips): [50 ; 49.949 ; 49.9012 ; 49.8296 ; 49.7246 ; 49.4964 ; 49.1504 ; 48.6797 ; 48.0852 ; 47.3947 ; 46.7144 ; 46.1164 ; 45.8256 ; 46.1573 ; 46.9824 ; 47.7137 ; 48.2666 ; 48.7542 ; 49.1786 ; 49.5434 ; 49.8639 ; 50.1711]

Bolt 3 - Shear Force (kips): [0.05043 ; 0.029891 ; 0.032389 ; 0.058533 ; 0.10187 ; 0.15973 ; 0.21753 ; 0.26695 ; 0.3097 ; 0.32763 ; 0.36529 ; 0.4781 ; 0.66075 ; 0.93135 ; 1.286 ; 1.5749 ; 1.8557 ; 2.1113 ; 2.3242 ; 2.5138 ; 2.6851 ; 2.8184]

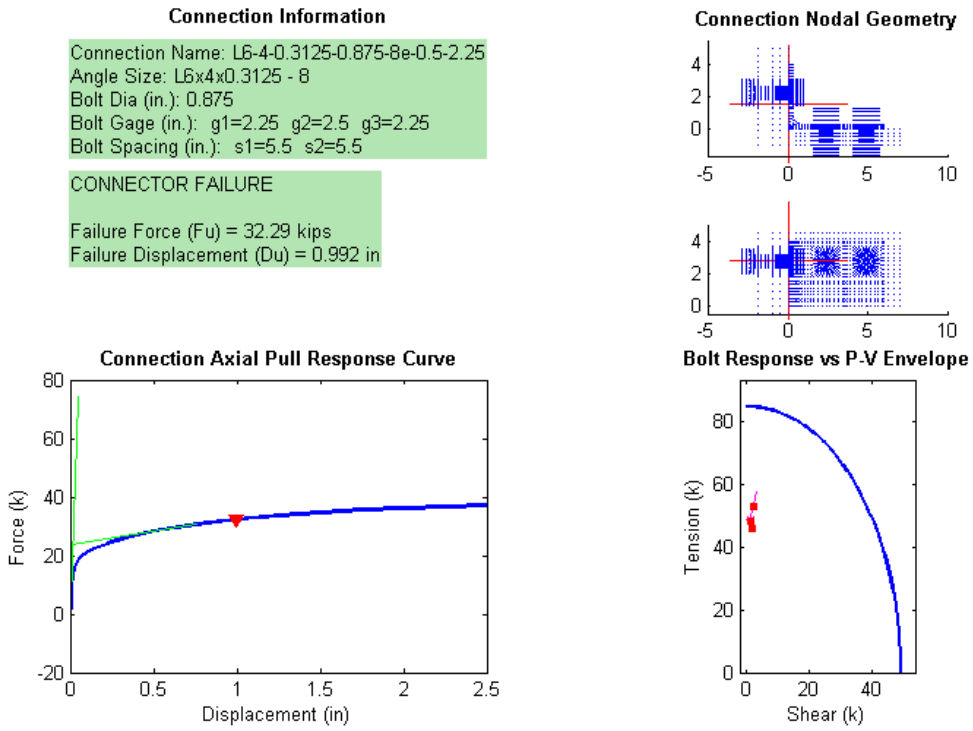


Figure B.25 Connection L6_4_0.3125_0.875_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.875_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.5038e+003

Plastic Stiffness (k/in): 9.4912

Displacement (in): [4.9352e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.5049 ; 1.7549 ; 2.0049 ; 2.2549 ; 2.5]

Force (kips): [-1.25546 ; 0.616463 ; 1.6816 ; 3.02087 ; 4.76629 ; 6.59608 ; 8.02759 ; 9.0387 ; 9.7657 ; 10.4332 ; 11.1637 ; 12.0339 ; 13.03 ; 14.1364 ; 15.3228 ; 16.1917 ; 16.8513 ; 17.3561 ; 17.7549 ; 18.0729 ; 18.3283 ; 18.5343]

Bolt 1 - Tensile Force (kips): [48.7143 ; 48.6421 ; 48.6008 ; 48.5471 ; 48.4743 ; 48.3961 ; 48.335 ; 48.2955 ; 48.2696 ; 48.2454 ; 48.2189 ; 48.185 ; 48.1447 ; 48.1054 ; 48.0765 ; 48.0712 ; 48.0818 ; 48.1021 ; 48.129 ; 48.1618 ; 48.197 ; 48.2337]

Bolt 1 - Shear Force (kips): [0.066697 ; 0.082389 ; 0.14334 ; 0.22682 ; 0.34091 ; 0.46209 ; 0.55302 ; 0.60505 ; 0.63872 ; 0.68301 ; 0.74221 ; 0.82286 ; 0.92376 ; 1.0353 ; 1.1502 ; 1.2277 ; 1.2789 ; 1.3143 ; 1.3392 ; 1.3555 ; 1.3653 ; 1.371]

Bolt 2 - Tensile Force (kips): [48.744 ; 48.628 ; 48.5581 ; 48.4699 ; 48.3502 ; 48.2175 ; 48.0566 ; 47.8829 ; 47.6761 ; 47.3462 ; 46.9294 ; 46.4538 ; 45.9633 ; 45.6254 ; 45.6647 ; 46.1083 ; 46.7598 ; 47.4553 ; 48.1173 ; 48.7329 ; 49.312 ; 49.8234]

Bolt 2 - Shear Force (kips): [0.10548 ; 0.11194 ; 0.205 ; 0.33381 ; 0.5089 ; 0.7038 ; 0.87694 ; 1.0245 ; 1.1402 ; 1.2157 ; 1.2455 ; 1.2645 ; 1.2964 ; 1.3414 ; 1.4244 ; 1.5168 ; 1.6072 ; 1.6918 ; 1.7668 ; 1.8428 ; 1.9196 ; 1.9967]

Bolt 3 - Tensile Force (kips): [50 ; 49.9304 ; 49.8687 ; 49.793 ; 49.6417 ; 49.436 ; 49.1314 ; 48.7277 ; 48.2534 ; 47.8029 ; 47.6145 ; 47.8537 ; 48.7802 ; 50.0659 ; 51.5866 ; 52.9207 ; 54.1328 ; 55.16 ; 56.0213 ; 56.7415 ; 57.3373 ; 57.8307]

Bolt 3 - Shear Force (kips): [0.059212 ; 0.024074 ; 0.039976 ; 0.088477 ; 0.15893 ; 0.24344 ; 0.32914 ; 0.41462 ; 0.49724 ; 0.59607 ; 0.73117 ; 0.89457 ; 1.0955 ; 1.3882 ; 1.7914 ; 2.0992 ; 2.3387 ; 2.5566 ; 2.7406 ; 2.8866 ; 3.0101 ; 3.1169]

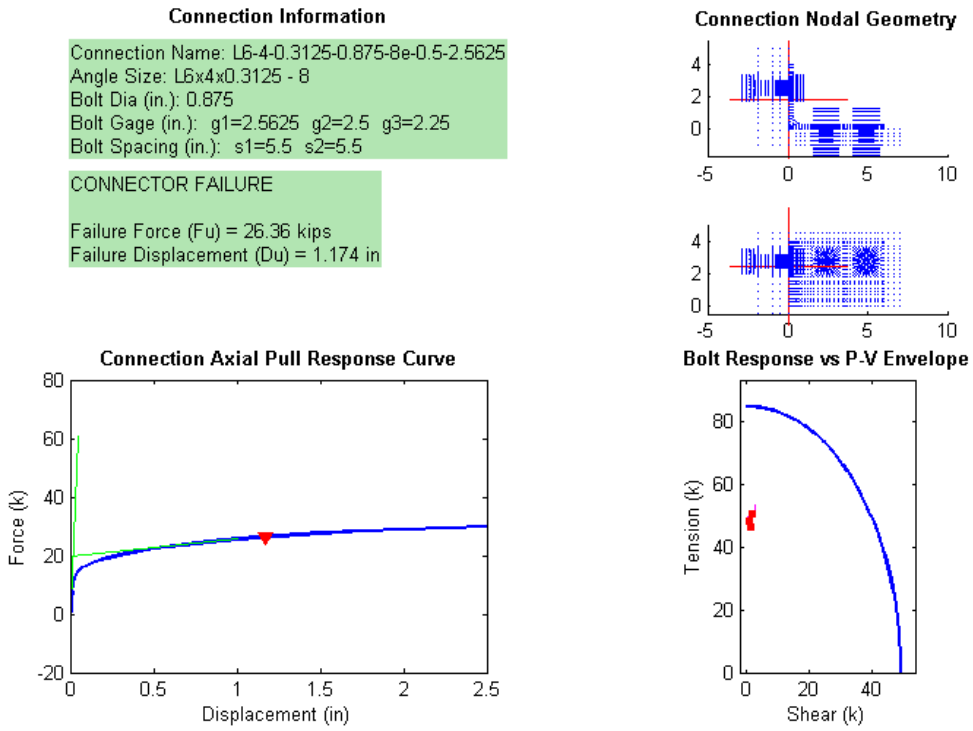


Figure B.26 Connection L6_4_0.3125_0.875_8e_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.875_8e_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.1713e+003

Plastic Stiffness (k/in): 5.7120

Displacement (in): [3.8804e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.50682 ; 0.75682 ; 1.0068 ; 1.2568 ; 1.5068 ; 1.7568 ; 2.0068 ; 2.2568 ; 2.5]

Force (kips): [-1.24668 ; 0.322351 ; 1.04092 ; 1.70263 ; 2.5784 ; 3.77546 ; 5.14426 ; 6.34417 ; 7.25241 ; 7.85927 ; 8.36326 ; 8.89458 ; 9.51261 ; 10.2642 ; 11.1358 ; 12.0965 ; 12.8105 ; 13.3651 ; 13.8096 ; 14.1728 ; 14.4708 ; 14.718 ; 14.9195]

Bolt 1 - Tensile Force (kips): [48.7143 ; 48.6537 ; 48.6262 ; 48.6004 ; 48.5653 ; 48.5159 ; 48.458 ; 48.4072 ; 48.372 ; 48.3531 ; 48.3401 ; 48.3282 ; 48.3167 ; 48.3033 ; 48.29 ; 48.2841 ; 48.2921 ; 48.3125 ; 48.3398 ; 48.3732 ; 48.4111 ; 48.4515 ; 48.4929]

Bolt 1 - Shear Force (kips): [0.066298 ; 0.06819 ; 0.10615 ; 0.1454 ; 0.20012 ; 0.27818 ; 0.36942 ; 0.44766 ; 0.49788 ; 0.52149 ; 0.53994 ; 0.57035 ; 0.6158 ; 0.67947 ; 0.76195 ; 0.85453 ; 0.92402 ; 0.9738 ; 1.0119 ; 1.0395 ; 1.0598 ; 1.0748 ; 1.0859]

Bolt 2 - Tensile Force (kips): [48.7442 ; 48.6465 ; 48.5965 ; 48.5516 ; 48.4919 ; 48.4096 ; 48.3162 ; 48.2071 ; 48.0794 ; 47.9545 ; 47.7998 ; 47.5819 ; 47.2927 ; 46.9174 ; 46.5241 ; 46.273 ; 46.2353 ; 46.4408 ; 46.7582 ; 47.1524 ; 47.5671 ; 47.9639 ; 48.3299]

Bolt 2 - Shear Force (kips): [0.10487 ; 0.091313 ; 0.15069 ; 0.21232 ; 0.29859 ; 0.42046 ; 0.5671 ; 0.70985 ; 0.83982 ; 0.94438 ; 1.0326 ; 1.0973 ; 1.132 ; 1.1483 ; 1.168 ; 1.1839 ; 1.2127 ; 1.2549 ; 1.2863 ; 1.3135 ; 1.343 ; 1.375 ; 1.4036]

Bolt 3 - Tensile Force (kips): [50 ; 49.9407 ; 49.8875 ; 49.8363 ; 49.7644 ; 49.6198 ; 49.3861 ; 49.0633 ; 48.6379 ; 48.0752 ; 47.4289 ; 46.8685 ; 46.5956 ; 46.9079 ; 47.9016 ; 49.1924 ; 50.0804 ; 50.766 ; 51.3983 ; 52.0178 ; 52.6013 ; 53.1379 ; 53.6052]

Bolt 3 - Shear Force (kips): [0.059445 ; 0.02926 ; 0.027336 ; 0.046555 ; 0.080548 ; 0.12972 ; 0.18787 ; 0.24619 ; 0.30556 ; 0.35137 ; 0.42169 ; 0.52877 ; 0.6797 ; 0.87415 ; 1.1173 ; 1.4236 ; 1.7398 ; 2.05 ; 2.2957 ; 2.4729 ; 2.6027 ; 2.6984 ; 2.7741]

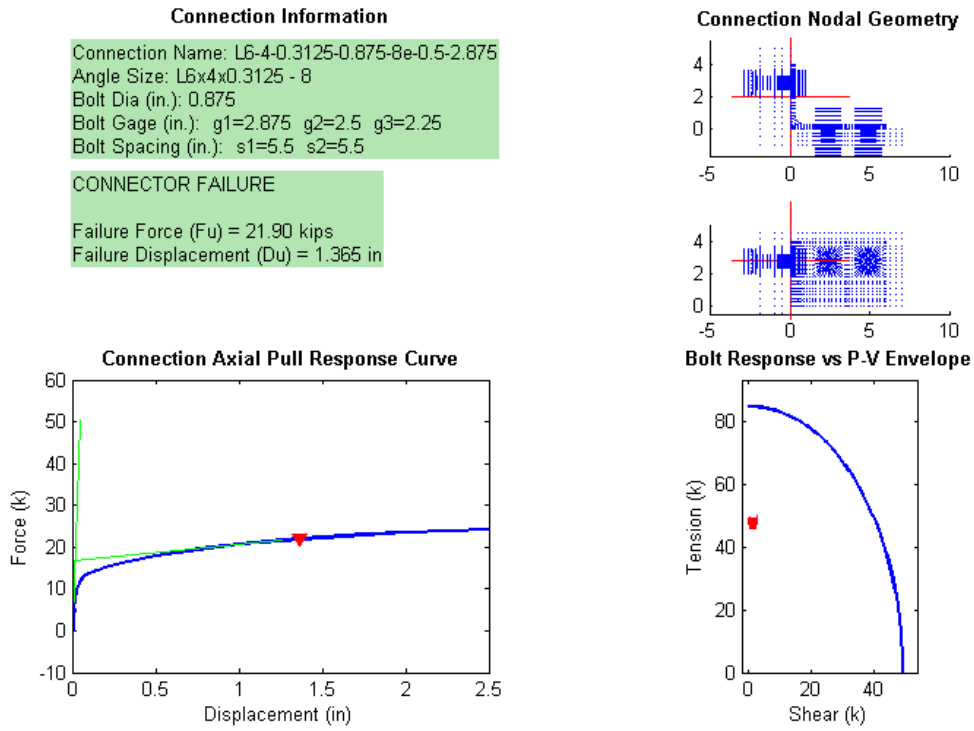


Figure B.27 Connection L6_4_0.3125_0.875_8e_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.3125_0.875_8e_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 979.4417

Plastic Stiffness (k/in): 3.7264

Displacement (in): [4.9371e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.50682 ; 0.75682 ; 1.0068 ; 1.2568 ; 1.5068 ; 1.7568 ; 2.0068 ; 2.2568 ; 2.5]

Force (kips): [-1.24371 ; 0.16215 ; 0.669262 ; 1.14438 ; 1.79015 ; 2.67509 ; 3.82444 ; 4.94239 ; 5.83851 ; 6.43835 ; 6.86052 ; 7.24314 ; 7.68975 ; 8.26844 ; 8.95904 ; 9.73178 ; 10.3203 ; 10.7861 ; 11.1675 ; 11.4802 ; 11.744 ; 11.9662 ; 12.1499]

Bolt 1 - Tensile Force (kips): [48.7145 ; 48.6601 ; 48.6408 ; 48.6226 ; 48.5973 ; 48.5616 ; 48.5137 ; 48.4667 ; 48.4305 ; 48.4116 ; 48.4034 ; 48.4001 ; 48.4002 ; 48.4031 ; 48.4101 ; 48.4267 ; 48.4485 ; 48.4775 ; 48.5113 ; 48.5499 ; 48.5924 ; 48.6371 ; 48.6821]

Bolt 1 - Shear Force (kips): [0.066311 ; 0.06136 ; 0.085945 ; 0.11274 ; 0.15173 ; 0.20804 ; 0.28462 ; 0.35965 ; 0.41597 ; 0.44432 ; 0.45978 ; 0.47648 ; 0.49693 ; 0.52475 ; 0.57548 ; 0.64235 ; 0.69849 ; 0.74128 ; 0.77676 ; 0.80504 ; 0.82703 ; 0.84468 ; 0.85849]

Bolt 2 - Tensile Force (kips): [48.7449 ; 48.6577 ; 48.6206 ; 48.5864 ; 48.5411 ; 48.4796 ; 48.3997 ; 48.3218 ; 48.2251 ; 48.1308 ; 48.0303 ; 47.9169 ; 47.7769 ; 47.5655 ; 47.266 ; 46.9437 ; 46.7495 ; 46.676 ; 46.6714 ; 46.7254 ; 46.8641 ; 47.0248 ; 47.191]

Bolt 2 - Shear Force (kips): [0.10479 ; 0.081132 ; 0.12034 ; 0.16329 ; 0.22605 ; 0.31599 ; 0.4372 ; 0.56485 ; 0.68266 ; 0.78035 ; 0.85966 ; 0.92566 ; 0.98927 ; 1.0481 ; 1.0698 ; 1.0774 ; 1.0792 ; 1.075 ; 1.087 ; 1.1011 ; 1.1151 ; 1.1256 ; 1.132]

Bolt 3 - Tensile Force (kips): [50 ; 49.9502 ; 49.9039 ; 49.8581 ; 49.7946 ; 49.6797 ; 49.4417 ; 49.1292 ; 48.6977 ; 48.1575 ; 47.4771 ; 46.7782 ; 46.176 ; 45.8461 ; 46.1935 ; 47.037 ; 47.7605 ; 48.3121 ; 48.7752 ; 49.1941 ; 49.5537 ; 49.8776 ; 50.1717]

Bolt 3 - Shear Force (kips): [0.059595 ; 0.034312 ; 0.02604 ; 0.033215 ; 0.056439 ; 0.09368 ; 0.13995 ; 0.18636 ; 0.22496 ; 0.25276 ; 0.28123 ; 0.33357 ; 0.45136 ; 0.64033 ; 0.90104 ; 1.238 ; 1.5258 ; 1.8048 ; 2.0648 ; 2.273 ; 2.4609 ; 2.6245 ; 2.7622]

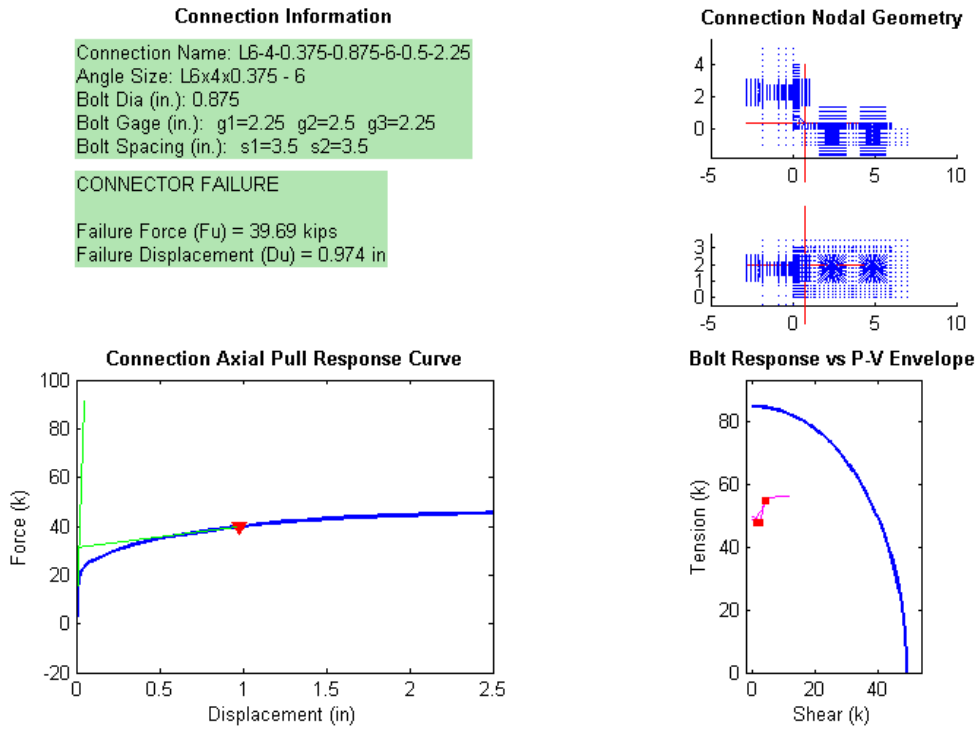


Figure B.28 Connection L6_4_0.375_0.875_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.375_0.875_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 2.0494e+003

Plastic Stiffness (k/in): 8.3441

Displacement (in): [6.7996e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 0.81737 ; 0.91112 ; 0.94627 ; 0.95946 ; 0.97923 ; 1.0089 ; 1.0534 ; 1.0701 ; 1.0951 ; 1.1326 ; 1.189 ; 1.2734 ; 1.3051 ; 1.3526 ; 1.4239 ; 1.5308 ; 1.6912 ; 1.9317 ; 2.1723 ; 2.4128 ; 2.5]

Force (kips): [-1.33416 ; 1.16153 ; 2.66862 ; 4.55029 ; 6.87009 ; 9.14699 ; 10.5746 ; 11.3848 ; 12.1387 ; 12.9288 ; 13.7935 ; 14.865 ; 16.1207 ; 17.4601 ; 18.8846 ; 19.1769 ; 19.569 ; 19.7188 ; 19.7738 ; 19.8707 ; 19.9952 ; 20.1803 ; 20.2446 ; 20.3397 ; 20.4745 ; 20.6604 ; 20.9115 ; 20.9985 ; 21.1211 ; 21.2929 ; 21.5204 ; 21.8119 ; 22.159 ; 22.438 ; 22.6619 ; 22.735]

Bolt 1 - Tensile Force (kips): [48.6439 ; 48.5602 ; 48.5088 ; 48.442 ; 48.3554 ; 48.2687 ; 48.2179 ; 48.1942 ; 48.171 ; 48.1445 ; 48.1136 ; 48.0741 ; 48.0302 ; 47.9929 ; 47.9742 ; 47.9735 ; 47.976 ; 47.977 ; 47.9775 ; 47.9773 ; 47.9784 ; 47.9801 ; 47.981 ; 47.9824 ; 47.985 ; 47.9901 ; 47.9996 ; 48.0036 ; 48.0102 ; 48.021 ; 48.0389 ; 48.0689 ; 48.1196 ; 48.174 ; 48.2301 ; 48.2505]

Bolt 1 - Shear Force (kips): [0.0876 ; 0.087955 ; 0.16085 ; 0.2627 ; 0.39563 ; 0.52787 ; 0.6024 ; 0.63638 ; 0.67663 ; 0.72953 ; 0.79807 ; 0.89056 ; 1.0023 ; 1.1199 ; 1.2364 ; 1.2596 ; 1.2889 ; 1.2997 ; 1.3037 ; 1.3107 ; 1.3195 ; 1.3326 ; 1.3372 ; 1.3439 ; 1.3533 ; 1.3658 ; 1.3818 ; 1.3871 ; 1.3943 ; 1.4037 ; 1.4147 ; 1.4256 ; 1.4302 ; 1.4287 ; 1.425 ; 1.424]

Bolt 2 - Tensile Force (kips): [48.6548 ; 48.5187 ; 48.4312 ; 48.3219 ; 48.1793 ; 48.0287 ; 47.8714 ; 47.7511 ; 47.6096 ; 47.5154 ; 47.3713 ; 47.173 ; 46.9437 ; 46.8181 ; 47.1814 ; 47.3326 ; 47.5982 ; 47.7113 ; 47.7554 ; 47.8274 ; 47.936 ; 48.1066 ; 48.1683 ; 48.2614 ; 48.4009 ; 48.6102 ; 48.9103 ; 49.0163 ; 49.176 ; 49.4165 ; 49.7799 ; 50.3085 ; 51.1015 ; 51.8812 ; 52.6309 ; 52.8973]

Bolt 2 - Shear Force (kips): [0.087183 ; 0.15564 ; 0.28471 ; 0.45528 ; 0.67475 ; 0.90377 ; 1.0767 ; 1.2004 ; 1.3195 ; 1.4128 ; 1.4789 ; 1.5472 ; 1.6376 ; 1.773 ; 1.9753 ; 2.0261 ; 2.1016 ; 2.1313 ; 2.1425 ; 2.1611 ; 2.1866 ; 2.2249 ; 2.2388 ; 2.2595 ; 2.2901 ; 2.3353 ; 2.403 ; 2.4287 ; 2.4673 ; 2.5256 ; 2.6146 ; 2.7535 ; 2.9589 ; 3.1393 ; 3.2794 ; 3.3171]

Bolt 3 - Tensile Force (kips): [50 ; 49.9088 ; 49.8415 ; 49.7583 ; 49.662 ; 49.5323 ; 49.3604 ; 49.1086 ; 48.869 ; 48.7339 ; 48.8908 ; 49.5957 ; 50.5508 ; 51.6479 ; 53.3444 ; 53.784 ; 54.4204 ; 54.6165 ; 54.6726 ; 54.7394 ; 54.8438 ; 54.959 ; 54.9957 ; 55.0491 ; 55.1273 ; 55.2542 ; 55.4545 ; 55.5344 ; 55.6441 ; 55.7988 ; 56.0167 ; 56.2553 ; 56.3946 ; 56.4371 ; 56.4088 ; 56.3777]

Bolt 3 - Shear Force (kips): [0.0468241 ; 0.0366699 ; 0.0891967 ; 0.168615 ; 0.283438 ; 0.416882 ; 0.556329 ; 0.674681 ; 0.80761 ; 0.942338 ; 1.07667 ; 1.28376 ; 1.75348 ; 2.59736 ; 3.54297 ; 3.72847 ; 3.97165 ; 4.07508 ; 4.11243 ; 4.19806 ; 4.2985 ; 4.47891 ; 4.53994 ; 4.63755 ; 4.78131 ; 4.98221 ; 5.25689 ; 5.41429 ; 5.91053 ; 6.64406 ; 7.47742 ; 8.5826 ; 9.75695 ; 10.7149 ; 11.4328 ; 11.4865]

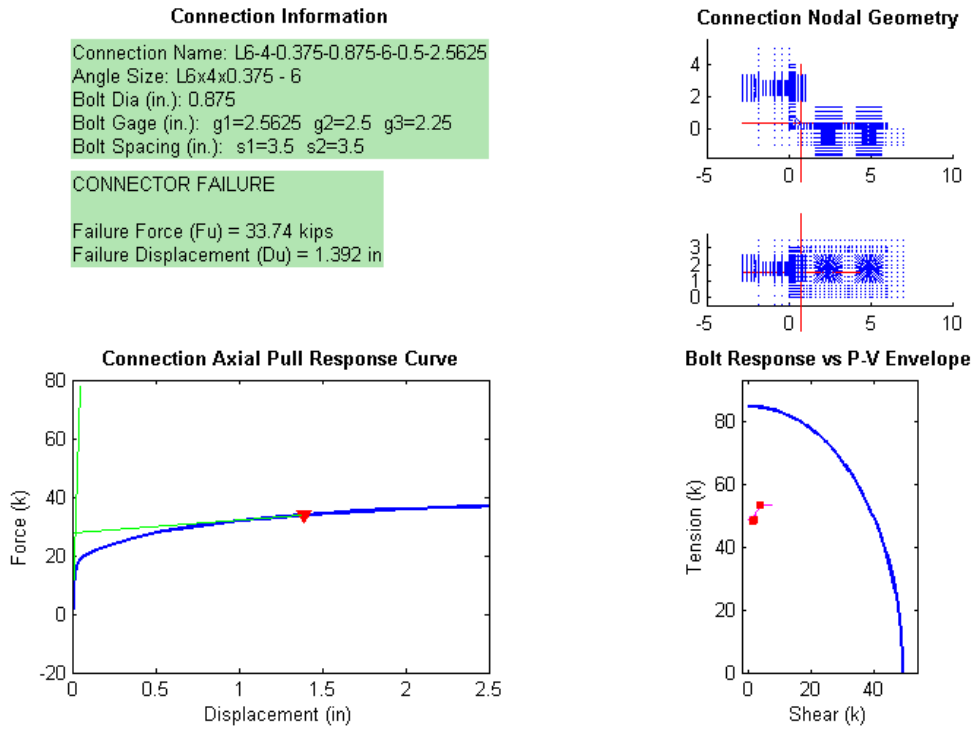


Figure B.29 Connection L6_4_0.375_0.875_6_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.375_0.875_6_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.5693e+003

Plastic Stiffness (k/in): 4.2845

Displacement (in): [3.8186e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.3174 ; 1.3408 ; 1.376 ; 1.4287 ; 1.4814 ; 1.5342 ; 1.6133 ; 1.7319 ; 1.9099 ; 1.9724 ; 2.0661 ; 2.2068 ; 2.4177 ; 2.5]

Force (kips): [-1.33166 ; 0.675942 ; 1.73335 ; 3.09284 ; 4.85442 ; 6.83757 ; 8.33141 ; 9.17128 ; 9.75068 ; 10.2774 ; 10.8967 ; 11.7383 ; 12.7536 ; 13.8862 ; 15.0549 ; 15.9031 ; 16.5639 ; 16.7043 ; 16.7546 ; 16.8299 ; 16.9551 ; 17.0715 ; 17.1797 ; 17.3311 ; 17.534 ; 17.7938 ; 17.8776 ; 17.9919 ; 18.1471 ; 18.3507 ; 18.4225]

Bolt 1 - Tensile Force (kips): [48.6438 ; 48.5766 ; 48.5414 ; 48.4949 ; 48.4317 ; 48.3581 ; 48.3048 ; 48.2818 ; 48.2691 ; 48.2587 ; 48.2484 ; 48.2312 ; 48.2102 ; 48.1929 ; 48.1926 ; 48.2106 ; 48.241 ; 48.2501 ; 48.2537 ; 48.2591 ; 48.2666 ; 48.2748 ; 48.2834 ; 48.2969 ; 48.3181 ; 48.3523 ; 48.3647 ; 48.3838 ; 48.4134 ; 48.459 ; 48.4771]

Bolt 1 - Shear Force (kips): [0.08735 ; 0.07 ; 0.1142 ; 0.18343 ; 0.28081 ; 0.39493 ; 0.47677 ; 0.50797 ; 0.5296 ; 0.55667 ; 0.59166 ; 0.64876 ; 0.73023 ; 0.8281 ; 0.92762 ; 0.99713 ; 1.0464 ; 1.0564 ; 1.0599 ; 1.065 ; 1.0735 ; 1.0811 ; 1.0879 ; 1.0973 ; 1.1096 ; 1.1238 ; 1.1281 ; 1.1335 ; 1.1394 ; 1.1452 ; 1.1466]

Bolt 2 - Tensile Force (kips): [48.654 ; 48.5445 ; 48.4816 ; 48.4015 ; 48.2979 ; 48.1824 ; 48.0723 ; 47.9693 ; 47.9051 ; 47.8438 ; 47.8067 ; 47.782 ; 47.7001 ; 47.6521 ; 47.7076 ; 47.9579 ; 48.363 ; 48.4794 ; 48.5239 ; 48.5938 ; 48.7113 ; 48.8379 ; 48.9663 ; 49.1534 ; 49.4278 ; 49.8302 ; 49.9663 ; 50.1648 ; 50.4579 ; 50.901 ; 51.0693]

Bolt 2 - Shear Force (kips): [0.086632 ; 0.11904 ; 0.20887 ; 0.33235 ; 0.49962 ; 0.69745 ; 0.86799 ; 0.99505 ; 1.0952 ; 1.1744 ; 1.249 ; 1.326 ; 1.3813 ; 1.4371 ; 1.5278 ; 1.6189 ; 1.7242 ; 1.7497 ; 1.7589 ; 1.7726 ; 1.7952 ; 1.8174 ; 1.8391 ; 1.8709 ; 1.9174 ; 1.9874 ; 2.0118 ; 2.0475 ; 2.1012 ; 2.1872 ; 2.2217]

Bolt 3 - Tensile Force (kips): [50 ; 49.9182 ; 49.851 ; 49.7683 ; 49.6424 ; 49.4687 ; 49.2538 ; 48.9187 ; 48.5258 ; 48.1821 ; 48.0226 ; 48.1995 ; 48.9435 ; 50.0434 ; 51.1273 ; 52.1267 ; 53.0656 ; 53.2917 ; 53.3759 ; 53.4931 ; 53.541 ; 53.5449 ; 53.5352 ; 53.5168 ; 53.4995 ; 53.498 ; 53.4813 ; 53.4607 ; 53.4654 ; 53.5009 ; 53.5134]

Bolt 3 - Shear Force (kips): [0.048618 ; 0.027842 ; 0.061545 ; 0.12095 ; 0.20679 ; 0.31729 ; 0.42768 ; 0.54192 ; 0.63967 ; 0.72021 ; 0.81353 ; 0.98178 ; 1.2248 ; 1.5605 ; 2.3325 ; 2.9966 ; 3.5187 ; 3.6326 ; 3.6724 ; 3.7374 ; 3.894 ; 4.0579 ; 4.2182 ; 4.4403 ; 4.7971 ; 5.3319 ; 5.5449 ; 5.8567 ; 6.3043 ; 7.2331 ; 7.5372]

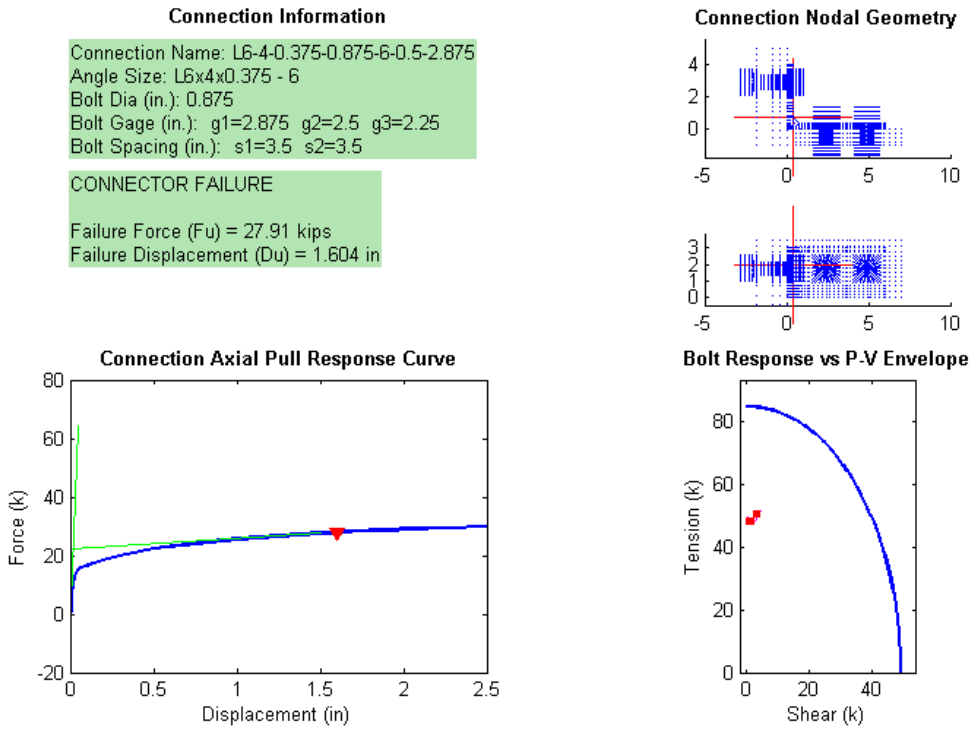


Figure B.30 Connection L6_4_0.375_0.875_6_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.375_0.875_6_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 1.2663e+003

Plastic Stiffness (k/in): 3.5984

Displacement (in): [5.3115e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.5049 ; 1.7549 ; 1.8174 ; 1.9111 ; 2.0517 ; 2.2627 ; 2.5]

Force (kips): [-1.32458 ; 0.392074 ; 1.14874 ; 2.15044 ; 3.4622 ; 5.10541 ; 6.5806 ; 7.46288 ; 7.95235 ; 8.30829 ; 8.74818 ; 9.37885 ; 10.1977 ; 11.1303 ; 12.0932 ; 12.805 ; 13.3591 ; 13.8089 ; 14.1724 ; 14.2543 ; 14.3725 ; 14.5331 ; 14.7406 ; 14.9388]

Bolt 1 - Tensile Force (kips): [48.6438 ; 48.5863 ; 48.5616 ; 48.5282 ; 48.4831 ; 48.4239 ; 48.3709 ; 48.3446 ; 48.3362 ; 48.3338 ; 48.3324 ; 48.3308 ; 48.3316 ; 48.3342 ; 48.3531 ; 48.3813 ; 48.4171 ; 48.4589 ; 48.5062 ; 48.5185 ; 48.5372 ; 48.566 ; 48.6109 ; 48.6629]

Bolt 1 - Shear Force (kips): [0.08709 ; 0.062287 ; 0.088252 ; 0.13494 ; 0.20391 ; 0.29654 ; 0.38028 ; 0.42155 ; 0.43576 ; 0.4494 ; 0.46996 ; 0.5005 ; 0.54134 ; 0.60915 ; 0.68741 ; 0.74772 ; 0.79455 ; 0.83159 ; 0.85912 ; 0.86522 ; 0.87386 ; 0.88514 ; 0.89858 ; 0.91022]

Bolt 2 - Tensile Force (kips): [48.654 ; 48.561 ; 48.5144 ; 48.4534 ; 48.3765 ; 48.2816 ; 48.2003 ; 48.1201 ; 48.0697 ; 48.0439 ; 48.0123 ; 47.9824 ; 48.036 ; 48.0418 ; 48.0744 ; 48.1431 ; 48.2383 ; 48.3744 ; 48.559 ; 48.608 ; 48.6854 ; 48.8081 ; 49.003 ; 49.2143]

Bolt 2 - Shear Force (kips): [0.086 ; 0.098152 ; 0.16164 ; 0.25271 ; 0.37779 ; 0.54134 ; 0.70181 ; 0.82217 ; 0.9047 ; 0.96112 ; 1.0301 ; 1.122 ; 1.2129 ; 1.2714 ; 1.3144 ; 1.3462 ; 1.3787 ; 1.41 ; 1.4516 ; 1.4624 ; 1.4779 ; 1.5004 ; 1.5358 ; 1.5723]

Bolt 3 - Tensile Force (kips): [50 ; 49.9304 ; 49.8694 ; 49.7899 ; 49.6657 ; 49.4782 ; 49.2027 ; 48.8256 ; 48.3762 ; 47.9323 ; 47.5257 ; 47.273 ; 47.4237 ; 47.8138 ; 47.9671 ; 48.4972 ; 49.3665 ; 50.1865 ; 50.9465 ; 51.1141 ; 51.2945 ; 51.4805 ; 51.6393 ; 51.7523]

Bolt 3 - Shear Force (kips): [0.049175 ; 0.027763 ; 0.044913 ; 0.087898 ; 0.15198 ; 0.24057 ; 0.3293 ; 0.40911 ; 0.46696 ; 0.49946 ; 0.55703 ; 0.69235 ; 0.94423 ; 1.3697 ; 2.1345 ; 2.6831 ; 2.9357 ; 3.1271 ; 3.2794 ; 3.3314 ; 3.4387 ; 3.6557 ; 4.0135 ; 4.5155]

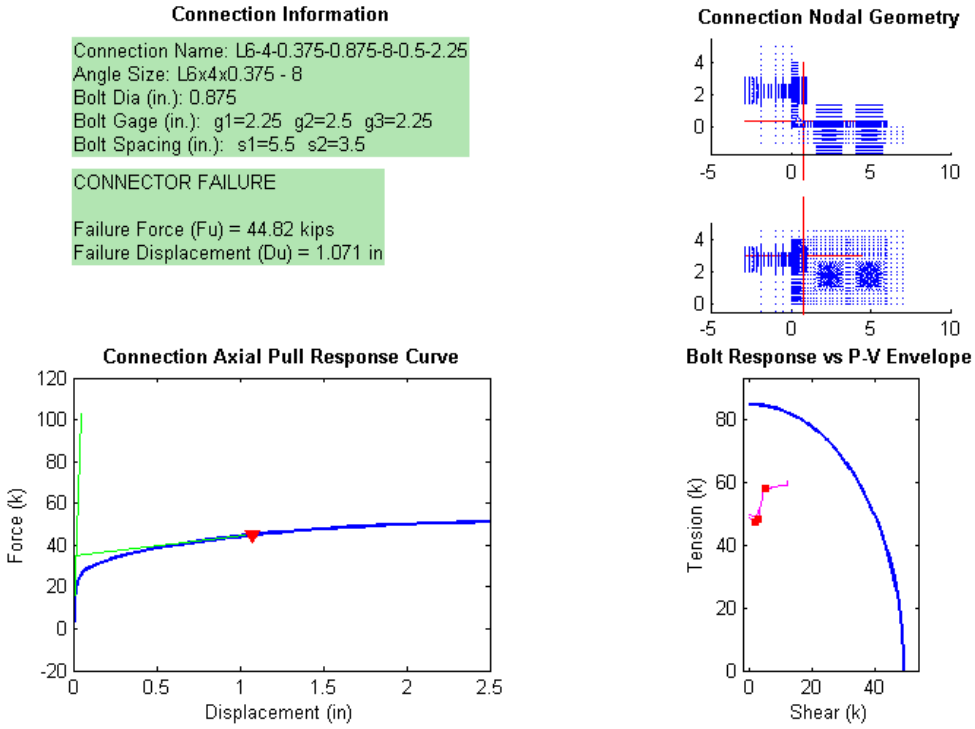


Figure B.31 Connection L6_4_0.375_0.875_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.375_0.875_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.9683e+003

Plastic Stiffness (k/in): 9.2066

Displacement (in): [5.1978e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 0.81737 ; 0.91112 ; 0.91991 ; 0.93309 ; 0.95287 ; 0.98253 ; 1.027 ; 1.0938 ; 1.1939 ; 1.2314 ; 1.2877 ; 1.3722 ; 1.4989 ; 1.689 ; 1.939 ; 2.189 ; 2.2515 ; 2.3452 ; 2.4858 ; 2.5]

Force (kips): [-1.22234 ; 1.11096 ; 2.62198 ; 4.50514 ; 6.89698 ; 9.46943 ; 11.4246 ; 12.6855 ; 13.6427 ; 14.5921 ; 15.5536 ; 16.6296 ; 17.8787 ; 19.3056 ; 20.8704 ; 21.1956 ; 21.6533 ; 21.702 ; 21.7721 ; 21.8725 ; 22.0177 ; 22.2225 ; 22.5111 ; 22.9041 ; 23.0426 ; 23.2365 ; 23.5066 ; 23.8767 ; 24.3392 ; 24.841 ; 25.2335 ; 25.3333 ; 25.4682 ; 25.6528 ; 25.6702]

Bolt 1 - Tensile Force (kips): [48.6395 ; 48.5538 ; 48.4955 ; 48.4191 ; 48.317 ; 48.2016 ; 48.1124 ; 48.0574 ; 48.0183 ; 47.9716 ; 47.9179 ; 47.8481 ; 47.7666 ; 47.6869 ; 47.616 ; 47.6023 ; 47.5845 ; 47.5826 ; 47.58 ; 47.5765 ; 47.5716 ; 47.5654 ; 47.5577 ; 47.5491 ; 47.5466 ; 47.5439 ; 47.5411 ; 47.5402 ; 47.5468 ; 47.5655 ; 47.5959 ; 47.6084 ; 47.6241 ; 47.6446 ; 47.6467]

Bolt 1 - Shear Force (kips): [0.092064 ; 0.10178 ; 0.1844 ; 0.29972 ; 0.45462 ; 0.62843 ; 0.76078 ; 0.84053 ; 0.89624 ; 0.96927 ; 1.0584 ; 1.1811 ; 1.3292 ; 1.4876 ; 1.6512 ; 1.6856 ; 1.7329 ; 1.7376 ; 1.7443 ; 1.7539 ; 1.7675 ; 1.7865 ; 1.8129 ; 1.8485 ; 1.861 ; 1.8782 ; 1.9025 ; 1.9347 ; 1.9739 ; 2.0141 ; 2.0395 ; 2.0367 ; 2.0391 ; 2.0493 ; 2.0503]

Bolt 2 - Tensile Force (kips): [48.6483 ; 48.5258 ; 48.4373 ; 48.3252 ; 48.1816 ; 48.0103 ; 47.8449 ; 47.6675 ; 47.5012 ; 47.3566 ; 47.2625 ; 47.1731 ; 47.1296 ; 47.1188 ; 47.4689 ; 47.5782 ; 47.7743 ; 47.7917 ; 47.8185 ; 47.8605 ; 47.9253 ; 48.0332 ; 48.2029 ; 48.4747 ; 48.576 ; 48.7347 ; 48.9752 ; 49.3495 ; 49.9229 ; 50.6716 ; 51.3979 ; 51.585 ; 51.8823 ; 52.3533 ; 52.4001]

Bolt 2 - Shear Force (kips): [0.072588 ; 0.14424 ; 0.27652 ; 0.44865 ; 0.67522 ; 0.93046 ; 1.1506 ; 1.3235 ; 1.4755 ; 1.6261 ; 1.7488 ; 1.8573 ; 1.9857 ; 2.1426 ; 2.3424 ; 2.3878 ; 2.4548 ; 2.4614 ; 2.4709 ; 2.4847 ; 2.5048 ; 2.5331 ; 2.5736 ; 2.6343 ; 2.6567 ; 2.6895 ; 2.7408 ; 2.8177 ; 2.9301 ; 3.0782 ; 3.2226 ; 3.2497 ; 3.303 ; 3.3973 ; 3.4065]

Bolt 3 - Tensile Force (kips): [50 ; 49.9086 ; 49.8393 ; 49.7637 ; 49.682 ; 49.5661 ; 49.4937 ; 49.3071 ; 49.1283 ; 49.0756 ; 49.1425 ; 49.409 ; 50.8772 ; 53.1138 ; 55.9327 ; 56.5389 ; 57.3385 ; 57.3908 ; 57.457 ; 57.5442 ; 57.6521 ; 57.775 ; 57.9255 ; 58.1383 ; 58.1977 ; 58.3065 ; 58.4464 ; 58.66 ; 58.8717 ; 58.9566 ; 58.9638 ; 59.2199 ; 59.6673 ; 60.3245 ; 60.387]

Bolt 3 - Shear Force (kips): [0.0526677 ; 0.0324852 ; 0.0777244 ; 0.150085 ; 0.25717 ; 0.38907 ; 0.542603 ; 0.730027 ; 0.963793 ; 1.21835 ; 1.65224 ; 2.39532 ; 2.86848 ; 3.36318 ; 3.94383 ; 4.06876 ; 4.26754 ; 4.29196 ; 4.34232 ; 4.43053 ; 4.55296 ; 4.74728 ; 5.12735 ; 5.72937 ; 6.12734 ; 6.66081 ; 6.98157 ; 8.41276 ; 9.51535 ; 10.7661 ; 11.7985 ; 11.9617 ; 11.9851 ; 11.9244 ; 11.9227]

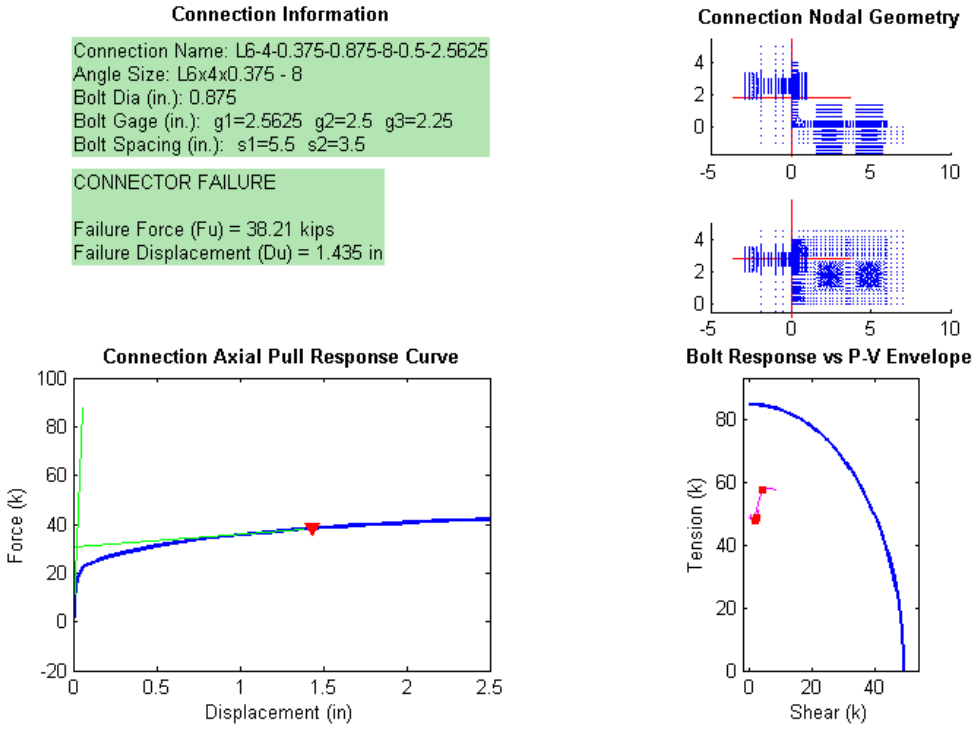


Figure B.32 Connection L6_4_0.375_0.875_8_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.375_0.875_8_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.5094e+003

Plastic Stiffness (k/in): 5.2077

Displacement (in): [4.9682e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.2705 ; 1.2939 ; 1.3291 ; 1.3818 ; 1.4609 ; 1.4906 ; 1.5351 ; 1.6018 ; 1.7019 ; 1.802 ; 1.9022 ; 2.0523 ; 2.1086 ; 2.1931 ; 2.3198 ; 2.5]

Force (kips): [-1.21792 ; 0.658096 ; 1.73014 ; 3.1175 ; 4.94396 ; 7.10898 ; 9.02145 ; 10.3182 ; 11.1575 ; 11.8714 ; 12.5748 ; 13.4159 ; 14.443 ; 15.5993 ; 16.8767 ; 17.8462 ; 18.6224 ; 18.6677 ; 18.7375 ; 18.8352 ; 18.9725 ; 19.1726 ; 19.2537 ; 19.3684 ; 19.5267 ; 19.7439 ; 19.9478 ; 20.1384 ; 20.3896 ; 20.4827 ; 20.6117 ; 20.788 ; 21.0051]

Bolt 1 - Tensile Force (kips): [48.6392 ; 48.571 ; 48.5305 ; 48.476 ; 48.4005 ; 48.3061 ; 48.2206 ; 48.1652 ; 48.1352 ; 48.1117 ; 48.0829 ; 48.0428 ; 47.9922 ; 47.939 ; 47.8984 ; 47.8818 ; 47.88 ; 47.8801 ; 47.8803 ; 47.8809 ; 47.8826 ; 47.8858 ; 47.8869 ; 47.8891 ; 47.8935 ; 47.9025 ; 47.9129 ; 47.9238 ; 47.943 ; 47.9502 ; 47.9618 ; 47.9804 ; 48.0094]

Bolt 1 - Shear Force (kips): [0.091609 ; 0.082598 ; 0.13411 ; 0.21475 ; 0.32954 ; 0.47333 ; 0.60323 ; 0.68572 ; 0.72947 ; 0.76795 ; 0.82498 ; 0.90705 ; 1.0159 ; 1.1462 ; 1.2845 ; 1.386 ; 1.4649 ; 1.4695 ; 1.4764 ; 1.486 ; 1.4995 ; 1.5187 ; 1.5259 ; 1.5361 ; 1.5495 ; 1.5667 ; 1.5824 ; 1.597 ; 1.6146 ; 1.6213 ; 1.63 ; 1.6413 ; 1.6536]

Bolt 2 - Tensile Force (kips): [48.6472 ; 48.5493 ; 48.4836 ; 48.3983 ; 48.288 ; 48.1544 ; 48.0199 ; 47.8828 ; 47.7542 ; 47.6698 ; 47.6011 ; 47.5914 ; 47.6088 ; 47.6878 ; 47.8492 ; 48.1592 ; 48.5913 ; 48.6165 ; 48.6548 ; 48.7137 ; 48.8095 ; 48.9586 ; 49.0139 ; 49.0991 ; 49.2307 ; 49.4351 ; 49.6432 ; 49.8515 ; 50.1727 ; 50.2948 ; 50.4789 ; 50.7538 ; 51.14]

Bolt 2 - Shear Force (kips): [0.072025 ; 0.10763 ; 0.20242 ; 0.33063 ; 0.50528 ; 0.72096 ; 0.92997 ; 1.103 ; 1.2424 ; 1.3664 ; 1.4734 ; 1.5826 ; 1.6844 ; 1.7902 ; 1.9137 ; 2.0249 ; 2.1327 ; 2.1389 ; 2.1484 ; 2.1621 ; 2.1826 ; 2.2118 ; 2.223 ; 2.2393 ; 2.2643 ; 2.3032 ; 2.3424 ; 2.3825 ; 2.4421 ; 2.4653 ; 2.4996 ; 2.5516 ; 2.6235]

Bolt 3 - Tensile Force (kips): [50 ; 49.9173 ; 49.8501 ; 49.7712 ; 49.6373 ; 49.4903 ; 49.3245 ; 49.1079 ; 48.7698 ; 48.5004 ; 48.5167 ; 48.981 ; 49.8749 ; 51.1604 ; 53.2279 ; 55.0938 ; 56.7075 ; 56.7975 ; 56.9179 ; 57.0971 ; 57.3658 ; 57.7221 ; 57.8155 ; 57.9223 ; 58.0058 ; 58.0502 ; 58.0625 ; 58.0585 ; 57.9945 ; 57.9791 ; 57.9259 ; 57.8325 ; 57.7092]

Bolt 3 - Shear Force (kips): [0.053463 ; 0.027071 ; 0.054833 ; 0.11 ; 0.19091 ; 0.30123 ; 0.42286 ; 0.57439 ; 0.76502 ; 0.97484 ; 1.1658 ; 1.4034 ; 1.7805 ; 2.3492 ; 2.8831 ; 3.2936 ; 3.5963 ; 3.6316 ; 3.7074 ; 3.7504 ; 3.8245 ; 3.9966 ; 4.1882 ; 4.467 ; 4.7716 ; 4.9486 ; 5.4437 ; 5.7678 ; 6.3864 ; 6.5961 ; 7.0852 ; 7.652 ; 8.361]

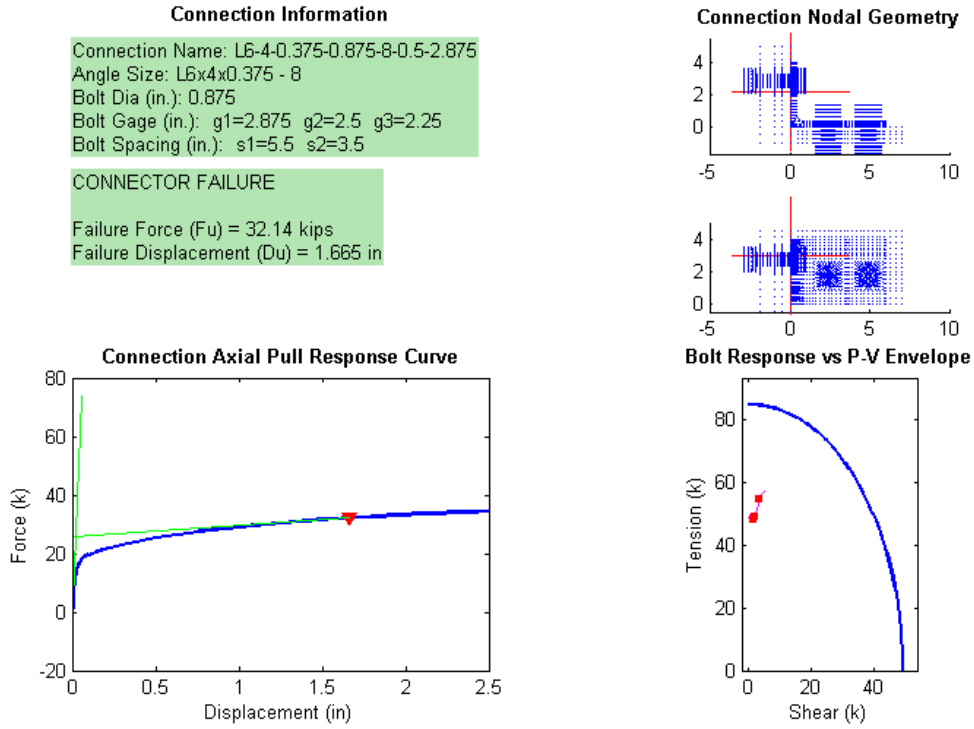


Figure B.33 Connection L6_4_0.375_0.875_8_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.375_0.875_8_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 1.2197e+003

Plastic Stiffness (k/in): 3.7269

Displacement (in): [4.8728e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.5049 ; 1.5674 ; 1.6611 ; 1.6963 ; 1.749 ; 1.8281 ; 1.9468 ; 2.1247 ; 2.3747 ; 2.5]

Force (kips): [-1.21654 ; 0.38431 ; 1.16559 ; 2.21069 ; 3.57613 ; 5.34396 ; 7.12756 ; 8.44565 ; 9.24907 ; 9.80171 ; 10.3044 ; 10.9402 ; 11.7547 ; 12.7042 ; 13.7522 ; 14.5659 ; 15.2185 ; 15.763 ; 15.8854 ; 16.0601 ; 16.1266 ; 16.2236 ; 16.3601 ; 16.5459 ; 16.8042 ; 17.1089 ; 17.2469]

Bolt 1 - Tensile Force (kips): [48.6392 ; 48.5813 ; 48.5522 ; 48.5122 ; 48.4576 ; 48.3829 ; 48.3042 ; 48.2471 ; 48.2175 ; 48.2009 ; 48.1843 ; 48.1638 ; 48.1365 ; 48.1048 ; 48.0856 ; 48.0864 ; 48.1005 ; 48.1218 ; 48.1279 ; 48.1378 ; 48.1416 ; 48.1475 ; 48.1571 ; 48.1728 ; 48.1982 ; 48.2377 ; 48.2582]

Bolt 1 - Shear Force (kips): [0.091454 ; 0.073659 ; 0.10533 ; 0.16167 ; 0.24406 ; 0.35843 ; 0.47967 ; 0.56791 ; 0.61378 ; 0.64522 ; 0.68751 ; 0.745 ; 0.82226 ; 0.92471 ; 1.0375 ; 1.1221 ; 1.1869 ; 1.2403 ; 1.2526 ; 1.2699 ; 1.2763 ; 1.2853 ; 1.298 ; 1.3151 ; 1.3377 ; 1.3638 ; 1.3756]

Bolt 2 - Tensile Force (kips): [48.647 ; 48.5647 ; 48.5145 ; 48.4478 ; 48.3626 ; 48.2554 ; 48.1474 ; 48.0424 ; 47.9354 ; 47.8759 ; 47.8402 ; 47.809 ; 47.8868 ; 48.0358 ; 48.2115 ; 48.3554 ; 48.5622 ; 48.8314 ; 48.9025 ; 49.0133 ; 49.0549 ; 49.1177 ; 49.2124 ; 49.3625 ; 49.5961 ; 49.946 ; 50.1219]

Bolt 2 - Shear Force (kips): [0.071907 ; 0.085092 ; 0.1547 ; 0.25235 ; 0.38459 ; 0.56191 ; 0.75254 ; 0.918 ; 1.0488 ; 1.1489 ; 1.2385 ; 1.3461 ; 1.4662 ; 1.5663 ; 1.6528 ; 1.7197 ; 1.7796 ; 1.8406 ; 1.8558 ; 1.8776 ; 1.8858 ; 1.8981 ; 1.916 ; 1.9423 ; 1.9812 ; 2.0413 ; 2.0727]

Bolt 3 - Tensile Force (kips): [50 ; 49.9292 ; 49.8677 ; 49.7863 ; 49.6642 ; 49.4858 ; 49.2379 ; 48.9622 ; 48.5813 ; 48.2232 ; 48.075 ; 48.2177 ; 48.7405 ; 49.5278 ; 50.5806 ; 51.7179 ; 53.0406 ; 54.285 ; 54.5807 ; 55.0086 ; 55.1535 ; 55.3636 ; 55.6496 ; 56.0227 ; 56.4993 ; 57.0721 ; 57.3307]

Bolt 3 - Shear Force (kips): [0.053055 ; 0.027355 ; 0.040343 ; 0.081296 ; 0.14343 ; 0.23286 ; 0.33116 ; 0.44262 ; 0.57928 ; 0.71808 ; 0.83086 ; 0.99372 ; 1.2809 ; 1.7548 ; 2.3978 ; 2.8798 ; 3.1045 ; 3.2331 ; 3.2561 ; 3.2921 ; 3.3492 ; 3.5073 ; 3.7048 ; 3.895 ; 4.4787 ; 4.9489 ; 5.0658]

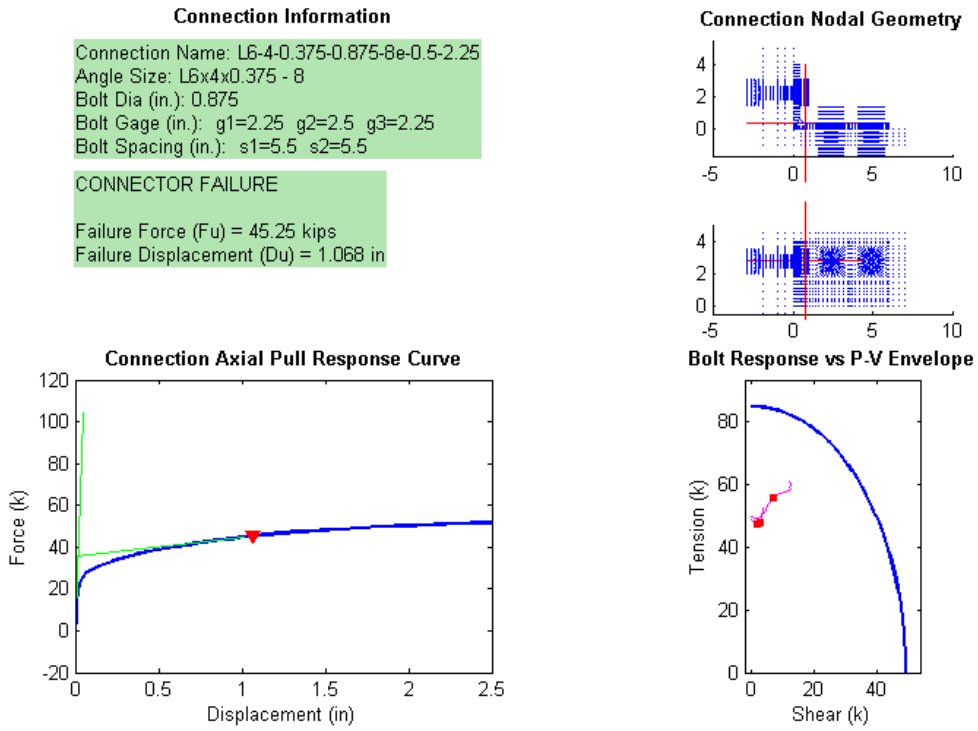


Figure B.34 Connection L6_4_0.375_0.875_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.375_0.875_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 2.0401e+003

Plastic Stiffness (k/in): 9.2782

Displacement (in): [5.4601e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.53655 ; 0.67909 ; 0.73254 ; 0.75259 ; 0.78265 ; 0.79393 ; 0.81084 ; 0.83621 ; 0.87427 ; 0.93135 ; 1.017 ; 1.1454 ; 1.3381 ; 1.5881 ; 1.8381 ; 1.9006 ; 1.924 ; 1.9591 ; 2.0119 ; 2.091 ; 2.2096 ; 2.2541 ; 2.3209 ; 2.421 ; 2.5]

Force (kips): [-1.37279 ; 1.06667 ; 2.61184 ; 4.53379 ; 6.94461 ; 9.45703 ; 11.3729 ; 12.6568 ; 13.6225 ; 14.5563 ; 15.5807 ; 16.7349 ; 17.9988 ; 18.3952 ; 18.9347 ; 19.6438 ; 20.5349 ; 20.8505 ; 20.9854 ; 21.1815 ; 21.2554 ; 21.3638 ; 21.5154 ; 21.7296 ; 22.0212 ; 22.4184 ; 22.9387 ; 23.604 ; 24.2948 ; 24.8432 ; 24.9603 ; 25.0064 ; 25.072 ; 25.166 ; 25.2941 ; 25.473 ; 25.5411 ; 25.6351 ; 25.7621 ; 25.8542]

Bolt 1 - Tensile Force (kips): [48.6791 ; 48.5837 ; 48.5208 ; 48.439 ; 48.3313 ; 48.2145 ; 48.123 ; 48.0655 ; 48.0273 ; 47.9893 ; 47.9401 ; 47.8769 ; 47.8079 ; 47.7871 ; 47.7593 ; 47.7255 ; 47.6847 ; 47.6705 ; 47.6641 ; 47.6541 ; 47.6502 ; 47.6445 ; 47.6367 ; 47.6258 ; 47.6115 ; 47.5933 ; 47.572 ; 47.5504 ; 47.5344 ; 47.5248 ; 47.5229 ; 47.5215 ; 47.5199 ; 47.5176 ; 47.5147 ; 47.5117 ; 47.5102 ; 47.5084 ; 47.5061 ; 47.5044]

Bolt 1 - Shear Force (kips): [0.067307 ; 0.11037 ; 0.2048 ; 0.3291 ; 0.4916 ; 0.66499 ; 0.79633 ; 0.87423 ; 0.92185 ; 0.97309 ; 1.0479 ; 1.1634 ; 1.2967 ; 1.3377 ; 1.3933 ; 1.4644 ; 1.554 ; 1.5856 ; 1.5986 ; 1.619 ; 1.6266 ; 1.6378 ; 1.6531 ; 1.6746 ; 1.7036 ; 1.742 ; 1.7899 ; 1.8464 ; 1.9005 ; 1.9415 ; 1.9499 ; 1.9532 ; 1.9577 ; 1.9639 ; 1.9718 ; 1.9815 ; 1.9852 ; 1.99 ; 1.9962 ; 2.0005]

Bolt 2 - Tensile Force (kips): [48.7067 ; 48.5694 ; 48.4777 ; 48.3643 ; 48.2162 ; 48.0534 ; 47.8794 ; 47.71 ; 47.5507 ; 47.4299 ; 47.3616 ; 47.2631 ; 47.2056 ; 47.1698 ; 47.1258 ; 47.0843 ; 47.08 ; 47.0878 ; 47.0932 ; 47.1201 ; 47.1332 ; 47.1557 ; 47.1974 ; 47.2696 ; 47.3976 ; 47.6337 ; 48.0537 ; 48.7447 ; 49.5549 ; 50.2965 ; 50.4751 ; 50.5537 ; 50.6721 ; 50.846 ; 51.1063 ; 51.4904 ; 51.6299 ; 51.8384 ; 52.1476 ; 52.3914]

Bolt 2 - Shear Force (kips): [0.10657 ; 0.13552 ; 0.26416 ; 0.43543 ; 0.65931 ; 0.90563 ; 1.1229 ; 1.3094 ; 1.4873 ; 1.6474 ; 1.7947 ; 1.9167 ; 2.0502 ; 2.0915 ; 2.1518 ; 2.2279 ; 2.3215 ; 2.3543 ; 2.3683 ; 2.3889 ; 2.3969 ; 2.4082 ; 2.4235 ; 2.4457 ; 2.4778 ; 2.525 ; 2.5998 ; 2.7308 ; 2.9242 ; 3.132 ; 3.1856 ; 3.2088 ; 3.2425 ; 3.2918 ; 3.3638 ; 3.4711 ; 3.5116 ; 3.5697 ; 3.6494 ; 3.7066]

Bolt 3 - Tensile Force (kips): [50 ; 49.9117 ; 49.8458 ; 49.776 ; 49.7031 ; 49.6013 ; 49.5307 ; 49.3824 ; 49.2573 ; 49.2255 ; 49.4243 ; 49.416 ; 50.2747 ; 50.6354 ; 51.2481 ; 52.1918 ; 53.6061 ; 54.0443 ; 54.1365 ; 54.3026 ; 54.3605 ; 54.4406 ; 54.5611 ; 54.7553 ; 55.0405 ; 55.4937 ; 56.2075 ; 57.0806 ; 57.8117 ; 58.2243 ; 58.2837 ; 58.427 ; 58.6142 ; 58.8899 ; 59.2691 ; 59.8191 ; 60.0173 ; 60.3166 ; 60.6912 ; 60.9669]

Bolt 3 - Shear Force (kips): [0.0614377 ; 0.0219739 ; 0.0598032 ; 0.130329 ; 0.237563 ; 0.368763 ; 0.515125 ; 0.677686 ; 0.876137 ; 1.10466 ; 1.40634 ; 2.36188 ; 3.33411 ; 3.63747 ; 4.02635 ; 4.52211 ; 5.06407 ; 5.26895 ; 5.38163 ; 5.52637 ; 5.58426 ; 5.67134 ; 5.78421 ; 5.95511 ; 6.18813 ; 6.5627 ; 7.23384 ; 9.12941 ; 10.8899 ; 12.0221 ; 12.2862 ; 12.2696 ; 12.2891 ; 12.2185 ; 12.2378 ; 12.2366 ; 12.2558 ; 12.2647 ; 12.2079 ; 12.2089]

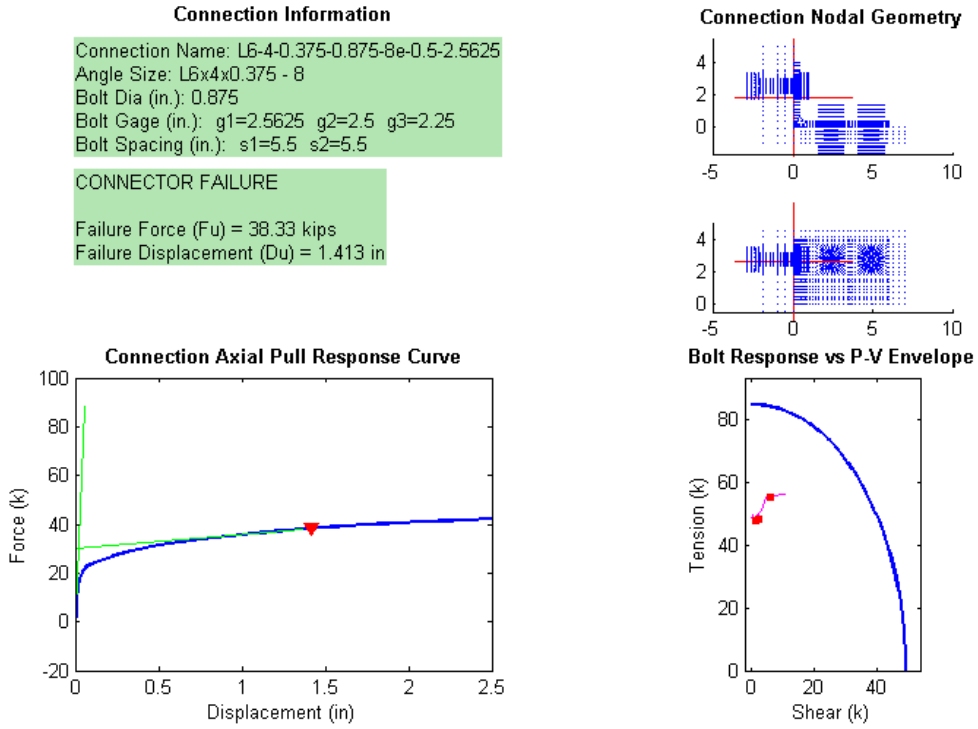


Figure B.35 Connection L6_4_0.375_0.875_8e_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.375_0.875_8e_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.5607e+003

Plastic Stiffness (k/in): 5.7849

Displacement (in): [5.2198e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.0674 ; 1.0908 ; 1.126 ; 1.1787 ; 1.2183 ; 1.2776 ; 1.3666 ; 1.5001 ; 1.5501 ; 1.6252 ; 1.7378 ; 1.78 ; 1.8434 ; 1.9384 ; 2.081 ; 2.1344 ; 2.2146 ; 2.3349 ; 2.5]

Force (kips): [-1.34646 ; 0.611153 ; 1.70185 ; 3.11112 ; 4.95338 ; 7.09516 ; 8.95547 ; 10.2541 ; 11.0823 ; 11.8007 ; 12.5647 ; 13.4542 ; 14.5101 ; 15.6683 ; 16.9318 ; 17.8871 ; 18.0937 ; 18.1685 ; 18.2822 ; 18.4598 ; 18.5955 ; 18.7859 ; 19.0433 ; 19.3879 ; 19.5092 ; 19.6752 ; 19.905 ; 19.9923 ; 20.1101 ; 20.2734 ; 20.5017 ; 20.5848 ; 20.7035 ; 20.8593 ; 21.0556]

Bolt 1 - Tensile Force (kips): [48.6789 ; 48.6024 ; 48.5586 ; 48.4999 ; 48.4193 ; 48.3216 ; 48.2342 ; 48.1757 ; 48.1453 ; 48.1208 ; 48.0957 ; 48.063 ; 48.0242 ; 47.9813 ; 47.944 ; 47.9262 ; 47.9235 ; 47.9226 ; 47.9213 ; 47.9187 ; 47.9173 ; 47.9165 ; 47.917 ; 47.9187 ; 47.9193 ; 47.9215 ; 47.9268 ; 47.9289 ; 47.9328 ; 47.9398 ; 47.9506 ; 47.9545 ; 47.9606 ; 47.9711 ; 47.9871]

Bolt 1 - Shear Force (kips): [0.065628 ; 0.085482 ; 0.14959 ; 0.23925 ; 0.36231 ; 0.51066 ; 0.64094 ; 0.72448 ; 0.76615 ; 0.80219 ; 0.8461 ; 0.90878 ; 0.9943 ; 1.1095 ; 1.2369 ; 1.3323 ; 1.3533 ; 1.361 ; 1.3719 ; 1.3888 ; 1.4001 ; 1.4152 ; 1.4351 ; 1.4644 ; 1.4755 ; 1.4902 ; 1.5096 ; 1.5169 ; 1.5266 ; 1.5391 ; 1.5555 ; 1.5613 ; 1.5695 ; 1.5793 ; 1.5908]

Bolt 2 - Tensile Force (kips): [48.7059 ; 48.5941 ; 48.5277 ; 48.4429 ; 48.3343 ; 48.206 ; 48.0754 ; 47.9478 ; 47.8318 ; 47.7758 ; 47.7484 ; 47.754 ; 47.7912 ; 47.862 ; 47.942 ; 48.0885 ; 48.1341 ; 48.1527 ; 48.1824 ; 48.2252 ; 48.2628 ; 48.3287 ; 48.4424 ; 48.6539 ; 48.749 ; 48.9037 ; 49.1433 ; 49.2342 ; 49.3725 ; 49.584 ; 49.9002 ; 50.0124 ; 50.1794 ; 50.4261 ; 50.7513]

Bolt 2 - Shear Force (kips): [0.10476 ; 0.10319 ; 0.19078 ; 0.3153 ; 0.48575 ; 0.6938 ; 0.89526 ; 1.0717 ; 1.2248 ; 1.365 ; 1.4882 ; 1.604 ; 1.7182 ; 1.829 ; 1.9501 ; 2.0337 ; 2.0512 ; 2.0575 ; 2.0671 ; 2.0842 ; 2.0977 ; 2.1167 ; 2.1433 ; 2.1774 ; 2.191 ; 2.2117 ; 2.2471 ; 2.2609 ; 2.281 ; 2.3153 ; 2.3718 ; 2.3941 ; 2.4275 ; 2.4785 ; 2.5489]

Bolt 3 - Tensile Force (kips): [50 ; 49.9197 ; 49.8548 ; 49.7795 ; 49.66 ; 49.5204 ; 49.3657 ; 49.1898 ; 48.9128 ; 48.7078 ; 48.677 ; 49.0396 ; 49.701 ; 50.6779 ; 52.4864 ; 54.1869 ; 54.5702 ; 54.7099 ; 54.9042 ; 55.0874 ; 55.1278 ; 55.1297 ; 55.1378 ; 55.2027 ; 55.2698 ; 55.3572 ; 55.5348 ; 55.6117 ; 55.6994 ; 55.8258 ; 56.0022 ; 56.0509 ; 56.0888 ; 56.1103 ; 56.1097]

Bolt 3 - Shear Force (kips): [0.0630841 ; 0.0248213 ; 0.0375867 ; 0.0882788 ; 0.166828 ; 0.275186 ; 0.391453 ; 0.523443 ; 0.675147 ; 0.845366 ; 1.05511 ; 1.33954 ; 1.87778 ; 2.75282 ; 3.64115 ; 4.24581 ; 4.37396 ; 4.4195 ; 4.50956 ; 4.65268 ; 4.80265 ; 5.0995 ; 5.51668 ; 6.03529 ; 6.24473 ; 6.46457 ; 7.02819 ; 7.42106 ; 7.81683 ; 8.29407 ; 9.06996 ; 9.12085 ; 9.37653 ; 9.92982 ; 10.5457]

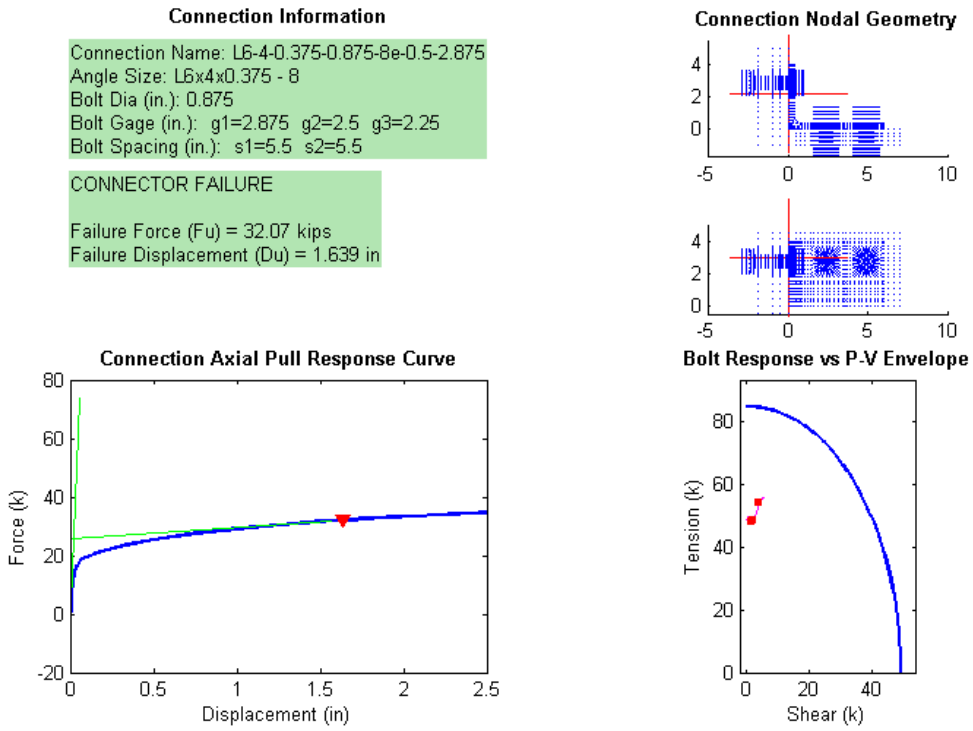


Figure B.36 Connection L6_4_0.375_0.875_8e_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.375_0.875_8e_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 1.2633e+003

Plastic Stiffness (k/in): 3.9904

Displacement (in): [5.4412e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.5049 ; 1.5674 ; 1.6611 ; 1.8017 ; 1.8545 ; 1.9336 ; 2.0522 ; 2.2302 ; 2.2927 ; 2.3865 ; 2.5]

Force (kips): [-1.33342 ; 0.341176 ; 1.13397 ; 2.18989 ; 3.56716 ; 5.33296 ; 7.07048 ; 8.37428 ; 9.18024 ; 9.75435 ; 10.2974 ; 10.9417 ; 11.7602 ; 12.7137 ; 13.7675 ; 14.5842 ; 15.2368 ; 15.7769 ; 15.9016 ; 16.0775 ; 16.3291 ; 16.4176 ; 16.5404 ; 16.7082 ; 16.9411 ; 17.0203 ; 17.1351 ; 17.2599]

Bolt 1 - Tensile Force (kips): [48.679 ; 48.6135 ; 48.5819 ; 48.5387 ; 48.4797 ; 48.4005 ; 48.3197 ; 48.2593 ; 48.2288 ; 48.2118 ; 48.1989 ; 48.1859 ; 48.169 ; 48.15 ; 48.1371 ; 48.1372 ; 48.1484 ; 48.1658 ; 48.1704 ; 48.1779 ; 48.1904 ; 48.1956 ; 48.2039 ; 48.2176 ; 48.2396 ; 48.2476 ; 48.2603 ; 48.2765]

Bolt 1 - Shear Force (kips): [0.064898 ; 0.071847 ; 0.11614 ; 0.18193 ; 0.27269 ; 0.39472 ; 0.51863 ; 0.60875 ; 0.65474 ; 0.68497 ; 0.71757 ; 0.76091 ; 0.82 ; 0.90147 ; 0.99775 ; 1.0728 ; 1.1317 ; 1.1837 ; 1.1962 ; 1.2144 ; 1.239 ; 1.2472 ; 1.2588 ; 1.2749 ; 1.2965 ; 1.3034 ; 1.3129 ; 1.3231]

Bolt 2 - Tensile Force (kips): [48.7062 ; 48.6101 ; 48.5598 ; 48.494 ; 48.412 ; 48.3081 ; 48.2091 ; 48.1111 ; 48.0183 ; 47.9641 ; 47.951 ; 47.9477 ; 48.021 ; 48.1599 ; 48.3276 ; 48.4659 ; 48.6177 ; 48.8084 ; 48.8574 ; 48.933 ; 49.0568 ; 49.1086 ; 49.1911 ; 49.3213 ; 49.5232 ; 49.5954 ; 49.7085 ; 49.8473]

Bolt 2 - Shear Force (kips): [0.10396 ; 0.085645 ; 0.14593 ; 0.23775 ; 0.36486 ; 0.53501 ; 0.71578 ; 0.87824 ; 1.0165 ; 1.1369 ; 1.2373 ; 1.337 ; 1.4427 ; 1.5399 ; 1.6353 ; 1.7055 ; 1.7561 ; 1.7966 ; 1.8059 ; 1.82 ; 1.8403 ; 1.8474 ; 1.8581 ; 1.8733 ; 1.8996 ; 1.9102 ; 1.9273 ; 1.9489]

Bolt 3 - Tensile Force (kips): [50 ; 49.9315 ; 49.8716 ; 49.7931 ; 49.6779 ; 49.5066 ; 49.2771 ; 49.0235 ; 48.7053 ; 48.3598 ; 48.1755 ; 48.2776 ; 48.7228 ; 49.3323 ; 50.1499 ; 51.2284 ; 52.4855 ; 53.673 ; 53.9391 ; 54.2979 ; 54.7566 ; 54.8829 ; 55.0661 ; 55.3374 ; 55.662 ; 55.7306 ; 55.7691 ; 55.8086]

Bolt 3 - Shear Force (kips): [0.062677 ; 0.030594 ; 0.027534 ; 0.06077 ; 0.11849 ; 0.20434 ; 0.29968 ; 0.40004 ; 0.51037 ; 0.63935 ; 0.77319 ; 0.95265 ; 1.2734 ; 1.8363 ; 2.6231 ; 3.1664 ; 3.4523 ; 3.638 ; 3.7196 ; 3.815 ; 4.2349 ; 4.4519 ; 4.5998 ; 4.8461 ; 5.2218 ; 5.3143 ; 5.1627 ; 4.9786]

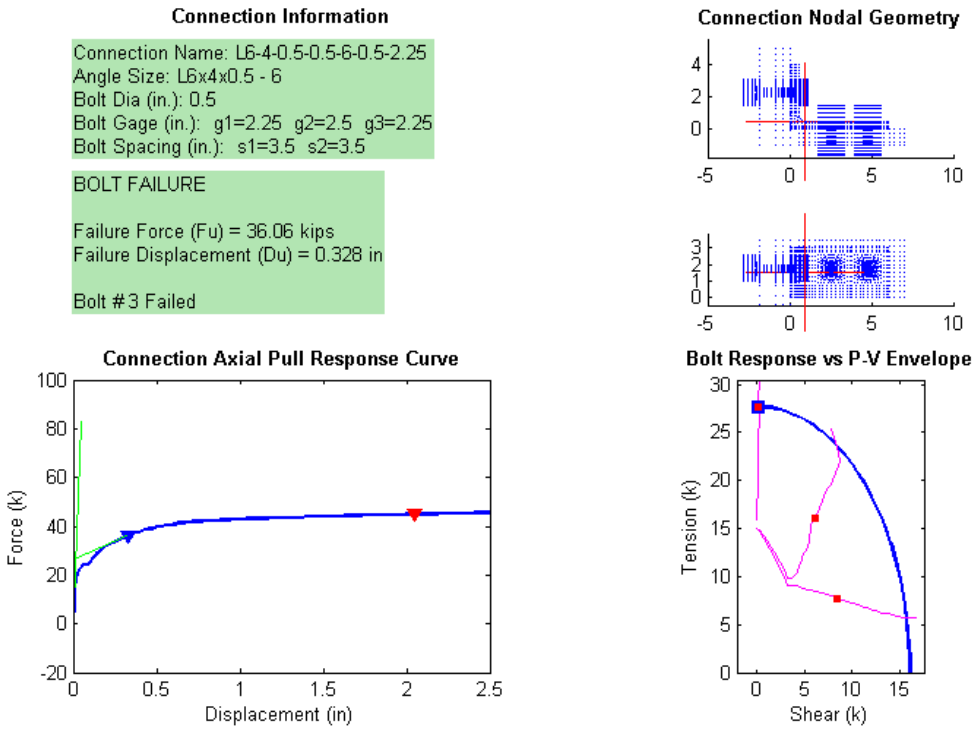


Figure B.37 Connection L6_4_0.5_0.5_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.5_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.8059e+003

Plastic Stiffness (k/in): 29.7337

Displacement (in): [7.1698e-037 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.066875 ; 0.070003 ; 0.074696 ; 0.081735 ; 0.084375 ; 0.088334 ; 0.088706 ; 0.089262 ; 0.090097 ; 0.09135 ; 0.09323 ; 0.096048 ; 0.10028 ; 0.10186 ; 0.10246 ; 0.10335 ; 0.10469 ; 0.10669 ; 0.1097 ; 0.11422 ; 0.12099 ; 0.13115 ; 0.14639 ; 0.16925 ; 0.17782 ; 0.19068 ; 0.20997 ; 0.2389 ; 0.28229 ; 0.29856 ; 0.32297 ; 0.35959 ; 0.41451 ; 0.43511 ; 0.466 ; 0.51234 ; 0.58185 ; 0.60792 ; 0.64702 ; 0.70567 ; 0.72766 ; 0.76065 ; 0.81014 ; 0.85963 ; 0.90911 ; 0.98334 ; 1.0947 ; 1.2617 ; 1.5117 ; 1.5742 ; 1.668 ; 1.8086 ; 1.914 ; 2.0722 ; 2.3096 ; 2.5]

Force (kips): [-0.224337 ; 1.82167 ; 3.30285 ; 5.08603 ; 7.1065 ; 9.21802 ; 10.5265 ; 11.3294 ; 12.0654 ; 12.1003 ; 12.1318 ; 12.1334 ; 12.1332 ; 12.1331 ; 12.133 ; 12.1372 ; 12.1572 ; 12.1865 ; 12.2271 ; 12.2662 ; 12.3463 ; 12.3483 ; 12.3482 ; 12.3899 ; 12.4556 ; 12.5487 ; 12.671 ; 12.865 ; 13.1189 ; 13.4457 ; 13.9007 ; 14.476 ; 15.1413 ; 15.3609 ; 15.6856 ; 16.0914 ; 16.6207 ; 17.3546 ; 17.6061 ; 17.969 ; 18.4684 ; 19.0715 ; 19.2655 ; 19.5368 ; 19.8824 ; 20.2985 ; 20.442 ; 20.6343 ; 20.8577 ; 20.9239 ; 21.0085 ; 21.1094 ; 21.1956 ; 21.2759 ; 21.3874 ; 21.5389 ; 21.7389 ; 22.0018 ; 22.0797 ; 22.1733 ; 22.2979 ; 22.3942 ; 22.5185 ; 22.6747 ; 22.789]

Bolt 1 - Tensile Force (kips): [15.03 ; 14.9784 ; 14.9341 ; 14.8696 ; 14.7845 ; 14.6767 ; 13.9512 ; 12.1293 ; 9.53408 ; 9.40108 ; 9.39974 ; 9.39843 ; 9.39734 ; 9.39703 ; 9.3967 ; 9.39253 ; 9.34401 ; 9.26445 ; 9.15554 ; 9.12468 ; 9.12359 ; 9.12385 ; 9.12404 ; 9.11957 ; 9.11649 ; 9.11272 ; 9.10793 ; 9.09299 ; 9.08366 ; 9.06838 ; 8.9984 ; 8.90284 ; 8.79232 ; 8.74392 ; 8.66575 ; 8.58171 ; 8.4816 ; 8.10762 ; 7.97352 ; 7.78706 ; 7.53001 ; 7.26842 ; 7.18847 ; 7.01903 ; 6.78688 ; 6.57454 ; 6.51445 ; 6.42566 ; 6.29661 ; 6.2584 ; 6.2144 ; 6.16737 ; 6.13904 ; 6.1223 ; 6.10252 ; 6.04975 ; 5.83324 ; 5.76501 ; 5.76155 ; 5.73662 ; 5.68113 ; 5.65987 ; 5.65674 ; 5.66373 ; 5.67252]

Bolt 1 - Shear Force (kips): [0.0157999 ; 0.068759 ; 0.126058 ; 0.195506 ; 0.276523 ; 0.366047 ; 0.843462 ; 1.84057 ; 3.04702 ; 3.10215 ; 3.10185 ; 3.10147 ; 3.10112 ; 3.10102 ; 3.10091 ; 3.10652 ; 3.14317 ; 3.2002 ; 3.28045 ; 3.30238 ; 3.302 ; 3.30174 ; 3.30163 ; 3.3426 ; 3.37162 ; 3.41029 ; 3.46678 ; 3.57564 ; 3.6765 ; 3.83877 ; 4.123 ; 4.47381 ; 4.78227 ; 4.98579 ; 5.31384 ; 5.60328 ; 6.12924 ; 7.34976 ; 7.76517 ; 8.27734 ; 9.03284 ; 9.90863 ; 10.1479 ; 10.5931 ; 11.257 ; 11.8915 ; 12.0749 ; 12.342 ; 12.7384 ; 12.8649 ; 13.0266 ; 13.2187 ; 13.384 ; 13.5353 ; 13.7566 ; 14.1375 ; 14.745 ; 15.2026 ; 15.2971 ; 15.4716 ; 15.7435 ; 15.9212 ; 16.1444 ; 16.4313 ; 16.6455]

Bolt 2 - Tensile Force (kips): [15.0403 ; 14.9827 ; 14.939 ; 14.8903 ; 14.855 ; 14.8612 ; 14.2436 ; 12.5989 ; 10.4163 ; 10.2195 ; 9.91955 ; 9.89602 ; 9.89451 ; 9.89449 ; 9.8947 ; 9.89589 ; 9.9005 ; 9.90711 ; 9.91653 ; 9.85068 ; 9.69509 ; 9.69078 ; 9.69077 ; 9.70564 ; 9.73048 ; 9.7708 ; 9.83383 ; 9.92897 ; 10.0751 ; 10.2857 ; 10.6152 ; 11.0995 ; 11.8078 ; 12.085 ; 12.5234 ; 13.1004 ; 13.888 ; 15.0095 ; 15.3947 ; 15.9418 ; 16.7238 ; 17.6674 ; 17.9632 ; 18.3647 ; 18.8147 ; 19.3254 ; 19.4994 ; 19.7522 ; 20.0862 ; 20.1948 ; 20.3439 ; 20.5419 ; 20.7224 ; 20.8938 ; 21.1347 ; 21.4852 ; 21.9925 ; 22.84 ; 23.0377 ; 23.3192 ; 23.7239 ; 24.0228 ; 24.4257 ; 24.9646 ; 25.3599]

Bolt 2 - Shear Force (kips): [0.01663 ; 0.07626 ; 0.1387 ; 0.21445 ; 0.30283 ; 0.39798 ; 0.86353 ; 1.8437 ; 3.0215 ; 3.1158 ; 3.2534 ; 3.2641 ; 3.265 ; 3.2651 ; 3.2652 ; 3.2656 ; 3.2672 ; 3.2693 ; 3.2725 ; 3.3299 ; 3.4833 ; 3.4877 ; 3.4876 ; 3.4931 ; 3.5356 ; 3.5991 ; 3.6823 ; 3.797 ; 3.9649 ; 4.1279 ; 4.2535 ; 4.4709 ; 4.7592 ; 4.8063 ; 5.0196 ; 5.3072 ; 5.53 ; 5.6755 ; 5.7211 ; 6.0131 ; 6.3892 ; 6.8182 ; 6.9334 ; 7.0671 ; 7.2702 ; 7.5594 ; 7.6756 ; 7.8166 ; 7.9566 ; 8.0012 ; 8.0665 ; 8.1602 ; 8.2487 ; 8.3323 ; 8.4658 ; 8.6275 ; 8.7242 ; 8.5742 ; 8.53 ; 8.4673 ; 8.3713 ; 8.2958 ; 8.1797 ; 8.0169 ; 7.8872]

Bolt 3 - Tensile Force (kips): [16 ; 15.9955 ; 16.0599 ; 16.2478 ; 16.6378 ; 17.2899 ; 17.8585 ; 18.311 ; 18.895 ; 18.9295 ; 18.964 ; 18.9655 ; 18.9639 ; 18.9633 ; 18.9625 ; 18.9671 ; 18.986 ; 19.0146 ; 19.0552 ; 19.0969 ; 19.185 ; 19.1869 ; 19.1865 ; 19.2319 ; 19.3049 ; 19.4112 ; 19.5571 ; 19.8133 ; 20.1838 ; 20.7012 ; 21.4851 ; 22.5102 ; 23.6472 ; 23.9965 ; 24.4826 ; 25.0669 ; 25.8107 ; 26.7945 ; 27.1315 ; 27.6149 ; 28.2703 ; 29.0483 ; 29.293 ; 29.6312 ; 30.0753 ; 30.6355 ; 30.8264 ; 31.0761 ; 31.3338 ; 31.397 ; 31.4697 ; 31.5459 ; 31.6078 ; 31.6604 ; 31.7258 ; 31.7984 ; 31.8699 ; 31.9155 ; 31.8676 ; 31.8743 ; 31.8955 ; 31.8541 ; 31.8769 ; 31.9464 ; 31.9852]

Bolt 3 - Shear Force (kips): [0.0080415 ; 0.0087651 ; 0.024799 ; 0.046758 ; 0.072208 ; 0.098919 ; 0.11087 ; 0.12212 ; 0.14106 ; 0.14222 ; 0.14341 ; 0.1435 ; 0.14358 ; 0.1436 ; 0.14364 ; 0.14369 ; 0.14426 ; 0.14517 ; 0.14647 ; 0.14782 ; 0.15085 ; 0.15095 ; 0.15096 ; 0.15255 ; 0.1552 ; 0.1591 ; 0.16441 ; 0.17339 ; 0.18663 ; 0.20441 ; 0.2248 ; 0.24033 ; 0.25298 ; 0.25634 ; 0.26073 ; 0.2693 ; 0.27797 ; 0.27877 ; 0.27653 ; 0.27081 ; 0.2583 ; 0.23936 ; 0.25738 ; 0.29319 ; 0.30729 ; 0.29801 ; 0.33007 ; 0.35631 ; 0.35877 ; 0.34829 ; 0.325 ; 0.27617 ; 0.24147 ; 0.22089 ; 0.20805 ; 0.2141 ; 0.24432 ; 0.38265 ; 0.49204 ; 0.62811 ; 0.86073 ; 1.1851 ; 1.4169 ; 1.5987 ; 1.754]

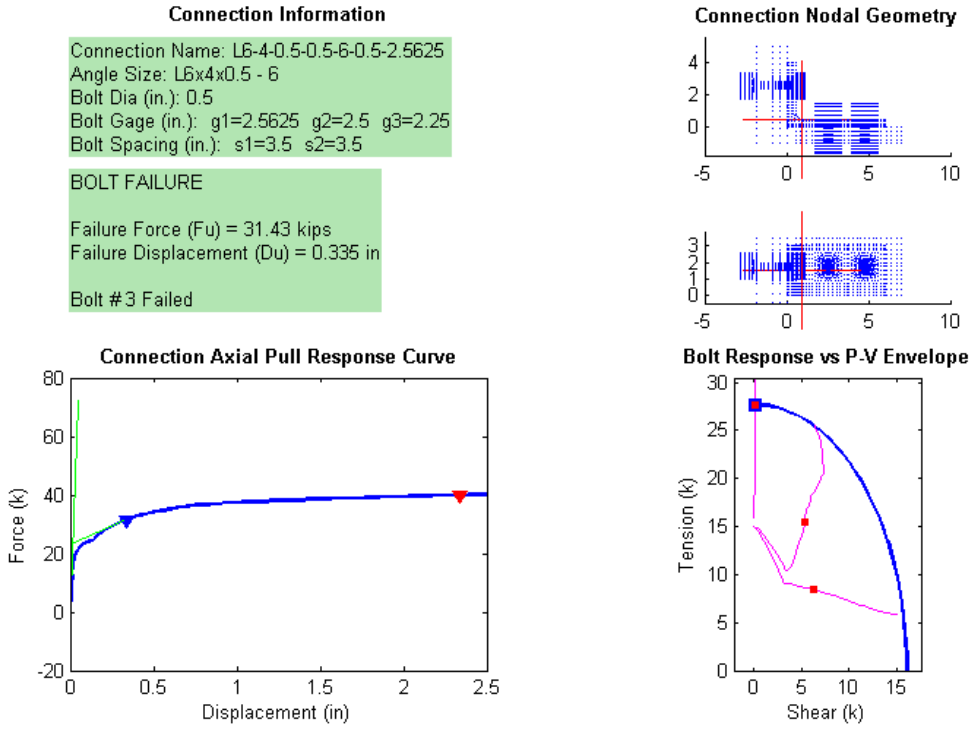


Figure B.38 Connection L6_4_0.5_0.5_6_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.5_6_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.4167e+003

Plastic Stiffness (k/in): 24.7783

Displacement (in): [6.4861e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.10324 ; 0.10793 ; 0.11497 ; 0.11761 ; 0.12157 ; 0.12751 ; 0.12974 ; 0.13057 ; 0.13183 ; 0.13371 ; 0.13653 ; 0.14075 ; 0.14115 ; 0.14175 ; 0.14264 ; 0.14397 ; 0.14598 ; 0.14899 ; 0.15351 ; 0.16028 ; 0.17044 ; 0.18568 ; 0.20854 ; 0.24282 ; 0.29426 ; 0.30711 ; 0.31997 ; 0.33926 ; 0.36819 ; 0.41158 ; 0.42786 ; 0.45227 ; 0.48888 ; 0.50261 ; 0.52321 ; 0.5541 ; 0.60044 ; 0.66995 ; 0.77422 ; 0.81332 ; 0.87197 ; 0.95995 ; 1.0919 ; 1.2898 ; 1.5398 ; 1.6023 ; 1.6961 ; 1.8367 ; 1.8895 ; 1.9686 ; 2.0872 ; 2.2652 ; 2.5]

Force (kips): [-0.2165 ; 1.3699 ; 2.55054 ; 3.55208 ; 4.8439 ; 6.40804 ; 8.13255 ; 9.70927 ; 10.6168 ; 11.314 ; 11.9654 ; 11.9973 ; 12.0398 ; 12.0409 ; 12.0408 ; 12.0493 ; 12.1761 ; 12.1762 ; 12.1761 ; 12.1819 ; 12.2218 ; 12.2784 ; 12.3354 ; 12.3377 ; 12.3558 ; 12.3822 ; 12.4207 ; 12.4774 ; 12.565 ; 12.692 ; 12.8794 ; 13.1352 ; 13.4686 ; 13.9105 ; 14.4643 ; 15.2164 ; 15.3791 ; 15.5384 ; 15.7705 ; 16.0767 ; 16.4632 ; 16.5873 ; 16.7538 ; 16.9816 ; 17.0658 ; 17.1893 ; 17.364 ; 17.6016 ; 17.9101 ; 18.2755 ; 18.3712 ; 18.4974 ; 18.6458 ; 18.8288 ; 19.0586 ; 19.3215 ; 19.3935 ; 19.4824 ; 19.606 ; 19.6546 ; 19.7217 ; 19.8129 ; 19.9318 ; 20.0748]

Bolt 1 - Tensile Force (kips): [15.0298 ; 14.9907 ; 14.9573 ; 14.9253 ; 14.8772 ; 14.8116 ; 14.7265 ; 14.5434 ; 13.4867 ; 11.5371 ; 9.40228 ; 9.40065 ; 9.39821 ; 9.3971 ; 9.39674 ; 9.38953 ; 9.12848 ; 9.12819 ; 9.12807 ; 9.12785 ; 9.12716 ; 9.1261 ; 9.12508 ; 9.12505 ; 9.12358 ; 9.12081 ; 9.11757 ; 9.11381 ; 9.11041 ; 9.10682 ; 9.09246 ; 9.07984 ; 9.06043 ; 8.95396 ; 8.79971 ; 8.59609 ; 8.56258 ; 8.54175 ; 8.4123 ; 8.21934 ; 7.98695 ; 7.89043 ; 7.78632 ; 7.65106 ; 7.58947 ; 7.49614 ; 7.39339 ; 7.29824 ; 7.14133 ; 6.82354 ; 6.71597 ; 6.59115 ; 6.45464 ; 6.2994 ; 6.17155 ; 6.09947 ; 6.08299 ; 6.06072 ; 6.02173 ; 6.00712 ; 5.98936 ; 5.92318 ; 5.84905 ; 5.83164]

Bolt 1 - Shear Force (kips): [0.0154566 ; 0.0520215 ; 0.0979252 ; 0.137513 ; 0.188973 ; 0.253216 ; 0.327418 ; 0.469357 ; 1.11336 ; 2.14203 ; 3.10266 ; 3.10218 ; 3.1014 ; 3.10104 ; 3.10092 ; 3.10958 ; 3.29611 ; 3.29627 ; 3.29622 ; 3.29606 ; 3.29563 ; 3.29497 ; 3.29414 ; 3.29573 ; 3.3137 ; 3.33665 ; 3.36497 ; 3.39986 ; 3.43069 ; 3.4645 ; 3.56383 ; 3.67768 ; 3.84272 ; 4.26154 ; 4.74455 ; 5.58176 ; 5.73666 ; 5.95852 ; 6.46245 ; 7.09901 ; 7.84612 ; 8.09923 ; 8.3674 ; 8.76212 ; 8.96201 ; 9.232 ; 9.57082 ; 9.90639 ; 10.3505 ; 11.2025 ; 11.4926 ; 11.8321 ; 12.2318 ; 12.6937 ; 13.1492 ; 13.5176 ; 13.6032 ; 13.7357 ; 13.9517 ; 14.0327 ; 14.1457 ; 14.3593 ; 14.6378 ; 14.9121]

Bolt 2 - Tensile Force (kips): [15.0397 ; 14.9956 ; 14.9627 ; 14.9387 ; 14.9115 ; 14.9006 ; 14.9265 ; 14.9187 ; 14.0938 ; 12.6067 ; 10.8855 ; 10.7003 ; 10.4375 ; 10.4254 ; 10.4245 ; 10.429 ; 10.4969 ; 10.4971 ; 10.4971 ; 10.4889 ; 10.4628 ; 10.4281 ; 10.3735 ; 10.3753 ; 10.3943 ; 10.4218 ; 10.4618 ; 10.5206 ; 10.6187 ; 10.7638 ; 10.9866 ; 11.3072 ; 11.771 ; 12.4621 ; 13.3238 ; 14.5791 ; 14.8553 ; 15.1206 ; 15.5082 ; 16.026 ; 16.6726 ; 16.8814 ; 17.1504 ; 17.5201 ; 17.6613 ; 17.8707 ; 18.1697 ; 18.5523 ; 19.0644 ; 19.7017 ; 19.8987 ; 20.1603 ; 20.4878 ; 21.053 ; 21.9038 ; 22.8367 ; 23.0573 ; 23.3623 ; 23.7903 ; 23.946 ; 24.1718 ; 24.5075 ; 24.9709 ; 25.5086]

Bolt 2 - Shear Force (kips): [0.016258 ; 0.058194 ; 0.10836 ; 0.15173 ; 0.20813 ; 0.27841 ; 0.35762 ; 0.49431 ; 1.1148 ; 2.1059 ; 3.1955 ; 3.295 ; 3.4331 ; 3.4392 ; 3.4397 ; 3.4415 ; 3.4639 ; 3.464 ; 3.464 ; 3.4738 ; 3.5293 ; 3.6109 ; 3.7018 ; 3.7024 ; 3.7029 ; 3.704 ; 3.706 ; 3.7155 ; 3.7768 ; 3.8707 ; 4.0061 ; 4.1793 ; 4.3392 ; 4.5152 ; 4.7497 ; 5.1913 ; 5.2626 ; 5.3108 ; 5.3475 ; 5.4027 ; 5.5235 ; 5.5973 ; 5.7628 ; 5.9024 ; 5.9267 ; 5.9598 ; 6.0207 ; 6.2646 ; 6.5894 ; 6.9136 ; 6.9981 ; 7.1159 ; 7.2917 ; 7.3157 ; 7.2199 ; 7.1598 ; 7.1298 ; 7.0896 ; 7.0245 ; 6.9943 ; 6.9437 ; 6.8238 ; 6.6462 ; 6.4472]

Bolt 3 - Tensile Force (kips): [16 ; 15.9876 ; 16.0236 ; 16.1064 ; 16.278 ; 16.6093 ; 17.1782 ; 17.9579 ; 18.6959 ; 19.6682 ; 20.9787 ; 21.0537 ; 21.1553 ; 21.1582 ; 21.1581 ; 21.1758 ; 21.4426 ; 21.4427 ; 21.4425 ; 21.4554 ; 21.5412 ; 21.6642 ; 21.7912 ; 21.7963 ; 21.8344 ; 21.8906 ; 21.9733 ; 22.0953 ; 22.2798 ; 22.5473 ; 22.9318 ; 23.4499 ; 24.0962 ; 24.8717 ; 25.7884 ; 26.9487 ; 27.1973 ; 27.4364 ; 27.7765 ; 28.223 ; 28.7743 ; 28.9469 ; 29.1878 ; 29.5199 ; 29.6384 ; 29.8083 ; 30.048 ; 30.371 ; 30.7862 ; 31.2403 ; 31.3536 ; 31.4861 ; 31.5974 ; 31.7004 ; 31.7951 ; 31.8517 ; 31.8194 ; 31.837 ; 31.8533 ; 31.8337 ; 31.8209 ; 31.8547 ; 31.9134 ; 31.9588]

Bolt 3 - Shear Force (kips): [0.0091704 ; 0.0062181 ; 0.019439 ; 0.033331 ; 0.050788 ; 0.07247 ; 0.096737 ; 0.11326 ; 0.13346 ; 0.16514 ; 0.21001 ; 0.21213 ; 0.21487 ; 0.21501 ; 0.21504 ; 0.21547 ; 0.22114 ; 0.22117 ; 0.22117 ; 0.22141 ; 0.22301 ; 0.22508 ; 0.22706 ; 0.22714 ; 0.22767 ; 0.22843 ; 0.22953 ; 0.23104 ; 0.233 ; 0.23535 ; 0.23754 ; 0.23895 ; 0.23893 ; 0.24012 ; 0.24467 ; 0.2389 ; 0.2369 ; 0.23473 ; 0.23092 ; 0.22468 ; 0.21692 ; 0.21473 ; 0.212 ; 0.20699 ; 0.20442 ; 0.21836 ; 0.24045 ; 0.25563 ; 0.2627 ; 0.24872 ; 0.23364 ; 0.25089 ; 0.24045 ; 0.23305 ; 0.27056 ; 0.43836 ; 0.54727 ; 0.64132 ; 0.90019 ; 1.0734 ; 1.267 ; 1.4142 ; 1.5638 ; 1.7859]

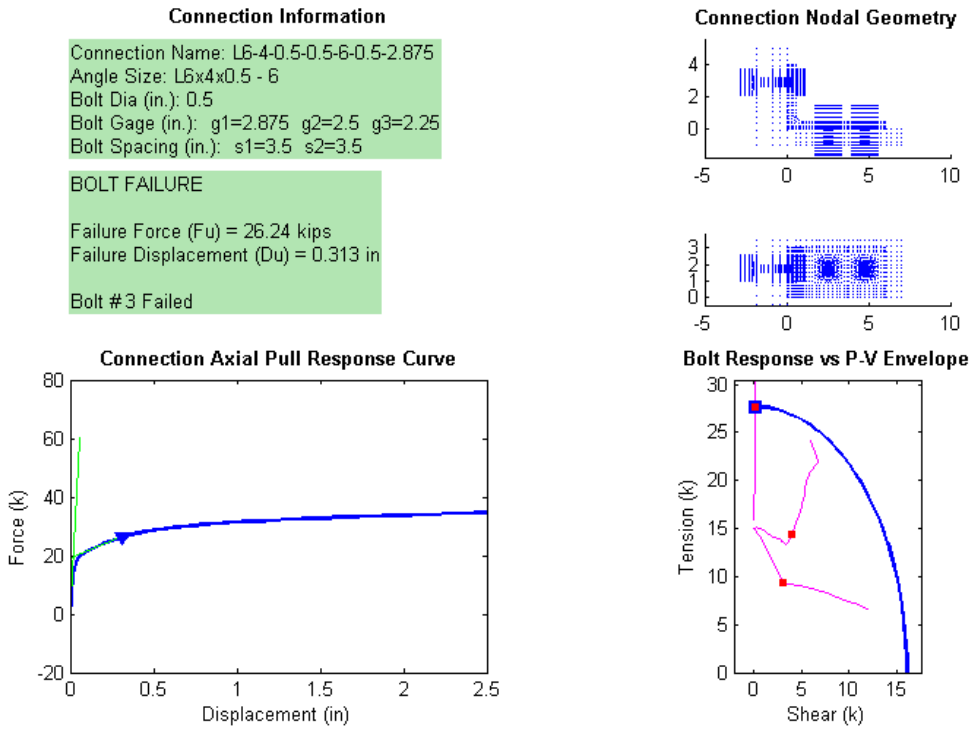


Figure B.39 Connection L6_4_0.5_0.5_6_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.5_6_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 1.1151e+003

Plastic Stiffness (k/in): 22.9214

Displacement (in): [6.6207e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.014831 ; 0.017303 ; 0.021011 ; 0.026573 ; 0.034916 ; 0.04743 ; 0.066201 ; 0.094358 ; 0.13659 ; 0.19995 ; 0.20589 ; 0.21479 ; 0.22816 ; 0.2482 ; 0.27827 ; 0.32337 ; 0.34029 ; 0.36566 ; 0.40371 ; 0.46079 ; 0.4822 ; 0.51431 ; 0.52635 ; 0.54441 ; 0.5715 ; 0.61214 ; 0.62738 ; 0.65023 ; 0.68452 ; 0.73595 ; 0.8131 ; 0.84203 ; 0.85288 ; 0.86915 ; 0.89356 ; 0.93018 ; 0.9851 ; 1.0675 ; 1.0984 ; 1.1447 ; 1.2142 ; 1.3185 ; 1.3576 ; 1.4163 ; 1.5042 ; 1.6362 ; 1.8341 ; 1.8966 ; 1.9904 ; 2.131 ; 2.3419 ; 2.5]

Force (kips): [-0.208019 ; 1.03366 ; 1.96993 ; 2.78303 ; 3.85816 ; 5.21921 ; 5.65427 ; 6.23586 ; 6.98356 ; 7.87007 ; 8.736 ; 9.42103 ; 9.98808 ; 10.5753 ; 11.2738 ; 12.0539 ; 12.1078 ; 12.1828 ; 12.2875 ; 12.4397 ; 12.7843 ; 13.2238 ; 13.3685 ; 13.5605 ; 13.8041 ; 14.0973 ; 14.1983 ; 14.342 ; 14.394 ; 14.47 ; 14.5771 ; 14.724 ; 14.7754 ; 14.8549 ; 14.9675 ; 15.1191 ; 15.3033 ; 15.3613 ; 15.3818 ; 15.4152 ; 15.4659 ; 15.5396 ; 15.6347 ; 15.7545 ; 15.7992 ; 15.8667 ; 15.968 ; 16.1314 ; 16.1857 ; 16.2633 ; 16.3707 ; 16.5306 ; 16.7317 ; 16.7924 ; 16.8737 ; 16.9877 ; 17.1476 ; 17.2513]

Bolt 1 - Tensile Force (kips): [15.0297 ; 14.9998 ; 14.9744 ; 14.9499 ; 14.9138 ; 14.8598 ; 14.8412 ; 14.8152 ; 14.7786 ; 14.7302 ; 14.6729 ; 14.453 ; 14.0656 ; 12.9152 ; 11.3859 ; 9.41595 ; 9.40632 ; 9.40351 ; 9.40145 ; 9.40105 ; 9.4037 ; 9.41165 ; 9.4154 ; 9.40027 ; 9.19308 ; 9.21407 ; 9.22318 ; 9.23797 ; 9.24353 ; 9.25186 ; 9.2645 ; 9.28297 ; 9.28961 ; 9.26877 ; 9.25397 ; 9.23985 ; 9.10823 ; 9.06271 ; 9.04917 ; 9.03127 ; 9.00031 ; 8.93405 ; 8.84379 ; 8.76834 ; 8.72856 ; 8.61734 ; 8.45375 ; 8.22912 ; 8.15717 ; 8.00729 ; 7.81891 ; 7.56758 ; 7.29119 ; 7.1734 ; 7.04729 ; 6.886 ; 6.69279 ; 6.59473]

Bolt 1 - Shear Force (kips): [0.0150938 ; 0.0397617 ; 0.0760518 ; 0.108335 ; 0.151845 ; 0.207872 ; 0.22634 ; 0.251544 ; 0.284874 ; 0.326413 ; 0.373491 ; 0.535057 ; 0.780439 ; 1.43128 ; 2.21973 ; 3.09976 ; 3.10384 ; 3.10307 ; 3.10246 ; 3.10234 ; 3.10321 ; 3.10584 ; 3.10707 ; 3.12689 ; 3.28723 ; 3.28726 ; 3.28743 ; 3.28804 ; 3.28842 ; 3.28898 ; 3.28959 ; 3.29035 ; 3.29054 ; 3.42983 ; 3.65234 ; 3.90184 ; 4.46581 ; 4.63284 ; 4.68096 ; 4.74196 ; 4.86205 ; 5.17352 ; 5.51838 ; 5.90851 ; 6.10616 ; 6.48564 ; 6.98353 ; 7.66514 ; 7.88874 ; 8.25652 ; 8.75845 ; 9.53367 ; 10.3266 ; 10.6032 ; 10.8775 ; 11.263 ; 11.7202 ; 11.9705]

Bolt 2 - Tensile Force (kips): [15.0394 ; 15.0054 ; 14.98 ; 14.9616 ; 14.942 ; 14.9334 ; 14.9368 ; 14.947 ; 14.9677 ; 15.0093 ; 15.0903 ; 15.0804 ; 15.0631 ; 14.5312 ; 14.1268 ; 13.9142 ; 13.8418 ; 13.7107 ; 13.5133 ; 13.2709 ; 13.8847 ; 14.6409 ; 14.8925 ; 15.2183 ; 15.6315 ; 16.1061 ; 16.2779 ; 16.5326 ; 16.6269 ; 16.7666 ; 16.9716 ; 17.2667 ; 17.3714 ; 17.5377 ; 17.7732 ; 18.0952 ; 18.5568 ; 18.7206 ; 18.7798 ; 18.865 ; 18.9892 ; 19.1736 ; 19.4289 ; 19.7656 ; 19.8838 ; 20.0592 ; 20.2995 ; 20.6328 ; 20.7504 ; 20.9245 ; 21.1794 ; 21.4885 ; 21.9187 ; 22.0813 ; 22.4212 ; 22.9458 ; 23.6414 ; 24.1089]

Bolt 2 - Shear Force (kips): [0.015852 ; 0.044946 ; 0.084769 ; 0.12031 ; 0.16802 ; 0.22993 ; 0.25016 ; 0.27749 ; 0.31333 ; 0.3564 ; 0.40266 ; 0.54918 ; 0.76702 ; 1.3648 ; 2.0413 ; 2.7761 ; 2.8605 ; 2.9908 ; 3.1761 ; 3.4287 ; 3.7792 ; 4.0785 ; 4.1788 ; 4.275 ; 4.3994 ; 4.6723 ; 4.7375 ; 4.82 ; 4.8491 ; 4.891 ; 4.9481 ; 5.0206 ; 5.0466 ; 5.0633 ; 5.0851 ; 5.2243 ; 5.3278 ; 5.3551 ; 5.3663 ; 5.3843 ; 5.4045 ; 5.4076 ; 5.4242 ; 5.4736 ; 5.5036 ; 5.5455 ; 5.6394 ; 5.8181 ; 5.9043 ; 6.0443 ; 6.189 ; 6.3902 ; 6.6781 ; 6.6916 ; 6.5906 ; 6.3888 ; 6.1387 ; 5.977]

Bolt 3 - Tensile Force (kips): [16 ; 15.9834 ; 16.0023 ; 16.0568 ; 16.182 ; 16.4268 ; 16.5442 ; 16.7388 ; 17.0337 ; 17.4861 ; 18.1806 ; 19.1315 ; 20.3712 ; 21.8365 ; 23.6682 ; 25.4849 ; 25.6052 ; 25.7744 ; 26.0118 ; 26.3531 ; 27.0363 ; 27.8978 ; 28.1736 ; 28.5389 ; 28.9834 ; 29.5305 ; 29.7125 ; 29.9654 ; 30.0532 ; 30.1812 ; 30.3615 ; 30.6029 ; 30.684 ; 30.8034 ; 30.9648 ; 31.1587 ; 31.3235 ; 31.3625 ; 31.3756 ; 31.4025 ; 31.4448 ; 31.4979 ; 31.5567 ; 31.6074 ; 31.6243 ; 31.648 ; 31.6834 ; 31.6885 ; 31.7006 ; 31.7292 ; 31.7739 ; 31.7524 ; 31.8343 ; 31.8652 ; 31.9062 ; 31.9575 ; 31.9569 ; 31.9861]

Bolt 3 - Shear Force (kips): [0.009845 ; 0.0042411 ; 0.014914 ; 0.026853 ; 0.04315 ; 0.063079 ; 0.069723 ; 0.078525 ; 0.08996 ; 0.1011 ; 0.11033 ; 0.1369 ; 0.18669 ; 0.22632 ; 0.24083 ; 0.24424 ; 0.2444 ; 0.24426 ; 0.24355 ; 0.24172 ; 0.23443 ; 0.22238 ; 0.21721 ; 0.21043 ; 0.20257 ; 0.19541 ; 0.19181 ; 0.18478 ; 0.19182 ; 0.20483 ; 0.21619 ; 0.22683 ; 0.23142 ; 0.23474 ; 0.23905 ; 0.24479 ; 0.22837 ; 0.21882 ; 0.21542 ; 0.23201 ; 0.26158 ; 0.29269 ; 0.31982 ; 0.33058 ; 0.33373 ; 0.3387 ; 0.37199 ; 0.55388 ; 0.59884 ; 0.65291 ; 0.72862 ; 1.0701 ; 1.4006 ; 1.4726 ; 1.5699 ; 1.7205 ; 2.0937 ; 2.2749]

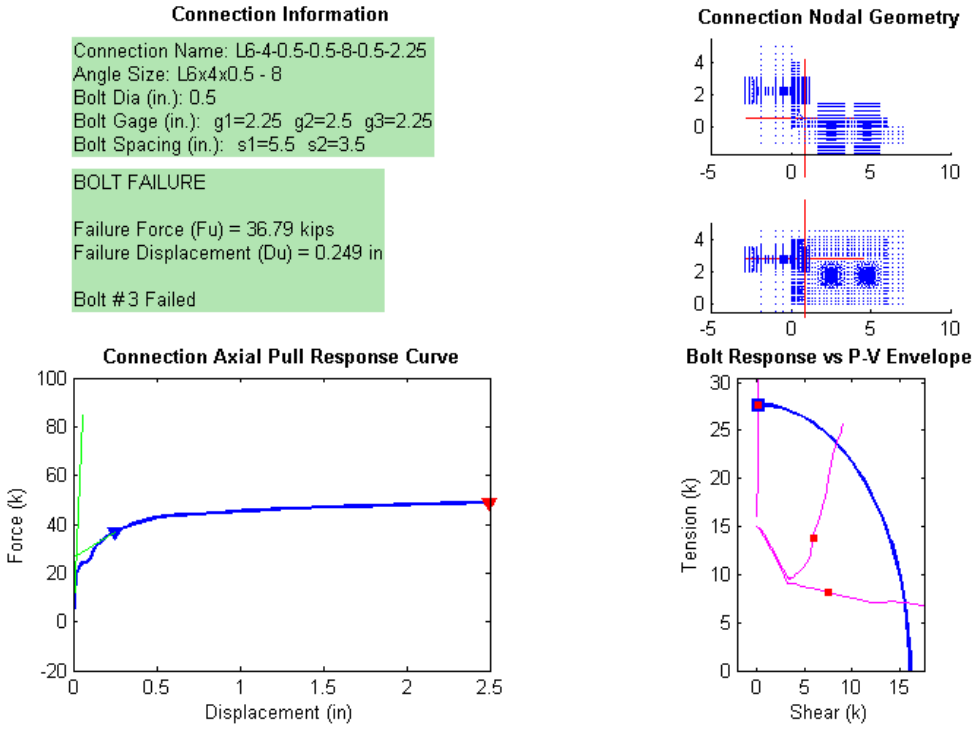


Figure B.40 Connection L6_4_0.5_0.5_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.5_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.4055e+003

Plastic Stiffness (k/in): 41.7452

Displacement (in): [6.1821e-037 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.055916 ; 0.064259 ; 0.067387 ; 0.07208 ; 0.079119 ; 0.081759 ; 0.082749 ; 0.08312 ; 0.083677 ; 0.084512 ; 0.085765 ; 0.087644 ; 0.090463 ; 0.094691 ; 0.096277 ; 0.098655 ; 0.099547 ; 0.10089 ; 0.10289 ; 0.1059 ; 0.11042 ; 0.11719 ; 0.12735 ; 0.14259 ; 0.1483 ; 0.15687 ; 0.16973 ; 0.18902 ; 0.19625 ; 0.2071 ; 0.22337 ; 0.24778 ; 0.2844 ; 0.33932 ; 0.42171 ; 0.4526 ; 0.49894 ; 0.51632 ; 0.54238 ; 0.58148 ; 0.64013 ; 0.72811 ; 0.86007 ; 1.058 ; 1.308 ; 1.558 ; 1.5619 ; 1.5678 ; 1.5766 ; 1.5898 ; 1.6095 ; 1.6392 ; 1.6837 ; 1.7504 ; 1.8505 ; 2.0007 ; 2.057 ; 2.1415 ; 2.2682 ; 2.4583 ; 2.5]

Force (kips): [-0.205406 ; 5.70428 ; 6.65746 ; 7.46779 ; 8.53327 ; 9.7989 ; 10.5365 ; 11.1416 ; 11.8329 ; 12.0069 ; 12.1618 ; 12.1621 ; 12.1612 ; 12.1594 ; 12.1588 ; 12.1586 ; 12.163 ; 12.189 ; 12.226 ; 12.2762 ; 12.3545 ; 12.4002 ; 12.3998 ; 12.4635 ; 12.7032 ; 12.7947 ; 12.9386 ; 13.1262 ; 13.351 ; 13.7269 ; 14.2216 ; 14.8225 ; 15.5158 ; 15.7582 ; 16.0878 ; 16.4964 ; 17.014 ; 17.2045 ; 17.4807 ; 17.8595 ; 18.369 ; 19.0064 ; 19.7608 ; 20.6532 ; 20.9309 ; 21.2822 ; 21.3921 ; 21.5365 ; 21.6954 ; 21.8711 ; 22.0962 ; 22.3915 ; 22.7632 ; 23.1576 ; 23.4781 ; 23.4852 ; 23.4954 ; 23.5094 ; 23.5285 ; 23.5602 ; 23.6032 ; 23.6642 ; 23.7466 ; 23.8619 ; 24.03 ; 24.0939 ; 24.179 ; 24.293 ; 24.4521 ; 24.4842]

Bolt 1 - Tensile Force (kips): [15.0254 ; 14.8208 ; 14.7761 ; 14.7344 ; 14.6759 ; 14.5757 ; 13.9327 ; 12.6233 ; 10.6463 ; 9.95061 ; 9.3906 ; 9.38935 ; 9.38795 ; 9.38662 ; 9.38622 ; 9.38612 ; 9.38212 ; 9.32757 ; 9.23922 ; 9.12245 ; 9.11197 ; 9.11165 ; 9.11204 ; 9.1055 ; 9.09657 ; 9.08791 ; 9.07866 ; 9.0716 ; 9.06721 ; 8.99558 ; 8.9096 ; 8.82634 ; 8.71595 ; 8.67357 ; 8.62771 ; 8.57969 ; 8.5598 ; 8.52668 ; 8.4549 ; 8.35574 ; 8.19487 ; 8.01007 ; 7.73937 ; 7.51629 ; 7.37407 ; 7.217 ; 7.17696 ; 7.14276 ; 7.12319 ; 7.09877 ; 7.0921 ; 7.14677 ; 7.22025 ; 7.07589 ; 7.06363 ; 7.05966 ; 7.05314 ; 7.04376 ; 7.03063 ; 7.01415 ; 6.99559 ; 6.97438 ; 6.94833 ; 6.91474 ; 6.80721 ; 6.77409 ; 6.72057 ; 6.66044 ; 6.61932 ; 6.60898]

Bolt 1 - Shear Force (kips): [0.015158 ; 0.235137 ; 0.275778 ; 0.310854 ; 0.35794 ; 0.433554 ; 0.846484 ; 1.57444 ; 2.55568 ; 2.86231 ; 3.09879 ; 3.09846 ; 3.09802 ; 3.09758 ; 3.09745 ; 3.09742 ; 3.10271 ; 3.14373 ; 3.20737 ; 3.29275 ; 3.30005 ; 3.30002 ; 3.29979 ; 3.36048 ; 3.45708 ; 3.51865 ; 3.58374 ; 3.65871 ; 3.75655 ; 4.05839 ; 4.38561 ; 4.6554 ; 5.04067 ; 5.22825 ; 5.41607 ; 5.60491 ; 5.86073 ; 6.05989 ; 6.38335 ; 6.79527 ; 7.42591 ; 8.12961 ; 9.12304 ; 10.2067 ; 10.7088 ; 11.413 ; 11.6088 ; 11.8275 ; 12.0731 ; 12.4284 ; 12.891 ; 13.3768 ; 14.0488 ; 15.0782 ; 15.8348 ; 15.8497 ; 15.8722 ; 15.9048 ; 15.9515 ; 16.0165 ; 16.1047 ; 16.2224 ; 16.3921 ; 16.645 ; 17.0515 ; 17.181 ; 17.3621 ; 17.6068 ; 17.9499 ; 18.0262]

Bolt 2 - Tensile Force (kips): [15.0346 ; 14.854 ; 14.8294 ; 14.8121 ; 14.7966 ; 14.768 ; 14.1719 ; 12.9415 ; 11.1427 ; 10.5326 ; 9.75583 ; 9.74627 ; 9.74277 ; 9.7406 ; 9.73995 ; 9.73975 ; 9.74086 ; 9.74696 ; 9.75364 ; 9.75523 ; 9.61693 ; 9.52205 ; 9.5214 ; 9.53654 ; 9.59623 ; 9.6269 ; 9.66751 ; 9.73138 ; 9.83714 ; 10.0056 ; 10.1869 ; 10.4109 ; 10.7814 ; 10.9727 ; 11.2535 ; 11.6334 ; 12.1553 ; 12.3579 ; 12.664 ; 13.1019 ; 13.7524 ; 14.6828 ; 15.9707 ; 17.5769 ; 18.1022 ; 18.8215 ; 19.0595 ; 19.3657 ; 19.7451 ; 20.2317 ; 20.8581 ; 21.6251 ; 22.527 ; 23.3847 ; 24.0481 ; 24.0582 ; 24.073 ; 24.095 ; 24.1271 ; 24.1739 ; 24.241 ; 24.3367 ; 24.4699 ; 24.665 ; 24.9745 ; 25.0819 ; 25.2211 ; 25.3981 ; 25.6095 ; 25.6435]

Bolt 2 - Shear Force (kips): [0.013987 ; 0.24967 ; 0.29224 ; 0.32907 ; 0.37769 ; 0.45284 ; 0.85674 ; 1.5755 ; 2.5406 ; 2.8432 ; 3.2094 ; 3.2136 ; 3.2147 ; 3.2144 ; 3.2142 ; 3.2141 ; 3.2145 ; 3.2165 ; 3.2187 ; 3.2264 ; 3.3529 ; 3.4358 ; 3.4357 ; 3.44 ; 3.5857 ; 3.6161 ; 3.6995 ; 3.8199 ; 3.9626 ; 4.0616 ; 4.2815 ; 4.6698 ; 4.9839 ; 5.0777 ; 5.2729 ; 5.4715 ; 5.6472 ; 5.683 ; 5.7389 ; 5.8198 ; 5.9009 ; 6.1556 ; 6.5933 ; 7.022 ; 7.1385 ; 7.3046 ; 7.3497 ; 7.4259 ; 7.5075 ; 7.5638 ; 7.6438 ; 7.7809 ; 8.0253 ; 8.2768 ; 8.4942 ; 8.4976 ; 8.5027 ; 8.5103 ; 8.5217 ; 8.5395 ; 8.5669 ; 8.6082 ; 8.6673 ; 8.7438 ; 8.8165 ; 8.84 ; 8.8835 ; 8.9493 ; 9.0418 ; 9.0627]

Bolt 3 - Tensile Force (kips): [16 ; 16.3199 ; 16.4887 ; 16.6916 ; 16.996 ; 17.4293 ; 17.7392 ; 18.0263 ; 18.4178 ; 18.5337 ; 18.6525 ; 18.6527 ; 18.6512 ; 18.6483 ; 18.6472 ; 18.6469 ; 18.6507 ; 18.6699 ; 18.6963 ; 18.7327 ; 18.7922 ; 18.8287 ; 18.8277 ; 18.8771 ; 19.0747 ; 19.1541 ; 19.2853 ; 19.4667 ; 19.7047 ; 20.1356 ; 20.7805 ; 21.7286 ; 22.9664 ; 23.4018 ; 23.9898 ; 24.7114 ; 25.5829 ; 25.8874 ; 26.3202 ; 26.9071 ; 27.6677 ; 28.5492 ; 29.4316 ; 30.422 ; 30.7139 ; 31.0612 ; 31.1643 ; 31.2927 ; 31.4191 ; 31.5284 ; 31.6357 ; 31.7495 ; 31.8592 ; 31.9401 ; 31.986 ; 31.9881 ; 31.9896 ; 31.9903 ; 31.9914 ; 31.9839 ; 31.9717 ; 31.9533 ; 31.9597 ; 31.9845 ; 31.9742 ; 31.9541 ; 31.9582 ; 31.9841 ; 32.0363 ; 32.0476]

Bolt 3 - Shear Force (kips): [0.0085535 ; 0.049138 ; 0.059999 ; 0.069837 ; 0.082691 ; 0.095965 ; 0.10104 ; 0.10561 ; 0.11528 ; 0.11848 ; 0.12152 ; 0.12156 ; 0.12157 ; 0.12155 ; 0.12154 ; 0.12154 ; 0.12175 ; 0.12205 ; 0.12272 ; 0.12364 ; 0.12523 ; 0.12619 ; 0.12621 ; 0.12749 ; 0.1329 ; 0.13515 ; 0.13879 ; 0.14392 ; 0.15086 ; 0.16309 ; 0.17956 ; 0.19502 ; 0.19862 ; 0.19678 ; 0.19214 ; 0.18621 ; 0.18734 ; 0.18849 ; 0.18757 ; 0.18218 ; 0.17164 ; 0.15486 ; 0.14285 ; 0.13205 ; 0.12036 ; 0.10073 ; 0.097454 ; 0.11406 ; 0.10895 ; 0.08055 ; 0.054614 ; 0.08835 ; 0.14155 ; 0.21257 ; 0.2846 ; 0.29591 ; 0.3106 ; 0.32755 ; 0.3457 ; 0.38726 ; 0.43303 ; 0.49112 ; 0.57546 ; 0.70648 ; 1.0029 ; 1.1603 ; 1.2845 ; 1.4013 ; 1.537 ; 1.5626]

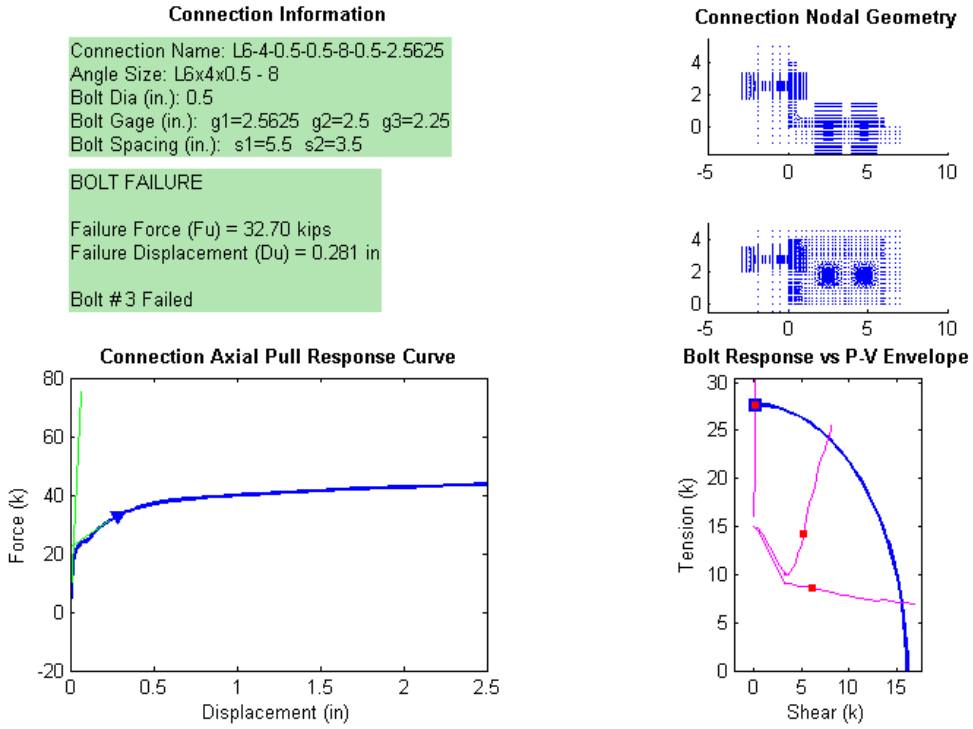


Figure B.41 Connection L6_4_0.5_0.5_8_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.5_8_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.1486e+003

Plastic Stiffness (k/in): 39.8799

Displacement (in): [6.0106e-037 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.072601 ; 0.080944 ; 0.084073 ; 0.088765 ; 0.095805 ; 0.098444 ; 0.099434 ; 0.10092 ; 0.10315 ; 0.10649 ; 0.1115 ; 0.11338 ; 0.11408 ; 0.11514 ; 0.11673 ; 0.1191 ; 0.12267 ; 0.12802 ; 0.13605 ; 0.14809 ; 0.16615 ; 0.19324 ; 0.23388 ; 0.29484 ; 0.3177 ; 0.35198 ; 0.40341 ; 0.48056 ; 0.50949 ; 0.55289 ; 0.61798 ; 0.71562 ; 0.86208 ; 1.0818 ; 1.3318 ; 1.3943 ; 1.4177 ; 1.4529 ; 1.4661 ; 1.4858 ; 1.5155 ; 1.56 ; 1.6267 ; 1.7268 ; 1.877 ; 1.9333 ; 2.0178 ; 2.1445 ; 2.3346 ; 2.5]

Force (kips): [-0.199887 ; 4.58537 ; 5.40859 ; 6.1397 ; 7.07855 ; 8.2674 ; 9.59815 ; 10.5043 ; 11.2046 ; 11.9036 ; 12.0377 ; 12.0619 ; 12.0625 ; 12.0607 ; 12.0598 ; 12.0595 ; 12.0808 ; 12.15 ; 12.1896 ; 12.2894 ; 12.2894 ; 12.2893 ; 12.3118 ; 12.3916 ; 12.5136 ; 12.6834 ; 12.9248 ; 13.2309 ; 13.6283 ; 14.1539 ; 14.7838 ; 15.5941 ; 16.571 ; 16.8802 ; 17.2757 ; 17.7765 ; 18.3681 ; 18.5401 ; 18.7651 ; 19.051 ; 19.353 ; 19.6961 ; 20.1025 ; 20.4815 ; 20.567 ; 20.5984 ; 20.6444 ; 20.6614 ; 20.694 ; 20.7395 ; 20.8078 ; 20.8987 ; 21.0216 ; 21.1935 ; 21.2584 ; 21.3481 ; 21.4706 ; 21.6427 ; 21.7812]

Bolt 1 - Tensile Force (kips): [15.0251 ; 14.8675 ; 14.8311 ; 14.797 ; 14.7488 ; 14.6816 ; 14.5648 ; 13.8426 ; 12.2171 ; 9.84489 ; 9.39438 ; 9.39286 ; 9.3912 ; 9.38958 ; 9.38909 ; 9.38895 ; 9.35077 ; 9.17264 ; 9.11807 ; 9.11788 ; 9.11809 ; 9.11818 ; 9.11533 ; 9.10778 ; 9.1038 ; 9.09547 ; 9.08108 ; 9.07465 ; 9.04516 ; 8.95475 ; 8.82892 ; 8.68909 ; 8.56056 ; 8.44527 ; 8.28404 ; 8.10086 ; 7.88794 ; 7.85781 ; 7.83304 ; 7.77111 ; 7.59539 ; 7.41465 ; 7.30152 ; 7.35998 ; 7.37374 ; 7.35992 ; 7.32547 ; 7.31206 ; 7.28155 ; 7.23672 ; 7.18382 ; 7.14575 ; 7.13085 ; 7.15867 ; 7.15002 ; 7.11362 ; 7.03998 ; 6.9598 ; 6.87532]

Bolt 1 - Shear Force (kips): [0.014862 ; 0.190633 ; 0.225963 ; 0.2579 ; 0.299768 ; 0.354343 ; 0.442577 ; 0.900277 ; 1.78892 ; 2.91037 ; 3.09995 ; 3.09958 ; 3.09908 ; 3.09856 ; 3.0984 ; 3.09835 ; 3.13116 ; 3.25989 ; 3.29871 ; 3.29831 ; 3.29821 ; 3.29816 ; 3.32015 ; 3.39149 ; 3.43218 ; 3.50498 ; 3.61045 ; 3.69715 ; 3.88684 ; 4.24953 ; 4.68471 ; 5.3319 ; 6.2788 ; 6.78078 ; 7.4839 ; 8.25129 ; 9.25536 ; 9.51032 ; 9.80586 ; 10.2079 ; 10.9795 ; 11.9054 ; 12.9106 ; 13.6366 ; 13.822 ; 13.9146 ; 14.0612 ; 14.115 ; 14.2075 ; 14.3443 ; 14.5233 ; 14.7469 ; 15.0207 ; 15.3594 ; 15.5107 ; 15.7301 ; 16.0449 ; 16.4273 ; 16.7596]

Bolt 2 - Tensile Force (kips): [15.034 ; 14.8952 ; 14.8775 ; 14.8658 ; 14.8551 ; 14.8592 ; 14.8537 ; 14.2502 ; 12.8418 ; 10.948 ; 10.2692 ; 10.0669 ; 10.0505 ; 10.0455 ; 10.0442 ; 10.0438 ; 10.0528 ; 10.0756 ; 10.0409 ; 9.88291 ; 9.8823 ; 9.88198 ; 9.89376 ; 9.93179 ; 10.0037 ; 10.1235 ; 10.3075 ; 10.5634 ; 10.93 ; 11.4721 ; 12.1807 ; 13.2077 ; 14.63 ; 15.1267 ; 15.8309 ; 16.7875 ; 17.8998 ; 18.2154 ; 18.6569 ; 19.2699 ; 20.0814 ; 21.0417 ; 22.0916 ; 23.0233 ; 23.238 ; 23.3176 ; 23.4327 ; 23.4725 ; 23.5317 ; 23.619 ; 23.7444 ; 23.9129 ; 24.1423 ; 24.4478 ; 24.5571 ; 24.7114 ; 24.9328 ; 25.2363 ; 25.5351]

Bolt 2 - Shear Force (kips): [0.013624 ; 0.20315 ; 0.24064 ; 0.27422 ; 0.31811 ; 0.37385 ; 0.45932 ; 0.90155 ; 1.7701 ; 2.8585 ; 3.2077 ; 3.3065 ; 3.314 ; 3.3148 ; 3.3145 ; 3.3144 ; 3.3174 ; 3.3249 ; 3.3659 ; 3.5486 ; 3.549 ; 3.5489 ; 3.5523 ; 3.5714 ; 3.6599 ; 3.7606 ; 3.8948 ; 4.0713 ; 4.2365 ; 4.4235 ; 4.6388 ; 5.0207 ; 5.3549 ; 5.4254 ; 5.4912 ; 5.696 ; 5.9878 ; 6.1152 ; 6.2767 ; 6.4628 ; 6.6273 ; 6.808 ; 7.1105 ; 7.4893 ; 7.559 ; 7.5775 ; 7.6033 ; 7.6135 ; 7.626 ; 7.643 ; 7.6689 ; 7.7304 ; 7.8197 ; 7.9369 ; 7.9732 ; 8.0217 ; 8.0825 ; 8.1594 ; 8.1368]

Bolt 3 - Tensile Force (kips): [16 ; 16.2209 ; 16.3525 ; 16.5041 ; 16.7728 ; 17.1733 ; 17.7574 ; 18.2887 ; 18.8641 ; 19.6559 ; 19.8479 ; 19.8869 ; 19.8883 ; 19.8856 ; 19.8842 ; 19.8838 ; 19.9125 ; 20.0079 ; 20.065 ; 20.217 ; 20.2169 ; 20.2166 ; 20.2504 ; 20.373 ; 20.5712 ; 20.8599 ; 21.3016 ; 21.9142 ; 22.7513 ; 23.8489 ; 25.0715 ; 26.4766 ; 28.061 ; 28.5049 ; 29.0163 ; 29.6275 ; 30.3826 ; 30.6131 ; 30.9056 ; 31.2421 ; 31.473 ; 31.6422 ; 31.7784 ; 31.8624 ; 31.8765 ; 31.8811 ; 31.8871 ; 31.8891 ; 31.8949 ; 31.8984 ; 31.8802 ; 31.8777 ; 31.9051 ; 31.91 ; 31.8947 ; 31.9023 ; 31.9338 ; 31.994 ; 32.0032]

Bolt 3 - Shear Force (kips): [0.0095032 ; 0.042469 ; 0.05241 ; 0.061601 ; 0.073885 ; 0.089263 ; 0.10104 ; 0.11212 ; 0.12671 ; 0.15063 ; 0.15684 ; 0.15813 ; 0.15823 ; 0.15824 ; 0.15822 ; 0.15821 ; 0.15909 ; 0.16205 ; 0.16386 ; 0.16866 ; 0.1687 ; 0.16871 ; 0.16973 ; 0.17347 ; 0.17934 ; 0.18729 ; 0.19725 ; 0.20584 ; 0.211 ; 0.20896 ; 0.20483 ; 0.20393 ; 0.18192 ; 0.17267 ; 0.16293 ; 0.1603 ; 0.1449 ; 0.13486 ; 0.12869 ; 0.15271 ; 0.12134 ; 0.11609 ; 0.17383 ; 0.25329 ; 0.27693 ; 0.28573 ; 0.29881 ; 0.30378 ; 0.34388 ; 0.39111 ; 0.4713 ; 0.5499 ; 0.6402 ; 0.93874 ; 1.0991 ; 1.2368 ; 1.3676 ; 1.5136 ; 1.7148]

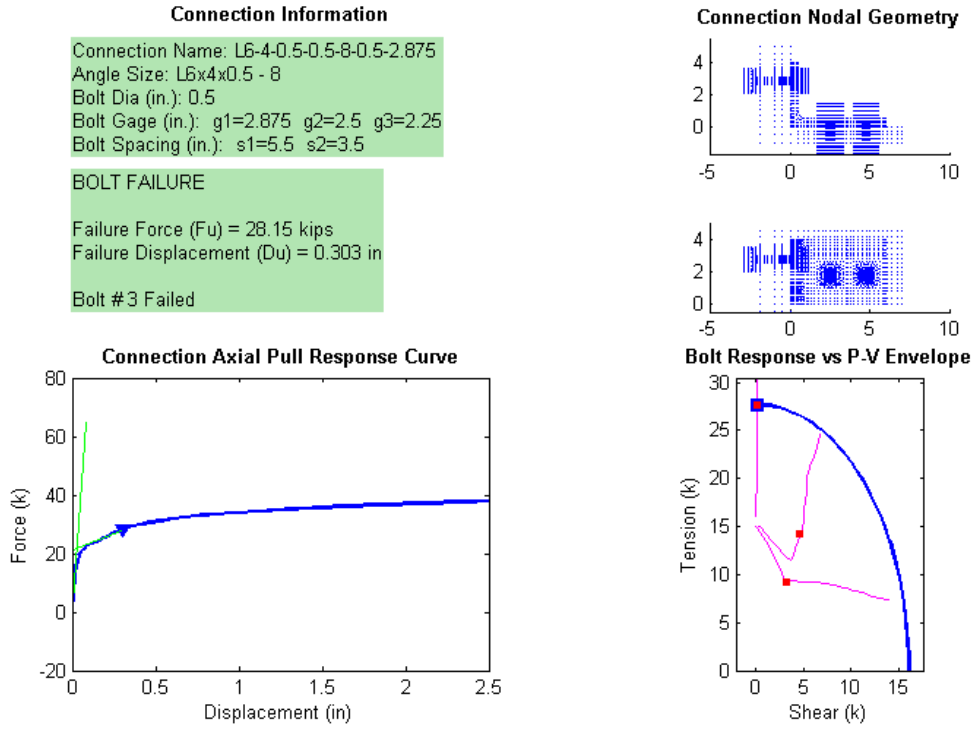


Figure B.42 Connection L6_4_0.5_0.5_8_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.5_8_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 801.9159

Plastic Stiffness (k/in): 22.3700

Displacement (in): [5.5703e-037 ; 0.0078125 ; 0.015625 ; 0.017578 ; 0.020508 ; 0.024902 ; 0.031494 ; 0.041382 ; 0.056213 ; 0.078461 ; 0.11183 ; 0.12435 ; 0.14312 ; 0.17127 ; 0.18183 ; 0.19767 ; 0.22143 ; 0.23034 ; 0.2437 ; 0.26375 ; 0.29381 ; 0.33892 ; 0.40657 ; 0.43194 ; 0.46999 ; 0.52707 ; 0.6127 ; 0.74113 ; 0.78929 ; 0.86154 ; 0.9699 ; 1.1325 ; 1.1934 ; 1.2163 ; 1.2248 ; 1.2377 ; 1.257 ; 1.2859 ; 1.3293 ; 1.3944 ; 1.492 ; 1.6385 ; 1.8582 ; 2.1082 ; 2.3582 ; 2.5]

Force (kips): [-0.185218 ; 3.67088 ; 6.07975 ; 6.54313 ; 7.17014 ; 7.96304 ; 8.86055 ; 9.67431 ; 10.3305 ; 10.9654 ; 11.6248 ; 11.8176 ; 12.037 ; 12.364 ; 12.541 ; 12.7822 ; 13.1088 ; 13.2162 ; 13.3934 ; 13.6442 ; 13.9805 ; 14.4323 ; 14.9387 ; 15.0903 ; 15.3005 ; 15.5862 ; 15.9727 ; 16.4167 ; 16.5427 ; 16.7137 ; 16.959 ; 17.2474 ; 17.3501 ; 17.3872 ; 17.4024 ; 17.4273 ; 17.4609 ; 17.5145 ; 17.5887 ; 17.6892 ; 17.8321 ; 18.0352 ; 18.2961 ; 18.5622 ; 18.7881 ; 18.9081]

Bolt 1 - Tensile Force (kips): [15.025 ; 14.9043 ; 14.7954 ; 14.7713 ; 14.7362 ; 14.6883 ; 14.6262 ; 14.4209 ; 13.5089 ; 12.0496 ; 10.2711 ; 9.66228 ; 9.39688 ; 9.39899 ; 9.40073 ; 9.40387 ; 9.40819 ; 9.41013 ; 9.32627 ; 9.16871 ; 9.18513 ; 9.22035 ; 9.28531 ; 9.29579 ; 9.30135 ; 9.32299 ; 9.27476 ; 9.28368 ; 9.29486 ; 9.25678 ; 9.08092 ; 8.85061 ; 8.74935 ; 8.71172 ; 8.69765 ; 8.67611 ; 8.64692 ; 8.60876 ; 8.55904 ; 8.48644 ; 8.36967 ; 8.09566 ; 7.76534 ; 7.56197 ; 7.44255 ; 7.4234]

Bolt 1 - Shear Force (kips): [0.0141425 ; 0.154113 ; 0.260525 ; 0.281971 ; 0.311569 ; 0.350541 ; 0.398468 ; 0.545524 ; 1.09473 ; 1.87787 ; 2.72705 ; 2.98915 ; 3.10077 ; 3.10164 ; 3.10221 ; 3.10276 ; 3.10467 ; 3.10532 ; 3.16849 ; 3.29201 ; 3.29916 ; 3.30454 ; 3.31531 ; 3.38021 ; 3.65176 ; 4.00248 ; 4.63865 ; 5.5197 ; 5.79886 ; 6.35673 ; 7.25808 ; 8.27302 ; 8.72131 ; 8.88359 ; 8.94337 ; 9.03456 ; 9.15753 ; 9.31966 ; 9.5402 ; 9.84873 ; 10.3042 ; 11.1769 ; 12.1728 ; 13.0412 ; 13.6079 ; 13.9234]

Bolt 2 - Tensile Force (kips): [15.0336 ; 14.9266 ; 14.8971 ; 14.9001 ; 14.9102 ; 14.9328 ; 14.9792 ; 14.9339 ; 14.2778 ; 13.3438 ; 12.5479 ; 12.3318 ; 11.8563 ; 11.4943 ; 11.7648 ; 12.1642 ; 12.6763 ; 12.8392 ; 13.1332 ; 13.5317 ; 14.0628 ; 14.8469 ; 15.7339 ; 15.9973 ; 16.3533 ; 16.8754 ; 17.6641 ; 18.7505 ; 19.1165 ; 19.6037 ; 20.2437 ; 21.0602 ; 21.3394 ; 21.4422 ; 21.479 ; 21.532 ; 21.6056 ; 21.7099 ; 21.851 ; 22.0716 ; 22.3935 ; 22.8343 ; 23.4137 ; 23.9823 ; 24.4275 ; 24.6546]

Bolt 2 - Shear Force (kips): [0.012836 ; 0.16492 ; 0.27764 ; 0.30011 ; 0.33071 ; 0.36961 ; 0.41566 ; 0.55076 ; 1.0742 ; 1.8124 ; 2.581 ; 2.8174 ; 3.2102 ; 3.7137 ; 3.8406 ; 3.9778 ; 4.1561 ; 4.2191 ; 4.315 ; 4.4219 ; 4.5578 ; 4.8681 ; 5.0686 ; 5.1026 ; 5.1143 ; 5.1313 ; 5.2501 ; 5.3178 ; 5.3256 ; 5.3182 ; 5.4156 ; 5.6143 ; 5.7074 ; 5.7369 ; 5.7473 ; 5.7612 ; 5.781 ; 5.8132 ; 5.9082 ; 6.0154 ; 6.1531 ; 6.2416 ; 6.3772 ; 6.5416 ; 6.7069 ; 6.7825]

Bolt 3 - Tensile Force (kips): [16 ; 16.1484 ; 16.661 ; 16.8257 ; 17.0715 ; 17.441 ; 18.0189 ; 18.8093 ; 19.651 ; 20.7789 ; 22.3399 ; 22.8399 ; 23.4302 ; 24.2702 ; 24.6641 ; 25.1731 ; 25.8408 ; 26.0552 ; 26.4001 ; 26.8835 ; 27.5273 ; 28.3375 ; 29.1774 ; 29.4355 ; 29.7978 ; 30.2648 ; 30.8142 ; 31.2885 ; 31.3665 ; 31.4491 ; 31.5786 ; 31.6774 ; 31.7038 ; 31.7129 ; 31.7168 ; 31.7202 ; 31.725 ; 31.7139 ; 31.704 ; 31.7263 ; 31.7569 ; 31.7648 ; 31.8298 ; 31.9011 ; 31.9668 ; 31.9599]

Bolt 3 - Shear Force (kips): [0.010171 ; 0.035912 ; 0.068813 ; 0.075349 ; 0.084296 ; 0.093941 ; 0.10116 ; 0.12041 ; 0.14934 ; 0.19125 ; 0.22191 ; 0.22621 ; 0.22895 ; 0.22925 ; 0.22954 ; 0.23181 ; 0.23346 ; 0.23294 ; 0.23074 ; 0.2259 ; 0.21823 ; 0.20467 ; 0.19198 ; 0.18957 ; 0.18283 ; 0.17192 ; 0.20099 ; 0.2144 ; 0.20125 ; 0.17969 ; 0.24502 ; 0.28748 ; 0.30389 ; 0.31036 ; 0.32173 ; 0.35392 ; 0.38408 ; 0.4535 ; 0.52619 ; 0.59406 ; 0.68795 ; 1.0442 ; 1.4329 ; 1.767 ; 2.0358 ; 2.2661]

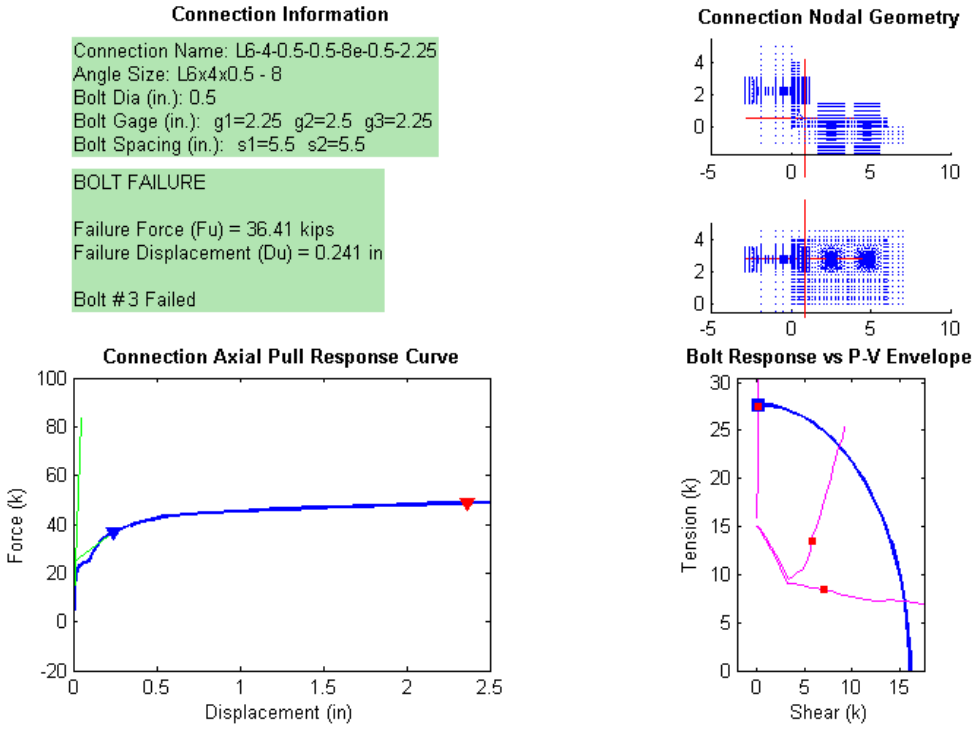


Figure B.43 Connection L6_4_0.5_0.5_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.5_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.8321e+003

Plastic Stiffness (k/in): 52.0882

Displacement (in): [8.9417e-037 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.066875 ; 0.070003 ; 0.074696 ; 0.081735 ; 0.084375 ; 0.085365 ; 0.086849 ; 0.089077 ; 0.092418 ; 0.09367 ; 0.09555 ; 0.096254 ; 0.097311 ; 0.098897 ; 0.10128 ; 0.10484 ; 0.10618 ; 0.10819 ; 0.1112 ; 0.11571 ; 0.12249 ; 0.13265 ; 0.14788 ; 0.17074 ; 0.20503 ; 0.25646 ; 0.27575 ; 0.30468 ; 0.34808 ; 0.41317 ; 0.51081 ; 0.54742 ; 0.60235 ; 0.68473 ; 0.8083 ; 0.99367 ; 1.2437 ; 1.4937 ; 1.5562 ; 1.5796 ; 1.5884 ; 1.6016 ; 1.6214 ; 1.651 ; 1.6955 ; 1.7623 ; 1.8624 ; 2.0125 ; 2.2378 ; 2.4878 ; 2.5]

Force (kips): [-0.242173 ; 1.80693 ; 3.33619 ; 5.19132 ; 7.30113 ; 9.52516 ; 10.7082 ; 11.5317 ; 12.1915 ; 12.1919 ; 12.1919 ; 12.1915 ; 12.1913 ; 12.2348 ; 12.2756 ; 12.3215 ; 12.4014 ; 12.4108 ; 12.4106 ; 12.4103 ; 12.4648 ; 12.5649 ; 12.7206 ; 12.9559 ; 13.2656 ; 13.3646 ; 13.5429 ; 13.7794 ; 14.1129 ; 14.557 ; 15.0812 ; 15.7538 ; 16.5353 ; 17.4283 ; 18.5222 ; 18.8535 ; 19.2827 ; 19.8407 ; 20.5309 ; 21.308 ; 21.5233 ; 21.746 ; 21.9792 ; 22.2686 ; 22.6371 ; 23.0434 ; 23.3751 ; 23.4518 ; 23.4798 ; 23.4901 ; 23.507 ; 23.5381 ; 23.5845 ; 23.6487 ; 23.7328 ; 23.8475 ; 24.009 ; 24.2281 ; 24.4374 ; 24.4469]

Bolt 1 - Tensile Force (kips): [15.0593 ; 15.0012 ; 14.9489 ; 14.8721 ; 14.7703 ; 14.6419 ; 13.7082 ; 11.7341 ; 9.40907 ; 9.40861 ; 9.40805 ; 9.40749 ; 9.40703 ; 9.30126 ; 9.2001 ; 9.14065 ; 9.14053 ; 9.14037 ; 9.14044 ; 9.14062 ; 9.13445 ; 9.12752 ; 9.12349 ; 9.1053 ; 9.10011 ; 9.09807 ; 9.06622 ; 9.02258 ; 8.96569 ; 8.90518 ; 8.83924 ; 8.74296 ; 8.66556 ; 8.60417 ; 8.32423 ; 8.23066 ; 8.07427 ; 7.88674 ; 7.72349 ; 7.42454 ; 7.35045 ; 7.28911 ; 7.2465 ; 7.28702 ; 7.37822 ; 7.20734 ; 7.19121 ; 7.1341 ; 7.1104 ; 7.10189 ; 7.08967 ; 7.07459 ; 7.05902 ; 7.0437 ; 7.02717 ; 6.99603 ; 6.91784 ; 6.81172 ; 6.79322 ; 6.79222]

Bolt 1 - Shear Force (kips): [0.0141683 ; 0.0765271 ; 0.140075 ; 0.217275 ; 0.307475 ; 0.407413 ; 0.994081 ; 2.04912 ; 3.10483 ; 3.10478 ; 3.10464 ; 3.10447 ; 3.10432 ; 3.17971 ; 3.25271 ; 3.29552 ; 3.29564 ; 3.29562 ; 3.29555 ; 3.29542 ; 3.34857 ; 3.42084 ; 3.47281 ; 3.61782 ; 3.72976 ; 3.77683 ; 3.92468 ; 4.11156 ; 4.34382 ; 4.5676 ; 4.76671 ; 5.23027 ; 5.5975 ; 6.19718 ; 7.443 ; 7.81922 ; 8.35804 ; 9.14191 ; 10.0077 ; 11.4019 ; 11.8034 ; 12.2413 ; 12.7671 ; 13.2991 ; 13.9156 ; 14.9808 ; 15.7873 ; 16.0141 ; 16.0939 ; 16.1224 ; 16.1637 ; 16.2227 ; 16.314 ; 16.4411 ; 16.6261 ; 16.9042 ; 17.2607 ; 17.7247 ; 18.1164 ; 18.134]

Bolt 2 - Tensile Force (kips): [15.0857 ; 15.0257 ; 14.9763 ; 14.9169 ; 14.8661 ; 14.8453 ; 13.9998 ; 12.171 ; 9.7804 ; 9.7729 ; 9.76959 ; 9.76858 ; 9.76859 ; 9.77583 ; 9.78192 ; 9.73282 ; 9.57281 ; 9.55513 ; 9.55495 ; 9.55474 ; 9.56735 ; 9.58441 ; 9.62294 ; 9.69718 ; 9.80113 ; 9.84297 ; 9.91571 ; 10.0152 ; 10.1378 ; 10.2735 ; 10.454 ; 10.8808 ; 11.5902 ; 12.5426 ; 13.8882 ; 14.3575 ; 15.0247 ; 15.9651 ; 17.1799 ; 18.6322 ; 19.0808 ; 19.6308 ; 20.2535 ; 21.0527 ; 21.9828 ; 22.8935 ; 23.5755 ; 23.7344 ; 23.7899 ; 23.8103 ; 23.8403 ; 23.8842 ; 23.9403 ; 24.0219 ; 24.1462 ; 24.3475 ; 24.6506 ; 25.025 ; 25.3477 ; 25.3618]

Bolt 2 - Shear Force (kips): [0.02041 ; 0.074825 ; 0.1403 ; 0.22003 ; 0.31257 ; 0.41219 ; 0.98554 ; 2.0267 ; 3.2184 ; 3.2216 ; 3.2231 ; 3.2235 ; 3.2236 ; 3.226 ; 3.228 ; 3.2708 ; 3.4153 ; 3.4304 ; 3.4304 ; 3.4302 ; 3.4338 ; 3.4681 ; 3.5759 ; 3.6735 ; 3.8915 ; 3.9524 ; 3.9977 ; 4.0667 ; 4.2013 ; 4.4675 ; 4.8311 ; 5.0078 ; 5.4358 ; 5.676 ; 5.8779 ; 5.9843 ; 6.2282 ; 6.5807 ; 6.9686 ; 7.3989 ; 7.5644 ; 7.7174 ; 7.8381 ; 7.9854 ; 8.2256 ; 8.4956 ; 8.7384 ; 8.7875 ; 8.8056 ; 8.8124 ; 8.8228 ; 8.8387 ; 8.8691 ; 8.9129 ; 8.97 ; 9.0317 ; 9.0945 ; 9.1616 ; 9.202 ; 9.2031]

Bolt 3 - Tensile Force (kips): [16 ; 15.9953 ; 16.0566 ; 16.2456 ; 16.6439 ; 17.3269 ; 17.8244 ; 18.2479 ; 18.6891 ; 18.6894 ; 18.6889 ; 18.6877 ; 18.6861 ; 18.7178 ; 18.7471 ; 18.7809 ; 18.8435 ; 18.8505 ; 18.8501 ; 18.8495 ; 18.8934 ; 18.9783 ; 19.1127 ; 19.3292 ; 19.6473 ; 19.7541 ; 19.9536 ; 20.2334 ; 20.6693 ; 21.3288 ; 22.2135 ; 23.4212 ; 24.806 ; 26.2865 ; 27.9514 ; 28.4131 ; 28.9551 ; 29.5896 ; 30.37 ; 31.1508 ; 31.3331 ; 31.4772 ; 31.5978 ; 31.7146 ; 31.834 ; 31.929 ; 31.9801 ; 31.9904 ; 31.9939 ; 31.9952 ; 31.9982 ; 32.0022 ; 31.9945 ; 31.9698 ; 31.968 ; 31.9895 ; 31.9849 ; 31.9764 ; 32.0397 ; 32.0431]

Bolt 3 - Shear Force (kips): [0.01481 ; 0.0030079 ; 0.018254 ; 0.039736 ; 0.064416 ; 0.090182 ; 0.098475 ; 0.10667 ; 0.11805 ; 0.11808 ; 0.11813 ; 0.11818 ; 0.11824 ; 0.11887 ; 0.11959 ; 0.12047 ; 0.1221 ; 0.12231 ; 0.12232 ; 0.12232 ; 0.12339 ; 0.12551 ; 0.12919 ; 0.13511 ; 0.14387 ; 0.14689 ; 0.15238 ; 0.15993 ; 0.17078 ; 0.18377 ; 0.19148 ; 0.18976 ; 0.1787 ; 0.18155 ; 0.16103 ; 0.1517 ; 0.14063 ; 0.1373 ; 0.12905 ; 0.092613 ; 0.11062 ; 0.090948 ; 0.057971 ; 0.052518 ; 0.10964 ; 0.18663 ; 0.2622 ; 0.28094 ; 0.2881 ; 0.29083 ; 0.30086 ; 0.3414 ; 0.39987 ; 0.47051 ; 0.53808 ; 0.67947 ; 0.96309 ; 1.3425 ; 1.5397 ; 1.5474]

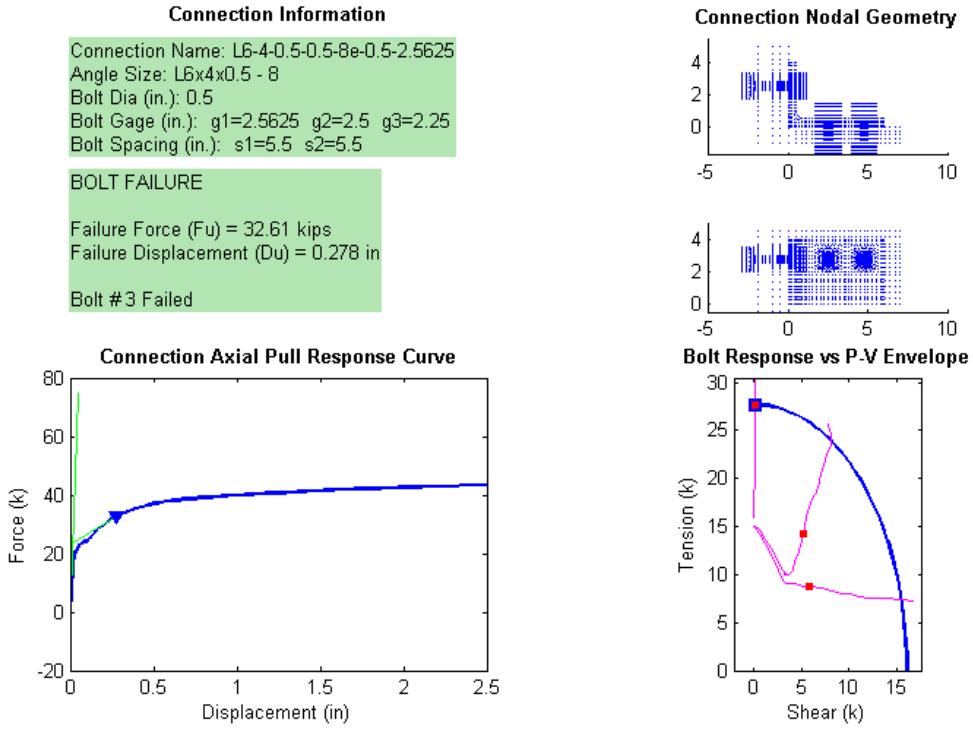


Figure B.44 Connection L6_4_0.5_0.5_8e_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.5_8e_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.4558e+003

Plastic Stiffness (k/in): 35.5020

Displacement (in): [7.5864e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.026367 ; 0.032959 ; 0.042847 ; 0.057678 ; 0.079925 ; 0.082011 ; 0.08514 ; 0.089832 ; 0.096872 ; 0.099511 ; 0.1005 ; 0.10199 ; 0.10421 ; 0.10505 ; 0.1063 ; 0.10677 ; 0.10748 ; 0.10853 ; 0.11012 ; 0.1125 ; 0.11339 ; 0.11473 ; 0.11523 ; 0.11598 ; 0.11711 ; 0.1188 ; 0.12134 ; 0.12515 ; 0.13087 ; 0.13944 ; 0.14265 ; 0.14747 ; 0.15471 ; 0.16556 ; 0.18183 ; 0.20624 ; 0.21539 ; 0.22912 ; 0.24972 ; 0.28061 ; 0.32696 ; 0.3733 ; 0.38488 ; 0.40226 ; 0.42833 ; 0.46742 ; 0.52607 ; 0.54807 ; 0.58106 ; 0.63055 ; 0.70477 ; 0.81612 ; 0.98313 ; 1.2331 ; 1.4831 ; 1.5456 ; 1.6394 ; 1.78 ; 1.8327 ; 1.9118 ; 2.0305 ; 2.2085 ; 2.4585 ; 2.5]

Force (kips): [-0.237023 ; 1.37605 ; 2.60637 ; 3.65676 ; 5.00946 ; 6.63807 ; 8.43919 ; 9.6833 ; 10.3817 ; 10.8896 ; 11.4899 ; 12.0328 ; 12.0542 ; 12.0751 ; 12.0755 ; 12.0752 ; 12.0751 ; 12.0752 ; 12.108 ; 12.1716 ; 12.1738 ; 12.1739 ; 12.1844 ; 12.2043 ; 12.2338 ; 12.2711 ; 12.2821 ; 12.282 ; 12.2817 ; 12.2982 ; 12.3388 ; 12.3938 ; 12.4797 ; 12.6079 ; 12.7917 ; 13.0328 ; 13.3398 ; 13.4528 ; 13.6162 ; 13.8396 ; 14.1451 ; 14.543 ; 15.0441 ; 15.2293 ; 15.5025 ; 15.8681 ; 16.3482 ; 16.9681 ; 17.4528 ; 17.5618 ; 17.7258 ; 17.9553 ; 18.2582 ; 18.6178 ; 18.7315 ; 18.8886 ; 19.0874 ; 19.3161 ; 19.5877 ; 19.9265 ; 20.3286 ; 20.6654 ; 20.7606 ; 20.8903 ; 21.0556 ; 21.1184 ; 21.2052 ; 21.3296 ; 21.4968 ; 21.7059 ; 21.7411]

Bolt 1 - Tensile Force (kips): [15.0589 ; 15.0138 ; 14.9739 ; 14.9347 ; 14.8768 ; 14.7985 ; 14.6965 ; 14.5637 ; 14.2032 ; 13.1368 ; 11.5129 ; 9.41185 ; 9.41148 ; 9.41114 ; 9.41049 ; 9.40987 ; 9.4097 ; 9.40969 ; 9.32504 ; 9.15196 ; 9.14545 ; 9.14506 ; 9.14522 ; 9.14535 ; 9.14558 ; 9.14593 ; 9.14623 ; 9.14633 ; 9.14647 ; 9.14398 ; 9.13975 ; 9.13452 ; 9.13149 ; 9.12951 ; 9.11476 ; 9.11014 ; 9.11112 ; 9.09816 ; 9.07181 ; 9.03868 ; 8.99088 ; 8.92146 ; 8.86127 ; 8.82889 ; 8.7768 ; 8.73623 ; 8.74346 ; 8.56584 ; 8.39559 ; 8.35041 ; 8.27191 ; 8.15892 ; 8.06661 ; 7.98562 ; 7.96793 ; 7.93292 ; 7.85794 ; 7.70575 ; 7.5904 ; 7.51354 ; 7.57741 ; 7.50419 ; 7.44122 ; 7.40854 ; 7.41348 ; 7.4198 ; 7.41766 ; 7.35619 ; 7.27238 ; 7.19459 ; 7.18119]

Bolt 1 - Shear Force (kips): [0.0139958 ; 0.0593103 ; 0.111025 ; 0.155509 ; 0.213195 ; 0.284768 ; 0.367367 ; 0.466274 ; 0.701551 ; 1.31488 ; 2.16056 ; 3.10543 ; 3.10558 ; 3.10561 ; 3.10545 ; 3.10525 ; 3.1052 ; 3.1052 ; 3.16708 ; 3.2932 ; 3.29782 ; 3.29802 ; 3.29809 ; 3.29813 ; 3.29816 ; 3.29817 ; 3.29808 ; 3.29803 ; 3.29793 ; 3.31444 ; 3.35592 ; 3.41208 ; 3.45315 ; 3.48611 ; 3.59972 ; 3.67553 ; 3.75857 ; 3.83212 ; 3.95565 ; 4.10313 ; 4.3057 ; 4.57949 ; 4.81226 ; 5.01182 ; 5.30571 ; 5.5793 ; 5.93617 ; 6.91654 ; 7.76844 ; 7.94957 ; 8.22985 ; 8.65134 ; 9.18246 ; 9.72191 ; 9.87636 ; 10.1089 ; 10.4618 ; 11.1661 ; 11.9041 ; 12.724 ; 13.543 ; 14.4159 ; 14.6568 ; 14.9348 ; 15.2802 ; 15.3958 ; 15.5681 ; 15.8515 ; 16.2019 ; 16.6069 ; 16.6812]

Bolt 2 - Tensile Force (kips): [15.0848 ; 15.0384 ; 15.001 ; 14.9705 ; 14.9356 ; 14.9104 ; 14.9161 ; 14.8976 ; 14.6374 ; 13.6849 ; 12.3346 ; 10.4384 ; 10.2547 ; 10.0661 ; 10.0541 ; 10.0521 ; 10.052 ; 10.0521 ; 10.0616 ; 10.0801 ; 10.0808 ; 10.081 ; 10.0567 ; 10.0227 ; 9.97491 ; 9.90447 ; 9.88073 ; 9.88039 ; 9.87992 ; 9.88752 ; 9.90474 ; 9.92841 ; 9.96232 ; 10.0337 ; 10.1623 ; 10.341 ; 10.5898 ; 10.6903 ; 10.8421 ; 11.0609 ; 11.3868 ; 11.8489 ; 12.4458 ; 12.684 ; 13.0601 ; 13.573 ; 14.2432 ; 15.1851 ; 16.0464 ; 16.249 ; 16.5581 ; 16.9943 ; 17.5573 ; 18.2135 ; 18.4289 ; 18.7275 ; 19.1569 ; 19.7727 ; 20.5472 ; 21.4136 ; 22.4175 ; 23.2086 ; 23.3899 ; 23.6403 ; 23.9855 ; 24.113 ; 24.3032 ; 24.6204 ; 25.0496 ; 25.6157 ; 25.7162]

Bolt 2 - Shear Force (kips): [0.02013 ; 0.056919 ; 0.10983 ; 0.1556 ; 0.21488 ; 0.28798 ; 0.3701 ; 0.46256 ; 0.68566 ; 1.2856 ; 2.1091 ; 3.1336 ; 3.2215 ; 3.3107 ; 3.3159 ; 3.317 ; 3.3171 ; 3.3171 ; 3.3203 ; 3.3264 ; 3.3266 ; 3.3267 ; 3.3477 ; 3.3842 ; 3.4384 ; 3.5119 ; 3.535 ; 3.5351 ; 3.535 ; 3.5372 ; 3.542 ; 3.5486 ; 3.6034 ; 3.7034 ; 3.7774 ; 3.9291 ; 4.1214 ; 4.1586 ; 4.2074 ; 4.2704 ; 4.3823 ; 4.5149 ; 4.7106 ; 4.7453 ; 4.8852 ; 5.0799 ; 5.2541 ; 5.4194 ; 5.5263 ; 5.5517 ; 5.6814 ; 5.8172 ; 6.0049 ; 6.3225 ; 6.4214 ; 6.5496 ; 6.6812 ; 6.8384 ; 7.0316 ; 7.3039 ; 7.7198 ; 8.0088 ; 8.0441 ; 8.0968 ; 8.1564 ; 8.1678 ; 8.1694 ; 8.0999 ; 8.0088 ; 7.855 ; 7.8166]

Bolt 3 - Tensile Force (kips): [16 ; 15.9876 ; 16.0232 ; 16.1078 ; 16.2866 ; 16.6358 ; 17.241 ; 17.8152 ; 18.2359 ; 18.6151 ; 19.2099 ; 19.8983 ; 19.9325 ; 19.9666 ; 19.9675 ; 19.9665 ; 19.966 ; 19.966 ; 20.0114 ; 20.1004 ; 20.1035 ; 20.1036 ; 20.1192 ; 20.1485 ; 20.1922 ; 20.2491 ; 20.266 ; 20.2658 ; 20.2653 ; 20.2897 ; 20.3501 ; 20.4334 ; 20.5685 ; 20.7799 ; 21.0979 ; 21.5543 ; 22.1758 ; 22.4062 ; 22.7408 ; 23.2096 ; 23.8468 ; 24.6435 ; 25.5773 ; 25.9006 ; 26.3617 ; 26.9804 ; 27.7755 ; 28.6841 ; 29.2986 ; 29.4339 ; 29.631 ; 29.9069 ; 30.2772 ; 30.7389 ; 30.8872 ; 31.0841 ; 31.3043 ; 31.4678 ; 31.5991 ; 31.7322 ; 31.8394 ; 31.8957 ; 31.8988 ; 31.8749 ; 31.9148 ; 31.8946 ; 31.8914 ; 31.8969 ; 31.9471 ; 32.0092 ; 31.9935]

Bolt 3 - Shear Force (kips): [0.015855 ; 0.0013077 ; 0.013315 ; 0.026939 ; 0.043915 ; 0.064883 ; 0.088182 ; 0.098483 ; 0.10672 ; 0.11615 ; 0.13143 ; 0.15274 ; 0.15385 ; 0.15499 ; 0.15509 ; 0.15522 ; 0.15527 ; 0.15529 ; 0.15656 ; 0.1593 ; 0.1594 ; 0.15943 ; 0.15991 ; 0.16082 ; 0.16217 ; 0.16394 ; 0.16449 ; 0.1645 ; 0.16451 ; 0.16523 ; 0.16704 ; 0.1695 ; 0.1734 ; 0.1793 ; 0.18705 ; 0.19559 ; 0.20198 ; 0.20336 ; 0.20458 ; 0.20475 ; 0.20241 ; 0.1982 ; 0.20033 ; 0.20109 ; 0.1991 ; 0.19265 ; 0.18146 ; 0.16376 ; 0.1561 ; 0.15596 ; 0.15556 ; 0.15316 ; 0.14525 ; 0.1251 ; 0.12674 ; 0.14136 ; 0.14918 ; 0.11837 ; 0.081645 ; 0.13339 ; 0.21322 ; 0.29884 ; 0.40738 ; 0.53676 ; 0.68629 ; 0.86374 ; 1.0304 ; 1.2453 ; 1.4235 ; 1.632 ; 1.7259]

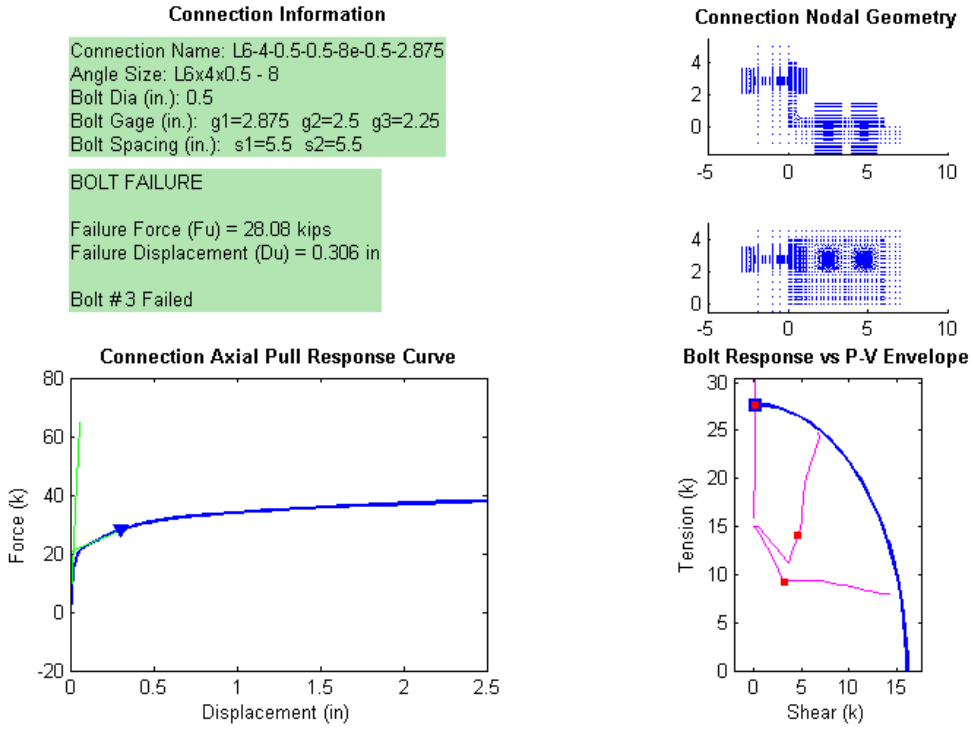


Figure B.45 Connection L6_4_0.5_0.5_8e_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.5_8e_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 1.1592e+003

Plastic Stiffness (k/in): 24.2813

Displacement (in): [9.6422e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.014831 ; 0.017303 ; 0.021011 ; 0.026573 ; 0.034916 ; 0.04743 ; 0.066201 ; 0.094358 ; 0.13659 ; 0.14055 ; 0.14649 ; 0.1554 ; 0.16876 ; 0.17378 ; 0.18129 ; 0.19257 ; 0.20948 ; 0.23485 ; 0.27291 ; 0.32999 ; 0.35139 ; 0.3835 ; 0.39554 ; 0.4136 ; 0.4407 ; 0.48133 ; 0.54229 ; 0.63372 ; 0.66801 ; 0.71944 ; 0.73873 ; 0.76766 ; 0.81105 ; 0.87615 ; 0.97379 ; 1.1203 ; 1.1752 ; 1.2575 ; 1.3811 ; 1.5665 ; 1.629 ; 1.7227 ; 1.8634 ; 2.0743 ; 2.3243 ; 2.5]

Force (kips): [-0.226808 ; 1.05107 ; 2.03724 ; 2.89505 ; 4.02098 ; 5.43273 ; 5.87834 ; 6.47592 ; 7.2562 ; 8.19125 ; 9.14863 ; 9.98281 ; 10.6248 ; 11.3083 ; 11.9646 ; 12.0044 ; 12.0601 ; 12.1329 ; 12.3041 ; 12.3821 ; 12.4977 ; 12.6713 ; 12.888 ; 13.236 ; 13.698 ; 14.2962 ; 14.4895 ; 14.7396 ; 14.8304 ; 14.9584 ; 15.1263 ; 15.3452 ; 15.6454 ; 16.0363 ; 16.168 ; 16.3367 ; 16.3932 ; 16.4728 ; 16.5852 ; 16.7432 ; 16.9652 ; 17.2372 ; 17.3302 ; 17.4639 ; 17.6701 ; 17.9377 ; 18.0211 ; 18.138 ; 18.3014 ; 18.5251 ; 18.7547 ; 18.902]

Bolt 1 - Tensile Force (kips): [15.0587 ; 15.0234 ; 14.9926 ; 14.9627 ; 14.9176 ; 14.8533 ; 14.8315 ; 14.8 ; 14.7555 ; 14.6971 ; 14.6059 ; 14.2606 ; 12.8937 ; 11.2294 ; 9.42129 ; 9.42176 ; 9.42306 ; 9.42556 ; 9.42983 ; 9.43096 ; 9.43322 ; 9.43717 ; 9.43875 ; 9.2323 ; 9.23141 ; 9.28658 ; 9.31029 ; 9.34958 ; 9.33709 ; 9.33689 ; 9.36724 ; 9.37457 ; 9.343 ; 9.3528 ; 9.34793 ; 9.37386 ; 9.3791 ; 9.39934 ; 9.39635 ; 9.29679 ; 9.1647 ; 8.99 ; 8.93067 ; 8.87432 ; 8.73484 ; 8.44448 ; 8.35249 ; 8.25067 ; 8.12718 ; 8.04949 ; 8.02094 ; 7.96052]

Bolt 1 - Shear Force (kips): [0.0135701 ; 0.0464597 ; 0.0882618 ; 0.125154 ; 0.173915 ; 0.23659 ; 0.257002 ; 0.284746 ; 0.321966 ; 0.368803 ; 0.438243 ; 0.669015 ; 1.44998 ; 2.30376 ; 3.10839 ; 3.10891 ; 3.10952 ; 3.11041 ; 3.11183 ; 3.1122 ; 3.11265 ; 3.11326 ; 3.11656 ; 3.27573 ; 3.30356 ; 3.31342 ; 3.31781 ; 3.32533 ; 3.45615 ; 3.6399 ; 3.81108 ; 4.07452 ; 4.55548 ; 5.18149 ; 5.4911 ; 5.78543 ; 5.91233 ; 6.12096 ; 6.45893 ; 7.07472 ; 7.82553 ; 8.83519 ; 9.18042 ; 9.55602 ; 10.1924 ; 11.3333 ; 11.6609 ; 12.0699 ; 12.6524 ; 13.2563 ; 13.7668 ; 14.1628]

Bolt 2 - Tensile Force (kips): [15.0843 ; 15.0481 ; 15.019 ; 14.9953 ; 14.9695 ; 14.9519 ; 14.9492 ; 14.9529 ; 14.9674 ; 14.9992 ; 15.0478 ; 14.9243 ; 13.91 ; 12.9587 ; 11.9464 ; 11.8163 ; 11.6188 ; 11.3035 ; 11.2706 ; 11.3946 ; 11.5859 ; 11.8829 ; 12.2293 ; 12.7563 ; 13.4643 ; 14.4638 ; 14.8003 ; 15.2322 ; 15.4108 ; 15.6585 ; 15.9586 ; 16.331 ; 16.893 ; 17.7132 ; 18.0167 ; 18.4396 ; 18.5916 ; 18.8086 ; 19.1137 ; 19.5549 ; 20.1545 ; 20.9451 ; 21.1938 ; 21.5106 ; 21.9557 ; 22.5512 ; 22.7254 ; 22.9862 ; 23.3411 ; 23.798 ; 24.2909 ; 24.7183]

Bolt 2 - Shear Force (kips): [0.019573 ; 0.04379 ; 0.086114 ; 0.12388 ; 0.17386 ; 0.23794 ; 0.25867 ; 0.28671 ; 0.3236 ; 0.36815 ; 0.43041 ; 0.63895 ; 1.3855 ; 2.1779 ; 3.076 ; 3.166 ; 3.2969 ; 3.4866 ; 3.6945 ; 3.7423 ; 3.8104 ; 3.9092 ; 4.0309 ; 4.1985 ; 4.4365 ; 4.7653 ; 4.8759 ; 4.9931 ; 5.0049 ; 5.0204 ; 5.0486 ; 5.0711 ; 5.0797 ; 5.1955 ; 5.2361 ; 5.2841 ; 5.2937 ; 5.3017 ; 5.3531 ; 5.4222 ; 5.6015 ; 5.7845 ; 5.888 ; 6.0454 ; 6.2091 ; 6.34 ; 6.4224 ; 6.5149 ; 6.6423 ; 6.8211 ; 6.9219 ; 6.8068]

Bolt 3 - Tensile Force (kips): [16 ; 15.983 ; 16.0022 ; 16.0597 ; 16.1962 ; 16.4645 ; 16.5931 ; 16.8032 ; 17.1134 ; 17.5911 ; 18.3098 ; 19.2681 ; 20.1996 ; 21.6038 ; 23.266 ; 23.3762 ; 23.5314 ; 23.7374 ; 24.1693 ; 24.3512 ; 24.6123 ; 24.9884 ; 25.4406 ; 26.1466 ; 27.0645 ; 28.1755 ; 28.5084 ; 28.9142 ; 29.0481 ; 29.2391 ; 29.5096 ; 29.8859 ; 30.3704 ; 30.9171 ; 31.0712 ; 31.2417 ; 31.2859 ; 31.3373 ; 31.3965 ; 31.4658 ; 31.5794 ; 31.6745 ; 31.6992 ; 31.7338 ; 31.7247 ; 31.7717 ; 31.7777 ; 31.7759 ; 31.833 ; 31.9045 ; 31.9558 ; 31.9646]

Bolt 3 - Shear Force (kips): [0.016479 ; 0.0022527 ; 0.0091879 ; 0.020898 ; 0.03685 ; 0.056036 ; 0.062462 ; 0.070903 ; 0.082266 ; 0.092329 ; 0.1035 ; 0.13048 ; 0.16479 ; 0.20607 ; 0.22227 ; 0.22263 ; 0.22298 ; 0.22318 ; 0.2232 ; 0.22318 ; 0.2234 ; 0.22494 ; 0.22731 ; 0.22705 ; 0.21873 ; 0.20301 ; 0.19706 ; 0.19052 ; 0.18899 ; 0.18753 ; 0.185 ; 0.17726 ; 0.17598 ; 0.20344 ; 0.21052 ; 0.2174 ; 0.21411 ; 0.20642 ; 0.1923 ; 0.17254 ; 0.22773 ; 0.27204 ; 0.28846 ; 0.34857 ; 0.55209 ; 0.79099 ; 0.96772 ; 1.2426 ; 1.4322 ; 1.6892 ; 2.0006 ; 2.25]

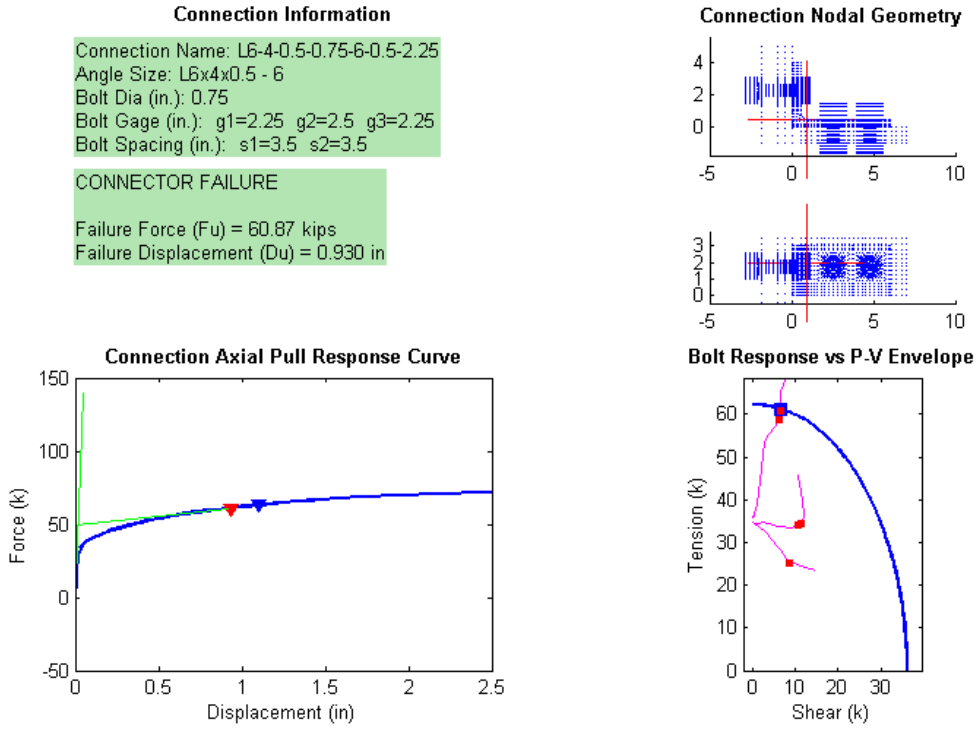


Figure B.46 Connection L6_4_0.5_0.75_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.75_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 2.7642e+003

Plastic Stiffness (k/in): 12.7152

Displacement (in): [2.7438e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.13464 ; 0.19799 ; 0.29302 ; 0.32866 ; 0.38211 ; 0.40216 ; 0.43222 ; 0.4435 ; 0.46041 ; 0.48578 ; 0.52384 ; 0.58092 ; 0.66654 ; 0.79498 ; 0.84314 ; 0.91538 ; 1.0237 ; 1.0508 ; 1.0779 ; 1.1186 ; 1.1795 ; 1.1948 ; 1.21 ; 1.2329 ; 1.2672 ; 1.3186 ; 1.3379 ; 1.3668 ; 1.4102 ; 1.4753 ; 1.5729 ; 1.7194 ; 1.9391 ; 2.1891 ; 2.4391 ; 2.5]

Force (kips): [-0.866549 ; 2.32723 ; 4.53224 ; 7.22639 ; 10.4362 ; 11.412 ; 12.6702 ; 14.1061 ; 15.538 ; 16.8249 ; 17.9458 ; 18.9892 ; 20.0414 ; 21.2087 ; 22.6039 ; 24.2058 ; 24.7405 ; 25.4729 ; 25.7354 ; 26.141 ; 26.2873 ; 26.4955 ; 26.7978 ; 27.2029 ; 27.7873 ; 28.5689 ; 29.5571 ; 29.8805 ; 30.3398 ; 31.0302 ; 31.1843 ; 31.3409 ; 31.6031 ; 31.9555 ; 32.0514 ; 32.1466 ; 32.2837 ; 32.4874 ; 32.7623 ; 32.8595 ; 33.0008 ; 33.2063 ; 33.476 ; 33.8226 ; 34.2795 ; 34.8505 ; 35.3545 ; 35.7574 ; 35.843]

Bolt 1 - Tensile Force (kips): [34.7705 ; 34.6818 ; 34.6134 ; 34.5212 ; 34.4025 ; 34.3641 ; 34.3125 ; 34.2506 ; 34.1839 ; 34.1124 ; 34.0302 ; 33.9194 ; 33.4372 ; 32.2464 ; 30.6982 ; 28.8236 ; 28.1552 ; 27.1832 ; 26.8161 ; 26.2676 ; 26.0722 ; 25.7982 ; 25.4745 ; 25.4707 ; 25.4687 ; 25.4703 ; 25.4778 ; 25.4814 ; 25.3428 ; 25.3532 ; 25.3571 ; 25.3614 ; 25.3673 ; 25.3767 ; 25.3498 ; 25.3113 ; 25.2465 ; 25.0917 ; 24.905 ; 24.8485 ; 24.7728 ; 24.6205 ; 24.4665 ; 24.3 ; 24.1421 ; 23.9463 ; 23.7243 ; 23.4762 ; 23.4045]

Bolt 1 - Shear Force (kips): [0.0542952 ; 0.129289 ; 0.243882 ; 0.389486 ; 0.570888 ; 0.627785 ; 0.702604 ; 0.791284 ; 0.885761 ; 0.986638 ; 1.10108 ; 1.25082 ; 1.83658 ; 3.03765 ; 4.42977 ; 5.95991 ; 6.47578 ; 7.20665 ; 7.47333 ; 7.86061 ; 7.99584 ; 8.18303 ; 8.4024 ; 8.40364 ; 8.40413 ; 8.40502 ; 8.40761 ; 8.40882 ; 8.59309 ; 8.58946 ; 8.5872 ; 8.58472 ; 8.58046 ; 8.57419 ; 8.7036 ; 8.88497 ; 9.13525 ; 9.62322 ; 10.1591 ; 10.3291 ; 10.6042 ; 11.0815 ; 11.5289 ; 11.9897 ; 12.491 ; 13.141 ; 13.7602 ; 14.3149 ; 14.4584]

Bolt 2 - Tensile Force (kips): [34.7796 ; 34.6633 ; 34.5747 ; 34.4729 ; 34.3799 ; 34.3587 ; 34.3384 ; 34.3269 ; 34.3422 ; 34.3913 ; 34.4592 ; 34.609 ; 34.6437 ; 34.4183 ; 34.18 ; 33.8981 ; 33.8433 ; 33.7808 ; 33.7604 ; 33.7263 ; 33.7142 ; 33.7013 ; 33.6732 ; 33.5966 ; 33.4974 ; 33.4884 ; 33.6547 ; 33.7268 ; 33.914 ; 34.3164 ; 34.4182 ; 34.5209 ; 34.4955 ; 34.7579 ; 34.8905 ; 35.0191 ; 35.2136 ; 35.4981 ; 35.9063 ; 36.0542 ; 36.2749 ; 36.6758 ; 37.3842 ; 38.4211 ; 39.8653 ; 41.8346 ; 43.7277 ; 45.3283 ; 45.6844]

Bolt 2 - Shear Force (kips): [0.0561001 ; 0.165754 ; 0.308922 ; 0.491945 ; 0.720242 ; 0.792383 ; 0.887603 ; 1.00323 ; 1.13317 ; 1.28254 ; 1.46358 ; 1.69012 ; 2.31148 ; 3.46068 ; 4.72133 ; 5.90835 ; 6.26357 ; 6.7527 ; 6.92986 ; 7.19056 ; 7.2867 ; 7.42863 ; 7.64447 ; 8.00028 ; 8.50494 ; 9.12416 ; 9.87251 ; 10.1222 ; 10.4307 ; 10.7956 ; 10.878 ; 10.9573 ; 11.3063 ; 11.6062 ; 11.639 ; 11.6722 ; 11.7226 ; 11.7904 ; 11.8857 ; 11.9196 ; 11.9713 ; 11.9819 ; 11.9004 ; 11.7963 ; 11.6756 ; 11.3823 ; 11.0562 ; 10.7635 ; 10.6819]

Bolt 3 - Tensile Force (kips): [36 ; 35.9446 ; 35.978 ; 36.1538 ; 36.4533 ; 36.5803 ; 36.7797 ; 37.108 ; 37.6609 ; 38.3058 ; 38.979 ; 39.7719 ; 40.8659 ; 42.3347 ; 44.5037 ; 47.4714 ; 48.4779 ; 49.8704 ; 50.3582 ; 51.0206 ; 51.2523 ; 51.5793 ; 52.0462 ; 52.6985 ; 53.8107 ; 55.244 ; 57.0443 ; 57.6569 ; 58.5146 ; 59.8623 ; 60.1344 ; 60.4584 ; 61.1424 ; 62.1563 ; 62.4294 ; 62.6495 ; 62.947 ; 63.4106 ; 64.0733 ; 64.3071 ; 64.6331 ; 65.0601 ; 65.6014 ; 66.2335 ; 67.0359 ; 68.0923 ; 68.9708 ; 69.5935 ; 69.7047]

Bolt 3 - Shear Force (kips): [0.026876 ; 0.037003 ; 0.089896 ; 0.17406 ; 0.28177 ; 0.32032 ; 0.37622 ; 0.45389 ; 0.55875 ; 0.68781 ; 0.85276 ; 1.0434 ; 1.2465 ; 1.4939 ; 1.7552 ; 2.029 ; 2.1262 ; 2.262 ; 2.3081 ; 2.3878 ; 2.4185 ; 2.4534 ; 2.5111 ; 2.587 ; 2.7557 ; 3.8977 ; 5.1146 ; 5.5604 ; 5.9528 ; 6.3046 ; 6.414 ; 6.4371 ; 6.3484 ; 6.4919 ; 6.5016 ; 6.5384 ; 6.5446 ; 6.6012 ; 6.4751 ; 6.4305 ; 6.3959 ; 6.4297 ; 6.5995 ; 6.7958 ; 7.1173 ; 7.4776 ; 7.8073 ; 8.1879 ; 8.2713]

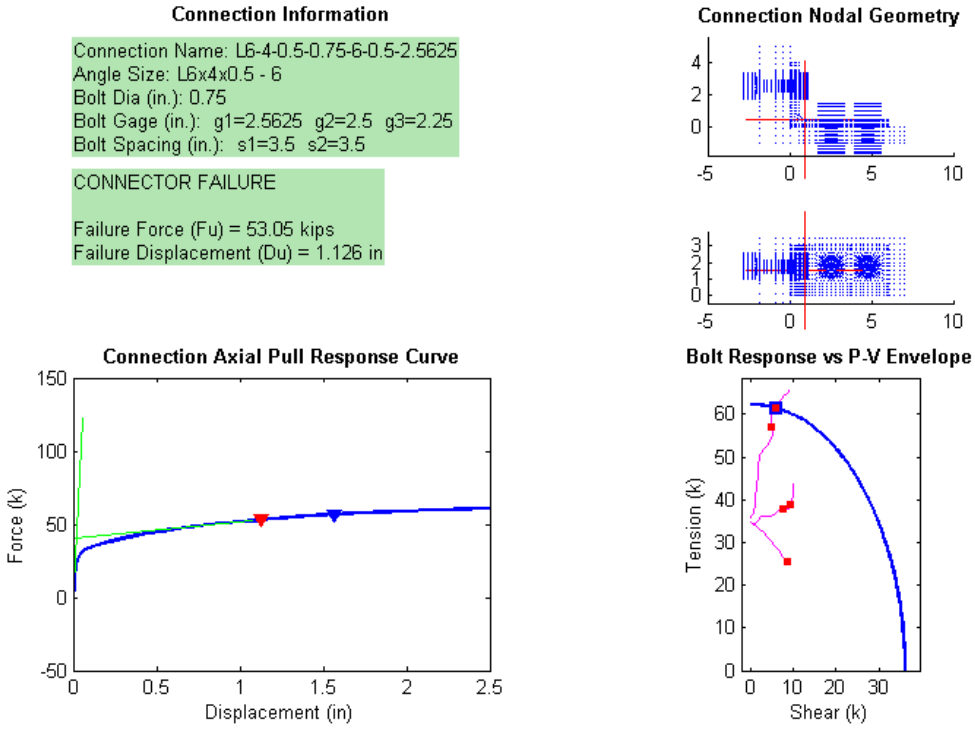


Figure B.47 Connection L6_4_0.5_0.75_6_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.75_6_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 2.1067e+003

Plastic Stiffness (k/in): 11.0839

Displacement (in): [2.5485e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.46527 ; 0.47418 ; 0.48755 ; 0.50759 ; 0.53766 ; 0.58276 ; 0.62786 ; 0.67296 ; 0.68988 ; 0.71525 ; 0.7533 ; 0.81038 ; 0.89601 ; 1.0244 ; 1.0726 ; 1.1448 ; 1.199 ; 1.2803 ; 1.3108 ; 1.3565 ; 1.4251 ; 1.4936 ; 1.5622 ; 1.6651 ; 1.7037 ; 1.7615 ; 1.8483 ; 1.9785 ; 2.1738 ; 2.2363 ; 2.33 ; 2.4707 ; 2.5]

Force (kips): [-0.849849 ; 1.58997 ; 3.26485 ; 5.36302 ; 7.97501 ; 10.8768 ; 13.2292 ; 14.7349 ; 15.8815 ; 16.9478 ; 18.0145 ; 19.2129 ; 20.6646 ; 21.1327 ; 21.77 ; 21.9937 ; 22.0791 ; 22.2189 ; 22.4062 ; 22.6826 ; 23.0784 ; 23.4511 ; 23.8052 ; 23.9377 ; 24.1226 ; 24.3845 ; 24.7561 ; 25.2718 ; 25.9805 ; 26.2474 ; 26.6199 ; 26.8848 ; 27.2402 ; 27.3784 ; 27.5681 ; 27.8417 ; 28.098 ; 28.3342 ; 28.6559 ; 28.7655 ; 28.9257 ; 29.1453 ; 29.4327 ; 29.8071 ; 29.9164 ; 30.0713 ; 30.2923 ; 30.3386]

Bolt 1 - Tensile Force (kips): [34.7699 ; 34.7036 ; 34.6539 ; 34.5852 ; 34.4924 ; 34.3797 ; 34.2756 ; 34.1916 ; 34.0991 ; 33.978 ; 33.8623 ; 33.1523 ; 31.8921 ; 31.4607 ; 30.8433 ; 30.6142 ; 30.526 ; 30.3816 ; 30.1838 ; 29.8915 ; 29.453 ; 29.0241 ; 28.6005 ; 28.4367 ; 28.2029 ; 27.8638 ; 27.3749 ; 26.6633 ; 25.6839 ; 25.5676 ; 25.5684 ; 25.5704 ; 25.5757 ; 25.5779 ; 25.5829 ; 25.5927 ; 25.6028 ; 25.6128 ; 25.628 ; 25.6335 ; 25.6017 ; 25.597 ; 25.622 ; 25.6652 ; 25.6796 ; 25.7017 ; 25.736 ; 25.7436]

Bolt 1 - Shear Force (kips): [0.053131 ; 0.093688 ; 0.17936 ; 0.29179 ; 0.43852 ; 0.61066 ; 0.76499 ; 0.89081 ; 1.0292 ; 1.1999 ; 1.3562 ; 2.1798 ; 3.4102 ; 3.8066 ; 4.3548 ; 4.5529 ; 4.6284 ; 4.7511 ; 4.9182 ; 5.1619 ; 5.5198 ; 5.8638 ; 6.1979 ; 6.3256 ; 6.507 ; 6.768 ; 7.1395 ; 7.6627 ; 8.3507 ; 8.4344 ; 8.4365 ; 8.4377 ; 8.4398 ; 8.4406 ; 8.4422 ; 8.4455 ; 8.4488 ; 8.4521 ; 8.4572 ; 8.459 ; 8.5202 ; 8.5451 ; 8.5363 ; 8.521 ; 8.516 ; 8.5088 ; 8.4983 ; 8.4963]

Bolt 2 - Tensile Force (kips): [34.7774 ; 34.6898 ; 34.623 ; 34.5448 ; 34.47 ; 34.4275 ; 34.4699 ; 34.6019 ; 34.805 ; 35.2184 ; 35.888 ; 36.1755 ; 36.2402 ; 36.2363 ; 36.2649 ; 36.3089 ; 36.3238 ; 36.3389 ; 36.3813 ; 36.4506 ; 36.5533 ; 36.6674 ; 36.8016 ; 36.8495 ; 36.9284 ; 37.0526 ; 37.2483 ; 37.5759 ; 38.0522 ; 38.0664 ; 38.0026 ; 37.9582 ; 37.9469 ; 37.9233 ; 37.9994 ; 38.3123 ; 38.6442 ; 38.9374 ; 39.3763 ; 39.5254 ; 39.8624 ; 40.2913 ; 40.8185 ; 41.6865 ; 42.0188 ; 42.5988 ; 43.504 ; 43.6907]

Bolt 2 - Shear Force (kips): [0.0545681 ; 0.121778 ; 0.230779 ; 0.373568 ; 0.56063 ; 0.781488 ; 0.992717 ; 1.18996 ; 1.41801 ; 1.67582 ; 1.90031 ; 2.68458 ; 3.79655 ; 4.14384 ; 4.58101 ; 4.71687 ; 4.76872 ; 4.8537 ; 4.96509 ; 5.12491 ; 5.35664 ; 5.57261 ; 5.77457 ; 5.85093 ; 5.95647 ; 6.10587 ; 6.31471 ; 6.59787 ; 7.01726 ; 7.29962 ; 7.77485 ; 8.11468 ; 8.56372 ; 8.74147 ; 8.93087 ; 9.07513 ; 9.1905 ; 9.31701 ; 9.49026 ; 9.55858 ; 9.58759 ; 9.66363 ; 9.8229 ; 9.96387 ; 10.0058 ; 10.0552 ; 10.0466 ; 10.061]

Bolt 3 - Tensile Force (kips): [36 ; 35.9358 ; 35.9353 ; 36.0291 ; 36.2603 ; 36.6308 ; 37.2285 ; 37.9623 ; 38.5605 ; 39.4192 ; 40.896 ; 43.1658 ; 46.0213 ; 46.9477 ; 48.2537 ; 48.7148 ; 48.88 ; 49.0999 ; 49.4224 ; 49.8618 ; 50.4545 ; 51.0348 ; 51.6502 ; 51.8992 ; 52.232 ; 52.6802 ; 53.3109 ; 54.219 ; 55.6076 ; 56.2744 ; 57.2944 ; 58.07 ; 59.0049 ; 59.4321 ; 59.9531 ; 60.522 ; 61.0186 ; 61.4712 ; 62.1839 ; 62.4179 ; 62.7445 ; 63.1715 ; 63.7572 ; 64.551 ; 64.7714 ; 65.0514 ; 65.5476 ; 65.6598]

Bolt 3 - Shear Force (kips): [0.030602 ; 0.026145 ; 0.066923 ; 0.13405 ; 0.22823 ; 0.34964 ; 0.49291 ; 0.64763 ; 0.83393 ; 1.0118 ; 1.1652 ; 1.3069 ; 1.5682 ; 1.6613 ; 1.7926 ; 1.8391 ; 1.8599 ; 1.9067 ; 1.9608 ; 2.0473 ; 2.1753 ; 2.3477 ; 2.6546 ; 2.988 ; 3.3211 ; 3.6075 ; 4.0149 ; 4.7023 ; 5.2151 ; 5.0145 ; 4.9058 ; 4.7735 ; 4.8233 ; 4.8044 ; 4.9377 ; 5.2357 ; 5.5404 ; 5.7497 ; 6.2314 ; 6.3628 ; 6.5404 ; 6.8073 ; 7.1767 ; 7.8903 ; 8.1296 ; 8.3954 ; 8.7621 ; 8.8379]

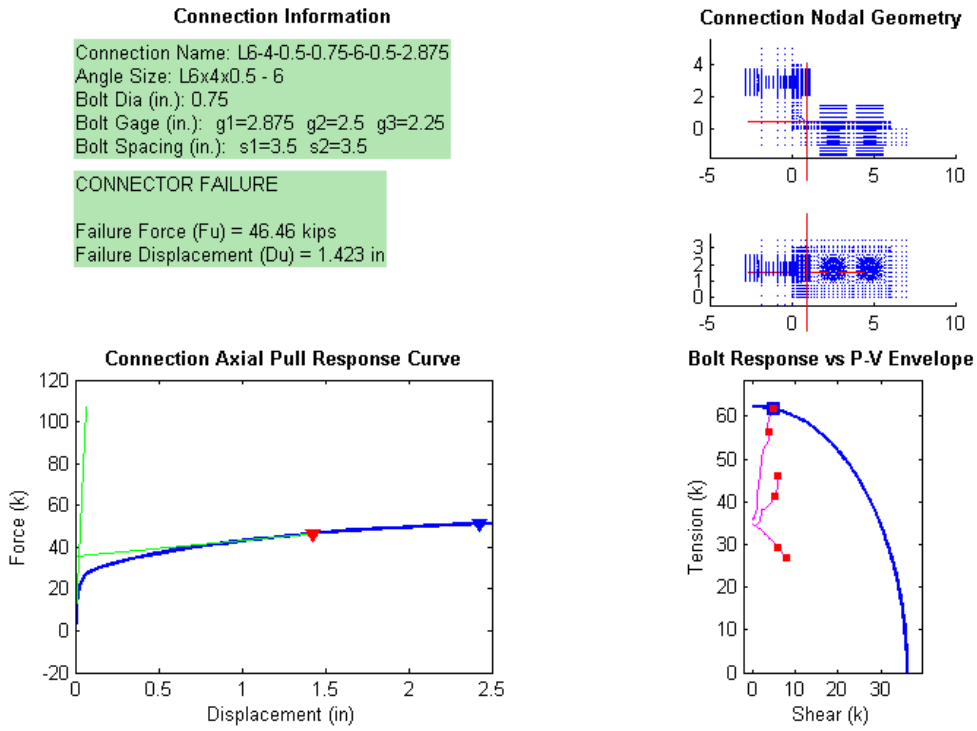


Figure B.48 Connection L6_4_0.5_0.75_6_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.75_6_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 1.6458e+003

Plastic Stiffness (k/in): 7.7730

Displacement (in): [3.1631e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.53655 ; 0.67909 ; 0.73254 ; 0.75259 ; 0.78265 ; 0.81272 ; 0.84279 ; 0.88789 ; 0.95554 ; 1.057 ; 1.0951 ; 1.1522 ; 1.2378 ; 1.2699 ; 1.318 ; 1.3903 ; 1.4987 ; 1.6612 ; 1.905 ; 2.155 ; 2.2175 ; 2.3113 ; 2.4519 ; 2.5]

Force (kips): [-0.83877 ; 1.09188 ; 2.37576 ; 4.01161 ; 6.10684 ; 8.61454 ; 10.8963 ; 12.3693 ; 13.3763 ; 14.2734 ; 15.0334 ; 15.9967 ; 17.2349 ; 17.6327 ; 18.1617 ; 18.8639 ; 19.785 ; 20.1054 ; 20.2304 ; 20.4123 ; 20.5796 ; 20.743 ; 20.9718 ; 21.2982 ; 21.7598 ; 21.9278 ; 22.1627 ; 22.5181 ; 22.6406 ; 22.8375 ; 23.1183 ; 23.4987 ; 24.0025 ; 24.6057 ; 25.1052 ; 25.2138 ; 25.3723 ; 25.5964 ; 25.6679]

Bolt 1 - Tensile Force (kips): [34.7698 ; 34.7181 ; 34.6809 ; 34.6304 ; 34.5588 ; 34.4656 ; 34.3711 ; 34.2969 ; 34.2278 ; 34.1491 ; 34.1013 ; 34.045 ; 33.9734 ; 33.9424 ; 33.8437 ; 33.4595 ; 32.8171 ; 32.5694 ; 32.4677 ; 32.3137 ; 32.1662 ; 32.017 ; 31.8058 ; 31.4947 ; 31.0373 ; 30.8662 ; 30.6236 ; 30.2483 ; 30.1189 ; 29.9037 ; 29.5866 ; 29.1404 ; 28.5218 ; 27.7639 ; 27.1163 ; 26.9742 ; 26.8537 ; 26.7895 ; 26.7761]

Bolt 1 - Shear Force (kips): [0.052511 ; 0.070822 ; 0.13425 ; 0.22125 ; 0.33776 ; 0.4853 ; 0.63165 ; 0.74744 ; 0.85838 ; 0.98355 ; 1.0647 ; 1.1596 ; 1.2779 ; 1.3264 ; 1.4614 ; 1.932 ; 2.6169 ; 2.8654 ; 2.9659 ; 3.1164 ; 3.2594 ; 3.4029 ; 3.604 ; 3.8955 ; 4.3133 ; 4.4664 ; 4.6814 ; 5.0083 ; 5.1201 ; 5.3029 ; 5.5686 ; 5.9381 ; 6.4425 ; 7.0549 ; 7.5675 ; 7.6783 ; 7.7788 ; 7.8486 ; 7.8665]

Bolt 2 - Tensile Force (kips): [34.7767 ; 34.7085 ; 34.6567 ; 34.5958 ; 34.5316 ; 34.4945 ; 34.5263 ; 34.6712 ; 34.8809 ; 35.1939 ; 35.579 ; 36.3041 ; 37.3849 ; 37.7125 ; 38.0691 ; 38.3296 ; 38.6811 ; 38.821 ; 38.8693 ; 38.9431 ; 39.0277 ; 39.1188 ; 39.2664 ; 39.4898 ; 39.8389 ; 39.9759 ; 40.194 ; 40.5201 ; 40.6512 ; 40.8409 ; 41.1375 ; 41.6052 ; 42.3319 ; 43.4612 ; 44.6543 ; 44.9536 ; 45.4407 ; 46.195 ; 46.4482]

Bolt 2 - Shear Force (kips): [0.053708 ; 0.09262 ; 0.17537 ; 0.28703 ; 0.43736 ; 0.62782 ; 0.82465 ; 1.0047 ; 1.194 ; 1.3999 ; 1.5373 ; 1.7047 ; 1.9047 ; 1.9754 ; 2.1262 ; 2.5555 ; 3.1658 ; 3.3775 ; 3.4602 ; 3.5804 ; 3.6854 ; 3.7838 ; 3.9184 ; 4.1093 ; 4.3712 ; 4.4643 ; 4.5894 ; 4.7744 ; 4.8345 ; 4.934 ; 5.0713 ; 5.2482 ; 5.4661 ; 5.6784 ; 5.8105 ; 5.8331 ; 5.8204 ; 5.7514 ; 5.7255]

Bolt 3 - Tensile Force (kips): [36 ; 35.9364 ; 35.9157 ; 35.9546 ; 36.1191 ; 36.376 ; 36.8381 ; 37.4402 ; 38.0097 ; 38.609 ; 39.7576 ; 41.5015 ; 43.9539 ; 44.7694 ; 45.8979 ; 47.4268 ; 49.4818 ; 50.1606 ; 50.3799 ; 50.6719 ; 50.9578 ; 51.2258 ; 51.6072 ; 52.1433 ; 52.9554 ; 53.3093 ; 53.7557 ; 54.5349 ; 54.8052 ; 55.2912 ; 55.9894 ; 56.9068 ; 58.1485 ; 59.5914 ; 60.7999 ; 61.0503 ; 61.409 ; 61.9029 ; 62.0609]

Bolt 3 - Shear Force (kips): [0.032008 ; 0.019629 ; 0.050079 ; 0.10254 ; 0.18438 ; 0.28686 ; 0.40775 ; 0.53537 ; 0.68471 ; 0.84302 ; 0.87449 ; 1.0067 ; 1.307 ; 1.408 ; 1.546 ; 1.7239 ; 1.9363 ; 2.03 ; 2.0986 ; 2.1129 ; 2.1493 ; 2.2104 ; 2.2602 ; 2.3305 ; 2.7175 ; 2.9907 ; 3.3419 ; 3.6149 ; 3.775 ; 3.832 ; 3.8522 ; 3.5815 ; 3.232 ; 3.6615 ; 4.0772 ; 4.1707 ; 4.3822 ; 4.732 ; 4.8483]

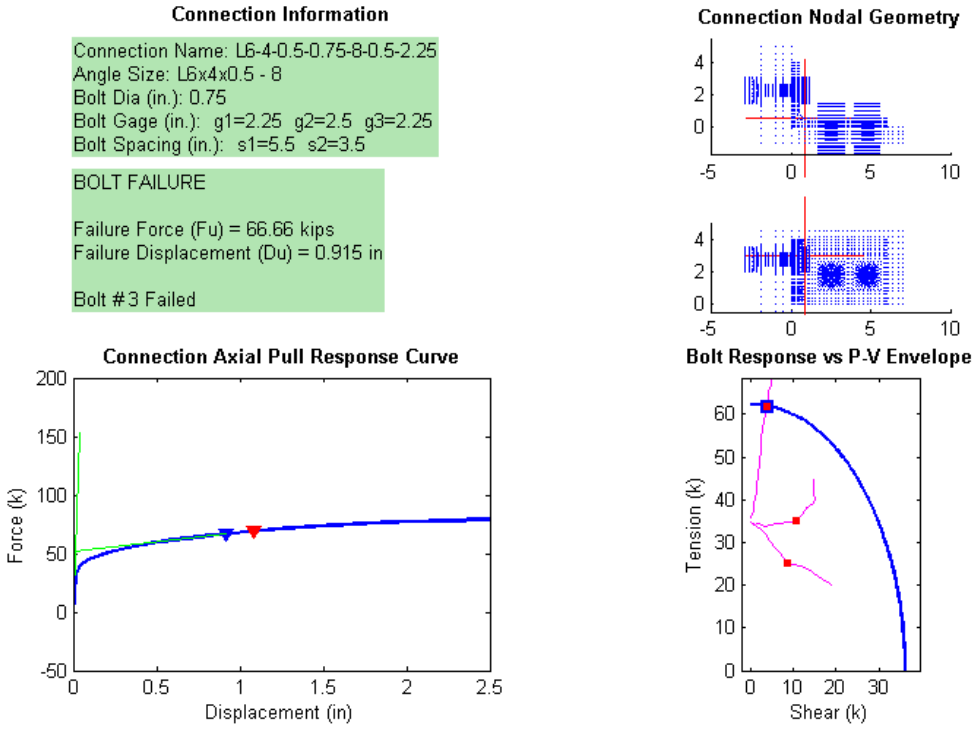


Figure B.49 Connection L6_4_0.5_0.75_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.75_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 3.5393e+003

Plastic Stiffness (k/in): 15.6148

Displacement (in): [2.296e-036 ; 0.00048828 ; 0.00097656 ; 0.001709 ; 0.0028076 ; 0.0044556 ; 0.0069275 ; 0.010635 ; 0.012026 ; 0.014112 ; 0.01724 ; 0.021933 ; 0.028972 ; 0.039531 ; 0.055369 ; 0.079126 ; 0.11476 ; 0.16822 ; 0.2484 ; 0.36867 ; 0.41377 ; 0.48142 ; 0.50679 ; 0.54485 ; 0.60193 ; 0.68755 ; 0.81598 ; 0.819 ; 0.82351 ; 0.83028 ; 0.84044 ; 0.85568 ; 0.87854 ; 0.91283 ; 0.96426 ; 1.0414 ; 1.0703 ; 1.1137 ; 1.13 ; 1.1544 ; 1.1636 ; 1.1773 ; 1.1979 ; 1.2288 ; 1.2751 ; 1.2925 ; 1.3186 ; 1.3577 ; 1.4163 ; 1.5043 ; 1.5373 ; 1.5868 ; 1.661 ; 1.6888 ; 1.7306 ; 1.7932 ; 1.8872 ; 2.0281 ; 2.2395 ; 2.4895 ; 2.5]

Force (kips): [-0.76665 ; 0.186487 ; 0.961536 ; 1.98326 ; 3.33586 ; 5.09394 ; 7.37091 ; 10.2613 ; 11.199 ; 12.4594 ; 14.0661 ; 15.8524 ; 17.6809 ; 19.3149 ; 20.6869 ; 21.8227 ; 23.052 ; 24.4669 ; 26.1425 ; 28.0711 ; 28.6627 ; 29.4547 ; 29.7524 ; 30.1727 ; 30.7569 ; 31.5303 ; 32.5397 ; 32.5642 ; 32.6004 ; 32.6574 ; 32.7467 ; 32.8669 ; 33.0402 ; 33.3079 ; 33.6941 ; 34.2125 ; 34.405 ; 34.6748 ; 34.7792 ; 34.9292 ; 34.9905 ; 35.0805 ; 35.2043 ; 35.3827 ; 35.6344 ; 35.7359 ; 35.8801 ; 36.0885 ; 36.3879 ; 36.7915 ; 36.9357 ; 37.1408 ; 37.4319 ; 37.5377 ; 37.6879 ; 37.9028 ; 38.1873 ; 38.5531 ; 39.0073 ; 39.4672 ; 39.4862]

Bolt 1 - Tensile Force (kips): [34.7664 ; 34.7388 ; 34.7151 ; 34.6821 ; 34.6366 ; 34.5719 ; 34.4827 ; 34.3606 ; 34.3184 ; 34.2595 ; 34.1805 ; 34.0874 ; 33.9819 ; 33.861 ; 33.6955 ; 33.0354 ; 31.9185 ; 30.4221 ; 28.4228 ; 25.8993 ; 25.4284 ; 25.4185 ; 25.4163 ; 25.4146 ; 25.4145 ; 25.4174 ; 25.4265 ; 25.427 ; 25.4236 ; 25.3658 ; 25.2786 ; 25.2772 ; 25.2779 ; 25.2821 ; 25.2906 ; 25.3054 ; 25.3105 ; 25.3167 ; 25.2882 ; 25.2431 ; 25.1853 ; 25.0945 ; 24.9991 ; 24.868 ; 24.6906 ; 24.5528 ; 24.3471 ; 24.0831 ; 23.7309 ; 23.1999 ; 22.9611 ; 22.5846 ; 22.1956 ; 22.0811 ; 21.9125 ; 21.5651 ; 21.2111 ; 20.8343 ; 20.3864 ; 20.0767 ; 20.058]

Bolt 1 - Shear Force (kips): [0.0530068 ; 0.0400884 ; 0.0700132 ; 0.123488 ; 0.199399 ; 0.300578 ; 0.43562 ; 0.613192 ; 0.672295 ; 0.752994 ; 0.858411 ; 0.980289 ; 1.11403 ; 1.26337 ; 1.46256 ; 2.20277 ; 3.28008 ; 4.59727 ; 6.20281 ; 8.05792 ; 8.38108 ; 8.38474 ; 8.38517 ; 8.38543 ; 8.38597 ; 8.38726 ; 8.39046 ; 8.39063 ; 8.39676 ; 8.4818 ; 8.58671 ; 8.58861 ; 8.58903 ; 8.58738 ; 8.58318 ; 8.57639 ; 8.57361 ; 8.56888 ; 8.6989 ; 8.90722 ; 9.09149 ; 9.36411 ; 9.6395 ; 10.0052 ; 10.5247 ; 10.9249 ; 11.4789 ; 12.1453 ; 13.0688 ; 14.2091 ; 14.6092 ; 15.1953 ; 15.7645 ; 15.9202 ; 16.156 ; 16.6755 ; 17.1612 ; 17.6734 ; 18.3156 ; 18.7351 ; 18.7606]

Bolt 2 - Tensile Force (kips): [34.7742 ; 34.745 ; 34.7169 ; 34.6762 ; 34.6207 ; 34.5469 ; 34.4576 ; 34.3586 ; 34.3305 ; 34.301 ; 34.2702 ; 34.2514 ; 34.2564 ; 34.2869 ; 34.3332 ; 34.0531 ; 33.7865 ; 33.944 ; 34.2852 ; 34.6077 ; 34.654 ; 34.6527 ; 34.6396 ; 34.638 ; 34.6519 ; 34.7172 ; 34.9601 ; 34.9674 ; 34.9793 ; 35.0069 ; 35.0427 ; 35.0809 ; 35.1423 ; 35.2383 ; 35.3979 ; 35.6694 ; 35.7522 ; 35.8273 ; 35.8963 ; 36.0038 ; 36.0583 ; 36.143 ; 36.2621 ; 36.4091 ; 36.7141 ; 36.8382 ; 37.0213 ; 37.2788 ; 37.6111 ; 38.0705 ; 38.2546 ; 38.5433 ; 38.9154 ; 39.0508 ; 39.253 ; 39.5509 ; 40.1809 ; 41.2748 ; 42.8147 ; 44.5369 ; 44.6141]

Bolt 2 - Shear Force (kips): [0.0463855 ; 0.0364186 ; 0.0790619 ; 0.144167 ; 0.233546 ; 0.352003 ; 0.510162 ; 0.717698 ; 0.786709 ; 0.880884 ; 1.00342 ; 1.14869 ; 1.31334 ; 1.51109 ; 1.77238 ; 2.52096 ; 3.56472 ; 4.7659 ; 6.07777 ; 7.35432 ; 7.76899 ; 8.36758 ; 8.58002 ; 8.87247 ; 9.27165 ; 9.78695 ; 10.3964 ; 10.4092 ; 10.4274 ; 10.4462 ; 10.4787 ; 10.5403 ; 10.6278 ; 10.7526 ; 10.9247 ; 11.1486 ; 11.2545 ; 11.5607 ; 11.6357 ; 11.7461 ; 11.7829 ; 11.8319 ; 11.9063 ; 12.0444 ; 12.1726 ; 12.2046 ; 12.25 ; 12.3604 ; 12.6851 ; 13.1407 ; 13.3595 ; 13.5994 ; 14.0887 ; 14.3082 ; 14.5581 ; 14.8007 ; 14.9133 ; 14.8668 ; 14.7276 ; 14.6635 ; 14.6513]

Bolt 3 - Tensile Force (kips): [36 ; 35.9783 ; 35.9611 ; 35.9478 ; 35.9501 ; 36.002 ; 36.1607 ; 36.4259 ; 36.5323 ; 36.7149 ; 37.0059 ; 37.5846 ; 38.378 ; 39.3161 ; 40.485 ; 41.8069 ; 43.4912 ; 45.7477 ; 48.7101 ; 52.3244 ; 53.3887 ; 54.8028 ; 55.2874 ; 56.0082 ; 57.0722 ; 58.4824 ; 60.3611 ; 60.417 ; 60.4954 ; 60.6043 ; 60.781 ; 61.042 ; 61.4201 ; 61.9675 ; 62.8338 ; 63.9821 ; 64.4512 ; 65.0333 ; 65.251 ; 65.5148 ; 65.6155 ; 65.7606 ; 65.9767 ; 66.2775 ; 66.7006 ; 66.8704 ; 67.0934 ; 67.427 ; 67.9392 ; 68.5064 ; 68.6978 ; 68.9606 ; 69.3383 ; 69.4911 ; 69.7094 ; 70.0049 ; 70.3658 ; 70.7584 ; 71.1227 ; 71.5606 ; 71.5834]

Bolt 3 - Shear Force (kips): [0.030395 ; 0.016007 ; 0.013057 ; 0.02544 ; 0.051287 ; 0.094102 ; 0.16203 ; 0.2514 ; 0.28288 ; 0.33011 ; 0.39707 ; 0.49189 ; 0.61361 ; 0.7777 ; 0.98224 ; 1.1982 ; 1.477 ; 1.7568 ; 2.0427 ; 2.3024 ; 2.3626 ; 2.4626 ; 2.5158 ; 2.5745 ; 2.6866 ; 2.8994 ; 3.3026 ; 3.3639 ; 3.4522 ; 3.598 ; 3.6513 ; 3.616 ; 3.6234 ; 3.6488 ; 3.9201 ; 4.1505 ; 3.9873 ; 4.0504 ; 4.1032 ; 4.1804 ; 4.2044 ; 4.2678 ; 4.3811 ; 4.5288 ; 4.6388 ; 4.6525 ; 4.6779 ; 4.6514 ; 4.6672 ; 4.7752 ; 4.8129 ; 4.8678 ; 4.9902 ; 5.0599 ; 5.1498 ; 5.2489 ; 5.3679 ; 5.4723 ; 5.5468 ; 5.6036 ; 5.61]

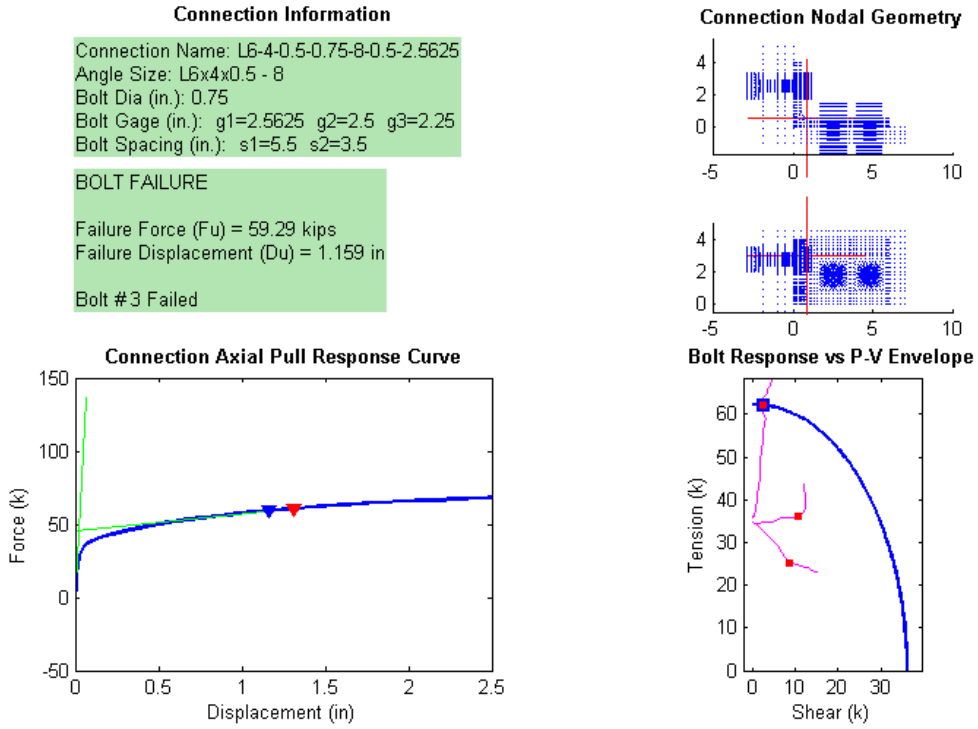


Figure B.50 Connection L6_4_0.5_0.75_8_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.75_8_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 2.0792e+003

Plastic Stiffness (k/in): 11.6004

Displacement (in): [2.9406e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.56737 ; 0.59081 ; 0.62596 ; 0.6787 ; 0.7578 ; 0.87645 ; 0.92095 ; 0.98769 ; 1.0127 ; 1.0503 ; 1.1066 ; 1.1277 ; 1.1594 ; 1.2069 ; 1.2781 ; 1.3049 ; 1.345 ; 1.4051 ; 1.4953 ; 1.5291 ; 1.5418 ; 1.5609 ; 1.5894 ; 1.6001 ; 1.6161 ; 1.6402 ; 1.6764 ; 1.6899 ; 1.7102 ; 1.7407 ; 1.7864 ; 1.855 ; 1.9579 ; 2.1121 ; 2.3436 ; 2.3827 ; 2.4413 ; 2.5]

Force (kips): [-0.736845 ; 1.6015 ; 3.32419 ; 5.49536 ; 8.2422 ; 11.4383 ; 14.3861 ; 16.5239 ; 17.9838 ; 19.2048 ; 20.336 ; 21.6417 ; 23.1957 ; 25.0252 ; 25.5901 ; 25.8085 ; 26.1078 ; 26.5255 ; 27.1117 ; 27.8939 ; 28.1816 ; 28.6087 ; 28.7946 ; 29.0452 ; 29.3633 ; 29.4858 ; 29.651 ; 29.8895 ; 30.2059 ; 30.318 ; 30.4977 ; 30.7495 ; 31.1134 ; 31.2586 ; 31.3161 ; 31.398 ; 31.5115 ; 31.5553 ; 31.6206 ; 31.7134 ; 31.8451 ; 31.8983 ; 31.9767 ; 32.0908 ; 32.2539 ; 32.4864 ; 32.7919 ; 33.1976 ; 33.7062 ; 33.7866 ; 33.9007 ; 34.0085]

Bolt 1 - Tensile Force (kips): [34.7655 ; 34.6949 ; 34.637 ; 34.5556 ; 34.4438 ; 34.2992 ; 34.1473 ; 34.0114 ; 33.8639 ; 33.5438 ; 32.3892 ; 30.9275 ; 29.1422 ; 26.6994 ; 25.8743 ; 25.6023 ; 25.4759 ; 25.4691 ; 25.467 ; 25.4708 ; 25.4723 ; 25.4767 ; 25.4779 ; 25.4804 ; 25.4853 ; 25.4207 ; 25.3691 ; 25.3735 ; 25.3847 ; 25.3894 ; 25.3979 ; 25.4107 ; 25.3783 ; 25.3214 ; 25.2545 ; 25.1749 ; 25.1034 ; 25.0582 ; 24.9869 ; 24.9148 ; 24.8385 ; 24.7744 ; 24.669 ; 24.514 ; 24.2915 ; 24.0397 ; 23.8106 ; 23.6208 ; 23.2692 ; 23.2048 ; 23.1086 ; 23.0098]

Bolt 1 - Shear Force (kips): [0.0512265 ; 0.103782 ; 0.200351 ; 0.327143 ; 0.494919 ; 0.700339 ; 0.906044 ; 1.08527 ; 1.27431 ; 1.65931 ; 2.85497 ; 4.1862 ; 5.66985 ; 7.53479 ; 8.11735 ; 8.30433 ; 8.39398 ; 8.39893 ; 8.40171 ; 8.40436 ; 8.40516 ; 8.40684 ; 8.40731 ; 8.40818 ; 8.40989 ; 8.50614 ; 8.57356 ; 8.57177 ; 8.56597 ; 8.56361 ; 8.56029 ; 8.55522 ; 8.76728 ; 9.02298 ; 9.23347 ; 9.48071 ; 9.68766 ; 9.81799 ; 10.0249 ; 10.231 ; 10.4512 ; 10.6591 ; 10.9751 ; 11.4101 ; 11.987 ; 12.6792 ; 13.2849 ; 13.7711 ; 14.4735 ; 14.5869 ; 14.7475 ; 14.9093]

Bolt 2 - Tensile Force (kips): [34.7713 ; 34.6878 ; 34.616 ; 34.5298 ; 34.4374 ; 34.3748 ; 34.3818 ; 34.4737 ; 34.6263 ; 34.8218 ; 34.6823 ; 34.9392 ; 35.2958 ; 35.7598 ; 35.8756 ; 35.901 ; 35.9088 ; 35.8956 ; 35.8846 ; 35.9061 ; 35.9114 ; 35.9361 ; 35.9405 ; 35.9674 ; 36.0284 ; 36.0658 ; 36.1158 ; 36.1768 ; 36.319 ; 36.3793 ; 36.4796 ; 36.6392 ; 36.867 ; 37.0037 ; 37.0758 ; 37.1735 ; 37.2897 ; 37.3438 ; 37.4292 ; 37.5211 ; 37.6504 ; 37.7262 ; 37.8427 ; 38.0215 ; 38.2853 ; 38.6715 ; 39.5459 ; 40.8774 ; 42.7204 ; 43.0191 ; 43.4521 ; 43.8781]

Bolt 2 - Shear Force (kips): [0.0439838 ; 0.121285 ; 0.236659 ; 0.38694 ; 0.585582 ; 0.828173 ; 1.07638 ; 1.31216 ; 1.57858 ; 2.02762 ; 3.17741 ; 4.38965 ; 5.60408 ; 6.83601 ; 7.23437 ; 7.38989 ; 7.63986 ; 8.01184 ; 8.53042 ; 9.21029 ; 9.45078 ; 9.78974 ; 9.91697 ; 10.0911 ; 10.3262 ; 10.3988 ; 10.5119 ; 10.688 ; 10.9155 ; 10.9933 ; 11.0984 ; 11.2439 ; 11.5977 ; 11.7076 ; 11.7235 ; 11.7654 ; 11.8781 ; 11.9031 ; 11.9315 ; 12.0093 ; 12.1459 ; 12.1714 ; 12.2042 ; 12.2461 ; 12.3012 ; 12.4202 ; 12.3765 ; 12.2783 ; 12.0759 ; 12.0317 ; 11.9678 ; 11.8965]

Bolt 3 - Tensile Force (kips): [36 ; 35.9367 ; 35.9375 ; 36.0356 ; 36.2836 ; 36.7081 ; 37.5355 ; 38.6717 ; 39.7795 ; 41.2327 ; 43.0011 ; 45.4858 ; 48.7044 ; 52.4415 ; 53.4978 ; 53.8755 ; 54.381 ; 55.1031 ; 56.1922 ; 57.6409 ; 58.2284 ; 59.25 ; 59.8239 ; 60.5912 ; 61.4523 ; 61.7926 ; 62.2143 ; 62.8187 ; 63.5889 ; 63.8238 ; 64.1813 ; 64.7405 ; 65.437 ; 65.7142 ; 65.8152 ; 65.9576 ; 66.1544 ; 66.2261 ; 66.3312 ; 66.4807 ; 66.6935 ; 66.7753 ; 66.897 ; 67.0766 ; 67.3609 ; 67.7645 ; 68.2309 ; 68.8476 ; 69.6175 ; 69.7498 ; 69.9291 ; 70.0904]

Bolt 3 - Shear Force (kips): [0.033172 ; 0.021792 ; 0.059183 ; 0.12333 ; 0.21578 ; 0.33599 ; 0.48606 ; 0.66397 ; 0.88622 ; 1.0871 ; 1.3422 ; 1.5824 ; 1.8409 ; 2.126 ; 2.2007 ; 2.2505 ; 2.3105 ; 2.3737 ; 2.5181 ; 2.7534 ; 2.5974 ; 3.0467 ; 2.7804 ; 2.441 ; 2.383 ; 2.3608 ; 2.3311 ; 2.309 ; 2.3154 ; 2.3427 ; 2.6145 ; 2.9449 ; 3.2439 ; 3.4273 ; 3.4845 ; 3.5588 ; 3.6526 ; 3.6906 ; 3.7497 ; 3.829 ; 3.9313 ; 3.9624 ; 4.0044 ; 4.0979 ; 4.2201 ; 4.3548 ; 4.5127 ; 4.813 ; 5.1113 ; 5.1479 ; 5.1996 ; 5.25]

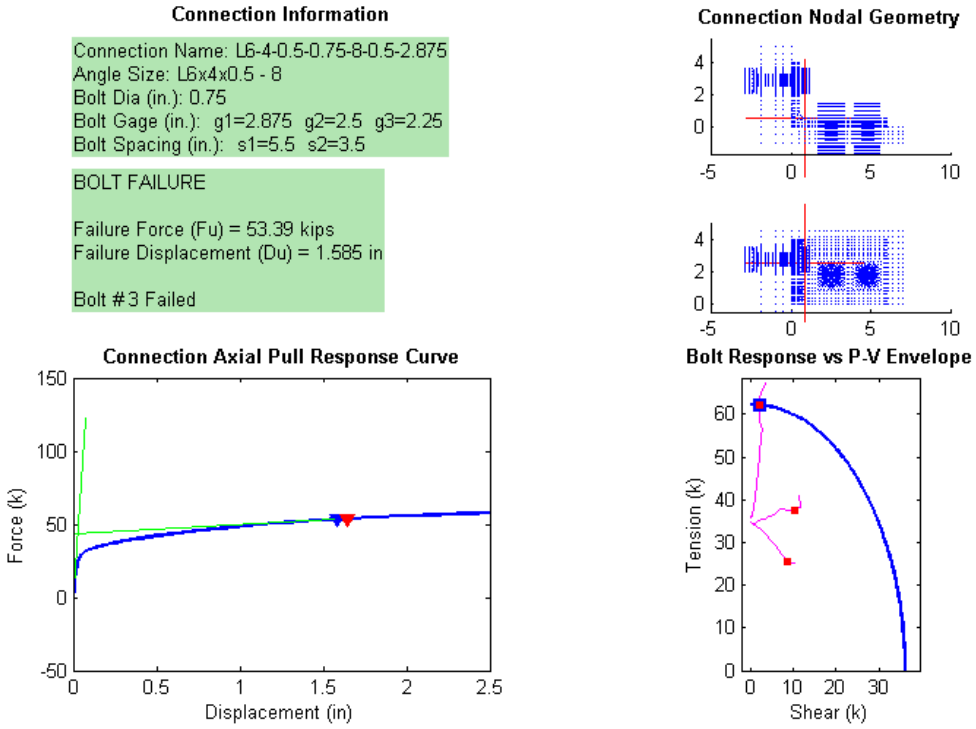


Figure B.51 Connection L6_4_0.5_0.75_8_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.75_8_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 1.6346e+003

Plastic Stiffness (k/in): 6.4882

Displacement (in): [2.1896e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.20294 ; 0.22669 ; 0.26233 ; 0.31578 ; 0.39596 ; 0.51624 ; 0.69664 ; 0.70055 ; 0.70641 ; 0.7152 ; 0.72838 ; 0.74816 ; 0.77782 ; 0.82231 ; 0.839 ; 0.86403 ; 0.90157 ; 0.95788 ; 1.0424 ; 1.1268 ; 1.2113 ; 1.243 ; 1.2905 ; 1.3618 ; 1.4687 ; 1.5088 ; 1.5689 ; 1.6591 ; 1.7944 ; 1.9974 ; 2.0599 ; 2.0833 ; 2.1185 ; 2.1712 ; 2.2503 ; 2.2799 ; 2.3244 ; 2.3912 ; 2.4913 ; 2.5]

Force (kips): [-0.730232 ; 1.12246 ; 2.46237 ; 4.17703 ; 6.381 ; 9.10548 ; 9.93656 ; 10.9826 ; 12.1986 ; 13.4454 ; 14.5237 ; 15.4447 ; 16.2962 ; 17.1314 ; 17.9777 ; 18.2748 ; 18.7022 ; 19.2986 ; 20.1027 ; 21.1372 ; 22.4205 ; 22.4455 ; 22.4828 ; 22.5434 ; 22.63 ; 22.7531 ; 22.9309 ; 23.1871 ; 23.2801 ; 23.4276 ; 23.6356 ; 23.9448 ; 24.381 ; 24.827 ; 25.2843 ; 25.4397 ; 25.6433 ; 25.9332 ; 26.3159 ; 26.4507 ; 26.6458 ; 26.9202 ; 27.2975 ; 27.7812 ; 27.928 ; 27.9916 ; 28.0846 ; 28.2186 ; 28.4024 ; 28.4659 ; 28.5602 ; 28.6985 ; 28.8949 ; 28.9113]

Bolt 1 - Tensile Force (kips): [34.7652 ; 34.7102 ; 34.6662 ; 34.6049 ; 34.5179 ; 34.4001 ; 34.3612 ; 34.3099 ; 34.2465 ; 34.1746 ; 34.0984 ; 34.0073 ; 33.8859 ; 33.7007 ; 33.0049 ; 32.7055 ; 32.2614 ; 31.6216 ; 30.7279 ; 29.5066 ; 27.851 ; 27.818 ; 27.7687 ; 27.6845 ; 27.5644 ; 27.3954 ; 27.1497 ; 26.7838 ; 26.6496 ; 26.4272 ; 26.1146 ; 25.6854 ; 25.5461 ; 25.5418 ; 25.5426 ; 25.5438 ; 25.5468 ; 25.5525 ; 25.5638 ; 25.5682 ; 25.5749 ; 25.5124 ; 25.5333 ; 25.5791 ; 25.5938 ; 25.5628 ; 25.505 ; 25.4166 ; 25.3064 ; 25.2939 ; 25.2599 ; 25.2104 ; 25.155 ; 25.1508]

Bolt 1 - Shear Force (kips): [0.0507786 ; 0.079416 ; 0.152614 ; 0.252237 ; 0.385845 ; 0.560147 ; 0.615583 ; 0.687617 ; 0.775778 ; 0.874772 ; 0.980219 ; 1.10449 ; 1.26422 ; 1.49391 ; 2.27261 ; 2.57262 ; 3.00102 ; 3.59651 ; 4.39047 ; 5.41864 ; 6.7287 ; 6.75409 ; 6.7919 ; 6.8561 ; 6.94753 ; 7.07623 ; 7.26209 ; 7.53276 ; 7.63058 ; 7.79053 ; 8.01234 ; 8.31245 ; 8.41819 ; 8.42417 ; 8.427 ; 8.42792 ; 8.42934 ; 8.43156 ; 8.43557 ; 8.43707 ; 8.43937 ; 8.54173 ; 8.53395 ; 8.51834 ; 8.51348 ; 8.65743 ; 8.91379 ; 9.24713 ; 9.59912 ; 9.64541 ; 9.76527 ; 9.93855 ; 10.1388 ; 10.1538]

Bolt 2 - Tensile Force (kips): [34.7703 ; 34.7052 ; 34.6483 ; 34.5788 ; 34.502 ; 34.4462 ; 34.4416 ; 34.4441 ; 34.468 ; 34.5283 ; 34.6285 ; 34.7738 ; 35.0044 ; 35.312 ; 35.4124 ; 35.4722 ; 35.5814 ; 35.7588 ; 36.0436 ; 36.4559 ; 37.1 ; 37.1142 ; 37.1357 ; 37.1607 ; 37.2013 ; 37.2683 ; 37.3707 ; 37.5169 ; 37.5698 ; 37.6306 ; 37.7212 ; 37.832 ; 37.7885 ; 37.7107 ; 37.6423 ; 37.6231 ; 37.6078 ; 37.603 ; 37.6266 ; 37.6348 ; 37.6551 ; 37.7404 ; 37.845 ; 38.047 ; 38.1245 ; 38.1975 ; 38.331 ; 38.5292 ; 39.0215 ; 39.2173 ; 39.5938 ; 40.1515 ; 40.8967 ; 40.9584]

Bolt 2 - Shear Force (kips): [0.0433677 ; 0.0914995 ; 0.181308 ; 0.30079 ; 0.460964 ; 0.669034 ; 0.735158 ; 0.821838 ; 0.930089 ; 1.05722 ; 1.20294 ; 1.38164 ; 1.60551 ; 1.88854 ; 2.63883 ; 2.92211 ; 3.31912 ; 3.85594 ; 4.53839 ; 5.31587 ; 6.13734 ; 6.1525 ; 6.17499 ; 6.21497 ; 6.27071 ; 6.34631 ; 6.4526 ; 6.6079 ; 6.66495 ; 6.76423 ; 6.90745 ; 7.13163 ; 7.61292 ; 8.09927 ; 8.56063 ; 8.7222 ; 8.94589 ; 9.25893 ; 9.68084 ; 9.83138 ; 10.0464 ; 10.3174 ; 10.7168 ; 11.2299 ; 11.3991 ; 11.4559 ; 11.5033 ; 11.5881 ; 11.5769 ; 11.5843 ; 11.529 ; 11.4313 ; 11.3435 ; 11.3385]

Bolt 3 - Tensile Force (kips): [36 ; 35.9361 ; 35.9159 ; 35.9589 ; 36.1393 ; 36.4488 ; 36.5785 ; 36.8158 ; 37.1657 ; 37.718 ; 38.4112 ; 39.1319 ; 40.0432 ; 41.3583 ; 43.1875 ; 43.8322 ; 44.75 ; 46.0081 ; 47.7018 ; 49.9239 ; 52.5797 ; 52.6271 ; 52.6976 ; 52.794 ; 52.942 ; 53.1638 ; 53.4869 ; 53.9525 ; 54.1228 ; 54.3676 ; 54.7258 ; 55.3019 ; 56.2327 ; 57.3595 ; 58.7421 ; 59.188 ; 59.7113 ; 60.4163 ; 61.3023 ; 61.6246 ; 62.128 ; 62.7804 ; 63.8457 ; 64.9463 ; 65.2817 ; 65.4152 ; 65.6057 ; 65.9047 ; 66.3218 ; 66.4553 ; 66.6462 ; 66.9249 ; 67.3183 ; 67.3464]

Bolt 3 - Shear Force (kips): [0.034181 ; 0.016624 ; 0.044214 ; 0.094806 ; 0.17528 ; 0.27784 ; 0.3122 ; 0.36042 ; 0.42251 ; 0.50469 ; 0.61093 ; 0.75817 ; 0.93929 ; 1.1116 ; 1.3091 ; 1.3778 ; 1.4691 ; 1.593 ; 1.7609 ; 1.9696 ; 2.1615 ; 2.1646 ; 2.1691 ; 2.1945 ; 2.2212 ; 2.2424 ; 2.2629 ; 2.2861 ; 2.2931 ; 2.3542 ; 2.4064 ; 2.3962 ; 2.5425 ; 2.363 ; 2.1583 ; 2.0534 ; 1.9894 ; 1.9087 ; 1.8723 ; 1.8924 ; 1.9553 ; 1.9962 ; 2.0981 ; 2.1996 ; 2.3617 ; 2.4693 ; 2.6067 ; 2.7834 ; 2.9731 ; 3.0307 ; 3.1152 ; 3.2867 ; 3.5024 ; 3.5209]

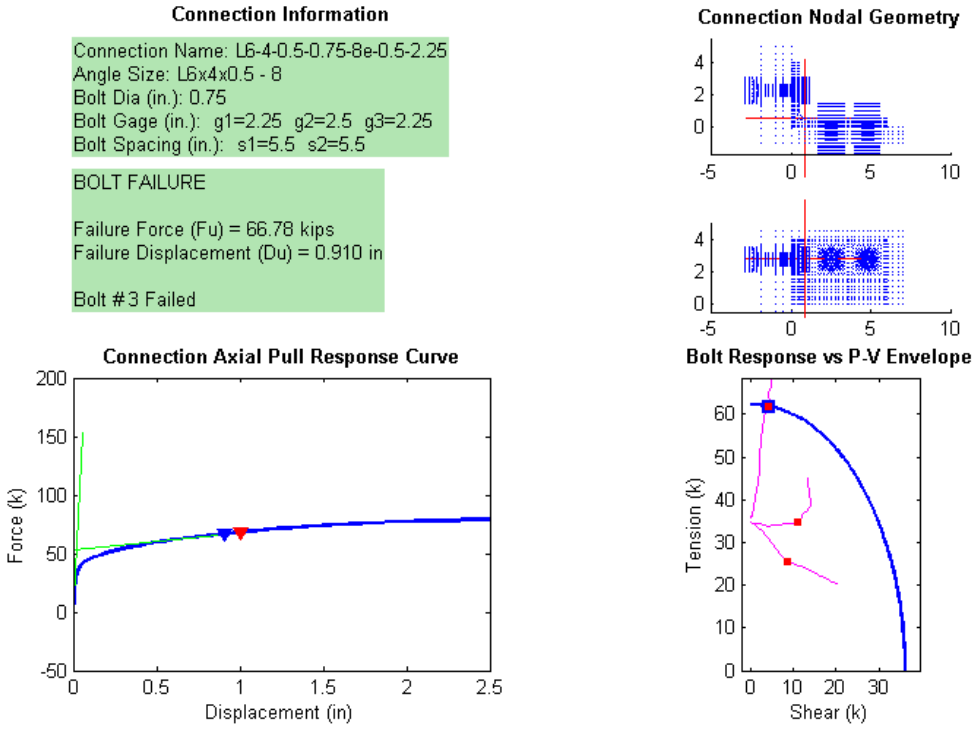


Figure B.52 Connection L6_4_0.5_0.75_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.75_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 2.7833e+003

Plastic Stiffness (k/in): 15.1444

Displacement (in): [2.7476e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.13464 ; 0.19799 ; 0.29302 ; 0.43556 ; 0.44893 ; 0.46897 ; 0.49904 ; 0.54414 ; 0.6118 ; 0.71327 ; 0.75133 ; 0.7656 ; 0.787 ; 0.81911 ; 0.86728 ; 0.93952 ; 0.96661 ; 1.0073 ; 1.0682 ; 1.0911 ; 1.1254 ; 1.1596 ; 1.1939 ; 1.2454 ; 1.2647 ; 1.2936 ; 1.337 ; 1.4021 ; 1.4265 ; 1.4631 ; 1.518 ; 1.5386 ; 1.5695 ; 1.6158 ; 1.6853 ; 1.7896 ; 1.946 ; 2.0047 ; 2.0926 ; 2.2246 ; 2.4226 ; 2.5]

Force (kips): [-0.916407 ; 2.25997 ; 4.51973 ; 7.3071 ; 10.6946 ; 11.7509 ; 13.1434 ; 14.808 ; 16.6163 ; 18.4192 ; 19.9538 ; 21.2303 ; 22.3635 ; 23.6213 ; 25.1169 ; 26.9364 ; 28.9769 ; 29.1397 ; 29.3836 ; 29.7416 ; 30.2467 ; 30.9473 ; 31.8524 ; 32.1628 ; 32.2762 ; 32.4496 ; 32.6963 ; 33.061 ; 33.6142 ; 33.82 ; 34.1011 ; 34.496 ; 34.6586 ; 34.893 ; 35.1139 ; 35.3235 ; 35.6302 ; 35.7444 ; 35.9095 ; 36.1428 ; 36.4814 ; 36.6053 ; 36.7816 ; 37.0257 ; 37.1152 ; 37.2432 ; 37.4251 ; 37.6793 ; 38.0192 ; 38.4508 ; 38.594 ; 38.792 ; 39.0582 ; 39.4233 ; 39.5576]

Bolt 1 - Tensile Force (kips): [34.8079 ; 34.7058 ; 34.6224 ; 34.5108 ; 34.3625 ; 34.313 ; 34.2449 ; 34.1595 ; 34.0589 ; 33.9462 ; 33.8186 ; 33.5119 ; 32.6296 ; 31.4152 ; 29.749 ; 27.4221 ; 25.4594 ; 25.4592 ; 25.4599 ; 25.4632 ; 25.4691 ; 25.4811 ; 25.503 ; 25.5105 ; 25.5134 ; 25.4553 ; 25.3505 ; 25.3572 ; 25.3805 ; 25.3897 ; 25.4041 ; 25.4267 ; 25.3638 ; 25.2126 ; 25.0695 ; 24.8963 ; 24.5681 ; 24.394 ; 24.1583 ; 23.8777 ; 23.4576 ; 23.2389 ; 22.9177 ; 22.5378 ; 22.4337 ; 22.2807 ; 22.0877 ; 21.8175 ; 21.4706 ; 21.1764 ; 21.0746 ; 20.8889 ; 20.6791 ; 20.4957 ; 20.4643]

Bolt 1 - Shear Force (kips): [0.0447612 ; 0.153093 ; 0.285524 ; 0.454783 ; 0.66893 ; 0.737628 ; 0.829956 ; 0.94345 ; 1.07221 ; 1.21184 ; 1.36794 ; 1.73431 ; 2.65438 ; 3.78262 ; 5.19606 ; 6.99901 ; 8.39593 ; 8.39761 ; 8.39938 ; 8.40155 ; 8.40414 ; 8.4084 ; 8.41576 ; 8.41827 ; 8.41923 ; 8.49129 ; 8.60485 ; 8.60854 ; 8.60781 ; 8.607 ; 8.60567 ; 8.60377 ; 8.88393 ; 9.41019 ; 9.83254 ; 10.3295 ; 11.3291 ; 11.771 ; 12.3723 ; 13.1499 ; 14.1105 ; 14.5225 ; 15.1031 ; 15.7894 ; 15.9733 ; 16.253 ; 16.6213 ; 17.1143 ; 17.7181 ; 18.3374 ; 18.5582 ; 18.9209 ; 19.3734 ; 19.9018 ; 20.0779]

Bolt 2 - Tensile Force (kips): [34.8335 ; 34.7147 ; 34.6195 ; 34.5087 ; 34.3947 ; 34.366 ; 34.3345 ; 34.3126 ; 34.3053 ; 34.3364 ; 34.3694 ; 34.3015 ; 33.9583 ; 33.8405 ; 33.9784 ; 34.2334 ; 34.4 ; 34.3944 ; 34.3818 ; 34.3584 ; 34.322 ; 34.3113 ; 34.4309 ; 34.4979 ; 34.5247 ; 34.5728 ; 34.6659 ; 34.8241 ; 35.0686 ; 35.1616 ; 35.3095 ; 35.42 ; 35.5181 ; 35.6915 ; 35.8612 ; 36.0806 ; 36.4221 ; 36.5541 ; 36.7508 ; 36.9927 ; 37.3091 ; 37.4392 ; 37.6466 ; 37.9638 ; 38.0581 ; 38.231 ; 38.5982 ; 39.1605 ; 40.0289 ; 41.259 ; 41.7223 ; 42.397 ; 43.3213 ; 44.5435 ; 45.0183]

Bolt 2 - Shear Force (kips): [0.0697793 ; 0.151608 ; 0.297438 ; 0.484731 ; 0.721723 ; 0.798035 ; 0.900051 ; 1.02642 ; 1.17432 ; 1.34387 ; 1.55547 ; 1.97445 ; 2.88607 ; 3.95159 ; 5.19525 ; 6.56644 ; 8.05466 ; 8.1861 ; 8.37672 ; 8.64886 ; 9.02698 ; 9.51102 ; 10.0828 ; 10.2752 ; 10.3448 ; 10.4404 ; 10.5671 ; 10.743 ; 10.9813 ; 11.0668 ; 11.1839 ; 11.5266 ; 11.6248 ; 11.7508 ; 11.8987 ; 11.9692 ; 12.0646 ; 12.0993 ; 12.1478 ; 12.3487 ; 12.8728 ; 13.0192 ; 13.2231 ; 13.4857 ; 13.6547 ; 13.8142 ; 13.8755 ; 13.8971 ; 13.8598 ; 13.792 ; 13.7384 ; 13.6289 ; 13.4851 ; 13.284 ; 13.189]

Bolt 3 - Tensile Force (kips): [36 ; 35.9453 ; 35.9795 ; 36.1574 ; 36.4737 ; 36.6108 ; 36.8297 ; 37.2213 ; 37.9083 ; 38.768 ; 39.7926 ; 41.0436 ; 42.5 ; 44.4186 ; 46.982 ; 50.2397 ; 53.9031 ; 54.1737 ; 54.5743 ; 55.1576 ; 56.0111 ; 57.2746 ; 58.8963 ; 59.4597 ; 59.6852 ; 60.0107 ; 60.4788 ; 61.2516 ; 62.426 ; 62.8889 ; 63.5144 ; 64.393 ; 64.7558 ; 65.1929 ; 65.6271 ; 66.0267 ; 66.4911 ; 66.6606 ; 66.9277 ; 67.2761 ; 67.814 ; 68.0307 ; 68.2892 ; 68.6186 ; 68.729 ; 68.8899 ; 69.1476 ; 69.5338 ; 70.0143 ; 70.5527 ; 70.6991 ; 70.875 ; 71.0828 ; 71.4692 ; 71.6389]

Bolt 3 - Shear Force (kips): [0.0399 ; 0.023575 ; 0.073414 ; 0.15459 ; 0.26085 ; 0.29855 ; 0.3538 ; 0.4314 ; 0.53722 ; 0.67358 ; 0.85748 ; 1.0632 ; 1.3032 ; 1.5805 ; 1.8577 ; 2.1657 ; 2.4051 ; 2.4247 ; 2.4585 ; 2.519 ; 2.5853 ; 2.7378 ; 2.9539 ; 3.0768 ; 3.145 ; 3.2514 ; 3.517 ; 3.8372 ; 4.1378 ; 4.3184 ; 4.4531 ; 4.2433 ; 4.115 ; 4.1518 ; 4.3057 ; 4.4595 ; 4.6366 ; 4.6788 ; 4.6906 ; 4.7337 ; 4.7022 ; 4.7243 ; 4.7622 ; 4.8293 ; 4.8585 ; 4.899 ; 5.0078 ; 5.1746 ; 5.3444 ; 5.5001 ; 5.5365 ; 5.5747 ; 5.6178 ; 5.689 ; 5.7224]

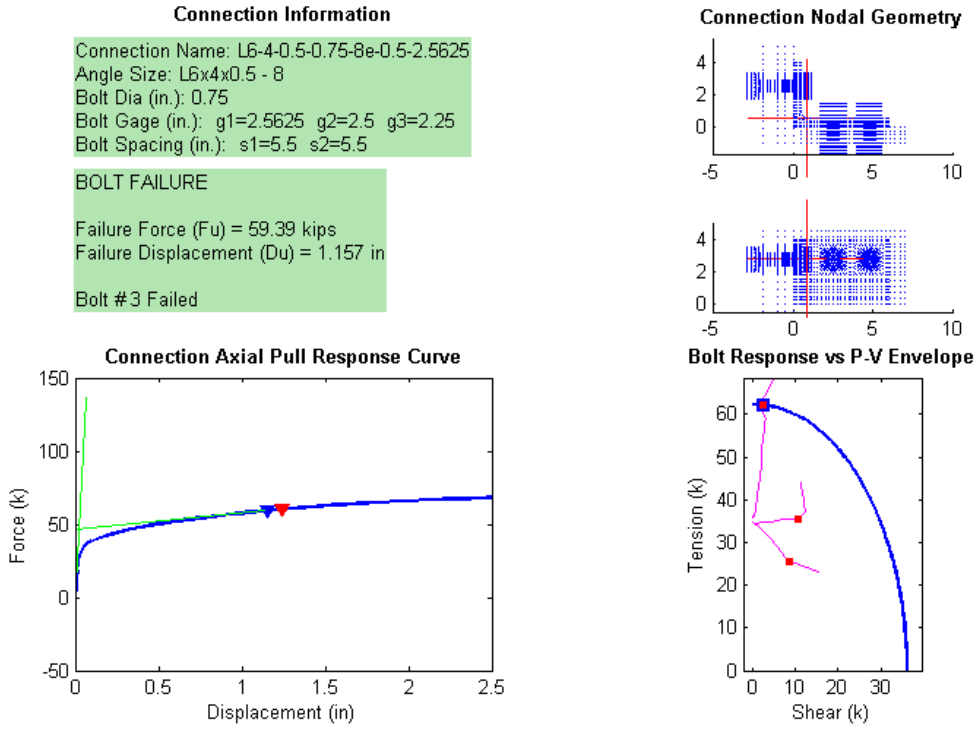


Figure B.53 Connection L6_4_0.5_0.75_8e_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.75_8e_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 2.1424e+003

Plastic Stiffness (k/in): 10.7885

Displacement (in): [2.9734e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.50682 ; 0.56932 ; 0.59276 ; 0.62792 ; 0.68065 ; 0.75975 ; 0.8784 ; 0.9229 ; 0.98964 ; 1.0564 ; 1.0731 ; 1.0981 ; 1.1356 ; 1.192 ; 1.2764 ; 1.3081 ; 1.3556 ; 1.3734 ; 1.4002 ; 1.4403 ; 1.4553 ; 1.4778 ; 1.5117 ; 1.5624 ; 1.5814 ; 1.61 ; 1.6528 ; 1.717 ; 1.8133 ; 1.9578 ; 2.1745 ; 2.237 ; 2.3308 ; 2.4245 ; 2.5]

Force (kips): [-0.888096 ; 1.55801 ; 3.29625 ; 4.79559 ; 6.77243 ; 9.29597 ; 12.1329 ; 14.7346 ; 16.7014 ; 18.0903 ; 19.2435 ; 20.3263 ; 21.6494 ; 23.2472 ; 25.0962 ; 25.6689 ; 25.8796 ; 26.1817 ; 26.6008 ; 27.1911 ; 27.9746 ; 28.2607 ; 28.6799 ; 29.136 ; 29.2454 ; 29.3858 ; 29.5883 ; 29.8766 ; 30.2523 ; 30.3946 ; 30.6015 ; 30.6775 ; 30.797 ; 30.9796 ; 31.0547 ; 31.1598 ; 31.309 ; 31.518 ; 31.6027 ; 31.7264 ; 31.8984 ; 32.1307 ; 32.4419 ; 32.8586 ; 33.3876 ; 33.526 ; 33.7204 ; 33.9009 ; 34.0384]

Bolt 1 - Tensile Force (kips): [34.8067 ; 34.7289 ; 34.6671 ; 34.6091 ; 34.5283 ; 34.4176 ; 34.2802 ; 34.1379 ; 34.0069 ; 33.8686 ; 33.5537 ; 32.4691 ; 30.9254 ; 28.8783 ; 26.2324 ; 25.5059 ; 25.5022 ; 25.5026 ; 25.5075 ; 25.5197 ; 25.5431 ; 25.5514 ; 25.5643 ; 25.5086 ; 25.4388 ; 25.4391 ; 25.4458 ; 25.4604 ; 25.4853 ; 25.4958 ; 25.5125 ; 25.5189 ; 25.5019 ; 25.4016 ; 25.3199 ; 25.2311 ; 25.1095 ; 24.9569 ; 24.8343 ; 24.6661 ; 24.4532 ; 24.2804 ; 24.1291 ; 23.9266 ; 23.6377 ; 23.5313 ; 23.3792 ; 23.2401 ; 23.1401]

Bolt 1 - Shear Force (kips): [0.0431788 ; 0.114642 ; 0.21699 ; 0.307564 ; 0.430797 ; 0.593818 ; 0.786204 ; 0.977334 ; 1.14759 ; 1.32565 ; 1.70553 ; 2.82574 ; 4.23043 ; 5.91452 ; 7.89804 ; 8.3999 ; 8.40558 ; 8.4108 ; 8.41537 ; 8.4207 ; 8.42886 ; 8.4317 ; 8.43601 ; 8.5155 ; 8.58979 ; 8.59462 ; 8.59684 ; 8.59551 ; 8.59152 ; 8.59021 ; 8.58847 ; 8.58782 ; 8.68266 ; 9.10377 ; 9.36323 ; 9.63328 ; 9.99463 ; 10.4989 ; 10.8761 ; 11.3649 ; 11.9163 ; 12.3869 ; 12.8665 ; 13.4681 ; 14.2038 ; 14.4293 ; 14.7427 ; 15.0258 ; 15.2308]

Bolt 2 - Tensile Force (kips): [34.83 ; 34.7389 ; 34.6665 ; 34.6059 ; 34.5333 ; 34.4623 ; 34.4241 ; 34.4536 ; 34.5573 ; 34.7103 ; 34.8719 ; 34.7533 ; 34.9316 ; 35.1616 ; 35.4571 ; 35.4886 ; 35.4663 ; 35.436 ; 35.3962 ; 35.3381 ; 35.3534 ; 35.3796 ; 35.4311 ; 35.4942 ; 35.5194 ; 35.5474 ; 35.5974 ; 35.7034 ; 35.9157 ; 36.0014 ; 36.136 ; 36.1711 ; 36.1988 ; 36.3354 ; 36.4068 ; 36.4909 ; 36.6231 ; 36.8354 ; 36.9281 ; 37.0548 ; 37.2975 ; 37.8218 ; 38.6879 ; 39.9903 ; 41.7396 ; 42.2089 ; 42.8983 ; 43.5737 ; 44.1031]

Bolt 2 - Shear Force (kips): [0.067789 ; 0.109875 ; 0.220664 ; 0.320242 ; 0.456034 ; 0.63588 ; 0.848353 ; 1.06703 ; 1.28521 ; 1.54038 ; 1.98077 ; 3.05295 ; 4.31884 ; 5.71134 ; 7.05755 ; 7.51569 ; 7.70867 ; 7.98468 ; 8.36675 ; 8.89716 ; 9.55785 ; 9.77589 ; 10.083 ; 10.3711 ; 10.4344 ; 10.535 ; 10.6788 ; 10.8699 ; 11.1075 ; 11.1889 ; 11.3013 ; 11.3632 ; 11.5264 ; 11.6635 ; 11.6927 ; 11.7715 ; 11.8966 ; 12.0274 ; 12.0557 ; 12.1236 ; 12.191 ; 12.1795 ; 12.0861 ; 11.8959 ; 11.6459 ; 11.568 ; 11.444 ; 11.3277 ; 11.2399]

Bolt 3 - Tensile Force (kips): [36 ; 35.9365 ; 35.9356 ; 35.9885 ; 36.1427 ; 36.3924 ; 36.8491 ; 37.6993 ; 38.785 ; 39.8818 ; 41.3206 ; 43.0795 ; 45.5153 ; 48.6893 ; 52.4699 ; 53.5431 ; 53.9112 ; 54.4392 ; 55.1796 ; 56.2733 ; 57.7216 ; 58.2979 ; 59.2817 ; 60.6322 ; 60.9603 ; 61.3446 ; 61.89 ; 62.7225 ; 63.6094 ; 63.9167 ; 64.3446 ; 64.4937 ; 64.7223 ; 65.0678 ; 65.2112 ; 65.4092 ; 65.6708 ; 66.0336 ; 66.1688 ; 66.3622 ; 66.6346 ; 67.0362 ; 67.5508 ; 68.2581 ; 69.0814 ; 69.2842 ; 69.5557 ; 69.8306 ; 70.0626]

Bolt 3 - Shear Force (kips): [0.043382 ; 0.013839 ; 0.05252 ; 0.09478 ; 0.16114 ; 0.2477 ; 0.36304 ; 0.5063 ; 0.67798 ; 0.89563 ; 1.0854 ; 1.3318 ; 1.5934 ; 1.8689 ; 2.1364 ; 2.212 ; 2.2536 ; 2.3116 ; 2.3799 ; 2.5484 ; 2.7511 ; 2.6198 ; 3.0806 ; 2.4383 ; 2.3973 ; 2.3968 ; 2.3851 ; 2.3674 ; 2.3334 ; 2.502 ; 2.796 ; 2.898 ; 3.0143 ; 3.1493 ; 3.245 ; 3.3694 ; 3.5125 ; 3.6674 ; 3.7121 ; 3.7935 ; 3.9247 ; 4.1613 ; 4.4048 ; 4.6471 ; 5.0318 ; 5.1231 ; 5.2452 ; 5.331 ; 5.3743]

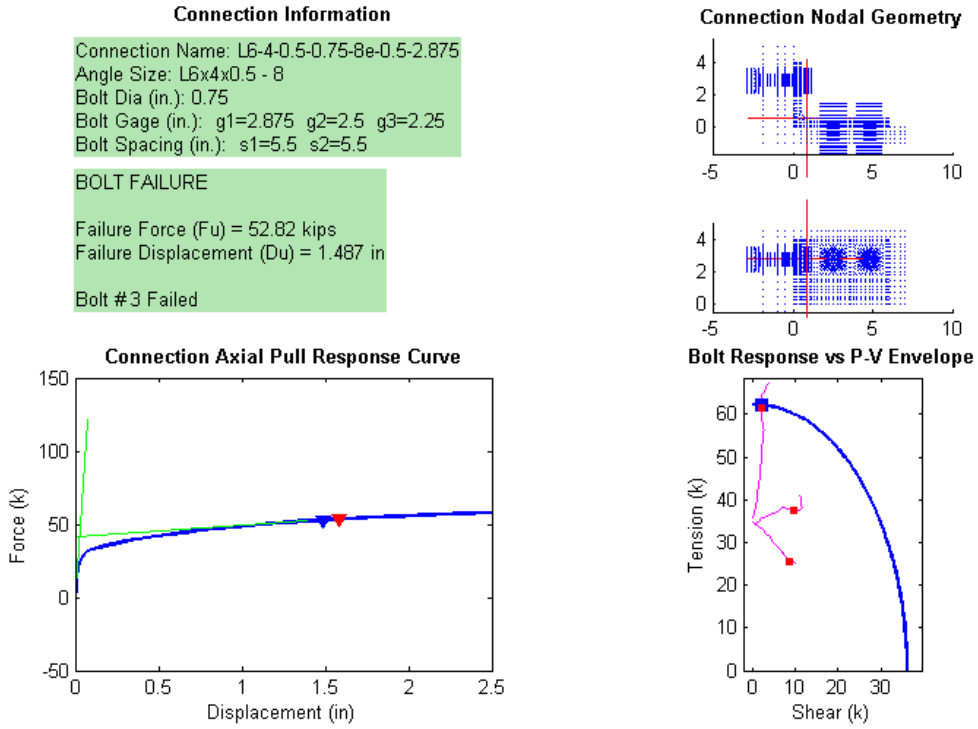


Figure B.54 Connection L6_4_0.5_0.75_8e_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.75_8e_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 1.6806e+003

Plastic Stiffness (k/in): 7.9169

Displacement (in): [2.5894e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.30034 ; 0.37542 ; 0.48805 ; 0.65699 ; 0.71949 ; 0.74293 ; 0.77809 ; 0.83082 ; 0.85059 ; 0.88026 ; 0.92475 ; 0.99149 ; 1.0165 ; 1.0541 ; 1.1104 ; 1.1315 ; 1.1632 ; 1.2107 ; 1.282 ; 1.3889 ; 1.5492 ; 1.6094 ; 1.6319 ; 1.6657 ; 1.7165 ; 1.7926 ; 1.9067 ; 1.9496 ; 2.0138 ; 2.0379 ; 2.074 ; 2.1282 ; 2.2094 ; 2.3314 ; 2.3735 ; 2.4368 ; 2.5]

Force (kips): [-0.858426 ; 1.07958 ; 2.4239 ; 3.59912 ; 5.17255 ; 7.24025 ; 9.72975 ; 12.1523 ; 14.0615 ; 15.3249 ; 16.3141 ; 17.2275 ; 18.2402 ; 19.1182 ; 19.9018 ; 20.9232 ; 22.1983 ; 22.6067 ; 22.7593 ; 22.9717 ; 23.2734 ; 23.3825 ; 23.5582 ; 23.8092 ; 24.1747 ; 24.3104 ; 24.4958 ; 24.8044 ; 24.9423 ; 25.1134 ; 25.3481 ; 25.6613 ; 26.0845 ; 26.6198 ; 26.8052 ; 26.8761 ; 26.9755 ; 27.1182 ; 27.3231 ; 27.6044 ; 27.7027 ; 27.8469 ; 27.9079 ; 28.0084 ; 28.143 ; 28.3325 ; 28.5917 ; 28.6785 ; 28.8049 ; 28.9238]

Bolt 1 - Tensile Force (kips): [34.8062 ; 34.7451 ; 34.6986 ; 34.6545 ; 34.5916 ; 34.5036 ; 34.388 ; 34.261 ; 34.143 ; 34.035 ; 33.9053 ; 33.754 ; 33.0722 ; 32.1619 ; 31.3007 ; 30.1408 ; 28.5291 ; 27.9818 ; 27.7678 ; 27.473 ; 27.0456 ; 26.8878 ; 26.6146 ; 26.2369 ; 25.7191 ; 25.5946 ; 25.589 ; 25.5906 ; 25.5921 ; 25.5961 ; 25.6036 ; 25.6162 ; 25.6375 ; 25.6715 ; 25.6838 ; 25.6081 ; 25.6087 ; 25.6181 ; 25.6375 ; 25.6699 ; 25.6826 ; 25.7023 ; 25.6991 ; 25.6265 ; 25.6068 ; 25.5314 ; 25.4493 ; 25.4307 ; 25.3892 ; 25.3516]

Bolt 1 - Shear Force (kips): [0.0415394 ; 0.0888146 ; 0.167872 ; 0.239078 ; 0.337111 ; 0.471054 ; 0.640075 ; 0.818093 ; 0.979968 ; 1.12865 ; 1.30151 ; 1.48969 ; 2.25407 ; 3.14437 ; 3.93616 ; 4.94026 ; 6.24974 ; 6.67656 ; 6.84099 ; 7.06586 ; 7.3874 ; 7.50358 ; 7.701 ; 7.96931 ; 8.33143 ; 8.41895 ; 8.4295 ; 8.43859 ; 8.44109 ; 8.44409 ; 8.44775 ; 8.45262 ; 8.46002 ; 8.47139 ; 8.47548 ; 8.56212 ; 8.5673 ; 8.57037 ; 8.56821 ; 8.56237 ; 8.56013 ; 8.55694 ; 8.59527 ; 8.90401 ; 9.05061 ; 9.33554 ; 9.65073 ; 9.72981 ; 9.88849 ; 10.034]

Bolt 2 - Tensile Force (kips): [34.8284 ; 34.7561 ; 34.7 ; 34.6524 ; 34.5952 ; 34.5352 ; 34.499 ; 34.5291 ; 34.6565 ; 34.833 ; 35.0922 ; 35.5444 ; 35.9195 ; 36.1345 ; 36.3679 ; 36.7465 ; 37.2906 ; 37.5006 ; 37.5676 ; 37.6796 ; 37.8421 ; 37.9007 ; 37.9603 ; 38.0604 ; 38.187 ; 38.1882 ; 38.1327 ; 38.0374 ; 37.9911 ; 37.9391 ; 37.8743 ; 37.799 ; 37.7073 ; 37.6506 ; 37.6343 ; 37.6525 ; 37.6479 ; 37.6457 ; 37.6465 ; 37.682 ; 37.7029 ; 37.7454 ; 37.785 ; 37.9578 ; 38.2451 ; 38.9056 ; 39.7971 ; 40.1025 ; 40.6163 ; 41.1003]

Bolt 2 - Shear Force (kips): [0.0657614 ; 0.0827409 ; 0.165937 ; 0.243859 ; 0.351211 ; 0.498457 ; 0.683704 ; 0.882676 ; 1.08152 ; 1.29229 ; 1.53765 ; 1.77862 ; 2.51165 ; 3.326 ; 4.01819 ; 4.84868 ; 5.73459 ; 5.9899 ; 6.08932 ; 6.22041 ; 6.40418 ; 6.47164 ; 6.5951 ; 6.76573 ; 7.02782 ; 7.15845 ; 7.39592 ; 7.75684 ; 7.89934 ; 8.09565 ; 8.37193 ; 8.75115 ; 9.26783 ; 9.91935 ; 10.1445 ; 10.2095 ; 10.328 ; 10.4992 ; 10.7442 ; 11.0738 ; 11.1873 ; 11.3471 ; 11.3918 ; 11.3974 ; 11.4584 ; 11.3626 ; 11.248 ; 11.2166 ; 11.1271 ; 11.0461]

Bolt 3 - Tensile Force (kips): [36 ; 35.9362 ; 35.9143 ; 35.9349 ; 36.0266 ; 36.2294 ; 36.5429 ; 37.1703 ; 38.1065 ; 39.042 ; 40.1137 ; 41.6067 ; 43.6963 ; 45.5594 ; 47.2194 ; 49.4088 ; 52.0758 ; 52.8683 ; 53.1505 ; 53.5447 ; 54.0977 ; 54.2969 ; 54.5798 ; 55.028 ; 55.7704 ; 56.0841 ; 56.4661 ; 57.2354 ; 57.7136 ; 58.2162 ; 58.8871 ; 59.6778 ; 60.7062 ; 61.967 ; 62.4471 ; 62.6384 ; 62.9207 ; 63.3321 ; 63.8958 ; 64.5617 ; 64.7743 ; 65.0828 ; 65.2243 ; 65.4459 ; 65.7368 ; 66.1401 ; 66.6937 ; 66.8705 ; 67.1371 ; 67.3837]

Bolt 3 - Shear Force (kips): [0.044648 ; 0.011617 ; 0.037374 ; 0.070364 ; 0.1242 ; 0.2009 ; 0.29863 ; 0.41577 ; 0.55166 ; 0.72918 ; 0.93972 ; 1.1501 ; 1.3949 ; 1.5785 ; 1.7361 ; 1.9356 ; 2.1297 ; 2.1853 ; 2.2156 ; 2.2414 ; 2.2785 ; 2.2916 ; 2.3706 ; 2.3464 ; 2.4385 ; 2.5238 ; 2.5462 ; 2.3368 ; 2.2588 ; 2.2821 ; 2.1377 ; 2.0155 ; 1.9032 ; 1.8869 ; 1.9528 ; 1.9505 ; 1.9578 ; 1.9778 ; 2.0663 ; 2.162 ; 2.1946 ; 2.2736 ; 2.4124 ; 2.5809 ; 2.7835 ; 2.9818 ; 3.218 ; 3.3502 ; 3.5217 ; 3.6579]

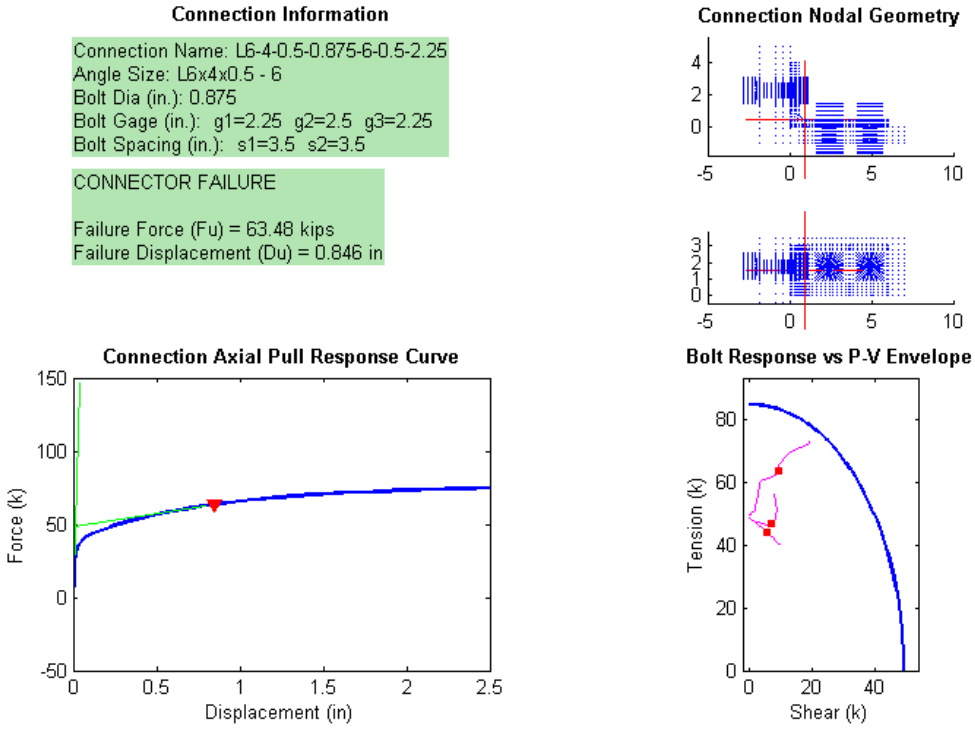


Figure B.55 Connection L6_4_0.5_0.875_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.875_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 3.3549e+003

Plastic Stiffness (k/in): 18.0915

Displacement (in): [6.1592e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.46527 ; 0.47418 ; 0.48755 ; 0.50759 ; 0.51511 ; 0.52638 ; 0.5433 ; 0.56867 ; 0.57818 ; 0.59245 ; 0.60672 ; 0.62099 ; 0.6424 ; 0.67451 ; 0.72267 ; 0.79491 ; 0.90328 ; 0.94392 ; 1.0049 ; 1.0963 ; 1.2335 ; 1.4392 ; 1.6892 ; 1.7517 ; 1.8454 ; 1.9861 ; 2.197 ; 2.2595 ; 2.3533 ; 2.4939 ; 2.5]

Force (kips): [-1.49479 ; 2.45223 ; 5.05779 ; 8.20528 ; 11.8323 ; 15.2518 ; 17.4045 ; 18.6616 ; 19.936 ; 21.2613 ; 22.58 ; 24.138 ; 26.0391 ; 26.6455 ; 27.4659 ; 27.7514 ; 27.8587 ; 28.0437 ; 28.2871 ; 28.3941 ; 28.5475 ; 28.7678 ; 29.0731 ; 29.1808 ; 29.347 ; 29.5076 ; 29.6613 ; 29.8825 ; 30.2039 ; 30.6821 ; 31.3356 ; 32.1885 ; 32.4915 ; 32.8916 ; 33.4532 ; 34.1978 ; 35.066 ; 35.8327 ; 35.9914 ; 36.2226 ; 36.5392 ; 36.9162 ; 37.0169 ; 37.1643 ; 37.3595 ; 37.3674]

Bolt 1 - Tensile Force (kips): [48.5765 ; 48.4351 ; 48.3374 ; 48.2146 ; 48.0636 ; 47.9094 ; 47.7997 ; 47.7144 ; 47.6005 ; 47.487 ; 47.3841 ; 47.2727 ; 47.0983 ; 47.0024 ; 46.779 ; 46.6281 ; 46.5668 ; 46.4629 ; 46.3189 ; 46.2581 ; 46.17 ; 46.0416 ; 45.854 ; 45.7858 ; 45.6822 ; 45.581 ; 45.4825 ; 45.3402 ; 45.1363 ; 44.8247 ; 44.3766 ; 43.7529 ; 43.521 ; 43.2037 ; 42.7319 ; 42.0807 ; 41.293 ; 40.5881 ; 40.43 ; 40.3317 ; 40.363 ; 40.3276 ; 40.3396 ; 40.3632 ; 40.395 ; 40.3966]

Bolt 1 - Shear Force (kips): [0.082414 ; 0.15314 ; 0.29239 ; 0.47065 ; 0.68637 ; 0.9013 ; 1.0554 ; 1.1806 ; 1.3486 ; 1.5142 ; 1.6645 ; 1.8271 ; 2.0695 ; 2.1965 ; 2.4954 ; 2.7016 ; 2.7841 ; 2.9216 ; 3.1083 ; 3.1852 ; 3.2953 ; 3.4536 ; 3.6797 ; 3.7606 ; 3.8823 ; 4.0001 ; 4.1137 ; 4.2768 ; 4.5082 ; 4.8556 ; 5.3448 ; 6.0098 ; 6.2527 ; 6.5823 ; 7.0637 ; 7.7107 ; 8.4761 ; 9.1588 ; 9.3106 ; 9.4181 ; 9.4155 ; 9.5058 ; 9.508 ; 9.5009 ; 9.4982 ; 9.4983]

Bolt 2 - Tensile Force (kips): [48.585 ; 48.3976 ; 48.2647 ; 48.1109 ; 47.9354 ; 47.7735 ; 47.6539 ; 47.5741 ; 47.4727 ; 47.3989 ; 47.3815 ; 47.2982 ; 47.1915 ; 47.1622 ; 47.0972 ; 47.0167 ; 46.9837 ; 46.9223 ; 46.853 ; 46.8208 ; 46.7781 ; 46.7241 ; 46.6606 ; 46.6424 ; 46.6156 ; 46.5959 ; 46.5828 ; 46.5733 ; 46.5773 ; 46.5922 ; 46.6646 ; 46.8752 ; 46.9756 ; 47.1976 ; 47.6104 ; 48.316 ; 49.5394 ; 51.0864 ; 51.4632 ; 52.0985 ; 53.1055 ; 54.3826 ; 54.7542 ; 55.2978 ; 56.0616 ; 56.0941]

Bolt 2 - Shear Force (kips): [0.080699 ; 0.22622 ; 0.42282 ; 0.67285 ; 0.97427 ; 1.2806 ; 1.5347 ; 1.7846 ; 2.1161 ; 2.4167 ; 2.6382 ; 2.877 ; 3.262 ; 3.4373 ; 3.7881 ; 3.9959 ; 4.0777 ; 4.2129 ; 4.3962 ; 4.4717 ; 4.5798 ; 4.7349 ; 4.9544 ; 5.0327 ; 5.1506 ; 5.2644 ; 5.3735 ; 5.5298 ; 5.7508 ; 6.0792 ; 6.5296 ; 7.1098 ; 7.3087 ; 7.5416 ; 7.8209 ; 8.1465 ; 8.416 ; 8.5413 ; 8.5549 ; 8.4911 ; 8.2995 ; 8.1276 ; 8.0664 ; 7.9728 ; 7.8487 ; 7.8434]

Bolt 3 - Tensile Force (kips): [50 ; 49.8936 ; 49.8597 ; 49.8679 ; 49.9342 ; 50.0658 ; 50.3362 ; 50.5259 ; 50.7431 ; 51.1916 ; 52.2857 ; 54.0467 ; 56.5541 ; 57.4201 ; 58.6416 ; 59.0727 ; 59.2312 ; 59.4324 ; 59.7134 ; 59.7961 ; 59.9192 ; 60.1015 ; 60.3626 ; 60.4609 ; 60.5979 ; 60.7377 ; 60.8836 ; 61.1045 ; 61.4259 ; 62.0096 ; 62.9126 ; 64.2883 ; 64.8375 ; 65.5013 ; 66.4944 ; 67.8528 ; 69.2919 ; 70.3431 ; 70.5337 ; 70.8405 ; 71.2174 ; 71.7655 ; 71.9436 ; 72.3122 ; 72.839 ; 72.8614]

Bolt 3 - Shear Force (kips): [0.043583 ; 0.0535539 ; 0.123659 ; 0.226276 ; 0.370189 ; 0.557893 ; 0.755072 ; 0.94572 ; 1.17687 ; 1.4994 ; 1.74405 ; 2.05094 ; 2.53366 ; 2.69163 ; 2.89135 ; 2.95776 ; 2.98403 ; 3.04886 ; 3.11839 ; 3.17389 ; 3.26206 ; 3.39511 ; 3.5587 ; 3.60946 ; 3.7262 ; 3.89949 ; 4.34195 ; 4.99181 ; 6.02211 ; 7.42333 ; 8.93901 ; 9.26144 ; 9.07092 ; 9.25292 ; 9.94004 ; 11.1125 ; 12.6844 ; 14.2354 ; 14.5805 ; 15.222 ; 16.3251 ; 17.4961 ; 17.8425 ; 18.3742 ; 18.9668 ; 18.9896]

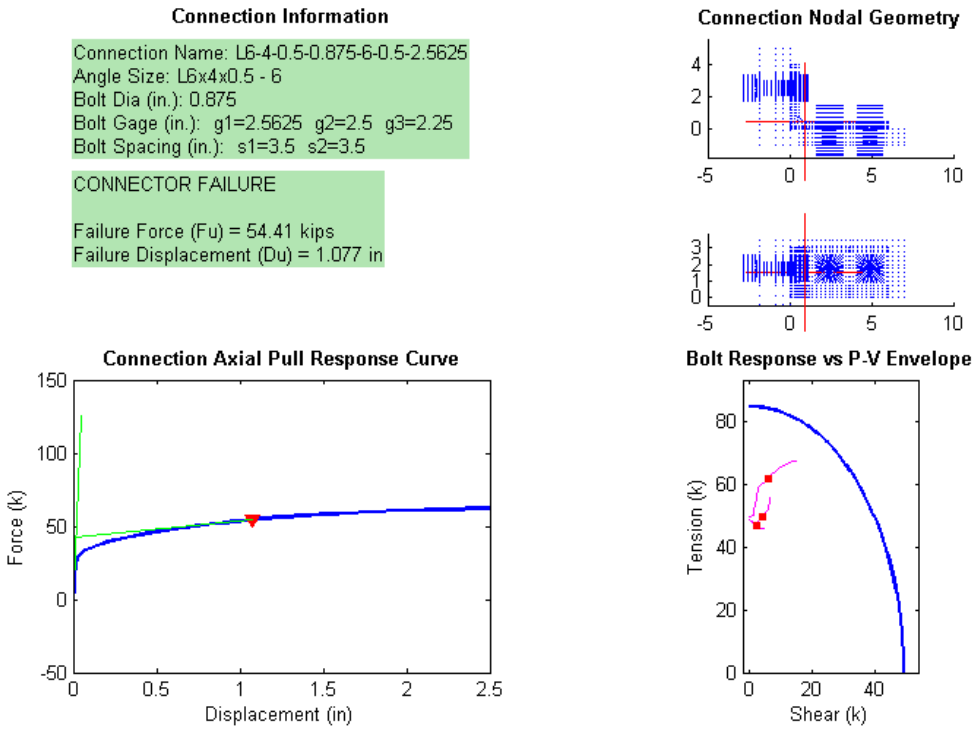


Figure B.56 Connection L6_4_0.5_0.875_6_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.875_6_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 2.5803e+003

Plastic Stiffness (k/in): 11.0564

Displacement (in): [5.9802e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.44793 ; 0.66174 ; 0.66565 ; 0.67151 ; 0.68029 ; 0.69348 ; 0.71325 ; 0.74292 ; 0.78741 ; 0.85415 ; 0.87918 ; 0.91672 ; 0.97304 ; 0.99416 ; 1.0258 ; 1.0734 ; 1.1446 ; 1.2515 ; 1.4119 ; 1.452 ; 1.4921 ; 1.5522 ; 1.6424 ; 1.7777 ; 1.9807 ; 2.2307 ; 2.4807 ; 2.5]

Force (kips): [-1.49504 ; 1.59073 ; 3.54452 ; 5.94511 ; 8.89002 ; 11.9622 ; 14.2151 ; 14.6464 ; 15.1032 ; 15.6007 ; 16.1832 ; 16.9019 ; 17.6541 ; 18.5183 ; 19.6247 ; 20.9615 ; 22.5397 ; 24.3686 ; 24.403 ; 24.4517 ; 24.5208 ; 24.6226 ; 24.7913 ; 25.0294 ; 25.3603 ; 25.8259 ; 25.9977 ; 26.2418 ; 26.6119 ; 26.7394 ; 26.9221 ; 27.1848 ; 27.5515 ; 28.0432 ; 28.705 ; 28.862 ; 29.0071 ; 29.2109 ; 29.4876 ; 29.8452 ; 30.2942 ; 30.721 ; 31.0546 ; 31.0777]

Bolt 1 - Tensile Force (kips): [48.5759 ; 48.4662 ; 48.3936 ; 48.3015 ; 48.1827 ; 48.0496 ; 47.9413 ; 47.9177 ; 47.8906 ; 47.8584 ; 47.8136 ; 47.7485 ; 47.6973 ; 47.6399 ; 47.5789 ; 47.5056 ; 47.423 ; 47.3322 ; 47.3304 ; 47.3275 ; 47.3235 ; 47.3176 ; 47.308 ; 47.2934 ; 47.2702 ; 47.2287 ; 47.2114 ; 47.1852 ; 47.1351 ; 47.1169 ; 47.0886 ; 47.0395 ; 46.9475 ; 46.7613 ; 46.5059 ; 46.4448 ; 46.391 ; 46.3179 ; 46.224 ; 46.1056 ; 45.9578 ; 45.8566 ; 45.8017 ; 45.799]

Bolt 1 - Shear Force (kips): [0.081844 ; 0.11142 ; 0.21246 ; 0.34634 ; 0.52019 ; 0.7118 ; 0.86743 ; 0.90243 ; 0.94345 ; 0.99353 ; 1.0643 ; 1.1667 ; 1.2491 ; 1.3424 ; 1.4441 ; 1.57 ; 1.7207 ; 1.9008 ; 1.9044 ; 1.9095 ; 1.9171 ; 1.9284 ; 1.9461 ; 1.9727 ; 2.0138 ; 2.0836 ; 2.112 ; 2.155 ; 2.2336 ; 2.2626 ; 2.3077 ; 2.3846 ; 2.5269 ; 2.8087 ; 3.1844 ; 3.2719 ; 3.3496 ; 3.4559 ; 3.5954 ; 3.7759 ; 4.0082 ; 4.201 ; 4.3409 ; 4.3499]

Bolt 2 - Tensile Force (kips): [48.5821 ; 48.4374 ; 48.3366 ; 48.2193 ; 48.0846 ; 47.9633 ; 47.8791 ; 47.8579 ; 47.8419 ; 47.8362 ; 47.8477 ; 47.8141 ; 47.8454 ; 47.8906 ; 48.0107 ; 48.1235 ; 48.2764 ; 48.7564 ; 48.765 ; 48.7783 ; 48.7988 ; 48.8303 ; 48.8776 ; 48.9523 ; 49.069 ; 49.259 ; 49.3328 ; 49.4476 ; 49.6144 ; 49.6779 ; 49.7734 ; 49.915 ; 50.1223 ; 50.4281 ; 50.9684 ; 51.1068 ; 51.2516 ; 51.4769 ; 51.838 ; 52.4183 ; 53.3504 ; 54.513 ; 55.6221 ; 55.7064]

Bolt 2 - Shear Force (kips): [0.080337 ; 0.16724 ; 0.31501 ; 0.50728 ; 0.75446 ; 1.0287 ; 1.2733 ; 1.338 ; 1.4202 ; 1.5276 ; 1.6795 ; 1.8816 ; 2.0478 ; 2.2119 ; 2.3696 ; 2.5524 ; 2.7991 ; 3.1859 ; 3.1937 ; 3.2052 ; 3.2221 ; 3.2478 ; 3.2884 ; 3.3499 ; 3.444 ; 3.5937 ; 3.6517 ; 3.7399 ; 3.8872 ; 3.9418 ; 4.025 ; 4.1568 ; 4.3716 ; 4.7326 ; 5.2108 ; 5.3191 ; 5.417 ; 5.5504 ; 5.7207 ; 5.9155 ; 6.1 ; 6.2258 ; 6.2958 ; 6.2995]

Bolt 3 - Tensile Force (kips): [50 ; 49.89 ; 49.8305 ; 49.7997 ; 49.8024 ; 49.8377 ; 49.9577 ; 49.9763 ; 49.986 ; 49.9828 ; 49.9758 ; 50.0381 ; 50.3029 ; 50.9819 ; 52.0902 ; 53.5483 ; 55.7947 ; 58.8176 ; 58.8547 ; 58.909 ; 58.9897 ; 59.1084 ; 59.2306 ; 59.4035 ; 59.6846 ; 60.1271 ; 60.2993 ; 60.54 ; 61.0527 ; 61.2219 ; 61.4632 ; 61.8725 ; 62.4672 ; 63.1585 ; 64.091 ; 64.3715 ; 64.6117 ; 64.9546 ; 65.4331 ; 66.0039 ; 66.6863 ; 67.2031 ; 67.4487 ; 67.4579]

Bolt 3 - Shear Force (kips): [0.0486271 ; 0.0374379 ; 0.0899232 ; 0.169934 ; 0.284788 ; 0.432691 ; 0.594485 ; 0.639926 ; 0.702834 ; 0.785878 ; 0.889633 ; 1.01233 ; 1.15101 ; 1.29445 ; 1.4003 ; 1.66902 ; 2.09907 ; 2.58302 ; 2.59742 ; 2.61658 ; 2.64085 ; 2.67934 ; 2.81669 ; 3.01675 ; 3.28269 ; 3.52415 ; 3.99154 ; 4.67795 ; 4.97096 ; 5.24038 ; 5.58244 ; 5.78802 ; 6.23147 ; 7.04725 ; 8.15604 ; 8.51047 ; 8.82679 ; 9.3625 ; 9.99841 ; 10.7677 ; 11.984 ; 13.3234 ; 14.5385 ; 14.6441]

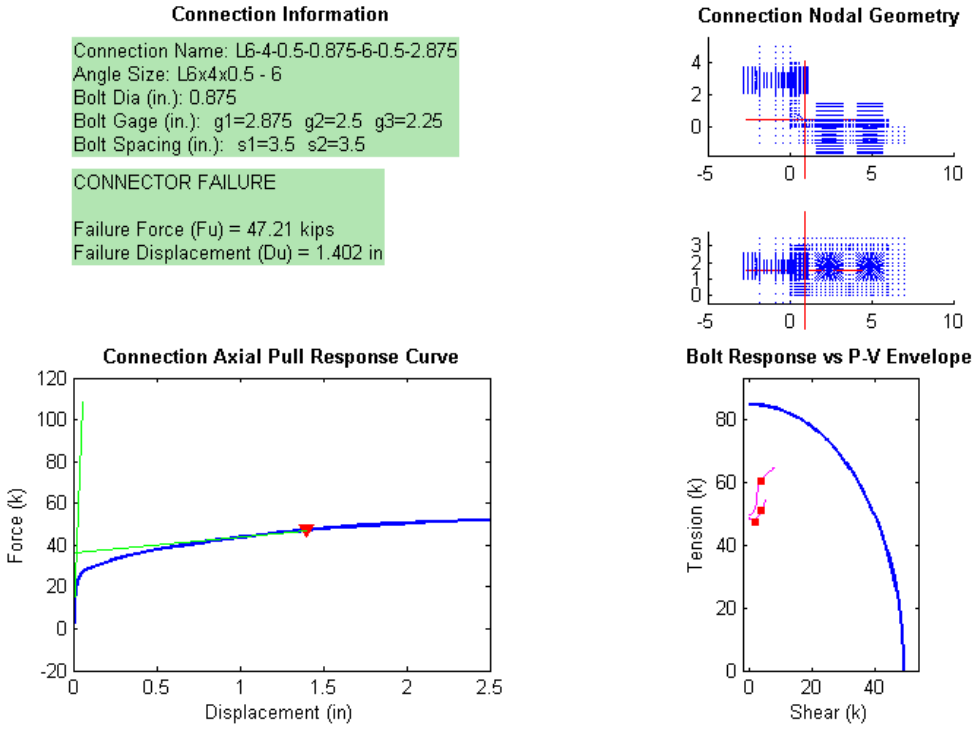


Figure B.57 Connection L6_4_0.5_0.875_6_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.875_6_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 2.0434e+003

Plastic Stiffness (k/in): 7.6734

Displacement (in): [4.449e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 0.81737 ; 0.84081 ; 0.87596 ; 0.9287 ; 0.94847 ; 0.97813 ; 0.98926 ; 1.0059 ; 1.031 ; 1.0685 ; 1.1248 ; 1.2093 ; 1.241 ; 1.2529 ; 1.2707 ; 1.2974 ; 1.3375 ; 1.3976 ; 1.4878 ; 1.5216 ; 1.5724 ; 1.6485 ; 1.7627 ; 1.9339 ; 2.1839 ; 2.4339 ; 2.5]

Force (kips): [-1.49433 ; 1.02632 ; 2.49677 ; 4.34344 ; 6.6915 ; 9.37102 ; 11.6201 ; 12.9177 ; 13.762 ; 14.5018 ; 15.301 ; 16.3804 ; 17.6144 ; 19.0005 ; 20.5862 ; 20.9199 ; 21.0404 ; 21.2281 ; 21.4901 ; 21.5841 ; 21.7291 ; 21.7886 ; 21.8771 ; 22.0118 ; 22.1901 ; 22.4538 ; 22.8445 ; 22.9721 ; 23.0232 ; 23.0991 ; 23.2081 ; 23.3618 ; 23.5925 ; 23.8899 ; 24.0101 ; 24.1706 ; 24.3946 ; 24.6962 ; 25.0855 ; 25.5551 ; 25.937 ; 26.0309]

Bolt 1 - Tensile Force (kips): [48.5757 ; 48.4866 ; 48.4325 ; 48.3625 ; 48.2699 ; 48.1574 ; 48.0541 ; 47.9837 ; 47.9256 ; 47.8627 ; 47.8078 ; 47.7434 ; 47.6876 ; 47.6399 ; 47.6007 ; 47.5943 ; 47.5921 ; 47.5886 ; 47.5842 ; 47.5829 ; 47.5804 ; 47.5789 ; 47.5766 ; 47.5732 ; 47.5699 ; 47.5651 ; 47.5559 ; 47.5542 ; 47.5533 ; 47.5522 ; 47.5506 ; 47.5488 ; 47.5479 ; 47.5515 ; 47.5525 ; 47.5555 ; 47.5609 ; 47.5711 ; 47.59 ; 47.6266 ; 47.6718 ; 47.6844]

Bolt 1 - Shear Force (kips): [0.081705 ; 0.086218 ; 0.15844 ; 0.2593 ; 0.39611 ; 0.56208 ; 0.71429 ; 0.82273 ; 0.9186 ; 1.0263 ; 1.1259 ; 1.2447 ; 1.359 ; 1.4808 ; 1.6146 ; 1.6437 ; 1.6542 ; 1.6703 ; 1.6933 ; 1.7016 ; 1.7147 ; 1.7203 ; 1.7286 ; 1.7413 ; 1.758 ; 1.7827 ; 1.8222 ; 1.835 ; 1.8402 ; 1.8475 ; 1.8584 ; 1.8742 ; 1.8952 ; 1.9204 ; 1.9303 ; 1.9431 ; 1.9613 ; 1.9858 ; 2.0186 ; 2.055 ; 2.0792 ; 2.0849]

Bolt 2 - Tensile Force (kips): [48.5811 ; 48.4645 ; 48.388 ; 48.295 ; 48.1906 ; 48.0901 ; 48.0235 ; 47.9991 ; 48.045 ; 48.0587 ; 48.1053 ; 48.2515 ; 48.4865 ; 48.7424 ; 49.2473 ; 49.3854 ; 49.4378 ; 49.5164 ; 49.6393 ; 49.6867 ; 49.7586 ; 49.785 ; 49.8253 ; 49.887 ; 49.9837 ; 50.1359 ; 50.3764 ; 50.4696 ; 50.5041 ; 50.5567 ; 50.6358 ; 50.756 ; 50.9411 ; 51.222 ; 51.3261 ; 51.4839 ; 51.7197 ; 52.0774 ; 52.6244 ; 53.4322 ; 54.2629 ; 54.4826]

Bolt 2 - Shear Force (kips): [0.080164 ; 0.12861 ; 0.23972 ; 0.38837 ; 0.58744 ; 0.82649 ; 1.0559 ; 1.2577 ; 1.465 ; 1.6706 ; 1.856 ; 2.069 ; 2.2405 ; 2.4208 ; 2.6979 ; 2.7683 ; 2.7952 ; 2.8373 ; 2.9015 ; 2.9255 ; 2.9632 ; 2.9785 ; 3.0013 ; 3.0362 ; 3.0865 ; 3.1646 ; 3.2895 ; 3.3345 ; 3.3525 ; 3.3788 ; 3.4188 ; 3.4792 ; 3.5691 ; 3.6968 ; 3.7467 ; 3.8191 ; 3.9265 ; 4.0816 ; 4.2968 ; 4.562 ; 4.7632 ; 4.8096]

Bolt 3 - Tensile Force (kips): [50 ; 49.8974 ; 49.828 ; 49.774 ; 49.7388 ; 49.7126 ; 49.725 ; 49.7014 ; 49.6054 ; 49.7362 ; 50.2505 ; 50.9543 ; 51.9342 ; 53.5095 ; 56.0806 ; 56.6864 ; 56.9081 ; 57.2194 ; 57.6637 ; 57.828 ; 58.0546 ; 58.1164 ; 58.2016 ; 58.3678 ; 58.5565 ; 58.8631 ; 59.428 ; 59.6044 ; 59.6654 ; 59.7798 ; 59.9496 ; 60.2158 ; 60.5909 ; 61.0464 ; 61.266 ; 61.5542 ; 61.9184 ; 62.4171 ; 63.0632 ; 63.8571 ; 64.5644 ; 64.7849]

Bolt 3 - Shear Force (kips): [0.050103 ; 0.029569 ; 0.066695 ; 0.12863 ; 0.22048 ; 0.34207 ; 0.47305 ; 0.60813 ; 0.74403 ; 0.82389 ; 0.93038 ; 1.204 ; 1.5616 ; 1.9778 ; 2.3416 ; 2.3945 ; 2.4117 ; 2.5192 ; 2.57 ; 2.5916 ; 2.5207 ; 2.5504 ; 2.6392 ; 2.6616 ; 2.7126 ; 2.7928 ; 2.8122 ; 2.9188 ; 2.9397 ; 3.0625 ; 3.2823 ; 3.4956 ; 3.6055 ; 3.9224 ; 3.9267 ; 4.1385 ; 4.6285 ; 5.0991 ; 5.6958 ; 6.7333 ; 7.5336 ; 7.7173]

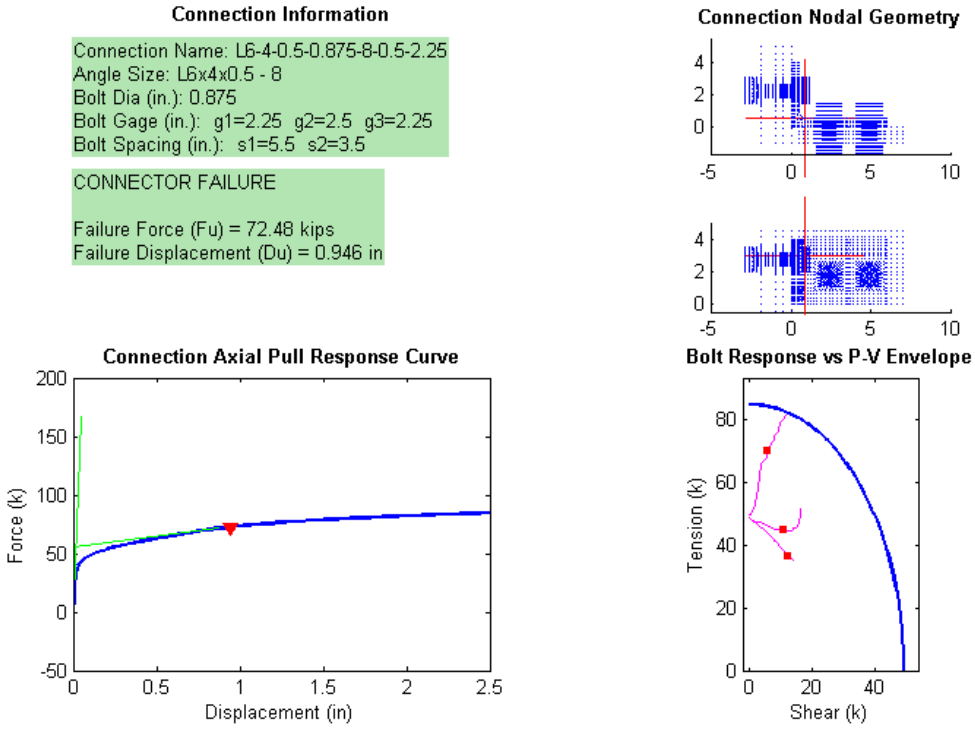


Figure B.58 Connection L6_4_0.5_0.875_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.875_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 3.2662e+003

Plastic Stiffness (k/in): 18.2898

Displacement (in): [5.4549e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.44793 ; 0.50138 ; 0.52142 ; 0.55149 ; 0.59659 ; 0.6417 ; 0.6868 ; 0.75445 ; 0.77982 ; 0.81787 ; 0.87496 ; 0.96058 ; 0.99269 ; 1.0409 ; 1.1131 ; 1.1402 ; 1.1808 ; 1.2418 ; 1.3332 ; 1.4704 ; 1.4736 ; 1.4784 ; 1.4856 ; 1.4965 ; 1.5128 ; 1.5372 ; 1.5738 ; 1.5875 ; 1.6081 ; 1.639 ; 1.6853 ; 1.7549 ; 1.8244 ; 1.8939 ; 1.9199 ; 1.9297 ; 1.9444 ; 1.9664 ; 1.9994 ; 2.0488 ; 2.1231 ; 2.2344 ; 2.4014 ; 2.5]

Force (kips): [-1.36354 ; 2.39882 ; 5.01583 ; 8.21092 ; 12.0496 ; 16.047 ; 19.0993 ; 19.7572 ; 20.4389 ; 21.1782 ; 22.0286 ; 23.0481 ; 24.2147 ; 25.4607 ; 26.8976 ; 28.6537 ; 30.7619 ; 31.4403 ; 31.6968 ; 32.0782 ; 32.6518 ; 33.2093 ; 33.7277 ; 34.481 ; 34.769 ; 35.1428 ; 35.6648 ; 36.3586 ; 36.5939 ; 36.9246 ; 37.3837 ; 37.551 ; 37.7913 ; 38.1297 ; 38.5897 ; 39.2046 ; 39.22 ; 39.2432 ; 39.2752 ; 39.3199 ; 39.3854 ; 39.4809 ; 39.6256 ; 39.679 ; 39.7616 ; 39.8856 ; 40.0562 ; 40.2969 ; 40.5183 ; 40.7312 ; 40.8171 ; 40.8495 ; 40.8996 ; 40.968 ; 41.0633 ; 41.1989 ; 41.3919 ; 41.6673 ; 42.0367 ; 42.2382]

Bolt 1 - Tensile Force (kips): [48.5728 ; 48.4235 ; 48.3133 ; 48.1721 ; 47.9889 ; 47.7798 ; 47.5989 ; 47.5539 ; 47.5011 ; 47.4314 ; 47.3316 ; 47.1897 ; 46.9889 ; 46.7204 ; 45.9751 ; 44.6135 ; 42.7614 ; 42.0829 ; 41.8206 ; 41.4235 ; 40.8168 ; 40.2009 ; 39.5919 ; 38.67 ; 38.306 ; 37.8196 ; 37.1258 ; 36.5456 ; 36.5169 ; 36.4823 ; 36.4413 ; 36.4274 ; 36.4093 ; 36.3852 ; 36.356 ; 36.3219 ; 36.3071 ; 36.2796 ; 36.2574 ; 36.2492 ; 36.2389 ; 36.2272 ; 36.2124 ; 36.2069 ; 36.1989 ; 36.1861 ; 36.1731 ; 36.1608 ; 36.1474 ; 36.0936 ; 36.0283 ; 35.9961 ; 35.9298 ; 35.8695 ; 35.8134 ; 35.7407 ; 35.643 ; 35.5201 ; 35.3831 ; 35.3079]

Bolt 1 - Shear Force (kips): [0.0864383 ; 0.170255 ; 0.324789 ; 0.524574 ; 0.776128 ; 1.05311 ; 1.28641 ; 1.34413 ; 1.41227 ; 1.50309 ; 1.63407 ; 1.81639 ; 2.06277 ; 2.38063 ; 3.30122 ; 4.8262 ; 6.72135 ; 7.37541 ; 7.62176 ; 7.98859 ; 8.53808 ; 9.084 ; 9.61112 ; 10.3885 ; 10.6865 ; 11.0744 ; 11.607 ; 12.0305 ; 12.0325 ; 12.0294 ; 12.0208 ; 12.0173 ; 12.0124 ; 12.0054 ; 11.9965 ; 11.9872 ; 12.0224 ; 12.0781 ; 12.1148 ; 12.1168 ; 12.1187 ; 12.1159 ; 12.1093 ; 12.1059 ; 12.1003 ; 12.0911 ; 12.079 ; 12.0627 ; 12.0458 ; 12.2301 ; 12.4522 ; 12.5503 ; 12.7409 ; 12.8966 ; 13.0231 ; 13.1687 ; 13.3377 ; 13.5439 ; 13.7002 ; 13.7903]

Bolt 2 - Tensile Force (kips): [48.5801 ; 48.4066 ; 48.2719 ; 48.1104 ; 47.9255 ; 47.7425 ; 47.6055 ; 47.5722 ; 47.5435 ; 47.5011 ; 47.4524 ; 47.3866 ; 47.3307 ; 47.39 ; 47.0978 ; 46.3743 ; 45.5716 ; 45.3893 ; 45.3242 ; 45.2397 ; 45.1316 ; 45.0483 ; 45.0084 ; 44.9965 ; 44.9784 ; 44.9986 ; 45.0392 ; 44.9417 ; 44.8329 ; 44.7081 ; 44.5973 ; 44.5711 ; 44.5549 ; 44.5749 ; 44.7684 ; 45.2482 ; 45.2671 ; 45.2959 ; 45.329 ; 45.3688 ; 45.4295 ; 45.5232 ; 45.5847 ; 45.608 ; 45.5932 ; 45.5614 ; 45.7401 ; 46.2907 ; 46.8087 ; 47.2843 ; 47.4566 ; 47.5202 ; 47.617 ; 47.7692 ; 47.9998 ; 48.333 ; 48.8279 ; 49.6794 ; 50.8924 ; 51.6283]

Bolt 2 - Shear Force (kips): [0.0683259 ; 0.218889 ; 0.418421 ; 0.672628 ; 0.989675 ; 1.33749 ; 1.65061 ; 1.73556 ; 1.84291 ; 1.99059 ; 2.206 ; 2.49667 ; 2.84534 ; 3.2177 ; 4.08577 ; 5.45418 ; 7.03198 ; 7.48933 ; 7.65893 ; 7.90566 ; 8.26579 ; 8.61022 ; 8.92885 ; 9.38501 ; 9.56802 ; 9.80356 ; 10.1513 ; 10.8108 ; 11.1174 ; 11.5444 ; 12.1163 ; 12.3142 ; 12.5913 ; 12.9683 ; 13.4083 ; 13.9144 ; 13.9191 ; 13.9256 ; 13.9437 ; 13.9793 ; 14.0317 ; 14.1073 ; 14.33 ; 14.4202 ; 14.6094 ; 14.9353 ; 15.1962 ; 15.3656 ; 15.5167 ; 15.641 ; 15.688 ; 15.7049 ; 15.7291 ; 15.7667 ; 15.821 ; 15.8922 ; 15.9939 ; 16.031 ; 16.0782 ; 16.0261]

Bolt 3 - Tensile Force (kips): [50 ; 49.8936 ; 49.8599 ; 49.8761 ; 49.9566 ; 50.1643 ; 50.6566 ; 50.804 ; 50.9919 ; 51.2238 ; 51.5231 ; 51.955 ; 52.7132 ; 53.9791 ; 55.8367 ; 58.4786 ; 61.8318 ; 62.9331 ; 63.3104 ; 63.8096 ; 64.4337 ; 65.1128 ; 65.7984 ; 67.037 ; 67.6054 ; 68.2366 ; 69.192 ; 70.5026 ; 70.9348 ; 71.5433 ; 72.4335 ; 72.7903 ; 73.2602 ; 73.878 ; 74.6831 ; 75.7541 ; 75.7815 ; 75.8224 ; 75.8818 ; 75.9679 ; 76.0898 ; 76.2602 ; 76.5116 ; 76.6022 ; 76.7353 ; 76.9315 ; 77.2141 ; 77.6145 ; 77.9855 ; 78.3605 ; 78.4991 ; 78.5522 ; 78.6306 ; 78.7452 ; 78.9141 ; 79.1623 ; 79.5638 ; 80.1264 ; 80.8568 ; 81.3402]

Bolt 3 - Shear Force (kips): [0.0499488 ; 0.0436851 ; 0.1065 ; 0.202817 ; 0.342508 ; 0.529735 ; 0.735011 ; 0.790796 ; 0.865095 ; 0.963039 ; 1.10161 ; 1.30285 ; 1.53178 ; 1.78357 ; 2.13611 ; 2.56722 ; 3.0122 ; 3.1464 ; 3.20861 ; 3.31363 ; 3.4955 ; 3.6077 ; 3.79464 ; 4.69674 ; 5.07488 ; 5.42903 ; 5.47671 ; 5.57076 ; 5.79749 ; 6.27614 ; 6.74801 ; 6.97477 ; 7.26439 ; 7.59259 ; 7.97217 ; 8.54486 ; 8.56385 ; 8.59079 ; 8.62885 ; 8.68065 ; 8.74978 ; 8.84229 ; 8.95463 ; 8.9961 ; 9.05293 ; 9.12892 ; 9.23351 ; 9.37314 ; 9.5542 ; 9.68442 ; 9.73958 ; 9.75974 ; 9.78677 ; 9.82542 ; 9.87522 ; 9.95905 ; 10.1689 ; 10.4861 ; 10.9486 ; 11.2943]

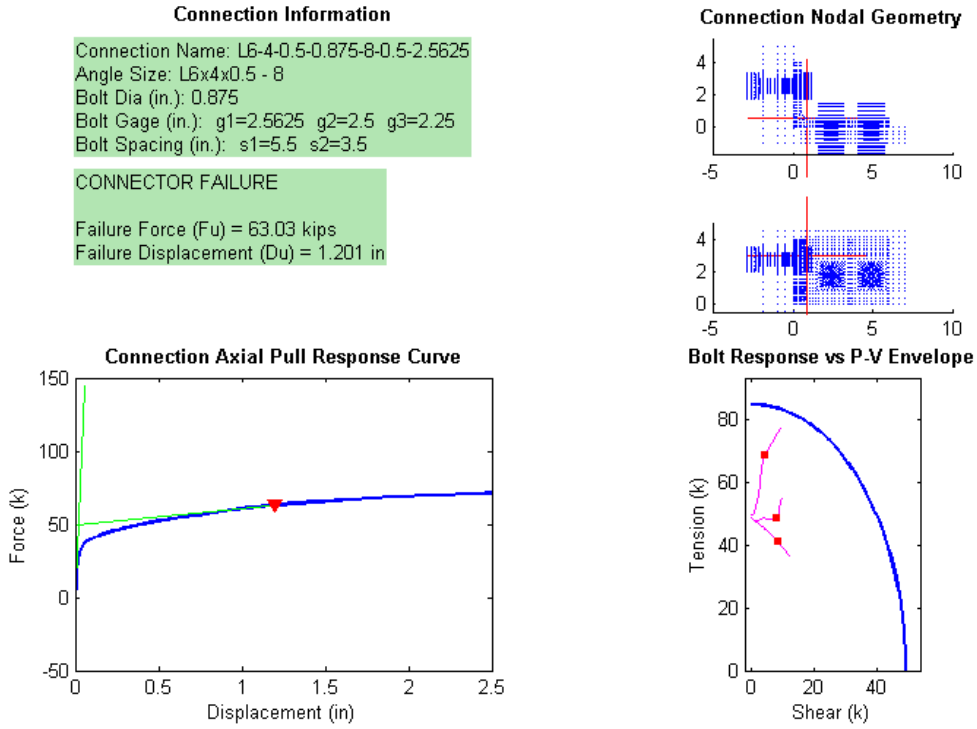


Figure B.59 Connection L6_4_0.5_0.875_8_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.875_8_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 2.5192e+003

Plastic Stiffness (k/in): 11.5108

Displacement (in): [5.3954e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.25146 ; 0.29369 ; 0.35705 ; 0.45208 ; 0.59462 ; 0.64807 ; 0.66812 ; 0.69818 ; 0.74329 ; 0.78839 ; 0.83349 ; 0.87859 ; 0.94624 ; 1.0477 ; 1.0501 ; 1.0537 ; 1.059 ; 1.0671 ; 1.0791 ; 1.0972 ; 1.1242 ; 1.1649 ; 1.2258 ; 1.3173 ; 1.4544 ; 1.6602 ; 1.9102 ; 2.1601 ; 2.4101 ; 2.5]

Force (kips): [-1.34868 ; 1.57907 ; 3.57172 ; 6.04076 ; 9.14461 ; 12.6311 ; 15.6312 ; 17.5189 ; 18.8008 ; 20.0454 ; 21.2344 ; 22.5406 ; 22.9849 ; 23.6014 ; 24.4336 ; 25.5302 ; 26.9167 ; 27.3806 ; 27.5471 ; 27.8065 ; 28.202 ; 28.5959 ; 28.9902 ; 29.3814 ; 29.9115 ; 30.6075 ; 30.6246 ; 30.6496 ; 30.6856 ; 30.7376 ; 30.8125 ; 30.9236 ; 31.0859 ; 31.3198 ; 31.6491 ; 32.1051 ; 32.7181 ; 33.4922 ; 34.2846 ; 34.9275 ; 35.4437 ; 35.6057]

Bolt 1 - Tensile Force (kips): [48.5717 ; 48.4569 ; 48.3735 ; 48.2664 ; 48.1226 ; 47.9465 ; 47.7766 ; 47.6435 ; 47.5094 ; 47.3273 ; 47.1725 ; 47.0083 ; 46.9458 ; 46.8538 ; 46.706 ; 46.3726 ; 45.5263 ; 45.1867 ; 45.06 ; 44.8618 ; 44.5485 ; 44.2348 ; 43.9038 ; 43.544 ; 43.0346 ; 42.3284 ; 42.3107 ; 42.2849 ; 42.2477 ; 42.1942 ; 42.1169 ; 42.0021 ; 41.8312 ; 41.5859 ; 41.2381 ; 40.741 ; 40.0504 ; 39.1241 ; 38.1203 ; 37.2967 ; 36.7883 ; 36.7597]

Bolt 1 - Shear Force (kips): [0.0851564 ; 0.126613 ; 0.240616 ; 0.393045 ; 0.595081 ; 0.835686 ; 1.06143 ; 1.2391 ; 1.42149 ; 1.66721 ; 1.86717 ; 2.06345 ; 2.13718 ; 2.24662 ; 2.42389 ; 2.83833 ; 3.87026 ; 4.25471 ; 4.3959 ; 4.61451 ; 4.95495 ; 5.29119 ; 5.63979 ; 6.01201 ; 6.53082 ; 7.23138 ; 7.24861 ; 7.27366 ; 7.30977 ; 7.3617 ; 7.43654 ; 7.54703 ; 7.71031 ; 7.94242 ; 8.26791 ; 8.72615 ; 9.35062 ; 10.1677 ; 11.016 ; 11.6718 ; 12.0641 ; 12.0779]

Bolt 2 - Tensile Force (kips): [48.5762 ; 48.4428 ; 48.3375 ; 48.2106 ; 48.0647 ; 47.9136 ; 47.8112 ; 47.7555 ; 47.7374 ; 47.7069 ; 47.8444 ; 48.1352 ; 48.2235 ; 48.3458 ; 48.4991 ; 48.5817 ; 48.4032 ; 48.3408 ; 48.3203 ; 48.2866 ; 48.2351 ; 48.2004 ; 48.1801 ; 48.1747 ; 48.2207 ; 48.3895 ; 48.3926 ; 48.3981 ; 48.4076 ; 48.4239 ; 48.4513 ; 48.4949 ; 48.5643 ; 48.6846 ; 48.8919 ; 49.2414 ; 49.8431 ; 50.8473 ; 52.0906 ; 53.3325 ; 54.4763 ; 54.8028]

Bolt 2 - Shear Force (kips): [0.067038 ; 0.1613 ; 0.31445 ; 0.5132 ; 0.77322 ; 1.0794 ; 1.3764 ; 1.6485 ; 1.9544 ; 2.346 ; 2.6388 ; 2.8818 ; 2.9652 ; 3.0861 ; 3.2732 ; 3.6754 ; 4.6061 ; 4.9465 ; 5.0708 ; 5.2624 ; 5.5578 ; 5.8431 ; 6.1206 ; 6.3887 ; 6.7442 ; 7.1894 ; 7.2005 ; 7.2165 ; 7.2391 ; 7.271 ; 7.3163 ; 7.3823 ; 7.4783 ; 7.6102 ; 7.7854 ; 8.0158 ; 8.296 ; 8.6034 ; 8.8796 ; 9.0741 ; 9.297 ; 9.4415]

Bolt 3 - Tensile Force (kips): [50 ; 49.8903 ; 49.8319 ; 49.8075 ; 49.8248 ; 49.9103 ; 50.2047 ; 50.5749 ; 50.9559 ; 51.542 ; 52.6145 ; 54.3893 ; 55.0082 ; 55.9128 ; 57.2041 ; 59.0102 ; 61.4042 ; 62.2228 ; 62.5207 ; 62.9186 ; 63.5517 ; 64.0978 ; 64.655 ; 65.3324 ; 66.2261 ; 67.3761 ; 67.4137 ; 67.4655 ; 67.5357 ; 67.6294 ; 67.7546 ; 67.9263 ; 68.1827 ; 68.5764 ; 69.1186 ; 69.9349 ; 71.0967 ; 72.6006 ; 74.2721 ; 75.6867 ; 76.7783 ; 77.1394]

Bolt 3 - Shear Force (kips): [0.053244 ; 0.030928 ; 0.076954 ; 0.15182 ; 0.2646 ; 0.414 ; 0.58444 ; 0.75491 ; 0.94517 ; 1.2048 ; 1.4677 ; 1.7163 ; 1.8248 ; 1.9829 ; 2.2022 ; 2.4531 ; 2.7156 ; 2.7965 ; 2.8242 ; 2.9181 ; 2.98 ; 2.897 ; 2.9583 ; 2.989 ; 3.4379 ; 3.582 ; 3.5613 ; 3.5373 ; 3.5145 ; 3.5026 ; 3.5172 ; 3.4982 ; 3.543 ; 3.7094 ; 4.1977 ; 4.7547 ; 5.6859 ; 6.5761 ; 7.5119 ; 8.2151 ; 8.7675 ; 8.9561]

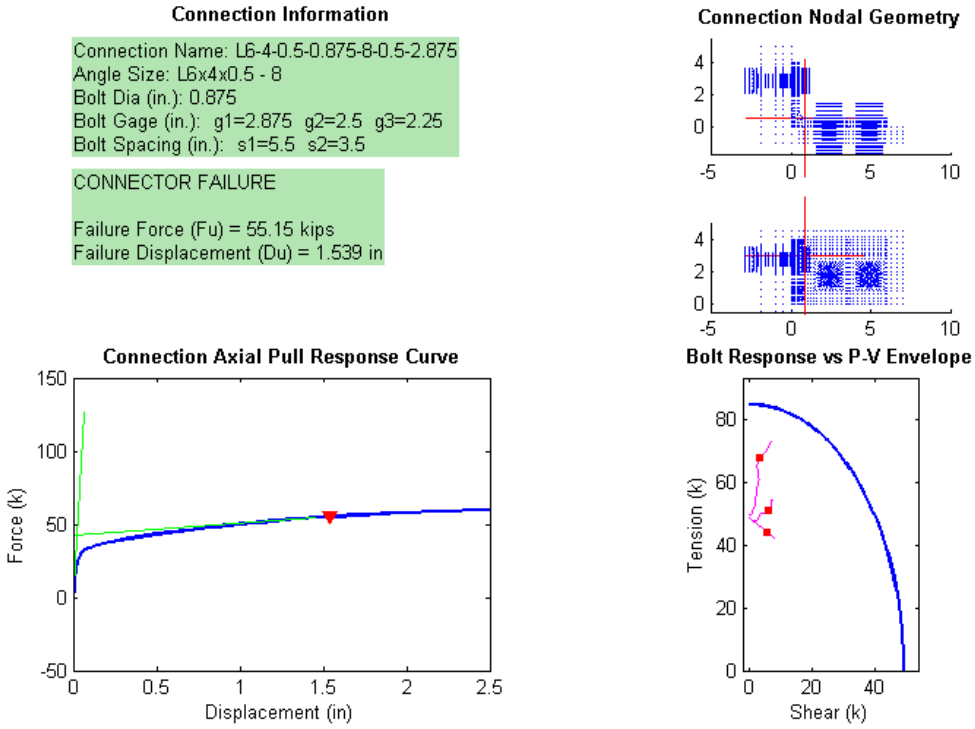


Figure B.60 Connection L6_4_0.5_0.875_8_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.875_8_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 1998

Plastic Stiffness (k/in): 8.1016

Displacement (in): [4.0524e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 0.81737 ; 0.84081 ; 0.87596 ; 0.9287 ; 0.94847 ; 0.97813 ; 0.98926 ; 1.0059 ; 1.031 ; 1.0685 ; 1.1248 ; 1.2093 ; 1.336 ; 1.3835 ; 1.4548 ; 1.5617 ; 1.7221 ; 1.9626 ; 2.2126 ; 2.4626 ; 2.5]

Force (kips): [-1.34909 ; 1.03164 ; 2.5533 ; 4.48311 ; 6.95441 ; 9.92042 ; 12.7622 ; 14.7358 ; 15.9039 ; 16.8841 ; 17.7747 ; 18.8149 ; 20.1192 ; 21.6706 ; 23.4659 ; 23.854 ; 24.0063 ; 24.2127 ; 24.5319 ; 24.6592 ; 24.8604 ; 24.9403 ; 25.0504 ; 25.1999 ; 25.422 ; 25.7262 ; 26.1743 ; 26.7728 ; 26.9795 ; 27.2682 ; 27.6558 ; 28.1733 ; 28.8421 ; 29.4318 ; 29.9255 ; 29.9936]

Bolt 1 - Tensile Force (kips): [48.5714 ; 48.4789 ; 48.4156 ; 48.3327 ; 48.221 ; 48.0756 ; 47.9204 ; 47.792 ; 47.6816 ; 47.5463 ; 47.4211 ; 47.3064 ; 47.1682 ; 46.9924 ; 46.7293 ; 46.6442 ; 46.6017 ; 46.5317 ; 46.3716 ; 46.2953 ; 46.1704 ; 46.1189 ; 46.0467 ; 45.9455 ; 45.792 ; 45.5802 ; 45.2383 ; 44.768 ; 44.6031 ; 44.3761 ; 44.0597 ; 43.6286 ; 43.082 ; 42.5975 ; 42.1956 ; 42.1401]

Bolt 1 - Shear Force (kips): [0.084881 ; 0.099647 ; 0.18251 ; 0.29945 ; 0.45866 ; 0.66184 ; 0.87342 ; 1.0484 ; 1.2038 ; 1.3975 ; 1.5755 ; 1.7346 ; 1.9137 ; 2.1408 ; 2.4893 ; 2.6019 ; 2.6568 ; 2.7477 ; 2.9588 ; 3.0582 ; 3.218 ; 3.2827 ; 3.3727 ; 3.4971 ; 3.6827 ; 3.9344 ; 4.3304 ; 4.8646 ; 5.0494 ; 5.3029 ; 5.6535 ; 6.1247 ; 6.7178 ; 7.2374 ; 7.6672 ; 7.7263]

Bolt 2 - Tensile Force (kips): [48.5748 ; 48.4687 ; 48.3861 ; 48.2832 ; 48.1656 ; 48.041 ; 47.9544 ; 47.9139 ; 47.9289 ; 47.9361 ; 47.9892 ; 48.2402 ; 48.6812 ; 49.2077 ; 49.8143 ; 49.9374 ; 49.9759 ; 50.0304 ; 50.0717 ; 50.0757 ; 50.0777 ; 50.0752 ; 50.0768 ; 50.0875 ; 50.108 ; 50.1613 ; 50.2367 ; 50.4403 ; 50.5439 ; 50.7253 ; 51.0309 ; 51.546 ; 52.4219 ; 53.3999 ; 54.3954 ; 54.5439]

Bolt 2 - Shear Force (kips): [0.067038 ; 0.12217 ; 0.23998 ; 0.39664 ; 0.60618 ; 0.86896 ; 1.144 ; 1.3991 ; 1.6591 ; 1.9739 ; 2.2381 ; 2.4583 ; 2.6809 ; 2.9398 ; 3.3427 ; 3.4688 ; 3.5274 ; 3.6221 ; 3.825 ; 3.9179 ; 4.066 ; 4.126 ; 4.2093 ; 4.3244 ; 4.4957 ; 4.7275 ; 5.0849 ; 5.5274 ; 5.6628 ; 5.8411 ; 6.0744 ; 6.3638 ; 6.6855 ; 6.9217 ; 7.0762 ; 7.0944]

Bolt 3 - Tensile Force (kips): [50 ; 49.8974 ; 49.8304 ; 49.7796 ; 49.7533 ; 49.7605 ; 49.901 ; 50.1837 ; 50.469 ; 50.9208 ; 51.7123 ; 52.7754 ; 54.523 ; 57.0319 ; 60.2966 ; 61.0929 ; 61.3505 ; 61.7318 ; 62.3515 ; 62.561 ; 62.9401 ; 63.1103 ; 63.34 ; 63.6503 ; 64.0315 ; 64.5377 ; 65.2798 ; 66.2924 ; 66.6983 ; 67.2622 ; 67.9715 ; 68.9624 ; 70.3807 ; 71.7627 ; 72.9484 ; 73.1169]

Bolt 3 - Shear Force (kips): [0.053974 ; 0.025366 ; 0.056759 ; 0.11541 ; 0.20588 ; 0.3306 ; 0.47153 ; 0.61513 ; 0.77353 ; 0.96234 ; 1.1921 ; 1.5402 ; 1.9068 ; 2.3229 ; 2.6469 ; 3.0655 ; 2.7082 ; 2.7111 ; 2.854 ; 2.8422 ; 2.7234 ; 2.6902 ; 2.6187 ; 2.5794 ; 2.5476 ; 2.2387 ; 2.2865 ; 2.4401 ; 2.4698 ; 2.6434 ; 3.3881 ; 4.2139 ; 5.2538 ; 6.0993 ; 6.692 ; 6.7823]

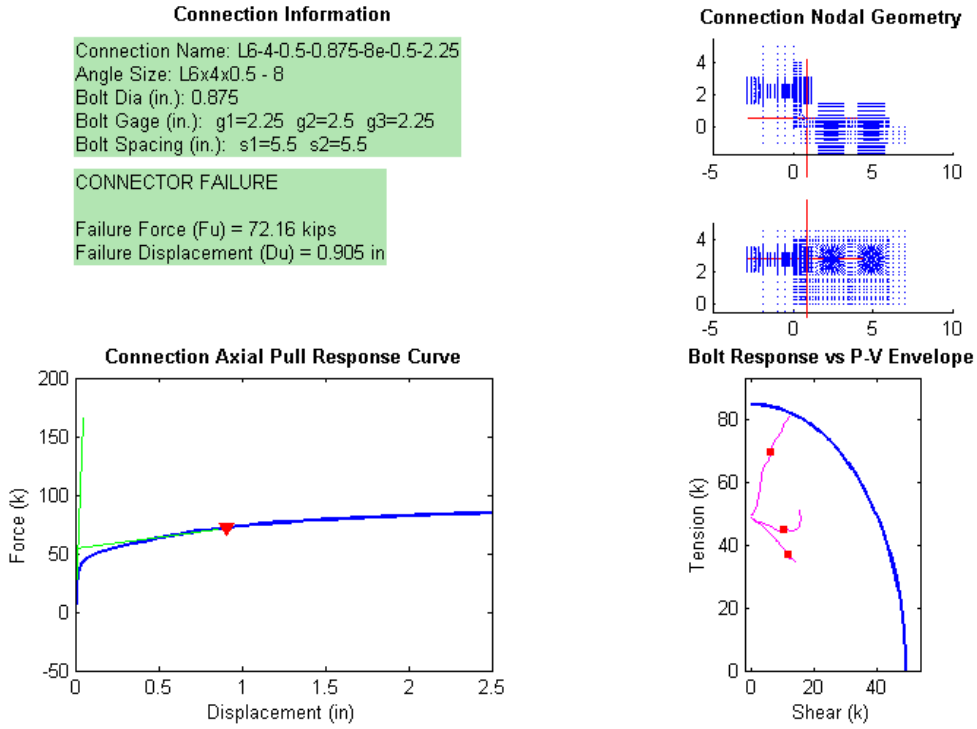


Figure B.61 Connection L6_4_0.5_0.875_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.875_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 3.3487e+003

Plastic Stiffness (k/in): 19.2542

Displacement (in): [5.5548e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.44793 ; 0.50138 ; 0.52142 ; 0.52894 ; 0.54022 ; 0.55713 ; 0.5825 ; 0.62055 ; 0.67764 ; 0.69904 ; 0.73115 ; 0.77931 ; 0.85156 ; 0.9238 ; 0.99604 ; 1.1044 ; 1.267 ; 1.3279 ; 1.4193 ; 1.4536 ; 1.5051 ; 1.5244 ; 1.5533 ; 1.5967 ; 1.613 ; 1.6374 ; 1.674 ; 1.7289 ; 1.7495 ; 1.7804 ; 1.8267 ; 1.8441 ; 1.8702 ; 1.88 ; 1.8946 ; 1.9166 ; 1.9496 ; 1.9991 ; 2.0733 ; 2.1847 ; 2.3517 ; 2.5]

Force (kips): [-1.56046 ; 2.32866 ; 4.98004 ; 8.21631 ; 12.0576 ; 16.0138 ; 19.0667 ; 19.7368 ; 20.4579 ; 21.2171 ; 22.0802 ; 23.0722 ; 24.1721 ; 25.3904 ; 26.8805 ; 28.7082 ; 30.8633 ; 31.563 ; 31.8237 ; 31.9323 ; 32.0829 ; 32.3058 ; 32.6459 ; 33.1289 ; 33.7821 ; 34.0411 ; 34.398 ; 34.9269 ; 35.6224 ; 36.2431 ; 36.7941 ; 37.5023 ; 38.4181 ; 38.721 ; 39.1324 ; 39.2773 ; 39.4856 ; 39.5584 ; 39.6652 ; 39.8335 ; 39.895 ; 39.9871 ; 40.1194 ; 40.3052 ; 40.3722 ; 40.4701 ; 40.6101 ; 40.6708 ; 40.7604 ; 40.7918 ; 40.8398 ; 40.9086 ; 41.007 ; 41.1466 ; 41.3436 ; 41.631 ; 41.9946 ; 42.2786]

Bolt 1 - Tensile Force (kips): [48.6129 ; 48.4504 ; 48.3334 ; 48.1835 ; 47.9912 ; 47.7757 ; 47.5872 ; 47.5409 ; 47.4865 ; 47.4199 ; 47.3279 ; 47.2053 ; 47.0487 ; 46.8682 ; 46.3452 ; 44.9056 ; 42.9446 ; 42.2577 ; 41.9965 ; 41.8898 ; 41.7363 ; 41.5053 ; 41.1514 ; 40.6276 ; 39.8832 ; 39.5767 ; 39.1469 ; 38.4898 ; 37.5874 ; 36.7715 ; 36.5191 ; 36.4384 ; 36.3437 ; 36.3093 ; 36.2602 ; 36.2339 ; 36.1663 ; 36.1497 ; 36.1301 ; 36.1009 ; 36.0906 ; 36.0754 ; 36.0483 ; 36.0109 ; 35.997 ; 35.9757 ; 35.9422 ; 35.89 ; 35.8208 ; 35.8 ; 35.7617 ; 35.7074 ; 35.6307 ; 35.5208 ; 35.3908 ; 35.2513 ; 35.0711 ; 34.9211]

Bolt 1 - Shear Force (kips): [0.065377 ; 0.188312 ; 0.355272 ; 0.568074 ; 0.83189 ; 1.11764 ; 1.35992 ; 1.41954 ; 1.49036 ; 1.5789 ; 1.70272 ; 1.8653 ; 2.06712 ; 2.29163 ; 2.94329 ; 4.60288 ; 6.61073 ; 7.26954 ; 7.51408 ; 7.61285 ; 7.75425 ; 7.96517 ; 8.28441 ; 8.74898 ; 9.39385 ; 9.65269 ; 10.0109 ; 10.5472 ; 11.2539 ; 11.8579 ; 12.0259 ; 12.0193 ; 11.9925 ; 11.9816 ; 11.9656 ; 11.9987 ; 12.0901 ; 12.0893 ; 12.0845 ; 12.0703 ; 12.0646 ; 12.0559 ; 12.0412 ; 12.0194 ; 12.0113 ; 11.9989 ; 11.9797 ; 12.1437 ; 12.3856 ; 12.4483 ; 12.5656 ; 12.7111 ; 12.8798 ; 13.0685 ; 13.2258 ; 13.4038 ; 13.6231 ; 13.831]

Bolt 2 - Tensile Force (kips): [48.6376 ; 48.4492 ; 48.3114 ; 48.1467 ; 47.9545 ; 47.7657 ; 47.6195 ; 47.5788 ; 47.5341 ; 47.4855 ; 47.4132 ; 47.291 ; 47.1888 ; 47.2114 ; 47.0275 ; 46.2161 ; 45.3621 ; 45.1471 ; 45.069 ; 45.0338 ; 44.991 ; 44.9321 ; 44.8607 ; 44.7936 ; 44.775 ; 44.7526 ; 44.7488 ; 44.7546 ; 44.834 ; 44.934 ; 44.8071 ; 44.5956 ; 44.4719 ; 44.5066 ; 44.6911 ; 44.787 ; 44.9616 ; 45.0168 ; 45.1032 ; 45.1016 ; 45.107 ; 45.1136 ; 45.3054 ; 45.719 ; 45.872 ; 46.0924 ; 46.4165 ; 46.5306 ; 46.6994 ; 46.7636 ; 46.8583 ; 46.9997 ; 47.2115 ; 47.5298 ; 48.0059 ; 48.8968 ; 50.1421 ; 51.1722]

Bolt 2 - Shear Force (kips): [0.102338 ; 0.198853 ; 0.392734 ; 0.642357 ; 0.949882 ; 1.28323 ; 1.58449 ; 1.66826 ; 1.77633 ; 1.9222 ; 2.13659 ; 2.41356 ; 2.7251 ; 3.00624 ; 3.63428 ; 5.13168 ; 6.8543 ; 7.38523 ; 7.57913 ; 7.65602 ; 7.76247 ; 7.91745 ; 8.13683 ; 8.43973 ; 8.83513 ; 8.99843 ; 9.21857 ; 9.54653 ; 9.98423 ; 10.3972 ; 11.001 ; 11.9091 ; 13.0309 ; 13.3704 ; 13.7666 ; 13.8875 ; 14.0374 ; 14.0995 ; 14.1887 ; 14.5272 ; 14.6485 ; 14.8394 ; 14.9867 ; 15.1102 ; 15.1529 ; 15.2139 ; 15.2972 ; 15.3236 ; 15.3604 ; 15.3742 ; 15.3938 ; 15.4227 ; 15.466 ; 15.5313 ; 15.6323 ; 15.5643 ; 15.443 ; 15.3339]

Bolt 3 - Tensile Force (kips): [50 ; 49.896 ; 49.861 ; 49.8782 ; 49.9618 ; 50.1572 ; 50.6506 ; 50.8004 ; 50.9917 ; 51.2281 ; 51.5319 ; 51.9712 ; 52.7231 ; 53.951 ; 55.7569 ; 58.3756 ; 61.7676 ; 62.87 ; 63.2292 ; 63.3509 ; 63.5265 ; 63.7702 ; 64.0992 ; 64.6734 ; 65.4928 ; 65.9151 ; 66.4872 ; 67.4279 ; 68.7248 ; 69.921 ; 71.0418 ; 72.3714 ; 74.052 ; 74.5946 ; 75.3256 ; 75.5861 ; 75.9422 ; 76.0736 ; 76.2672 ; 76.5564 ; 76.6587 ; 76.8108 ; 77.0314 ; 77.3427 ; 77.459 ; 77.6321 ; 77.8859 ; 77.9812 ; 78.1205 ; 78.1711 ; 78.2468 ; 78.3588 ; 78.5226 ; 78.7523 ; 79.1282 ; 79.7523 ; 80.5381 ; 81.1655]

Bolt 3 - Shear Force (kips): [0.0599612 ; 0.0327874 ; 0.100639 ; 0.19792 ; 0.338636 ; 0.526457 ; 0.731271 ; 0.786987 ; 0.860756 ; 0.960206 ; 1.09978 ; 1.30025 ; 1.52896 ; 1.80447 ; 2.21481 ; 2.66124 ; 3.07437 ; 3.21583 ; 3.27974 ; 3.31468 ; 3.35578 ; 3.41789 ; 3.55907 ; 3.65908 ; 3.86812 ; 4.41005 ; 5.01288 ; 5.5974 ; 6.01882 ; 5.94415 ; 6.34029 ; 7.03638 ; 7.95339 ; 8.29807 ; 8.87564 ; 9.03548 ; 9.26351 ; 9.33777 ; 9.43497 ; 9.55614 ; 9.59189 ; 9.63622 ; 9.7372 ; 9.89756 ; 9.95142 ; 10.0248 ; 10.1197 ; 10.1499 ; 10.195 ; 10.2126 ; 10.2387 ; 10.2767 ; 10.3305 ; 10.4319 ; 10.6103 ; 11.0781 ; 11.5793 ; 11.9682]

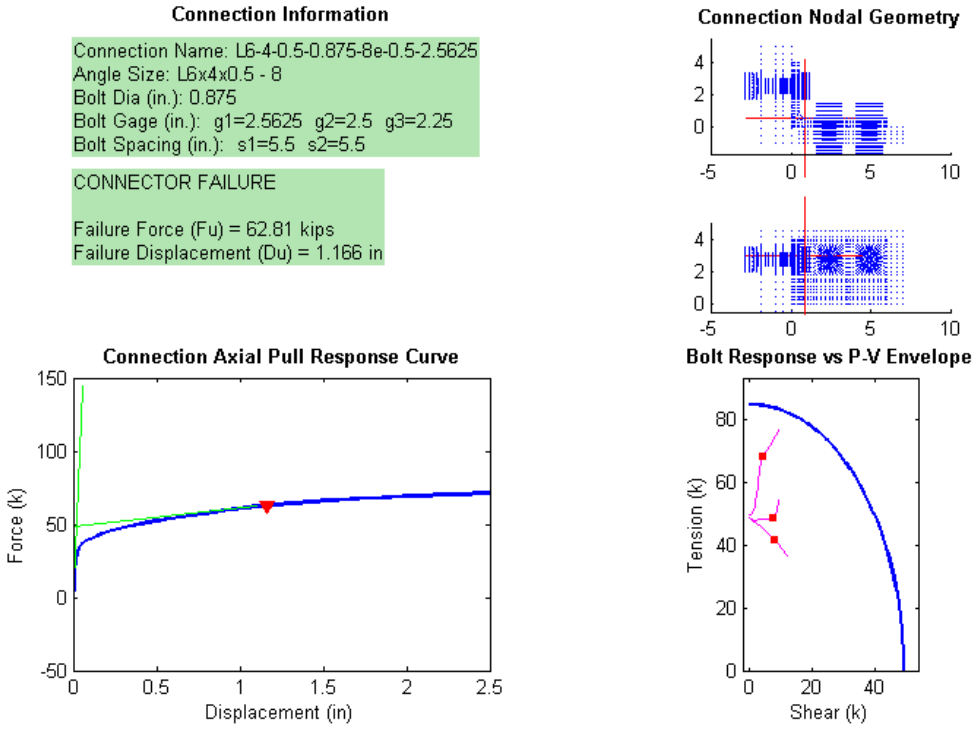


Figure B.62 Connection L6_4_0.5_0.875_8e_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.875_8e_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 2.5881e+003

Plastic Stiffness (k/in): 12.3839

Displacement (in): [5.9593e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.44793 ; 0.50138 ; 0.58156 ; 0.70183 ; 0.71311 ; 0.73002 ; 0.75539 ; 0.79344 ; 0.85052 ; 0.93615 ; 0.94417 ; 0.95622 ; 0.97428 ; 1.0014 ; 1.042 ; 1.103 ; 1.1944 ; 1.3316 ; 1.5373 ; 1.7873 ; 2.0373 ; 2.2873 ; 2.5]

Force (kips): [-1.53407 ; 1.51169 ; 3.52073 ; 6.0104 ; 9.1213 ; 12.5723 ; 15.5706 ; 16.267 ; 17.009 ; 17.7381 ; 18.4797 ; 19.2799 ; 20.1715 ; 21.1421 ; 22.3145 ; 23.7541 ; 25.5156 ; 26.0896 ; 26.8648 ; 27.9019 ; 28.0093 ; 28.1631 ; 28.4022 ; 28.7209 ; 29.2231 ; 29.9233 ; 29.9968 ; 30.093 ; 30.2228 ; 30.4076 ; 30.6675 ; 31.0449 ; 31.5663 ; 32.2486 ; 33.1096 ; 33.9592 ; 34.6558 ; 35.2134 ; 35.5999]

Bolt 1 - Tensile Force (kips): [48.6114 ; 48.4841 ; 48.3954 ; 48.2814 ; 48.1293 ; 47.9456 ; 47.768 ; 47.7221 ; 47.6697 ; 47.6122 ; 47.5433 ; 47.4495 ; 47.3323 ; 47.242 ; 47.125 ; 46.9452 ; 46.582 ; 46.2927 ; 45.7815 ; 45.0049 ; 44.9221 ; 44.8021 ; 44.613 ; 44.3548 ; 43.9321 ; 43.3033 ; 43.2327 ; 43.1384 ; 43.0107 ; 42.826 ; 42.5627 ; 42.1824 ; 41.6436 ; 40.8939 ; 39.8743 ; 38.8037 ; 37.8752 ; 37.0996 ; 36.5945]

Bolt 1 - Shear Force (kips): [0.0632805 ; 0.141205 ; 0.267452 ; 0.431914 ; 0.64691 ; 0.898082 ; 1.13559 ; 1.19628 ; 1.26629 ; 1.34519 ; 1.44169 ; 1.57336 ; 1.73592 ; 1.85968 ; 2.01246 ; 2.23422 ; 2.66723 ; 3.03127 ; 3.64774 ; 4.51891 ; 4.6088 ; 4.73849 ; 4.94093 ; 5.21366 ; 5.65179 ; 6.28742 ; 6.35756 ; 6.45091 ; 6.57707 ; 6.75799 ; 7.01459 ; 7.37931 ; 7.88265 ; 8.56183 ; 9.45132 ; 10.3421 ; 11.0697 ; 11.6372 ; 11.9756]

Bolt 2 - Tensile Force (kips): [48.6316 ; 48.4848 ; 48.3802 ; 48.2525 ; 48.1073 ; 47.9621 ; 47.8529 ; 47.8269 ; 47.7971 ; 47.7751 ; 47.7671 ; 47.7251 ; 47.6844 ; 47.838 ; 48.0659 ; 48.3045 ; 48.5417 ; 48.4988 ; 48.3967 ; 48.3358 ; 48.3224 ; 48.3075 ; 48.2808 ; 48.2694 ; 48.2352 ; 48.2361 ; 48.229 ; 48.2291 ; 48.2425 ; 48.2727 ; 48.3444 ; 48.4909 ; 48.771 ; 49.278 ; 50.1481 ; 51.2697 ; 52.3901 ; 53.4821 ; 54.3649]

Bolt 2 - Shear Force (kips): [0.10064 ; 0.14437 ; 0.28906 ; 0.48076 ; 0.73054 ; 1.0209 ; 1.3032 ; 1.3825 ; 1.4835 ; 1.6107 ; 1.7752 ; 2.0025 ; 2.2683 ; 2.466 ; 2.6622 ; 2.9154 ; 3.3725 ; 3.7134 ; 4.2732 ; 5.0427 ; 5.1219 ; 5.2353 ; 5.4106 ; 5.6441 ; 6.0146 ; 6.5268 ; 6.5808 ; 6.6512 ; 6.7438 ; 6.8742 ; 7.0456 ; 7.2731 ; 7.5649 ; 7.9172 ; 8.3189 ; 8.6614 ; 8.9078 ; 9.0903 ; 9.2394]

Bolt 3 - Tensile Force (kips): [50 ; 49.8925 ; 49.8312 ; 49.8079 ; 49.8249 ; 49.9055 ; 50.1956 ; 50.2949 ; 50.4367 ; 50.6146 ; 50.8282 ; 51.1312 ; 51.6478 ; 52.4964 ; 53.9181 ; 56.0156 ; 58.8919 ; 59.8473 ; 61.1817 ; 62.9731 ; 63.1204 ; 63.3521 ; 63.7125 ; 64.1223 ; 64.8572 ; 66.0681 ; 66.232 ; 66.4161 ; 66.6263 ; 66.8976 ; 67.2942 ; 67.8879 ; 68.7539 ; 69.9682 ; 71.6077 ; 73.3197 ; 74.8299 ; 75.9799 ; 76.7828]

Bolt 3 - Shear Force (kips): [0.064664 ; 0.020799 ; 0.069432 ; 0.14521 ; 0.25811 ; 0.40719 ; 0.57662 ; 0.62371 ; 0.68783 ; 0.77247 ; 0.88027 ; 1.0362 ; 1.2476 ; 1.4908 ; 1.7394 ; 2.0725 ; 2.4568 ; 2.5687 ; 2.7131 ; 2.9159 ; 2.9952 ; 3.0021 ; 2.8903 ; 2.9313 ; 3.0473 ; 3.5755 ; 3.5525 ; 3.5129 ; 3.5569 ; 3.6603 ; 3.7933 ; 3.6691 ; 4.1714 ; 5.1778 ; 6.2731 ; 7.3195 ; 8.1715 ; 8.8851 ; 9.3556]

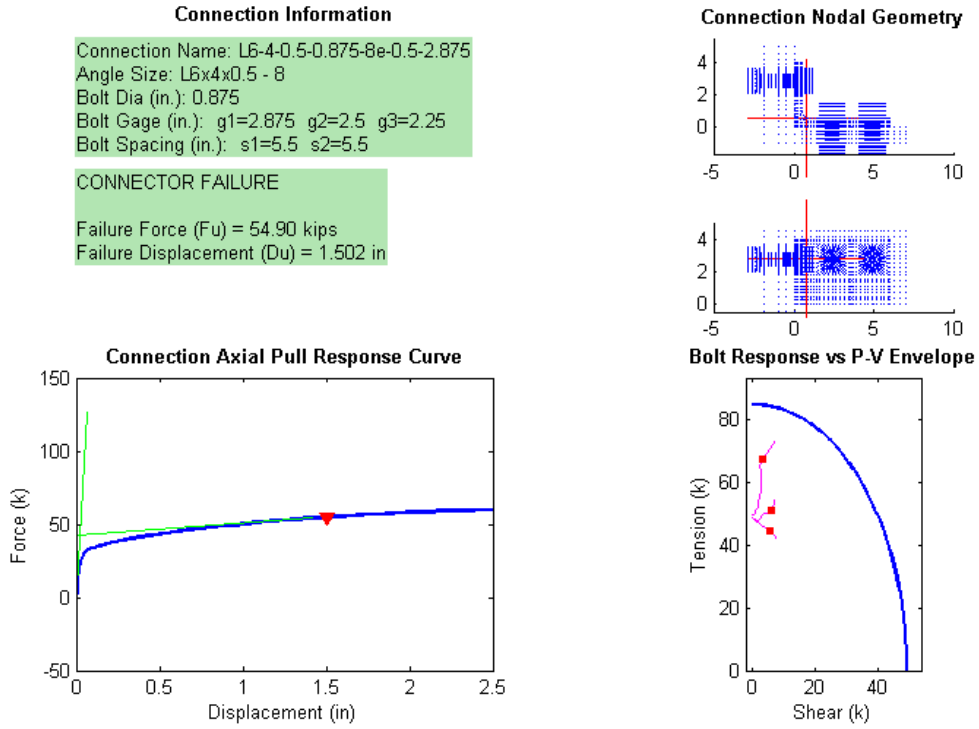


Figure B.63 Connection L6_4_0.5_0.875_8e_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.5_0.875_8e_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 2.0521e+003

Plastic Stiffness (k/in): 8.3408

Displacement (in): [6.0194e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.53655 ; 0.67909 ; 0.8929 ; 0.9554 ; 1.0179 ; 1.0804 ; 1.1038 ; 1.139 ; 1.1522 ; 1.172 ; 1.2016 ; 1.2461 ; 1.3129 ; 1.413 ; 1.5631 ; 1.7884 ; 2.0384 ; 2.2884 ; 2.5]

Force (kips): [-1.51048 ; 0.96898 ; 2.49753 ; 4.43628 ; 6.91889 ; 9.86312 ; 12.681 ; 14.6909 ; 15.8589 ; 16.8158 ; 17.7332 ; 18.7867 ; 20.0975 ; 20.5306 ; 21.133 ; 21.9536 ; 23.0068 ; 24.3291 ; 24.7245 ; 25.1346 ; 25.5108 ; 25.6443 ; 25.8369 ; 25.9147 ; 26.0211 ; 26.1782 ; 26.3926 ; 26.7066 ; 27.1241 ; 27.6764 ; 28.3744 ; 29.035 ; 29.5847 ; 29.9716]

Bolt 1 - Tensile Force (kips): [48.6109 ; 48.5075 ; 48.4399 ; 48.3514 ; 48.2323 ; 48.0795 ; 47.917 ; 47.7831 ; 47.6802 ; 47.5643 ; 47.4654 ; 47.3631 ; 47.2397 ; 47.1961 ; 47.1298 ; 47.0249 ; 46.8676 ; 46.5711 ; 46.3847 ; 46.1293 ; 45.8753 ; 45.7847 ; 45.6489 ; 45.5907 ; 45.5105 ; 45.3891 ; 45.2155 ; 44.9746 ; 44.6492 ; 44.2093 ; 43.6226 ; 43.0678 ; 42.5984 ; 42.2691]

Bolt 1 - Shear Force (kips): [0.061753 ; 0.11028 ; 0.20551 ; 0.33368 ; 0.50571 ; 0.72096 ; 0.94374 ; 1.1279 ; 1.2767 ; 1.4476 ; 1.5942 ; 1.7461 ; 1.921 ; 1.9798 ; 2.0666 ; 2.1982 ; 2.3913 ; 2.7521 ; 2.9907 ; 3.3103 ; 3.615 ; 3.7209 ; 3.8777 ; 3.944 ; 4.0348 ; 4.1712 ; 4.3643 ; 4.6292 ; 4.9824 ; 5.4493 ; 6.0594 ; 6.6237 ; 7.0915 ; 7.4143]

Bolt 2 - Tensile Force (kips): [48.6298 ; 48.5105 ; 48.4305 ; 48.3289 ; 48.2145 ; 48.0948 ; 48.0128 ; 47.9679 ; 47.9828 ; 47.996 ; 48.0977 ; 48.3204 ; 48.6725 ; 48.7965 ; 48.9753 ; 49.2201 ; 49.575 ; 50.0722 ; 50.1463 ; 50.1728 ; 50.2142 ; 50.2347 ; 50.267 ; 50.2741 ; 50.2914 ; 50.3193 ; 50.3715 ; 50.4705 ; 50.6656 ; 51.044 ; 51.7383 ; 52.5934 ; 53.4859 ; 54.2649]

Bolt 2 - Shear Force (kips): [0.099209 ; 0.10917 ; 0.21671 ; 0.3645 ; 0.56377 ; 0.81072 ; 1.0669 ; 1.309 ; 1.5524 ; 1.8355 ; 2.0746 ; 2.2943 ; 2.5079 ; 2.5755 ; 2.6729 ; 2.8196 ; 3.0397 ; 3.4588 ; 3.6904 ; 3.9866 ; 4.2677 ; 4.3662 ; 4.5112 ; 4.5718 ; 4.655 ; 4.7789 ; 4.9539 ; 5.1934 ; 5.5009 ; 5.8718 ; 6.2744 ; 6.5985 ; 6.8306 ; 6.9593]

Bolt 3 - Tensile Force (kips): [50 ; 49.8997 ; 49.8297 ; 49.7778 ; 49.7494 ; 49.7557 ; 49.8897 ; 50.1776 ; 50.4661 ; 50.9009 ; 51.5904 ; 52.6186 ; 54.3869 ; 55.023 ; 55.9737 ; 57.3466 ; 59.2503 ; 61.8112 ; 62.5892 ; 63.3964 ; 64.1167 ; 64.3473 ; 64.6521 ; 64.7959 ; 64.963 ; 65.2072 ; 65.5025 ; 66.0158 ; 66.7585 ; 67.7968 ; 69.1619 ; 70.6427 ; 71.9339 ; 72.8449]

Bolt 3 - Shear Force (kips): [0.065513 ; 0.021348 ; 0.047619 ; 0.10805 ; 0.19823 ; 0.32241 ; 0.46196 ; 0.60258 ; 0.75692 ; 0.9548 ; 1.2273 ; 1.5867 ; 1.9429 ; 2.0687 ; 2.2338 ; 2.4237 ; 2.6136 ; 2.8164 ; 2.7267 ; 2.6591 ; 2.5147 ; 2.4513 ; 2.4039 ; 2.3498 ; 2.4084 ; 2.3444 ; 2.3826 ; 2.4604 ; 2.5961 ; 3.4133 ; 4.5416 ; 5.5872 ; 6.3032 ; 6.7647]

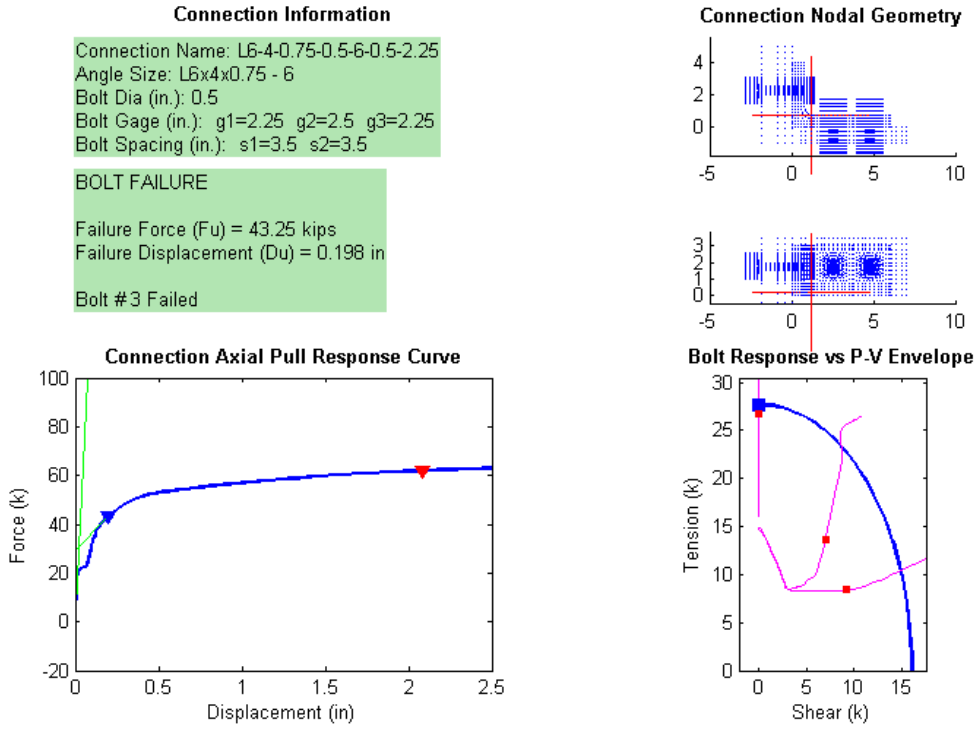


Figure B.64 Connection L6_4_0.75_0.5_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.5_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.3516e+003

Plastic Stiffness (k/in): 70.1192

Displacement (in): [7.6075e-037 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.035156 ; 0.052734 ; 0.059326 ; 0.061798 ; 0.065506 ; 0.066896 ; 0.068982 ; 0.072111 ; 0.073284 ; 0.075044 ; 0.075704 ; 0.076693 ; 0.078178 ; 0.080406 ; 0.083746 ; 0.084999 ; 0.086878 ; 0.089697 ; 0.093926 ; 0.10027 ; 0.10978 ; 0.11335 ; 0.1187 ; 0.12673 ; 0.13877 ; 0.15683 ; 0.18392 ; 0.22456 ; 0.28551 ; 0.37695 ; 0.41124 ; 0.46267 ; 0.53982 ; 0.65554 ; 0.82912 ; 0.83303 ; 0.83888 ; 0.84767 ; 0.86086 ; 0.8658 ; 0.87322 ; 0.88434 ; 0.90102 ; 0.92605 ; 0.9636 ; 1.0199 ; 1.041 ; 1.0727 ; 1.0846 ; 1.1024 ; 1.1291 ; 1.1692 ; 1.2293 ; 1.3196 ; 1.4549 ; 1.5902 ; 1.7255 ; 1.9284 ; 1.9323 ; 1.9382 ; 1.947 ; 1.9602 ; 1.9799 ; 2.0096 ; 2.0541 ; 2.1208 ; 2.221 ; 2.3711 ; 2.5]

Force (kips): [-0.211876 ; 9.18337 ; 10.3478 ; 10.6571 ; 11.0072 ; 11.1905 ; 11.1995 ; 11.1995 ; 11.1991 ; 11.1991 ; 11.2468 ; 11.5247 ; 11.5249 ; 11.525 ; 11.6603 ; 11.9447 ; 12.2719 ; 12.7286 ; 13.1462 ; 13.3265 ; 13.6706 ; 14.085 ; 14.536 ; 15.5442 ; 16.7263 ; 17.1117 ; 17.7232 ; 18.5185 ; 19.3651 ; 20.2246 ; 21.1744 ; 22.4496 ; 23.829 ; 25.3146 ; 25.7505 ; 26.2236 ; 26.6628 ; 27.2006 ; 27.8787 ; 27.893 ; 27.9144 ; 27.9468 ; 27.994 ; 28.0116 ; 28.0382 ; 28.0776 ; 28.1346 ; 28.218 ; 28.3383 ; 28.5072 ; 28.5677 ; 28.6562 ; 28.6892 ; 28.7446 ; 28.8517 ; 28.9921 ; 29.1744 ; 29.4217 ; 29.7753 ; 30.0793 ; 30.3511 ; 30.7135 ; 30.7228 ; 30.7359 ; 30.7542 ; 30.7802 ; 30.8159 ; 30.8656 ; 30.9355 ; 31.0327 ; 31.1689 ; 31.3577 ; 31.5096]

Bolt 1 - Tensile Force (kips): [14.9136 ; 14.6264 ; 13.7527 ; 12.6415 ; 10.9586 ; 8.84773 ; 8.65732 ; 8.65699 ; 8.65656 ; 8.65645 ; 8.57078 ; 8.40342 ; 8.40335 ; 8.40347 ; 8.38914 ; 8.37599 ; 8.36983 ; 8.35766 ; 8.36974 ; 8.36309 ; 8.34982 ; 8.34107 ; 8.36005 ; 8.34991 ; 8.34604 ; 8.3432 ; 8.33048 ; 8.30426 ; 8.30356 ; 8.31331 ; 8.34671 ; 8.44572 ; 8.77071 ; 9.28937 ; 9.35456 ; 9.50151 ; 9.76832 ; 10.1078 ; 10.5555 ; 10.5665 ; 10.5833 ; 10.6065 ; 10.6446 ; 10.6595 ; 10.6823 ; 10.7162 ; 10.7656 ; 10.8309 ; 10.9068 ; 11.009 ; 11.0446 ; 11.0967 ; 11.1166 ; 11.1487 ; 11.2053 ; 11.2914 ; 11.4158 ; 11.5688 ; 11.8231 ; 12.1035 ; 12.3687 ; 12.6744 ; 12.6795 ; 12.687 ; 12.6978 ; 12.7072 ; 12.7234 ; 12.7491 ; 12.7823 ; 12.8228 ; 12.871 ; 12.9196 ; 12.9165]

Bolt 1 - Shear Force (kips): [0.0128843 ; 0.265262 ; 0.754641 ; 1.2767 ; 2.00681 ; 2.79094 ; 2.85686 ; 2.85679 ; 2.85666 ; 2.85663 ; 2.92479 ; 3.10014 ; 3.10024 ; 3.10022 ; 3.21894 ; 3.35881 ; 3.51004 ; 3.74194 ; 3.93592 ; 4.05586 ; 4.23249 ; 4.4284 ; 4.60822 ; 5.23329 ; 5.76119 ; 5.9418 ; 6.3622 ; 6.98029 ; 7.55898 ; 8.14249 ; 8.87856 ; 9.92788 ; 10.9551 ; 12.1511 ; 12.6325 ; 13.1004 ; 13.5266 ; 14.2577 ; 15.2072 ; 15.2251 ; 15.2529 ; 15.3075 ; 15.3775 ; 15.4017 ; 15.4362 ; 15.4882 ; 15.5663 ; 15.6935 ; 15.9029 ; 16.1876 ; 16.2839 ; 16.4192 ; 16.4665 ; 16.5346 ; 16.631 ; 16.7643 ; 16.953 ; 17.2487 ; 17.6357 ; 17.9753 ; 18.262 ; 18.5873 ; 18.5925 ; 18.6005 ; 18.6122 ; 18.6435 ; 18.6852 ; 18.7412 ; 18.8191 ; 18.9183 ; 19.0418 ; 19.2015 ; 19.3415]

Bolt 2 - Tensile Force (kips): [14.9227 ; 14.6815 ; 13.827 ; 12.7303 ; 11.0755 ; 9.00541 ; 8.73794 ; 8.73774 ; 8.73744 ; 8.73747 ; 8.72281 ; 8.51457 ; 8.51459 ; 8.51471 ; 8.52285 ; 8.53212 ; 8.55337 ; 8.59392 ; 8.66338 ; 8.69865 ; 8.75516 ; 8.82725 ; 8.97764 ; 9.35726 ; 9.69794 ; 9.79498 ; 10.0292 ; 10.4412 ; 11.0517 ; 11.931 ; 13.1369 ; 14.7595 ; 16.8347 ; 19.0716 ; 19.6302 ; 20.2902 ; 21.0487 ; 22.0636 ; 23.2526 ; 23.2761 ; 23.3114 ; 23.3652 ; 23.443 ; 23.4716 ; 23.5142 ; 23.5772 ; 23.6701 ; 23.8074 ; 24.0093 ; 24.2893 ; 24.3878 ; 24.5281 ; 24.5751 ; 24.643 ; 24.7463 ; 24.8846 ; 25.0576 ; 25.262 ; 25.4978 ; 25.6731 ; 25.8253 ; 26.0214 ; 26.0249 ; 26.0301 ; 26.0377 ; 26.0516 ; 26.0719 ; 26.0999 ; 26.1399 ; 26.1971 ; 26.2794 ; 26.3881 ; 26.4729]

Bolt 2 - Shear Force (kips): [0.0125958 ; 0.273852 ; 0.75892 ; 1.27892 ; 2.00602 ; 2.78852 ; 2.88305 ; 2.88331 ; 2.88333 ; 2.88335 ; 2.89728 ; 3.14106 ; 3.14127 ; 3.14131 ; 3.16557 ; 3.32568 ; 3.51332 ; 3.76643 ; 4.01004 ; 4.07874 ; 4.26458 ; 4.51316 ; 4.7881 ; 5.03823 ; 5.61891 ; 5.81568 ; 5.96587 ; 6.08733 ; 6.23262 ; 6.5413 ; 6.82972 ; 7.24666 ; 7.69801 ; 8.17915 ; 8.31496 ; 8.43923 ; 8.59592 ; 8.70015 ; 8.66178 ; 8.66051 ; 8.65823 ; 8.65115 ; 8.64371 ; 8.64151 ; 8.63889 ; 8.63583 ; 8.6324 ; 8.62584 ; 8.61209 ; 8.60067 ; 8.59798 ; 8.59822 ; 8.60265 ; 8.61089 ; 8.615 ; 8.62424 ; 8.65737 ; 8.74102 ; 9.07023 ; 9.36496 ; 9.61395 ; 9.93379 ; 9.93992 ; 9.94917 ; 9.96317 ; 9.98146 ; 10.0102 ; 10.0546 ; 10.1216 ; 10.2243 ; 10.372 ; 10.5779 ; 10.7336]

Bolt 3 - Tensile Force (kips): [16 ; 16.6074 ; 16.829 ; 16.8987 ; 16.9911 ; 17.0503 ; 17.054 ; 17.0536 ; 17.0526 ; 17.0523 ; 17.0673 ; 17.165 ; 17.1651 ; 17.1648 ; 17.2149 ; 17.3365 ; 17.5052 ; 17.7872 ; 18.0506 ; 18.1713 ; 18.4065 ; 18.6979 ; 19.0288 ; 19.8011 ; 20.7965 ; 21.1508 ; 21.7332 ; 22.5797 ; 23.6814 ; 24.8777 ; 26.1869 ; 27.7976 ; 29.1687 ; 30.4607 ; 30.8472 ; 31.245 ; 31.4797 ; 31.625 ; 31.7654 ; 31.7679 ; 31.7715 ; 31.7769 ; 31.7846 ; 31.7867 ; 31.7877 ; 31.7876 ; 31.7913 ; 31.7971 ; 31.8084 ; 31.8259 ; 31.8319 ; 31.841 ; 31.8443 ; 31.8434 ; 31.812 ; 31.7763 ; 31.7561 ; 31.7422 ; 31.6626 ; 31.6321 ; 31.6247 ; 31.5676 ; 31.5615 ; 31.5535 ; 31.5442 ; 31.5348 ; 31.527 ; 31.5211 ; 31.5164 ; 31.5124 ; 31.5121 ; 31.5196 ; 31.5312]

Bolt 3 - Shear Force (kips): [0.0051092 ; 0.039881 ; 0.046588 ; 0.04834 ; 0.049964 ; 0.050581 ; 0.050595 ; 0.050592 ; 0.050582 ; 0.050587 ; 0.050728 ; 0.051557 ; 0.05157 ; 0.051558 ; 0.051879 ; 0.052383 ; 0.05243 ; 0.05144 ; 0.051259 ; 0.0515 ; 0.053326 ; 0.056865 ; 0.061682 ; 0.075496 ; 0.093444 ; 0.099301 ; 0.10737 ; 0.11034 ; 0.10198 ; 0.094195 ; 0.10478 ; 0.092293 ; 0.076724 ; 0.079767 ; 0.070807 ; 0.049641 ; 0.037062 ; 0.032941 ; 0.025364 ; 0.025179 ; 0.024893 ; 0.024457 ; 0.023801 ; 0.024647 ; 0.026741 ; 0.035769 ; 0.061038 ; 0.088845 ; 0.11243 ; 0.13043 ; 0.1361 ; 0.14137 ; 0.14291 ; 0.18108 ; 0.40329 ; 0.6515 ; 0.85338 ; 1.0618 ; 1.5587 ; 1.8498 ; 2.047 ; 2.4097 ; 2.4355 ; 2.4687 ; 2.509 ; 2.5535 ; 2.6003 ; 2.652 ; 2.7154 ; 2.799 ; 2.9098 ; 3.0542 ; 3.1626]

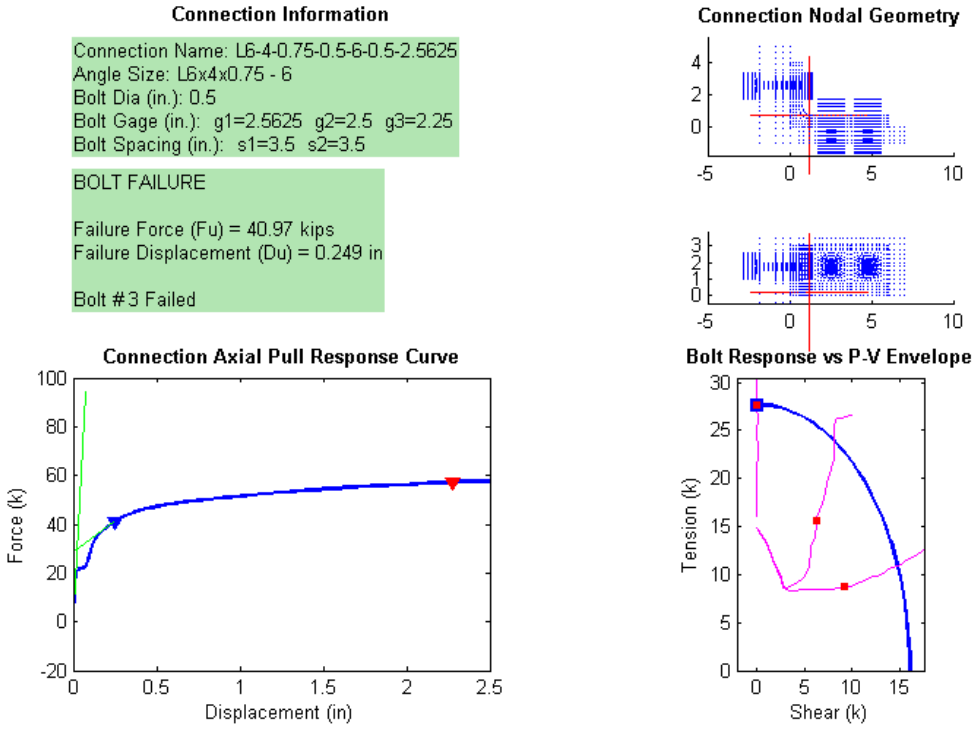


Figure B.65 Connection L6_4_0.75_0.5_6_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.5_6_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.3265e+003

Plastic Stiffness (k/in): 50.6669

Displacement (in): [5.718e-037 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.035156 ; 0.052734 ; 0.059326 ; 0.061798 ; 0.065506 ; 0.071068 ; 0.073153 ; 0.073936 ; 0.075109 ; 0.076869 ; 0.079508 ; 0.080498 ; 0.081983 ; 0.08421 ; 0.087551 ; 0.092562 ; 0.094442 ; 0.097261 ; 0.10149 ; 0.10783 ; 0.11735 ; 0.13162 ; 0.13697 ; 0.14499 ; 0.15704 ; 0.1751 ; 0.20219 ; 0.24283 ; 0.25806 ; 0.28092 ; 0.31521 ; 0.36664 ; 0.44379 ; 0.47272 ; 0.51611 ; 0.58121 ; 0.67885 ; 0.71546 ; 0.77038 ; 0.79098 ; 0.82188 ; 0.86821 ; 0.93773 ; 0.94424 ; 0.95402 ; 0.96868 ; 0.99067 ; 1.0237 ; 1.0732 ; 1.1474 ; 1.2587 ; 1.4257 ; 1.6757 ; 1.7382 ; 1.832 ; 1.9726 ; 2.1835 ; 2.4335 ; 2.5]

Force (kips): [-0.230251 ; 7.84753 ; 10.1327 ; 10.45 ; 10.8101 ; 11.0663 ; 11.0977 ; 11.1019 ; 11.1016 ; 11.1011 ; 11.1222 ; 11.1679 ; 11.2563 ; 11.3769 ; 11.4205 ; 11.4523 ; 11.7206 ; 12.0678 ; 12.5726 ; 13.114 ; 13.3645 ; 13.7533 ; 14.2492 ; 14.8875 ; 15.9106 ; 16.8627 ; 17.1253 ; 17.5061 ; 17.9752 ; 18.5321 ; 19.3166 ; 20.3461 ; 20.6967 ; 21.1804 ; 21.7665 ; 22.4224 ; 23.1698 ; 23.4122 ; 23.733 ; 24.1144 ; 24.5507 ; 24.6957 ; 24.9011 ; 24.9782 ; 25.0934 ; 25.2578 ; 25.4894 ; 25.5103 ; 25.5437 ; 25.6095 ; 25.7 ; 25.8228 ; 25.9874 ; 26.218 ; 26.5565 ; 26.9825 ; 27.528 ; 27.6673 ; 27.8496 ; 28.0983 ; 28.4233 ; 28.7481 ; 28.8336]

Bolt 1 - Tensile Force (kips): [14.913 ; 14.6757 ; 14.1497 ; 13.1182 ; 11.5064 ; 9.31272 ; 8.65655 ; 8.65588 ; 8.65503 ; 8.65437 ; 8.6126 ; 8.54164 ; 8.45187 ; 8.40865 ; 8.40871 ; 8.40519 ; 8.37536 ; 8.37121 ; 8.35748 ; 8.37175 ; 8.36564 ; 8.36275 ; 8.38514 ; 8.4649 ; 8.45193 ; 8.48583 ; 8.50558 ; 8.49384 ; 8.48578 ; 8.47059 ; 8.5327 ; 8.69259 ; 8.73593 ; 8.81643 ; 9.03769 ; 9.29275 ; 9.59862 ; 9.71083 ; 9.77986 ; 9.87605 ; 10.1624 ; 10.2826 ; 10.4846 ; 10.5462 ; 10.6219 ; 10.6984 ; 10.8401 ; 10.8552 ; 10.8796 ; 10.9221 ; 10.9876 ; 11.0891 ; 11.2444 ; 11.4674 ; 11.6965 ; 11.9605 ; 12.4008 ; 12.4963 ; 12.6466 ; 12.8807 ; 13.1489 ; 13.3182 ; 13.3409]

Bolt 1 - Shear Force (kips): [0.0136009 ; 0.229505 ; 0.55155 ; 1.05804 ; 1.77803 ; 2.62795 ; 2.85629 ; 2.85632 ; 2.85614 ; 2.85594 ; 2.89175 ; 2.96219 ; 3.05575 ; 3.10207 ; 3.10214 ; 3.1353 ; 3.32338 ; 3.4684 ; 3.74488 ; 3.97912 ; 4.12737 ; 4.30596 ; 4.48661 ; 4.68212 ; 5.30009 ; 5.78737 ; 5.90947 ; 6.20055 ; 6.61155 ; 7.24284 ; 8.03731 ; 9.00904 ; 9.38227 ; 9.95798 ; 10.3988 ; 11.0038 ; 11.6025 ; 11.8075 ; 12.2161 ; 12.7565 ; 13.2897 ; 13.4472 ; 13.651 ; 13.7593 ; 13.9474 ; 14.2631 ; 14.6682 ; 14.7016 ; 14.7495 ; 14.818 ; 14.92 ; 15.0744 ; 15.274 ; 15.5515 ; 16.0058 ; 16.5796 ; 17.2308 ; 17.3997 ; 17.6295 ; 17.9296 ; 18.284 ; 18.6446 ; 18.7409]

Bolt 2 - Tensile Force (kips): [14.9217 ; 14.7326 ; 14.2756 ; 13.2627 ; 11.705 ; 9.6093 ; 8.97349 ; 8.814 ; 8.81192 ; 8.81138 ; 8.81336 ; 8.81685 ; 8.75936 ; 8.65869 ; 8.6086 ; 8.61359 ; 8.64938 ; 8.7109 ; 8.83994 ; 9.02143 ; 9.12366 ; 9.24756 ; 9.39696 ; 9.65487 ; 10.2601 ; 10.9371 ; 11.1674 ; 11.5496 ; 12.0993 ; 12.8705 ; 13.9264 ; 15.3869 ; 15.9058 ; 16.6505 ; 17.5179 ; 18.5468 ; 19.6171 ; 19.9814 ; 20.4712 ; 21.0156 ; 21.7754 ; 22.0433 ; 22.4171 ; 22.5537 ; 22.7546 ; 23.0423 ; 23.4449 ; 23.4812 ; 23.5356 ; 23.6204 ; 23.7431 ; 23.9172 ; 24.1613 ; 24.5083 ; 24.9856 ; 25.558 ; 26.0655 ; 26.1628 ; 26.2746 ; 26.3556 ; 26.4534 ; 26.5533 ; 26.5783]

Bolt 2 - Shear Force (kips): [0.013183 ; 0.23697 ; 0.553 ; 1.0557 ; 1.7705 ; 2.6155 ; 2.8488 ; 2.9066 ; 2.9075 ; 2.9077 ; 2.9084 ; 2.9095 ; 2.9642 ; 3.104 ; 3.1713 ; 3.1728 ; 3.2867 ; 3.5225 ; 3.7924 ; 4.1019 ; 4.1706 ; 4.3343 ; 4.6009 ; 4.9303 ; 5.1749 ; 5.4671 ; 5.5434 ; 5.5972 ; 5.6697 ; 5.7412 ; 6.0701 ; 6.2502 ; 6.3564 ; 6.5302 ; 6.9602 ; 7.1881 ; 7.377 ; 7.4706 ; 7.599 ; 7.831 ; 8.0162 ; 8.0531 ; 8.1039 ; 8.1147 ; 8.1157 ; 8.1094 ; 8.1142 ; 8.1146 ; 8.1149 ; 8.1129 ; 8.1114 ; 8.1116 ; 8.1135 ; 8.1129 ; 8.0882 ; 8.0785 ; 8.2566 ; 8.3437 ; 8.5286 ; 8.9213 ; 9.4103 ; 9.8838 ; 9.9917]

Bolt 3 - Tensile Force (kips): [16 ; 16.5118 ; 17.0838 ; 17.2231 ; 17.4187 ; 17.5771 ; 17.6019 ; 17.6064 ; 17.6057 ; 17.6043 ; 17.6166 ; 17.6418 ; 17.6915 ; 17.7606 ; 17.786 ; 17.8035 ; 17.9705 ; 18.2004 ; 18.5329 ; 18.9176 ; 19.104 ; 19.395 ; 19.7799 ; 20.3264 ; 21.291 ; 22.4891 ; 22.8938 ; 23.4962 ; 24.2607 ; 25.121 ; 26.1984 ; 27.5416 ; 27.9531 ; 28.4727 ; 29.0539 ; 29.7368 ; 30.6277 ; 30.8807 ; 31.1655 ; 31.4061 ; 31.5457 ; 31.582 ; 31.6291 ; 31.6412 ; 31.6492 ; 31.6663 ; 31.6933 ; 31.6954 ; 31.6946 ; 31.6686 ; 31.641 ; 31.615 ; 31.6053 ; 31.6029 ; 31.5229 ; 31.5084 ; 31.461 ; 31.4246 ; 31.4171 ; 31.4172 ; 31.4392 ; 31.4462 ; 31.3972]

Bolt 3 - Shear Force (kips): [0.0064845 ; 0.037046 ; 0.050295 ; 0.051253 ; 0.051918 ; 0.051926 ; 0.051858 ; 0.051841 ; 0.051852 ; 0.051826 ; 0.051785 ; 0.051804 ; 0.051868 ; 0.051989 ; 0.052049 ; 0.052098 ; 0.052422 ; 0.05344 ; 0.057727 ; 0.064437 ; 0.068235 ; 0.074579 ; 0.08315 ; 0.095328 ; 0.11498 ; 0.12498 ; 0.12381 ; 0.12035 ; 0.11429 ; 0.11203 ; 0.12233 ; 0.11286 ; 0.10636 ; 0.098818 ; 0.092511 ; 0.092709 ; 0.086059 ; 0.076682 ; 0.061187 ; 0.046856 ; 0.042147 ; 0.041211 ; 0.038983 ; 0.041007 ; 0.074967 ; 0.14734 ; 0.20305 ; 0.20803 ; 0.23148 ; 0.38228 ; 0.56267 ; 0.74708 ; 0.89938 ; 1.0677 ; 1.5596 ; 1.8852 ; 2.3408 ; 2.5493 ; 2.7036 ; 2.8926 ; 3.11 ; 3.3753 ; 3.5309]

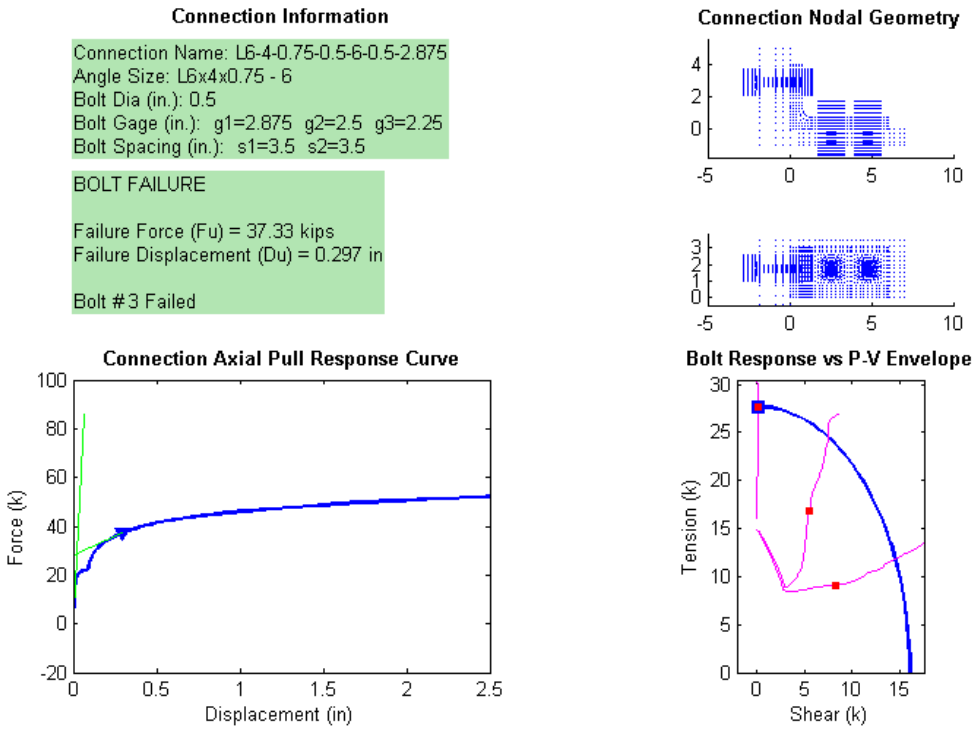


Figure B.66 Connection L6_4_0.75_0.5_6_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.5_6_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 1225

Plastic Stiffness (k/in): 31.7761

Displacement (in): [7.1629e-037 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.035156 ; 0.052734 ; 0.059326 ; 0.069214 ; 0.072922 ; 0.078484 ; 0.080569 ; 0.083698 ; 0.084871 ; 0.086631 ; 0.089271 ; 0.09323 ; 0.099169 ; 0.10808 ; 0.11142 ; 0.11643 ; 0.12395 ; 0.13522 ; 0.15214 ; 0.17751 ; 0.21556 ; 0.27264 ; 0.29405 ; 0.32616 ; 0.37432 ; 0.44656 ; 0.47365 ; 0.51429 ; 0.57525 ; 0.59811 ; 0.63239 ; 0.68383 ; 0.68865 ; 0.69588 ; 0.70673 ; 0.723 ; 0.74741 ; 0.75657 ; 0.7703 ; 0.79089 ; 0.82179 ; 0.86813 ; 0.93764 ; 1.0419 ; 1.1983 ; 1.4329 ; 1.4954 ; 1.5892 ; 1.7298 ; 1.9407 ; 2.1907 ; 2.4407 ; 2.5]

Force (kips): [-0.230978 ; 6.6155 ; 9.33951 ; 10.023 ; 10.4058 ; 10.7809 ; 10.8418 ; 10.8964 ; 10.9041 ; 10.9036 ; 10.9095 ; 11.0632 ; 11.0904 ; 11.1815 ; 11.295 ; 11.8057 ; 12.5181 ; 13.3314 ; 13.6307 ; 14.035 ; 14.5073 ; 15.0099 ; 15.6181 ; 16.2973 ; 17.1324 ; 18.2874 ; 18.6275 ; 19.0284 ; 19.5326 ; 20.2054 ; 20.4381 ; 20.756 ; 21.1686 ; 21.3043 ; 21.4903 ; 21.7318 ; 21.753 ; 21.7885 ; 21.8417 ; 21.9155 ; 22.0155 ; 22.0569 ; 22.1222 ; 22.2096 ; 22.3328 ; 22.5095 ; 22.7762 ; 23.118 ; 23.5744 ; 24.1848 ; 24.3389 ; 24.5513 ; 24.8482 ; 25.2464 ; 25.6501 ; 25.9864 ; 26.0583]

Bolt 1 - Tensile Force (kips): [14.9126 ; 14.7194 ; 14.568 ; 13.8939 ; 12.4024 ; 10.1531 ; 9.40134 ; 8.65747 ; 8.65676 ; 8.65576 ; 8.64721 ; 8.41505 ; 8.41487 ; 8.41608 ; 8.41421 ; 8.38933 ; 8.40817 ; 8.46661 ; 8.48072 ; 8.50005 ; 8.54255 ; 8.60249 ; 8.65186 ; 8.72617 ; 8.86872 ; 8.99692 ; 9.08679 ; 9.20312 ; 9.25996 ; 9.46573 ; 9.59001 ; 9.77472 ; 10.0274 ; 10.1215 ; 10.2538 ; 10.4293 ; 10.445 ; 10.4692 ; 10.4965 ; 10.5139 ; 10.528 ; 10.5349 ; 10.5487 ; 10.5779 ; 10.6417 ; 10.7403 ; 10.9393 ; 11.297 ; 11.6469 ; 12.1499 ; 12.2788 ; 12.4486 ; 12.6135 ; 12.9076 ; 13.2875 ; 13.577 ; 13.6115]

Bolt 1 - Shear Force (kips): [0.0136512 ; 0.196025 ; 0.306785 ; 0.684731 ; 1.38504 ; 2.32177 ; 2.59691 ; 2.85677 ; 2.85669 ; 2.85639 ; 2.86519 ; 3.10153 ; 3.10229 ; 3.10266 ; 3.1383 ; 3.41806 ; 3.70504 ; 3.97696 ; 4.122 ; 4.35842 ; 4.53078 ; 4.64629 ; 5.08929 ; 5.62728 ; 6.26345 ; 7.87003 ; 8.20162 ; 8.54774 ; 9.24617 ; 10.1242 ; 10.3241 ; 10.6325 ; 11.1113 ; 11.267 ; 11.4787 ; 11.7538 ; 11.7781 ; 11.8138 ; 11.876 ; 11.9897 ; 12.1644 ; 12.2274 ; 12.3182 ; 12.4401 ; 12.5978 ; 12.8212 ; 13.1129 ; 13.4763 ; 14.2519 ; 15.127 ; 15.337 ; 15.6291 ; 16.1108 ; 16.6848 ; 17.2155 ; 17.6973 ; 17.8188]

Bolt 2 - Tensile Force (kips): [14.9208 ; 14.7743 ; 14.7461 ; 14.1325 ; 12.7365 ; 10.6686 ; 9.97524 ; 9.12592 ; 8.97159 ; 8.96965 ; 8.97069 ; 8.99669 ; 8.95039 ; 8.88837 ; 8.85336 ; 9.07074 ; 9.40208 ; 9.79707 ; 9.9821 ; 10.2495 ; 10.5842 ; 11.1323 ; 11.9999 ; 13.1426 ; 14.5969 ; 16.3371 ; 16.8335 ; 17.3472 ; 18.056 ; 19.0759 ; 19.3984 ; 19.8857 ; 20.5313 ; 20.7417 ; 21.0414 ; 21.4593 ; 21.4974 ; 21.5557 ; 21.6423 ; 21.7663 ; 21.9428 ; 22.0089 ; 22.1091 ; 22.2574 ; 22.4782 ; 22.8007 ; 23.2077 ; 23.6757 ; 24.3404 ; 25.1808 ; 25.3792 ; 25.66 ; 26.04 ; 26.3975 ; 26.6523 ; 26.8521 ; 26.8949]

Bolt 2 - Shear Force (kips): [0.013167 ; 0.20251 ; 0.30982 ; 0.67663 ; 1.3664 ; 2.2902 ; 2.5645 ; 2.8976 ; 2.959 ; 2.9598 ; 2.9602 ; 2.9689 ; 3.0147 ; 3.1397 ; 3.247 ; 3.4251 ; 3.7514 ; 4.1539 ; 4.2445 ; 4.3376 ; 4.5506 ; 4.784 ; 4.9874 ; 5.1022 ; 5.1969 ; 5.3827 ; 5.4864 ; 5.6102 ; 5.678 ; 5.9645 ; 6.1646 ; 6.3485 ; 6.5752 ; 6.6631 ; 6.7689 ; 6.8864 ; 6.8957 ; 6.9086 ; 6.9256 ; 6.9463 ; 6.9817 ; 6.9973 ; 7.0203 ; 7.0516 ; 7.0952 ; 7.1548 ; 7.2631 ; 7.406 ; 7.4483 ; 7.5208 ; 7.5388 ; 7.5615 ; 7.565 ; 7.789 ; 8.1467 ; 8.455 ; 8.5242]

Bolt 3 - Tensile Force (kips): [16 ; 16.4314 ; 17.3744 ; 17.7681 ; 17.9836 ; 18.2037 ; 18.2444 ; 18.2887 ; 18.2963 ; 18.2945 ; 18.2981 ; 18.3841 ; 18.401 ; 18.4559 ; 18.5254 ; 18.8508 ; 19.3548 ; 20.021 ; 20.2889 ; 20.6851 ; 21.246 ; 22.0323 ; 23.0687 ; 24.3016 ; 25.581 ; 27.1327 ; 27.6354 ; 28.2973 ; 29.0379 ; 29.8183 ; 30.0757 ; 30.4204 ; 30.8374 ; 30.9605 ; 31.1055 ; 31.2743 ; 31.2874 ; 31.282 ; 31.2598 ; 31.2401 ; 31.2385 ; 31.2275 ; 31.2351 ; 31.2474 ; 31.2669 ; 31.2872 ; 31.2247 ; 31.2456 ; 31.2746 ; 31.205 ; 31.2141 ; 31.2253 ; 31.2466 ; 31.2278 ; 31.2114 ; 31.2389 ; 31.2486]

Bolt 3 - Shear Force (kips): [0.0075377 ; 0.034194 ; 0.051091 ; 0.053806 ; 0.055591 ; 0.058178 ; 0.05888 ; 0.059687 ; 0.05984 ; 0.05987 ; 0.059888 ; 0.061574 ; 0.061919 ; 0.063135 ; 0.064845 ; 0.073412 ; 0.086856 ; 0.10566 ; 0.1132 ; 0.12381 ; 0.13725 ; 0.1488 ; 0.15239 ; 0.15034 ; 0.1557 ; 0.15151 ; 0.14485 ; 0.13513 ; 0.12363 ; 0.12151 ; 0.11879 ; 0.11051 ; 0.093009 ; 0.087541 ; 0.084208 ; 0.077335 ; 0.076882 ; 0.12203 ; 0.27844 ; 0.44732 ; 0.57904 ; 0.675 ; 0.76848 ; 0.83514 ; 0.90521 ; 1.0226 ; 1.458 ; 1.6996 ; 1.9638 ; 2.5329 ; 2.6377 ; 2.7646 ; 2.9353 ; 3.2615 ; 3.5872 ; 3.8133 ; 3.8596]

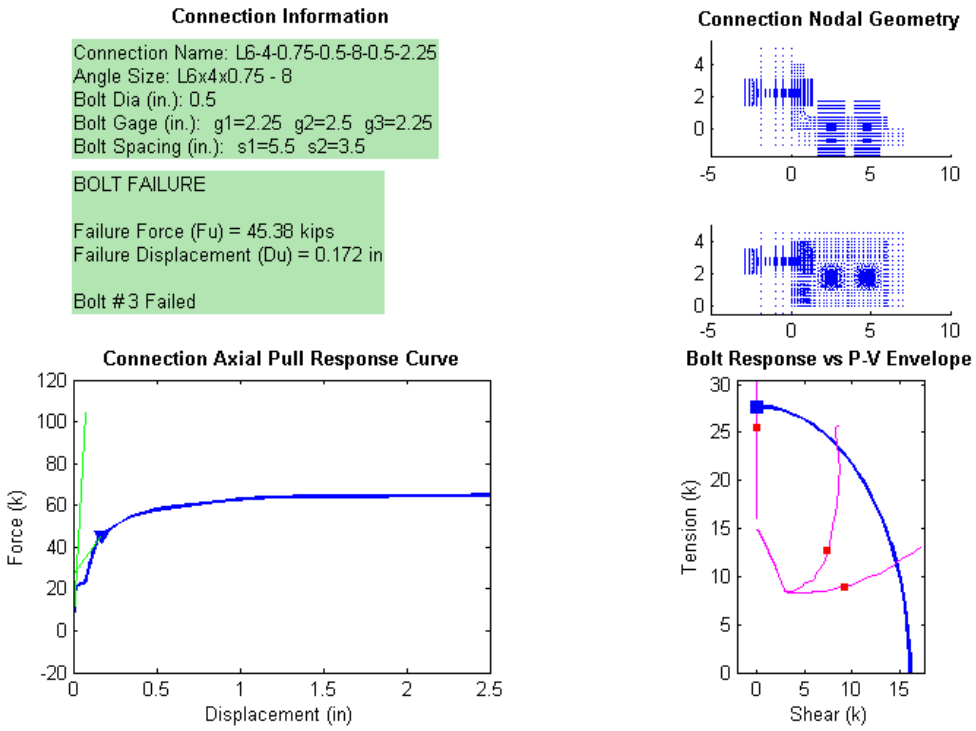


Figure B.67 Connection L6_4_0.75_0.5_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.5_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.3501e+003

Plastic Stiffness (k/in): 110.6030

Displacement (in): [5.3252e-037 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.035156 ; 0.052734 ; 0.059326 ; 0.061798 ; 0.065506 ; 0.066896 ; 0.067418 ; 0.0682 ; 0.069373 ; 0.071133 ; 0.073773 ; 0.074763 ; 0.075134 ; 0.075691 ; 0.076526 ; 0.077779 ; 0.079658 ; 0.082477 ; 0.083534 ; 0.085119 ; 0.087498 ; 0.091065 ; 0.096417 ; 0.098424 ; 0.10143 ; 0.10595 ; 0.10764 ; 0.11018 ; 0.11399 ; 0.11971 ; 0.12828 ; 0.14114 ; 0.16042 ; 0.18935 ; 0.23275 ; 0.29784 ; 0.32225 ; 0.35887 ; 0.41379 ; 0.49617 ; 0.61975 ; 0.80511 ; 0.86761 ; 0.96136 ; 0.99652 ; 1.0493 ; 1.069 ; 1.0764 ; 1.0876 ; 1.1043 ; 1.1293 ; 1.1668 ; 1.1703 ; 1.1739 ; 1.1774 ; 1.1827 ; 1.1906 ; 1.2025 ; 1.2203 ; 1.247 ; 1.2871 ; 1.3472 ; 1.4374 ; 1.5727 ; 1.7757 ; 2.0257 ; 2.2757 ; 2.5]

Force (kips): [-0.177376 ; 9.19429 ; 10.3705 ; 10.6779 ; 11.0233 ; 11.1973 ; 11.2042 ; 11.2043 ; 11.2038 ; 11.2038 ; 11.2038 ; 11.2267 ; 11.3573 ; 11.5216 ; 11.5288 ; 11.5288 ; 11.6286 ; 11.8146 ; 12.0525 ; 12.3505 ; 12.7698 ; 13.147 ; 13.3094 ; 13.6619 ; 14.0803 ; 14.5081 ; 15.4644 ; 15.7972 ; 16.2685 ; 16.886 ; 17.1042 ; 17.4838 ; 18.0447 ; 18.8316 ; 19.9596 ; 21.2012 ; 22.2678 ; 23.3445 ; 24.7153 ; 26.2136 ; 26.6742 ; 27.3238 ; 28.1398 ; 28.9086 ; 29.6385 ; 30.5511 ; 30.8233 ; 31.1932 ; 31.3234 ; 31.5085 ; 31.5755 ; 31.6002 ; 31.6457 ; 31.717 ; 31.8194 ; 31.9591 ; 31.9598 ; 31.9599 ; 31.9596 ; 31.9585 ; 31.9559 ; 31.9502 ; 31.9395 ; 31.9551 ; 31.9757 ; 32.0035 ; 32.0406 ; 32.0906 ; 32.1592 ; 32.2367 ; 32.3077 ; 32.3658]

Bolt 1 - Tensile Force (kips): [14.9097 ; 14.5912 ; 13.7023 ; 12.5856 ; 10.8983 ; 8.79916 ; 8.65385 ; 8.65354 ; 8.65303 ; 8.6529 ; 8.6529 ; 8.60537 ; 8.49876 ; 8.405 ; 8.40498 ; 8.40497 ; 8.39299 ; 8.37603 ; 8.37238 ; 8.36438 ; 8.35527 ; 8.36576 ; 8.35804 ; 8.34383 ; 8.33486 ; 8.34958 ; 8.34828 ; 8.34243 ; 8.34387 ; 8.36531 ; 8.38651 ; 8.39769 ; 8.42477 ; 8.45579 ; 8.54929 ; 8.746 ; 8.87187 ; 8.99359 ; 9.31878 ; 9.88145 ; 10.0428 ; 10.1161 ; 10.3556 ; 10.7905 ; 11.2266 ; 11.9067 ; 12.0765 ; 12.281 ; 12.3553 ; 12.4671 ; 12.509 ; 12.5248 ; 12.5517 ; 12.5933 ; 12.6567 ; 12.7522 ; 12.755 ; 12.7574 ; 12.7597 ; 12.7627 ; 12.7666 ; 12.7713 ; 12.7766 ; 12.7839 ; 12.7936 ; 12.8068 ; 12.8247 ; 12.8496 ; 12.8818 ; 12.9165 ; 12.9495 ; 12.9776]

Bolt 1 - Shear Force (kips): [0.0118155 ; 0.28365 ; 0.77492 ; 1.29795 ; 2.02771 ; 2.80513 ; 2.85573 ; 2.85565 ; 2.8555 ; 2.85546 ; 2.85546 ; 2.89456 ; 3.00393 ; 3.10447 ; 3.10473 ; 3.10471 ; 3.19741 ; 3.29631 ; 3.40185 ; 3.56101 ; 3.75943 ; 3.93127 ; 4.04896 ; 4.22265 ; 4.41241 ; 4.58845 ; 5.20028 ; 5.36896 ; 5.55588 ; 5.80434 ; 5.89099 ; 6.14191 ; 6.53394 ; 7.14064 ; 7.79504 ; 8.27878 ; 8.86974 ; 9.71965 ; 10.5859 ; 11.527 ; 11.8427 ; 12.4479 ; 13.0639 ; 13.5417 ; 14.3869 ; 15.3361 ; 15.6644 ; 16.0918 ; 16.2281 ; 16.4163 ; 16.4835 ; 16.5081 ; 16.5433 ; 16.5946 ; 16.6688 ; 16.7716 ; 16.776 ; 16.7801 ; 16.7839 ; 16.7893 ; 16.7966 ; 16.8068 ; 16.82 ; 16.8283 ; 16.8385 ; 16.8522 ; 16.8704 ; 16.895 ; 16.9309 ; 16.9742 ; 17.0132 ; 17.0445]

Bolt 2 - Tensile Force (kips): [14.9184 ; 14.6491 ; 13.7775 ; 12.6714 ; 11.0036 ; 8.92618 ; 8.71608 ; 8.71596 ; 8.71567 ; 8.71569 ; 8.71575 ; 8.71635 ; 8.62005 ; 8.48891 ; 8.47926 ; 8.47924 ; 8.48315 ; 8.4828 ; 8.47911 ; 8.49676 ; 8.52729 ; 8.59495 ; 8.62361 ; 8.66816 ; 8.73774 ; 8.85487 ; 9.18277 ; 9.29657 ; 9.38656 ; 9.49537 ; 9.54163 ; 9.64429 ; 9.82053 ; 10.1107 ; 10.6145 ; 11.3052 ; 12.2492 ; 13.5516 ; 15.2849 ; 17.4261 ; 18.1063 ; 19.0097 ; 20.0973 ; 21.2086 ; 22.4242 ; 23.8123 ; 24.2114 ; 24.7395 ; 24.9034 ; 25.1433 ; 25.2292 ; 25.2609 ; 25.3058 ; 25.3707 ; 25.46 ; 25.5737 ; 25.5762 ; 25.5784 ; 25.5805 ; 25.5831 ; 25.5865 ; 25.5905 ; 25.5948 ; 25.6014 ; 25.6088 ; 25.6186 ; 25.6313 ; 25.6477 ; 25.6694 ; 25.6932 ; 25.7135 ; 25.7291]

Bolt 2 - Shear Force (kips): [0.010298 ; 0.28665 ; 0.7742 ; 1.2958 ; 2.0238 ; 2.802 ; 2.8759 ; 2.8761 ; 2.8761 ; 2.8762 ; 2.8762 ; 2.8764 ; 2.9701 ; 3.1224 ; 3.1334 ; 3.1334 ; 3.1472 ; 3.2482 ; 3.3931 ; 3.5393 ; 3.7755 ; 3.9837 ; 4.0326 ; 4.2209 ; 4.4556 ; 4.6974 ; 4.9766 ; 5.1093 ; 5.3727 ; 5.7213 ; 5.8398 ; 5.9396 ; 6.0617 ; 6.192 ; 6.4978 ; 6.9804 ; 7.3204 ; 7.6009 ; 8.0044 ; 8.4012 ; 8.4739 ; 8.5194 ; 8.5921 ; 8.7095 ; 8.6215 ; 8.4657 ; 8.3998 ; 8.312 ; 8.2923 ; 8.261 ; 8.2505 ; 8.2474 ; 8.2488 ; 8.2531 ; 8.2746 ; 8.3344 ; 8.3389 ; 8.3432 ; 8.3472 ; 8.3529 ; 8.3608 ; 8.3719 ; 8.3867 ; 8.3944 ; 8.4056 ; 8.4206 ; 8.4408 ; 8.4675 ; 8.5035 ; 8.5472 ; 8.5872 ; 8.6199]

Bolt 3 - Tensile Force (kips): [16 ; 16.5854 ; 16.8054 ; 16.8717 ; 16.9562 ; 17.0076 ; 17.01 ; 17.0096 ; 17.0086 ; 17.0083 ; 17.0082 ; 17.0156 ; 17.0543 ; 17.1057 ; 17.1079 ; 17.1078 ; 17.1427 ; 17.2092 ; 17.3029 ; 17.434 ; 17.6466 ; 17.8581 ; 17.9492 ; 18.1462 ; 18.3904 ; 18.6534 ; 19.2475 ; 19.4684 ; 19.79 ; 20.225 ; 20.3826 ; 20.6536 ; 21.065 ; 21.6811 ; 22.6114 ; 23.7835 ; 25.0054 ; 26.3684 ; 27.9867 ; 29.3174 ; 29.6744 ; 30.1868 ; 30.8396 ; 31.3755 ; 31.5839 ; 31.7486 ; 31.7865 ; 31.8137 ; 31.8235 ; 31.8393 ; 31.8449 ; 31.847 ; 31.8426 ; 31.8289 ; 31.805 ; 31.7811 ; 31.7929 ; 31.8041 ; 31.815 ; 31.8305 ; 31.8528 ; 31.8846 ; 31.9275 ; 31.9445 ; 31.9654 ; 31.9937 ; 32.0316 ; 32.0828 ; 32.1531 ; 32.2327 ; 32.3058 ; 32.3658]

Bolt 3 - Shear Force (kips): [0.0061364 ; 0.038034 ; 0.044432 ; 0.046183 ; 0.047899 ; 0.048571 ; 0.048582 ; 0.04858 ; 0.048572 ; 0.048577 ; 0.04858 ; 0.048631 ; 0.049133 ; 0.049698 ; 0.049711 ; 0.049715 ; 0.049949 ; 0.050451 ; 0.050901 ; 0.051266 ; 0.050936 ; 0.050493 ; 0.050422 ; 0.05067 ; 0.052611 ; 0.055863 ; 0.065064 ; 0.069087 ; 0.074988 ; 0.082939 ; 0.085814 ; 0.090586 ; 0.097402 ; 0.10606 ; 0.10933 ; 0.099944 ; 0.093849 ; 0.10655 ; 0.090508 ; 0.077079 ; 0.077904 ; 0.081579 ; 0.071791 ; 0.042308 ; 0.03473 ; 0.026417 ; 0.024049 ; 0.083457 ; 0.10475 ; 0.1197 ; 0.1242 ; 0.12567 ; 0.17517 ; 0.2852 ; 0.45239 ; 0.64291 ; 0.60161 ; 0.55966 ; 0.51724 ; 0.45364 ; 0.3577 ; 0.21218 ; 0.0045697 ; 0.0027599 ; 0.0017636 ; 0.0011468 ; 0.00069965 ; 0.00059581 ; 0.00067853 ; 0.00083152 ; 0.0010446 ; 0.0012968]

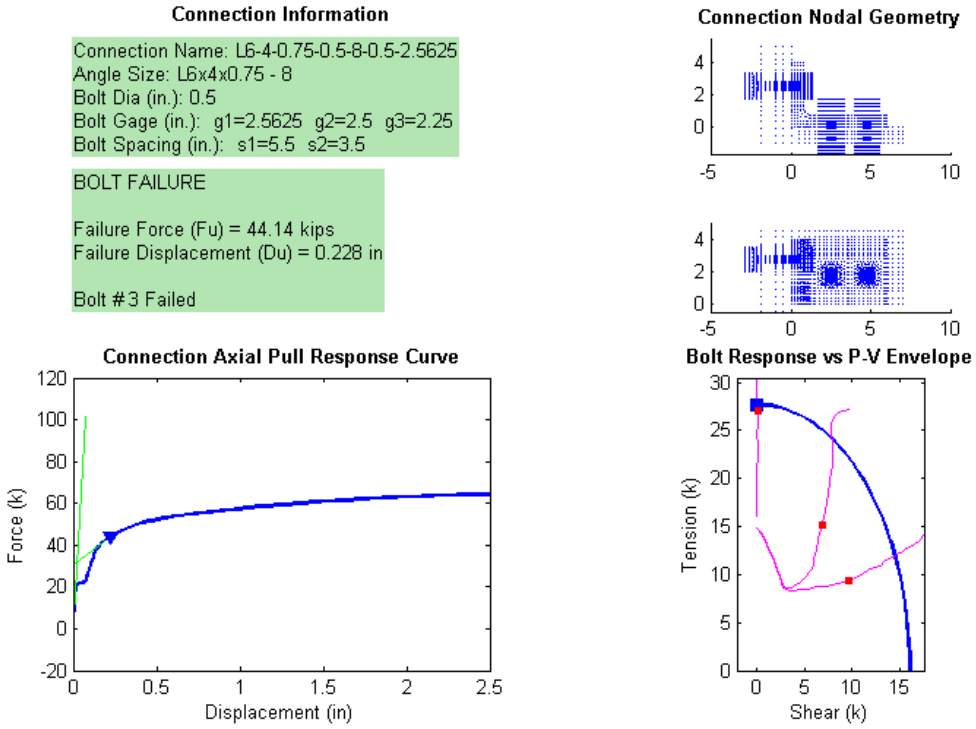


Figure B.68 Connection L6_4_0.75_0.5_8_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.5_8_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.3289e+003

Plastic Stiffness (k/in): 60.6452

Displacement (in): [6.0583e-037 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.035156 ; 0.052734 ; 0.059326 ; 0.061798 ; 0.065506 ; 0.071068 ; 0.071589 ; 0.072371 ; 0.073545 ; 0.075304 ; 0.077944 ; 0.078934 ; 0.079305 ; 0.079862 ; 0.080697 ; 0.08195 ; 0.083829 ; 0.086648 ; 0.090876 ; 0.097219 ; 0.10673 ; 0.121 ; 0.12635 ; 0.13438 ; 0.14642 ; 0.16448 ; 0.19158 ; 0.23221 ; 0.29317 ; 0.3846 ; 0.41889 ; 0.47032 ; 0.54747 ; 0.62462 ; 0.70176 ; 0.73069 ; 0.77409 ; 0.77816 ; 0.78426 ; 0.79341 ; 0.80715 ; 0.82774 ; 0.85864 ; 0.90497 ; 0.92235 ; 0.94842 ; 0.98752 ; 1.0462 ; 1.1341 ; 1.2661 ; 1.4641 ; 1.5266 ; 1.6203 ; 1.7609 ; 1.8137 ; 1.8928 ; 2.0114 ; 2.0559 ; 2.1227 ; 2.2228 ; 2.3729 ; 2.4047 ; 2.4365 ; 2.4682 ; 2.5]

Force (kips): [-0.201589 ; 7.92392 ; 10.1802 ; 10.5 ; 10.864 ; 11.0989 ; 11.126 ; 11.1263 ; 11.126 ; 11.1255 ; 11.1284 ; 11.1739 ; 11.2684 ; 11.4094 ; 11.4499 ; 11.4499 ; 11.4973 ; 11.6161 ; 11.8031 ; 12.049 ; 12.402 ; 12.8303 ; 13.3642 ; 14.3053 ; 15.6282 ; 17.2477 ; 17.8358 ; 18.5877 ; 19.3999 ; 20.1982 ; 21.0197 ; 22.2015 ; 23.6172 ; 24.9778 ; 25.3624 ; 25.8627 ; 26.4782 ; 26.9528 ; 27.3567 ; 27.5014 ; 27.7062 ; 27.725 ; 27.7536 ; 27.7963 ; 27.8592 ; 27.9502 ; 28.0821 ; 28.273 ; 28.3602 ; 28.4853 ; 28.6601 ; 28.8963 ; 29.2323 ; 29.692 ; 30.2677 ; 30.4357 ; 30.6807 ; 31.0204 ; 31.1412 ; 31.3077 ; 31.542 ; 31.6264 ; 31.7487 ; 31.9226 ; 32.1297 ; 32.1335 ; 32.1355 ; 32.1394 ; 32.1448]

Bolt 1 - Tensile Force (kips): [14.9092 ; 14.6431 ; 14.066 ; 13.012 ; 11.3714 ; 9.18393 ; 8.65269 ; 8.65214 ; 8.65135 ; 8.6507 ; 8.64769 ; 8.57576 ; 8.48055 ; 8.40981 ; 8.40987 ; 8.40986 ; 8.40374 ; 8.38964 ; 8.37258 ; 8.37023 ; 8.35806 ; 8.35573 ; 8.36381 ; 8.39074 ; 8.46931 ; 8.65326 ; 8.69917 ; 8.74612 ; 8.80744 ; 8.92281 ; 9.11709 ; 9.32452 ; 9.85246 ; 10.4779 ; 10.6055 ; 10.6958 ; 10.9429 ; 11.2792 ; 11.6117 ; 11.6871 ; 11.8004 ; 11.8102 ; 11.8257 ; 11.8504 ; 11.8872 ; 11.9475 ; 12.0486 ; 12.1964 ; 12.2511 ; 12.3369 ; 12.4632 ; 12.6328 ; 12.8169 ; 13.0841 ; 13.5453 ; 13.6952 ; 13.8921 ; 14.1169 ; 14.1836 ; 14.2779 ; 14.4114 ; 14.456 ; 14.5096 ; 14.5753 ; 14.6557 ; 14.6588 ; 14.6614 ; 14.6643 ; 14.6673]

Bolt 1 - Shear Force (kips): [0.0127714 ; 0.247201 ; 0.590184 ; 1.10253 ; 1.83119 ; 2.67009 ; 2.85516 ; 2.85513 ; 2.85493 ; 2.85473 ; 2.85874 ; 2.92941 ; 3.02878 ; 3.10479 ; 3.10507 ; 3.10504 ; 3.15473 ; 3.2464 ; 3.34421 ; 3.43951 ; 3.63591 ; 3.82948 ; 4.11925 ; 4.50759 ; 5.14978 ; 5.91517 ; 6.29134 ; 6.82707 ; 7.41175 ; 7.96481 ; 8.58721 ; 9.70777 ; 10.6927 ; 11.6625 ; 11.9424 ; 12.4059 ; 12.943 ; 13.344 ; 13.7583 ; 13.9756 ; 14.2716 ; 14.2985 ; 14.3371 ; 14.3911 ; 14.4789 ; 14.5917 ; 14.7266 ; 14.9305 ; 15.0199 ; 15.1305 ; 15.2791 ; 15.4998 ; 15.8651 ; 16.3387 ; 16.8845 ; 17.0327 ; 17.2555 ; 17.5402 ; 17.6382 ; 17.7614 ; 17.9068 ; 17.956 ; 18.043 ; 18.1727 ; 18.3062 ; 18.3206 ; 18.333 ; 18.3447 ; 18.3562]

Bolt 2 - Tensile Force (kips): [14.9175 ; 14.7011 ; 14.1804 ; 13.1412 ; 11.5374 ; 9.40494 ; 8.78445 ; 8.7656 ; 8.76453 ; 8.76423 ; 8.76451 ; 8.76769 ; 8.70537 ; 8.60055 ; 8.55247 ; 8.55239 ; 8.55858 ; 8.57075 ; 8.5912 ; 8.61578 ; 8.68245 ; 8.7763 ; 8.95015 ; 9.16174 ; 9.68666 ; 10.3753 ; 10.6452 ; 11.0732 ; 11.7198 ; 12.5746 ; 13.7397 ; 15.3822 ; 17.4324 ; 19.5577 ; 20.0064 ; 20.5763 ; 21.4055 ; 22.1573 ; 22.7992 ; 23.0269 ; 23.3448 ; 23.3735 ; 23.4162 ; 23.4791 ; 23.5716 ; 23.7064 ; 23.9013 ; 24.1794 ; 24.2854 ; 24.4393 ; 24.6586 ; 24.9643 ; 25.3871 ; 25.8971 ; 26.3734 ; 26.4776 ; 26.6297 ; 26.826 ; 26.8896 ; 26.958 ; 27.045 ; 27.0645 ; 27.0913 ; 27.1223 ; 27.1494 ; 27.1471 ; 27.1451 ; 27.1435 ; 27.1422]

Bolt 2 - Shear Force (kips): [0.011058 ; 0.2497 ; 0.58677 ; 1.0964 ; 1.8218 ; 2.6597 ; 2.8848 ; 2.8916 ; 2.8921 ; 2.8922 ; 2.8923 ; 2.8933 ; 2.9501 ; 3.0914 ; 3.1543 ; 3.1544 ; 3.1562 ; 3.1944 ; 3.2988 ; 3.4622 ; 3.6318 ; 3.8854 ; 4.134 ; 4.62 ; 5.0876 ; 5.6891 ; 5.8212 ; 5.93 ; 6.0066 ; 6.3204 ; 6.4901 ; 6.9071 ; 7.4134 ; 7.6083 ; 7.7036 ; 7.8286 ; 7.9427 ; 7.9945 ; 8.0289 ; 8.011 ; 7.9821 ; 7.9794 ; 7.9755 ; 7.97 ; 7.961 ; 7.9485 ; 7.9334 ; 7.9059 ; 7.8861 ; 7.8629 ; 7.8352 ; 7.7993 ; 7.7379 ; 7.8071 ; 8.1255 ; 8.2214 ; 8.3433 ; 8.5118 ; 8.575 ; 8.7285 ; 8.941 ; 9.0307 ; 9.1554 ; 9.3386 ; 9.5864 ; 9.6151 ; 9.6394 ; 9.6625 ; 9.6849]

Bolt 3 - Tensile Force (kips): [16 ; 16.5059 ; 17.0359 ; 17.152 ; 17.3092 ; 17.4327 ; 17.4518 ; 17.4522 ; 17.4513 ; 17.45 ; 17.4521 ; 17.4748 ; 17.5233 ; 17.5961 ; 17.6178 ; 17.6177 ; 17.6419 ; 17.7023 ; 17.7963 ; 17.9203 ; 18.1104 ; 18.3486 ; 18.6567 ; 19.2319 ; 20.1069 ; 21.3342 ; 21.8237 ; 22.5295 ; 23.4821 ; 24.5731 ; 25.7032 ; 27.1511 ; 28.6459 ; 29.8996 ; 30.3106 ; 30.8189 ; 31.283 ; 31.473 ; 31.5626 ; 31.5898 ; 31.6266 ; 31.6297 ; 31.6319 ; 31.6328 ; 31.6357 ; 31.6434 ; 31.6559 ; 31.6743 ; 31.6551 ; 31.6256 ; 31.5942 ; 31.5859 ; 31.5649 ; 31.5061 ; 31.4994 ; 31.4944 ; 31.4555 ; 31.4083 ; 31.4054 ; 31.4054 ; 31.4126 ; 31.4169 ; 31.4245 ; 31.4174 ; 31.3854 ; 31.3713 ; 31.3691 ; 31.3733 ; 31.3792]

Bolt 3 - Shear Force (kips): [0.0071059 ; 0.035645 ; 0.048573 ; 0.049781 ; 0.050797 ; 0.051181 ; 0.051196 ; 0.051195 ; 0.051194 ; 0.051181 ; 0.051147 ; 0.051188 ; 0.051265 ; 0.051366 ; 0.051382 ; 0.051382 ; 0.051387 ; 0.051455 ; 0.051678 ; 0.052133 ; 0.052814 ; 0.055224 ; 0.059963 ; 0.071232 ; 0.09082 ; 0.11601 ; 0.12268 ; 0.12519 ; 0.12104 ; 0.11358 ; 0.11997 ; 0.12039 ; 0.098843 ; 0.095612 ; 0.094199 ; 0.08056 ; 0.055139 ; 0.045071 ; 0.042636 ; 0.041667 ; 0.039686 ; 0.039797 ; 0.042429 ; 0.045711 ; 0.0629 ; 0.10347 ; 0.14725 ; 0.19244 ; 0.32492 ; 0.51718 ; 0.74614 ; 0.91924 ; 1.1875 ; 1.6399 ; 1.9745 ; 2.079 ; 2.311 ; 2.6201 ; 2.7105 ; 2.816 ; 2.9506 ; 2.9962 ; 3.0603 ; 3.1865 ; 3.3347 ; 3.2954 ; 3.2289 ; 3.1562 ; 3.0842]

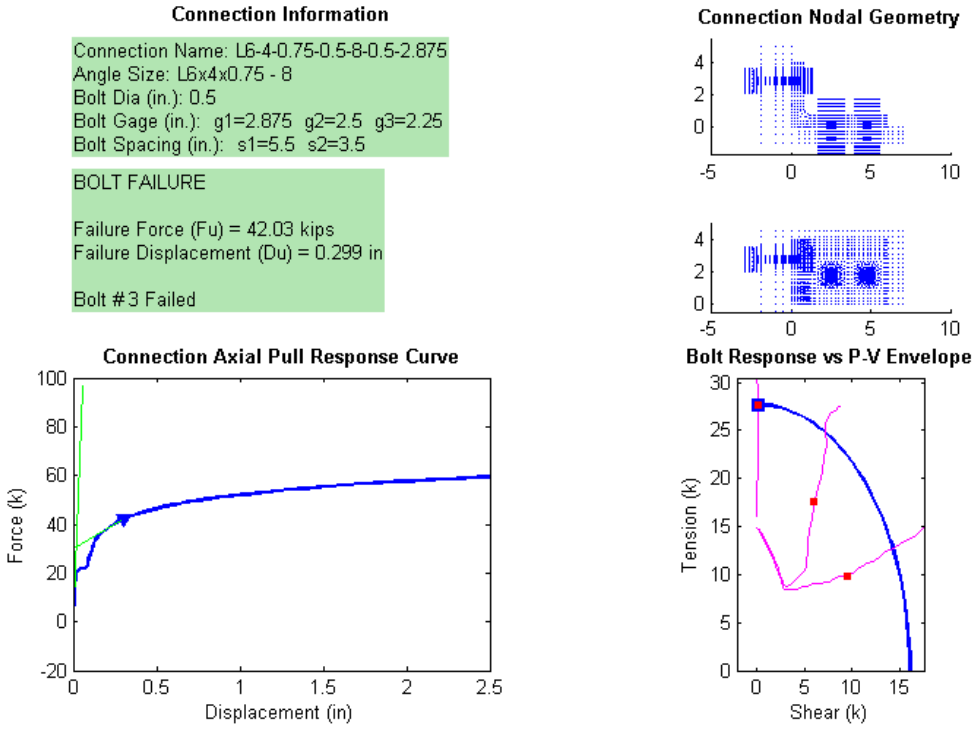


Figure B.69 Connection L6_4_0.75_0.5_8_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.5_8_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 1.6192e+003

Plastic Stiffness (k/in): 40.3484

Displacement (in): [6.3251e-037 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.055916 ; 0.064259 ; 0.067387 ; 0.07208 ; 0.07384 ; 0.076479 ; 0.077469 ; 0.077841 ; 0.078397 ; 0.079232 ; 0.080485 ; 0.080955 ; 0.08166 ; 0.082717 ; 0.084303 ; 0.086681 ; 0.090249 ; 0.0956 ; 0.10363 ; 0.11567 ; 0.12018 ; 0.12696 ; 0.13711 ; 0.15235 ; 0.17521 ; 0.2095 ; 0.24379 ; 0.25236 ; 0.26522 ; 0.28451 ; 0.31344 ; 0.35683 ; 0.42192 ; 0.51956 ; 0.55618 ; 0.6111 ; 0.6317 ; 0.66259 ; 0.67418 ; 0.69155 ; 0.71762 ; 0.75672 ; 0.81537 ; 0.90334 ; 1.0353 ; 1.2333 ; 1.2958 ; 1.3895 ; 1.5301 ; 1.7411 ; 1.9911 ; 2.2411 ; 2.4911 ; 2.5]

Force (kips): [-0.210578 ; 6.73105 ; 7.69572 ; 8.49503 ; 9.39655 ; 9.97938 ; 10.2419 ; 10.5578 ; 10.8708 ; 10.9256 ; 10.9758 ; 10.9853 ; 10.9855 ; 10.9853 ; 10.985 ; 10.9849 ; 10.9876 ; 11.017 ; 11.0644 ; 11.1309 ; 11.166 ; 11.2059 ; 11.2633 ; 11.3304 ; 11.4624 ; 12.0326 ; 12.8006 ; 13.7725 ; 15.1029 ; 15.5857 ; 16.2123 ; 16.8674 ; 17.5051 ; 18.1904 ; 19.0991 ; 19.918 ; 20.1055 ; 20.3782 ; 20.7673 ; 21.2489 ; 21.7817 ; 22.4511 ; 23.3452 ; 23.6352 ; 24.0311 ; 24.1678 ; 24.3571 ; 24.425 ; 24.5315 ; 24.6876 ; 24.9019 ; 25.1805 ; 25.5796 ; 26.1256 ; 26.8441 ; 27.055 ; 27.3456 ; 27.7396 ; 28.261 ; 28.8069 ; 29.2762 ; 29.6717 ; 29.6861]

Bolt 1 - Tensile Force (kips): [14.9087 ; 14.6898 ; 14.6459 ; 14.6059 ; 14.5396 ; 14.2198 ; 13.4023 ; 12.0862 ; 10.145 ; 9.49549 ; 8.65289 ; 8.65137 ; 8.65029 ; 8.64997 ; 8.64955 ; 8.64943 ; 8.64682 ; 8.5998 ; 8.52858 ; 8.43229 ; 8.40991 ; 8.41013 ; 8.41017 ; 8.41067 ; 8.39393 ; 8.38369 ; 8.40717 ; 8.47022 ; 8.61168 ; 8.68864 ; 8.75123 ; 8.85492 ; 8.99668 ; 9.12481 ; 9.27557 ; 9.62282 ; 9.70014 ; 9.75904 ; 9.82637 ; 9.97025 ; 10.1989 ; 10.5511 ; 11.0763 ; 11.2516 ; 11.3872 ; 11.4165 ; 11.4958 ; 11.5314 ; 11.5943 ; 11.6912 ; 11.8428 ; 12.0775 ; 12.4327 ; 12.7077 ; 13.2363 ; 13.3727 ; 13.5301 ; 13.7648 ; 14.1687 ; 14.6379 ; 14.888 ; 14.9834 ; 14.9831]

Bolt 1 - Shear Force (kips): [0.0131367 ; 0.212503 ; 0.244878 ; 0.272658 ; 0.317292 ; 0.507545 ; 0.919351 ; 1.52116 ; 2.31996 ; 2.55862 ; 2.85451 ; 2.85476 ; 2.85456 ; 2.85448 ; 2.85435 ; 2.85431 ; 2.85789 ; 2.90383 ; 2.97669 ; 3.07982 ; 3.10366 ; 3.10396 ; 3.10413 ; 3.10433 ; 3.23182 ; 3.51702 ; 3.8301 ; 4.24812 ; 4.67799 ; 4.88352 ; 5.25634 ; 5.60808 ; 5.91371 ; 6.32497 ; 7.61188 ; 8.27513 ; 8.45235 ; 8.77663 ; 9.29712 ; 9.78082 ; 10.1247 ; 10.5719 ; 11.3457 ; 11.5958 ; 12.0463 ; 12.2228 ; 12.4354 ; 12.5031 ; 12.5922 ; 12.7168 ; 12.8964 ; 13.1456 ; 13.4896 ; 14.2968 ; 15.0476 ; 15.2712 ; 15.6302 ; 16.1207 ; 16.6787 ; 17.1836 ; 17.5742 ; 17.8841 ; 17.9017]

Bolt 2 - Tensile Force (kips): [14.9167 ; 14.7453 ; 14.725 ; 14.7135 ; 14.692 ; 14.4091 ; 13.612 ; 12.3543 ; 10.5294 ; 9.92445 ; 9.14486 ; 8.89923 ; 8.88179 ; 8.88123 ; 8.88086 ; 8.88079 ; 8.88127 ; 8.88522 ; 8.89107 ; 8.8999 ; 8.88095 ; 8.84558 ; 8.79771 ; 8.73657 ; 8.77341 ; 8.95942 ; 9.23474 ; 9.6198 ; 10.2172 ; 10.518 ; 10.9554 ; 11.5124 ; 12.2699 ; 13.317 ; 14.748 ; 15.9751 ; 16.2599 ; 16.6647 ; 17.2224 ; 17.8826 ; 18.5687 ; 19.5274 ; 20.818 ; 21.2548 ; 21.8469 ; 22.0545 ; 22.3553 ; 22.4638 ; 22.6213 ; 22.8256 ; 23.1077 ; 23.4629 ; 23.9564 ; 24.6627 ; 25.5391 ; 25.7784 ; 26.1057 ; 26.475 ; 26.8228 ; 27.1102 ; 27.3358 ; 27.5003 ; 27.5063]

Bolt 2 - Shear Force (kips): [0.011312 ; 0.21463 ; 0.24635 ; 0.27312 ; 0.31532 ; 0.49953 ; 0.90694 ; 1.5029 ; 2.295 ; 2.5324 ; 2.8303 ; 2.9236 ; 2.9303 ; 2.9305 ; 2.9306 ; 2.9306 ; 2.9308 ; 2.9321 ; 2.934 ; 2.9369 ; 2.9674 ; 3.0238 ; 3.1067 ; 3.2088 ; 3.222 ; 3.5112 ; 3.8825 ; 4.2883 ; 4.9144 ; 5.0596 ; 5.1599 ; 5.2856 ; 5.3861 ; 5.45 ; 5.5326 ; 5.8534 ; 5.8817 ; 5.9075 ; 5.9726 ; 6.11 ; 6.3431 ; 6.6335 ; 6.8587 ; 6.9201 ; 7.0294 ; 7.0627 ; 7.1047 ; 7.1191 ; 7.1414 ; 7.1881 ; 7.2353 ; 7.2899 ; 7.3214 ; 7.2569 ; 7.2702 ; 7.2771 ; 7.328 ; 7.566 ; 7.8838 ; 8.2148 ; 8.4924 ; 8.7594 ; 8.7681]

Bolt 3 - Tensile Force (kips): [16 ; 16.4359 ; 16.6569 ; 16.8862 ; 17.2446 ; 17.5212 ; 17.6517 ; 17.8091 ; 17.9676 ; 17.9987 ; 18.0311 ; 18.0393 ; 18.0388 ; 18.0382 ; 18.0373 ; 18.037 ; 18.0386 ; 18.0525 ; 18.0742 ; 18.1045 ; 18.121 ; 18.1402 ; 18.168 ; 18.2012 ; 18.263 ; 18.5365 ; 18.9459 ; 19.5039 ; 20.3796 ; 20.7411 ; 21.2732 ; 21.979 ; 22.9079 ; 24.0573 ; 25.3216 ; 26.3318 ; 26.5635 ; 26.8978 ; 27.3698 ; 28.0101 ; 28.7812 ; 29.546 ; 30.4335 ; 30.6929 ; 30.993 ; 31.0782 ; 31.189 ; 31.2206 ; 31.2156 ; 31.2086 ; 31.2095 ; 31.2456 ; 31.1964 ; 31.2212 ; 31.2148 ; 31.1723 ; 31.1781 ; 31.2002 ; 31.2156 ; 31.1934 ; 31.2016 ; 31.2384 ; 31.2416]

Bolt 3 - Shear Force (kips): [0.0079213 ; 0.03322 ; 0.038436 ; 0.044192 ; 0.049716 ; 0.052586 ; 0.053313 ; 0.054324 ; 0.05566 ; 0.055922 ; 0.056231 ; 0.056309 ; 0.056349 ; 0.056357 ; 0.05636 ; 0.056361 ; 0.056369 ; 0.056448 ; 0.056722 ; 0.057118 ; 0.057344 ; 0.057626 ; 0.058066 ; 0.058646 ; 0.059783 ; 0.065671 ; 0.076615 ; 0.093066 ; 0.1188 ; 0.12875 ; 0.14154 ; 0.15174 ; 0.15598 ; 0.15529 ; 0.15597 ; 0.15954 ; 0.1582 ; 0.15522 ; 0.14965 ; 0.14035 ; 0.12754 ; 0.12223 ; 0.11081 ; 0.10086 ; 0.089691 ; 0.088236 ; 0.085039 ; 0.091564 ; 0.25728 ; 0.50205 ; 0.77154 ; 0.93424 ; 1.4144 ; 1.7475 ; 2.1813 ; 2.3931 ; 2.5607 ; 2.7583 ; 3.0342 ; 3.399 ; 3.669 ; 3.8756 ; 3.8823]

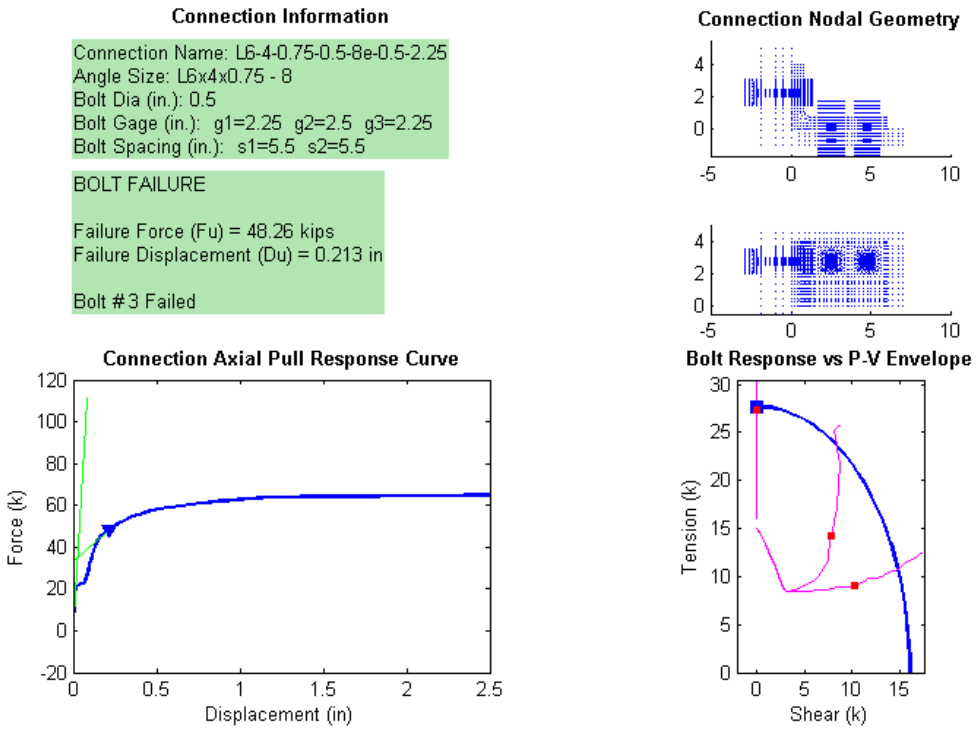


Figure B.70 Connection L6_4_0.75_0.5_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.5_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.3558e+003

Plastic Stiffness (k/in): 70.1392

Displacement (in): [6.6515e-037 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.035156 ; 0.052734 ; 0.059326 ; 0.061798 ; 0.065506 ; 0.066896 ; 0.068982 ; 0.072111 ; 0.073284 ; 0.075044 ; 0.075704 ; 0.076693 ; 0.078178 ; 0.080406 ; 0.082633 ; 0.08486 ; 0.088201 ; 0.093212 ; 0.10073 ; 0.112 ; 0.11623 ; 0.12258 ; 0.13209 ; 0.14636 ; 0.16063 ; 0.1749 ; 0.19631 ; 0.22841 ; 0.27658 ; 0.29464 ; 0.32173 ; 0.36237 ; 0.42332 ; 0.51476 ; 0.65191 ; 0.70334 ; 0.78049 ; 0.89621 ; 1.0698 ; 1.1323 ; 1.1382 ; 1.1469 ; 1.1601 ; 1.1651 ; 1.1725 ; 1.1836 ; 1.2003 ; 1.2253 ; 1.2629 ; 1.3192 ; 1.4037 ; 1.5304 ; 1.7204 ; 1.9704 ; 2.2204 ; 2.4704 ; 2.5]

Force (kips): [-0.200169 ; 9.15799 ; 10.3918 ; 10.6982 ; 11.0439 ; 11.2199 ; 11.2276 ; 11.2276 ; 11.2272 ; 11.2272 ; 11.2933 ; 11.5311 ; 11.5314 ; 11.5985 ; 11.7758 ; 12.0552 ; 12.4003 ; 12.8556 ; 13.151 ; 13.5212 ; 14.1255 ; 14.7664 ; 16.0655 ; 17.6192 ; 18.238 ; 19.1325 ; 20.3451 ; 21.5896 ; 22.3057 ; 22.8485 ; 23.5992 ; 24.5986 ; 25.7855 ; 26.1528 ; 26.6682 ; 27.3943 ; 28.2693 ; 29.0419 ; 29.8405 ; 30.1158 ; 30.4961 ; 30.9912 ; 31.6183 ; 31.8198 ; 31.8384 ; 31.872 ; 31.9275 ; 31.9272 ; 31.9244 ; 31.9291 ; 31.9395 ; 31.9535 ; 31.9727 ; 31.9994 ; 32.0353 ; 32.0828 ; 32.148 ; 32.2262 ; 32.2976 ; 32.3626 ; 32.37]

Bolt 1 - Tensile Force (kips): [14.9453 ; 14.621 ; 13.7367 ; 12.6198 ; 10.9331 ; 8.83406 ; 8.66869 ; 8.66855 ; 8.66825 ; 8.6682 ; 8.55081 ; 8.41787 ; 8.41778 ; 8.41112 ; 8.39534 ; 8.3936 ; 8.38781 ; 8.39307 ; 8.41894 ; 8.42401 ; 8.44443 ; 8.5118 ; 8.48076 ; 8.55422 ; 8.5843 ; 8.63805 ; 8.73355 ; 8.91456 ; 8.91473 ; 8.922 ; 8.96046 ; 9.15093 ; 9.48009 ; 9.61493 ; 9.772 ; 9.83273 ; 10.0514 ; 10.4331 ; 10.8028 ; 10.9821 ; 11.2811 ; 11.6108 ; 11.9902 ; 12.1349 ; 12.1489 ; 12.1708 ; 12.2046 ; 12.2079 ; 12.2118 ; 12.2166 ; 12.2216 ; 12.2282 ; 12.2372 ; 12.25 ; 12.2664 ; 12.2865 ; 12.3148 ; 12.3498 ; 12.3829 ; 12.4118 ; 12.4151]

Bolt 1 - Shear Force (kips): [0.0106703 ; 0.286186 ; 0.772709 ; 1.29564 ; 2.02525 ; 2.80317 ; 2.86061 ; 2.8606 ; 2.86052 ; 2.8605 ; 2.95324 ; 3.09594 ; 3.09609 ; 3.16604 ; 3.31681 ; 3.4271 ; 3.61471 ; 3.81078 ; 3.93925 ; 4.19347 ; 4.45436 ; 4.73243 ; 5.49497 ; 6.21436 ; 6.67189 ; 7.34781 ; 7.97921 ; 8.37711 ; 8.8661 ; 9.28824 ; 9.94204 ; 10.4838 ; 11.2417 ; 11.479 ; 11.8365 ; 12.5218 ; 13.206 ; 13.7446 ; 14.7711 ; 15.0595 ; 15.4699 ; 16.0175 ; 16.6693 ; 16.859 ; 16.8758 ; 16.901 ; 16.9383 ; 16.9435 ; 16.9501 ; 16.9562 ; 16.962 ; 16.9695 ; 16.9794 ; 16.9928 ; 17.0118 ; 17.0389 ; 17.0758 ; 17.1198 ; 17.1597 ; 17.1979 ; 17.2024]

Bolt 2 - Tensile Force (kips): [14.9703 ; 14.7003 ; 13.8422 ; 12.7373 ; 11.0705 ; 8.98843 ; 8.73386 ; 8.73348 ; 8.73304 ; 8.73301 ; 8.70662 ; 8.50748 ; 8.5075 ; 8.51055 ; 8.51632 ; 8.51269 ; 8.52851 ; 8.5569 ; 8.60261 ; 8.65268 ; 8.72602 ; 8.88023 ; 9.24797 ; 9.48819 ; 9.61855 ; 9.89288 ; 10.4024 ; 11.1411 ; 11.8582 ; 12.5498 ; 13.548 ; 14.8596 ; 16.565 ; 17.1311 ; 17.9196 ; 18.9451 ; 20.1555 ; 21.3588 ; 22.707 ; 23.1319 ; 23.7001 ; 24.4262 ; 25.2455 ; 25.447 ; 25.4613 ; 25.4838 ; 25.518 ; 25.5216 ; 25.5259 ; 25.5307 ; 25.5353 ; 25.5414 ; 25.5493 ; 25.559 ; 25.5719 ; 25.5888 ; 25.6111 ; 25.6366 ; 25.6588 ; 25.6779 ; 25.68]

Bolt 2 - Shear Force (kips): [0.014639 ; 0.27666 ; 0.75842 ; 1.2802 ; 2.0096 ; 2.7924 ; 2.8817 ; 2.8819 ; 2.8819 ; 2.8819 ; 2.9051 ; 3.1251 ; 3.1253 ; 3.1262 ; 3.1633 ; 3.3462 ; 3.5147 ; 3.7929 ; 3.9596 ; 4.0799 ; 4.4272 ; 4.7626 ; 5.2128 ; 6.0096 ; 6.1471 ; 6.3039 ; 6.702 ; 7.2698 ; 7.4581 ; 7.5667 ; 7.7272 ; 7.9996 ; 8.2939 ; 8.3836 ; 8.459 ; 8.5054 ; 8.5893 ; 8.6735 ; 8.5409 ; 8.489 ; 8.4099 ; 8.3022 ; 8.1854 ; 8.3775 ; 8.3981 ; 8.4275 ; 8.4687 ; 8.4745 ; 8.4819 ; 8.4887 ; 8.4949 ; 8.5028 ; 8.5137 ; 8.5325 ; 8.5569 ; 8.5881 ; 8.63 ; 8.6783 ; 8.7212 ; 8.7587 ; 8.763]

Bolt 3 - Tensile Force (kips): [16 ; 16.5857 ; 16.8194 ; 16.887 ; 16.9744 ; 17.0293 ; 17.0322 ; 17.0317 ; 17.0308 ; 17.0305 ; 17.0509 ; 17.1295 ; 17.1295 ; 17.1524 ; 17.217 ; 17.3314 ; 17.4976 ; 17.7484 ; 17.9171 ; 18.1261 ; 18.4864 ; 18.8884 ; 19.7372 ; 20.8348 ; 21.2872 ; 21.9776 ; 22.9728 ; 24.1682 ; 25.0151 ; 25.7079 ; 26.6839 ; 27.8727 ; 28.9924 ; 29.2824 ; 29.6792 ; 30.2466 ; 30.9418 ; 31.4291 ; 31.6216 ; 31.6712 ; 31.7336 ; 31.8041 ; 31.8558 ; 31.8703 ; 31.8715 ; 31.8671 ; 31.8586 ; 31.873 ; 31.8948 ; 31.9138 ; 31.9243 ; 31.9387 ; 31.9582 ; 31.9856 ; 32.0225 ; 32.0715 ; 32.1389 ; 32.22 ; 32.2944 ; 32.3622 ; 32.37]

Bolt 3 - Shear Force (kips): [0.012801 ; 0.033245 ; 0.039933 ; 0.041696 ; 0.043401 ; 0.044134 ; 0.044165 ; 0.044169 ; 0.044169 ; 0.044177 ; 0.044393 ; 0.045218 ; 0.045217 ; 0.045405 ; 0.045891 ; 0.04642 ; 0.046617 ; 0.045906 ; 0.045718 ; 0.045888 ; 0.048872 ; 0.054155 ; 0.069089 ; 0.088755 ; 0.095933 ; 0.1039 ; 0.10215 ; 0.090928 ; 0.088198 ; 0.093659 ; 0.1011 ; 0.08594 ; 0.073153 ; 0.071222 ; 0.072203 ; 0.076203 ; 0.062564 ; 0.03512 ; 0.030037 ; 0.028198 ; 0.02501 ; 0.019834 ; 0.072358 ; 0.094748 ; 0.09672 ; 0.13422 ; 0.21984 ; 0.15692 ; 0.059147 ; 0.0065618 ; 0.0041056 ; 0.0020333 ; 0.00065434 ; 0.0003817 ; 0.00095775 ; 0.0010005 ; 0.00065074 ; 7.4489e-005 ; 0.00059237 ; 0.0012444 ; 0.0013073]

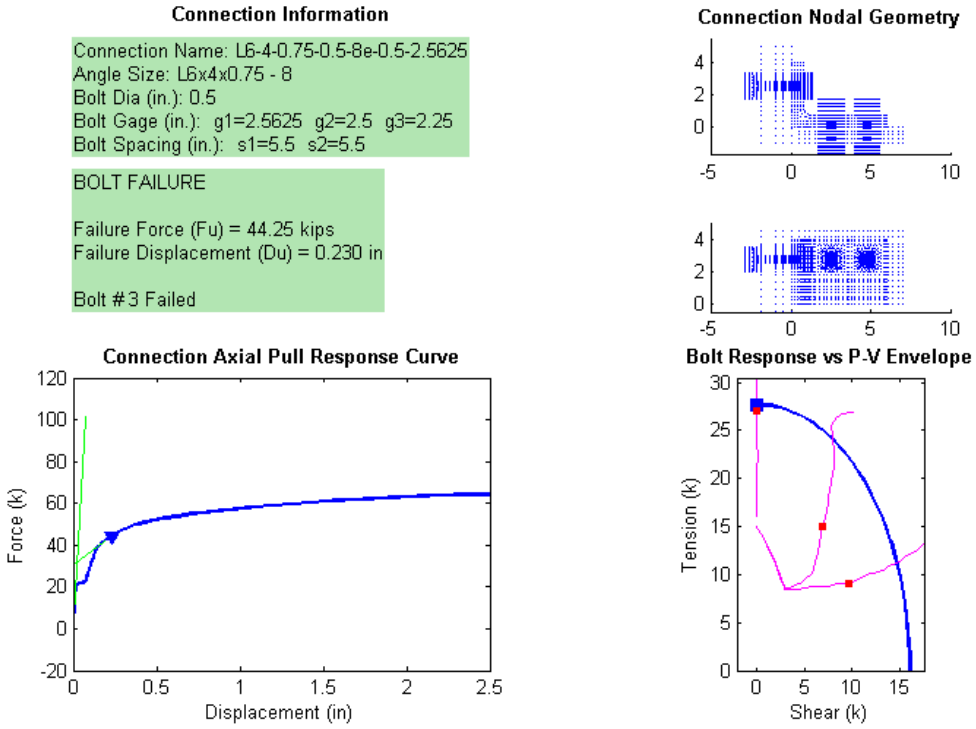


Figure B.71 Connection L6_4_0.75_0.5_8e_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.5_8e_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.3341e+003

Plastic Stiffness (k/in): 58.8956

Displacement (in): [4.7097e-037 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.035156 ; 0.052734 ; 0.059326 ; 0.061798 ; 0.065506 ; 0.071068 ; 0.071589 ; 0.072371 ; 0.073545 ; 0.075304 ; 0.077944 ; 0.078934 ; 0.079305 ; 0.079862 ; 0.080697 ; 0.08195 ; 0.083829 ; 0.086648 ; 0.090876 ; 0.097219 ; 0.10673 ; 0.121 ; 0.12635 ; 0.13438 ; 0.14642 ; 0.16448 ; 0.19158 ; 0.23221 ; 0.27285 ; 0.31349 ; 0.37444 ; 0.3973 ; 0.43159 ; 0.48302 ; 0.56017 ; 0.67589 ; 0.71928 ; 0.78438 ; 0.80879 ; 0.8454 ; 0.90033 ; 0.92092 ; 0.95181 ; 0.9634 ; 0.98078 ; 1.0068 ; 1.0459 ; 1.1046 ; 1.1926 ; 1.3245 ; 1.5225 ; 1.585 ; 1.6787 ; 1.7139 ; 1.7666 ; 1.8457 ; 1.9248 ; 2.0039 ; 2.1226 ; 2.1671 ; 2.2338 ; 2.3339 ; 2.3715 ; 2.409 ; 2.4465 ; 2.5]

Force (kips): [-0.228072 ; 7.87345 ; 10.1946 ; 10.511 ; 10.8737 ; 11.113 ; 11.1404 ; 11.1421 ; 11.1418 ; 11.1413 ; 11.1414 ; 11.1635 ; 11.2377 ; 11.3867 ; 11.4526 ; 11.4528 ; 11.4562 ; 11.5652 ; 11.7211 ; 11.9682 ; 12.3121 ; 12.7558 ; 13.2799 ; 14.2329 ; 15.5154 ; 17.1897 ; 17.7797 ; 18.5622 ; 19.4086 ; 20.211 ; 21.0088 ; 22.1873 ; 23.1883 ; 23.9693 ; 24.8643 ; 25.1373 ; 25.4986 ; 25.979 ; 26.5713 ; 27.2411 ; 27.471 ; 27.7842 ; 27.8955 ; 28.0574 ; 28.2863 ; 28.3685 ; 28.4876 ; 28.5336 ; 28.6158 ; 28.7362 ; 28.9018 ; 29.1268 ; 29.4464 ; 29.8891 ; 30.4448 ; 30.6057 ; 30.8434 ; 30.9331 ; 31.0571 ; 31.2342 ; 31.3996 ; 31.5556 ; 31.7776 ; 31.8561 ; 31.9684 ; 32.1185 ; 32.1246 ; 32.1276 ; 32.133 ; 32.1424]

Bolt 1 - Tensile Force (kips): [14.9444 ; 14.6733 ; 14.1125 ; 13.0637 ; 11.4293 ; 9.24273 ; 8.66861 ; 8.66822 ; 8.66765 ; 8.66731 ; 8.6674 ; 8.62121 ; 8.51774 ; 8.43084 ; 8.43109 ; 8.43107 ; 8.43095 ; 8.41713 ; 8.39924 ; 8.40108 ; 8.39823 ; 8.41069 ; 8.45509 ; 8.49986 ; 8.59645 ; 8.72115 ; 8.7635 ; 8.79826 ; 8.83103 ; 8.89067 ; 9.0388 ; 9.12344 ; 9.40387 ; 9.69157 ; 10.0511 ; 10.1364 ; 10.1408 ; 10.2151 ; 10.4722 ; 10.952 ; 11.0434 ; 11.2131 ; 11.2808 ; 11.4004 ; 11.5784 ; 11.6415 ; 11.7364 ; 11.7719 ; 11.8247 ; 11.8952 ; 11.9981 ; 12.1284 ; 12.3248 ; 12.6317 ; 13.1025 ; 13.2275 ; 13.4035 ; 13.4632 ; 13.5473 ; 13.6646 ; 13.7697 ; 13.8556 ; 13.9442 ; 13.9756 ; 14.0166 ; 14.0636 ; 14.0663 ; 14.0683 ; 14.0705 ; 14.0735]

Bolt 1 - Shear Force (kips): [0.0117704 ; 0.249658 ; 0.582165 ; 1.09229 ; 1.81933 ; 2.66032 ; 2.8603 ; 2.8604 ; 2.8603 ; 2.86021 ; 2.86024 ; 2.89848 ; 3.00494 ; 3.09966 ; 3.10017 ; 3.1002 ; 3.10359 ; 3.21878 ; 3.35405 ; 3.44864 ; 3.63493 ; 3.82875 ; 4.10158 ; 4.51104 ; 5.13845 ; 5.91942 ; 6.28108 ; 6.83493 ; 7.46555 ; 8.00668 ; 8.57001 ; 9.74865 ; 10.4169 ; 11.0325 ; 11.6767 ; 11.8698 ; 12.2475 ; 12.7123 ; 13.2269 ; 13.828 ; 14.1822 ; 14.6169 ; 14.757 ; 14.9268 ; 15.1895 ; 15.2841 ; 15.4146 ; 15.4618 ; 15.5355 ; 15.6502 ; 15.8035 ; 16.046 ; 16.3619 ; 16.7671 ; 17.2798 ; 17.4461 ; 17.6618 ; 17.7325 ; 17.8313 ; 17.9625 ; 18.0705 ; 18.1732 ; 18.3479 ; 18.4039 ; 18.4773 ; 18.5731 ; 18.5901 ; 18.6045 ; 18.6185 ; 18.6376]

Bolt 2 - Tensile Force (kips): [14.9692 ; 14.7539 ; 14.2606 ; 13.2306 ; 11.6338 ; 9.49649 ; 8.85916 ; 8.78368 ; 8.78201 ; 8.78137 ; 8.78144 ; 8.78311 ; 8.77466 ; 8.66472 ; 8.58399 ; 8.58404 ; 8.58456 ; 8.59726 ; 8.61356 ; 8.63251 ; 8.67028 ; 8.7262 ; 8.84595 ; 9.03816 ; 9.47713 ; 10.0532 ; 10.2713 ; 10.6644 ; 11.3067 ; 12.1995 ; 13.4069 ; 15.0526 ; 16.472 ; 17.7501 ; 19.1703 ; 19.4911 ; 19.8868 ; 20.4795 ; 21.3592 ; 22.4904 ; 22.8595 ; 23.3482 ; 23.5143 ; 23.7516 ; 24.0838 ; 24.2032 ; 24.3757 ; 24.439 ; 24.5348 ; 24.6751 ; 24.8758 ; 25.1598 ; 25.5242 ; 25.9682 ; 26.382 ; 26.4829 ; 26.6007 ; 26.6351 ; 26.6842 ; 26.738 ; 26.7779 ; 26.8096 ; 26.8524 ; 26.8637 ; 26.8772 ; 26.8998 ; 26.9009 ; 26.902 ; 26.9031 ; 26.9049]

Bolt 2 - Shear Force (kips): [0.0157355 ; 0.23909 ; 0.562358 ; 1.06991 ; 1.7943 ; 2.63948 ; 2.87013 ; 2.89713 ; 2.89775 ; 2.89781 ; 2.89785 ; 2.8984 ; 2.91034 ; 3.04705 ; 3.14861 ; 3.14877 ; 3.14895 ; 3.15261 ; 3.18746 ; 3.35546 ; 3.53692 ; 3.8167 ; 4.07259 ; 4.54764 ; 5.01977 ; 5.71792 ; 5.88997 ; 6.02165 ; 6.07406 ; 6.3993 ; 6.53756 ; 6.9303 ; 7.39197 ; 7.50832 ; 7.68506 ; 7.78274 ; 7.87788 ; 7.97725 ; 8.0585 ; 8.11702 ; 8.08986 ; 8.0514 ; 8.03888 ; 8.02405 ; 7.99069 ; 7.97616 ; 7.95752 ; 7.95056 ; 7.93877 ; 7.91771 ; 7.88896 ; 7.8434 ; 7.86547 ; 8.11023 ; 8.42438 ; 8.51158 ; 8.67956 ; 8.75235 ; 8.85784 ; 9.04624 ; 9.23282 ; 9.4023 ; 9.61979 ; 9.7017 ; 9.82533 ; 9.99383 ; 10.0232 ; 10.0476 ; 10.0711 ; 10.103]

Bolt 3 - Tensile Force (kips): [16 ; 16.5044 ; 17.0652 ; 17.1921 ; 17.3573 ; 17.4916 ; 17.5114 ; 17.513 ; 17.5122 ; 17.5108 ; 17.5108 ; 17.5227 ; 17.5602 ; 17.6371 ; 17.6724 ; 17.6726 ; 17.6741 ; 17.729 ; 17.8065 ; 17.9355 ; 18.1278 ; 18.3789 ; 18.6814 ; 19.2675 ; 20.1097 ; 21.3448 ; 21.8205 ; 22.5254 ; 23.4821 ; 24.5816 ; 25.716 ; 27.1723 ; 28.2587 ; 28.9893 ; 29.7803 ; 30.0651 ; 30.4622 ; 30.9296 ; 31.335 ; 31.5382 ; 31.5822 ; 31.6373 ; 31.6544 ; 31.6642 ; 31.6836 ; 31.6898 ; 31.7002 ; 31.6905 ; 31.6671 ; 31.6398 ; 31.6219 ; 31.6119 ; 31.588 ; 31.5229 ; 31.5136 ; 31.5169 ; 31.4683 ; 31.4421 ; 31.419 ; 31.414 ; 31.4143 ; 31.4168 ; 31.4268 ; 31.4315 ; 31.4394 ; 31.43 ; 31.4097 ; 31.4019 ; 31.4033 ; 31.4148]

Bolt 3 - Shear Force (kips): [0.013952 ; 0.0306 ; 0.043706 ; 0.044865 ; 0.045877 ; 0.046256 ; 0.046251 ; 0.046244 ; 0.046246 ; 0.046246 ; 0.046253 ; 0.046215 ; 0.046255 ; 0.04638 ; 0.046422 ; 0.04643 ; 0.046419 ; 0.046494 ; 0.046739 ; 0.047136 ; 0.047844 ; 0.050429 ; 0.055144 ; 0.066753 ; 0.08559 ; 0.11083 ; 0.11724 ; 0.11954 ; 0.11481 ; 0.10664 ; 0.11292 ; 0.11336 ; 0.097283 ; 0.088681 ; 0.089122 ; 0.090131 ; 0.086457 ; 0.070772 ; 0.047461 ; 0.039336 ; 0.038392 ; 0.035922 ; 0.035861 ; 0.069975 ; 0.14467 ; 0.16803 ; 0.19118 ; 0.2463 ; 0.39011 ; 0.57724 ; 0.75394 ; 0.924 ; 1.1908 ; 1.6519 ; 1.9837 ; 2.066 ; 2.3122 ; 2.4307 ; 2.5555 ; 2.6873 ; 2.7947 ; 2.8907 ; 3.0142 ; 3.0571 ; 3.1187 ; 3.2247 ; 3.1865 ; 3.1146 ; 3.0335 ; 2.9085]

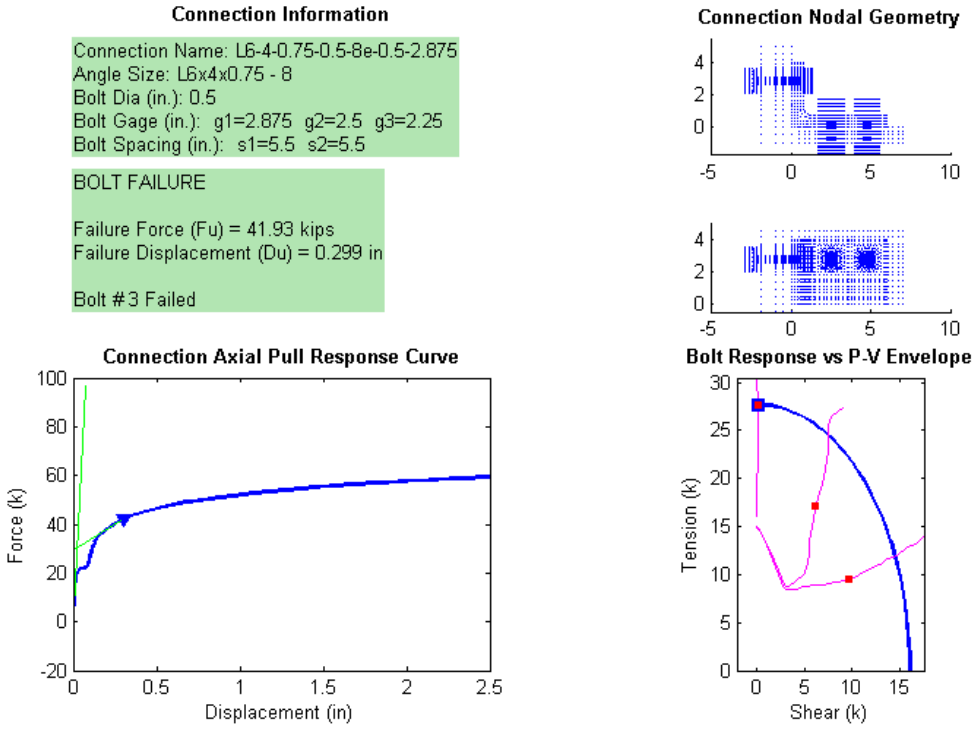


Figure B.72 Connection L6_4_0.75_0.5_8e_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.5_8e_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 1.2496e+003

Plastic Stiffness (k/in): 42.2862

Displacement (in): [7.7165e-037 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.035156 ; 0.052734 ; 0.059326 ; 0.069214 ; 0.072922 ; 0.078484 ; 0.080569 ; 0.081351 ; 0.081645 ; 0.082085 ; 0.082745 ; 0.083735 ; 0.085219 ; 0.085776 ; 0.086611 ; 0.087864 ; 0.089743 ; 0.092562 ; 0.096791 ; 0.10313 ; 0.11265 ; 0.11621 ; 0.12157 ; 0.12959 ; 0.14163 ; 0.15969 ; 0.18679 ; 0.22742 ; 0.28838 ; 0.34934 ; 0.41029 ; 0.50172 ; 0.63888 ; 0.69031 ; 0.70959 ; 0.73852 ; 0.74937 ; 0.76565 ; 0.79006 ; 0.82667 ; 0.8816 ; 0.96398 ; 1.0876 ; 1.2729 ; 1.4583 ; 1.5046 ; 1.5741 ; 1.6784 ; 1.8348 ; 2.0694 ; 2.3194 ; 2.5]

Force (kips): [-0.239141 ; 6.67291 ; 9.5233 ; 10.1598 ; 10.548 ; 10.9086 ; 10.9628 ; 11.0016 ; 11.0013 ; 11.0025 ; 11.1151 ; 11.1515 ; 11.162 ; 11.1854 ; 11.2206 ; 11.2712 ; 11.3166 ; 11.3172 ; 11.3741 ; 11.5617 ; 11.8502 ; 12.2931 ; 12.8604 ; 13.628 ; 14.683 ; 15.0833 ; 15.674 ; 16.3659 ; 17.0625 ; 17.7337 ; 18.5035 ; 19.5215 ; 20.8103 ; 21.684 ; 22.3219 ; 23.1914 ; 24.2093 ; 24.5177 ; 24.6287 ; 24.7877 ; 24.8434 ; 24.9285 ; 25.0594 ; 25.2356 ; 25.4862 ; 25.848 ; 26.333 ; 26.9787 ; 27.5489 ; 27.6803 ; 27.8645 ; 28.1236 ; 28.4872 ; 28.9774 ; 29.4258 ; 29.7062]

Bolt 1 - Tensile Force (kips): [14.9438 ; 14.7205 ; 14.534 ; 13.7675 ; 12.2292 ; 9.95972 ; 9.22378 ; 8.67209 ; 8.67157 ; 8.66945 ; 8.49774 ; 8.44443 ; 8.44136 ; 8.44171 ; 8.44225 ; 8.44316 ; 8.4441 ; 8.44408 ; 8.43874 ; 8.41279 ; 8.41658 ; 8.42519 ; 8.45773 ; 8.51693 ; 8.63705 ; 8.70069 ; 8.759 ; 8.8051 ; 8.88622 ; 8.97182 ; 8.98673 ; 9.16221 ; 9.42966 ; 9.69164 ; 9.97642 ; 10.4279 ; 10.8667 ; 10.9854 ; 11.0409 ; 11.139 ; 11.1771 ; 11.2389 ; 11.3358 ; 11.4886 ; 11.6399 ; 11.8094 ; 12.1658 ; 12.6487 ; 12.9729 ; 13.0525 ; 13.1825 ; 13.3928 ; 13.7191 ; 14.0687 ; 14.2758 ; 14.3389]

Bolt 1 - Shear Force (kips): [0.0123116 ; 0.214891 ; 0.343981 ; 0.757638 ; 1.4721 ; 2.40254 ; 2.66846 ; 2.86161 ; 2.86158 ; 2.86363 ; 3.03532 ; 3.09214 ; 3.09566 ; 3.09593 ; 3.09627 ; 3.09668 ; 3.09702 ; 3.09703 ; 3.15385 ; 3.34434 ; 3.47551 ; 3.69604 ; 3.87857 ; 4.20729 ; 4.61682 ; 4.71882 ; 5.01241 ; 5.40819 ; 5.76343 ; 6.08477 ; 7.0528 ; 8.18733 ; 9.58395 ; 10.29 ; 10.756 ; 11.4796 ; 12.5118 ; 12.8528 ; 12.9603 ; 13.1063 ; 13.1577 ; 13.2313 ; 13.3367 ; 13.4841 ; 13.828 ; 14.3491 ; 14.8656 ; 15.5629 ; 16.2361 ; 16.3829 ; 16.5839 ; 16.8516 ; 17.1986 ; 17.6629 ; 18.0048 ; 18.256]

Bolt 2 - Tensile Force (kips): [14.9684 ; 14.7989 ; 14.7282 ; 14.0119 ; 12.5389 ; 10.3964 ; 9.70368 ; 8.8937 ; 8.89036 ; 8.88964 ; 8.90105 ; 8.90465 ; 8.88748 ; 8.85973 ; 8.82029 ; 8.76622 ; 8.71562 ; 8.71555 ; 8.72713 ; 8.76874 ; 8.83245 ; 8.96587 ; 9.13204 ; 9.41073 ; 9.79158 ; 9.97941 ; 10.3068 ; 10.7435 ; 11.3279 ; 12.2104 ; 13.4676 ; 15.0099 ; 16.8843 ; 18.08 ; 18.9417 ; 20.2416 ; 21.8535 ; 22.3099 ; 22.4602 ; 22.6753 ; 22.7518 ; 22.8636 ; 23.0251 ; 23.2527 ; 23.5858 ; 24.0516 ; 24.6804 ; 25.4875 ; 26.1152 ; 26.2252 ; 26.3726 ; 26.5568 ; 26.7672 ; 27.0231 ; 27.2247 ; 27.313]

Bolt 2 - Shear Force (kips): [0.016198 ; 0.20374 ; 0.32116 ; 0.72591 ; 1.4336 ; 2.3616 ; 2.6293 ; 2.932 ; 2.9332 ; 2.9335 ; 2.9373 ; 2.9385 ; 2.9539 ; 2.9888 ; 3.0416 ; 3.1183 ; 3.19 ; 3.1903 ; 3.1938 ; 3.2059 ; 3.3739 ; 3.5743 ; 3.8978 ; 4.221 ; 4.6907 ; 4.8958 ; 5.0617 ; 5.2277 ; 5.3966 ; 5.5002 ; 5.4909 ; 5.8626 ; 6.1302 ; 6.492 ; 6.7994 ; 7.0454 ; 7.2802 ; 7.3904 ; 7.4318 ; 7.4775 ; 7.4915 ; 7.5094 ; 7.5315 ; 7.5549 ; 7.5442 ; 7.5184 ; 7.4931 ; 7.4705 ; 7.6533 ; 7.7435 ; 7.8581 ; 8.0133 ; 8.238 ; 8.5496 ; 8.8372 ; 9.1031]

Bolt 3 - Tensile Force (kips): [16 ; 16.4324 ; 17.3484 ; 17.6726 ; 17.8655 ; 18.0502 ; 18.0823 ; 18.1099 ; 18.1088 ; 18.1081 ; 18.1601 ; 18.1766 ; 18.1817 ; 18.1929 ; 18.2097 ; 18.2341 ; 18.2562 ; 18.2564 ; 18.2827 ; 18.3708 ; 18.5087 ; 18.7312 ; 19.04 ; 19.4779 ; 20.154 ; 20.4346 ; 20.8734 ; 21.4775 ; 22.2751 ; 23.3117 ; 24.5661 ; 25.8947 ; 27.4869 ; 28.6788 ; 29.4353 ; 30.3036 ; 31.1301 ; 31.2952 ; 31.3144 ; 31.2933 ; 31.2801 ; 31.2704 ; 31.2579 ; 31.275 ; 31.2842 ; 31.2371 ; 31.256 ; 31.2482 ; 31.2015 ; 31.2102 ; 31.2198 ; 31.2342 ; 31.2407 ; 31.2083 ; 31.22 ; 31.2443]

Bolt 3 - Shear Force (kips): [0.01484 ; 0.028015 ; 0.045543 ; 0.048007 ; 0.049432 ; 0.051148 ; 0.051511 ; 0.051842 ; 0.051871 ; 0.051947 ; 0.052578 ; 0.052856 ; 0.052944 ; 0.053149 ; 0.053458 ; 0.053911 ; 0.054346 ; 0.054349 ; 0.054866 ; 0.056551 ; 0.059616 ; 0.065324 ; 0.073812 ; 0.086768 ; 0.10644 ; 0.11416 ; 0.12552 ; 0.13826 ; 0.14604 ; 0.14791 ; 0.14411 ; 0.15098 ; 0.14027 ; 0.12241 ; 0.11577 ; 0.10939 ; 0.073503 ; 0.06807 ; 0.10933 ; 0.37632 ; 0.47324 ; 0.57616 ; 0.76696 ; 0.87469 ; 1.0583 ; 1.4823 ; 1.7626 ; 2.149 ; 2.5811 ; 2.6538 ; 2.7481 ; 2.879 ; 3.0904 ; 3.445 ; 3.7048 ; 3.8554]

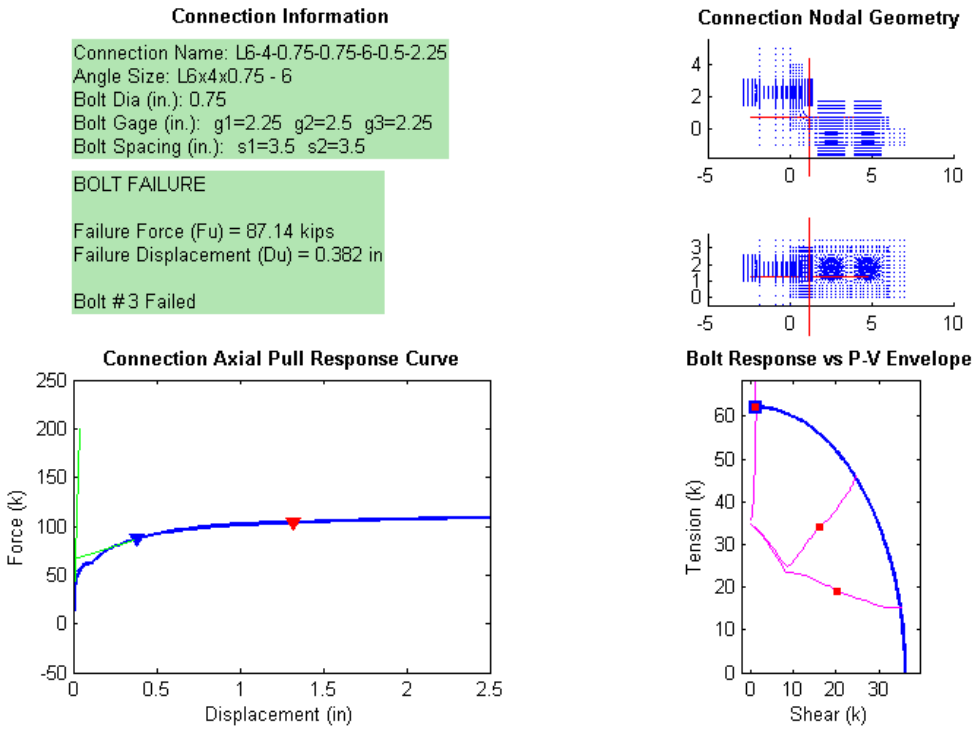


Figure B.73 Connection L6_4_0.75_0.75_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.75_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 5072

Plastic Stiffness (k/in): 53.6484

Displacement (in): [2.8149e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.071287 ; 0.073927 ; 0.077886 ; 0.083826 ; 0.092735 ; 0.09357 ; 0.094823 ; 0.096702 ; 0.099521 ; 0.10375 ; 0.11009 ; 0.11247 ; 0.11336 ; 0.1147 ; 0.11671 ; 0.11972 ; 0.12423 ; 0.13101 ; 0.14116 ; 0.14497 ; 0.15069 ; 0.15926 ; 0.17212 ; 0.1914 ; 0.19864 ; 0.20949 ; 0.22576 ; 0.23186 ; 0.24102 ; 0.25475 ; 0.27534 ; 0.30624 ; 0.31782 ; 0.3352 ; 0.36127 ; 0.40037 ; 0.45902 ; 0.54699 ; 0.57998 ; 0.62947 ; 0.64802 ; 0.67586 ; 0.71762 ; 0.78024 ; 0.87419 ; 1.0151 ; 1.2265 ; 1.289 ; 1.3827 ; 1.5234 ; 1.5761 ; 1.5959 ; 1.6255 ; 1.6552 ; 1.6849 ; 1.7294 ; 1.7961 ; 1.8962 ; 2.0464 ; 2.1027 ; 2.1872 ; 2.3139 ; 2.5]

Force (kips): [-0.910798 ; 4.93098 ; 8.99538 ; 13.7121 ; 18.7057 ; 20.0999 ; 21.9024 ; 23.645 ; 24.9555 ; 26.4556 ; 28.2222 ; 30.0173 ; 30.5151 ; 30.6334 ; 30.666 ; 30.664 ; 30.6571 ; 30.7168 ; 30.8175 ; 30.9295 ; 31.1337 ; 31.1732 ; 31.1715 ; 31.1704 ; 31.1717 ; 31.312 ; 31.5182 ; 31.8249 ; 32.2305 ; 32.842 ; 33.6422 ; 33.9442 ; 34.3793 ; 34.9808 ; 35.8552 ; 37.0442 ; 37.4476 ; 37.9906 ; 38.707 ; 38.9738 ; 39.3529 ; 39.8829 ; 40.5882 ; 41.5393 ; 41.8776 ; 42.3654 ; 43.0646 ; 44.0117 ; 45.2038 ; 46.6452 ; 47.117 ; 47.7615 ; 47.9907 ; 48.3278 ; 48.7918 ; 49.4029 ; 50.0588 ; 50.7566 ; 51.5976 ; 51.8173 ; 52.1149 ; 52.5048 ; 52.6405 ; 52.7005 ; 52.7864 ; 52.8701 ; 52.9495 ; 53.0613 ; 53.2141 ; 53.425 ; 53.7231 ; 53.8351 ; 53.9912 ; 54.1992 ; 54.4705]

Bolt 1 - Tensile Force (kips): [34.6457 ; 34.4784 ; 34.3446 ; 34.1679 ; 33.9528 ; 33.8852 ; 33.7821 ; 33.4444 ; 32.3813 ; 30.6241 ; 28.0993 ; 24.9244 ; 23.9777 ; 23.9653 ; 23.9547 ; 23.9447 ; 23.9353 ; 23.8965 ; 23.7929 ; 23.6862 ; 23.6787 ; 23.6724 ; 23.6692 ; 23.6685 ; 23.6682 ; 23.6512 ; 23.6314 ; 23.6129 ; 23.5902 ; 23.5366 ; 23.4848 ; 23.4298 ; 23.3352 ; 23.2288 ; 23.0494 ; 22.7803 ; 22.6446 ; 22.4917 ; 22.248 ; 22.0834 ; 21.8381 ; 21.5173 ; 21.1773 ; 20.5408 ; 20.2667 ; 19.9097 ; 19.4011 ; 18.9057 ; 18.4478 ; 17.9722 ; 17.7462 ; 17.4598 ; 17.369 ; 17.2627 ; 17.1291 ; 16.8534 ; 16.4708 ; 16.0242 ; 15.6799 ; 15.5434 ; 15.3691 ; 15.2084 ; 15.1791 ; 15.173 ; 15.1699 ; 15.1701 ; 15.1683 ; 15.1761 ; 15.2026 ; 15.2622 ; 15.3014 ; 15.3058 ; 15.2978 ; 15.2946 ; 15.3683]

Bolt 1 - Shear Force (kips): [0.0469908 ; 0.219488 ; 0.398284 ; 0.614028 ; 0.857041 ; 0.92894 ; 1.03429 ; 1.37931 ; 2.29524 ; 3.64021 ; 5.38539 ; 7.36006 ; 7.90074 ; 7.90558 ; 7.9044 ; 7.90166 ; 7.89865 ; 7.96493 ; 8.09142 ; 8.21311 ; 8.21561 ; 8.21816 ; 8.21721 ; 8.21665 ; 8.218 ; 8.33701 ; 8.47368 ; 8.59191 ; 8.73376 ; 9.06498 ; 9.35915 ; 9.5745 ; 9.89953 ; 10.1571 ; 10.8381 ; 12.1961 ; 12.7139 ; 13.2633 ; 13.9347 ; 14.316 ; 14.8664 ; 15.5604 ; 16.283 ; 17.5324 ; 18.0316 ; 18.7306 ; 19.742 ; 20.8589 ; 22.0671 ; 23.5418 ; 24.0921 ; 24.8501 ; 25.1171 ; 25.468 ; 25.9905 ; 26.8313 ; 27.8012 ; 28.9132 ; 30.1843 ; 30.5808 ; 31.142 ; 31.8951 ; 32.1671 ; 32.2578 ; 32.3845 ; 32.5095 ; 32.6525 ; 32.8325 ; 33.0696 ; 33.3918 ; 33.9385 ; 34.1416 ; 34.4681 ; 34.8952 ; 35.356]

Bolt 2 - Tensile Force (kips): [34.6563 ; 34.4819 ; 34.3464 ; 34.1882 ; 34.0394 ; 34.0023 ; 33.9481 ; 33.6751 ; 32.6649 ; 31.0266 ; 28.8052 ; 26.3711 ; 25.605 ; 25.2201 ; 25.0858 ; 25.0625 ; 25.0559 ; 25.0758 ; 25.1067 ; 25.1221 ; 24.969 ; 24.9388 ; 24.9371 ; 24.9367 ; 24.9371 ; 25.0021 ; 25.084 ; 25.1814 ; 25.3591 ; 25.6764 ; 26.0717 ; 26.2529 ; 26.5311 ; 26.9093 ; 27.5231 ; 28.4131 ; 28.7364 ; 29.196 ; 29.8568 ; 30.1022 ; 30.4459 ; 30.9121 ; 31.5392 ; 32.3618 ; 32.643 ; 33.059 ; 33.6128 ; 34.2332 ; 34.9757 ; 35.9936 ; 36.3217 ; 36.7908 ; 36.9563 ; 37.1793 ; 37.5135 ; 37.9786 ; 38.5742 ; 39.4608 ; 40.6938 ; 41.0279 ; 41.4934 ; 42.191 ; 42.43 ; 42.5241 ; 42.6667 ; 42.811 ; 42.9579 ; 43.1677 ; 43.4623 ; 43.8481 ; 44.4363 ; 44.653 ; 44.9807 ; 45.4387 ; 46.134]

Bolt 2 - Shear Force (kips): [0.0438729 ; 0.250409 ; 0.44947 ; 0.689259 ; 0.95537 ; 1.0335 ; 1.14764 ; 1.4834 ; 2.38501 ; 3.71352 ; 5.43013 ; 7.33069 ; 7.91377 ; 8.17069 ; 8.25592 ; 8.26772 ; 8.26823 ; 8.27481 ; 8.28401 ; 8.31657 ; 8.59386 ; 8.6436 ; 8.64834 ; 8.64722 ; 8.64804 ; 8.66807 ; 8.73946 ; 8.93667 ; 9.19327 ; 9.45576 ; 9.94947 ; 10.0482 ; 10.1768 ; 10.5209 ; 11.0086 ; 11.6221 ; 11.8528 ; 12.2319 ; 12.6839 ; 12.8551 ; 13.086 ; 13.4607 ; 14.0771 ; 14.6849 ; 14.8891 ; 15.1699 ; 15.6112 ; 16.3143 ; 17.1151 ; 18.0241 ; 18.3648 ; 18.8011 ; 18.956 ; 19.1769 ; 19.4579 ; 19.7814 ; 20.2345 ; 20.8595 ; 21.7205 ; 22.01 ; 22.396 ; 22.8458 ; 22.9841 ; 23.0328 ; 23.1018 ; 23.1654 ; 23.218 ; 23.3015 ; 23.4329 ; 23.6641 ; 23.9928 ; 24.0999 ; 24.2216 ; 24.3966 ; 24.5399]

Bolt 3 - Tensile Force (kips): [36 ; 35.9817 ; 36.1332 ; 36.5393 ; 37.3758 ; 37.7337 ; 38.2254 ; 38.7406 ; 39.1784 ; 39.8332 ; 40.9956 ; 43.1023 ; 43.8894 ; 44.0902 ; 44.1485 ; 44.1478 ; 44.1395 ; 44.2322 ; 44.3945 ; 44.5762 ; 44.9163 ; 44.9825 ; 44.98 ; 44.9784 ; 44.9801 ; 45.21 ; 45.5507 ; 46.0646 ; 46.7456 ; 47.7617 ; 49.0653 ; 49.543 ; 50.2203 ; 51.1384 ; 52.3861 ; 53.9568 ; 54.4683 ; 55.154 ; 56.0605 ; 56.3913 ; 56.86 ; 57.5185 ; 58.4105 ; 59.6336 ; 60.0714 ; 60.7087 ; 61.6306 ; 62.8943 ; 64.4612 ; 66.3565 ; 66.9745 ; 67.8196 ; 68.1115 ; 68.574 ; 69.2085 ; 69.9804 ; 70.6258 ; 71.0273 ; 71.3722 ; 71.4608 ; 71.5609 ; 71.6648 ; 71.6972 ; 71.696 ; 71.6737 ; 71.6281 ; 71.5736 ; 71.5204 ; 71.5079 ; 71.5279 ; 71.5074 ; 71.435 ; 71.3929 ; 71.4149 ; 71.4744]

Bolt 3 - Shear Force (kips): [0.013624 ; 0.050163 ; 0.11433 ; 0.20011 ; 0.29703 ; 0.3276 ; 0.36787 ; 0.41314 ; 0.45004 ; 0.49714 ; 0.56549 ; 0.66732 ; 0.70733 ; 0.71793 ; 0.72114 ; 0.72143 ; 0.72108 ; 0.72574 ; 0.73406 ; 0.74353 ; 0.76178 ; 0.76542 ; 0.7655 ; 0.76546 ; 0.76556 ; 0.7775 ; 0.7948 ; 0.81919 ; 0.84837 ; 0.88531 ; 0.9256 ; 0.93793 ; 0.9547 ; 0.97906 ; 1.01 ; 1.053 ; 1.0683 ; 1.0915 ; 1.1217 ; 1.1289 ; 1.1384 ; 1.1497 ; 1.1635 ; 1.1748 ; 1.1765 ; 1.1762 ; 1.1684 ; 1.1463 ; 1.0962 ; 0.97956 ; 0.92313 ; 0.83415 ; 0.8417 ; 0.8509 ; 0.85235 ; 0.84496 ; 0.73125 ; 0.64287 ; 0.61667 ; 0.60124 ; 0.59702 ; 0.62056 ; 0.63168 ; 0.69217 ; 0.90956 ; 1.1959 ; 1.4996 ; 1.817 ; 2.0602 ; 2.2574 ; 2.6396 ; 2.976 ; 3.2527 ; 3.4424 ; 3.61]

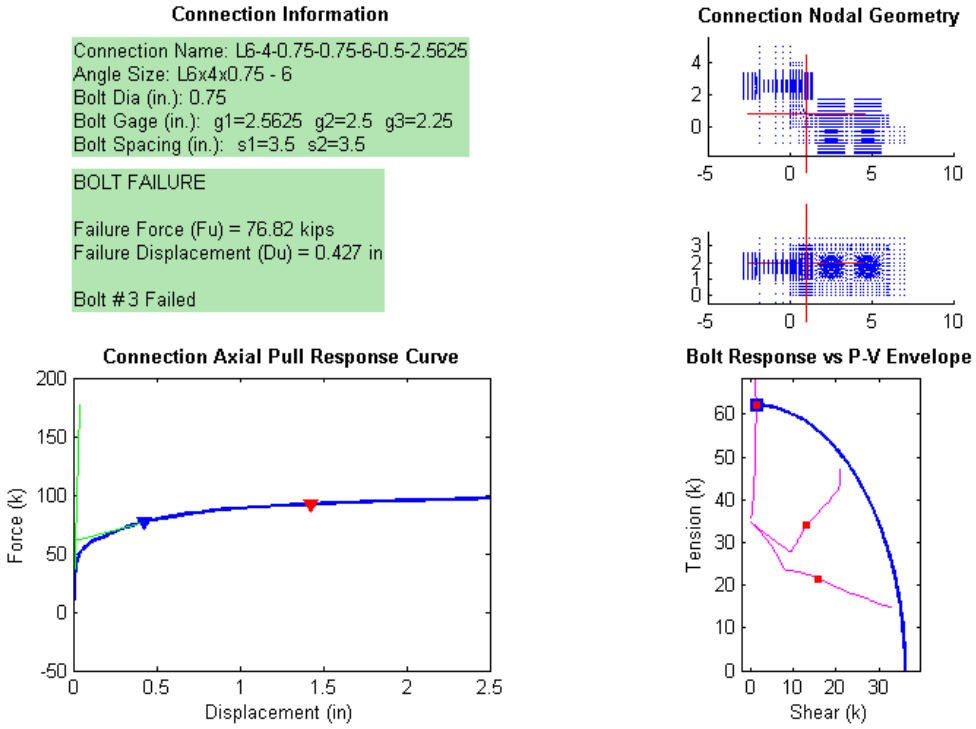


Figure B.74 Connection L6_4_0.75_0.75_6_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.75_6_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 4.1447e+003

Plastic Stiffness (k/in): 39.8427

Displacement (in): [2.8864e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.13464 ; 0.15048 ; 0.15642 ; 0.15865 ; 0.16087 ; 0.1631 ; 0.16644 ; 0.17145 ; 0.17333 ; 0.17615 ; 0.17721 ; 0.17879 ; 0.18117 ; 0.18474 ; 0.19009 ; 0.1921 ; 0.19511 ; 0.19962 ; 0.2064 ; 0.21655 ; 0.23179 ; 0.25465 ; 0.26322 ; 0.27608 ; 0.29537 ; 0.3026 ; 0.31345 ; 0.32972 ; 0.35413 ; 0.36329 ; 0.37702 ; 0.39761 ; 0.42851 ; 0.47485 ; 0.54436 ; 0.64863 ; 0.68773 ; 0.74638 ; 0.83435 ; 0.86734 ; 0.91683 ; 0.99106 ; 1.1024 ; 1.2694 ; 1.3319 ; 1.3554 ; 1.3905 ; 1.4432 ; 1.5223 ; 1.641 ; 1.6855 ; 1.7522 ; 1.8523 ; 2.0025 ; 2.2278 ; 2.3528 ; 2.5]

Force (kips): [-0.943703 ; 3.82045 ; 7.15147 ; 11.1099 ; 15.6024 ; 16.8707 ; 18.5059 ; 20.5445 ; 22.5588 ; 24.2895 ; 25.6689 ; 27.0897 ; 28.8643 ; 30.8875 ; 31.3865 ; 31.4473 ; 31.4511 ; 31.4505 ; 31.5023 ; 31.6566 ; 31.8406 ; 31.8442 ; 31.843 ; 31.8823 ; 31.945 ; 32.041 ; 32.1771 ; 32.2834 ; 32.2857 ; 32.2866 ; 32.4891 ; 32.7628 ; 33.1624 ; 33.7249 ; 34.4559 ; 34.7078 ; 35.0789 ; 35.6141 ; 35.8014 ; 36.0804 ; 36.4589 ; 36.9759 ; 37.1622 ; 37.446 ; 37.8563 ; 38.4296 ; 39.2023 ; 40.2033 ; 41.4634 ; 41.8852 ; 42.4737 ; 43.2511 ; 43.5125 ; 43.8727 ; 44.3201 ; 44.8461 ; 45.5037 ; 45.7136 ; 45.7908 ; 45.9105 ; 46.0841 ; 46.3468 ; 46.6878 ; 46.8136 ; 46.9917 ; 47.2457 ; 47.5876 ; 48.018 ; 48.2229 ; 48.4501]

Bolt 1 - Tensile Force (kips): [34.644 ; 34.5085 ; 34.4025 ; 34.2593 ; 34.073 ; 34.0147 ; 33.9345 ; 33.8209 ; 33.5036 ; 32.6499 ; 31.0068 ; 29.1458 ; 26.5999 ; 23.9446 ; 23.9137 ; 23.9048 ; 23.9016 ; 23.8988 ; 23.8817 ; 23.7927 ; 23.6601 ; 23.6542 ; 23.6496 ; 23.6484 ; 23.6467 ; 23.6444 ; 23.6414 ; 23.6385 ; 23.6381 ; 23.6376 ; 23.6044 ; 23.5771 ; 23.5437 ; 23.506 ; 23.3347 ; 23.2718 ; 23.1831 ; 22.9979 ; 22.9315 ; 22.7907 ; 22.6179 ; 22.4654 ; 22.3908 ; 22.1748 ; 21.8524 ; 21.4986 ; 21.021 ; 20.3223 ; 19.2899 ; 19.0053 ; 18.6725 ; 18.3129 ; 18.1589 ; 17.9069 ; 17.6175 ; 17.3453 ; 16.8113 ; 16.6018 ; 16.5227 ; 16.4085 ; 16.2698 ; 16.0548 ; 15.8163 ; 15.7335 ; 15.5973 ; 15.4201 ; 15.2028 ; 15.0517 ; 15.0148 ; 14.992]

Bolt 1 - Shear Force (kips): [0.0479443 ; 0.173546 ; 0.321618 ; 0.504356 ; 0.724434 ; 0.790075 ; 0.877919 ; 0.99607 ; 1.32282 ; 2.07502 ; 3.35653 ; 4.67592 ; 6.33827 ; 7.89931 ; 7.89119 ; 7.88851 ; 7.88751 ; 7.88659 ; 7.92284 ; 8.04415 ; 8.19307 ; 8.19652 ; 8.19752 ; 8.19711 ; 8.19643 ; 8.1954 ; 8.19391 ; 8.1923 ; 8.19188 ; 8.19234 ; 8.42011 ; 8.62225 ; 8.86735 ; 9.22658 ; 9.91922 ; 10.1341 ; 10.5199 ; 11.4785 ; 11.8153 ; 12.3694 ; 13.0124 ; 13.6073 ; 13.8143 ; 14.3185 ; 15.0398 ; 15.8415 ; 16.8813 ; 18.2528 ; 20.4295 ; 21.1089 ; 21.948 ; 23.0214 ; 23.4416 ; 24.0491 ; 24.8456 ; 25.8278 ; 27.3346 ; 27.8014 ; 27.9544 ; 28.203 ; 28.5282 ; 29.015 ; 29.6193 ; 29.8555 ; 30.228 ; 30.7396 ; 31.3838 ; 32.1024 ; 32.4173 ; 32.7545]

Bolt 2 - Tensile Force (kips): [34.6516 ; 34.5163 ; 34.4121 ; 34.2871 ; 34.1688 ; 34.1403 ; 34.1096 ; 34.0787 ; 33.8852 ; 33.2274 ; 31.9155 ; 30.8851 ; 29.8872 ; 28.6321 ; 27.8038 ; 27.6806 ; 27.6633 ; 27.6542 ; 27.6911 ; 27.8097 ; 27.9483 ; 27.9497 ; 27.9477 ; 27.9494 ; 27.9667 ; 28.0114 ; 28.0724 ; 28.1085 ; 28.107 ; 28.1057 ; 28.3188 ; 28.6093 ; 29.0356 ; 29.6286 ; 30.4651 ; 30.7557 ; 31.1263 ; 31.6673 ; 31.8541 ; 32.1334 ; 32.5094 ; 33.0009 ; 33.1797 ; 33.4406 ; 33.7837 ; 34.2183 ; 34.8399 ; 35.6007 ; 36.6369 ; 36.9873 ; 37.5069 ; 38.2552 ; 38.5011 ; 38.8237 ; 39.2321 ; 39.8864 ; 40.8041 ; 41.1018 ; 41.2079 ; 41.3786 ; 41.6326 ; 42.0275 ; 42.5839 ; 42.7935 ; 43.1177 ; 43.609 ; 44.3704 ; 45.6278 ; 46.2694 ; 46.9902]

Bolt 2 - Shear Force (kips): [0.0445998 ; 0.199074 ; 0.36467 ; 0.568472 ; 0.811568 ; 0.883491 ; 0.979027 ; 1.1069 ; 1.42856 ; 2.1567 ; 3.41042 ; 4.66421 ; 6.18085 ; 8.1534 ; 8.99269 ; 9.10544 ; 9.11746 ; 9.12166 ; 9.13552 ; 9.17253 ; 9.22071 ; 9.22244 ; 9.22243 ; 9.26612 ; 9.33134 ; 9.42279 ; 9.5564 ; 9.66454 ; 9.66819 ; 9.66942 ; 9.71764 ; 9.79363 ; 10.0606 ; 10.5427 ; 10.9358 ; 11.1118 ; 11.4471 ; 11.7055 ; 11.7783 ; 11.9213 ; 12.1032 ; 12.4377 ; 12.5492 ; 12.6585 ; 12.8174 ; 13.1553 ; 13.5671 ; 14.402 ; 15.3369 ; 15.7163 ; 16.2318 ; 16.8993 ; 17.1264 ; 17.4519 ; 17.9724 ; 18.646 ; 19.2645 ; 19.4673 ; 19.5554 ; 19.6755 ; 19.8518 ; 20.0842 ; 20.4068 ; 20.5146 ; 20.6484 ; 20.8127 ; 20.9819 ; 21.0302 ; 21.0052 ; 20.943]

Bolt 3 - Tensile Force (kips): [36 ; 35.9546 ; 36.0459 ; 36.361 ; 36.9895 ; 37.2907 ; 37.7646 ; 38.4133 ; 39.167 ; 40.1507 ; 41.5986 ; 44.0947 ; 47.5248 ; 51.2952 ; 52.1933 ; 52.3027 ; 52.3104 ; 52.3102 ; 52.3962 ; 52.6512 ; 52.9518 ; 52.9577 ; 52.9563 ; 53.0201 ; 53.1215 ; 53.275 ; 53.4907 ; 53.6581 ; 53.6617 ; 53.6627 ; 53.962 ; 54.3683 ; 54.9382 ; 55.7186 ; 56.7262 ; 57.0736 ; 57.5773 ; 58.2973 ; 58.5531 ; 58.9321 ; 59.4622 ; 60.208 ; 60.4787 ; 60.8853 ; 61.4749 ; 62.3065 ; 63.4215 ; 64.82 ; 66.5887 ; 67.1682 ; 67.9504 ; 68.952 ; 69.2801 ; 69.7122 ; 70.1669 ; 70.5081 ; 70.7929 ; 70.8723 ; 70.8897 ; 70.892 ; 70.9027 ; 70.9382 ; 71.0702 ; 71.0848 ; 71.125 ; 71.1465 ; 71.2611 ; 71.4517 ; 71.5535 ; 71.5689]

Bolt 3 - Shear Force (kips): [0.020273 ; 0.039192 ; 0.093536 ; 0.17238 ; 0.26492 ; 0.2929 ; 0.33155 ; 0.38077 ; 0.44225 ; 0.51076 ; 0.58869 ; 0.7297 ; 0.90011 ; 0.98899 ; 1.0061 ; 1.0083 ; 1.0085 ; 1.0087 ; 1.0102 ; 1.0154 ; 1.0217 ; 1.0218 ; 1.0218 ; 1.0233 ; 1.0258 ; 1.0298 ; 1.036 ; 1.0413 ; 1.0415 ; 1.0417 ; 1.0495 ; 1.0627 ; 1.0813 ; 1.1059 ; 1.1364 ; 1.146 ; 1.1578 ; 1.1711 ; 1.1756 ; 1.1808 ; 1.1888 ; 1.2005 ; 1.2039 ; 1.2065 ; 1.2083 ; 1.2053 ; 1.1893 ; 1.1415 ; 1.0127 ; 0.95358 ; 0.95326 ; 0.9808 ; 0.98154 ; 0.97385 ; 0.92046 ; 0.8069 ; 0.70042 ; 0.6752 ; 0.69614 ; 0.80309 ; 0.95848 ; 1.3341 ; 1.9771 ; 2.3124 ; 2.6915 ; 3.2805 ; 3.7926 ; 4.2935 ; 4.5213 ; 4.9844]

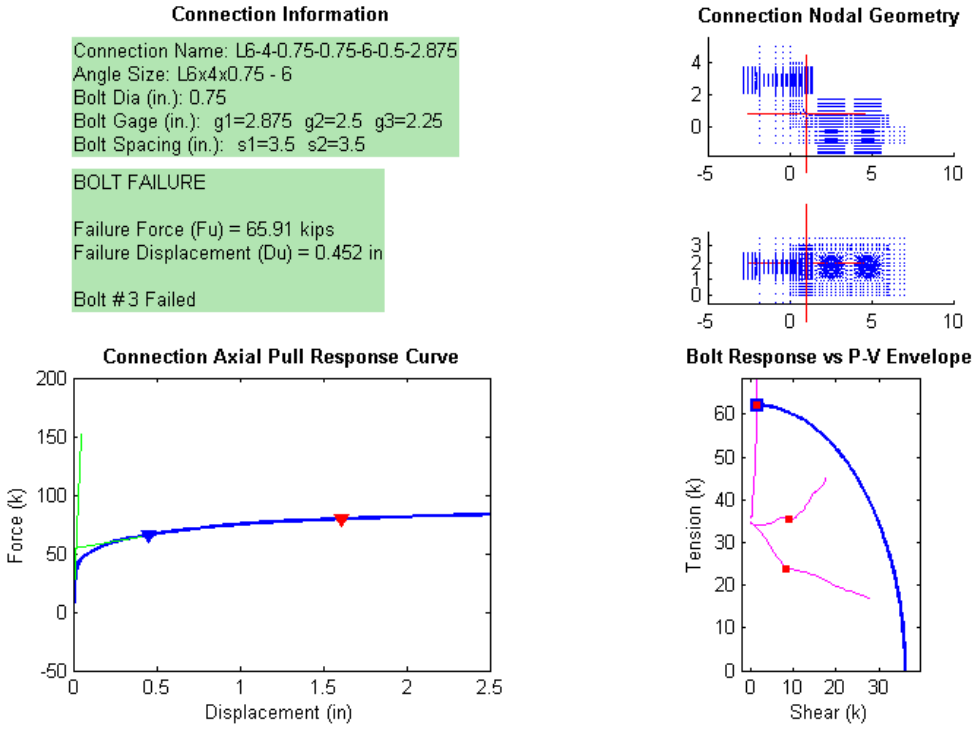


Figure B.75 Connection L6_4_0.75_0.75_6_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.75_6_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 3385

Plastic Stiffness (k/in): 25.1436

Displacement (in): [2.8437e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.13464 ; 0.19799 ; 0.22175 ; 0.25739 ; 0.31084 ; 0.33088 ; 0.36095 ; 0.40605 ; 0.47371 ; 0.57519 ; 0.61324 ; 0.62751 ; 0.64892 ; 0.68102 ; 0.72919 ; 0.80143 ; 0.82852 ; 0.86916 ; 0.8844 ; 0.90726 ; 0.94155 ; 0.99298 ; 1.0123 ; 1.0412 ; 1.0846 ; 1.1497 ; 1.2473 ; 1.2839 ; 1.3389 ; 1.4212 ; 1.5448 ; 1.5912 ; 1.6607 ; 1.7649 ; 1.9213 ; 2.1559 ; 2.4059 ; 2.5]

Force (kips): [-0.947191 ; 2.93795 ; 5.66421 ; 8.95916 ; 12.843 ; 14.0172 ; 15.4575 ; 17.2243 ; 19.2584 ; 21.1016 ; 22.3996 ; 23.5764 ; 25.0283 ; 26.899 ; 28.9755 ; 29.5584 ; 30.2914 ; 31.1586 ; 31.445 ; 31.8516 ; 32.4186 ; 33.2171 ; 34.1843 ; 34.5362 ; 34.6576 ; 34.8608 ; 35.1481 ; 35.5574 ; 36.1208 ; 36.3295 ; 36.6227 ; 36.7314 ; 36.8883 ; 37.1078 ; 37.428 ; 37.5457 ; 37.7171 ; 37.9538 ; 38.2484 ; 38.6307 ; 38.7621 ; 38.9521 ; 39.2224 ; 39.5986 ; 39.7483 ; 39.9473 ; 40.2237 ; 40.5908 ; 41.0685 ; 41.5032 ; 41.6517]

Bolt 1 - Tensile Force (kips): [34.6431 ; 34.5331 ; 34.4489 ; 34.3339 ; 34.179 ; 34.1275 ; 34.0605 ; 33.9707 ; 33.8527 ; 33.5857 ; 33.0361 ; 32.2724 ; 31.133 ; 29.2286 ; 26.6074 ; 25.8333 ; 24.8377 ; 23.9432 ; 23.9364 ; 23.9348 ; 23.9519 ; 23.7759 ; 23.8963 ; 23.9362 ; 23.952 ; 23.8668 ; 23.8396 ; 23.8086 ; 23.6017 ; 23.459 ; 23.2851 ; 23.1814 ; 23.0405 ; 22.8818 ; 22.7515 ; 22.6137 ; 22.3881 ; 22.0982 ; 21.8188 ; 21.1466 ; 20.8879 ; 20.4843 ; 19.8843 ; 19.2761 ; 19.101 ; 18.8485 ; 18.5418 ; 17.9978 ; 17.542 ; 16.981 ; 16.8072]

Bolt 1 - Shear Force (kips): [0.047963 ; 0.137036 ; 0.258838 ; 0.411908 ; 0.602996 ; 0.663733 ; 0.741222 ; 0.841485 ; 0.966979 ; 1.24496 ; 1.75241 ; 2.37801 ; 3.24891 ; 4.59533 ; 6.30765 ; 6.78237 ; 7.37583 ; 7.89358 ; 7.89632 ; 7.8978 ; 7.90399 ; 8.16686 ; 8.19792 ; 8.20324 ; 8.2054 ; 8.64125 ; 9.02826 ; 9.52868 ; 10.4922 ; 11.0544 ; 11.8495 ; 12.2104 ; 12.7038 ; 13.2735 ; 13.8455 ; 14.1885 ; 14.7105 ; 15.4005 ; 16.1325 ; 17.4977 ; 18.0082 ; 18.8065 ; 20.0014 ; 21.3895 ; 21.8213 ; 22.4226 ; 23.2734 ; 24.5732 ; 26.0607 ; 27.3926 ; 27.7327]

Bolt 2 - Tensile Force (kips): [34.649 ; 34.5435 ; 34.4626 ; 34.3646 ; 34.2696 ; 34.2484 ; 34.2286 ; 34.2155 ; 34.223 ; 34.1551 ; 33.9685 ; 33.974 ; 34.191 ; 34.4257 ; 34.8607 ; 35.1321 ; 35.5228 ; 35.8836 ; 35.838 ; 35.7207 ; 35.5129 ; 35.5967 ; 35.5838 ; 35.8385 ; 35.9236 ; 36.1432 ; 36.4105 ; 36.7508 ; 37.3331 ; 37.539 ; 37.8637 ; 37.9902 ; 38.1813 ; 38.4589 ; 38.7714 ; 38.8971 ; 39.09 ; 39.3902 ; 39.8354 ; 40.3759 ; 40.566 ; 40.8255 ; 41.2039 ; 41.6544 ; 41.8325 ; 42.0792 ; 42.467 ; 43.0118 ; 43.8686 ; 44.7835 ; 45.2171]

Bolt 2 - Shear Force (kips): [0.0444553 ; 0.158067 ; 0.295069 ; 0.466488 ; 0.678918 ; 0.74594 ; 0.831625 ; 0.941393 ; 1.07808 ; 1.35918 ; 1.84105 ; 2.41676 ; 3.1756 ; 4.29962 ; 5.62019 ; 5.95613 ; 6.37953 ; 6.98602 ; 7.30871 ; 7.78357 ; 8.45182 ; 9.0764 ; 10.0324 ; 10.5421 ; 10.679 ; 10.7605 ; 10.9997 ; 11.4404 ; 12.0305 ; 12.2396 ; 12.4605 ; 12.5177 ; 12.6011 ; 12.7357 ; 13.081 ; 13.1711 ; 13.2737 ; 13.411 ; 13.7029 ; 13.9707 ; 14.0724 ; 14.2422 ; 14.4265 ; 14.9633 ; 15.1588 ; 15.4514 ; 15.864 ; 16.3617 ; 17.17 ; 17.5574 ; 17.6021]

Bolt 3 - Tensile Force (kips): [36 ; 35.9378 ; 35.9842 ; 36.222 ; 36.7176 ; 36.9433 ; 37.3621 ; 38.0173 ; 38.8953 ; 40.1349 ; 41.8565 ; 44.2096 ; 47.3711 ; 51.2633 ; 55.2481 ; 56.3076 ; 57.6438 ; 59.2265 ; 59.7356 ; 60.4429 ; 61.4068 ; 62.7135 ; 64.2154 ; 64.7304 ; 64.9126 ; 65.2019 ; 65.6171 ; 66.2364 ; 67.0791 ; 67.3745 ; 67.7884 ; 67.9397 ; 68.1626 ; 68.4773 ; 68.8561 ; 68.9918 ; 69.1649 ; 69.3533 ; 69.5515 ; 69.826 ; 69.9074 ; 70.0105 ; 70.0878 ; 70.2367 ; 70.2726 ; 70.3448 ; 70.472 ; 70.6179 ; 70.763 ; 70.9212 ; 70.945]

Bolt 3 - Shear Force (kips): [0.023943 ; 0.03098 ; 0.076379 ; 0.14738 ; 0.23239 ; 0.25951 ; 0.29386 ; 0.33901 ; 0.39505 ; 0.46982 ; 0.59244 ; 0.7896 ; 0.99853 ; 1.1342 ; 1.2289 ; 1.2503 ; 1.2768 ; 1.3186 ; 1.3337 ; 1.3551 ; 1.3815 ; 1.3957 ; 1.3751 ; 1.3523 ; 1.3427 ; 1.3212 ; 1.3558 ; 1.4359 ; 1.4714 ; 1.4723 ; 1.4724 ; 1.4699 ; 1.4605 ; 1.4456 ; 1.5763 ; 1.6224 ; 1.7145 ; 1.911 ; 2.1231 ; 2.2641 ; 2.3068 ; 2.352 ; 2.5273 ; 3.117 ; 3.3484 ; 3.605 ; 3.9084 ; 4.3699 ; 5.0393 ; 5.5789 ; 5.8257]

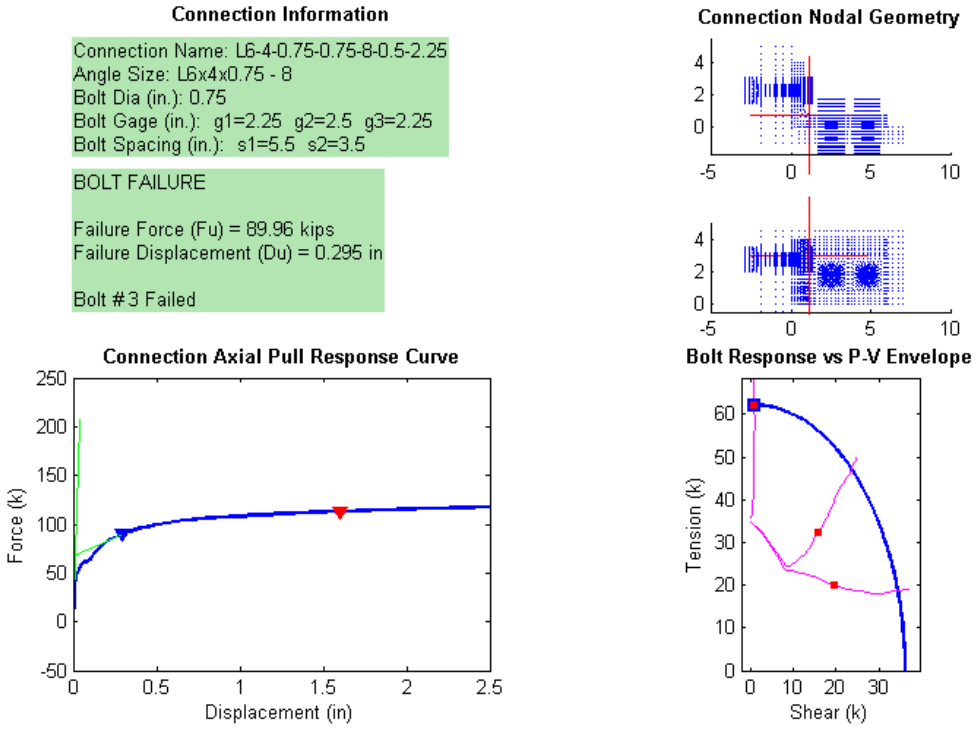


Figure B.76 Connection L6_4_0.75_0.75_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.75_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 4.9699e+003

Plastic Stiffness (k/in): 77.3305

Displacement (in): [2.3773e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.071287 ; 0.081846 ; 0.085806 ; 0.091745 ; 0.10065 ; 0.104 ; 0.10525 ; 0.10713 ; 0.10995 ; 0.11417 ; 0.11576 ; 0.11814 ; 0.12171 ; 0.12706 ; 0.13508 ; 0.14713 ; 0.15164 ; 0.15841 ; 0.16857 ; 0.18381 ; 0.18953 ; 0.1981 ; 0.21096 ; 0.23024 ; 0.25917 ; 0.27002 ; 0.2863 ; 0.31071 ; 0.34732 ; 0.40224 ; 0.42284 ; 0.45373 ; 0.50007 ; 0.56958 ; 0.67385 ; 0.83025 ; 0.8889 ; 0.97688 ; 1.1088 ; 1.3068 ; 1.3693 ; 1.463 ; 1.6037 ; 1.6564 ; 1.7355 ; 1.8542 ; 2.0321 ; 2.0946 ; 2.1884 ; 2.329 ; 2.5]

Force (kips): [-0.790993 ; 4.84108 ; 8.9159 ; 13.7399 ; 18.9681 ; 20.4602 ; 22.3742 ; 24.0823 ; 25.3216 ; 26.935 ; 28.9183 ; 30.6655 ; 30.6628 ; 30.7432 ; 31.1304 ; 31.1362 ; 31.3392 ; 31.8951 ; 32.0731 ; 32.3556 ; 32.7451 ; 33.2494 ; 33.4245 ; 33.7254 ; 34.1185 ; 34.6938 ; 35.5428 ; 36.7689 ; 37.2074 ; 37.8253 ; 38.6382 ; 39.6732 ; 40.0484 ; 40.5937 ; 41.3485 ; 42.3304 ; 43.6187 ; 44.0595 ; 44.6887 ; 45.5028 ; 46.5248 ; 47.7976 ; 48.232 ; 48.8349 ; 49.648 ; 50.7023 ; 51.9728 ; 53.1546 ; 53.5023 ; 53.9928 ; 54.6414 ; 55.4759 ; 55.7239 ; 56.0928 ; 56.5777 ; 56.7479 ; 56.9928 ; 57.3235 ; 57.7845 ; 57.9354 ; 58.1505 ; 58.4515 ; 58.7861]

Bolt 1 - Tensile Force (kips): [34.6431 ; 34.4654 ; 34.3148 ; 34.1114 ; 33.8555 ; 33.772 ; 33.6438 ; 33.1957 ; 31.9558 ; 29.9913 ; 27.0713 ; 23.9463 ; 23.9306 ; 23.8419 ; 23.6635 ; 23.6537 ; 23.6258 ; 23.5917 ; 23.5806 ; 23.5496 ; 23.5281 ; 23.4988 ; 23.474 ; 23.4101 ; 23.3156 ; 23.2291 ; 23.0916 ; 22.8999 ; 22.799 ; 22.6676 ; 22.5279 ; 22.3174 ; 22.1646 ; 21.946 ; 21.637 ; 21.3139 ; 20.6991 ; 20.4435 ; 20.0806 ; 19.661 ; 19.294 ; 19.059 ; 18.9877 ; 18.8405 ; 18.6804 ; 18.6094 ; 18.3041 ; 18.1078 ; 18.0686 ; 18.0333 ; 18.0763 ; 18.303 ; 18.3786 ; 18.4743 ; 18.5884 ; 18.6226 ; 18.6608 ; 18.7082 ; 18.7937 ; 18.8195 ; 18.8651 ; 18.9081 ; 18.9483]

Bolt 1 - Shear Force (kips): [0.0457701 ; 0.234293 ; 0.42764 ; 0.665177 ; 0.937836 ; 1.0196 ; 1.14307 ; 1.57524 ; 2.6045 ; 4.06656 ; 6.02819 ; 7.90025 ; 7.89688 ; 8.00036 ; 8.19352 ; 8.19688 ; 8.38723 ; 8.6336 ; 8.71244 ; 8.92076 ; 9.09532 ; 9.30317 ; 9.40446 ; 9.65592 ; 9.96949 ; 10.1754 ; 10.7202 ; 11.6894 ; 12.0921 ; 12.5792 ; 13.0983 ; 13.747 ; 14.1245 ; 14.6552 ; 15.4051 ; 16.2251 ; 17.6347 ; 18.1829 ; 19.0909 ; 20.2027 ; 21.4038 ; 22.7543 ; 23.216 ; 23.8495 ; 24.705 ; 25.699 ; 27.0244 ; 28.515 ; 29.0776 ; 29.8191 ; 30.6596 ; 31.7982 ; 32.1771 ; 32.6723 ; 33.3601 ; 33.6244 ; 34.0011 ; 34.5022 ; 35.2108 ; 35.4467 ; 35.7697 ; 36.2553 ; 36.8286]

Bolt 2 - Tensile Force (kips): [34.6529 ; 34.4887 ; 34.3474 ; 34.1733 ; 33.9893 ; 33.9388 ; 33.8663 ; 33.4728 ; 32.2745 ; 30.4112 ; 27.7107 ; 24.5658 ; 24.5329 ; 24.538 ; 24.3265 ; 24.3157 ; 24.3599 ; 24.4511 ; 24.4886 ; 24.5567 ; 24.6453 ; 24.7806 ; 24.835 ; 24.9308 ; 25.0658 ; 25.1865 ; 25.4846 ; 25.9916 ; 26.1833 ; 26.478 ; 26.9321 ; 27.5854 ; 27.8422 ; 28.1904 ; 28.7625 ; 29.6735 ; 30.9581 ; 31.4122 ; 32.0507 ; 32.9049 ; 33.9996 ; 35.4293 ; 35.9219 ; 36.5904 ; 37.512 ; 38.6659 ; 40.0527 ; 41.7565 ; 42.2742 ; 42.9764 ; 43.7906 ; 44.9465 ; 45.2823 ; 45.7944 ; 46.4835 ; 46.7306 ; 47.0827 ; 47.6025 ; 48.3583 ; 48.5992 ; 48.9335 ; 49.3842 ; 49.8584]

Bolt 2 - Shear Force (kips): [0.0371951 ; 0.251647 ; 0.45634 ; 0.706054 ; 0.988454 ; 1.07212 ; 1.19586 ; 1.61363 ; 2.63192 ; 4.07725 ; 6.01431 ; 8.07637 ; 8.09263 ; 8.09733 ; 8.43584 ; 8.4453 ; 8.4595 ; 8.79422 ; 8.89984 ; 8.98274 ; 9.20914 ; 9.52103 ; 9.60288 ; 9.67025 ; 9.77682 ; 10.1971 ; 10.5397 ; 11.0888 ; 11.3193 ; 11.7387 ; 12.3078 ; 12.9401 ; 13.1029 ; 13.4194 ; 13.7896 ; 14.217 ; 14.7884 ; 15.0373 ; 15.457 ; 15.9775 ; 16.7083 ; 17.5194 ; 17.7734 ; 18.1148 ; 18.5045 ; 19.0097 ; 19.6241 ; 20.3335 ; 20.6101 ; 21.0251 ; 21.6659 ; 22.4079 ; 22.589 ; 22.8196 ; 23.172 ; 23.29 ; 23.4874 ; 23.7787 ; 24.1367 ; 24.2391 ; 24.3823 ; 24.5454 ; 24.6831]

Bolt 3 - Tensile Force (kips): [36 ; 35.9794 ; 36.1214 ; 36.5114 ; 37.3608 ; 37.736 ; 38.2446 ; 38.7396 ; 39.1228 ; 39.7388 ; 40.8313 ; 42.2669 ; 42.2664 ; 42.3417 ; 42.7425 ; 42.7486 ; 42.9653 ; 43.5919 ; 43.805 ; 44.164 ; 44.6932 ; 45.4244 ; 45.6874 ; 46.1492 ; 46.7713 ; 47.7129 ; 49.1266 ; 51.138 ; 51.8385 ; 52.8088 ; 54.0549 ; 55.5585 ; 56.0772 ; 56.8173 ; 57.83 ; 59.138 ; 60.7485 ; 61.2718 ; 61.9886 ; 62.9087 ; 64.0313 ; 65.4179 ; 65.8957 ; 66.5698 ; 67.4867 ; 68.6615 ; 69.9825 ; 70.7377 ; 70.8703 ; 71.0519 ; 71.2507 ; 71.446 ; 71.4785 ; 71.4255 ; 71.3683 ; 71.3579 ; 71.3433 ; 71.3917 ; 71.3861 ; 71.3944 ; 71.4372 ; 71.4375 ; 71.4532]

Bolt 3 - Shear Force (kips): [0.018986 ; 0.045097 ; 0.10715 ; 0.19231 ; 0.28757 ; 0.31654 ; 0.35524 ; 0.39323 ; 0.42134 ; 0.46024 ; 0.51296 ; 0.56733 ; 0.56758 ; 0.57066 ; 0.58667 ; 0.58706 ; 0.59556 ; 0.62056 ; 0.62936 ; 0.6447 ; 0.66855 ; 0.70231 ; 0.71421 ; 0.73374 ; 0.75699 ; 0.78503 ; 0.81169 ; 0.82428 ; 0.82332 ; 0.81916 ; 0.81404 ; 0.82284 ; 0.82756 ; 0.8318 ; 0.83349 ; 0.83014 ; 0.82213 ; 0.81972 ; 0.81609 ; 0.81106 ; 0.80994 ; 0.81603 ; 0.80984 ; 0.79064 ; 0.7414 ; 0.64765 ; 0.57707 ; 0.4944 ; 0.44473 ; 0.45963 ; 0.4938 ; 0.52977 ; 0.60261 ; 0.80869 ; 1.2259 ; 1.5146 ; 1.8742 ; 2.1811 ; 2.7882 ; 2.9651 ; 3.1287 ; 3.4917 ; 3.8629]

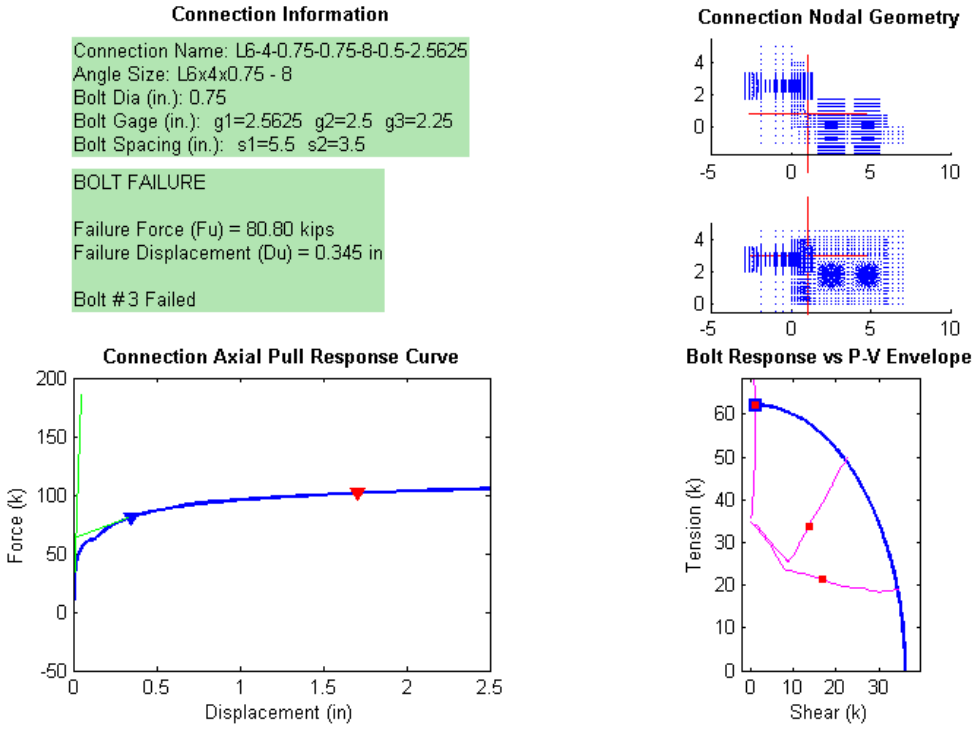


Figure B.77 Connection L6_4_0.75_0.75_8_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.75_8_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 4.1085e+003

Plastic Stiffness (k/in): 50.7005

Displacement (in): [2.4773e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.10296 ; 0.10692 ; 0.11286 ; 0.11509 ; 0.11843 ; 0.12344 ; 0.13096 ; 0.13378 ; 0.13484 ; 0.13642 ; 0.1388 ; 0.14237 ; 0.14772 ; 0.15574 ; 0.16779 ; 0.18585 ; 0.21294 ; 0.2231 ; 0.22691 ; 0.23262 ; 0.24119 ; 0.25405 ; 0.27334 ; 0.28057 ; 0.29142 ; 0.30769 ; 0.3321 ; 0.36872 ; 0.42364 ; 0.47856 ; 0.53348 ; 0.61587 ; 0.64676 ; 0.6931 ; 0.76262 ; 0.86688 ; 1.0233 ; 1.0819 ; 1.1699 ; 1.2029 ; 1.2153 ; 1.2338 ; 1.2617 ; 1.3034 ; 1.3661 ; 1.46 ; 1.6009 ; 1.8123 ; 2.0623 ; 2.1873 ; 2.3748 ; 2.5]

Force (kips): [-0.825058 ; 3.8201 ; 7.19928 ; 11.265 ; 15.9357 ; 17.2852 ; 19.0298 ; 21.2247 ; 23.3767 ; 25.067 ; 26.8253 ; 28.7252 ; 30.5284 ; 30.6743 ; 30.6717 ; 30.725 ; 30.8723 ; 30.9569 ; 31.2235 ; 31.233 ; 31.2307 ; 31.2295 ; 31.3495 ; 31.5268 ; 31.779 ; 32.1562 ; 32.7221 ; 33.4932 ; 34.5484 ; 35.9532 ; 36.4503 ; 36.633 ; 36.893 ; 37.2515 ; 37.7485 ; 38.4318 ; 38.6759 ; 39.022 ; 39.4986 ; 40.1174 ; 40.9293 ; 41.9831 ; 42.9031 ; 43.7247 ; 44.7923 ; 45.1553 ; 45.6693 ; 46.3565 ; 47.1809 ; 48.0637 ; 48.3521 ; 48.7507 ; 48.9038 ; 48.9615 ; 49.0521 ; 49.182 ; 49.3642 ; 49.6261 ; 49.9832 ; 50.4882 ; 51.1454 ; 51.7951 ; 52.0959 ; 52.4967 ; 52.7389]

Bolt 1 - Tensile Force (kips): [34.6413 ; 34.4951 ; 34.3739 ; 34.2077 ; 33.9876 ; 33.9166 ; 33.8173 ; 33.6764 ; 33.2443 ; 31.8759 ; 29.596 ; 26.7284 ; 23.937 ; 23.9125 ; 23.905 ; 23.8639 ; 23.7299 ; 23.6485 ; 23.6377 ; 23.6334 ; 23.6321 ; 23.6318 ; 23.617 ; 23.5943 ; 23.5686 ; 23.5494 ; 23.4862 ; 23.4318 ; 23.2263 ; 22.9522 ; 22.8386 ; 22.7779 ; 22.6915 ; 22.587 ; 22.4956 ; 22.2566 ; 22.1166 ; 21.9184 ; 21.7072 ; 21.4906 ; 21.0431 ; 20.4083 ; 19.9496 ; 19.732 ; 19.6126 ; 19.523 ; 19.4226 ; 19.3311 ; 19.2209 ; 18.9349 ; 18.839 ; 18.7028 ; 18.6443 ; 18.622 ; 18.5966 ; 18.5608 ; 18.5268 ; 18.4962 ; 18.4802 ; 18.5243 ; 18.6842 ; 18.8553 ; 18.9 ; 18.9558 ; 18.9921]

Bolt 1 - Shear Force (kips): [0.0465755 ; 0.188684 ; 0.350581 ; 0.552376 ; 0.797703 ; 0.872589 ; 0.972408 ; 1.10893 ; 1.52791 ; 2.66342 ; 4.34067 ; 6.23903 ; 7.89449 ; 7.89073 ; 7.88856 ; 7.9449 ; 8.10845 ; 8.19778 ; 8.19787 ; 8.19783 ; 8.19712 ; 8.19684 ; 8.28664 ; 8.42499 ; 8.58223 ; 8.67208 ; 9.01773 ; 9.29155 ; 9.98892 ; 11.2783 ; 11.9204 ; 12.189 ; 12.5527 ; 12.9863 ; 13.4316 ; 14.1779 ; 14.5431 ; 15.0618 ; 15.6491 ; 16.3292 ; 17.4687 ; 19.1083 ; 20.5034 ; 21.5464 ; 22.8109 ; 23.31 ; 23.9533 ; 24.8281 ; 25.9167 ; 27.3311 ; 27.8186 ; 28.5101 ; 28.7753 ; 28.8781 ; 29.028 ; 29.2333 ; 29.5075 ; 29.9037 ; 30.4151 ; 31.0899 ; 32.1156 ; 33.1949 ; 33.7034 ; 34.3427 ; 34.7453]

Bolt 2 - Tensile Force (kips): [34.6485 ; 34.5184 ; 34.4068 ; 34.2668 ; 34.119 ; 34.0789 ; 34.0349 ; 33.9782 ; 33.6662 ; 32.4291 ; 30.414 ; 28.2649 ; 26.0914 ; 25.6711 ; 25.6525 ; 25.6716 ; 25.7339 ; 25.7621 ; 25.6426 ; 25.6317 ; 25.6279 ; 25.6264 ; 25.7022 ; 25.8068 ; 25.9439 ; 26.1172 ; 26.4874 ; 26.9727 ; 27.8086 ; 29.0668 ; 29.5485 ; 29.7353 ; 30.0024 ; 30.3779 ; 30.8774 ; 31.5792 ; 31.8403 ; 32.2209 ; 32.7348 ; 33.4364 ; 34.3286 ; 35.5141 ; 36.6026 ; 37.6044 ; 38.9485 ; 39.3519 ; 39.9157 ; 40.7479 ; 41.8749 ; 43.1799 ; 43.6085 ; 44.1936 ; 44.4123 ; 44.4912 ; 44.6128 ; 44.7795 ; 45.0116 ; 45.3558 ; 45.8943 ; 46.7108 ; 47.659 ; 48.564 ; 49.0067 ; 49.6271 ; 50.0141]

Bolt 2 - Shear Force (kips): [0.0372949 ; 0.202611 ; 0.374699 ; 0.587637 ; 0.843832 ; 0.920923 ; 1.02283 ; 1.16035 ; 1.5606 ; 2.67232 ; 4.31852 ; 6.14894 ; 8.1387 ; 8.45354 ; 8.46141 ; 8.47092 ; 8.49137 ; 8.51237 ; 8.85495 ; 8.86962 ; 8.86934 ; 8.86893 ; 8.8921 ; 8.92352 ; 9.01037 ; 9.2935 ; 9.55341 ; 10.0131 ; 10.428 ; 11.0809 ; 11.2723 ; 11.3481 ; 11.4466 ; 11.5743 ; 11.8953 ; 12.3109 ; 12.4217 ; 12.5783 ; 12.9305 ; 13.3694 ; 13.8031 ; 14.4846 ; 15.0509 ; 15.6347 ; 16.3686 ; 16.6294 ; 17.05 ; 17.5713 ; 18.179 ; 18.8074 ; 19.0177 ; 19.3056 ; 19.4021 ; 19.4412 ; 19.4991 ; 19.6002 ; 19.7618 ; 19.9897 ; 20.2795 ; 20.692 ; 21.207 ; 21.8387 ; 22.088 ; 22.4261 ; 22.6751]

Bolt 3 - Tensile Force (kips): [36 ; 35.9541 ; 36.0444 ; 36.3603 ; 37.0094 ; 37.3365 ; 37.8361 ; 38.5136 ; 39.2805 ; 40.1143 ; 41.4242 ; 43.76 ; 46.9408 ; 47.2332 ; 47.2327 ; 47.3291 ; 47.6019 ; 47.7596 ; 48.269 ; 48.2881 ; 48.2853 ; 48.2839 ; 48.5062 ; 48.8392 ; 49.3134 ; 50.0227 ; 51.0564 ; 52.4533 ; 54.2186 ; 56.2892 ; 56.9787 ; 57.2269 ; 57.5829 ; 58.0804 ; 58.7671 ; 59.6947 ; 60.0181 ; 60.477 ; 61.1062 ; 61.9369 ; 63.0209 ; 64.3329 ; 65.4391 ; 66.4175 ; 67.6812 ; 68.0977 ; 68.6654 ; 69.4115 ; 70.165 ; 70.6006 ; 70.7047 ; 70.8418 ; 70.9104 ; 70.9241 ; 70.9127 ; 70.8975 ; 70.9052 ; 70.8992 ; 70.9808 ; 71.0188 ; 71.0973 ; 71.2689 ; 71.2613 ; 71.3585 ; 71.4306]

Bolt 3 - Shear Force (kips): [0.023693 ; 0.035399 ; 0.088369 ; 0.16668 ; 0.25819 ; 0.28522 ; 0.32261 ; 0.37097 ; 0.42954 ; 0.48118 ; 0.54464 ; 0.66069 ; 0.82656 ; 0.83766 ; 0.83777 ; 0.84112 ; 0.84989 ; 0.85473 ; 0.86916 ; 0.86984 ; 0.86973 ; 0.86966 ; 0.87528 ; 0.88253 ; 0.89142 ; 0.90227 ; 0.91285 ; 0.92028 ; 0.92834 ; 0.95227 ; 0.95516 ; 0.95507 ; 0.9548 ; 0.95468 ; 0.95481 ; 0.954 ; 0.95331 ; 0.95287 ; 0.95453 ; 0.95965 ; 0.96313 ; 0.97089 ; 0.95863 ; 0.91914 ; 0.82555 ; 0.7862 ; 0.80274 ; 0.85141 ; 0.8532 ; 0.70705 ; 0.66533 ; 0.62481 ; 0.65996 ; 0.693 ; 0.79277 ; 0.90964 ; 1.0174 ; 1.2006 ; 1.4394 ; 2.1386 ; 2.9212 ; 3.4534 ; 3.9229 ; 4.2886 ; 4.4783]

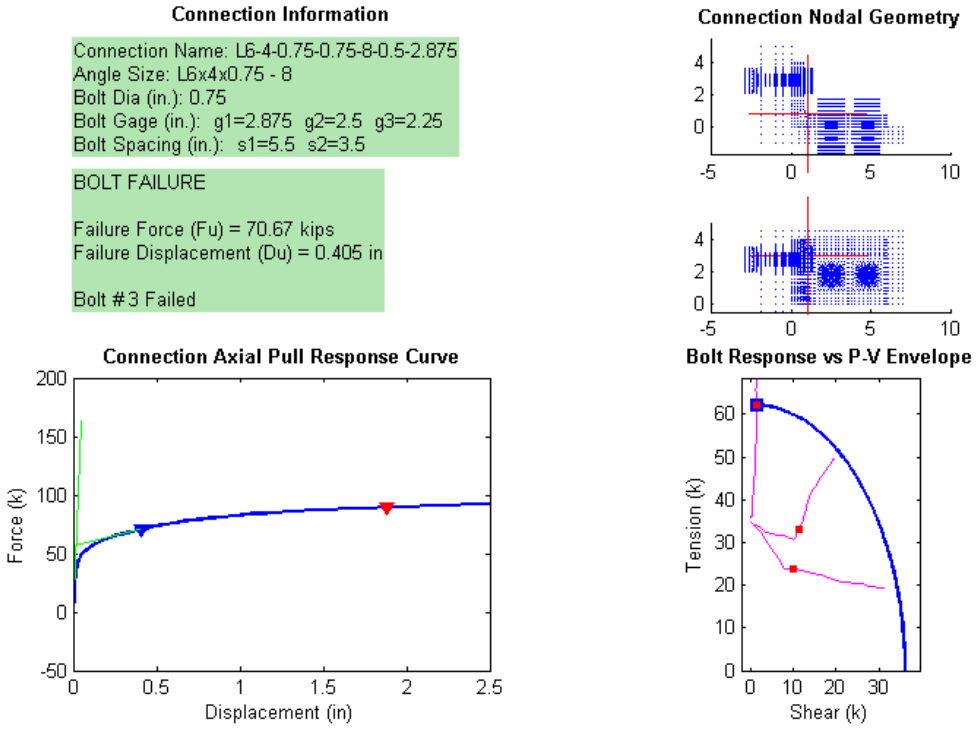


Figure B.78 Connection L6_4_0.75_0.75_8_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.75_8_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 3.3793e+003

Plastic Stiffness (k/in): 35.7641

Displacement (in): [3.2625e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.13464 ; 0.19799 ; 0.22175 ; 0.25739 ; 0.27075 ; 0.29079 ; 0.29267 ; 0.29549 ; 0.29972 ; 0.30606 ; 0.31558 ; 0.32985 ; 0.35125 ; 0.38336 ; 0.3954 ; 0.41346 ; 0.44055 ; 0.48119 ; 0.49643 ; 0.51929 ; 0.55358 ; 0.60501 ; 0.68216 ; 0.71109 ; 0.75448 ; 0.77076 ; 0.79517 ; 0.83178 ; 0.8867 ; 0.96909 ; 1.0927 ; 1.139 ; 1.2085 ; 1.3128 ; 1.4692 ; 1.7038 ; 1.9538 ; 2.2038 ; 2.4538 ; 2.5]

Force (kips): [-0.819779 ; 2.98098 ; 5.78051 ; 9.17694 ; 13.1823 ; 14.4209 ; 15.9623 ; 17.8667 ; 20.1336 ; 22.2309 ; 24.0688 ; 25.5459 ; 27.1029 ; 29.0613 ; 31.2504 ; 31.828 ; 32.6274 ; 32.9105 ; 33.1517 ; 33.1648 ; 33.2088 ; 33.2973 ; 33.432 ; 33.6497 ; 33.9421 ; 34.3705 ; 34.9551 ; 35.1704 ; 35.4721 ; 35.9006 ; 36.5154 ; 36.7351 ; 37.0451 ; 37.4638 ; 38.0443 ; 38.8315 ; 39.1121 ; 39.4992 ; 39.6403 ; 39.8494 ; 40.1511 ; 40.5814 ; 41.1718 ; 41.8818 ; 42.106 ; 42.4168 ; 42.8507 ; 43.4497 ; 44.2634 ; 44.9929 ; 45.5896 ; 46.09 ; 46.1821]

Bolt 1 - Tensile Force (kips): [34.64 ; 34.5207 ; 34.4228 ; 34.2879 ; 34.1054 ; 34.0433 ; 33.9604 ; 33.848 ; 33.6948 ; 33.2629 ; 32.3877 ; 30.751 ; 28.7951 ; 26.0995 ; 23.9087 ; 23.9118 ; 23.8066 ; 23.7219 ; 23.7569 ; 23.7591 ; 23.7651 ; 23.7755 ; 23.7885 ; 23.7642 ; 23.773 ; 23.7788 ; 23.8205 ; 23.7845 ; 23.7461 ; 23.673 ; 23.4692 ; 23.3815 ; 23.2583 ; 23.1751 ; 22.9355 ; 22.5319 ; 22.2989 ; 22.033 ; 21.9236 ; 21.7438 ; 21.4698 ; 21.1538 ; 20.897 ; 20.7607 ; 20.7179 ; 20.5401 ; 20.395 ; 20.2786 ; 19.8779 ; 19.6695 ; 19.4726 ; 19.2824 ; 19.282]

Bolt 1 - Shear Force (kips): [0.0461171 ; 0.151341 ; 0.286332 ; 0.456152 ; 0.66788 ; 0.736789 ; 0.825928 ; 0.941673 ; 1.09197 ; 1.51235 ; 2.25216 ; 3.5054 ; 4.86852 ; 6.59973 ; 7.88537 ; 7.89002 ; 8.06794 ; 8.18734 ; 8.20089 ; 8.20137 ; 8.2027 ; 8.20498 ; 8.21943 ; 8.4955 ; 8.6973 ; 9.04492 ; 9.38537 ; 9.67148 ; 9.99972 ; 10.4656 ; 11.6778 ; 12.139 ; 12.7559 ; 13.4031 ; 14.398 ; 15.899 ; 16.5593 ; 17.3567 ; 17.6687 ; 18.1788 ; 19.0048 ; 20.0191 ; 21.2608 ; 22.5236 ; 22.9957 ; 23.7214 ; 24.6636 ; 25.8646 ; 27.3631 ; 28.6978 ; 29.9186 ; 30.9441 ; 31.1349]

Bolt 2 - Tensile Force (kips): [34.6453 ; 34.5435 ; 34.4544 ; 34.3427 ; 34.2243 ; 34.1932 ; 34.1591 ; 34.1272 ; 34.1042 ; 33.8729 ; 33.3563 ; 32.4601 ; 32.0132 ; 31.7653 ; 31.572 ; 31.1635 ; 30.9242 ; 30.9667 ; 30.7357 ; 30.7178 ; 30.718 ; 30.7638 ; 30.8715 ; 31.1148 ; 31.4399 ; 31.9232 ; 32.6098 ; 32.8777 ; 33.2811 ; 33.8679 ; 34.6621 ; 34.9402 ; 35.3564 ; 35.9456 ; 36.8016 ; 38.0002 ; 38.4209 ; 39.0089 ; 39.2142 ; 39.5319 ; 40.0113 ; 40.6714 ; 41.5824 ; 42.7441 ; 43.1354 ; 43.674 ; 44.4207 ; 45.4484 ; 46.6892 ; 47.8073 ; 48.683 ; 49.4481 ; 49.5866]

Bolt 2 - Shear Force (kips): [0.036334 ; 0.162194 ; 0.306436 ; 0.486422 ; 0.708886 ; 0.780577 ; 0.872994 ; 0.991426 ; 1.14339 ; 1.54301 ; 2.24258 ; 3.42643 ; 4.64478 ; 6.10338 ; 8.01753 ; 8.77499 ; 9.57321 ; 9.76822 ; 10.0802 ; 10.0991 ; 10.1441 ; 10.2209 ; 10.313 ; 10.358 ; 10.4357 ; 10.7044 ; 11.1532 ; 11.2636 ; 11.3917 ; 11.6492 ; 11.9363 ; 12.0775 ; 12.2567 ; 12.4555 ; 12.7676 ; 12.9916 ; 13.0411 ; 13.1433 ; 13.2089 ; 13.3187 ; 13.4223 ; 13.631 ; 13.9833 ; 14.8162 ; 15.082 ; 15.4009 ; 15.877 ; 16.4858 ; 17.3234 ; 18.1555 ; 18.8457 ; 19.3279 ; 19.3965]

Bolt 3 - Tensile Force (kips): [36 ; 35.9379 ; 35.9868 ; 36.2344 ; 36.7589 ; 37.0039 ; 37.4593 ; 38.1304 ; 39.021 ; 40.2388 ; 41.9679 ; 44.1664 ; 47.2612 ; 51.2044 ; 55.2259 ; 56.2441 ; 57.6534 ; 58.1513 ; 58.6029 ; 58.6284 ; 58.7083 ; 58.8663 ; 59.1069 ; 59.4806 ; 60.0026 ; 60.7394 ; 61.7104 ; 62.0448 ; 62.5081 ; 63.1289 ; 63.9257 ; 64.1946 ; 64.5771 ; 65.1068 ; 65.8358 ; 66.8227 ; 67.1595 ; 67.622 ; 67.7857 ; 68.0244 ; 68.3643 ; 68.7892 ; 69.2699 ; 69.7108 ; 69.8218 ; 69.9602 ; 70.0857 ; 70.248 ; 70.5327 ; 70.7033 ; 70.9022 ; 71.0708 ; 71.0611]

Bolt 3 - Shear Force (kips): [0.026498 ; 0.027986 ; 0.072943 ; 0.14367 ; 0.2279 ; 0.25509 ; 0.289 ; 0.33478 ; 0.39518 ; 0.47541 ; 0.59702 ; 0.77687 ; 0.98678 ; 1.1258 ; 1.2071 ; 1.2203 ; 1.2275 ; 1.2279 ; 1.2279 ; 1.2279 ; 1.2279 ; 1.2275 ; 1.227 ; 1.2252 ; 1.2244 ; 1.2231 ; 1.2244 ; 1.2246 ; 1.2254 ; 1.2255 ; 1.2201 ; 1.2167 ; 1.2084 ; 1.1908 ; 1.1525 ; 1.1903 ; 1.2381 ; 1.2825 ; 1.2947 ; 1.306 ; 1.3141 ; 1.4371 ; 1.7465 ; 2.1204 ; 2.2 ; 2.2753 ; 2.4724 ; 3.1719 ; 3.8466 ; 4.6063 ; 5.1611 ; 5.6009 ; 5.753]

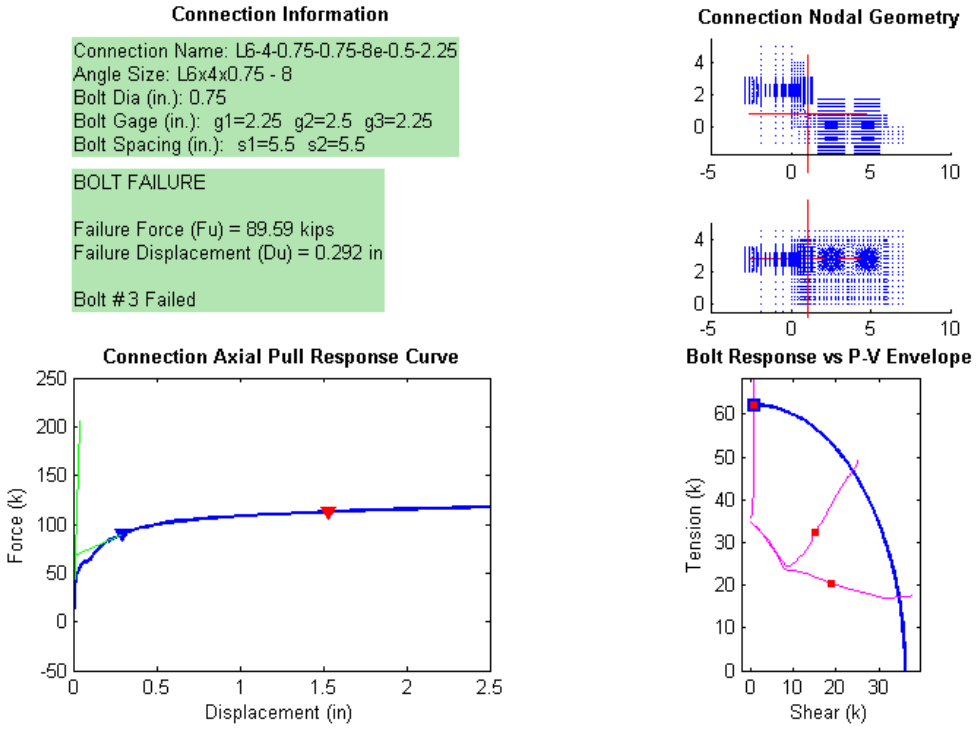


Figure B.79 Connection L6_4_0.75_0.75_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.75_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 4.9599e+003

Plastic Stiffness (k/in): 75.9786

Displacement (in): [2.3902e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.071287 ; 0.081846 ; 0.085806 ; 0.091745 ; 0.10065 ; 0.104 ; 0.10525 ; 0.10713 ; 0.10995 ; 0.11417 ; 0.11576 ; 0.11814 ; 0.12171 ; 0.12706 ; 0.13508 ; 0.14713 ; 0.15164 ; 0.15841 ; 0.16857 ; 0.18381 ; 0.18953 ; 0.1981 ; 0.21096 ; 0.23024 ; 0.25917 ; 0.27002 ; 0.2863 ; 0.31071 ; 0.34732 ; 0.36105 ; 0.38165 ; 0.41254 ; 0.42412 ; 0.4415 ; 0.46757 ; 0.50667 ; 0.56532 ; 0.65329 ; 0.78526 ; 0.83474 ; 0.90897 ; 1.0203 ; 1.1873 ; 1.4373 ; 1.4998 ; 1.5936 ; 1.7342 ; 1.7869 ; 1.866 ; 1.9847 ; 2.1627 ; 2.2252 ; 2.3189 ; 2.4596 ; 2.5]

Force (kips): [-0.925554 ; 4.68185 ; 8.7617 ; 13.5955 ; 18.8393 ; 20.3243 ; 22.2398 ; 24.0088 ; 25.2996 ; 26.914 ; 28.8959 ; 30.7086 ; 30.7129 ; 30.7551 ; 31.1047 ; 31.1628 ; 31.3236 ; 31.8426 ; 32.0441 ; 32.3535 ; 32.7442 ; 33.2748 ; 33.4723 ; 33.7729 ; 34.1649 ; 34.7205 ; 35.6143 ; 36.812 ; 37.2437 ; 37.8484 ; 38.6465 ; 39.6724 ; 40.0396 ; 40.5732 ; 41.3201 ; 42.2937 ; 43.547 ; 43.9814 ; 44.5996 ; 45.4489 ; 46.5303 ; 46.8978 ; 47.4143 ; 48.124 ; 48.3744 ; 48.731 ; 49.2268 ; 49.894 ; 50.7657 ; 51.8294 ; 52.919 ; 53.2347 ; 53.6628 ; 54.2416 ; 55.0121 ; 55.9866 ; 56.2117 ; 56.5415 ; 56.9896 ; 57.1459 ; 57.3701 ; 57.6797 ; 58.1031 ; 58.2409 ; 58.4323 ; 58.703 ; 58.7821]

Bolt 1 - Tensile Force (kips): [34.6874 ; 34.5039 ; 34.3483 ; 34.1389 ; 33.8762 ; 33.7919 ; 33.6616 ; 33.2297 ; 32.0115 ; 30.0463 ; 27.1372 ; 23.9882 ; 23.9781 ; 23.9304 ; 23.7194 ; 23.7109 ; 23.6894 ; 23.6537 ; 23.6455 ; 23.6189 ; 23.6046 ; 23.5875 ; 23.5598 ; 23.5017 ; 23.4164 ; 23.3307 ; 23.1896 ; 23.0158 ; 22.9229 ; 22.8009 ; 22.6714 ; 22.5378 ; 22.4214 ; 22.2004 ; 21.8991 ; 21.5799 ; 21.0935 ; 20.858 ; 20.5644 ; 20.0966 ; 19.6012 ; 19.4824 ; 19.3276 ; 19.1768 ; 19.1074 ; 18.9642 ; 18.7849 ; 18.6235 ; 18.4479 ; 18.0284 ; 17.5948 ; 17.4204 ; 17.2612 ; 17.0453 ; 16.9017 ; 17.0601 ; 17.1063 ; 17.1706 ; 17.2163 ; 17.211 ; 17.2123 ; 17.2317 ; 17.2685 ; 17.2794 ; 17.3304 ; 17.4655 ; 17.5003]

Bolt 1 - Shear Force (kips): [0.0368206 ; 0.242296 ; 0.440934 ; 0.685376 ; 0.965293 ; 1.04829 ; 1.17644 ; 1.58994 ; 2.60003 ; 4.06442 ; 6.02277 ; 7.91337 ; 7.91249 ; 7.96811 ; 8.20241 ; 8.20796 ; 8.36503 ; 8.68395 ; 8.75518 ; 8.95897 ; 9.17109 ; 9.35242 ; 9.48561 ; 9.72788 ; 10.0251 ; 10.2488 ; 10.8784 ; 11.8125 ; 12.1864 ; 12.6539 ; 13.1539 ; 13.69 ; 13.9873 ; 14.5177 ; 15.2416 ; 16.0544 ; 17.3188 ; 17.8725 ; 18.6671 ; 19.8873 ; 21.3476 ; 21.7649 ; 22.32 ; 23.0228 ; 23.2965 ; 23.7261 ; 24.327 ; 25.0865 ; 26.1073 ; 27.4874 ; 28.8441 ; 29.3485 ; 29.9702 ; 30.8785 ; 32.0315 ; 33.3833 ; 33.7134 ; 34.1621 ; 34.8358 ; 35.086 ; 35.4369 ; 35.9261 ; 36.5225 ; 36.7668 ; 37.0846 ; 37.5043 ; 37.6118]

Bolt 2 - Tensile Force (kips): [34.7137 ; 34.5427 ; 34.3992 ; 34.2236 ; 34.0438 ; 33.9988 ; 33.9319 ; 33.5835 ; 32.433 ; 30.5878 ; 27.9265 ; 24.6138 ; 24.5668 ; 24.5658 ; 24.4106 ; 24.3555 ; 24.3863 ; 24.4659 ; 24.5025 ; 24.5651 ; 24.6505 ; 24.7768 ; 24.8336 ; 24.9259 ; 25.0601 ; 25.2121 ; 25.5513 ; 26.101 ; 26.3049 ; 26.6122 ; 27.0788 ; 27.7496 ; 28.0058 ; 28.3898 ; 28.9154 ; 29.7395 ; 31.0308 ; 31.5073 ; 32.1503 ; 33.0293 ; 34.1827 ; 34.5593 ; 35.1057 ; 35.8662 ; 36.129 ; 36.4982 ; 37.0146 ; 37.725 ; 38.6453 ; 39.6936 ; 41.0092 ; 41.4741 ; 42.0619 ; 42.8669 ; 43.9553 ; 45.267 ; 45.5653 ; 45.9927 ; 46.6279 ; 46.8613 ; 47.2017 ; 47.6452 ; 48.2335 ; 48.4193 ; 48.6655 ; 48.9924 ; 49.0773]

Bolt 2 - Shear Force (kips): [0.0535645 ; 0.228724 ; 0.42651 ; 0.666809 ; 0.937314 ; 1.0162 ; 1.13363 ; 1.51965 ; 2.51382 ; 3.95791 ; 5.8881 ; 8.07736 ; 8.10225 ; 8.10644 ; 8.36163 ; 8.43911 ; 8.44943 ; 8.67624 ; 8.81601 ; 8.93769 ; 9.12406 ; 9.48601 ; 9.55965 ; 9.63712 ; 9.75583 ; 10.1242 ; 10.4405 ; 10.7986 ; 11.0192 ; 11.3812 ; 11.9047 ; 12.5722 ; 12.7535 ; 12.9851 ; 13.4067 ; 13.8888 ; 14.331 ; 14.5056 ; 14.8542 ; 15.337 ; 16.0961 ; 16.3716 ; 16.7499 ; 17.2516 ; 17.4278 ; 17.6569 ; 17.9469 ; 18.3004 ; 18.7065 ; 19.2392 ; 19.9477 ; 20.1802 ; 20.5684 ; 21.1575 ; 21.8959 ; 22.7054 ; 22.885 ; 23.1687 ; 23.5654 ; 23.7099 ; 23.9213 ; 24.2445 ; 24.6414 ; 24.7531 ; 24.9026 ; 25.0964 ; 25.1511]

Bolt 3 - Tensile Force (kips): [36 ; 35.9766 ; 36.1157 ; 36.5055 ; 37.3473 ; 37.7236 ; 38.2338 ; 38.7504 ; 39.1541 ; 39.7836 ; 40.9017 ; 42.4362 ; 42.4427 ; 42.4833 ; 42.8404 ; 42.9026 ; 43.0725 ; 43.6527 ; 43.887 ; 44.259 ; 44.7554 ; 45.5057 ; 45.8002 ; 46.2616 ; 46.8837 ; 47.7895 ; 49.2676 ; 51.2742 ; 51.977 ; 52.948 ; 54.1874 ; 55.6939 ; 56.214 ; 56.9548 ; 57.9657 ; 59.271 ; 60.87 ; 61.3931 ; 62.1074 ; 63.0444 ; 64.1734 ; 64.5448 ; 65.0761 ; 65.8296 ; 66.0985 ; 66.4886 ; 67.0404 ; 67.7917 ; 68.7735 ; 69.9063 ; 70.6994 ; 70.8238 ; 70.966 ; 71.13 ; 71.3336 ; 71.5563 ; 71.5684 ; 71.5045 ; 71.444 ; 71.4261 ; 71.4097 ; 71.4536 ; 71.4533 ; 71.4465 ; 71.4737 ; 71.5304 ; 71.5208]

Bolt 3 - Shear Force (kips): [0.030399 ; 0.036583 ; 0.098413 ; 0.18354 ; 0.27897 ; 0.30779 ; 0.34624 ; 0.38485 ; 0.41363 ; 0.45088 ; 0.50139 ; 0.55379 ; 0.55423 ; 0.55584 ; 0.56866 ; 0.57106 ; 0.57718 ; 0.59864 ; 0.60774 ; 0.62255 ; 0.64313 ; 0.67561 ; 0.6879 ; 0.70583 ; 0.72699 ; 0.75123 ; 0.77473 ; 0.78362 ; 0.78111 ; 0.77536 ; 0.76919 ; 0.77735 ; 0.78135 ; 0.78465 ; 0.78646 ; 0.78169 ; 0.77263 ; 0.76903 ; 0.76439 ; 0.75575 ; 0.74977 ; 0.7507 ; 0.75216 ; 0.74903 ; 0.74445 ; 0.73446 ; 0.71391 ; 0.67168 ; 0.59521 ; 0.48322 ; 0.39574 ; 0.37892 ; 0.34806 ; 0.31649 ; 0.3469 ; 0.45177 ; 0.54387 ; 0.74472 ; 1.3176 ; 1.6047 ; 1.9426 ; 2.2475 ; 2.7829 ; 2.97 ; 3.1401 ; 3.3319 ; 3.4527]

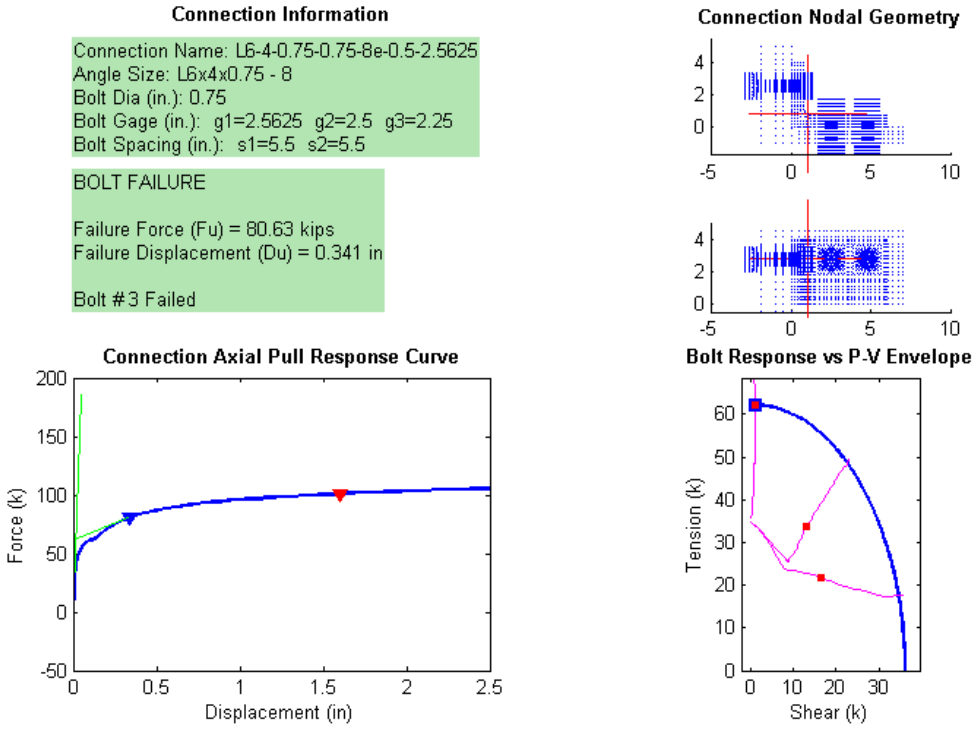


Figure B.80 Connection L6_4_0.75_0.75_8e_0.5_2.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.75_8e_0.5_2.5625 Analysis Response Variables.
Initial Stiffness (k/in): 4.1063e+003

Plastic Stiffness (k/in): 54.4121

Displacement (in): [2.9694e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.10296 ; 0.10692 ; 0.11286 ; 0.11509 ; 0.11843 ; 0.11968 ; 0.12156 ; 0.12438 ; 0.12861 ; 0.13495 ; 0.14447 ; 0.14803 ; 0.15338 ; 0.16141 ; 0.17345 ; 0.19151 ; 0.19829 ; 0.20845 ; 0.22368 ; 0.2294 ; 0.23797 ; 0.25083 ; 0.27012 ; 0.27735 ; 0.2882 ; 0.30447 ; 0.32888 ; 0.3655 ; 0.37923 ; 0.39982 ; 0.43072 ; 0.47706 ; 0.49444 ; 0.5205 ; 0.5596 ; 0.61825 ; 0.70623 ; 0.73922 ; 0.7887 ; 0.86293 ; 0.97428 ; 1.0856 ; 1.197 ; 1.2387 ; 1.3014 ; 1.3953 ; 1.5362 ; 1.7476 ; 1.8101 ; 1.9038 ; 2.0445 ; 2.2554 ; 2.5]

Force (kips): [-0.973789 ; 3.66461 ; 7.04626 ; 11.116 ; 15.7914 ; 17.1363 ; 18.8727 ; 21.0718 ; 23.2527 ; 25.0236 ; 26.7729 ; 28.7289 ; 30.5461 ; 30.7291 ; 30.7293 ; 30.7733 ; 30.919 ; 30.9878 ; 31.035 ; 31.1444 ; 31.2557 ; 31.2637 ; 31.2726 ; 31.9318 ; 32.1944 ; 32.5727 ; 33.0947 ; 33.8399 ; 34.8244 ; 35.1653 ; 35.6901 ; 36.4253 ; 36.6888 ; 37.0585 ; 37.5691 ; 38.2531 ; 38.5055 ; 38.8642 ; 39.3604 ; 40.0245 ; 40.902 ; 41.1972 ; 41.6142 ; 42.1944 ; 42.9693 ; 43.2468 ; 43.6382 ; 44.1709 ; 44.8869 ; 45.8294 ; 46.1482 ; 46.6016 ; 47.183 ; 47.8451 ; 48.4065 ; 48.9067 ; 49.0807 ; 49.3327 ; 49.7308 ; 50.2698 ; 50.9684 ; 51.159 ; 51.4244 ; 51.79 ; 52.2769 ; 52.7665]

Bolt 1 - Tensile Force (kips): [34.6841 ; 34.5326 ; 34.407 ; 34.2348 ; 34.0088 ; 33.9366 ; 33.8364 ; 33.6929 ; 33.2628 ; 31.957 ; 29.6753 ; 26.7306 ; 23.9909 ; 23.978 ; 23.9738 ; 23.9391 ; 23.7941 ; 23.719 ; 23.7166 ; 23.7153 ; 23.7132 ; 23.7107 ; 23.7093 ; 23.6444 ; 23.6223 ; 23.5945 ; 23.5815 ; 23.5298 ; 23.3721 ; 23.3282 ; 23.2069 ; 23.0634 ; 22.9686 ; 22.8444 ; 22.7314 ; 22.6436 ; 22.5103 ; 22.3139 ; 22.0685 ; 21.8685 ; 21.415 ; 21.2497 ; 21.01 ; 20.6288 ; 20.1464 ; 20.0042 ; 19.8419 ; 19.6782 ; 19.5313 ; 19.1856 ; 19.0999 ; 19.0135 ; 18.8383 ; 18.4909 ; 18.1448 ; 17.8129 ; 17.7316 ; 17.6027 ; 17.484 ; 17.3919 ; 17.4222 ; 17.4621 ; 17.5223 ; 17.5973 ; 17.6401 ; 17.6423]

Bolt 1 - Shear Force (kips): [0.0387334 ; 0.196626 ; 0.363956 ; 0.572519 ; 0.825788 ; 0.90235 ; 1.00407 ; 1.14604 ; 1.56078 ; 2.64305 ; 4.32737 ; 6.2851 ; 7.91227 ; 7.91233 ; 7.91127 ; 7.95766 ; 8.12361 ; 8.20469 ; 8.20673 ; 8.20776 ; 8.20893 ; 8.20915 ; 8.21536 ; 8.70219 ; 8.84611 ; 9.03572 ; 9.21245 ; 9.51828 ; 10.138 ; 10.3257 ; 10.9614 ; 11.8372 ; 12.2343 ; 12.7487 ; 13.2729 ; 13.802 ; 14.1685 ; 14.6935 ; 15.3878 ; 16.0977 ; 17.3567 ; 17.7947 ; 18.4542 ; 19.4294 ; 20.6969 ; 21.1276 ; 21.6582 ; 22.2693 ; 23.0781 ; 24.3778 ; 24.8249 ; 25.4529 ; 26.4643 ; 27.7237 ; 28.6412 ; 29.5386 ; 29.8392 ; 30.3251 ; 30.9534 ; 31.7984 ; 32.8848 ; 33.1659 ; 33.563 ; 34.1315 ; 34.9328 ; 35.7713]

Bolt 2 - Tensile Force (kips): [34.7066 ; 34.5721 ; 34.4594 ; 34.3205 ; 34.1756 ; 34.1409 ; 34.1022 ; 34.0526 ; 33.7761 ; 32.6422 ; 30.6505 ; 28.4327 ; 26.2008 ; 25.6902 ; 25.6717 ; 25.6872 ; 25.7507 ; 25.7806 ; 25.7557 ; 25.7048 ; 25.6555 ; 25.6513 ; 25.6556 ; 26.06 ; 26.2141 ; 26.4426 ; 26.7725 ; 27.2674 ; 28.0985 ; 28.4148 ; 28.9191 ; 29.596 ; 29.8584 ; 30.2421 ; 30.7862 ; 31.5254 ; 31.8005 ; 32.2001 ; 32.7687 ; 33.5353 ; 34.513 ; 34.8481 ; 35.3 ; 35.8875 ; 36.78 ; 37.0856 ; 37.5105 ; 38.1176 ; 38.9616 ; 40.0189 ; 40.3851 ; 40.9228 ; 41.634 ; 42.5762 ; 43.3841 ; 44.116 ; 44.3751 ; 44.7545 ; 45.2905 ; 45.9826 ; 46.918 ; 47.1403 ; 47.4619 ; 47.9264 ; 48.6492 ; 49.4582]

Bolt 2 - Shear Force (kips): [0.0555368 ; 0.179878 ; 0.344793 ; 0.547971 ; 0.791289 ; 0.863835 ; 0.959294 ; 1.08976 ; 1.46579 ; 2.51287 ; 4.15963 ; 6.04646 ; 8.07859 ; 8.45843 ; 8.46744 ; 8.47609 ; 8.49701 ; 8.5073 ; 8.56864 ; 8.70881 ; 8.8515 ; 8.86133 ; 8.86421 ; 8.99953 ; 9.16572 ; 9.39396 ; 9.65973 ; 10.0589 ; 10.4183 ; 10.5954 ; 10.7738 ; 11.0666 ; 11.14 ; 11.2368 ; 11.4954 ; 11.9277 ; 12.0535 ; 12.2198 ; 12.4422 ; 12.9547 ; 13.4865 ; 13.6427 ; 13.9242 ; 14.326 ; 14.7395 ; 14.9663 ; 15.3062 ; 15.717 ; 16.2322 ; 16.9536 ; 17.2437 ; 17.6044 ; 18.0612 ; 18.5819 ; 19.0506 ; 19.4702 ; 19.6174 ; 19.8183 ; 20.1213 ; 20.614 ; 21.2599 ; 21.4458 ; 21.7214 ; 22.1149 ; 22.6007 ; 23.0537]

Bolt 3 - Tensile Force (kips): [36 ; 35.9519 ; 36.0384 ; 36.3507 ; 36.9964 ; 37.3193 ; 37.8229 ; 38.5026 ; 39.2884 ; 40.1844 ; 41.5368 ; 43.8572 ; 47.0413 ; 47.4054 ; 47.4084 ; 47.4896 ; 47.759 ; 47.8875 ; 47.9778 ; 48.1887 ; 48.4043 ; 48.4201 ; 48.4369 ; 49.6912 ; 50.1818 ; 50.8888 ; 51.8676 ; 53.1959 ; 54.8171 ; 55.3438 ; 56.1048 ; 57.1483 ; 57.5117 ; 58.0226 ; 58.7251 ; 59.661 ; 59.9898 ; 60.4551 ; 61.0945 ; 61.9458 ; 63.0535 ; 63.4199 ; 63.9225 ; 64.6118 ; 65.5457 ; 65.8723 ; 66.3381 ; 66.9817 ; 67.8469 ; 68.9451 ; 69.2973 ; 69.7574 ; 70.2463 ; 70.5781 ; 70.7759 ; 70.9225 ; 70.9688 ; 71.0296 ; 71.0057 ; 71.0525 ; 71.1079 ; 71.102 ; 71.1487 ; 71.2372 ; 71.3225 ; 71.4064]

Bolt 3 - Shear Force (kips): [0.036194 ; 0.026268 ; 0.078518 ; 0.15658 ; 0.24758 ; 0.27434 ; 0.31103 ; 0.35879 ; 0.41552 ; 0.46643 ; 0.52342 ; 0.6331 ; 0.78981 ; 0.80205 ; 0.80221 ; 0.80466 ; 0.81196 ; 0.8153 ; 0.8176 ; 0.82279 ; 0.82773 ; 0.82815 ; 0.82864 ; 0.84941 ; 0.85484 ; 0.86062 ; 0.86584 ; 0.86828 ; 0.88072 ; 0.88764 ; 0.89559 ; 0.90063 ; 0.90061 ; 0.90042 ; 0.90004 ; 0.89911 ; 0.89839 ; 0.89762 ; 0.89856 ; 0.90206 ; 0.9028 ; 0.90439 ; 0.90759 ; 0.90994 ; 0.8988 ; 0.89008 ; 0.87151 ; 0.8347 ; 0.76933 ; 0.66234 ; 0.62839 ; 0.69207 ; 0.72217 ; 0.64439 ; 0.57855 ; 0.53798 ; 0.52803 ; 0.53328 ; 0.86649 ; 1.4163 ; 2.3726 ; 2.6806 ; 2.9673 ; 3.2817 ; 3.811 ; 4.3431]

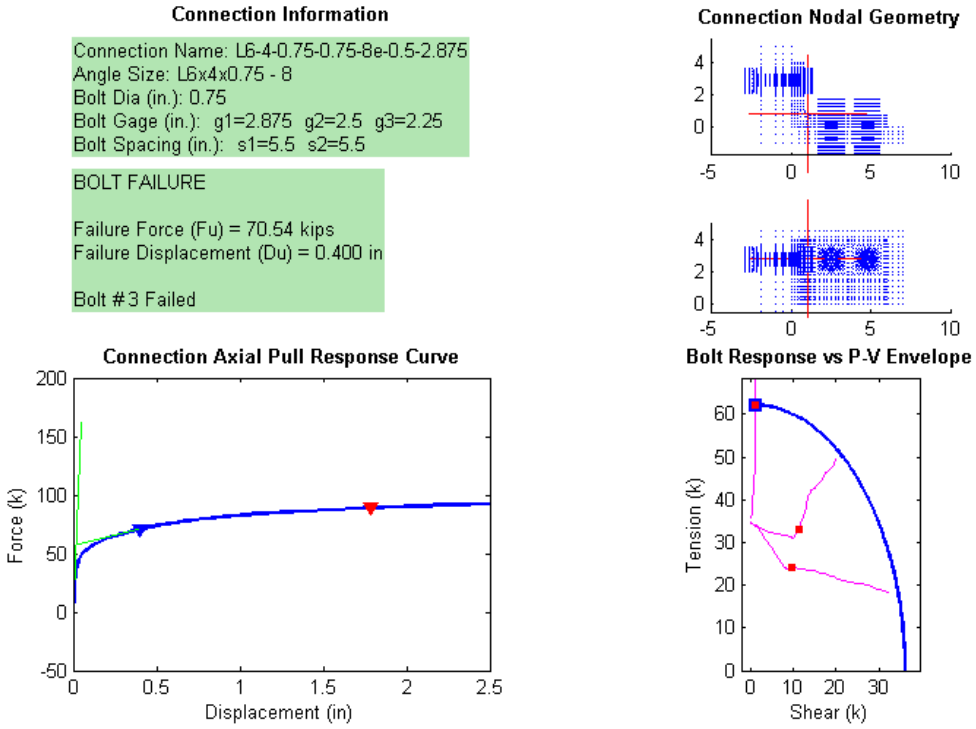


Figure B.81 Connection L6_4_0.75_0.75_8e_0.5_2.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_4_0.75_0.75_8e_0.5_2.875 Analysis Response Variables.
Initial Stiffness (k/in): 3.3862e+003

Plastic Stiffness (k/in): 35.2397

Displacement (in): [3.2816e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.13464 ; 0.19799 ; 0.21383 ; 0.22967 ; 0.25343 ; 0.25565 ; 0.25899 ; 0.26401 ; 0.27152 ; 0.2828 ; 0.29971 ; 0.30605 ; 0.30843 ; 0.312 ; 0.31735 ; 0.32538 ; 0.33742 ; 0.35548 ; 0.38257 ; 0.39273 ; 0.40797 ; 0.43083 ; 0.46512 ; 0.51655 ; 0.53583 ; 0.56476 ; 0.60816 ; 0.67325 ; 0.69766 ; 0.73428 ; 0.7892 ; 0.8098 ; 0.84069 ; 0.88703 ; 0.90441 ; 0.93048 ; 0.96958 ; 1.0282 ; 1.1162 ; 1.1492 ; 1.1987 ; 1.2729 ; 1.3843 ; 1.5513 ; 1.7183 ; 1.76 ; 1.8227 ; 1.9166 ; 2.0575 ; 2.2689 ; 2.5]

Force (kips): [-0.974579 ; 2.84 ; 5.639 ; 9.026 ; 13.0333 ; 14.268 ; 15.797 ; 17.6914 ; 19.9545 ; 22.0765 ; 23.9991 ; 25.5317 ; 27.1061 ; 29.0389 ; 31.2274 ; 31.6308 ; 32.0025 ; 32.5057 ; 32.5588 ; 32.6473 ; 32.7779 ; 32.9448 ; 33.1537 ; 33.3983 ; 33.4456 ; 33.4785 ; 33.5626 ; 33.6839 ; 33.8575 ; 34.0988 ; 34.4672 ; 34.9626 ; 35.1416 ; 35.4098 ; 35.7765 ; 36.3155 ; 37.0446 ; 37.2995 ; 37.6525 ; 38.1304 ; 38.7757 ; 38.9982 ; 39.3305 ; 39.7958 ; 39.9638 ; 40.2091 ; 40.5585 ; 40.6871 ; 40.8812 ; 41.1475 ; 41.5131 ; 41.9823 ; 42.1403 ; 42.3661 ; 42.6827 ; 43.1231 ; 43.728 ; 44.302 ; 44.4415 ; 44.6353 ; 44.9064 ; 45.2687 ; 45.7481 ; 46.202]

Bolt 1 - Tensile Force (kips): [34.682 ; 34.5574 ; 34.4556 ; 34.3159 ; 34.1277 ; 34.0642 ; 33.9804 ; 33.8673 ; 33.7127 ; 33.2822 ; 32.4395 ; 30.763 ; 28.8272 ; 26.2297 ; 24.0373 ; 24.0525 ; 24.076 ; 24.1175 ; 24.099 ; 24.0444 ; 23.9603 ; 23.9183 ; 23.942 ; 23.9877 ; 23.9984 ; 24.0013 ; 23.9866 ; 23.9821 ; 23.9964 ; 24.0239 ; 24.0433 ; 24.111 ; 24.1034 ; 24.066 ; 24.0569 ; 23.8882 ; 23.6961 ; 23.6228 ; 23.5726 ; 23.4599 ; 23.0691 ; 22.9536 ; 22.6469 ; 22.3252 ; 22.2071 ; 21.965 ; 21.6738 ; 21.5732 ; 21.4246 ; 21.2202 ; 21.0216 ; 20.8945 ; 20.845 ; 20.7004 ; 20.5012 ; 20.3076 ; 19.9499 ; 19.5853 ; 19.4937 ; 19.3526 ; 19.1384 ; 18.8646 ; 18.5573 ; 18.4122]

Bolt 1 - Shear Force (kips): [0.0388381 ; 0.159214 ; 0.299734 ; 0.475564 ; 0.695309 ; 0.766354 ; 0.857586 ; 0.976077 ; 1.13127 ; 1.54945 ; 2.26415 ; 3.55418 ; 4.91259 ; 6.60063 ; 7.92686 ; 7.9359 ; 7.94466 ; 7.95866 ; 7.98625 ; 8.05756 ; 8.16552 ; 8.23913 ; 8.25959 ; 8.27665 ; 8.27957 ; 8.29312 ; 8.40935 ; 8.56163 ; 8.70881 ; 8.82327 ; 9.16819 ; 9.41817 ; 9.58183 ; 9.91889 ; 10.2206 ; 11.1988 ; 12.6162 ; 13.0772 ; 13.5892 ; 14.3356 ; 15.6935 ; 16.1298 ; 16.9594 ; 17.9831 ; 18.3542 ; 19.0201 ; 19.8978 ; 20.1938 ; 20.6361 ; 21.3034 ; 22.068 ; 22.8844 ; 23.2055 ; 23.754 ; 24.5552 ; 25.6299 ; 27.1621 ; 28.441 ; 28.6871 ; 29.0149 ; 29.5511 ; 30.3029 ; 31.3265 ; 32.3185]

Bolt 2 - Tensile Force (kips): [34.7019 ; 34.5966 ; 34.5071 ; 34.3978 ; 34.2832 ; 34.2535 ; 34.2278 ; 34.203 ; 34.1943 ; 33.9974 ; 33.5514 ; 32.6203 ; 32.2312 ; 32.0674 ; 31.8337 ; 31.5851 ; 31.332 ; 30.9325 ; 30.9574 ; 31.0631 ; 31.2198 ; 31.2917 ; 31.1694 ; 30.9837 ; 30.9355 ; 30.9552 ; 31.0679 ; 31.2266 ; 31.4243 ; 31.6972 ; 32.1231 ; 32.7347 ; 32.9697 ; 33.3081 ; 33.8137 ; 34.5811 ; 35.575 ; 35.9173 ; 36.4188 ; 37.1239 ; 38.1319 ; 38.4916 ; 38.9981 ; 39.708 ; 39.9449 ; 40.2991 ; 40.8062 ; 40.9805 ; 41.2372 ; 41.6305 ; 42.1869 ; 42.757 ; 42.9712 ; 43.2969 ; 43.7902 ; 44.5037 ; 45.4241 ; 46.3364 ; 46.5084 ; 46.7472 ; 47.1183 ; 47.6875 ; 48.531 ; 49.3771]

Bolt 2 - Shear Force (kips): [0.0553201 ; 0.140861 ; 0.2776 ; 0.447444 ; 0.656815 ; 0.723913 ; 0.809394 ; 0.91916 ; 1.05964 ; 1.43264 ; 2.0855 ; 3.30003 ; 4.51215 ; 5.93108 ; 7.81841 ; 8.32462 ; 8.79474 ; 9.44448 ; 9.47228 ; 9.48178 ; 9.4944 ; 9.58793 ; 9.82475 ; 10.1192 ; 10.1801 ; 10.1946 ; 10.1933 ; 10.1922 ; 10.2495 ; 10.348 ; 10.6232 ; 10.9968 ; 11.0804 ; 11.2176 ; 11.407 ; 11.6455 ; 11.9635 ; 12.1624 ; 12.4611 ; 12.7027 ; 12.8947 ; 12.959 ; 13.0172 ; 13.1081 ; 13.18 ; 13.2606 ; 13.4395 ; 13.5701 ; 13.7315 ; 13.8707 ; 14.1454 ; 14.9634 ; 15.2096 ; 15.4975 ; 15.8337 ; 16.2576 ; 17.0365 ; 17.6234 ; 17.8543 ; 18.1795 ; 18.5624 ; 19.0474 ; 19.4817 ; 19.7719]

Bolt 3 - Tensile Force (kips): [36 ; 35.9357 ; 35.9804 ; 36.2263 ; 36.7478 ; 36.9911 ; 37.4436 ; 38.1231 ; 39.0263 ; 40.278 ; 42.0475 ; 44.2489 ; 47.3745 ; 51.3693 ; 55.3944 ; 56.0933 ; 56.7408 ; 57.6278 ; 57.7186 ; 57.8668 ; 58.0852 ; 58.3731 ; 58.7443 ; 59.1845 ; 59.2714 ; 59.3288 ; 59.4669 ; 59.6705 ; 59.9678 ; 60.3929 ; 61.0091 ; 61.8275 ; 62.1108 ; 62.5164 ; 63.0583 ; 63.7687 ; 64.6719 ; 64.9814 ; 65.4165 ; 66.0208 ; 66.8566 ; 67.1455 ; 67.5454 ; 68.1122 ; 68.3109 ; 68.5867 ; 68.971 ; 69.1018 ; 69.2476 ; 69.4739 ; 69.6527 ; 69.8434 ; 69.9139 ; 70.0211 ; 70.1429 ; 70.25 ; 70.3904 ; 70.5558 ; 70.6065 ; 70.6554 ; 70.6857 ; 70.7956 ; 70.9572 ; 71.1188]

Bolt 3 - Shear Force (kips): [0.039391 ; 0.018901 ; 0.062492 ; 0.13234 ; 0.21613 ; 0.24271 ; 0.27586 ; 0.32037 ; 0.37853 ; 0.4557 ; 0.57313 ; 0.74399 ; 0.94047 ; 1.0629 ; 1.1397 ; 1.1491 ; 1.1543 ; 1.1573 ; 1.1574 ; 1.1575 ; 1.1576 ; 1.1576 ; 1.1575 ; 1.1572 ; 1.1572 ; 1.1571 ; 1.1565 ; 1.1558 ; 1.155 ; 1.1544 ; 1.1522 ; 1.1525 ; 1.1525 ; 1.1525 ; 1.154 ; 1.1529 ; 1.1426 ; 1.1342 ; 1.1182 ; 1.0859 ; 1.0201 ; 0.9929 ; 1.0534 ; 1.1071 ; 1.1179 ; 1.1356 ; 1.1516 ; 1.1648 ; 1.2801 ; 1.3615 ; 1.6386 ; 1.9335 ; 2.0143 ; 2.1093 ; 2.207 ; 2.6235 ; 3.3841 ; 3.8911 ; 3.9671 ; 4.1408 ; 4.4754 ; 4.8438 ; 5.2614 ; 5.6203]

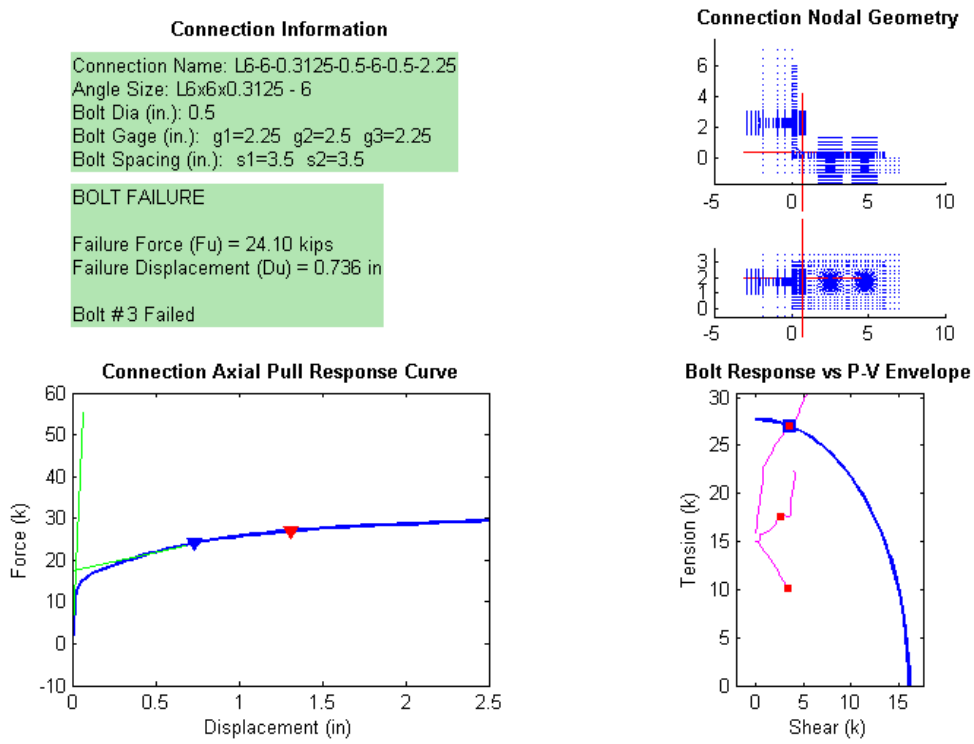


Figure B.82 Connection L6_6_0.3125_0.5_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.5_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 813.9561

Plastic Stiffness (k/in): 9.1813

Displacement (in): [5.9706e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.088989 ; 0.11124 ; 0.14461 ; 0.19466 ; 0.26975 ; 0.2979 ; 0.34014 ; 0.35598 ; 0.36192 ; 0.37083 ; 0.38419 ; 0.40424 ; 0.4343 ; 0.47941 ; 0.49632 ; 0.52169 ; 0.55974 ; 0.57401 ; 0.59542 ; 0.62753 ; 0.67569 ; 0.74793 ; 0.8563 ; 0.89694 ; 0.95789 ; 1.0493 ; 1.0836 ; 1.0965 ; 1.1158 ; 1.1447 ; 1.1881 ; 1.2532 ; 1.3508 ; 1.3874 ; 1.4424 ; 1.5247 ; 1.6483 ; 1.6947 ; 1.7642 ; 1.8684 ; 2.0248 ; 2.2594 ; 2.3196 ; 2.4098 ; 2.5]

Force (kips): [-0.179308 ; 0.722953 ; 1.41045 ; 2.03332 ; 2.89233 ; 4.01992 ; 5.26522 ; 6.39376 ; 7.12907 ; 7.63178 ; 7.96697 ; 8.23801 ; 8.57635 ; 9.01565 ; 9.56564 ; 9.75081 ; 10.0056 ; 10.0954 ; 10.1284 ; 10.1904 ; 10.2821 ; 10.4136 ; 10.5989 ; 10.8413 ; 10.9247 ; 11.0441 ; 11.2357 ; 11.3009 ; 11.4035 ; 11.5673 ; 11.7884 ; 12.1005 ; 12.4669 ; 12.5869 ; 12.7462 ; 12.9549 ; 13.0273 ; 13.0573 ; 13.1024 ; 13.1687 ; 13.2625 ; 13.3952 ; 13.572 ; 13.6304 ; 13.7104 ; 13.8187 ; 13.9675 ; 14.0214 ; 14.0935 ; 14.1946 ; 14.3372 ; 14.5183 ; 14.5688 ; 14.6397 ; 14.7015]

Bolt 1 - Tensile Force (kips): [15.1202 ; 15.0979 ; 15.0786 ; 15.0601 ; 15.0322 ; 14.9895 ; 14.9355 ; 14.8798 ; 14.8377 ; 14.7988 ; 14.7618 ; 14.7229 ; 14.4458 ; 13.8369 ; 12.996 ; 12.6961 ; 12.2717 ; 12.116 ; 12.0583 ; 11.9992 ; 11.9185 ; 11.8083 ; 11.6364 ; 11.3649 ; 11.2657 ; 11.1197 ; 10.8884 ; 10.8045 ; 10.6712 ; 10.4744 ; 10.2418 ; 10.0991 ; 10.1085 ; 10.1118 ; 10.1167 ; 10.1244 ; 10.1273 ; 10.1285 ; 10.1304 ; 10.1331 ; 10.1373 ; 10.1369 ; 10.0278 ; 10.0336 ; 10.0424 ; 10.0556 ; 10.0756 ; 10.0832 ; 10.0946 ; 10.1117 ; 10.1374 ; 10.1765 ; 10.1864 ; 10.1804 ; 10.1708]

Bolt 1 - Shear Force (kips): [0.015654 ; 0.034407 ; 0.065934 ; 0.095606 ; 0.13759 ; 0.19381 ; 0.25815 ; 0.32067 ; 0.36656 ; 0.40832 ; 0.44714 ; 0.48602 ; 0.71318 ; 1.1452 ; 1.6908 ; 1.8769 ; 2.1339 ; 2.2262 ; 2.2601 ; 2.2952 ; 2.3428 ; 2.4076 ; 2.5074 ; 2.6612 ; 2.7161 ; 2.7962 ; 2.9209 ; 2.9656 ; 3.0357 ; 3.1377 ; 3.257 ; 3.3327 ; 3.3358 ; 3.3369 ; 3.3385 ; 3.341 ; 3.342 ; 3.3424 ; 3.343 ; 3.3439 ; 3.3453 ; 3.3532 ; 3.4369 ; 3.4348 ; 3.4317 ; 3.427 ; 3.4198 ; 3.4171 ; 3.4131 ; 3.4071 ; 3.3981 ; 3.3847 ; 3.3812 ; 3.4781 ; 3.5969]

Bolt 2 - Tensile Force (kips): [15.1309 ; 15.1011 ; 15.0776 ; 15.0598 ; 15.0366 ; 15.0089 ; 14.9944 ; 15.001 ; 15.0538 ; 15.2289 ; 15.4659 ; 15.6996 ; 15.8444 ; 15.9994 ; 16.2977 ; 16.393 ; 16.5298 ; 16.5739 ; 16.5897 ; 16.6231 ; 16.6737 ; 16.7579 ; 16.8744 ; 17.0287 ; 17.0853 ; 17.166 ; 17.2645 ; 17.3007 ; 17.3458 ; 17.4126 ; 17.5527 ; 17.6551 ; 17.7086 ; 17.6915 ; 17.632 ; 17.6074 ; 17.5773 ; 17.6699 ; 17.8069 ; 18.0003 ; 18.2728 ; 18.6574 ; 19.1722 ; 19.3382 ; 19.5539 ; 19.8316 ; 20.1993 ; 20.3376 ; 20.5279 ; 20.7797 ; 21.0989 ; 21.6408 ; 21.808 ; 22.095 ; 22.3845]

Bolt 2 - Shear Force (kips): [0.017185 ; 0.042754 ; 0.079818 ; 0.11485 ; 0.16434 ; 0.23053 ; 0.30738 ; 0.38267 ; 0.43735 ; 0.48371 ; 0.52158 ; 0.55744 ; 0.75851 ; 1.1312 ; 1.5697 ; 1.7125 ; 1.9033 ; 1.971 ; 1.9958 ; 2.0195 ; 2.0512 ; 2.0873 ; 2.1392 ; 2.2204 ; 2.2487 ; 2.29 ; 2.359 ; 2.3839 ; 2.4252 ; 2.4849 ; 2.5454 ; 2.6924 ; 2.9466 ; 3.0698 ; 3.2706 ; 3.5175 ; 3.6092 ; 3.6163 ; 3.6273 ; 3.6456 ; 3.672 ; 3.7113 ; 3.719 ; 3.7372 ; 3.7662 ; 3.8137 ; 3.8807 ; 3.9036 ; 3.9337 ; 3.9813 ; 4.0553 ; 4.1183 ; 4.1515 ; 4.0884 ; 3.9896]

Bolt 3 - Tensile Force (kips): [16 ; 15.9857 ; 15.9894 ; 16.0117 ; 16.0712 ; 16.2155 ; 16.5482 ; 17.0448 ; 17.5899 ; 18.1207 ; 18.5509 ; 18.9545 ; 19.5215 ; 20.3752 ; 21.5685 ; 21.9776 ; 22.5573 ; 22.7624 ; 22.8376 ; 22.9786 ; 23.2027 ; 23.5443 ; 24.0395 ; 24.6383 ; 24.8232 ; 25.0636 ; 25.428 ; 25.5459 ; 25.7302 ; 26.032 ; 26.4549 ; 27.1105 ; 27.7355 ; 27.9624 ; 28.2687 ; 28.6113 ; 28.7392 ; 28.782 ; 28.8577 ; 28.9752 ; 29.1467 ; 29.4073 ; 29.7316 ; 29.8223 ; 29.9279 ; 30.0443 ; 30.1994 ; 30.2666 ; 30.3294 ; 30.411 ; 30.5732 ; 30.7322 ; 30.8571 ; 31.0153 ; 31.1161]

Bolt 3 - Shear Force (kips): [0.0088143 ; 0.0083005 ; 0.023759 ; 0.039718 ; 0.062366 ; 0.093033 ; 0.13257 ; 0.17619 ; 0.23596 ; 0.33225 ; 0.41584 ; 0.48351 ; 0.56729 ; 0.65486 ; 0.73582 ; 0.75738 ; 0.78201 ; 0.78863 ; 0.79088 ; 0.92199 ; 1.1035 ; 1.3171 ; 1.5596 ; 1.8319 ; 1.9286 ; 2.0707 ; 2.3239 ; 2.4035 ; 2.5266 ; 2.785 ; 3.1384 ; 3.6639 ; 4.2325 ; 4.3687 ; 4.4479 ; 4.5515 ; 4.5871 ; 4.6225 ; 4.6713 ; 4.7301 ; 4.8097 ; 4.8802 ; 5.0095 ; 5.0581 ; 5.1236 ; 5.2191 ; 5.4128 ; 5.4787 ; 5.5723 ; 5.6996 ; 5.8966 ; 6.1408 ; 6.1431 ; 6.1544 ; 6.2048]

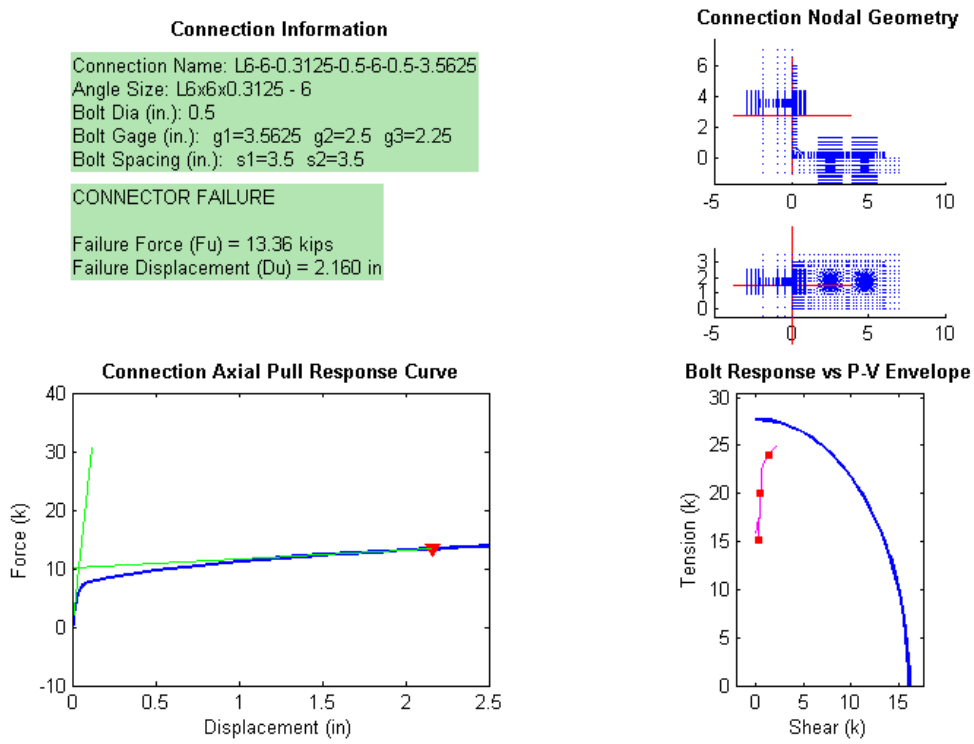


Figure B.83 Connection L6_6_0.3125_0.5_6_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.5_6_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 268.1021

Plastic Stiffness (k/in): 1.4613

Displacement (in): [6.8208e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.50682 ; 0.75682 ; 1.0068 ; 1.2568 ; 1.5068 ; 1.5693 ; 1.5928 ; 1.6279 ; 1.6807 ; 1.7597 ; 1.7894 ; 1.8339 ; 1.9007 ; 2.0008 ; 2.1509 ; 2.3762 ; 2.5]

Force (kips): [-0.16748 ; 0.16656 ; 0.35616 ; 0.53416 ; 0.79329 ; 1.1645 ; 1.6977 ; 2.4204 ; 3.1393 ; 3.6146 ; 3.8301 ; 3.9859 ; 4.1984 ; 4.4688 ; 4.8153 ; 5.2489 ; 5.6096 ; 5.9049 ; 6.1535 ; 6.209 ; 6.2303 ; 6.2615 ; 6.3068 ; 6.3711 ; 6.394 ; 6.4291 ; 6.4818 ; 6.5627 ; 6.6725 ; 6.8176 ; 6.8894]

Bolt 1 - Tensile Force (kips): [15.1202 ; 15.1129 ; 15.1085 ; 15.1042 ; 15.0978 ; 15.0881 ; 15.0734 ; 15.0513 ; 15.0272 ; 15.0114 ; 15.0083 ; 15.0109 ; 15.0123 ; 15.0106 ; 15.0149 ; 15.0335 ; 15.0591 ; 15.0892 ; 15.122 ; 15.1305 ; 15.1337 ; 15.1384 ; 15.1455 ; 15.1563 ; 15.1604 ; 15.1665 ; 15.1765 ; 15.1932 ; 15.2175 ; 15.2535 ; 15.2733]

Bolt 1 - Shear Force (kips): [0.015175 ; 0.013811 ; 0.01966 ; 0.026802 ; 0.038259 ; 0.055567 ; 0.081688 ; 0.11879 ; 0.15777 ; 0.18454 ; 0.19686 ; 0.20603 ; 0.22242 ; 0.25116 ; 0.28399 ; 0.31593 ; 0.33775 ; 0.35296 ; 0.36437 ; 0.36681 ; 0.36776 ; 0.36917 ; 0.3712 ; 0.374 ; 0.37499 ; 0.37654 ; 0.37746 ; 0.37552 ; 0.37395 ; 0.37221 ; 0.37125]

Bolt 2 - Tensile Force (kips): [15.1312 ; 15.12 ; 15.1136 ; 15.1076 ; 15.1001 ; 15.0936 ; 15.0891 ; 15.0957 ; 15.1253 ; 15.1838 ; 15.2328 ; 15.2867 ; 15.4471 ; 15.7967 ; 16.2788 ; 17.054 ; 17.787 ; 18.4099 ; 18.9637 ; 19.0916 ; 19.1393 ; 19.2099 ; 19.314 ; 19.4654 ; 19.5206 ; 19.6027 ; 19.7049 ; 19.8102 ; 19.9707 ; 20.1898 ; 20.3056]

Bolt 2 - Shear Force (kips): [0.016617 ; 0.018237 ; 0.026089 ; 0.035007 ; 0.049061 ; 0.070513 ; 0.10281 ; 0.14869 ; 0.19721 ; 0.23404 ; 0.25269 ; 0.26633 ; 0.28886 ; 0.32115 ; 0.35918 ; 0.40014 ; 0.43058 ; 0.45881 ; 0.48316 ; 0.48849 ; 0.49048 ; 0.49337 ; 0.49756 ; 0.50329 ; 0.50531 ; 0.50828 ; 0.51129 ; 0.5127 ; 0.51573 ; 0.51943 ; 0.52127]

Bolt 3 - Tensile Force (kips): [16 ; 15.9895 ; 15.9824 ; 15.9789 ; 15.9771 ; 15.9869 ; 16.0224 ; 16.1201 ; 16.3118 ; 16.4966 ; 16.6438 ; 16.8182 ; 16.9501 ; 17.1512 ; 17.8625 ; 19.0806 ; 20.2443 ; 21.2591 ; 22.1256 ; 22.3206 ; 22.384 ; 22.477 ; 22.6141 ; 22.7964 ; 22.8605 ; 22.9601 ; 23.1535 ; 23.5051 ; 23.9564 ; 24.5921 ; 24.8864]

Bolt 3 - Shear Force (kips): [0.0089049 ; 0.002739 ; 0.0057328 ; 0.011721 ; 0.021077 ; 0.035729 ; 0.057492 ; 0.08718 ; 0.11941 ; 0.14425 ; 0.15215 ; 0.15231 ; 0.21469 ; 0.34138 ; 0.43212 ; 0.52419 ; 0.59403 ; 0.64007 ; 0.6744 ; 0.6814 ; 0.68845 ; 0.69815 ; 0.71064 ; 0.72746 ; 0.73173 ; 0.74828 ; 0.83883 ; 1.0722 ; 1.3435 ; 1.8359 ; 2.1542]

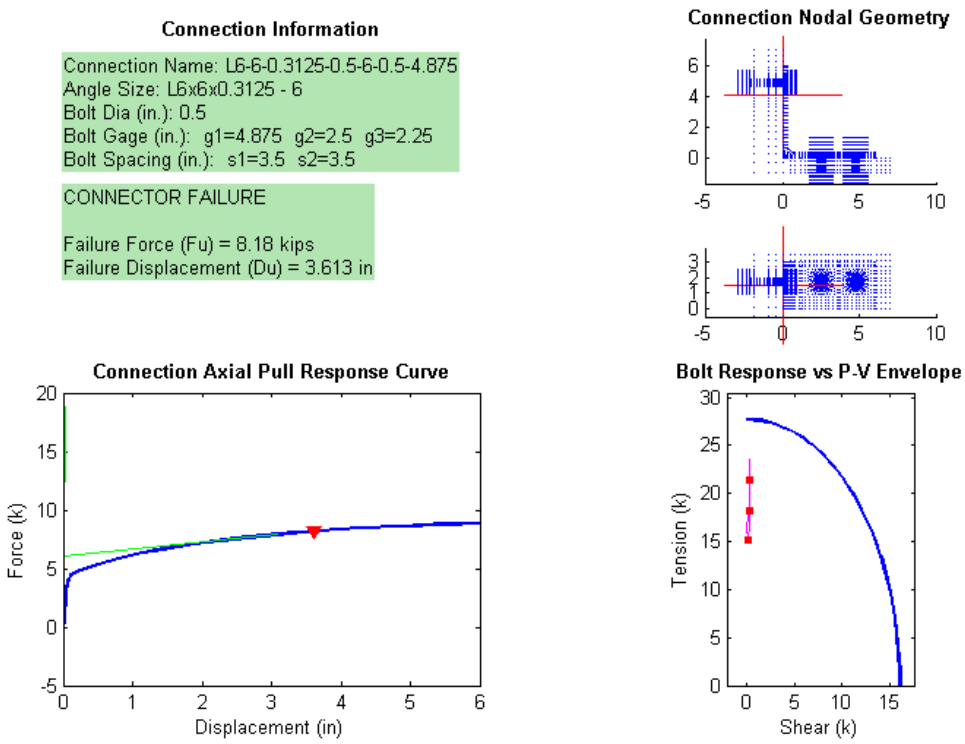


Figure B.84 Connection L6_6_0.3125_0.5_6_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.5_6_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 594.7151

Plastic Stiffness (k/in): 0.6059

Displacement (in): [6.6951e-037 ; 0.00029297 ; 0.00058594 ; 0.0010254 ; 0.0016846 ; 0.0026733 ; 0.0041565 ; 0.0063812 ; 0.0097183 ; 0.014724 ; 0.022232 ; 0.033495 ; 0.050389 ; 0.07573 ; 0.11374 ; 0.17076 ; 0.25628 ; 0.38458 ; 0.57701 ; 0.86566 ; 1.1543 ; 1.443 ; 1.8759 ; 2.4759 ; 3.0759 ; 3.6759 ; 4.2759 ; 4.8759 ; 5.4759 ; 6]

Force (kips): [-0.16711 ; -0.0047469 ; 0.0071211 ; 0.024774 ; 0.04985 ; 0.086458 ; 0.14049 ; 0.21903 ; 0.33142 ; 0.49691 ; 0.73813 ; 1.0899 ; 1.5766 ; 2.0222 ; 2.2386 ; 2.3264 ; 2.418 ; 2.5549 ; 2.7491 ; 2.9862 ; 3.1774 ; 3.3404 ; 3.5474 ; 3.7759 ; 3.9577 ; 4.1042 ; 4.2197 ; 4.3078 ; 4.3753 ; 4.4226]

Bolt 1 - Tensile Force (kips): [15.1203 ; 15.1166 ; 15.1164 ; 15.116 ; 15.1155 ; 15.1148 ; 15.1136 ; 15.1119 ; 15.1094 ; 15.1055 ; 15.0997 ; 15.0906 ; 15.0771 ; 15.0641 ; 15.0592 ; 15.0601 ; 15.0625 ; 15.0661 ; 15.0715 ; 15.0866 ; 15.1042 ; 15.1149 ; 15.1341 ; 15.1674 ; 15.2032 ; 15.2406 ; 15.2788 ; 15.3177 ; 15.3569 ; 15.391]

Bolt 1 - Shear Force (kips): [0.015224 ; 0.012231 ; 0.012192 ; 0.012174 ; 0.012246 ; 0.012545 ; 0.013385 ; 0.015284 ; 0.01897 ; 0.025549 ; 0.036271 ; 0.053028 ; 0.077909 ; 0.10222 ; 0.11495 ; 0.12082 ; 0.12775 ; 0.13815 ; 0.15325 ; 0.16505 ; 0.17253 ; 0.18901 ; 0.20825 ; 0.22427 ; 0.23522 ; 0.24278 ; 0.24813 ; 0.25147 ; 0.25368 ; 0.25576]

Bolt 2 - Tensile Force (kips): [15.1317 ; 15.1268 ; 15.1264 ; 15.1257 ; 15.1247 ; 15.1231 ; 15.121 ; 15.1182 ; 15.1143 ; 15.1095 ; 15.106 ; 15.1069 ; 15.12 ; 15.1547 ; 15.1839 ; 15.2053 ; 15.2366 ; 15.287 ; 15.392 ; 15.6156 ; 15.885 ; 16.199 ; 16.6559 ; 17.2483 ; 17.7541 ; 18.192 ; 18.5494 ; 18.8281 ; 19.0421 ; 19.2086]

Bolt 2 - Shear Force (kips): [0.016719 ; 0.014801 ; 0.014903 ; 0.015097 ; 0.015491 ; 0.016272 ; 0.017823 ; 0.020761 ; 0.025855 ; 0.034473 ; 0.04829 ; 0.070042 ; 0.10222 ; 0.13412 ; 0.15081 ; 0.15823 ; 0.16705 ; 0.18137 ; 0.20484 ; 0.22951 ; 0.2457 ; 0.27055 ; 0.301 ; 0.3306 ; 0.35461 ; 0.37399 ; 0.38867 ; 0.39951 ; 0.40664 ; 0.41198]

Bolt 3 - Tensile Force (kips): [16 ; 15.999 ; 15.9981 ; 15.9967 ; 15.9949 ; 15.9922 ; 15.9884 ; 15.9835 ; 15.9795 ; 15.9757 ; 15.9785 ; 15.998 ; 16.0594 ; 16.1794 ; 16.2804 ; 16.3761 ; 16.4983 ; 16.6798 ; 16.9352 ; 17.314 ; 17.7019 ; 18.1504 ; 18.8617 ; 19.8509 ; 20.7337 ; 21.4968 ; 22.1513 ; 22.7095 ; 23.175 ; 23.4969]

Bolt 3 - Shear Force (kips): [0.0090595 ; 0.0076755 ; 0.0071979 ; 0.006495 ; 0.0055081 ; 0.0042101 ; 0.0029962 ; 0.0041889 ; 0.0088941 ; 0.016751 ; 0.029169 ; 0.048196 ; 0.07407 ; 0.097861 ; 0.10589 ; 0.10202 ; 0.094652 ; 0.093764 ; 0.10516 ; 0.1377 ; 0.18399 ; 0.23276 ; 0.29029 ; 0.33443 ; 0.36243 ; 0.37307 ; 0.3674 ; 0.34947 ; 0.32599 ; 0.31522]

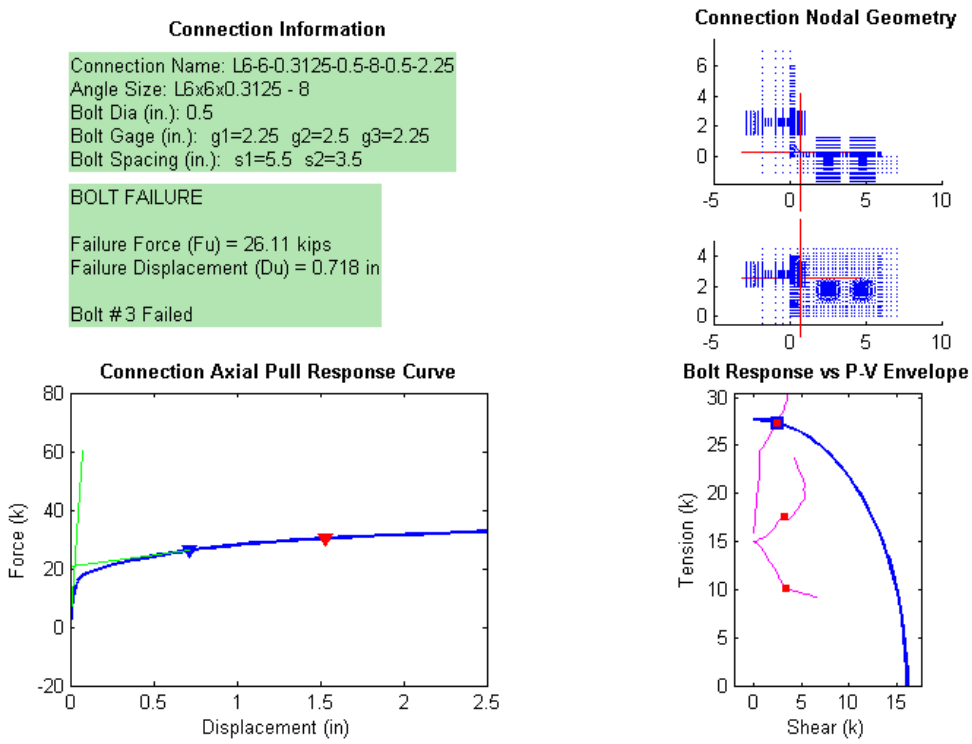


Figure B.85 Connection L6_6_0.3125_0.5_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.5_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 804.9823

Plastic Stiffness (k/in): 7.7887

Displacement (in): [6.0708e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0078125 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.033569 ; 0.048401 ; 0.070648 ; 0.10402 ; 0.15408 ; 0.22916 ; 0.30424 ; 0.37933 ; 0.40749 ; 0.41805 ; 0.43388 ; 0.45764 ; 0.49328 ; 0.54673 ; 0.62691 ; 0.65698 ; 0.66825 ; 0.68517 ; 0.71054 ; 0.74859 ; 0.80567 ; 0.82708 ; 0.83511 ; 0.84715 ; 0.86521 ; 0.8923 ; 0.93294 ; 0.99389 ; 1.0168 ; 1.051 ; 1.1025 ; 1.1796 ; 1.2953 ; 1.3387 ; 1.4038 ; 1.4282 ; 1.4649 ; 1.4786 ; 1.4992 ; 1.5301 ; 1.5764 ; 1.6459 ; 1.7502 ; 1.9066 ; 1.9652 ; 2.0532 ; 2.1852 ; 2.3831 ; 2.5]

Force (kips): [-0.151801 ; 0.721097 ; 1.42043 ; 2.0596 ; 2.65744 ; 3.22082 ; 3.99486 ; 4.95603 ; 6.05887 ; 7.10916 ; 7.99006 ; 8.65061 ; 9.19233 ; 9.73811 ; 10.3861 ; 10.9322 ; 11.3967 ; 11.5514 ; 11.6164 ; 11.7162 ; 11.861 ; 12.0644 ; 12.329 ; 12.6795 ; 12.8106 ; 12.8619 ; 12.9272 ; 13.026 ; 13.1769 ; 13.3961 ; 13.4636 ; 13.4924 ; 13.5377 ; 13.6035 ; 13.6943 ; 13.8178 ; 13.9915 ; 14.0532 ; 14.1461 ; 14.2746 ; 14.4503 ; 14.6906 ; 14.7719 ; 14.8887 ; 14.9323 ; 14.995 ; 15.0185 ; 15.0546 ; 15.1075 ; 15.1864 ; 15.2978 ; 15.4497 ; 15.6508 ; 15.7286 ; 15.8317 ; 15.9708 ; 16.1693 ; 16.2759]

Bolt 1 - Tensile Force (kips): [15.1153 ; 15.0917 ; 15.0703 ; 15.0493 ; 15.0283 ; 15.0067 ; 14.9737 ; 14.929 ; 14.8724 ; 14.8111 ; 14.7492 ; 14.6867 ; 14.374 ; 13.7277 ; 12.8525 ; 12.0466 ; 11.3007 ; 11.0309 ; 10.9305 ; 10.7818 ; 10.5645 ; 10.2493 ; 10.0736 ; 10.0805 ; 10.0835 ; 10.0846 ; 10.0864 ; 10.089 ; 10.0931 ; 10.0992 ; 10.1005 ; 10.1015 ; 10.1031 ; 10.1053 ; 10.1084 ; 10.1131 ; 10.1049 ; 10.0207 ; 9.96647 ; 9.97593 ; 9.9903 ; 10.0119 ; 10.02 ; 10.0322 ; 10.0292 ; 10.0148 ; 10.0041 ; 9.97384 ; 9.92357 ; 9.87053 ; 9.78883 ; 9.65197 ; 9.56244 ; 9.52396 ; 9.45275 ; 9.35458 ; 9.22245 ; 9.14382]

Bolt 1 - Shear Force (kips): [0.014232 ; 0.036998 ; 0.071876 ; 0.10466 ; 0.13574 ; 0.16528 ; 0.20617 ; 0.25815 ; 0.32008 ; 0.38323 ; 0.4437 ; 0.5021 ; 0.75218 ; 1.2047 ; 1.7661 ; 2.2531 ; 2.6795 ; 2.8262 ; 2.8799 ; 2.9586 ; 3.0719 ; 3.2325 ; 3.3236 ; 3.3264 ; 3.3274 ; 3.3278 ; 3.3284 ; 3.3293 ; 3.3306 ; 3.3327 ; 3.3331 ; 3.3335 ; 3.334 ; 3.3347 ; 3.3357 ; 3.3373 ; 3.3514 ; 3.4105 ; 3.4499 ; 3.4475 ; 3.4437 ; 3.4379 ; 3.4357 ; 3.4324 ; 3.4648 ; 3.5868 ; 3.6536 ; 3.789 ; 3.9927 ; 4.209 ; 4.4997 ; 4.8653 ; 5.198 ; 5.3524 ; 5.6115 ; 5.9654 ; 6.3975 ; 6.6151]

Bolt 2 - Tensile Force (kips): [15.124 ; 15.0943 ; 15.0698 ; 15.0483 ; 15.0316 ; 15.0144 ; 14.9931 ; 14.9752 ; 14.9611 ; 14.9677 ; 15.0038 ; 15.1776 ; 15.2946 ; 15.4472 ; 15.8719 ; 16.2752 ; 16.635 ; 16.7667 ; 16.8111 ; 16.8726 ; 16.9586 ; 17.0784 ; 17.235 ; 17.4218 ; 17.475 ; 17.4916 ; 17.5205 ; 17.56 ; 17.6034 ; 17.5946 ; 17.2549 ; 17.2801 ; 17.3475 ; 17.4436 ; 17.5812 ; 17.7629 ; 17.9923 ; 18.0939 ; 18.2155 ; 18.3904 ; 18.7 ; 19.1398 ; 19.2874 ; 19.4674 ; 19.5439 ; 19.6881 ; 19.751 ; 19.8597 ; 20.0178 ; 20.2085 ; 20.4635 ; 20.837 ; 21.5458 ; 21.8085 ; 22.1943 ; 22.7194 ; 23.37 ; 23.7089]

Bolt 2 - Shear Force (kips): [0.013021 ; 0.043328 ; 0.083057 ; 0.12028 ; 0.15562 ; 0.18889 ; 0.23517 ; 0.29436 ; 0.36457 ; 0.43687 ; 0.5058 ; 0.56687 ; 0.79699 ; 1.1928 ; 1.6458 ; 2.0063 ; 2.3004 ; 2.3919 ; 2.4248 ; 2.4732 ; 2.5434 ; 2.6433 ; 2.7846 ; 2.9833 ; 3.0562 ; 3.0837 ; 3.1216 ; 3.1775 ; 3.2623 ; 3.4138 ; 3.618 ; 3.6494 ; 3.7101 ; 3.8013 ; 3.93 ; 4.0957 ; 4.2925 ; 4.356 ; 4.4511 ; 4.5869 ; 4.7867 ; 5.0856 ; 5.1861 ; 5.3189 ; 5.3511 ; 5.3633 ; 5.3598 ; 5.341 ; 5.3107 ; 5.2987 ; 5.2905 ; 5.3615 ; 5.1804 ; 5.0879 ; 4.9133 ; 4.6767 ; 4.4262 ; 4.303]

Bolt 3 - Tensile Force (kips): [16 ; 15.986 ; 15.9905 ; 16.0142 ; 16.0534 ; 16.1055 ; 16.2131 ; 16.4419 ; 16.8252 ; 17.3895 ; 18.0794 ; 18.825 ; 19.6436 ; 20.6286 ; 21.9482 ; 23.1332 ; 24.118 ; 24.4242 ; 24.547 ; 24.739 ; 25.0367 ; 25.4729 ; 25.9915 ; 26.6721 ; 26.9196 ; 27.0102 ; 27.1328 ; 27.3249 ; 27.62 ; 28.065 ; 28.209 ; 28.2585 ; 28.3293 ; 28.4548 ; 28.611 ; 28.796 ; 29.0715 ; 29.1636 ; 29.3239 ; 29.5436 ; 29.825 ; 30.2241 ; 30.3509 ; 30.5466 ; 30.6152 ; 30.6978 ; 30.7262 ; 30.7684 ; 30.8308 ; 30.9464 ; 31.1163 ; 31.3237 ; 31.5721 ; 31.7241 ; 31.8754 ; 32.0442 ; 32.3934 ; 32.5839]

Bolt 3 - Shear Force (kips): [0.0091532 ; 0.0067767 ; 0.019546 ; 0.03328 ; 0.047082 ; 0.060127 ; 0.078737 ; 0.10424 ; 0.13517 ; 0.16626 ; 0.20823 ; 0.29357 ; 0.39226 ; 0.49097 ; 0.58469 ; 0.63357 ; 0.65575 ; 0.66183 ; 0.75595 ; 0.92997 ; 1.1665 ; 1.4352 ; 1.7543 ; 2.084 ; 2.2165 ; 2.2776 ; 2.3283 ; 2.4055 ; 2.5651 ; 2.8242 ; 2.9142 ; 2.947 ; 3.0019 ; 3.0601 ; 3.1082 ; 3.1748 ; 3.2778 ; 3.298 ; 3.3778 ; 3.4571 ; 3.5121 ; 3.6081 ; 3.6482 ; 3.721 ; 3.7258 ; 3.7259 ; 3.7244 ; 3.7342 ; 3.7647 ; 3.8754 ; 3.9365 ; 4.0632 ; 4.0086 ; 4.0148 ; 3.9535 ; 3.8964 ; 3.7701 ; 3.7868]

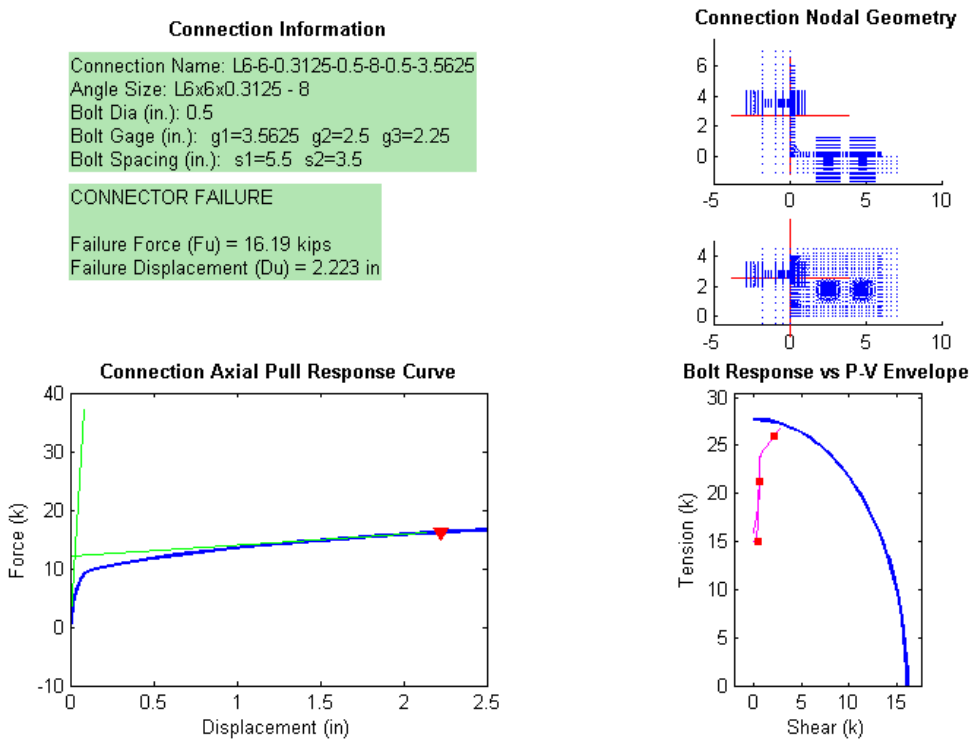


Figure B.86 Connection L6_6_0.3125_0.5_8_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.5_8_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 430.4636

Plastic Stiffness (k/in): 1.8125

Displacement (in): [7.2198e-037 ; 0.00048828 ; 0.00097656 ; 0.0014648 ; 0.0021973 ; 0.0032959 ; 0.0049438 ; 0.0065918 ; 0.0082398 ; 0.010712 ; 0.01442 ; 0.019981 ; 0.028324 ; 0.040838 ; 0.059609 ; 0.087766 ; 0.13 ; 0.19335 ; 0.28838 ; 0.43093 ; 0.64474 ; 0.89474 ; 1.1447 ; 1.3947 ; 1.4572 ; 1.551 ; 1.5861 ; 1.6389 ; 1.718 ; 1.7476 ; 1.7921 ; 1.8589 ; 1.959 ; 1.9965 ; 2.0528 ; 2.1373 ; 2.264 ; 2.3115 ; 2.3828 ; 2.4897 ; 2.5]

Force (kips): [-0.14438 ; 0.0059813 ; 0.065809 ; 0.12174 ; 0.20409 ; 0.32237 ; 0.48995 ; 0.65389 ; 0.81397 ; 1.0493 ; 1.3897 ; 1.8832 ; 2.5652 ; 3.3566 ; 4.0794 ; 4.5782 ; 4.8654 ; 5.0857 ; 5.3525 ; 5.6914 ; 6.1342 ; 6.575 ; 6.9456 ; 7.2576 ; 7.3287 ; 7.4298 ; 7.4675 ; 7.5268 ; 7.6124 ; 7.6471 ; 7.6928 ; 7.7608 ; 7.8581 ; 7.8954 ; 7.9504 ; 8.0269 ; 8.1304 ; 8.1682 ; 8.2221 ; 8.3004 ; 8.3078]

Bolt 1 - Tensile Force (kips): [15.1153 ; 15.1117 ; 15.1103 ; 15.109 ; 15.1069 ; 15.1038 ; 15.0993 ; 15.0948 ; 15.0903 ; 15.0834 ; 15.0731 ; 15.0572 ; 15.0331 ; 15.0007 ; 14.9669 ; 14.9431 ; 14.9295 ; 14.9171 ; 14.8992 ; 14.8911 ; 14.8913 ; 14.901 ; 14.9188 ; 14.9409 ; 14.9467 ; 14.9554 ; 14.96 ; 14.9679 ; 14.9795 ; 14.9842 ; 14.9907 ; 15.0007 ; 15.0157 ; 15.0217 ; 15.0307 ; 15.0437 ; 15.0623 ; 15.0695 ; 15.0799 ; 15.0957 ; 15.0973]

Bolt 1 - Shear Force (kips): [0.013909 ; 0.011066 ; 0.011292 ; 0.012199 ; 0.01449 ; 0.018965 ; 0.026447 ; 0.034351 ; 0.042296 ; 0.054287 ; 0.072058 ; 0.09856 ; 0.13655 ; 0.18252 ; 0.22764 ; 0.26217 ; 0.28679 ; 0.31379 ; 0.35185 ; 0.38645 ; 0.42307 ; 0.45503 ; 0.47848 ; 0.49767 ; 0.50235 ; 0.50924 ; 0.51057 ; 0.51107 ; 0.51238 ; 0.51237 ; 0.51325 ; 0.51417 ; 0.5155 ; 0.51531 ; 0.51501 ; 0.51549 ; 0.5177 ; 0.51814 ; 0.51935 ; 0.5209 ; 0.521]

Bolt 2 - Tensile Force (kips): [15.1242 ; 15.1197 ; 15.1174 ; 15.1153 ; 15.1121 ; 15.1078 ; 15.1017 ; 15.0959 ; 15.091 ; 15.0841 ; 15.0784 ; 15.0725 ; 15.0743 ; 15.0969 ; 15.1516 ; 15.2286 ; 15.3521 ; 15.5464 ; 15.8576 ; 16.3752 ; 17.212 ; 18.1201 ; 18.9476 ; 19.6936 ; 19.8683 ; 20.1217 ; 20.2029 ; 20.3095 ; 20.4682 ; 20.5223 ; 20.6093 ; 20.7328 ; 20.9122 ; 20.9714 ; 21.0575 ; 21.1899 ; 21.3906 ; 21.4598 ; 21.565 ; 21.7139 ; 21.7276]

Bolt 2 - Shear Force (kips): [0.012645 ; 0.010605 ; 0.011739 ; 0.01355 ; 0.017014 ; 0.022895 ; 0.032052 ; 0.041444 ; 0.050862 ; 0.065028 ; 0.086144 ; 0.11753 ; 0.16207 ; 0.21622 ; 0.27112 ; 0.31446 ; 0.34377 ; 0.37196 ; 0.40963 ; 0.4416 ; 0.47763 ; 0.51884 ; 0.55948 ; 0.59352 ; 0.60098 ; 0.61089 ; 0.61328 ; 0.61552 ; 0.61866 ; 0.61937 ; 0.62075 ; 0.62244 ; 0.62433 ; 0.62461 ; 0.62488 ; 0.62493 ; 0.62531 ; 0.62493 ; 0.62395 ; 0.62246 ; 0.6223]

Bolt 3 - Tensile Force (kips): [16 ; 15.9972 ; 15.9944 ; 15.9919 ; 15.9883 ; 15.9838 ; 15.9804 ; 15.9782 ; 15.978 ; 15.9811 ; 15.9961 ; 16.0348 ; 16.1331 ; 16.3573 ; 16.6518 ; 16.9146 ; 17.1291 ; 17.3593 ; 17.7476 ; 18.4835 ; 19.7306 ; 21.1159 ; 22.3057 ; 23.2944 ; 23.5067 ; 23.8004 ; 23.9185 ; 24.1192 ; 24.4197 ; 24.5576 ; 24.7057 ; 24.9068 ; 25.2005 ; 25.3321 ; 25.5271 ; 25.8024 ; 26.1148 ; 26.232 ; 26.4004 ; 26.6495 ; 26.6761]

Bolt 3 - Shear Force (kips): [0.0091957 ; 0.0070406 ; 0.0054061 ; 0.0040065 ; 0.002705 ; 0.0040456 ; 0.0087521 ; 0.013837 ; 0.018973 ; 0.026786 ; 0.038911 ; 0.056683 ; 0.081262 ; 0.11123 ; 0.14225 ; 0.17166 ; 0.21156 ; 0.27361 ; 0.361 ; 0.44743 ; 0.54568 ; 0.61133 ; 0.65037 ; 0.67343 ; 0.67787 ; 0.68445 ; 0.73252 ; 0.86282 ; 1.0234 ; 1.1162 ; 1.1967 ; 1.3557 ; 1.5791 ; 1.6746 ; 1.8628 ; 2.0847 ; 2.281 ; 2.4042 ; 2.5304 ; 2.6952 ; 2.7132]

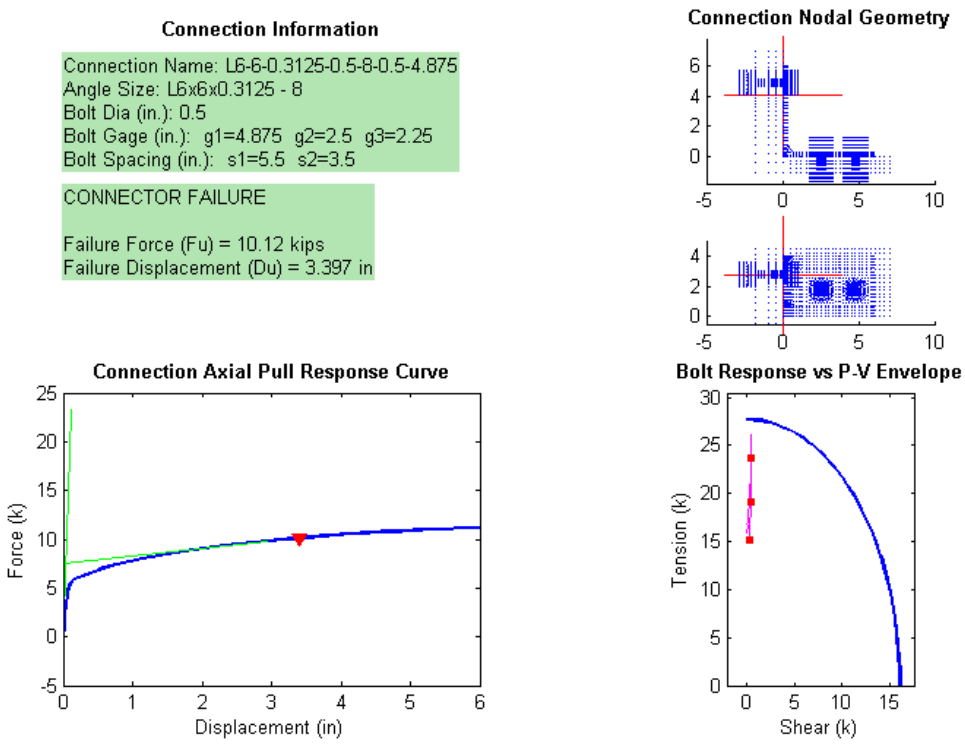


Figure B.87 Connection L6_6_0.3125_0.5_8_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.5_8_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 210.0475

Plastic Stiffness (k/in): 0.7964

Displacement (in): [6.0253e-037 ; 0.0011719 ; 0.0020508 ; 0.0029297 ; 0.004248 ; 0.0062256 ; 0.0091919 ; 0.013641 ; 0.020316 ; 0.030327 ; 0.045344 ; 0.067869 ; 0.10166 ; 0.15234 ; 0.22836 ; 0.3424 ; 0.51345 ; 0.77003 ; 1.1549 ; 1.7322 ; 2.3322 ; 2.9322 ; 3.5322 ; 4.1322 ; 4.7322 ; 5.3322 ; 5.9322 ; 6]

Force (kips): [-0.1472 ; 0.029973 ; 0.068181 ; 0.10568 ; 0.16098 ; 0.24198 ; 0.35876 ; 0.53055 ; 0.78186 ; 1.1468 ; 1.6652 ; 2.2622 ; 2.7218 ; 2.9349 ; 3.0721 ; 3.2302 ; 3.4393 ; 3.7018 ; 4.0025 ; 4.3701 ; 4.6716 ; 4.9105 ; 5.1053 ; 5.2664 ; 5.3976 ; 5.5023 ; 5.5875 ; 5.5959]

Bolt 1 - Tensile Force (kips): [15.1155 ; 15.1112 ; 15.1103 ; 15.1094 ; 15.108 ; 15.106 ; 15.1029 ; 15.0983 ; 15.0912 ; 15.0803 ; 15.0635 ; 15.0418 ; 15.0238 ; 15.0169 ; 15.0145 ; 15.0129 ; 15.0115 ; 15.0129 ; 15.0169 ; 15.0315 ; 15.0556 ; 15.0845 ; 15.1169 ; 15.1513 ; 15.1873 ; 15.2244 ; 15.2621 ; 15.2664]

Bolt 1 - Shear Force (kips): [0.014093 ; 0.011093 ; 0.011356 ; 0.011919 ; 0.01323 ; 0.015882 ; 0.02063 ; 0.028611 ; 0.041207 ; 0.060414 ; 0.089348 ; 0.12495 ; 0.15466 ; 0.16926 ; 0.18016 ; 0.19376 ; 0.21318 ; 0.23749 ; 0.26858 ; 0.30126 ; 0.32333 ; 0.33897 ; 0.35086 ; 0.36036 ; 0.36776 ; 0.37344 ; 0.37799 ; 0.37846]

Bolt 2 - Tensile Force (kips): [15.1247 ; 15.1191 ; 15.1174 ; 15.1158 ; 15.1134 ; 15.1103 ; 15.1057 ; 15.1 ; 15.0938 ; 15.0925 ; 15.0997 ; 15.1362 ; 15.1914 ; 15.2285 ; 15.264 ; 15.3227 ; 15.4597 ; 15.7419 ; 16.3024 ; 17.2119 ; 18.0325 ; 18.7195 ; 19.3321 ; 19.886 ; 20.3507 ; 20.7209 ; 21.0262 ; 21.0567]

Bolt 2 - Shear Force (kips): [0.012919 ; 0.011056 ; 0.011981 ; 0.013215 ; 0.015457 ; 0.019347 ; 0.025617 ; 0.035633 ; 0.051071 ; 0.074859 ; 0.11033 ; 0.15389 ; 0.19056 ; 0.2087 ; 0.22174 ; 0.2393 ; 0.26663 ; 0.29997 ; 0.34009 ; 0.38472 ; 0.42636 ; 0.46289 ; 0.4933 ; 0.51863 ; 0.53652 ; 0.54623 ; 0.55158 ; 0.55201]

Bolt 3 - Tensile Force (kips): [16 ; 15.9962 ; 15.9937 ; 15.9913 ; 15.9879 ; 15.9834 ; 15.9797 ; 15.9763 ; 15.9785 ; 16 ; 16.066 ; 16.2371 ; 16.4595 ; 16.6549 ; 16.8575 ; 17.1042 ; 17.4496 ; 18.0014 ; 18.8846 ; 20.3829 ; 21.808 ; 23.0014 ; 23.9271 ; 24.6155 ; 25.1964 ; 25.7008 ; 26.1423 ; 26.1898]

Bolt 3 - Shear Force (kips): [0.0094435 ; 0.0065651 ; 0.0051223 ; 0.0038791 ; 0.0027635 ; 0.004021 ; 0.0084998 ; 0.015921 ; 0.027472 ; 0.045188 ; 0.069887 ; 0.098387 ; 0.11913 ; 0.12135 ; 0.11425 ; 0.11725 ; 0.13558 ; 0.18603 ; 0.29723 ; 0.40397 ; 0.44923 ; 0.46097 ; 0.46596 ; 0.47604 ; 0.47713 ; 0.46932 ; 0.45567 ; 0.4536]

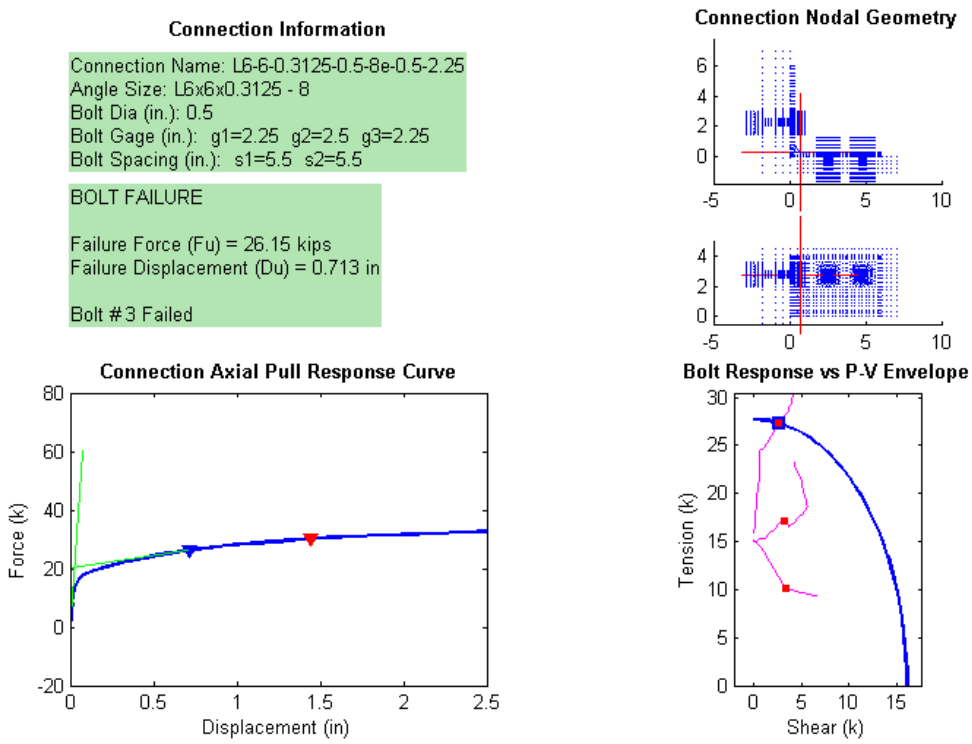


Figure B.88 Connection L6_6_0.3125_0.5_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.5_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 839.7778

Plastic Stiffness (k/in): 8.0102

Displacement (in): [6.3325e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.36604 ; 0.3942 ; 0.40475 ; 0.40871 ; 0.41465 ; 0.42356 ; 0.43693 ; 0.45697 ; 0.48704 ; 0.53214 ; 0.59979 ; 0.62516 ; 0.63467 ; 0.64895 ; 0.67035 ; 0.70246 ; 0.72654 ; 0.76266 ; 0.77621 ; 0.78129 ; 0.78891 ; 0.80034 ; 0.81748 ; 0.8432 ; 0.88177 ; 0.93963 ; 0.96133 ; 0.99388 ; 1.0427 ; 1.1159 ; 1.2258 ; 1.3356 ; 1.3631 ; 1.3734 ; 1.3888 ; 1.412 ; 1.4468 ; 1.4989 ; 1.5771 ; 1.6944 ; 1.8703 ; 1.9328 ; 2.0266 ; 2.1672 ; 2.3781 ; 2.5]

Force (kips): [-0.201821 ; 0.724485 ; 1.43837 ; 2.08614 ; 2.98224 ; 4.16097 ; 5.48109 ; 6.75414 ; 7.81947 ; 8.57808 ; 9.1657 ; 9.71896 ; 10.357 ; 11.1476 ; 11.3201 ; 11.481 ; 11.5386 ; 11.5633 ; 11.6028 ; 11.6609 ; 11.7467 ; 11.8712 ; 12.0479 ; 12.2807 ; 12.5848 ; 12.7064 ; 12.7509 ; 12.8162 ; 12.9022 ; 13.0308 ; 13.1386 ; 13.2856 ; 13.3302 ; 13.3495 ; 13.3826 ; 13.4318 ; 13.5018 ; 13.5959 ; 13.7273 ; 13.9074 ; 13.9708 ; 14.0628 ; 14.1896 ; 14.3727 ; 14.6182 ; 14.8314 ; 14.8867 ; 14.9076 ; 14.94 ; 14.9849 ; 15.0486 ; 15.1333 ; 15.2512 ; 15.4224 ; 15.6418 ; 15.7205 ; 15.8319 ; 15.9795 ; 16.182 ; 16.2961]

Bolt 1 - Tensile Force (kips): [15.1481 ; 15.1222 ; 15.0998 ; 15.0778 ; 15.0444 ; 14.9929 ; 14.9282 ; 14.8564 ; 14.7853 ; 14.7197 ; 14.4183 ; 13.7691 ; 12.9048 ; 11.7078 ; 11.4208 ; 11.1409 ; 11.0371 ; 10.9986 ; 10.941 ; 10.8555 ; 10.7299 ; 10.5446 ; 10.2766 ; 10.0859 ; 10.0933 ; 10.0962 ; 10.0974 ; 10.0991 ; 10.1018 ; 10.106 ; 10.1093 ; 10.1145 ; 10.1166 ; 10.1174 ; 10.1184 ; 10.1199 ; 10.1223 ; 10.1257 ; 10.1308 ; 10.0892 ; 9.99676 ; 9.9807 ; 9.99098 ; 10.0063 ; 10.0296 ; 10.0354 ; 10.03 ; 10.0207 ; 9.9998 ; 9.96185 ; 9.91269 ; 9.87561 ; 9.83117 ; 9.7421 ; 9.64853 ; 9.62007 ; 9.57098 ; 9.47938 ; 9.36136 ; 9.30761]

Bolt 1 - Shear Force (kips): [0.013852 ; 0.040103 ; 0.075928 ; 0.10932 ; 0.15633 ; 0.21905 ; 0.29191 ; 0.36644 ; 0.43546 ; 0.49673 ; 0.73845 ; 1.1937 ; 1.7488 ; 2.4643 ; 2.6262 ; 2.7792 ; 2.835 ; 2.8556 ; 2.8863 ; 2.9317 ; 2.9976 ; 3.0936 ; 3.2299 ; 3.3275 ; 3.3305 ; 3.3316 ; 3.332 ; 3.3326 ; 3.3335 ; 3.3349 ; 3.336 ; 3.3378 ; 3.3385 ; 3.3387 ; 3.3391 ; 3.3396 ; 3.3403 ; 3.3415 ; 3.3431 ; 3.3778 ; 3.4387 ; 3.4532 ; 3.4517 ; 3.4489 ; 3.4447 ; 3.525 ; 3.6027 ; 3.6607 ; 3.7617 ; 3.9222 ; 4.1286 ; 4.2993 ; 4.4902 ; 4.7852 ; 5.1182 ; 5.2625 ; 5.4901 ; 5.8521 ; 6.3159 ; 6.538]

Bolt 2 - Tensile Force (kips): [15.1753 ; 15.1433 ; 15.1178 ; 15.0971 ; 15.0699 ; 15.0358 ; 15.0147 ; 15.0118 ; 15.033 ; 15.1749 ; 15.2749 ; 15.3547 ; 15.7094 ; 16.2572 ; 16.3765 ; 16.4902 ; 16.5336 ; 16.5481 ; 16.5682 ; 16.5994 ; 16.6456 ; 16.7137 ; 16.8114 ; 16.9365 ; 17.0824 ; 17.1139 ; 17.1241 ; 17.1371 ; 17.1581 ; 17.1712 ; 17.141 ; 16.9314 ; 16.6174 ; 16.6019 ; 16.6427 ; 16.6966 ; 16.7689 ; 16.8886 ; 17.04 ; 17.2409 ; 17.3254 ; 17.4171 ; 17.5412 ; 17.8219 ; 18.2178 ; 18.5554 ; 18.6576 ; 18.7087 ; 18.7894 ; 18.913 ; 19.0762 ; 19.3045 ; 19.7191 ; 20.2829 ; 21.0145 ; 21.283 ; 21.6688 ; 22.2146 ; 22.9139 ; 23.2677]

Bolt 2 - Shear Force (kips): [0.021243 ; 0.042029 ; 0.081205 ; 0.11841 ; 0.17091 ; 0.24135 ; 0.32361 ; 0.40825 ; 0.48748 ; 0.55357 ; 0.78024 ; 1.1853 ; 1.639 ; 2.166 ; 2.2793 ; 2.3835 ; 2.4185 ; 2.4316 ; 2.4512 ; 2.4799 ; 2.5218 ; 2.5823 ; 2.6685 ; 2.7936 ; 2.9737 ; 3.0455 ; 3.0721 ; 3.112 ; 3.1686 ; 3.2572 ; 3.3384 ; 3.5331 ; 3.7038 ; 3.7382 ; 3.787 ; 3.8602 ; 3.96 ; 4.1063 ; 4.2873 ; 4.5149 ; 4.5818 ; 4.6878 ; 4.8295 ; 5.0715 ; 5.3983 ; 5.592 ; 5.6129 ; 5.608 ; 5.5956 ; 5.5719 ; 5.5514 ; 5.5354 ; 5.4325 ; 5.2811 ; 5.123 ; 5.0351 ; 4.8966 ; 4.6579 ; 4.371 ; 4.2417]

Bolt 3 - Tensile Force (kips): [16 ; 15.9868 ; 15.9907 ; 16.0147 ; 16.0792 ; 16.2375 ; 16.5988 ; 17.1706 ; 17.9197 ; 18.7235 ; 19.5875 ; 20.5944 ; 21.9205 ; 23.6363 ; 23.9878 ; 24.3057 ; 24.4167 ; 24.4621 ; 24.5342 ; 24.6424 ; 24.8074 ; 25.0607 ; 25.4361 ; 25.8904 ; 26.4537 ; 26.6819 ; 26.7568 ; 26.8612 ; 27.0119 ; 27.2372 ; 27.4377 ; 27.7442 ; 27.8334 ; 27.8649 ; 27.9131 ; 27.9919 ; 28.1157 ; 28.2646 ; 28.463 ; 28.7311 ; 28.8271 ; 28.9786 ; 29.1854 ; 29.5034 ; 29.9168 ; 30.263 ; 30.3685 ; 30.4012 ; 30.46 ; 30.5261 ; 30.6147 ; 30.7184 ; 30.86 ; 31.1137 ; 31.3653 ; 31.492 ; 31.6781 ; 31.8587 ; 32.1496 ; 32.3918]

Bolt 3 - Shear Force (kips): [0.015178 ; 0.0018692 ; 0.015133 ; 0.030168 ; 0.05181 ; 0.080751 ; 0.11773 ; 0.15565 ; 0.19407 ; 0.27917 ; 0.38305 ; 0.48442 ; 0.57932 ; 0.64453 ; 0.65278 ; 0.65997 ; 0.66242 ; 0.69832 ; 0.77704 ; 0.88437 ; 1.0441 ; 1.2483 ; 1.4908 ; 1.7871 ; 2.1017 ; 2.2419 ; 2.2928 ; 2.3668 ; 2.438 ; 2.5612 ; 2.7506 ; 2.9722 ; 3.0568 ; 3.0878 ; 3.1344 ; 3.2058 ; 3.2999 ; 3.379 ; 3.4959 ; 3.6562 ; 3.698 ; 3.7725 ; 3.8635 ; 3.9443 ; 4.0585 ; 4.1502 ; 4.2028 ; 4.2182 ; 4.2219 ; 4.2379 ; 4.257 ; 4.2904 ; 4.3461 ; 4.4185 ; 4.5219 ; 4.4572 ; 4.4524 ; 4.3876 ; 4.3652 ; 4.2725]

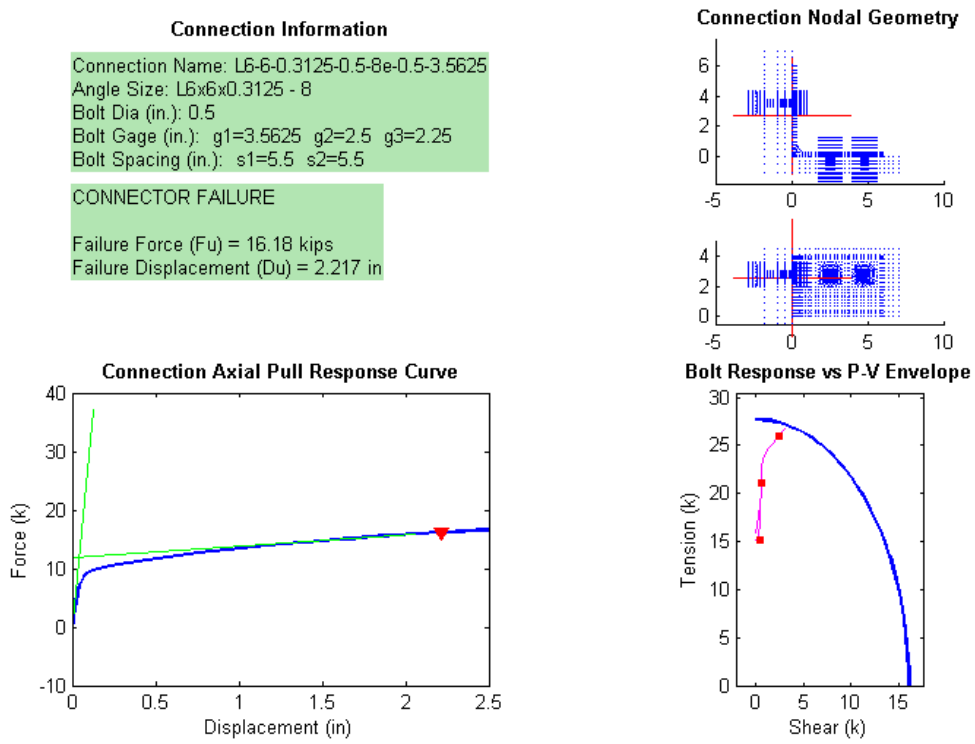


Figure B.89 Connection L6_6_0.3125_0.5_8e_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.5_8e_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 289.2104

Plastic Stiffness (k/in): 1.9213

Displacement (in): [7.5834e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0078125 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.033569 ; 0.048401 ; 0.070648 ; 0.10402 ; 0.15408 ; 0.22916 ; 0.34179 ; 0.51073 ; 0.76073 ; 1.0107 ; 1.2607 ; 1.5107 ; 1.5732 ; 1.667 ; 1.8076 ; 1.8603 ; 1.9394 ; 2.0581 ; 2.2361 ; 2.4861 ; 2.5]

Force (kips): [-0.18028 ; 0.17516 ; 0.38459 ; 0.5812 ; 0.77298 ; 0.96105 ; 1.2336 ; 1.6317 ; 2.1995 ; 2.9293 ; 3.6818 ; 4.311 ; 4.7143 ; 4.9607 ; 5.1912 ; 5.4795 ; 5.8577 ; 6.3372 ; 6.7405 ; 7.0796 ; 7.3724 ; 7.4452 ; 7.5518 ; 7.7032 ; 7.7558 ; 7.8401 ; 7.9541 ; 8.1043 ; 8.2949 ; 8.3051]

Bolt 1 - Tensile Force (kips): [15.1483 ; 15.1391 ; 15.1334 ; 15.1278 ; 15.1221 ; 15.1164 ; 15.108 ; 15.0951 ; 15.0751 ; 15.0464 ; 15.0119 ; 14.9808 ; 14.9631 ; 14.9506 ; 14.9361 ; 14.9252 ; 14.9196 ; 14.9239 ; 14.9374 ; 14.9565 ; 14.9822 ; 14.9915 ; 15.0055 ; 15.027 ; 15.0352 ; 15.0482 ; 15.0671 ; 15.0948 ; 15.1345 ; 15.1367]

Bolt 1 - Shear Force (kips): [0.012899 ; 0.016035 ; 0.024912 ; 0.034343 ; 0.043932 ; 0.053603 ; 0.067915 ; 0.089282 ; 0.12074 ; 0.16255 ; 0.20793 ; 0.24884 ; 0.27658 ; 0.30055 ; 0.33099 ; 0.36306 ; 0.39795 ; 0.43498 ; 0.46253 ; 0.48411 ; 0.50012 ; 0.50107 ; 0.50239 ; 0.50398 ; 0.50457 ; 0.50407 ; 0.50461 ; 0.50656 ; 0.50769 ; 0.50768]

Bolt 2 - Tensile Force (kips): [15.1759 ; 15.1631 ; 15.1556 ; 15.1484 ; 15.1425 ; 15.1369 ; 15.1315 ; 15.1263 ; 15.1235 ; 15.1358 ; 15.1713 ; 15.2424 ; 15.3448 ; 15.5066 ; 15.729 ; 16.0992 ; 16.7103 ; 17.6369 ; 18.4867 ; 19.2503 ; 19.9068 ; 20.0361 ; 20.2224 ; 20.4833 ; 20.577 ; 20.7011 ; 20.8881 ; 21.158 ; 21.4897 ; 21.5068]

Bolt 2 - Shear Force (kips): [0.020033 ; 0.018845 ; 0.026776 ; 0.036461 ; 0.046782 ; 0.057402 ; 0.07346 ; 0.097622 ; 0.1332 ; 0.18027 ; 0.23254 ; 0.28213 ; 0.31878 ; 0.34441 ; 0.37387 ; 0.40324 ; 0.43555 ; 0.4756 ; 0.51586 ; 0.5553 ; 0.58489 ; 0.58879 ; 0.59383 ; 0.59934 ; 0.60094 ; 0.60217 ; 0.60394 ; 0.6053 ; 0.60395 ; 0.60394]

Bolt 3 - Tensile Force (kips): [16 ; 15.99 ; 15.983 ; 15.9801 ; 15.9789 ; 15.98 ; 15.9895 ; 16.0128 ; 16.0729 ; 16.2252 ; 16.476 ; 16.7691 ; 17.0259 ; 17.2125 ; 17.4702 ; 17.9731 ; 18.8915 ; 20.327 ; 21.6098 ; 22.6894 ; 23.6353 ; 23.9046 ; 24.2776 ; 24.7614 ; 24.9104 ; 25.2094 ; 25.6121 ; 26.0408 ; 26.6597 ; 26.698]

Bolt 3 - Shear Force (kips): [0.015178 ; 0.0079746 ; 0.002716 ; 0.0051845 ; 0.011064 ; 0.01728 ; 0.026945 ; 0.041606 ; 0.0626 ; 0.090597 ; 0.12095 ; 0.14963 ; 0.17146 ; 0.23008 ; 0.31634 ; 0.40841 ; 0.50919 ; 0.60695 ; 0.66325 ; 0.69933 ; 0.80467 ; 0.94004 ; 1.1457 ; 1.484 ; 1.5929 ; 1.836 ; 2.1529 ; 2.5228 ; 3.0029 ; 3.0442]

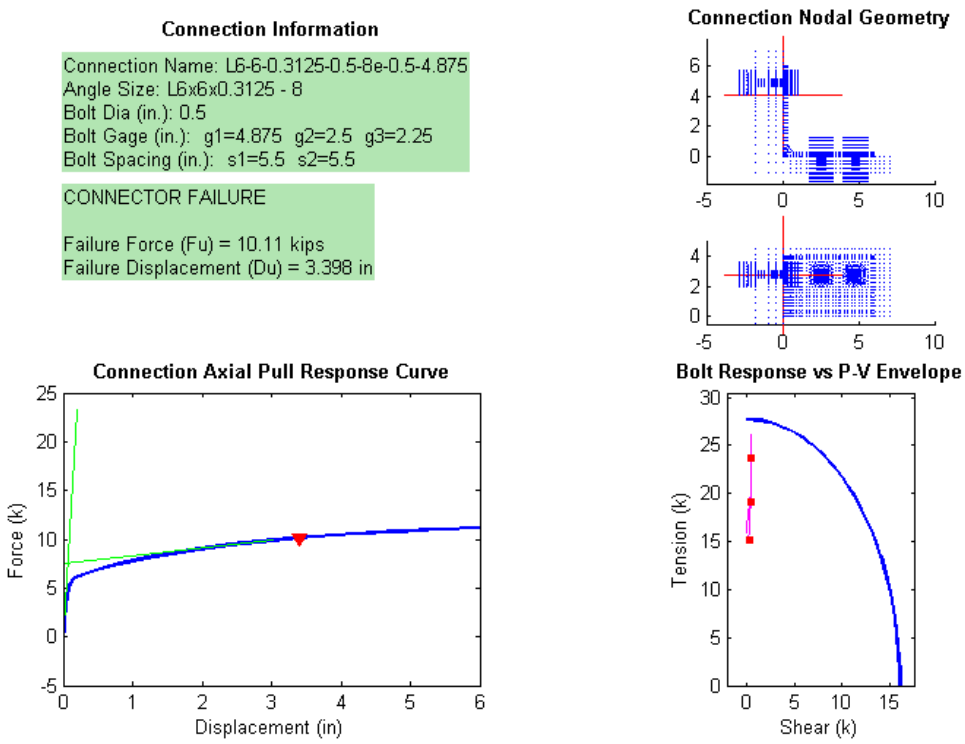


Figure B.90 Connection L6_6_0.3125_0.5_8e_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.5_8e_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 116.0757

Plastic Stiffness (k/in): 0.7716

Displacement (in): [5.1567e-037 ; 0.0046875 ; 0.009375 ; 0.016406 ; 0.026953 ; 0.042773 ; 0.066504 ; 0.1021 ; 0.15549 ; 0.23558 ; 0.35572 ; 0.53592 ; 0.80623 ; 1.2117 ; 1.8117 ; 2.4117 ; 3.0117 ; 3.6117 ; 4.2117 ; 4.8117 ; 5.4117 ; 6]

Force (kips): [-0.17731 ; 0.18052 ; 0.36679 ; 0.6353 ; 1.023 ; 1.5763 ; 2.2227 ; 2.7191 ; 2.9482 ; 3.0891 ; 3.2527 ; 3.468 ; 3.7354 ; 4.0428 ; 4.4129 ; 4.7033 ; 4.9348 ; 5.1235 ; 5.2803 ; 5.4078 ; 5.51 ; 5.5916]

Bolt 1 - Tensile Force (kips): [15.1486 ; 15.1393 ; 15.1341 ; 15.1263 ; 15.1143 ; 15.0957 ; 15.0713 ; 15.0503 ; 15.0423 ; 15.0399 ; 15.0387 ; 15.0387 ; 15.0436 ; 15.047 ; 15.0629 ; 15.0874 ; 15.1167 ; 15.1489 ; 15.1831 ; 15.2191 ; 15.2563 ; 15.2928]

Bolt 1 - Shear Force (kips): [0.012833 ; 0.016414 ; 0.024505 ; 0.03784 ; 0.058424 ; 0.089664 ; 0.12866 ; 0.16102 ; 0.17664 ; 0.18744 ; 0.20075 ; 0.21865 ; 0.23844 ; 0.26997 ; 0.3013 ; 0.32204 ; 0.33709 ; 0.34917 ; 0.35912 ; 0.36698 ; 0.37304 ; 0.37782]

Bolt 2 - Tensile Force (kips): [15.1771 ; 15.1635 ; 15.1564 ; 15.1484 ; 15.1449 ; 15.1518 ; 15.1899 ; 15.2521 ; 15.2961 ; 15.3315 ; 15.3926 ; 15.5586 ; 15.8794 ; 16.4416 ; 17.3497 ; 18.1359 ; 18.799 ; 19.386 ; 19.9085 ; 20.3406 ; 20.6864 ; 20.9627]

Bolt 2 - Shear Force (kips): [0.020024 ; 0.01942 ; 0.026709 ; 0.04061 ; 0.063676 ; 0.099222 ; 0.14387 ; 0.18165 ; 0.20036 ; 0.21332 ; 0.23128 ; 0.25872 ; 0.28762 ; 0.32518 ; 0.36935 ; 0.4106 ; 0.44575 ; 0.4764 ; 0.50182 ; 0.51935 ; 0.52929 ; 0.53459]

Bolt 3 - Tensile Force (kips): [16 ; 15.9876 ; 15.9805 ; 15.9773 ; 15.9926 ; 16.0556 ; 16.2276 ; 16.4612 ; 16.6647 ; 16.8706 ; 17.1286 ; 17.491 ; 18.0656 ; 19.0061 ; 20.5448 ; 21.9283 ; 23.0788 ; 23.9637 ; 24.6328 ; 25.1999 ; 25.6963 ; 26.1243]

Bolt 3 - Shear Force (kips): [0.015261 ; 0.0064435 ; 0.0031168 ; 0.013721 ; 0.031938 ; 0.058621 ; 0.089871 ; 0.1125 ; 0.11577 ; 0.111 ; 0.11586 ; 0.13621 ; 0.19639 ; 0.31809 ; 0.4293 ; 0.47356 ; 0.48708 ; 0.4971 ; 0.50805 ; 0.50888 ; 0.50011 ; 0.4848]

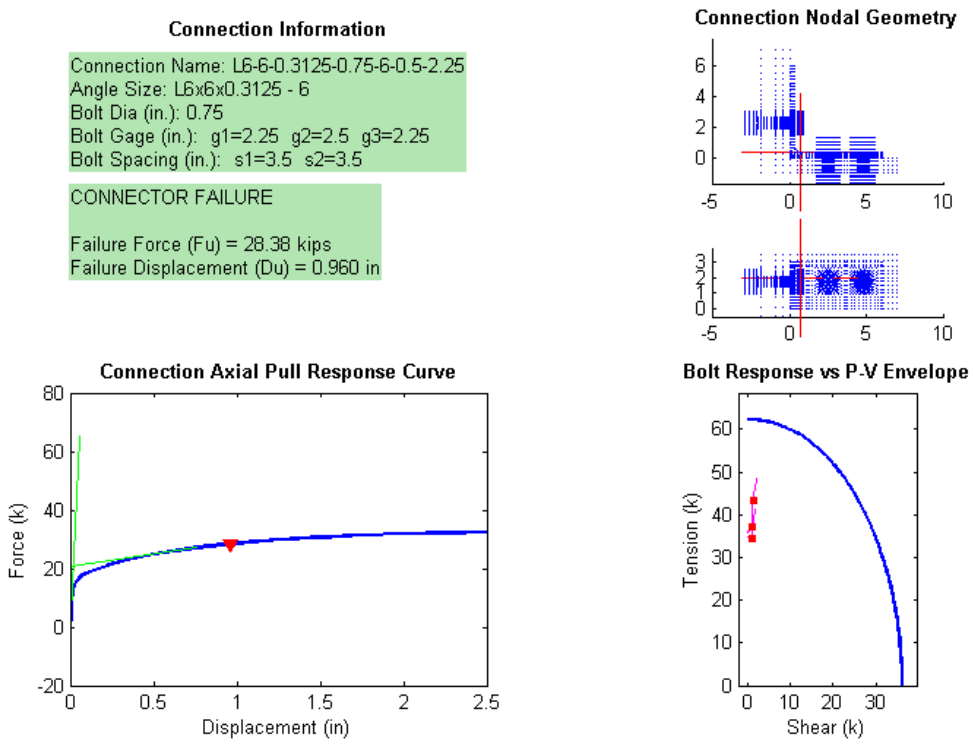


Figure B.91 Connection L6_6_0.3125_0.75_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.75_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.1956e+003

Plastic Stiffness (k/in): 8.7104

Displacement (in): [2.8274e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.5049 ; 1.7549 ; 2.0049 ; 2.2549 ; 2.5]

Force (kips): [-0.690061 ; 0.744931 ; 1.64506 ; 2.842 ; 4.41136 ; 6.12226 ; 7.32465 ; 7.97991 ; 8.57759 ; 9.16685 ; 9.78763 ; 10.53 ; 11.4471 ; 12.4637 ; 13.5525 ; 14.3319 ; 14.9098 ; 15.3336 ; 15.6457 ; 15.8845 ; 16.0766 ; 16.2283]

Bolt 1 - Tensile Force (kips): [34.872 ; 34.8347 ; 34.8116 ; 34.7788 ; 34.7328 ; 34.6799 ; 34.6442 ; 34.6287 ; 34.6163 ; 34.6056 ; 34.5953 ; 34.5846 ; 34.5725 ; 34.5668 ; 34.5768 ; 34.6011 ; 34.635 ; 34.6773 ; 34.7246 ; 34.7742 ; 34.8256 ; 34.8767]

Bolt 1 - Shear Force (kips): [0.053514 ; 0.056414 ; 0.10021 ; 0.16538 ; 0.25509 ; 0.35521 ; 0.42468 ; 0.46057 ; 0.49535 ; 0.53212 ; 0.57418 ; 0.62645 ; 0.69515 ; 0.77398 ; 0.85379 ; 0.90771 ; 0.94412 ; 0.96546 ; 0.97565 ; 0.9783 ; 0.97638 ; 0.97295]

Bolt 2 - Tensile Force (kips): [34.8829 ; 34.8176 ; 34.7759 ; 34.7211 ; 34.6602 ; 34.6125 ; 34.6159 ; 34.6834 ; 34.8239 ; 35.0413 ; 35.2163 ; 35.3874 ; 35.6297 ; 36.0527 ; 36.7197 ; 37.3911 ; 38.0629 ; 38.7505 ; 39.429 ; 40.1041 ; 40.7889 ; 41.4566]

Bolt 2 - Shear Force (kips): [0.057119 ; 0.088566 ; 0.15878 ; 0.25829 ; 0.3947 ; 0.55205 ; 0.67438 ; 0.75279 ; 0.82368 ; 0.86128 ; 0.87053 ; 0.87992 ; 0.883 ; 0.90198 ; 0.99869 ; 1.1006 ; 1.2028 ; 1.3075 ; 1.4071 ; 1.496 ; 1.5691 ; 1.6077]

Bolt 3 - Tensile Force (kips): [36 ; 35.9562 ; 35.937 ; 35.9431 ; 35.9996 ; 36.092 ; 36.1777 ; 36.2532 ; 36.3356 ; 36.4907 ; 36.8351 ; 37.421 ; 38.2043 ; 39.6408 ; 41.8717 ; 43.7655 ; 45.2314 ; 46.3308 ; 47.1802 ; 47.8581 ; 48.3433 ; 48.5876]

Bolt 3 - Shear Force (kips): [0.028333 ; 0.021818 ; 0.056514 ; 0.11359 ; 0.19972 ; 0.30342 ; 0.38665 ; 0.44047 ; 0.5003 ; 0.56106 ; 0.61353 ; 0.69669 ; 0.84276 ; 0.94345 ; 1.1204 ; 1.3064 ; 1.4947 ; 1.6606 ; 1.8014 ; 1.9207 ; 2.0475 ; 2.1899]

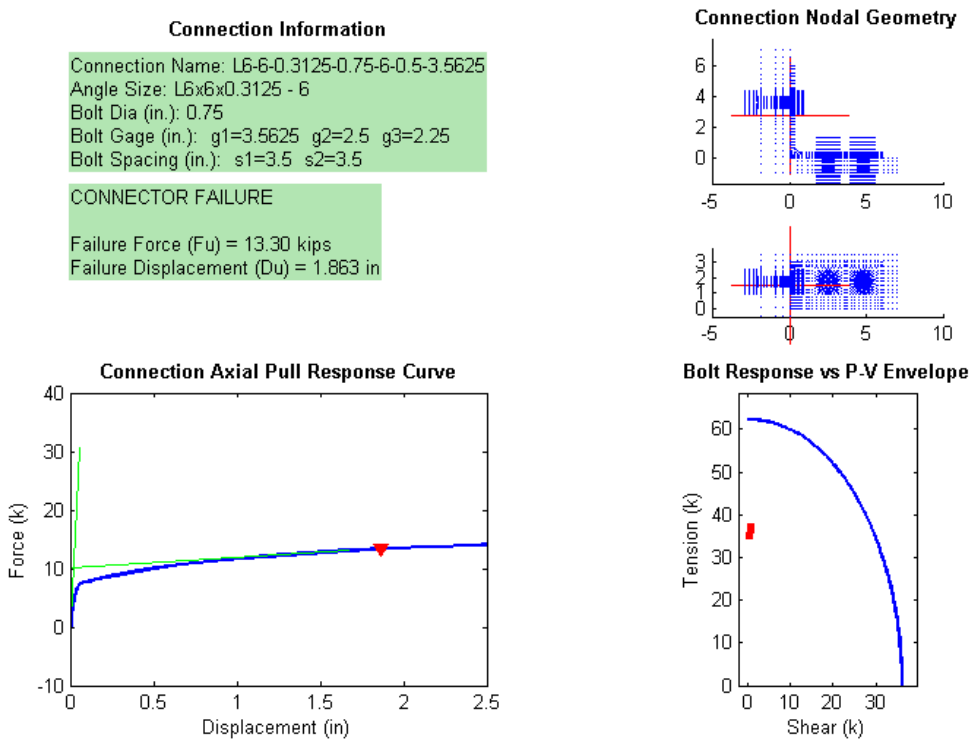


Figure B.92 Connection L6_6_0.3125_0.75_6_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.75_6_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 517.1492

Plastic Stiffness (k/in): 1.7074

Displacement (in): [2.7156e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.048103 ; 0.056446 ; 0.06896 ; 0.087731 ; 0.11589 ; 0.15812 ; 0.22148 ; 0.3165 ; 0.45905 ; 0.67286 ; 0.92286 ; 1.1729 ; 1.4229 ; 1.6729 ; 1.9229 ; 2.1729 ; 2.4229 ; 2.5]

Force (kips): [-0.67918 ; 0.11023 ; 0.33088 ; 0.64412 ; 1.0811 ; 1.7035 ; 2.5278 ; 3.2797 ; 3.4342 ; 3.5907 ; 3.7158 ; 3.8258 ; 3.9273 ; 4.0678 ; 4.2718 ; 4.547 ; 4.8963 ; 5.3285 ; 5.7252 ; 6.0409 ; 6.3005 ; 6.514 ; 6.6944 ; 6.8422 ; 6.9664 ; 7.0007]

Bolt 1 - Tensile Force (kips): [34.8723 ; 34.8517 ; 34.8468 ; 34.8399 ; 34.8303 ; 34.8163 ; 34.7967 ; 34.7797 ; 34.7769 ; 34.775 ; 34.7747 ; 34.7761 ; 34.7797 ; 34.7866 ; 34.7986 ; 34.8164 ; 34.8431 ; 34.8834 ; 34.9304 ; 34.9782 ; 35.0272 ; 35.0773 ; 35.1277 ; 35.1783 ; 35.2294 ; 35.2452]

Bolt 1 - Shear Force (kips): [0.053495 ; 0.038337 ; 0.042679 ; 0.052992 ; 0.071826 ; 0.10289 ; 0.14713 ; 0.18885 ; 0.19731 ; 0.20538 ; 0.212 ; 0.21802 ; 0.22383 ; 0.23 ; 0.23569 ; 0.2456 ; 0.26001 ; 0.28024 ; 0.30276 ; 0.32149 ; 0.33636 ; 0.34795 ; 0.35758 ; 0.3656 ; 0.37183 ; 0.37346]

Bolt 2 - Tensile Force (kips): [34.8844 ; 34.8492 ; 34.8364 ; 34.8191 ; 34.7978 ; 34.7698 ; 34.7496 ; 34.7487 ; 34.7527 ; 34.759 ; 34.7655 ; 34.7746 ; 34.7862 ; 34.8124 ; 34.8615 ; 34.9642 ; 35.1623 ; 35.4983 ; 35.7704 ; 35.9728 ; 36.1484 ; 36.3028 ; 36.4459 ; 36.5752 ; 36.6944 ; 36.7307]

Bolt 2 - Shear Force (kips): [0.056842 ; 0.050535 ; 0.064525 ; 0.088316 ; 0.12525 ; 0.18089 ; 0.25871 ; 0.33528 ; 0.35224 ; 0.37045 ; 0.38484 ; 0.39702 ; 0.40784 ; 0.42627 ; 0.45567 ; 0.49681 ; 0.54694 ; 0.5838 ; 0.58262 ; 0.56989 ; 0.55343 ; 0.53573 ; 0.51802 ; 0.50778 ; 0.50433 ; 0.50348]

Bolt 3 - Tensile Force (kips): [36 ; 35.9771 ; 35.9569 ; 35.9314 ; 35.911 ; 35.8953 ; 35.8947 ; 35.8958 ; 35.8892 ; 35.883 ; 35.8795 ; 35.8808 ; 35.8797 ; 35.861 ; 35.8208 ; 35.7932 ; 35.8676 ; 36.1033 ; 36.3904 ; 36.6707 ; 36.9178 ; 37.1135 ; 37.2595 ; 37.3776 ; 37.4732 ; 37.5049]

Bolt 3 - Shear Force (kips): [0.027595 ; 0.015963 ; 0.016711 ; 0.031471 ; 0.060029 ; 0.10546 ; 0.17051 ; 0.23568 ; 0.24889 ; 0.26244 ; 0.2684 ; 0.26736 ; 0.25755 ; 0.26471 ; 0.28398 ; 0.30706 ; 0.35902 ; 0.4277 ; 0.48726 ; 0.54083 ; 0.5903 ; 0.63693 ; 0.68328 ; 0.72651 ; 0.76319 ; 0.77264]

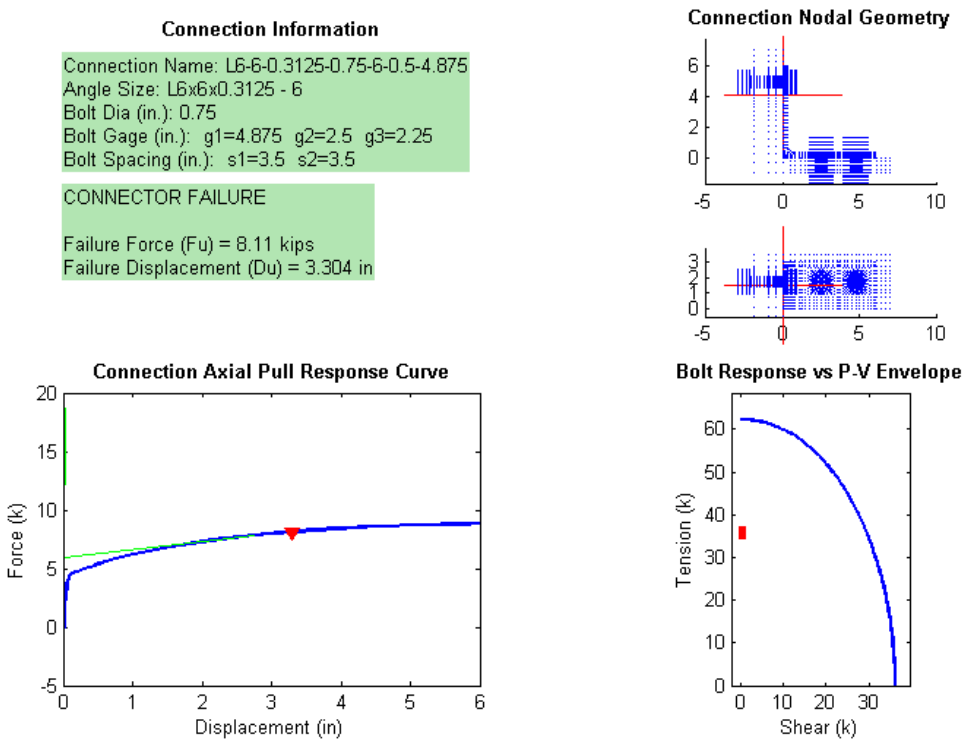


Figure B.93 Connection L6_6_0.3125_0.75_6_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.75_6_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 610.5896

Plastic Stiffness (k/in): 0.6819

Displacement (in): [2.7513e-036 ; 0.0011719 ; 0.0023437 ; 0.0041016 ; 0.0067383 ; 0.010693 ; 0.016626 ; 0.025525 ; 0.038873 ; 0.058896 ; 0.08893 ; 0.13398 ; 0.20156 ; 0.30292 ; 0.45497 ; 0.68304 ; 1.0251 ; 1.5383 ; 2.1383 ; 2.7383 ; 3.3383 ; 3.9383 ; 4.5383 ; 5.1383 ; 5.7383 ; 6]

Force (kips): [-0.67219 ; -0.0059452 ; 0.043343 ; 0.11308 ; 0.21525 ; 0.36375 ; 0.57881 ; 0.8898 ; 1.3346 ; 1.8503 ; 2.1731 ; 2.2917 ; 2.3732 ; 2.4868 ; 2.65 ; 2.8668 ; 3.124 ; 3.4339 ; 3.7026 ; 3.9072 ; 4.0659 ; 4.1888 ; 4.2819 ; 4.352 ; 4.4048 ; 4.4239]

Bolt 1 - Tensile Force (kips): [34.8726 ; 34.8544 ; 34.8535 ; 34.852 ; 34.85 ; 34.847 ; 34.8427 ; 34.8364 ; 34.8272 ; 34.8166 ; 34.8112 ; 34.8118 ; 34.8148 ; 34.8202 ; 34.8296 ; 34.8472 ; 34.8781 ; 34.9245 ; 34.9771 ; 35.0294 ; 35.0816 ; 35.1331 ; 35.1845 ; 35.2355 ; 35.2862 ; 35.3083]

Bolt 1 - Shear Force (kips): [0.053526 ; 0.037403 ; 0.037799 ; 0.038663 ; 0.040493 ; 0.044198 ; 0.051259 ; 0.063819 ; 0.084764 ; 0.11153 ; 0.12951 ; 0.13723 ; 0.14458 ; 0.15363 ; 0.16517 ; 0.17582 ; 0.17838 ; 0.18152 ; 0.19005 ; 0.19803 ; 0.2043 ; 0.21165 ; 0.21917 ; 0.22639 ; 0.23433 ; 0.23782]

Bolt 2 - Tensile Force (kips): [34.8857 ; 34.8578 ; 34.8545 ; 34.8496 ; 34.8426 ; 34.8327 ; 34.82 ; 34.8041 ; 34.7855 ; 34.7834 ; 34.7914 ; 34.7993 ; 34.81 ; 34.8277 ; 34.8581 ; 34.9285 ; 35.0469 ; 35.2883 ; 35.581 ; 35.7995 ; 35.9682 ; 36.1076 ; 36.2257 ; 36.3286 ; 36.4163 ; 36.4527]

Bolt 2 - Shear Force (kips): [0.056998 ; 0.045039 ; 0.047743 ; 0.052054 ; 0.059147 ; 0.07067 ; 0.089015 ; 0.11767 ; 0.16083 ; 0.21377 ; 0.24901 ; 0.26072 ; 0.26722 ; 0.27996 ; 0.30408 ; 0.34459 ; 0.38957 ; 0.43926 ; 0.47251 ; 0.48084 ; 0.47925 ; 0.47352 ; 0.46553 ; 0.4574 ; 0.45104 ; 0.44806]

Bolt 3 - Tensile Force (kips): [36 ; 35.9923 ; 35.9851 ; 35.9752 ; 35.9608 ; 35.9418 ; 35.9201 ; 35.8997 ; 35.8777 ; 35.8627 ; 35.8433 ; 35.8441 ; 35.8448 ; 35.8207 ; 35.7294 ; 35.6134 ; 35.6413 ; 35.8291 ; 36.0888 ; 36.2743 ; 36.4182 ; 36.5593 ; 36.6802 ; 36.758 ; 36.7975 ; 36.809]

Bolt 3 - Shear Force (kips): [0.028298 ; 0.021831 ; 0.019505 ; 0.017327 ; 0.017457 ; 0.024176 ; 0.040444 ; 0.068545 ; 0.11202 ; 0.16462 ; 0.19461 ; 0.1919 ; 0.16885 ; 0.14361 ; 0.13183 ; 0.14353 ; 0.21 ; 0.28818 ; 0.34902 ; 0.39398 ; 0.42862 ; 0.45441 ; 0.47293 ; 0.48382 ; 0.49028 ; 0.49237]

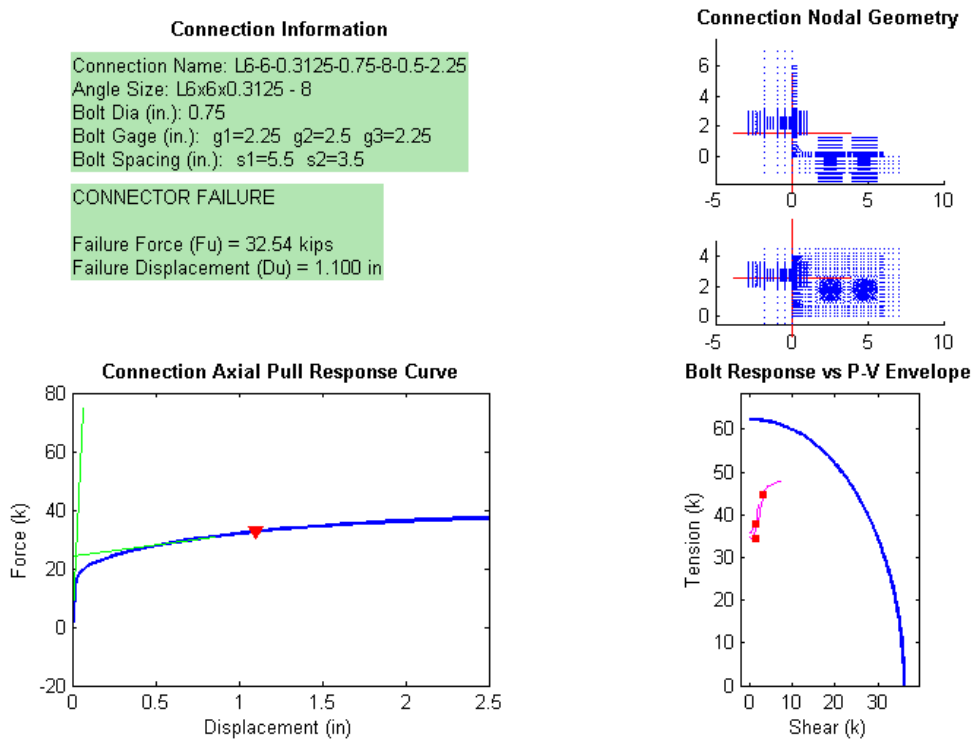


Figure B.94 Connection L6_6_0.3125_0.75_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.75_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.1517e+003

Plastic Stiffness (k/in): 7.9531

Displacement (in): [1.8504e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.017578 ; 0.021973 ; 0.028565 ; 0.038452 ; 0.053284 ; 0.075531 ; 0.1089 ; 0.15896 ; 0.23404 ; 0.34667 ; 0.51561 ; 0.68455 ; 0.85349 ; 1.1035 ; 1.166 ; 1.1894 ; 1.2246 ; 1.2773 ; 1.3564 ; 1.4751 ; 1.653 ; 1.7155 ; 1.8093 ; 1.9499 ; 2.1609 ; 2.4109 ; 2.5]

Force (kips): [-0.617219 ; 0.725792 ; 1.63213 ; 2.44838 ; 3.58769 ; 5.08882 ; 6.27553 ; 7.14129 ; 8.00856 ; 8.77096 ; 9.39466 ; 10.0032 ; 10.65 ; 11.3328 ; 12.0886 ; 12.9679 ; 13.9882 ; 14.8112 ; 15.483 ; 16.2845 ; 16.4737 ; 16.5417 ; 16.6372 ; 16.7786 ; 16.9735 ; 17.2335 ; 17.5636 ; 17.6682 ; 17.8143 ; 18.0118 ; 18.2643 ; 18.5137 ; 18.5939]

Bolt 1 - Tensile Force (kips): [34.8671 ; 34.829 ; 34.8027 ; 34.7773 ; 34.74 ; 34.6876 ; 34.6441 ; 34.6122 ; 34.5812 ; 34.5551 ; 34.5357 ; 34.5172 ; 34.4975 ; 34.4783 ; 34.458 ; 34.4363 ; 34.4165 ; 34.4075 ; 34.4085 ; 34.4231 ; 34.4277 ; 34.4296 ; 34.4328 ; 34.4378 ; 34.4465 ; 34.4618 ; 34.4893 ; 34.4998 ; 34.5163 ; 34.5422 ; 34.5829 ; 34.6326 ; 34.6509]

Bolt 1 - Shear Force (kips): [0.053269 ; 0.062424 ; 0.11264 ; 0.16215 ; 0.23398 ; 0.33171 ; 0.4108 ; 0.46904 ; 0.52677 ; 0.57768 ; 0.62014 ; 0.66444 ; 0.71459 ; 0.76954 ; 0.83328 ; 0.90997 ; 1.0033 ; 1.0773 ; 1.1351 ; 1.1993 ; 1.214 ; 1.2193 ; 1.2266 ; 1.2373 ; 1.2516 ; 1.2694 ; 1.2888 ; 1.2945 ; 1.3017 ; 1.3105 ; 1.3203 ; 1.3281 ; 1.33]

Bolt 2 - Tensile Force (kips): [34.876 ; 34.816 ; 34.7732 ; 34.7345 ; 34.6812 ; 34.6199 ; 34.581 ; 34.558 ; 34.5458 ; 34.5531 ; 34.6071 ; 34.7244 ; 34.9679 ; 35.2689 ; 35.5132 ; 35.7443 ; 36.0826 ; 36.5294 ; 37.0091 ; 37.7569 ; 37.954 ; 38.028 ; 38.1383 ; 38.3106 ; 38.5689 ; 38.9518 ; 39.5253 ; 39.7262 ; 40.0263 ; 40.4727 ; 41.1296 ; 41.9342 ; 42.2252]

Bolt 2 - Shear Force (kips): [0.046111 ; 0.08176 ; 0.15632 ; 0.22569 ; 0.32473 ; 0.45944 ; 0.57033 ; 0.65528 ; 0.74572 ; 0.83079 ; 0.90748 ; 0.98425 ; 1.0495 ; 1.0857 ; 1.1109 ; 1.142 ; 1.1787 ; 1.2235 ; 1.2834 ; 1.3861 ; 1.4127 ; 1.4225 ; 1.4368 ; 1.4587 ; 1.4919 ; 1.5432 ; 1.6219 ; 1.6498 ; 1.6916 ; 1.7501 ; 1.8212 ; 1.8663 ; 1.8803]

Bolt 3 - Tensile Force (kips): [36 ; 35.9558 ; 35.9356 ; 35.9368 ; 35.9591 ; 36.0276 ; 36.0899 ; 36.1494 ; 36.2129 ; 36.3102 ; 36.4268 ; 36.5961 ; 36.8549 ; 37.3091 ; 37.7369 ; 38.3551 ; 39.8084 ; 41.418 ; 42.8529 ; 44.6576 ; 44.9647 ; 45.0566 ; 45.1824 ; 45.3885 ; 45.6417 ; 45.9808 ; 46.4572 ; 46.6335 ; 46.8577 ; 47.1653 ; 47.5278 ; 47.8138 ; 47.9909]

Bolt 3 - Shear Force (kips): [0.031052 ; 0.021483 ; 0.0536 ; 0.08998 ; 0.14635 ; 0.22854 ; 0.29709 ; 0.3533 ; 0.42149 ; 0.48771 ; 0.54734 ; 0.62477 ; 0.71161 ; 0.81302 ; 1.1342 ; 1.6886 ; 2.2114 ; 2.5348 ; 2.7828 ; 3.0797 ; 3.1845 ; 3.2233 ; 3.273 ; 3.3689 ; 3.5162 ; 3.7233 ; 4.0289 ; 4.2407 ; 4.6361 ; 5.3604 ; 6.0616 ; 6.8151 ; 7.0465]

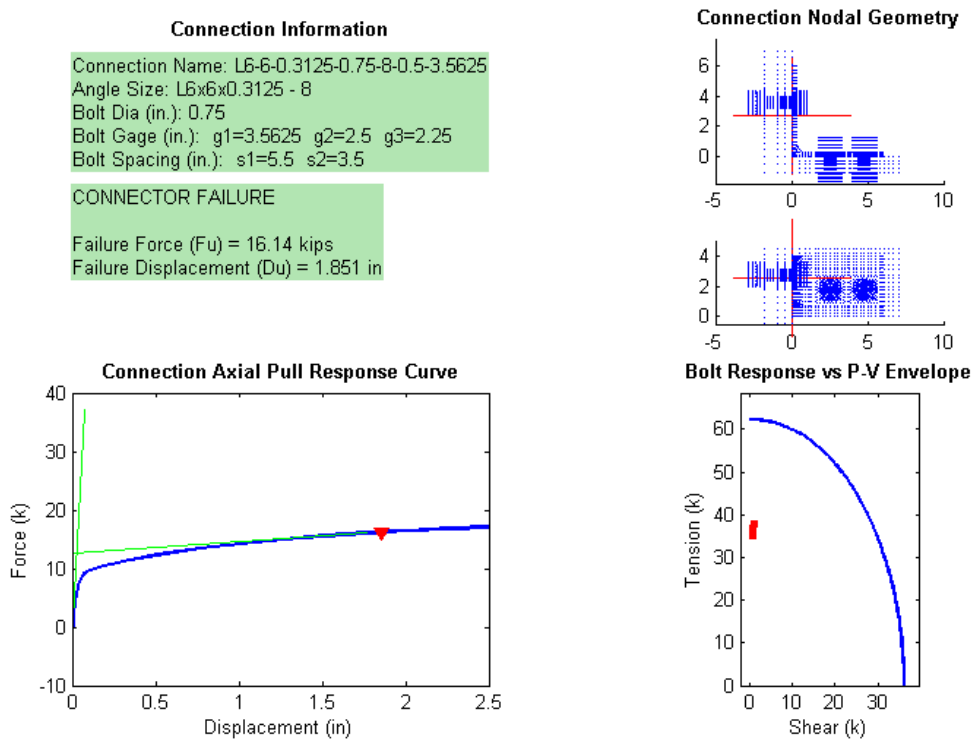


Figure B.95 Connection L6_6_0.3125_0.75_8_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.75_8_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 495.1521

Plastic Stiffness (k/in): 1.9517

Displacement (in): [1.8425e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.017578 ; 0.021973 ; 0.028565 ; 0.038452 ; 0.053284 ; 0.075531 ; 0.1089 ; 0.15896 ; 0.23404 ; 0.34667 ; 0.51561 ; 0.76561 ; 1.0156 ; 1.2656 ; 1.5156 ; 1.7656 ; 2.0156 ; 2.2656 ; 2.5]

Force (kips): [-0.61446 ; 0.11206 ; 0.35263 ; 0.58303 ; 0.91376 ; 1.3827 ; 1.8375 ; 2.2688 ; 2.8528 ; 3.5263 ; 4.1494 ; 4.5938 ; 4.8647 ; 5.0901 ; 5.3729 ; 5.7243 ; 6.1629 ; 6.694 ; 7.1161 ; 7.4653 ; 7.7566 ; 8.0006 ; 8.2097 ; 8.3905 ; 8.5377]

Bolt 1 - Tensile Force (kips): [34.8674 ; 34.8471 ; 34.8409 ; 34.835 ; 34.8264 ; 34.814 ; 34.8014 ; 34.7889 ; 34.7716 ; 34.7511 ; 34.7333 ; 34.724 ; 34.723 ; 34.7271 ; 34.738 ; 34.7558 ; 34.7822 ; 34.8223 ; 34.8637 ; 34.907 ; 34.9515 ; 34.9967 ; 35.0428 ; 35.0899 ; 35.1346]

Bolt 1 - Shear Force (kips): [0.053457 ; 0.040787 ; 0.047124 ; 0.056213 ; 0.072213 ; 0.098015 ; 0.12475 ; 0.15117 ; 0.1879 ; 0.23168 ; 0.27239 ; 0.30031 ; 0.31664 ; 0.33056 ; 0.34354 ; 0.36205 ; 0.38933 ; 0.42477 ; 0.4552 ; 0.48037 ; 0.50178 ; 0.52026 ; 0.53634 ; 0.5498 ; 0.56019]

Bolt 2 - Tensile Force (kips): [34.8772 ; 34.8458 ; 34.8312 ; 34.8174 ; 34.7991 ; 34.7749 ; 34.753 ; 34.733 ; 34.7169 ; 34.7091 ; 34.7121 ; 34.7298 ; 34.7515 ; 34.7827 ; 34.8406 ; 34.9778 ; 35.2739 ; 35.7609 ; 36.0941 ; 36.3503 ; 36.5696 ; 36.755 ; 36.9284 ; 37.0997 ; 37.2526]

Bolt 2 - Shear Force (kips): [0.04647 ; 0.038533 ; 0.056554 ; 0.075795 ; 0.10498 ; 0.148 ; 0.19055 ; 0.23173 ; 0.28938 ; 0.35845 ; 0.42746 ; 0.48101 ; 0.51456 ; 0.54336 ; 0.58434 ; 0.63992 ; 0.70444 ; 0.74485 ; 0.74853 ; 0.73913 ; 0.7268 ; 0.71536 ; 0.70621 ; 0.69982 ; 0.70017]

Bolt 3 - Tensile Force (kips): [36 ; 35.9765 ; 35.9561 ; 35.9384 ; 35.9191 ; 35.9064 ; 35.8945 ; 35.891 ; 35.9036 ; 35.9097 ; 35.8975 ; 35.8946 ; 35.9107 ; 35.9187 ; 35.9131 ; 35.9879 ; 36.1996 ; 36.6386 ; 37.0395 ; 37.387 ; 37.6802 ; 37.8786 ; 38.101 ; 38.3092 ; 38.5303]

Bolt 3 - Shear Force (kips): [0.029777 ; 0.017902 ; 0.018418 ; 0.027615 ; 0.046532 ; 0.077894 ; 0.11036 ; 0.14266 ; 0.18887 ; 0.2449 ; 0.29979 ; 0.33781 ; 0.3489 ; 0.35807 ; 0.38988 ; 0.4467 ; 0.53467 ; 0.65033 ; 0.75015 ; 0.83279 ; 0.93674 ; 1.096 ; 1.2493 ; 1.4081 ; 1.5367]

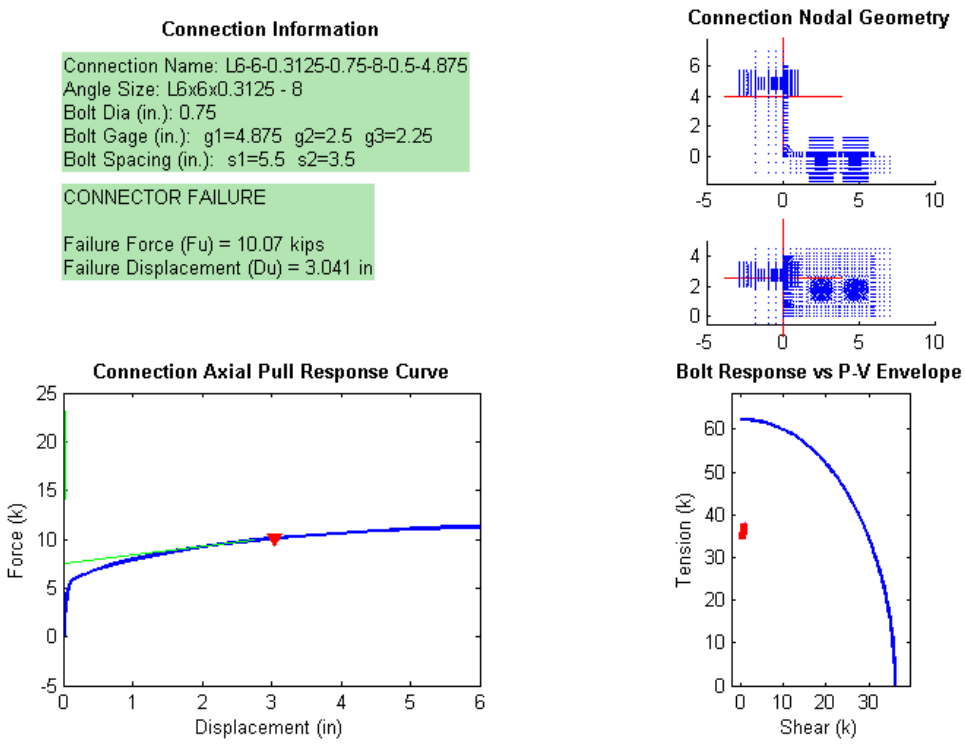


Figure B.96 Connection L6_6_0.3125_0.75_8_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.75_8_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 559.3084

Plastic Stiffness (k/in): 0.8474

Displacement (in): [2.5359e-036 ; 0.0011719 ; 0.0023437 ; 0.0041016 ; 0.0067383 ; 0.010693 ; 0.016626 ; 0.025525 ; 0.038873 ; 0.058896 ; 0.08893 ; 0.13398 ; 0.20156 ; 0.30292 ; 0.45497 ; 0.68304 ; 1.0251 ; 1.5383 ; 2.1383 ; 2.7383 ; 3.3383 ; 3.9383 ; 4.5383 ; 5.1383 ; 5.7383 ; 6]

Force (kips): [-0.61364 ; -0.015207 ; 0.041802 ; 0.12279 ; 0.24067 ; 0.41296 ; 0.66303 ; 1.0236 ; 1.5411 ; 2.1695 ; 2.6696 ; 2.9098 ; 3.0513 ; 3.2069 ; 3.4066 ; 3.6679 ; 3.9768 ; 4.3477 ; 4.6781 ; 4.9323 ; 5.1344 ; 5.2971 ; 5.4256 ; 5.5271 ; 5.6072 ; 5.6366]

Bolt 1 - Tensile Force (kips): [34.8676 ; 34.8503 ; 34.849 ; 34.847 ; 34.8442 ; 34.8399 ; 34.8337 ; 34.8246 ; 34.8111 ; 34.7935 ; 34.7797 ; 34.7749 ; 34.774 ; 34.7761 ; 34.7829 ; 34.7972 ; 34.8268 ; 34.8702 ; 34.9178 ; 34.9646 ; 35.0128 ; 35.0613 ; 35.1098 ; 35.1584 ; 35.2072 ; 35.2286]

Bolt 1 - Shear Force (kips): [0.053654 ; 0.039218 ; 0.039823 ; 0.041152 ; 0.043974 ; 0.049665 ; 0.060234 ; 0.078396 ; 0.10795 ; 0.14672 ; 0.17983 ; 0.19745 ; 0.21088 ; 0.22505 ; 0.2412 ; 0.25927 ; 0.2688 ; 0.28313 ; 0.30299 ; 0.32163 ; 0.33591 ; 0.34851 ; 0.36071 ; 0.37264 ; 0.3836 ; 0.38824]

Bolt 2 - Tensile Force (kips): [34.8783 ; 34.8549 ; 34.8507 ; 34.8446 ; 34.8359 ; 34.8234 ; 34.8071 ; 34.7865 ; 34.7603 ; 34.7521 ; 34.76 ; 34.7695 ; 34.7835 ; 34.8073 ; 34.8531 ; 34.9399 ; 35.0937 ; 35.4195 ; 35.81 ; 36.1079 ; 36.3241 ; 36.5081 ; 36.6678 ; 36.8064 ; 36.928 ; 36.9768]

Bolt 2 - Shear Force (kips): [0.046966 ; 0.030968 ; 0.034601 ; 0.040481 ; 0.050024 ; 0.065176 ; 0.088601 ; 0.12415 ; 0.17674 ; 0.2443 ; 0.30133 ; 0.32833 ; 0.34276 ; 0.36325 ; 0.39918 ; 0.45595 ; 0.5139 ; 0.57743 ; 0.61474 ; 0.6282 ; 0.62919 ; 0.62455 ; 0.61716 ; 0.60893 ; 0.60059 ; 0.59709]

Bolt 3 - Tensile Force (kips): [36 ; 35.9921 ; 35.9845 ; 35.9741 ; 35.9594 ; 35.9396 ; 35.917 ; 35.8988 ; 35.8727 ; 35.8672 ; 35.8566 ; 35.862 ; 35.8754 ; 35.8609 ; 35.7982 ; 35.7879 ; 35.9397 ; 36.2769 ; 36.716 ; 37.0705 ; 37.3418 ; 37.5886 ; 37.8175 ; 38.0426 ; 38.2581 ; 38.351]

Bolt 3 - Shear Force (kips): [0.029837 ; 0.022745 ; 0.019815 ; 0.016997 ; 0.017108 ; 0.025347 ; 0.044421 ; 0.076827 ; 0.12619 ; 0.18997 ; 0.2389 ; 0.24562 ; 0.21961 ; 0.19852 ; 0.19802 ; 0.24323 ; 0.33695 ; 0.45618 ; 0.5591 ; 0.6437 ; 0.72361 ; 0.79673 ; 0.85849 ; 0.91231 ; 0.95755 ; 0.97381]

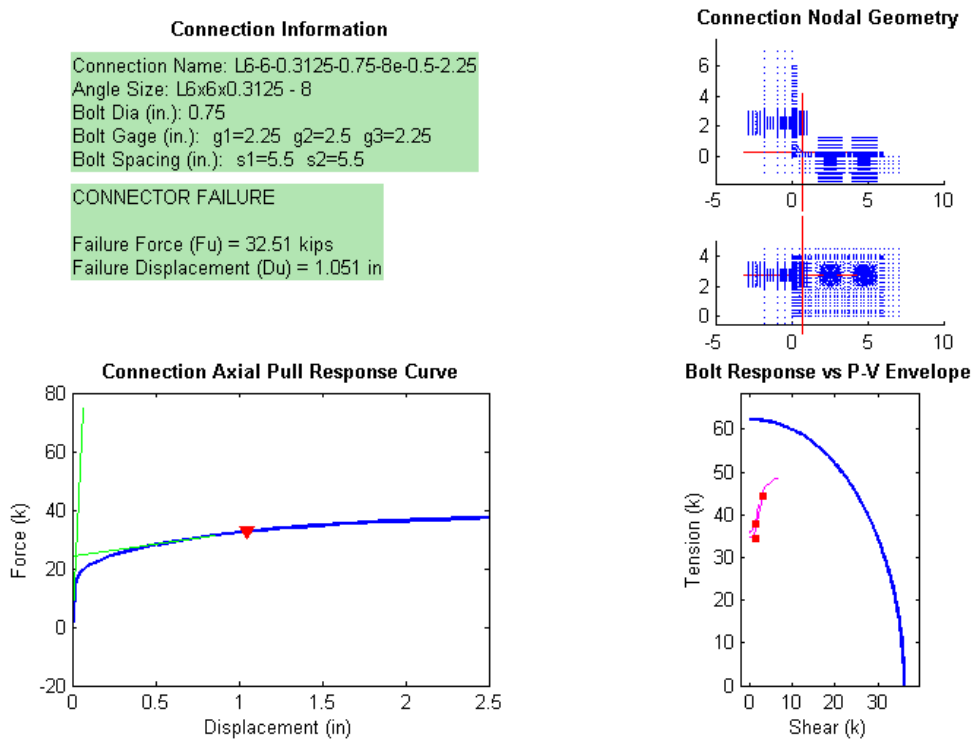


Figure B.97 Connection L6_6_0.3125_0.75_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.75_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.1974e+003

Plastic Stiffness (k/in): 7.9673

Displacement (in): [2.1706e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.017578 ; 0.021973 ; 0.028565 ; 0.038452 ; 0.053284 ; 0.075531 ; 0.1089 ; 0.15896 ; 0.23404 ; 0.34667 ; 0.51561 ; 0.68455 ; 0.85349 ; 1.1035 ; 1.166 ; 1.1894 ; 1.2246 ; 1.2773 ; 1.3564 ; 1.4751 ; 1.653 ; 1.903 ; 2.153 ; 2.403 ; 2.5]

Force (kips): [-0.707446 ; 0.704747 ; 1.63123 ; 2.46615 ; 3.62547 ; 5.1335 ; 6.2897 ; 7.12265 ; 7.96921 ; 8.7417 ; 9.39339 ; 10.0005 ; 10.6205 ; 11.3094 ; 12.1381 ; 13.0816 ; 14.123 ; 14.953 ; 15.626 ; 16.4236 ; 16.6031 ; 16.6729 ; 16.7701 ; 16.9063 ; 17.0997 ; 17.3539 ; 17.6799 ; 18.0491 ; 18.3435 ; 18.5834 ; 18.6657]

Bolt 1 - Tensile Force (kips): [34.9073 ; 34.865 ; 34.8366 ; 34.8095 ; 34.77 ; 34.7155 ; 34.6723 ; 34.6412 ; 34.6106 ; 34.5863 ; 34.5696 ; 34.5532 ; 34.5364 ; 34.517 ; 34.4914 ; 34.463 ; 34.4385 ; 34.4262 ; 34.4242 ; 34.4354 ; 34.4396 ; 34.441 ; 34.4436 ; 34.4485 ; 34.4568 ; 34.4714 ; 34.4971 ; 34.539 ; 34.5841 ; 34.6301 ; 34.6482]

Bolt 1 - Shear Force (kips): [0.040611 ; 0.069742 ; 0.12504 ; 0.17729 ; 0.25197 ; 0.35117 ; 0.42861 ; 0.48471 ; 0.54067 ; 0.58715 ; 0.62393 ; 0.66347 ; 0.70628 ; 0.75855 ; 0.8291 ; 0.91274 ; 1.0069 ; 1.0789 ; 1.1347 ; 1.1973 ; 1.2111 ; 1.2165 ; 1.2238 ; 1.2337 ; 1.2471 ; 1.2636 ; 1.2829 ; 1.3011 ; 1.313 ; 1.3212 ; 1.3235]

Bolt 2 - Tensile Force (kips): [34.9344 ; 34.8669 ; 34.822 ; 34.7818 ; 34.7269 ; 34.6699 ; 34.6341 ; 34.6122 ; 34.6027 ; 34.61 ; 34.6478 ; 34.7524 ; 34.9616 ; 35.2543 ; 35.5504 ; 35.8497 ; 36.3 ; 36.8057 ; 37.3156 ; 38.071 ; 38.2582 ; 38.3295 ; 38.436 ; 38.5976 ; 38.8509 ; 39.227 ; 39.7779 ; 40.5145 ; 41.2223 ; 41.9127 ; 42.1765]

Bolt 2 - Shear Force (kips): [0.067701 ; 0.081 ; 0.15228 ; 0.22166 ; 0.32123 ; 0.456 ; 0.56415 ; 0.64691 ; 0.73767 ; 0.83044 ; 0.91559 ; 0.99632 ; 1.0608 ; 1.0959 ; 1.1219 ; 1.1504 ; 1.1786 ; 1.2243 ; 1.2866 ; 1.3766 ; 1.4002 ; 1.4097 ; 1.4242 ; 1.4461 ; 1.4807 ; 1.5346 ; 1.6166 ; 1.7235 ; 1.8132 ; 1.8818 ; 1.9051]

Bolt 3 - Tensile Force (kips): [36 ; 35.9566 ; 35.9383 ; 35.9412 ; 35.9706 ; 36.0483 ; 36.1192 ; 36.1848 ; 36.2548 ; 36.345 ; 36.4533 ; 36.6231 ; 36.898 ; 37.3749 ; 38.0318 ; 38.6356 ; 40.0442 ; 41.6387 ; 43.1059 ; 44.9556 ; 45.3214 ; 45.4401 ; 45.5844 ; 45.781 ; 46.0785 ; 46.4262 ; 46.8978 ; 47.4948 ; 48.0112 ; 48.3993 ; 48.5087]

Bolt 3 - Shear Force (kips): [0.040173 ; 0.013452 ; 0.037667 ; 0.072164 ; 0.12676 ; 0.20685 ; 0.27257 ; 0.32521 ; 0.3876 ; 0.45839 ; 0.52879 ; 0.60175 ; 0.68028 ; 0.77209 ; 0.94487 ; 1.5297 ; 2.1145 ; 2.4557 ; 2.6914 ; 2.9644 ; 3.0402 ; 3.0789 ; 3.1293 ; 3.1975 ; 3.3255 ; 3.5308 ; 3.8068 ; 4.6033 ; 5.555 ; 6.2481 ; 6.4782]

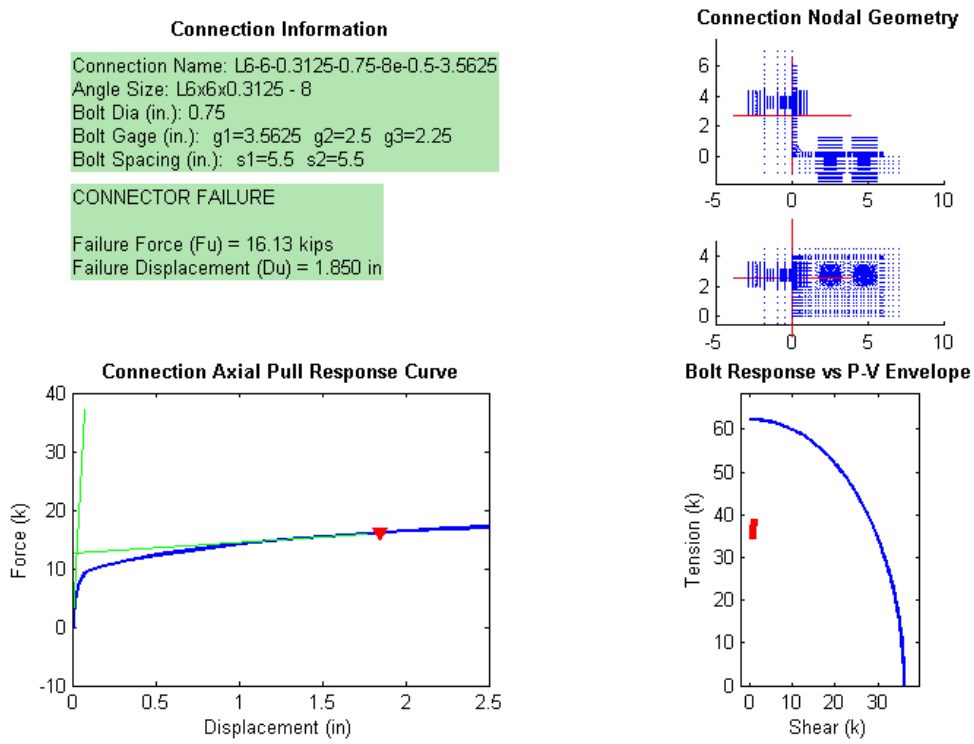


Figure B.98 Connection L6_6_0.3125_0.75_8e_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.75_8e_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 520.2084

Plastic Stiffness (k/in): 1.9768

Displacement (in): [2.0789e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.017578 ; 0.021973 ; 0.028565 ; 0.038452 ; 0.053284 ; 0.075531 ; 0.1089 ; 0.15896 ; 0.23404 ; 0.34667 ; 0.51561 ; 0.76561 ; 1.0156 ; 1.2656 ; 1.5156 ; 1.7656 ; 2.0156 ; 2.2656 ; 2.5]

Force (kips): [-0.67728 ; 0.097421 ; 0.33876 ; 0.56928 ; 0.89991 ; 1.3689 ; 1.8235 ; 2.2542 ; 2.834 ; 3.4907 ; 4.104 ; 4.5662 ; 4.8593 ; 5.0867 ; 5.3632 ; 5.7147 ; 6.1526 ; 6.6822 ; 7.1049 ; 7.4564 ; 7.7487 ; 7.9958 ; 8.2053 ; 8.386 ; 8.5336]

Bolt 1 - Tensile Force (kips): [34.9081 ; 34.8848 ; 34.8781 ; 34.8717 ; 34.8623 ; 34.8487 ; 34.8348 ; 34.8213 ; 34.8027 ; 34.7812 ; 34.7617 ; 34.7504 ; 34.7497 ; 34.7553 ; 34.7678 ; 34.7882 ; 34.8167 ; 34.8552 ; 34.8931 ; 34.9315 ; 34.9718 ; 35.0136 ; 35.0567 ; 35.1008 ; 35.143]

Bolt 1 - Shear Force (kips): [0.03941 ; 0.039986 ; 0.051 ; 0.063316 ; 0.082534 ; 0.11132 ; 0.14028 ; 0.1685 ; 0.20714 ; 0.25212 ; 0.29404 ; 0.32371 ; 0.3395 ; 0.35064 ; 0.36031 ; 0.36822 ; 0.38653 ; 0.41833 ; 0.44825 ; 0.47328 ; 0.49395 ; 0.51191 ; 0.52676 ; 0.53838 ; 0.54751]

Bolt 2 - Tensile Force (kips): [34.9372 ; 34.8997 ; 34.8848 ; 34.8709 ; 34.8527 ; 34.8292 ; 34.8073 ; 34.7896 ; 34.7778 ; 34.7713 ; 34.7849 ; 34.8111 ; 34.8452 ; 34.8848 ; 34.9546 ; 35.0945 ; 35.3799 ; 35.8459 ; 36.1642 ; 36.4285 ; 36.6575 ; 36.8641 ; 37.0598 ; 37.2458 ; 37.4123]

Bolt 2 - Shear Force (kips): [0.065959 ; 0.049917 ; 0.061791 ; 0.077121 ; 0.10262 ; 0.14239 ; 0.18272 ; 0.22227 ; 0.27764 ; 0.34322 ; 0.40944 ; 0.46631 ; 0.50779 ; 0.54197 ; 0.5895 ; 0.64841 ; 0.71199 ; 0.74716 ; 0.74639 ; 0.73558 ; 0.72166 ; 0.70897 ; 0.69858 ; 0.70175 ; 0.70742]

Bolt 3 - Tensile Force (kips): [36 ; 35.9769 ; 35.957 ; 35.9399 ; 35.9213 ; 35.9098 ; 35.9009 ; 35.9019 ; 35.9176 ; 35.9323 ; 35.9318 ; 35.9362 ; 35.9461 ; 35.9481 ; 35.9436 ; 35.9999 ; 36.2006 ; 36.6454 ; 37.055 ; 37.3997 ; 37.7275 ; 37.9902 ; 38.2592 ; 38.5086 ; 38.7399]

Bolt 3 - Shear Force (kips): [0.039391 ; 0.023907 ; 0.016561 ; 0.016983 ; 0.030096 ; 0.05714 ; 0.086263 ; 0.11569 ; 0.15805 ; 0.2094 ; 0.26055 ; 0.2998 ; 0.3184 ; 0.33312 ; 0.3644 ; 0.42896 ; 0.52154 ; 0.63068 ; 0.72578 ; 0.80891 ; 0.88479 ; 0.98754 ; 1.0977 ; 1.2212 ; 1.3373]

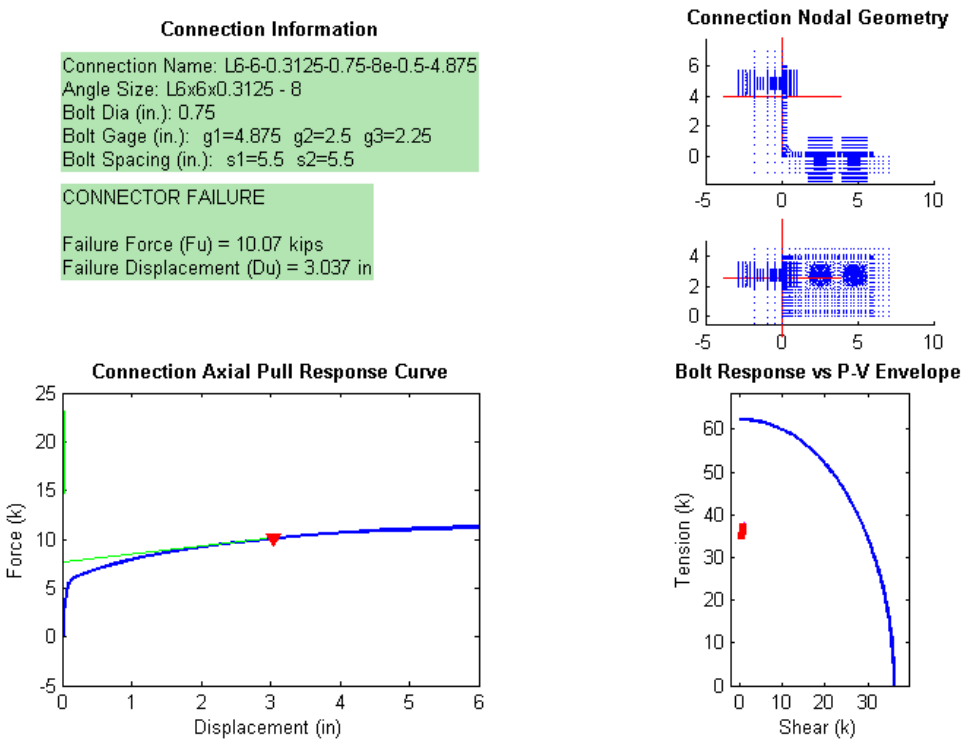


Figure B.99 Connection L6_6_0.3125_0.75_8e_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.75_8e_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 683.1193

Plastic Stiffness (k/in): 0.7844

Displacement (in): [2.0403e-036 ; 0.0011719 ; 0.0020508 ; 0.0029297 ; 0.004248 ; 0.0062256 ; 0.0091919 ; 0.013641 ; 0.020316 ; 0.030327 ; 0.045344 ; 0.067869 ; 0.10166 ; 0.15234 ; 0.22836 ; 0.3424 ; 0.51345 ; 0.77003 ; 1.1549 ; 1.7322 ; 2.3322 ; 2.9322 ; 3.5322 ; 4.1322 ; 4.7322 ; 5.3322 ; 5.9322 ; 6]

Force (kips): [-0.67761 ; -0.019785 ; 0.022853 ; 0.064713 ; 0.12441 ; 0.21243 ; 0.34169 ; 0.53161 ; 0.80442 ; 1.2019 ; 1.7562 ; 2.348 ; 2.7671 ; 2.9635 ; 3.1013 ; 3.2641 ; 3.4804 ; 3.7538 ; 4.0783 ; 4.4636 ; 4.7649 ; 5.0002 ; 5.1887 ; 5.3395 ; 5.4581 ; 5.5524 ; 5.6262 ; 5.6336]

Bolt 1 - Tensile Force (kips): [34.9087 ; 34.8884 ; 34.8873 ; 34.8862 ; 34.8845 ; 34.8821 ; 34.8786 ; 34.8733 ; 34.8656 ; 34.8541 ; 34.8369 ; 34.8178 ; 34.8048 ; 34.8016 ; 34.8021 ; 34.8063 ; 34.8164 ; 34.8368 ; 34.8699 ; 34.9163 ; 34.9626 ; 35.0084 ; 35.0541 ; 35.0996 ; 35.1452 ; 35.1911 ; 35.2375 ; 35.2428]

Bolt 1 - Shear Force (kips): [0.039917 ; 0.035683 ; 0.037151 ; 0.038728 ; 0.041184 ; 0.045181 ; 0.051666 ; 0.062086 ; 0.078233 ; 0.10323 ; 0.14001 ; 0.18156 ; 0.21211 ; 0.22718 ; 0.23967 ; 0.25261 ; 0.2666 ; 0.27728 ; 0.28045 ; 0.29162 ; 0.30619 ; 0.31989 ; 0.33119 ; 0.34213 ; 0.35316 ; 0.36398 ; 0.37435 ; 0.37553]

Bolt 2 - Tensile Force (kips): [34.9399 ; 34.9104 ; 34.9072 ; 34.904 ; 34.8994 ; 34.8929 ; 34.8834 ; 34.8707 ; 34.8543 ; 34.8341 ; 34.8154 ; 34.8172 ; 34.8389 ; 34.8538 ; 34.8687 ; 34.8936 ; 34.9564 ; 35.069 ; 35.2922 ; 35.6888 ; 36.0153 ; 36.2595 ; 36.4554 ; 36.6293 ; 36.7755 ; 36.9027 ; 37.0139 ; 37.0261]

Bolt 2 - Shear Force (kips): [0.066651 ; 0.047094 ; 0.048286 ; 0.049739 ; 0.052246 ; 0.056722 ; 0.064645 ; 0.078294 ; 0.10067 ; 0.13644 ; 0.18963 ; 0.25019 ; 0.29573 ; 0.31699 ; 0.33154 ; 0.35577 ; 0.40092 ; 0.46534 ; 0.5262 ; 0.58412 ; 0.60473 ; 0.6073 ; 0.60353 ; 0.59446 ; 0.58421 ; 0.57393 ; 0.56415 ; 0.56301]

Bolt 3 - Tensile Force (kips): [36 ; 35.9921 ; 35.9865 ; 35.9812 ; 35.9737 ; 35.963 ; 35.9482 ; 35.9281 ; 35.9112 ; 35.8949 ; 35.8777 ; 35.8843 ; 35.8814 ; 35.8918 ; 35.8966 ; 35.8642 ; 35.7943 ; 35.8233 ; 36.0163 ; 36.4285 ; 36.8428 ; 37.1538 ; 37.4103 ; 37.6415 ; 37.8568 ; 38.0705 ; 38.2818 ; 38.3057]

Bolt 3 - Shear Force (kips): [0.039495 ; 0.030273 ; 0.027862 ; 0.025574 ; 0.022498 ; 0.018708 ; 0.016065 ; 0.021251 ; 0.039394 ; 0.071612 ; 0.12035 ; 0.17665 ; 0.21324 ; 0.21454 ; 0.19456 ; 0.18784 ; 0.20139 ; 0.26321 ; 0.35736 ; 0.48058 ; 0.57874 ; 0.66718 ; 0.75067 ; 0.82625 ; 0.89094 ; 0.94941 ; 0.99549 ; 1.0001]

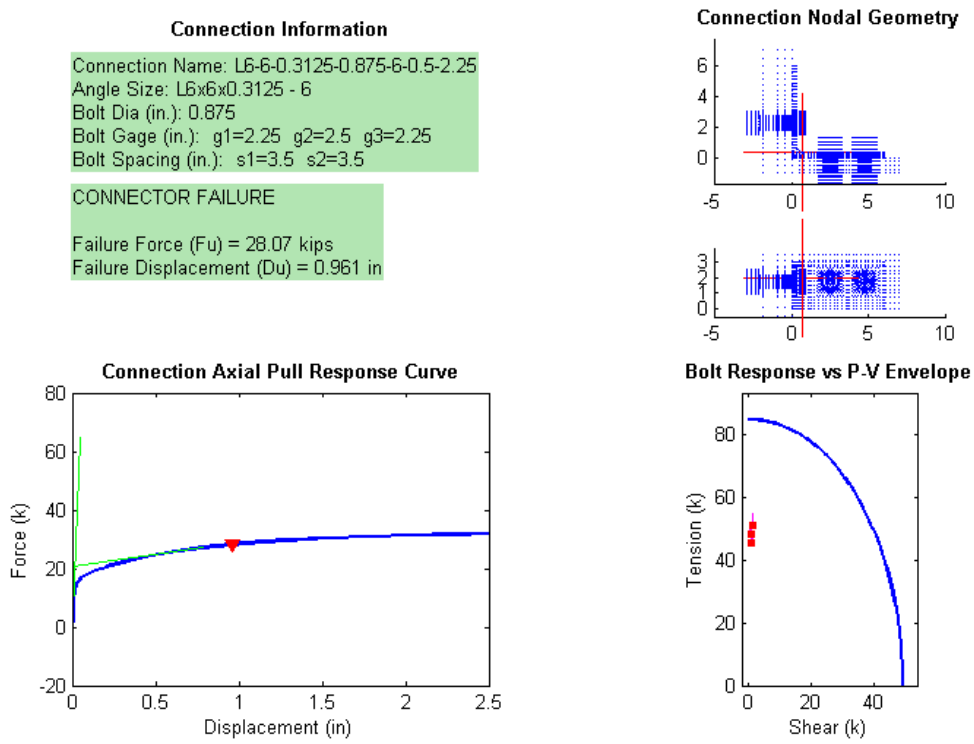


Figure B.100 Connection L6_6_0.3125_0.875_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.875_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.4685e+003

Plastic Stiffness (k/in): 8.0256

Displacement (in): [4.7389e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.2737 ; 0.33706 ; 0.43209 ; 0.57463 ; 0.78845 ; 1.0385 ; 1.2885 ; 1.5385 ; 1.7885 ; 2.0385 ; 2.2885 ; 2.5]

Force (kips): [-1.18729 ; 0.663801 ; 1.68093 ; 2.96029 ; 4.61965 ; 6.30274 ; 7.36446 ; 7.56592 ; 7.80101 ; 8.07089 ; 8.38882 ; 8.75667 ; 9.17635 ; 9.67422 ; 10.3018 ; 10.8483 ; 11.3271 ; 11.9331 ; 12.6727 ; 13.5307 ; 14.2598 ; 14.7935 ; 15.1838 ; 15.4718 ; 15.6918 ; 15.8665 ; 15.9858]

Bolt 1 - Tensile Force (kips): [48.6847 ; 48.6231 ; 48.59 ; 48.5474 ; 48.4901 ; 48.4312 ; 48.3954 ; 48.3893 ; 48.3823 ; 48.3749 ; 48.3662 ; 48.3564 ; 48.3463 ; 48.3361 ; 48.3244 ; 48.3137 ; 48.3056 ; 48.2989 ; 48.2967 ; 48.3079 ; 48.3367 ; 48.3773 ; 48.4247 ; 48.4765 ; 48.5308 ; 48.5865 ; 48.6346]

Bolt 1 - Shear Force (kips): [0.086927 ; 0.072037 ; 0.11364 ; 0.1783 ; 0.26952 ; 0.36363 ; 0.42246 ; 0.43297 ; 0.44544 ; 0.45963 ; 0.47786 ; 0.5024 ; 0.5335 ; 0.57163 ; 0.62121 ; 0.66844 ; 0.71062 ; 0.76311 ; 0.82654 ; 0.89523 ; 0.94709 ; 0.97872 ; 0.99875 ; 1.01 ; 1.0161 ; 1.0188 ; 1.019]

Bolt 2 - Tensile Force (kips): [48.6962 ; 48.5851 ; 48.5186 ; 48.4344 ; 48.3189 ; 48.1909 ; 48.0343 ; 47.9763 ; 47.8936 ; 47.7852 ; 47.6132 ; 47.3311 ; 46.9829 ; 46.5946 ; 46.1727 ; 45.7789 ; 45.4564 ; 45.16 ; 44.9171 ; 44.9529 ; 45.4202 ; 46.0615 ; 46.7155 ; 47.3617 ; 47.9526 ; 48.4671 ; 48.8405]

Bolt 2 - Shear Force (kips): [0.091175 ; 0.12012 ; 0.20808 ; 0.32795 ; 0.49 ; 0.66242 ; 0.77512 ; 0.79749 ; 0.82356 ; 0.85181 ; 0.87349 ; 0.87214 ; 0.84986 ; 0.82472 ; 0.80719 ; 0.78808 ; 0.76841 ; 0.76497 ; 0.79681 ; 0.8723 ; 0.98808 ; 1.0939 ; 1.1688 ; 1.2228 ; 1.2672 ; 1.3086 ; 1.3438]

Bolt 3 - Tensile Force (kips): [50 ; 49.9284 ; 49.8642 ; 49.7816 ; 49.6261 ; 49.3975 ; 49.1317 ; 49.034 ; 48.9027 ; 48.7172 ; 48.4681 ; 48.1685 ; 47.8252 ; 47.6074 ; 47.6129 ; 47.8493 ; 48.216 ; 48.8382 ; 49.645 ; 50.6112 ; 51.451 ; 52.3283 ; 53.0706 ; 53.6798 ; 54.1816 ; 54.6065 ; 54.9124]

Bolt 3 - Shear Force (kips): [0.045991 ; 0.029796 ; 0.063804 ; 0.12079 ; 0.2 ; 0.2876 ; 0.33992 ; 0.34785 ; 0.3574 ; 0.36793 ; 0.38551 ; 0.41032 ; 0.43045 ; 0.4631 ; 0.51994 ; 0.59792 ; 0.67539 ; 0.78126 ; 0.93076 ; 1.1478 ; 1.318 ; 1.362 ; 1.4016 ; 1.4326 ; 1.4595 ; 1.4755 ; 1.4824]

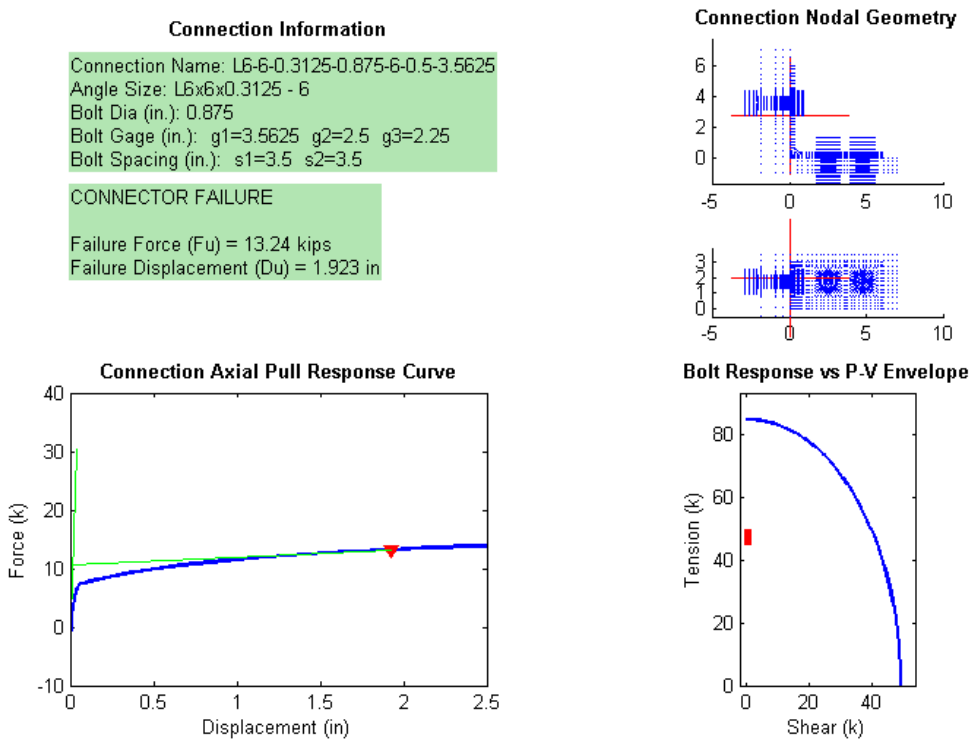


Figure B.101 Connection L6_6_0.3125_0.875_6_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.875_6_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 741.1236

Plastic Stiffness (k/in): 1.4097

Displacement (in): [4.6505e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.048103 ; 0.056446 ; 0.06896 ; 0.087731 ; 0.11589 ; 0.15812 ; 0.22148 ; 0.3165 ; 0.45905 ; 0.67286 ; 0.92286 ; 1.1729 ; 1.4229 ; 1.6729 ; 1.9229 ; 2.1729 ; 2.4229 ; 2.5]

Force (kips): [-1.1627 ; 0.047267 ; 0.28483 ; 0.61471 ; 1.0824 ; 1.7155 ; 2.5465 ; 3.2676 ; 3.4189 ; 3.5696 ; 3.6928 ; 3.8044 ; 3.9072 ; 4.0464 ; 4.2482 ; 4.5178 ; 4.86 ; 5.2833 ; 5.6719 ; 5.9824 ; 6.2355 ; 6.4435 ; 6.6197 ; 6.7657 ; 6.888 ; 6.9221]

Bolt 1 - Tensile Force (kips): [48.6852 ; 48.6442 ; 48.6373 ; 48.6277 ; 48.6139 ; 48.595 ; 48.5698 ; 48.5491 ; 48.5455 ; 48.5428 ; 48.5419 ; 48.543 ; 48.5468 ; 48.5537 ; 48.5645 ; 48.5819 ; 48.6093 ; 48.6524 ; 48.7053 ; 48.7601 ; 48.816 ; 48.8726 ; 48.9292 ; 48.9865 ; 49.0443 ; 49.0623]

Bolt 1 - Shear Force (kips): [0.086749 ; 0.06006 ; 0.063641 ; 0.071852 ; 0.087991 ; 0.1149 ; 0.15528 ; 0.19191 ; 0.19944 ; 0.20648 ; 0.21263 ; 0.21869 ; 0.22472 ; 0.23031 ; 0.23435 ; 0.23902 ; 0.25008 ; 0.26924 ; 0.29004 ; 0.30707 ; 0.32119 ; 0.33335 ; 0.34475 ; 0.35348 ; 0.35971 ; 0.36133]

Bolt 2 - Tensile Force (kips): [48.6985 ; 48.6282 ; 48.6091 ; 48.5823 ; 48.5459 ; 48.4982 ; 48.4382 ; 48.3931 ; 48.3829 ; 48.3713 ; 48.3619 ; 48.3543 ; 48.3462 ; 48.3278 ; 48.2903 ; 48.2227 ; 48.1174 ; 47.8743 ; 47.6167 ; 47.4284 ; 47.2654 ; 47.1395 ; 47.0397 ; 46.9663 ; 46.9309 ; 46.9223]

Bolt 2 - Shear Force (kips): [0.090331 ; 0.077409 ; 0.096501 ; 0.12646 ; 0.17227 ; 0.23778 ; 0.32742 ; 0.4106 ; 0.42907 ; 0.44819 ; 0.46277 ; 0.47485 ; 0.48476 ; 0.50303 ; 0.53372 ; 0.5726 ; 0.61078 ; 0.61101 ; 0.57809 ; 0.54371 ; 0.50944 ; 0.47587 ; 0.44949 ; 0.4324 ; 0.41727 ; 0.41259]

Bolt 3 - Tensile Force (kips): [50 ; 49.9671 ; 49.9348 ; 49.8887 ; 49.8171 ; 49.7035 ; 49.4791 ; 49.1273 ; 49.0023 ; 48.8366 ; 48.634 ; 48.3934 ; 48.0875 ; 47.6808 ; 47.196 ; 46.6125 ; 46.0731 ; 45.6794 ; 45.6208 ; 45.6876 ; 45.8518 ; 46.0243 ; 46.1941 ; 46.3534 ; 46.49 ; 46.5264]

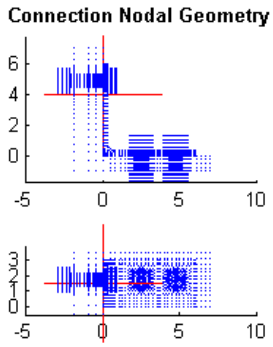
Bolt 3 - Shear Force (kips): [0.044296 ; 0.030292 ; 0.02785 ; 0.037158 ; 0.062303 ; 0.10039 ; 0.14547 ; 0.16909 ; 0.1673 ; 0.1601 ; 0.13997 ; 0.1083 ; 0.072593 ; 0.063169 ; 0.077741 ; 0.094392 ; 0.10045 ; 0.12346 ; 0.19377 ; 0.27412 ; 0.356 ; 0.42368 ; 0.48158 ; 0.53043 ; 0.57244 ; 0.58358]

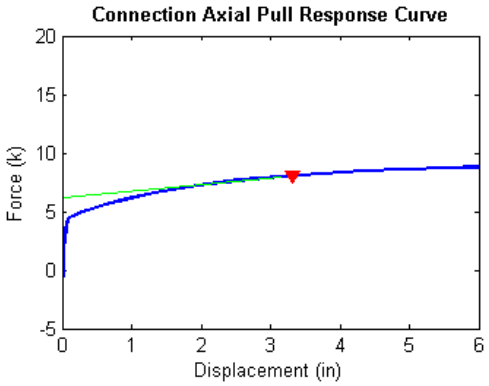
Connection Information

Connection Name: L6-6-0.3125-0.875-6-0.5-4.875
Angle Size: L6x6x0.3125 - 6
Bolt Dia (in.): 0.875
Bolt Gage (in.): g1=4.875 g2=2.5 g3=2.25
Bolt Spacing (in.): s1=3.5 s2=3.5

CONNECTOR FAILURE

Failure Force (Fu) = 8.06 kips
Failure Displacement (Du) = 3.307 in





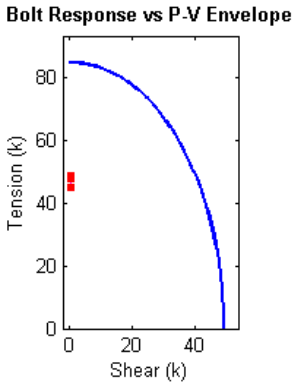


Figure B.102 Connection L6_6_0.3125_0.875_6_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.875_6_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 990.0808

Plastic Stiffness (k/in): 0.5662

Displacement (in): [7.0614e-036 ; 0.0011719 ; 0.0023437 ; 0.0041016 ; 0.0067383 ; 0.010693 ; 0.016626 ; 0.025525 ; 0.038873 ; 0.058896 ; 0.066404 ; 0.077667 ; 0.094561 ; 0.1199 ; 0.15791 ; 0.21493 ; 0.30046 ; 0.42875 ; 0.62118 ; 0.90983 ; 1.3428 ; 1.9428 ; 2.5428 ; 3.1428 ; 3.7428 ; 4.3428 ; 4.9428 ; 5.5428 ; 6]

Force (kips): [-1.1495 ; -0.039275 ; 0.010731 ; 0.085008 ; 0.19101 ; 0.34503 ; 0.56964 ; 0.88766 ; 1.3342 ; 1.8432 ; 1.9604 ; 2.0814 ; 2.1841 ; 2.2549 ; 2.3144 ; 2.3822 ; 2.4765 ; 2.6131 ; 2.8012 ; 3.0296 ; 3.3091 ; 3.6038 ; 3.8222 ; 3.9921 ; 4.1238 ; 4.225 ; 4.3009 ; 4.3582 ; 4.393]

Bolt 1 - Tensile Force (kips): [48.6856 ; 48.647 ; 48.6457 ; 48.6437 ; 48.6407 ; 48.6364 ; 48.6301 ; 48.6211 ; 48.6081 ; 48.5934 ; 48.5902 ; 48.5873 ; 48.5855 ; 48.5855 ; 48.5866 ; 48.5892 ; 48.5945 ; 48.6035 ; 48.6185 ; 48.6433 ; 48.6832 ; 48.7393 ; 48.7968 ; 48.8553 ; 48.9143 ; 48.9732 ; 49.0315 ; 49.0897 ; 49.1338]

Bolt 1 - Shear Force (kips): [0.086815 ; 0.059229 ; 0.059784 ; 0.060778 ; 0.062562 ; 0.06582 ; 0.071774 ; 0.082134 ; 0.099569 ; 0.12278 ; 0.12862 ; 0.13477 ; 0.1404 ; 0.14495 ; 0.15005 ; 0.15644 ; 0.16372 ; 0.17244 ; 0.1808 ; 0.18328 ; 0.17978 ; 0.18357 ; 0.18943 ; 0.19359 ; 0.19815 ; 0.20367 ; 0.2101 ; 0.21643 ; 0.22173]

Bolt 2 - Tensile Force (kips): [48.7004 ; 48.6383 ; 48.6336 ; 48.6264 ; 48.6161 ; 48.601 ; 48.5795 ; 48.551 ; 48.5129 ; 48.4748 ; 48.4677 ; 48.461 ; 48.4575 ; 48.4568 ; 48.4574 ; 48.4581 ; 48.4576 ; 48.4505 ; 48.4219 ; 48.3717 ; 48.3258 ; 48.2198 ; 48.1163 ; 48.0421 ; 47.9819 ; 47.9389 ; 47.9149 ; 47.9005 ; 47.8907]

Bolt 2 - Shear Force (kips): [0.090498 ; 0.0709 ; 0.075157 ; 0.081746 ; 0.09178 ; 0.1072 ; 0.13093 ; 0.16616 ; 0.21753 ; 0.27778 ; 0.29192 ; 0.3068 ; 0.31859 ; 0.32499 ; 0.32828 ; 0.33285 ; 0.34325 ; 0.36353 ; 0.3996 ; 0.44404 ; 0.48528 ; 0.50745 ; 0.49899 ; 0.48379 ; 0.46527 ; 0.44431 ; 0.42439 ; 0.404 ; 0.38836]

Bolt 3 - Tensile Force (kips): [50 ; 49.9877 ; 49.9775 ; 49.9622 ; 49.9401 ; 49.9072 ; 49.8567 ; 49.7773 ; 49.6279 ; 49.3468 ; 49.2396 ; 49.0958 ; 48.9218 ; 48.7249 ; 48.4983 ; 48.2244 ; 47.8219 ; 47.2894 ; 46.628 ; 45.9204 ; 45.3286 ; 44.9844 ; 44.9041 ; 44.8735 ; 44.8793 ; 44.9166 ; 44.9661 ; 45.0138 ; 45.0687]

Bolt 3 - Shear Force (kips): [0.045382 ; 0.037031 ; 0.034811 ; 0.032451 ; 0.031278 ; 0.034358 ; 0.046241 ; 0.068833 ; 0.10014 ; 0.12131 ; 0.11959 ; 0.11211 ; 0.094754 ; 0.069193 ; 0.053377 ; 0.088072 ; 0.15043 ; 0.22304 ; 0.28191 ; 0.29107 ; 0.25395 ; 0.20825 ; 0.18446 ; 0.19725 ; 0.22278 ; 0.24887 ; 0.26756 ; 0.28169 ; 0.2908]

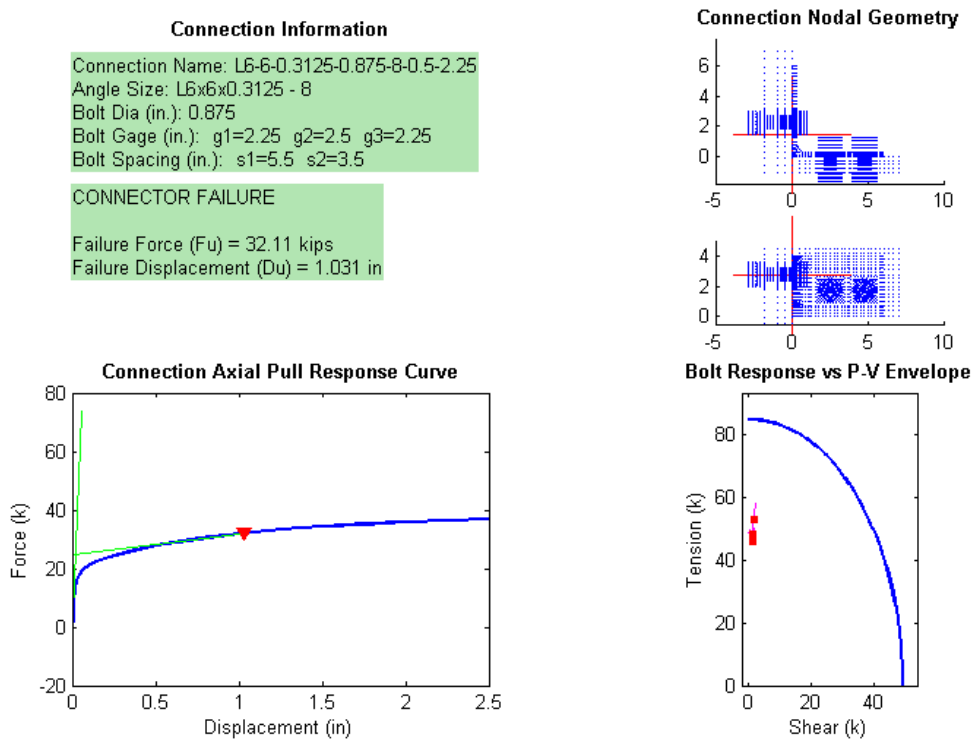


Figure B.103 Connection L6_6_0.3125_0.875_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.875_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.4018e+003

Plastic Stiffness (k/in): 6.9880

Displacement (in): [3.2552e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.5049 ; 1.7549 ; 2.0049 ; 2.2549 ; 2.5]

Force (kips): [-1.08496 ; 0.633706 ; 1.65302 ; 2.94474 ; 4.65369 ; 6.53087 ; 8.02303 ; 8.99984 ; 9.72042 ; 10.4154 ; 11.1291 ; 11.9163 ; 12.8423 ; 13.922 ; 15.1139 ; 15.9874 ; 16.6577 ; 17.1807 ; 17.593 ; 17.9215 ; 18.189 ; 18.4062]

Bolt 1 - Tensile Force (kips): [48.6798 ; 48.6179 ; 48.5809 ; 48.5325 ; 48.4658 ; 48.3895 ; 48.3295 ; 48.2923 ; 48.2648 ; 48.2368 ; 48.209 ; 48.183 ; 48.1551 ; 48.1286 ; 48.116 ; 48.126 ; 48.1513 ; 48.1866 ; 48.2292 ; 48.2763 ; 48.3271 ; 48.3791]

Bolt 1 - Shear Force (kips): [0.089553 ; 0.082994 ; 0.1319 ; 0.20696 ; 0.31445 ; 0.43756 ; 0.53583 ; 0.60073 ; 0.65292 ; 0.71237 ; 0.78095 ; 0.8568 ; 0.94898 ; 1.0597 ; 1.1756 ; 1.2539 ; 1.3086 ; 1.3463 ; 1.3725 ; 1.3913 ; 1.4039 ; 1.4116]

Bolt 2 - Tensile Force (kips): [48.6891 ; 48.59 ; 48.5238 ; 48.4385 ; 48.3231 ; 48.1796 ; 48.02 ; 47.8173 ; 47.5492 ; 47.179 ; 46.7061 ; 46.2564 ; 45.7734 ; 45.3612 ; 45.4694 ; 45.95 ; 46.5919 ; 47.3628 ; 48.1349 ; 48.8095 ; 49.4068 ; 49.9374]

Bolt 2 - Shear Force (kips): [0.075587 ; 0.10495 ; 0.19857 ; 0.32339 ; 0.49296 ; 0.68695 ; 0.84776 ; 0.9574 ; 1.0354 ; 1.0658 ; 1.0483 ; 1.0302 ; 1.0191 ; 1.0294 ; 1.1483 ; 1.2716 ; 1.3681 ; 1.4528 ; 1.5264 ; 1.5931 ; 1.6565 ; 1.7196]

Bolt 3 - Tensile Force (kips): [50 ; 49.928 ; 49.8631 ; 49.7796 ; 49.6136 ; 49.3974 ; 49.1063 ; 48.7977 ; 48.4246 ; 48.0508 ; 47.841 ; 48.0639 ; 48.9431 ; 50.1774 ; 51.5937 ; 52.9506 ; 54.1841 ; 55.2571 ; 56.1549 ; 56.8893 ; 57.4923 ; 57.9787]

Bolt 3 - Shear Force (kips): [0.051767 ; 0.031531 ; 0.060884 ; 0.11678 ; 0.19643 ; 0.29517 ; 0.38685 ; 0.451 ; 0.5197 ; 0.6082 ; 0.70186 ; 0.80463 ; 0.93858 ; 1.1413 ; 1.4293 ; 1.566 ; 1.6755 ; 1.7832 ; 1.8936 ; 2.0093 ; 2.121 ; 2.2201]

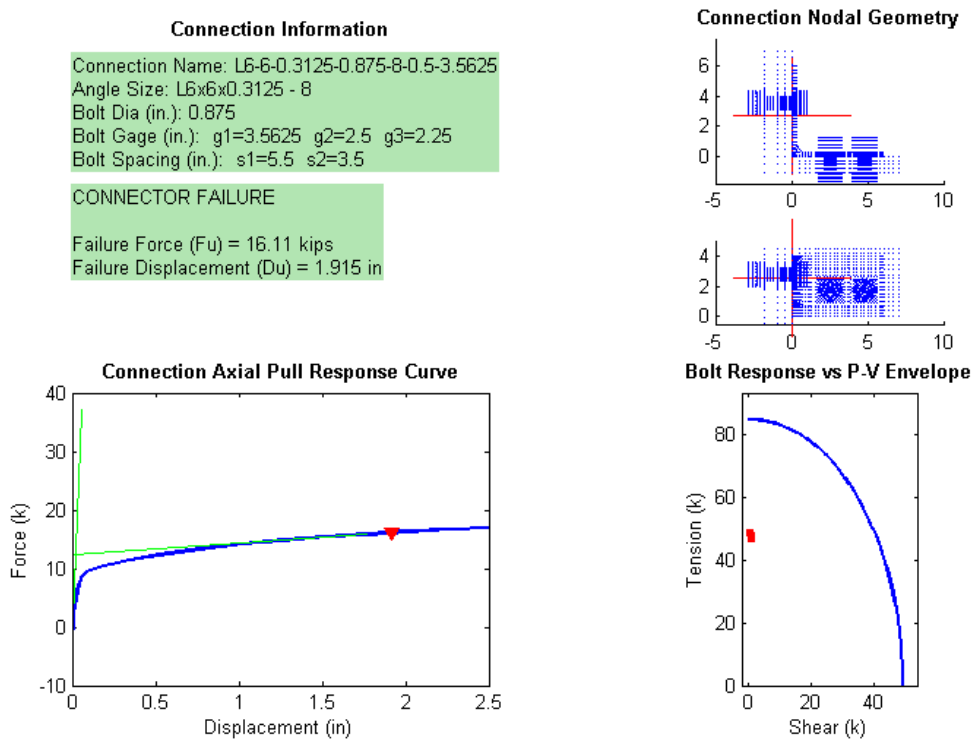


Figure B.104 Connection L6_6_0.3125_0.875_8_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.875_8_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 703.0246

Plastic Stiffness (k/in): 1.9308

Displacement (in): [3.2161e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.024414 ; 0.031006 ; 0.040894 ; 0.055725 ; 0.077972 ; 0.11134 ; 0.1614 ; 0.23649 ; 0.34911 ; 0.51805 ; 0.76805 ; 1.018 ; 1.268 ; 1.518 ; 1.768 ; 2.0181 ; 2.2681 ; 2.5]

Force (kips): [-1.0726 ; 0.041822 ; 0.30049 ; 0.6623 ; 1.1762 ; 1.87 ; 2.5132 ; 3.061 ; 3.6606 ; 4.2131 ; 4.602 ; 4.8523 ; 5.0738 ; 5.3507 ; 5.696 ; 6.1286 ; 6.6481 ; 7.0629 ; 7.4049 ; 7.6904 ; 7.9318 ; 8.1414 ; 8.3229 ; 8.468]

Bolt 1 - Tensile Force (kips): [48.6802 ; 48.64 ; 48.6315 ; 48.6193 ; 48.6018 ; 48.5777 ; 48.5546 ; 48.5345 ; 48.5128 ; 48.4944 ; 48.4843 ; 48.4825 ; 48.4859 ; 48.4948 ; 48.5111 ; 48.5359 ; 48.5755 ; 48.6204 ; 48.6683 ; 48.7177 ; 48.7683 ; 48.8196 ; 48.8724 ; 48.9222]

Bolt 1 - Shear Force (kips): [0.089565 ; 0.067322 ; 0.072824 ; 0.084707 ; 0.10713 ; 0.14325 ; 0.18016 ; 0.21357 ; 0.25103 ; 0.28479 ; 0.30834 ; 0.32367 ; 0.33751 ; 0.34939 ; 0.36451 ; 0.39242 ; 0.43339 ; 0.4657 ; 0.49255 ; 0.51647 ; 0.53741 ; 0.55602 ; 0.57088 ; 0.58182]

Bolt 2 - Tensile Force (kips): [48.6911 ; 48.631 ; 48.6092 ; 48.5787 ; 48.5365 ; 48.4808 ; 48.4305 ; 48.3885 ; 48.3463 ; 48.2999 ; 48.2567 ; 48.2252 ; 48.1917 ; 48.1238 ; 48.015 ; 47.8396 ; 47.5227 ; 47.3114 ; 47.1491 ; 47.0206 ; 46.9281 ; 46.8746 ; 46.8537 ; 46.8541]

Bolt 2 - Shear Force (kips): [0.075694 ; 0.056538 ; 0.080506 ; 0.11678 ; 0.17053 ; 0.24568 ; 0.31675 ; 0.37871 ; 0.44883 ; 0.51734 ; 0.56648 ; 0.597 ; 0.62494 ; 0.66628 ; 0.7167 ; 0.75338 ; 0.73239 ; 0.69301 ; 0.65037 ; 0.60857 ; 0.56866 ; 0.54599 ; 0.53025 ; 0.51837]

Bolt 3 - Tensile Force (kips): [50 ; 49.9662 ; 49.9329 ; 49.8849 ; 49.8105 ; 49.6942 ; 49.5394 ; 49.3506 ; 49.1002 ; 48.7891 ; 48.4225 ; 47.9971 ; 47.4796 ; 46.8555 ; 46.2727 ; 45.9366 ; 45.9093 ; 46.2432 ; 46.6457 ; 47.0466 ; 47.4336 ; 47.7639 ; 48.0275 ; 48.2234]

Bolt 3 - Shear Force (kips): [0.048439 ; 0.033806 ; 0.030913 ; 0.040475 ; 0.067383 ; 0.10866 ; 0.14626 ; 0.17423 ; 0.20266 ; 0.22743 ; 0.23119 ; 0.21234 ; 0.2077 ; 0.2411 ; 0.30686 ; 0.41972 ; 0.58975 ; 0.71386 ; 0.80936 ; 0.886 ; 0.94182 ; 0.98791 ; 1.0272 ; 1.0609]

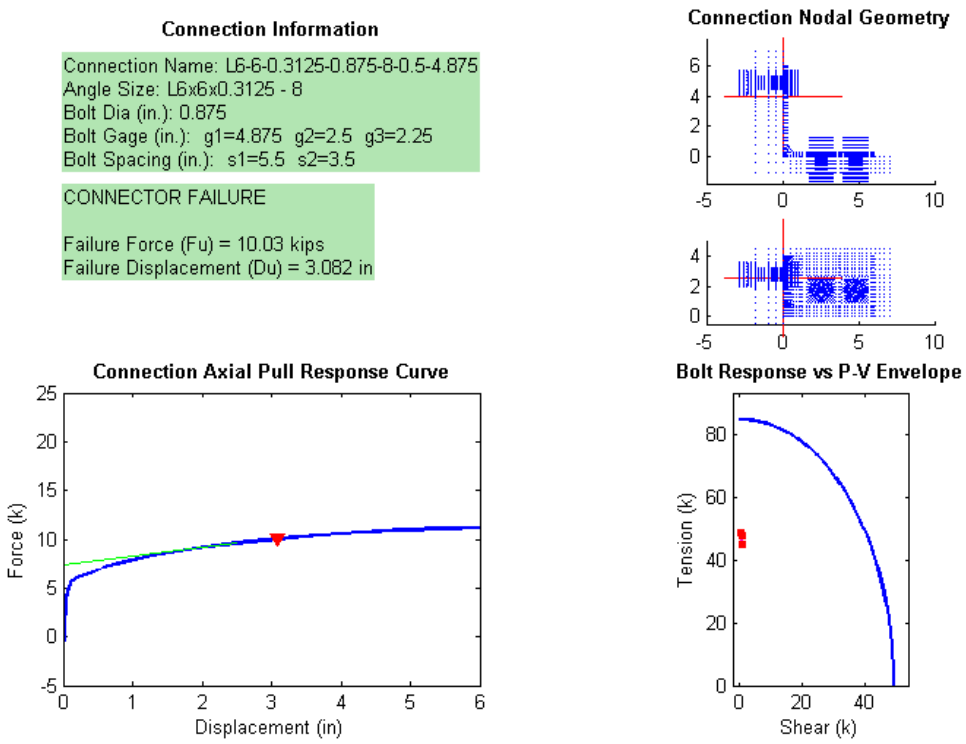


Figure B.105 Connection L6_6_0.3125_0.875_8_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.875_8_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 3.3572e+003

Plastic Stiffness (k/in): 0.9232

Displacement (in): [5.5008e-036 ; 0.00029297 ; 0.00058594 ; 0.0010254 ; 0.0016846 ; 0.0026733 ; 0.0041565 ; 0.0063812 ; 0.0097183 ; 0.014724 ; 0.022232 ; 0.033495 ; 0.050389 ; 0.07573 ; 0.11374 ; 0.17076 ; 0.25628 ; 0.38458 ; 0.57701 ; 0.86566 ; 1.2986 ; 1.8986 ; 2.4986 ; 3.0986 ; 3.6986 ; 4.2986 ; 4.8986 ; 5.4986 ; 6]

Force (kips): [-1.0675 ; -0.13877 ; -0.083986 ; -0.061962 ; -0.029341 ; 0.019577 ; 0.09193 ; 0.1954 ; 0.34648 ; 0.56797 ; 0.88636 ; 1.3329 ; 1.9291 ; 2.4887 ; 2.8194 ; 2.9826 ; 3.1262 ; 3.3012 ; 3.5363 ; 3.8217 ; 4.1623 ; 4.5287 ; 4.8056 ; 5.0229 ; 5.1992 ; 5.3403 ; 5.4506 ; 5.5392 ; 5.5982]

Bolt 1 - Tensile Force (kips): [48.6805 ; 48.6463 ; 48.6441 ; 48.6434 ; 48.6424 ; 48.6409 ; 48.6386 ; 48.6352 ; 48.6303 ; 48.623 ; 48.6123 ; 48.5968 ; 48.5755 ; 48.5552 ; 48.5445 ; 48.5417 ; 48.5419 ; 48.5466 ; 48.5554 ; 48.5748 ; 48.6088 ; 48.6565 ; 48.706 ; 48.7582 ; 48.8124 ; 48.867 ; 48.9218 ; 48.9769 ; 49.0231]

Bolt 1 - Shear Force (kips): [0.089732 ; 0.064823 ; 0.065509 ; 0.065785 ; 0.066224 ; 0.06697 ; 0.068271 ; 0.070536 ; 0.074587 ; 0.081879 ; 0.094603 ; 0.11568 ; 0.14814 ; 0.18239 ; 0.205 ; 0.21962 ; 0.23458 ; 0.24903 ; 0.26629 ; 0.2776 ; 0.28503 ; 0.30549 ; 0.32625 ; 0.34124 ; 0.35275 ; 0.36451 ; 0.37706 ; 0.38911 ; 0.39823]

Bolt 2 - Tensile Force (kips): [48.6925 ; 48.6478 ; 48.6441 ; 48.6419 ; 48.6386 ; 48.6336 ; 48.6261 ; 48.6152 ; 48.5994 ; 48.5765 ; 48.5452 ; 48.503 ; 48.4495 ; 48.4094 ; 48.3883 ; 48.3778 ; 48.3666 ; 48.3449 ; 48.2909 ; 48.2017 ; 48.1096 ; 47.9323 ; 47.7821 ; 47.6844 ; 47.612 ; 47.5474 ; 47.5001 ; 47.4681 ; 47.4533]

Bolt 2 - Shear Force (kips): [0.076237 ; 0.041335 ; 0.044979 ; 0.047038 ; 0.05016 ; 0.054969 ; 0.062314 ; 0.073268 ; 0.089832 ; 0.11487 ; 0.15195 ; 0.20519 ; 0.27786 ; 0.34764 ; 0.38785 ; 0.40259 ; 0.41741 ; 0.44549 ; 0.4965 ; 0.55862 ; 0.61054 ; 0.62628 ; 0.60805 ; 0.5849 ; 0.55902 ; 0.52954 ; 0.5014 ; 0.47447 ; 0.45353]

Bolt 3 - Tensile Force (kips): [50 ; 49.9952 ; 49.9924 ; 49.9883 ; 49.9822 ; 49.973 ; 49.9592 ; 49.9394 ; 49.9099 ; 49.8648 ; 49.792 ; 49.6636 ; 49.4 ; 48.9843 ; 48.5728 ; 48.1709 ; 47.68 ; 47.0848 ; 46.3452 ; 45.6086 ; 45.0533 ; 44.846 ; 45.0338 ; 45.2552 ; 45.5159 ; 45.7599 ; 45.9793 ; 46.1936 ; 46.3621]

Bolt 3 - Shear Force (kips): [0.047368 ; 0.040992 ; 0.039575 ; 0.038287 ; 0.036513 ; 0.034167 ; 0.031581 ; 0.029953 ; 0.032294 ; 0.043462 ; 0.066079 ; 0.099245 ; 0.13676 ; 0.15122 ; 0.13142 ; 0.10418 ; 0.14336 ; 0.21272 ; 0.2729 ; 0.28976 ; 0.32709 ; 0.41726 ; 0.49462 ; 0.58193 ; 0.66445 ; 0.73113 ; 0.78072 ; 0.81437 ; 0.82878]

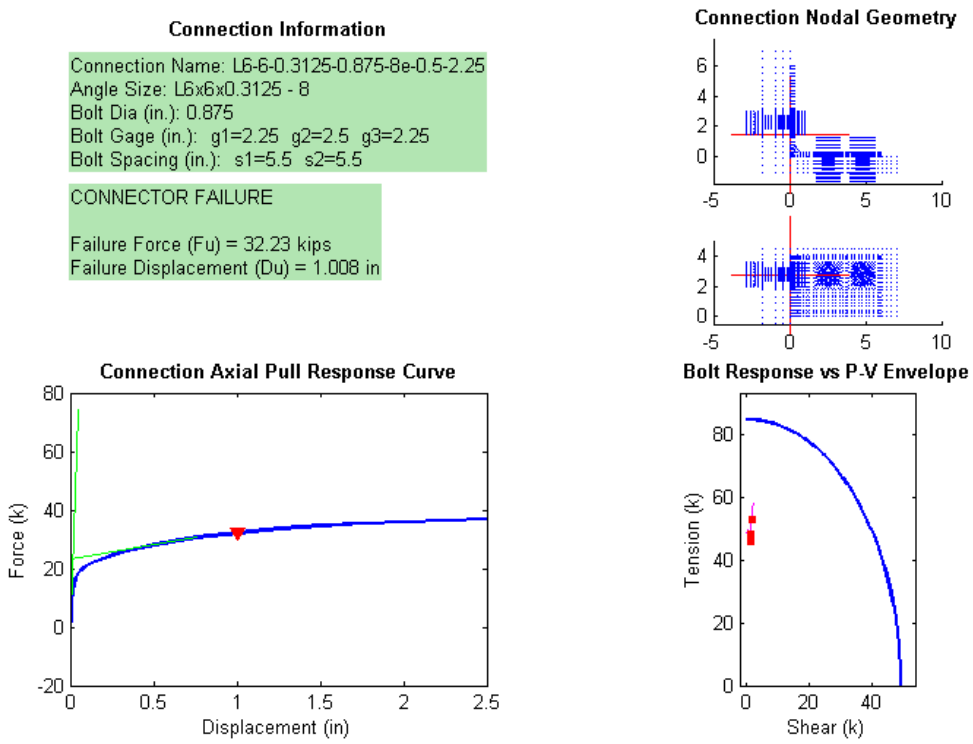


Figure B.106 Connection L6_6_0.3125_0.875_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.875_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1458

Plastic Stiffness (k/in): 9.4776

Displacement (in): [4.9537e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.033569 ; 0.048401 ; 0.070648 ; 0.10402 ; 0.15408 ; 0.22916 ; 0.34179 ; 0.51073 ; 0.76073 ; 1.0107 ; 1.2607 ; 1.5107 ; 1.7607 ; 2.0107 ; 2.2607 ; 2.5]

Force (kips): [-1.20931 ; 0.59316 ; 1.63832 ; 2.9571 ; 4.1476 ; 5.18007 ; 6.36107 ; 7.49723 ; 8.47208 ; 9.22051 ; 9.85114 ; 10.477 ; 11.1735 ; 12.0113 ; 12.9875 ; 14.0765 ; 15.2612 ; 16.1235 ; 16.7822 ; 17.287 ; 17.6837 ; 17.9957 ; 18.2492 ; 18.4516]

Bolt 1 - Tensile Force (kips): [48.7235 ; 48.6543 ; 48.614 ; 48.5616 ; 48.5127 ; 48.4692 ; 48.4191 ; 48.3706 ; 48.3303 ; 48.3016 ; 48.2779 ; 48.2546 ; 48.2283 ; 48.1951 ; 48.1538 ; 48.1138 ; 48.0871 ; 48.0817 ; 48.091 ; 48.1111 ; 48.1373 ; 48.1663 ; 48.1974 ; 48.2286]

Bolt 1 - Shear Force (kips): [0.065141 ; 0.085033 ; 0.14536 ; 0.22828 ; 0.30627 ; 0.37531 ; 0.45421 ; 0.52887 ; 0.58695 ; 0.6262 ; 0.66643 ; 0.71456 ; 0.77604 ; 0.85628 ; 0.95798 ; 1.0697 ; 1.1817 ; 1.2588 ; 1.3109 ; 1.3465 ; 1.3719 ; 1.3885 ; 1.3994 ; 1.406]

Bolt 2 - Tensile Force (kips): [48.7509 ; 48.6386 ; 48.5691 ; 48.4807 ; 48.3986 ; 48.3247 ; 48.2365 ; 48.1193 ; 47.9768 ; 47.8062 ; 47.5381 ; 47.1241 ; 46.6804 ; 46.2017 ; 45.6716 ; 45.2941 ; 45.3524 ; 45.8281 ; 46.482 ; 47.1808 ; 47.8142 ; 48.3952 ; 48.9353 ; 49.4031]

Bolt 2 - Shear Force (kips): [0.10699 ; 0.10648 ; 0.19384 ; 0.31723 ; 0.43298 ; 0.53625 ; 0.65935 ; 0.7863 ; 0.9087 ; 1.0111 ; 1.087 ; 1.1216 ; 1.1254 ; 1.1322 ; 1.1412 ; 1.1619 ; 1.2458 ; 1.3234 ; 1.4073 ; 1.4883 ; 1.5628 ; 1.6343 ; 1.7076 ; 1.7814]

Bolt 3 - Tensile Force (kips): [50 ; 49.9295 ; 49.867 ; 49.7897 ; 49.6917 ; 49.5896 ; 49.4552 ; 49.2582 ; 48.992 ; 48.6786 ; 48.3164 ; 47.9651 ; 47.8377 ; 48.099 ; 48.9748 ; 50.1941 ; 51.6346 ; 53.017 ; 54.2518 ; 55.298 ; 56.1968 ; 56.9486 ; 57.5705 ; 58.0737]

Bolt 3 - Shear Force (kips): [0.060517 ; 0.025923 ; 0.042479 ; 0.092339 ; 0.14229 ; 0.1883 ; 0.24573 ; 0.31063 ; 0.3825 ; 0.44357 ; 0.50668 ; 0.57821 ; 0.66997 ; 0.78743 ; 0.93766 ; 1.159 ; 1.4378 ; 1.5476 ; 1.6453 ; 1.7399 ; 1.8231 ; 1.9008 ; 1.9825 ; 2.05]

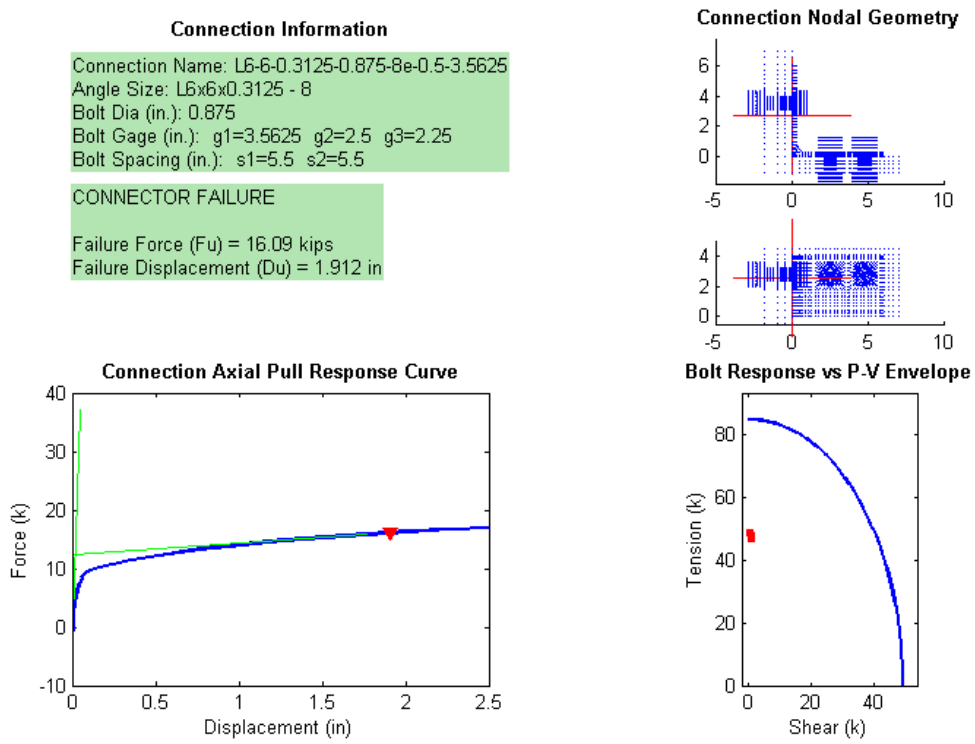


Figure B.107 Connection L6_6_0.3125_0.875_8e_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.875_8e_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 747.0582

Plastic Stiffness (k/in): 1.9428

Displacement (in): [4.8055e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.026367 ; 0.032959 ; 0.042847 ; 0.057678 ; 0.079925 ; 0.1133 ; 0.16335 ; 0.23844 ; 0.35107 ; 0.52001 ; 0.77001 ; 1.02 ; 1.27 ; 1.52 ; 1.77 ; 2.02 ; 2.27 ; 2.5]

Force (kips): [-1.1781 ; 0.021221 ; 0.28099 ; 0.52417 ; 0.87624 ; 1.3666 ; 2.0469 ; 2.6655 ; 3.1673 ; 3.7074 ; 4.218 ; 4.6031 ; 4.8593 ; 5.078 ; 5.3477 ; 5.6918 ; 6.1229 ; 6.64 ; 7.0547 ; 7.3981 ; 7.6837 ; 7.9266 ; 8.1356 ; 8.3163 ; 8.4603]

Bolt 1 - Tensile Force (kips): [48.7247 ; 48.6783 ; 48.6688 ; 48.6597 ; 48.6465 ; 48.6279 ; 48.6012 ; 48.5764 ; 48.5559 ; 48.5343 ; 48.5149 ; 48.5036 ; 48.5017 ; 48.5058 ; 48.514 ; 48.5277 ; 48.5515 ; 48.5912 ; 48.6323 ; 48.6745 ; 48.7173 ; 48.7618 ; 48.8079 ; 48.8558 ; 48.9013]

Bolt 1 - Shear Force (kips): [0.064496 ; 0.058947 ; 0.070188 ; 0.082443 ; 0.10201 ; 0.13135 ; 0.17454 ; 0.21571 ; 0.25009 ; 0.28706 ; 0.32066 ; 0.34328 ; 0.35593 ; 0.36561 ; 0.37214 ; 0.37592 ; 0.38966 ; 0.42408 ; 0.45546 ; 0.48142 ; 0.50451 ; 0.52504 ; 0.54195 ; 0.5548 ; 0.56431]

Bolt 2 - Tensile Force (kips): [48.7556 ; 48.6822 ; 48.6605 ; 48.6401 ; 48.6114 ; 48.5729 ; 48.521 ; 48.4753 ; 48.4392 ; 48.4014 ; 48.3518 ; 48.3079 ; 48.2741 ; 48.24 ; 48.1805 ; 48.0759 ; 47.9097 ; 47.642 ; 47.424 ; 47.255 ; 47.1092 ; 47.012 ; 46.9508 ; 46.9374 ; 46.9452]

Bolt 2 - Shear Force (kips): [0.10559 ; 0.073842 ; 0.089798 ; 0.10864 ; 0.13953 ; 0.18662 ; 0.25579 ; 0.32112 ; 0.376 ; 0.43807 ; 0.50191 ; 0.55503 ; 0.59391 ; 0.62979 ; 0.68347 ; 0.74987 ; 0.80686 ; 0.8146 ; 0.79963 ; 0.7831 ; 0.76263 ; 0.7459 ; 0.74219 ; 0.74106 ; 0.73998]

Bolt 3 - Tensile Force (kips): [50 ; 49.9668 ; 49.9345 ; 49.9036 ; 49.857 ; 49.7887 ; 49.6664 ; 49.511 ; 49.3291 ; 49.1064 ; 48.8193 ; 48.4692 ; 48.0466 ; 47.5306 ; 46.9091 ; 46.3055 ; 45.9287 ; 45.9005 ; 46.2232 ; 46.6312 ; 47.0321 ; 47.4157 ; 47.7462 ; 48.0084 ; 48.2044]

Bolt 3 - Shear Force (kips): [0.0585 ; 0.039476 ; 0.031832 ; 0.029311 ; 0.035827 ; 0.056233 ; 0.089429 ; 0.11868 ; 0.13869 ; 0.16066 ; 0.18002 ; 0.189 ; 0.18349 ; 0.18986 ; 0.22898 ; 0.29812 ; 0.41282 ; 0.5734 ; 0.69213 ; 0.78784 ; 0.86605 ; 0.92575 ; 0.97203 ; 1.0132 ; 1.0477]

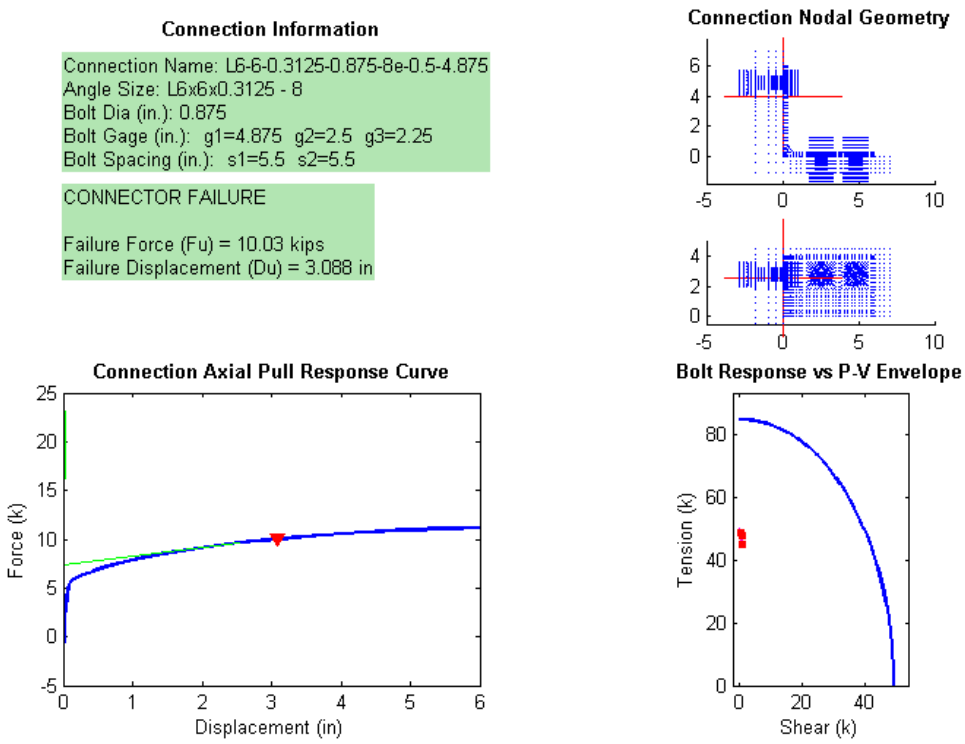


Figure B.108 Connection L6_6_0.3125_0.875_8e_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.3125_0.875_8e_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 997.1256

Plastic Stiffness (k/in): 0.9054

Displacement (in): [4.724e-036 ; 0.0011719 ; 0.0023437 ; 0.0041016 ; 0.0067383 ; 0.010693 ; 0.016626 ; 0.025525 ; 0.038873 ; 0.058896 ; 0.066404 ; 0.077667 ; 0.094561 ; 0.1199 ; 0.15791 ; 0.21493 ; 0.30046 ; 0.42875 ; 0.62118 ; 0.90983 ; 1.3428 ; 1.9428 ; 2.5428 ; 3.1428 ; 3.7428 ; 4.3428 ; 4.9428 ; 5.5428 ; 6]

Force (kips): [-1.1722 ; -0.061266 ; -0.0036634 ; 0.081817 ; 0.20361 ; 0.38062 ; 0.63942 ; 1.0055 ; 1.5198 ; 2.1398 ; 2.3067 ; 2.5005 ; 2.6972 ; 2.8495 ; 2.9638 ; 3.0689 ; 3.1948 ; 3.3615 ; 3.5861 ; 3.8604 ; 4.1925 ; 4.5503 ; 4.8219 ; 5.0351 ; 5.2079 ; 5.3464 ; 5.4548 ; 5.5418 ; 5.5951]

Bolt 1 - Tensile Force (kips): [48.7256 ; 48.682 ; 48.68 ; 48.6768 ; 48.6722 ; 48.6656 ; 48.6556 ; 48.6413 ; 48.6206 ; 48.5946 ; 48.5875 ; 48.5794 ; 48.5716 ; 48.5666 ; 48.5646 ; 48.5644 ; 48.5669 ; 48.5727 ; 48.5834 ; 48.603 ; 48.6346 ; 48.6813 ; 48.7297 ; 48.7795 ; 48.8301 ; 48.8817 ; 48.9334 ; 48.9852 ; 49.0251]

Bolt 1 - Shear Force (kips): [0.065008 ; 0.055577 ; 0.057769 ; 0.061312 ; 0.066858 ; 0.07572 ; 0.089956 ; 0.11179 ; 0.14483 ; 0.18803 ; 0.20018 ; 0.21443 ; 0.22899 ; 0.24088 ; 0.2507 ; 0.26122 ; 0.27192 ; 0.28278 ; 0.29323 ; 0.29242 ; 0.29488 ; 0.30567 ; 0.31971 ; 0.33084 ; 0.34025 ; 0.35031 ; 0.36105 ; 0.3724 ; 0.38106]

Bolt 2 - Tensile Force (kips): [48.7592 ; 48.6944 ; 48.6886 ; 48.6798 ; 48.6673 ; 48.6493 ; 48.6238 ; 48.5899 ; 48.5456 ; 48.4963 ; 48.4846 ; 48.4716 ; 48.457 ; 48.444 ; 48.4363 ; 48.4319 ; 48.4221 ; 48.3998 ; 48.3499 ; 48.2721 ; 48.1556 ; 48.0229 ; 47.9101 ; 47.8224 ; 47.7608 ; 47.7037 ; 47.6573 ; 47.62 ; 47.6021]

Bolt 2 - Shear Force (kips): [0.10618 ; 0.070369 ; 0.073365 ; 0.078517 ; 0.087181 ; 0.10167 ; 0.12543 ; 0.16236 ; 0.21755 ; 0.28715 ; 0.30636 ; 0.32915 ; 0.3528 ; 0.37009 ; 0.38195 ; 0.39173 ; 0.40962 ; 0.44276 ; 0.50196 ; 0.56841 ; 0.63032 ; 0.66142 ; 0.66364 ; 0.65762 ; 0.64702 ; 0.6297 ; 0.61045 ; 0.58946 ; 0.57305]

Bolt 3 - Tensile Force (kips): [50 ; 49.9868 ; 49.9763 ; 49.9606 ; 49.9381 ; 49.9045 ; 49.8525 ; 49.7699 ; 49.6071 ; 49.2913 ; 49.1677 ; 48.9984 ; 48.7956 ; 48.5572 ; 48.2806 ; 47.9314 ; 47.4662 ; 46.9029 ; 46.1911 ; 45.5231 ; 45.0324 ; 44.8548 ; 45.0354 ; 45.2393 ; 45.4747 ; 45.6942 ; 45.886 ; 46.0809 ; 46.2238]

Bolt 3 - Shear Force (kips): [0.057925 ; 0.045027 ; 0.041928 ; 0.037801 ; 0.033126 ; 0.029892 ; 0.034732 ; 0.053304 ; 0.082654 ; 0.10842 ; 0.11176 ; 0.11204 ; 0.1089 ; 0.099268 ; 0.095213 ; 0.12301 ; 0.17728 ; 0.23573 ; 0.28132 ; 0.29411 ; 0.33278 ; 0.41983 ; 0.50047 ; 0.59341 ; 0.68126 ; 0.7557 ; 0.81514 ; 0.85587 ; 0.87391]

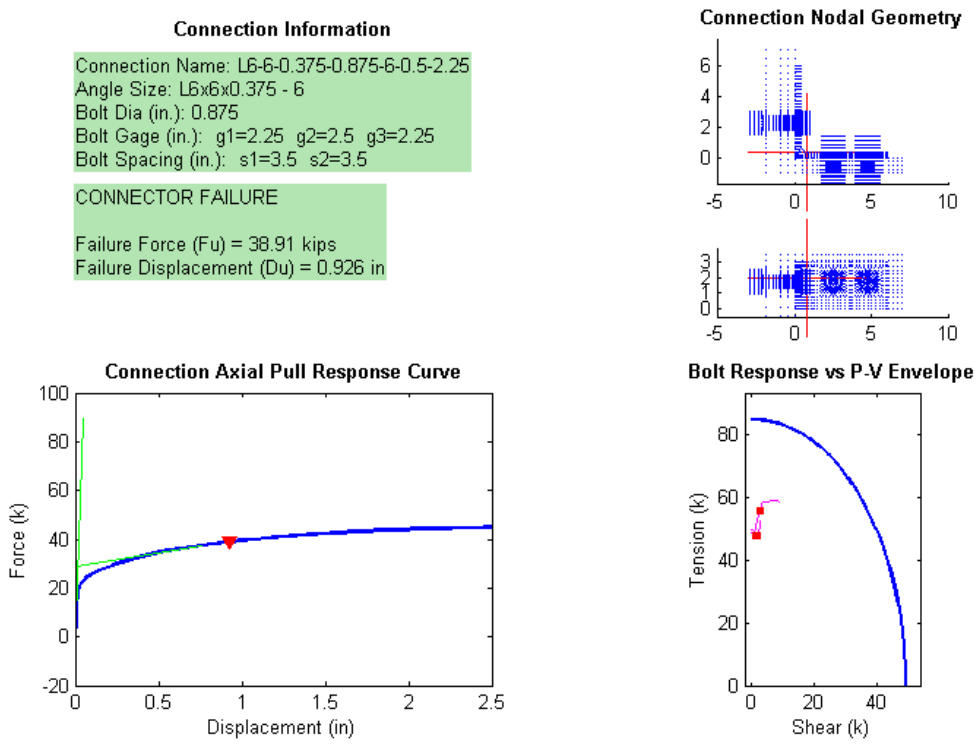


Figure B.109 Connection L6_6_0.375_0.875_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.375_0.875_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.9915e+003

Plastic Stiffness (k/in): 11.5856

Displacement (in): [5.4685e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.0674 ; 1.1611 ; 1.1963 ; 1.2095 ; 1.2292 ; 1.2589 ; 1.3034 ; 1.3701 ; 1.3952 ; 1.4327 ; 1.489 ; 1.5735 ; 1.7002 ; 1.8903 ; 2.1403 ; 2.3903 ; 2.5]

Force (kips): [-1.29101 ; 1.11951 ; 2.59858 ; 4.44629 ; 6.7424 ; 9.01655 ; 10.4536 ; 11.2343 ; 11.9771 ; 12.7778 ; 13.6534 ; 14.6937 ; 15.9365 ; 17.3094 ; 18.7576 ; 19.7812 ; 19.9944 ; 20.2849 ; 20.3901 ; 20.4327 ; 20.4927 ; 20.5871 ; 20.7169 ; 20.8944 ; 20.9585 ; 21.0491 ; 21.1732 ; 21.3405 ; 21.56 ; 21.8376 ; 22.1324 ; 22.3597 ; 22.4419]

Bolt 1 - Tensile Force (kips): [48.6493 ; 48.5683 ; 48.5179 ; 48.4524 ; 48.3669 ; 48.2807 ; 48.2294 ; 48.2056 ; 48.1833 ; 48.1562 ; 48.1252 ; 48.0885 ; 48.0459 ; 48.0081 ; 47.9909 ; 48.0007 ; 48.0056 ; 48.0146 ; 48.0181 ; 48.0193 ; 48.0212 ; 48.024 ; 48.0288 ; 48.0373 ; 48.0407 ; 48.0461 ; 48.0549 ; 48.0692 ; 48.0924 ; 48.1306 ; 48.184 ; 48.2393 ; 48.2638]

Bolt 1 - Shear Force (kips): [0.086122 ; 0.090367 ; 0.1629 ; 0.26411 ; 0.39714 ; 0.53061 ; 0.60701 ; 0.64555 ; 0.68609 ; 0.74204 ; 0.81298 ; 0.90306 ; 1.0155 ; 1.1364 ; 1.251 ; 1.3249 ; 1.3399 ; 1.3599 ; 1.3672 ; 1.3702 ; 1.3742 ; 1.3806 ; 1.389 ; 1.3999 ; 1.4037 ; 1.4088 ; 1.4153 ; 1.4232 ; 1.431 ; 1.4357 ; 1.4368 ; 1.4356 ; 1.4352]

Bolt 2 - Tensile Force (kips): [48.6598 ; 48.5261 ; 48.4386 ; 48.3287 ; 48.1834 ; 48.0274 ; 47.8628 ; 47.7284 ; 47.5539 ; 47.3919 ; 47.2104 ; 46.9757 ; 46.6976 ; 46.6686 ; 47.2115 ; 48.0398 ; 48.2442 ; 48.538 ; 48.6417 ; 48.6802 ; 48.7379 ; 48.8282 ; 48.9632 ; 49.1626 ; 49.2359 ; 49.3455 ; 49.5124 ; 49.7636 ; 50.1486 ; 50.745 ; 51.4951 ; 52.2099 ; 52.522]

Bolt 2 - Shear Force (kips): [0.090619 ; 0.14665 ; 0.26944 ; 0.43267 ; 0.64457 ; 0.86664 ; 1.031 ; 1.1362 ; 1.2374 ; 1.3071 ; 1.3498 ; 1.3958 ; 1.454 ; 1.5646 ; 1.7715 ; 1.9488 ; 1.9904 ; 2.0516 ; 2.0759 ; 2.0857 ; 2.1001 ; 2.1225 ; 2.1549 ; 2.2046 ; 2.2236 ; 2.2522 ; 2.2953 ; 2.3602 ; 2.4605 ; 2.6042 ; 2.7568 ; 2.8607 ; 2.8872]

Bolt 3 - Tensile Force (kips): [50 ; 49.9079 ; 49.8389 ; 49.7555 ; 49.659 ; 49.5351 ; 49.3844 ; 49.1985 ; 48.9935 ; 48.8988 ; 49.0885 ; 49.7955 ; 50.9632 ; 52.7548 ; 54.7062 ; 56.4393 ; 56.8392 ; 57.3872 ; 57.5779 ; 57.6369 ; 57.7132 ; 57.8226 ; 57.9606 ; 58.1177 ; 58.1728 ; 58.2549 ; 58.3672 ; 58.507 ; 58.7039 ; 58.9112 ; 58.9457 ; 58.8132 ; 58.7528]

Bolt 3 - Shear Force (kips): [0.047739 ; 0.036524 ; 0.089872 ; 0.17099 ; 0.28832 ; 0.42401 ; 0.55829 ; 0.65073 ; 0.77134 ; 0.89003 ; 0.99472 ; 1.1638 ; 1.4175 ; 1.5496 ; 2.2151 ; 2.7608 ; 2.8746 ; 3.0344 ; 3.0969 ; 3.1251 ; 3.1638 ; 3.2401 ; 3.3451 ; 3.506 ; 3.5725 ; 3.6701 ; 3.8033 ; 4.1225 ; 5.3905 ; 6.5761 ; 7.4259 ; 8.1863 ; 8.6742]

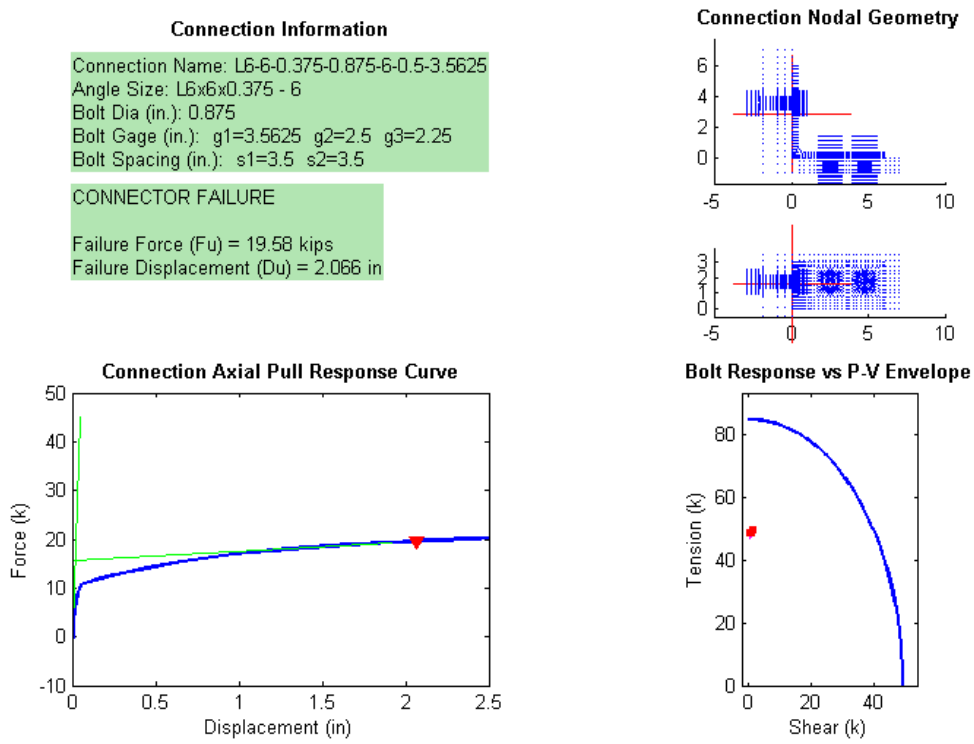


Figure B.110 Connection L6_6_0.375_0.875_6_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.375_0.875_6_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 900.5220

Plastic Stiffness (k/in): 1.9480

Displacement (in): [3.9913e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.44793 ; 0.66174 ; 0.91174 ; 0.97424 ; 1.068 ; 1.2086 ; 1.4196 ; 1.6696 ; 1.9196 ; 2.1696 ; 2.4196 ; 2.5]

Force (kips): [-1.25997 ; 0.112296 ; 0.498862 ; 1.02602 ; 1.74942 ; 2.72904 ; 3.93387 ; 4.25836 ; 4.62427 ; 4.98556 ; 5.281 ; 5.48091 ; 5.6417 ; 5.84697 ; 6.14354 ; 6.54654 ; 7.0679 ; 7.71814 ; 8.30112 ; 8.42487 ; 8.59719 ; 8.83199 ; 9.13177 ; 9.43031 ; 9.67381 ; 9.87522 ; 10.0464 ; 10.0972]

Bolt 1 - Tensile Force (kips): [48.6495 ; 48.6031 ; 48.5911 ; 48.5745 ; 48.5512 ; 48.5189 ; 48.4776 ; 48.4665 ; 48.4545 ; 48.4436 ; 48.4363 ; 48.4341 ; 48.4359 ; 48.4404 ; 48.4489 ; 48.4642 ; 48.4877 ; 48.5256 ; 48.5731 ; 48.5848 ; 48.6029 ; 48.6308 ; 48.674 ; 48.7265 ; 48.7807 ; 48.8363 ; 48.8929 ; 48.9112]

Bolt 1 - Shear Force (kips): [0.085131 ; 0.059643 ; 0.068776 ; 0.087955 ; 0.12081 ; 0.17118 ; 0.23847 ; 0.25705 ; 0.27766 ; 0.29747 ; 0.3131 ; 0.32407 ; 0.33284 ; 0.34264 ; 0.35234 ; 0.36019 ; 0.3778 ; 0.40133 ; 0.42701 ; 0.43542 ; 0.44697 ; 0.46296 ; 0.48445 ; 0.50752 ; 0.52639 ; 0.54098 ; 0.55301 ; 0.55645]

Bolt 2 - Tensile Force (kips): [48.6605 ; 48.5863 ; 48.5597 ; 48.5234 ; 48.4753 ; 48.4142 ; 48.3437 ; 48.3279 ; 48.311 ; 48.2923 ; 48.2739 ; 48.261 ; 48.2466 ; 48.2304 ; 48.2119 ; 48.2052 ; 48.2052 ; 48.3177 ; 48.4073 ; 48.4199 ; 48.4431 ; 48.4709 ; 48.5092 ; 48.5581 ; 48.6215 ; 48.6914 ; 48.7688 ; 48.7917]

Bolt 2 - Shear Force (kips): [0.088716 ; 0.077822 ; 0.10721 ; 0.15289 ; 0.22021 ; 0.31583 ; 0.43888 ; 0.47389 ; 0.51522 ; 0.55866 ; 0.59641 ; 0.62169 ; 0.64391 ; 0.67542 ; 0.7265 ; 0.79443 ; 0.87408 ; 0.9399 ; 0.96331 ; 0.96423 ; 0.96263 ; 0.95625 ; 0.94478 ; 0.93063 ; 0.9198 ; 0.92064 ; 0.92278 ; 0.92356]

Bolt 3 - Tensile Force (kips): [50 ; 49.953 ; 49.9071 ; 49.8453 ; 49.7587 ; 49.6154 ; 49.3832 ; 49.2879 ; 49.1544 ; 48.9709 ; 48.7336 ; 48.4453 ; 48.1181 ; 47.7729 ; 47.364 ; 47.0057 ; 46.8838 ; 47.2434 ; 47.8729 ; 48.0211 ; 48.2299 ; 48.5321 ; 48.9413 ; 49.3349 ; 49.6861 ; 50.0729 ; 50.403 ; 50.5353]

Bolt 3 - Shear Force (kips): [0.047094 ; 0.027765 ; 0.027931 ; 0.049107 ; 0.089002 ; 0.14674 ; 0.2175 ; 0.23482 ; 0.25273 ; 0.26511 ; 0.26224 ; 0.23447 ; 0.20859 ; 0.19464 ; 0.21088 ; 0.30204 ; 0.45383 ; 0.66847 ; 0.84696 ; 0.8807 ; 0.92675 ; 0.98797 ; 1.067 ; 1.1444 ; 1.1785 ; 1.1407 ; 1.1074 ; 1.2956]

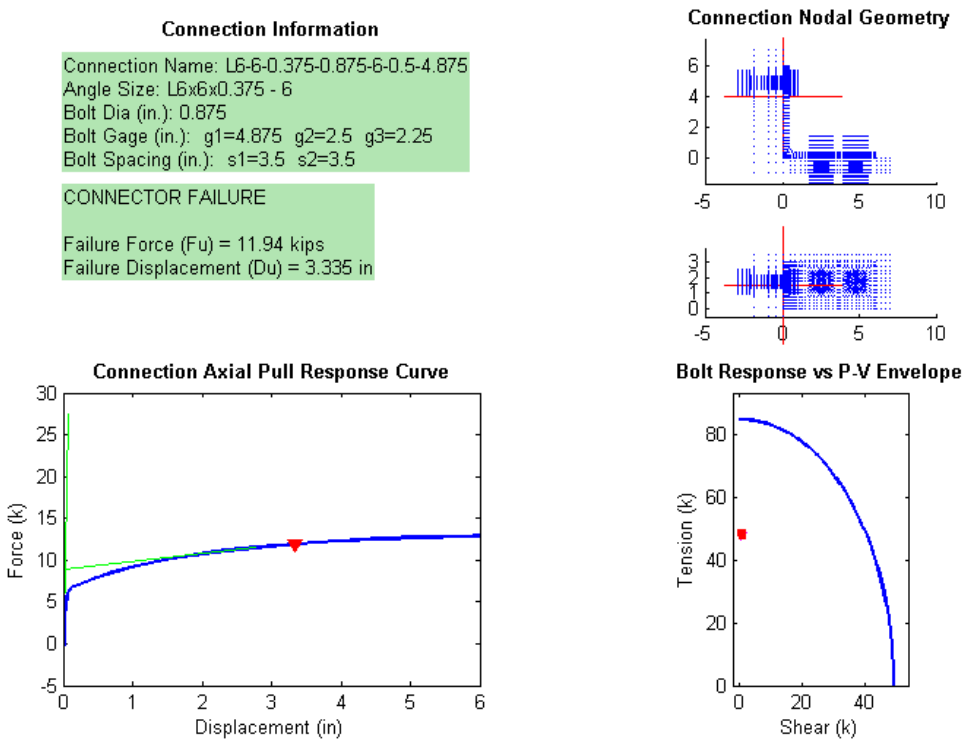


Figure B.111 Connection L6_6_0.375_0.875_6_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.375_0.875_6_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 372.0851

Plastic Stiffness (k/in): 0.9565

Displacement (in): [3.8157e-036 ; 0.0046875 ; 0.009375 ; 0.016406 ; 0.026953 ; 0.042773 ; 0.048706 ; 0.057605 ; 0.070953 ; 0.090976 ; 0.12101 ; 0.16606 ; 0.23364 ; 0.335 ; 0.48705 ; 0.71512 ; 1.0572 ; 1.5704 ; 2.1704 ; 2.7704 ; 3.3704 ; 3.9704 ; 4.5704 ; 5.1704 ; 5.7704 ; 6]

Force (kips): [-1.2448 ; 0.19309 ; 0.49937 ; 0.9335 ; 1.5309 ; 2.3264 ; 2.5509 ; 2.8046 ; 3.0415 ; 3.2089 ; 3.3193 ; 3.408 ; 3.5309 ; 3.7115 ; 3.9574 ; 4.263 ; 4.6453 ; 5.0967 ; 5.4802 ; 5.7672 ; 5.9824 ; 6.1436 ; 6.2632 ; 6.3542 ; 6.42 ; 6.4412]

Bolt 1 - Tensile Force (kips): [48.6498 ; 48.6014 ; 48.5921 ; 48.5786 ; 48.5596 ; 48.5332 ; 48.5257 ; 48.5172 ; 48.5096 ; 48.505 ; 48.503 ; 48.5027 ; 48.5039 ; 48.5072 ; 48.5144 ; 48.5321 ; 48.5617 ; 48.6052 ; 48.6588 ; 48.7148 ; 48.7717 ; 48.8291 ; 48.8865 ; 48.9438 ; 49.0008 ; 49.0225]

Bolt 1 - Shear Force (kips): [0.08492 ; 0.061589 ; 0.069903 ; 0.085815 ; 0.11249 ; 0.15373 ; 0.16638 ; 0.18108 ; 0.19527 ; 0.20666 ; 0.21571 ; 0.22542 ; 0.23679 ; 0.2503 ; 0.26589 ; 0.27265 ; 0.27507 ; 0.29259 ; 0.3112 ; 0.32338 ; 0.33591 ; 0.34959 ; 0.36343 ; 0.37718 ; 0.39158 ; 0.39728]

Bolt 2 - Tensile Force (kips): [48.6618 ; 48.5825 ; 48.5577 ; 48.5236 ; 48.4815 ; 48.4311 ; 48.4191 ; 48.4077 ; 48.4001 ; 48.3972 ; 48.3964 ; 48.3975 ; 48.3978 ; 48.3899 ; 48.3706 ; 48.3737 ; 48.4209 ; 48.5409 ; 48.7214 ; 48.8396 ; 48.9294 ; 49.0016 ; 49.0642 ; 49.1214 ; 49.1712 ; 49.1897]

Bolt 2 - Shear Force (kips): [0.088373 ; 0.086074 ; 0.11354 ; 0.15596 ; 0.21811 ; 0.30422 ; 0.3291 ; 0.35819 ; 0.38649 ; 0.40538 ; 0.41626 ; 0.42454 ; 0.44149 ; 0.47314 ; 0.52571 ; 0.59038 ; 0.6615 ; 0.73621 ; 0.76316 ; 0.76127 ; 0.75249 ; 0.74001 ; 0.72627 ; 0.71248 ; 0.70159 ; 0.69758]

Bolt 3 - Tensile Force (kips): [50 ; 49.9385 ; 49.8823 ; 49.7998 ; 49.6723 ; 49.4226 ; 49.3237 ; 49.1715 ; 48.9648 ; 48.7161 ; 48.4408 ; 48.1381 ; 47.7739 ; 47.3588 ; 46.8825 ; 46.4756 ; 46.3178 ; 46.5258 ; 47.0597 ; 47.564 ; 47.9371 ; 48.2078 ; 48.4071 ; 48.5239 ; 48.6182 ; 48.6481]

Bolt 3 - Shear Force (kips): [0.047387 ; 0.029473 ; 0.035894 ; 0.061602 ; 0.10345 ; 0.15507 ; 0.1659 ; 0.17232 ; 0.16601 ; 0.1359 ; 0.09023 ; 0.052204 ; 0.089114 ; 0.1352 ; 0.1475 ; 0.11175 ; 0.17232 ; 0.35072 ; 0.50512 ; 0.61211 ; 0.6758 ; 0.71647 ; 0.88232 ; 1.6675 ; 1.9194 ; 1.9664]

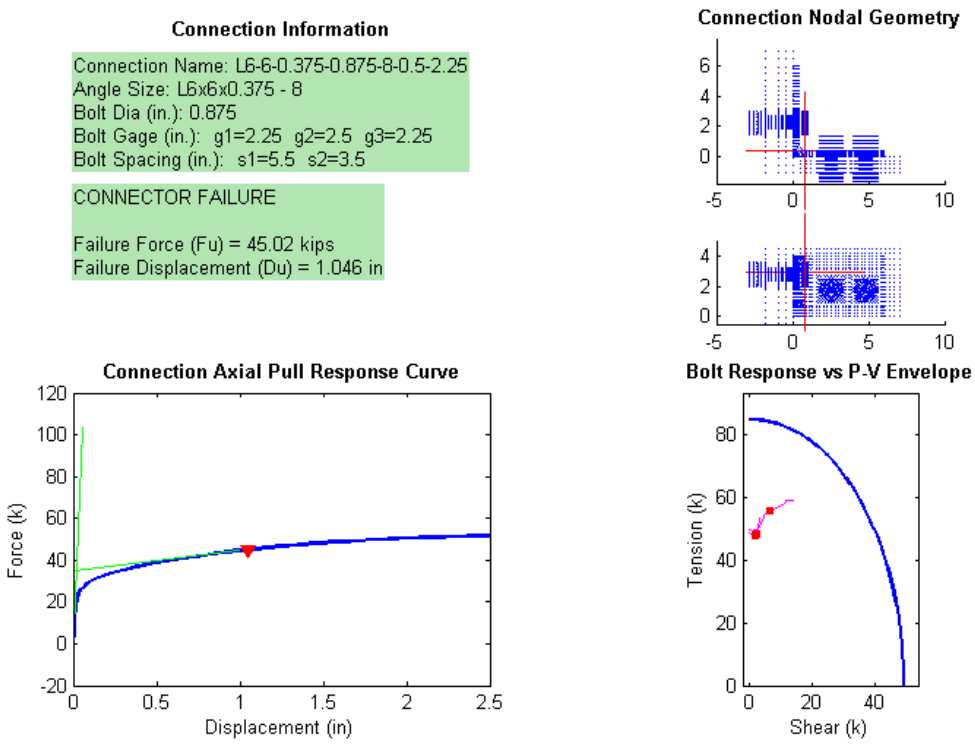


Figure B.112 Connection L6_6_0.375_0.875_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.375_0.875_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.9155e+003

Plastic Stiffness (k/in): 9.5024

Displacement (in): [3.5174e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.033569 ; 0.048401 ; 0.070648 ; 0.10402 ; 0.15408 ; 0.22916 ; 0.30424 ; 0.37933 ; 0.49196 ; 0.6609 ; 0.7234 ; 0.74684 ; 0.78199 ; 0.83473 ; 0.8545 ; 0.88416 ; 0.92866 ; 0.9954 ; 1.0955 ; 1.2457 ; 1.2832 ; 1.3208 ; 1.3771 ; 1.4615 ; 1.5883 ; 1.6358 ; 1.707 ; 1.814 ; 1.854 ; 1.9142 ; 2.0044 ; 2.1397 ; 2.3426 ; 2.382 ; 2.441 ; 2.5]

Force (kips): [-1.17114 ; 1.07889 ; 2.5701 ; 4.43367 ; 6.08719 ; 7.49983 ; 9.18468 ; 10.777 ; 12.074 ; 13.012 ; 13.8655 ; 14.7937 ; 15.7718 ; 16.818 ; 17.648 ; 18.3603 ; 19.2698 ; 20.3929 ; 20.7625 ; 20.9176 ; 21.1445 ; 21.4679 ; 21.5858 ; 21.7485 ; 21.9768 ; 22.2939 ; 22.722 ; 23.2836 ; 23.4125 ; 23.536 ; 23.7111 ; 23.9637 ; 24.3011 ; 24.427 ; 24.6058 ; 24.8321 ; 24.9116 ; 25.0287 ; 25.186 ; 25.3987 ; 25.6729 ; 25.7227 ; 25.7973 ; 25.8682]

Bolt 1 - Tensile Force (kips): [48.6446 ; 48.5623 ; 48.5053 ; 48.4304 ; 48.361 ; 48.2998 ; 48.2245 ; 48.1531 ; 48.0965 ; 48.0576 ; 48.0198 ; 47.9727 ; 47.9191 ; 47.8632 ; 47.8202 ; 47.7854 ; 47.7435 ; 47.6987 ; 47.6847 ; 47.6785 ; 47.6695 ; 47.657 ; 47.6526 ; 47.6468 ; 47.6393 ; 47.6298 ; 47.6184 ; 47.6079 ; 47.6056 ; 47.6038 ; 47.6017 ; 47.5998 ; 47.6001 ; 47.6005 ; 47.6015 ; 47.6069 ; 47.6094 ; 47.6135 ; 47.6215 ; 47.6361 ; 47.6609 ; 47.6657 ; 47.6732 ; 47.6808]

Bolt 1 - Shear Force (kips): [0.088142 ; 0.10273 ; 0.18563 ; 0.30117 ; 0.40859 ; 0.50312 ; 0.61844 ; 0.72693 ; 0.8113 ; 0.86972 ; 0.93082 ; 1.0099 ; 1.1052 ; 1.2109 ; 1.2975 ; 1.3729 ; 1.4696 ; 1.5866 ; 1.6249 ; 1.6406 ; 1.6637 ; 1.6963 ; 1.7083 ; 1.7248 ; 1.7479 ; 1.7797 ; 1.8223 ; 1.8773 ; 1.8902 ; 1.9025 ; 1.9198 ; 1.9441 ; 1.9768 ; 1.9888 ; 2.0058 ; 2.0264 ; 2.0336 ; 2.044 ; 2.057 ; 2.0732 ; 2.0945 ; 2.0986 ; 2.1049 ; 2.1109]

Bolt 2 - Tensile Force (kips): [48.6531 ; 48.5327 ; 48.4449 ; 48.3326 ; 48.2322 ; 48.143 ; 48.028 ; 47.8998 ; 47.7574 ; 47.5985 ; 47.4681 ; 47.368 ; 47.3273 ; 47.2712 ; 47.217 ; 47.1736 ; 47.1526 ; 47.347 ; 47.4468 ; 47.4911 ; 47.5719 ; 47.7144 ; 47.7715 ; 47.8605 ; 48.0064 ; 48.2367 ; 48.586 ; 49.1501 ; 49.2855 ; 49.4213 ; 49.624 ; 49.9288 ; 50.3856 ; 50.5503 ; 50.7916 ; 51.1562 ; 51.2903 ; 51.4916 ; 51.7947 ; 52.2517 ; 52.9583 ; 53.0986 ; 53.3311 ; 53.5633]

Bolt 2 - Shear Force (kips): [0.075683 ; 0.13471 ; 0.26249 ; 0.42948 ; 0.58198 ; 0.71531 ; 0.87887 ; 1.0461 ; 1.1995 ; 1.3263 ; 1.4522 ; 1.5732 ; 1.6595 ; 1.7367 ; 1.7951 ; 1.8434 ; 1.9136 ; 2.0166 ; 2.0521 ; 2.0674 ; 2.0913 ; 2.1292 ; 2.1433 ; 2.1628 ; 2.1905 ; 2.2342 ; 2.2991 ; 2.3973 ; 2.4215 ; 2.4459 ; 2.4834 ; 2.5424 ; 2.6323 ; 2.6669 ; 2.7179 ; 2.7936 ; 2.8217 ; 2.863 ; 2.9227 ; 3.0055 ; 3.0929 ; 3.1056 ; 3.1216 ; 3.1355]

Bolt 3 - Tensile Force (kips): [50 ; 49.9076 ; 49.8363 ; 49.7581 ; 49.6906 ; 49.6367 ; 49.5518 ; 49.5188 ; 49.407 ; 49.288 ; 49.255 ; 49.3081 ; 49.5706 ; 49.5312 ; 50.0218 ; 50.6856 ; 51.898 ; 53.6981 ; 54.2853 ; 54.4297 ; 54.6191 ; 54.8337 ; 54.9088 ; 55.0332 ; 55.2308 ; 55.5493 ; 56.0559 ; 56.8065 ; 57.0021 ; 57.1824 ; 57.4393 ; 57.8311 ; 58.282 ; 58.435 ; 58.6244 ; 58.7587 ; 58.8005 ; 58.8379 ; 58.8476 ; 58.8208 ; 58.7261 ; 58.7352 ; 58.9511 ; 59.1557]

Bolt 3 - Shear Force (kips): [0.0537635 ; 0.0350662 ; 0.082463 ; 0.158351 ; 0.234996 ; 0.306634 ; 0.399961 ; 0.515737 ; 0.660332 ; 0.813247 ; 0.966378 ; 1.14734 ; 1.39651 ; 2.28942 ; 2.88081 ; 3.33219 ; 3.81693 ; 4.34592 ; 4.52914 ; 4.63029 ; 4.794 ; 5.05416 ; 5.16512 ; 5.31484 ; 5.55243 ; 5.96665 ; 7.09112 ; 8.68853 ; 9.08397 ; 9.51654 ; 10.0491 ; 10.37 ; 10.9167 ; 11.0858 ; 11.0169 ; 11.3172 ; 11.4546 ; 11.6468 ; 11.9676 ; 12.5364 ; 13.3709 ; 13.4952 ; 13.5885 ; 13.6726]

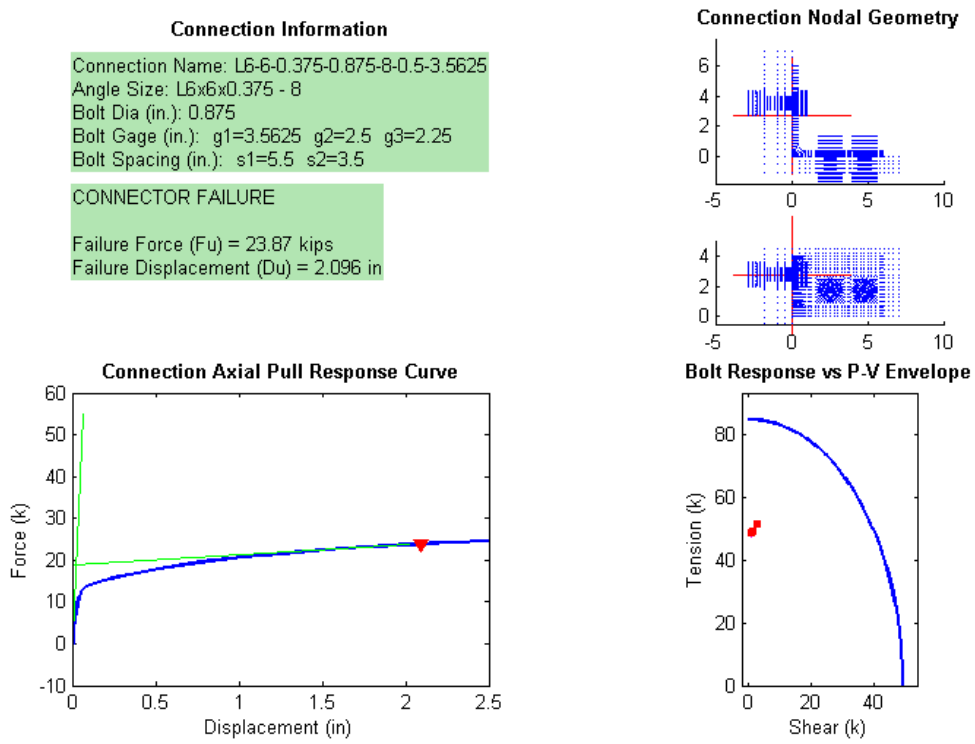


Figure B.113 Connection L6_6_0.375_0.875_8_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.375_0.875_8_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 864.1203

Plastic Stiffness (k/in): 2.3216

Displacement (in): [3.6166e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.024414 ; 0.031006 ; 0.040894 ; 0.055725 ; 0.077972 ; 0.11134 ; 0.1614 ; 0.23649 ; 0.34911 ; 0.51805 ; 0.76805 ; 1.018 ; 1.268 ; 1.518 ; 1.768 ; 2.0181 ; 2.2681 ; 2.5]

Force (kips): [-1.15296 ; 0.114579 ; 0.534775 ; 1.1108 ; 1.9036 ; 2.97896 ; 3.9459 ; 4.72325 ; 5.5477 ; 6.2704 ; 6.75759 ; 7.0775 ; 7.3873 ; 7.78071 ; 8.29733 ; 8.9527 ; 9.73404 ; 10.3428 ; 10.8269 ; 11.2257 ; 11.5639 ; 11.8541 ; 12.1054 ; 12.3086]

Bolt 1 - Tensile Force (kips): [48.6445 ; 48.5988 ; 48.5839 ; 48.563 ; 48.5334 ; 48.4916 ; 48.4521 ; 48.4194 ; 48.3847 ; 48.3557 ; 48.3397 ; 48.3329 ; 48.3303 ; 48.3329 ; 48.3422 ; 48.357 ; 48.3814 ; 48.4095 ; 48.4431 ; 48.4804 ; 48.5206 ; 48.5645 ; 48.6106 ; 48.6549]

Bolt 1 - Shear Force (kips): [0.087242 ; 0.067595 ; 0.080147 ; 0.10571 ; 0.14847 ; 0.21306 ; 0.27526 ; 0.32741 ; 0.38357 ; 0.43209 ; 0.46267 ; 0.4836 ; 0.50492 ; 0.52497 ; 0.54544 ; 0.57997 ; 0.63177 ; 0.68324 ; 0.72731 ; 0.76767 ; 0.80528 ; 0.83753 ; 0.86537 ; 0.88804]

Bolt 2 - Tensile Force (kips): [48.6527 ; 48.5891 ; 48.5588 ; 48.5169 ; 48.4609 ; 48.3892 ; 48.3271 ; 48.2803 ; 48.2366 ; 48.1845 ; 48.1432 ; 48.109 ; 48.0875 ; 48.0606 ; 48.05 ; 48.1069 ; 48.3211 ; 48.5339 ; 48.6901 ; 48.8152 ; 48.9353 ; 49.0585 ; 49.1867 ; 49.3094]

Bolt 2 - Shear Force (kips): [0.074445 ; 0.060181 ; 0.096103 ; 0.1493 ; 0.22593 ; 0.33341 ; 0.43282 ; 0.51548 ; 0.6082 ; 0.69779 ; 0.76565 ; 0.81281 ; 0.86202 ; 0.93649 ; 1.0271 ; 1.1255 ; 1.1933 ; 1.2115 ; 1.2143 ; 1.2124 ; 1.2083 ; 1.208 ; 1.2162 ; 1.2298]

Bolt 3 - Tensile Force (kips): [50 ; 49.9514 ; 49.9046 ; 49.8413 ; 49.7537 ; 49.6085 ; 49.444 ; 49.3012 ; 49.0932 ; 48.8204 ; 48.5112 ; 48.1989 ; 47.8906 ; 47.605 ; 47.5228 ; 47.806 ; 48.6387 ; 49.3009 ; 49.6948 ; 50.2104 ; 50.7941 ; 51.3589 ; 51.932 ; 52.4648]

Bolt 3 - Shear Force (kips): [0.051688 ; 0.031563 ; 0.030954 ; 0.051941 ; 0.093045 ; 0.15374 ; 0.21004 ; 0.25751 ; 0.30757 ; 0.35596 ; 0.39049 ; 0.41304 ; 0.44091 ; 0.54377 ; 0.73835 ; 0.97677 ; 1.2281 ; 1.4892 ; 1.8863 ; 2.1592 ; 2.3331 ; 2.4784 ; 2.5828 ; 2.7146]

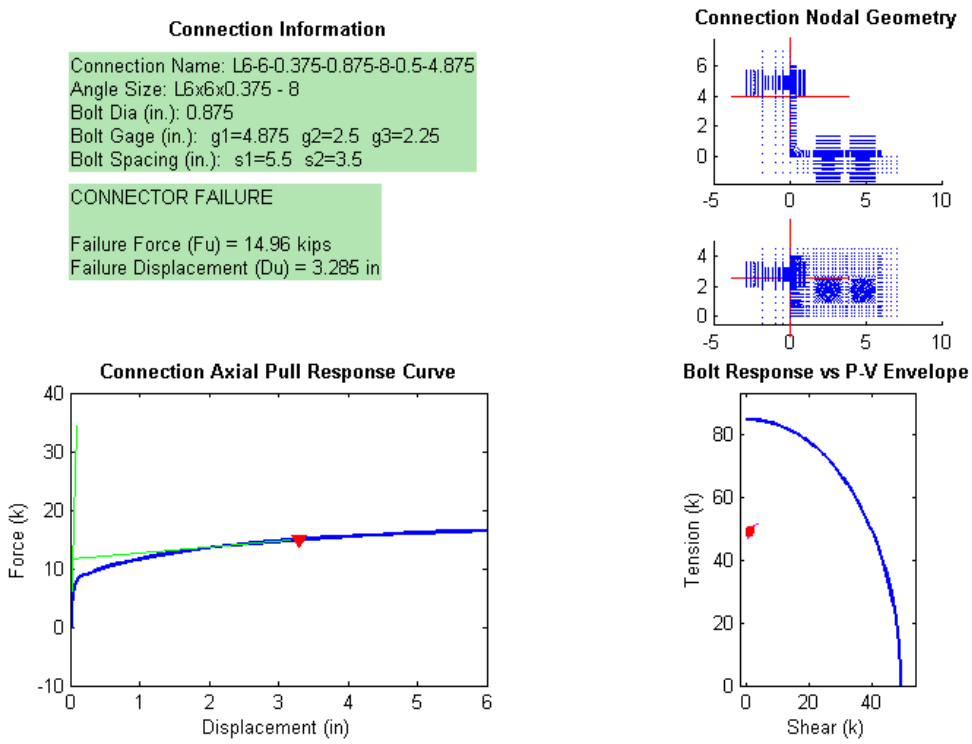


Figure B.114 Connection L6_6_0.375_0.875_8_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.375_0.875_8_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 365.9580

Plastic Stiffness (k/in): 0.9919

Displacement (in): [3.5397e-036 ; 0.0046875 ; 0.009375 ; 0.016406 ; 0.026953 ; 0.042773 ; 0.066504 ; 0.1021 ; 0.15549 ; 0.23558 ; 0.35572 ; 0.53592 ; 0.6035 ; 0.70486 ; 0.85691 ; 1.085 ; 1.4271 ; 1.9402 ; 2.0902 ; 2.3152 ; 2.6527 ; 3.159 ; 3.759 ; 4.359 ; 4.959 ; 5.559 ; 6]

Force (kips): [-1.1476 ; 0.21554 ; 0.56781 ; 1.0695 ; 1.7596 ; 2.6907 ; 3.5824 ; 4.1007 ; 4.3417 ; 4.5471 ; 4.8083 ; 5.145 ; 5.2569 ; 5.414 ; 5.6267 ; 5.915 ; 6.2867 ; 6.7254 ; 6.8332 ; 6.983 ; 7.1797 ; 7.4308 ; 7.6696 ; 7.8583 ; 8.0079 ; 8.1254 ; 8.1979]

Bolt 1 - Tensile Force (kips): [48.6447 ; 48.5955 ; 48.583 ; 48.5646 ; 48.5382 ; 48.5005 ; 48.4619 ; 48.4393 ; 48.4302 ; 48.4245 ; 48.4205 ; 48.418 ; 48.4203 ; 48.4259 ; 48.4341 ; 48.4454 ; 48.4628 ; 48.4904 ; 48.499 ; 48.5126 ; 48.5345 ; 48.5705 ; 48.617 ; 48.6652 ; 48.7137 ; 48.7638 ; 48.8012]

Bolt 1 - Shear Force (kips): [0.087194 ; 0.070251 ; 0.082289 ; 0.10512 ; 0.1426 ; 0.20026 ; 0.26158 ; 0.30123 ; 0.32434 ; 0.34663 ; 0.37237 ; 0.40471 ; 0.41067 ; 0.41446 ; 0.42393 ; 0.44153 ; 0.46752 ; 0.50626 ; 0.51701 ; 0.53136 ; 0.55111 ; 0.5759 ; 0.60199 ; 0.62775 ; 0.6538 ; 0.67699 ; 0.69296]

Bolt 2 - Tensile Force (kips): [48.6534 ; 48.5817 ; 48.5506 ; 48.5076 ; 48.4541 ; 48.3889 ; 48.3426 ; 48.3174 ; 48.3079 ; 48.2993 ; 48.2734 ; 48.2493 ; 48.2462 ; 48.2576 ; 48.2723 ; 48.3167 ; 48.4931 ; 48.7299 ; 48.7894 ; 48.8825 ; 49.0033 ; 49.1583 ; 49.3119 ; 49.438 ; 49.5493 ; 49.6526 ; 49.7231]

Bolt 2 - Shear Force (kips): [0.074536 ; 0.070518 ; 0.1049 ; 0.15658 ; 0.23088 ; 0.3341 ; 0.4384 ; 0.50235 ; 0.53032 ; 0.56133 ; 0.61583 ; 0.70816 ; 0.73555 ; 0.76879 ; 0.81446 ; 0.87447 ; 0.93867 ; 0.97735 ; 0.98158 ; 0.98535 ; 0.98754 ; 0.98262 ; 0.97035 ; 0.95806 ; 0.94847 ; 0.94915 ; 0.95257]

Bolt 3 - Tensile Force (kips): [50 ; 49.9353 ; 49.8773 ; 49.7895 ; 49.6503 ; 49.3665 ; 48.9892 ; 48.5483 ; 48.1207 ; 47.7098 ; 47.2994 ; 46.9276 ; 46.8206 ; 46.729 ; 46.7068 ; 46.8648 ; 47.4215 ; 48.2426 ; 48.4228 ; 48.699 ; 49.0653 ; 49.4958 ; 49.9737 ; 50.424 ; 50.8761 ; 51.3375 ; 51.6518]

Bolt 3 - Shear Force (kips): [0.050352 ; 0.028731 ; 0.036434 ; 0.066439 ; 0.11457 ; 0.1761 ; 0.22121 ; 0.20198 ; 0.14146 ; 0.12953 ; 0.16507 ; 0.23335 ; 0.27102 ; 0.3397 ; 0.43431 ; 0.5525 ; 0.71705 ; 0.8985 ; 0.94815 ; 1.0224 ; 1.1312 ; 1.3001 ; 1.4559 ; 1.791 ; 2.5042 ; 3.0016 ; 3.3803]

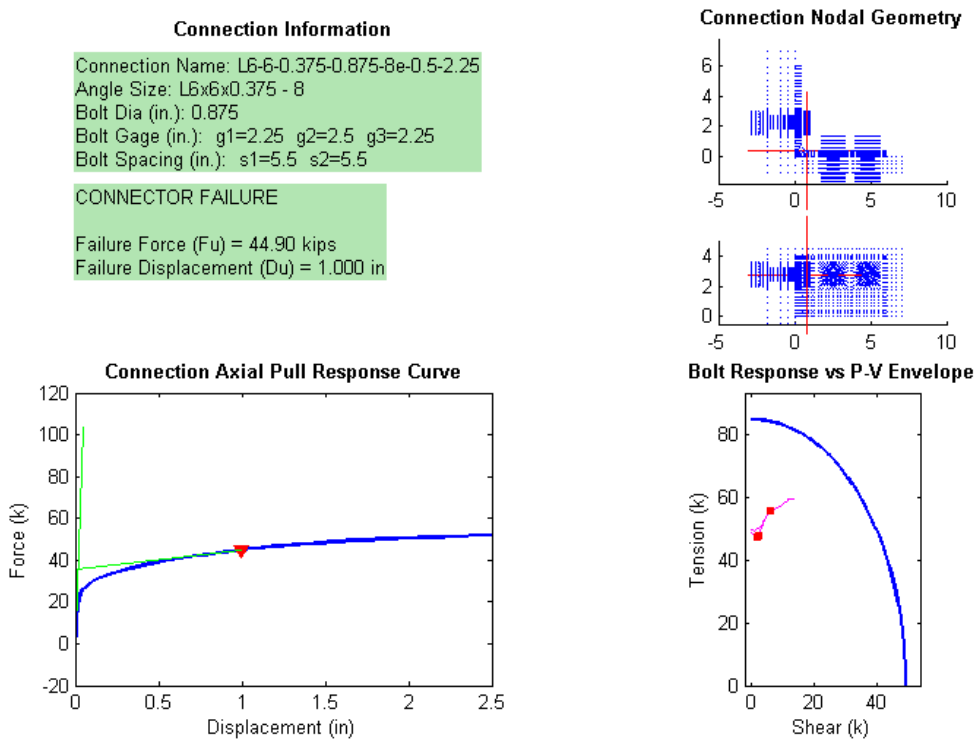


Figure B.115 Connection L6_6_0.375_0.875_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.375_0.875_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.9918e+003

Plastic Stiffness (k/in): 9.3405

Displacement (in): [5.4121e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.033569 ; 0.048401 ; 0.070648 ; 0.10402 ; 0.15408 ; 0.22916 ; 0.34179 ; 0.45441 ; 0.56704 ; 0.73598 ; 0.73989 ; 0.74575 ; 0.75454 ; 0.76772 ; 0.7875 ; 0.81716 ; 0.86165 ; 0.87834 ; 0.90337 ; 0.94091 ; 0.99722 ; 1.0817 ; 1.2084 ; 1.3985 ; 1.461 ; 1.5547 ; 1.6953 ; 1.9063 ; 1.9688 ; 1.9922 ; 2.0274 ; 2.0801 ; 2.1592 ; 2.2778 ; 2.4558 ; 2.5]

Force (kips): [-1.33421 ; 1.0325 ; 2.55604 ; 4.45402 ; 6.12318 ; 7.53173 ; 9.1666 ; 10.7092 ; 11.9928 ; 12.9495 ; 13.8276 ; 14.7312 ; 15.7404 ; 16.8965 ; 18.1406 ; 19.1218 ; 19.9461 ; 20.9741 ; 20.9996 ; 21.0346 ; 21.0878 ; 21.1829 ; 21.305 ; 21.4979 ; 21.757 ; 21.8513 ; 21.9876 ; 22.178 ; 22.441 ; 22.8048 ; 23.2846 ; 23.9017 ; 24.0819 ; 24.334 ; 24.6753 ; 25.095 ; 25.2117 ; 25.2527 ; 25.3098 ; 25.3904 ; 25.5048 ; 25.6626 ; 25.8759 ; 25.9251]

Bolt 1 - Tensile Force (kips): [48.6885 ; 48.5965 ; 48.535 ; 48.455 ; 48.3817 ; 48.318 ; 48.2425 ; 48.1699 ; 48.11 ; 48.0702 ; 48.0357 ; 47.995 ; 47.9385 ; 47.8728 ; 47.804 ; 47.7502 ; 47.7055 ; 47.6532 ; 47.652 ; 47.6501 ; 47.6473 ; 47.642 ; 47.6356 ; 47.625 ; 47.6111 ; 47.6061 ; 47.5993 ; 47.5905 ; 47.5786 ; 47.5612 ; 47.5379 ; 47.5062 ; 47.4967 ; 47.4823 ; 47.4612 ; 47.4347 ; 47.4266 ; 47.4234 ; 47.4189 ; 47.412 ; 47.4021 ; 47.3881 ; 47.3691 ; 47.3644]

Bolt 1 - Shear Force (kips): [0.066554 ; 0.11179 ; 0.2053 ; 0.32865 ; 0.44105 ; 0.53795 ; 0.65123 ; 0.75787 ; 0.84219 ; 0.89431 ; 0.93494 ; 0.99827 ; 1.0913 ; 1.2066 ; 1.3369 ; 1.4424 ; 1.5324 ; 1.6408 ; 1.6434 ; 1.647 ; 1.6525 ; 1.6622 ; 1.6746 ; 1.6939 ; 1.7194 ; 1.7285 ; 1.7414 ; 1.7589 ; 1.7829 ; 1.8151 ; 1.8563 ; 1.9077 ; 1.9224 ; 1.9422 ; 1.9687 ; 1.9997 ; 2.0085 ; 2.0116 ; 2.0157 ; 2.0214 ; 2.0297 ; 2.0409 ; 2.0581 ; 2.0622]

Bolt 2 - Tensile Force (kips): [48.7143 ; 48.5792 ; 48.4872 ; 48.3726 ; 48.2688 ; 48.177 ; 48.0666 ; 47.9309 ; 47.7848 ; 47.6348 ; 47.4973 ; 47.3574 ; 47.2408 ; 47.2108 ; 47.1237 ; 47.0755 ; 47.0937 ; 47.2612 ; 47.2664 ; 47.2746 ; 47.2871 ; 47.307 ; 47.3422 ; 47.4038 ; 47.5104 ; 47.5548 ; 47.6281 ; 47.7453 ; 47.9269 ; 48.2201 ; 48.6776 ; 49.318 ; 49.5138 ; 49.8049 ; 50.2222 ; 50.8365 ; 51.0105 ; 51.0765 ; 51.1762 ; 51.3263 ; 51.5537 ; 51.8939 ; 52.4216 ; 52.5531]

Bolt 2 - Shear Force (kips): [0.1092 ; 0.12824 ; 0.2516 ; 0.4175 ; 0.56856 ; 0.69981 ; 0.85754 ; 1.0205 ; 1.1771 ; 1.3219 ; 1.4684 ; 1.5957 ; 1.6971 ; 1.7891 ; 1.8897 ; 1.9676 ; 2.0252 ; 2.1084 ; 2.1109 ; 2.1145 ; 2.1199 ; 2.1296 ; 2.1424 ; 2.165 ; 2.1977 ; 2.2099 ; 2.229 ; 2.2577 ; 2.3003 ; 2.3645 ; 2.4679 ; 2.641 ; 2.7016 ; 2.7942 ; 2.9337 ; 3.139 ; 3.1973 ; 3.2183 ; 3.2489 ; 3.2934 ; 3.3557 ; 3.4423 ; 3.5357 ; 3.5558]

Bolt 3 - Tensile Force (kips): [50 ; 49.9104 ; 49.8428 ; 49.7715 ; 49.7103 ; 49.6664 ; 49.5944 ; 49.5737 ; 49.4874 ; 49.3712 ; 49.2849 ; 49.3475 ; 49.6698 ; 49.9436 ; 50.6725 ; 51.7633 ; 52.8982 ; 54.5593 ; 54.5926 ; 54.638 ; 54.7007 ; 54.7693 ; 54.8898 ; 55.033 ; 55.2132 ; 55.2787 ; 55.3878 ; 55.5584 ; 55.8058 ; 56.213 ; 56.8148 ; 57.6526 ; 57.9489 ; 58.3352 ; 58.7782 ; 59.1526 ; 59.2682 ; 59.2933 ; 59.3144 ; 59.3368 ; 59.3413 ; 59.3399 ; 59.3171 ; 59.3008]

Bolt 3 - Shear Force (kips): [0.0630085 ; 0.0237324 ; 0.0623255 ; 0.135276 ; 0.210337 ; 0.280139 ; 0.36958 ; 0.475386 ; 0.599745 ; 0.741866 ; 0.917035 ; 1.08365 ; 1.2842 ; 1.96907 ; 2.89682 ; 3.50093 ; 3.95388 ; 4.45634 ; 4.47103 ; 4.49011 ; 4.5207 ; 4.58857 ; 4.66397 ; 4.81187 ; 5.01319 ; 5.09976 ; 5.23109 ; 5.42474 ; 5.75918 ; 6.63848 ; 8.09134 ; 9.55783 ; 10.0412 ; 10.5132 ; 10.9294 ; 11.4632 ; 11.3342 ; 11.3903 ; 11.5107 ; 11.7147 ; 12.1464 ; 12.6317 ; 13.3355 ; 13.4811]

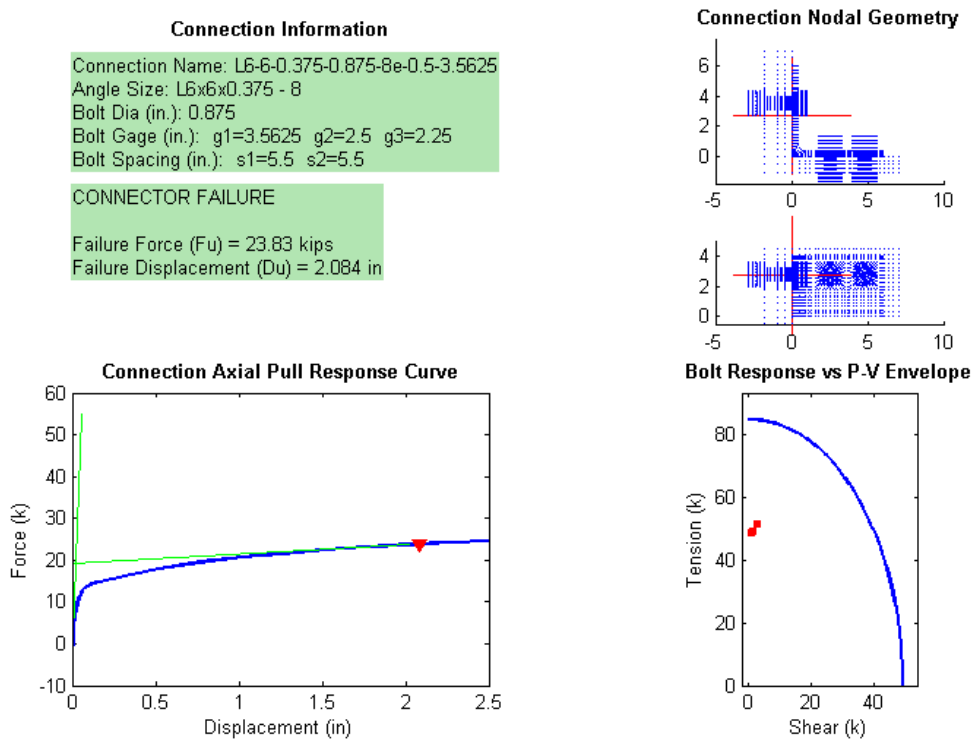


Figure B.116 Connection L6_6_0.375_0.875_8e_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.375_0.875_8e_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 906.0301

Plastic Stiffness (k/in): 2.2936

Displacement (in): [5.1572e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.026367 ; 0.032959 ; 0.042847 ; 0.057678 ; 0.079925 ; 0.1133 ; 0.16335 ; 0.23844 ; 0.35107 ; 0.52001 ; 0.77001 ; 1.02 ; 1.27 ; 1.52 ; 1.77 ; 2.02 ; 2.27 ; 2.5]

Force (kips): [-1.26206 ; 0.084737 ; 0.50753 ; 0.895462 ; 1.45081 ; 2.20298 ; 3.25211 ; 4.15858 ; 4.86259 ; 5.60614 ; 6.27861 ; 6.75648 ; 7.08521 ; 7.38994 ; 7.77591 ; 8.29041 ; 8.94404 ; 9.72697 ; 10.3385 ; 10.828 ; 11.2288 ; 11.5655 ; 11.8522 ; 12.1013 ; 12.3034]

Bolt 1 - Tensile Force (kips): [48.6894 ; 48.6369 ; 48.6205 ; 48.6051 ; 48.5828 ; 48.5516 ; 48.5064 ; 48.4659 ; 48.4337 ; 48.3996 ; 48.3702 ; 48.3543 ; 48.3487 ; 48.348 ; 48.3517 ; 48.3602 ; 48.3719 ; 48.3919 ; 48.4154 ; 48.4445 ; 48.477 ; 48.5141 ; 48.5543 ; 48.5959 ; 48.6356]

Bolt 1 - Shear Force (kips): [0.063253 ; 0.062809 ; 0.084002 ; 0.10632 ; 0.14062 ; 0.18959 ; 0.2612 ; 0.3256 ; 0.3768 ; 0.43121 ; 0.4784 ; 0.5066 ; 0.52427 ; 0.54167 ; 0.55614 ; 0.57111 ; 0.5962 ; 0.63238 ; 0.67184 ; 0.71389 ; 0.75128 ; 0.78312 ; 0.8103 ; 0.83537 ; 0.85765]

Bolt 2 - Tensile Force (kips): [48.7174 ; 48.6395 ; 48.6094 ; 48.5818 ; 48.5431 ; 48.4937 ; 48.4281 ; 48.3736 ; 48.3355 ; 48.2931 ; 48.2552 ; 48.216 ; 48.181 ; 48.1561 ; 48.1506 ; 48.1682 ; 48.2661 ; 48.4682 ; 48.6448 ; 48.7974 ; 48.9189 ; 49.0275 ; 49.133 ; 49.2449 ; 49.3543]

Bolt 2 - Shear Force (kips): [0.10488 ; 0.072033 ; 0.097241 ; 0.12689 ; 0.17377 ; 0.24203 ; 0.3413 ; 0.43055 ; 0.50299 ; 0.58472 ; 0.66797 ; 0.74164 ; 0.79977 ; 0.85657 ; 0.93715 ; 1.0328 ; 1.1289 ; 1.1977 ; 1.2323 ; 1.2407 ; 1.2461 ; 1.2467 ; 1.2482 ; 1.2546 ; 1.2589]

Bolt 3 - Tensile Force (kips): [50 ; 49.9532 ; 49.9075 ; 49.8666 ; 49.8055 ; 49.7273 ; 49.5792 ; 49.4344 ; 49.2998 ; 49.1117 ; 48.8624 ; 48.5747 ; 48.2649 ; 47.9521 ; 47.6797 ; 47.616 ; 47.9153 ; 48.7423 ; 49.454 ; 49.8887 ; 50.3881 ; 50.8617 ; 51.326 ; 51.8377 ; 52.346]

Bolt 3 - Shear Force (kips): [0.061881 ; 0.03797 ; 0.02803 ; 0.030045 ; 0.048485 ; 0.08317 ; 0.13639 ; 0.18527 ; 0.22415 ; 0.266 ; 0.30666 ; 0.34497 ; 0.37524 ; 0.40757 ; 0.50262 ; 0.68554 ; 0.91314 ; 1.1756 ; 1.3803 ; 1.7236 ; 1.9894 ; 2.2336 ; 2.4486 ; 2.5973 ; 2.8498]

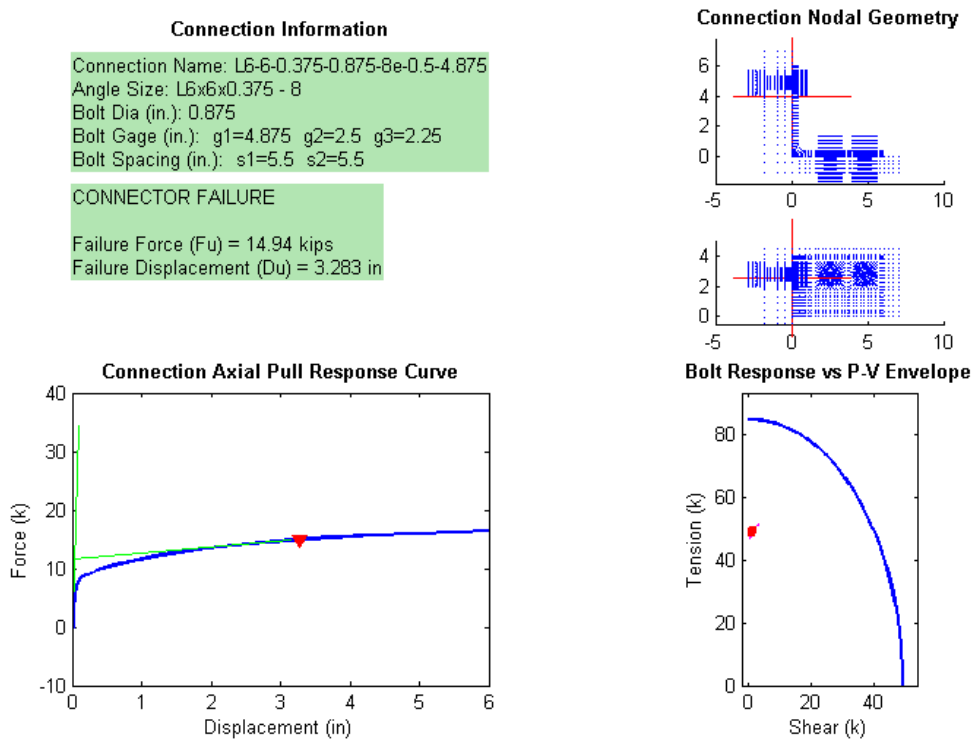


Figure B.117 Connection L6_6_0.375_0.875_8e_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.375_0.875_8e_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 385.9601

Plastic Stiffness (k/in): 1.0161

Displacement (in): [3.7968e-036 ; 0.0046875 ; 0.009375 ; 0.016406 ; 0.026953 ; 0.042773 ; 0.066504 ; 0.1021 ; 0.15549 ; 0.23558 ; 0.35572 ; 0.53592 ; 0.6035 ; 0.70486 ; 0.85691 ; 1.085 ; 1.4271 ; 1.9402 ; 2.5402 ; 3.1402 ; 3.7402 ; 4.3402 ; 4.9402 ; 5.5402 ; 6]

Force (kips): [-1.2551 ; 0.20362 ; 0.55411 ; 1.052 ; 1.7381 ; 2.6638 ; 3.5556 ; 4.1012 ; 4.3496 ; 4.5515 ; 4.8102 ; 5.145 ; 5.2561 ; 5.4128 ; 5.6247 ; 5.9122 ; 6.2823 ; 6.7201 ; 7.1102 ; 7.415 ; 7.6567 ; 7.8471 ; 7.9975 ; 8.1159 ; 8.1912]

Bolt 1 - Tensile Force (kips): [48.6904 ; 48.6332 ; 48.6191 ; 48.5984 ; 48.5688 ; 48.5266 ; 48.4833 ; 48.4573 ; 48.4481 ; 48.4439 ; 48.4429 ; 48.4453 ; 48.449 ; 48.4548 ; 48.4636 ; 48.4766 ; 48.4957 ; 48.5237 ; 48.5596 ; 48.5984 ; 48.6401 ; 48.6828 ; 48.7263 ; 48.7718 ; 48.8073]

Bolt 1 - Shear Force (kips): [0.063804 ; 0.068512 ; 0.087886 ; 0.11873 ; 0.16478 ; 0.23177 ; 0.30125 ; 0.34584 ; 0.36935 ; 0.39027 ; 0.41163 ; 0.4359 ; 0.43592 ; 0.43669 ; 0.44228 ; 0.4555 ; 0.47628 ; 0.50909 ; 0.54134 ; 0.5701 ; 0.59614 ; 0.62218 ; 0.64844 ; 0.67262 ; 0.69042]

Bolt 2 - Tensile Force (kips): [48.7214 ; 48.6342 ; 48.6045 ; 48.5642 ; 48.515 ; 48.4571 ; 48.4119 ; 48.3929 ; 48.3865 ; 48.379 ; 48.3614 ; 48.3317 ; 48.3329 ; 48.3537 ; 48.3895 ; 48.4461 ; 48.5966 ; 48.8206 ; 49.0393 ; 49.2096 ; 49.3513 ; 49.4707 ; 49.5767 ; 49.6724 ; 49.745]

Bolt 2 - Shear Force (kips): [0.10541 ; 0.079981 ; 0.10523 ; 0.14794 ; 0.21296 ; 0.30589 ; 0.4009 ; 0.46404 ; 0.49123 ; 0.51964 ; 0.57627 ; 0.67278 ; 0.69806 ; 0.73321 ; 0.77956 ; 0.83571 ; 0.89042 ; 0.9174 ; 0.92378 ; 0.92352 ; 0.91684 ; 0.91037 ; 0.90164 ; 0.89932 ; 0.89948]

Bolt 3 - Tensile Force (kips): [50 ; 49.9378 ; 49.8818 ; 49.7978 ; 49.6661 ; 49.399 ; 49.0412 ; 48.6101 ; 48.1715 ; 47.734 ; 47.3105 ; 46.9288 ; 46.8178 ; 46.7272 ; 46.7045 ; 46.8544 ; 47.3958 ; 48.1713 ; 48.8767 ; 49.3788 ; 49.8431 ; 50.2739 ; 50.7051 ; 51.1617 ; 51.4872]

Bolt 3 - Shear Force (kips): [0.060533 ; 0.033832 ; 0.028606 ; 0.045956 ; 0.085572 ; 0.13886 ; 0.18063 ; 0.17159 ; 0.12663 ; 0.12617 ; 0.16251 ; 0.23149 ; 0.26925 ; 0.33631 ; 0.4301 ; 0.54773 ; 0.71671 ; 0.91616 ; 1.1278 ; 1.3374 ; 1.4968 ; 1.7336 ; 2.3451 ; 2.9194 ; 3.2813]

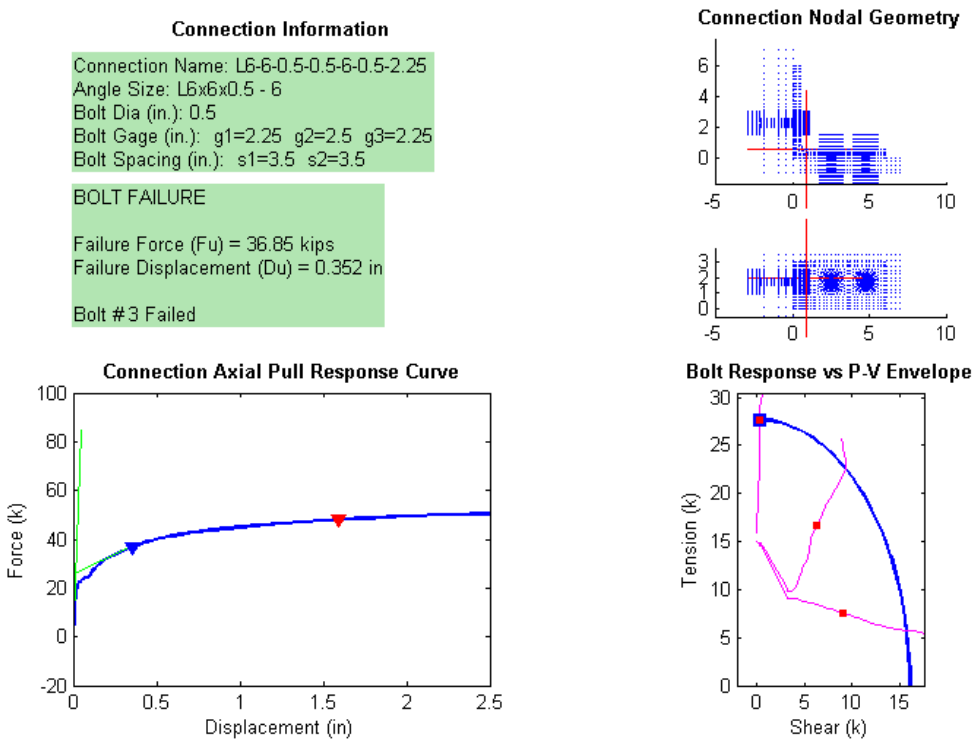


Figure B.118 Connection L6_6_0.5_0.5_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.5_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.8017e+003

Plastic Stiffness (k/in): 30.8480

Displacement (in): [6.708e-037 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.024414 ; 0.031006 ; 0.040894 ; 0.055725 ; 0.061287 ; 0.06963 ; 0.072758 ; 0.077451 ; 0.08449 ; 0.08713 ; 0.08812 ; 0.088491 ; 0.089048 ; 0.089883 ; 0.091136 ; 0.093015 ; 0.095834 ; 0.10006 ; 0.10165 ; 0.10224 ; 0.10313 ; 0.10447 ; 0.10648 ; 0.10949 ; 0.114 ; 0.12078 ; 0.13094 ; 0.14618 ; 0.16903 ; 0.17761 ; 0.19046 ; 0.20975 ; 0.23868 ; 0.28208 ; 0.29835 ; 0.32276 ; 0.35938 ; 0.4143 ; 0.41945 ; 0.4246 ; 0.42974 ; 0.43747 ; 0.44905 ; 0.46643 ; 0.4925 ; 0.5316 ; 0.54626 ; 0.56825 ; 0.60124 ; 0.65073 ; 0.72496 ; 0.8363 ; 1.0033 ; 1.2533 ; 1.5033 ; 1.7533 ; 2.0033 ; 2.2533 ; 2.5]

Force (kips): [-0.223193 ; 1.81628 ; 3.2957 ; 5.07788 ; 7.09939 ; 8.59926 ; 9.72846 ; 10.3337 ; 10.752 ; 11.2878 ; 11.8914 ; 12.0463 ; 12.1922 ; 12.1954 ; 12.1952 ; 12.1951 ; 12.1951 ; 12.1951 ; 12.2017 ; 12.2223 ; 12.2536 ; 12.297 ; 12.3366 ; 12.4223 ; 12.4267 ; 12.4266 ; 12.4663 ; 12.534 ; 12.6327 ; 12.7615 ; 12.9632 ; 13.23 ; 13.5595 ; 14.0017 ; 14.5168 ; 15.1256 ; 15.3452 ; 15.6745 ; 16.0893 ; 16.6304 ; 17.379 ; 17.634 ; 18.0105 ; 18.5291 ; 19.1713 ; 19.2277 ; 19.2832 ; 19.3376 ; 19.4174 ; 19.5323 ; 19.6932 ; 19.9119 ; 20.1972 ; 20.2968 ; 20.4477 ; 20.6648 ; 20.9663 ; 21.3702 ; 21.8739 ; 22.4798 ; 23.1923 ; 23.7871 ; 24.2622 ; 24.6592 ; 24.9817 ; 25.244]

Bolt 1 - Tensile Force (kips): [15.03 ; 14.9786 ; 14.9344 ; 14.8701 ; 14.7852 ; 14.7115 ; 14.622 ; 14.335 ; 13.5504 ; 12.3152 ; 10.5097 ; 9.87317 ; 9.39699 ; 9.39605 ; 9.39506 ; 9.39419 ; 9.39395 ; 9.3939 ; 9.38573 ; 9.33527 ; 9.25738 ; 9.15024 ; 9.12046 ; 9.11932 ; 9.11954 ; 9.11973 ; 9.11559 ; 9.11214 ; 9.10851 ; 9.10373 ; 9.08947 ; 9.07915 ; 9.06279 ; 8.99138 ; 8.89495 ; 8.78381 ; 8.73217 ; 8.6533 ; 8.56983 ; 8.45349 ; 8.07421 ; 7.94269 ; 7.74517 ; 7.47414 ; 7.23222 ; 7.20358 ; 7.17648 ; 7.14461 ; 7.08957 ; 7.01087 ; 6.89271 ; 6.74385 ; 6.58783 ; 6.54255 ; 6.48314 ; 6.39491 ; 6.2582 ; 6.1447 ; 6.09162 ; 5.87594 ; 5.78007 ; 5.70727 ; 5.60058 ; 5.46079 ; 5.42988 ; 5.42156]

Bolt 1 - Shear Force (kips): [0.0157695 ; 0.0685581 ; 0.125728 ; 0.195039 ; 0.275967 ; 0.338255 ; 0.408864 ; 0.607735 ; 1.0758 ; 1.7437 ; 2.62298 ; 2.9008 ; 3.10093 ; 3.10068 ; 3.10037 ; 3.10008 ; 3.1 ; 3.09999 ; 3.10895 ; 3.14526 ; 3.2011 ; 3.28001 ; 3.30114 ; 3.30073 ; 3.30047 ; 3.30036 ; 3.33828 ; 3.37093 ; 3.40766 ; 3.46308 ; 3.56741 ; 3.67495 ; 3.84099 ; 4.12996 ; 4.48249 ; 4.78733 ; 5.01385 ; 5.34204 ; 5.62662 ; 6.21338 ; 7.435 ; 7.84758 ; 8.36819 ; 9.17675 ; 10.0251 ; 10.1012 ; 10.1714 ; 10.2519 ; 10.3927 ; 10.5892 ; 10.8881 ; 11.3144 ; 11.7563 ; 11.8891 ; 12.0674 ; 12.3326 ; 12.761 ; 13.2417 ; 13.7732 ; 14.7214 ; 15.7052 ; 16.4202 ; 17.0428 ; 17.5567 ; 17.9008 ; 18.2229]

Bolt 2 - Tensile Force (kips): [15.0404 ; 14.9831 ; 14.9395 ; 14.891 ; 14.8561 ; 14.8563 ; 14.8438 ; 14.6071 ; 13.8724 ; 12.762 ; 11.2292 ; 10.702 ; 9.93372 ; 9.89968 ; 9.89696 ; 9.8969 ; 9.89707 ; 9.89721 ; 9.89888 ; 9.9036 ; 9.91088 ; 9.9211 ; 9.86033 ; 9.70727 ; 9.69905 ; 9.69905 ; 9.7136 ; 9.73837 ; 9.78005 ; 9.84641 ; 9.95243 ; 10.1097 ; 10.3376 ; 10.6963 ; 11.233 ; 11.9697 ; 12.257 ; 12.7003 ; 13.2631 ; 14.0446 ; 15.1522 ; 15.5356 ; 16.0945 ; 16.8912 ; 17.8706 ; 17.9499 ; 18.0263 ; 18.1026 ; 18.218 ; 18.3768 ; 18.5912 ; 18.8504 ; 19.1691 ; 19.2844 ; 19.4496 ; 19.6967 ; 20.0678 ; 20.5147 ; 21.0655 ; 21.7394 ; 22.5015 ; 23.3575 ; 24.109 ; 24.7388 ; 25.2201 ; 25.6325]

Bolt 2 - Shear Force (kips): [0.016604 ; 0.075978 ; 0.13824 ; 0.21381 ; 0.30208 ; 0.36881 ; 0.44033 ; 0.63171 ; 1.092 ; 1.7488 ; 2.605 ; 2.8772 ; 3.2488 ; 3.2642 ; 3.2656 ; 3.2659 ; 3.266 ; 3.2661 ; 3.2666 ; 3.2682 ; 3.2706 ; 3.274 ; 3.3281 ; 3.482 ; 3.4901 ; 3.4901 ; 3.4942 ; 3.5324 ; 3.5984 ; 3.6809 ; 3.7875 ; 3.9685 ; 4.1376 ; 4.2647 ; 4.4719 ; 4.7513 ; 4.7949 ; 5.0225 ; 5.3076 ; 5.5221 ; 5.674 ; 5.7219 ; 6.0549 ; 6.4202 ; 6.8674 ; 6.8981 ; 6.9289 ; 6.9561 ; 6.9904 ; 7.0565 ; 7.1394 ; 7.2701 ; 7.47 ; 7.5396 ; 7.654 ; 7.8072 ; 7.973 ; 8.195 ; 8.514 ; 8.893 ; 9.2831 ; 9.2761 ; 9.1551 ; 9.0376 ; 8.9669 ; 8.8804]

Bolt 3 - Tensile Force (kips): [16 ; 15.9952 ; 16.0594 ; 16.2472 ; 16.6372 ; 17.0765 ; 17.4801 ; 17.7431 ; 17.9427 ; 18.2224 ; 18.6117 ; 18.7288 ; 18.8534 ; 18.8564 ; 18.8553 ; 18.8536 ; 18.853 ; 18.8529 ; 18.8591 ; 18.876 ; 18.902 ; 18.9383 ; 18.9728 ; 19.0501 ; 19.0535 ; 19.053 ; 19.089 ; 19.1516 ; 19.2451 ; 19.3713 ; 19.5792 ; 19.8767 ; 20.2957 ; 20.9371 ; 21.7816 ; 22.8655 ; 23.2431 ; 23.7819 ; 24.4674 ; 25.2894 ; 26.3344 ; 26.6818 ; 27.174 ; 27.8317 ; 28.6151 ; 28.6745 ; 28.7315 ; 28.7867 ; 28.8672 ; 28.9846 ; 29.1502 ; 29.3688 ; 29.6626 ; 29.7637 ; 29.9238 ; 30.1462 ; 30.4355 ; 30.7993 ; 31.1858 ; 31.56 ; 31.8588 ; 32.1303 ; 32.3137 ; 32.4497 ; 32.5465 ; 32.6139]

Bolt 3 - Shear Force (kips): [0.0082892 ; 0.0089053 ; 0.025164 ; 0.047269 ; 0.072779 ; 0.092176 ; 0.10462 ; 0.11004 ; 0.11413 ; 0.12219 ; 0.13653 ; 0.14128 ; 0.14644 ; 0.14656 ; 0.14664 ; 0.14671 ; 0.14674 ; 0.14675 ; 0.14687 ; 0.1475 ; 0.14853 ; 0.14999 ; 0.15142 ; 0.15473 ; 0.15493 ; 0.15494 ; 0.15647 ; 0.15921 ; 0.16337 ; 0.16915 ; 0.17931 ; 0.19458 ; 0.21647 ; 0.24617 ; 0.27383 ; 0.29636 ; 0.30139 ; 0.30641 ; 0.31178 ; 0.31722 ; 0.3148 ; 0.31258 ; 0.30773 ; 0.29777 ; 0.28403 ; 0.2998 ; 0.31973 ; 0.3374 ; 0.35962 ; 0.38499 ; 0.41223 ; 0.44353 ; 0.46841 ; 0.47472 ; 0.53543 ; 0.61015 ; 0.68316 ; 0.73227 ; 0.73655 ; 0.71759 ; 0.89065 ; 1.5523 ; 1.9828 ; 2.31 ; 2.5383 ; 2.7251]

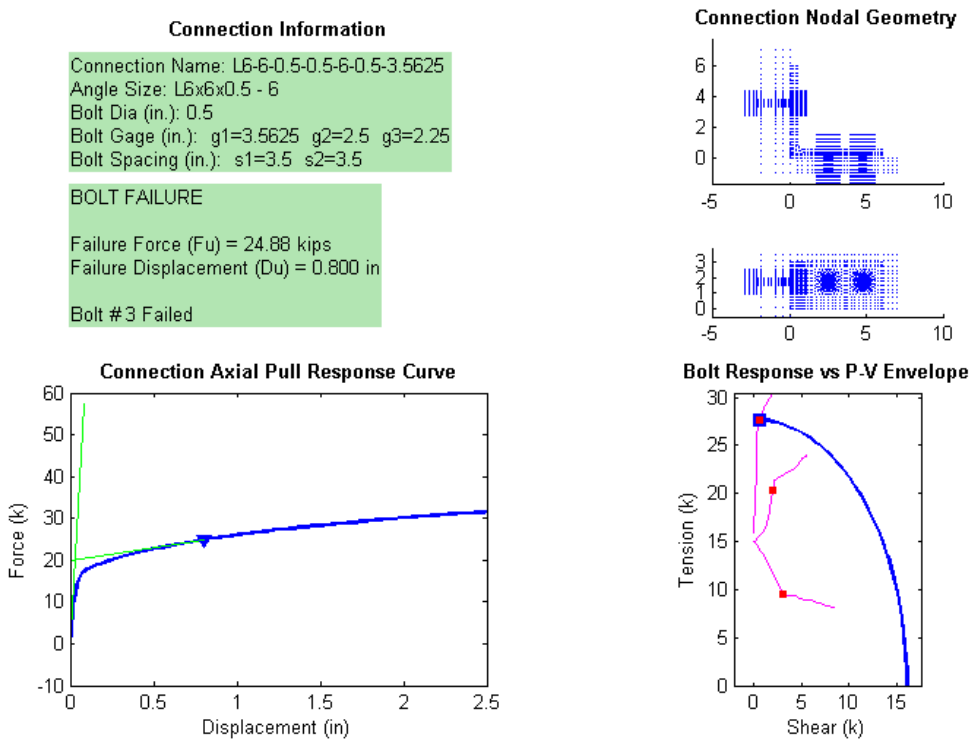


Figure B.119 Connection L6_6_0.5_0.5_6_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.5_6_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 683.9747

Plastic Stiffness (k/in): 6.3329

Displacement (in): [6.3391e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.022247 ; 0.025955 ; 0.031517 ; 0.03986 ; 0.052374 ; 0.071145 ; 0.099302 ; 0.14154 ; 0.20489 ; 0.29992 ; 0.44246 ; 0.49592 ; 0.51596 ; 0.54603 ; 0.59113 ; 0.65878 ; 0.76026 ; 0.79832 ; 0.8554 ; 0.8768 ; 0.90891 ; 0.92095 ; 0.93901 ; 0.96611 ; 1.0067 ; 1.0677 ; 1.0906 ; 1.1248 ; 1.1763 ; 1.2534 ; 1.2824 ; 1.3258 ; 1.3908 ; 1.4885 ; 1.6349 ; 1.6899 ; 1.7723 ; 1.8031 ; 1.8495 ; 1.919 ; 2.0233 ; 2.0624 ; 2.121 ; 2.209 ; 2.242 ; 2.2915 ; 2.3657 ; 2.477 ; 2.5]

Force (kips): [-0.191938 ; 0.571012 ; 1.14395 ; 1.65974 ; 2.36215 ; 3.3094 ; 4.54039 ; 4.94396 ; 5.48374 ; 6.18377 ; 6.99918 ; 7.81472 ; 8.41832 ; 8.86462 ; 9.27151 ; 9.77787 ; 10.3221 ; 11.0383 ; 11.2813 ; 11.3692 ; 11.5089 ; 11.7042 ; 11.9672 ; 12.3144 ; 12.4349 ; 12.6057 ; 12.667 ; 12.7557 ; 12.7886 ; 12.8429 ; 12.9195 ; 13.0263 ; 13.1747 ; 13.2342 ; 13.3214 ; 13.4605 ; 13.6484 ; 13.7127 ; 13.8034 ; 13.9375 ; 14.1219 ; 14.3832 ; 14.4964 ; 14.6552 ; 14.7146 ; 14.8021 ; 14.9172 ; 15.0859 ; 15.147 ; 15.235 ; 15.3608 ; 15.4066 ; 15.4768 ; 15.5743 ; 15.7161 ; 15.7451]

Bolt 1 - Tensile Force (kips): [15.0297 ; 15.0124 ; 14.9975 ; 14.9835 ; 14.9631 ; 14.9321 ; 14.8841 ; 14.8666 ; 14.842 ; 14.8078 ; 14.7613 ; 14.7042 ; 14.5395 ; 14.1647 ; 13.624 ; 12.9576 ; 12.3079 ; 11.2662 ; 10.8809 ; 10.7412 ; 10.5315 ; 10.2326 ; 9.82492 ; 9.4649 ; 9.46945 ; 9.47665 ; 9.47942 ; 9.48351 ; 9.48505 ; 9.48738 ; 9.49089 ; 9.49605 ; 9.50363 ; 9.50616 ; 9.50977 ; 9.51552 ; 9.52418 ; 9.5275 ; 9.49802 ; 9.41171 ; 9.43107 ; 9.44068 ; 9.40692 ; 9.35487 ; 9.30793 ; 9.22106 ; 9.1306 ; 8.96504 ; 8.91333 ; 8.86837 ; 8.67697 ; 8.60919 ; 8.50029 ; 8.35998 ; 8.12954 ; 8.07879]

Bolt 1 - Shear Force (kips): [0.014465 ; 0.023588 ; 0.044832 ; 0.06523 ; 0.093857 ; 0.13357 ; 0.18666 ; 0.20461 ; 0.22937 ; 0.26267 ; 0.30442 ; 0.3532 ; 0.48023 ; 0.72498 ; 1.0449 ; 1.4149 ; 1.7633 ; 2.294 ; 2.4791 ; 2.5446 ; 2.6416 ; 2.7776 ; 2.9602 ; 3.1224 ; 3.1244 ; 3.1271 ; 3.1281 ; 3.1295 ; 3.13 ; 3.1308 ; 3.1319 ; 3.1337 ; 3.1362 ; 3.137 ; 3.1382 ; 3.1401 ; 3.143 ; 3.1441 ; 3.1714 ; 3.2417 ; 3.2364 ; 3.3524 ; 3.6685 ; 4.0588 ; 4.2406 ; 4.5382 ; 4.8029 ; 5.4963 ; 5.6901 ; 6.0422 ; 6.7252 ; 6.935 ; 7.2645 ; 7.698 ; 8.3258 ; 8.4523]

Bolt 2 - Tensile Force (kips): [15.0397 ; 15.0197 ; 15.0039 ; 14.992 ; 14.9815 ; 14.9756 ; 14.9936 ; 15.0086 ; 15.0332 ; 15.0787 ; 15.1605 ; 15.3067 ; 15.4602 ; 15.5997 ; 15.9004 ; 16.3864 ; 16.9804 ; 18.0657 ; 18.4544 ; 18.5943 ; 18.8018 ; 19.0991 ; 19.5192 ; 20.0815 ; 20.2687 ; 20.5337 ; 20.6286 ; 20.7661 ; 20.8162 ; 20.8876 ; 20.9915 ; 21.1412 ; 21.3535 ; 21.4307 ; 21.5338 ; 21.6722 ; 21.8562 ; 21.9182 ; 22.0108 ; 22.135 ; 22.2948 ; 22.5297 ; 22.6381 ; 22.78 ; 22.8312 ; 22.915 ; 23.0293 ; 23.2291 ; 23.2974 ; 23.3946 ; 23.5427 ; 23.588 ; 23.658 ; 23.7574 ; 23.9087 ; 23.9383]

Bolt 2 - Shear Force (kips): [0.015275 ; 0.027419 ; 0.050852 ; 0.073433 ; 0.10521 ; 0.14925 ; 0.20795 ; 0.22777 ; 0.25459 ; 0.28963 ; 0.33111 ; 0.37498 ; 0.4824 ; 0.68651 ; 0.93317 ; 1.1914 ; 1.3983 ; 1.6472 ; 1.7235 ; 1.7499 ; 1.7892 ; 1.8423 ; 1.9107 ; 1.999 ; 2.0308 ; 2.0731 ; 2.0878 ; 2.109 ; 2.1167 ; 2.1284 ; 2.145 ; 2.1684 ; 2.2015 ; 2.3142 ; 2.5347 ; 2.7589 ; 3.058 ; 3.151 ; 3.2574 ; 3.5478 ; 3.8724 ; 4.2086 ; 4.2719 ; 4.426 ; 4.501 ; 4.5844 ; 4.7046 ; 4.7827 ; 4.8208 ; 4.8644 ; 4.9353 ; 4.9995 ; 5.0969 ; 5.2564 ; 5.5257 ; 5.5744]

Bolt 3 - Tensile Force (kips): [16 ; 15.9814 ; 15.981 ; 15.998 ; 16.0561 ; 16.1892 ; 16.4498 ; 16.574 ; 16.7752 ; 17.0679 ; 17.4709 ; 17.9951 ; 18.582 ; 19.3241 ; 20.2939 ; 21.6236 ; 23.2676 ; 24.9084 ; 25.3879 ; 25.5592 ; 25.8345 ; 26.2308 ; 26.7447 ; 27.4329 ; 27.6667 ; 27.9938 ; 28.1083 ; 28.2738 ; 28.3344 ; 28.4366 ; 28.5784 ; 28.768 ; 29.0115 ; 29.1004 ; 29.2259 ; 29.5172 ; 29.8707 ; 29.9774 ; 30.1121 ; 30.2872 ; 30.5614 ; 31.0312 ; 31.3086 ; 31.6847 ; 31.8224 ; 32.0369 ; 32.2675 ; 32.5523 ; 32.6805 ; 32.8319 ; 32.9771 ; 33.0301 ; 33.1533 ; 33.2677 ; 33.4574 ; 33.5109]

Bolt 3 - Shear Force (kips): [0.010211 ; 0.0020146 ; 0.0083743 ; 0.016431 ; 0.029354 ; 0.046703 ; 0.06825 ; 0.07572 ; 0.085529 ; 0.098444 ; 0.11209 ; 0.12743 ; 0.15777 ; 0.19832 ; 0.24902 ; 0.28249 ; 0.28024 ; 0.27901 ; 0.27909 ; 0.27846 ; 0.28188 ; 0.30886 ; 0.51855 ; 0.65003 ; 0.69759 ; 0.7461 ; 0.76271 ; 0.78815 ; 0.80288 ; 0.88613 ; 0.9763 ; 1.0597 ; 1.1419 ; 1.1928 ; 1.2462 ; 1.4539 ; 1.6786 ; 1.7448 ; 1.8109 ; 1.8686 ; 1.8833 ; 1.7075 ; 1.7095 ; 1.7477 ; 1.7447 ; 1.7638 ; 1.826 ; 1.7348 ; 1.7231 ; 1.6836 ; 1.6355 ; 1.6389 ; 1.7026 ; 1.7553 ; 1.8897 ; 1.9025]

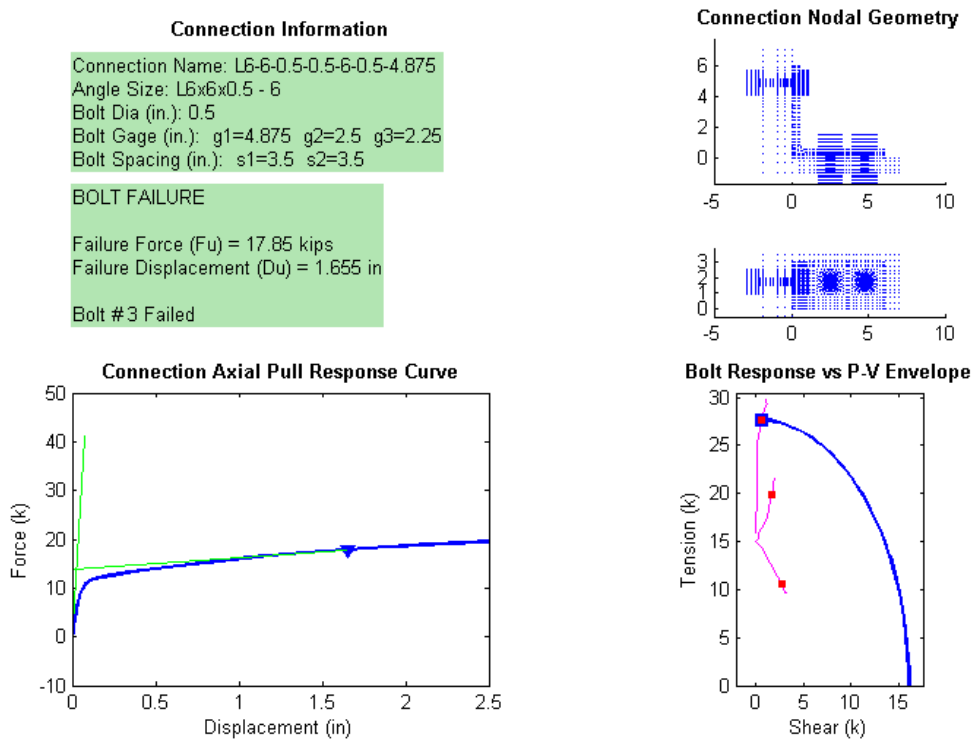


Figure B.120 Connection L6_6_0.5_0.5_6_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.5_6_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 539.6954

Plastic Stiffness (k/in): 2.4782

Displacement (in): [7.3101e-037 ; 0.00048828 ; 0.00097656 ; 0.001709 ; 0.0028076 ; 0.0044556 ; 0.0069275 ; 0.010635 ; 0.016197 ; 0.02454 ; 0.037054 ; 0.055825 ; 0.083982 ; 0.12622 ; 0.18957 ; 0.2846 ; 0.42714 ; 0.64096 ; 0.89096 ; 0.95346 ; 1.0472 ; 1.1878 ; 1.3988 ; 1.6488 ; 1.8988 ; 2.1488 ; 2.2113 ; 2.305 ; 2.3402 ; 2.3929 ; 2.472 ; 2.5]

Force (kips): [-0.18261 ; 0.011367 ; 0.08091 ; 0.18086 ; 0.32542 ; 0.53075 ; 0.81778 ; 1.2218 ; 1.7836 ; 2.5578 ; 3.5887 ; 4.6646 ; 5.4922 ; 5.9318 ; 6.1681 ; 6.4262 ; 6.781 ; 7.2674 ; 7.7769 ; 7.8937 ; 8.0672 ; 8.3004 ; 8.6107 ; 8.9205 ; 9.1869 ; 9.4216 ; 9.4806 ; 9.5636 ; 9.5941 ; 9.643 ; 9.7097 ; 9.7335]

Bolt 1 - Tensile Force (kips): [15.0299 ; 15.0258 ; 15.0244 ; 15.0223 ; 15.0191 ; 15.0142 ; 15.007 ; 14.9964 ; 14.981 ; 14.9568 ; 14.9183 ; 14.8683 ; 14.8215 ; 14.7943 ; 14.7817 ; 14.7574 ; 14.4562 ; 13.6435 ; 12.7812 ; 12.5754 ; 12.2679 ; 11.8233 ; 11.2176 ; 10.6187 ; 10.0857 ; 9.66759 ; 9.62969 ; 9.63896 ; 9.64251 ; 9.64789 ; 9.65604 ; 9.6592]

Bolt 1 - Shear Force (kips): [0.014141 ; 0.011164 ; 0.011271 ; 0.012604 ; 0.016207 ; 0.022896 ; 0.033564 ; 0.049759 ; 0.073606 ; 0.10806 ; 0.1567 ; 0.21186 ; 0.26238 ; 0.29426 ; 0.31654 ; 0.35303 ; 0.58719 ; 1.0907 ; 1.5791 ; 1.6925 ; 1.8598 ; 2.0965 ; 2.4089 ; 2.7037 ; 2.9573 ; 3.1552 ; 3.1763 ; 3.1801 ; 3.1814 ; 3.1834 ; 3.1862 ; 3.1864]

Bolt 2 - Tensile Force (kips): [15.0402 ; 15.0357 ; 15.0341 ; 15.0316 ; 15.0276 ; 15.0217 ; 15.0149 ; 15.0079 ; 15.0072 ; 15.0214 ; 15.0785 ; 15.1993 ; 15.3701 ; 15.5105 ; 15.6367 ; 15.8713 ; 16.2222 ; 16.8212 ; 17.67 ; 17.8844 ; 18.2067 ; 18.6571 ; 19.2751 ; 19.9058 ; 20.4796 ; 20.9923 ; 21.1069 ; 21.2714 ; 21.3317 ; 21.4235 ; 21.5537 ; 21.599]

Bolt 2 - Shear Force (kips): [0.014988 ; 0.012938 ; 0.013393 ; 0.015111 ; 0.019403 ; 0.026994 ; 0.038943 ; 0.0571 ; 0.084111 ; 0.12319 ; 0.17709 ; 0.23695 ; 0.28598 ; 0.31346 ; 0.33161 ; 0.35943 ; 0.54376 ; 0.91336 ; 1.2165 ; 1.278 ; 1.3614 ; 1.4703 ; 1.601 ; 1.7159 ; 1.8108 ; 1.8912 ; 1.9095 ; 1.9362 ; 1.946 ; 1.9611 ; 1.9829 ; 1.9907]

Bolt 3 - Tensile Force (kips): [16 ; 15.9965 ; 15.9929 ; 15.988 ; 15.9824 ; 15.977 ; 15.9761 ; 15.9907 ; 16.0495 ; 16.1932 ; 16.4885 ; 17.0743 ; 17.7975 ; 18.5303 ; 19.2486 ; 20.0439 ; 21.1857 ; 22.84 ; 24.4748 ; 24.7915 ; 25.2727 ; 25.9144 ; 26.7765 ; 27.6595 ; 28.3299 ; 28.8401 ; 28.9846 ; 29.1799 ; 29.2629 ; 29.4673 ; 29.7196 ; 29.8183]

Bolt 3 - Shear Force (kips): [0.010313 ; 0.0081589 ; 0.0064863 ; 0.004416 ; 0.0027631 ; 0.0032332 ; 0.0078953 ; 0.016258 ; 0.029971 ; 0.048454 ; 0.071701 ; 0.095737 ; 0.11139 ; 0.12929 ; 0.14153 ; 0.15512 ; 0.1771 ; 0.18642 ; 0.19358 ; 0.19854 ; 0.22065 ; 0.40673 ; 0.57387 ; 0.69203 ; 0.79693 ; 0.93757 ; 1.036 ; 1.1605 ; 1.1964 ; 1.1676 ; 1.1198 ; 1.105]

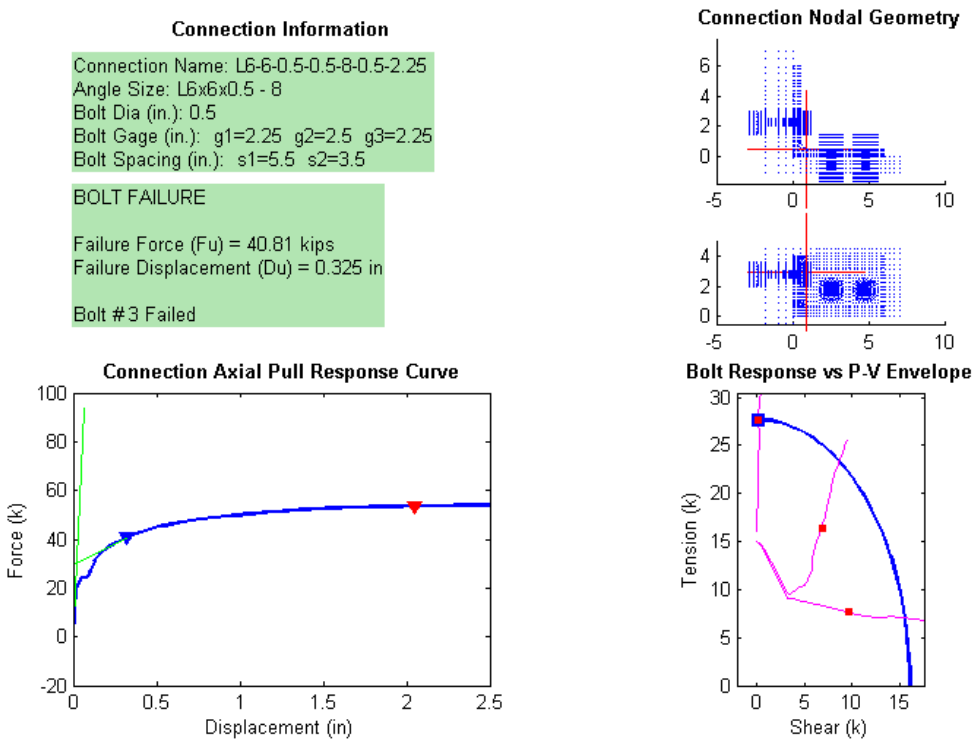


Figure B.121 Connection L6_6_0.5_0.5_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.5_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.4116e+003

Plastic Stiffness (k/in): 35.1313

Displacement (in): [6.1931e-037 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.055916 ; 0.064259 ; 0.067387 ; 0.07208 ; 0.079119 ; 0.081759 ; 0.082749 ; 0.084234 ; 0.086461 ; 0.089802 ; 0.091054 ; 0.092934 ; 0.093638 ; 0.094695 ; 0.096281 ; 0.098659 ; 0.10223 ; 0.10357 ; 0.10557 ; 0.10858 ; 0.1131 ; 0.11987 ; 0.13003 ; 0.13384 ; 0.13955 ; 0.14813 ; 0.16098 ; 0.18027 ; 0.2092 ; 0.2526 ; 0.31769 ; 0.3421 ; 0.37871 ; 0.43364 ; 0.51602 ; 0.54691 ; 0.59325 ; 0.66277 ; 0.76703 ; 0.92343 ; 0.98208 ; 1.0701 ; 1.202 ; 1.4 ; 1.4625 ; 1.5562 ; 1.5914 ; 1.6441 ; 1.6639 ; 1.6935 ; 1.738 ; 1.8048 ; 1.9049 ; 2.0551 ; 2.2052 ; 2.3554 ; 2.5]

Force (kips): [-0.205918 ; 5.71986 ; 6.68686 ; 7.51476 ; 8.6093 ; 9.89992 ; 10.6097 ; 11.2248 ; 11.9172 ; 12.0866 ; 12.1986 ; 12.1983 ; 12.1971 ; 12.1955 ; 12.2188 ; 12.2654 ; 12.3368 ; 12.4271 ; 12.4398 ; 12.4396 ; 12.4393 ; 12.4418 ; 12.5769 ; 12.7624 ; 13.0603 ; 13.4203 ; 13.5576 ; 13.7665 ; 14.0491 ; 14.4667 ; 14.99 ; 15.6015 ; 15.8185 ; 16.1176 ; 16.5038 ; 16.964 ; 17.5517 ; 18.2732 ; 19.1556 ; 20.299 ; 20.6673 ; 21.1578 ; 21.8057 ; 22.5675 ; 22.8082 ; 23.1365 ; 23.5692 ; 24.1116 ; 24.7394 ; 24.9404 ; 25.2144 ; 25.5825 ; 26.0333 ; 26.1672 ; 26.3342 ; 26.393 ; 26.4678 ; 26.4918 ; 26.5238 ; 26.5684 ; 26.6269 ; 26.699 ; 26.7863 ; 26.8619 ; 26.9322 ; 26.9935]

Bolt 1 - Tensile Force (kips): [15.0254 ; 14.8205 ; 14.7753 ; 14.7328 ; 14.6729 ; 14.5564 ; 13.8592 ; 12.5055 ; 10.465 ; 9.75986 ; 9.39087 ; 9.38976 ; 9.38853 ; 9.38737 ; 9.34341 ; 9.23359 ; 9.11301 ; 9.11234 ; 9.11241 ; 9.11251 ; 9.11271 ; 9.11254 ; 9.10285 ; 9.09586 ; 9.07641 ; 9.06782 ; 9.0511 ; 9.01482 ; 8.96966 ; 8.90303 ; 8.83708 ; 8.73612 ; 8.69704 ; 8.65388 ; 8.60592 ; 8.56307 ; 8.50343 ; 8.29002 ; 8.03222 ; 7.67078 ; 7.59732 ; 7.43761 ; 7.18878 ; 7.0908 ; 7.07704 ; 7.09498 ; 7.14461 ; 7.19904 ; 7.04845 ; 7.04301 ; 7.06901 ; 7.00827 ; 6.94548 ; 6.88817 ; 6.82836 ; 6.81088 ; 6.76998 ; 6.75662 ; 6.73949 ; 6.71951 ; 6.69946 ; 6.67621 ; 6.65361 ; 6.65106 ; 6.66077 ; 6.67718]

Bolt 1 - Shear Force (kips): [0.015207 ; 0.235456 ; 0.276548 ; 0.312248 ; 0.360389 ; 0.448023 ; 0.889935 ; 1.63683 ; 2.63748 ; 2.94394 ; 3.09892 ; 3.0986 ; 3.09821 ; 3.09783 ; 3.13243 ; 3.20965 ; 3.29589 ; 3.29601 ; 3.29596 ; 3.2959 ; 3.29578 ; 3.29795 ; 3.38455 ; 3.45816 ; 3.60243 ; 3.73657 ; 3.82792 ; 3.98335 ; 4.16283 ; 4.41926 ; 4.63149 ; 4.96882 ; 5.14161 ; 5.32902 ; 5.50934 ; 5.69416 ; 6.16514 ; 7.04364 ; 8.09068 ; 9.48459 ; 9.87378 ; 10.4571 ; 11.5101 ; 12.4147 ; 12.7178 ; 13.0392 ; 13.3986 ; 13.9001 ; 14.8533 ; 15.1152 ; 15.4602 ; 15.999 ; 16.6128 ; 16.8447 ; 17.0974 ; 17.1782 ; 17.3054 ; 17.3476 ; 17.4051 ; 17.4835 ; 17.5968 ; 17.7527 ; 17.9742 ; 18.1693 ; 18.3526 ; 18.5274]

Bolt 2 - Tensile Force (kips): [15.0347 ; 14.8538 ; 14.8289 ; 14.8111 ; 14.7952 ; 14.7496 ; 14.0949 ; 12.8194 ; 10.9489 ; 10.326 ; 9.72523 ; 9.72085 ; 9.71864 ; 9.71694 ; 9.72166 ; 9.72917 ; 9.68794 ; 9.52005 ; 9.49251 ; 9.49227 ; 9.49197 ; 9.49274 ; 9.51216 ; 9.55779 ; 9.63627 ; 9.76312 ; 9.81691 ; 9.89775 ; 9.99709 ; 10.1034 ; 10.2496 ; 10.4489 ; 10.5854 ; 10.7984 ; 11.1085 ; 11.5387 ; 12.1857 ; 13.1375 ; 14.4783 ; 16.2667 ; 16.8492 ; 17.608 ; 18.7024 ; 19.9386 ; 20.3115 ; 20.7783 ; 21.3376 ; 22.0127 ; 22.7956 ; 23.0325 ; 23.3445 ; 23.7966 ; 24.3125 ; 24.4699 ; 24.6658 ; 24.7327 ; 24.8254 ; 24.8574 ; 24.9025 ; 24.9649 ; 25.05 ; 25.1579 ; 25.3035 ; 25.4205 ; 25.5124 ; 25.599]

Bolt 2 - Shear Force (kips): [0.013989 ; 0.24994 ; 0.293 ; 0.3305 ; 0.38022 ; 0.46682 ; 0.9001 ; 1.6382 ; 2.6237 ; 2.9263 ; 3.205 ; 3.2067 ; 3.207 ; 3.2066 ; 3.2081 ; 3.2106 ; 3.2514 ; 3.4028 ; 3.4261 ; 3.4261 ; 3.4259 ; 3.4261 ; 3.473 ; 3.5743 ; 3.7162 ; 3.9247 ; 3.9658 ; 4.0156 ; 4.1198 ; 4.3062 ; 4.66 ; 4.9999 ; 5.0515 ; 5.1924 ; 5.4019 ; 5.5954 ; 5.7574 ; 5.8991 ; 6.1883 ; 6.7832 ; 6.9516 ; 7.1576 ; 7.4244 ; 7.7028 ; 7.7598 ; 7.8426 ; 7.9631 ; 8.1785 ; 8.4231 ; 8.5075 ; 8.6429 ; 8.8158 ; 9.0154 ; 9.0467 ; 9.1092 ; 9.1299 ; 9.1571 ; 9.1667 ; 9.1807 ; 9.202 ; 9.2317 ; 9.2728 ; 9.3176 ; 9.3648 ; 9.4218 ; 9.4576]

Bolt 3 - Tensile Force (kips): [16 ; 16.3162 ; 16.4819 ; 16.6808 ; 16.98 ; 17.3909 ; 17.6607 ; 17.9148 ; 18.2351 ; 18.3255 ; 18.3885 ; 18.3878 ; 18.3858 ; 18.383 ; 18.3968 ; 18.422 ; 18.4615 ; 18.5131 ; 18.52 ; 18.5196 ; 18.5189 ; 18.5205 ; 18.5958 ; 18.7025 ; 18.8931 ; 19.1405 ; 19.2421 ; 19.402 ; 19.6319 ; 20.0022 ; 20.5298 ; 21.2411 ; 21.5149 ; 21.9058 ; 22.4392 ; 23.1207 ; 23.9894 ; 24.9975 ; 26.1647 ; 27.5762 ; 28.0078 ; 28.5569 ; 29.1779 ; 29.8694 ; 30.0883 ; 30.4067 ; 30.8132 ; 31.2234 ; 31.4742 ; 31.5288 ; 31.5989 ; 31.7324 ; 31.9244 ; 32.0011 ; 32.0737 ; 32.0874 ; 32.0947 ; 32.0925 ; 32.0854 ; 32.0742 ; 32.058 ; 32.0235 ; 31.9306 ; 31.8886 ; 31.8819 ; 31.8848]

Bolt 3 - Shear Force (kips): [0.0086903 ; 0.049631 ; 0.060568 ; 0.070488 ; 0.083392 ; 0.097015 ; 0.10211 ; 0.10615 ; 0.11396 ; 0.11663 ; 0.11876 ; 0.11878 ; 0.11877 ; 0.11875 ; 0.11908 ; 0.11985 ; 0.12106 ; 0.12273 ; 0.12298 ; 0.12299 ; 0.12299 ; 0.12303 ; 0.12544 ; 0.12891 ; 0.13466 ; 0.14308 ; 0.14669 ; 0.15246 ; 0.16089 ; 0.17475 ; 0.19437 ; 0.21726 ; 0.22395 ; 0.23203 ; 0.24172 ; 0.25228 ; 0.26183 ; 0.27308 ; 0.27885 ; 0.26932 ; 0.26301 ; 0.25516 ; 0.27948 ; 0.37502 ; 0.38614 ; 0.45244 ; 0.51613 ; 0.55116 ; 0.51516 ; 0.49464 ; 0.47435 ; 0.46598 ; 0.50671 ; 0.61182 ; 0.78378 ; 0.87526 ; 0.97909 ; 1.0061 ; 1.0373 ; 1.0774 ; 1.1221 ; 1.1593 ; 1.2569 ; 1.3078 ; 1.3333 ; 1.3337]

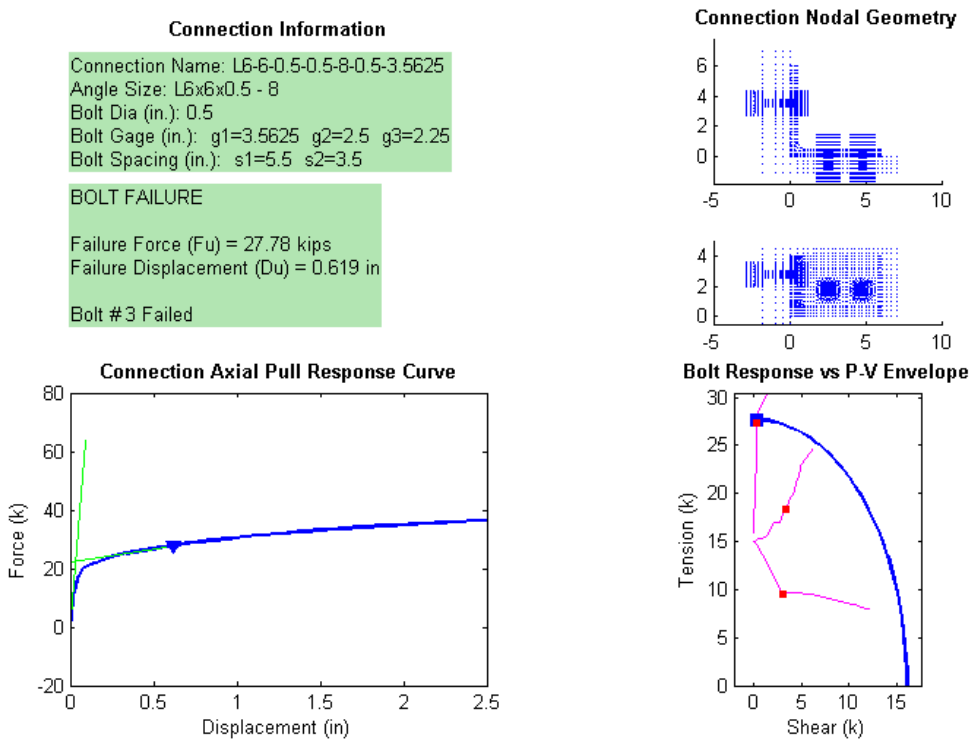


Figure B.122 Connection L6_6_0.5_0.5_8_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.5_8_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 718.8454

Plastic Stiffness (k/in): 9.2884

Displacement (in): [6.3751e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0078125 ; 0.010742 ; 0.015137 ; 0.021729 ; 0.031616 ; 0.046448 ; 0.068695 ; 0.10207 ; 0.15212 ; 0.22721 ; 0.33983 ; 0.38207 ; 0.44542 ; 0.54045 ; 0.57609 ; 0.62954 ; 0.70972 ; 0.73979 ; 0.78489 ; 0.85254 ; 0.95402 ; 0.99208 ; 1.0492 ; 1.1348 ; 1.2632 ; 1.3917 ; 1.5201 ; 1.5682 ; 1.6405 ; 1.7489 ; 1.9114 ; 2.1552 ; 2.2177 ; 2.3115 ; 2.4521 ; 2.5]

Force (kips): [-0.159545 ; 0.618475 ; 1.24445 ; 1.81142 ; 2.33526 ; 3.06112 ; 4.04383 ; 5.31486 ; 6.8219 ; 8.39021 ; 9.61334 ; 10.4422 ; 11.1042 ; 11.8644 ; 12.6228 ; 12.831 ; 13.1084 ; 13.5336 ; 13.6991 ; 13.9367 ; 14.2705 ; 14.387 ; 14.5584 ; 14.7934 ; 15.1197 ; 15.2324 ; 15.4004 ; 15.6387 ; 15.9892 ; 16.3035 ; 16.5926 ; 16.7021 ; 16.8546 ; 17.0694 ; 17.3625 ; 17.7453 ; 17.8439 ; 17.9766 ; 18.1568 ; 18.2149]

Bolt 1 - Tensile Force (kips): [15.025 ; 15.0053 ; 14.987 ; 14.9697 ; 14.9524 ; 14.9265 ; 14.8862 ; 14.8267 ; 14.7438 ; 14.6364 ; 14.2869 ; 13.6592 ; 12.5737 ; 11.3205 ; 9.77061 ; 9.43069 ; 9.45171 ; 9.49433 ; 9.51089 ; 9.53915 ; 9.58864 ; 9.54498 ; 9.44992 ; 9.51424 ; 9.60988 ; 9.64508 ; 9.64664 ; 9.69708 ; 9.61959 ; 9.561 ; 9.5154 ; 9.4363 ; 9.27817 ; 9.08064 ; 8.80742 ; 8.51258 ; 8.39411 ; 8.20368 ; 7.99577 ; 7.93266]

Bolt 1 - Shear Force (kips): [0.0130079 ; 0.0267365 ; 0.0523257 ; 0.0766137 ; 0.0993636 ; 0.131408 ; 0.175457 ; 0.234318 ; 0.308335 ; 0.394131 ; 0.635533 ; 1.01234 ; 1.60692 ; 2.24654 ; 2.95918 ; 3.10995 ; 3.11878 ; 3.13302 ; 3.13848 ; 3.1478 ; 3.16412 ; 3.21722 ; 3.3272 ; 3.33925 ; 3.35583 ; 3.36168 ; 3.57916 ; 3.97682 ; 4.72532 ; 5.48831 ; 6.17585 ; 6.56453 ; 7.18264 ; 7.92499 ; 8.99169 ; 10.1764 ; 10.55 ; 11.1251 ; 11.8314 ; 12.023]

Bolt 2 - Tensile Force (kips): [15.0336 ; 15.0116 ; 14.9927 ; 14.9779 ; 14.9661 ; 14.955 ; 14.9485 ; 14.9628 ; 15.0237 ; 15.1616 ; 15.2532 ; 15.3574 ; 15.5721 ; 16.2919 ; 16.9443 ; 17.0335 ; 17.0162 ; 17.6604 ; 17.9862 ; 18.4411 ; 19.0438 ; 19.2543 ; 19.5529 ; 19.9423 ; 20.4517 ; 20.6259 ; 20.8901 ; 21.2302 ; 21.6884 ; 22.1123 ; 22.5105 ; 22.6525 ; 22.8586 ; 23.1411 ; 23.5645 ; 24.0943 ; 24.2055 ; 24.3715 ; 24.6023 ; 24.6749]

Bolt 2 - Shear Force (kips): [0.011622 ; 0.029219 ; 0.056824 ; 0.082909 ; 0.10731 ; 0.14174 ; 0.18859 ; 0.25121 ; 0.32627 ; 0.40434 ; 0.60916 ; 0.92194 ; 1.3875 ; 1.7909 ; 2.2466 ; 2.4162 ; 2.7178 ; 2.9505 ; 3.1776 ; 3.3721 ; 3.6224 ; 3.6722 ; 3.8664 ; 4.0835 ; 4.2861 ; 4.3506 ; 4.4063 ; 4.5293 ; 4.7267 ; 4.8115 ; 4.8901 ; 4.924 ; 4.9714 ; 5.1372 ; 5.3826 ; 5.7885 ; 5.8879 ; 5.9718 ; 6.0684 ; 6.1018]

Bolt 3 - Tensile Force (kips): [16 ; 15.9818 ; 15.9829 ; 16.0014 ; 16.0399 ; 16.1253 ; 16.2913 ; 16.6116 ; 17.1852 ; 17.9836 ; 18.915 ; 20.0129 ; 21.3078 ; 22.9431 ; 24.7394 ; 25.2221 ; 25.833 ; 26.6947 ; 27.0063 ; 27.4689 ; 28.114 ; 28.327 ; 28.6131 ; 28.9775 ; 29.4454 ; 29.5927 ; 29.8018 ; 30.0924 ; 30.6001 ; 30.9986 ; 31.4061 ; 31.611 ; 31.837 ; 32.1919 ; 32.5605 ; 33.0231 ; 33.2236 ; 33.3889 ; 33.5757 ; 33.6369]

Bolt 3 - Shear Force (kips): [0.010439 ; 0.0020502 ; 0.0080326 ; 0.016105 ; 0.024813 ; 0.037296 ; 0.05305 ; 0.07353 ; 0.09725 ; 0.11664 ; 0.15587 ; 0.21518 ; 0.26913 ; 0.30151 ; 0.30208 ; 0.2999 ; 0.29707 ; 0.29208 ; 0.28892 ; 0.28722 ; 0.32328 ; 0.44023 ; 0.56776 ; 0.72787 ; 0.96833 ; 1.051 ; 1.1588 ; 1.2892 ; 1.5397 ; 1.7207 ; 1.6901 ; 1.5625 ; 1.3846 ; 1.2646 ; 1.2537 ; 1.039 ; 1.1163 ; 1.2445 ; 1.4986 ; 1.6219]

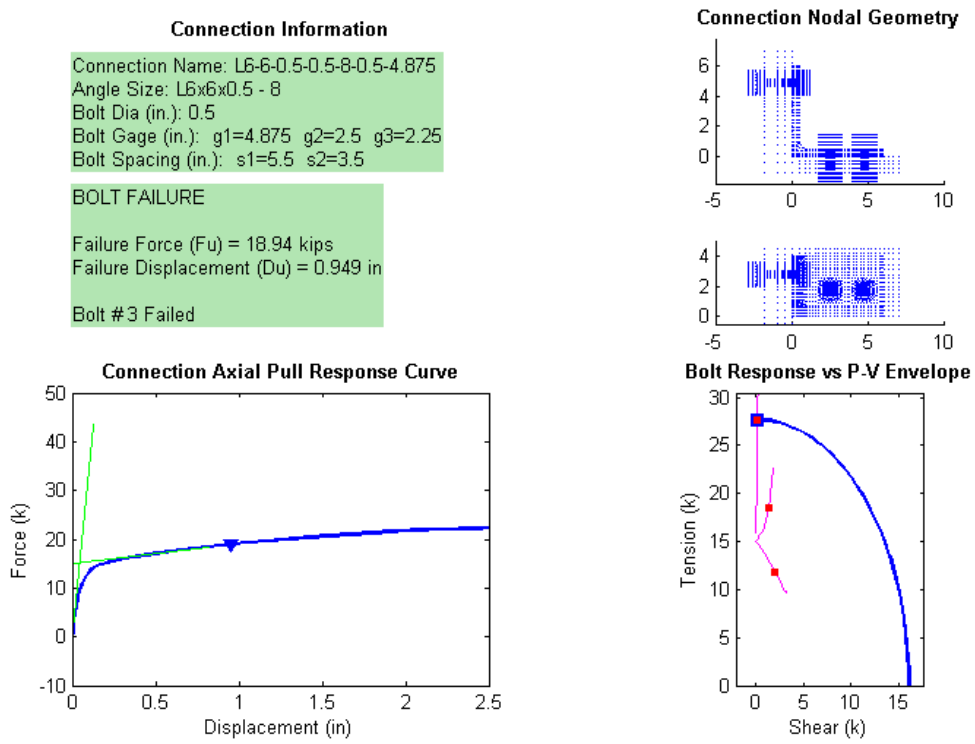


Figure B.123 Connection L6_6_0.5_0.5_8_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.5_8_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 351.2581

Plastic Stiffness (k/in): 4.0550

Displacement (in): [6.8215e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.033371 ; 0.038933 ; 0.047275 ; 0.05979 ; 0.078561 ; 0.10672 ; 0.14895 ; 0.2123 ; 0.30733 ; 0.44988 ; 0.66369 ; 0.72619 ; 0.81994 ; 0.96057 ; 1.1715 ; 1.4215 ; 1.6715 ; 1.9215 ; 1.984 ; 2.0778 ; 2.2184 ; 2.4293 ; 2.5]

Force (kips): [-0.155203 ; 0.242998 ; 0.530848 ; 0.797154 ; 1.17486 ; 1.70108 ; 2.42544 ; 3.39691 ; 3.72478 ; 4.16979 ; 4.75136 ; 5.44018 ; 6.14798 ; 6.75933 ; 7.23284 ; 7.64741 ; 8.01314 ; 8.4012 ; 8.90228 ; 9.03564 ; 9.22572 ; 9.49325 ; 9.84739 ; 10.2034 ; 10.5146 ; 10.7714 ; 10.8286 ; 10.9084 ; 11.009 ; 11.119 ; 11.1507]

Bolt 1 - Tensile Force (kips): [15.0251 ; 15.0158 ; 15.0082 ; 15.0007 ; 14.9896 ; 14.9733 ; 14.9484 ; 14.9095 ; 14.8945 ; 14.8728 ; 14.8419 ; 14.8013 ; 14.7518 ; 14.7024 ; 14.6627 ; 14.548 ; 14.2023 ; 13.596 ; 12.7901 ; 12.5671 ; 12.2438 ; 11.781 ; 11.1463 ; 10.5011 ; 10.0163 ; 9.70687 ; 9.69468 ; 9.71272 ; 9.74071 ; 9.78208 ; 9.79583]

Bolt 1 - Shear Force (kips): [0.012866 ; 0.013717 ; 0.02384 ; 0.034595 ; 0.050735 ; 0.074281 ; 0.10783 ; 0.1549 ; 0.17125 ; 0.19401 ; 0.2252 ; 0.26474 ; 0.30994 ; 0.35414 ; 0.39118 ; 0.48478 ; 0.71914 ; 1.0862 ; 1.5422 ; 1.6655 ; 1.8424 ; 2.0914 ; 2.4248 ; 2.751 ; 2.9998 ; 3.1753 ; 3.1918 ; 3.2008 ; 3.2122 ; 3.227 ; 3.2315]

Bolt 2 - Tensile Force (kips): [15.034 ; 15.0236 ; 15.0144 ; 15.0067 ; 14.9974 ; 14.9902 ; 14.9904 ; 15.0153 ; 15.0304 ; 15.062 ; 15.116 ; 15.2032 ; 15.3319 ; 15.5029 ; 15.6374 ; 15.7558 ; 15.9803 ; 16.5076 ; 17.3914 ; 17.6607 ; 18.0574 ; 18.6333 ; 19.4284 ; 20.2677 ; 20.9885 ; 21.5941 ; 21.7293 ; 21.9187 ; 22.1781 ; 22.5155 ; 22.6172]

Bolt 2 - Shear Force (kips): [0.011514 ; 0.014598 ; 0.026277 ; 0.038118 ; 0.055726 ; 0.081436 ; 0.11808 ; 0.16863 ; 0.18624 ; 0.21065 ; 0.24286 ; 0.28113 ; 0.32112 ; 0.35491 ; 0.3834 ; 0.45815 ; 0.64089 ; 0.8988 ; 1.172 ; 1.2351 ; 1.3174 ; 1.4166 ; 1.5308 ; 1.6298 ; 1.6976 ; 1.7454 ; 1.7562 ; 1.7723 ; 1.7947 ; 1.8251 ; 1.8356]

Bolt 3 - Tensile Force (kips): [16 ; 15.9866 ; 15.9785 ; 15.9771 ; 15.9858 ; 16.0287 ; 16.1475 ; 16.3939 ; 16.5141 ; 16.7349 ; 17.0657 ; 17.5494 ; 18.2523 ; 19.2919 ; 20.7658 ; 22.2641 ; 23.4916 ; 24.7023 ; 26.1212 ; 26.4938 ; 27.0275 ; 27.7577 ; 28.6302 ; 29.3959 ; 30.1184 ; 30.7525 ; 30.8944 ; 31.0846 ; 31.2798 ; 31.3795 ; 31.398]

Bolt 3 - Shear Force (kips): [0.010566 ; 0.0039309 ; 0.0024472 ; 0.0059125 ; 0.012682 ; 0.023994 ; 0.04034 ; 0.060266 ; 0.067113 ; 0.076401 ; 0.088494 ; 0.10054 ; 0.11597 ; 0.15054 ; 0.1982 ; 0.218 ; 0.22948 ; 0.24551 ; 0.25395 ; 0.25258 ; 0.24989 ; 0.24347 ; 0.23312 ; 0.22741 ; 0.2307 ; 0.37467 ; 0.44305 ; 0.50189 ; 0.54023 ; 0.55954 ; 0.57252]

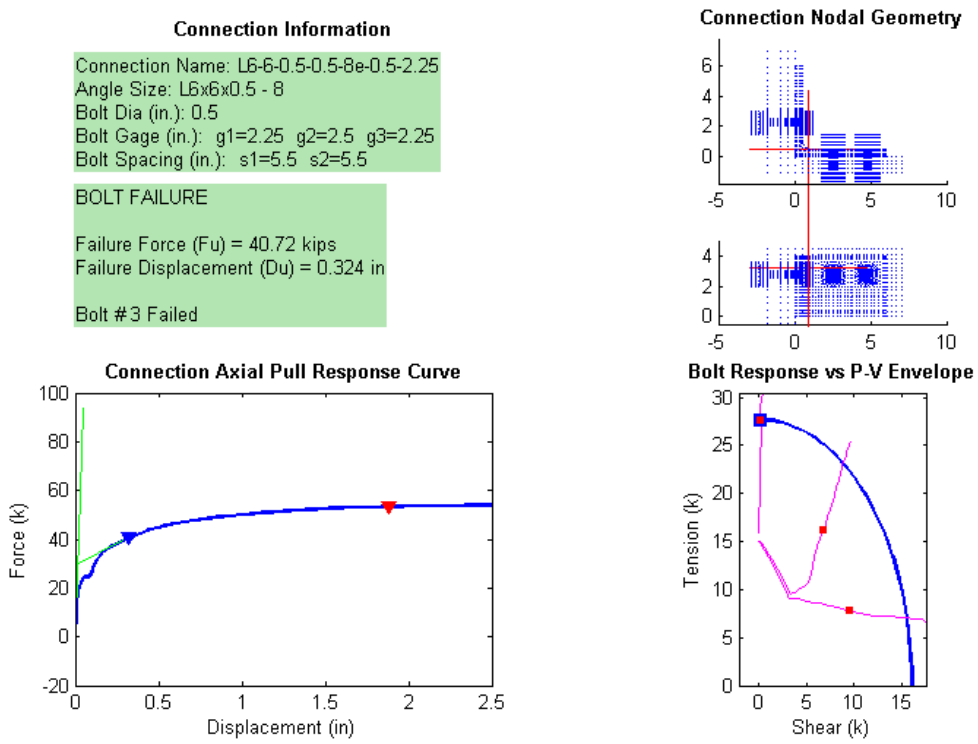


Figure B.124 Connection L6_6_0.5_0.5_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.5_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.8314e+003

Plastic Stiffness (k/in): 36.2518

Displacement (in): [7.4956e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0078125 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.033569 ; 0.048401 ; 0.053963 ; 0.062306 ; 0.065434 ; 0.070127 ; 0.077166 ; 0.079806 ; 0.080796 ; 0.08228 ; 0.084508 ; 0.087848 ; 0.09286 ; 0.094739 ; 0.095444 ; 0.096501 ; 0.098086 ; 0.10047 ; 0.10403 ; 0.10938 ; 0.11741 ; 0.12945 ; 0.13397 ; 0.14074 ; 0.1509 ; 0.16614 ; 0.189 ; 0.22328 ; 0.23614 ; 0.25543 ; 0.28436 ; 0.32776 ; 0.39285 ; 0.41726 ; 0.42641 ; 0.44014 ; 0.46074 ; 0.49163 ; 0.53797 ; 0.60748 ; 0.71175 ; 0.86815 ; 0.9268 ; 1.0148 ; 1.1467 ; 1.3447 ; 1.4072 ; 1.5009 ; 1.5361 ; 1.5888 ; 1.6416 ; 1.6943 ; 1.7734 ; 1.8921 ; 2.07 ; 2.248 ; 2.426 ; 2.5]

Force (kips): [-0.241 ; 1.80432 ; 3.336 ; 4.62408 ; 5.73614 ; 6.70494 ; 7.91525 ; 9.4107 ; 10.5128 ; 11.1483 ; 11.8894 ; 12.0765 ; 12.2589 ; 12.2608 ; 12.2607 ; 12.2605 ; 12.2604 ; 12.2605 ; 12.2831 ; 12.3737 ; 12.4883 ; 12.4893 ; 12.5759 ; 12.6574 ; 12.7837 ; 12.9679 ; 13.244 ; 13.5929 ; 14.1136 ; 14.8136 ; 15.5789 ; 15.838 ; 16.1894 ; 16.6317 ; 17.146 ; 17.794 ; 18.5708 ; 18.8293 ; 19.2007 ; 19.7251 ; 20.4245 ; 21.2726 ; 21.5636 ; 21.6687 ; 21.8202 ; 22.0338 ; 22.3212 ; 22.7128 ; 23.2253 ; 23.8649 ; 24.5641 ; 24.7805 ; 25.0703 ; 25.4588 ; 25.947 ; 26.0798 ; 26.2641 ; 26.3242 ; 26.4028 ; 26.4683 ; 26.5233 ; 26.5954 ; 26.6767 ; 26.7763 ; 26.8608 ; 26.9392 ; 26.9694]

Bolt 1 - Tensile Force (kips): [15.0594 ; 15.0014 ; 14.9491 ; 14.8969 ; 14.8481 ; 14.8018 ; 14.7382 ; 14.6514 ; 14.1619 ; 12.8388 ; 10.8011 ; 10.0761 ; 9.40579 ; 9.40519 ; 9.40442 ; 9.40388 ; 9.40374 ; 9.40374 ; 9.3557 ; 9.13834 ; 9.13784 ; 9.13794 ; 9.12914 ; 9.12497 ; 9.12188 ; 9.10868 ; 9.09879 ; 9.08163 ; 8.99122 ; 8.89119 ; 8.78473 ; 8.74125 ; 8.69683 ; 8.65592 ; 8.63003 ; 8.54978 ; 8.33284 ; 8.25429 ; 8.13774 ; 7.95602 ; 7.76523 ; 7.56236 ; 7.43524 ; 7.3964 ; 7.34733 ; 7.29441 ; 7.25025 ; 7.19195 ; 7.21224 ; 7.30066 ; 7.13551 ; 7.09479 ; 7.09419 ; 7.00668 ; 6.89906 ; 6.86702 ; 6.79726 ; 6.74974 ; 6.69818 ; 6.66373 ; 6.64088 ; 6.61875 ; 6.60821 ; 6.61405 ; 6.60648 ; 6.60982 ; 6.61411]

Bolt 1 - Shear Force (kips): [0.0141773 ; 0.0764194 ; 0.140001 ; 0.193318 ; 0.240093 ; 0.28131 ; 0.333882 ; 0.400468 ; 0.725869 ; 1.47459 ; 2.49781 ; 2.81989 ; 3.1037 ; 3.10366 ; 3.10345 ; 3.10328 ; 3.10324 ; 3.10323 ; 3.13965 ; 3.29588 ; 3.29619 ; 3.296 ; 3.3763 ; 3.42228 ; 3.46111 ; 3.56831 ; 3.67495 ; 3.8458 ; 4.21905 ; 4.57978 ; 4.95168 ; 5.16429 ; 5.37453 ; 5.55712 ; 5.76226 ; 6.37554 ; 7.32846 ; 7.6541 ; 8.07197 ; 8.70869 ; 9.58088 ; 10.5801 ; 11.141 ; 11.3213 ; 11.5512 ; 11.8256 ; 12.15 ; 12.6711 ; 13.2179 ; 13.7637 ; 14.748 ; 15.052 ; 15.4129 ; 16.0057 ; 16.7201 ; 16.9375 ; 17.2134 ; 17.3278 ; 17.4747 ; 17.593 ; 17.6938 ; 17.8272 ; 17.9952 ; 18.214 ; 18.4588 ; 18.6866 ; 18.774]

Bolt 2 - Tensile Force (kips): [15.0861 ; 15.0263 ; 14.9769 ; 14.9355 ; 14.9027 ; 14.8795 ; 14.8559 ; 14.8459 ; 14.4293 ; 13.1794 ; 11.314 ; 10.6644 ; 9.77298 ; 9.75197 ; 9.74823 ; 9.7477 ; 9.74772 ; 9.74781 ; 9.75134 ; 9.75927 ; 9.53211 ; 9.53149 ; 9.5493 ; 9.55892 ; 9.58416 ; 9.63603 ; 9.70532 ; 9.82624 ; 10.0115 ; 10.1776 ; 10.3931 ; 10.537 ; 10.7786 ; 11.1471 ; 11.671 ; 12.4546 ; 13.5468 ; 13.929 ; 14.487 ; 15.2719 ; 16.3195 ; 17.6315 ; 18.0855 ; 18.2481 ; 18.4828 ; 18.8003 ; 19.2498 ; 19.8582 ; 20.6088 ; 21.4411 ; 22.3517 ; 22.6256 ; 22.9814 ; 23.452 ; 24.0201 ; 24.179 ; 24.3916 ; 24.4642 ; 24.5597 ; 24.6428 ; 24.7163 ; 24.8063 ; 24.9207 ; 25.0637 ; 25.1805 ; 25.2734 ; 25.3081]

Bolt 2 - Shear Force (kips): [0.020339 ; 0.074637 ; 0.14013 ; 0.19516 ; 0.2434 ; 0.2856 ; 0.33916 ; 0.40516 ; 0.72062 ; 1.4599 ; 2.4691 ; 2.789 ; 3.2055 ; 3.2147 ; 3.2163 ; 3.2167 ; 3.2167 ; 3.2168 ; 3.2179 ; 3.2248 ; 3.4222 ; 3.4224 ; 3.4274 ; 3.4634 ; 3.548 ; 3.6176 ; 3.7813 ; 3.9597 ; 4.1124 ; 4.4893 ; 4.9634 ; 5.0147 ; 5.1607 ; 5.4046 ; 5.5998 ; 5.747 ; 5.8891 ; 5.9328 ; 6.1359 ; 6.4468 ; 6.8498 ; 7.2261 ; 7.3933 ; 7.4446 ; 7.511 ; 7.6422 ; 7.7867 ; 7.9386 ; 8.0979 ; 8.3485 ; 8.5889 ; 8.6696 ; 8.7808 ; 8.9348 ; 9.114 ; 9.1516 ; 9.2124 ; 9.2337 ; 9.266 ; 9.2962 ; 9.3241 ; 9.3712 ; 9.4182 ; 9.4943 ; 9.5584 ; 9.6233 ; 9.6505]

Bolt 3 - Tensile Force (kips): [16 ; 15.9947 ; 16.0557 ; 16.1718 ; 16.3188 ; 16.4863 ; 16.7893 ; 17.2322 ; 17.6324 ; 17.898 ; 18.2412 ; 18.3389 ; 18.4399 ; 18.4408 ; 18.4397 ; 18.4377 ; 18.437 ; 18.4368 ; 18.45 ; 18.499 ; 18.5647 ; 18.5642 ; 18.6128 ; 18.6597 ; 18.7381 ; 18.8556 ; 19.042 ; 19.2888 ; 19.7027 ; 20.3506 ; 21.2166 ; 21.5387 ; 21.9983 ; 22.617 ; 23.3899 ; 24.3477 ; 25.4209 ; 25.7674 ; 26.2531 ; 26.9176 ; 27.7792 ; 28.747 ; 29.016 ; 29.1078 ; 29.2424 ; 29.4357 ; 29.6869 ; 30.0234 ; 30.4775 ; 31.0324 ; 31.4088 ; 31.4815 ; 31.5595 ; 31.6655 ; 31.8782 ; 31.9331 ; 32.033 ; 32.06 ; 32.0852 ; 32.0848 ; 32.0698 ; 32.0392 ; 31.9808 ; 31.8864 ; 31.8699 ; 31.8791 ; 31.884]

Bolt 3 - Shear Force (kips): [0.015261 ; 0.0031525 ; 0.018429 ; 0.033495 ; 0.045939 ; 0.057115 ; 0.07161 ; 0.088881 ; 0.098122 ; 0.10209 ; 0.11023 ; 0.11319 ; 0.11653 ; 0.11658 ; 0.11666 ; 0.11673 ; 0.11675 ; 0.11676 ; 0.117 ; 0.11849 ; 0.12063 ; 0.12071 ; 0.12218 ; 0.12367 ; 0.126 ; 0.12955 ; 0.13549 ; 0.14419 ; 0.15879 ; 0.18267 ; 0.21118 ; 0.21907 ; 0.22824 ; 0.23877 ; 0.24967 ; 0.25989 ; 0.27244 ; 0.27392 ; 0.27371 ; 0.27071 ; 0.26151 ; 0.24801 ; 0.24425 ; 0.26536 ; 0.30044 ; 0.33235 ; 0.36485 ; 0.386 ; 0.43294 ; 0.5159 ; 0.51173 ; 0.5001 ; 0.4763 ; 0.45878 ; 0.47426 ; 0.50111 ; 0.68226 ; 0.74914 ; 0.84711 ; 0.92639 ; 0.98508 ; 1.0522 ; 1.104 ; 1.2257 ; 1.2744 ; 1.2718 ; 1.2652]

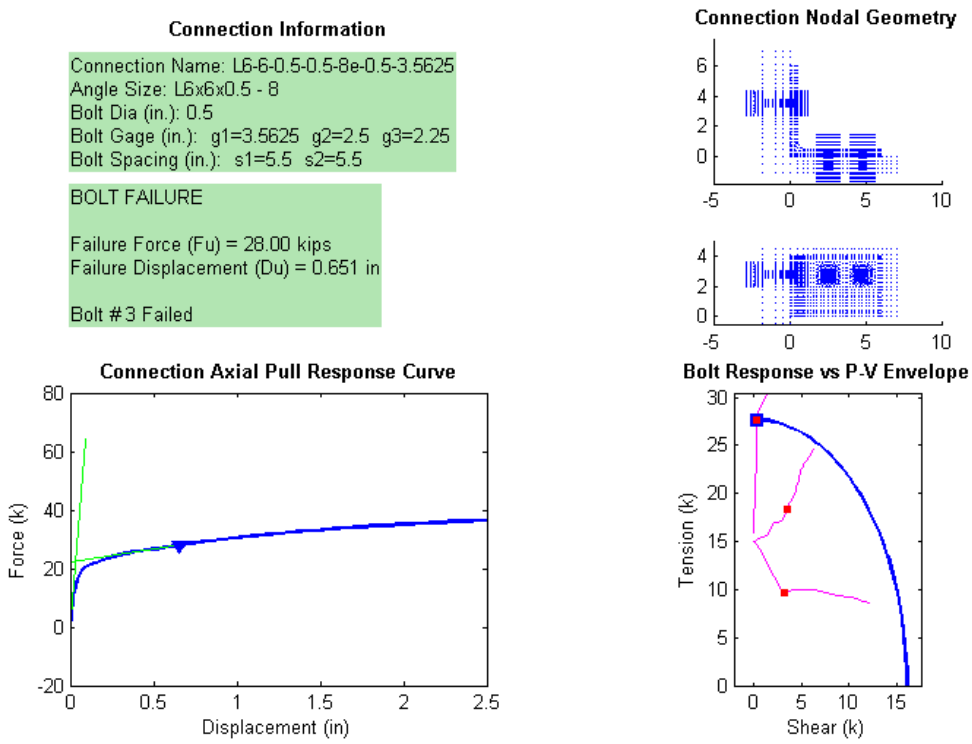


Figure B.125 Connection L6_6_0.5_0.5_8e_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.5_8e_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 731.7827

Plastic Stiffness (k/in): 8.8200

Displacement (in): [6.3793e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0078125 ; 0.010742 ; 0.015137 ; 0.021729 ; 0.031616 ; 0.046448 ; 0.068695 ; 0.10207 ; 0.15212 ; 0.22721 ; 0.33983 ; 0.38207 ; 0.39791 ; 0.42167 ; 0.4573 ; 0.51075 ; 0.59093 ; 0.621 ; 0.6661 ; 0.73376 ; 0.83524 ; 0.98745 ; 1.0017 ; 1.0231 ; 1.0552 ; 1.1034 ; 1.1215 ; 1.1486 ; 1.1892 ; 1.2502 ; 1.3416 ; 1.3759 ; 1.4273 ; 1.4466 ; 1.4755 ; 1.5189 ; 1.5352 ; 1.5596 ; 1.5962 ; 1.6511 ; 1.7335 ; 1.8571 ; 2.0425 ; 2.105 ; 2.1987 ; 2.3393 ; 2.5]

Force (kips): [-0.203203 ; 0.602467 ; 1.22606 ; 1.79182 ; 2.3145 ; 3.03813 ; 4.01955 ; 5.28896 ; 6.78151 ; 8.34718 ; 9.58939 ; 10.441 ; 11.0886 ; 11.8341 ; 12.6112 ; 12.8214 ; 12.894 ; 12.998 ; 13.1492 ; 13.3682 ; 13.7355 ; 13.8681 ; 14.0652 ; 14.333 ; 14.7024 ; 15.1932 ; 15.237 ; 15.3051 ; 15.404 ; 15.54 ; 15.5905 ; 15.669 ; 15.7882 ; 15.9541 ; 16.1881 ; 16.2695 ; 16.3853 ; 16.4277 ; 16.4961 ; 16.5958 ; 16.6327 ; 16.6865 ; 16.7656 ; 16.8802 ; 17.0456 ; 17.2722 ; 17.5787 ; 17.6761 ; 17.8183 ; 18.0133 ; 18.2137]

Bolt 1 - Tensile Force (kips): [15.0588 ; 15.0372 ; 15.0183 ; 15.0004 ; 14.9823 ; 14.9553 ; 14.9131 ; 14.8519 ; 14.7675 ; 14.6601 ; 14.2975 ; 13.7145 ; 12.6295 ; 11.4087 ; 9.92681 ; 9.51441 ; 9.49286 ; 9.50296 ; 9.52464 ; 9.56636 ; 9.61842 ; 9.64084 ; 9.67577 ; 9.67875 ; 9.66419 ; 9.85291 ; 9.86186 ; 9.85052 ; 9.85879 ; 9.92128 ; 9.93262 ; 9.92971 ; 9.90929 ; 9.91817 ; 9.92139 ; 9.92315 ; 9.93227 ; 9.9325 ; 9.92714 ; 9.9379 ; 9.9179 ; 9.86365 ; 9.78232 ; 9.66733 ; 9.53198 ; 9.37604 ; 9.22343 ; 9.16602 ; 9.0395 ; 8.81652 ; 8.62578]

Bolt 1 - Shear Force (kips): [0.0126472 ; 0.0290635 ; 0.0553953 ; 0.0802303 ; 0.103423 ; 0.136079 ; 0.18089 ; 0.240991 ; 0.315538 ; 0.401579 ; 0.650009 ; 1.00013 ; 1.59875 ; 2.23111 ; 2.92792 ; 3.11453 ; 3.12931 ; 3.13483 ; 3.14281 ; 3.1568 ; 3.17395 ; 3.18134 ; 3.19285 ; 3.24766 ; 3.37631 ; 3.41361 ; 3.45999 ; 3.62399 ; 3.8657 ; 4.03007 ; 4.11304 ; 4.2693 ; 4.58002 ; 4.88955 ; 5.52634 ; 5.71899 ; 5.93337 ; 6.01733 ; 6.20213 ; 6.4245 ; 6.54739 ; 6.7606 ; 7.07441 ; 7.50891 ; 8.06909 ; 8.88721 ; 9.75851 ; 10.0726 ; 10.6409 ; 11.4386 ; 12.1289]

Bolt 2 - Tensile Force (kips): [15.0849 ; 15.063 ; 15.0445 ; 15.0299 ; 15.0181 ; 15.0075 ; 15.0012 ; 15.0164 ; 15.0771 ; 15.2153 ; 15.2871 ; 15.4152 ; 15.5477 ; 16.1864 ; 16.9229 ; 17.0501 ; 17.0618 ; 17.06 ; 17.0646 ; 17.1241 ; 17.8582 ; 18.1167 ; 18.4831 ; 18.9848 ; 19.6377 ; 20.4094 ; 20.4798 ; 20.595 ; 20.7566 ; 20.9678 ; 21.0445 ; 21.1549 ; 21.3222 ; 21.5535 ; 21.8894 ; 22.0101 ; 22.1774 ; 22.2382 ; 22.3303 ; 22.4554 ; 22.504 ; 22.5765 ; 22.6829 ; 22.8389 ; 23.0732 ; 23.4108 ; 23.8558 ; 23.9778 ; 24.1526 ; 24.4015 ; 24.6254]

Bolt 2 - Shear Force (kips): [0.018483 ; 0.026734 ; 0.052109 ; 0.077042 ; 0.10054 ; 0.13371 ; 0.17903 ; 0.23954 ; 0.31144 ; 0.38554 ; 0.59373 ; 0.88237 ; 1.3624 ; 1.7752 ; 2.2139 ; 2.3607 ; 2.4311 ; 2.541 ; 2.6951 ; 2.8931 ; 3.3445 ; 3.4393 ; 3.6067 ; 3.7455 ; 4.1204 ; 4.4176 ; 4.4349 ; 4.4454 ; 4.46 ; 4.5413 ; 4.5831 ; 4.6467 ; 4.7017 ; 4.7771 ; 4.8242 ; 4.8451 ; 4.8848 ; 4.8989 ; 4.9128 ; 4.9654 ; 4.9814 ; 5.0088 ; 5.0581 ; 5.1461 ; 5.2664 ; 5.4686 ; 5.814 ; 5.923 ; 6.0354 ; 6.1494 ; 6.3326]

Bolt 3 - Tensile Force (kips): [16 ; 15.9815 ; 15.9817 ; 15.9998 ; 16.0378 ; 16.1227 ; 16.2867 ; 16.6048 ; 17.1756 ; 17.9699 ; 18.9048 ; 20.0181 ; 21.3062 ; 22.9311 ; 24.7162 ; 25.204 ; 25.3681 ; 25.6019 ; 25.9306 ; 26.3872 ; 27.0926 ; 27.3502 ; 27.7432 ; 28.2475 ; 28.847 ; 29.5499 ; 29.6004 ; 29.6849 ; 29.8065 ; 29.9656 ; 30.0221 ; 30.1246 ; 30.2995 ; 30.5494 ; 30.8521 ; 30.9499 ; 31.0829 ; 31.1297 ; 31.2405 ; 31.4369 ; 31.5135 ; 31.6032 ; 31.7081 ; 31.8889 ; 32.1758 ; 32.4536 ; 32.8684 ; 32.999 ; 33.198 ; 33.4265 ; 33.6334]

Bolt 3 - Shear Force (kips): [0.017002 ; 0.0050505 ; 0.0037815 ; 0.011694 ; 0.020389 ; 0.032902 ; 0.048724 ; 0.069296 ; 0.093011 ; 0.11214 ; 0.15021 ; 0.2088 ; 0.26205 ; 0.29518 ; 0.29979 ; 0.29808 ; 0.2975 ; 0.29641 ; 0.29454 ; 0.29229 ; 0.28617 ; 0.28526 ; 0.28739 ; 0.41655 ; 0.64802 ; 1.0061 ; 1.0394 ; 1.087 ; 1.1496 ; 1.2269 ; 1.2521 ; 1.3171 ; 1.3946 ; 1.543 ; 1.6919 ; 1.7301 ; 1.7682 ; 1.7792 ; 1.7464 ; 1.6304 ; 1.5827 ; 1.5349 ; 1.4337 ; 1.3265 ; 1.2468 ; 1.2462 ; 1.1337 ; 1.0075 ; 1.0514 ; 1.2558 ; 1.6131]

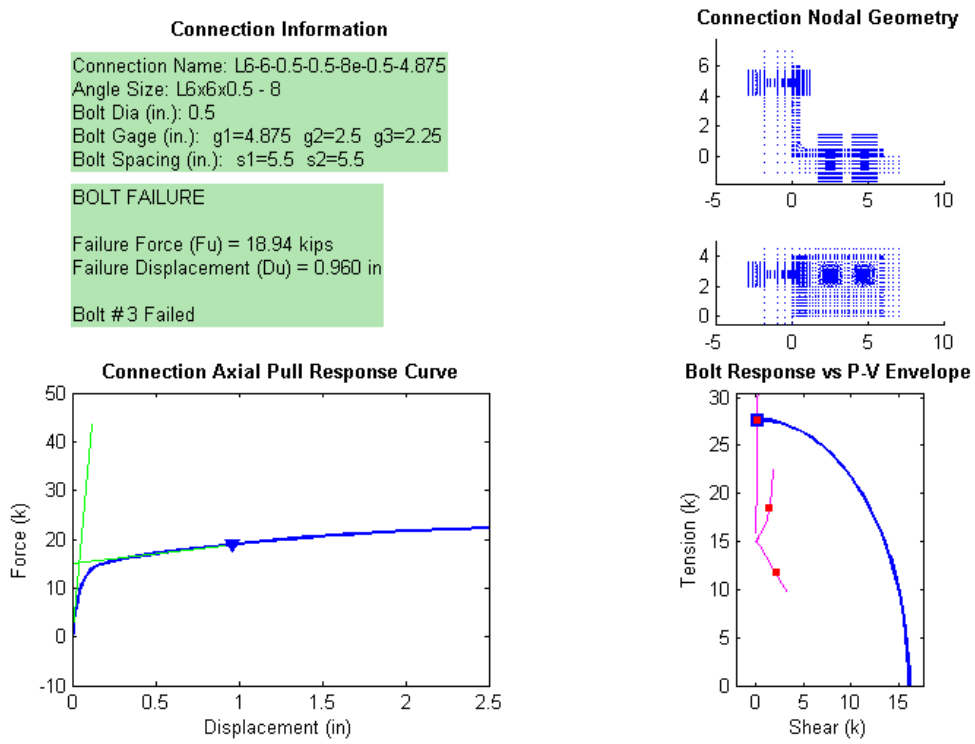


Figure B.126 Connection L6_6_0.5_0.5_8e_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.5_8e_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 362.0608

Plastic Stiffness (k/in): 3.9957

Displacement (in): [7.8516e-037 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.033371 ; 0.038933 ; 0.047275 ; 0.05979 ; 0.078561 ; 0.10672 ; 0.14895 ; 0.2123 ; 0.30733 ; 0.44988 ; 0.66369 ; 0.91369 ; 1.1637 ; 1.4137 ; 1.4762 ; 1.5699 ; 1.6051 ; 1.6578 ; 1.7369 ; 1.8556 ; 2.0336 ; 2.2836 ; 2.5]

Force (kips): [-0.186943 ; 0.238036 ; 0.520207 ; 0.784237 ; 1.15909 ; 1.68217 ; 2.402 ; 3.36936 ; 3.69684 ; 4.14032 ; 4.71422 ; 5.40175 ; 6.11605 ; 6.74556 ; 7.23463 ; 7.64929 ; 8.01093 ; 8.39435 ; 8.89318 ; 9.39264 ; 9.82006 ; 10.1777 ; 10.2621 ; 10.3808 ; 10.4232 ; 10.4865 ; 10.5756 ; 10.6972 ; 10.8607 ; 11.0358 ; 11.1401]

Bolt 1 - Tensile Force (kips): [15.0591 ; 15.0484 ; 15.0402 ; 15.0322 ; 15.0206 ; 15.0037 ; 14.9774 ; 14.9364 ; 14.9206 ; 14.8981 ; 14.8671 ; 14.8257 ; 14.7752 ; 14.7237 ; 14.6813 ; 14.5174 ; 14.1693 ; 13.5466 ; 12.7243 ; 11.8844 ; 11.1514 ; 10.5651 ; 10.4377 ; 10.2673 ; 10.2155 ; 10.1453 ; 10.0526 ; 9.93477 ; 9.86887 ; 9.93732 ; 9.99487]

Bolt 1 - Shear Force (kips): [0.012047 ; 0.015922 ; 0.02679 ; 0.038049 ; 0.054772 ; 0.079061 ; 0.11348 ; 0.16164 ; 0.17841 ; 0.20173 ; 0.23339 ; 0.2737 ; 0.31998 ; 0.36638 ; 0.40558 ; 0.53071 ; 0.76153 ; 1.138 ; 1.6084 ; 2.0767 ; 2.4743 ; 2.7921 ; 2.8628 ; 2.96 ; 2.9914 ; 3.0351 ; 3.0959 ; 3.1768 ; 3.2479 ; 3.2761 ; 3.2964]

Bolt 2 - Tensile Force (kips): [15.0859 ; 15.0749 ; 15.0667 ; 15.0593 ; 15.0506 ; 15.0432 ; 15.0452 ; 15.0687 ; 15.0845 ; 15.1172 ; 15.1677 ; 15.2556 ; 15.3821 ; 15.5523 ; 15.6926 ; 15.7951 ; 16.0038 ; 16.4952 ; 17.3297 ; 18.3209 ; 19.2358 ; 20.0698 ; 20.2659 ; 20.5485 ; 20.6509 ; 20.7965 ; 21.0048 ; 21.2979 ; 21.6896 ; 22.1532 ; 22.4933]

Bolt 2 - Shear Force (kips): [0.017817 ; 0.016101 ; 0.024313 ; 0.034542 ; 0.050626 ; 0.074654 ; 0.10908 ; 0.15705 ; 0.17368 ; 0.19666 ; 0.22697 ; 0.26289 ; 0.30072 ; 0.33397 ; 0.36305 ; 0.4648 ; 0.64724 ; 0.91723 ; 1.2065 ; 1.4306 ; 1.5811 ; 1.6832 ; 1.7035 ; 1.7302 ; 1.7391 ; 1.7519 ; 1.7693 ; 1.7926 ; 1.8244 ; 1.8636 ; 1.8919]

Bolt 3 - Tensile Force (kips): [16 ; 15.9867 ; 15.9779 ; 15.9761 ; 15.9841 ; 16.0255 ; 16.1415 ; 16.3843 ; 16.5015 ; 16.7194 ; 17.0482 ; 17.5304 ; 18.2318 ; 19.276 ; 20.756 ; 22.245 ; 23.4795 ; 24.6832 ; 26.1001 ; 27.4996 ; 28.5838 ; 29.3503 ; 29.5455 ; 29.8212 ; 29.9148 ; 30.073 ; 30.2959 ; 30.591 ; 30.9919 ; 31.3211 ; 31.3989]

Bolt 3 - Shear Force (kips): [0.017117 ; 0.0095567 ; 0.0039462 ; 0.0022981 ; 0.008392 ; 0.019593 ; 0.035974 ; 0.055995 ; 0.062989 ; 0.072193 ; 0.084165 ; 0.096377 ; 0.11154 ; 0.1462 ; 0.19468 ; 0.21595 ; 0.22714 ; 0.2435 ; 0.25289 ; 0.24581 ; 0.23269 ; 0.22716 ; 0.22514 ; 0.2188 ; 0.2158 ; 0.24838 ; 0.31747 ; 0.37687 ; 0.49124 ; 0.5517 ; 0.57902]

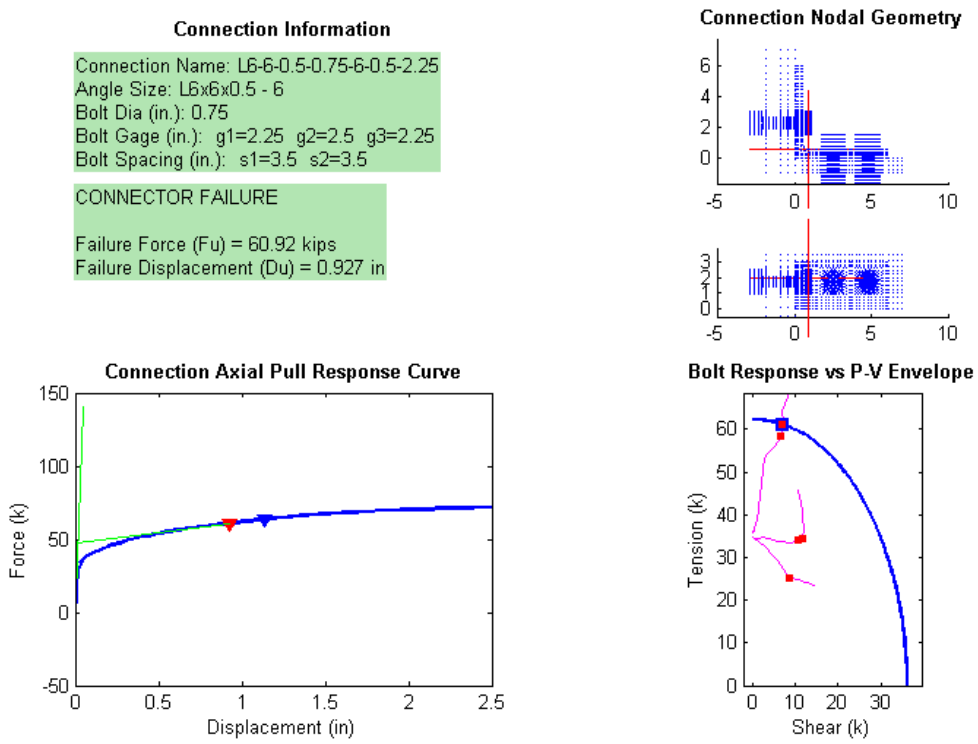


Figure B.127 Connection L6_6_0.5_0.75_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.75_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 2.7536e+003

Plastic Stiffness (k/in): 14.1296

Displacement (in): [2.5967e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.13464 ; 0.19799 ; 0.29302 ; 0.32866 ; 0.38211 ; 0.40216 ; 0.43222 ; 0.47733 ; 0.49424 ; 0.51961 ; 0.55766 ; 0.61474 ; 0.70037 ; 0.8288 ; 0.87696 ; 0.89503 ; 0.92212 ; 0.96276 ; 1.0237 ; 1.1151 ; 1.1494 ; 1.2009 ; 1.2202 ; 1.2346 ; 1.2563 ; 1.2889 ; 1.3377 ; 1.356 ; 1.3835 ; 1.4246 ; 1.4864 ; 1.5791 ; 1.6139 ; 1.666 ; 1.7442 ; 1.8615 ; 2.0375 ; 2.2875 ; 2.5]

Force (kips): [-0.866119 ; 2.31381 ; 4.51202 ; 7.20109 ; 10.411 ; 11.3875 ; 12.6502 ; 14.0883 ; 15.5261 ; 16.8204 ; 17.9532 ; 18.9968 ; 20.0471 ; 21.2122 ; 22.6103 ; 24.2144 ; 24.7501 ; 25.485 ; 25.7627 ; 26.1666 ; 26.7216 ; 26.9121 ; 27.1939 ; 27.5934 ; 28.1405 ; 28.8837 ; 29.8219 ; 30.1245 ; 30.2374 ; 30.4288 ; 30.6998 ; 31.0753 ; 31.6304 ; 31.8297 ; 32.1344 ; 32.2562 ; 32.3506 ; 32.4846 ; 32.6703 ; 32.9244 ; 33.0136 ; 33.1483 ; 33.3298 ; 33.5818 ; 33.9134 ; 34.033 ; 34.2023 ; 34.4381 ; 34.7542 ; 35.1526 ; 35.6161 ; 35.9344]

Bolt 1 - Tensile Force (kips): [34.7705 ; 34.6821 ; 34.6139 ; 34.522 ; 34.4034 ; 34.3649 ; 34.3132 ; 34.2511 ; 34.184 ; 34.1119 ; 34.0286 ; 33.9176 ; 33.4311 ; 32.2384 ; 30.6861 ; 28.8069 ; 28.1359 ; 27.1606 ; 26.7846 ; 26.2341 ; 25.5325 ; 25.4743 ; 25.4718 ; 25.4698 ; 25.4695 ; 25.4723 ; 25.4809 ; 25.485 ; 25.4439 ; 25.3423 ; 25.3441 ; 25.3524 ; 25.3676 ; 25.3725 ; 25.3237 ; 25.2912 ; 25.2122 ; 25.113 ; 25 ; 24.8422 ; 24.7952 ; 24.6935 ; 24.5776 ; 24.4343 ; 24.278 ; 24.2354 ; 24.1814 ; 24.121 ; 24.0094 ; 23.8371 ; 23.6207 ; 23.3805]

Bolt 1 - Shear Force (kips): [0.0543032 ; 0.128713 ; 0.242957 ; 0.388223 ; 0.569516 ; 0.62643 ; 0.701489 ; 0.790356 ; 0.885342 ; 0.986928 ; 1.10262 ; 1.25275 ; 1.84314 ; 3.04512 ; 4.43999 ; 5.97281 ; 6.49028 ; 7.22303 ; 7.49552 ; 7.88354 ; 8.3631 ; 8.40341 ; 8.40406 ; 8.40433 ; 8.40465 ; 8.40577 ; 8.40865 ; 8.41002 ; 8.48019 ; 8.59876 ; 8.59834 ; 8.59355 ; 8.58478 ; 8.58112 ; 8.83379 ; 8.9895 ; 9.24695 ; 9.56412 ; 9.89347 ; 10.3727 ; 10.5298 ; 10.8647 ; 11.219 ; 11.631 ; 12.0618 ; 12.1825 ; 12.3539 ; 12.5937 ; 12.9655 ; 13.461 ; 14.0226 ; 14.5246]

Bolt 2 - Tensile Force (kips): [34.7797 ; 34.6641 ; 34.5759 ; 34.4745 ; 34.3817 ; 34.3605 ; 34.34 ; 34.3285 ; 34.3436 ; 34.3924 ; 34.4592 ; 34.609 ; 34.6411 ; 34.417 ; 34.1763 ; 33.8937 ; 33.8387 ; 33.7759 ; 33.7501 ; 33.7155 ; 33.6802 ; 33.6465 ; 33.5913 ; 33.5178 ; 33.4552 ; 33.5111 ; 33.7013 ; 33.7872 ; 33.841 ; 33.9431 ; 34.0831 ; 34.313 ; 34.4931 ; 34.5786 ; 35.0122 ; 35.1619 ; 35.2724 ; 35.4384 ; 35.6951 ; 36.0723 ; 36.2122 ; 36.4552 ; 36.8831 ; 37.5556 ; 38.537 ; 38.9013 ; 39.4346 ; 40.1807 ; 41.2535 ; 42.6937 ; 44.4402 ; 45.7496]

Bolt 2 - Shear Force (kips): [0.0561129 ; 0.164637 ; 0.307121 ; 0.489392 ; 0.717248 ; 0.789349 ; 0.884825 ; 1.00058 ; 1.13091 ; 1.28089 ; 1.4636 ; 1.69098 ; 2.31678 ; 3.46716 ; 4.72993 ; 5.91723 ; 6.27329 ; 6.76357 ; 6.94557 ; 7.2074 ; 7.58444 ; 7.74334 ; 7.98428 ; 8.33048 ; 8.79494 ; 9.3599 ; 10.0711 ; 10.3085 ; 10.3807 ; 10.4752 ; 10.6223 ; 10.8181 ; 11.3287 ; 11.5337 ; 11.6537 ; 11.6961 ; 11.7271 ; 11.7722 ; 11.8367 ; 11.925 ; 11.957 ; 11.9789 ; 11.9539 ; 11.8754 ; 11.78 ; 11.7484 ; 11.6984 ; 11.6227 ; 11.4575 ; 11.2082 ; 10.9261 ; 10.6532]

Bolt 3 - Tensile Force (kips): [36 ; 35.9432 ; 35.9758 ; 36.1498 ; 36.448 ; 36.5759 ; 36.7763 ; 37.1067 ; 37.657 ; 38.2971 ; 38.9596 ; 39.7521 ; 40.8326 ; 42.2808 ; 44.4326 ; 47.406 ; 48.4095 ; 49.8019 ; 50.2811 ; 50.9331 ; 51.7986 ; 52.0925 ; 52.5607 ; 53.271 ; 54.2479 ; 55.578 ; 57.2391 ; 57.7862 ; 57.9836 ; 58.3046 ; 58.8065 ; 59.4843 ; 60.82 ; 61.355 ; 62.1491 ; 62.5002 ; 62.7253 ; 63.0478 ; 63.519 ; 64.1476 ; 64.3471 ; 64.6081 ; 64.9423 ; 65.4406 ; 66.0591 ; 66.2833 ; 66.6059 ; 67.0481 ; 67.6192 ; 68.3086 ; 69.0724 ; 69.4891]

Bolt 3 - Shear Force (kips): [0.028528 ; 0.037469 ; 0.091996 ; 0.17807 ; 0.28744 ; 0.32643 ; 0.38271 ; 0.46113 ; 0.56692 ; 0.69738 ; 0.86337 ; 1.0472 ; 1.2462 ; 1.4861 ; 1.7427 ; 2.0065 ; 2.1019 ; 2.2367 ; 2.292 ; 2.3674 ; 2.4606 ; 2.4876 ; 2.5612 ; 2.6747 ; 3.349 ; 4.6529 ; 5.7453 ; 6.0779 ; 6.1777 ; 6.3555 ; 6.3926 ; 6.7793 ; 7.0408 ; 6.9324 ; 7.027 ; 7.0622 ; 7.1009 ; 7.0549 ; 6.9297 ; 6.8643 ; 6.8907 ; 6.9675 ; 7.0842 ; 7.2555 ; 7.4339 ; 7.5323 ; 7.6885 ; 7.8816 ; 8.0974 ; 8.3655 ; 8.6767 ; 8.9526]

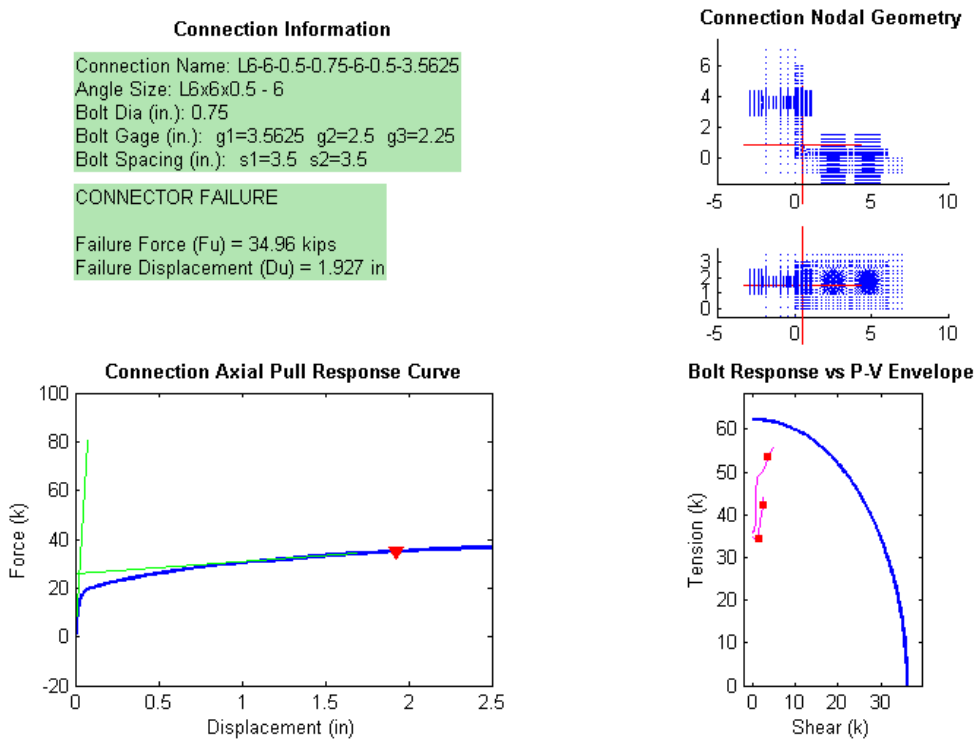


Figure B.128 Connection L6_6_0.5_0.75_6_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.75_6_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.0519e+003

Plastic Stiffness (k/in): 4.8000

Displacement (in): [3.148e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.53655 ; 0.67909 ; 0.8929 ; 0.9554 ; 0.97884 ; 1.014 ; 1.0667 ; 1.1458 ; 1.2645 ; 1.4425 ; 1.6925 ; 1.9425 ; 2.1925 ; 2.4425 ; 2.5]

Force (kips): [-0.82014 ; 0.503184 ; 1.23441 ; 2.20389 ; 3.49761 ; 5.20574 ; 7.16345 ; 8.7107 ; 9.60052 ; 10.0825 ; 10.5118 ; 11.1644 ; 12.0216 ; 12.305 ; 12.704 ; 13.2393 ; 13.9159 ; 14.7628 ; 14.9792 ; 15.0635 ; 15.1863 ; 15.358 ; 15.6045 ; 15.9424 ; 16.4122 ; 17.0122 ; 17.5122 ; 17.9112 ; 18.2511 ; 18.319]

Bolt 1 - Tensile Force (kips): [34.77 ; 34.7349 ; 34.7151 ; 34.6871 ; 34.6477 ; 34.5894 ; 34.516 ; 34.4511 ; 34.4062 ; 34.3781 ; 34.351 ; 34.3243 ; 34.2961 ; 34.2895 ; 34.2826 ; 34.2739 ; 34.2696 ; 34.2705 ; 34.2726 ; 34.2735 ; 34.2749 ; 34.2775 ; 34.2825 ; 34.2927 ; 34.3097 ; 34.334 ; 34.3627 ; 34.396 ; 34.4311 ; 34.4398]

Bolt 1 - Shear Force (kips): [0.05183 ; 0.047181 ; 0.078758 ; 0.12802 ; 0.19862 ; 0.29673 ; 0.41759 ; 0.5255 ; 0.60534 ; 0.66314 ; 0.72464 ; 0.7938 ; 0.87509 ; 0.89812 ; 0.92726 ; 0.96699 ; 1.0142 ; 1.0756 ; 1.0909 ; 1.0966 ; 1.1049 ; 1.1168 ; 1.133 ; 1.1541 ; 1.1841 ; 1.227 ; 1.2649 ; 1.297 ; 1.3269 ; 1.3332]

Bolt 2 - Tensile Force (kips): [34.7773 ; 34.7325 ; 34.7024 ; 34.6639 ; 34.6216 ; 34.5876 ; 34.5907 ; 34.6695 ; 34.8421 ; 34.9844 ; 35.134 ; 35.4816 ; 36.0611 ; 36.325 ; 36.7444 ; 37.3483 ; 38.1259 ; 39.054 ; 39.297 ; 39.3871 ; 39.5204 ; 39.7162 ; 40.0017 ; 40.4152 ; 40.9985 ; 41.7946 ; 42.5479 ; 43.278 ; 43.9891 ; 44.1442]

Bolt 2 - Shear Force (kips): [0.053007 ; 0.060397 ; 0.10498 ; 0.17078 ; 0.26366 ; 0.39335 ; 0.55307 ; 0.70564 ; 0.83986 ; 0.93963 ; 1.0412 ; 1.1745 ; 1.3408 ; 1.3926 ; 1.4613 ; 1.5528 ; 1.6638 ; 1.8028 ; 1.8402 ; 1.8545 ; 1.8753 ; 1.9051 ; 1.9485 ; 2.0101 ; 2.1045 ; 2.2348 ; 2.3526 ; 2.4447 ; 2.5202 ; 2.5359]

Bolt 3 - Tensile Force (kips): [36 ; 35.947 ; 35.912 ; 35.8975 ; 35.9406 ; 36.102 ; 36.3366 ; 36.7156 ; 37.1195 ; 37.4891 ; 37.917 ; 38.578 ; 40.0032 ; 40.5423 ; 41.3889 ; 42.6744 ; 44.5055 ; 46.9511 ; 47.5898 ; 47.7984 ; 48.0853 ; 48.4892 ; 49.0273 ; 49.7785 ; 50.9273 ; 52.4059 ; 53.6915 ; 54.6592 ; 55.4683 ; 55.651]

Bolt 3 - Shear Force (kips): [0.033043 ; 0.01181 ; 0.02724 ; 0.060173 ; 0.11434 ; 0.19648 ; 0.28986 ; 0.37406 ; 0.45628 ; 0.51169 ; 0.58177 ; 0.64586 ; 0.55442 ; 0.55041 ; 0.55672 ; 0.59886 ; 0.70146 ; 0.8264 ; 0.8477 ; 0.87443 ; 0.91587 ; 0.96675 ; 1.0604 ; 1.8845 ; 2.7331 ; 3.1504 ; 3.5941 ; 4.1663 ; 4.5732 ; 4.6613]

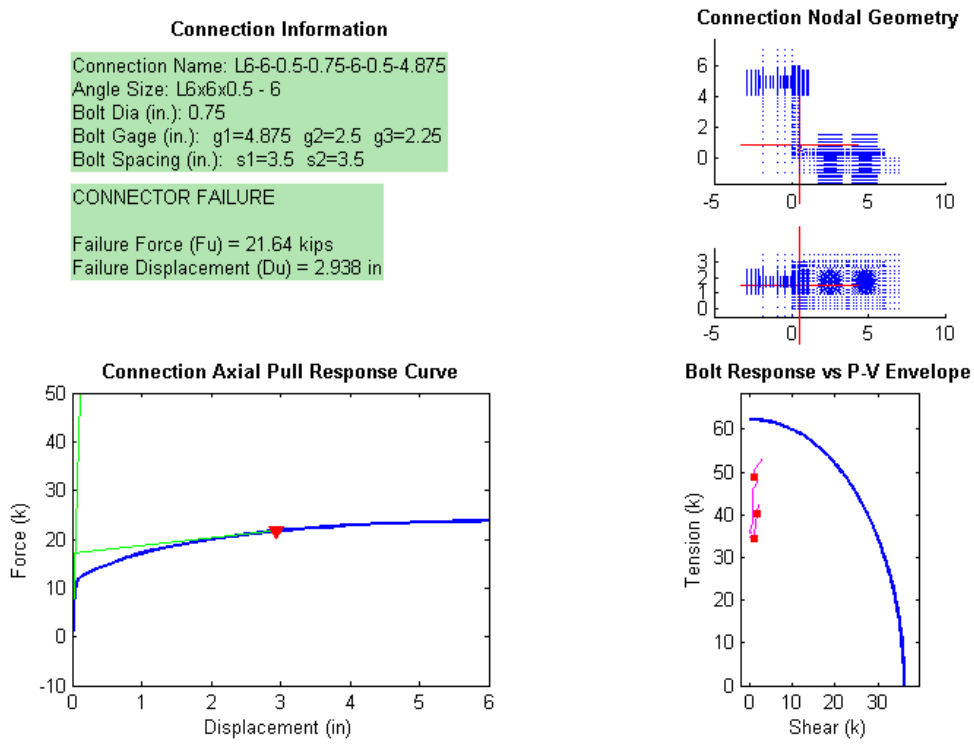


Figure B.129 Connection L6_6_0.5_0.75_6_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.75_6_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 419.2666

Plastic Stiffness (k/in): 1.5536

Displacement (in): [3.2447e-036 ; 0.0046875 ; 0.009375 ; 0.016406 ; 0.026953 ; 0.042773 ; 0.066504 ; 0.1021 ; 0.15549 ; 0.23558 ; 0.35572 ; 0.53592 ; 0.80623 ; 0.90759 ; 1.0596 ; 1.2877 ; 1.6298 ; 2.143 ; 2.293 ; 2.518 ; 2.6023 ; 2.7289 ; 2.7764 ; 2.8476 ; 2.9543 ; 3.1145 ; 3.2747 ; 3.4349 ; 3.6752 ; 4.0356 ; 4.5762 ; 5.1762 ; 5.7762 ; 6]

Force (kips): [-0.801322 ; 0.53683 ; 1.16399 ; 2.01657 ; 3.17596 ; 4.5676 ; 5.59284 ; 6.0185 ; 6.2298 ; 6.52122 ; 6.9402 ; 7.4791 ; 8.15516 ; 8.37586 ; 8.6788 ; 9.06897 ; 9.55078 ; 10.1288 ; 10.2786 ; 10.4789 ; 10.5513 ; 10.6576 ; 10.6969 ; 10.7522 ; 10.8318 ; 10.9438 ; 11.0493 ; 11.148 ; 11.2743 ; 11.4331 ; 11.6161 ; 11.7647 ; 11.8734 ; 11.9063]

Bolt 1 - Tensile Force (kips): [34.7703 ; 34.7349 ; 34.7179 ; 34.6931 ; 34.6567 ; 34.6061 ; 34.5642 ; 34.5462 ; 34.5389 ; 34.5263 ; 34.4999 ; 34.4711 ; 34.4574 ; 34.4536 ; 34.4509 ; 34.4518 ; 34.4597 ; 34.4752 ; 34.4797 ; 34.4879 ; 34.4909 ; 34.4951 ; 34.4967 ; 34.4994 ; 34.5037 ; 34.5111 ; 34.5189 ; 34.5269 ; 34.5402 ; 34.5617 ; 34.5971 ; 34.6403 ; 34.686 ; 34.7035]

Bolt 1 - Shear Force (kips): [0.051325 ; 0.049469 ; 0.077673 ; 0.12252 ; 0.18961 ; 0.27733 ; 0.35061 ; 0.38665 ; 0.40814 ; 0.44353 ; 0.50932 ; 0.58773 ; 0.6532 ; 0.67424 ; 0.69921 ; 0.72753 ; 0.75946 ; 0.80374 ; 0.8167 ; 0.83447 ; 0.84124 ; 0.85178 ; 0.85578 ; 0.86127 ; 0.86918 ; 0.87982 ; 0.89004 ; 0.90011 ; 0.91367 ; 0.93232 ; 0.9569 ; 0.97931 ; 0.99872 ; 1.0052]

Bolt 2 - Tensile Force (kips): [34.7787 ; 34.7318 ; 34.7047 ; 34.6754 ; 34.6533 ; 34.6719 ; 34.7356 ; 34.7801 ; 34.8182 ; 34.9156 ; 35.1063 ; 35.4766 ; 36.0302 ; 36.251 ; 36.6343 ; 37.2057 ; 37.9841 ; 38.9684 ; 39.2203 ; 39.5614 ; 39.6841 ; 39.8649 ; 39.9312 ; 40.0288 ; 40.1734 ; 40.379 ; 40.5751 ; 40.7642 ; 41.017 ; 41.3387 ; 41.7291 ; 42.0702 ; 42.3519 ; 42.4433]

Bolt 2 - Shear Force (kips): [0.052391 ; 0.065362 ; 0.10698 ; 0.16993 ; 0.26203 ; 0.38192 ; 0.48429 ; 0.53376 ; 0.56277 ; 0.62057 ; 0.73521 ; 0.88639 ; 1.0418 ; 1.094 ; 1.1633 ; 1.2491 ; 1.3533 ; 1.489 ; 1.5249 ; 1.5741 ; 1.592 ; 1.6189 ; 1.6291 ; 1.6437 ; 1.665 ; 1.695 ; 1.7234 ; 1.751 ; 1.7884 ; 1.8371 ; 1.8971 ; 1.9481 ; 1.9878 ; 2.0004]

Bolt 3 - Tensile Force (kips): [36 ; 35.9326 ; 35.8921 ; 35.8862 ; 35.9688 ; 36.1405 ; 36.382 ; 36.6403 ; 36.8431 ; 37.1355 ; 37.5788 ; 38.2234 ; 39.4451 ; 39.9735 ; 40.7874 ; 42.0192 ; 43.7525 ; 46.1014 ; 46.8028 ; 47.7251 ; 48.0371 ; 48.4264 ; 48.5751 ; 48.7651 ; 48.9959 ; 49.3224 ; 49.6609 ; 50 ; 50.421 ; 50.9581 ; 51.6446 ; 52.2928 ; 52.7596 ; 52.9238]

Bolt 3 - Shear Force (kips): [0.03222 ; 0.015879 ; 0.036797 ; 0.07778 ; 0.14549 ; 0.22562 ; 0.26964 ; 0.26532 ; 0.25011 ; 0.28043 ; 0.35467 ; 0.49694 ; 0.52216 ; 0.51156 ; 0.51128 ; 0.5346 ; 0.59416 ; 0.70605 ; 1.1961 ; 1.5915 ; 1.577 ; 1.374 ; 1.3611 ; 1.2714 ; 0.92635 ; 0.74613 ; 0.79021 ; 0.84088 ; 0.8301 ; 1.2039 ; 1.8406 ; 2.4263 ; 2.7658 ; 2.8455]

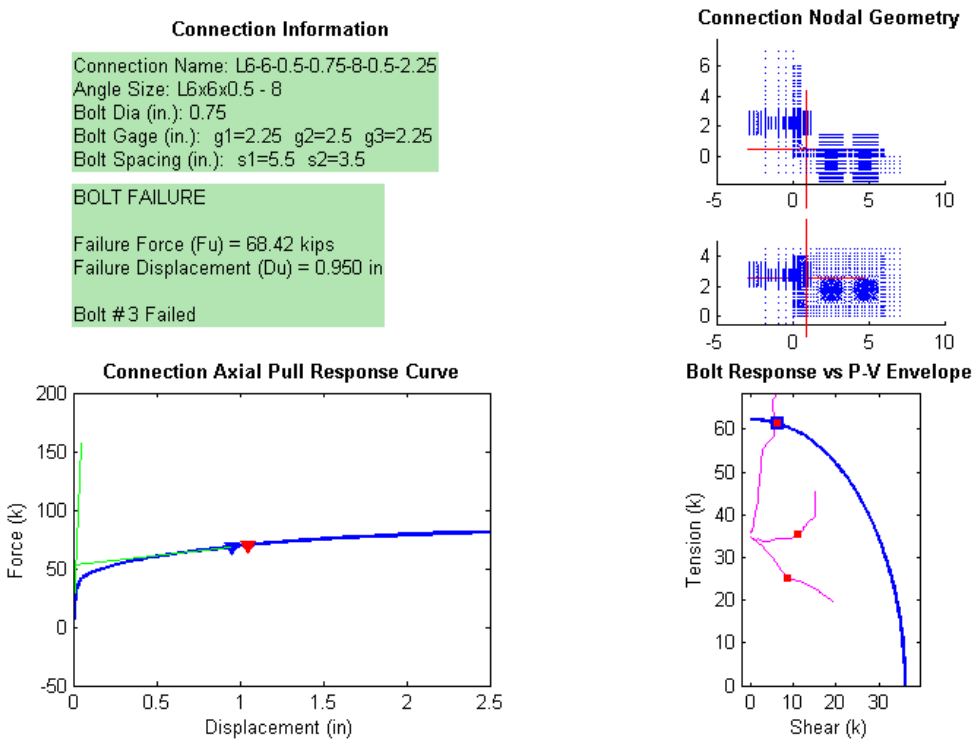


Figure B.130 Connection L6_6_0.5_0.75_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.75_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 3526

Plastic Stiffness (k/in): 16.3856

Displacement (in): [2.3086e-036 ; 0.00048828 ; 0.00097656 ; 0.001709 ; 0.0028076 ; 0.0044556 ; 0.0069275 ; 0.0093994 ; 0.011871 ; 0.015579 ; 0.021141 ; 0.023227 ; 0.026355 ; 0.031048 ; 0.038087 ; 0.048646 ; 0.064484 ; 0.088242 ; 0.12388 ; 0.17733 ; 0.25751 ; 0.37778 ; 0.38906 ; 0.40597 ; 0.43134 ; 0.4694 ; 0.48367 ; 0.50507 ; 0.53718 ; 0.56929 ; 0.6014 ; 0.64956 ; 0.72181 ; 0.7489 ; 0.78953 ; 0.85049 ; 0.94192 ; 0.97621 ; 1.0276 ; 1.0469 ; 1.0759 ; 1.0867 ; 1.103 ; 1.1274 ; 1.164 ; 1.2189 ; 1.2395 ; 1.2704 ; 1.3168 ; 1.3863 ; 1.4123 ; 1.4514 ; 1.5101 ; 1.5981 ; 1.6311 ; 1.6805 ; 1.7548 ; 1.8661 ; 2.0331 ; 2.2831 ; 2.5]

Force (kips): [-0.770832 ; 0.178957 ; 0.950827 ; 1.97126 ; 3.32389 ; 5.08425 ; 7.36729 ; 9.36522 ; 11.1134 ; 13.2895 ; 15.6672 ; 16.348 ; 17.2141 ; 18.2502 ; 19.3399 ; 20.429 ; 21.4378 ; 22.4155 ; 23.5789 ; 24.9813 ; 26.6333 ; 28.5519 ; 28.7196 ; 28.9502 ; 29.3063 ; 29.7861 ; 29.9608 ; 30.2157 ; 30.5722 ; 30.9119 ; 31.2397 ; 31.7095 ; 32.3487 ; 32.5697 ; 32.8964 ; 33.396 ; 34.1451 ; 34.4299 ; 34.8077 ; 34.9453 ; 35.1461 ; 35.2203 ; 35.3417 ; 35.5141 ; 35.7546 ; 36.1022 ; 36.2322 ; 36.4153 ; 36.6805 ; 37.0485 ; 37.1857 ; 37.3807 ; 37.6553 ; 38.0325 ; 38.1649 ; 38.3597 ; 38.6334 ; 38.9967 ; 39.4733 ; 40.0424 ; 40.4494]

Bolt 1 - Tensile Force (kips): [34.7663 ; 34.7388 ; 34.7151 ; 34.6822 ; 34.6366 ; 34.5718 ; 34.4825 ; 34.3992 ; 34.322 ; 34.219 ; 34.0974 ; 34.0602 ; 34.0105 ; 33.9459 ; 33.8625 ; 33.75 ; 33.4089 ; 32.6283 ; 31.4886 ; 29.9454 ; 27.8768 ; 25.4337 ; 25.4208 ; 25.416 ; 25.4112 ; 25.4071 ; 25.406 ; 25.4048 ; 25.404 ; 25.4042 ; 25.4049 ; 25.4065 ; 25.4105 ; 25.4125 ; 25.3246 ; 25.2695 ; 25.284 ; 25.2891 ; 25.2967 ; 25.2989 ; 25.2454 ; 25.2281 ; 25.1374 ; 24.9976 ; 24.8315 ; 24.5442 ; 24.3625 ; 24.1223 ; 23.8372 ; 23.3567 ; 23.1692 ; 22.8506 ; 22.3962 ; 21.9828 ; 21.8194 ; 21.4804 ; 21.1209 ; 20.73 ; 20.3427 ; 19.9722 ; 19.648]

Bolt 1 - Shear Force (kips): [0.0532994 ; 0.0399799 ; 0.0695725 ; 0.122968 ; 0.198919 ; 0.30027 ; 0.43569 ; 0.557761 ; 0.667144 ; 0.807234 ; 0.967263 ; 1.01505 ; 1.07796 ; 1.15837 ; 1.26074 ; 1.39655 ; 1.79769 ; 2.60734 ; 3.66948 ; 4.99099 ; 6.61574 ; 8.36984 ; 8.37911 ; 8.3809 ; 8.38204 ; 8.38237 ; 8.3824 ; 8.3824 ; 8.38245 ; 8.38272 ; 8.38307 ; 8.38373 ; 8.38516 ; 8.38587 ; 8.51372 ; 8.58808 ; 8.58153 ; 8.57818 ; 8.57278 ; 8.5705 ; 8.80843 ; 8.88926 ; 9.1864 ; 9.60246 ; 10.0635 ; 10.9117 ; 11.3981 ; 11.999 ; 12.7535 ; 13.8545 ; 14.1946 ; 14.7042 ; 15.3834 ; 15.9603 ; 16.1813 ; 16.6733 ; 17.1536 ; 17.6893 ; 18.2263 ; 18.7145 ; 19.1705]

Bolt 2 - Tensile Force (kips): [34.7743 ; 34.7453 ; 34.7175 ; 34.6769 ; 34.6215 ; 34.5477 ; 34.4582 ; 34.3872 ; 34.3335 ; 34.2849 ; 34.2518 ; 34.2473 ; 34.2475 ; 34.2596 ; 34.2776 ; 34.3069 ; 34.1862 ; 33.9 ; 33.7438 ; 33.984 ; 34.3302 ; 34.622 ; 34.6199 ; 34.6166 ; 34.6043 ; 34.5919 ; 34.5854 ; 34.5791 ; 34.5875 ; 34.5962 ; 34.6125 ; 34.6507 ; 34.769 ; 34.8228 ; 34.9394 ; 35.1359 ; 35.4343 ; 35.5335 ; 35.6519 ; 35.6763 ; 35.8077 ; 35.8552 ; 35.9463 ; 36.0942 ; 36.2879 ; 36.7092 ; 36.8622 ; 37.0832 ; 37.3432 ; 37.7477 ; 37.8921 ; 38.1329 ; 38.49 ; 38.9184 ; 39.0726 ; 39.3041 ; 39.7068 ; 40.5708 ; 41.9312 ; 43.8247 ; 45.3519]

Bolt 2 - Shear Force (kips): [0.0465776 ; 0.0357204 ; 0.0780153 ; 0.143046 ; 0.232399 ; 0.350903 ; 0.509319 ; 0.65192 ; 0.77958 ; 0.942761 ; 1.13139 ; 1.189 ; 1.26577 ; 1.36668 ; 1.50268 ; 1.68448 ; 2.11371 ; 2.9106 ; 3.92252 ; 5.10378 ; 6.36984 ; 7.63046 ; 7.75163 ; 7.92616 ; 8.17825 ; 8.52245 ; 8.64612 ; 8.82329 ; 9.06698 ; 9.29744 ; 9.51188 ; 9.80785 ; 10.187 ; 10.3164 ; 10.4801 ; 10.7053 ; 11.0189 ; 11.1361 ; 11.3962 ; 11.5511 ; 11.6835 ; 11.7376 ; 11.8145 ; 11.907 ; 12.0617 ; 12.1769 ; 12.2162 ; 12.3098 ; 12.641 ; 12.9172 ; 13.1528 ; 13.4092 ; 13.7551 ; 14.4511 ; 14.65 ; 14.8398 ; 15.0577 ; 15.0844 ; 15.0762 ; 15.0601 ; 14.9718]

Bolt 3 - Tensile Force (kips): [36 ; 35.9778 ; 35.9601 ; 35.9463 ; 35.9479 ; 35.9986 ; 36.1545 ; 36.33 ; 36.5092 ; 36.8349 ; 37.4553 ; 37.7038 ; 38.0503 ; 38.5065 ; 39.0949 ; 39.8415 ; 40.7701 ; 41.8608 ; 43.3146 ; 45.3439 ; 48.0604 ; 51.51 ; 51.7782 ; 52.1545 ; 52.6935 ; 53.4259 ; 53.696 ; 54.0849 ; 54.6418 ; 55.21 ; 55.7927 ; 56.6468 ; 57.8157 ; 58.1981 ; 58.7432 ; 59.6769 ; 61.258 ; 61.9765 ; 62.9488 ; 63.2665 ; 63.6856 ; 63.8239 ; 64.0325 ; 64.3324 ; 64.794 ; 65.4576 ; 65.6732 ; 65.9638 ; 66.3517 ; 66.8894 ; 67.1014 ; 67.3774 ; 67.7599 ; 68.2778 ; 68.4661 ; 68.7388 ; 69.1517 ; 69.6528 ; 70.302 ; 70.8801 ; 71.2076]

Bolt 3 - Shear Force (kips): [0.031846 ; 0.016834 ; 0.014115 ; 0.026972 ; 0.053501 ; 0.097379 ; 0.16673 ; 0.2282 ; 0.28611 ; 0.36989 ; 0.4864 ; 0.52647 ; 0.58226 ; 0.66107 ; 0.77196 ; 0.91919 ; 1.0801 ; 1.2852 ; 1.5412 ; 1.8024 ; 2.0709 ; 2.3366 ; 2.361 ; 2.3917 ; 2.4527 ; 2.5135 ; 2.5323 ; 2.5705 ; 2.641 ; 2.7211 ; 2.9794 ; 3.8696 ; 4.8486 ; 5.0547 ; 5.3575 ; 5.5934 ; 6.1715 ; 6.0135 ; 5.7318 ; 5.5059 ; 5.3368 ; 5.3153 ; 5.2277 ; 5.1124 ; 5.0239 ; 5.0132 ; 5.0281 ; 5.0628 ; 5.1147 ; 5.2542 ; 5.3619 ; 5.5092 ; 5.6411 ; 5.781 ; 5.8569 ; 5.9618 ; 6.1429 ; 6.3201 ; 6.4944 ; 6.6487 ; 6.795]

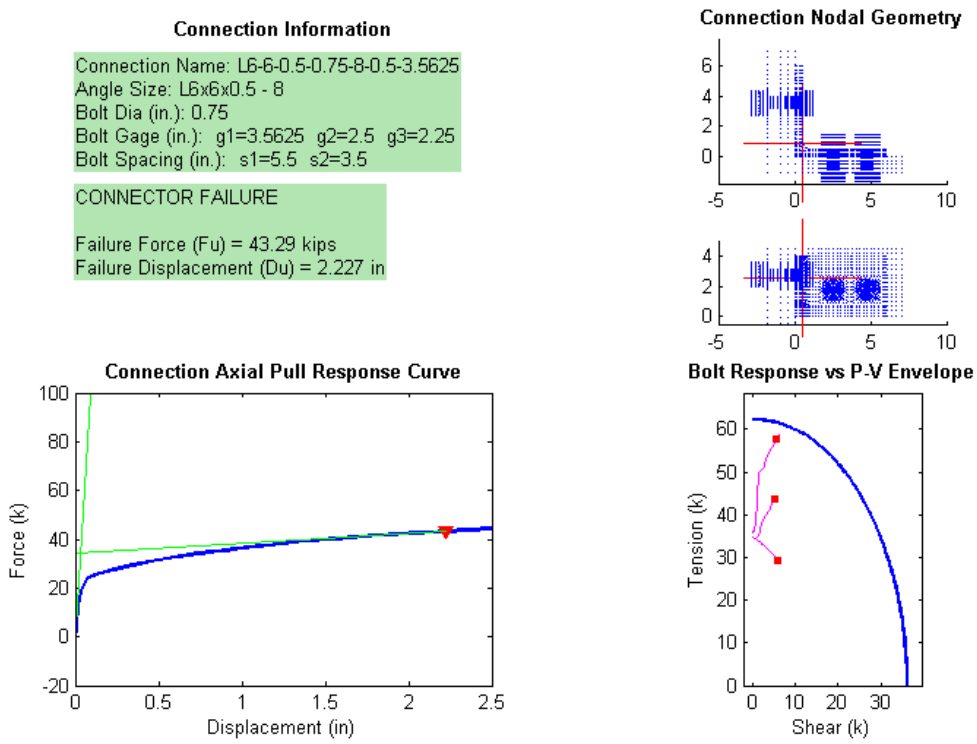


Figure B.131 Connection L6_6_0.5_0.75_8_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.75_8_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.0558e+003

Plastic Stiffness (k/in): 3.9659

Displacement (in): [2.8904e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.026611 ; 0.036499 ; 0.051331 ; 0.073578 ; 0.10695 ; 0.15701 ; 0.23209 ; 0.34472 ; 0.38695 ; 0.45031 ; 0.54533 ; 0.68788 ; 0.74133 ; 0.82151 ; 0.85158 ; 0.89668 ; 0.96433 ; 0.9897 ; 1.0278 ; 1.0658 ; 1.1039 ; 1.1609 ; 1.2466 ; 1.375 ; 1.5677 ; 1.8177 ; 2.0677 ; 2.1302 ; 2.2239 ; 2.3645 ; 2.5]

Force (kips): [-0.722465 ; 0.543783 ; 1.33969 ; 2.40411 ; 3.82669 ; 5.11094 ; 6.2879 ; 7.7905 ; 9.40753 ; 10.8418 ; 11.8321 ; 12.524 ; 13.0721 ; 13.7624 ; 14.6646 ; 14.9725 ; 15.4047 ; 15.9953 ; 16.7636 ; 17.0232 ; 17.3941 ; 17.5334 ; 17.7375 ; 18.0275 ; 18.1291 ; 18.2838 ; 18.4324 ; 18.5764 ; 18.7929 ; 19.1159 ; 19.5526 ; 20.1189 ; 20.7715 ; 21.3196 ; 21.4518 ; 21.6377 ; 21.8898 ; 22.1124]

Bolt 1 - Tensile Force (kips): [34.7653 ; 34.7284 ; 34.7034 ; 34.668 ; 34.6164 ; 34.5655 ; 34.5161 ; 34.4483 ; 34.3683 ; 34.2871 ; 34.2127 ; 34.1462 ; 34.0866 ; 34.0216 ; 33.9548 ; 33.93 ; 33.8936 ; 33.8324 ; 33.6454 ; 33.4846 ; 33.2411 ; 33.1467 ; 33.0064 ; 32.7957 ; 32.719 ; 32.6032 ; 32.4896 ; 32.3766 ; 32.1967 ; 31.9168 ; 31.5165 ; 30.9668 ; 30.2712 ; 29.6501 ; 29.4922 ; 29.2705 ; 28.9685 ; 28.6995]

Bolt 1 - Shear Force (kips): [0.050553 ; 0.052856 ; 0.092031 ; 0.15208 ; 0.23705 ; 0.31696 ; 0.39302 ; 0.49476 ; 0.61224 ; 0.73074 ; 0.84165 ; 0.94415 ; 1.0399 ; 1.1455 ; 1.2524 ; 1.29 ; 1.3449 ; 1.4353 ; 1.6851 ; 1.8814 ; 2.1621 ; 2.2667 ; 2.4187 ; 2.6412 ; 2.7211 ; 2.8406 ; 2.9569 ; 3.0717 ; 3.2518 ; 3.5272 ; 3.9139 ; 4.4329 ; 5.0674 ; 5.6183 ; 5.7553 ; 5.9471 ; 6.2079 ; 6.4399]

Bolt 2 - Tensile Force (kips): [34.7706 ; 34.729 ; 34.6936 ; 34.6476 ; 34.5954 ; 34.5562 ; 34.5387 ; 34.5354 ; 34.5775 ; 34.6847 ; 34.8535 ; 35.0297 ; 35.1937 ; 35.5308 ; 36.3121 ; 36.6627 ; 37.1806 ; 37.9026 ; 38.8113 ; 39.05 ; 39.3881 ; 39.5102 ; 39.6917 ; 39.9468 ; 40.0413 ; 40.1819 ; 40.3215 ; 40.4625 ; 40.6701 ; 40.9697 ; 41.3919 ; 41.9888 ; 42.7059 ; 43.3855 ; 43.5503 ; 43.7986 ; 44.1753 ; 44.5386]

Bolt 2 - Shear Force (kips): [0.042942 ; 0.055918 ; 0.10844 ; 0.18339 ; 0.28756 ; 0.38547 ; 0.47865 ; 0.60199 ; 0.74716 ; 0.90128 ; 1.062 ; 1.212 ; 1.3472 ; 1.5048 ; 1.676 ; 1.7333 ; 1.8133 ; 1.9351 ; 2.1993 ; 2.3757 ; 2.6278 ; 2.7212 ; 2.8559 ; 3.0506 ; 3.1195 ; 3.2204 ; 3.3151 ; 3.4009 ; 3.5248 ; 3.7077 ; 3.9516 ; 4.2547 ; 4.5991 ; 4.8743 ; 4.9416 ; 5.0314 ; 5.144 ; 5.2367]

Bolt 3 - Tensile Force (kips): [36 ; 35.9466 ; 35.9141 ; 35.9033 ; 35.9545 ; 36.0715 ; 36.1989 ; 36.3831 ; 36.7388 ; 37.2779 ; 37.7786 ; 38.2634 ; 38.9384 ; 40.088 ; 41.8447 ; 42.4911 ; 43.4638 ; 44.9032 ; 46.8381 ; 47.4987 ; 48.4339 ; 48.7486 ; 49.1752 ; 49.725 ; 49.9125 ; 50.2105 ; 50.5132 ; 50.8107 ; 51.2708 ; 52.0109 ; 52.998 ; 54.1649 ; 55.728 ; 57.0643 ; 57.4003 ; 57.8799 ; 58.4629 ; 58.9509]

Bolt 3 - Shear Force (kips): [0.034857 ; 0.013495 ; 0.02705 ; 0.059507 ; 0.11437 ; 0.17173 ; 0.22257 ; 0.28895 ; 0.36515 ; 0.44931 ; 0.55435 ; 0.66743 ; 0.7449 ; 0.74347 ; 0.83096 ; 0.87949 ; 0.95195 ; 1.0494 ; 1.1694 ; 1.2094 ; 1.2773 ; 1.316 ; 1.3774 ; 1.4756 ; 1.5023 ; 1.6041 ; 1.9787 ; 2.425 ; 2.5944 ; 2.6439 ; 2.9705 ; 3.5393 ; 4.3529 ; 5.0005 ; 5.323 ; 5.5318 ; 5.8656 ; 6.0617]

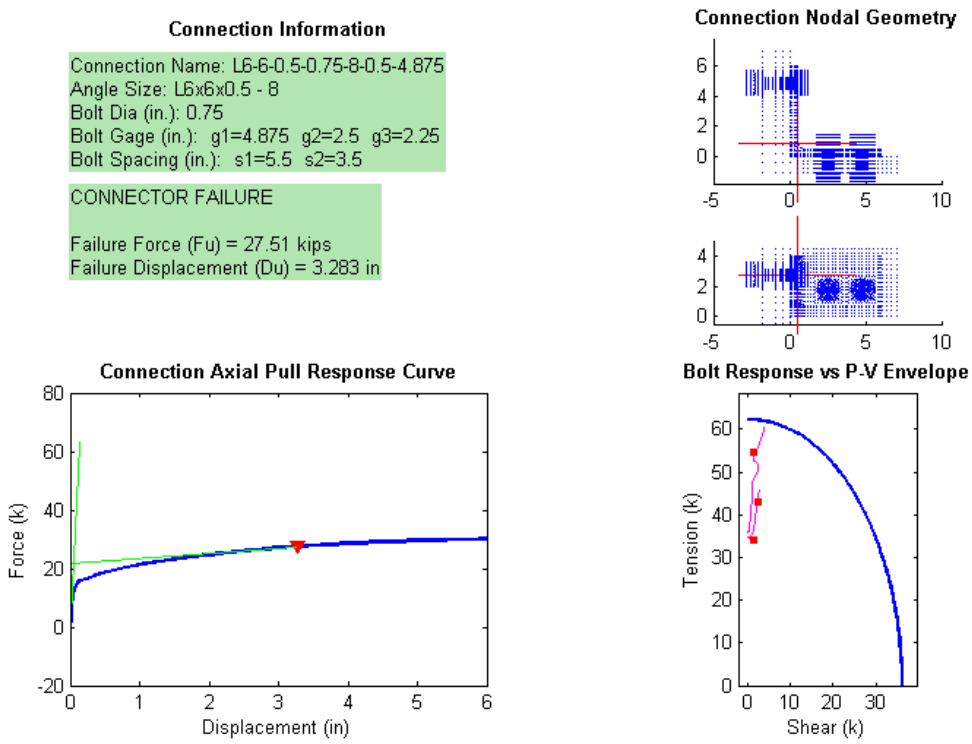


Figure B.132 Connection L6_6_0.5_0.75_8_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.75_8_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 437.2269

Plastic Stiffness (k/in): 1.7572

Displacement (in): [2.9111e-036 ; 0.0046875 ; 0.009375 ; 0.016406 ; 0.026953 ; 0.042773 ; 0.066504 ; 0.1021 ; 0.15549 ; 0.23558 ; 0.35572 ; 0.53592 ; 0.80623 ; 0.90759 ; 1.0596 ; 1.2877 ; 1.6298 ; 1.7581 ; 1.9505 ; 2.0227 ; 2.1309 ; 2.2933 ; 2.3542 ; 2.4455 ; 2.5825 ; 2.6339 ; 2.711 ; 2.8266 ; 2.9999 ; 3.26 ; 3.3575 ; 3.5038 ; 3.7233 ; 4.0524 ; 4.5462 ; 5.1462 ; 5.7462 ; 6]

Force (kips): [-0.713371 ; 0.616093 ; 1.33613 ; 2.31772 ; 3.64751 ; 5.3098 ; 6.74955 ; 7.54542 ; 7.9297 ; 8.30554 ; 8.79477 ; 9.40324 ; 10.1611 ; 10.4131 ; 10.7621 ; 11.2227 ; 11.7985 ; 11.9981 ; 12.2744 ; 12.3736 ; 12.5192 ; 12.733 ; 12.8086 ; 12.9173 ; 13.0706 ; 13.1294 ; 13.2158 ; 13.3397 ; 13.5086 ; 13.7371 ; 13.8171 ; 13.9345 ; 14.0926 ; 14.3019 ; 14.5634 ; 14.8066 ; 14.9995 ; 15.0694]

Bolt 1 - Tensile Force (kips): [34.7656 ; 34.7263 ; 34.7031 ; 34.6689 ; 34.6174 ; 34.5429 ; 34.4681 ; 34.4214 ; 34.3976 ; 34.3685 ; 34.3122 ; 34.236 ; 34.1795 ; 34.1627 ; 34.1406 ; 34.1157 ; 34.0929 ; 34.0857 ; 34.0768 ; 34.074 ; 34.0702 ; 34.064 ; 34.0622 ; 34.06 ; 34.0578 ; 34.0566 ; 34.0546 ; 34.0518 ; 34.0493 ; 34.0476 ; 34.0476 ; 34.0481 ; 34.0503 ; 34.0547 ; 34.0604 ; 34.0652 ; 34.0408 ; 33.9988]

Bolt 1 - Shear Force (kips): [0.050323 ; 0.057041 ; 0.094327 ; 0.15217 ; 0.23698 ; 0.35246 ; 0.46611 ; 0.53919 ; 0.58088 ; 0.63515 ; 0.73567 ; 0.86877 ; 0.97373 ; 1.0037 ; 1.043 ; 1.0912 ; 1.1493 ; 1.1708 ; 1.2018 ; 1.2133 ; 1.2305 ; 1.2578 ; 1.2676 ; 1.2815 ; 1.3015 ; 1.3095 ; 1.3216 ; 1.3394 ; 1.3642 ; 1.3986 ; 1.4108 ; 1.4286 ; 1.4538 ; 1.4908 ; 1.5472 ; 1.6167 ; 1.7188 ; 1.7982]

Bolt 2 - Tensile Force (kips): [34.7716 ; 34.7243 ; 34.6889 ; 34.6503 ; 34.6165 ; 34.6293 ; 34.7143 ; 34.8076 ; 34.8741 ; 34.9926 ; 35.2077 ; 35.6153 ; 36.3775 ; 36.7338 ; 37.2862 ; 38.0658 ; 39.1092 ; 39.4799 ; 39.9996 ; 40.1867 ; 40.4606 ; 40.8605 ; 41.0068 ; 41.2214 ; 41.53 ; 41.6442 ; 41.8133 ; 42.0599 ; 42.4095 ; 42.8908 ; 43.0641 ; 43.3158 ; 43.6603 ; 44.1185 ; 44.6869 ; 45.2261 ; 45.6507 ; 45.7897]

Bolt 2 - Shear Force (kips): [0.042653 ; 0.06314 ; 0.11446 ; 0.18971 ; 0.29761 ; 0.44332 ; 0.58701 ; 0.68054 ; 0.73297 ; 0.81086 ; 0.95845 ; 1.1618 ; 1.3497 ; 1.4066 ; 1.4809 ; 1.5763 ; 1.7008 ; 1.747 ; 1.8125 ; 1.8365 ; 1.8724 ; 1.9296 ; 1.951 ; 1.9829 ; 2.0293 ; 2.047 ; 2.0733 ; 2.1112 ; 2.1643 ; 2.2366 ; 2.2599 ; 2.2875 ; 2.3241 ; 2.3728 ; 2.4361 ; 2.5021 ; 2.5784 ; 2.6318]

Bolt 3 - Tensile Force (kips): [36 ; 35.9315 ; 35.8941 ; 35.899 ; 36.0153 ; 36.2486 ; 36.6977 ; 37.2504 ; 37.7449 ; 38.2773 ; 38.9484 ; 40.159 ; 42.2739 ; 43.0618 ; 44.2317 ; 45.8562 ; 47.9829 ; 48.7791 ; 49.9083 ; 50.3306 ; 50.9189 ; 51.6585 ; 51.8901 ; 52.197 ; 52.6027 ; 52.7897 ; 53.067 ; 53.4928 ; 54.0301 ; 54.749 ; 55.0224 ; 55.4499 ; 56.0421 ; 56.8149 ; 57.8976 ; 58.99 ; 59.9947 ; 60.3755]

Bolt 3 - Shear Force (kips): [0.033881 ; 0.0159 ; 0.038642 ; 0.083527 ; 0.1574 ; 0.24655 ; 0.3119 ; 0.33824 ; 0.36109 ; 0.43562 ; 0.56885 ; 0.68903 ; 0.8119 ; 0.86334 ; 0.94047 ; 1.03 ; 1.1166 ; 1.5173 ; 2.0768 ; 2.3755 ; 2.5037 ; 2.2857 ; 2.2182 ; 1.8605 ; 1.3863 ; 1.1873 ; 1.2135 ; 1.2589 ; 1.1959 ; 1.236 ; 1.4984 ; 2.0358 ; 2.5317 ; 2.7939 ; 2.9714 ; 3.2568 ; 3.5909 ; 3.7106]

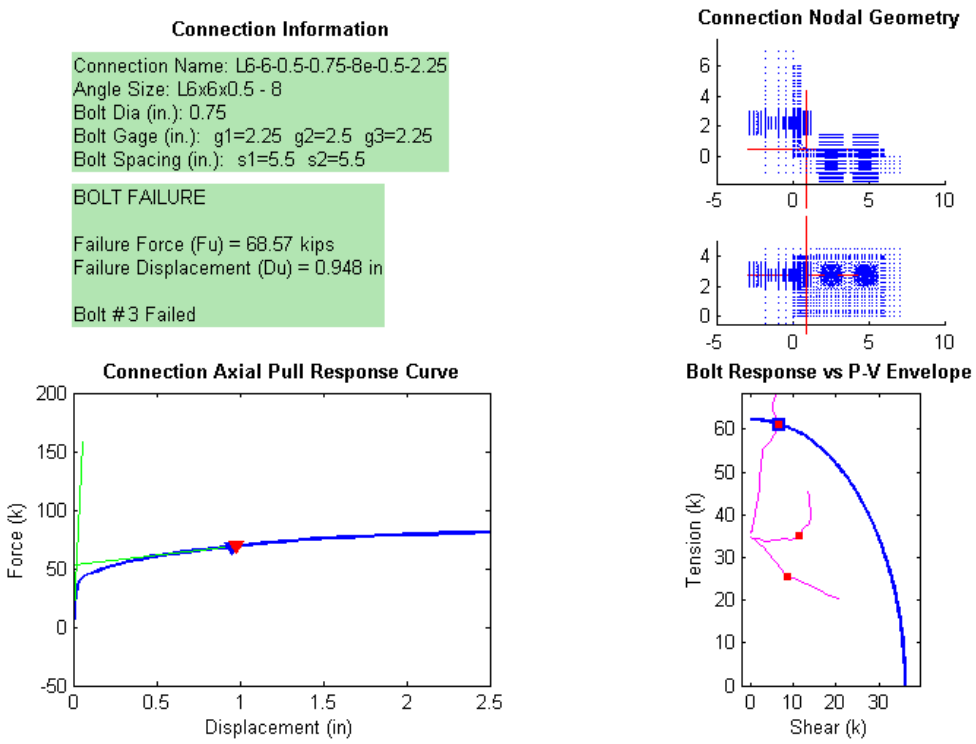


Figure B.133 Connection L6_6_0.5_0.75_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.75_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 2.7788e+003

Plastic Stiffness (k/in): 16.6981

Displacement (in): [2.8131e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.018738 ; 0.02121 ; 0.024918 ; 0.030479 ; 0.038822 ; 0.051336 ; 0.070108 ; 0.098264 ; 0.1405 ; 0.20385 ; 0.29888 ; 0.33452 ; 0.38797 ; 0.40802 ; 0.43808 ; 0.48318 ; 0.5001 ; 0.52547 ; 0.55084 ; 0.57621 ; 0.61426 ; 0.67134 ; 0.75697 ; 0.75897 ; 0.76198 ; 0.7665 ; 0.77327 ; 0.78343 ; 0.79867 ; 0.82153 ; 0.85582 ; 0.90725 ; 0.9844 ; 1.0133 ; 1.0242 ; 1.0405 ; 1.0649 ; 1.1015 ; 1.1564 ; 1.177 ; 1.2079 ; 1.2542 ; 1.3237 ; 1.3933 ; 1.4628 ; 1.5323 ; 1.5583 ; 1.5974 ; 1.6561 ; 1.7441 ; 1.876 ; 2.074 ; 2.324 ; 2.5]

Force (kips): [-0.91873 ; 2.24834 ; 4.50857 ; 7.29997 ; 9.65911 ; 11.6507 ; 14.0209 ; 14.7334 ; 15.6587 ; 16.7968 ; 18.1167 ; 19.4322 ; 20.6776 ; 21.73 ; 22.7963 ; 24.0358 ; 25.5363 ; 27.3479 ; 27.9399 ; 28.7466 ; 29.0314 ; 29.4504 ; 30.0159 ; 30.2191 ; 30.5125 ; 30.7882 ; 31.0595 ; 31.4525 ; 32.0027 ; 32.7338 ; 32.7508 ; 32.7752 ; 32.8107 ; 32.8641 ; 32.9447 ; 33.0613 ; 33.2496 ; 33.5419 ; 33.9713 ; 34.5566 ; 34.7864 ; 34.8752 ; 35.0016 ; 35.1906 ; 35.4504 ; 35.8217 ; 35.97 ; 36.1772 ; 36.4593 ; 36.8609 ; 37.2354 ; 37.5748 ; 37.8842 ; 37.9958 ; 38.1582 ; 38.3873 ; 38.6978 ; 39.1136 ; 39.6357 ; 40.1604 ; 40.4729]

Bolt 1 - Tensile Force (kips): [34.8079 ; 34.706 ; 34.6226 ; 34.5108 ; 34.4092 ; 34.3174 ; 34.2003 ; 34.1632 ; 34.1131 ; 34.0482 ; 33.9671 ; 33.8696 ; 33.7376 ; 33.2324 ; 32.3198 ; 31.0665 ; 29.3312 ; 26.9346 ; 26.11 ; 25.4495 ; 25.4478 ; 25.448 ; 25.4526 ; 25.4546 ; 25.4579 ; 25.4617 ; 25.4664 ; 25.4742 ; 25.4864 ; 25.3671 ; 25.3467 ; 25.3349 ; 25.3332 ; 25.3316 ; 25.3306 ; 25.3313 ; 25.3356 ; 25.3456 ; 25.3637 ; 25.3914 ; 25.4021 ; 25.3711 ; 25.3299 ; 25.2029 ; 25.0323 ; 24.7551 ; 24.5632 ; 24.2707 ; 23.9343 ; 23.4889 ; 22.8853 ; 22.4359 ; 22.1054 ; 21.9585 ; 21.7735 ; 21.5164 ; 21.2497 ; 21.0167 ; 20.6423 ; 20.4328 ; 20.2891]

Bolt 1 - Shear Force (kips): [0.0449943 ; 0.152516 ; 0.285019 ; 0.45452 ; 0.602758 ; 0.731191 ; 0.889224 ; 0.938205 ; 1.00303 ; 1.08507 ; 1.18524 ; 1.30423 ; 1.46327 ; 2.04217 ; 2.94841 ; 4.0865 ; 5.52688 ; 7.35311 ; 7.93604 ; 8.38937 ; 8.39271 ; 8.3954 ; 8.39829 ; 8.39924 ; 8.40055 ; 8.40195 ; 8.40358 ; 8.40624 ; 8.41032 ; 8.55921 ; 8.57939 ; 8.59135 ; 8.59348 ; 8.5963 ; 8.59896 ; 8.60106 ; 8.60217 ; 8.60196 ; 8.60062 ; 8.59787 ; 8.59676 ; 8.7242 ; 8.91852 ; 9.35071 ; 9.8527 ; 10.711 ; 11.244 ; 11.9713 ; 12.891 ; 13.9766 ; 15.1167 ; 15.9357 ; 16.5595 ; 16.8216 ; 17.15 ; 17.5881 ; 18.091 ; 18.6086 ; 19.3839 ; 20.0738 ; 20.5762]

Bolt 2 - Tensile Force (kips): [34.8337 ; 34.7157 ; 34.6205 ; 34.5097 ; 34.4269 ; 34.3696 ; 34.3231 ; 34.3139 ; 34.3056 ; 34.3041 ; 34.3242 ; 34.3463 ; 34.3714 ; 34.1266 ; 33.8427 ; 33.8195 ; 33.961 ; 34.2432 ; 34.3118 ; 34.359 ; 34.347 ; 34.3242 ; 34.2937 ; 34.2786 ; 34.256 ; 34.2421 ; 34.2462 ; 34.2641 ; 34.3313 ; 34.5087 ; 34.5162 ; 34.5253 ; 34.5372 ; 34.5581 ; 34.5929 ; 34.6465 ; 34.7228 ; 34.8321 ; 35.0021 ; 35.2765 ; 35.2786 ; 35.3259 ; 35.4056 ; 35.5363 ; 35.748 ; 36.1308 ; 36.2775 ; 36.4988 ; 36.8147 ; 37.1689 ; 37.5663 ; 37.9862 ; 38.4572 ; 38.6486 ; 38.9329 ; 39.3811 ; 40.0695 ; 41.1439 ; 42.6464 ; 44.3023 ; 45.3594]

Bolt 2 - Shear Force (kips): [0.0698411 ; 0.15045 ; 0.296149 ; 0.483391 ; 0.647159 ; 0.789335 ; 0.963778 ; 1.01846 ; 1.09187 ; 1.18643 ; 1.30592 ; 1.46099 ; 1.67543 ; 2.27252 ; 3.16077 ; 4.21716 ; 5.46716 ; 6.80315 ; 7.21472 ; 7.7972 ; 8.01706 ; 8.32513 ; 8.74396 ; 8.89349 ; 9.10685 ; 9.30459 ; 9.48317 ; 9.72997 ; 10.0595 ; 10.4714 ; 10.4789 ; 10.4916 ; 10.512 ; 10.5406 ; 10.5813 ; 10.6403 ; 10.7281 ; 10.8563 ; 11.0314 ; 11.271 ; 11.5305 ; 11.5849 ; 11.6522 ; 11.7441 ; 11.8857 ; 11.9903 ; 12.0307 ; 12.0887 ; 12.212 ; 12.7937 ; 13.2068 ; 13.5852 ; 13.8416 ; 13.8862 ; 13.9386 ; 13.9712 ; 13.9863 ; 13.9693 ; 13.7714 ; 13.5451 ; 13.3303]

Bolt 3 - Tensile Force (kips): [36 ; 35.9434 ; 35.9762 ; 36.1518 ; 36.3599 ; 36.5841 ; 36.9778 ; 37.1588 ; 37.4644 ; 37.8963 ; 38.465 ; 39.1674 ; 40.0409 ; 41.0725 ; 42.3381 ; 44.0365 ; 46.367 ; 49.4027 ; 50.4096 ; 51.7895 ; 52.2366 ; 52.837 ; 53.6954 ; 54.0207 ; 54.479 ; 54.9167 ; 55.3585 ; 56.0598 ; 57.0907 ; 58.3453 ; 58.3722 ; 58.4119 ; 58.4704 ; 58.5568 ; 58.6877 ; 58.8851 ; 59.2133 ; 59.7409 ; 60.6287 ; 62.0153 ; 62.6303 ; 62.8493 ; 63.1349 ; 63.5431 ; 64.051 ; 64.7606 ; 65.0346 ; 65.4188 ; 65.8983 ; 66.4773 ; 67.0639 ; 67.5396 ; 67.9623 ; 68.126 ; 68.3859 ; 68.7415 ; 69.1876 ; 69.7758 ; 70.4351 ; 70.9562 ; 71.1876]

Bolt 3 - Shear Force (kips): [0.042047 ; 0.024849 ; 0.076084 ; 0.15897 ; 0.23233 ; 0.30105 ; 0.39854 ; 0.43346 ; 0.4842 ; 0.55344 ; 0.64711 ; 0.77788 ; 0.94895 ; 1.126 ; 1.3559 ; 1.6192 ; 1.8859 ; 2.1873 ; 2.2746 ; 2.3834 ; 2.4262 ; 2.4965 ; 2.5642 ; 2.585 ; 2.6475 ; 2.701 ; 2.8485 ; 3.5215 ; 4.511 ; 5.1836 ; 5.1974 ; 5.2176 ; 5.2466 ; 5.2975 ; 5.397 ; 5.505 ; 5.6373 ; 5.7538 ; 6.194 ; 6.44 ; 6.0665 ; 5.9634 ; 5.773 ; 5.5198 ; 5.4004 ; 5.2677 ; 5.2212 ; 5.1321 ; 5.1305 ; 5.198 ; 5.4183 ; 5.5941 ; 5.7594 ; 5.8537 ; 5.9961 ; 6.1491 ; 6.3016 ; 6.5052 ; 6.7431 ; 6.868 ; 6.9861]

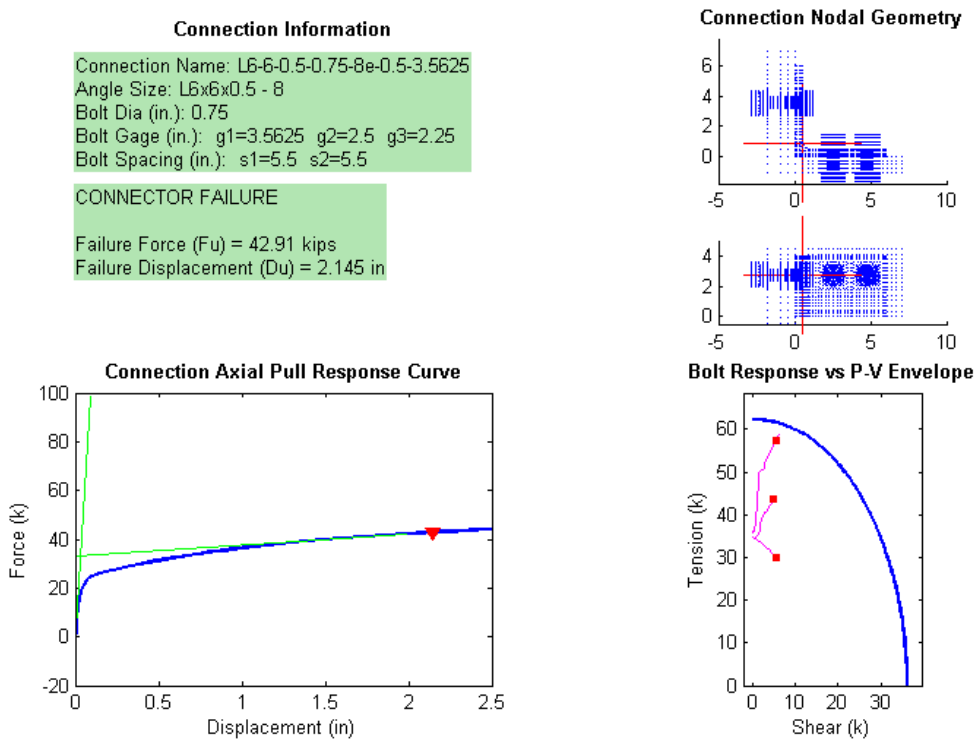


Figure B.134 Connection L6_6_0.5_0.75_8e_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.75_8e_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.0821e+003

Plastic Stiffness (k/in): 4.6280

Displacement (in): [2.4896e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.38012 ; 0.44347 ; 0.5385 ; 0.68104 ; 0.7345 ; 0.81468 ; 0.84474 ; 0.88985 ; 0.9575 ; 0.98287 ; 1.0209 ; 1.078 ; 1.1636 ; 1.2921 ; 1.4847 ; 1.7347 ; 1.9847 ; 2.2347 ; 2.4847 ; 2.5]

Force (kips): [-0.81022 ; 0.510602 ; 1.30318 ; 2.02554 ; 3.01427 ; 4.36345 ; 6.1687 ; 8.28334 ; 10.2205 ; 11.5592 ; 12.3931 ; 13 ; 13.6754 ; 14.5764 ; 14.8865 ; 15.323 ; 15.9167 ; 16.6958 ; 16.9626 ; 17.3428 ; 17.4842 ; 17.6913 ; 17.9845 ; 18.0872 ; 18.242 ; 18.4643 ; 18.7899 ; 19.2611 ; 19.8657 ; 20.5509 ; 21.1294 ; 21.6346 ; 22.0626 ; 22.0869]

Bolt 1 - Tensile Force (kips): [34.8067 ; 34.7653 ; 34.7384 ; 34.7129 ; 34.6758 ; 34.621 ; 34.5423 ; 34.4408 ; 34.3344 ; 34.2454 ; 34.1744 ; 34.1166 ; 34.0693 ; 34.002 ; 33.9785 ; 33.9447 ; 33.8943 ; 33.7934 ; 33.7054 ; 33.5041 ; 33.4296 ; 33.3113 ; 33.1281 ; 33.059 ; 32.9517 ; 32.7899 ; 32.5378 ; 32.1369 ; 31.5698 ; 30.8698 ; 30.2433 ; 29.6718 ; 29.187 ; 29.1592]

Bolt 1 - Shear Force (kips): [0.039246 ; 0.058996 ; 0.10417 ; 0.14827 ; 0.21028 ; 0.29754 ; 0.41983 ; 0.5725 ; 0.72727 ; 0.85833 ; 0.96871 ; 1.0632 ; 1.1444 ; 1.2521 ; 1.2884 ; 1.3402 ; 1.4182 ; 1.568 ; 1.6836 ; 1.9329 ; 2.0217 ; 2.1586 ; 2.363 ; 2.4381 ; 2.5532 ; 2.7243 ; 2.9841 ; 3.3865 ; 3.9401 ; 4.5954 ; 5.1682 ; 5.6764 ; 6.1041 ; 6.1285]

Bolt 2 - Tensile Force (kips): [34.8295 ; 34.78 ; 34.747 ; 34.7165 ; 34.6791 ; 34.6356 ; 34.601 ; 34.6093 ; 34.6975 ; 34.8854 ; 35.1063 ; 35.2996 ; 35.6521 ; 36.4354 ; 36.7857 ; 37.302 ; 38.0219 ; 38.9904 ; 39.2929 ; 39.6776 ; 39.8158 ; 40.0106 ; 40.2778 ; 40.3717 ; 40.5043 ; 40.6931 ; 40.9564 ; 41.3196 ; 41.8661 ; 42.5448 ; 43.1973 ; 43.8442 ; 44.5039 ; 44.5445]

Bolt 2 - Shear Force (kips): [0.062998 ; 0.054232 ; 0.097427 ; 0.14301 ; 0.20962 ; 0.30385 ; 0.43674 ; 0.60106 ; 0.77456 ; 0.94579 ; 1.1095 ; 1.25 ; 1.3812 ; 1.5495 ; 1.6051 ; 1.6818 ; 1.7924 ; 1.9794 ; 2.0938 ; 2.3201 ; 2.4009 ; 2.5229 ; 2.703 ; 2.7686 ; 2.8683 ; 3.0144 ; 3.2283 ; 3.5252 ; 3.8741 ; 4.2602 ; 4.573 ; 4.83 ; 5.0225 ; 5.0328]

Bolt 3 - Tensile Force (kips): [36 ; 35.9474 ; 35.9127 ; 35.8978 ; 35.913 ; 35.997 ; 36.1878 ; 36.4818 ; 37.0328 ; 37.6389 ; 38.1371 ; 38.7837 ; 39.9275 ; 41.6661 ; 42.3052 ; 43.2749 ; 44.7152 ; 46.6715 ; 47.3452 ; 48.2956 ; 48.6144 ; 49.0437 ; 49.5929 ; 49.7827 ; 50.084 ; 50.5309 ; 51.2202 ; 52.2881 ; 53.5891 ; 55.111 ; 56.5004 ; 57.7262 ; 58.6982 ; 58.754]

Bolt 3 - Shear Force (kips): [0.046226 ; 0.017132 ; 0.01861 ; 0.040905 ; 0.075623 ; 0.13224 ; 0.21246 ; 0.30681 ; 0.40562 ; 0.51832 ; 0.65417 ; 0.75982 ; 0.7569 ; 0.84646 ; 0.89605 ; 0.96857 ; 1.0713 ; 1.1859 ; 1.222 ; 1.2861 ; 1.3227 ; 1.3831 ; 1.4843 ; 1.5133 ; 1.5985 ; 2.2028 ; 2.7251 ; 2.8782 ; 3.442 ; 4.1323 ; 4.8938 ; 5.5619 ; 6.1189 ; 6.1516]

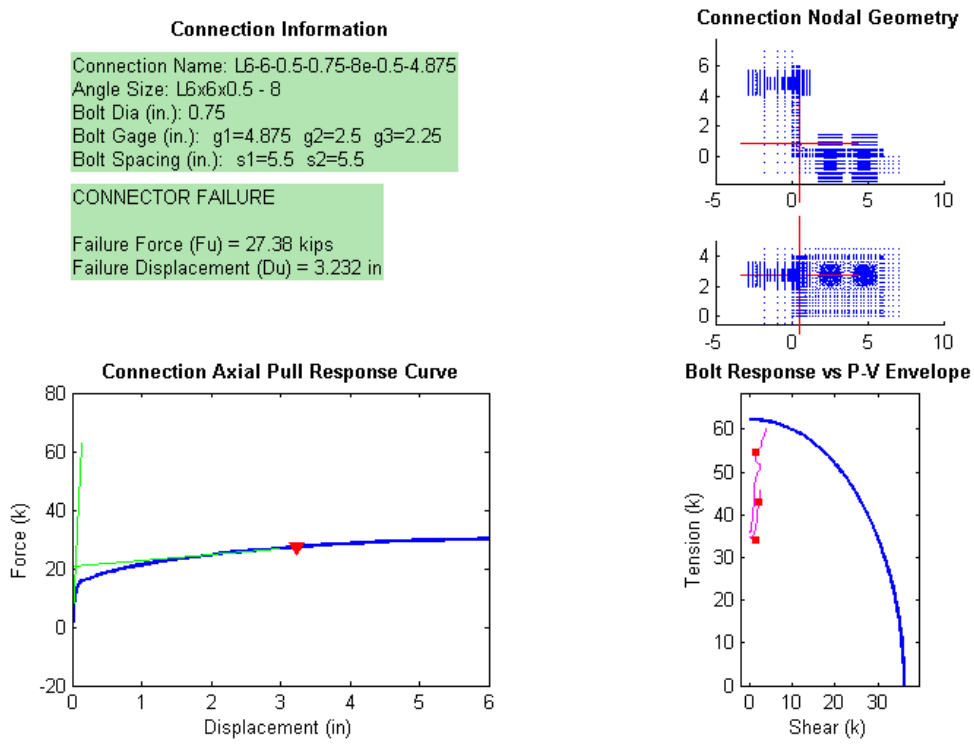


Figure B.135 Connection L6_6_0.5_0.75_8e_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.75_8e_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 445.5475

Plastic Stiffness (k/in): 2.0077

Displacement (in): [2.3377e-036 ; 0.0046875 ; 0.009375 ; 0.016406 ; 0.026953 ; 0.042773 ; 0.066504 ; 0.1021 ; 0.15549 ; 0.23558 ; 0.35572 ; 0.53592 ; 0.6035 ; 0.70486 ; 0.85691 ; 1.085 ; 1.4271 ; 1.9402 ; 2.0902 ; 2.1465 ; 2.2309 ; 2.3574 ; 2.4049 ; 2.4761 ; 2.5829 ; 2.7431 ; 2.9833 ; 3.3437 ; 3.4338 ; 3.5239 ; 3.6591 ; 3.8618 ; 4.1659 ; 4.2799 ; 4.451 ; 4.7076 ; 5.0924 ; 5.6697 ; 6]

Force (kips): [-0.779774 ; 0.596254 ; 1.30873 ; 2.28223 ; 3.60218 ; 5.24679 ; 6.70114 ; 7.54412 ; 7.9365 ; 8.30721 ; 8.79014 ; 9.39041 ; 9.59397 ; 9.88118 ; 10.2745 ; 10.7987 ; 11.4566 ; 12.2444 ; 12.4478 ; 12.5253 ; 12.6405 ; 12.7978 ; 12.8565 ; 12.9377 ; 13.0571 ; 13.2338 ; 13.475 ; 13.7902 ; 13.8646 ; 13.9363 ; 14.0352 ; 14.1713 ; 14.3571 ; 14.4204 ; 14.5087 ; 14.6293 ; 14.7821 ; 14.9719 ; 15.0642]

Bolt 1 - Tensile Force (kips): [34.8075 ; 34.7632 ; 34.7376 ; 34.7005 ; 34.6439 ; 34.5648 ; 34.4847 ; 34.4324 ; 34.4083 ; 34.3811 ; 34.3284 ; 34.2764 ; 34.2618 ; 34.2408 ; 34.213 ; 34.1784 ; 34.1432 ; 34.1175 ; 34.1137 ; 34.1121 ; 34.109 ; 34.1056 ; 34.1038 ; 34.1021 ; 34.0998 ; 34.0953 ; 34.0888 ; 34.0818 ; 34.0806 ; 34.0796 ; 34.0787 ; 34.0773 ; 34.0746 ; 34.0731 ; 34.0708 ; 34.0681 ; 34.0663 ; 34.067 ; 34.0646]

Bolt 1 - Shear Force (kips): [0.037987 ; 0.065387 ; 0.10916 ; 0.17338 ; 0.26514 ; 0.38894 ; 0.5118 ; 0.59339 ; 0.63689 ; 0.69001 ; 0.7875 ; 0.88521 ; 0.91295 ; 0.95154 ; 1.0005 ; 1.062 ; 1.1366 ; 1.2229 ; 1.2471 ; 1.257 ; 1.2725 ; 1.294 ; 1.3025 ; 1.3139 ; 1.3308 ; 1.3568 ; 1.3943 ; 1.4453 ; 1.4576 ; 1.4695 ; 1.4866 ; 1.5121 ; 1.5498 ; 1.5642 ; 1.5854 ; 1.6159 ; 1.6587 ; 1.7192 ; 1.7568]

Bolt 2 - Tensile Force (kips): [34.8322 ; 34.7779 ; 34.7461 ; 34.7106 ; 34.6819 ; 34.7027 ; 34.7911 ; 34.8964 ; 34.9723 ; 35.0956 ; 35.3254 ; 35.7821 ; 35.9514 ; 36.2317 ; 36.7505 ; 37.5794 ; 38.7117 ; 40.1786 ; 40.5573 ; 40.697 ; 40.905 ; 41.1988 ; 41.307 ; 41.4632 ; 41.6904 ; 42.0153 ; 42.4656 ; 43.0829 ; 43.2281 ; 43.3697 ; 43.5723 ; 43.858 ; 44.2453 ; 44.3798 ; 44.5703 ; 44.8336 ; 45.1719 ; 45.5998 ; 45.8146]

Bolt 2 - Shear Force (kips): [0.061645 ; 0.059828 ; 0.101 ; 0.1668 ; 0.2639 ; 0.39419 ; 0.52391 ; 0.61454 ; 0.6676 ; 0.74494 ; 0.89071 ; 1.0539 ; 1.1017 ; 1.1685 ; 1.2573 ; 1.3713 ; 1.5177 ; 1.7048 ; 1.7577 ; 1.7785 ; 1.8101 ; 1.855 ; 1.8721 ; 1.8961 ; 1.9314 ; 1.9847 ; 2.0602 ; 2.1599 ; 2.1837 ; 2.2052 ; 2.2344 ; 2.2732 ; 2.3253 ; 2.3438 ; 2.3702 ; 2.4061 ; 2.4503 ; 2.5088 ; 2.5419]

Bolt 3 - Tensile Force (kips): [36 ; 35.9315 ; 35.892 ; 35.895 ; 36.0083 ; 36.2371 ; 36.6773 ; 37.2275 ; 37.7236 ; 38.258 ; 38.9202 ; 40.105 ; 40.5927 ; 41.3688 ; 42.5582 ; 44.3309 ; 46.6986 ; 49.7243 ; 50.6075 ; 50.9197 ; 51.349 ; 51.8419 ; 52.0186 ; 52.238 ; 52.5627 ; 53.1321 ; 53.8964 ; 54.904 ; 55.1973 ; 55.464 ; 55.8298 ; 56.3066 ; 57.0419 ; 57.3065 ; 57.6477 ; 58.1497 ; 58.8607 ; 59.8446 ; 60.3223]

Bolt 3 - Shear Force (kips): [0.045166 ; 0.013797 ; 0.031477 ; 0.076195 ; 0.14958 ; 0.23889 ; 0.30689 ; 0.33984 ; 0.36356 ; 0.43636 ; 0.57188 ; 0.69871 ; 0.72942 ; 0.7816 ; 0.85895 ; 0.96795 ; 1.0779 ; 1.6777 ; 2.3563 ; 2.4073 ; 2.3841 ; 2.2019 ; 2.013 ; 1.7775 ; 1.3092 ; 1.1965 ; 1.2549 ; 1.3663 ; 1.727 ; 2.1297 ; 2.4293 ; 2.7168 ; 2.7439 ; 2.7845 ; 2.902 ; 3.0187 ; 3.3123 ; 3.6124 ; 3.7347]

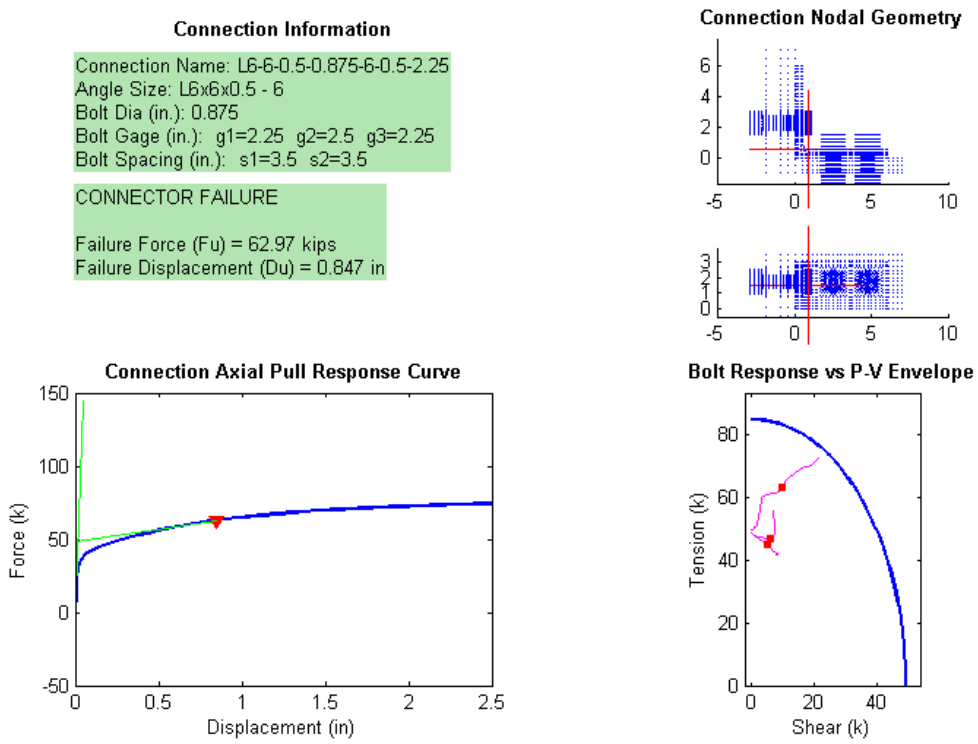


Figure B.136 Connection L6_6_0.5_0.875_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.875_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 3.2886e+003

Plastic Stiffness (k/in): 16.9597

Displacement (in): [4.473e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.46527 ; 0.47418 ; 0.48755 ; 0.50759 ; 0.52764 ; 0.54768 ; 0.57775 ; 0.62285 ; 0.66795 ; 0.71305 ; 0.78071 ; 0.80608 ; 0.84413 ; 0.90121 ; 0.98684 ; 1.1153 ; 1.3079 ; 1.3704 ; 1.4642 ; 1.6048 ; 1.6575 ; 1.7366 ; 1.8553 ; 1.8998 ; 1.9665 ; 1.9915 ; 2.0291 ; 2.0854 ; 2.1699 ; 2.2966 ; 2.4866 ; 2.5]

Force (kips): [-1.47333 ; 2.38213 ; 4.94973 ; 8.05702 ; 11.6572 ; 15.0692 ; 17.2139 ; 18.4618 ; 19.7106 ; 21.0185 ; 22.379 ; 23.9367 ; 25.8087 ; 26.4079 ; 27.2198 ; 27.5083 ; 27.628 ; 27.8018 ; 28.0649 ; 28.3293 ; 28.5774 ; 28.9247 ; 29.4213 ; 29.8778 ; 30.3082 ; 30.9117 ; 31.1421 ; 31.4648 ; 31.9108 ; 32.4858 ; 33.2472 ; 34.1962 ; 34.4566 ; 34.7992 ; 35.2441 ; 35.4001 ; 35.6332 ; 35.9244 ; 36.0221 ; 36.1627 ; 36.2184 ; 36.2966 ; 36.4071 ; 36.5643 ; 36.7722 ; 37.036 ; 37.0525]

Bolt 1 - Tensile Force (kips): [48.582 ; 48.4447 ; 48.3493 ; 48.2294 ; 48.0813 ; 47.9297 ; 47.8238 ; 47.7454 ; 47.6472 ; 47.5493 ; 47.4483 ; 47.3434 ; 47.2103 ; 47.1576 ; 47.0542 ; 47.0027 ; 46.9782 ; 46.9374 ; 46.8553 ; 46.7271 ; 46.5999 ; 46.4152 ; 46.1418 ; 45.8794 ; 45.626 ; 45.2459 ; 45.0961 ; 44.884 ; 44.5727 ; 44.156 ; 43.5812 ; 42.8186 ; 42.605 ; 42.3282 ; 41.9595 ; 41.885 ; 41.9062 ; 41.9327 ; 41.9399 ; 41.9458 ; 41.9522 ; 41.9615 ; 41.9746 ; 41.9925 ; 42.0146 ; 42.0329 ; 42.0341]

Bolt 1 - Shear Force (kips): [0.082574 ; 0.15214 ; 0.28958 ; 0.46571 ; 0.6795 ; 0.89258 ; 1.0423 ; 1.1589 ; 1.3074 ; 1.4551 ; 1.6077 ; 1.7675 ; 1.9674 ; 2.0448 ; 2.1909 ; 2.2623 ; 2.2959 ; 2.3522 ; 2.4662 ; 2.6421 ; 2.8131 ; 3.0552 ; 3.3992 ; 3.7169 ; 4.0151 ; 4.4512 ; 4.6201 ; 4.8567 ; 5.1993 ; 5.6518 ; 6.2654 ; 7.0622 ; 7.2822 ; 7.5662 ; 7.942 ; 8.0236 ; 8.011 ; 8.0096 ; 8.0149 ; 8.0311 ; 8.0265 ; 8.0215 ; 8.0176 ; 8.0165 ; 8.0254 ; 8.0631 ; 8.0658]

Bolt 2 - Tensile Force (kips): [48.5898 ; 48.4029 ; 48.2689 ; 48.1141 ; 47.9333 ; 47.7595 ; 47.6261 ; 47.5155 ; 47.4275 ; 47.3917 ; 47.4264 ; 47.3589 ; 47.3137 ; 47.3212 ; 47.3532 ; 47.3564 ; 47.3513 ; 47.3435 ; 47.3163 ; 47.2508 ; 47.192 ; 47.1252 ; 47.0562 ; 47.0225 ; 47.024 ; 47.0529 ; 47.0585 ; 47.0955 ; 47.1829 ; 47.4344 ; 47.972 ; 48.9223 ; 49.255 ; 49.7842 ; 50.5835 ; 50.9119 ; 51.4933 ; 52.2885 ; 52.5679 ; 52.969 ; 53.128 ; 53.36 ; 53.6946 ; 54.1738 ; 54.8463 ; 55.774 ; 55.8372]

Bolt 2 - Shear Force (kips): [0.085328 ; 0.2141 ; 0.4037 ; 0.64574 ; 0.93909 ; 1.2382 ; 1.4801 ; 1.7115 ; 2.0081 ; 2.2688 ; 2.4617 ; 2.663 ; 2.9547 ; 3.0697 ; 3.2708 ; 3.3605 ; 3.4006 ; 3.4654 ; 3.5878 ; 3.7612 ; 3.929 ; 4.1663 ; 4.5015 ; 4.8086 ; 5.0938 ; 5.4984 ; 5.6534 ; 5.8651 ; 6.1559 ; 6.4809 ; 6.8226 ; 7.1814 ; 7.2623 ; 7.3434 ; 7.4218 ; 7.4144 ; 7.3114 ; 7.1867 ; 7.1464 ; 7.0942 ; 7.0669 ; 7.0279 ; 6.9742 ; 6.9014 ; 6.8041 ; 6.6768 ; 6.668]

Bolt 3 - Tensile Force (kips): [50 ; 49.8911 ; 49.8553 ; 49.8617 ; 49.9275 ; 50.062 ; 50.3226 ; 50.4948 ; 50.6725 ; 51.067 ; 52.1335 ; 53.8864 ; 56.3649 ; 57.2286 ; 58.4594 ; 58.8995 ; 59.0482 ; 59.2479 ; 59.5171 ; 59.7415 ; 59.9431 ; 60.25 ; 60.6966 ; 61.1449 ; 61.5905 ; 62.3552 ; 62.707 ; 63.2395 ; 64.017 ; 64.894 ; 66.1105 ; 67.6612 ; 68.0401 ; 68.5013 ; 69.0942 ; 69.279 ; 69.5333 ; 69.9201 ; 70.0417 ; 70.2867 ; 70.4147 ; 70.5994 ; 70.888 ; 71.3081 ; 71.8277 ; 72.4501 ; 72.4849]

Bolt 3 - Shear Force (kips): [0.0458855 ; 0.0531395 ; 0.124245 ; 0.228259 ; 0.373747 ; 0.561528 ; 0.761195 ; 0.958199 ; 1.19328 ; 1.54104 ; 1.80853 ; 2.09198 ; 2.55354 ; 2.70901 ; 2.90235 ; 2.9709 ; 3.00916 ; 3.06238 ; 3.17158 ; 3.31729 ; 3.46005 ; 3.66127 ; 4.80968 ; 6.37994 ; 7.85644 ; 9.14552 ; 9.39353 ; 9.85628 ; 9.98592 ; 10.5607 ; 11.7359 ; 13.1736 ; 13.8161 ; 14.6103 ; 15.6347 ; 16.1255 ; 17.0916 ; 18.052 ; 18.3895 ; 18.7954 ; 18.9995 ; 19.2601 ; 19.5394 ; 19.981 ; 20.5599 ; 21.4168 ; 21.4712]

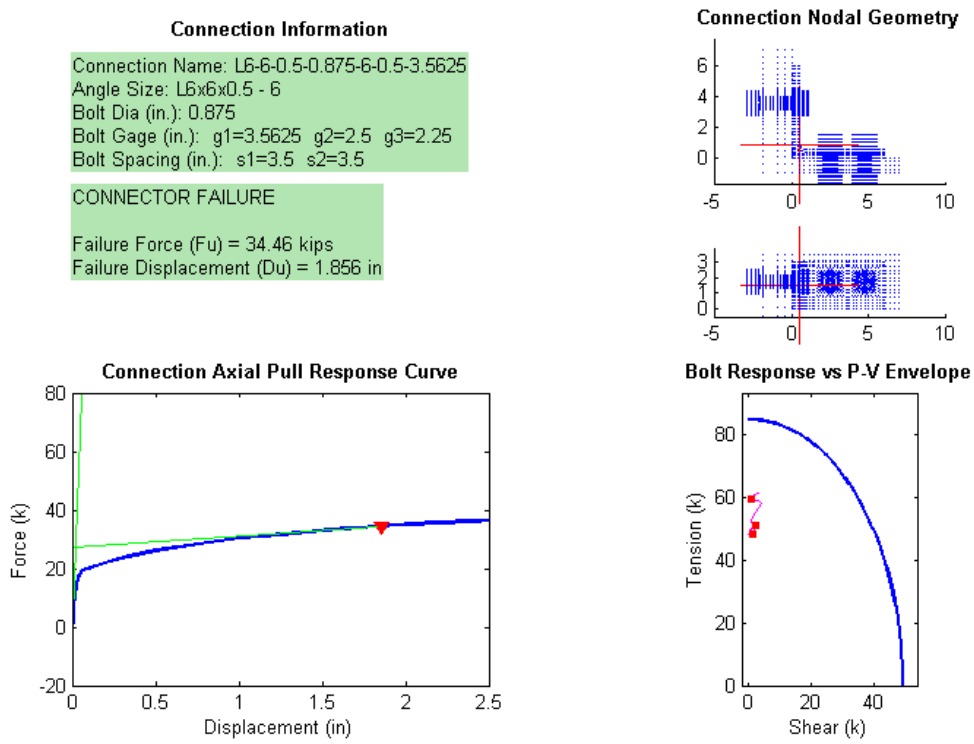


Figure B.137 Connection L6_6_0.5_0.875_6_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.875_6_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1337

Plastic Stiffness (k/in): 3.9154

Displacement (in): [4.2672e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.2549 ; 1.5049 ; 1.5205 ; 1.5439 ; 1.5791 ; 1.6318 ; 1.7109 ; 1.8296 ; 1.8741 ; 1.9408 ; 2.0409 ; 2.1911 ; 2.4164 ; 2.5]

Force (kips): [-1.42225 ; 0.389454 ; 1.18917 ; 2.26366 ; 3.66243 ; 5.49472 ; 7.47375 ; 8.92309 ; 9.64955 ; 10.0527 ; 10.484 ; 11.1483 ; 12.0385 ; 13.1131 ; 14.2507 ; 15.1419 ; 15.8646 ; 16.4611 ; 16.5013 ; 16.5639 ; 16.6452 ; 16.773 ; 16.9471 ; 17.1794 ; 17.2631 ; 17.3813 ; 17.5459 ; 17.7764 ; 18.068 ; 18.1619]

Bolt 1 - Tensile Force (kips): [48.5814 ; 48.518 ; 48.4895 ; 48.4502 ; 48.3975 ; 48.3254 ; 48.2427 ; 48.177 ; 48.1409 ; 48.1182 ; 48.0913 ; 48.0738 ; 48.044 ; 48.0215 ; 48.0316 ; 48.0486 ; 48.0746 ; 48.1032 ; 48.1046 ; 48.1067 ; 48.1107 ; 48.1171 ; 48.1276 ; 48.1449 ; 48.1517 ; 48.1621 ; 48.1787 ; 48.2048 ; 48.2464 ; 48.2625]

Bolt 1 - Shear Force (kips): [0.079797 ; 0.064783 ; 0.097324 ; 0.15167 ; 0.22942 ; 0.33889 ; 0.46608 ; 0.56972 ; 0.63422 ; 0.68443 ; 0.74842 ; 0.80685 ; 0.89917 ; 0.99756 ; 1.0741 ; 1.1399 ; 1.1931 ; 1.2456 ; 1.2495 ; 1.2552 ; 1.2628 ; 1.2732 ; 1.2876 ; 1.3069 ; 1.3139 ; 1.3238 ; 1.3372 ; 1.3552 ; 1.3783 ; 1.3861]

Bolt 2 - Tensile Force (kips): [48.5866 ; 48.5023 ; 48.4585 ; 48.3982 ; 48.3261 ; 48.2485 ; 48.1905 ; 48.1674 ; 48.175 ; 48.1928 ; 48.2404 ; 48.382 ; 48.5553 ; 48.906 ; 49.3407 ; 49.7031 ; 50.0627 ; 50.4403 ; 50.4637 ; 50.499 ; 50.5518 ; 50.6308 ; 50.7498 ; 50.931 ; 50.9983 ; 51.0994 ; 51.2532 ; 51.4872 ; 51.8288 ; 51.9506]

Bolt 2 - Shear Force (kips): [0.081958 ; 0.085171 ; 0.14139 ; 0.22556 ; 0.34229 ; 0.50423 ; 0.69101 ; 0.85355 ; 0.9754 ; 1.0696 ; 1.1923 ; 1.3423 ; 1.5435 ; 1.7066 ; 1.8048 ; 1.882 ; 1.9676 ; 2.0701 ; 2.0777 ; 2.0893 ; 2.1055 ; 2.13 ; 2.166 ; 2.2193 ; 2.2396 ; 2.2703 ; 2.3163 ; 2.3872 ; 2.4925 ; 2.5307]

Bolt 3 - Tensile Force (kips): [50 ; 49.9226 ; 49.8575 ; 49.7832 ; 49.7144 ; 49.652 ; 49.5791 ; 49.5538 ; 49.4338 ; 49.3798 ; 49.4226 ; 49.6092 ; 50.22 ; 51.196 ; 52.9491 ; 54.8055 ; 56.5291 ; 58.0927 ; 58.2077 ; 58.3648 ; 58.5386 ; 58.8316 ; 59.1778 ; 59.6271 ; 59.7945 ; 60.0139 ; 60.303 ; 60.7448 ; 61.2901 ; 61.4731]

Bolt 3 - Shear Force (kips): [0.051259 ; 0.02126 ; 0.035541 ; 0.073006 ; 0.13134 ; 0.21661 ; 0.31157 ; 0.38507 ; 0.43613 ; 0.44926 ; 0.50094 ; 0.62982 ; 0.81028 ; 1.0345 ; 0.95479 ; 1.9263 ; 3.0349 ; 3.8684 ; 3.8633 ; 3.6946 ; 3.5259 ; 2.8217 ; 1.7298 ; 0.69109 ; 0.69127 ; 0.79256 ; 1.3166 ; 2.0806 ; 3.0073 ; 3.3327]

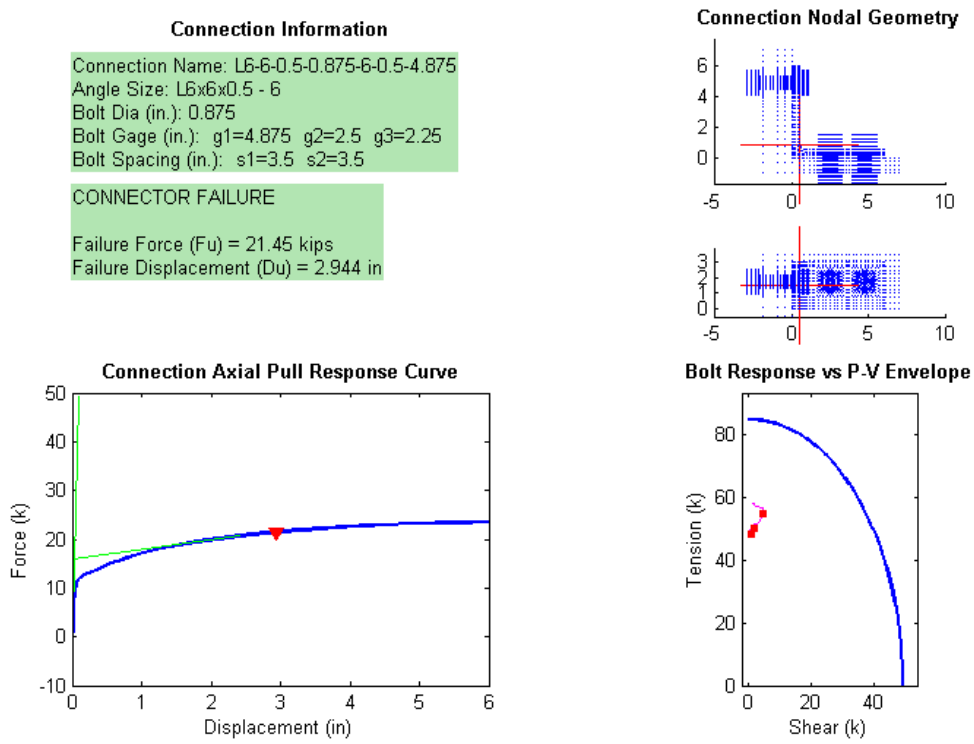


Figure B.138 Connection L6_6_0.5_0.875_6_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.875_6_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 542.2187

Plastic Stiffness (k/in): 1.9683

Displacement (in): [5.6413e-036 ; 0.0046875 ; 0.009375 ; 0.016406 ; 0.026953 ; 0.042773 ; 0.066504 ; 0.1021 ; 0.15549 ; 0.23558 ; 0.35572 ; 0.40077 ; 0.46835 ; 0.56971 ; 0.72176 ; 0.94983 ; 1.2919 ; 1.8051 ; 2.4051 ; 3.0051 ; 3.6051 ; 3.7551 ; 3.8113 ; 3.8957 ; 4.0223 ; 4.2121 ; 4.4969 ; 4.924 ; 5.524 ; 6]

Force (kips): [-1.39135 ; 0.485327 ; 1.1503 ; 2.05272 ; 3.26538 ; 4.65221 ; 5.60833 ; 5.9809 ; 6.18808 ; 6.47738 ; 6.89489 ; 7.04471 ; 7.24826 ; 7.52725 ; 7.91443 ; 8.42506 ; 9.05297 ; 9.73901 ; 10.3295 ; 10.7724 ; 11.1093 ; 11.178 ; 11.2061 ; 11.2472 ; 11.3019 ; 11.3751 ; 11.4676 ; 11.5797 ; 11.7021 ; 11.7712]

Bolt 1 - Tensile Force (kips): [48.5819 ; 48.5158 ; 48.4919 ; 48.4581 ; 48.4104 ; 48.3514 ; 48.3073 ; 48.2891 ; 48.2804 ; 48.2678 ; 48.243 ; 48.2322 ; 48.2201 ; 48.2199 ; 48.2164 ; 48.2099 ; 48.2074 ; 48.2167 ; 48.2386 ; 48.2696 ; 48.3081 ; 48.3179 ; 48.3214 ; 48.3264 ; 48.3345 ; 48.3474 ; 48.368 ; 48.4013 ; 48.4509 ; 48.4924]

Bolt 1 - Shear Force (kips): [0.079156 ; 0.069074 ; 0.098253 ; 0.14572 ; 0.21696 ; 0.30816 ; 0.38005 ; 0.41536 ; 0.43937 ; 0.47472 ; 0.53789 ; 0.56398 ; 0.59588 ; 0.61413 ; 0.64741 ; 0.69825 ; 0.76031 ; 0.83182 ; 0.90011 ; 0.9538 ; 0.99628 ; 1.0067 ; 1.011 ; 1.0176 ; 1.0266 ; 1.0391 ; 1.0561 ; 1.0781 ; 1.1046 ; 1.1221]

Bolt 2 - Tensile Force (kips): [48.5887 ; 48.4997 ; 48.4591 ; 48.407 ; 48.3523 ; 48.3165 ; 48.3176 ; 48.3217 ; 48.33 ; 48.3487 ; 48.3892 ; 48.409 ; 48.4664 ; 48.589 ; 48.7236 ; 48.9011 ; 49.2172 ; 49.6723 ; 50.0801 ; 50.4272 ; 50.7399 ; 50.8081 ; 50.8336 ; 50.8712 ; 50.9256 ; 51.0031 ; 51.1103 ; 51.2522 ; 51.4253 ; 51.5424]

Bolt 2 - Shear Force (kips): [0.080874 ; 0.094972 ; 0.14813 ; 0.22688 ; 0.34032 ; 0.48 ; 0.58937 ; 0.6365 ; 0.66647 ; 0.72462 ; 0.84534 ; 0.89631 ; 0.96776 ; 1.0388 ; 1.1376 ; 1.2653 ; 1.3843 ; 1.4726 ; 1.5388 ; 1.5933 ; 1.6524 ; 1.6674 ; 1.6736 ; 1.683 ; 1.6965 ; 1.716 ; 1.744 ; 1.7819 ; 1.8292 ; 1.8606]

Bolt 3 - Tensile Force (kips): [50 ; 49.8983 ; 49.8162 ; 49.7218 ; 49.5987 ; 49.4084 ; 49.2286 ; 48.9932 ; 48.7944 ; 48.7186 ; 48.8456 ; 48.9073 ; 49.0199 ; 49.2375 ; 49.6494 ; 50.2598 ; 51.0319 ; 52.1677 ; 53.6096 ; 54.9286 ; 56.1529 ; 56.4568 ; 56.5866 ; 56.7375 ; 56.8948 ; 57.087 ; 57.3273 ; 57.6202 ; 57.9243 ; 58.0972]

Bolt 3 - Shear Force (kips): [0.049494 ; 0.02595 ; 0.045606 ; 0.086748 ; 0.14893 ; 0.21143 ; 0.217 ; 0.15118 ; 0.092494 ; 0.11464 ; 0.19755 ; 0.23513 ; 0.29123 ; 0.37782 ; 0.48556 ; 0.63391 ; 1.6957 ; 3.0654 ; 4.0754 ; 4.5338 ; 4.6599 ; 4.6844 ; 4.6168 ; 4.274 ; 3.7872 ; 3.1078 ; 2.3455 ; 1.5778 ; 1.259 ; 1.5397]

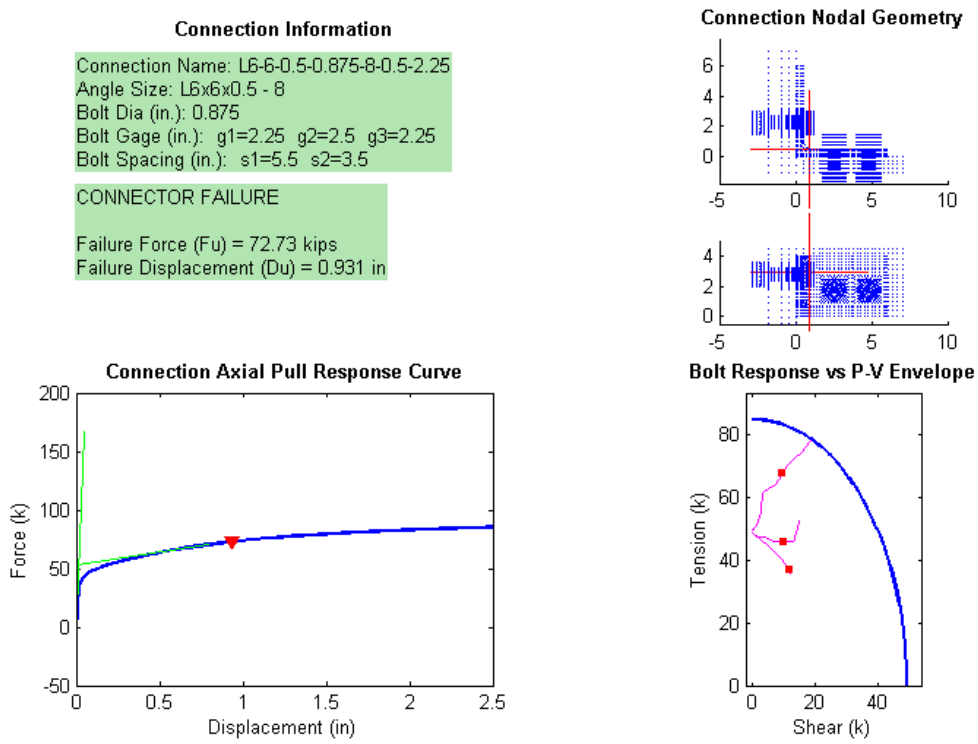


Figure B.139 Connection L6_6_0.5_0.875_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.875_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 3.2086e+003

Plastic Stiffness (k/in): 21.6794

Displacement (in): [5.3122e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.026611 ; 0.036499 ; 0.051331 ; 0.073578 ; 0.10695 ; 0.15701 ; 0.23209 ; 0.34472 ; 0.38695 ; 0.45031 ; 0.46614 ; 0.48198 ; 0.50574 ; 0.54137 ; 0.59483 ; 0.67501 ; 0.79528 ; 0.97569 ; 1.1561 ; 1.3365 ; 1.399 ; 1.4928 ; 1.5279 ; 1.5806 ; 1.6004 ; 1.6301 ; 1.6746 ; 1.7413 ; 1.7663 ; 1.8039 ; 1.818 ; 1.8391 ; 1.8708 ; 1.9183 ; 1.9895 ; 2.0964 ; 2.2568 ; 2.3169 ; 2.4072 ; 2.5]

Force (kips): [-1.32645 ; 2.34553 ; 4.94029 ; 8.1155 ; 11.9518 ; 14.8652 ; 16.8987 ; 18.8374 ; 20.3745 ; 21.6518 ; 23.0017 ; 24.4113 ; 25.8531 ; 27.4939 ; 29.4488 ; 30.0878 ; 30.9776 ; 31.2072 ; 31.4473 ; 31.7955 ; 32.2634 ; 32.9457 ; 33.877 ; 35.1807 ; 36.7538 ; 37.9328 ; 38.8885 ; 39.1842 ; 39.5904 ; 39.7338 ; 39.9672 ; 40.0491 ; 40.176 ; 40.3562 ; 40.6024 ; 40.6932 ; 40.8262 ; 40.8789 ; 40.9555 ; 41.0656 ; 41.2286 ; 41.4536 ; 41.7548 ; 42.1573 ; 42.2974 ; 42.4944 ; 42.6799]

Bolt 1 - Tensile Force (kips): [48.5781 ; 48.4339 ; 48.3265 ; 48.1885 ; 48.0085 ; 47.8609 ; 47.7514 ; 47.6383 ; 47.5341 ; 47.418 ; 47.2632 ; 47.0499 ; 46.8093 ; 46.0892 ; 44.5786 ; 44.0356 ; 43.244 ; 43.0333 ; 42.817 ; 42.4961 ; 42.0448 ; 41.3738 ; 40.3801 ; 38.8183 ; 36.8316 ; 36.5471 ; 36.463 ; 36.4378 ; 36.4048 ; 36.3928 ; 36.3776 ; 36.3718 ; 36.3533 ; 36.3066 ; 36.2784 ; 36.2685 ; 36.2545 ; 36.2492 ; 36.241 ; 36.2278 ; 36.2011 ; 36.1613 ; 36.1112 ; 36.0403 ; 36.0082 ; 35.9563 ; 35.899]

Bolt 1 - Shear Force (kips): [0.0835755 ; 0.168776 ; 0.322035 ; 0.520293 ; 0.770785 ; 0.969638 ; 1.11417 ; 1.26155 ; 1.3979 ; 1.55265 ; 1.75907 ; 2.03171 ; 2.32783 ; 3.23229 ; 4.93109 ; 5.50157 ; 6.30682 ; 6.51666 ; 6.72975 ; 7.04174 ; 7.47297 ; 8.09547 ; 8.98831 ; 10.3232 ; 11.8716 ; 12.0474 ; 12.0294 ; 12.0223 ; 12.0124 ; 12.0086 ; 12.0037 ; 12.0018 ; 12.0333 ; 12.1066 ; 12.0985 ; 12.093 ; 12.0839 ; 12.0798 ; 12.0739 ; 12.0645 ; 12.0477 ; 12.0223 ; 11.9864 ; 11.9339 ; 11.9124 ; 11.8788 ; 11.8428]

Bolt 2 - Tensile Force (kips): [48.5842 ; 48.412 ; 48.276 ; 48.1131 ; 47.9234 ; 47.7791 ; 47.6861 ; 47.5907 ; 47.5033 ; 47.4308 ; 47.357 ; 47.3462 ; 47.5543 ; 47.3501 ; 46.6185 ; 46.382 ; 46.1094 ; 46.0493 ; 45.9878 ; 45.9085 ; 45.8392 ; 45.7808 ; 45.779 ; 45.8555 ; 46.2169 ; 46.079 ; 46.0546 ; 46.0696 ; 46.1359 ; 46.1755 ; 46.4356 ; 46.5328 ; 46.7546 ; 47.1075 ; 47.4716 ; 47.6256 ; 47.8339 ; 47.9531 ; 48.1313 ; 48.3642 ; 48.6298 ; 49.0321 ; 49.7165 ; 50.7574 ; 51.1618 ; 51.7386 ; 52.3085]

Bolt 2 - Shear Force (kips): [0.07191 ; 0.20704 ; 0.401501 ; 0.650032 ; 0.961904 ; 1.20839 ; 1.39169 ; 1.58938 ; 1.79423 ; 2.0456 ; 2.3795 ; 2.7518 ; 3.06719 ; 3.89021 ; 5.36322 ; 5.83533 ; 6.45155 ; 6.59369 ; 6.73711 ; 6.94186 ; 7.21041 ; 7.58129 ; 8.07972 ; 8.79133 ; 9.69148 ; 11.0143 ; 12.1677 ; 12.5234 ; 13.0058 ; 13.1711 ; 13.2717 ; 13.3077 ; 13.3051 ; 13.282 ; 13.3923 ; 13.4585 ; 13.578 ; 13.5991 ; 13.6241 ; 13.6752 ; 13.8189 ; 14.0089 ; 14.2021 ; 14.4039 ; 14.4836 ; 14.6192 ; 14.7548]

Bolt 3 - Tensile Force (kips): [50 ; 49.8902 ; 49.8544 ; 49.8684 ; 49.9459 ; 50.0564 ; 50.2431 ; 50.5571 ; 50.8937 ; 51.2313 ; 51.6358 ; 52.4033 ; 53.7256 ; 55.7746 ; 58.6387 ; 59.5858 ; 60.8842 ; 61.1417 ; 61.3566 ; 61.6278 ; 62.0576 ; 62.6997 ; 63.8026 ; 65.7444 ; 68.4447 ; 70.2866 ; 71.7217 ; 72.1579 ; 72.7471 ; 72.9603 ; 73.2708 ; 73.3735 ; 73.5509 ; 73.8099 ; 74.1617 ; 74.2963 ; 74.5074 ; 74.5969 ; 74.7326 ; 74.9646 ; 75.3102 ; 75.7941 ; 76.4046 ; 77.2186 ; 77.5076 ; 77.93 ; 78.3194]

Bolt 3 - Shear Force (kips): [0.0522528 ; 0.0468121 ; 0.11055 ; 0.208563 ; 0.35083 ; 0.481714 ; 0.596102 ; 0.734822 ; 0.889423 ; 1.08114 ; 1.35566 ; 1.67539 ; 2.05273 ; 2.44368 ; 2.87637 ; 3.01324 ; 3.22425 ; 3.29707 ; 3.39821 ; 3.56508 ; 3.76542 ; 4.85217 ; 7.08183 ; 8.19423 ; 9.73716 ; 11.204 ; 12.4386 ; 12.9109 ; 13.5553 ; 13.7726 ; 14.3215 ; 14.4913 ; 14.7592 ; 15.0661 ; 15.4809 ; 15.6224 ; 15.8223 ; 15.9085 ; 16.0402 ; 16.1829 ; 16.4038 ; 16.7405 ; 17.1622 ; 17.7512 ; 17.9498 ; 18.2121 ; 18.4512]

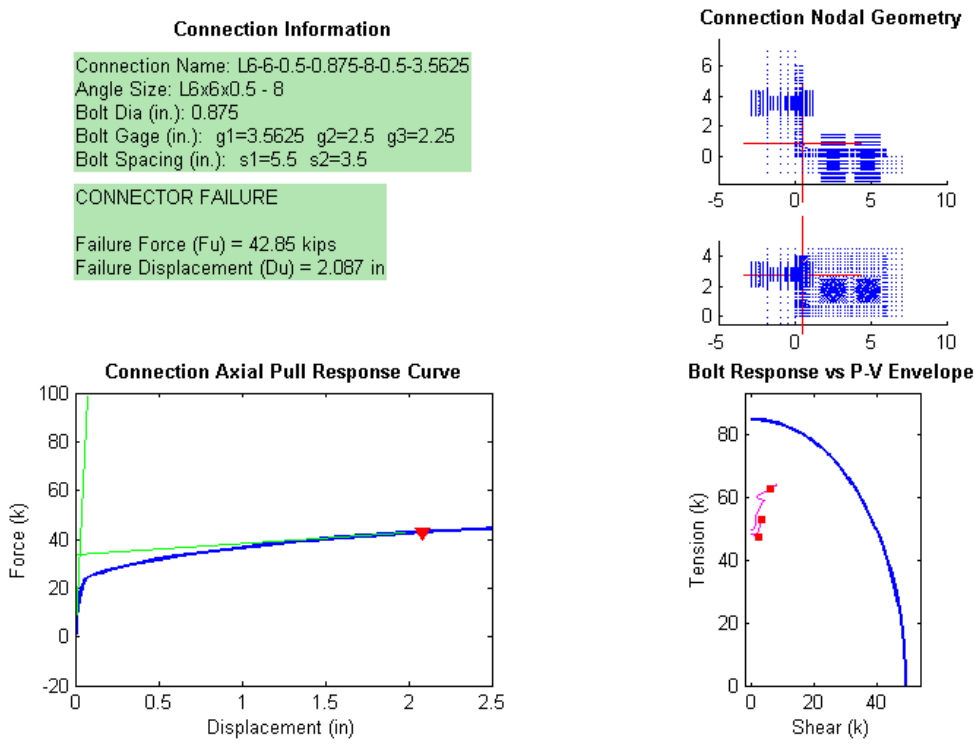


Figure B.140 Connection L6_6_0.5_0.875_8_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.875_8_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.3195e+003

Plastic Stiffness (k/in): 4.5095

Displacement (in): [5.1249e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.024414 ; 0.031006 ; 0.040894 ; 0.055725 ; 0.077972 ; 0.11134 ; 0.1614 ; 0.23649 ; 0.34911 ; 0.39135 ; 0.4547 ; 0.54973 ; 0.69227 ; 0.90609 ; 1.1561 ; 1.1717 ; 1.1951 ; 1.2303 ; 1.283 ; 1.3621 ; 1.3918 ; 1.4363 ; 1.503 ; 1.6032 ; 1.7533 ; 1.9786 ; 2.2038 ; 2.4291 ; 2.5]

Force (kips): [-1.28188 ; 0.418335 ; 1.29522 ; 2.46317 ; 3.99708 ; 6.03223 ; 7.71987 ; 9.00851 ; 10.3286 ; 11.3913 ; 12.1108 ; 12.6479 ; 13.1793 ; 13.9024 ; 14.8514 ; 15.1686 ; 15.6035 ; 16.1876 ; 16.938 ; 17.8951 ; 18.8348 ; 18.8961 ; 18.9826 ; 19.1242 ; 19.3162 ; 19.5832 ; 19.6895 ; 19.8341 ; 20.0368 ; 20.3194 ; 20.7035 ; 21.2114 ; 21.6566 ; 22.0526 ; 22.1667]

Bolt 1 - Tensile Force (kips): [48.5767 ; 48.5121 ; 48.4766 ; 48.4279 ; 48.3618 ; 48.269 ; 48.1862 ; 48.1189 ; 48.0441 ; 47.976 ; 47.9198 ; 47.8722 ; 47.823 ; 47.7748 ; 47.7123 ; 47.6922 ; 47.6661 ; 47.6351 ; 47.5991 ; 47.5567 ; 47.5178 ; 47.5149 ; 47.511 ; 47.5046 ; 47.4965 ; 47.4849 ; 47.4795 ; 47.4728 ; 47.4646 ; 47.4539 ; 47.4406 ; 47.4291 ; 47.4243 ; 47.4235 ; 47.4244]

Bolt 1 - Shear Force (kips): [0.080781 ; 0.074488 ; 0.11543 ; 0.18199 ; 0.27727 ; 0.41237 ; 0.53158 ; 0.62767 ; 0.73349 ; 0.83123 ; 0.91668 ; 0.99561 ; 1.0838 ; 1.1749 ; 1.2923 ; 1.33 ; 1.3798 ; 1.4424 ; 1.523 ; 1.636 ; 1.7509 ; 1.7584 ; 1.7689 ; 1.7854 ; 1.808 ; 1.8413 ; 1.8548 ; 1.8735 ; 1.8993 ; 1.9362 ; 1.9887 ; 2.0597 ; 2.1232 ; 2.1827 ; 2.2002]

Bolt 2 - Tensile Force (kips): [48.5795 ; 48.5055 ; 48.4549 ; 48.3851 ; 48.2994 ; 48.2057 ; 48.1424 ; 48.1073 ; 48.0829 ; 48.0855 ; 48.1077 ; 48.1505 ; 48.1905 ; 48.321 ; 48.609 ; 48.7362 ; 48.9309 ; 49.2296 ; 49.6564 ; 50.1945 ; 50.7636 ; 50.7979 ; 50.849 ; 50.9253 ; 51.0391 ; 51.2102 ; 51.2742 ; 51.3706 ; 51.5154 ; 51.7318 ; 52.0547 ; 52.5333 ; 53.0077 ; 53.4984 ; 53.6545]

Bolt 2 - Shear Force (kips): [0.06864 ; 0.074538 ; 0.14041 ; 0.2347 ; 0.36463 ; 0.5456 ; 0.70211 ; 0.82874 ; 0.97166 ; 1.1166 ; 1.2608 ; 1.3932 ; 1.5376 ; 1.7128 ; 1.9214 ; 1.9784 ; 2.0474 ; 2.1288 ; 2.2219 ; 2.3377 ; 2.4714 ; 2.4804 ; 2.4933 ; 2.5143 ; 2.5449 ; 2.5905 ; 2.6094 ; 2.6364 ; 2.6756 ; 2.7354 ; 2.828 ; 2.9629 ; 3.0914 ; 3.1938 ; 3.2226]

Bolt 3 - Tensile Force (kips): [50 ; 49.9216 ; 49.8556 ; 49.7851 ; 49.7248 ; 49.6776 ; 49.6337 ; 49.6538 ; 49.695 ; 49.7484 ; 49.787 ; 49.9159 ; 50.1825 ; 50.6146 ; 51.4314 ; 51.7709 ; 52.3261 ; 53.1582 ; 54.4177 ; 56.466 ; 58.7963 ; 58.9446 ; 59.1295 ; 59.3976 ; 59.6803 ; 60.0466 ; 60.2288 ; 60.418 ; 60.6743 ; 61.0046 ; 61.4577 ; 62.255 ; 63.0513 ; 63.8024 ; 64.0284]

Bolt 3 - Shear Force (kips): [0.055015 ; 0.024645 ; 0.036384 ; 0.071928 ; 0.13009 ; 0.21967 ; 0.29672 ; 0.35642 ; 0.42275 ; 0.49922 ; 0.57961 ; 0.66041 ; 0.76621 ; 0.94925 ; 1.1608 ; 1.1856 ; 1.1997 ; 1.2232 ; 1.3389 ; 2.5949 ; 3.944 ; 3.9058 ; 3.8066 ; 3.0627 ; 1.9777 ; 1.6372 ; 1.6833 ; 1.8234 ; 2.0711 ; 2.6794 ; 3.7098 ; 5.263 ; 6.5778 ; 7.5656 ; 7.8328]

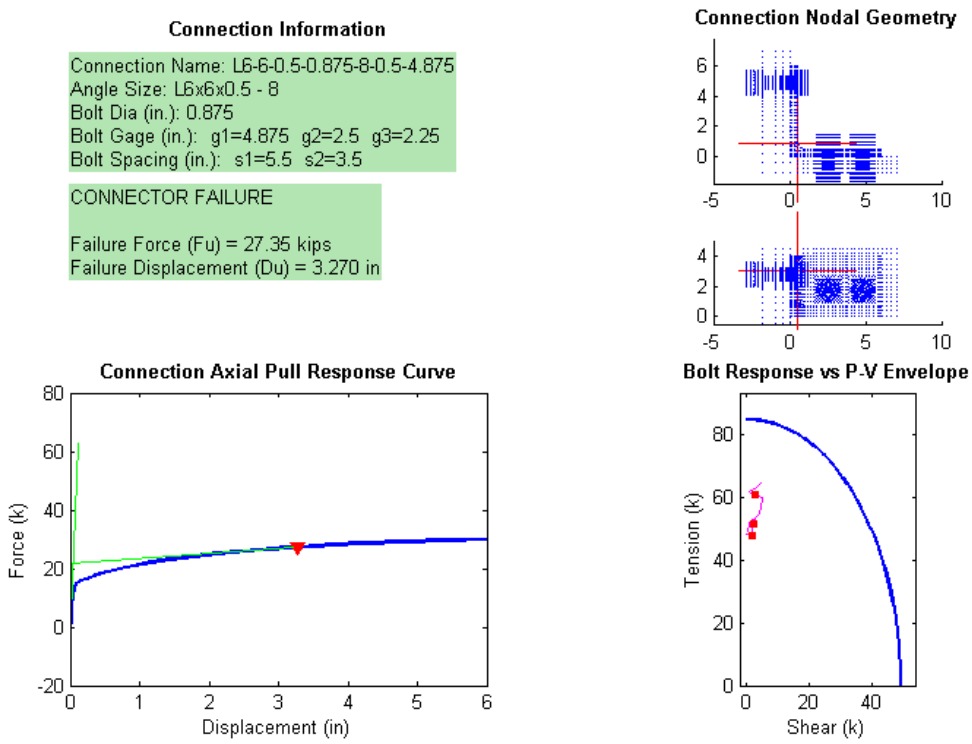


Figure B.141 Connection L6_6_0.5_0.875_8_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.875_8_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 550.9717

Plastic Stiffness (k/in): 1.7376

Displacement (in): [5.154e-036 ; 0.0046875 ; 0.009375 ; 0.016406 ; 0.026953 ; 0.042773 ; 0.066504 ; 0.1021 ; 0.15549 ; 0.23558 ; 0.35572 ; 0.53592 ; 0.80623 ; 0.90759 ; 1.0596 ; 1.2877 ; 1.6298 ; 2.143 ; 2.743 ; 2.893 ; 3.118 ; 3.2023 ; 3.3289 ; 3.5187 ; 3.8035 ; 4.2307 ; 4.8307 ; 5.4307 ; 6]

Force (kips): [-1.26378 ; 0.556711 ; 1.3189 ; 2.35863 ; 3.75726 ; 5.45145 ; 6.84936 ; 7.555 ; 7.91474 ; 8.29317 ; 8.79171 ; 9.41534 ; 10.194 ; 10.4476 ; 10.7963 ; 11.2596 ; 11.8319 ; 12.5285 ; 13.1846 ; 13.3359 ; 13.5455 ; 13.6188 ; 13.7228 ; 13.868 ; 14.0665 ; 14.3171 ; 14.5884 ; 14.7908 ; 14.9482]

Bolt 1 - Tensile Force (kips): [48.5771 ; 48.5068 ; 48.475 ; 48.4298 ; 48.3651 ; 48.2788 ; 48.198 ; 48.1512 ; 48.1264 ; 48.0958 ; 48.0412 ; 47.9767 ; 47.9216 ; 47.9013 ; 47.8744 ; 47.8396 ; 47.8043 ; 47.778 ; 47.7651 ; 47.7628 ; 47.7603 ; 47.7598 ; 47.7597 ; 47.7607 ; 47.765 ; 47.7746 ; 47.7949 ; 47.8223 ; 47.8531]

Bolt 1 - Shear Force (kips): [0.080375 ; 0.081127 ; 0.11973 ; 0.18179 ; 0.27423 ; 0.39892 ; 0.5159 ; 0.58595 ; 0.62842 ; 0.68426 ; 0.78356 ; 0.90455 ; 1.0189 ; 1.0589 ; 1.1122 ; 1.182 ; 1.2648 ; 1.3627 ; 1.4527 ; 1.4743 ; 1.5049 ; 1.5156 ; 1.5309 ; 1.552 ; 1.5805 ; 1.6194 ; 1.6681 ; 1.708 ; 1.7397]

Bolt 2 - Tensile Force (kips): [48.5808 ; 48.4974 ; 48.4462 ; 48.3795 ; 48.3085 ; 48.2571 ; 48.2475 ; 48.2582 ; 48.272 ; 48.3011 ; 48.3728 ; 48.5416 ; 48.8655 ; 49.0071 ; 49.232 ; 49.5847 ; 50.0824 ; 50.6877 ; 51.2904 ; 51.4303 ; 51.6363 ; 51.712 ; 51.8256 ; 51.992 ; 52.2217 ; 52.5293 ; 52.8909 ; 53.1912 ; 53.4427]

Bolt 2 - Shear Force (kips): [0.067889 ; 0.087396 ; 0.15162 ; 0.24444 ; 0.37689 ; 0.54848 ; 0.70689 ; 0.79669 ; 0.84608 ; 0.92895 ; 1.0928 ; 1.3197 ; 1.5373 ; 1.6032 ; 1.6788 ; 1.7625 ; 1.8489 ; 1.9524 ; 2.0655 ; 2.0951 ; 2.1394 ; 2.1549 ; 2.1788 ; 2.2142 ; 2.2662 ; 2.3398 ; 2.4332 ; 2.5103 ; 2.573]

Bolt 3 - Tensile Force (kips): [50 ; 49.8953 ; 49.8152 ; 49.7184 ; 49.5986 ; 49.4541 ; 49.4402 ; 49.4471 ; 49.5544 ; 49.7214 ; 50.0066 ; 50.592 ; 51.5886 ; 51.8883 ; 52.4309 ; 53.4532 ; 54.933 ; 57.0869 ; 59.4096 ; 59.9441 ; 60.5228 ; 60.7105 ; 60.9555 ; 61.2835 ; 61.8159 ; 62.5064 ; 63.3332 ; 63.9796 ; 64.5616]

Bolt 3 - Shear Force (kips): [0.052285 ; 0.025541 ; 0.046892 ; 0.092451 ; 0.16267 ; 0.24511 ; 0.29085 ; 0.27466 ; 0.25559 ; 0.30463 ; 0.40402 ; 0.58422 ; 0.89544 ; 1.0137 ; 1.4147 ; 2.7315 ; 4.0135 ; 4.5707 ; 5.1042 ; 4.9266 ; 3.7552 ; 3.1736 ; 2.3405 ; 1.4143 ; 0.92628 ; 1.7798 ; 2.8922 ; 3.8994 ; 4.5552]

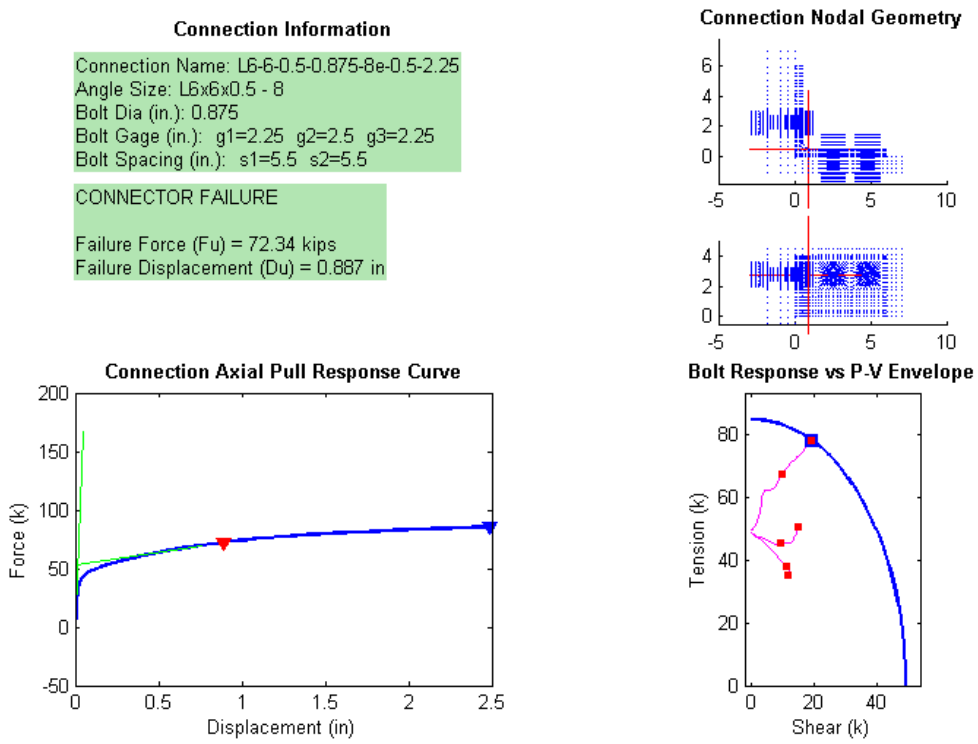


Figure B.142 Connection L6_6_0.5_0.875_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.875_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 3.3027e+003

Plastic Stiffness (k/in): 21.9453

Displacement (in): [6.2884e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.026611 ; 0.036499 ; 0.051331 ; 0.073578 ; 0.10695 ; 0.15701 ; 0.23209 ; 0.34472 ; 0.38695 ; 0.40279 ; 0.42655 ; 0.46218 ; 0.47555 ; 0.49559 ; 0.52566 ; 0.53694 ; 0.55385 ; 0.57922 ; 0.61727 ; 0.67436 ; 0.75998 ; 0.88841 ; 0.93657 ; 1.0088 ; 1.1172 ; 1.2797 ; 1.3102 ; 1.3559 ; 1.4245 ; 1.5274 ; 1.5659 ; 1.6238 ; 1.6455 ; 1.6781 ; 1.7269 ; 1.8001 ; 1.8733 ; 1.9466 ; 2.0564 ; 2.0976 ; 2.1594 ; 2.2521 ; 2.2868 ; 2.339 ; 2.4171 ; 2.5]

Force (kips): [-1.54757 ; 2.27703 ; 4.90311 ; 8.11644 ; 11.9493 ; 14.821 ; 16.842 ; 18.792 ; 20.3797 ; 21.6826 ; 23.0213 ; 24.3574 ; 25.7788 ; 27.4786 ; 29.4767 ; 30.1256 ; 30.356 ; 30.7091 ; 31.2473 ; 31.4627 ; 31.7523 ; 32.1699 ; 32.3314 ; 32.5615 ; 32.8877 ; 33.3368 ; 34.0011 ; 34.9406 ; 36.1787 ; 36.5727 ; 37.1166 ; 37.8157 ; 38.7126 ; 38.869 ; 39.0899 ; 39.3971 ; 39.8465 ; 40.0167 ; 40.2497 ; 40.3373 ; 40.4571 ; 40.6256 ; 40.8874 ; 41.141 ; 41.3803 ; 41.6942 ; 41.805 ; 41.9613 ; 42.1795 ; 42.2586 ; 42.3727 ; 42.5331 ; 42.6931]

Bolt 1 - Tensile Force (kips): [48.623 ; 48.4651 ; 48.3508 ; 48.2042 ; 48.0151 ; 47.8631 ; 47.7489 ; 47.6296 ; 47.5208 ; 47.409 ; 47.271 ; 47.1029 ; 46.8926 ; 46.3521 ; 44.7811 ; 44.2074 ; 43.9988 ; 43.6807 ; 43.2016 ; 43.0155 ; 42.7531 ; 42.3686 ; 42.2214 ; 42.004 ; 41.6845 ; 41.2248 ; 40.5011 ; 39.3926 ; 37.8298 ; 37.3058 ; 36.6004 ; 36.4466 ; 36.3385 ; 36.3188 ; 36.2914 ; 36.2531 ; 36.2008 ; 36.1815 ; 36.1535 ; 36.122 ; 36.0926 ; 36.0577 ; 36.013 ; 35.9595 ; 35.886 ; 35.7595 ; 35.7049 ; 35.6267 ; 35.5218 ; 35.4894 ; 35.4414 ; 35.3668 ; 35.2861]

Bolt 1 - Shear Force (kips): [0.0666868 ; 0.185604 ; 0.350293 ; 0.560598 ; 0.822238 ; 1.02585 ; 1.17575 ; 1.32945 ; 1.47138 ; 1.62182 ; 1.80885 ; 2.0289 ; 2.29426 ; 2.973 ; 4.75914 ; 5.35761 ; 5.57054 ; 5.89093 ; 6.36608 ; 6.54782 ; 6.8013 ; 7.16676 ; 7.30478 ; 7.50645 ; 7.79879 ; 8.2123 ; 8.84959 ; 9.78991 ; 11.0367 ; 11.4295 ; 11.9346 ; 12.0146 ; 11.9894 ; 11.9837 ; 11.9753 ; 11.963 ; 11.9459 ; 11.9395 ; 11.9302 ; 12.0099 ; 12.0198 ; 12.0194 ; 12.0009 ; 11.9738 ; 11.9384 ; 11.8789 ; 11.8538 ; 11.8164 ; 11.7642 ; 11.747 ; 11.7216 ; 11.6827 ; 11.6409]

Bolt 2 - Tensile Force (kips): [48.6466 ; 48.4574 ; 48.3183 ; 48.1523 ; 47.9552 ; 47.8131 ; 47.705 ; 47.6013 ; 47.4879 ; 47.3762 ; 47.2189 ; 47.1327 ; 47.2117 ; 47.0894 ; 46.2756 ; 46.0059 ; 45.915 ; 45.7798 ; 45.5873 ; 45.5151 ; 45.428 ; 45.3224 ; 45.2846 ; 45.2408 ; 45.2 ; 45.178 ; 45.1561 ; 45.1779 ; 45.3445 ; 45.4293 ; 45.562 ; 45.4592 ; 45.37 ; 45.353 ; 45.34 ; 45.3496 ; 45.5855 ; 45.7596 ; 46.0226 ; 46.2127 ; 46.3629 ; 46.55 ; 46.9754 ; 47.4061 ; 47.7522 ; 48.2262 ; 48.4427 ; 48.7805 ; 49.2707 ; 49.4516 ; 49.7161 ; 50.1028 ; 50.4752]

Bolt 2 - Shear Force (kips): [0.106851 ; 0.188884 ; 0.377587 ; 0.621872 ; 0.924582 ; 1.16013 ; 1.33606 ; 1.52675 ; 1.73034 ; 1.98047 ; 2.30777 ; 2.63581 ; 2.91547 ; 3.52917 ; 5.09322 ; 5.60231 ; 5.7807 ; 6.04415 ; 6.43124 ; 6.57606 ; 6.77356 ; 7.04572 ; 7.14416 ; 7.28139 ; 7.46721 ; 7.71937 ; 8.09542 ; 8.62518 ; 9.31573 ; 9.55123 ; 9.89988 ; 10.6906 ; 11.7713 ; 11.9611 ; 12.2294 ; 12.5966 ; 12.956 ; 13.0229 ; 13.1159 ; 13.0815 ; 13.1286 ; 13.2225 ; 13.333 ; 13.5051 ; 13.7408 ; 14.1039 ; 14.2049 ; 14.337 ; 14.5149 ; 14.5741 ; 14.6584 ; 14.7811 ; 14.9326]

Bolt 3 - Tensile Force (kips): [50 ; 49.8934 ; 49.8555 ; 49.8697 ; 49.951 ; 50.0598 ; 50.2374 ; 50.5511 ; 50.8934 ; 51.2347 ; 51.6497 ; 52.4299 ; 53.7158 ; 55.7072 ; 58.5534 ; 59.5182 ; 59.8679 ; 60.3518 ; 60.9309 ; 61.0997 ; 61.3561 ; 61.7335 ; 61.8786 ; 62.0906 ; 62.3894 ; 62.8366 ; 63.7009 ; 65.0568 ; 67.2233 ; 67.9169 ; 68.7924 ; 69.8753 ; 71.2206 ; 71.4753 ; 71.7776 ; 72.2067 ; 72.9375 ; 73.1676 ; 73.4964 ; 73.6212 ; 73.8111 ; 74.0809 ; 74.6295 ; 75.1622 ; 75.6516 ; 76.2341 ; 76.4456 ; 76.7664 ; 77.2394 ; 77.4184 ; 77.6917 ; 78.0684 ; 78.4287]

Bolt 3 - Shear Force (kips): [0.062679 ; 0.033896 ; 0.104274 ; 0.203614 ; 0.346875 ; 0.477931 ; 0.593127 ; 0.732121 ; 0.886008 ; 1.08101 ; 1.3545 ; 1.65861 ; 2.06095 ; 2.52957 ; 2.98739 ; 3.11398 ; 3.15768 ; 3.24419 ; 3.42115 ; 3.52767 ; 3.6431 ; 3.82216 ; 3.93815 ; 4.1798 ; 5.36418 ; 6.77072 ; 7.66021 ; 8.44225 ; 9.53502 ; 9.95734 ; 10.769 ; 11.5442 ; 12.5492 ; 12.805 ; 13.1932 ; 13.703 ; 14.4985 ; 14.9189 ; 15.4225 ; 15.5879 ; 15.7938 ; 16.0439 ; 16.3744 ; 16.7563 ; 17.102 ; 17.5157 ; 17.6825 ; 17.9016 ; 18.1973 ; 18.2948 ; 18.4322 ; 18.6207 ; 18.8385]

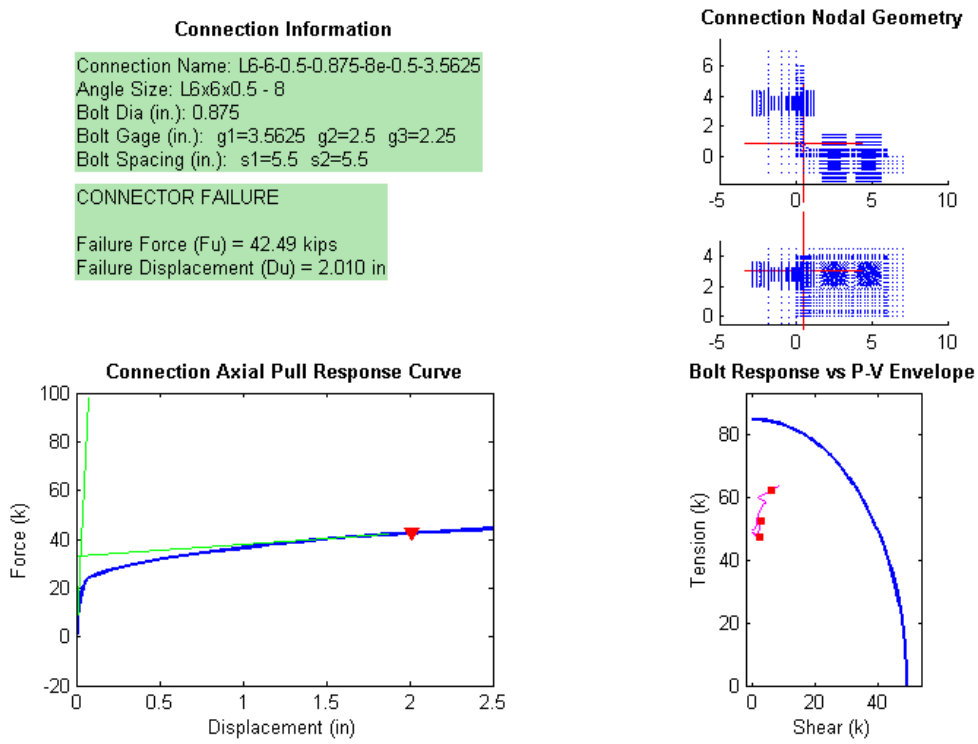


Figure B.143 Connection L6_6_0.5_0.875_8e_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.875_8e_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.3606e+003

Plastic Stiffness (k/in): 4.8082

Displacement (in): [7.1676e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.024414 ; 0.031006 ; 0.040894 ; 0.055725 ; 0.077972 ; 0.11134 ; 0.1614 ; 0.23649 ; 0.34911 ; 0.51805 ; 0.76805 ; 1.018 ; 1.0805 ; 1.104 ; 1.1392 ; 1.1919 ; 1.2117 ; 1.2413 ; 1.2858 ; 1.3526 ; 1.3776 ; 1.4151 ; 1.4714 ; 1.5559 ; 1.6826 ; 1.8727 ; 2.1227 ; 2.3727 ; 2.5]

Force (kips): [-1.41126 ; 0.369907 ; 1.24607 ; 2.41092 ; 3.94069 ; 5.96638 ; 7.63 ; 8.90763 ; 10.2363 ; 11.3288 ; 12.0774 ; 12.6307 ; 13.163 ; 13.8696 ; 14.8137 ; 15.9554 ; 17.2508 ; 18.3052 ; 18.5422 ; 18.6271 ; 18.7591 ; 18.9584 ; 19.039 ; 19.153 ; 19.3062 ; 19.534 ; 19.6188 ; 19.7494 ; 19.926 ; 20.1673 ; 20.5065 ; 20.9634 ; 21.4805 ; 21.9315 ; 22.1384]

Bolt 1 - Tensile Force (kips): [48.6212 ; 48.5479 ; 48.5096 ; 48.4572 ; 48.3861 ; 48.2867 ; 48.1993 ; 48.1277 ; 48.0474 ; 47.9759 ; 47.9218 ; 47.8796 ; 47.843 ; 47.8113 ; 47.7597 ; 47.6972 ; 47.6225 ; 47.5537 ; 47.5382 ; 47.5327 ; 47.5238 ; 47.5105 ; 47.5052 ; 47.4975 ; 47.4866 ; 47.469 ; 47.4623 ; 47.4512 ; 47.4366 ; 47.4168 ; 47.3863 ; 47.3485 ; 47.3055 ; 47.2658 ; 47.2466]

Bolt 1 - Shear Force (kips): [0.058812 ; 0.07823 ; 0.13014 ; 0.20594 ; 0.31113 ; 0.45773 ; 0.58462 ; 0.68703 ; 0.80047 ; 0.90404 ; 0.98884 ; 1.063 ; 1.1345 ; 1.203 ; 1.3077 ; 1.4313 ; 1.5863 ; 1.7217 ; 1.7522 ; 1.7632 ; 1.7797 ; 1.804 ; 1.8134 ; 1.827 ; 1.8462 ; 1.875 ; 1.8855 ; 1.9022 ; 1.9251 ; 1.9573 ; 2.0045 ; 2.0692 ; 2.145 ; 2.2132 ; 2.2457]

Bolt 2 - Tensile Force (kips): [48.6399 ; 48.5515 ; 48.5025 ; 48.4365 ; 48.3554 ; 48.2691 ; 48.2103 ; 48.1784 ; 48.1639 ; 48.1631 ; 48.1876 ; 48.2297 ; 48.2846 ; 48.4273 ; 48.7084 ; 49.1891 ; 49.8653 ; 50.4299 ; 50.5621 ; 50.6113 ; 50.6843 ; 50.7925 ; 50.8332 ; 50.8945 ; 50.987 ; 51.1233 ; 51.1742 ; 51.2509 ; 51.3658 ; 51.538 ; 51.7982 ; 52.1733 ; 52.644 ; 53.1184 ; 53.3602]

Bolt 2 - Shear Force (kips): [0.098363 ; 0.073425 ; 0.12646 ; 0.2101 ; 0.32837 ; 0.49459 ; 0.63689 ; 0.75188 ; 0.88159 ; 1.0167 ; 1.156 ; 1.2871 ; 1.4188 ; 1.5651 ; 1.7596 ; 1.9273 ; 2.0903 ; 2.2261 ; 2.2598 ; 2.2726 ; 2.2926 ; 2.3241 ; 2.337 ; 2.3559 ; 2.3836 ; 2.4268 ; 2.4432 ; 2.4692 ; 2.5073 ; 2.5633 ; 2.6501 ; 2.7833 ; 2.9575 ; 3.1242 ; 3.2062]

Bolt 3 - Tensile Force (kips): [50 ; 49.9238 ; 49.8575 ; 49.7848 ; 49.7216 ; 49.6727 ; 49.6315 ; 49.6445 ; 49.685 ; 49.7349 ; 49.754 ; 49.8466 ; 50.0991 ; 50.5338 ; 51.3453 ; 52.8709 ; 55.0636 ; 57.493 ; 58.1029 ; 58.3207 ; 58.6393 ; 59.0352 ; 59.1889 ; 59.3634 ; 59.5444 ; 59.8401 ; 59.9579 ; 60.1232 ; 60.3648 ; 60.6163 ; 61.0189 ; 61.6923 ; 62.564 ; 63.3906 ; 63.7905]

Bolt 3 - Shear Force (kips): [0.067303 ; 0.030645 ; 0.025299 ; 0.060387 ; 0.12198 ; 0.21116 ; 0.28794 ; 0.34737 ; 0.41499 ; 0.49337 ; 0.58623 ; 0.68654 ; 0.79726 ; 0.97342 ; 1.1856 ; 1.2152 ; 1.4958 ; 3.2476 ; 3.8815 ; 4.0712 ; 4.0722 ; 3.5929 ; 3.1274 ; 2.3756 ; 1.7294 ; 1.7162 ; 1.8044 ; 1.9245 ; 2.1216 ; 2.7138 ; 3.5975 ; 4.9444 ; 6.531 ; 7.6125 ; 8.1039]

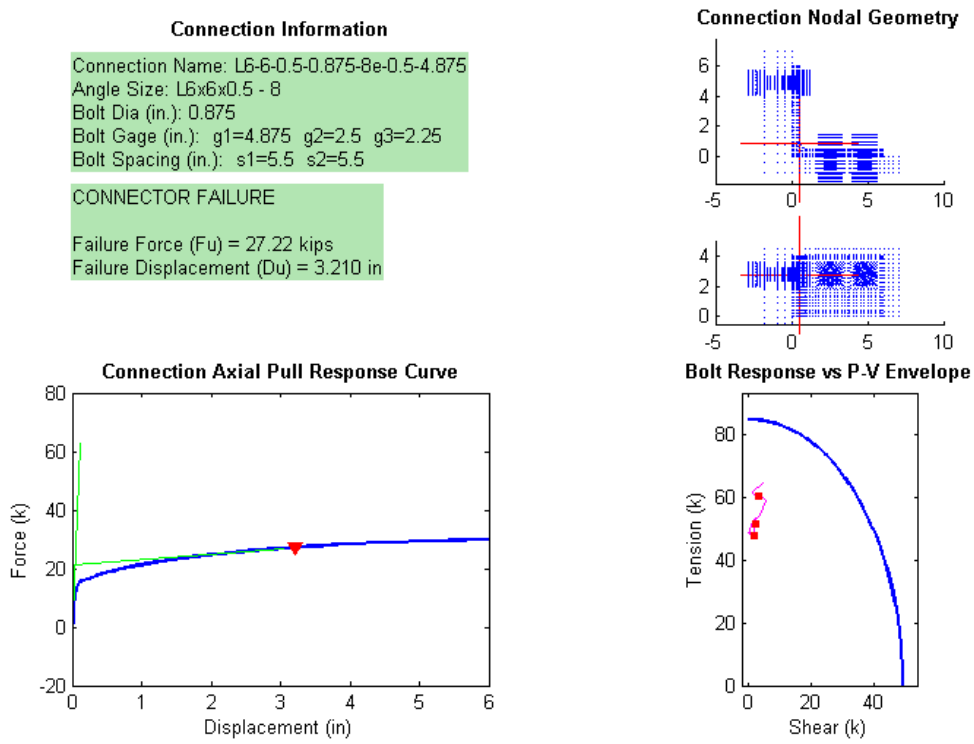


Figure B.144 Connection L6_6_0.5_0.875_8e_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.5_0.875_8e_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 568.2112

Plastic Stiffness (k/in): 1.8835

Displacement (in): [5.5233e-036 ; 0.0046875 ; 0.009375 ; 0.016406 ; 0.026953 ; 0.042773 ; 0.066504 ; 0.1021 ; 0.15549 ; 0.23558 ; 0.35572 ; 0.53592 ; 0.6035 ; 0.70486 ; 0.85691 ; 1.085 ; 1.4271 ; 1.7692 ; 2.1113 ; 2.6244 ; 2.7744 ; 2.8307 ; 2.9151 ; 3.0416 ; 3.2315 ; 3.5162 ; 3.9434 ; 4.5434 ; 5.1434 ; 5.2934 ; 5.5184 ; 5.8559 ; 6]

Force (kips): [-1.37638 ; 0.531627 ; 1.28711 ; 2.31814 ; 3.7046 ; 5.38186 ; 6.80396 ; 7.55439 ; 7.92172 ; 8.2945 ; 8.78673 ; 9.40188 ; 9.61253 ; 9.9074 ; 10.3085 ; 10.8325 ; 11.4904 ; 12.0276 ; 12.4787 ; 13.0472 ; 13.2042 ; 13.2577 ; 13.3448 ; 13.464 ; 13.6293 ; 13.8518 ; 14.1408 ; 14.4595 ; 14.6913 ; 14.741 ; 14.8106 ; 14.9058 ; 14.943]

Bolt 1 - Tensile Force (kips): [48.6224 ; 48.5421 ; 48.5068 ; 48.457 ; 48.3859 ; 48.2923 ; 48.2025 ; 48.1503 ; 48.1254 ; 48.0971 ; 48.0459 ; 48.0066 ; 47.9949 ; 47.9773 ; 47.9498 ; 47.9076 ; 47.8585 ; 47.8239 ; 47.7973 ; 47.7668 ; 47.7573 ; 47.7542 ; 47.7483 ; 47.7403 ; 47.7292 ; 47.7122 ; 47.6931 ; 47.6726 ; 47.665 ; 47.6635 ; 47.6625 ; 47.6638 ; 47.6651]

Bolt 1 - Shear Force (kips): [0.057715 ; 0.088816 ; 0.13811 ; 0.21118 ; 0.31623 ; 0.4547 ; 0.58576 ; 0.66528 ; 0.71011 ; 0.76558 ; 0.8636 ; 0.94919 ; 0.97594 ; 1.0156 ; 1.074 ; 1.1549 ; 1.2562 ; 1.3366 ; 1.4052 ; 1.4914 ; 1.5164 ; 1.525 ; 1.5391 ; 1.5589 ; 1.5863 ; 1.6246 ; 1.674 ; 1.735 ; 1.7875 ; 1.8004 ; 1.8185 ; 1.8432 ; 1.8533]

Bolt 2 - Tensile Force (kips): [48.6438 ; 48.5457 ; 48.4991 ; 48.4389 ; 48.3769 ; 48.333 ; 48.3397 ; 48.3577 ; 48.3683 ; 48.3976 ; 48.4619 ; 48.6795 ; 48.7577 ; 48.8794 ; 49.0744 ; 49.3991 ; 49.8837 ; 50.3261 ; 50.7098 ; 51.2133 ; 51.3545 ; 51.4057 ; 51.4848 ; 51.602 ; 51.7737 ; 52.0192 ; 52.3545 ; 52.7504 ; 53.0703 ; 53.1427 ; 53.2453 ; 53.3891 ; 53.4464]

Bolt 2 - Shear Force (kips): [0.096948 ; 0.08413 ; 0.13434 ; 0.21299 ; 0.32799 ; 0.47757 ; 0.61704 ; 0.70267 ; 0.75317 ; 0.83603 ; 0.99858 ; 1.1813 ; 1.2355 ; 1.3101 ; 1.4108 ; 1.5212 ; 1.6331 ; 1.7077 ; 1.7687 ; 1.8552 ; 1.8837 ; 1.8942 ; 1.9118 ; 1.938 ; 1.9775 ; 2.0377 ; 2.1249 ; 2.2387 ; 2.3396 ; 2.3635 ; 2.3978 ; 2.4457 ; 2.4651]

Bolt 3 - Tensile Force (kips): [50 ; 49.8977 ; 49.8158 ; 49.7164 ; 49.5954 ; 49.4493 ; 49.4241 ; 49.4212 ; 49.5247 ; 49.6899 ; 49.956 ; 50.5095 ; 50.7432 ; 51.1064 ; 51.6144 ; 52.4402 ; 53.9849 ; 55.4644 ; 56.8802 ; 58.8922 ; 59.4384 ; 59.6221 ; 59.8951 ; 60.2252 ; 60.6313 ; 61.1369 ; 61.9104 ; 62.8179 ; 63.5457 ; 63.7186 ; 63.9617 ; 64.3152 ; 64.4664]

Bolt 3 - Shear Force (kips): [0.06473 ; 0.025945 ; 0.036364 ; 0.083177 ; 0.1543 ; 0.23686 ; 0.28788 ; 0.2807 ; 0.26237 ; 0.30955 ; 0.41431 ; 0.60388 ; 0.67713 ; 0.79441 ; 0.97174 ; 1.4049 ; 3.1494 ; 4.2493 ; 4.5811 ; 5.24 ; 5.1323 ; 5.1255 ; 4.707 ; 3.9753 ; 2.8394 ; 1.4317 ; 1.23 ; 2.3904 ; 3.5329 ; 3.7777 ; 4.0867 ; 4.4664 ; 4.6162]

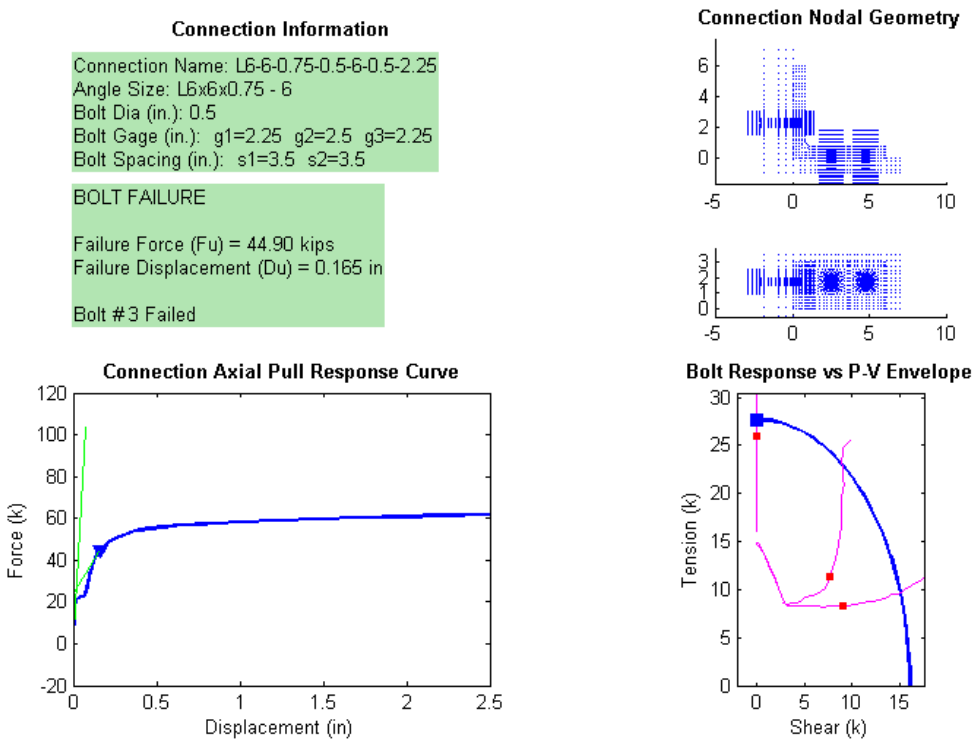


Figure B.145 Connection L6_6_0.75_0.5_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.5_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.3559e+003

Plastic Stiffness (k/in): 129.6606

Displacement (in): [7.3913e-037 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.035156 ; 0.052734 ; 0.059326 ; 0.061798 ; 0.065506 ; 0.066896 ; 0.068982 ; 0.072111 ; 0.073284 ; 0.075044 ; 0.075704 ; 0.076693 ; 0.078178 ; 0.080406 ; 0.083746 ; 0.088758 ; 0.090637 ; 0.093456 ; 0.097684 ; 0.10403 ; 0.10641 ; 0.10997 ; 0.11532 ; 0.12335 ; 0.13539 ; 0.15345 ; 0.18054 ; 0.22118 ; 0.28214 ; 0.37357 ; 0.40786 ; 0.45929 ; 0.53644 ; 0.65216 ; 0.69556 ; 0.76065 ; 0.85829 ; 1.0048 ; 1.2244 ; 1.4744 ; 1.7244 ; 1.9744 ; 2.2244 ; 2.4744 ; 2.5]

Force (kips): [-0.211752 ; 9.20346 ; 10.3811 ; 10.6943 ; 11.0495 ; 11.2341 ; 11.2427 ; 11.2427 ; 11.2423 ; 11.2423 ; 11.3078 ; 11.5712 ; 11.5714 ; 11.5988 ; 11.8372 ; 12.1563 ; 12.5794 ; 13.073 ; 13.6924 ; 14.6494 ; 14.9064 ; 15.5112 ; 16.2385 ; 17.0707 ; 17.3523 ; 17.8137 ; 18.5036 ; 19.4912 ; 20.7562 ; 21.9271 ; 23.185 ; 24.5004 ; 25.7059 ; 27.0357 ; 27.2687 ; 27.5628 ; 27.9243 ; 28.342 ; 28.4726 ; 28.6361 ; 28.8369 ; 29.1091 ; 29.4623 ; 29.8067 ; 30.1071 ; 30.3749 ; 30.6133 ; 30.8259 ; 30.847]

Bolt 1 - Tensile Force (kips): [14.9136 ; 14.6263 ; 13.7459 ; 12.6306 ; 10.9408 ; 8.83101 ; 8.65737 ; 8.65705 ; 8.65663 ; 8.65652 ; 8.55189 ; 8.40038 ; 8.40032 ; 8.39776 ; 8.37572 ; 8.37114 ; 8.36032 ; 8.35804 ; 8.3581 ; 8.34871 ; 8.35926 ; 8.34055 ; 8.31686 ; 8.30079 ; 8.29042 ; 8.27164 ; 8.22267 ; 8.24094 ; 8.32785 ; 8.34226 ; 8.33699 ; 8.38802 ; 8.54968 ; 8.77192 ; 8.83263 ; 8.87189 ; 9.06691 ; 9.4367 ; 9.51036 ; 9.57981 ; 9.69332 ; 9.99793 ; 10.4282 ; 10.7867 ; 11.052 ; 11.3715 ; 11.7449 ; 12.0942 ; 12.1255]

Bolt 1 - Shear Force (kips): [0.0128893 ; 0.265398 ; 0.757955 ; 1.28164 ; 2.01403 ; 2.79673 ; 2.85688 ; 2.85681 ; 2.85668 ; 2.85665 ; 2.93965 ; 3.09967 ; 3.09973 ; 3.12715 ; 3.28361 ; 3.41546 ; 3.62373 ; 3.84491 ; 4.15007 ; 4.53582 ; 4.61466 ; 5.03245 ; 5.42921 ; 5.79297 ; 5.95066 ; 6.2991 ; 6.91472 ; 7.62522 ; 8.19714 ; 8.80447 ; 9.52544 ; 10.3053 ; 10.976 ; 11.9385 ; 12.2756 ; 12.8116 ; 13.3746 ; 13.9644 ; 14.2536 ; 14.634 ; 15.0506 ; 15.4869 ; 16.1211 ; 16.7573 ; 17.3144 ; 17.7701 ; 18.1446 ; 18.4505 ; 18.4783]

Bolt 2 - Tensile Force (kips): [14.9227 ; 14.6815 ; 13.8203 ; 12.7192 ; 11.0567 ; 8.98641 ; 8.7366 ; 8.73644 ; 8.73617 ; 8.7362 ; 8.70339 ; 8.50942 ; 8.50944 ; 8.5113 ; 8.51756 ; 8.51906 ; 8.5487 ; 8.58787 ; 8.67465 ; 8.82372 ; 8.89535 ; 9.05136 ; 9.22925 ; 9.30225 ; 9.32368 ; 9.38203 ; 9.50656 ; 9.74841 ; 10.1941 ; 10.889 ; 11.8446 ; 13.132 ; 14.6979 ; 16.7492 ; 17.4302 ; 18.3312 ; 19.406 ; 20.6044 ; 20.9793 ; 21.4214 ; 21.9474 ; 22.6368 ; 23.5199 ; 24.1833 ; 24.6938 ; 25.0704 ; 25.3408 ; 25.5737 ; 25.5955]

Bolt 2 - Shear Force (kips): [0.012587 ; 0.27391 ; 0.76213 ; 1.2838 ; 2.0132 ; 2.7944 ; 2.8826 ; 2.8829 ; 2.8829 ; 2.8829 ; 2.9115 ; 3.1375 ; 3.1377 ; 3.1382 ; 3.2282 ; 3.4189 ; 3.6257 ; 3.8866 ; 4.1618 ; 4.6378 ; 4.7668 ; 4.8981 ; 5.2054 ; 5.7379 ; 5.9036 ; 6.0582 ; 6.2157 ; 6.5382 ; 7.1476 ; 7.5427 ; 7.8725 ; 8.2119 ; 8.5415 ; 8.82 ; 8.8271 ; 8.8249 ; 8.9237 ; 9.103 ; 9.109 ; 9.1041 ; 9.0846 ; 9.0487 ; 8.9422 ; 8.985 ; 9.0317 ; 9.3037 ; 9.5754 ; 9.817 ; 9.8402]

Bolt 3 - Tensile Force (kips): [16 ; 16.6025 ; 16.8095 ; 16.8715 ; 16.9476 ; 16.9943 ; 16.997 ; 16.9965 ; 16.9955 ; 16.9952 ; 17.0119 ; 17.0786 ; 17.0785 ; 17.0853 ; 17.1476 ; 17.2372 ; 17.3654 ; 17.5317 ; 17.7727 ; 18.2046 ; 18.3381 ; 18.6777 ; 19.1818 ; 19.92 ; 20.2003 ; 20.67 ; 21.3963 ; 22.4648 ; 23.8896 ; 25.2935 ; 26.9376 ; 28.6304 ; 29.9764 ; 31.3255 ; 31.4443 ; 31.5506 ; 31.662 ; 31.7884 ; 31.8264 ; 31.8739 ; 31.9301 ; 31.9918 ; 32.0538 ; 32.1044 ; 32.1471 ; 32.1848 ; 32.2181 ; 32.2478 ; 32.2506]

Bolt 3 - Shear Force (kips): [0.0051879 ; 0.040244 ; 0.047023 ; 0.048806 ; 0.050665 ; 0.051423 ; 0.051442 ; 0.05144 ; 0.051431 ; 0.051436 ; 0.051669 ; 0.052741 ; 0.052747 ; 0.052827 ; 0.053671 ; 0.054711 ; 0.055932 ; 0.056739 ; 0.056903 ; 0.05775 ; 0.058771 ; 0.062078 ; 0.067529 ; 0.075448 ; 0.078139 ; 0.082478 ; 0.088102 ; 0.090513 ; 0.071629 ; 0.063119 ; 0.07141 ; 0.047207 ; 0.04303 ; 0.022137 ; 0.019285 ; 0.016941 ; 0.015336 ; 0.012475 ; 0.011218 ; 0.0092907 ; 0.0073787 ; 0.0053515 ; 0.0045254 ; 0.0045706 ; 0.0049364 ; 0.0054312 ; 0.0055718 ; 0.0058554 ; 0.0058872]

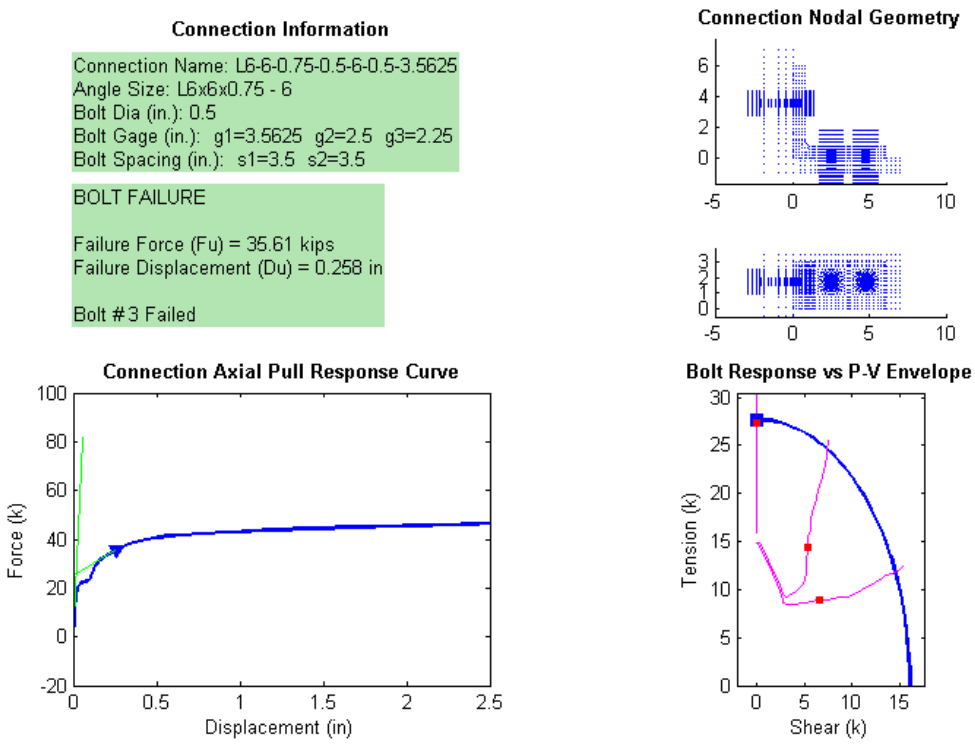


Figure B.146 Connection L6_6_0.75_0.5_6_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.5_6_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.4887e+003

Plastic Stiffness (k/in): 40.4584

Displacement (in): [6.7985e-037 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.073132 ; 0.07626 ; 0.080953 ; 0.087992 ; 0.090632 ; 0.094591 ; 0.096076 ; 0.098303 ; 0.10164 ; 0.10666 ; 0.11417 ; 0.11699 ; 0.12122 ; 0.12756 ; 0.13708 ; 0.15135 ; 0.17275 ; 0.20486 ; 0.25302 ; 0.27108 ; 0.29818 ; 0.33881 ; 0.39977 ; 0.4912 ; 0.52549 ; 0.57692 ; 0.65407 ; 0.76979 ; 0.94337 ; 1.1934 ; 1.4434 ; 1.6934 ; 1.9434 ; 2.0059 ; 2.0996 ; 2.1348 ; 2.1875 ; 2.2666 ; 2.3853 ; 2.5]

Force (kips): [-0.21343 ; 1.44042 ; 2.69417 ; 4.24954 ; 6.12391 ; 8.31677 ; 10.1851 ; 10.76 ; 11.2764 ; 11.3669 ; 11.3932 ; 11.4226 ; 11.4415 ; 11.4737 ; 11.6125 ; 11.6152 ; 11.7308 ; 12.1181 ; 12.5995 ; 13.2002 ; 13.3961 ; 13.6779 ; 14.1089 ; 14.621 ; 15.2615 ; 15.997 ; 16.7395 ; 17.7138 ; 18.0468 ; 18.4875 ; 18.9941 ; 19.565 ; 20.2369 ; 20.4327 ; 20.6414 ; 20.857 ; 21.1281 ; 21.4535 ; 21.8227 ; 22.1479 ; 22.4213 ; 22.6617 ; 22.7175 ; 22.7988 ; 22.8296 ; 22.8758 ; 22.9415 ; 23.0747 ; 23.1932]

Bolt 1 - Tensile Force (kips): [14.9123 ; 14.877 ; 14.8445 ; 14.799 ; 14.732 ; 14.6361 ; 14.2461 ; 12.4637 ; 9.76341 ; 8.9149 ; 8.66342 ; 8.66422 ; 8.66486 ; 8.60116 ; 8.41917 ; 8.41936 ; 8.42317 ; 8.40133 ; 8.41883 ; 8.45405 ; 8.4711 ; 8.49193 ; 8.50862 ; 8.5602 ; 8.63052 ; 8.6544 ; 8.74384 ; 8.84752 ; 8.84054 ; 8.86995 ; 9.00026 ; 9.19919 ; 9.29264 ; 9.35504 ; 9.47404 ; 9.68669 ; 9.96837 ; 10.3548 ; 10.6896 ; 11.0177 ; 11.4777 ; 11.7234 ; 11.773 ; 11.867 ; 11.9078 ; 11.9767 ; 12.0854 ; 12.236 ; 12.3742]

Bolt 1 - Shear Force (kips): [0.0130555 ; 0.0423063 ; 0.0799177 ; 0.128182 ; 0.187575 ; 0.260885 ; 0.501096 ; 1.35876 ; 2.46885 ; 2.77129 ; 2.85832 ; 2.85908 ; 2.85939 ; 2.91019 ; 3.10108 ; 3.10124 ; 3.10764 ; 3.31588 ; 3.51864 ; 3.84306 ; 3.91525 ; 4.03598 ; 4.35891 ; 4.58027 ; 4.71526 ; 5.26119 ; 5.71526 ; 6.38168 ; 6.87596 ; 7.54486 ; 8.12705 ; 8.72649 ; 9.67116 ; 9.92583 ; 10.1973 ; 10.4969 ; 11.0207 ; 11.6093 ; 12.3806 ; 13.0432 ; 13.5193 ; 14.2546 ; 14.4234 ; 14.6535 ; 14.7273 ; 14.8172 ; 14.9324 ; 15.1493 ; 15.3421]

Bolt 2 - Tensile Force (kips): [14.9202 ; 14.8894 ; 14.863 ; 14.8359 ; 14.8184 ; 14.8351 ; 14.6466 ; 13.0224 ; 10.6434 ; 9.95784 ; 9.73263 ; 9.40765 ; 9.18961 ; 9.19483 ; 9.22005 ; 9.21645 ; 9.1534 ; 9.30178 ; 9.49933 ; 9.73758 ; 9.81405 ; 9.93948 ; 10.1708 ; 10.46 ; 11.0213 ; 11.8479 ; 12.9129 ; 14.3142 ; 14.801 ; 15.4534 ; 16.2981 ; 17.2862 ; 18.2284 ; 18.5462 ; 18.9719 ; 19.5402 ; 20.3112 ; 21.2096 ; 22.281 ; 23.2369 ; 23.879 ; 24.4375 ; 24.5673 ; 24.7539 ; 24.8219 ; 24.9216 ; 25.0644 ; 25.2861 ; 25.4908]

Bolt 2 - Shear Force (kips): [0.012635 ; 0.044878 ; 0.083548 ; 0.13284 ; 0.19238 ; 0.26243 ; 0.48045 ; 1.3174 ; 2.4078 ; 2.7051 ; 2.8028 ; 2.94 ; 3.0316 ; 3.034 ; 3.0425 ; 3.0464 ; 3.1846 ; 3.3622 ; 3.6477 ; 3.9602 ; 4.1023 ; 4.2983 ; 4.4216 ; 4.6924 ; 5.0495 ; 5.1724 ; 5.2741 ; 5.3521 ; 5.3431 ; 5.4407 ; 5.6155 ; 5.6738 ; 5.8218 ; 5.9359 ; 6.0608 ; 6.2784 ; 6.4752 ; 6.7746 ; 6.9786 ; 7.17 ; 7.3595 ; 7.3996 ; 7.4025 ; 7.4079 ; 7.4105 ; 7.4187 ; 7.44 ; 7.4463 ; 7.4538]

Bolt 3 - Tensile Force (kips): [16 ; 15.9849 ; 16.0218 ; 16.163 ; 16.4739 ; 16.9802 ; 17.6193 ; 17.8815 ; 18.1702 ; 18.2337 ; 18.2538 ; 18.278 ; 18.2938 ; 18.314 ; 18.4046 ; 18.4063 ; 18.4892 ; 18.7973 ; 19.2645 ; 19.9495 ; 20.1883 ; 20.5408 ; 21.112 ; 21.8871 ; 23.0003 ; 24.3175 ; 25.6343 ; 27.2755 ; 27.7909 ; 28.4278 ; 29.1133 ; 29.9028 ; 30.9048 ; 31.1672 ; 31.3932 ; 31.5218 ; 31.6422 ; 31.7614 ; 31.8516 ; 31.8964 ; 31.921 ; 31.9359 ; 31.9389 ; 31.943 ; 31.9458 ; 31.9507 ; 31.9546 ; 31.8941 ; 31.839]

Bolt 3 - Shear Force (kips): [0.00884 ; 0.0026833 ; 0.011687 ; 0.025296 ; 0.03855 ; 0.054476 ; 0.064058 ; 0.064672 ; 0.065553 ; 0.066 ; 0.066177 ; 0.066395 ; 0.066543 ; 0.066721 ; 0.06751 ; 0.067526 ; 0.068259 ; 0.071956 ; 0.07823 ; 0.088328 ; 0.091777 ; 0.09679 ; 0.10417 ; 0.11168 ; 0.1079 ; 0.092874 ; 0.092139 ; 0.093457 ; 0.083542 ; 0.071906 ; 0.064866 ; 0.064564 ; 0.056946 ; 0.043713 ; 0.029159 ; 0.024957 ; 0.021367 ; 0.015879 ; 0.010304 ; 0.0076738 ; 0.007383 ; 0.0080024 ; 0.0081755 ; 0.0084233 ; 0.01392 ; 0.028345 ; 0.039148 ; 0.37181 ; 0.71563]

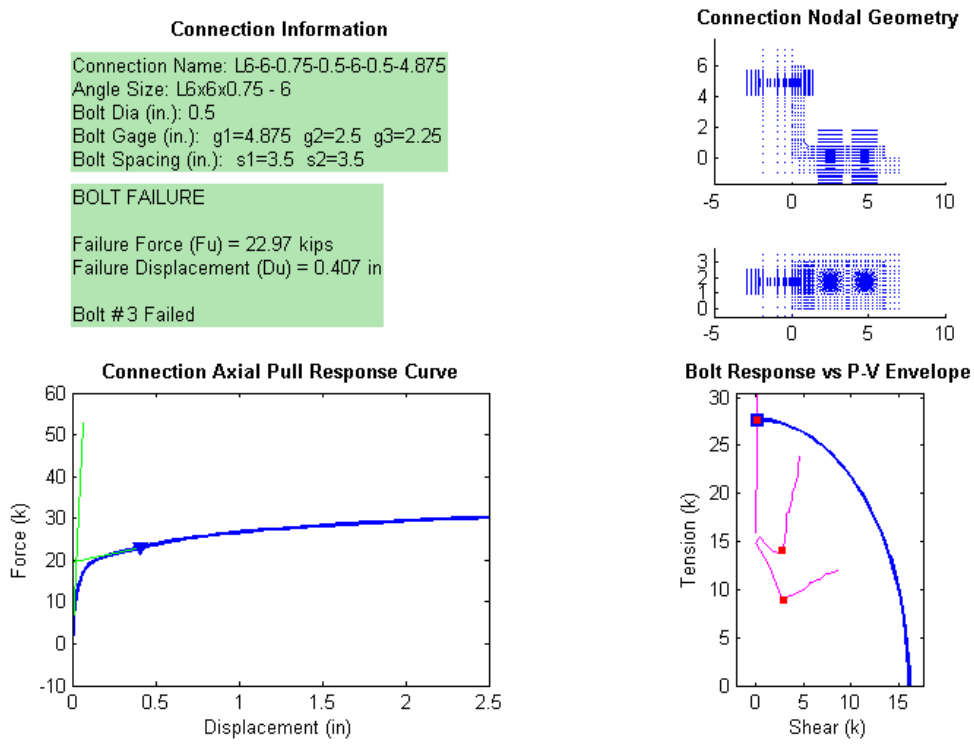


Figure B.147 Connection L6_6_0.75_0.5_6_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.5_6_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 765.5798

Plastic Stiffness (k/in): 8.4622

Displacement (in): [6.3788e-037 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.53655 ; 0.57218 ; 0.62564 ; 0.70581 ; 0.73588 ; 0.78099 ; 0.84864 ; 0.87401 ; 0.91206 ; 0.96914 ; 1.0548 ; 1.1832 ; 1.2314 ; 1.3036 ; 1.3104 ; 1.3205 ; 1.3358 ; 1.3586 ; 1.3929 ; 1.4444 ; 1.5215 ; 1.6372 ; 1.8108 ; 2.0608 ; 2.1233 ; 2.2171 ; 2.2522 ; 2.3049 ; 2.384 ; 2.5]

Force (kips): [-0.199573 ; 0.64598 ; 1.2957 ; 2.14586 ; 3.24393 ; 4.58917 ; 6.00559 ; 7.23297 ; 8.39756 ; 9.40769 ; 10.0306 ; 10.5976 ; 11.162 ; 11.3407 ; 11.6578 ; 12.0359 ; 12.1593 ; 12.3411 ; 12.5919 ; 12.6831 ; 12.8117 ; 12.9833 ; 13.0452 ; 13.1355 ; 13.2585 ; 13.4225 ; 13.6452 ; 13.7148 ; 13.8118 ; 13.8209 ; 13.8369 ; 13.8617 ; 13.8969 ; 13.9463 ; 14.0239 ; 14.1315 ; 14.273 ; 14.4661 ; 14.719 ; 14.779 ; 14.867 ; 14.9029 ; 14.953 ; 15.0237 ; 15.1207]

Bolt 1 - Tensile Force (kips): [14.9124 ; 14.8959 ; 14.8806 ; 14.8586 ; 14.827 ; 14.7809 ; 14.7196 ; 14.6486 ; 14.4533 ; 14.1698 ; 12.5059 ; 10.5593 ; 8.8224 ; 8.88893 ; 8.95446 ; 9.06452 ; 9.09822 ; 9.13165 ; 9.24882 ; 9.30154 ; 9.37034 ; 9.4979 ; 9.5515 ; 9.64107 ; 9.7408 ; 9.86742 ; 10.1493 ; 10.277 ; 10.4473 ; 10.4627 ; 10.4855 ; 10.5174 ; 10.5637 ; 10.6309 ; 10.6986 ; 10.7619 ; 10.8723 ; 11.105 ; 11.5034 ; 11.5909 ; 11.6897 ; 11.7191 ; 11.7623 ; 11.8421 ; 11.9818]

Bolt 1 - Shear Force (kips): [0.012617 ; 0.020611 ; 0.039571 ; 0.06611 ; 0.10228 ; 0.14886 ; 0.20238 ; 0.25808 ; 0.39062 ; 0.55379 ; 1.3567 ; 2.2072 ; 2.9104 ; 2.9333 ; 2.9549 ; 2.9913 ; 3.0162 ; 3.1547 ; 3.3474 ; 3.532 ; 3.827 ; 4.1045 ; 4.1816 ; 4.284 ; 4.4934 ; 4.7828 ; 5.2008 ; 5.3315 ; 5.4846 ; 5.4975 ; 5.5161 ; 5.5412 ; 5.5772 ; 5.627 ; 5.7306 ; 5.9323 ; 6.2045 ; 6.6752 ; 7.1882 ; 7.3323 ; 7.68 ; 7.8134 ; 8.0002 ; 8.2522 ; 8.5472]

Bolt 2 - Tensile Force (kips): [14.9203 ; 14.9081 ; 14.896 ; 14.8832 ; 14.8756 ; 14.8869 ; 14.9466 ; 15.1063 ; 15.2866 ; 15.5111 ; 14.662 ; 13.9902 ; 13.8269 ; 13.7457 ; 14.4298 ; 15.3136 ; 15.6241 ; 16.0631 ; 16.6798 ; 16.9007 ; 17.2139 ; 17.6741 ; 17.8358 ; 18.0493 ; 18.3788 ; 18.8702 ; 19.5495 ; 19.7896 ; 20.1407 ; 20.173 ; 20.2214 ; 20.2876 ; 20.3824 ; 20.5179 ; 20.7187 ; 21.0098 ; 21.4312 ; 22.0184 ; 22.7712 ; 22.9471 ; 23.178 ; 23.2542 ; 23.3632 ; 23.5279 ; 23.7837]

Bolt 2 - Shear Force (kips): [0.012258 ; 0.02245 ; 0.041911 ; 0.069009 ; 0.10582 ; 0.15196 ; 0.20258 ; 0.24669 ; 0.33928 ; 0.44165 ; 1.1525 ; 1.879 ; 2.5062 ; 2.7045 ; 2.9221 ; 3.0889 ; 3.1344 ; 3.1947 ; 3.2352 ; 3.2304 ; 3.218 ; 3.2268 ; 3.2803 ; 3.4784 ; 3.6176 ; 3.7184 ; 3.8464 ; 3.8769 ; 3.9146 ; 3.918 ; 3.9232 ; 3.9445 ; 3.9802 ; 4.0366 ; 4.0992 ; 4.2299 ; 4.3612 ; 4.4197 ; 4.4553 ; 4.4584 ; 4.4731 ; 4.4983 ; 4.5364 ; 4.5826 ; 4.6192]

Bolt 3 - Tensile Force (kips): [16 ; 15.9815 ; 15.983 ; 16.0233 ; 16.1662 ; 16.4989 ; 17.1625 ; 18.2564 ; 19.5356 ; 21.2731 ; 23.0508 ; 24.973 ; 26.7891 ; 27.3257 ; 28.1645 ; 29.0337 ; 29.2685 ; 29.5999 ; 30.0506 ; 30.2056 ; 30.4213 ; 30.6952 ; 30.773 ; 30.8839 ; 31.0323 ; 31.2009 ; 31.1874 ; 31.1799 ; 31.1891 ; 31.1902 ; 31.1994 ; 31.2165 ; 31.2353 ; 31.2546 ; 31.2043 ; 31.1841 ; 31.1981 ; 31.2188 ; 31.1609 ; 31.1316 ; 31.1242 ; 31.134 ; 31.1418 ; 31.1483 ; 31.1564]

Bolt 3 - Shear Force (kips): [0.0095115 ; 0.0024701 ; 0.004373 ; 0.012963 ; 0.025575 ; 0.037215 ; 0.050269 ; 0.059819 ; 0.092198 ; 0.13983 ; 0.14874 ; 0.14423 ; 0.1493 ; 0.14405 ; 0.13367 ; 0.12314 ; 0.12294 ; 0.12416 ; 0.12169 ; 0.11862 ; 0.11229 ; 0.10377 ; 0.10465 ; 0.10338 ; 0.10948 ; 0.16421 ; 0.74158 ; 0.88124 ; 1.0068 ; 1.0164 ; 1.0184 ; 1.0274 ; 1.0436 ; 1.0748 ; 1.3643 ; 1.551 ; 1.716 ; 1.9089 ; 2.3142 ; 2.4397 ; 2.5519 ; 2.5887 ; 2.6475 ; 2.7308 ; 2.8436]

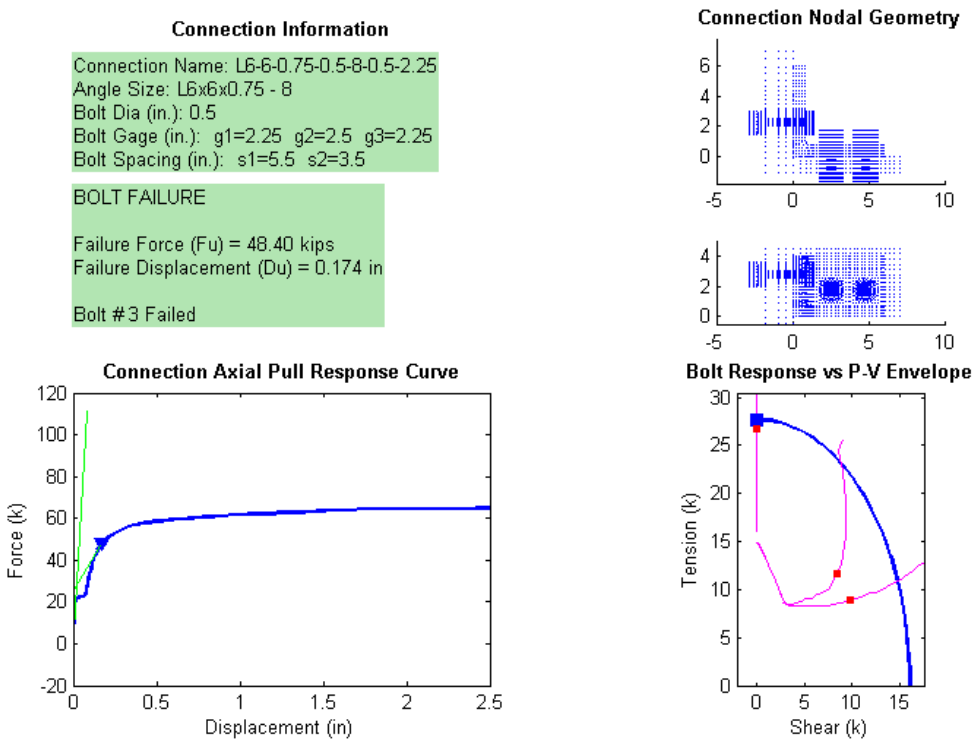


Figure B.148 Connection L6_6_0.75_0.5_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.5_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.3569e+003

Plastic Stiffness (k/in): 133.4111

Displacement (in): [5.3523e-037 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.035156 ; 0.052734 ; 0.059326 ; 0.061798 ; 0.065506 ; 0.066896 ; 0.067418 ; 0.0682 ; 0.069373 ; 0.071133 ; 0.073773 ; 0.074763 ; 0.076247 ; 0.076804 ; 0.077639 ; 0.078892 ; 0.080771 ; 0.08359 ; 0.087819 ; 0.089404 ; 0.091783 ; 0.09535 ; 0.1007 ; 0.10271 ; 0.10572 ; 0.11023 ; 0.11701 ; 0.12717 ; 0.13098 ; 0.13669 ; 0.14526 ; 0.15812 ; 0.17741 ; 0.20634 ; 0.24973 ; 0.31483 ; 0.33924 ; 0.37585 ; 0.43077 ; 0.51316 ; 0.63673 ; 0.8221 ; 0.8846 ; 0.97835 ; 1.119 ; 1.3299 ; 1.5799 ; 1.8299 ; 2.0799 ; 2.3299 ; 2.5]

Force (kips): [-0.178264 ; 9.31742 ; 10.4222 ; 10.7321 ; 11.0786 ; 11.2493 ; 11.2548 ; 11.2548 ; 11.2544 ; 11.2544 ; 11.2585 ; 11.3261 ; 11.4725 ; 11.5868 ; 11.5872 ; 11.7591 ; 12.2485 ; 12.4324 ; 12.7029 ; 12.9793 ; 13.2575 ; 13.9769 ; 14.6629 ; 14.9514 ; 15.4884 ; 16.1598 ; 16.9105 ; 17.1531 ; 17.5907 ; 18.2484 ; 19.2172 ; 20.6633 ; 21.111 ; 21.7063 ; 22.4366 ; 23.2943 ; 24.3735 ; 25.4668 ; 26.4489 ; 27.657 ; 28.0557 ; 28.4633 ; 28.8571 ; 29.3381 ; 29.8954 ; 30.4203 ; 30.5732 ; 30.7906 ; 31.0836 ; 31.4685 ; 31.866 ; 32.1829 ; 32.2578 ; 32.3257 ; 32.3683]

Bolt 1 - Tensile Force (kips): [14.9096 ; 14.587 ; 13.6697 ; 12.5448 ; 10.8489 ; 8.75999 ; 8.65399 ; 8.65364 ; 8.65321 ; 8.6531 ; 8.64736 ; 8.56868 ; 8.46413 ; 8.4092 ; 8.40925 ; 8.39145 ; 8.37561 ; 8.3675 ; 8.36034 ; 8.35938 ; 8.37138 ; 8.34408 ; 8.35099 ; 8.35123 ; 8.3245 ; 8.30209 ; 8.28869 ; 8.29053 ; 8.28676 ; 8.27946 ; 8.33657 ; 8.45769 ; 8.52109 ; 8.56912 ; 8.62567 ; 8.74487 ; 8.89333 ; 9.04978 ; 9.24304 ; 9.55528 ; 9.60117 ; 9.6455 ; 9.76004 ; 10.0743 ; 10.5176 ; 10.9221 ; 11.0793 ; 11.3173 ; 11.6151 ; 11.9617 ; 12.3632 ; 12.6872 ; 12.7206 ; 12.7516 ; 12.7717]

Bolt 1 - Shear Force (kips): [0.0118518 ; 0.286486 ; 0.790972 ; 1.31646 ; 2.04759 ; 2.8188 ; 2.85578 ; 2.85569 ; 2.85556 ; 2.85552 ; 2.86152 ; 2.93833 ; 3.04787 ; 3.10634 ; 3.1065 ; 3.23241 ; 3.45608 ; 3.56829 ; 3.69009 ; 3.81463 ; 3.9359 ; 4.30792 ; 4.58655 ; 4.74068 ; 5.14138 ; 5.44088 ; 5.77861 ; 5.89214 ; 6.21094 ; 6.75889 ; 7.44278 ; 8.0853 ; 8.24238 ; 8.54403 ; 8.95275 ; 9.40322 ; 9.93429 ; 10.379 ; 10.9549 ; 11.6354 ; 11.9344 ; 12.3571 ; 12.8736 ; 13.3978 ; 14.0789 ; 14.8899 ; 15.09 ; 15.403 ; 15.8318 ; 16.3773 ; 16.8592 ; 17.2698 ; 17.3076 ; 17.3405 ; 17.3609]

Bolt 2 - Tensile Force (kips): [14.9183 ; 14.6445 ; 13.7414 ; 12.6263 ; 10.9479 ; 8.87817 ; 8.71242 ; 8.71235 ; 8.71209 ; 8.71211 ; 8.71235 ; 8.67643 ; 8.57563 ; 8.47358 ; 8.47352 ; 8.47479 ; 8.46917 ; 8.47641 ; 8.48711 ; 8.51133 ; 8.55216 ; 8.62149 ; 8.73811 ; 8.80182 ; 8.92371 ; 9.02306 ; 9.10149 ; 9.13515 ; 9.20201 ; 9.32 ; 9.51449 ; 9.85547 ; 10.0018 ; 10.2383 ; 10.5928 ; 11.0786 ; 11.7795 ; 12.6426 ; 13.816 ; 15.4555 ; 16.0223 ; 16.8234 ; 17.9292 ; 19.3158 ; 20.8424 ; 22.1346 ; 22.4931 ; 22.9937 ; 23.6608 ; 24.4266 ; 25.0614 ; 25.4575 ; 25.4792 ; 25.4977 ; 25.5089]

Bolt 2 - Shear Force (kips): [0.010227 ; 0.28958 ; 0.79054 ; 1.3147 ; 2.0443 ; 2.8165 ; 2.8748 ; 2.875 ; 2.875 ; 2.875 ; 2.8751 ; 2.9045 ; 3.0146 ; 3.1307 ; 3.1309 ; 3.1854 ; 3.4641 ; 3.5365 ; 3.6856 ; 3.8323 ; 3.9761 ; 4.3014 ; 4.6586 ; 4.7639 ; 4.868 ; 5.2481 ; 5.7373 ; 5.8986 ; 6.0409 ; 6.1936 ; 6.489 ; 7.2033 ; 7.4383 ; 7.6574 ; 7.8682 ; 8.1147 ; 8.4119 ; 8.8056 ; 9.0971 ; 9.2837 ; 9.3148 ; 9.3246 ; 9.3422 ; 9.3265 ; 9.2463 ; 9.0413 ; 8.9736 ; 8.8754 ; 8.7408 ; 8.6419 ; 8.6966 ; 9.0035 ; 9.033 ; 9.058 ; 9.0732]

Bolt 3 - Tensile Force (kips): [16 ; 16.5691 ; 16.7495 ; 16.8055 ; 16.8713 ; 16.9079 ; 16.9089 ; 16.9084 ; 16.9074 ; 16.9071 ; 16.9088 ; 16.9229 ; 16.9544 ; 16.9793 ; 16.979 ; 17.0197 ; 17.1431 ; 17.1948 ; 17.2717 ; 17.3581 ; 17.4526 ; 17.7315 ; 18.055 ; 18.2037 ; 18.5105 ; 18.9568 ; 19.556 ; 19.7721 ; 20.1735 ; 20.7953 ; 21.7323 ; 23.1731 ; 23.6211 ; 24.1985 ; 24.8894 ; 25.7275 ; 26.9269 ; 28.2734 ; 29.389 ; 30.6471 ; 31.0411 ; 31.3508 ; 31.4998 ; 31.6332 ; 31.7755 ; 31.9129 ; 31.9455 ; 31.9849 ; 32.0287 ; 32.079 ; 32.1262 ; 32.1719 ; 32.2509 ; 32.3229 ; 32.3683]

Bolt 3 - Shear Force (kips): [0.0060305 ; 0.038157 ; 0.043842 ; 0.045445 ; 0.047292 ; 0.048145 ; 0.048165 ; 0.048167 ; 0.048161 ; 0.048166 ; 0.048188 ; 0.048476 ; 0.049119 ; 0.049616 ; 0.049635 ; 0.050215 ; 0.051835 ; 0.052322 ; 0.053003 ; 0.053592 ; 0.053954 ; 0.05362 ; 0.05287 ; 0.053004 ; 0.05474 ; 0.058491 ; 0.064618 ; 0.066699 ; 0.070333 ; 0.075697 ; 0.081988 ; 0.075575 ; 0.068271 ; 0.061382 ; 0.057101 ; 0.058256 ; 0.065603 ; 0.045347 ; 0.039475 ; 0.044719 ; 0.037056 ; 0.021497 ; 0.018139 ; 0.015952 ; 0.013037 ; 0.0081963 ; 0.0067868 ; 0.0052946 ; 0.0045124 ; 0.004227 ; 0.0045052 ; 0.0044344 ; 0.0013987 ; 0.0012477 ; 0.0013659]

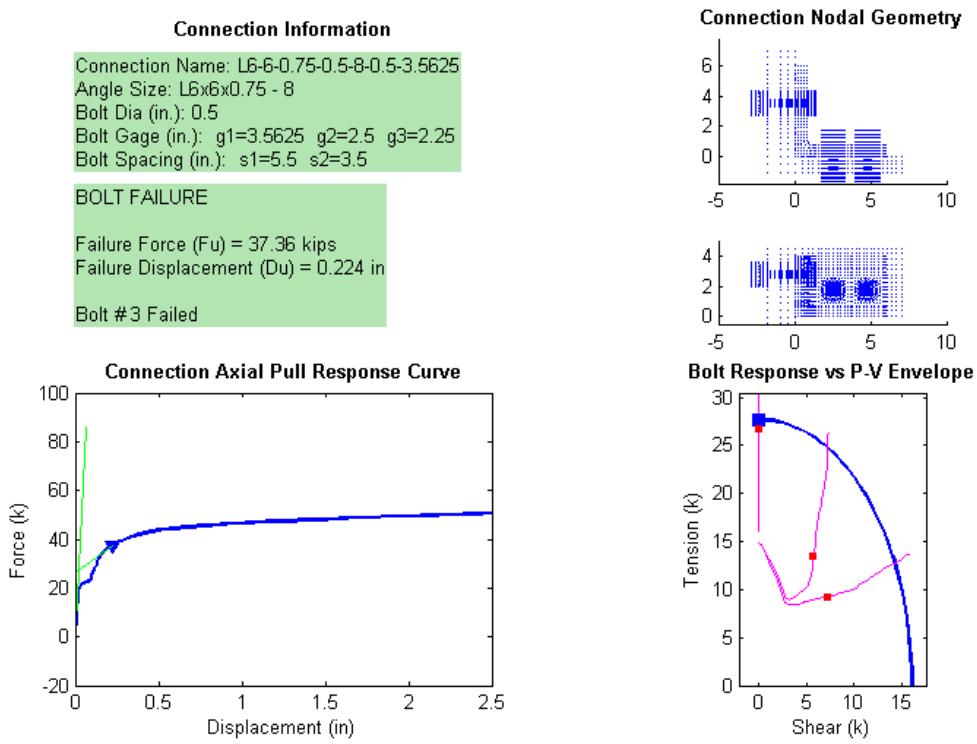


Figure B.149 Connection L6_6_0.75_0.5_8_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.5_8_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.2603e+003

Plastic Stiffness (k/in): 48.8897

Displacement (in): [5.9218e-037 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.072601 ; 0.080944 ; 0.084073 ; 0.085246 ; 0.087006 ; 0.089645 ; 0.093605 ; 0.099544 ; 0.10845 ; 0.11068 ; 0.11291 ; 0.11625 ; 0.12126 ; 0.12878 ; 0.1316 ; 0.13582 ; 0.14217 ; 0.15168 ; 0.16595 ; 0.18736 ; 0.21946 ; 0.26763 ; 0.28569 ; 0.31278 ; 0.35342 ; 0.41437 ; 0.50581 ; 0.54009 ; 0.59153 ; 0.66867 ; 0.78439 ; 0.95798 ; 1.208 ; 1.458 ; 1.708 ; 1.958 ; 2.0205 ; 2.1142 ; 2.2548 ; 2.3955 ; 2.5]

Force (kips): [-0.191707 ; 5.04686 ; 5.96218 ; 6.77099 ; 7.86674 ; 9.23493 ; 10.1888 ; 10.5865 ; 11.0375 ; 11.3133 ; 11.3385 ; 11.3383 ; 11.3546 ; 11.4537 ; 11.5254 ; 11.7217 ; 12.4553 ; 13.3456 ; 13.5361 ; 13.7485 ; 14.0579 ; 14.478 ; 15.0645 ; 15.2911 ; 15.6364 ; 16.0834 ; 16.6175 ; 17.1948 ; 17.7996 ; 18.5845 ; 19.5522 ; 19.8347 ; 20.2048 ; 20.6876 ; 21.3148 ; 21.9244 ; 22.0633 ; 22.2358 ; 22.4667 ; 22.7749 ; 23.1773 ; 23.6397 ; 24.0224 ; 24.3736 ; 24.6881 ; 24.7617 ; 24.8674 ; 25.028 ; 25.2122 ; 25.3284]

Bolt 1 - Tensile Force (kips): [14.9082 ; 14.7535 ; 14.7165 ; 14.681 ; 14.6288 ; 14.5399 ; 14.0947 ; 12.8623 ; 10.9431 ; 8.65781 ; 8.65724 ; 8.65657 ; 8.62863 ; 8.4944 ; 8.41419 ; 8.41958 ; 8.40303 ; 8.45882 ; 8.47487 ; 8.48452 ; 8.50085 ; 8.54408 ; 8.6393 ; 8.68939 ; 8.71718 ; 8.75631 ; 8.83835 ; 8.95477 ; 9.06529 ; 9.14409 ; 9.36248 ; 9.48769 ; 9.64975 ; 9.76015 ; 9.97847 ; 10.2768 ; 10.3807 ; 10.5401 ; 10.7798 ; 11.1222 ; 11.447 ; 11.8944 ; 12.4393 ; 12.7387 ; 13.088 ; 13.1703 ; 13.2984 ; 13.4745 ; 13.6075 ; 13.6949]

Bolt 1 - Shear Force (kips): [0.0123619 ; 0.162354 ; 0.192818 ; 0.220268 ; 0.258278 ; 0.318277 ; 0.575739 ; 1.17204 ; 2.00997 ; 2.85655 ; 2.85684 ; 2.85666 ; 2.8812 ; 3.01834 ; 3.10515 ; 3.10774 ; 3.53763 ; 3.92224 ; 3.98798 ; 4.12081 ; 4.3358 ; 4.51836 ; 4.69412 ; 4.77083 ; 5.00568 ; 5.29035 ; 5.59404 ; 5.88982 ; 6.19968 ; 7.04692 ; 8.02675 ; 8.24612 ; 8.61984 ; 9.30232 ; 9.95644 ; 10.3475 ; 10.4704 ; 10.7112 ; 11.0351 ; 11.4708 ; 12.1469 ; 12.8634 ; 13.3926 ; 14.1983 ; 14.7659 ; 14.9075 ; 15.0753 ; 15.3173 ; 15.5926 ; 15.7929]

Bolt 2 - Tensile Force (kips): [14.9155 ; 14.7997 ; 14.7828 ; 14.7716 ; 14.7616 ; 14.7485 ; 14.3751 ; 13.2075 ; 11.4433 ; 9.32596 ; 9.0279 ; 9.02722 ; 9.02946 ; 9.0444 ; 9.03773 ; 8.90508 ; 9.14261 ; 9.43078 ; 9.4998 ; 9.59267 ; 9.72947 ; 9.8766 ; 10.1178 ; 10.2362 ; 10.4384 ; 10.7149 ; 11.0811 ; 11.5739 ; 12.2694 ; 13.3031 ; 14.6837 ; 15.1451 ; 15.8071 ; 16.6693 ; 17.6827 ; 18.5853 ; 18.8895 ; 19.3563 ; 19.9766 ; 20.8268 ; 21.9163 ; 23.1213 ; 23.9332 ; 24.6611 ; 25.2862 ; 25.4251 ; 25.6221 ; 25.9024 ; 26.1708 ; 26.3429]

Bolt 2 - Shear Force (kips): [0.010393 ; 0.164 ; 0.19415 ; 0.22089 ; 0.25714 ; 0.31253 ; 0.55834 ; 1.1456 ; 1.9704 ; 2.8542 ; 2.9783 ; 2.9787 ; 2.9796 ; 2.9846 ; 3.004 ; 3.2567 ; 3.5494 ; 4.0673 ; 4.1952 ; 4.2698 ; 4.3601 ; 4.6008 ; 4.9775 ; 5.0925 ; 5.1625 ; 5.2571 ; 5.3887 ; 5.5318 ; 5.6264 ; 5.6426 ; 5.9206 ; 6.0019 ; 6.0511 ; 6.1149 ; 6.2577 ; 6.5062 ; 6.577 ; 6.646 ; 6.7621 ; 6.8779 ; 6.9929 ; 7.1555 ; 7.2433 ; 7.1829 ; 7.1555 ; 7.1516 ; 7.1615 ; 7.1769 ; 7.21 ; 7.3111]

Bolt 3 - Tensile Force (kips): [16 ; 16.2366 ; 16.3792 ; 16.5376 ; 16.774 ; 17.1413 ; 17.4894 ; 17.663 ; 17.8913 ; 18.0642 ; 18.0833 ; 18.0827 ; 18.0917 ; 18.1488 ; 18.1918 ; 18.3186 ; 18.8524 ; 19.6684 ; 19.8629 ; 20.0848 ; 20.4141 ; 20.8761 ; 21.5532 ; 21.8227 ; 22.2418 ; 22.8129 ; 23.5458 ; 24.4129 ; 25.3722 ; 26.6623 ; 28.1824 ; 28.571 ; 29.0404 ; 29.6123 ; 30.4143 ; 31.2665 ; 31.3948 ; 31.4877 ; 31.5821 ; 31.6853 ; 31.7897 ; 31.8698 ; 31.9102 ; 31.9329 ; 31.9471 ; 31.9499 ; 31.9556 ; 31.9468 ; 31.8648 ; 31.8299]

Bolt 3 - Shear Force (kips): [0.0089022 ; 0.028701 ; 0.034452 ; 0.038891 ; 0.046036 ; 0.054623 ; 0.058632 ; 0.059013 ; 0.058989 ; 0.058948 ; 0.058989 ; 0.059 ; 0.059008 ; 0.059229 ; 0.059443 ; 0.060409 ; 0.066209 ; 0.077624 ; 0.080351 ; 0.083393 ; 0.087911 ; 0.093893 ; 0.10134 ; 0.10333 ; 0.10431 ; 0.10104 ; 0.092244 ; 0.082525 ; 0.08104 ; 0.09046 ; 0.067828 ; 0.063365 ; 0.059606 ; 0.057511 ; 0.062301 ; 0.034641 ; 0.027089 ; 0.024609 ; 0.022296 ; 0.019481 ; 0.014308 ; 0.0094436 ; 0.0075209 ; 0.0073689 ; 0.008054 ; 0.0082289 ; 0.016406 ; 0.096012 ; 0.60708 ; 0.82987]

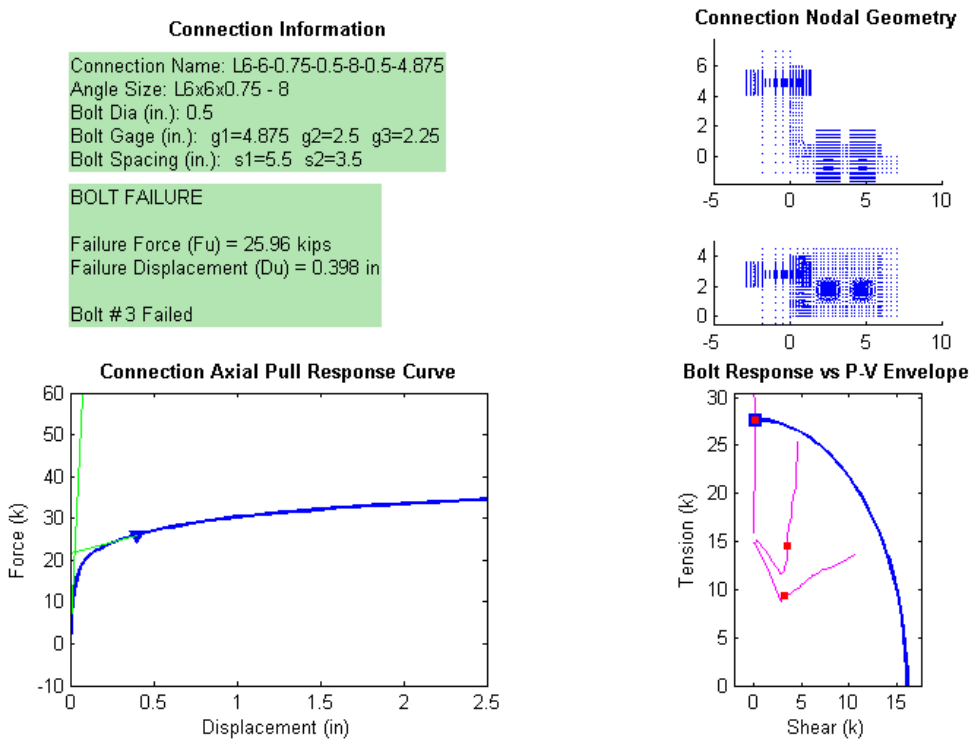


Figure B.150 Connection L6_6_0.75_0.5_8_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.5_8_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 829.0632

Plastic Stiffness (k/in): 11.2105

Displacement (in): [6.7006e-037 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.16699 ; 0.17403 ; 0.17667 ; 0.18063 ; 0.18657 ; 0.19547 ; 0.20884 ; 0.22888 ; 0.25895 ; 0.30405 ; 0.37171 ; 0.39707 ; 0.43513 ; 0.49221 ; 0.57783 ; 0.60994 ; 0.65811 ; 0.73035 ; 0.83871 ; 1.0013 ; 1.0622 ; 1.1537 ; 1.1879 ; 1.2394 ; 1.2587 ; 1.2876 ; 1.331 ; 1.3961 ; 1.4937 ; 1.6402 ; 1.8599 ; 2.1099 ; 2.1724 ; 2.2661 ; 2.4067 ; 2.5]

Force (kips): [-0.167144 ; 0.725604 ; 1.45212 ; 2.39091 ; 3.58124 ; 4.97791 ; 6.41734 ; 7.8056 ; 9.2107 ; 10.2096 ; 11.019 ; 11.1897 ; 11.2415 ; 11.2598 ; 11.3082 ; 11.3976 ; 11.519 ; 11.68 ; 11.8846 ; 12.1235 ; 12.4273 ; 12.8285 ; 12.9707 ; 13.1798 ; 13.4643 ; 13.8279 ; 13.9589 ; 14.1422 ; 14.3966 ; 14.7328 ; 15.1462 ; 15.285 ; 15.4735 ; 15.5361 ; 15.6252 ; 15.6573 ; 15.7098 ; 15.7866 ; 15.8931 ; 16.0493 ; 16.2706 ; 16.5578 ; 16.8528 ; 16.9267 ; 17.0329 ; 17.1807 ; 17.2733]

Bolt 1 - Tensile Force (kips): [14.908 ; 14.8884 ; 14.8689 ; 14.8413 ; 14.8018 ; 14.7453 ; 14.6731 ; 14.5794 ; 14.2893 ; 12.3503 ; 9.38556 ; 8.80377 ; 8.82688 ; 8.83665 ; 8.84834 ; 8.86168 ; 8.88094 ; 8.90941 ; 8.95358 ; 9.01738 ; 9.07703 ; 9.23038 ; 9.31295 ; 9.44261 ; 9.64286 ; 9.94988 ; 10.0351 ; 10.1629 ; 10.3826 ; 10.7151 ; 11.1304 ; 11.2478 ; 11.4406 ; 11.5117 ; 11.6172 ; 11.6596 ; 11.7249 ; 11.8211 ; 11.9644 ; 12.1532 ; 12.3411 ; 12.7162 ; 13.0758 ; 13.1435 ; 13.2598 ; 13.4618 ; 13.6021]

Bolt 1 - Shear Force (kips): [0.0114464 ; 0.0241919 ; 0.0473447 ; 0.0788248 ; 0.120503 ; 0.171595 ; 0.229721 ; 0.296808 ; 0.475323 ; 1.41596 ; 2.66422 ; 2.90359 ; 2.91247 ; 2.91588 ; 2.91981 ; 2.9242 ; 2.93054 ; 2.93992 ; 2.95448 ; 2.97554 ; 3.07301 ; 3.25237 ; 3.30098 ; 3.5468 ; 3.93583 ; 4.31384 ; 4.50253 ; 4.70215 ; 4.96041 ; 5.39361 ; 5.7897 ; 5.96281 ; 6.21171 ; 6.37414 ; 6.63963 ; 6.71099 ; 6.80347 ; 6.92424 ; 7.08114 ; 7.40642 ; 8.17679 ; 8.82821 ; 9.5649 ; 9.77955 ; 10.0424 ; 10.3555 ; 10.5269]

Bolt 2 - Tensile Force (kips): [14.9152 ; 14.9006 ; 14.8843 ; 14.8663 ; 14.8509 ; 14.8511 ; 14.8917 ; 15.0351 ; 15.1955 ; 14.0906 ; 12.4391 ; 11.8771 ; 11.6689 ; 11.5936 ; 11.591 ; 11.6947 ; 11.8433 ; 12.0696 ; 12.382 ; 12.7528 ; 13.3114 ; 14.1936 ; 14.5194 ; 14.9731 ; 15.6011 ; 16.4672 ; 16.7505 ; 17.1748 ; 17.802 ; 18.6741 ; 19.8573 ; 20.2216 ; 20.7891 ; 20.984 ; 21.2599 ; 21.3618 ; 21.5135 ; 21.7322 ; 22.0402 ; 22.4632 ; 22.9937 ; 23.7029 ; 24.4553 ; 24.6274 ; 24.8646 ; 25.2 ; 25.3908]

Bolt 2 - Shear Force (kips): [0.0094851 ; 0.024887 ; 0.048366 ; 0.079946 ; 0.12143 ; 0.1711 ; 0.2252 ; 0.27833 ; 0.40504 ; 1.2458 ; 2.3987 ; 2.7325 ; 2.8453 ; 2.8852 ; 2.9352 ; 2.9973 ; 3.0788 ; 3.1762 ; 3.2889 ; 3.4132 ; 3.4886 ; 3.5247 ; 3.5266 ; 3.5087 ; 3.522 ; 3.6579 ; 3.7548 ; 3.8539 ; 3.9433 ; 4.0304 ; 4.1913 ; 4.3407 ; 4.4327 ; 4.4388 ; 4.4368 ; 4.4392 ; 4.4439 ; 4.4503 ; 4.4587 ; 4.4836 ; 4.5305 ; 4.6284 ; 4.5929 ; 4.5869 ; 4.5951 ; 4.5847 ; 4.5842]

Bolt 3 - Tensile Force (kips): [16 ; 15.982 ; 15.9862 ; 16.04 ; 16.2188 ; 16.6093 ; 17.3276 ; 18.4065 ; 19.6834 ; 20.8801 ; 22.2599 ; 22.6562 ; 22.7886 ; 22.837 ; 22.9581 ; 23.1851 ; 23.5126 ; 23.9645 ; 24.5432 ; 25.2355 ; 26.1581 ; 27.3132 ; 27.6838 ; 28.1827 ; 28.7804 ; 29.3961 ; 29.6028 ; 29.893 ; 30.2842 ; 30.7586 ; 31.1905 ; 31.273 ; 31.264 ; 31.2667 ; 31.2597 ; 31.2564 ; 31.2672 ; 31.2933 ; 31.3202 ; 31.3016 ; 31.2703 ; 31.2682 ; 31.2384 ; 31.191 ; 31.1686 ; 31.1737 ; 31.1795]

Bolt 3 - Shear Force (kips): [0.0096702 ; 0.0021779 ; 0.0047025 ; 0.014001 ; 0.026629 ; 0.037459 ; 0.050715 ; 0.062115 ; 0.096918 ; 0.13151 ; 0.15066 ; 0.15142 ; 0.15153 ; 0.15155 ; 0.15152 ; 0.15132 ; 0.1505 ; 0.1485 ; 0.14581 ; 0.14732 ; 0.15213 ; 0.14289 ; 0.13808 ; 0.13139 ; 0.12282 ; 0.12008 ; 0.12083 ; 0.1206 ; 0.11434 ; 0.097534 ; 0.087632 ; 0.17427 ; 0.55744 ; 0.64763 ; 0.7965 ; 0.84205 ; 0.8838 ; 0.92624 ; 0.99463 ; 1.2515 ; 1.5803 ; 1.8573 ; 2.1911 ; 2.3543 ; 2.5043 ; 2.6614 ; 2.7548]

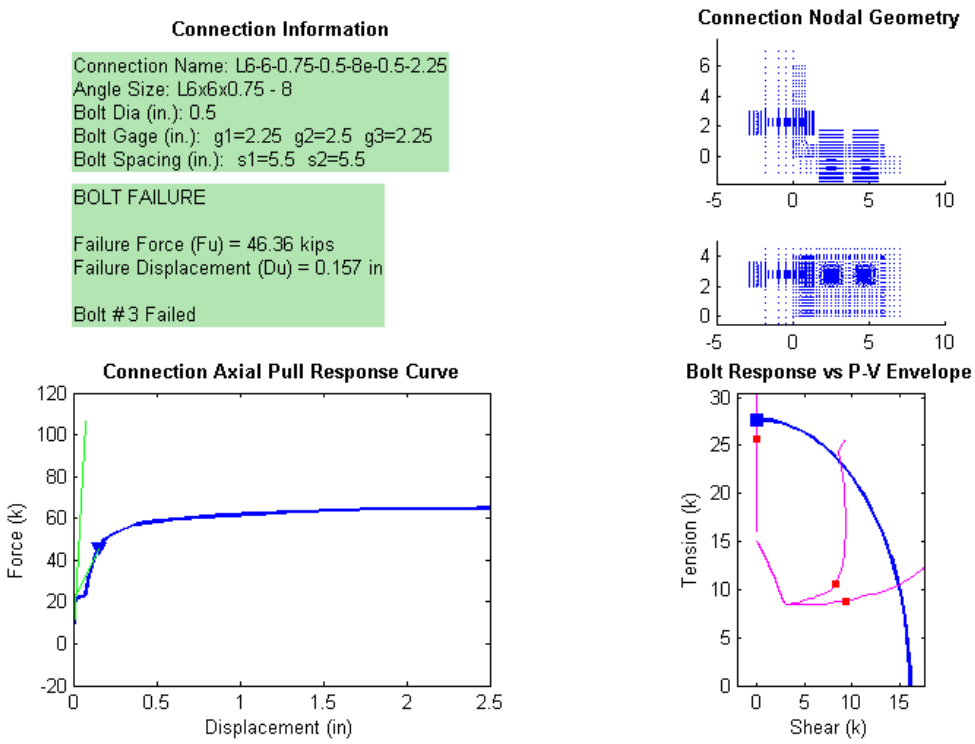


Figure B.151 Connection L6_6_0.75_0.5_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.5_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 1.3626e+003

Plastic Stiffness (k/in): 166.3089

Displacement (in): [6.0534e-037 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.035156 ; 0.052734 ; 0.059326 ; 0.061798 ; 0.065506 ; 0.066896 ; 0.067418 ; 0.0682 ; 0.069373 ; 0.071133 ; 0.073773 ; 0.074763 ; 0.076247 ; 0.077361 ; 0.079032 ; 0.081537 ; 0.082477 ; 0.083886 ; 0.086 ; 0.089172 ; 0.090361 ; 0.092145 ; 0.09482 ; 0.098834 ; 0.10485 ; 0.10711 ; 0.1105 ; 0.11558 ; 0.1232 ; 0.13463 ; 0.15177 ; 0.17749 ; 0.21606 ; 0.27392 ; 0.36071 ; 0.39326 ; 0.44208 ; 0.51531 ; 0.62515 ; 0.78992 ; 0.91349 ; 1.0989 ; 1.3489 ; 1.5989 ; 1.8489 ; 2.0989 ; 2.3489 ; 2.5]

Force (kips): [-0.198937 ; 9.27141 ; 10.446 ; 10.7556 ; 11.1033 ; 11.2767 ; 11.283 ; 11.283 ; 11.2826 ; 11.2826 ; 11.2826 ; 11.3209 ; 11.4601 ; 11.5968 ; 11.5973 ; 11.7339 ; 12.2304 ; 12.5779 ; 12.9952 ; 13.393 ; 13.6532 ; 14.0368 ; 14.4434 ; 14.8767 ; 15.1556 ; 15.5363 ; 16.0343 ; 16.6391 ; 17.395 ; 17.7138 ; 18.208 ; 18.9444 ; 20.0876 ; 21.4497 ; 22.8753 ; 24.4139 ; 25.7501 ; 26.924 ; 28.3238 ; 28.5989 ; 28.9309 ; 29.3569 ; 29.8601 ; 30.3534 ; 30.6544 ; 31.0662 ; 31.5249 ; 31.9119 ; 32.1942 ; 32.2675 ; 32.3341 ; 32.3715]

Bolt 1 - Tensile Force (kips): [14.9453 ; 14.6174 ; 13.7058 ; 12.5804 ; 10.8845 ; 8.79451 ; 8.66885 ; 8.66872 ; 8.66845 ; 8.66841 ; 8.66844 ; 8.59126 ; 8.48593 ; 8.42614 ; 8.42605 ; 8.40841 ; 8.40128 ; 8.39249 ; 8.39856 ; 8.42743 ; 8.4225 ; 8.42165 ; 8.44206 ; 8.48875 ; 8.47866 ; 8.45754 ; 8.44531 ; 8.43761 ; 8.44565 ; 8.45539 ; 8.45615 ; 8.47417 ; 8.53971 ; 8.71205 ; 8.76857 ; 8.94361 ; 9.12633 ; 9.32697 ; 9.56291 ; 9.57065 ; 9.63993 ; 9.86764 ; 10.2039 ; 10.4193 ; 10.6838 ; 11.1069 ; 11.5172 ; 11.9109 ; 12.1899 ; 12.2225 ; 12.2522 ; 12.2692]

Bolt 1 - Shear Force (kips): [0.0106573 ; 0.288728 ; 0.787975 ; 1.31356 ; 2.04483 ; 2.81698 ; 2.86066 ; 2.86066 ; 2.86059 ; 2.86057 ; 2.86058 ; 2.92443 ; 3.03507 ; 3.10067 ; 3.10089 ; 3.24314 ; 3.46161 ; 3.65976 ; 3.82762 ; 4.01412 ; 4.19006 ; 4.34641 ; 4.49985 ; 4.66501 ; 4.86586 ; 5.14921 ; 5.38529 ; 5.65744 ; 6.03643 ; 6.26779 ; 6.67338 ; 7.23236 ; 7.82825 ; 8.32337 ; 9.1713 ; 9.93945 ; 10.4465 ; 11.1406 ; 12.0454 ; 12.4215 ; 12.8785 ; 13.3674 ; 13.9851 ; 14.8876 ; 15.3115 ; 15.9029 ; 16.5624 ; 17.0373 ; 17.4008 ; 17.4371 ; 17.4697 ; 17.4878]

Bolt 2 - Tensile Force (kips): [14.9706 ; 14.6974 ; 13.8092 ; 12.695 ; 11.0173 ; 8.94141 ; 8.73068 ; 8.73035 ; 8.72993 ; 8.7299 ; 8.72994 ; 8.7309 ; 8.63025 ; 8.5032 ; 8.50332 ; 8.50816 ; 8.48908 ; 8.50978 ; 8.53761 ; 8.58629 ; 8.60722 ; 8.63197 ; 8.67106 ; 8.75932 ; 8.81031 ; 8.89142 ; 8.96463 ; 9.00614 ; 9.0984 ; 9.1369 ; 9.20269 ; 9.32146 ; 9.50393 ; 9.81502 ; 10.4234 ; 11.363 ; 12.5225 ; 14.167 ; 16.3211 ; 17.0419 ; 18.0105 ; 19.2496 ; 20.6714 ; 21.9352 ; 22.649 ; 23.5805 ; 24.4706 ; 25.0732 ; 25.4108 ; 25.4334 ; 25.4528 ; 25.4635]

Bolt 2 - Shear Force (kips): [0.014518 ; 0.27912 ; 0.77388 ; 1.2984 ; 2.0297 ; 2.8069 ; 2.8807 ; 2.8809 ; 2.8809 ; 2.8809 ; 2.8809 ; 2.8812 ; 2.9826 ; 3.1254 ; 3.1257 ; 3.1269 ; 3.4217 ; 3.5682 ; 3.8096 ; 3.9974 ; 4.0698 ; 4.2769 ; 4.4938 ; 4.7122 ; 4.7683 ; 4.8462 ; 5.1111 ; 5.5103 ; 5.9659 ; 6.0682 ; 6.1883 ; 6.3904 ; 6.9381 ; 7.7112 ; 8.1162 ; 8.544 ; 9.0173 ; 9.2036 ; 9.2795 ; 9.2758 ; 9.2742 ; 9.2539 ; 9.1946 ; 9.0032 ; 8.8765 ; 8.6972 ; 8.5872 ; 8.8614 ; 9.1658 ; 9.1934 ; 9.2167 ; 9.2293]

Bolt 3 - Tensile Force (kips): [16 ; 16.5702 ; 16.7647 ; 16.8206 ; 16.8875 ; 16.9258 ; 16.9277 ; 16.9271 ; 16.926 ; 16.9257 ; 16.9256 ; 16.9341 ; 16.9636 ; 16.9956 ; 16.9954 ; 17.0276 ; 17.1539 ; 17.2491 ; 17.3779 ; 17.5147 ; 17.6121 ; 17.769 ; 17.9545 ; 18.1773 ; 18.3302 ; 18.559 ; 18.8968 ; 19.3708 ; 20.057 ; 20.3582 ; 20.8275 ; 21.5419 ; 22.6659 ; 24.0021 ; 25.326 ; 26.9506 ; 28.5876 ; 29.8852 ; 31.2702 ; 31.4155 ; 31.5262 ; 31.6388 ; 31.7659 ; 31.8955 ; 31.9597 ; 32.0239 ; 32.0839 ; 32.1307 ; 32.1816 ; 32.2598 ; 32.3312 ; 32.3715]

Bolt 3 - Shear Force (kips): [0.012999 ; 0.033213 ; 0.039222 ; 0.040888 ; 0.042797 ; 0.04373 ; 0.043724 ; 0.043767 ; 0.043768 ; 0.043775 ; 0.043779 ; 0.043937 ; 0.044553 ; 0.045105 ; 0.045134 ; 0.04558 ; 0.047307 ; 0.048325 ; 0.049284 ; 0.04968 ; 0.04964 ; 0.049295 ; 0.048888 ; 0.048761 ; 0.049343 ; 0.05081 ; 0.053505 ; 0.058239 ; 0.064672 ; 0.06733 ; 0.07126 ; 0.076166 ; 0.076976 ; 0.058249 ; 0.051571 ; 0.060237 ; 0.039271 ; 0.035484 ; 0.019615 ; 0.015368 ; 0.013834 ; 0.013178 ; 0.011249 ; 0.0067494 ; 0.0041776 ; 0.0024129 ; 0.0022304 ; 0.0029516 ; 0.0027731 ; 0.00067203 ; 0.0010027 ; 0.0013763]

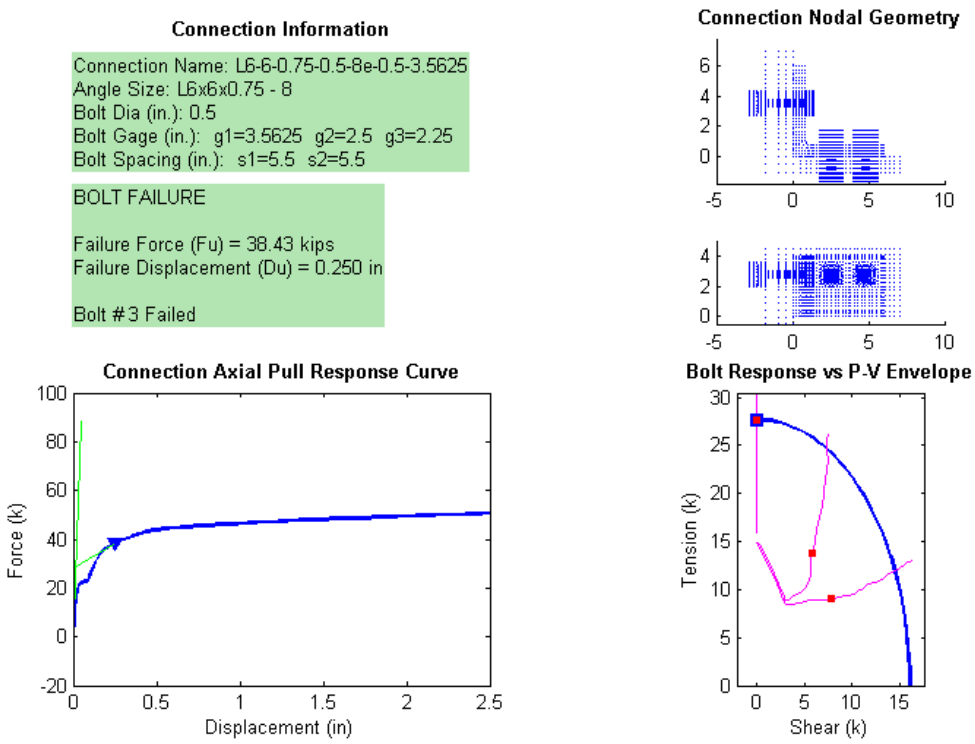


Figure B.152 Connection L6_6_0.75_0.5_8e_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.5_8e_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 1.7281e+003

Plastic Stiffness (k/in): 42.5813

Displacement (in): [8.8006e-037 ; 0.00097656 ; 0.0019531 ; 0.0029297 ; 0.0043945 ; 0.0065918 ; 0.0098877 ; 0.014831 ; 0.022247 ; 0.033371 ; 0.050056 ; 0.075085 ; 0.077431 ; 0.080951 ; 0.08623 ; 0.08821 ; 0.088952 ; 0.090066 ; 0.091736 ; 0.094242 ; 0.098 ; 0.10364 ; 0.10928 ; 0.11491 ; 0.12337 ; 0.13606 ; 0.15508 ; 0.18362 ; 0.22644 ; 0.24249 ; 0.26657 ; 0.30269 ; 0.35688 ; 0.43815 ; 0.56006 ; 0.60578 ; 0.67436 ; 0.77722 ; 0.93151 ; 1.163 ; 1.413 ; 1.663 ; 1.913 ; 1.9755 ; 1.9989 ; 2.0341 ; 2.0868 ; 2.1659 ; 2.1955 ; 2.24 ; 2.3068 ; 2.4069 ; 2.5]

Force (kips): [-0.220919 ; 0.684502 ; 1.46673 ; 2.16289 ; 3.10213 ; 4.34271 ; 5.9252 ; 7.83601 ; 9.81584 ; 10.5577 ; 11.0753 ; 11.3555 ; 11.3644 ; 11.3644 ; 11.3965 ; 11.5023 ; 11.5252 ; 11.5389 ; 11.6268 ; 11.7643 ; 12.2048 ; 12.8546 ; 13.3635 ; 13.8739 ; 14.5777 ; 15.6018 ; 16.7507 ; 17.6951 ; 18.7337 ; 19.0755 ; 19.5225 ; 20.0509 ; 20.7082 ; 21.5063 ; 22.1186 ; 22.2704 ; 22.4757 ; 22.7528 ; 23.1227 ; 23.5749 ; 23.9651 ; 24.3186 ; 24.6378 ; 24.7131 ; 24.7405 ; 24.7813 ; 24.8413 ; 24.9275 ; 24.9608 ; 25.007 ; 25.0735 ; 25.2082 ; 25.3203]

Bolt 1 - Tensile Force (kips): [14.9433 ; 14.9225 ; 14.9011 ; 14.8807 ; 14.8515 ; 14.808 ; 14.7441 ; 14.6539 ; 14.4426 ; 13.2491 ; 11.1015 ; 8.68102 ; 8.6811 ; 8.68069 ; 8.6156 ; 8.47419 ; 8.44445 ; 8.44457 ; 8.44696 ; 8.44627 ; 8.43326 ; 8.4566 ; 8.50119 ; 8.54274 ; 8.62901 ; 8.75976 ; 8.8644 ; 8.9491 ; 8.97591 ; 8.99923 ; 9.09604 ; 9.26074 ; 9.31912 ; 9.58922 ; 9.91909 ; 10.048 ; 10.2387 ; 10.5197 ; 10.7424 ; 11.1092 ; 11.5996 ; 11.9039 ; 12.3084 ; 12.3986 ; 12.4324 ; 12.4835 ; 12.5602 ; 12.653 ; 12.6857 ; 12.7333 ; 12.8005 ; 12.8966 ; 12.9916]

Bolt 1 - Shear Force (kips): [0.0118033 ; 0.0238323 ; 0.0487584 ; 0.0716422 ; 0.103048 ; 0.144698 ; 0.198355 ; 0.265348 ; 0.40235 ; 1.00908 ; 1.96082 ; 2.86441 ; 2.86465 ; 2.8646 ; 2.9153 ; 3.06102 ; 3.09298 ; 3.09347 ; 3.09427 ; 3.14421 ; 3.47548 ; 3.76813 ; 3.95187 ; 4.25859 ; 4.57484 ; 5.05277 ; 5.70548 ; 6.22518 ; 7.38338 ; 7.77014 ; 8.11839 ; 8.54508 ; 9.54587 ; 10.2623 ; 10.7813 ; 10.9937 ; 11.2864 ; 11.6769 ; 12.3699 ; 13.1089 ; 13.682 ; 14.481 ; 15.0142 ; 15.159 ; 15.2086 ; 15.2777 ; 15.3736 ; 15.532 ; 15.589 ; 15.6717 ; 15.7979 ; 15.9899 ; 16.1496]

Bolt 2 - Tensile Force (kips): [14.968 ; 14.9528 ; 14.934 ; 14.9171 ; 14.895 ; 14.8669 ; 14.8375 ; 14.8156 ; 14.7312 ; 13.6195 ; 11.6293 ; 9.14361 ; 8.99804 ; 8.99317 ; 8.99632 ; 9.00926 ; 9.01214 ; 8.98874 ; 8.9161 ; 8.86003 ; 8.97128 ; 9.17851 ; 9.31505 ; 9.51512 ; 9.74177 ; 10.1695 ; 10.8325 ; 11.7752 ; 13.1699 ; 13.6333 ; 14.2681 ; 15.1297 ; 16.2786 ; 17.5797 ; 18.6639 ; 19.0677 ; 19.6363 ; 20.4328 ; 21.4704 ; 22.6483 ; 23.5133 ; 24.2786 ; 24.9337 ; 25.0858 ; 25.1407 ; 25.2218 ; 25.3396 ; 25.512 ; 25.5742 ; 25.6646 ; 25.7945 ; 25.9837 ; 26.1272]

Bolt 2 - Shear Force (kips): [0.015526 ; 0.020671 ; 0.043646 ; 0.065239 ; 0.094973 ; 0.13441 ; 0.18444 ; 0.24542 ; 0.36721 ; 0.96105 ; 1.901 ; 2.9075 ; 2.965 ; 2.9668 ; 2.9686 ; 2.973 ; 2.9739 ; 2.9957 ; 3.1124 ; 3.2336 ; 3.344 ; 3.6982 ; 4.0522 ; 4.2696 ; 4.6586 ; 5.1355 ; 5.4756 ; 5.6625 ; 5.694 ; 5.7935 ; 6.0262 ; 6.1494 ; 6.2492 ; 6.5238 ; 6.8625 ; 6.9443 ; 7.0254 ; 7.1139 ; 7.217 ; 7.4183 ; 7.5089 ; 7.4201 ; 7.404 ; 7.3898 ; 7.3858 ; 7.3808 ; 7.3804 ; 7.3732 ; 7.3702 ; 7.3665 ; 7.3619 ; 7.4388 ; 7.5563]

Bolt 3 - Tensile Force (kips): [16 ; 15.9857 ; 15.9846 ; 15.9965 ; 16.0381 ; 16.1492 ; 16.3799 ; 16.7782 ; 17.3621 ; 17.6734 ; 17.9389 ; 18.1157 ; 18.1231 ; 18.1225 ; 18.141 ; 18.2047 ; 18.2184 ; 18.2274 ; 18.2854 ; 18.3778 ; 18.6971 ; 19.2489 ; 19.7448 ; 20.2793 ; 21.0543 ; 22.2534 ; 23.7619 ; 25.2158 ; 26.9326 ; 27.488 ; 28.1691 ; 28.8857 ; 29.6656 ; 30.7046 ; 31.4334 ; 31.5078 ; 31.5889 ; 31.6805 ; 31.7777 ; 31.8592 ; 31.9047 ; 31.9302 ; 31.9453 ; 31.9483 ; 31.9494 ; 31.9513 ; 31.9542 ; 31.9572 ; 31.9617 ; 31.964 ; 31.9664 ; 31.9024 ; 31.8537]

Bolt 3 - Shear Force (kips): [0.016153 ; 0.0079853 ; 0.0031651 ; 0.0016262 ; 0.0085259 ; 0.0187 ; 0.029338 ; 0.040977 ; 0.052677 ; 0.054074 ; 0.054027 ; 0.054178 ; 0.054206 ; 0.054229 ; 0.054255 ; 0.054558 ; 0.054653 ; 0.054716 ; 0.055124 ; 0.055809 ; 0.059093 ; 0.066082 ; 0.07307 ; 0.080323 ; 0.090155 ; 0.09833 ; 0.083212 ; 0.073899 ; 0.083143 ; 0.075551 ; 0.061776 ; 0.055459 ; 0.052505 ; 0.054686 ; 0.022477 ; 0.020983 ; 0.019474 ; 0.017615 ; 0.013236 ; 0.0083308 ; 0.0058417 ; 0.0057912 ; 0.0068209 ; 0.007109 ; 0.0072207 ; 0.0089739 ; 0.014053 ; 0.017238 ; 0.029784 ; 0.03692 ; 0.043392 ; 0.38535 ; 0.68752]

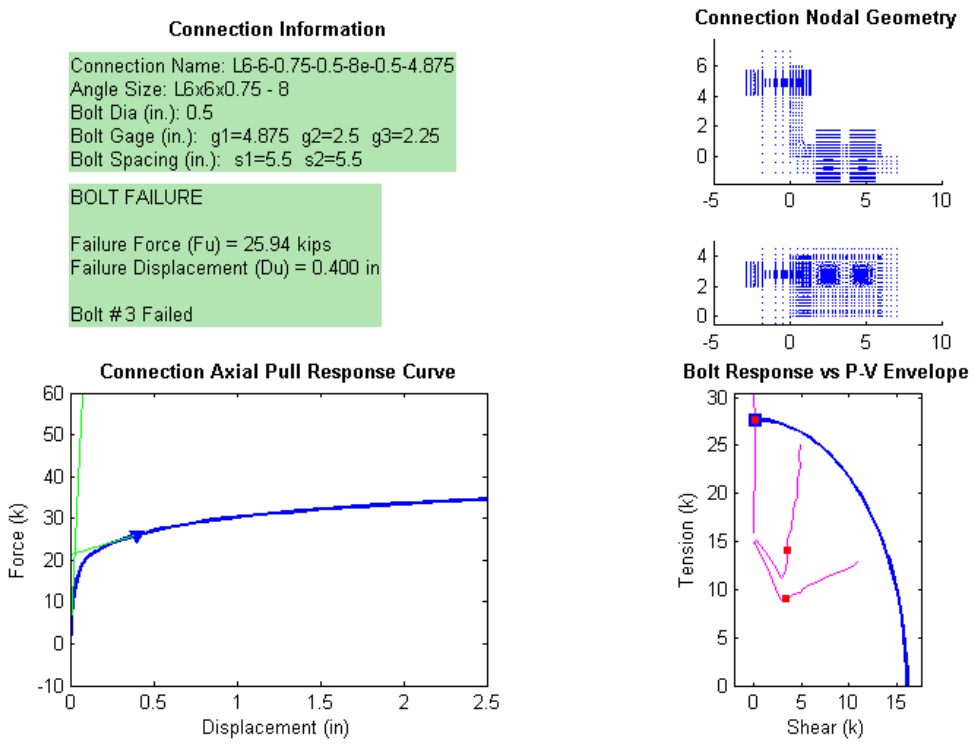


Figure B.153 Connection L6_6_0.75_0.5_8e_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.5_8e_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 818.4207

Plastic Stiffness (k/in): 11.4434

Displacement (in): [6.0119e-037 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.16699 ; 0.17403 ; 0.17667 ; 0.18063 ; 0.18657 ; 0.19547 ; 0.20884 ; 0.22888 ; 0.2364 ; 0.24768 ; 0.26459 ; 0.28996 ; 0.32801 ; 0.38509 ; 0.4065 ; 0.43861 ; 0.48677 ; 0.55902 ; 0.58611 ; 0.62674 ; 0.6877 ; 0.77913 ; 0.81342 ; 0.86485 ; 0.942 ; 1.0577 ; 1.2313 ; 1.2938 ; 1.3876 ; 1.5282 ; 1.7391 ; 1.9891 ; 2.2391 ; 2.3016 ; 2.3954 ; 2.5]

Force (kips): [-0.191488 ; 0.686261 ; 1.40699 ; 2.33788 ; 3.52069 ; 4.9121 ; 6.34192 ; 7.70796 ; 9.12203 ; 10.1705 ; 10.9857 ; 11.1541 ; 11.2005 ; 11.2197 ; 11.284 ; 11.3747 ; 11.499 ; 11.6616 ; 11.8671 ; 11.9356 ; 12.0306 ; 12.1563 ; 12.3272 ; 12.5587 ; 12.8853 ; 13.0073 ; 13.1828 ; 13.4199 ; 13.7333 ; 13.8474 ; 14.0081 ; 14.2327 ; 14.5387 ; 14.6421 ; 14.7877 ; 14.9929 ; 15.2613 ; 15.6011 ; 15.7058 ; 15.8695 ; 16.1005 ; 16.4017 ; 16.7085 ; 16.9908 ; 17.0603 ; 17.1592 ; 17.2643]

Bolt 1 - Tensile Force (kips): [14.9432 ; 14.9225 ; 14.9022 ; 14.8738 ; 14.8333 ; 14.7765 ; 14.7045 ; 14.6167 ; 14.3232 ; 12.4724 ; 9.38906 ; 8.83931 ; 8.85669 ; 8.86351 ; 8.87065 ; 8.88089 ; 8.89561 ; 8.91725 ; 8.95261 ; 8.94958 ; 8.94398 ; 8.93825 ; 8.93956 ; 8.97035 ; 9.10612 ; 9.1446 ; 9.20313 ; 9.30746 ; 9.48479 ; 9.53138 ; 9.60459 ; 9.74934 ; 10.0649 ; 10.1734 ; 10.3007 ; 10.3795 ; 10.5419 ; 10.8808 ; 11.0242 ; 11.2003 ; 11.444 ; 11.826 ; 12.0962 ; 12.4424 ; 12.5336 ; 12.6738 ; 12.8322]

Bolt 1 - Shear Force (kips): [0.0108548 ; 0.0253018 ; 0.049089 ; 0.0813387 ; 0.123832 ; 0.175828 ; 0.234898 ; 0.302234 ; 0.490247 ; 1.39499 ; 2.689 ; 2.91596 ; 2.92251 ; 2.92486 ; 2.92723 ; 2.93062 ; 2.93549 ; 2.94195 ; 2.9515 ; 2.96828 ; 3.01402 ; 3.07672 ; 3.15379 ; 3.23557 ; 3.35039 ; 3.5184 ; 3.80517 ; 4.05095 ; 4.37606 ; 4.5277 ; 4.70012 ; 4.93851 ; 5.29116 ; 5.38575 ; 5.52427 ; 5.84739 ; 6.21205 ; 6.88295 ; 7.07244 ; 7.47717 ; 8.19233 ; 8.89688 ; 9.78713 ; 10.4086 ; 10.5358 ; 10.7008 ; 10.8657]

Bolt 2 - Tensile Force (kips): [14.9684 ; 14.9544 ; 14.9389 ; 14.9214 ; 14.9077 ; 14.9077 ; 14.9498 ; 15.0803 ; 15.1997 ; 13.9838 ; 12.1068 ; 11.513 ; 11.2678 ; 11.1935 ; 11.2639 ; 11.3755 ; 11.533 ; 11.7432 ; 12.0142 ; 12.1232 ; 12.3101 ; 12.5589 ; 12.8729 ; 13.3273 ; 14.0012 ; 14.2432 ; 14.5944 ; 15.1005 ; 15.7955 ; 16.0289 ; 16.3779 ; 16.9061 ; 17.6781 ; 17.9623 ; 18.3803 ; 18.9358 ; 19.6588 ; 20.7016 ; 21.0466 ; 21.5176 ; 22.108 ; 22.8612 ; 23.665 ; 24.3611 ; 24.5316 ; 24.7721 ; 24.9929]

Bolt 2 - Shear Force (kips): [0.014481 ; 0.021325 ; 0.042545 ; 0.071851 ; 0.11061 ; 0.15724 ; 0.2075 ; 0.25684 ; 0.39113 ; 1.2185 ; 2.4398 ; 2.7822 ; 2.9051 ; 2.948 ; 2.9947 ; 3.0577 ; 3.1426 ; 3.2527 ; 3.3887 ; 3.4192 ; 3.4286 ; 3.4566 ; 3.5047 ; 3.5493 ; 3.5839 ; 3.5787 ; 3.5648 ; 3.5941 ; 3.7441 ; 3.8486 ; 3.9587 ; 4.0408 ; 4.1626 ; 4.1893 ; 4.2128 ; 4.2884 ; 4.553 ; 4.6543 ; 4.6703 ; 4.6726 ; 4.7333 ; 4.8525 ; 4.8318 ; 4.8359 ; 4.8336 ; 4.8612 ; 4.9213]

Bolt 3 - Tensile Force (kips): [16 ; 15.9809 ; 15.9843 ; 16.036 ; 16.2105 ; 16.5982 ; 17.3153 ; 18.3951 ; 19.6654 ; 20.8971 ; 22.235 ; 22.6155 ; 22.7325 ; 22.7813 ; 22.9345 ; 23.1603 ; 23.4852 ; 23.9349 ; 24.5116 ; 24.7024 ; 24.9692 ; 25.3383 ; 25.8612 ; 26.5746 ; 27.4943 ; 27.8005 ; 28.2131 ; 28.72 ; 29.2642 ; 29.4442 ; 29.699 ; 30.0527 ; 30.5105 ; 30.6568 ; 30.8431 ; 31.0576 ; 31.2911 ; 31.3057 ; 31.2877 ; 31.3212 ; 31.3278 ; 31.2852 ; 31.2802 ; 31.2088 ; 31.185 ; 31.1808 ; 31.1854]

Bolt 3 - Shear Force (kips): [0.016914 ; 0.0067987 ; 0.001437 ; 0.008314 ; 0.020749 ; 0.031301 ; 0.044792 ; 0.056023 ; 0.08986 ; 0.12518 ; 0.14387 ; 0.14469 ; 0.14482 ; 0.14486 ; 0.14483 ; 0.14467 ; 0.14411 ; 0.14225 ; 0.13961 ; 0.13938 ; 0.1398 ; 0.14243 ; 0.14636 ; 0.1454 ; 0.13573 ; 0.13166 ; 0.1261 ; 0.11898 ; 0.11526 ; 0.11576 ; 0.11696 ; 0.11509 ; 0.10365 ; 0.097827 ; 0.092334 ; 0.088159 ; 0.088776 ; 0.63142 ; 0.81522 ; 0.94512 ; 1.2048 ; 1.6391 ; 1.9412 ; 2.3557 ; 2.4808 ; 2.6023 ; 2.7153]

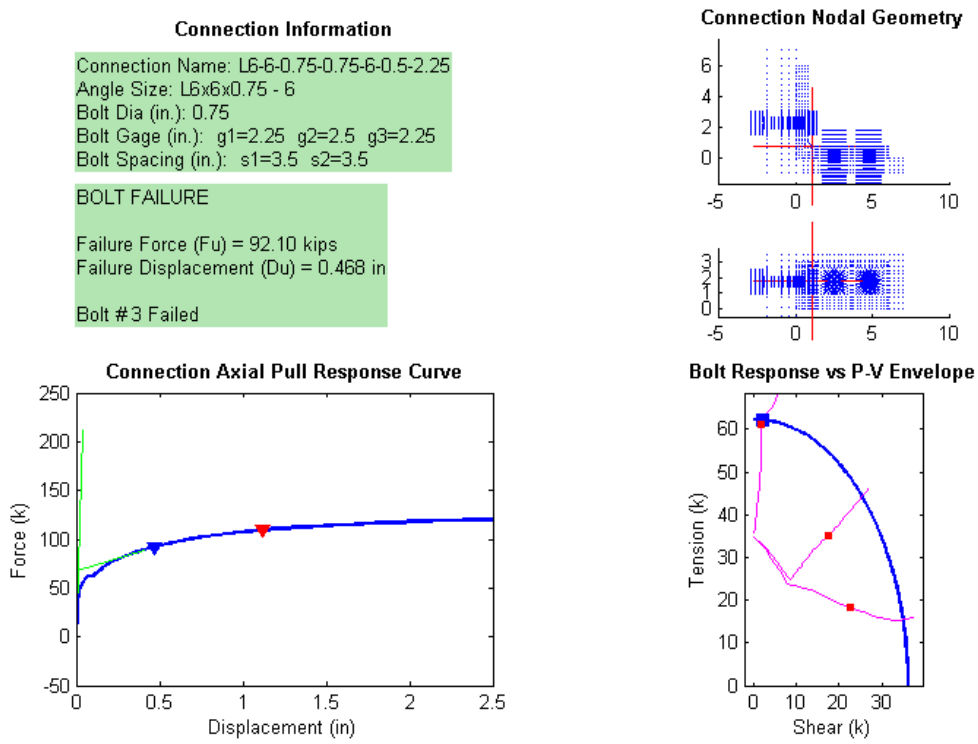


Figure B.154 Connection L6_6_0.75_0.75_6_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.75_6_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 5.0605e+003

Plastic Stiffness (k/in): 53.1463

Displacement (in): [2.6145e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.026611 ; 0.036499 ; 0.051331 ; 0.073578 ; 0.081921 ; 0.085049 ; 0.089742 ; 0.091502 ; 0.094141 ; 0.095131 ; 0.096616 ; 0.098843 ; 0.10218 ; 0.1072 ; 0.10908 ; 0.11189 ; 0.11612 ; 0.12246 ; 0.12484 ; 0.12841 ; 0.13376 ; 0.14179 ; 0.1448 ; 0.14931 ; 0.15609 ; 0.16625 ; 0.18149 ; 0.1872 ; 0.19577 ; 0.20863 ; 0.22792 ; 0.23515 ; 0.246 ; 0.26227 ; 0.28668 ; 0.29584 ; 0.30957 ; 0.33016 ; 0.36106 ; 0.4074 ; 0.47691 ; 0.54642 ; 0.5638 ; 0.58986 ; 0.62896 ; 0.68761 ; 0.77559 ; 0.90755 ; 1.1055 ; 1.3555 ; 1.6055 ; 1.8555 ; 2.1055 ; 2.168 ; 2.2617 ; 2.2969 ; 2.3496 ; 2.4287 ; 2.5]

Force (kips): [-0.91285 ; 4.91339 ; 8.97094 ; 13.6874 ; 18.6937 ; 22.1233 ; 24.0623 ; 25.4589 ; 27.1985 ; 29.2069 ; 30.9396 ; 30.9439 ; 30.9414 ; 30.9373 ; 30.9867 ; 31.1799 ; 31.2318 ; 31.341 ; 31.4327 ; 31.4352 ; 31.4337 ; 31.4329 ; 31.5091 ; 31.9184 ; 32.4639 ; 32.6664 ; 32.9522 ; 33.3605 ; 33.9154 ; 34.127 ; 34.444 ; 34.8775 ; 35.5193 ; 36.4943 ; 36.8604 ; 37.3684 ; 38.049 ; 38.9561 ; 39.2882 ; 39.7436 ; 40.3564 ; 41.1863 ; 41.485 ; 41.912 ; 42.5276 ; 43.3923 ; 44.6237 ; 46.2656 ; 47.6395 ; 47.9729 ; 48.4608 ; 49.1219 ; 50.0161 ; 51.1915 ; 52.7116 ; 54.5491 ; 56.1712 ; 57.4305 ; 58.4278 ; 59.2353 ; 59.4109 ; 59.6414 ; 59.7181 ; 59.818 ; 59.9397 ; 60.0292]

Bolt 1 - Tensile Force (kips): [34.6457 ; 34.4789 ; 34.3455 ; 34.1693 ; 33.9541 ; 33.7679 ; 33.3043 ; 31.926 ; 29.7939 ; 26.852 ; 23.966 ; 23.9505 ; 23.946 ; 23.9409 ; 23.9069 ; 23.69 ; 23.6862 ; 23.6818 ; 23.6765 ; 23.6727 ; 23.6707 ; 23.6701 ; 23.6613 ; 23.6222 ; 23.5933 ; 23.5684 ; 23.5389 ; 23.5176 ; 23.4726 ; 23.4311 ; 23.3468 ; 23.2495 ; 23.1199 ; 22.894 ; 22.7794 ; 22.608 ; 22.4469 ; 22.0603 ; 21.8542 ; 21.5664 ; 21.2465 ; 20.7622 ; 20.5329 ; 20.202 ; 19.7577 ; 19.1812 ; 18.6826 ; 18.1614 ; 17.6987 ; 17.5642 ; 17.3881 ; 17.212 ; 16.9253 ; 16.4379 ; 15.9017 ; 15.4712 ; 15.2658 ; 15.4224 ; 15.509 ; 15.725 ; 15.7465 ; 15.7846 ; 15.7988 ; 15.8222 ; 15.8789 ; 15.9235]

Bolt 1 - Shear Force (kips): [0.0470659 ; 0.218713 ; 0.397033 ; 0.61243 ; 0.855652 ; 1.04881 ; 1.51106 ; 2.65771 ; 4.23281 ; 6.1923 ; 7.9068 ; 7.90351 ; 7.90214 ; 7.90048 ; 7.95704 ; 8.21115 ; 8.21377 ; 8.21518 ; 8.2169 ; 8.21772 ; 8.21686 ; 8.21645 ; 8.2786 ; 8.53547 ; 8.69133 ; 8.83516 ; 9.01283 ; 9.1605 ; 9.3566 ; 9.51984 ; 9.82381 ; 10.0855 ; 10.4446 ; 11.6305 ; 12.1227 ; 12.7883 ; 13.4011 ; 14.369 ; 14.8319 ; 15.4534 ; 16.1301 ; 17.1084 ; 17.5313 ; 18.1366 ; 19.0114 ; 20.1988 ; 21.4344 ; 22.9018 ; 24.231 ; 24.5667 ; 25.0482 ; 25.6437 ; 26.6332 ; 27.8809 ; 29.3122 ; 30.9945 ; 32.7754 ; 34.1164 ; 35.3218 ; 36.18 ; 36.4174 ; 36.683 ; 36.7731 ; 36.9059 ; 37.1069 ; 37.2461]

Bolt 2 - Tensile Force (kips): [34.6562 ; 34.4826 ; 34.3477 ; 34.1898 ; 34.041 ; 33.9405 ; 33.55 ; 32.2339 ; 30.2742 ; 27.791 ; 25.1298 ; 25.0758 ; 25.071 ; 25.068 ; 25.085 ; 25.1512 ; 25.1112 ; 25.0302 ; 24.9677 ; 24.9645 ; 24.9632 ; 24.9629 ; 25.0035 ; 25.209 ; 25.4861 ; 25.6233 ; 25.8304 ; 26.0659 ; 26.4385 ; 26.5921 ; 26.8309 ; 27.1767 ; 27.6429 ; 28.4108 ; 28.6914 ; 29.0874 ; 29.6253 ; 30.3856 ; 30.6674 ; 31.046 ; 31.5462 ; 32.2105 ; 32.4379 ; 32.7685 ; 33.2412 ; 33.8722 ; 34.5589 ; 35.4203 ; 36.2099 ; 36.4052 ; 36.6981 ; 37.0873 ; 37.6346 ; 38.3489 ; 39.4376 ; 40.8376 ; 42.2946 ; 43.4204 ; 44.3645 ; 45.1271 ; 45.2941 ; 45.5337 ; 45.6167 ; 45.7246 ; 45.8633 ; 45.9686]

Bolt 2 - Shear Force (kips): [0.0439194 ; 0.249241 ; 0.447591 ; 0.686842 ; 0.953087 ; 1.16181 ; 1.60895 ; 2.74207 ; 4.29519 ; 6.20975 ; 8.23913 ; 8.2705 ; 8.27223 ; 8.27222 ; 8.27793 ; 8.29777 ; 8.37165 ; 8.5259 ; 8.65353 ; 8.65808 ; 8.65842 ; 8.65822 ; 8.67053 ; 8.81522 ; 9.18914 ; 9.2659 ; 9.36848 ; 9.66687 ; 9.98455 ; 10.0672 ; 10.172 ; 10.3726 ; 10.8387 ; 11.2327 ; 11.456 ; 11.7328 ; 12.2514 ; 12.8471 ; 13.07 ; 13.3528 ; 13.839 ; 14.4426 ; 14.6391 ; 14.8956 ; 15.2736 ; 15.7967 ; 16.6463 ; 17.6424 ; 18.5044 ; 18.6922 ; 18.9724 ; 19.3538 ; 19.7896 ; 20.3441 ; 21.2229 ; 22.5036 ; 23.6232 ; 24.6038 ; 25.4144 ; 26.1197 ; 26.2637 ; 26.4566 ; 26.5224 ; 26.6125 ; 26.7143 ; 26.7915]

Bolt 3 - Tensile Force (kips): [36 ; 35.9808 ; 36.1326 ; 36.5389 ; 37.3725 ; 38.2491 ; 38.7883 ; 39.2205 ; 39.9016 ; 41.0251 ; 42.5696 ; 42.5754 ; 42.573 ; 42.5686 ; 42.6169 ; 42.8135 ; 42.868 ; 42.9846 ; 43.0845 ; 43.0869 ; 43.0845 ; 43.0833 ; 43.1657 ; 43.639 ; 44.3117 ; 44.5625 ; 44.9259 ; 45.4525 ; 46.1915 ; 46.4655 ; 46.8714 ; 47.4461 ; 48.2783 ; 49.4883 ; 49.9287 ; 50.5531 ; 51.4136 ; 52.5659 ; 52.9663 ; 53.517 ; 54.2561 ; 55.246 ; 55.5962 ; 56.1015 ; 56.8283 ; 57.8637 ; 59.4198 ; 61.507 ; 63.1693 ; 63.6083 ; 64.1978 ; 64.9555 ; 65.8695 ; 66.9717 ; 68.3975 ; 70.3559 ; 71.457 ; 72.0223 ; 72.4817 ; 72.8415 ; 72.9044 ; 72.9917 ; 73.0217 ; 73.0779 ; 73.1036 ; 73.1019]

Bolt 3 - Shear Force (kips): [0.014409 ; 0.050527 ; 0.11568 ; 0.20224 ; 0.29974 ; 0.37673 ; 0.43015 ; 0.47271 ; 0.53712 ; 0.64982 ; 0.80941 ; 0.8105 ; 0.81041 ; 0.81022 ; 0.81535 ; 0.8366 ; 0.84267 ; 0.85569 ; 0.86705 ; 0.86748 ; 0.86751 ; 0.86748 ; 0.8769 ; 0.93148 ; 1.0091 ; 1.0372 ; 1.0769 ; 1.1311 ; 1.2042 ; 1.2297 ; 1.2661 ; 1.317 ; 1.3869 ; 1.4757 ; 1.5042 ; 1.5446 ; 1.5982 ; 1.654 ; 1.6682 ; 1.6879 ; 1.7148 ; 1.7497 ; 1.7607 ; 1.7753 ; 1.7925 ; 1.8108 ; 1.8294 ; 1.8286 ; 2.4147 ; 2.87 ; 3.5172 ; 4.1912 ; 4.639 ; 4.9753 ; 5.4173 ; 6.6924 ; 7.3559 ; 7.6776 ; 7.8716 ; 7.6964 ; 7.653 ; 7.5814 ; 7.5461 ; 7.4394 ; 7.2619 ; 7.1104]

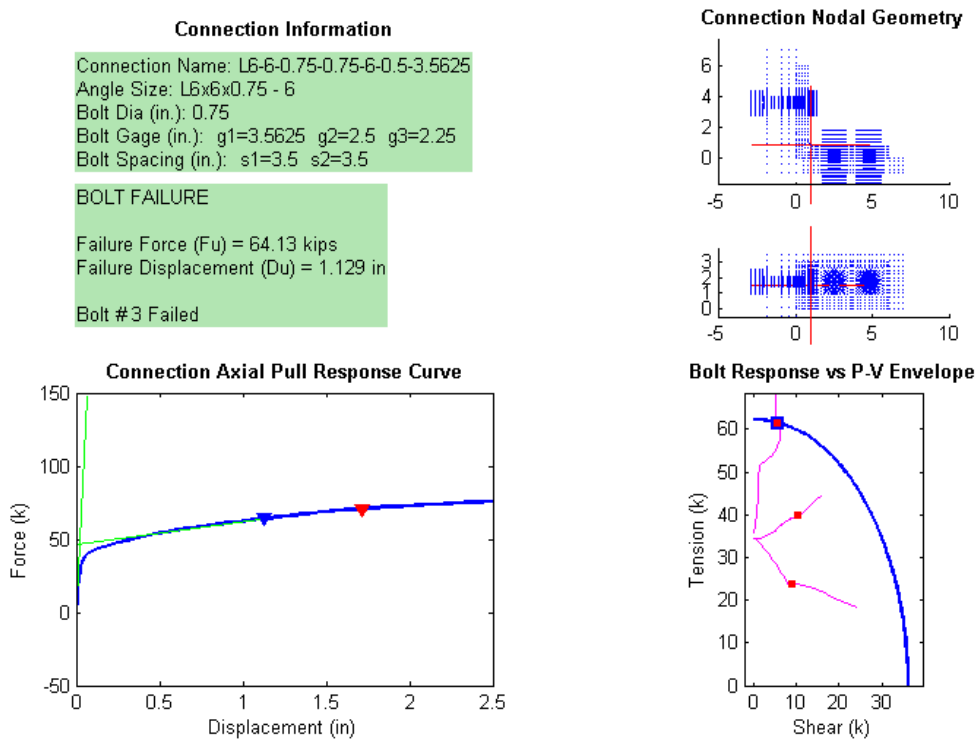


Figure B.155 Connection L6_6_0.75_0.75_6_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.75_6_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 2.2335e+003

Plastic Stiffness (k/in): 15.4156

Displacement (in): [2.8995e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.20294 ; 0.22669 ; 0.26233 ; 0.31578 ; 0.33583 ; 0.3659 ; 0.411 ; 0.47865 ; 0.50402 ; 0.54207 ; 0.59916 ; 0.68478 ; 0.81321 ; 0.82525 ; 0.84332 ; 0.87041 ; 0.91104 ; 0.972 ; 1.0634 ; 1.0977 ; 1.1491 ; 1.2263 ; 1.2552 ; 1.2986 ; 1.3637 ; 1.3881 ; 1.4247 ; 1.4797 ; 1.5003 ; 1.5312 ; 1.5775 ; 1.647 ; 1.7513 ; 1.9077 ; 2.1423 ; 2.3923 ; 2.5]

Force (kips): [-0.9378 ; 1.64838 ; 3.42455 ; 5.64701 ; 8.44838 ; 11.8073 ; 12.7896 ; 14.0656 ; 15.6622 ; 17.4028 ; 18.9888 ; 19.9867 ; 20.8609 ; 21.8087 ; 22.8981 ; 23.2979 ; 23.8641 ; 24.6504 ; 24.9257 ; 25.3663 ; 25.9738 ; 26.7825 ; 27.0558 ; 27.4616 ; 28.0299 ; 28.7961 ; 29.8024 ; 29.8958 ; 30.0302 ; 30.2199 ; 30.5163 ; 30.9476 ; 31.5812 ; 31.8455 ; 32.2115 ; 32.7239 ; 32.9069 ; 33.1836 ; 33.5979 ; 33.7485 ; 33.962 ; 34.2685 ; 34.3774 ; 34.546 ; 34.7853 ; 35.1177 ; 35.5777 ; 36.1915 ; 36.9888 ; 37.7076 ; 37.9905]

Bolt 1 - Tensile Force (kips): [34.6427 ; 34.5703 ; 34.5171 ; 34.4455 ; 34.3431 ; 34.2011 ; 34.1548 ; 34.0907 ; 34.0027 ; 33.8891 ; 33.6801 ; 33.0509 ; 32.1698 ; 31.1367 ; 29.9082 ; 29.4021 ; 28.6239 ; 27.4569 ; 27.0354 ; 26.3896 ; 25.4744 ; 24.331 ; 24.0105 ; 23.9773 ; 23.982 ; 24.0044 ; 24.0576 ; 23.9679 ; 23.8919 ; 23.9061 ; 23.9381 ; 23.9927 ; 24.073 ; 24.0144 ; 23.9596 ; 23.8788 ; 23.8221 ; 23.6455 ; 23.4145 ; 23.2987 ; 23.1308 ; 22.9693 ; 22.9422 ; 22.7813 ; 22.4773 ; 22.1282 ; 21.5442 ; 20.5682 ; 19.3396 ; 18.6529 ; 18.308]

Bolt 1 - Shear Force (kips): [0.0477275 ; 0.0843153 ; 0.162727 ; 0.267043 ; 0.405002 ; 0.582804 ; 0.638146 ; 0.71339 ; 0.813531 ; 0.937021 ; 1.15347 ; 1.743 ; 2.4613 ; 3.25029 ; 4.13433 ; 4.48533 ; 5.01265 ; 5.77917 ; 6.05099 ; 6.46124 ; 7.02043 ; 7.69869 ; 7.88361 ; 7.90683 ; 7.91251 ; 7.92111 ; 7.9389 ; 8.05508 ; 8.15278 ; 8.16275 ; 8.1694 ; 8.17732 ; 8.18717 ; 8.54484 ; 9.11201 ; 9.82483 ; 10.0919 ; 10.774 ; 11.8147 ; 12.2553 ; 12.8701 ; 13.5226 ; 13.6849 ; 14.1217 ; 14.824 ; 15.6639 ; 16.9587 ; 18.8827 ; 21.5061 ; 23.2576 ; 24.0334]

Bolt 2 - Tensile Force (kips): [34.6478 ; 34.584 ; 34.5347 ; 34.4765 ; 34.4143 ; 34.3746 ; 34.3748 ; 34.3839 ; 34.413 ; 34.4852 ; 34.5923 ; 34.5884 ; 34.8101 ; 35.1006 ; 35.4878 ; 35.6567 ; 35.9131 ; 36.3379 ; 36.5026 ; 36.7411 ; 37.0851 ; 37.594 ; 37.7708 ; 37.9807 ; 38.2573 ; 38.577 ; 38.9681 ; 39.0117 ; 39.0714 ; 39.1458 ; 39.2506 ; 39.4175 ; 39.6814 ; 39.837 ; 40.0662 ; 40.313 ; 40.4217 ; 40.6194 ; 40.8866 ; 40.9995 ; 41.1811 ; 41.4338 ; 41.5055 ; 41.5992 ; 41.7693 ; 42.0588 ; 42.4763 ; 42.9696 ; 43.6197 ; 44.2169 ; 44.462]

Bolt 2 - Shear Force (kips): [0.04453 ; 0.0982603 ; 0.187815 ; 0.305537 ; 0.459977 ; 0.656344 ; 0.717027 ; 0.798445 ; 0.904756 ; 1.03586 ; 1.25785 ; 1.8052 ; 2.44371 ; 3.11267 ; 3.82676 ; 4.0983 ; 4.4965 ; 5.04722 ; 5.23806 ; 5.52299 ; 5.90877 ; 6.40234 ; 6.57259 ; 6.83911 ; 7.21463 ; 7.73688 ; 8.43325 ; 8.48189 ; 8.55911 ; 8.68402 ; 8.86895 ; 9.12813 ; 9.85952 ; 10.0846 ; 10.3626 ; 11.0362 ; 11.2893 ; 11.5111 ; 11.9303 ; 12.033 ; 12.1707 ; 12.395 ; 12.5253 ; 12.6784 ; 12.8476 ; 13.1156 ; 13.4485 ; 13.9235 ; 14.6014 ; 15.4336 ; 15.7457]

Bolt 3 - Tensile Force (kips): [36 ; 35.9278 ; 35.9163 ; 36.0118 ; 36.3073 ; 36.8353 ; 37.0807 ; 37.4784 ; 38.022 ; 38.6829 ; 39.453 ; 40.3486 ; 41.6239 ; 43.4559 ; 45.912 ; 46.7235 ; 47.849 ; 49.3703 ; 49.903 ; 50.6507 ; 51.6106 ; 52.8243 ; 53.1989 ; 53.8205 ; 54.8152 ; 56.1516 ; 57.7919 ; 57.9366 ; 58.1447 ; 58.4419 ; 58.946 ; 59.7095 ; 60.7525 ; 61.25 ; 61.8459 ; 62.6801 ; 62.9513 ; 63.3643 ; 63.9743 ; 64.2074 ; 64.5228 ; 65.0473 ; 65.2206 ; 65.483 ; 65.8683 ; 66.3938 ; 67.1395 ; 67.9475 ; 68.823 ; 69.6355 ; 69.9351]

Bolt 3 - Shear Force (kips): [0.029037 ; 0.015067 ; 0.046658 ; 0.098249 ; 0.17223 ; 0.26145 ; 0.28986 ; 0.32861 ; 0.38336 ; 0.45666 ; 0.56048 ; 0.65514 ; 0.74233 ; 0.84314 ; 0.94858 ; 0.97936 ; 1.0208 ; 1.0871 ; 1.1128 ; 1.1771 ; 1.3756 ; 2.8957 ; 3.2312 ; 4.0196 ; 4.8187 ; 5.4734 ; 6.0471 ; 6.0914 ; 6.1549 ; 6.2422 ; 6.2722 ; 6.152 ; 5.7605 ; 5.5813 ; 5.4241 ; 5.1402 ; 5.0786 ; 5.0891 ; 5.1653 ; 5.2032 ; 5.2405 ; 5.2418 ; 5.2277 ; 5.2221 ; 5.2537 ; 5.2182 ; 5.1671 ; 5.1866 ; 5.1337 ; 5.1176 ; 5.1278]

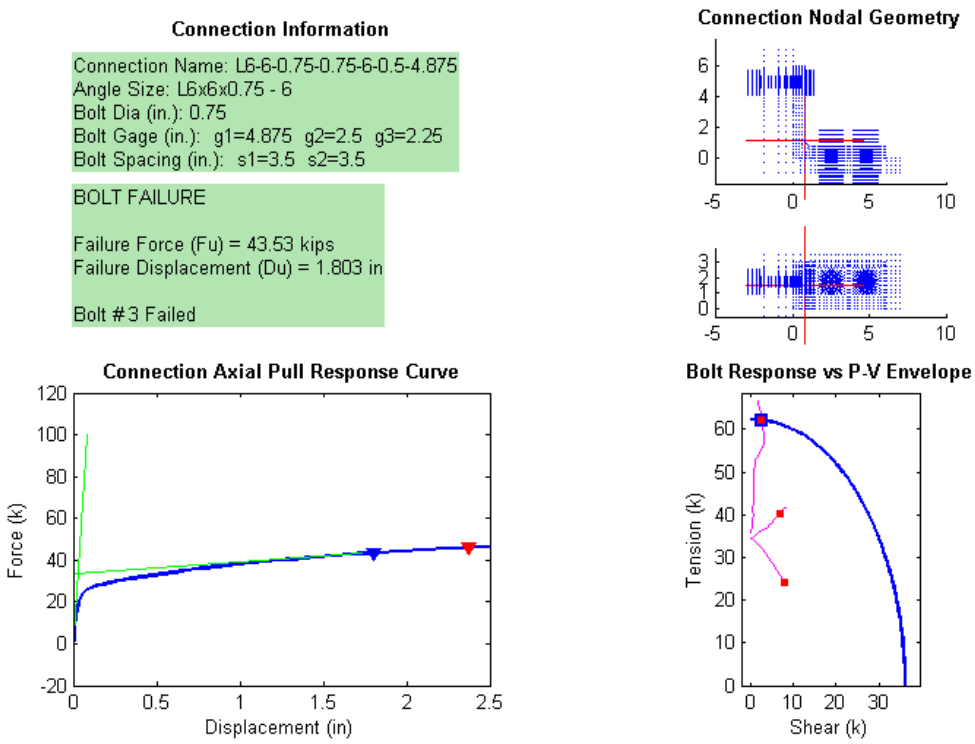


Figure B.156 Connection L6_6_0.75_0.75_6_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.75_6_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 1.1921e+003

Plastic Stiffness (k/in): 5.6576

Displacement (in): [2.7837e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.033371 ; 0.038933 ; 0.047275 ; 0.05979 ; 0.078561 ; 0.10672 ; 0.14895 ; 0.16479 ; 0.18855 ; 0.22418 ; 0.27764 ; 0.35782 ; 0.47809 ; 0.6585 ; 0.67412 ; 0.69756 ; 0.73272 ; 0.78545 ; 0.86455 ; 0.9832 ; 1.1612 ; 1.2237 ; 1.3174 ; 1.4581 ; 1.669 ; 1.7315 ; 1.8252 ; 1.9659 ; 2.1065 ; 2.2471 ; 2.4581 ; 2.5]

Force (kips): [-0.91993 ; 0.587265 ; 1.40838 ; 2.15086 ; 3.16344 ; 4.54242 ; 6.37271 ; 8.60569 ; 9.25765 ; 10.0911 ; 11.0802 ; 12.0882 ; 12.8991 ; 13.42 ; 13.8737 ; 14.0374 ; 14.266 ; 14.5908 ; 15.044 ; 15.6192 ; 16.4056 ; 17.4335 ; 17.5164 ; 17.6449 ; 17.8301 ; 18.1008 ; 18.4799 ; 19.0067 ; 19.7017 ; 19.9271 ; 20.2695 ; 20.7495 ; 21.4036 ; 21.5804 ; 21.8248 ; 22.1642 ; 22.473 ; 22.7522 ; 23.1324 ; 23.2014]

Bolt 1 - Tensile Force (kips): [34.6428 ; 34.6011 ; 34.5775 ; 34.5552 ; 34.5236 ; 34.4778 ; 34.4096 ; 34.313 ; 34.2815 ; 34.2389 ; 34.1843 ; 34.1227 ; 34.0726 ; 34.0436 ; 34.0127 ; 33.9972 ; 33.9715 ; 33.9265 ; 33.8166 ; 33.1636 ; 32.0992 ; 30.6588 ; 30.5405 ; 30.3618 ; 30.0923 ; 29.6822 ; 29.0742 ; 28.1625 ; 26.8852 ; 26.4654 ; 25.844 ; 24.9839 ; 24.1962 ; 24.2009 ; 24.2136 ; 24.2404 ; 24.2682 ; 24.2981 ; 24.3422 ; 24.3533]

Bolt 1 - Shear Force (kips): [0.047403 ; 0.044832 ; 0.077432 ; 0.11089 ; 0.1594 ; 0.22914 ; 0.32703 ; 0.4565 ; 0.49731 ; 0.55163 ; 0.61968 ; 0.69573 ; 0.7587 ; 0.79978 ; 0.84604 ; 0.86733 ; 0.90088 ; 0.95578 ; 1.0786 ; 1.7122 ; 2.5927 ; 3.6915 ; 3.7782 ; 3.908 ; 4.1017 ; 4.3932 ; 4.8189 ; 5.4404 ; 6.2925 ; 6.5636 ; 6.9558 ; 7.487 ; 7.9735 ; 7.9803 ; 7.9879 ; 7.9984 ; 8.0081 ; 8.0181 ; 8.0327 ; 8.0315]

Bolt 2 - Tensile Force (kips): [34.6485 ; 34.6166 ; 34.5958 ; 34.5775 ; 34.5555 ; 34.5307 ; 34.5147 ; 34.5318 ; 34.5485 ; 34.5815 ; 34.6368 ; 34.7182 ; 34.7938 ; 34.8505 ; 34.9419 ; 34.9916 ; 35.0814 ; 35.2473 ; 35.5277 ; 35.7625 ; 36.1162 ; 36.6748 ; 36.7281 ; 36.8072 ; 36.9355 ; 37.1219 ; 37.4207 ; 37.8908 ; 38.5719 ; 38.7884 ; 39.1028 ; 39.5607 ; 40.1434 ; 40.2878 ; 40.4894 ; 40.769 ; 41.0211 ; 41.2569 ; 41.5888 ; 41.6489]

Bolt 2 - Shear Force (kips): [0.044319 ; 0.051364 ; 0.091256 ; 0.13026 ; 0.18611 ; 0.26558 ; 0.37545 ; 0.51811 ; 0.56238 ; 0.62183 ; 0.6958 ; 0.77825 ; 0.84506 ; 0.88907 ; 0.93902 ; 0.96284 ; 1.0002 ; 1.0595 ; 1.1825 ; 1.7432 ; 2.4996 ; 3.391 ; 3.4581 ; 3.5582 ; 3.7043 ; 3.922 ; 4.2314 ; 4.6638 ; 5.2268 ; 5.4036 ; 5.6609 ; 6.0222 ; 6.5336 ; 6.6833 ; 6.8938 ; 7.1822 ; 7.4425 ; 7.6723 ; 7.9761 ; 8.0322]

Bolt 3 - Tensile Force (kips): [36 ; 35.9458 ; 35.9086 ; 35.892 ; 35.91 ; 36.0135 ; 36.2719 ; 36.7301 ; 36.9089 ; 37.2615 ; 37.797 ; 38.4622 ; 39.235 ; 40.0646 ; 41.1054 ; 41.4734 ; 41.994 ; 42.747 ; 43.851 ; 45.3429 ; 47.5195 ; 50.4623 ; 50.6944 ; 51.0271 ; 51.5027 ; 52.1805 ; 53.1008 ; 54.4059 ; 56.0845 ; 56.7013 ; 57.5975 ; 58.9131 ; 60.9596 ; 61.6077 ; 62.3731 ; 63.3407 ; 64.2198 ; 65.1254 ; 66.4798 ; 66.7288]

Bolt 3 - Shear Force (kips): [0.029454 ; 0.0099234 ; 0.018509 ; 0.034763 ; 0.061831 ; 0.1059 ; 0.16767 ; 0.2409 ; 0.26269 ; 0.28992 ; 0.32544 ; 0.36583 ; 0.41348 ; 0.48983 ; 0.48471 ; 0.48347 ; 0.47973 ; 0.48601 ; 0.50958 ; 0.56479 ; 0.64033 ; 0.75674 ; 0.76831 ; 0.80408 ; 0.85726 ; 0.95374 ; 1.0959 ; 2.0197 ; 2.853 ; 3.0953 ; 3.0179 ; 2.9107 ; 2.7588 ; 2.605 ; 2.4347 ; 2.322 ; 2.2966 ; 2.1381 ; 1.7654 ; 1.714]

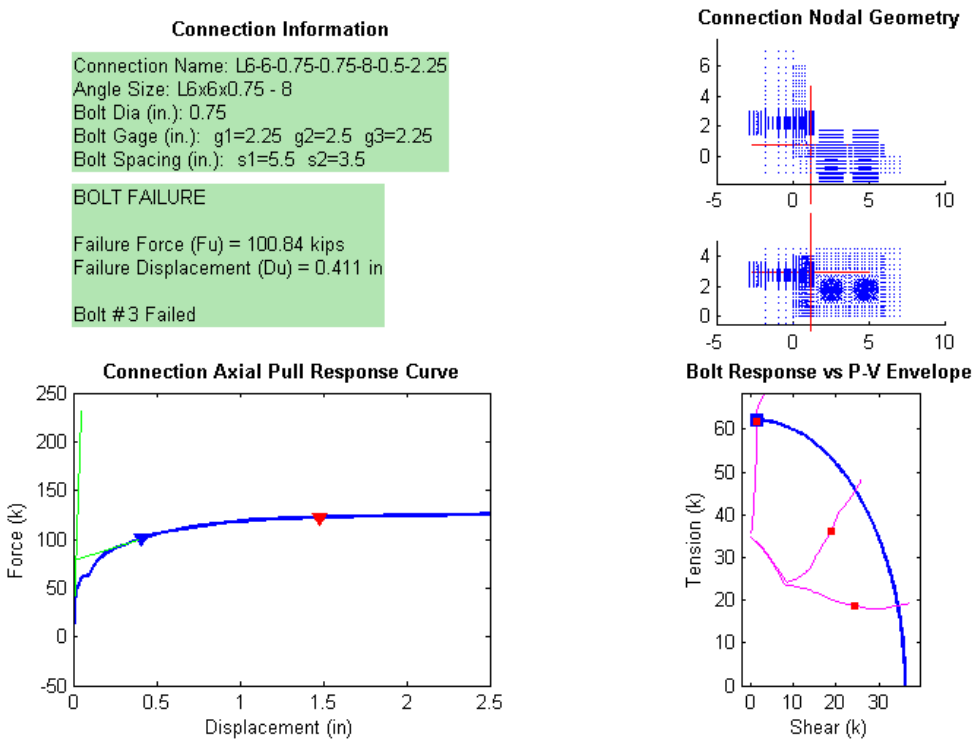


Figure B.157 Connection L6_6_0.75_0.75_8_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.75_8_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 4.9732e+003

Plastic Stiffness (k/in): 55.6203

Displacement (in): [2.4576e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.033569 ; 0.048401 ; 0.053963 ; 0.062306 ; 0.065434 ; 0.070127 ; 0.077166 ; 0.079806 ; 0.083765 ; 0.089705 ; 0.091932 ; 0.095273 ; 0.096526 ; 0.098405 ; 0.10122 ; 0.10228 ; 0.10387 ; 0.10625 ; 0.10981 ; 0.11516 ; 0.11717 ; 0.12018 ; 0.1247 ; 0.13147 ; 0.13401 ; 0.13782 ; 0.14353 ; 0.1521 ; 0.16496 ; 0.16978 ; 0.17702 ; 0.18787 ; 0.20414 ; 0.22855 ; 0.2377 ; 0.25143 ; 0.27203 ; 0.30292 ; 0.34926 ; 0.36664 ; 0.39271 ; 0.43181 ; 0.49046 ; 0.51245 ; 0.54544 ; 0.59493 ; 0.66916 ; 0.7805 ; 0.94752 ; 1.01 ; 1.1038 ; 1.1389 ; 1.1917 ; 1.2708 ; 1.3004 ; 1.3449 ; 1.4117 ; 1.5118 ; 1.6619 ; 1.7183 ; 1.8027 ; 1.9294 ; 2.1195 ; 2.3695 ; 2.5]

Force (kips): [-0.795217 ; 4.83255 ; 8.91799 ; 13.779 ; 17.5921 ; 20.5392 ; 23.5938 ; 25.3923 ; 27.4024 ; 29.829 ; 30.5314 ; 30.9447 ; 30.9432 ; 30.9373 ; 30.929 ; 31.2036 ; 31.4171 ; 31.4156 ; 31.4135 ; 31.4109 ; 31.6094 ; 32.0434 ; 32.5855 ; 32.8064 ; 33.119 ; 33.5092 ; 34.0904 ; 34.9272 ; 35.2206 ; 35.6863 ; 36.341 ; 37.2135 ; 37.5265 ; 37.9635 ; 38.5517 ; 39.3235 ; 40.3231 ; 40.6917 ; 41.2121 ; 41.9322 ; 42.8694 ; 44.118 ; 44.5497 ; 45.1889 ; 46.0649 ; 47.2233 ; 48.7121 ; 49.2243 ; 49.9492 ; 50.947 ; 52.2811 ; 52.7454 ; 53.4249 ; 54.3252 ; 55.4921 ; 56.9898 ; 58.6755 ; 59.1682 ; 59.7953 ; 60.0004 ; 60.2733 ; 60.6034 ; 60.7079 ; 60.8473 ; 61.04 ; 61.2957 ; 61.6155 ; 61.7244 ; 61.8699 ; 62.0712 ; 62.3471 ; 62.6732 ; 62.8309]

Bolt 1 - Tensile Force (kips): [34.643 ; 34.4653 ; 34.3147 ; 34.1102 ; 33.9297 ; 33.7717 ; 33.4196 ; 32.0203 ; 29.5811 ; 25.8993 ; 24.5982 ; 23.9452 ; 23.9374 ; 23.9289 ; 23.9199 ; 23.6737 ; 23.6592 ; 23.6521 ; 23.6505 ; 23.6489 ; 23.6242 ; 23.5992 ; 23.5623 ; 23.546 ; 23.5314 ; 23.5035 ; 23.39 ; 23.252 ; 23.2015 ; 23.1218 ; 23.0242 ; 22.9162 ; 22.8557 ; 22.7694 ; 22.6543 ; 22.5345 ; 22.3081 ; 22.1554 ; 21.9401 ; 21.638 ; 21.3255 ; 20.7527 ; 20.5066 ; 20.1725 ; 19.7199 ; 19.309 ; 18.9994 ; 18.9006 ; 18.7128 ; 18.569 ; 18.4428 ; 18.2917 ; 18.136 ; 18.0117 ; 17.8921 ; 17.8833 ; 18.0562 ; 18.1512 ; 18.2893 ; 18.3371 ; 18.4086 ; 18.4892 ; 18.5142 ; 18.5488 ; 18.5927 ; 18.6617 ; 18.7932 ; 18.8404 ; 18.9051 ; 18.9894 ; 19.085 ; 19.187 ; 19.2385]

Bolt 1 - Shear Force (kips): [0.0459582 ; 0.233905 ; 0.427507 ; 0.66636 ; 0.862215 ; 1.02032 ; 1.36711 ; 2.55432 ; 4.35594 ; 6.76127 ; 7.52901 ; 7.90058 ; 7.89899 ; 7.89648 ; 7.89357 ; 8.20219 ; 8.21396 ; 8.21474 ; 8.21417 ; 8.21321 ; 8.40325 ; 8.59831 ; 8.88017 ; 8.99588 ; 9.1208 ; 9.31286 ; 9.7702 ; 10.179 ; 10.3402 ; 10.7101 ; 11.1791 ; 11.7518 ; 11.994 ; 12.3309 ; 12.7599 ; 13.2194 ; 13.8576 ; 14.232 ; 14.7537 ; 15.4811 ; 16.2588 ; 17.5617 ; 18.0837 ; 18.8992 ; 20.0634 ; 21.3243 ; 22.7903 ; 23.3029 ; 23.9955 ; 24.8874 ; 25.9434 ; 26.3659 ; 26.9262 ; 27.5742 ; 28.4205 ; 29.6465 ; 30.9453 ; 31.4002 ; 32.0756 ; 32.3066 ; 32.6122 ; 33.0306 ; 33.1767 ; 33.3797 ; 33.6984 ; 34.1326 ; 34.6693 ; 34.8614 ; 35.1506 ; 35.5535 ; 36.0739 ; 36.7442 ; 37.1237]

Bolt 2 - Tensile Force (kips): [34.6529 ; 34.4888 ; 34.3472 ; 34.1717 ; 34.036 ; 33.9338 ; 33.6674 ; 32.3196 ; 29.9948 ; 26.5688 ; 25.3866 ; 24.4616 ; 24.4461 ; 24.4386 ; 24.4328 ; 24.4236 ; 24.2029 ; 24.1955 ; 24.1937 ; 24.1921 ; 24.2249 ; 24.2674 ; 24.3416 ; 24.3713 ; 24.4121 ; 24.478 ; 24.605 ; 24.7117 ; 24.7576 ; 24.8659 ; 25.0275 ; 25.2851 ; 25.3847 ; 25.5494 ; 25.804 ; 26.1988 ; 26.8043 ; 27.022 ; 27.3582 ; 27.8909 ; 28.7217 ; 29.9122 ; 30.3499 ; 30.951 ; 31.8222 ; 32.9585 ; 34.4758 ; 34.9959 ; 35.7006 ; 36.6143 ; 37.7824 ; 38.1555 ; 38.7105 ; 39.4871 ; 40.4675 ; 41.6328 ; 42.9197 ; 43.3286 ; 43.8703 ; 44.0499 ; 44.2744 ; 44.5915 ; 44.7058 ; 44.8737 ; 45.1243 ; 45.4923 ; 46.0071 ; 46.1874 ; 46.4397 ; 46.7883 ; 47.2745 ; 47.819 ; 48.072]

Bolt 2 - Shear Force (kips): [0.0370103 ; 0.250886 ; 0.455749 ; 0.706849 ; 0.91045 ; 1.07254 ; 1.41193 ; 2.58283 ; 4.36521 ; 6.73433 ; 7.48951 ; 8.05495 ; 8.06249 ; 8.06388 ; 8.06271 ; 8.1175 ; 8.40288 ; 8.40454 ; 8.40483 ; 8.40397 ; 8.41413 ; 8.65785 ; 8.92042 ; 9.03064 ; 9.22774 ; 9.44242 ; 9.61313 ; 10.1347 ; 10.3065 ; 10.4358 ; 10.6625 ; 11.1078 ; 11.3249 ; 11.6261 ; 12.0232 ; 12.5422 ; 13.1294 ; 13.3493 ; 13.6354 ; 13.9698 ; 14.3772 ; 14.9749 ; 15.1932 ; 15.6333 ; 16.1426 ; 16.9093 ; 17.7972 ; 18.0649 ; 18.4356 ; 18.9343 ; 19.5035 ; 19.6795 ; 19.9099 ; 20.2202 ; 20.6925 ; 21.5302 ; 22.5737 ; 22.8541 ; 23.1885 ; 23.3064 ; 23.5023 ; 23.7538 ; 23.8409 ; 23.9615 ; 24.1191 ; 24.3514 ; 24.658 ; 24.7645 ; 24.9185 ; 25.1432 ; 25.4388 ; 25.7273 ; 25.8283]

Bolt 3 - Tensile Force (kips): [36 ; 35.9784 ; 36.1201 ; 36.5062 ; 37.0105 ; 37.6465 ; 38.4035 ; 38.877 ; 39.4739 ; 40.4512 ; 40.809 ; 41.04 ; 41.0393 ; 41.0339 ; 41.0252 ; 41.1853 ; 41.3157 ; 41.3135 ; 41.3113 ; 41.3082 ; 41.4313 ; 41.7064 ; 42.0798 ; 42.2403 ; 42.4783 ; 42.7899 ; 43.2907 ; 44.0905 ; 44.3935 ; 44.8883 ; 45.6172 ; 46.6249 ; 46.9872 ; 47.505 ; 48.2189 ; 49.1823 ; 50.4494 ; 50.9023 ; 51.5403 ; 52.4168 ; 53.5547 ; 54.9735 ; 55.4507 ; 56.1405 ; 57.0906 ; 58.3746 ; 60.0895 ; 60.6785 ; 61.508 ; 62.6244 ; 64.0925 ; 64.6066 ; 65.3196 ; 66.2699 ; 67.5683 ; 69.2861 ; 70.943 ; 71.2795 ; 71.6703 ; 71.8021 ; 71.9696 ; 72.139 ; 72.1901 ; 72.2597 ; 72.3548 ; 72.4708 ; 72.5923 ; 72.6318 ; 72.6773 ; 72.7368 ; 72.8133 ; 72.8989 ; 72.9398]

Bolt 3 - Shear Force (kips): [0.019498 ; 0.04619 ; 0.10851 ; 0.19405 ; 0.26254 ; 0.31798 ; 0.38108 ; 0.4208 ; 0.47053 ; 0.53887 ; 0.56239 ; 0.57724 ; 0.57738 ; 0.57713 ; 0.57666 ; 0.58606 ; 0.59361 ; 0.5937 ; 0.59361 ; 0.59347 ; 0.60011 ; 0.61528 ; 0.63522 ; 0.64391 ; 0.6565 ; 0.67369 ; 0.70349 ; 0.75401 ; 0.77298 ; 0.80466 ; 0.85137 ; 0.91223 ; 0.9317 ; 0.95869 ; 0.99509 ; 1.0422 ; 1.105 ; 1.1249 ; 1.1538 ; 1.1933 ; 1.2467 ; 1.3086 ; 1.326 ; 1.3455 ; 1.3676 ; 1.3896 ; 1.4083 ; 1.4114 ; 1.4121 ; 1.3991 ; 1.3662 ; 1.3666 ; 1.5492 ; 1.9319 ; 2.8223 ; 3.7227 ; 4.5779 ; 4.6893 ; 4.7759 ; 4.7886 ; 4.816 ; 4.8516 ; 4.8553 ; 4.8572 ; 4.8656 ; 4.8662 ; 4.8264 ; 4.8052 ; 4.721 ; 4.5798 ; 4.3527 ; 4.039 ; 3.8796]

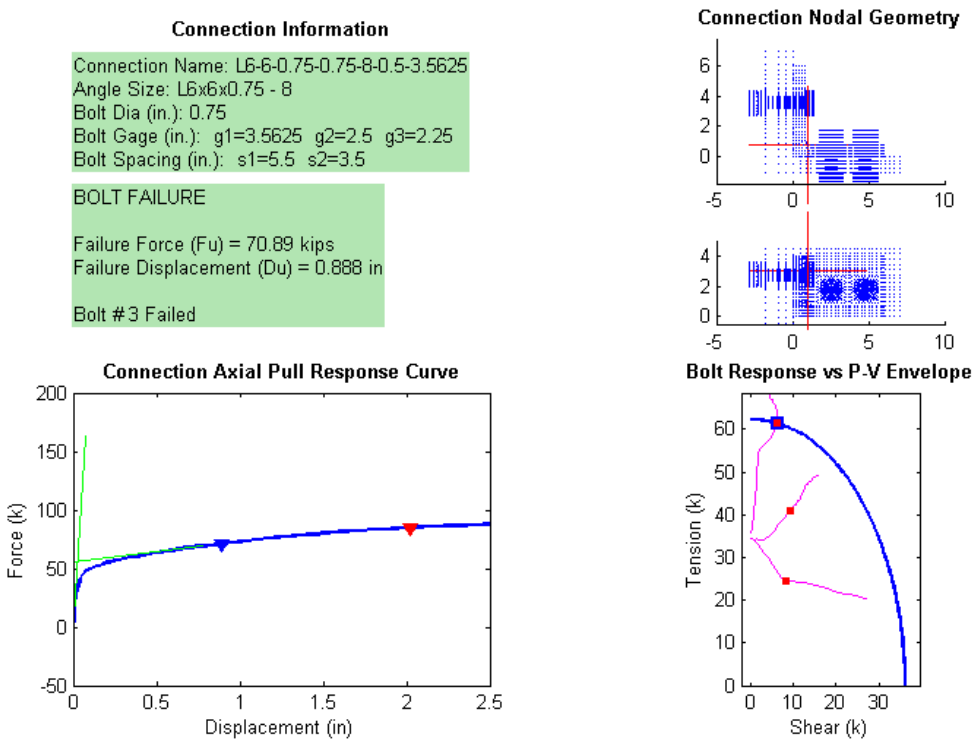


Figure B.158 Connection L6_6_0.75_0.75_8_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.75_8_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 2.2904e+003

Plastic Stiffness (k/in): 18.1984

Displacement (in): [3.2091e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.022247 ; 0.025955 ; 0.031517 ; 0.03986 ; 0.052374 ; 0.071145 ; 0.099302 ; 0.14154 ; 0.15737 ; 0.18113 ; 0.21677 ; 0.27022 ; 0.3504 ; 0.38047 ; 0.42557 ; 0.49323 ; 0.5947 ; 0.63276 ; 0.68984 ; 0.77546 ; 0.9039 ; 0.95206 ; 0.97012 ; 0.99721 ; 1.0378 ; 1.0988 ; 1.1902 ; 1.2245 ; 1.276 ; 1.2953 ; 1.3242 ; 1.3676 ; 1.4327 ; 1.5303 ; 1.5669 ; 1.6218 ; 1.7042 ; 1.8278 ; 1.8741 ; 1.9437 ; 1.9697 ; 2.0088 ; 2.0675 ; 2.1554 ; 2.2874 ; 2.3369 ; 2.4111 ; 2.5]

Force (kips): [-0.802061 ; 1.76236 ; 3.67137 ; 5.31521 ; 7.49766 ; 10.3328 ; 13.7738 ; 14.7955 ; 16.159 ; 17.9532 ; 20.0213 ; 21.9041 ; 23.4047 ; 24.6831 ; 26.0609 ; 26.5016 ; 27.0843 ; 27.7849 ; 28.659 ; 29.8441 ; 30.2728 ; 30.8891 ; 31.7094 ; 32.806 ; 33.198 ; 33.7589 ; 34.538 ; 35.573 ; 35.9755 ; 36.1229 ; 36.3644 ; 36.7185 ; 37.2643 ; 37.9936 ; 38.2602 ; 38.612 ; 38.7407 ; 38.9279 ; 39.1989 ; 39.5928 ; 40.1518 ; 40.3533 ; 40.6437 ; 41.0573 ; 41.6331 ; 41.8339 ; 42.1217 ; 42.2253 ; 42.3753 ; 42.589 ; 42.8846 ; 43.2877 ; 43.435 ; 43.6453 ; 43.8794]

Bolt 1 - Tensile Force (kips): [34.639 ; 34.5594 ; 34.4947 ; 34.4349 ; 34.3477 ; 34.2213 ; 34.0454 ; 33.987 ; 33.9047 ; 33.7852 ; 33.5892 ; 32.9991 ; 32.2113 ; 31.1244 ; 29.5839 ; 29.0476 ; 28.304 ; 27.4179 ; 26.3057 ; 24.7045 ; 24.1948 ; 23.9828 ; 24.0184 ; 24.1133 ; 24.156 ; 24.0608 ; 24.2053 ; 24.5 ; 24.4177 ; 24.4361 ; 24.4801 ; 24.4682 ; 24.3282 ; 24.0486 ; 23.9606 ; 23.8692 ; 23.7692 ; 23.6066 ; 23.4142 ; 23.1721 ; 22.736 ; 22.5034 ; 22.2061 ; 21.8655 ; 21.5765 ; 21.4924 ; 21.4315 ; 21.3705 ; 21.2615 ; 21.1043 ; 20.9462 ; 20.7931 ; 20.6881 ; 20.5688 ; 20.4307]

Bolt 1 - Shear Force (kips): [0.0454256 ; 0.0973439 ; 0.188989 ; 0.271539 ; 0.384332 ; 0.537626 ; 0.737117 ; 0.800189 ; 0.887427 ; 1.00811 ; 1.20025 ; 1.74702 ; 2.38664 ; 3.21197 ; 4.30666 ; 4.6732 ; 5.16855 ; 5.74801 ; 6.46109 ; 7.44222 ; 7.74761 ; 7.89245 ; 7.92038 ; 7.95573 ; 7.97032 ; 8.18127 ; 8.27047 ; 8.34141 ; 8.8896 ; 9.13439 ; 9.39628 ; 9.90783 ; 10.8363 ; 12.6676 ; 13.2156 ; 13.8835 ; 14.2174 ; 14.7319 ; 15.4151 ; 16.3191 ; 17.7366 ; 18.374 ; 19.2584 ; 20.4672 ; 21.8093 ; 22.2435 ; 22.824 ; 23.0657 ; 23.4361 ; 24.0043 ; 24.7134 ; 25.6431 ; 25.9832 ; 26.4521 ; 26.9514]

Bolt 2 - Tensile Force (kips): [34.643 ; 34.5812 ; 34.5229 ; 34.4734 ; 34.4084 ; 34.3383 ; 34.2842 ; 34.2766 ; 34.2732 ; 34.2806 ; 34.2918 ; 34.046 ; 34.0033 ; 34.24 ; 34.6947 ; 34.8568 ; 35.1256 ; 35.5224 ; 36.1213 ; 37.1163 ; 37.4845 ; 37.9541 ; 38.5287 ; 39.1997 ; 39.4275 ; 39.8088 ; 40.3022 ; 41.0195 ; 41.4101 ; 41.5501 ; 41.7581 ; 42.0547 ; 42.4931 ; 43.2115 ; 43.4784 ; 43.883 ; 44.0289 ; 44.2547 ; 44.582 ; 45.0041 ; 45.6283 ; 45.8486 ; 46.1705 ; 46.6293 ; 47.2118 ; 47.4178 ; 47.6633 ; 47.744 ; 47.8807 ; 48.0913 ; 48.3902 ; 48.7892 ; 48.9009 ; 49.0608 ; 49.2893]

Bolt 2 - Shear Force (kips): [0.0351574 ; 0.102888 ; 0.202337 ; 0.290658 ; 0.410652 ; 0.572216 ; 0.779135 ; 0.8431 ; 0.930629 ; 1.04911 ; 1.23303 ; 1.73523 ; 2.31173 ; 3.01332 ; 3.88928 ; 4.17109 ; 4.53554 ; 4.93701 ; 5.40581 ; 6.03962 ; 6.26461 ; 6.61144 ; 7.08871 ; 7.71273 ; 7.92134 ; 8.16907 ; 8.53945 ; 9.18971 ; 9.55832 ; 9.64632 ; 9.78881 ; 10.0811 ; 10.5592 ; 10.9366 ; 11.1815 ; 11.4738 ; 11.5676 ; 11.6696 ; 11.8125 ; 12.0793 ; 12.3878 ; 12.4962 ; 12.6318 ; 12.7825 ; 13.2078 ; 13.3875 ; 13.7401 ; 13.8683 ; 14.0273 ; 14.2268 ; 14.5273 ; 14.9824 ; 15.1894 ; 15.5544 ; 15.9068]

Bolt 3 - Tensile Force (kips): [36 ; 35.929 ; 35.9226 ; 35.9798 ; 36.16 ; 36.498 ; 37.1461 ; 37.4548 ; 37.8983 ; 38.4936 ; 39.2624 ; 40.2175 ; 41.4979 ; 43.157 ; 45.2977 ; 46.0228 ; 47.0351 ; 48.4416 ; 50.3012 ; 52.6103 ; 53.3335 ; 54.2459 ; 55.4302 ; 57.0951 ; 57.7407 ; 58.5964 ; 59.9244 ; 61.6728 ; 62.307 ; 62.5229 ; 62.9514 ; 63.5143 ; 64.4169 ; 65.5527 ; 66.0534 ; 66.5345 ; 66.6813 ; 66.873 ; 67.1576 ; 67.5956 ; 68.2829 ; 68.4959 ; 68.7921 ; 69.2469 ; 69.8703 ; 70.05 ; 70.3266 ; 70.4098 ; 70.523 ; 70.6563 ; 70.8033 ; 70.9519 ; 71.0185 ; 71.1075 ; 71.1914]

Bolt 3 - Shear Force (kips): [0.030291 ; 0.015802 ; 0.047571 ; 0.082317 ; 0.13699 ; 0.20542 ; 0.29132 ; 0.31846 ; 0.35745 ; 0.41203 ; 0.4907 ; 0.6034 ; 0.74478 ; 0.91557 ; 1.1239 ; 1.183 ; 1.2562 ; 1.3343 ; 1.419 ; 1.5169 ; 1.5538 ; 1.666 ; 2.1916 ; 3.651 ; 4.2698 ; 4.8324 ; 5.5499 ; 6.0897 ; 6.2409 ; 6.2942 ; 6.3609 ; 6.3003 ; 6.0394 ; 5.6405 ; 5.3756 ; 5.1332 ; 5.0566 ; 4.9629 ; 4.8067 ; 4.5357 ; 4.3712 ; 4.3229 ; 4.2134 ; 3.9809 ; 3.6566 ; 3.6081 ; 3.5361 ; 3.5106 ; 3.4747 ; 3.422 ; 3.3495 ; 3.2378 ; 3.2155 ; 3.1924 ; 3.1343]

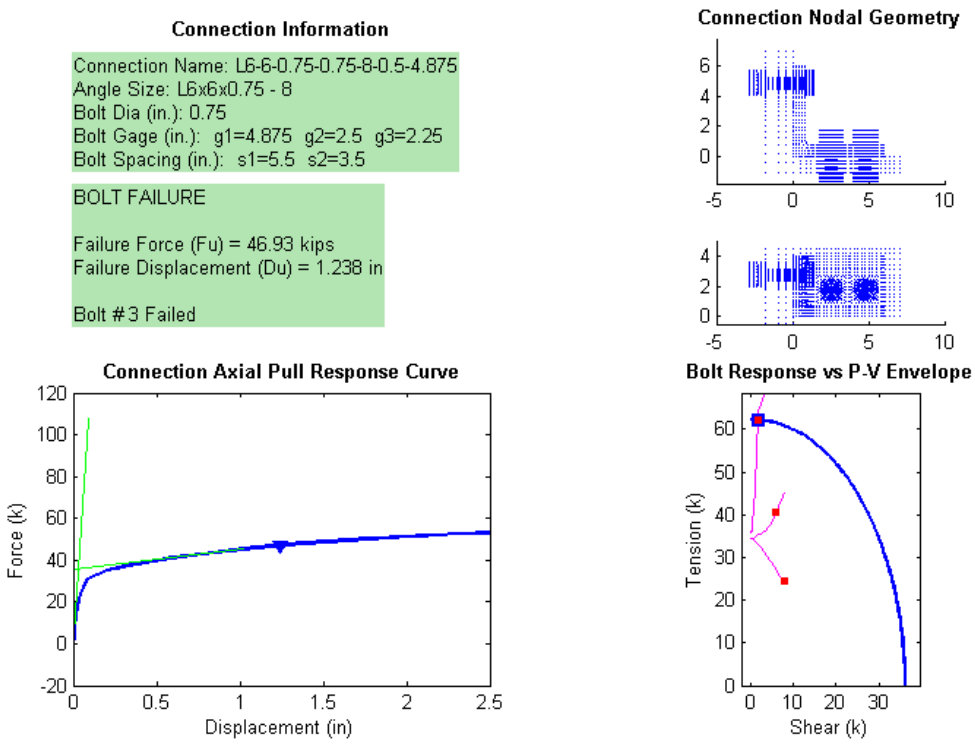


Figure B.159 Connection L6_6_0.75_0.75_8_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.75_8_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 1.2258e+003

Plastic Stiffness (k/in): 9.2216

Displacement (in): [3.203e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.34102 ; 0.39447 ; 0.47465 ; 0.59492 ; 0.77533 ; 1.0253 ; 1.2753 ; 1.5253 ; 1.7753 ; 2.0253 ; 2.0878 ; 2.1816 ; 2.3222 ; 2.5]

Force (kips): [-0.80003 ; 0.671161 ; 1.59406 ; 2.82497 ; 4.45079 ; 6.56356 ; 9.19049 ; 9.98207 ; 10.9809 ; 12.2343 ; 13.6467 ; 14.9527 ; 15.9076 ; 16.7341 ; 17.5907 ; 18.4878 ; 18.7726 ; 19.1837 ; 19.7534 ; 20.5003 ; 21.4736 ; 22.6263 ; 23.6125 ; 24.4117 ; 25.0832 ; 25.6675 ; 25.8022 ; 25.9969 ; 26.266 ; 26.5678]

Bolt 1 - Tensile Force (kips): [34.639 ; 34.5941 ; 34.5637 ; 34.5207 ; 34.4599 ; 34.3699 ; 34.2399 ; 34.1958 ; 34.1354 ; 34.0542 ; 33.9532 ; 33.8456 ; 33.7672 ; 33.6923 ; 33.3209 ; 32.3336 ; 31.933 ; 31.3488 ; 30.5106 ; 29.3289 ; 27.6863 ; 25.6789 ; 24.2766 ; 24.2712 ; 24.3751 ; 24.5004 ; 24.5313 ; 24.5571 ; 24.6615 ; 24.8077]

Bolt 1 - Shear Force (kips): [0.045542 ; 0.052041 ; 0.093066 ; 0.15448 ; 0.241 ; 0.3598 ; 0.52014 ; 0.57222 ; 0.64119 ; 0.73311 ; 0.8454 ; 0.96054 ; 1.0439 ; 1.1251 ; 1.4945 ; 2.3274 ; 2.6439 ; 3.0929 ; 3.713 ; 4.5501 ; 5.6718 ; 6.9889 ; 7.8961 ; 7.9931 ; 8.0387 ; 8.0825 ; 8.0931 ; 8.1329 ; 8.162 ; 8.1849]

Bolt 2 - Tensile Force (kips): [34.6432 ; 34.6151 ; 34.5883 ; 34.5529 ; 34.511 ; 34.4708 ; 34.4583 ; 34.4651 ; 34.4895 ; 34.5372 ; 34.6182 ; 34.7296 ; 34.8272 ; 34.9157 ; 35.0412 ; 35.4202 ; 35.5772 ; 35.8229 ; 36.1952 ; 36.8507 ; 37.9949 ; 39.5103 ; 40.9408 ; 42.0547 ; 42.9697 ; 43.7632 ; 43.9432 ; 44.2075 ; 44.5715 ; 44.9847]

Bolt 2 - Shear Force (kips): [0.035475 ; 0.05024 ; 0.098187 ; 0.16565 ; 0.25909 ; 0.38584 ; 0.55396 ; 0.6078 ; 0.67854 ; 0.77173 ; 0.88231 ; 0.99428 ; 1.0764 ; 1.156 ; 1.4858 ; 2.1957 ; 2.4576 ; 2.8193 ; 3.3034 ; 3.9056 ; 4.6197 ; 5.3908 ; 5.974 ; 6.4684 ; 6.887 ; 7.2503 ; 7.3347 ; 7.4534 ; 7.6238 ; 7.822]

Bolt 3 - Tensile Force (kips): [36 ; 35.9449 ; 35.9104 ; 35.9029 ; 35.9935 ; 36.2876 ; 36.8564 ; 37.1436 ; 37.6288 ; 38.3258 ; 39.2231 ; 40.5636 ; 42.6126 ; 45.1641 ; 47.7628 ; 50.295 ; 51.1029 ; 52.2179 ; 53.6542 ; 55.4376 ; 57.6617 ; 60.3453 ; 62.6132 ; 64.3907 ; 65.9468 ; 67.4202 ; 67.8197 ; 68.3608 ; 69.0396 ; 69.7091]

Bolt 3 - Shear Force (kips): [0.030511 ; 0.0098926 ; 0.020431 ; 0.048498 ; 0.095419 ; 0.16351 ; 0.24468 ; 0.26985 ; 0.30365 ; 0.35049 ; 0.42023 ; 0.53018 ; 0.67286 ; 0.8487 ; 0.98961 ; 1.1307 ; 1.1745 ; 1.2332 ; 1.304 ; 1.3654 ; 1.43 ; 1.5261 ; 1.5731 ; 1.7653 ; 2.3215 ; 2.8824 ; 3.0674 ; 3.0619 ; 3.0292 ; 2.987]

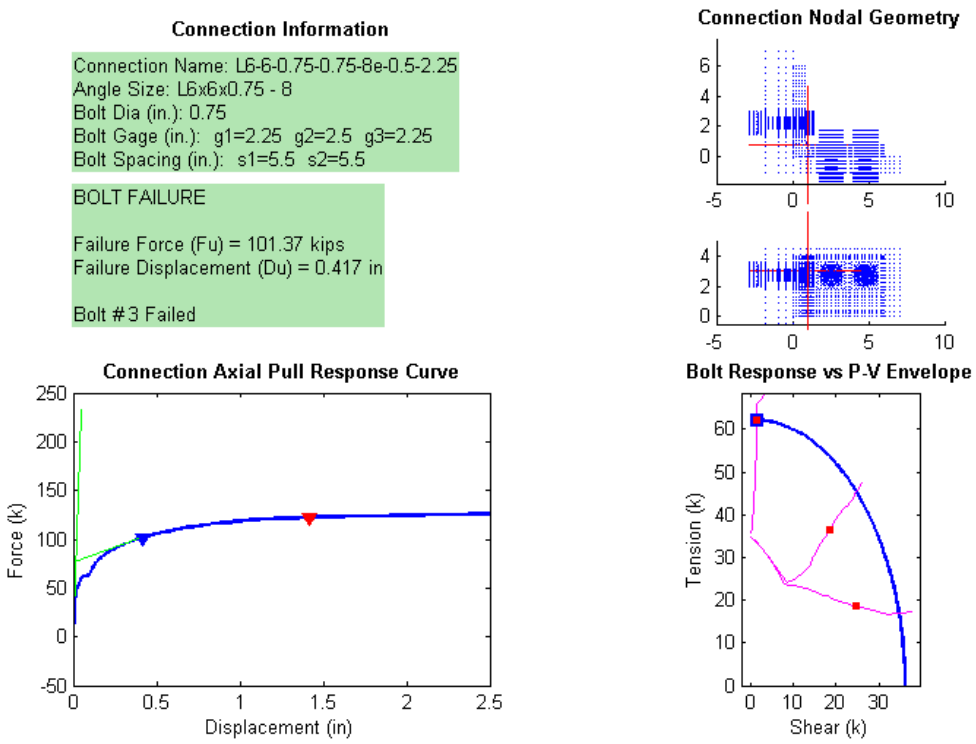


Figure B.160 Connection L6_6_0.75_0.75_8e_0.5_2.25 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.75_8e_0.5_2.25 Analysis Response Variables.
Initial Stiffness (k/in): 4.9617e+003

Plastic Stiffness (k/in): 59.0793

Displacement (in): [2.8319e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.033569 ; 0.048401 ; 0.053963 ; 0.062306 ; 0.065434 ; 0.070127 ; 0.077166 ; 0.079806 ; 0.080796 ; 0.08228 ; 0.084508 ; 0.087848 ; 0.09286 ; 0.094739 ; 0.097558 ; 0.098615 ; 0.1002 ; 0.10258 ; 0.10347 ; 0.10481 ; 0.10681 ; 0.10983 ; 0.11434 ; 0.12111 ; 0.13127 ; 0.13508 ; 0.1408 ; 0.14937 ; 0.16223 ; 0.16705 ; 0.17428 ; 0.18513 ; 0.2014 ; 0.22581 ; 0.23497 ; 0.2487 ; 0.26929 ; 0.30019 ; 0.31177 ; 0.32915 ; 0.35522 ; 0.39432 ; 0.45297 ; 0.54094 ; 0.57393 ; 0.62342 ; 0.69765 ; 0.80899 ; 0.85074 ; 0.91338 ; 1.0073 ; 1.0426 ; 1.0778 ; 1.113 ; 1.1482 ; 1.1835 ; 1.2363 ; 1.2561 ; 1.2859 ; 1.3304 ; 1.3973 ; 1.4976 ; 1.5353 ; 1.5917 ; 1.6764 ; 1.8033 ; 1.9938 ; 2.2438 ; 2.4938 ; 2.5]

Force (kips): [-0.927018 ; 4.67345 ; 8.76378 ; 13.6255 ; 17.447 ; 20.375 ; 23.4931 ; 25.3684 ; 27.3885 ; 29.8335 ; 30.5491 ; 31.0277 ; 31.0292 ; 31.026 ; 31.0214 ; 31.2386 ; 31.3018 ; 31.4738 ; 31.49 ; 31.4914 ; 31.4899 ; 31.4892 ; 31.8353 ; 32.0479 ; 32.3844 ; 32.8735 ; 33.0396 ; 33.2942 ; 33.6237 ; 34.1692 ; 34.8646 ; 35.9136 ; 37.2675 ; 37.7252 ; 38.3471 ; 39.1502 ; 40.1697 ; 40.52 ; 41.0395 ; 41.7605 ; 42.71 ; 43.9386 ; 44.368 ; 44.9834 ; 45.8746 ; 47.0817 ; 47.5111 ; 48.1183 ; 48.9656 ; 50.1206 ; 51.5991 ; 53.456 ; 54.0724 ; 54.9229 ; 56.03 ; 57.4626 ; 57.9393 ; 58.5609 ; 59.3153 ; 59.5639 ; 59.79 ; 59.9937 ; 60.178 ; 60.3496 ; 60.5627 ; 60.6315 ; 60.7289 ; 60.865 ; 61.0536 ; 61.3008 ; 61.386 ; 61.5044 ; 61.6651 ; 61.8822 ; 62.1751 ; 62.5176 ; 62.8208 ; 62.828]

Bolt 1 - Tensile Force (kips): [34.6874 ; 34.5042 ; 34.3486 ; 34.1386 ; 33.9533 ; 33.7933 ; 33.4518 ; 32.0808 ; 29.6394 ; 25.9649 ; 24.6579 ; 23.9854 ; 23.9804 ; 23.9755 ; 23.9709 ; 23.7377 ; 23.7213 ; 23.716 ; 23.7105 ; 23.7073 ; 23.7059 ; 23.7057 ; 23.6661 ; 23.6545 ; 23.647 ; 23.6088 ; 23.605 ; 23.6052 ; 23.5889 ; 23.4912 ; 23.369 ; 23.2034 ; 23.0331 ; 22.9468 ; 22.8316 ; 22.7033 ; 22.5612 ; 22.465 ; 22.2477 ; 21.9478 ; 21.5961 ; 21.1311 ; 20.9169 ; 20.6226 ; 20.1595 ; 19.6067 ; 19.4664 ; 19.3121 ; 19.1147 ; 18.8033 ; 18.4955 ; 17.9834 ; 17.76 ; 17.5347 ; 17.2267 ; 16.955 ; 16.8515 ; 16.7612 ; 16.7534 ; 16.7589 ; 16.782 ; 16.8098 ; 16.8427 ; 16.8708 ; 16.9092 ; 16.9222 ; 16.9382 ; 16.9618 ; 16.9811 ; 16.9893 ; 16.9807 ; 16.9849 ; 16.999 ; 17.0228 ; 17.0736 ; 17.2351 ; 17.4574 ; 17.463]

Bolt 1 - Shear Force (kips): [0.0369264 ; 0.241876 ; 0.440735 ; 0.686032 ; 0.887176 ; 1.04756 ; 1.38435 ; 2.54575 ; 4.3516 ; 6.75623 ; 7.52966 ; 7.91339 ; 7.91308 ; 7.91185 ; 7.9104 ; 8.19091 ; 8.20848 ; 8.21314 ; 8.21702 ; 8.21801 ; 8.21742 ; 8.21712 ; 8.55028 ; 8.65995 ; 8.743 ; 9.07341 ; 9.14873 ; 9.22547 ; 9.35853 ; 9.79016 ; 10.1897 ; 10.9127 ; 11.86 ; 12.2016 ; 12.6384 ; 13.1354 ; 13.686 ; 13.9262 ; 14.4416 ; 15.1536 ; 15.9941 ; 17.167 ; 17.6597 ; 18.3887 ; 19.5688 ; 21.0849 ; 21.5579 ; 22.1111 ; 22.9015 ; 24.0548 ; 25.5096 ; 27.4411 ; 28.0099 ; 28.6455 ; 29.5766 ; 30.731 ; 31.1652 ; 31.7309 ; 32.4301 ; 32.6958 ; 32.9157 ; 33.1094 ; 33.2986 ; 33.4917 ; 33.7454 ; 33.8376 ; 33.9771 ; 34.167 ; 34.4475 ; 34.8543 ; 35.0094 ; 35.2226 ; 35.5182 ; 35.9487 ; 36.4394 ; 37.0621 ; 37.5971 ; 37.6096]

Bolt 2 - Tensile Force (kips): [34.7139 ; 34.5434 ; 34.3999 ; 34.2237 ; 34.0923 ; 33.9978 ; 33.7682 ; 32.4849 ; 30.1812 ; 26.802 ; 25.6156 ; 24.5014 ; 24.4803 ; 24.4716 ; 24.4673 ; 24.4906 ; 24.4383 ; 24.2603 ; 24.2448 ; 24.2416 ; 24.2405 ; 24.2403 ; 24.2889 ; 24.3031 ; 24.3409 ; 24.4085 ; 24.4301 ; 24.4603 ; 24.5111 ; 24.6171 ; 24.7311 ; 24.9325 ; 25.3708 ; 25.5417 ; 25.8123 ; 26.2313 ; 26.8715 ; 27.1159 ; 27.4716 ; 27.9828 ; 28.7695 ; 29.9431 ; 30.3777 ; 31.0221 ; 31.8584 ; 33.053 ; 33.4511 ; 34.0043 ; 34.8254 ; 35.914 ; 37.2102 ; 38.5716 ; 38.9835 ; 39.5641 ; 40.3331 ; 41.247 ; 41.5694 ; 41.9813 ; 42.5582 ; 42.7542 ; 42.9415 ; 43.1207 ; 43.2956 ; 43.4738 ; 43.7183 ; 43.8041 ; 43.9369 ; 44.1266 ; 44.4045 ; 44.8119 ; 44.9568 ; 45.1673 ; 45.4697 ; 45.8978 ; 46.4654 ; 47.0816 ; 47.5973 ; 47.6085]

Bolt 2 - Shear Force (kips): [0.0534472 ; 0.227936 ; 0.425876 ; 0.666845 ; 0.861745 ; 1.01471 ; 1.32326 ; 2.46045 ; 4.24324 ; 6.61017 ; 7.37398 ; 8.06147 ; 8.07203 ; 8.07451 ; 8.0741 ; 8.08182 ; 8.15247 ; 8.38411 ; 8.40391 ; 8.40626 ; 8.40631 ; 8.40607 ; 8.42099 ; 8.52687 ; 8.77957 ; 8.94813 ; 9.04103 ; 9.22382 ; 9.42958 ; 9.57963 ; 9.93893 ; 10.3589 ; 10.8112 ; 11.0904 ; 11.5327 ; 12.0901 ; 12.7416 ; 12.925 ; 13.1944 ; 13.5775 ; 14.0082 ; 14.4937 ; 14.682 ; 14.9558 ; 15.4602 ; 16.1347 ; 16.4304 ; 16.9022 ; 17.4408 ; 18.0757 ; 18.8055 ; 19.5962 ; 19.8673 ; 20.2522 ; 20.7847 ; 21.7002 ; 22.0126 ; 22.4461 ; 22.9655 ; 23.1216 ; 23.2649 ; 23.3936 ; 23.5085 ; 23.6041 ; 23.7566 ; 23.815 ; 23.8926 ; 24.0116 ; 24.1715 ; 24.3769 ; 24.4525 ; 24.5622 ; 24.7217 ; 24.9607 ; 25.2803 ; 25.6526 ; 25.9279 ; 25.9352]

Bolt 3 - Tensile Force (kips): [36 ; 35.9752 ; 36.1141 ; 36.5027 ; 37.0037 ; 37.6413 ; 38.4135 ; 38.9069 ; 39.5068 ; 40.4941 ; 40.8485 ; 41.1207 ; 41.1221 ; 41.119 ; 41.1138 ; 41.2375 ; 41.274 ; 41.3771 ; 41.3867 ; 41.3869 ; 41.3845 ; 41.3835 ; 41.5951 ; 41.7289 ; 41.9526 ; 42.2966 ; 42.4202 ; 42.6164 ; 42.8763 ; 43.3291 ; 43.97 ; 45.0697 ; 46.6172 ; 47.162 ; 47.9186 ; 48.9254 ; 50.2323 ; 50.6834 ; 51.3399 ; 52.2445 ; 53.4236 ; 54.8664 ; 55.3514 ; 56.0404 ; 57.0115 ; 58.328 ; 58.7927 ; 59.4574 ; 60.3962 ; 61.6803 ; 63.2841 ; 65.2965 ; 66.0185 ; 66.9326 ; 68.1708 ; 69.7431 ; 70.2606 ; 70.8193 ; 71.3576 ; 71.5125 ; 71.6495 ; 71.7817 ; 71.8993 ; 72.006 ; 72.1191 ; 72.1539 ; 72.2036 ; 72.2724 ; 72.3656 ; 72.4755 ; 72.5098 ; 72.5525 ; 72.6033 ; 72.6635 ; 72.7368 ; 72.8179 ; 72.8914 ; 72.8932]

Bolt 3 - Shear Force (kips): [0.031737 ; 0.037031 ; 0.099041 ; 0.18436 ; 0.25283 ; 0.30766 ; 0.37162 ; 0.41314 ; 0.46215 ; 0.52949 ; 0.5529 ; 0.56901 ; 0.56921 ; 0.56921 ; 0.56905 ; 0.57589 ; 0.57803 ; 0.58386 ; 0.58443 ; 0.58456 ; 0.58457 ; 0.58456 ; 0.59528 ; 0.60227 ; 0.6137 ; 0.63127 ; 0.6375 ; 0.64749 ; 0.66164 ; 0.68636 ; 0.72304 ; 0.78958 ; 0.88101 ; 0.90797 ; 0.94444 ; 0.99133 ; 1.0531 ; 1.0735 ; 1.1003 ; 1.1373 ; 1.1868 ; 1.2473 ; 1.2639 ; 1.2834 ; 1.3023 ; 1.3179 ; 1.3208 ; 1.3243 ; 1.3273 ; 1.3249 ; 1.3018 ; 1.2775 ; 1.4567 ; 2.2513 ; 3.129 ; 4.0403 ; 4.3848 ; 4.6475 ; 4.7898 ; 4.8224 ; 4.85 ; 4.8649 ; 4.8779 ; 4.9003 ; 4.9178 ; 4.9133 ; 4.908 ; 4.906 ; 4.9072 ; 4.8903 ; 4.8813 ; 4.8539 ; 4.7742 ; 4.5968 ; 4.3138 ; 3.9432 ; 3.596 ; 3.5877]

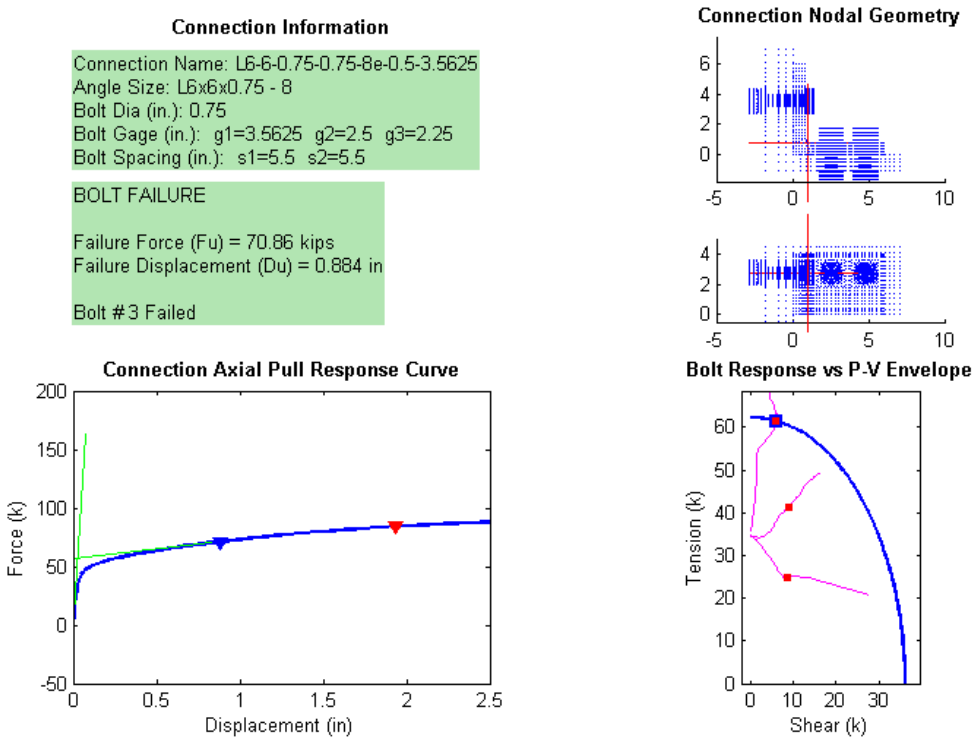


Figure B.161 Connection L6_6_0.75_0.75_8e_0.5_3.5625 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.75_8e_0.5_3.5625 Analysis Response Variables.
Initial Stiffness (k/in): 2.2906e+003

Plastic Stiffness (k/in): 16.6021

Displacement (in): [2.8455e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.10791 ; 0.12375 ; 0.1475 ; 0.18314 ; 0.23659 ; 0.25664 ; 0.28671 ; 0.33181 ; 0.39946 ; 0.42483 ; 0.46288 ; 0.51997 ; 0.60559 ; 0.6377 ; 0.68586 ; 0.70392 ; 0.73101 ; 0.77165 ; 0.83261 ; 0.92404 ; 0.95833 ; 0.97119 ; 0.99047 ; 1.0098 ; 1.0291 ; 1.058 ; 1.1014 ; 1.1665 ; 1.1909 ; 1.2275 ; 1.2824 ; 1.3648 ; 1.4884 ; 1.6737 ; 1.7362 ; 1.83 ; 1.9706 ; 2.0233 ; 2.1025 ; 2.1816 ; 2.2607 ; 2.3793 ; 2.5]

Force (kips): [-0.931084 ; 1.64706 ; 3.54281 ; 5.92484 ; 8.95622 ; 12.6683 ; 13.7945 ; 15.2663 ; 17.1735 ; 19.4502 ; 21.5813 ; 23.2563 ; 24.5714 ; 24.9538 ; 25.4727 ; 26.1789 ; 27.0754 ; 28.1038 ; 28.4365 ; 28.9165 ; 29.594 ; 30.5565 ; 30.9116 ; 31.3942 ; 32.071 ; 32.9788 ; 33.303 ; 33.7584 ; 33.9266 ; 34.177 ; 34.5344 ; 35.0404 ; 35.7395 ; 36.0295 ; 36.1354 ; 36.3067 ; 36.4605 ; 36.6175 ; 36.882 ; 37.251 ; 37.7802 ; 37.9791 ; 38.2567 ; 38.6279 ; 39.1466 ; 39.8823 ; 40.8771 ; 41.1875 ; 41.6267 ; 42.2174 ; 42.4217 ; 42.7084 ; 42.9709 ; 43.2173 ; 43.5597 ; 43.8818]

Bolt 1 - Tensile Force (kips): [34.6809 ; 34.5961 ; 34.5289 ; 34.4359 ; 34.3018 ; 34.1144 ; 34.0523 ; 33.9659 ; 33.8426 ; 33.6601 ; 33.0967 ; 32.3118 ; 31.2829 ; 30.9099 ; 30.3619 ; 29.5847 ; 28.5258 ; 27.2794 ; 26.8799 ; 26.2925 ; 25.4377 ; 24.3664 ; 24.2295 ; 24.2531 ; 24.3243 ; 24.4569 ; 24.5108 ; 24.5955 ; 24.5805 ; 24.513 ; 24.6145 ; 24.7904 ; 25.0674 ; 25.0193 ; 24.9929 ; 25.0172 ; 25.0599 ; 25.1155 ; 25.1235 ; 25.1239 ; 24.9209 ; 24.884 ; 24.8039 ; 24.7179 ; 24.5831 ; 23.9813 ; 23.1368 ; 22.8422 ; 22.4658 ; 22.1175 ; 22.0332 ; 21.7548 ; 21.5254 ; 21.3322 ; 20.9945 ; 20.7285]

Bolt 1 - Shear Force (kips): [0.0372855 ; 0.104296 ; 0.201457 ; 0.328229 ; 0.496435 ; 0.71607 ; 0.786364 ; 0.881719 ; 1.01072 ; 1.1943 ; 1.72271 ; 2.37176 ; 3.16821 ; 3.44574 ; 3.84482 ; 4.3981 ; 5.13081 ; 5.97404 ; 6.23987 ; 6.62416 ; 7.17152 ; 7.85286 ; 7.95924 ; 7.98916 ; 8.02257 ; 8.06956 ; 8.08781 ; 8.11603 ; 8.18337 ; 8.35285 ; 8.39777 ; 8.44932 ; 8.52051 ; 8.94209 ; 9.10564 ; 9.3701 ; 9.54802 ; 9.70173 ; 10.0789 ; 10.6286 ; 11.9883 ; 12.3725 ; 12.9638 ; 13.7434 ; 14.7671 ; 16.6905 ; 19.4454 ; 20.3459 ; 21.542 ; 22.8789 ; 23.3294 ; 24.1646 ; 24.9023 ; 25.5905 ; 26.646 ; 27.5274]

Bolt 2 - Tensile Force (kips): [34.6995 ; 34.6354 ; 34.5776 ; 34.5079 ; 34.4297 ; 34.3678 ; 34.3611 ; 34.3579 ; 34.3739 ; 34.4112 ; 34.2143 ; 34.1437 ; 34.4435 ; 34.5826 ; 34.783 ; 35.1083 ; 35.5971 ; 36.2554 ; 36.4878 ; 36.8644 ; 37.4704 ; 38.3868 ; 38.6962 ; 39.09 ; 39.5771 ; 40.0678 ; 40.2062 ; 40.3961 ; 40.4834 ; 40.6388 ; 40.8195 ; 41.1 ; 41.5579 ; 41.8539 ; 41.9665 ; 42.1205 ; 42.2601 ; 42.3922 ; 42.6088 ; 42.912 ; 43.4214 ; 43.5919 ; 43.8285 ; 44.2154 ; 44.7439 ; 45.5155 ; 46.5409 ; 46.8314 ; 47.2206 ; 47.7165 ; 47.8718 ; 48.1375 ; 48.3969 ; 48.6351 ; 48.962 ; 49.1897]

Bolt 2 - Shear Force (kips): [0.0533737 ; 0.0855049 ; 0.176476 ; 0.296322 ; 0.453554 ; 0.655447 ; 0.71915 ; 0.804852 ; 0.91843 ; 1.07557 ; 1.54088 ; 2.11901 ; 2.79052 ; 3.01632 ; 3.3353 ; 3.759 ; 4.2899 ; 4.86521 ; 5.04011 ; 5.28554 ; 5.62105 ; 6.08303 ; 6.25478 ; 6.50781 ; 6.8714 ; 7.40862 ; 7.60317 ; 7.88034 ; 7.96943 ; 8.08251 ; 8.27522 ; 8.54218 ; 8.92856 ; 9.25616 ; 9.34666 ; 9.44988 ; 9.54279 ; 9.62529 ; 9.84429 ; 10.1696 ; 10.4489 ; 10.6442 ; 10.9331 ; 11.2121 ; 11.642 ; 12.0794 ; 12.6662 ; 12.8797 ; 13.3257 ; 14.0653 ; 14.3262 ; 14.6148 ; 14.869 ; 15.1094 ; 15.4468 ; 16.0268]

Bolt 3 - Tensile Force (kips): [36 ; 35.9269 ; 35.9181 ; 36.0218 ; 36.3309 ; 36.9088 ; 37.1883 ; 37.6462 ; 38.2713 ; 39.0779 ; 40.0715 ; 41.3964 ; 43.0895 ; 43.6686 ; 44.4977 ; 45.6504 ; 47.1881 ; 49.226 ; 49.9347 ; 50.9308 ; 52.2638 ; 53.938 ; 54.466 ; 55.1245 ; 56.09 ; 57.447 ; 57.9777 ; 58.6854 ; 58.9375 ; 59.3061 ; 59.9213 ; 60.8205 ; 61.9966 ; 62.4593 ; 62.6271 ; 62.9125 ; 63.1425 ; 63.3957 ; 63.8213 ; 64.4094 ; 65.218 ; 65.5753 ; 65.9975 ; 66.4807 ; 67.0775 ; 67.9349 ; 69.0833 ; 69.4433 ; 69.8987 ; 70.4362 ; 70.5974 ; 70.7695 ; 70.8973 ; 70.9889 ; 71.0868 ; 71.1525]

Bolt 3 - Shear Force (kips): [0.044727 ; 0.0084367 ; 0.035984 ; 0.087049 ; 0.16129 ; 0.25085 ; 0.27932 ; 0.31859 ; 0.37393 ; 0.45041 ; 0.5589 ; 0.6934 ; 0.84876 ; 0.90315 ; 0.97889 ; 1.0721 ; 1.1785 ; 1.2822 ; 1.311 ; 1.3494 ; 1.3996 ; 1.4843 ; 1.5447 ; 1.6805 ; 2.6426 ; 3.8312 ; 4.3402 ; 4.7951 ; 4.9297 ; 5.0859 ; 5.4519 ; 5.7839 ; 6.087 ; 6.1763 ; 6.1933 ; 6.0742 ; 5.9996 ; 5.8178 ; 5.6817 ; 5.6051 ; 5.3932 ; 5.217 ; 5.0435 ; 4.842 ; 4.5696 ; 4.2594 ; 3.909 ; 3.7064 ; 3.5608 ; 3.4281 ; 3.3821 ; 3.3165 ; 3.2513 ; 3.1876 ; 3.1036 ; 3.0076]

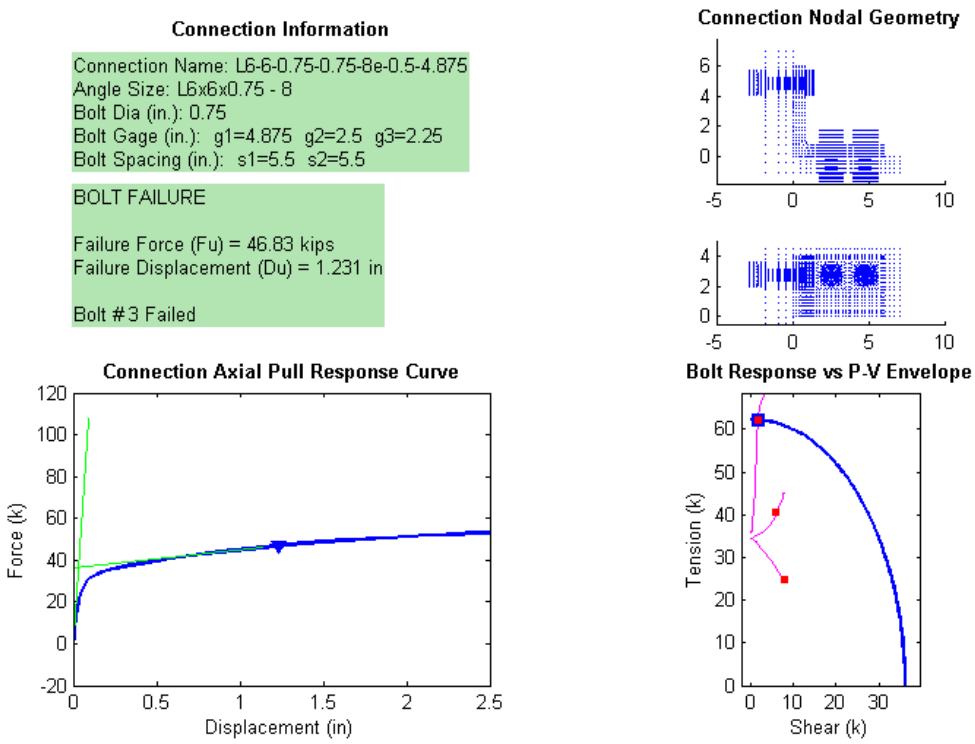


Figure B.162 Connection L6_6_0.75_0.75_8e_0.5_4.875 analysis response and failure criteria evaluation.

Numerical Data of Connection L6_6_0.75_0.75_8e_0.5_4.875 Analysis Response Variables.
Initial Stiffness (k/in): 1228

Plastic Stiffness (k/in): 8.6223

Displacement (in): [2.7052e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.44793 ; 0.50138 ; 0.58156 ; 0.70183 ; 0.88224 ; 1.1322 ; 1.3822 ; 1.6322 ; 1.8822 ; 2.1322 ; 2.1947 ; 2.2885 ; 2.4291 ; 2.5]

Force (kips): [-0.88116 ; 0.613779 ; 1.51723 ; 2.73267 ; 4.33786 ; 6.43088 ; 9.03597 ; 9.82418 ; 10.8327 ; 12.0946 ; 13.5274 ; 14.8928 ; 15.8983 ; 16.7376 ; 17.5779 ; 18.4642 ; 19.5387 ; 19.9011 ; 20.3982 ; 21.0801 ; 21.987 ; 23.0648 ; 23.9564 ; 24.6937 ; 25.3261 ; 25.8757 ; 26.0011 ; 26.1816 ; 26.4314 ; 26.5482]

Bolt 1 - Tensile Force (kips): [34.6814 ; 34.6322 ; 34.5997 ; 34.5545 ; 34.4896 ; 34.3943 ; 34.2583 ; 34.2131 ; 34.152 ; 34.0701 ; 33.9675 ; 33.8552 ; 33.7702 ; 33.6781 ; 33.2317 ; 32.2057 ; 30.6556 ; 30.1169 ; 29.3399 ; 28.2308 ; 26.7012 ; 24.9932 ; 24.5535 ; 24.7228 ; 24.9208 ; 25.1268 ; 25.1681 ; 25.265 ; 25.4365 ; 25.5249]

Bolt 1 - Shear Force (kips): [0.035561 ; 0.056382 ; 0.10311 ; 0.17012 ; 0.26286 ; 0.38979 ; 0.56027 ; 0.61538 ; 0.68911 ; 0.78649 ; 0.90476 ; 1.0279 ; 1.1216 ; 1.2243 ; 1.6571 ; 2.5184 ; 3.7189 ; 4.1167 ; 4.6814 ; 5.4698 ; 6.5317 ; 7.6723 ; 8.0769 ; 8.1523 ; 8.2216 ; 8.2904 ; 8.3169 ; 8.3566 ; 8.3997 ; 8.4185]

Bolt 2 - Tensile Force (kips): [34.7012 ; 34.6688 ; 34.6441 ; 34.6099 ; 34.5724 ; 34.5377 ; 34.5354 ; 34.548 ; 34.5735 ; 34.634 ; 34.7243 ; 34.8669 ; 34.9764 ; 35.0601 ; 35.1556 ; 35.5344 ; 36.1827 ; 36.4576 ; 36.8852 ; 37.5789 ; 38.679 ; 40.1088 ; 41.3316 ; 42.3654 ; 43.2953 ; 44.1177 ; 44.305 ; 44.5689 ; 44.9329 ; 45.1054]

Bolt 2 - Shear Force (kips): [0.051479 ; 0.043652 ; 0.081504 ; 0.14066 ; 0.22396 ; 0.3378 ; 0.48769 ; 0.53533 ; 0.59896 ; 0.68267 ; 0.78285 ; 0.88628 ; 0.96908 ; 1.0625 ; 1.4427 ; 2.1715 ; 3.1292 ; 3.4296 ; 3.8373 ; 4.3701 ; 5.0305 ; 5.7227 ; 6.2607 ; 6.695 ; 7.0601 ; 7.3672 ; 7.438 ; 7.5389 ; 7.6848 ; 7.754]

Bolt 3 - Tensile Force (kips): [36 ; 35.9442 ; 35.9079 ; 35.8987 ; 35.986 ; 36.2769 ; 36.8417 ; 37.1176 ; 37.6018 ; 38.3064 ; 39.2118 ; 40.5756 ; 42.6495 ; 45.2169 ; 47.7948 ; 50.316 ; 53.1896 ; 54.0846 ; 55.2771 ; 56.869 ; 58.9464 ; 61.4933 ; 63.4791 ; 65.135 ; 66.6893 ; 68.1442 ; 68.498 ; 68.9346 ; 69.518 ; 69.7551]

Bolt 3 - Shear Force (kips): [0.044745 ; 0.016152 ; 0.012172 ; 0.036538 ; 0.08086 ; 0.14713 ; 0.22564 ; 0.2499 ; 0.28233 ; 0.32849 ; 0.39647 ; 0.50501 ; 0.65196 ; 0.82985 ; 0.97152 ; 1.1119 ; 1.2605 ; 1.2984 ; 1.336 ; 1.3748 ; 1.4242 ; 1.5234 ; 1.5779 ; 1.9595 ; 2.523 ; 3.1469 ; 3.1554 ; 3.1379 ; 3.0471 ; 3.072]

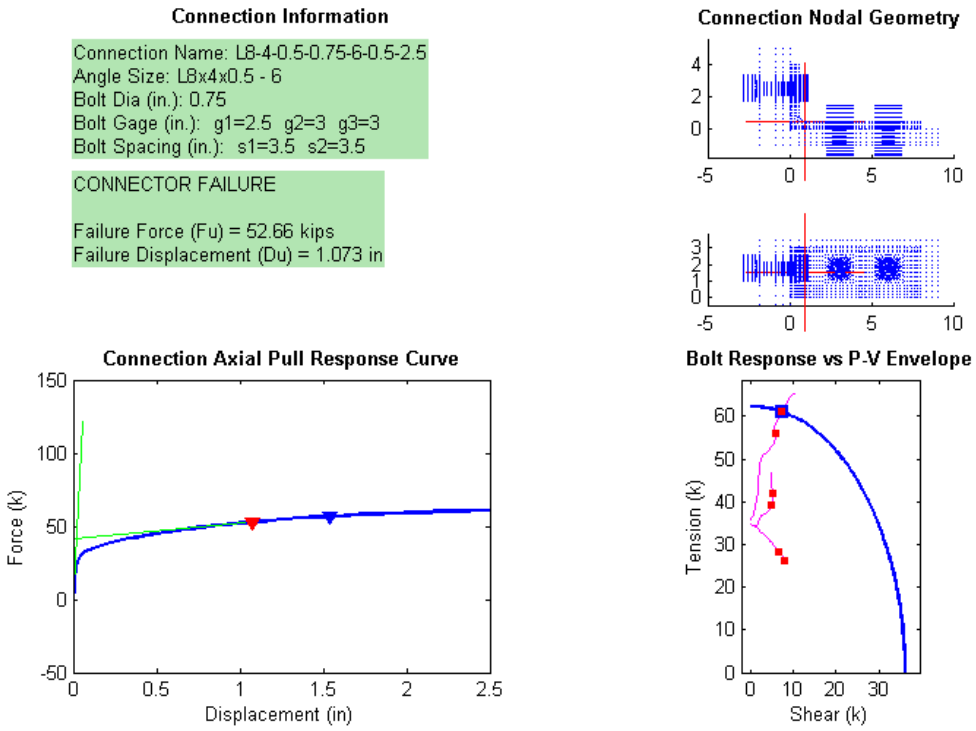


Figure B.163 Connection L8_4_0.5_0.75_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_0.75_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.0386e+003

Plastic Stiffness (k/in): 10.7150

Displacement (in): [2.9842e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.46527 ; 0.50091 ; 0.55436 ; 0.63454 ; 0.66461 ; 0.70971 ; 0.77737 ; 0.87884 ; 1.0311 ; 1.0881 ; 1.1096 ; 1.1417 ; 1.1898 ; 1.2621 ; 1.3704 ; 1.4517 ; 1.5736 ; 1.7565 ; 1.819 ; 1.9127 ; 2.0534 ; 2.2643 ; 2.5]

Force (kips): [-0.74499 ; 1.57668 ; 3.23661 ; 5.32273 ; 7.93814 ; 10.8715 ; 13.2192 ; 14.7288 ; 15.8088 ; 16.7967 ; 17.9422 ; 19.2907 ; 20.7637 ; 21.234 ; 21.8736 ; 22.1304 ; 22.4771 ; 22.9786 ; 23.6416 ; 23.883 ; 24.2106 ; 24.6585 ; 25.2748 ; 26.0903 ; 26.4142 ; 26.5361 ; 26.6972 ; 26.9406 ; 27.2942 ; 27.7792 ; 28.0934 ; 28.498 ; 29.0161 ; 29.1762 ; 29.3945 ; 29.6767 ; 30.0299 ; 30.3525]

Bolt 1 - Tensile Force (kips): [34.7767 ; 34.7184 ; 34.6727 ; 34.6099 ; 34.5244 ; 34.4207 ; 34.3283 ; 34.2603 ; 34.2004 ; 34.1241 ; 34.0448 ; 33.9519 ; 33.6114 ; 33.3549 ; 32.8909 ; 32.6746 ; 32.3713 ; 31.9187 ; 31.2812 ; 31.0362 ; 30.6924 ; 30.21 ; 29.5102 ; 28.5273 ; 28.1192 ; 27.962 ; 27.7516 ; 27.4817 ; 27.2436 ; 26.8946 ; 26.6171 ; 26.2665 ; 25.9249 ; 25.8797 ; 25.7995 ; 25.7647 ; 25.7919 ; 25.8255]

Bolt 1 - Shear Force (kips): [0.058313 ; 0.082765 ; 0.16547 ; 0.27487 ; 0.41746 ; 0.58441 ; 0.7276 ; 0.83343 ; 0.93003 ; 1.0502 ; 1.1734 ; 1.3156 ; 1.7527 ; 2.0445 ; 2.5292 ; 2.7439 ; 3.0391 ; 3.4682 ; 4.0527 ; 4.2703 ; 4.5708 ; 4.9839 ; 5.5649 ; 6.3541 ; 6.6725 ; 6.7938 ; 6.9557 ; 7.163 ; 7.348 ; 7.6147 ; 7.8217 ; 8.0823 ; 8.3421 ; 8.3825 ; 8.4512 ; 8.4967 ; 8.5085 ; 8.5165]

Bolt 2 - Tensile Force (kips): [34.7803 ; 34.6833 ; 34.607 ; 34.5138 ; 34.4125 ; 34.3305 ; 34.3163 ; 34.3854 ; 34.5344 ; 34.8398 ; 35.4483 ; 36.1756 ; 36.7526 ; 36.8309 ; 36.9295 ; 36.9667 ; 37.0364 ; 37.1514 ; 37.3769 ; 37.4684 ; 37.626 ; 37.9046 ; 38.356 ; 39.0806 ; 39.3165 ; 39.4001 ; 39.5435 ; 39.7827 ; 40.2415 ; 40.9117 ; 41.3819 ; 42.0807 ; 43.1408 ; 43.5305 ; 44.0703 ; 44.7904 ; 45.7516 ; 46.7477]

Bolt 2 - Shear Force (kips): [0.052625 ; 0.12865 ; 0.24221 ; 0.39102 ; 0.58642 ; 0.81723 ; 1.0257 ; 1.1992 ; 1.3718 ; 1.5589 ; 1.7204 ; 1.8695 ; 2.2479 ; 2.4904 ; 2.8493 ; 2.9794 ; 3.152 ; 3.3935 ; 3.6969 ; 3.8074 ; 3.9511 ; 4.1341 ; 4.3775 ; 4.6714 ; 4.8006 ; 4.8515 ; 4.9116 ; 4.9772 ; 4.9808 ; 4.9895 ; 5.0109 ; 5.0224 ; 4.9785 ; 4.9252 ; 4.871 ; 4.8408 ; 4.8429 ; 4.8428]

Bolt 3 - Tensile Force (kips): [36 ; 35.9381 ; 35.9383 ; 36.0324 ; 36.269 ; 36.6462 ; 37.2442 ; 37.971 ; 38.5305 ; 39.325 ; 40.6729 ; 42.8077 ; 45.7494 ; 46.7044 ; 48.0279 ; 48.4403 ; 49.0056 ; 49.7616 ; 50.8875 ; 51.3019 ; 51.8845 ; 52.6933 ; 53.8271 ; 55.3572 ; 56.1912 ; 56.5788 ; 57.021 ; 57.6776 ; 58.5295 ; 59.7439 ; 60.465 ; 61.3982 ; 62.5856 ; 62.9835 ; 63.5185 ; 64.158 ; 64.911 ; 65.4512]

Bolt 3 - Shear Force (kips): [0.0245852 ; 0.0273504 ; 0.0661759 ; 0.130775 ; 0.223148 ; 0.344166 ; 0.4889 ; 0.648703 ; 0.844186 ; 1.05541 ; 1.30071 ; 1.56352 ; 1.7945 ; 1.8737 ; 1.98872 ; 2.06319 ; 2.1514 ; 2.31897 ; 2.64569 ; 3.26179 ; 3.95297 ; 4.55216 ; 5.35789 ; 5.83458 ; 5.61542 ; 5.4846 ; 5.52233 ; 5.55716 ; 5.94731 ; 6.41972 ; 6.66496 ; 7.25343 ; 7.99027 ; 8.26992 ; 8.5671 ; 8.90568 ; 9.51515 ; 10.1993]

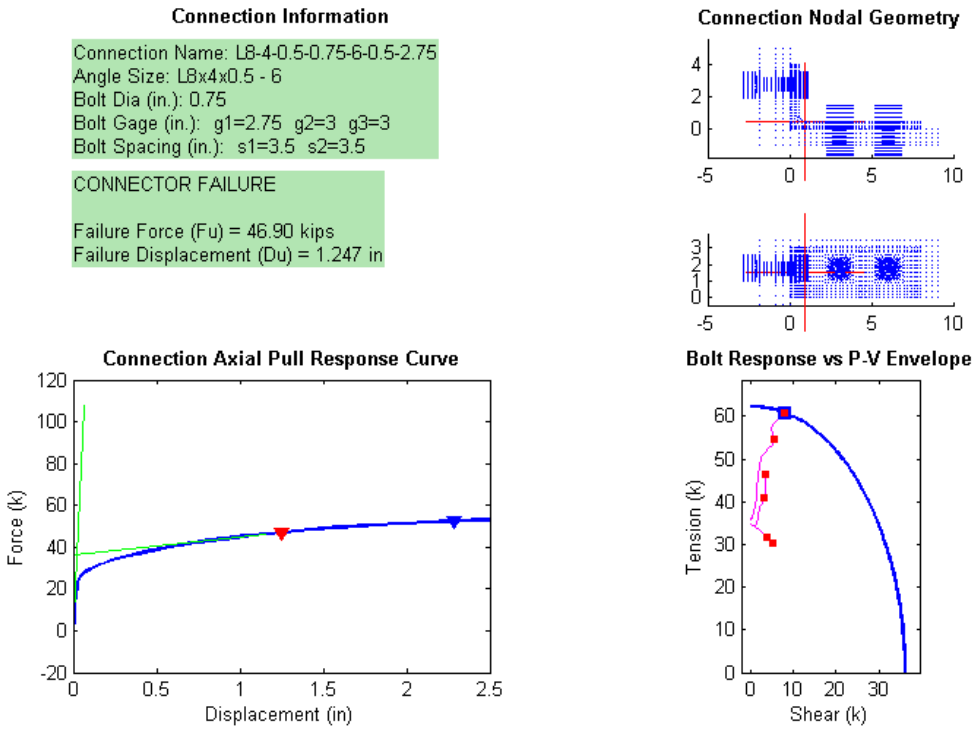


Figure B.164 Connection L8_4_0.5_0.75_6_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_0.75_6_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.6534e+003

Plastic Stiffness (k/in): 8.3666

Displacement (in): [2.4351e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.20294 ; 0.29797 ; 0.3336 ; 0.38705 ; 0.46724 ; 0.58751 ; 0.63261 ; 0.70026 ; 0.72563 ; 0.76369 ; 0.82077 ; 0.90639 ; 1.0348 ; 1.083 ; 1.1552 ; 1.2636 ; 1.4262 ; 1.5887 ; 1.6293 ; 1.67 ; 1.7309 ; 1.8224 ; 1.9595 ; 2.1652 ; 2.2277 ; 2.3215 ; 2.4621 ; 2.5]

Force (kips): [-0.720766 ; 1.16604 ; 2.50853 ; 4.21662 ; 6.40036 ; 9.01114 ; 9.76912 ; 10.642 ; 11.5847 ; 12.4535 ; 13.1987 ; 13.9001 ; 14.6358 ; 15.4608 ; 16.4217 ; 17.5551 ; 17.9372 ; 18.456 ; 19.1384 ; 20.0306 ; 20.3523 ; 20.8069 ; 20.9734 ; 21.2062 ; 21.5284 ; 21.9658 ; 22.5656 ; 22.78 ; 23.0822 ; 23.517 ; 24.135 ; 24.6743 ; 24.796 ; 24.9123 ; 25.0742 ; 25.2993 ; 25.6122 ; 26.0002 ; 26.1066 ; 26.2518 ; 26.446 ; 26.4962]

Bolt 1 - Tensile Force (kips): [34.7766 ; 34.73 ; 34.6939 ; 34.6452 ; 34.5762 ; 34.4875 ; 34.4603 ; 34.428 ; 34.3911 ; 34.3549 ; 34.3227 ; 34.2891 ; 34.2458 ; 34.1944 ; 34.1446 ; 34.0965 ; 34.0808 ; 34.061 ; 34.0319 ; 33.9662 ; 33.9198 ; 33.7659 ; 33.6885 ; 33.5686 ; 33.3646 ; 33.0393 ; 32.5621 ; 32.388 ; 32.1383 ; 31.7602 ; 31.1794 ; 30.6413 ; 30.5178 ; 30.4631 ; 30.4346 ; 30.4134 ; 30.3628 ; 30.2736 ; 30.2823 ; 30.2918 ; 30.314 ; 30.3226]

Bolt 1 - Shear Force (kips): [0.056955 ; 0.064637 ; 0.12875 ; 0.2174 ; 0.33514 ; 0.48255 ; 0.52689 ; 0.5792 ; 0.63827 ; 0.69688 ; 0.75085 ; 0.80974 ; 0.88604 ; 0.97633 ; 1.0675 ; 1.1635 ; 1.1954 ; 1.2377 ; 1.2988 ; 1.4134 ; 1.4812 ; 1.6838 ; 1.7795 ; 1.9224 ; 2.1528 ; 2.4994 ; 2.9861 ; 3.1595 ; 3.4054 ; 3.7699 ; 4.3104 ; 4.7956 ; 4.9057 ; 4.9589 ; 4.9947 ; 5.0305 ; 5.0993 ; 5.2125 ; 5.2172 ; 5.2275 ; 5.2348 ; 5.2332]

Bolt 2 - Tensile Force (kips): [34.7794 ; 34.7 ; 34.6373 ; 34.5603 ; 34.4739 ; 34.4018 ; 34.3898 ; 34.3885 ; 34.3985 ; 34.4372 ; 34.5307 ; 34.673 ; 34.9273 ; 35.3947 ; 35.9488 ; 36.6079 ; 36.8522 ; 37.1998 ; 37.6545 ; 38.2405 ; 38.4421 ; 38.725 ; 38.8236 ; 38.9734 ; 39.1963 ; 39.5455 ; 40.1086 ; 40.3242 ; 40.6576 ; 41.1571 ; 41.9103 ; 42.668 ; 42.8571 ; 43.0781 ; 43.4265 ; 43.9396 ; 44.666 ; 45.6938 ; 46.0073 ; 46.4605 ; 47.116 ; 47.2898]

Bolt 2 - Shear Force (kips): [0.050867 ; 0.10349 ; 0.19488 ; 0.31693 ; 0.48056 ; 0.6864 ; 0.74917 ; 0.82543 ; 0.91468 ; 1.0113 ; 1.11 ; 1.2244 ; 1.3585 ; 1.4924 ; 1.6045 ; 1.707 ; 1.739 ; 1.7824 ; 1.8435 ; 1.9567 ; 2.0079 ; 2.1156 ; 2.1668 ; 2.2427 ; 2.3651 ; 2.5425 ; 2.7763 ; 2.8565 ; 2.9643 ; 3.1176 ; 3.3301 ; 3.4967 ; 3.5306 ; 3.5267 ; 3.4944 ; 3.4408 ; 3.3822 ; 3.3148 ; 3.278 ; 3.2293 ; 3.1599 ; 3.1396]

Bolt 3 - Tensile Force (kips): [36 ; 35.9378 ; 35.9207 ; 35.9687 ; 36.1506 ; 36.4261 ; 36.5382 ; 36.7258 ; 36.992 ; 37.3453 ; 37.7449 ; 38.1332 ; 38.5618 ; 39.3703 ; 40.8705 ; 43.1965 ; 43.9695 ; 45.0554 ; 46.5275 ; 48.4559 ; 49.0448 ; 49.7634 ; 50.0433 ; 50.4154 ; 50.9474 ; 51.6594 ; 52.7017 ; 53.1323 ; 53.7367 ; 54.6797 ; 56.1557 ; 57.5345 ; 57.8581 ; 58.1128 ; 58.3776 ; 58.7413 ; 59.4599 ; 60.3493 ; 60.5948 ; 60.9291 ; 61.3669 ; 61.5032]

Bolt 3 - Shear Force (kips): [0.026255 ; 0.021842 ; 0.053239 ; 0.10639 ; 0.18921 ; 0.29414 ; 0.3299 ; 0.37875 ; 0.44128 ; 0.5208 ; 0.62193 ; 0.75776 ; 0.94588 ; 1.1215 ; 1.2507 ; 1.409 ; 1.4867 ; 1.5991 ; 1.7618 ; 2.001 ; 2.1103 ; 2.2798 ; 2.3362 ; 2.4993 ; 2.7655 ; 3.2968 ; 4.2283 ; 4.7348 ; 5.1436 ; 5.3368 ; 5.1757 ; 4.9367 ; 4.9676 ; 5.1105 ; 5.3721 ; 5.7559 ; 6.5055 ; 7.3515 ; 7.6853 ; 8.0448 ; 8.5028 ; 8.6389]

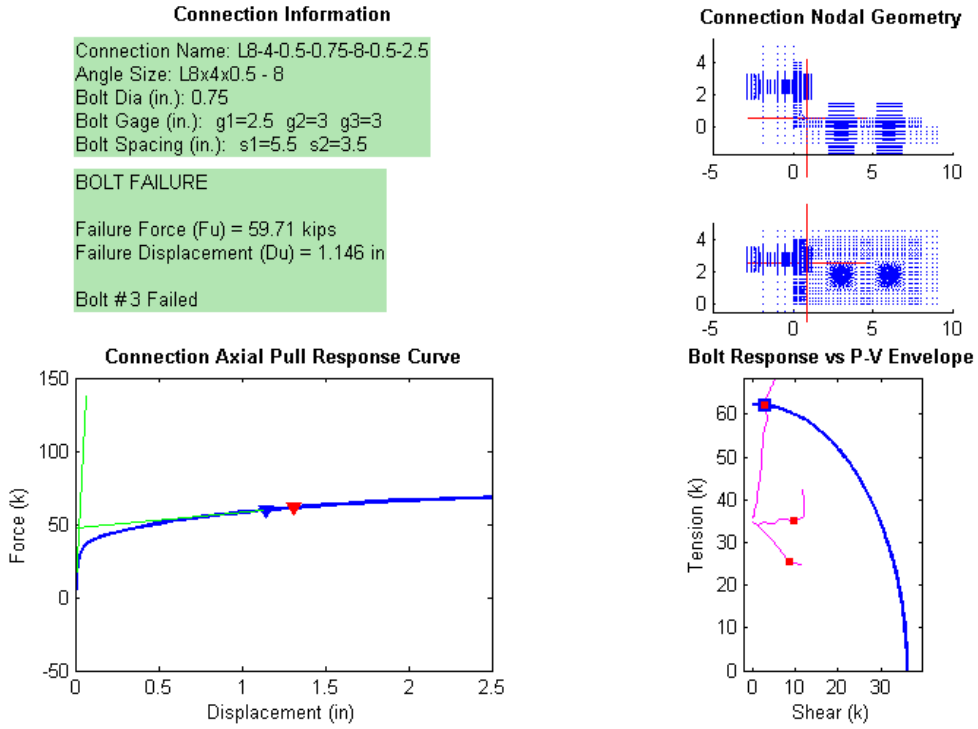


Figure B.165 Connection L8_4_0.5_0.75_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_0.75_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2053

Plastic Stiffness (k/in): 10.6692

Displacement (in): [2.1221e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.53655 ; 0.57218 ; 0.60782 ; 0.64345 ; 0.69691 ; 0.77709 ; 0.89736 ; 0.94246 ; 1.0101 ; 1.0355 ; 1.0735 ; 1.1306 ; 1.152 ; 1.1601 ; 1.1721 ; 1.1902 ; 1.2172 ; 1.2579 ; 1.3188 ; 1.4103 ; 1.5474 ; 1.5989 ; 1.676 ; 1.7917 ; 1.9653 ; 2.0278 ; 2.1216 ; 2.2622 ; 2.3149 ; 2.394 ; 2.5]

Force (kips): [-0.664098 ; 1.62662 ; 3.34562 ; 5.51841 ; 8.27607 ; 11.5114 ; 14.476 ; 16.6272 ; 18.0763 ; 19.3079 ; 20.5405 ; 21.9108 ; 23.4943 ; 24.003 ; 24.6939 ; 25.611 ; 25.9473 ; 26.2698 ; 26.5705 ; 26.9917 ; 27.5584 ; 28.3336 ; 28.6251 ; 29.0556 ; 29.238 ; 29.4759 ; 29.7804 ; 29.8869 ; 29.9309 ; 29.9983 ; 30.0886 ; 30.232 ; 30.4281 ; 30.7002 ; 31.1026 ; 31.6553 ; 31.862 ; 32.1489 ; 32.5214 ; 33.0171 ; 33.1786 ; 33.4042 ; 33.7131 ; 33.8208 ; 33.9737 ; 34.1628]

Bolt 1 - Tensile Force (kips): [34.7724 ; 34.7112 ; 34.6603 ; 34.5885 ; 34.4898 ; 34.3621 ; 34.2302 ; 34.1171 ; 34.0048 ; 33.8612 ; 33.1738 ; 31.7304 ; 29.9543 ; 29.3465 ; 28.4926 ; 27.2787 ; 26.8094 ; 26.3485 ; 25.9215 ; 25.5337 ; 25.5282 ; 25.531 ; 25.5329 ; 25.5373 ; 25.539 ; 25.5422 ; 25.5479 ; 25.5501 ; 25.5139 ; 25.4336 ; 25.4343 ; 25.4374 ; 25.4438 ; 25.4553 ; 25.4723 ; 25.4642 ; 25.3887 ; 25.2805 ; 25.2078 ; 25.0685 ; 25.0357 ; 25.0031 ; 24.9409 ; 24.9067 ; 24.856 ; 24.7912]

Bolt 1 - Shear Force (kips): [0.0522476 ; 0.0936413 ; 0.189933 ; 0.315364 ; 0.480092 ; 0.680909 ; 0.876599 ; 1.03972 ; 1.19765 ; 1.39026 ; 2.17428 ; 3.5656 ; 5.10569 ; 5.59797 ; 6.2696 ; 7.191 ; 7.53259 ; 7.85891 ; 8.15436 ; 8.42 ; 8.42278 ; 8.42488 ; 8.42566 ; 8.42721 ; 8.42779 ; 8.42888 ; 8.43077 ; 8.43151 ; 8.49022 ; 8.59027 ; 8.59075 ; 8.58988 ; 8.58706 ; 8.58198 ; 8.57364 ; 8.71342 ; 9.07097 ; 9.45454 ; 9.71983 ; 10.2006 ; 10.3181 ; 10.452 ; 10.78 ; 10.9172 ; 11.1146 ; 11.3582]

Bolt 2 - Tensile Force (kips): [34.7749 ; 34.6809 ; 34.6008 ; 34.5012 ; 34.3872 ; 34.2854 ; 34.2442 ; 34.2761 ; 34.3539 ; 34.5753 ; 34.6378 ; 34.4095 ; 34.5877 ; 34.7458 ; 34.9859 ; 35.3229 ; 35.4225 ; 35.5139 ; 35.6003 ; 35.6009 ; 35.4817 ; 35.362 ; 35.3133 ; 35.2638 ; 35.2282 ; 35.1987 ; 35.1836 ; 35.1831 ; 35.2011 ; 35.2296 ; 35.2303 ; 35.2496 ; 35.294 ; 35.3552 ; 35.4071 ; 35.7463 ; 36.1102 ; 36.7403 ; 37.6064 ; 39.0108 ; 39.4019 ; 39.8969 ; 40.8609 ; 41.2418 ; 41.7821 ; 42.4665]

Bolt 2 - Shear Force (kips): [0.0451025 ; 0.128761 ; 0.248815 ; 0.405362 ; 0.611823 ; 0.865184 ; 1.11803 ; 1.34316 ; 1.57588 ; 1.84948 ; 2.63144 ; 3.89878 ; 5.02147 ; 5.30885 ; 5.67568 ; 6.14253 ; 6.32198 ; 6.49843 ; 6.66912 ; 7.01048 ; 7.58297 ; 8.33201 ; 8.60082 ; 8.97704 ; 9.1229 ; 9.32471 ; 9.59944 ; 9.6969 ; 9.72114 ; 9.75619 ; 9.8347 ; 9.94 ; 10.0857 ; 10.333 ; 10.9022 ; 11.7307 ; 11.8143 ; 11.8425 ; 11.9217 ; 11.8134 ; 11.8408 ; 11.9279 ; 11.817 ; 11.7546 ; 11.6804 ; 11.5725]

Bolt 3 - Tensile Force (kips): [36 ; 35.9395 ; 35.9425 ; 36.0438 ; 36.3003 ; 36.737 ; 37.5772 ; 38.7099 ; 39.8071 ; 41.2568 ; 43.0728 ; 45.5115 ; 48.6475 ; 49.6992 ; 51.1338 ; 52.9801 ; 53.588 ; 54.1484 ; 54.665 ; 55.4179 ; 56.4575 ; 58.0112 ; 58.671 ; 59.7902 ; 60.3985 ; 61.1489 ; 61.9674 ; 62.2298 ; 62.3174 ; 62.467 ; 62.7126 ; 63.1008 ; 63.5339 ; 64.1083 ; 64.9449 ; 65.95 ; 66.2937 ; 66.7917 ; 67.4176 ; 68.2461 ; 68.4853 ; 68.7997 ; 69.243 ; 69.4031 ; 69.6362 ; 69.9262]

Bolt 3 - Shear Force (kips): [0.027531 ; 0.023177 ; 0.058472 ; 0.11995 ; 0.21003 ; 0.32903 ; 0.47988 ; 0.66203 ; 0.88884 ; 1.1033 ; 1.3862 ; 1.6662 ; 1.9559 ; 2.0433 ; 2.1483 ; 2.2685 ; 2.3273 ; 2.3768 ; 2.4309 ; 2.5321 ; 2.7268 ; 2.9847 ; 3.2531 ; 3.2966 ; 2.8951 ; 2.8581 ; 2.7704 ; 2.7508 ; 2.6911 ; 2.5843 ; 2.546 ; 2.7053 ; 2.9097 ; 3.1458 ; 3.6025 ; 4.0294 ; 4.2197 ; 4.4847 ; 4.7709 ; 5.121 ; 5.2383 ; 5.3832 ; 5.5484 ; 5.6014 ; 5.6733 ; 5.7491]

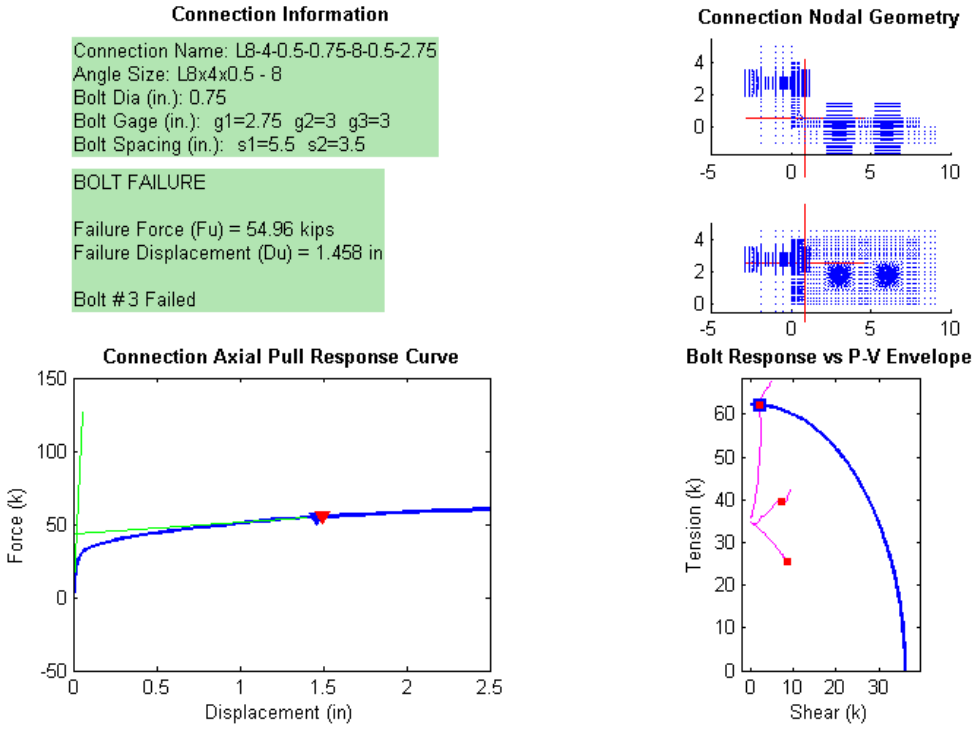


Figure B.166 Connection L8_4_0.5_0.75_8_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_0.75_8_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 2.0743e+003

Plastic Stiffness (k/in): 7.5800

Displacement (in): [3.0283e-036 ; 0.00048828 ; 0.00097656 ; 0.001709 ; 0.0028076 ; 0.0044556 ; 0.0069275 ; 0.010635 ; 0.016197 ; 0.018283 ; 0.021411 ; 0.026104 ; 0.033143 ; 0.043702 ; 0.05954 ; 0.083298 ; 0.11893 ; 0.17239 ; 0.25257 ; 0.37284 ; 0.41794 ; 0.48559 ; 0.58707 ; 0.62513 ; 0.68221 ; 0.76783 ; 0.79994 ; 0.8481 ; 0.89626 ; 0.94443 ; 1.0167 ; 1.0438 ; 1.0844 ; 1.1454 ; 1.2368 ; 1.2711 ; 1.3225 ; 1.3997 ; 1.5154 ; 1.689 ; 1.939 ; 2.0015 ; 2.0249 ; 2.0601 ; 2.1128 ; 2.1919 ; 2.3105 ; 2.4885 ; 2.5]

Force (kips): [-0.607503 ; -0.0471223 ; 0.405335 ; 1.02701 ; 1.86087 ; 2.97993 ; 4.47418 ; 6.43623 ; 8.94744 ; 9.74728 ; 10.789 ; 12.0205 ; 13.3574 ; 14.5888 ; 15.586 ; 16.4966 ; 17.4044 ; 18.3706 ; 19.5117 ; 20.8597 ; 21.3047 ; 21.9076 ; 22.7065 ; 22.9813 ; 23.3834 ; 23.9471 ; 24.1484 ; 24.4475 ; 24.7329 ; 25.0022 ; 25.4085 ; 25.5593 ; 25.8176 ; 26.1653 ; 26.6109 ; 26.7703 ; 26.9848 ; 27.2772 ; 27.6774 ; 28.2167 ; 28.9205 ; 29.0784 ; 29.136 ; 29.2215 ; 29.3408 ; 29.5088 ; 29.7439 ; 30.0726 ; 30.0938]

Bolt 1 - Tensile Force (kips): [34.7721 ; 34.7581 ; 34.7464 ; 34.7297 ; 34.7059 ; 34.6729 ; 34.625 ; 34.5568 ; 34.4634 ; 34.4318 ; 34.3889 ; 34.3355 ; 34.2732 ; 34.2096 ; 34.1456 ; 34.0653 ; 33.9691 ; 33.8792 ; 33.5329 ; 32.5129 ; 32.1131 ; 31.5324 ; 30.7002 ; 30.3987 ; 29.9378 ; 29.2538 ; 28.9987 ; 28.6151 ; 28.2431 ; 27.8809 ; 27.3194 ; 27.1053 ; 26.7315 ; 26.2163 ; 25.6286 ; 25.6244 ; 25.6231 ; 25.6259 ; 25.6348 ; 25.654 ; 25.6902 ; 25.6995 ; 25.7031 ; 25.6805 ; 25.6839 ; 25.6996 ; 25.726 ; 25.7688 ; 25.7718]

Bolt 1 - Shear Force (kips): [0.048873 ; 0.031928 ; 0.036823 ; 0.063192 ; 0.10737 ; 0.17051 ; 0.25684 ; 0.37336 ; 0.52796 ; 0.57863 ; 0.64583 ; 0.72768 ; 0.82169 ; 0.91784 ; 1.0152 ; 1.1349 ; 1.2728 ; 1.4014 ; 1.8251 ; 2.8806 ; 3.2634 ; 3.8022 ; 4.5397 ; 4.7986 ; 5.1863 ; 5.7441 ; 5.9479 ; 6.2508 ; 6.5409 ; 6.8204 ; 7.2454 ; 7.4037 ; 7.6742 ; 8.0381 ; 8.4465 ; 8.4502 ; 8.4529 ; 8.4554 ; 8.4591 ; 8.4656 ; 8.4776 ; 8.4808 ; 8.4819 ; 8.5246 ; 8.5327 ; 8.5277 ; 8.5189 ; 8.5055 ; 8.5047]

Bolt 2 - Tensile Force (kips): [34.7733 ; 34.7526 ; 34.7338 ; 34.7061 ; 34.6667 ; 34.6133 ; 34.5438 ; 34.4599 ; 34.3771 ; 34.3551 ; 34.3357 ; 34.3267 ; 34.3339 ; 34.381 ; 34.4574 ; 34.5927 ; 34.8983 ; 35.5034 ; 36.0348 ; 36.3338 ; 36.4609 ; 36.7681 ; 37.2168 ; 37.387 ; 37.6313 ; 37.9729 ; 38.0987 ; 38.2845 ; 38.4724 ; 38.6593 ; 38.9234 ; 39.0221 ; 39.1286 ; 39.2999 ; 39.5602 ; 39.5227 ; 39.5006 ; 39.5073 ; 39.5558 ; 39.7269 ; 40.4458 ; 40.6408 ; 40.7202 ; 40.9022 ; 41.0726 ; 41.2836 ; 41.6395 ; 42.1805 ; 42.2281]

Bolt 2 - Shear Force (kips): [0.041159 ; 0.031615 ; 0.051205 ; 0.090246 ; 0.14752 ; 0.22727 ; 0.33606 ; 0.48389 ; 0.68057 ; 0.74529 ; 0.83193 ; 0.9389 ; 1.0649 ; 1.2008 ; 1.3475 ; 1.5289 ; 1.7313 ; 1.9013 ; 2.3074 ; 3.2197 ; 3.5213 ; 3.8392 ; 4.229 ; 4.3599 ; 4.5507 ; 4.8162 ; 4.9112 ; 5.0494 ; 5.1753 ; 5.2924 ; 5.4731 ; 5.54 ; 5.6736 ; 5.8565 ; 6.1204 ; 6.3235 ; 6.5931 ; 6.9561 ; 7.4478 ; 8.0533 ; 8.4919 ; 8.5767 ; 8.6029 ; 8.6004 ; 8.6601 ; 8.7718 ; 8.96 ; 9.3391 ; 9.36]

Bolt 3 - Tensile Force (kips): [36 ; 35.9801 ; 35.963 ; 35.9423 ; 35.925 ; 35.9274 ; 35.9783 ; 36.1459 ; 36.4204 ; 36.5302 ; 36.7312 ; 37.0393 ; 37.527 ; 38.2011 ; 38.8987 ; 39.6985 ; 40.8499 ; 42.4531 ; 44.7044 ; 47.5917 ; 48.5464 ; 49.8563 ; 51.5619 ; 52.1259 ; 52.8981 ; 53.9298 ; 54.2645 ; 54.7855 ; 55.3389 ; 55.8519 ; 56.7045 ; 57.0529 ; 57.7733 ; 58.7855 ; 59.9007 ; 60.3737 ; 60.9542 ; 61.7045 ; 62.7386 ; 64.0469 ; 65.6193 ; 65.9434 ; 66.0569 ; 66.225 ; 66.4488 ; 66.7772 ; 67.2016 ; 67.7569 ; 67.7952]

Bolt 3 - Shear Force (kips): [0.029016 ; 0.01896 ; 0.013412 ; 0.01608 ; 0.029842 ; 0.055771 ; 0.099212 ; 0.16819 ; 0.25805 ; 0.28902 ; 0.33379 ; 0.39272 ; 0.47175 ; 0.57416 ; 0.71319 ; 0.89036 ; 1.0638 ; 1.3036 ; 1.56 ; 1.8188 ; 1.9052 ; 2.0215 ; 2.1498 ; 2.1855 ; 2.2607 ; 2.3399 ; 2.3907 ; 2.425 ; 2.4737 ; 2.5399 ; 2.5358 ; 2.5251 ; 2.498 ; 2.2522 ; 2.122 ; 2.091 ; 2.0623 ; 2.1194 ; 2.2108 ; 2.438 ; 3.4033 ; 3.6111 ; 3.7213 ; 3.8715 ; 4.05 ; 4.3087 ; 4.5523 ; 4.7732 ; 4.7909]

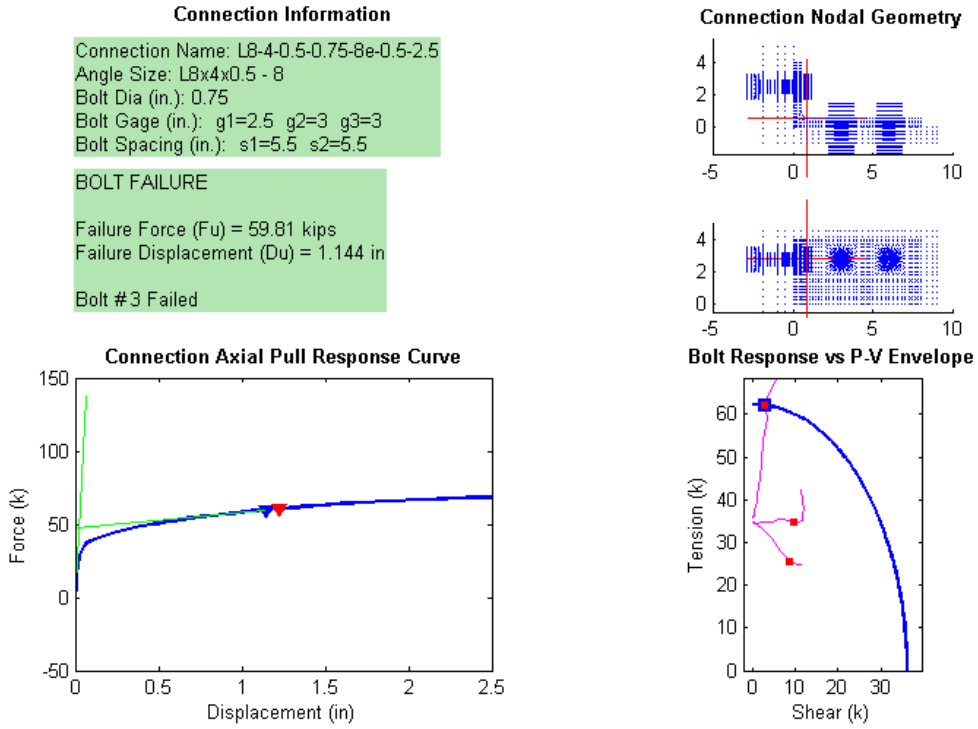


Figure B.167 Connection L8_4_0.5_0.75_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_0.75_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.0976e+003

Plastic Stiffness (k/in): 10.7743

Displacement (in): [2.3314e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.25146 ; 0.29369 ; 0.35705 ; 0.45208 ; 0.48771 ; 0.54116 ; 0.56121 ; 0.59128 ; 0.63638 ; 0.70403 ; 0.7294 ; 0.76746 ; 0.82454 ; 0.91016 ; 0.94227 ; 0.99043 ; 1.0085 ; 1.0356 ; 1.0762 ; 1.1372 ; 1.2286 ; 1.2629 ; 1.3143 ; 1.3915 ; 1.4686 ; 1.4879 ; 1.5168 ; 1.5602 ; 1.6253 ; 1.723 ; 1.8694 ; 2.0891 ; 2.144 ; 2.199 ; 2.2814 ; 2.4049 ; 2.5]

Force (kips): [-0.807801 ; 1.55955 ; 3.28908 ; 5.47265 ; 8.23643 ; 11.4554 ; 14.4043 ; 16.6171 ; 18.081 ; 19.2995 ; 20.5026 ; 21.8637 ; 22.3144 ; 22.9374 ; 23.7614 ; 24.8333 ; 25.1933 ; 25.7093 ; 25.9001 ; 26.187 ; 26.5749 ; 27.1135 ; 27.2967 ; 27.5598 ; 27.9381 ; 28.4844 ; 28.6876 ; 28.9734 ; 29.1142 ; 29.2953 ; 29.541 ; 29.8694 ; 30.3372 ; 30.5008 ; 30.7435 ; 31.092 ; 31.4063 ; 31.4903 ; 31.6131 ; 31.7863 ; 32.031 ; 32.3632 ; 32.8029 ; 33.3659 ; 33.4923 ; 33.6129 ; 33.7835 ; 34.0126 ; 34.1725]

Bolt 1 - Tensile Force (kips): [34.8329 ; 34.7638 ; 34.7075 ; 34.6291 ; 34.5226 ; 34.3858 ; 34.2459 ; 34.1253 ; 34.0182 ; 33.8911 ; 33.4198 ; 32.0917 ; 31.6091 ; 30.9293 ; 29.9346 ; 28.5308 ; 28.0336 ; 27.3046 ; 27.0276 ; 26.6047 ; 26.0274 ; 25.545 ; 25.5422 ; 25.5397 ; 25.5388 ; 25.5411 ; 25.5422 ; 25.5448 ; 25.5456 ; 25.547 ; 25.55 ; 25.446 ; 25.4507 ; 25.455 ; 25.4625 ; 25.4756 ; 25.4893 ; 25.448 ; 25.4074 ; 25.3784 ; 25.3167 ; 25.2338 ; 25.127 ; 24.9973 ; 24.9794 ; 24.9444 ; 24.8926 ; 24.8193 ; 24.7656]

Bolt 1 - Shear Force (kips): [0.0508477 ; 0.108033 ; 0.207175 ; 0.336618 ; 0.506759 ; 0.71288 ; 0.91312 ; 1.07956 ; 1.22671 ; 1.39666 ; 1.95188 ; 3.26757 ; 3.71083 ; 4.31166 ; 5.14829 ; 6.26199 ; 6.64303 ; 7.19056 ; 7.39238 ; 7.69347 ; 8.09492 ; 8.42561 ; 8.42666 ; 8.42712 ; 8.42747 ; 8.42844 ; 8.42886 ; 8.42975 ; 8.43001 ; 8.43048 ; 8.43147 ; 8.58193 ; 8.58208 ; 8.57974 ; 8.57519 ; 8.56835 ; 8.56155 ; 8.7435 ; 8.93791 ; 9.07244 ; 9.30749 ; 9.59906 ; 9.95663 ; 10.4169 ; 10.5248 ; 10.6661 ; 10.873 ; 11.1577 ; 11.3599]

Bolt 2 - Tensile Force (kips): [34.8496 ; 34.7505 ; 34.67 ; 34.5693 ; 34.4567 ; 34.3561 ; 34.3245 ; 34.3559 ; 34.4435 ; 34.6583 ; 34.8718 ; 34.7097 ; 34.6951 ; 34.7235 ; 34.907 ; 35.21 ; 35.3204 ; 35.4597 ; 35.5057 ; 35.5543 ; 35.6279 ; 35.5369 ; 35.4596 ; 35.3529 ; 35.2229 ; 35.08 ; 35.0342 ; 34.9978 ; 34.9709 ; 34.9458 ; 34.925 ; 34.95 ; 34.9534 ; 34.9604 ; 34.9119 ; 34.8929 ; 35.0802 ; 35.2116 ; 35.4047 ; 35.7179 ; 36.2908 ; 37.0063 ; 38.0248 ; 39.5287 ; 39.8789 ; 40.2655 ; 40.8368 ; 41.6339 ; 42.1959]

Bolt 2 - Shear Force (kips): [0.0717873 ; 0.117244 ; 0.23195 ; 0.384751 ; 0.586421 ; 0.832135 ; 1.07575 ; 1.29788 ; 1.52157 ; 1.77806 ; 2.34494 ; 3.53249 ; 3.91417 ; 4.41146 ; 4.93435 ; 5.54331 ; 5.74325 ; 6.03176 ; 6.13829 ; 6.30439 ; 6.53648 ; 7.0157 ; 7.22156 ; 7.51555 ; 7.92598 ; 8.4822 ; 8.67679 ; 8.94087 ; 9.04499 ; 9.18979 ; 9.39205 ; 9.64439 ; 10.0193 ; 10.1495 ; 10.5087 ; 11.0734 ; 11.5124 ; 11.5437 ; 11.5925 ; 11.6648 ; 11.6678 ; 11.7262 ; 11.8006 ; 11.7639 ; 11.754 ; 11.6975 ; 11.597 ; 11.4429 ; 11.3237]

Bolt 3 - Tensile Force (kips): [36 ; 35.9394 ; 35.9396 ; 36.0389 ; 36.2941 ; 36.7259 ; 37.5585 ; 38.7033 ; 39.8141 ; 41.2624 ; 43.0993 ; 45.5391 ; 46.373 ; 47.5642 ; 49.1973 ; 51.3461 ; 52.0573 ; 53.0311 ; 53.3583 ; 53.855 ; 54.5338 ; 55.5381 ; 55.8803 ; 56.3532 ; 57.0702 ; 58.2218 ; 58.6795 ; 59.3318 ; 59.7882 ; 60.3762 ; 61.169 ; 62.0571 ; 63.2535 ; 63.6209 ; 64.1228 ; 64.8326 ; 65.4025 ; 65.5428 ; 65.7372 ; 66.0308 ; 66.4673 ; 67.0209 ; 67.768 ; 68.6398 ; 68.8191 ; 68.9951 ; 69.2539 ; 69.5963 ; 69.8378]

Bolt 3 - Shear Force (kips): [0.035299 ; 0.014919 ; 0.053078 ; 0.11519 ; 0.20612 ; 0.32556 ; 0.4758 ; 0.65769 ; 0.88569 ; 1.0987 ; 1.3795 ; 1.6598 ; 1.747 ; 1.865 ; 2.0205 ; 2.1911 ; 2.2334 ; 2.305 ; 2.3371 ; 2.3909 ; 2.4525 ; 2.5917 ; 2.6569 ; 2.7608 ; 2.9533 ; 3.0483 ; 3.2668 ; 3.5651 ; 3.3727 ; 3.0896 ; 2.9822 ; 2.8261 ; 2.8924 ; 3.0125 ; 3.2585 ; 3.669 ; 3.9213 ; 3.9708 ; 4.0839 ; 4.2833 ; 4.5301 ; 4.7958 ; 5.1088 ; 5.4605 ; 5.541 ; 5.6107 ; 5.6978 ; 5.8177 ; 5.893]

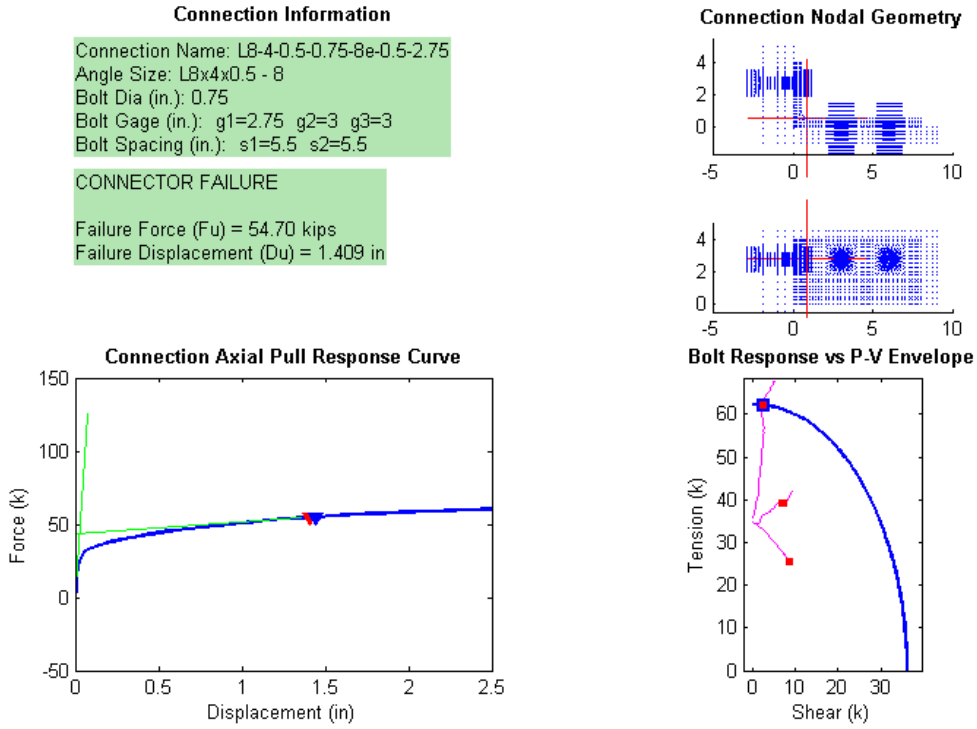


Figure B.168 Connection L8_4_0.5_0.75_8e_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_0.75_8e_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.7111e+003

Plastic Stiffness (k/in): 7.9117

Displacement (in): [2.3214e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.45051 ; 0.56314 ; 0.60537 ; 0.66872 ; 0.76375 ; 0.85878 ; 0.88254 ; 0.9063 ; 0.94193 ; 0.99538 ; 1.0154 ; 1.0455 ; 1.0906 ; 1.1583 ; 1.2597 ; 1.2978 ; 1.3549 ; 1.4405 ; 1.5689 ; 1.6171 ; 1.6893 ; 1.7977 ; 1.8383 ; 1.8993 ; 1.9907 ; 2.025 ; 2.0764 ; 2.1536 ; 2.2693 ; 2.3127 ; 2.3778 ; 2.4754 ; 2.5]

Force (kips): [-0.771688 ; 1.16072 ; 2.57031 ; 3.80067 ; 5.44601 ; 7.60835 ; 10.2061 ; 12.692 ; 14.6234 ; 15.8938 ; 16.9338 ; 17.929 ; 19.0917 ; 20.482 ; 21.606 ; 22.5493 ; 22.8684 ; 23.3235 ; 23.9654 ; 24.558 ; 24.7031 ; 24.8384 ; 25.0366 ; 25.3417 ; 25.4523 ; 25.6206 ; 25.9066 ; 26.2771 ; 26.7595 ; 26.9254 ; 27.1512 ; 27.4624 ; 27.8832 ; 28.0317 ; 28.2667 ; 28.5827 ; 28.6951 ; 28.8559 ; 29.0844 ; 29.1666 ; 29.2859 ; 29.4527 ; 29.6803 ; 29.7629 ; 29.8845 ; 30.059 ; 30.1028]

Bolt 1 - Tensile Force (kips): [34.8325 ; 34.7768 ; 34.7322 ; 34.69 ; 34.6299 ; 34.5463 ; 34.4371 ; 34.3209 ; 34.2195 ; 34.1372 ; 34.0451 ; 33.9726 ; 33.8543 ; 33.0683 ; 32.064 ; 31.0683 ; 30.7091 ; 30.1695 ; 29.3654 ; 28.5862 ; 28.3902 ; 28.2037 ; 27.9281 ; 27.5024 ; 27.3441 ; 27.1003 ; 26.6801 ; 26.1327 ; 25.6336 ; 25.632 ; 25.633 ; 25.6382 ; 25.6492 ; 25.6536 ; 25.6627 ; 25.6765 ; 25.6821 ; 25.6903 ; 25.7026 ; 25.7073 ; 25.6944 ; 25.6975 ; 25.7167 ; 25.7248 ; 25.7377 ; 25.758 ; 25.7634]

Bolt 1 - Shear Force (kips): [0.048961 ; 0.087251 ; 0.16699 ; 0.23922 ; 0.33845 ; 0.47335 ; 0.64177 ; 0.81283 ; 0.96025 ; 1.0816 ; 1.2159 ; 1.3237 ; 1.487 ; 2.3649 ; 3.3408 ; 4.244 ; 4.5557 ; 5.0136 ; 5.6718 ; 6.289 ; 6.4415 ; 6.5861 ; 6.7983 ; 7.121 ; 7.2392 ; 7.4184 ; 7.7195 ; 8.1043 ; 8.4523 ; 8.455 ; 8.4573 ; 8.46 ; 8.4641 ; 8.4656 ; 8.4686 ; 8.4732 ; 8.475 ; 8.4777 ; 8.4818 ; 8.4833 ; 8.5158 ; 8.5262 ; 8.5195 ; 8.5163 ; 8.5113 ; 8.5039 ; 8.5022]

Bolt 2 - Tensile Force (kips): [34.8478 ; 34.7657 ; 34.6996 ; 34.6421 ; 34.5697 ; 34.4889 ; 34.4192 ; 34.4152 ; 34.4718 ; 34.5959 ; 34.8202 ; 35.3531 ; 36.0894 ; 36.6427 ; 36.9334 ; 37.3308 ; 37.4938 ; 37.7205 ; 38.0335 ; 38.3529 ; 38.4308 ; 38.5137 ; 38.6396 ; 38.8165 ; 38.8827 ; 38.9764 ; 39.073 ; 39.2598 ; 39.4589 ; 39.4328 ; 39.4186 ; 39.4205 ; 39.4475 ; 39.4517 ; 39.6452 ; 39.9236 ; 40.0497 ; 40.2316 ; 40.4744 ; 40.5749 ; 40.7663 ; 40.9658 ; 41.2016 ; 41.3296 ; 41.5464 ; 41.8292 ; 41.9083]

Bolt 2 - Shear Force (kips): [0.06926 ; 0.094302 ; 0.18551 ; 0.27064 ; 0.38825 ; 0.54871 ; 0.74991 ; 0.95881 ; 1.156 ; 1.3438 ; 1.5565 ; 1.7139 ; 1.8936 ; 2.6524 ; 3.4463 ; 3.962 ; 4.1262 ; 4.3594 ; 4.6866 ; 4.9745 ; 5.0442 ; 5.1076 ; 5.1999 ; 5.3407 ; 5.3915 ; 5.471 ; 5.6259 ; 5.8223 ; 6.1771 ; 6.3837 ; 6.6645 ; 7.0506 ; 7.5715 ; 7.7582 ; 7.8995 ; 8.1005 ; 8.156 ; 8.2416 ; 8.3802 ; 8.4232 ; 8.458 ; 8.5611 ; 8.7447 ; 8.8139 ; 8.9247 ; 9.1187 ; 9.1709]

Bolt 3 - Tensile Force (kips): [36 ; 35.9382 ; 35.9205 ; 35.9464 ; 36.0507 ; 36.2678 ; 36.6166 ; 37.2692 ; 38.2382 ; 39.1499 ; 40.2437 ; 41.771 ; 43.9283 ; 46.7361 ; 49.1285 ; 51.1536 ; 51.8201 ; 52.7244 ; 53.8967 ; 54.9614 ; 55.2665 ; 55.5165 ; 55.8738 ; 56.4746 ; 56.695 ; 57.0837 ; 57.9316 ; 58.9592 ; 60.2439 ; 60.7137 ; 61.3263 ; 62.1783 ; 63.1733 ; 63.5401 ; 64.0964 ; 64.7989 ; 65.023 ; 65.3374 ; 65.8171 ; 65.9916 ; 66.2147 ; 66.556 ; 66.9741 ; 67.12 ; 67.3322 ; 67.6355 ; 67.7074]

Bolt 3 - Shear Force (kips): [0.036719 ; 0.011856 ; 0.041159 ; 0.074798 ; 0.12945 ; 0.20642 ; 0.30693 ; 0.42852 ; 0.57518 ; 0.76494 ; 0.96618 ; 1.1954 ; 1.4882 ; 1.7768 ; 1.9922 ; 2.1441 ; 2.1841 ; 2.2499 ; 2.3521 ; 2.442 ; 2.4724 ; 2.5082 ; 2.5575 ; 2.5406 ; 2.5709 ; 2.5559 ; 2.428 ; 2.2619 ; 2.1633 ; 2.1104 ; 2.1242 ; 2.2069 ; 2.2875 ; 2.3536 ; 2.7753 ; 3.2505 ; 3.4168 ; 3.6243 ; 3.9138 ; 4.0398 ; 4.2406 ; 4.4618 ; 4.6811 ; 4.7481 ; 4.8318 ; 4.9348 ; 4.9763]

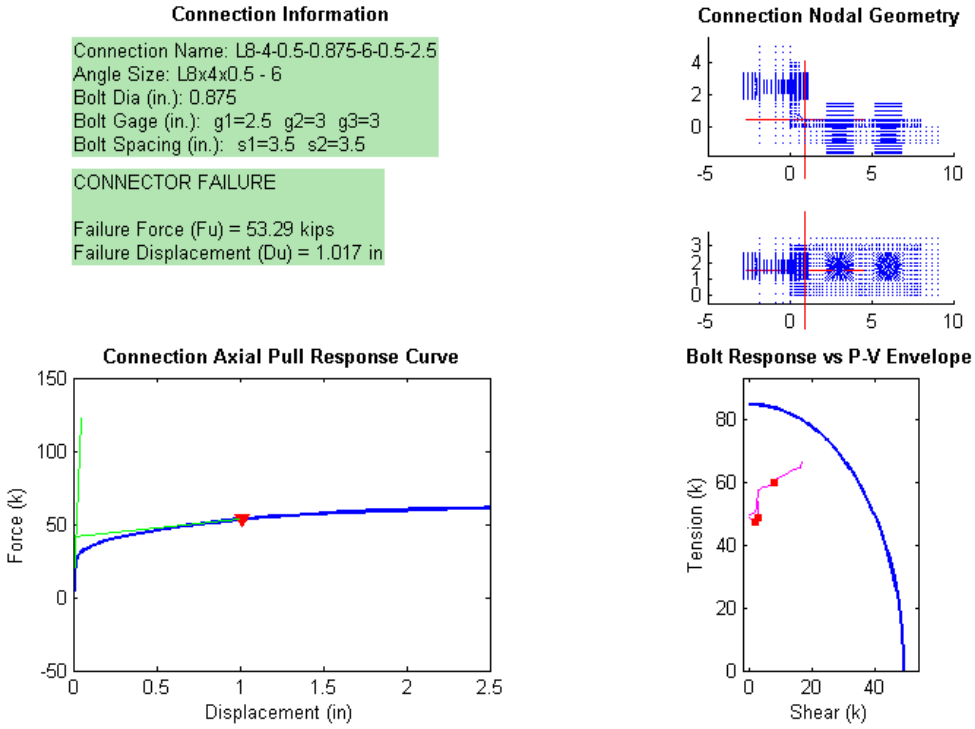


Figure B.169 Connection L8_4_0.5_0.875_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_0.875_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.4094e+003

Plastic Stiffness (k/in): 11.9955

Displacement (in): [3.7598e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.11067 ; 0.12945 ; 0.1576 ; 0.19984 ; 0.26319 ; 0.35822 ; 0.50076 ; 0.55422 ; 0.57426 ; 0.60433 ; 0.6156 ; 0.63252 ; 0.65789 ; 0.69594 ; 0.75302 ; 0.77443 ; 0.80654 ; 0.8547 ; 0.92695 ; 0.99919 ; 1.0714 ; 1.0985 ; 1.1392 ; 1.2001 ; 1.2916 ; 1.4287 ; 1.6344 ; 1.8844 ; 2.1344 ; 2.1969 ; 2.2907 ; 2.4313 ; 2.5]

Force (kips): [-1.25544 ; 1.53418 ; 3.4504 ; 5.81038 ; 8.7389 ; 11.8212 ; 14.0213 ; 15.1916 ; 16.1205 ; 17.1935 ; 17.5418 ; 18.0069 ; 18.6023 ; 19.3432 ; 20.2876 ; 21.4548 ; 22.8895 ; 23.3556 ; 23.5211 ; 23.7925 ; 23.8855 ; 24.0444 ; 24.2676 ; 24.5711 ; 24.9862 ; 25.1404 ; 25.3601 ; 25.6733 ; 26.1175 ; 26.5508 ; 26.9338 ; 27.0739 ; 27.2751 ; 27.548 ; 27.9221 ; 28.4289 ; 29.0567 ; 29.6268 ; 30.0513 ; 30.1585 ; 30.3039 ; 30.4935 ; 30.5775]

Bolt 1 - Tensile Force (kips): [48.5902 ; 48.5011 ; 48.4374 ; 48.357 ; 48.253 ; 48.1372 ; 48.0501 ; 48.0062 ; 47.9727 ; 47.9327 ; 47.9184 ; 47.8957 ; 47.8617 ; 47.8218 ; 47.7733 ; 47.721 ; 47.6655 ; 47.6485 ; 47.6426 ; 47.633 ; 47.6298 ; 47.6246 ; 47.6179 ; 47.6095 ; 47.6002 ; 47.597 ; 47.5928 ; 47.5873 ; 47.5797 ; 47.5708 ; 47.564 ; 47.5609 ; 47.5566 ; 47.5522 ; 47.5476 ; 47.5436 ; 47.5424 ; 47.5517 ; 47.574 ; 47.5898 ; 47.6033 ; 47.6103 ; 47.6137]

Bolt 1 - Shear Force (kips): [0.088817 ; 0.091356 ; 0.18298 ; 0.30723 ; 0.46978 ; 0.64786 ; 0.78087 ; 0.85175 ; 0.91105 ; 0.98332 ; 1.0094 ; 1.0513 ; 1.1141 ; 1.1896 ; 1.2836 ; 1.3928 ; 1.52 ; 1.5619 ; 1.5769 ; 1.6001 ; 1.6085 ; 1.6212 ; 1.6389 ; 1.6632 ; 1.6952 ; 1.7068 ; 1.7234 ; 1.7473 ; 1.7828 ; 1.82 ; 1.8547 ; 1.8684 ; 1.8885 ; 1.9159 ; 1.954 ; 2.0075 ; 2.0807 ; 2.1554 ; 2.2138 ; 2.2038 ; 2.228 ; 2.2703 ; 2.2905]

Bolt 2 - Tensile Force (kips): [48.591 ; 48.439 ; 48.3256 ; 48.1896 ; 48.0173 ; 47.8344 ; 47.667 ; 47.5561 ; 47.472 ; 47.458 ; 47.4576 ; 47.4498 ; 47.4416 ; 47.4239 ; 47.3787 ; 47.3759 ; 47.5583 ; 47.6415 ; 47.6758 ; 47.7297 ; 47.7511 ; 47.7845 ; 47.8411 ; 47.9342 ; 48.0875 ; 48.1448 ; 48.2318 ; 48.3619 ; 48.5607 ; 48.7533 ; 48.9483 ; 49.0209 ; 49.1354 ; 49.3262 ; 49.621 ; 50.0655 ; 50.7361 ; 51.5354 ; 52.332 ; 52.5528 ; 52.8995 ; 53.4252 ; 53.6883]

Bolt 2 - Shear Force (kips): [0.078028 ; 0.16566 ; 0.31177 ; 0.50302 ; 0.75118 ; 1.0262 ; 1.2481 ; 1.4048 ; 1.571 ; 1.743 ; 1.7865 ; 1.833 ; 1.8815 ; 1.9312 ; 1.9855 ; 2.0527 ; 2.1746 ; 2.2131 ; 2.2261 ; 2.2474 ; 2.2546 ; 2.2668 ; 2.2844 ; 2.3111 ; 2.3527 ; 2.3679 ; 2.3899 ; 2.4253 ; 2.4806 ; 2.5344 ; 2.5768 ; 2.5902 ; 2.6044 ; 2.6254 ; 2.6591 ; 2.7144 ; 2.7797 ; 2.8259 ; 2.8396 ; 2.8213 ; 2.8154 ; 2.7981 ; 2.7857]

Bolt 3 - Tensile Force (kips): [50 ; 49.8954 ; 49.8365 ; 49.8094 ; 49.8183 ; 49.8596 ; 49.9645 ; 49.9708 ; 49.9657 ; 50.0051 ; 50.0554 ; 50.1259 ; 50.4458 ; 51.1549 ; 52.2316 ; 53.7746 ; 56.0395 ; 56.8241 ; 57.1091 ; 57.4364 ; 57.5432 ; 57.6598 ; 57.8136 ; 58.0279 ; 58.3228 ; 58.4281 ; 58.5951 ; 58.8553 ; 59.2974 ; 59.8731 ; 60.3996 ; 60.6032 ; 60.8915 ; 61.2691 ; 61.7631 ; 62.4592 ; 63.4564 ; 64.1909 ; 64.5633 ; 64.7471 ; 65.4462 ; 66.2601 ; 66.5993]

Bolt 3 - Shear Force (kips): [0.0394457 ; 0.0359125 ; 0.0861945 ; 0.161191 ; 0.27134 ; 0.417171 ; 0.581622 ; 0.750183 ; 0.916197 ; 1.17142 ; 1.27775 ; 1.48181 ; 1.69317 ; 1.84221 ; 1.98748 ; 2.21318 ; 2.54761 ; 2.66055 ; 2.69984 ; 2.8188 ; 2.85303 ; 2.97758 ; 3.17008 ; 3.41546 ; 3.80546 ; 4.36732 ; 5.22809 ; 6.36699 ; 7.45073 ; 7.86268 ; 8.1313 ; 8.13858 ; 8.39637 ; 8.97865 ; 9.62991 ; 10.8548 ; 12.4122 ; 14.3462 ; 15.9537 ; 16.3675 ; 16.3861 ; 16.4718 ; 16.5623]

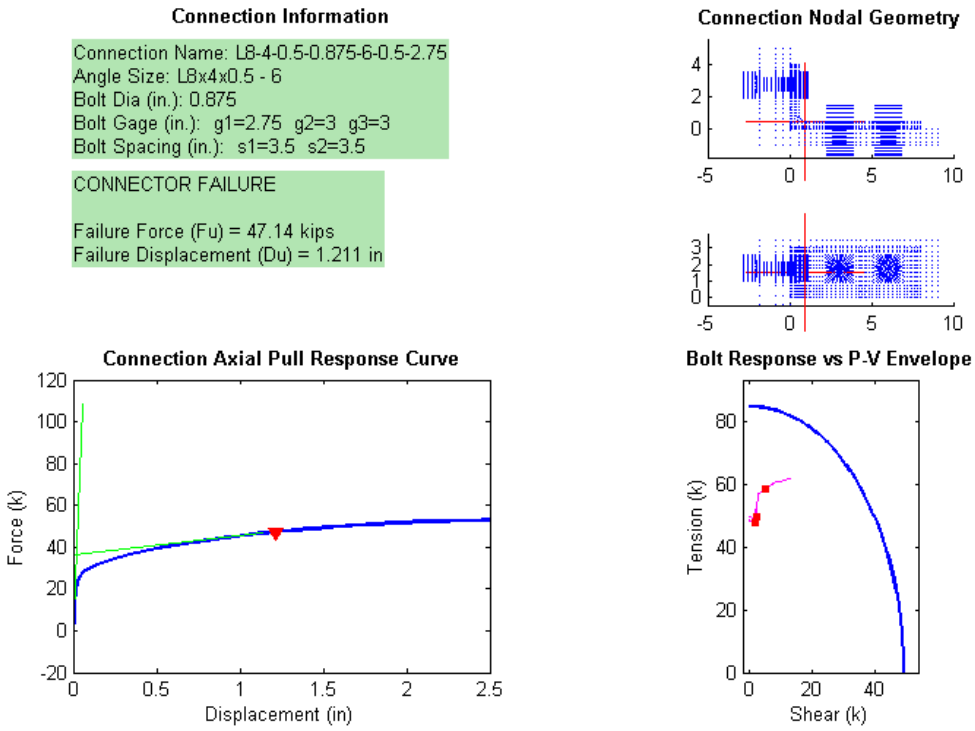


Figure B.170 Connection L8_4_0.5_0.875_6_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_0.875_6_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.9586e+003

Plastic Stiffness (k/in): 8.9721

Displacement (in): [3.5769e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.56737 ; 0.66112 ; 0.80174 ; 0.81493 ; 0.8347 ; 0.86437 ; 0.89403 ; 0.92369 ; 0.96819 ; 1.0349 ; 1.135 ; 1.2852 ; 1.3415 ; 1.426 ; 1.5527 ; 1.5646 ; 1.5824 ; 1.6091 ; 1.6492 ; 1.7093 ; 1.7996 ; 1.9349 ; 2.1378 ; 2.3878 ; 2.5]

Force (kips): [-1.22355 ; 1.07541 ; 2.60175 ; 4.51505 ; 6.94593 ; 9.71714 ; 11.9264 ; 13.1526 ; 13.9603 ; 14.8592 ; 15.851 ; 16.9266 ; 18.2248 ; 19.6775 ; 20.1335 ; 20.7473 ; 21.5602 ; 21.643 ; 21.759 ; 21.929 ; 22.0943 ; 22.2561 ; 22.4879 ; 22.813 ; 23.2621 ; 23.8703 ; 24.0913 ; 24.3889 ; 24.7865 ; 24.8283 ; 24.8865 ; 24.9661 ; 25.0738 ; 25.2278 ; 25.4349 ; 25.7133 ; 26.0564 ; 26.4001 ; 26.5305]

Bolt 1 - Tensile Force (kips): [48.5901 ; 48.5173 ; 48.4673 ; 48.4031 ; 48.3189 ; 48.2182 ; 48.1339 ; 48.0888 ; 48.0658 ; 48.0407 ; 48.0049 ; 47.9618 ; 47.9086 ; 47.8622 ; 47.8509 ; 47.8379 ; 47.8246 ; 47.8232 ; 47.8216 ; 47.8199 ; 47.8185 ; 47.8172 ; 47.8161 ; 47.8155 ; 47.8169 ; 47.8205 ; 47.8211 ; 47.8237 ; 47.8332 ; 47.8338 ; 47.8351 ; 47.8377 ; 47.8424 ; 47.8503 ; 47.8641 ; 47.8871 ; 47.9266 ; 47.9803 ; 48.0053]

Bolt 1 - Shear Force (kips): [0.087047 ; 0.073773 ; 0.14075 ; 0.23847 ; 0.37053 ; 0.52864 ; 0.66065 ; 0.73477 ; 0.77905 ; 0.8299 ; 0.90518 ; 1.0031 ; 1.1286 ; 1.261 ; 1.301 ; 1.3548 ; 1.4265 ; 1.4333 ; 1.4429 ; 1.4563 ; 1.4691 ; 1.4817 ; 1.4996 ; 1.5249 ; 1.5597 ; 1.6104 ; 1.6304 ; 1.6581 ; 1.6919 ; 1.6955 ; 1.7003 ; 1.7067 ; 1.7151 ; 1.7268 ; 1.7415 ; 1.7601 ; 1.7807 ; 1.7979 ; 1.8036]

Bolt 2 - Tensile Force (kips): [48.5898 ; 48.4633 ; 48.3707 ; 48.2564 ; 48.1187 ; 47.9629 ; 47.8235 ; 47.7335 ; 47.6905 ; 47.7175 ; 47.7883 ; 47.8325 ; 47.8874 ; 48.0453 ; 48.1295 ; 48.2789 ; 48.558 ; 48.5849 ; 48.6275 ; 48.6952 ; 48.7641 ; 48.8331 ; 48.9393 ; 49.0982 ; 49.3556 ; 49.7722 ; 49.9308 ; 50.1649 ; 50.5325 ; 50.5664 ; 50.6201 ; 50.7016 ; 50.8234 ; 51.0063 ; 51.28 ; 51.687 ; 52.2924 ; 53.0119 ; 53.3307]

Bolt 2 - Shear Force (kips): [0.075552 ; 0.13483 ; 0.25005 ; 0.40493 ; 0.61177 ; 0.85946 ; 1.0779 ; 1.2341 ; 1.3766 ; 1.5322 ; 1.6541 ; 1.737 ; 1.8046 ; 1.89 ; 1.9227 ; 1.9685 ; 2.0302 ; 2.0365 ; 2.0456 ; 2.0598 ; 2.0748 ; 2.0899 ; 2.111 ; 2.1454 ; 2.196 ; 2.2409 ; 2.2456 ; 2.2549 ; 2.2714 ; 2.274 ; 2.2778 ; 2.283 ; 2.2903 ; 2.3009 ; 2.315 ; 2.3365 ; 2.3574 ; 2.3651 ; 2.3617]

Bolt 3 - Tensile Force (kips): [50 ; 49.9003 ; 49.8328 ; 49.7849 ; 49.7636 ; 49.754 ; 49.7728 ; 49.7142 ; 49.5779 ; 49.4466 ; 49.6695 ; 50.4995 ; 51.7693 ; 53.5992 ; 54.2934 ; 55.3282 ; 56.7646 ; 56.8493 ; 56.9651 ; 57.0872 ; 57.1988 ; 57.2888 ; 57.4102 ; 57.6646 ; 58.0788 ; 58.7719 ; 59.1212 ; 59.5793 ; 60.1293 ; 60.2205 ; 60.3136 ; 60.4362 ; 60.5705 ; 60.7068 ; 60.878 ; 61.1223 ; 61.4052 ; 61.6917 ; 61.7614]

Bolt 3 - Shear Force (kips): [0.0415519 ; 0.0294286 ; 0.068357 ; 0.130341 ; 0.222364 ; 0.346744 ; 0.486797 ; 0.640889 ; 0.792145 ; 1.00009 ; 1.27248 ; 1.50636 ; 1.79268 ; 2.20216 ; 2.34025 ; 2.51195 ; 2.74465 ; 2.79889 ; 2.88559 ; 3.04476 ; 3.15685 ; 3.27684 ; 3.58216 ; 4.17101 ; 4.65589 ; 5.65379 ; 6.07068 ; 6.25963 ; 7.13726 ; 7.20225 ; 7.29857 ; 7.46479 ; 7.73633 ; 8.23215 ; 8.95311 ; 9.88582 ; 11.0626 ; 12.4623 ; 13.1046]

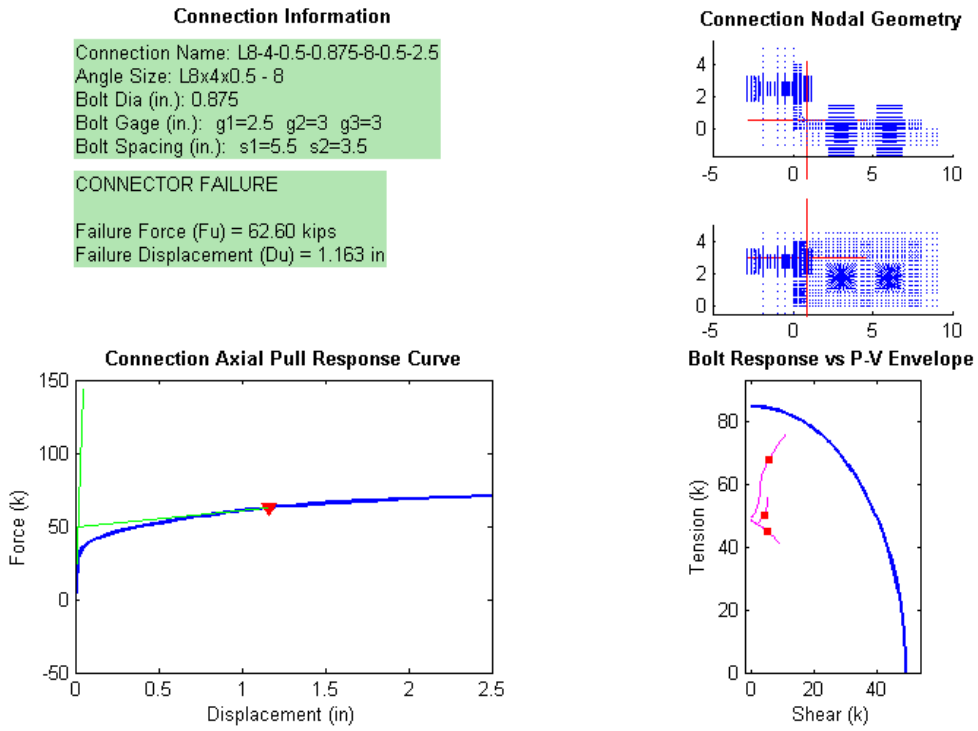


Figure B.171 Connection L8_4_0.5_0.875_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_0.875_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.7387e+003

Plastic Stiffness (k/in): 11.5566

Displacement (in): [4.6064e-036 ; 0.00097656 ; 0.0019531 ; 0.003418 ; 0.0056152 ; 0.0089111 ; 0.013855 ; 0.021271 ; 0.032394 ; 0.04908 ; 0.074108 ; 0.11165 ; 0.16796 ; 0.25243 ; 0.37914 ; 0.5692 ; 0.6317 ; 0.65514 ; 0.69029 ; 0.74303 ; 0.79576 ; 0.8485 ; 0.9276 ; 1.0462 ; 1.0907 ; 1.1575 ; 1.2576 ; 1.2951 ; 1.3515 ; 1.4359 ; 1.5626 ; 1.7527 ; 2.0027 ; 2.2527 ; 2.5]

Force (kips): [-1.09145 ; 0.421498 ; 1.5831 ; 3.08637 ; 5.02408 ; 7.53093 ; 10.6501 ; 13.9003 ; 16.3971 ; 17.8728 ; 19.0656 ; 20.3079 ; 21.6028 ; 23.0713 ; 24.7689 ; 26.7425 ; 27.2931 ; 27.5043 ; 27.8269 ; 28.2951 ; 28.7457 ; 29.1865 ; 29.8219 ; 30.6158 ; 30.8876 ; 31.2733 ; 31.7881 ; 31.9677 ; 32.2206 ; 32.576 ; 33.0596 ; 33.6906 ; 34.3843 ; 34.9321 ; 35.3614]

Bolt 1 - Tensile Force (kips): [48.5862 ; 48.5355 ; 48.4952 ; 48.4416 ; 48.371 ; 48.2765 ; 48.1509 ; 48.0093 ; 47.8912 ; 47.8097 ; 47.7252 ; 47.6373 ; 47.5568 ; 47.4595 ; 47.3503 ; 47.1999 ; 47.1421 ; 47.117 ; 47.0738 ; 46.9944 ; 46.8683 ; 46.6363 ; 46.2332 ; 45.6355 ; 45.4211 ; 45.1158 ; 44.6927 ; 44.541 ; 44.3241 ; 44.0115 ; 43.5773 ; 42.9973 ; 42.3476 ; 41.817 ; 41.3921]

Bolt 1 - Shear Force (kips): [0.078713 ; 0.053699 ; 0.10315 ; 0.18616 ; 0.3 ; 0.45289 ; 0.65025 ; 0.86506 ; 1.043 ; 1.1697 ; 1.3047 ; 1.4468 ; 1.5818 ; 1.7456 ; 1.9305 ; 2.1828 ; 2.2751 ; 2.3139 ; 2.3788 ; 2.4942 ; 2.669 ; 2.9798 ; 3.4873 ; 4.1972 ; 4.4446 ; 4.7918 ; 5.265 ; 5.4326 ; 5.6708 ; 6.0106 ; 6.4774 ; 7.0907 ; 7.7658 ; 8.3114 ; 8.7511]

Bolt 2 - Tensile Force (kips): [48.5847 ; 48.5082 ; 48.4431 ; 48.3545 ; 48.2394 ; 48.0954 ; 47.9153 ; 47.7262 ; 47.56 ; 47.436 ; 47.3714 ; 47.4045 ; 47.6115 ; 47.9369 ; 48.2708 ; 48.7731 ; 48.9364 ; 48.9921 ; 49.0759 ; 49.2226 ; 49.3617 ; 49.4452 ; 49.5756 ; 49.8337 ; 49.9441 ; 50.1357 ; 50.4616 ; 50.5889 ; 50.7898 ; 51.1046 ; 51.6001 ; 52.3865 ; 53.4496 ; 54.5145 ; 55.5396]

Bolt 2 - Shear Force (kips): [0.064846 ; 0.078467 ; 0.16084 ; 0.277 ; 0.43295 ; 0.64168 ; 0.91012 ; 1.205 ; 1.4652 ; 1.6813 ; 1.9229 ; 2.1688 ; 2.3437 ; 2.4766 ; 2.6001 ; 2.761 ; 2.8231 ; 2.8517 ; 2.8987 ; 2.9581 ; 3.0394 ; 3.2056 ; 3.4714 ; 3.8115 ; 3.9232 ; 4.0691 ; 4.2495 ; 4.3097 ; 4.3899 ; 4.4952 ; 4.6214 ; 4.7532 ; 4.8481 ; 4.8702 ; 4.8403]

Bolt 3 - Tensile Force (kips): [50 ; 49.9412 ; 49.8936 ; 49.8497 ; 49.8268 ; 49.8335 ; 49.8805 ; 50.0309 ; 50.3653 ; 50.698 ; 51.0434 ; 51.6225 ; 52.7466 ; 54.62 ; 57.3178 ; 60.8134 ; 61.8127 ; 62.1294 ; 62.5199 ; 63.0833 ; 63.6618 ; 64.2932 ; 65.4208 ; 66.7746 ; 67.247 ; 67.9485 ; 68.9004 ; 69.2344 ; 69.6846 ; 70.3465 ; 71.2421 ; 72.4294 ; 73.8242 ; 74.9118 ; 75.7407]

Bolt 3 - Shear Force (kips): [0.0448503 ; 0.0226677 ; 0.0322439 ; 0.0633351 ; 0.115154 ; 0.1954 ; 0.313161 ; 0.462888 ; 0.626803 ; 0.807283 ; 1.03819 ; 1.36306 ; 1.67822 ; 2.04299 ; 2.44876 ; 2.83778 ; 2.93637 ; 2.99653 ; 3.11232 ; 3.22583 ; 3.36246 ; 3.48428 ; 4.44946 ; 4.49672 ; 4.6502 ; 5.27379 ; 5.99553 ; 6.22381 ; 6.50063 ; 6.83875 ; 7.53898 ; 8.27012 ; 9.11713 ; 9.97517 ; 10.5712]

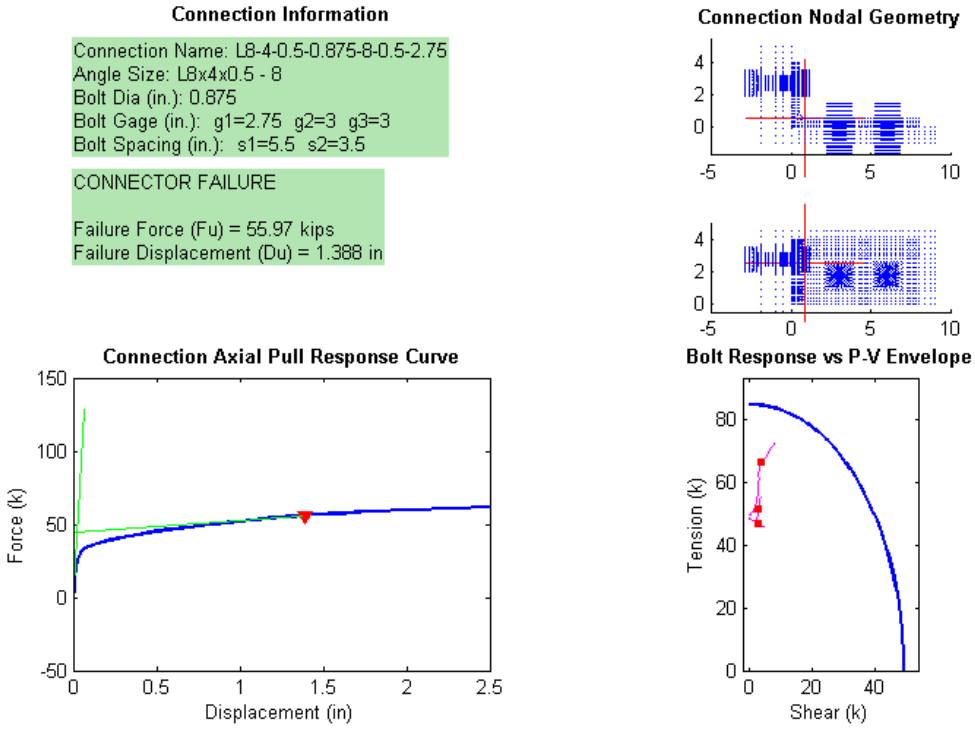


Figure B.172 Connection L8_4_0.5_0.875_8_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_0.875_8_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.9216e+003

Plastic Stiffness (k/in): 8.2777

Displacement (in): [5.1542e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 0.81737 ; 0.84081 ; 0.87596 ; 0.91112 ; 0.94627 ; 0.99901 ; 1.0781 ; 1.1968 ; 1.2413 ; 1.2579 ; 1.283 ; 1.3205 ; 1.3768 ; 1.4613 ; 1.588 ; 1.7781 ; 2.0281 ; 2.2781 ; 2.5]

Force (kips): [-1.04544 ; 1.12263 ; 2.70777 ; 4.71402 ; 7.28772 ; 10.3679 ; 13.247 ; 15.1516 ; 16.2986 ; 17.3455 ; 18.4143 ; 19.5744 ; 20.9424 ; 22.5483 ; 24.3777 ; 24.7848 ; 24.931 ; 25.1711 ; 25.4034 ; 25.6344 ; 25.984 ; 26.4792 ; 27.1209 ; 27.3424 ; 27.4271 ; 27.5442 ; 27.7102 ; 27.9433 ; 28.2735 ; 28.7219 ; 29.3104 ; 29.9628 ; 30.4945 ; 30.8886]

Bolt 1 - Tensile Force (kips): [48.5858 ; 48.5128 ; 48.4569 ; 48.384 ; 48.287 ; 48.1622 ; 48.0352 ; 47.9419 ; 47.8735 ; 47.8008 ; 47.738 ; 47.6651 ; 47.5866 ; 47.5086 ; 47.4292 ; 47.4103 ; 47.403 ; 47.3895 ; 47.3743 ; 47.3577 ; 47.3291 ; 47.2848 ; 47.2131 ; 47.1838 ; 47.1717 ; 47.1548 ; 47.1289 ; 47.0867 ; 47.0023 ; 46.8253 ; 46.5583 ; 46.2456 ; 45.9921 ; 45.8208]

Bolt 1 - Shear Force (kips): [0.075899 ; 0.080787 ; 0.16503 ; 0.28226 ; 0.4398 ; 0.63716 ; 0.83267 ; 0.97814 ; 1.0918 ; 1.2157 ; 1.3301 ; 1.4655 ; 1.6158 ; 1.7794 ; 1.9669 ; 2.0124 ; 2.0297 ; 2.0586 ; 2.0897 ; 2.1223 ; 2.1758 ; 2.2577 ; 2.3868 ; 2.4381 ; 2.4587 ; 2.4882 ; 2.533 ; 2.6045 ; 2.74 ; 3.0056 ; 3.3898 ; 3.8301 ; 4.192 ; 4.4489]

Bolt 2 - Tensile Force (kips): [48.5828 ; 48.4666 ; 48.3698 ; 48.2474 ; 48.0993 ; 47.9254 ; 47.7657 ; 47.6432 ; 47.5683 ; 47.5896 ; 47.7426 ; 48.0175 ; 48.3697 ; 48.8173 ; 49.5025 ; 49.6719 ; 49.7374 ; 49.8387 ; 49.9492 ; 50.0651 ; 50.2403 ; 50.5108 ; 50.9154 ; 51.065 ; 51.1208 ; 51.2065 ; 51.3362 ; 51.5329 ; 51.8258 ; 52.2537 ; 52.9164 ; 53.8119 ; 54.7159 ; 55.5206]

Bolt 2 - Shear Force (kips): [0.061399 ; 0.12866 ; 0.25158 ; 0.41561 ; 0.63468 ; 0.90807 ; 1.1848 ; 1.4156 ; 1.6229 ; 1.854 ; 2.0437 ; 2.1922 ; 2.3029 ; 2.3988 ; 2.5216 ; 2.5553 ; 2.567 ; 2.5821 ; 2.5899 ; 2.5942 ; 2.6042 ; 2.6235 ; 2.663 ; 2.6807 ; 2.6884 ; 2.6989 ; 2.7153 ; 2.7432 ; 2.8023 ; 2.9226 ; 3.0843 ; 3.2457 ; 3.3515 ; 3.4037]

Bolt 3 - Tensile Force (kips): [50 ; 49.8975 ; 49.8343 ; 49.7935 ; 49.7834 ; 49.8155 ; 49.9854 ; 50.2537 ; 50.4977 ; 50.8467 ; 51.4784 ; 52.6075 ; 54.5103 ; 57.1686 ; 60.5408 ; 61.2155 ; 61.4554 ; 61.9272 ; 62.3102 ; 62.6875 ; 63.2757 ; 64.0996 ; 65.1459 ; 65.5418 ; 65.7073 ; 65.9056 ; 66.1649 ; 66.5285 ; 67.0897 ; 67.9202 ; 69.0618 ; 70.487 ; 71.6022 ; 72.4235]

Bolt 3 - Shear Force (kips): [0.046196 ; 0.027082 ; 0.059289 ; 0.11638 ; 0.20624 ; 0.33141 ; 0.47635 ; 0.63214 ; 0.81327 ; 1.0637 ; 1.394 ; 1.7197 ; 2.0657 ; 2.4635 ; 2.7953 ; 2.9141 ; 2.9305 ; 2.7862 ; 2.8053 ; 2.7731 ; 2.7422 ; 3.0073 ; 3.0946 ; 3.1255 ; 3.0547 ; 3.0671 ; 3.1931 ; 3.5102 ; 3.9708 ; 4.7942 ; 5.6696 ; 6.5898 ; 7.3188 ; 7.8453]

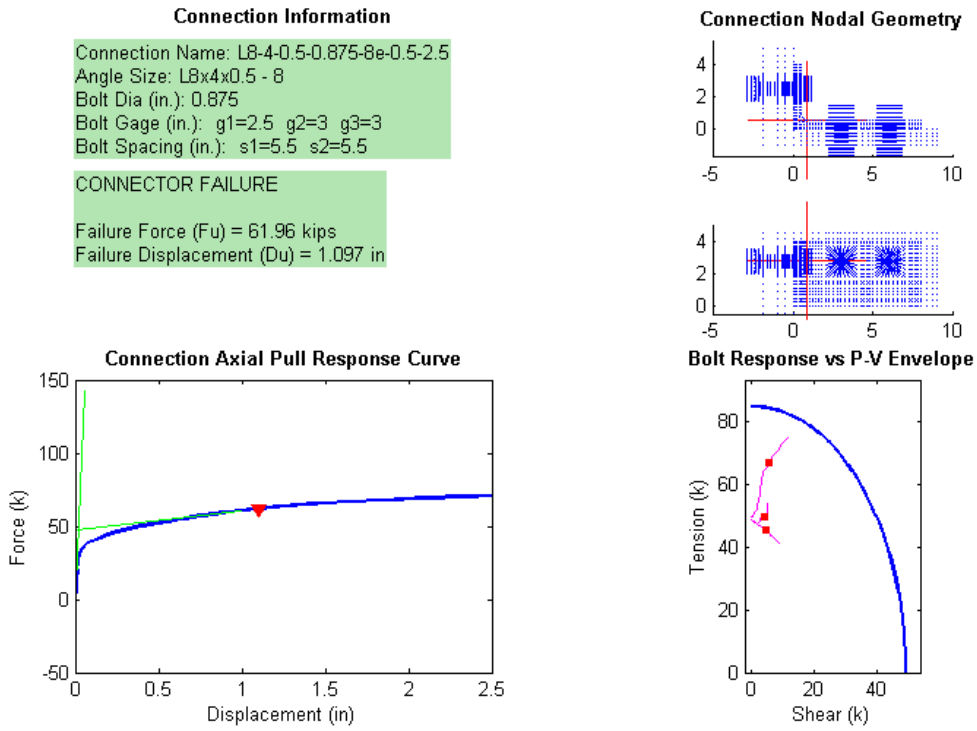


Figure B.173 Connection L8_4_0.5_0.875_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_0.875_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.4599e+003

Plastic Stiffness (k/in): 13.7340

Displacement (in): [3.581e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.25341 ; 0.29565 ; 0.359 ; 0.45403 ; 0.59657 ; 0.59991 ; 0.60492 ; 0.61244 ; 0.62372 ; 0.64063 ; 0.666 ; 0.70405 ; 0.76114 ; 0.84676 ; 0.87887 ; 0.92703 ; 0.99927 ; 1.1076 ; 1.2702 ; 1.3108 ; 1.3515 ; 1.4124 ; 1.5038 ; 1.641 ; 1.8467 ; 2.0967 ; 2.3467 ; 2.5]

Force (kips): [-1.33251 ; 1.48598 ; 3.47193 ; 5.15376 ; 7.38688 ; 10.2067 ; 13.2865 ; 15.8928 ; 17.5625 ; 18.753 ; 19.9285 ; 21.1702 ; 22.5909 ; 23.0609 ; 23.6993 ; 24.5458 ; 25.651 ; 27.0424 ; 27.0723 ; 27.1168 ; 27.1831 ; 27.2848 ; 27.4412 ; 27.6852 ; 28.0314 ; 28.535 ; 29.2401 ; 29.521 ; 29.896 ; 30.3921 ; 31.0457 ; 31.9002 ; 32.0909 ; 32.2708 ; 32.5257 ; 32.8879 ; 33.3665 ; 33.9958 ; 34.6097 ; 35.0907 ; 35.3397]

Bolt 1 - Tensile Force (kips): [48.6534 ; 48.5484 ; 48.4715 ; 48.4045 ; 48.3126 ; 48.1894 ; 48.0454 ; 47.9147 ; 47.8245 ; 47.7533 ; 47.6823 ; 47.61 ; 47.5197 ; 47.4863 ; 47.4427 ; 47.3864 ; 47.3099 ; 47.1889 ; 47.1859 ; 47.1808 ; 47.1733 ; 47.1612 ; 47.1421 ; 47.1098 ; 47.0577 ; 46.9581 ; 46.6503 ; 46.4805 ; 46.2431 ; 45.8975 ; 45.3996 ; 44.6913 ; 44.5264 ; 44.369 ; 44.1426 ; 43.8161 ; 43.3654 ; 42.7576 ; 42.1293 ; 41.6114 ; 41.3316]

Bolt 1 - Shear Force (kips): [0.074554 ; 0.12439 ; 0.24015 ; 0.34381 ; 0.48569 ; 0.67093 ; 0.88114 ; 1.0694 ; 1.2018 ; 1.3132 ; 1.4269 ; 1.5452 ; 1.6931 ; 1.7465 ; 1.8156 ; 1.9052 ; 2.025 ; 2.2043 ; 2.2089 ; 2.2159 ; 2.2265 ; 2.2435 ; 2.2702 ; 2.3145 ; 2.3861 ; 2.5207 ; 2.9308 ; 3.1474 ; 3.4409 ; 3.8533 ; 4.4256 ; 5.2131 ; 5.3922 ; 5.5623 ; 5.8049 ; 6.1515 ; 6.6237 ; 7.2494 ; 7.8829 ; 8.3992 ; 8.6769]

Bolt 2 - Tensile Force (kips): [48.6663 ; 48.5127 ; 48.3963 ; 48.2976 ; 48.1721 ; 48.0084 ; 47.8319 ; 47.6645 ; 47.5367 ; 47.4325 ; 47.3876 ; 47.5128 ; 47.7639 ; 47.8524 ; 47.9977 ; 48.1958 ; 48.4613 ; 48.8123 ; 48.8197 ; 48.8306 ; 48.8468 ; 48.8704 ; 48.9042 ; 48.954 ; 49.0312 ; 49.1402 ; 49.2418 ; 49.2663 ; 49.3344 ; 49.4574 ; 49.6791 ; 50.0729 ; 50.1775 ; 50.2881 ; 50.4627 ; 50.7396 ; 51.1823 ; 51.8741 ; 52.7313 ; 53.5975 ; 54.1171]

Bolt 2 - Shear Force (kips): [0.10635 ; 0.14559 ; 0.28978 ; 0.42012 ; 0.59946 ; 0.83339 ; 1.0998 ; 1.349 ; 1.5616 ; 1.7759 ; 2.0042 ; 2.1812 ; 2.3106 ; 2.3455 ; 2.3847 ; 2.4386 ; 2.5242 ; 2.6666 ; 2.6703 ; 2.6758 ; 2.6843 ; 2.698 ; 2.7194 ; 2.7546 ; 2.8119 ; 2.918 ; 3.1987 ; 3.3265 ; 3.4903 ; 3.7061 ; 3.977 ; 4.3097 ; 4.38 ; 4.4426 ; 4.5266 ; 4.6367 ; 4.7631 ; 4.8922 ; 4.9684 ; 4.9751 ; 4.9576]

Bolt 3 - Tensile Force (kips): [50 ; 49.8978 ; 49.8409 ; 49.8257 ; 49.8284 ; 49.8655 ; 49.9737 ; 50.2661 ; 50.6074 ; 50.9269 ; 51.4323 ; 52.3916 ; 54.0225 ; 54.5978 ; 55.4664 ; 56.7579 ; 58.6142 ; 61.1153 ; 61.1693 ; 61.25 ; 61.3704 ; 61.5445 ; 61.7671 ; 62.0612 ; 62.4497 ; 63.0447 ; 63.9961 ; 64.4975 ; 65.2127 ; 66.0777 ; 67.1748 ; 68.7096 ; 69.0621 ; 69.3737 ; 69.8037 ; 70.4547 ; 71.2635 ; 72.4706 ; 73.626 ; 74.5715 ; 75.0147]

Bolt 3 - Shear Force (kips): [0.05215 ; 0.0210523 ; 0.0644623 ; 0.114453 ; 0.1886 ; 0.294938 ; 0.433305 ; 0.591391 ; 0.760815 ; 0.969549 ; 1.25743 ; 1.56947 ; 1.91861 ; 2.06777 ; 2.26396 ; 2.50251 ; 2.74721 ; 2.99276 ; 2.998 ; 3.00575 ; 3.01715 ; 3.0386 ; 3.08533 ; 3.18055 ; 3.28874 ; 3.46597 ; 3.7818 ; 3.97159 ; 4.71429 ; 4.79678 ; 5.46873 ; 6.48418 ; 6.72002 ; 6.9287 ; 7.22781 ; 7.85481 ; 8.52755 ; 9.33005 ; 10.249 ; 11.0832 ; 11.4542]

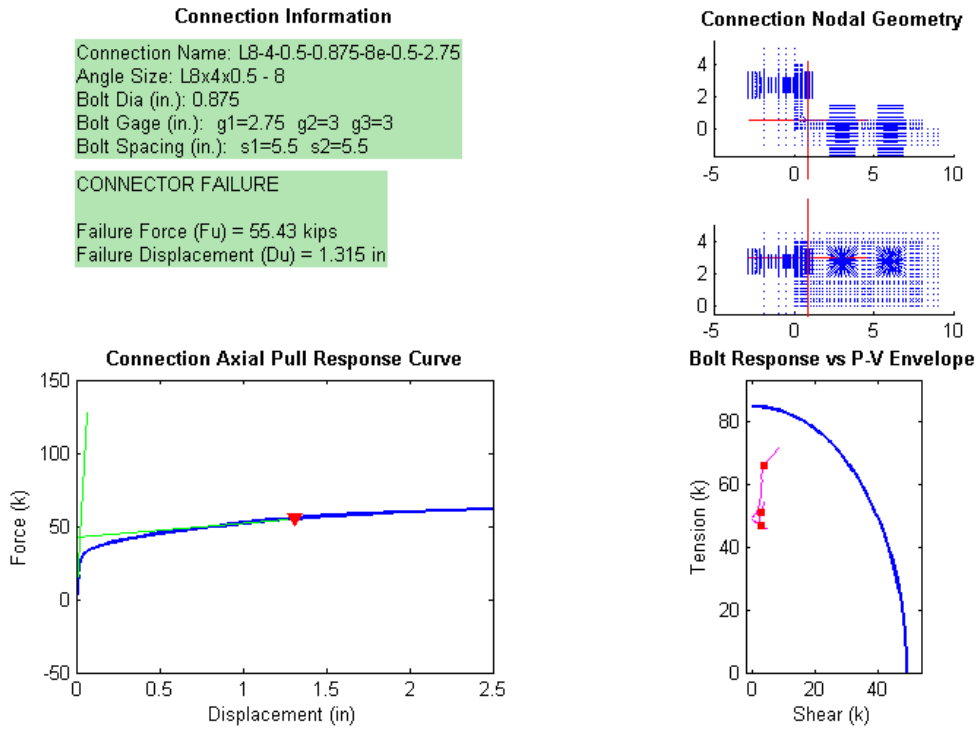


Figure B.174 Connection L8_4_0.5_0.875_8e_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_0.875_8e_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 2.0048e+003

Plastic Stiffness (k/in): 9.5685

Displacement (in): [5.1795e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.50682 ; 0.75682 ; 0.81932 ; 0.84276 ; 0.87792 ; 0.93065 ; 1.0097 ; 1.0889 ; 1.168 ; 1.1754 ; 1.1865 ; 1.2032 ; 1.2282 ; 1.2657 ; 1.3221 ; 1.4065 ; 1.5332 ; 1.7233 ; 1.9733 ; 2.2233 ; 2.4733 ; 2.5]

Force (kips): [-1.28301 ; 1.03661 ; 2.63265 ; 4.01837 ; 5.84787 ; 8.24321 ; 11.0151 ; 13.5375 ; 15.2665 ; 16.349 ; 17.3358 ; 18.3713 ; 19.5467 ; 20.9468 ; 22.5754 ; 24.4249 ; 24.8347 ; 24.9898 ; 25.2189 ; 25.5685 ; 26.0953 ; 26.5824 ; 27.0151 ; 27.0577 ; 27.1167 ; 27.1998 ; 27.3184 ; 27.498 ; 27.7469 ; 28.0895 ; 28.5588 ; 29.1671 ; 29.8343 ; 30.3821 ; 30.8237 ; 30.8686]

Bolt 1 - Tensile Force (kips): [48.653 ; 48.5668 ; 48.5053 ; 48.4506 ; 48.3765 ; 48.2746 ; 48.1488 ; 48.0254 ; 47.9352 ; 47.8743 ; 47.8235 ; 47.7674 ; 47.6975 ; 47.6162 ; 47.5282 ; 47.4333 ; 47.4107 ; 47.4024 ; 47.389 ; 47.3663 ; 47.3262 ; 47.2808 ; 47.2311 ; 47.2254 ; 47.2173 ; 47.2062 ; 47.1898 ; 47.1639 ; 47.1255 ; 47.0603 ; 46.9161 ; 46.6457 ; 46.3232 ; 46.0379 ; 45.8076 ; 45.7834]

Bolt 1 - Shear Force (kips): [0.071899 ; 0.10116 ; 0.19161 ; 0.27598 ; 0.39155 ; 0.54814 ; 0.73672 ; 0.91831 ; 1.0534 ; 1.1526 ; 1.2406 ; 1.3413 ; 1.4684 ; 1.6168 ; 1.78 ; 1.9612 ; 2.0042 ; 2.0203 ; 2.0455 ; 2.0863 ; 2.1539 ; 2.227 ; 2.3054 ; 2.3141 ; 2.3264 ; 2.3438 ; 2.3694 ; 2.4095 ; 2.4693 ; 2.5693 ; 2.7836 ; 3.1673 ; 3.6076 ; 3.9901 ; 4.3034 ; 4.3361]

Bolt 2 - Tensile Force (kips): [48.6639 ; 48.535 ; 48.4389 ; 48.3556 ; 48.2514 ; 48.1162 ; 47.9667 ; 47.8245 ; 47.7275 ; 47.663 ; 47.6805 ; 47.8006 ; 48.0608 ; 48.4347 ; 48.9037 ; 49.562 ; 49.7144 ; 49.7708 ; 49.8598 ; 49.9962 ; 50.2061 ; 50.4352 ; 50.6787 ; 50.7 ; 50.7327 ; 50.7827 ; 50.8582 ; 50.9701 ; 51.1393 ; 51.3885 ; 51.7395 ; 52.2607 ; 52.9813 ; 53.7169 ; 54.4512 ; 54.5276]

Bolt 2 - Shear Force (kips): [0.10283 ; 0.11821 ; 0.23062 ; 0.3369 ; 0.48322 ; 0.68194 ; 0.92132 ; 1.1582 ; 1.3653 ; 1.5582 ; 1.748 ; 1.9179 ; 2.045 ; 2.1465 ; 2.2566 ; 2.3964 ; 2.4299 ; 2.4427 ; 2.4634 ; 2.4982 ; 2.5538 ; 2.6 ; 2.6363 ; 2.6406 ; 2.6465 ; 2.6547 ; 2.6666 ; 2.6867 ; 2.7171 ; 2.7698 ; 2.8818 ; 3.0674 ; 3.2504 ; 3.384 ; 3.4655 ; 3.4732]

Bolt 3 - Tensile Force (kips): [50 ; 49.902 ; 49.837 ; 49.8016 ; 49.7768 ; 49.7752 ; 49.8224 ; 50.0089 ; 50.262 ; 50.4991 ; 50.8562 ; 51.4983 ; 52.5686 ; 54.3767 ; 57.0478 ; 60.4453 ; 61.1127 ; 61.3306 ; 61.7645 ; 62.3296 ; 63.1744 ; 63.9834 ; 64.6801 ; 64.7689 ; 64.8788 ; 65.0195 ; 65.2054 ; 65.49 ; 65.8945 ; 66.4417 ; 67.251 ; 68.3735 ; 69.7579 ; 70.8704 ; 71.7336 ; 71.8435]

Bolt 3 - Shear Force (kips): [0.053785 ; 0.020216 ; 0.048138 ; 0.088757 ; 0.15096 ; 0.24159 ; 0.36034 ; 0.4967 ; 0.64574 ; 0.82429 ; 1.0702 ; 1.3902 ; 1.7441 ; 2.1337 ; 2.5185 ; 2.8378 ; 2.961 ; 2.9222 ; 2.8399 ; 2.8813 ; 2.8712 ; 3.1711 ; 3.3047 ; 3.2681 ; 3.2503 ; 3.2977 ; 3.3975 ; 3.2976 ; 3.4161 ; 3.8092 ; 4.6759 ; 5.6804 ; 6.7005 ; 7.5213 ; 8.1824 ; 8.2558]

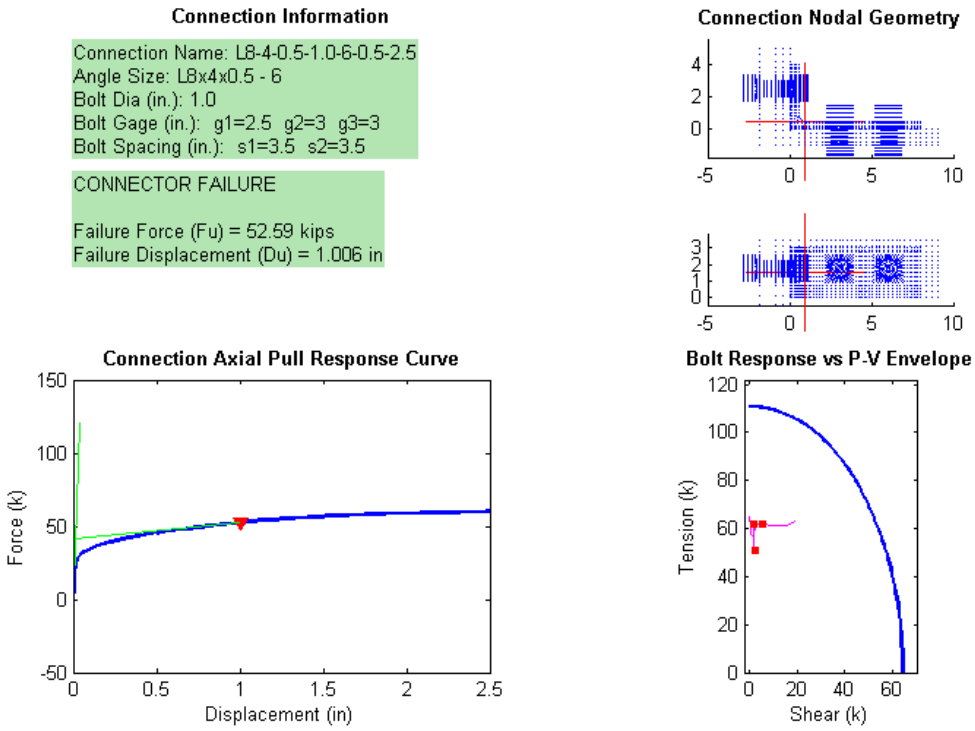


Figure B.175 Connection L8_4_0.5_1.0_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_1.0_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2897

Plastic Stiffness (k/in): 11.3361

Displacement (in): [1.0256e-035 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.56737 ; 0.66112 ; 0.69627 ; 0.74901 ; 0.82811 ; 0.85777 ; 0.90227 ; 0.94676 ; 0.99126 ; 1.058 ; 1.1581 ; 1.3083 ; 1.3646 ; 1.4491 ; 1.5758 ; 1.6233 ; 1.6946 ; 1.8015 ; 1.9618 ; 2.2024 ; 2.4524 ; 2.5]

Force (kips): [-2.04902 ; 1.45459 ; 3.60919 ; 6.23136 ; 9.35378 ; 12.3713 ; 14.2463 ; 15.2127 ; 16.102 ; 17.1239 ; 18.304 ; 19.6007 ; 21.0658 ; 22.7469 ; 23.2607 ; 23.947 ; 24.1823 ; 24.5792 ; 25.1848 ; 25.4156 ; 25.7038 ; 25.9686 ; 26.2208 ; 26.5563 ; 27.0336 ; 27.6437 ; 27.8536 ; 28.1408 ; 28.5029 ; 28.6282 ; 28.8037 ; 29.046 ; 29.344 ; 29.7004 ; 29.9921 ; 30.0427]

Bolt 1 - Tensile Force (kips): [63.3353 ; 63.1929 ; 63.1026 ; 62.987 ; 62.8422 ; 62.6944 ; 62.6005 ; 62.556 ; 62.5132 ; 62.4518 ; 62.3703 ; 62.2788 ; 62.1652 ; 62.0381 ; 62.001 ; 61.9562 ; 61.9422 ; 61.9215 ; 61.8943 ; 61.8837 ; 61.8731 ; 61.865 ; 61.8587 ; 61.8529 ; 61.8469 ; 61.8446 ; 61.8436 ; 61.8458 ; 61.8532 ; 61.8549 ; 61.8558 ; 61.8587 ; 61.8705 ; 61.8949 ; 61.926 ; 61.9323]

Bolt 1 - Shear Force (kips): [0.14928 ; 0.10869 ; 0.19686 ; 0.32927 ; 0.4986 ; 0.67053 ; 0.77958 ; 0.83318 ; 0.88636 ; 0.96419 ; 1.0742 ; 1.2106 ; 1.3902 ; 1.5984 ; 1.6627 ; 1.7457 ; 1.7735 ; 1.8137 ; 1.8689 ; 1.8901 ; 1.916 ; 1.9391 ; 1.9601 ; 1.9879 ; 2.0264 ; 2.0769 ; 2.0962 ; 2.1208 ; 2.1533 ; 2.1673 ; 2.1907 ; 2.224 ; 2.2656 ; 2.3201 ; 2.3697 ; 2.3788]

Bolt 2 - Tensile Force (kips): [63.3352 ; 63.0687 ; 62.8849 ; 62.6357 ; 62.3023 ; 61.895 ; 61.4831 ; 60.9526 ; 60.1459 ; 58.9514 ; 57.4929 ; 55.9219 ; 54.0968 ; 52.471 ; 51.9905 ; 51.5212 ; 51.3804 ; 51.1959 ; 50.9812 ; 50.9063 ; 50.8393 ; 50.7909 ; 50.7612 ; 50.7433 ; 50.7609 ; 50.9003 ; 50.9862 ; 51.1492 ; 51.4165 ; 51.5175 ; 51.6942 ; 51.9747 ; 52.4668 ; 53.1537 ; 53.7749 ; 53.8805]

Bolt 2 - Shear Force (kips): [0.12505 ; 0.22298 ; 0.40437 ; 0.64002 ; 0.93474 ; 1.2347 ; 1.4411 ; 1.5614 ; 1.6662 ; 1.7338 ; 1.765 ; 1.7747 ; 1.7733 ; 1.8536 ; 1.8804 ; 1.9543 ; 1.9872 ; 2.0473 ; 2.1453 ; 2.1849 ; 2.2387 ; 2.2922 ; 2.3426 ; 2.4132 ; 2.5032 ; 2.5647 ; 2.5567 ; 2.5264 ; 2.4554 ; 2.4276 ; 2.3818 ; 2.3025 ; 2.1727 ; 1.9704 ; 1.7756 ; 1.7423]

Bolt 3 - Tensile Force (kips): [65 ; 64.8311 ; 64.6662 ; 64.4301 ; 64.0673 ; 63.4624 ; 62.5088 ; 61.1361 ; 59.5657 ; 58.1158 ; 57.1057 ; 57.0532 ; 58.2048 ; 60.0114 ; 60.5388 ; 61.3213 ; 61.5947 ; 61.8961 ; 61.9381 ; 61.9099 ; 61.813 ; 61.7376 ; 61.7072 ; 61.5838 ; 61.5175 ; 61.5208 ; 61.481 ; 61.3547 ; 61.1891 ; 61.2074 ; 61.3766 ; 61.6591 ; 62.1376 ; 62.6397 ; 62.9974 ; 63.0695]

Bolt 3 - Shear Force (kips): [0.0652264 ; 0.0464546 ; 0.0933972 ; 0.167876 ; 0.267363 ; 0.372489 ; 0.463784 ; 0.543162 ; 0.67256 ; 0.958792 ; 1.38821 ; 1.8081 ; 2.1319 ; 2.40445 ; 2.46803 ; 2.53574 ; 2.56114 ; 2.77223 ; 3.37516 ; 3.51768 ; 3.7942 ; 4.20892 ; 5.37565 ; 6.88838 ; 8.67078 ; 10.9257 ; 11.6735 ; 13.0644 ; 14.7987 ; 15.3149 ; 15.8602 ; 16.68 ; 17.4491 ; 18.3391 ; 19.0961 ; 19.2717]

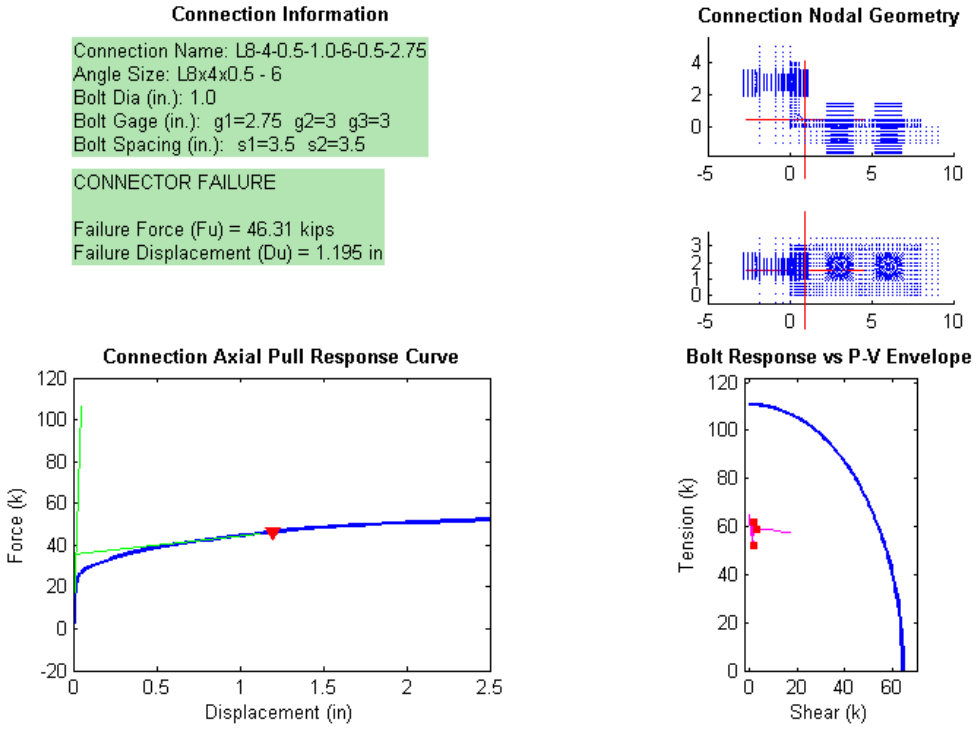


Figure B.176 Connection L8_4_0.5_1.0_6_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_1.0_6_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 2401

Plastic Stiffness (k/in): 9.0920

Displacement (in): [9.877e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 0.81737 ; 0.91112 ; 0.94627 ; 0.95946 ; 0.97923 ; 1.0089 ; 1.0534 ; 1.1201 ; 1.2203 ; 1.2578 ; 1.3141 ; 1.3352 ; 1.3669 ; 1.4144 ; 1.4857 ; 1.5124 ; 1.5525 ; 1.6126 ; 1.6352 ; 1.669 ; 1.7197 ; 1.7959 ; 1.91 ; 2.0813 ; 2.3313 ; 2.5]

Force (kips): [-2.02581 ; 0.962046 ; 2.66374 ; 4.78173 ; 7.37004 ; 10.1434 ; 12.1183 ; 13.1413 ; 13.9124 ; 14.7637 ; 15.6889 ; 16.7338 ; 18.0244 ; 19.4466 ; 20.986 ; 21.3157 ; 21.79 ; 21.962 ; 22.0444 ; 22.163 ; 22.3249 ; 22.5465 ; 22.8499 ; 23.2593 ; 23.4078 ; 23.613 ; 23.6932 ; 23.8033 ; 23.9562 ; 24.1758 ; 24.2663 ; 24.3889 ; 24.5524 ; 24.6114 ; 24.6965 ; 24.8165 ; 24.9897 ; 25.2196 ; 25.5244 ; 25.8713 ; 26.0656]

Bolt 1 - Tensile Force (kips): [63.3351 ; 63.2141 ; 63.1438 ; 63.0523 ; 62.935 ; 62.8025 ; 62.7048 ; 62.6576 ; 62.6264 ; 62.5878 ; 62.534 ; 62.4674 ; 62.3832 ; 62.293 ; 62.2066 ; 62.1901 ; 62.1702 ; 62.1629 ; 62.1595 ; 62.1551 ; 62.1493 ; 62.144 ; 62.1404 ; 62.1427 ; 62.1434 ; 62.1459 ; 62.1475 ; 62.1505 ; 62.1552 ; 62.1626 ; 62.1646 ; 62.1682 ; 62.1749 ; 62.1775 ; 62.1818 ; 62.1892 ; 62.2007 ; 62.219 ; 62.251 ; 62.3033 ; 62.3411]

Bolt 1 - Shear Force (kips): [0.14773 ; 0.096658 ; 0.1543 ; 0.25486 ; 0.39115 ; 0.54601 ; 0.66048 ; 0.71766 ; 0.75667 ; 0.80466 ; 0.88806 ; 1.0021 ; 1.1479 ; 1.3189 ; 1.5099 ; 1.5514 ; 1.6079 ; 1.6289 ; 1.6375 ; 1.6494 ; 1.6663 ; 1.6875 ; 1.7142 ; 1.7448 ; 1.7567 ; 1.7727 ; 1.7777 ; 1.7846 ; 1.7949 ; 1.81 ; 1.8168 ; 1.8262 ; 1.8388 ; 1.8436 ; 1.85 ; 1.8586 ; 1.8711 ; 1.8888 ; 1.9095 ; 1.9317 ; 1.9423]

Bolt 2 - Tensile Force (kips): [63.3336 ; 63.1046 ; 62.9587 ; 62.7591 ; 62.4909 ; 62.1537 ; 61.7975 ; 61.3799 ; 60.767 ; 59.8623 ; 58.7659 ; 57.5438 ; 55.8718 ; 54.1504 ; 52.8451 ; 52.6328 ; 52.3992 ; 52.3194 ; 52.2863 ; 52.246 ; 52.1939 ; 52.137 ; 52.0889 ; 52.0915 ; 52.0959 ; 52.1116 ; 52.1201 ; 52.1377 ; 52.1703 ; 52.2317 ; 52.2524 ; 52.2932 ; 52.3703 ; 52.4028 ; 52.4554 ; 52.539 ; 52.6696 ; 52.8742 ; 53.2267 ; 53.7487 ; 54.111]

Bolt 2 - Shear Force (kips): [0.1227 ; 0.1866 ; 0.32907 ; 0.51955 ; 0.76511 ; 1.0421 ; 1.2583 ; 1.3888 ; 1.4899 ; 1.5563 ; 1.5846 ; 1.5954 ; 1.5799 ; 1.5953 ; 1.6904 ; 1.7286 ; 1.8042 ; 1.8355 ; 1.848 ; 1.8674 ; 1.8969 ; 1.9381 ; 1.9975 ; 2.0849 ; 2.1157 ; 2.1601 ; 2.1759 ; 2.197 ; 2.2219 ; 2.2556 ; 2.2673 ; 2.2754 ; 2.2737 ; 2.2678 ; 2.2569 ; 2.2369 ; 2.2021 ; 2.1431 ; 2.0423 ; 1.8719 ; 1.7567]

Bolt 3 - Tensile Force (kips): [65 ; 64.843 ; 64.6839 ; 64.4386 ; 64.048 ; 63.4303 ; 62.4684 ; 61.0956 ; 59.4445 ; 57.689 ; 56.344 ; 55.7558 ; 55.7133 ; 56.3872 ; 57.792 ; 58.1628 ; 58.7545 ; 58.9718 ; 59.0248 ; 59.0477 ; 59.0424 ; 59.0187 ; 58.9492 ; 58.9137 ; 58.8875 ; 58.8281 ; 58.8367 ; 58.8256 ; 58.8018 ; 58.7811 ; 58.7655 ; 58.6994 ; 58.6229 ; 58.576 ; 58.5199 ; 58.4354 ; 58.3181 ; 58.1536 ; 57.8808 ; 57.583 ; 57.3782]

Bolt 3 - Shear Force (kips): [0.0674189 ; 0.0448253 ; 0.0755244 ; 0.131356 ; 0.204551 ; 0.286354 ; 0.347423 ; 0.414945 ; 0.506242 ; 0.714359 ; 1.02782 ; 1.41454 ; 1.83498 ; 1.92412 ; 2.01555 ; 2.57124 ; 2.92781 ; 3.16535 ; 2.87638 ; 2.59158 ; 2.55863 ; 2.47219 ; 2.82867 ; 3.61115 ; 3.92977 ; 4.71612 ; 5.19289 ; 5.69437 ; 6.34336 ; 7.2572 ; 7.69211 ; 8.3101 ; 9.0404 ; 9.25199 ; 9.61135 ; 10.1945 ; 11.0835 ; 12.1682 ; 13.9183 ; 15.7706 ; 17.0218]

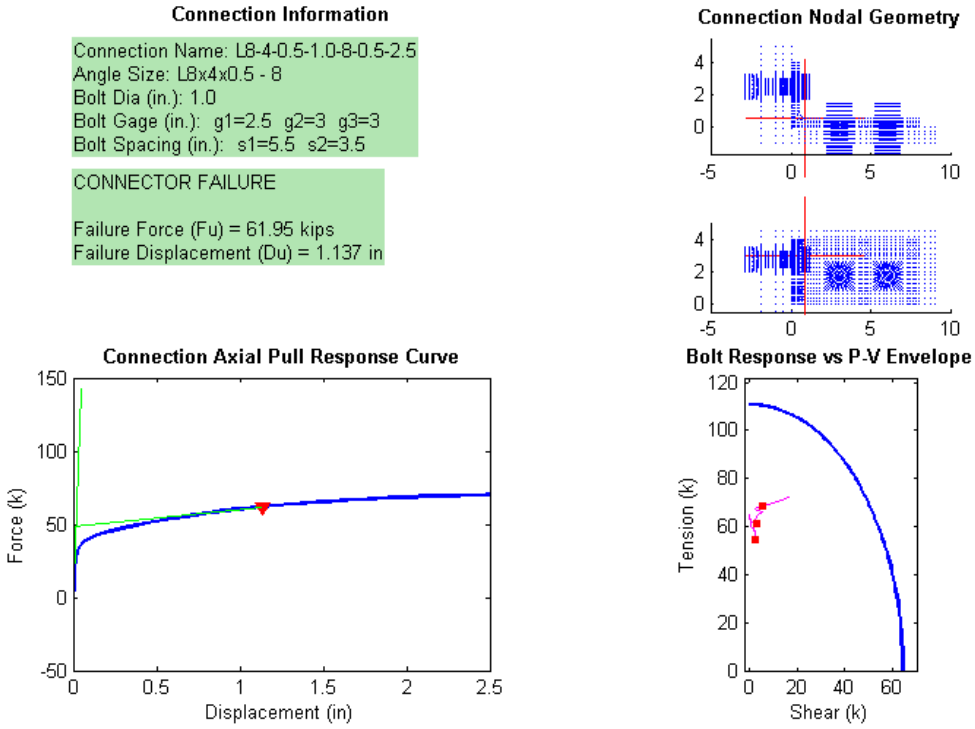


Figure B.177 Connection L8_4_0.5_1.0_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_1.0_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.8159e+003

Plastic Stiffness (k/in): 11.8797

Displacement (in): [8.9263e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.53655 ; 0.67909 ; 0.73254 ; 0.75259 ; 0.7601 ; 0.77138 ; 0.78829 ; 0.81366 ; 0.85172 ; 0.9088 ; 0.99442 ; 1.1229 ; 1.3155 ; 1.5082 ; 1.7008 ; 1.9508 ; 2.2008 ; 2.4508 ; 2.5]

Force (kips): [-1.78156 ; 1.50888 ; 3.71822 ; 6.4289 ; 9.74316 ; 13.2928 ; 16.0168 ; 17.6312 ; 18.8251 ; 20.0163 ; 21.2627 ; 22.642 ; 24.2085 ; 24.7118 ; 25.4015 ; 26.323 ; 27.5604 ; 28.0195 ; 28.1914 ; 28.2643 ; 28.3828 ; 28.551 ; 28.7792 ; 29.1011 ; 29.5525 ; 30.1419 ; 30.9048 ; 31.8542 ; 32.6383 ; 33.3049 ; 34.0054 ; 34.549 ; 34.9762 ; 35.0518]

Bolt 1 - Tensile Force (kips): [63.3336 ; 63.1973 ; 63.1016 ; 62.9781 ; 62.8182 ; 62.6354 ; 62.4848 ; 62.3846 ; 62.2939 ; 62.1965 ; 62.0928 ; 61.9709 ; 61.8315 ; 61.7857 ; 61.7269 ; 61.651 ; 61.5556 ; 61.5179 ; 61.5043 ; 61.4988 ; 61.4896 ; 61.4771 ; 61.4601 ; 61.4361 ; 61.4016 ; 61.3569 ; 61.2943 ; 61.2121 ; 61.1401 ; 61.0738 ; 60.9946 ; 60.929 ; 60.8742 ; 60.8625]

Bolt 1 - Shear Force (kips): [0.13367 ; 0.11916 ; 0.2346 ; 0.39499 ; 0.60271 ; 0.83628 ; 1.0279 ; 1.1593 ; 1.2839 ; 1.4183 ; 1.568 ; 1.7508 ; 1.96 ; 2.03 ; 2.1224 ; 2.2471 ; 2.4116 ; 2.4752 ; 2.4982 ; 2.5074 ; 2.5219 ; 2.5418 ; 2.5696 ; 2.6092 ; 2.6664 ; 2.7439 ; 2.8557 ; 3.0126 ; 3.1614 ; 3.3066 ; 3.4907 ; 3.6648 ; 3.8327 ; 3.8678]

Bolt 2 - Tensile Force (kips): [63.3307 ; 63.1051 ; 62.9307 ; 62.6943 ; 62.3695 ; 61.9785 ; 61.559 ; 61.0854 ; 60.4586 ; 59.6549 ; 58.7188 ; 57.5329 ; 56.107 ; 55.597 ; 55.0147 ; 54.3996 ; 54.0077 ; 53.9409 ; 53.9192 ; 53.9097 ; 53.8955 ; 53.8797 ; 53.8654 ; 53.8594 ; 53.8786 ; 53.9811 ; 54.2539 ; 54.7631 ; 55.3081 ; 55.8628 ; 56.5888 ; 57.2369 ; 57.8397 ; 57.9482]

Bolt 2 - Shear Force (kips): [0.10399 ; 0.2086 ; 0.39755 ; 0.64139 ; 0.95171 ; 1.2976 ; 1.5899 ; 1.8035 ; 1.9935 ; 2.1547 ; 2.246 ; 2.2902 ; 2.3247 ; 2.3336 ; 2.3414 ; 2.3693 ; 2.4778 ; 2.5322 ; 2.5537 ; 2.5626 ; 2.5771 ; 2.5974 ; 2.6264 ; 2.6683 ; 2.727 ; 2.7889 ; 2.7978 ; 2.7939 ; 2.7712 ; 2.7338 ; 2.6743 ; 2.5984 ; 2.5196 ; 2.5065]

Bolt 3 - Tensile Force (kips): [65 ; 64.8238 ; 64.6586 ; 64.4211 ; 64.0867 ; 63.5554 ; 62.8348 ; 61.7588 ; 60.5049 ; 59.5182 ; 59.0087 ; 59.4832 ; 60.8611 ; 61.3152 ; 62.0295 ; 63.1183 ; 64.9633 ; 65.7876 ; 66.0777 ; 66.1957 ; 66.3571 ; 66.527 ; 66.703 ; 66.9591 ; 67.2872 ; 67.7057 ; 68.3242 ; 69.1096 ; 69.8584 ; 70.5631 ; 71.1735 ; 71.6323 ; 71.9959 ; 72.063]

Bolt 3 - Shear Force (kips): [0.0729584 ; 0.0419946 ; 0.0798265 ; 0.143658 ; 0.239942 ; 0.351179 ; 0.4556 ; 0.566634 ; 0.783397 ; 1.15063 ; 1.64036 ; 1.97192 ; 2.1025 ; 2.14575 ; 2.19629 ; 2.29652 ; 3.66591 ; 5.23958 ; 5.59409 ; 5.55653 ; 5.26657 ; 4.50397 ; 3.98194 ; 3.21493 ; 2.62539 ; 3.5356 ; 5.47501 ; 7.84066 ; 9.78285 ; 11.8279 ; 13.6941 ; 15.189 ; 16.5763 ; 16.8079]

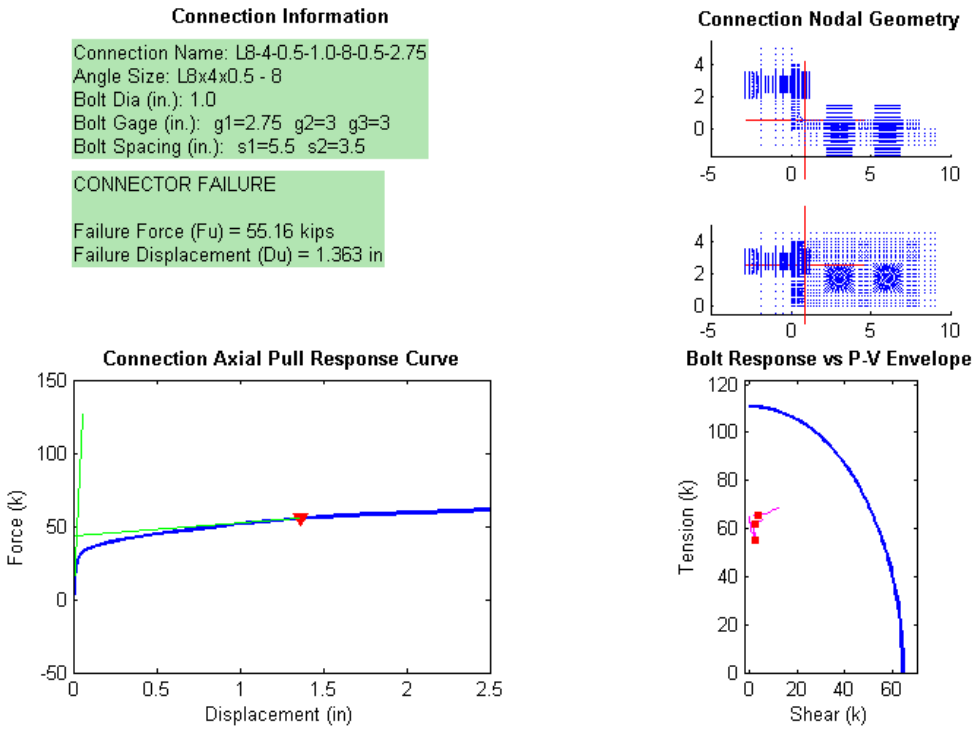


Figure B.178 Connection L8_4_0.5_1.0_8_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_1.0_8_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 2323

Plastic Stiffness (k/in): 8.4474

Displacement (in): [7.4161e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 0.81737 ; 0.91112 ; 0.94627 ; 0.99901 ; 1.0781 ; 1.1078 ; 1.1523 ; 1.219 ; 1.3191 ; 1.3567 ; 1.413 ; 1.4974 ; 1.6242 ; 1.8142 ; 2.0642 ; 2.3142 ; 2.5]

Force (kips): [-1.75481 ; 1.01165 ; 2.7823 ; 4.98801 ; 7.73432 ; 10.8883 ; 13.6161 ; 15.2969 ; 16.3855 ; 17.38 ; 18.4071 ; 19.5504 ; 20.8817 ; 22.4125 ; 24.1846 ; 24.6167 ; 25.2127 ; 25.4455 ; 25.7728 ; 26.2079 ; 26.3879 ; 26.628 ; 26.9569 ; 27.3998 ; 27.5584 ; 27.7812 ; 28.0896 ; 28.5183 ; 29.095 ; 29.714 ; 30.214 ; 30.5213]

Bolt 1 - Tensile Force (kips): [63.3331 ; 63.2191 ; 63.1433 ; 63.0444 ; 62.9146 ; 62.7557 ; 62.6079 ; 62.5075 ; 62.4286 ; 62.3544 ; 62.277 ; 62.1777 ; 62.0621 ; 61.9426 ; 61.827 ; 61.8007 ; 61.7705 ; 61.7589 ; 61.7433 ; 61.7241 ; 61.7152 ; 61.7045 ; 61.6908 ; 61.6717 ; 61.6653 ; 61.6568 ; 61.6459 ; 61.6336 ; 61.6233 ; 61.6217 ; 61.6321 ; 61.6468]

Bolt 1 - Shear Force (kips): [0.13155 ; 0.10006 ; 0.18338 ; 0.30975 ; 0.47857 ; 0.68332 ; 0.8729 ; 1.0055 ; 1.1166 ; 1.2236 ; 1.3442 ; 1.5058 ; 1.6944 ; 1.9039 ; 2.1356 ; 2.1912 ; 2.2617 ; 2.2882 ; 2.3251 ; 2.3753 ; 2.3965 ; 2.4243 ; 2.4627 ; 2.518 ; 2.5376 ; 2.5654 ; 2.6046 ; 2.6584 ; 2.7298 ; 2.8152 ; 2.8904 ; 2.9399]

Bolt 2 - Tensile Force (kips): [63.3284 ; 63.1376 ; 62.9951 ; 62.7992 ; 62.5318 ; 62.197 ; 61.8225 ; 61.4085 ; 60.8923 ; 60.2459 ; 59.4925 ; 58.5817 ; 57.3729 ; 56.0005 ; 55.0242 ; 54.8802 ; 54.8268 ; 54.8115 ; 54.8071 ; 54.839 ; 54.8514 ; 54.8902 ; 54.9755 ; 55.1603 ; 55.2317 ; 55.3455 ; 55.5251 ; 55.8212 ; 56.3053 ; 56.9422 ; 57.5651 ; 57.9793]

Bolt 2 - Shear Force (kips): [0.10132 ; 0.17043 ; 0.3223 ; 0.52233 ; 0.78207 ; 1.0928 ; 1.3828 ; 1.6021 ; 1.7852 ; 1.9347 ; 2.0226 ; 2.0829 ; 2.1022 ; 2.126 ; 2.1967 ; 2.2361 ; 2.308 ; 2.3372 ; 2.3806 ; 2.4416 ; 2.4637 ; 2.4943 ; 2.526 ; 2.529 ; 2.5281 ; 2.525 ; 2.5161 ; 2.495 ; 2.4527 ; 2.3838 ; 2.3114 ; 2.252]

Bolt 3 - Tensile Force (kips): [65 ; 64.8358 ; 64.6741 ; 64.4268 ; 64.0519 ; 63.4766 ; 62.701 ; 61.5963 ; 60.2322 ; 58.9368 ; 58.1414 ; 58.0403 ; 58.9216 ; 60.3875 ; 62.4499 ; 63.1025 ; 63.93 ; 64.2254 ; 64.5227 ; 64.9296 ; 65.0843 ; 65.2263 ; 65.422 ; 65.665 ; 65.7681 ; 65.8813 ; 66.0272 ; 66.3812 ; 66.982 ; 67.6815 ; 68.2505 ; 68.567]

Bolt 3 - Shear Force (kips): [0.0734081 ; 0.0410296 ; 0.065004 ; 0.111948 ; 0.181482 ; 0.269053 ; 0.347964 ; 0.429615 ; 0.58802 ; 0.883619 ; 1.30004 ; 1.73784 ; 1.92446 ; 2.00849 ; 3.39582 ; 5.17128 ; 5.60155 ; 5.28742 ; 4.21624 ; 3.2731 ; 2.50038 ; 1.85087 ; 2.05289 ; 3.17542 ; 3.6707 ; 4.39185 ; 5.37627 ; 6.7853 ; 8.57638 ; 10.1641 ; 11.2949 ; 12.1738]

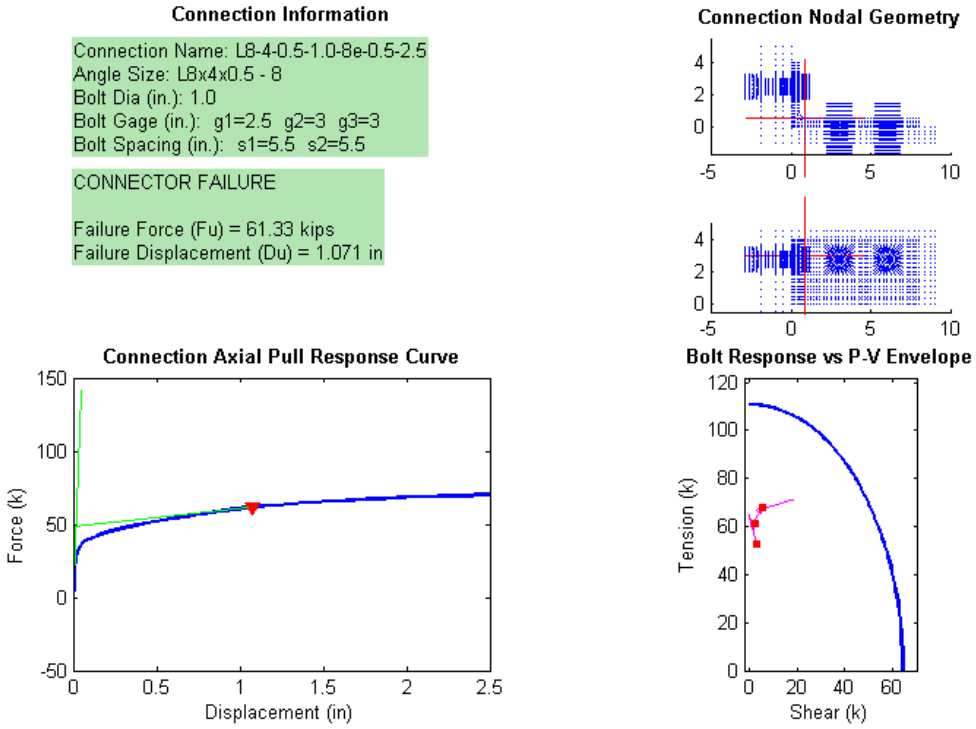


Figure B.179 Connection L8_4_0.5_1.0_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_1.0_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.9321e+003

Plastic Stiffness (k/in): 12.4218

Displacement (in): [1.0694e-035 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.53655 ; 0.67909 ; 0.73254 ; 0.75259 ; 0.78265 ; 0.82776 ; 0.84467 ; 0.87004 ; 0.90809 ; 0.96518 ; 1.0508 ; 1.1792 ; 1.2274 ; 1.2996 ; 1.408 ; 1.5706 ; 1.8144 ; 2.0644 ; 2.3144 ; 2.5]

Force (kips): [-2.12662 ; 1.3666 ; 3.60011 ; 6.33188 ; 9.65082 ; 13.1779 ; 15.9377 ; 17.6149 ; 18.8052 ; 19.957 ; 21.1879 ; 22.5997 ; 24.2128 ; 24.7269 ; 25.4285 ; 26.363 ; 27.6023 ; 28.066 ; 28.2808 ; 28.5804 ; 28.9693 ; 29.1223 ; 29.3324 ; 29.6169 ; 30.0191 ; 30.5509 ; 31.2545 ; 31.4952 ; 31.8337 ; 32.2935 ; 32.9019 ; 33.6559 ; 34.267 ; 34.7326 ; 35.0258]

Bolt 1 - Tensile Force (kips): [63.4031 ; 63.2405 ; 63.1314 ; 62.9907 ; 62.8091 ; 62.604 ; 62.4312 ; 62.319 ; 62.2339 ; 62.1466 ; 62.0375 ; 61.9007 ; 61.7433 ; 61.6902 ; 61.6149 ; 61.5185 ; 61.3863 ; 61.3343 ; 61.3117 ; 61.281 ; 61.2399 ; 61.2239 ; 61.2019 ; 61.171 ; 61.1253 ; 61.0609 ; 60.9651 ; 60.9286 ; 60.8739 ; 60.7912 ; 60.6681 ; 60.4816 ; 60.2959 ; 60.1281 ; 59.9975]

Bolt 1 - Shear Force (kips): [0.12235 ; 0.14377 ; 0.27127 ; 0.44242 ; 0.66179 ; 0.90594 ; 1.109 ; 1.2426 ; 1.3497 ; 1.4563 ; 1.5966 ; 1.7728 ; 1.9691 ; 2.0345 ; 2.1302 ; 2.2494 ; 2.4118 ; 2.4754 ; 2.502 ; 2.5376 ; 2.5845 ; 2.6023 ; 2.6266 ; 2.6608 ; 2.7098 ; 2.7776 ; 2.8796 ; 2.9188 ; 2.9778 ; 3.0681 ; 3.2057 ; 3.4196 ; 3.6411 ; 3.8635 ; 4.0609]

Bolt 2 - Tensile Force (kips): [63.4117 ; 63.1525 ; 62.9719 ; 62.7273 ; 62.3956 ; 61.9816 ; 61.5405 ; 61.0192 ; 60.2859 ; 59.2895 ; 58.1472 ; 56.8188 ; 55.4106 ; 54.9335 ; 54.3486 ; 53.7349 ; 53.0616 ; 52.8614 ; 52.7792 ; 52.6776 ; 52.5659 ; 52.5379 ; 52.5102 ; 52.4836 ; 52.4726 ; 52.497 ; 52.6189 ; 52.6802 ; 52.7865 ; 52.9664 ; 53.2702 ; 53.7594 ; 54.2766 ; 54.8122 ; 55.2011]

Bolt 2 - Shear Force (kips): [0.16393 ; 0.19004 ; 0.36622 ; 0.60124 ; 0.90004 ; 1.2316 ; 1.5128 ; 1.7257 ; 1.9096 ; 2.0584 ; 2.1601 ; 2.2309 ; 2.2805 ; 2.2873 ; 2.3062 ; 2.3509 ; 2.4553 ; 2.51 ; 2.5343 ; 2.5695 ; 2.6179 ; 2.6386 ; 2.6693 ; 2.7172 ; 2.7838 ; 2.8679 ; 2.9323 ; 2.9421 ; 2.952 ; 2.9568 ; 2.9438 ; 2.8878 ; 2.7994 ; 2.6839 ; 2.6163]

Bolt 3 - Tensile Force (kips): [65 ; 64.833 ; 64.6684 ; 64.432 ; 64.0907 ; 63.5553 ; 62.8237 ; 61.7407 ; 60.4849 ; 59.5525 ; 59.1011 ; 59.5435 ; 60.7472 ; 61.1644 ; 61.9002 ; 63.0342 ; 64.8748 ; 65.6733 ; 65.9922 ; 66.2724 ; 66.564 ; 66.6939 ; 66.8318 ; 66.9774 ; 67.2356 ; 67.5921 ; 68.0776 ; 68.2372 ; 68.4697 ; 68.8355 ; 69.3468 ; 69.9675 ; 70.4206 ; 70.7389 ; 70.9241]

Bolt 3 - Shear Force (kips): [0.0805108 ; 0.0325726 ; 0.0649118 ; 0.134226 ; 0.239709 ; 0.354431 ; 0.460923 ; 0.570963 ; 0.788851 ; 1.12655 ; 1.59514 ; 1.95643 ; 2.17283 ; 2.24188 ; 2.34835 ; 2.45905 ; 3.53653 ; 4.86236 ; 4.73015 ; 3.72821 ; 3.08313 ; 3.00625 ; 3.04792 ; 3.10243 ; 3.91856 ; 5.43446 ; 7.1324 ; 7.8505 ; 8.70735 ; 9.86455 ; 11.6562 ; 13.8086 ; 15.7557 ; 17.2421 ; 18.2484]

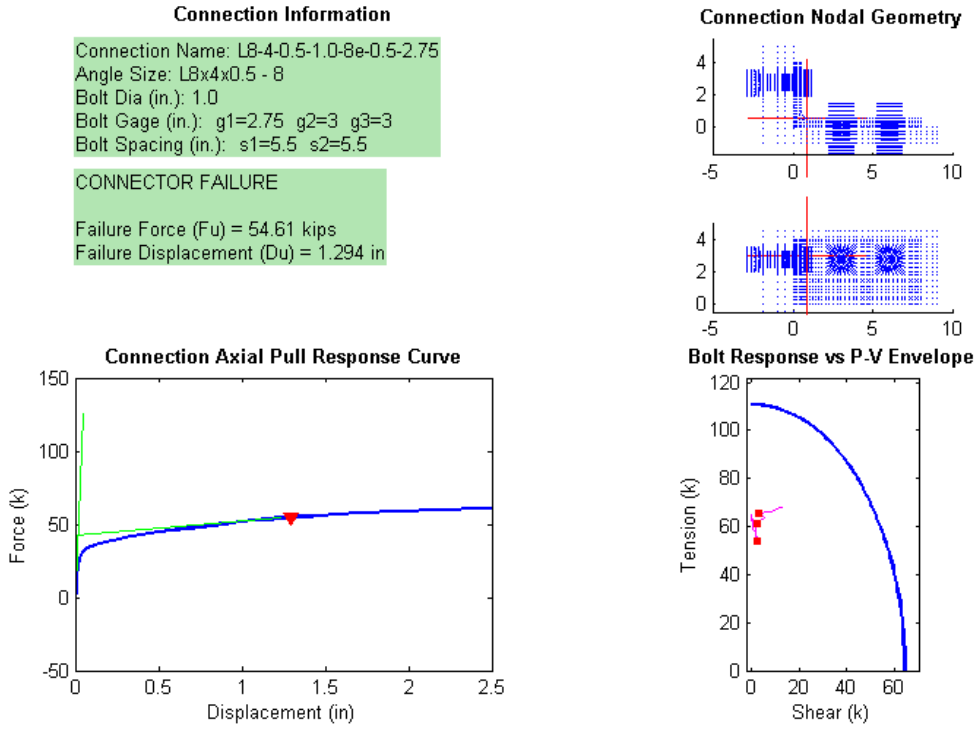


Figure B.180 Connection L8_4_0.5_1.0_8e_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.5_1.0_8e_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 2.4319e+003

Plastic Stiffness (k/in): 9.5449

Displacement (in): [1.1133e-035 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 0.81737 ; 0.91112 ; 0.94627 ; 0.99901 ; 1.0781 ; 1.1572 ; 1.2363 ; 1.355 ; 1.3995 ; 1.4662 ; 1.5663 ; 1.7165 ; 1.9417 ; 2.1917 ; 2.4417 ; 2.5]

Force (kips): [-2.07507 ; 0.890709 ; 2.67478 ; 4.89379 ; 7.64778 ; 10.7896 ; 13.5168 ; 15.2652 ; 16.3498 ; 17.3109 ; 18.3198 ; 19.4911 ; 20.8585 ; 22.4187 ; 24.2085 ; 24.6424 ; 25.2451 ; 25.4777 ; 25.805 ; 26.2507 ; 26.6811 ; 27.0586 ; 27.5654 ; 27.7434 ; 27.9946 ; 28.343 ; 28.8209 ; 29.4199 ; 29.9668 ; 30.4 ; 30.4888]

Bolt 1 - Tensile Force (kips): [63.4025 ; 63.2645 ; 63.178 ; 63.0651 ; 62.917 ; 62.7372 ; 62.57 ; 62.4553 ; 62.38 ; 62.3183 ; 62.2402 ; 62.1328 ; 62.0022 ; 61.8519 ; 61.6895 ; 61.6501 ; 61.5989 ; 61.579 ; 61.5521 ; 61.5146 ; 61.4789 ; 61.4479 ; 61.4058 ; 61.3899 ; 61.3662 ; 61.333 ; 61.2885 ; 61.2281 ; 61.1671 ; 61.1196 ; 61.1105]

Bolt 1 - Shear Force (kips): [0.11928 ; 0.12103 ; 0.21801 ; 0.35463 ; 0.53513 ; 0.75172 ; 0.95183 ; 1.0903 ; 1.1878 ; 1.2668 ; 1.3736 ; 1.5286 ; 1.7134 ; 1.9167 ; 2.1417 ; 2.1965 ; 2.2683 ; 2.2956 ; 2.3328 ; 2.3841 ; 2.4307 ; 2.4711 ; 2.5261 ; 2.5463 ; 2.5763 ; 2.6182 ; 2.6737 ; 2.7505 ; 2.8301 ; 2.9003 ; 2.9154]

Bolt 2 - Tensile Force (kips): [63.4089 ; 63.1849 ; 63.0395 ; 62.841 ; 62.5723 ; 62.226 ; 61.8385 ; 61.405 ; 60.835 ; 60.0804 ; 59.2111 ; 58.1177 ; 56.8324 ; 55.4806 ; 54.4601 ; 54.2202 ; 53.9943 ; 53.9172 ; 53.8367 ; 53.7618 ; 53.765 ; 53.813 ; 53.9293 ; 53.9816 ; 54.076 ; 54.2371 ; 54.5091 ; 54.9309 ; 55.383 ; 55.8297 ; 55.9289]

Bolt 2 - Shear Force (kips): [0.1602 ; 0.15911 ; 0.29549 ; 0.48513 ; 0.73312 ; 1.0289 ; 1.303 ; 1.5196 ; 1.6962 ; 1.8243 ; 1.9142 ; 1.976 ; 2.0148 ; 2.0623 ; 2.155 ; 2.1882 ; 2.2504 ; 2.2769 ; 2.3181 ; 2.3771 ; 2.4442 ; 2.4972 ; 2.5534 ; 2.563 ; 2.5616 ; 2.5531 ; 2.5244 ; 2.4642 ; 2.3852 ; 2.29 ; 2.2665]

Bolt 3 - Tensile Force (kips): [65 ; 64.8439 ; 64.6833 ; 64.4373 ; 64.057 ; 63.4719 ; 62.6882 ; 61.5901 ; 60.2193 ; 58.9367 ; 58.1557 ; 57.9195 ; 58.653 ; 60.1868 ; 62.2778 ; 62.9606 ; 63.8035 ; 64.0843 ; 64.3606 ; 64.7605 ; 65.0508 ; 65.2225 ; 65.4598 ; 65.552 ; 65.6774 ; 65.917 ; 66.3896 ; 66.9455 ; 67.4707 ; 67.8274 ; 67.8945]

Bolt 3 - Shear Force (kips): [0.0814136 ; 0.037396 ; 0.0510973 ; 0.100813 ; 0.177902 ; 0.270006 ; 0.349908 ; 0.429652 ; 0.588823 ; 0.873466 ; 1.28167 ; 1.77898 ; 2.01529 ; 2.06241 ; 3.26194 ; 5.1077 ; 5.59031 ; 5.27904 ; 4.23121 ; 3.22171 ; 2.1264 ; 2.51616 ; 3.84725 ; 4.37021 ; 5.27153 ; 6.43994 ; 8.14089 ; 9.86279 ; 11.2676 ; 12.5221 ; 12.8923]

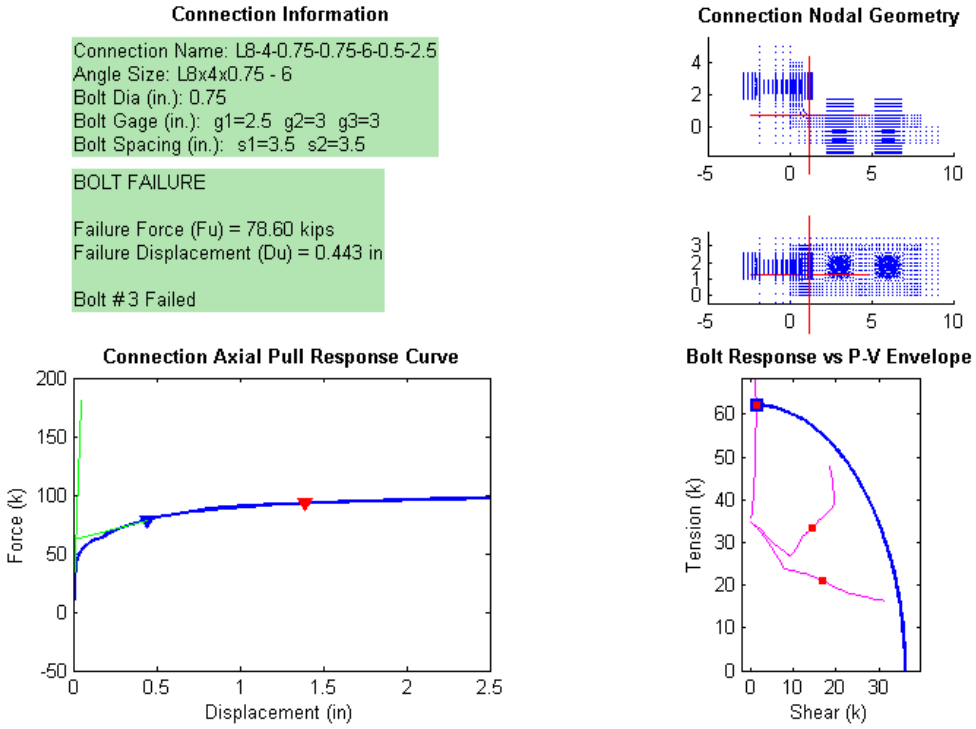


Figure B.181 Connection L8_4_0.75_0.75_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_0.75_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4.0969e+003

Plastic Stiffness (k/in): 37.0613

Displacement (in): [2.661e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.13464 ; 0.1386 ; 0.14454 ; 0.14677 ; 0.1476 ; 0.14885 ; 0.15073 ; 0.15355 ; 0.15778 ; 0.16412 ; 0.17364 ; 0.17602 ; 0.17839 ; 0.18196 ; 0.18731 ; 0.19534 ; 0.19835 ; 0.20286 ; 0.20964 ; 0.2198 ; 0.23504 ; 0.25789 ; 0.29218 ; 0.30504 ; 0.32433 ; 0.35326 ; 0.36411 ; 0.38038 ; 0.40479 ; 0.4414 ; 0.45514 ; 0.47573 ; 0.50662 ; 0.55297 ; 0.62248 ; 0.72674 ; 0.76584 ; 0.82449 ; 0.91247 ; 1.0444 ; 1.2424 ; 1.4924 ; 1.508 ; 1.5314 ; 1.5666 ; 1.6193 ; 1.6984 ; 1.8171 ; 1.9061 ; 2.0396 ; 2.2398 ; 2.4898 ; 2.5]

Force (kips): [-0.885741 ; 3.78645 ; 7.11604 ; 11.0917 ; 15.6267 ; 16.9186 ; 18.583 ; 20.6472 ; 22.7964 ; 24.4371 ; 25.87 ; 27.3277 ; 29.1243 ; 30.9678 ; 30.9721 ; 30.9661 ; 30.9632 ; 30.9622 ; 31.0313 ; 31.1245 ; 31.2603 ; 31.3624 ; 31.6274 ; 31.6361 ; 31.6899 ; 31.8183 ; 32.0092 ; 32.277 ; 32.6368 ; 32.7772 ; 32.9798 ; 33.2598 ; 33.6443 ; 34.2178 ; 34.9756 ; 36.02 ; 36.3776 ; 36.8607 ; 37.5152 ; 37.7553 ; 38.1038 ; 38.5949 ; 39.2734 ; 39.5182 ; 39.869 ; 40.3536 ; 41.0046 ; 41.8585 ; 42.9628 ; 43.3387 ; 43.8542 ; 44.5063 ; 45.1988 ; 45.9441 ; 46.6446 ; 46.6896 ; 46.761 ; 46.8621 ; 47.0099 ; 47.216 ; 47.4984 ; 47.7022 ; 47.9811 ; 48.3424 ; 48.7206 ; 48.7347]

Bolt 1 - Tensile Force (kips): [34.6521 ; 34.5276 ; 34.429 ; 34.2957 ; 34.1234 ; 34.0697 ; 33.9965 ; 33.8927 ; 33.6648 ; 32.7575 ; 31.0021 ; 28.923 ; 26.2393 ; 23.9915 ; 23.9845 ; 23.9774 ; 23.9751 ; 23.9744 ; 23.9379 ; 23.8617 ; 23.746 ; 23.7225 ; 23.7163 ; 23.7132 ; 23.7125 ; 23.7014 ; 23.6816 ; 23.6609 ; 23.644 ; 23.6225 ; 23.6005 ; 23.5849 ; 23.5585 ; 23.4219 ; 23.233 ; 22.917 ; 22.7593 ; 22.5944 ; 22.2788 ; 22.0895 ; 21.8329 ; 21.5039 ; 21.1368 ; 20.9946 ; 20.7638 ; 20.3731 ; 19.8301 ; 19.1792 ; 18.6423 ; 18.4386 ; 18.1629 ; 17.8661 ; 17.4999 ; 17.2376 ; 16.9563 ; 16.936 ; 16.9092 ; 16.8724 ; 16.8303 ; 16.7838 ; 16.7284 ; 16.6653 ; 16.5649 ; 16.4635 ; 16.4276 ; 16.4274]

Bolt 1 - Shear Force (kips): [0.0552692 ; 0.159808 ; 0.304539 ; 0.481962 ; 0.69318 ; 0.756122 ; 0.839392 ; 0.952627 ; 1.1909 ; 2.01158 ; 3.38427 ; 4.85554 ; 6.59678 ; 7.91621 ; 7.91466 ; 7.9125 ; 7.91177 ; 7.91153 ; 7.9701 ; 8.06012 ; 8.19151 ; 8.21596 ; 8.21496 ; 8.21382 ; 8.21313 ; 8.29713 ; 8.44233 ; 8.60183 ; 8.72401 ; 8.86731 ; 9.01917 ; 9.16343 ; 9.3462 ; 9.88207 ; 10.4476 ; 12.124 ; 12.7533 ; 13.3819 ; 14.2078 ; 14.6262 ; 15.1842 ; 15.8768 ; 16.6003 ; 16.8791 ; 17.3363 ; 18.0422 ; 19.0352 ; 20.404 ; 21.8263 ; 22.3404 ; 23.0515 ; 23.9852 ; 25.1205 ; 26.5539 ; 27.9413 ; 28.0199 ; 28.1297 ; 28.2856 ; 28.4971 ; 28.7864 ; 29.1817 ; 29.4882 ; 29.9475 ; 30.5363 ; 31.1519 ; 31.1756]

Bolt 2 - Tensile Force (kips): [34.6541 ; 34.4962 ; 34.3711 ; 34.2189 ; 34.0641 ; 34.0228 ; 33.9766 ; 33.9209 ; 33.7668 ; 32.9669 ; 31.4212 ; 29.9025 ; 28.5384 ; 26.6445 ; 26.6128 ; 26.598 ; 26.5941 ; 26.5929 ; 26.6392 ; 26.6959 ; 26.7789 ; 26.7781 ; 26.7884 ; 26.7838 ; 26.8215 ; 26.9186 ; 27.0704 ; 27.2899 ; 27.6202 ; 27.7485 ; 27.9223 ; 28.1756 ; 28.5541 ; 29.1537 ; 29.8591 ; 30.9001 ; 31.2367 ; 31.6239 ; 32.1386 ; 32.319 ; 32.5652 ; 32.9076 ; 33.38 ; 33.5435 ; 33.7689 ; 34.0983 ; 34.614 ; 35.2784 ; 35.9455 ; 36.2418 ; 36.6644 ; 37.2264 ; 37.9875 ; 39.076 ; 40.9443 ; 41.0611 ; 41.2413 ; 41.5068 ; 41.8993 ; 42.4624 ; 43.279 ; 43.9371 ; 44.8741 ; 46.2158 ; 47.7345 ; 47.7977]

Bolt 2 - Shear Force (kips): [0.0458496 ; 0.209922 ; 0.38539 ; 0.601829 ; 0.860265 ; 0.936887 ; 1.03823 ; 1.17598 ; 1.44342 ; 2.25259 ; 3.61146 ; 5.04763 ; 6.6666 ; 8.75504 ; 8.77394 ; 8.77625 ; 8.77564 ; 8.77539 ; 8.79068 ; 8.80937 ; 8.83675 ; 8.93271 ; 9.22278 ; 9.2363 ; 9.28395 ; 9.37849 ; 9.51635 ; 9.71265 ; 9.94242 ; 10.0009 ; 10.1328 ; 10.3247 ; 10.5416 ; 10.8501 ; 11.4006 ; 11.8923 ; 12.0927 ; 12.4905 ; 12.9576 ; 13.0808 ; 13.3172 ; 13.6675 ; 14.1908 ; 14.3957 ; 14.6568 ; 15.002 ; 15.4191 ; 15.8589 ; 16.908 ; 17.2238 ; 17.5962 ; 18.056 ; 18.774 ; 19.5849 ; 19.5106 ; 19.4961 ; 19.4687 ; 19.4292 ; 19.3704 ; 19.3053 ; 19.2365 ; 19.1405 ; 19.0151 ; 18.7751 ; 18.5056 ; 18.4909]

Bolt 3 - Tensile Force (kips): [36 ; 35.9597 ; 36.0521 ; 36.3731 ; 37.009 ; 37.3114 ; 37.7847 ; 38.4293 ; 39.2196 ; 40.1332 ; 41.4439 ; 43.8214 ; 47.2047 ; 50.562 ; 50.5706 ; 50.5637 ; 50.5601 ; 50.5589 ; 50.67 ; 50.8255 ; 51.0507 ; 51.2197 ; 51.6506 ; 51.6649 ; 51.7509 ; 51.9479 ; 52.2364 ; 52.6394 ; 53.18 ; 53.3813 ; 53.6687 ; 54.0638 ; 54.5996 ; 55.3691 ; 56.3793 ; 57.7414 ; 58.2094 ; 58.8551 ; 59.751 ; 60.0805 ; 60.564 ; 61.2662 ; 62.2626 ; 62.6193 ; 63.1255 ; 63.8142 ; 64.7372 ; 65.9862 ; 67.6623 ; 68.2739 ; 69.0489 ; 69.9541 ; 70.6551 ; 71.0247 ; 71.2721 ; 71.3021 ; 71.3053 ; 71.3034 ; 71.2711 ; 71.2718 ; 71.3512 ; 71.3373 ; 71.346 ; 71.4629 ; 71.6281 ; 71.6353]

Bolt 3 - Shear Force (kips): [0.017462 ; 0.036988 ; 0.087253 ; 0.16248 ; 0.25154 ; 0.27892 ; 0.31703 ; 0.36654 ; 0.43016 ; 0.49624 ; 0.57348 ; 0.69807 ; 0.86724 ; 0.96726 ; 0.96754 ; 0.96717 ; 0.96698 ; 0.96692 ; 0.97016 ; 0.97418 ; 0.97989 ; 0.98438 ; 0.99651 ; 0.99704 ; 0.99961 ; 1.0048 ; 1.0124 ; 1.0237 ; 1.042 ; 1.0486 ; 1.0586 ; 1.074 ; 1.0966 ; 1.1236 ; 1.1561 ; 1.1862 ; 1.1944 ; 1.2075 ; 1.2238 ; 1.2282 ; 1.2328 ; 1.2355 ; 1.2287 ; 1.2227 ; 1.211 ; 1.1892 ; 1.1489 ; 1.0611 ; 0.89006 ; 0.86225 ; 0.89737 ; 0.90892 ; 0.79582 ; 0.69183 ; 0.55616 ; 0.57793 ; 0.7695 ; 1.09 ; 1.6764 ; 2.3007 ; 2.7933 ; 3.3134 ; 3.9629 ; 4.5056 ; 4.9269 ; 4.9423]

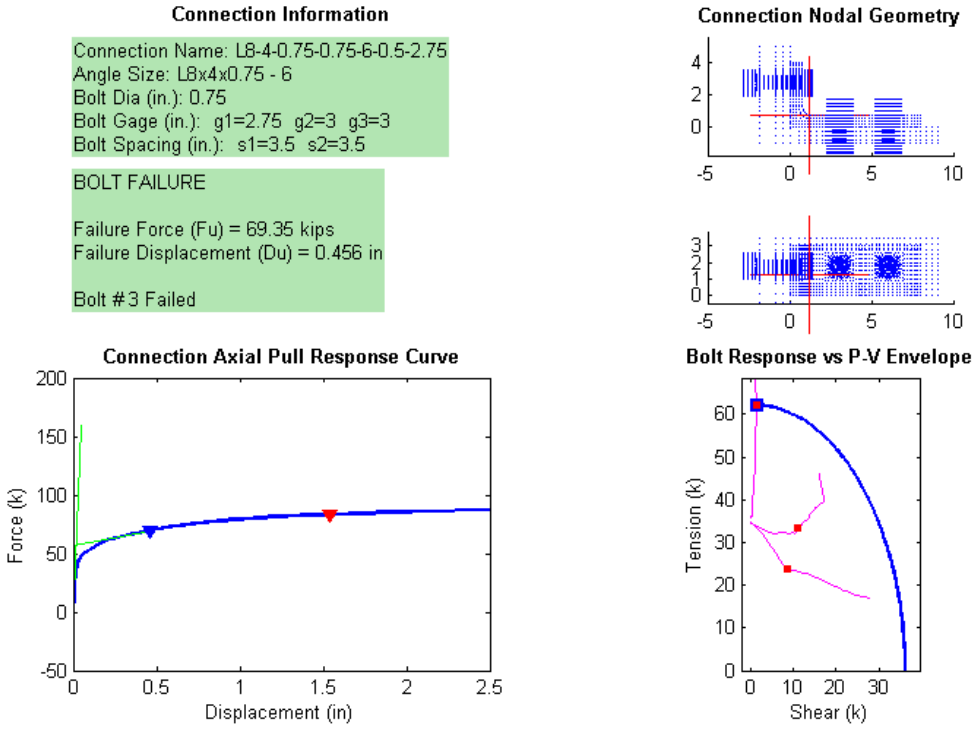


Figure B.182 Connection L8_4_0.75_0.75_6_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_0.75_6_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 3.4784e+003

Plastic Stiffness (k/in): 28.9545

Displacement (in): [3.512e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.13464 ; 0.19799 ; 0.22175 ; 0.23066 ; 0.24402 ; 0.26407 ; 0.29413 ; 0.33924 ; 0.35615 ; 0.38152 ; 0.39103 ; 0.4053 ; 0.42671 ; 0.45882 ; 0.50698 ; 0.52504 ; 0.53182 ; 0.54197 ; 0.55721 ; 0.58007 ; 0.61436 ; 0.66579 ; 0.68508 ; 0.71401 ; 0.7574 ; 0.77368 ; 0.79809 ; 0.8347 ; 0.88962 ; 0.97201 ; 1.0029 ; 1.0492 ; 1.1187 ; 1.223 ; 1.2621 ; 1.3208 ; 1.4087 ; 1.4967 ; 1.5847 ; 1.7167 ; 1.9146 ; 2.1646 ; 2.4146 ; 2.5]

Force (kips): [-0.877782 ; 3.07618 ; 5.91595 ; 9.35012 ; 13.4094 ; 14.6207 ; 16.1405 ; 18.0124 ; 20.1293 ; 22.0854 ; 23.4354 ; 24.6554 ; 26.2042 ; 28.174 ; 30.3531 ; 30.9708 ; 31.1651 ; 31.4382 ; 31.8102 ; 32.3111 ; 33.0429 ; 33.2776 ; 33.5931 ; 33.7198 ; 33.9371 ; 34.247 ; 34.714 ; 35.3848 ; 35.6101 ; 35.6978 ; 35.8262 ; 36.0075 ; 36.2594 ; 36.6423 ; 37.1717 ; 37.3553 ; 37.6111 ; 37.9635 ; 38.0928 ; 38.2891 ; 38.5701 ; 38.9573 ; 39.4788 ; 39.661 ; 39.9197 ; 40.247 ; 40.6461 ; 40.7931 ; 40.997 ; 41.2796 ; 41.5345 ; 41.7653 ; 42.0839 ; 42.5419 ; 43.0341 ; 43.4539 ; 43.5843]

Bolt 1 - Tensile Force (kips): [34.6515 ; 34.5471 ; 34.4655 ; 34.3543 ; 34.2055 ; 34.1571 ; 34.0931 ; 34.0081 ; 33.8944 ; 33.6312 ; 33.0177 ; 31.9537 ; 30.1652 ; 27.6819 ; 24.7088 ; 24.0067 ; 23.9966 ; 23.9841 ; 23.9685 ; 23.9472 ; 23.7602 ; 23.7355 ; 23.7249 ; 23.7233 ; 23.7246 ; 23.7273 ; 23.6853 ; 23.6201 ; 23.5867 ; 23.5488 ; 23.484 ; 23.4142 ; 23.3314 ; 23.1612 ; 22.9406 ; 22.827 ; 22.6768 ; 22.5041 ; 22.4027 ; 22.1747 ; 21.8378 ; 21.4004 ; 20.775 ; 20.4668 ; 20.0605 ; 19.5447 ; 18.9118 ; 18.755 ; 18.5423 ; 18.2362 ; 17.9878 ; 17.8069 ; 17.5561 ; 17.3672 ; 17.274 ; 17.1391 ; 17.0897]

Bolt 1 - Shear Force (kips): [0.0545644 ; 0.130397 ; 0.253664 ; 0.407317 ; 0.596714 ; 0.655521 ; 0.73183 ; 0.829679 ; 0.954707 ; 1.2307 ; 1.798 ; 2.6661 ; 3.99857 ; 5.68684 ; 7.5161 ; 7.91521 ; 7.91586 ; 7.91376 ; 7.90937 ; 7.90252 ; 8.15502 ; 8.18051 ; 8.17448 ; 8.17233 ; 8.1703 ; 8.1675 ; 8.52641 ; 9.15619 ; 9.34266 ; 9.51924 ; 9.77526 ; 10.0095 ; 10.2262 ; 11.0297 ; 12.1745 ; 12.6194 ; 13.1634 ; 13.7649 ; 14.0155 ; 14.5341 ; 15.2793 ; 16.1906 ; 17.4364 ; 17.9911 ; 18.7074 ; 19.7524 ; 21.1216 ; 21.5255 ; 22.0936 ; 22.8839 ; 23.6004 ; 24.2219 ; 24.9241 ; 25.7004 ; 26.5582 ; 27.4614 ; 27.7376]

Bolt 2 - Tensile Force (kips): [34.651 ; 34.519 ; 34.4151 ; 34.2876 ; 34.1556 ; 34.1226 ; 34.0836 ; 34.0503 ; 34.0213 ; 33.8945 ; 33.5371 ; 32.9865 ; 32.3709 ; 31.9755 ; 32.2804 ; 32.4414 ; 32.3623 ; 32.2615 ; 32.1704 ; 32.0871 ; 32.4816 ; 32.4379 ; 32.2101 ; 32.223 ; 32.4529 ; 32.8083 ; 33.2989 ; 33.7997 ; 33.9829 ; 34.0524 ; 34.1527 ; 34.288 ; 34.5061 ; 34.8046 ; 35.1172 ; 35.2244 ; 35.4043 ; 35.6903 ; 35.7999 ; 35.9329 ; 36.1282 ; 36.4294 ; 36.866 ; 37.0094 ; 37.1959 ; 37.5465 ; 38.0914 ; 38.2745 ; 38.5415 ; 38.8899 ; 39.275 ; 39.7382 ; 40.6807 ; 42.1078 ; 43.8484 ; 45.5358 ; 46.0951]

Bolt 2 - Shear Force (kips): [0.0449406 ; 0.17537 ; 0.326571 ; 0.515292 ; 0.749079 ; 0.821607 ; 0.915625 ; 1.03588 ; 1.18984 ; 1.49649 ; 2.05974 ; 2.90755 ; 4.15312 ; 5.6332 ; 7.06921 ; 7.51209 ; 7.74998 ; 8.08368 ; 8.52356 ; 9.10452 ; 9.56495 ; 9.81314 ; 10.2369 ; 10.371 ; 10.5708 ; 10.762 ; 10.9275 ; 11.5076 ; 11.7156 ; 11.76 ; 11.8256 ; 11.9898 ; 12.2395 ; 12.4808 ; 12.9168 ; 13.0402 ; 13.1971 ; 13.4172 ; 13.4881 ; 13.5615 ; 13.6633 ; 13.8213 ; 14.0272 ; 14.1099 ; 14.413 ; 14.767 ; 15.1929 ; 15.4091 ; 15.7109 ; 16.2037 ; 16.6571 ; 17.0047 ; 17.0007 ; 16.834 ; 16.5922 ; 16.1192 ; 15.9407]

Bolt 3 - Tensile Force (kips): [36 ; 35.9437 ; 35.9995 ; 36.2572 ; 36.7756 ; 37.0174 ; 37.4428 ; 38.0921 ; 38.9366 ; 40.1187 ; 41.8563 ; 44.2826 ; 47.512 ; 51.4822 ; 55.2909 ; 56.2699 ; 56.5794 ; 57.016 ; 57.6162 ; 58.4287 ; 59.6067 ; 59.9912 ; 60.5134 ; 60.7196 ; 61.0634 ; 61.5578 ; 62.2826 ; 63.2823 ; 63.6095 ; 63.7308 ; 63.9076 ; 64.1621 ; 64.5275 ; 65.0681 ; 65.8248 ; 66.0901 ; 66.4693 ; 67.0067 ; 67.1956 ; 67.4716 ; 67.8786 ; 68.4366 ; 69.1713 ; 69.4175 ; 69.7389 ; 70.0632 ; 70.331 ; 70.3555 ; 70.4028 ; 70.4588 ; 70.5109 ; 70.5882 ; 70.726 ; 70.9022 ; 71.0526 ; 71.1281 ; 71.1427]

Bolt 3 - Shear Force (kips): [0.021298 ; 0.030744 ; 0.074419 ; 0.14384 ; 0.22735 ; 0.25387 ; 0.28841 ; 0.33459 ; 0.39306 ; 0.46718 ; 0.57116 ; 0.73872 ; 0.91806 ; 1.0218 ; 1.1135 ; 1.1409 ; 1.1488 ; 1.1602 ; 1.1767 ; 1.1997 ; 1.2302 ; 1.2396 ; 1.2519 ; 1.2559 ; 1.2616 ; 1.2689 ; 1.271 ; 1.258 ; 1.2516 ; 1.2484 ; 1.2434 ; 1.2355 ; 1.2213 ; 1.1918 ; 1.1384 ; 1.1163 ; 1.0815 ; 1.0265 ; 1.033 ; 1.0742 ; 1.0968 ; 1.107 ; 1.1038 ; 1.0951 ; 1.0822 ; 1.0238 ; 0.92749 ; 1.0435 ; 1.1843 ; 1.4505 ; 1.7351 ; 2.1929 ; 2.6993 ; 3.304 ; 4.0384 ; 4.7821 ; 5.0413]

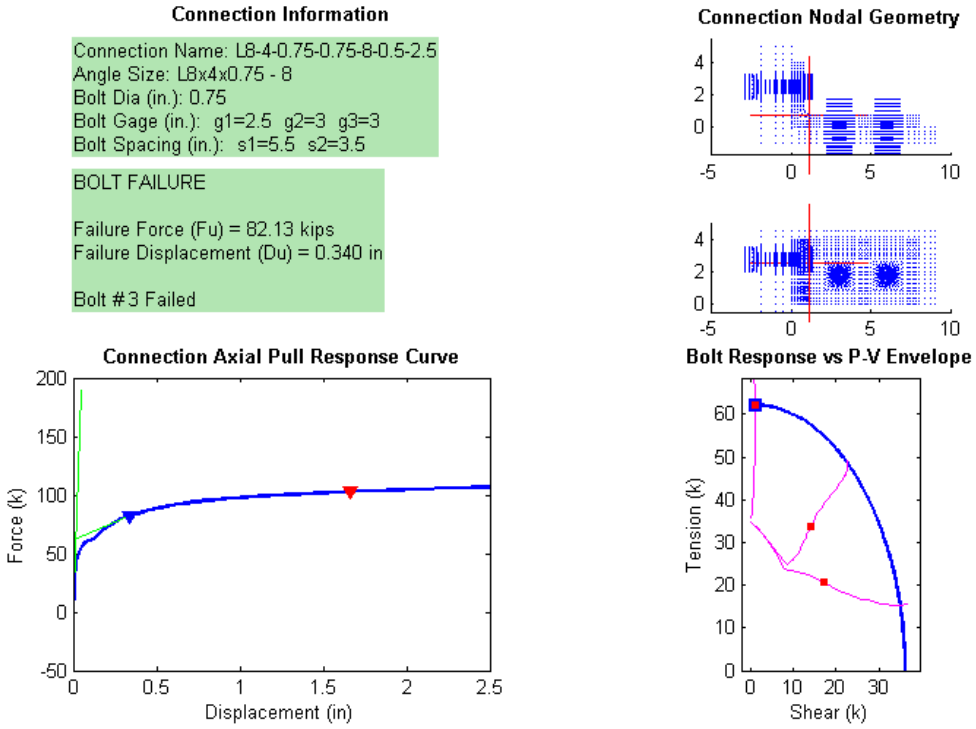


Figure B.183 Connection L8_4_0.75_0.75_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_0.75_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4.1031e+003

Plastic Stiffness (k/in): 60.3851

Displacement (in): [2.3262e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.10296 ; 0.10395 ; 0.10544 ; 0.10767 ; 0.1085 ; 0.10975 ; 0.11163 ; 0.11445 ; 0.11868 ; 0.12502 ; 0.1274 ; 0.13097 ; 0.13632 ; 0.14435 ; 0.15639 ; 0.1609 ; 0.16768 ; 0.17783 ; 0.19307 ; 0.21593 ; 0.22451 ; 0.23736 ; 0.25665 ; 0.26388 ; 0.27473 ; 0.291 ; 0.31541 ; 0.35203 ; 0.36576 ; 0.38636 ; 0.41725 ; 0.46359 ; 0.5331 ; 0.63737 ; 0.67647 ; 0.73512 ; 0.82309 ; 0.95505 ; 1.153 ; 1.2155 ; 1.3093 ; 1.3444 ; 1.3971 ; 1.4762 ; 1.5949 ; 1.7729 ; 1.8354 ; 1.9291 ; 2.0698 ; 2.2807 ; 2.5]

Force (kips): [-0.77424 ; 3.84888 ; 7.23967 ; 11.3418 ; 16.0702 ; 17.438 ; 19.216 ; 21.4573 ; 23.678 ; 25.2874 ; 27.0653 ; 28.9901 ; 30.4624 ; 30.449 ; 30.4475 ; 30.4937 ; 30.6517 ; 30.7068 ; 30.7879 ; 30.9083 ; 30.9608 ; 30.9587 ; 30.9519 ; 31.0838 ; 31.3953 ; 31.8254 ; 32.4228 ; 33.2708 ; 33.5568 ; 34.0126 ; 34.6341 ; 35.4904 ; 36.6964 ; 37.1196 ; 37.6983 ; 38.4564 ; 38.7315 ; 39.1351 ; 39.6915 ; 40.4285 ; 41.3689 ; 41.691 ; 42.1331 ; 42.7459 ; 43.5611 ; 44.6321 ; 45.9666 ; 46.4035 ; 46.9946 ; 47.7544 ; 48.5562 ; 49.4776 ; 49.7384 ; 50.1034 ; 50.2441 ; 50.4408 ; 50.7457 ; 51.1525 ; 51.6895 ; 51.8677 ; 52.1202 ; 52.4671 ; 52.9246 ; 53.3578]

Bolt 1 - Tensile Force (kips): [34.6503 ; 34.5189 ; 34.4094 ; 34.258 ; 34.0578 ; 33.9938 ; 33.9047 ; 33.7781 ; 33.3711 ; 31.9101 ; 29.5851 ; 26.4672 ; 23.9766 ; 23.9595 ; 23.9583 ; 23.926 ; 23.7616 ; 23.7103 ; 23.7026 ; 23.6986 ; 23.6934 ; 23.6892 ; 23.6863 ; 23.6729 ; 23.6507 ; 23.6277 ; 23.5878 ; 23.5423 ; 23.5078 ; 23.4031 ; 23.2968 ; 23.1374 ; 22.8615 ; 22.7169 ; 22.5323 ; 22.303 ; 22.1699 ; 21.9064 ; 21.5192 ; 21.0699 ; 20.3971 ; 20.0885 ; 19.6509 ; 19.0992 ; 18.4949 ; 17.8915 ; 17.2165 ; 16.983 ; 16.7888 ; 16.5842 ; 16.1493 ; 15.7089 ; 15.5988 ; 15.5374 ; 15.5314 ; 15.5198 ; 15.4263 ; 15.3602 ; 15.3452 ; 15.3339 ; 15.3398 ; 15.3792 ; 15.4307 ; 15.4625]

Bolt 1 - Shear Force (kips): [0.0499416 ; 0.179088 ; 0.339686 ; 0.538496 ; 0.777171 ; 0.84909 ; 0.944935 ; 1.07367 ; 1.473 ; 2.6863 ; 4.39077 ; 6.44383 ; 7.91124 ; 7.90657 ; 7.90619 ; 7.95764 ; 8.14872 ; 8.20702 ; 8.21303 ; 8.21533 ; 8.21722 ; 8.21684 ; 8.21513 ; 8.31523 ; 8.4764 ; 8.64632 ; 8.92966 ; 9.27645 ; 9.41586 ; 9.81982 ; 10.1244 ; 10.6385 ; 11.9626 ; 12.4982 ; 13.1233 ; 13.8053 ; 14.0943 ; 14.6605 ; 15.4619 ; 16.3318 ; 17.594 ; 18.1188 ; 18.8813 ; 19.9789 ; 21.2326 ; 22.5974 ; 24.3797 ; 24.9829 ; 25.7703 ; 26.9827 ; 28.5983 ; 30.3377 ; 30.819 ; 31.4397 ; 31.6566 ; 31.9772 ; 32.522 ; 33.2191 ; 34.1616 ; 34.4659 ; 34.9077 ; 35.4624 ; 36.0814 ; 36.6432]

Bolt 2 - Tensile Force (kips): [34.6512 ; 34.5 ; 34.371 ; 34.2053 ; 34.0215 ; 33.9729 ; 33.9098 ; 33.8334 ; 33.499 ; 32.123 ; 29.9944 ; 27.3576 ; 25.0723 ; 25.0416 ; 25.0396 ; 25.0574 ; 25.1161 ; 25.1247 ; 25.072 ; 24.9938 ; 24.9576 ; 24.9478 ; 24.9396 ; 25.0106 ; 25.1161 ; 25.3176 ; 25.6198 ; 26.0122 ; 26.1639 ; 26.4381 ; 26.8165 ; 27.4261 ; 28.4729 ; 28.9025 ; 29.541 ; 30.4209 ; 30.7495 ; 31.2355 ; 31.9148 ; 32.8347 ; 34.0599 ; 34.4763 ; 35.0705 ; 35.8193 ; 36.7295 ; 37.8184 ; 39.2154 ; 39.6474 ; 40.1917 ; 40.8471 ; 41.6907 ; 42.7985 ; 43.1177 ; 43.5769 ; 43.7538 ; 44.015 ; 44.3713 ; 44.8889 ; 45.6535 ; 45.937 ; 46.3808 ; 47.0504 ; 48.0688 ; 49.118]

Bolt 2 - Shear Force (kips): [0.0403205 ; 0.214188 ; 0.395934 ; 0.621606 ; 0.892604 ; 0.97378 ; 1.0819 ; 1.22717 ; 1.63077 ; 2.82861 ; 4.5114 ; 6.51373 ; 8.25867 ; 8.26286 ; 8.26255 ; 8.26863 ; 8.28796 ; 8.30582 ; 8.41166 ; 8.57212 ; 8.64363 ; 8.64619 ; 8.64371 ; 8.67244 ; 8.86508 ; 9.10395 ; 9.38786 ; 9.88531 ; 10.0329 ; 10.158 ; 10.5028 ; 11.0162 ; 11.5547 ; 11.7676 ; 12.0873 ; 12.4558 ; 12.6334 ; 12.8423 ; 13.1222 ; 13.6699 ; 14.2154 ; 14.3825 ; 14.5604 ; 14.9435 ; 15.4941 ; 16.2908 ; 17.1654 ; 17.5141 ; 17.9849 ; 18.5236 ; 19.2026 ; 20.029 ; 20.2659 ; 20.6227 ; 20.7481 ; 20.9271 ; 21.1905 ; 21.5801 ; 22.0181 ; 22.151 ; 22.3079 ; 22.4321 ; 22.4954 ; 22.4896]

Bolt 3 - Tensile Force (kips): [36 ; 35.9601 ; 36.0541 ; 36.3787 ; 37.0414 ; 37.3708 ; 37.8741 ; 38.5518 ; 39.3318 ; 40.1089 ; 41.38 ; 43.5874 ; 46.0605 ; 46.0465 ; 46.0448 ; 46.1183 ; 46.3986 ; 46.4977 ; 46.6457 ; 46.8675 ; 46.9651 ; 46.9632 ; 46.9549 ; 47.1897 ; 47.7601 ; 48.568 ; 49.6938 ; 51.2668 ; 51.7851 ; 52.5822 ; 53.6352 ; 54.9647 ; 56.6763 ; 57.2534 ; 58.0384 ; 59.0599 ; 59.4158 ; 59.9236 ; 60.6129 ; 61.5225 ; 62.6897 ; 63.0823 ; 63.6146 ; 64.3274 ; 65.2927 ; 66.575 ; 68.1727 ; 68.6776 ; 69.3423 ; 70.1086 ; 70.5942 ; 70.9313 ; 71.0075 ; 71.1096 ; 71.1669 ; 71.2242 ; 71.1675 ; 71.1491 ; 71.2128 ; 71.1858 ; 71.1795 ; 71.2459 ; 71.3727 ; 71.3883]

Bolt 3 - Shear Force (kips): [0.020629 ; 0.034237 ; 0.08346 ; 0.15812 ; 0.24616 ; 0.27251 ; 0.30942 ; 0.35803 ; 0.41587 ; 0.46254 ; 0.52427 ; 0.62573 ; 0.75236 ; 0.75154 ; 0.75145 ; 0.75511 ; 0.76707 ; 0.77112 ; 0.77702 ; 0.78539 ; 0.78897 ; 0.78894 ; 0.78855 ; 0.79675 ; 0.81318 ; 0.83248 ; 0.85133 ; 0.86606 ; 0.86872 ; 0.87079 ; 0.87345 ; 0.88657 ; 0.90383 ; 0.90573 ; 0.90688 ; 0.90882 ; 0.90874 ; 0.9086 ; 0.90982 ; 0.91467 ; 0.91893 ; 0.91997 ; 0.92408 ; 0.92917 ; 0.92263 ; 0.87393 ; 0.74678 ; 0.69499 ; 0.6476 ; 0.71149 ; 0.61703 ; 0.50073 ; 0.48 ; 0.4695 ; 0.51558 ; 0.5678 ; 0.82966 ; 1.2863 ; 1.9953 ; 2.3682 ; 2.7826 ; 3.1574 ; 3.5564 ; 4.1568]

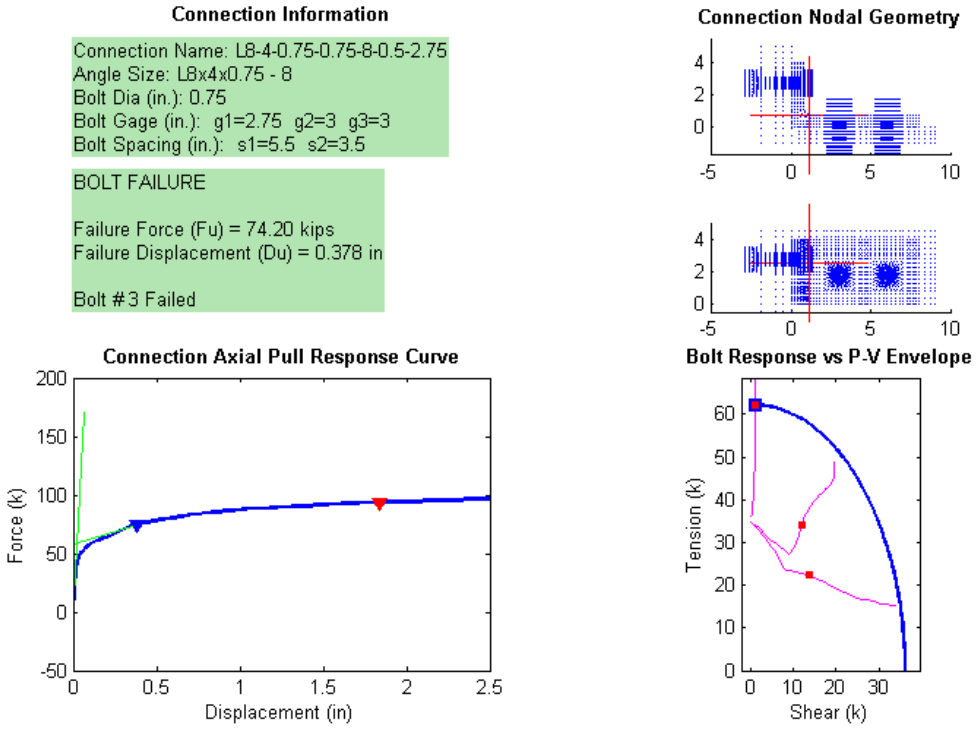


Figure B.184 Connection L8_4_0.75_0.75_8_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_0.75_8_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 2.7337e+003

Plastic Stiffness (k/in): 42.9501

Displacement (in): [2.3501e-036 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.072601 ; 0.080944 ; 0.093458 ; 0.11223 ; 0.14039 ; 0.15095 ; 0.16678 ; 0.16827 ; 0.1705 ; 0.17384 ; 0.17885 ; 0.18073 ; 0.18143 ; 0.18249 ; 0.18407 ; 0.18645 ; 0.19002 ; 0.19537 ; 0.19738 ; 0.20039 ; 0.20152 ; 0.20321 ; 0.20575 ; 0.20956 ; 0.21527 ; 0.22385 ; 0.2367 ; 0.25599 ; 0.26322 ; 0.27407 ; 0.29035 ; 0.31476 ; 0.32391 ; 0.33764 ; 0.35824 ; 0.38913 ; 0.40071 ; 0.41809 ; 0.44416 ; 0.48326 ; 0.54191 ; 0.5639 ; 0.59689 ; 0.64638 ; 0.72061 ; 0.74845 ; 0.7902 ; 0.85283 ; 0.94678 ; 1.0877 ; 1.1009 ; 1.1207 ; 1.1505 ; 1.195 ; 1.2619 ; 1.3622 ; 1.5127 ; 1.5692 ; 1.6538 ; 1.7808 ; 1.9712 ; 2.2212 ; 2.4712 ; 2.5]

Force (kips): [-0.782228 ; 10.6818 ; 12.566 ; 14.2596 ; 16.321 ; 18.7656 ; 21.5334 ; 23.7846 ; 25.4597 ; 27.1279 ; 27.6354 ; 28.3338 ; 29.2843 ; 30.5108 ; 30.844 ; 31.0347 ; 31.0337 ; 31.1033 ; 31.2542 ; 31.4143 ; 31.4126 ; 31.4168 ; 31.4587 ; 31.5189 ; 31.6093 ; 31.7425 ; 31.8376 ; 31.8375 ; 31.8342 ; 31.8403 ; 31.9168 ; 32.0286 ; 32.1898 ; 32.4264 ; 32.7698 ; 33.2671 ; 33.9323 ; 34.1827 ; 34.5272 ; 35.0094 ; 35.7118 ; 35.9559 ; 36.2972 ; 36.7395 ; 37.3173 ; 37.5277 ; 37.8283 ; 38.25 ; 38.8223 ; 39.6184 ; 39.8967 ; 40.2912 ; 40.8441 ; 41.5793 ; 41.8392 ; 42.2044 ; 42.7021 ; 43.3453 ; 44.0681 ; 44.1345 ; 44.2292 ; 44.3665 ; 44.5701 ; 44.8553 ; 45.2472 ; 45.7713 ; 45.9811 ; 46.2606 ; 46.6419 ; 47.1426 ; 47.7252 ; 48.2209 ; 48.2754]

Bolt 1 - Tensile Force (kips): [34.6494 ; 34.2792 ; 34.2025 ; 34.1294 ; 34.0339 ; 33.9081 ; 33.7265 ; 33.0483 ; 31.1352 ; 28.9341 ; 28.2131 ; 27.1904 ; 25.7231 ; 23.9781 ; 23.9565 ; 23.9303 ; 23.9279 ; 23.9017 ; 23.808 ; 23.6923 ; 23.6881 ; 23.687 ; 23.6852 ; 23.6826 ; 23.6785 ; 23.6721 ; 23.6668 ; 23.6665 ; 23.6662 ; 23.6656 ; 23.6544 ; 23.6365 ; 23.6146 ; 23.5922 ; 23.563 ; 23.5027 ; 23.4162 ; 23.3237 ; 23.225 ; 23.097 ; 22.8655 ; 22.778 ; 22.6199 ; 22.4439 ; 22.2451 ; 22.0886 ; 21.8382 ; 21.4775 ; 21.0696 ; 20.3577 ; 20.0789 ; 19.6755 ; 19.0592 ; 18.3999 ; 18.2247 ; 17.9547 ; 17.6448 ; 17.1333 ; 16.7835 ; 16.7686 ; 16.7394 ; 16.6456 ; 16.5276 ; 16.3545 ; 16.1187 ; 15.8595 ; 15.7512 ; 15.6191 ; 15.5267 ; 15.5018 ; 15.3365 ; 15.2613 ; 15.2507]

Bolt 1 - Shear Force (kips): [0.0498963 ; 0.511036 ; 0.606268 ; 0.69388 ; 0.804362 ; 0.941854 ; 1.12646 ; 1.76124 ; 3.27892 ; 4.83956 ; 5.32119 ; 5.98567 ; 6.89486 ; 7.90736 ; 7.90457 ; 7.89692 ; 7.89617 ; 7.94785 ; 8.07149 ; 8.2036 ; 8.20502 ; 8.20516 ; 8.20459 ; 8.20369 ; 8.2022 ; 8.19976 ; 8.19746 ; 8.19708 ; 8.19646 ; 8.19855 ; 8.27279 ; 8.38209 ; 8.51354 ; 8.63338 ; 8.77294 ; 9.10865 ; 9.46918 ; 9.79579 ; 10.0658 ; 10.3984 ; 11.5392 ; 11.9507 ; 12.5801 ; 13.2203 ; 13.8613 ; 14.2315 ; 14.7858 ; 15.5634 ; 16.4068 ; 17.7595 ; 18.2412 ; 18.9985 ; 20.2153 ; 21.6297 ; 22.0197 ; 22.6348 ; 23.4951 ; 24.6908 ; 26.1307 ; 26.2699 ; 26.4824 ; 26.8409 ; 27.3201 ; 27.9824 ; 28.8198 ; 29.8135 ; 30.1889 ; 30.6867 ; 31.2862 ; 32.0217 ; 32.9876 ; 33.8046 ; 33.8988]

Bolt 2 - Tensile Force (kips): [34.6482 ; 34.2309 ; 34.1608 ; 34.1004 ; 34.0356 ; 33.9651 ; 33.8902 ; 33.3853 ; 31.7432 ; 30.2724 ; 29.9252 ; 29.512 ; 29.0266 ; 28.1626 ; 27.5325 ; 27.1605 ; 27.1508 ; 27.1998 ; 27.3082 ; 27.4265 ; 27.4206 ; 27.4218 ; 27.4356 ; 27.4472 ; 27.4771 ; 27.5406 ; 27.5753 ; 27.5671 ; 27.5587 ; 27.5652 ; 27.6559 ; 27.7855 ; 27.9732 ; 28.2495 ; 28.6657 ; 29.2802 ; 30.1278 ; 30.4587 ; 30.9175 ; 31.5252 ; 32.4077 ; 32.7187 ; 33.1534 ; 33.7188 ; 34.4761 ; 34.7536 ; 35.1382 ; 35.6645 ; 36.396 ; 37.3258 ; 37.6302 ; 38.0959 ; 38.7106 ; 39.5291 ; 39.8166 ; 40.2459 ; 40.8199 ; 41.3812 ; 42.2191 ; 42.3036 ; 42.4281 ; 42.5747 ; 42.7927 ; 43.0812 ; 43.4828 ; 44.0618 ; 44.2919 ; 44.6553 ; 45.2701 ; 46.2677 ; 47.577 ; 48.7225 ; 48.872]

Bolt 2 - Shear Force (kips): [0.0399393 ; 0.59433 ; 0.703566 ; 0.803772 ; 0.929905 ; 1.08632 ; 1.29553 ; 1.91966 ; 3.41124 ; 4.91576 ; 5.36781 ; 5.97538 ; 6.78541 ; 8.01183 ; 8.60061 ; 8.95013 ; 8.95354 ; 8.9715 ; 9.00683 ; 9.04793 ; 9.04762 ; 9.05223 ; 9.09511 ; 9.16019 ; 9.2519 ; 9.3829 ; 9.48252 ; 9.48574 ; 9.48534 ; 9.48761 ; 9.50637 ; 9.52885 ; 9.56351 ; 9.70247 ; 9.95568 ; 10.254 ; 10.5885 ; 10.6502 ; 10.8272 ; 11.1466 ; 11.3773 ; 11.4758 ; 11.5994 ; 11.8032 ; 12.0833 ; 12.1434 ; 12.2411 ; 12.4086 ; 12.7002 ; 13.2466 ; 13.5042 ; 13.7846 ; 14.1813 ; 14.7888 ; 15.0718 ; 15.3861 ; 15.8208 ; 16.5394 ; 17.3495 ; 17.4098 ; 17.4917 ; 17.6243 ; 17.8145 ; 18.0596 ; 18.4168 ; 18.8711 ; 19.0125 ; 19.2389 ; 19.4702 ; 19.6145 ; 19.5723 ; 19.4925 ; 19.4783]

Bolt 3 - Tensile Force (kips): [36 ; 36.3834 ; 36.6297 ; 36.895 ; 37.4248 ; 38.2265 ; 39.2723 ; 40.6733 ; 42.4142 ; 45.1542 ; 46.1526 ; 47.5821 ; 49.5599 ; 52.0252 ; 52.6879 ; 53.0672 ; 53.0669 ; 53.1921 ; 53.4636 ; 53.7474 ; 53.7457 ; 53.7522 ; 53.8256 ; 53.9312 ; 54.088 ; 54.3157 ; 54.4773 ; 54.478 ; 54.4742 ; 54.4824 ; 54.6023 ; 54.7784 ; 55.0348 ; 55.4085 ; 55.9434 ; 56.7 ; 57.7201 ; 58.0832 ; 58.593 ; 59.2998 ; 60.2812 ; 60.6226 ; 61.1061 ; 61.7633 ; 62.6334 ; 62.9354 ; 63.3539 ; 63.9101 ; 64.6443 ; 65.6384 ; 65.9804 ; 66.4678 ; 67.1474 ; 68.0426 ; 68.3325 ; 68.7506 ; 69.31 ; 69.9425 ; 70.3638 ; 70.3668 ; 70.37 ; 70.4012 ; 70.4337 ; 70.4709 ; 70.5224 ; 70.6779 ; 70.7047 ; 70.7913 ; 70.9267 ; 71.1091 ; 71.0965 ; 71.2091 ; 71.2264]

Bolt 3 - Shear Force (kips): [0.023486 ; 0.16018 ; 0.19722 ; 0.23097 ; 0.27312 ; 0.32845 ; 0.40056 ; 0.48684 ; 0.58429 ; 0.76584 ; 0.82476 ; 0.88785 ; 0.94361 ; 0.98105 ; 0.98746 ; 0.99082 ; 0.99087 ; 0.99207 ; 0.99523 ; 0.99921 ; 0.99912 ; 0.9993 ; 1.0005 ; 1.0022 ; 1.0048 ; 1.0088 ; 1.012 ; 1.0121 ; 1.0119 ; 1.0122 ; 1.0143 ; 1.0173 ; 1.0215 ; 1.0272 ; 1.0344 ; 1.0402 ; 1.0432 ; 1.0428 ; 1.0424 ; 1.0419 ; 1.0388 ; 1.0381 ; 1.0378 ; 1.0397 ; 1.0418 ; 1.0429 ; 1.0454 ; 1.0482 ; 1.0469 ; 1.0222 ; 1.0059 ; 0.97625 ; 0.92279 ; 0.83637 ; 0.88614 ; 0.92571 ; 0.9511 ; 0.96751 ; 0.87278 ; 0.92531 ; 0.99685 ; 1.0547 ; 1.1641 ; 1.372 ; 1.7539 ; 2.3763 ; 2.6569 ; 2.9371 ; 3.2647 ; 3.6627 ; 4.583 ; 5.0986 ; 5.147]

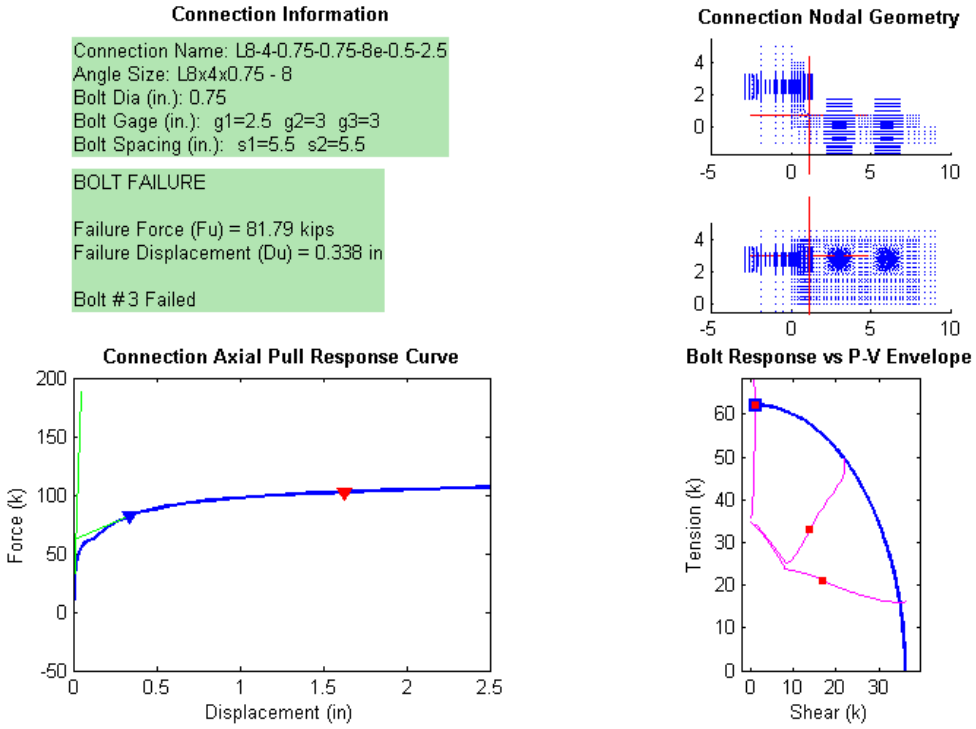


Figure B.185 Connection L8_4_0.75_0.75_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_0.75_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4.0812e+003

Plastic Stiffness (k/in): 60.4863

Displacement (in): [2.6131e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.10296 ; 0.10692 ; 0.11286 ; 0.12177 ; 0.12511 ; 0.12637 ; 0.12824 ; 0.13106 ; 0.13529 ; 0.14163 ; 0.15115 ; 0.16542 ; 0.18682 ; 0.19485 ; 0.20689 ; 0.22495 ; 0.25204 ; 0.2622 ; 0.26601 ; 0.27173 ; 0.2803 ; 0.29316 ; 0.31244 ; 0.34137 ; 0.35222 ; 0.3685 ; 0.39291 ; 0.42952 ; 0.48444 ; 0.56683 ; 0.59772 ; 0.64406 ; 0.71357 ; 0.81784 ; 0.97424 ; 1.2088 ; 1.4588 ; 1.5213 ; 1.6151 ; 1.6503 ; 1.703 ; 1.7821 ; 1.9007 ; 2.0787 ; 2.3287 ; 2.5]

Force (kips): [-0.948929 ; 3.64057 ; 7.0221 ; 11.1148 ; 15.8409 ; 17.2074 ; 18.9802 ; 21.236 ; 23.5012 ; 25.2019 ; 26.9885 ; 28.9654 ; 30.543 ; 30.5323 ; 30.6115 ; 30.9382 ; 31.0165 ; 31.0147 ; 31.0139 ; 31.1379 ; 31.3704 ; 31.7069 ; 32.1929 ; 32.8798 ; 33.8175 ; 35.053 ; 35.5026 ; 36.1372 ; 37.0107 ; 38.146 ; 38.52 ; 38.6586 ; 38.8663 ; 39.1698 ; 39.5992 ; 40.1825 ; 40.9774 ; 41.2555 ; 41.6536 ; 42.209 ; 42.9496 ; 43.9162 ; 45.127 ; 45.5274 ; 46.0728 ; 46.7974 ; 47.7108 ; 48.6588 ; 49.7123 ; 50.6464 ; 50.8856 ; 51.2009 ; 51.3113 ; 51.4717 ; 51.7042 ; 52.0285 ; 52.4623 ; 52.9911 ; 53.3245]

Bolt 1 - Tensile Force (kips): [34.7136 ; 34.5725 ; 34.4547 ; 34.2928 ; 34.0805 ; 34.0132 ; 33.9191 ; 33.7883 ; 33.3886 ; 32.001 ; 29.6819 ; 26.5158 ; 24.005 ; 23.9875 ; 23.9208 ; 23.7442 ; 23.7341 ; 23.732 ; 23.7314 ; 23.7169 ; 23.6904 ; 23.67 ; 23.6472 ; 23.6051 ; 23.5247 ; 23.3177 ; 23.2166 ; 23.0731 ; 22.855 ; 22.5854 ; 22.4682 ; 22.4053 ; 22.2744 ; 22.0907 ; 21.8249 ; 21.5234 ; 21.0915 ; 20.8932 ; 20.5622 ; 20.1525 ; 19.5348 ; 18.9905 ; 18.5057 ; 18.339 ; 18.0402 ; 17.7754 ; 17.4647 ; 16.9069 ; 16.3533 ; 16.1529 ; 16.1184 ; 16.0738 ; 16.0656 ; 16.0759 ; 16.0936 ; 16.1002 ; 16.1095 ; 16.1093 ; 16.1161]

Bolt 1 - Shear Force (kips): [0.0485468 ; 0.186533 ; 0.350636 ; 0.554641 ; 0.800371 ; 0.874251 ; 0.972372 ; 1.10242 ; 1.49013 ; 2.64298 ; 4.34907 ; 6.44013 ; 7.92029 ; 7.9158 ; 8.00674 ; 8.20466 ; 8.20674 ; 8.20606 ; 8.20574 ; 8.30994 ; 8.50464 ; 8.66051 ; 8.82624 ; 9.17167 ; 9.60206 ; 10.2641 ; 10.7149 ; 11.4279 ; 12.4643 ; 13.5298 ; 13.8604 ; 14.0236 ; 14.3313 ; 14.762 ; 15.3687 ; 16.0543 ; 17.0266 ; 17.4432 ; 18.1107 ; 19.0536 ; 20.4299 ; 21.7827 ; 23.2751 ; 23.8157 ; 24.6043 ; 25.6406 ; 27.0819 ; 28.9215 ; 30.8948 ; 32.505 ; 32.8546 ; 33.3717 ; 33.5493 ; 33.7885 ; 34.1384 ; 34.6407 ; 35.2794 ; 35.9854 ; 36.402]

Bolt 2 - Tensile Force (kips): [34.7268 ; 34.5727 ; 34.4431 ; 34.2794 ; 34.1057 ; 34.061 ; 34.0072 ; 33.9467 ; 33.6608 ; 32.399 ; 30.3238 ; 27.6896 ; 25.2006 ; 25.1658 ; 25.1942 ; 25.1352 ; 25.0821 ; 25.0797 ; 25.0789 ; 25.1387 ; 25.2528 ; 25.3855 ; 25.6016 ; 25.9622 ; 26.4483 ; 27.2362 ; 27.5688 ; 28.0712 ; 28.7783 ; 29.8478 ; 30.2496 ; 30.4072 ; 30.6492 ; 30.9956 ; 31.5032 ; 32.2225 ; 33.2167 ; 33.562 ; 34.0631 ; 34.7314 ; 35.6552 ; 36.7086 ; 38.0031 ; 38.4498 ; 39.0433 ; 39.8222 ; 40.7355 ; 41.7976 ; 43.2613 ; 44.5267 ; 44.837 ; 45.3118 ; 45.4885 ; 45.769 ; 46.1961 ; 46.8167 ; 47.7081 ; 48.8167 ; 49.5852]

Bolt 2 - Shear Force (kips): [0.0631 ; 0.188293 ; 0.362751 ; 0.578739 ; 0.836846 ; 0.913805 ; 1.01547 ; 1.14866 ; 1.52138 ; 2.64883 ; 4.32402 ; 6.36126 ; 8.29423 ; 8.30344 ; 8.31372 ; 8.55657 ; 8.66244 ; 8.66277 ; 8.66257 ; 8.68078 ; 8.71521 ; 8.89792 ; 9.21182 ; 9.53294 ; 10.0288 ; 10.5787 ; 10.8037 ; 11.0418 ; 11.3773 ; 12.1643 ; 12.3617 ; 12.42 ; 12.4896 ; 12.6551 ; 12.8909 ; 13.2543 ; 13.8432 ; 14.01 ; 14.2302 ; 14.5701 ; 14.9187 ; 15.7603 ; 16.6858 ; 16.966 ; 17.3533 ; 17.8925 ; 18.5403 ; 19.3546 ; 20.3146 ; 21.15 ; 21.3519 ; 21.5732 ; 21.6486 ; 21.7313 ; 21.8142 ; 21.8511 ; 21.8323 ; 21.8717 ; 21.8805]

Bolt 3 - Tensile Force (kips): [36 ; 35.9579 ; 36.0465 ; 36.3651 ; 37.0176 ; 37.3418 ; 37.8465 ; 38.5293 ; 39.327 ; 40.1602 ; 41.4583 ; 43.6805 ; 46.352 ; 46.3412 ; 46.4752 ; 47.0667 ; 47.2115 ; 47.2093 ; 47.2082 ; 47.4319 ; 47.8602 ; 48.4925 ; 49.412 ; 50.7033 ; 52.4274 ; 54.5195 ; 55.1888 ; 56.1115 ; 57.343 ; 58.878 ; 59.3795 ; 59.5612 ; 59.8277 ; 60.2088 ; 60.7396 ; 61.4585 ; 62.414 ; 62.7407 ; 63.1993 ; 63.8216 ; 64.6397 ; 65.7564 ; 67.2062 ; 67.6829 ; 68.3327 ; 69.1776 ; 70.1281 ; 70.6756 ; 71.022 ; 71.2241 ; 71.1834 ; 71.1653 ; 71.1812 ; 71.2184 ; 71.2252 ; 71.2108 ; 71.252 ; 71.395 ; 71.386]

Bolt 3 - Shear Force (kips): [0.030766 ; 0.026063 ; 0.074315 ; 0.14843 ; 0.23604 ; 0.2621 ; 0.2982 ; 0.34668 ; 0.40401 ; 0.45238 ; 0.51062 ; 0.60655 ; 0.73472 ; 0.73418 ; 0.7398 ; 0.76103 ; 0.76584 ; 0.76577 ; 0.76572 ; 0.77243 ; 0.78359 ; 0.79771 ; 0.81322 ; 0.82635 ; 0.83514 ; 0.84673 ; 0.85507 ; 0.86641 ; 0.8747 ; 0.87848 ; 0.87869 ; 0.8787 ; 0.87876 ; 0.87906 ; 0.8804 ; 0.88378 ; 0.88734 ; 0.88727 ; 0.88846 ; 0.89128 ; 0.89533 ; 0.87856 ; 0.80227 ; 0.76541 ; 0.7071 ; 0.61965 ; 0.61011 ; 0.54726 ; 0.45296 ; 0.55598 ; 0.77565 ; 1.253 ; 1.4062 ; 1.5714 ; 1.9459 ; 2.504 ; 3.1009 ; 3.5705 ; 4.0751]

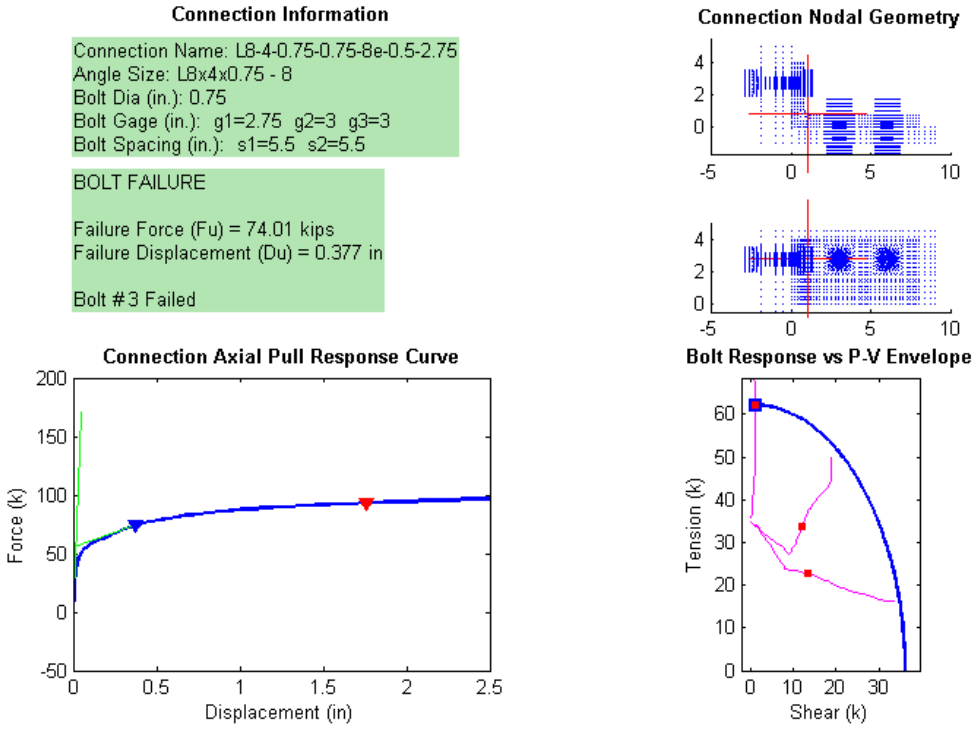


Figure B.186 Connection L8_4_0.75_0.75_8e_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_0.75_8e_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 3.5038e+003

Plastic Stiffness (k/in): 50.8261

Displacement (in): [2.9044e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.13464 ; 0.15048 ; 0.17424 ; 0.18314 ; 0.18649 ; 0.1915 ; 0.19901 ; 0.20183 ; 0.20289 ; 0.20447 ; 0.20507 ; 0.20596 ; 0.2073 ; 0.20931 ; 0.21232 ; 0.21683 ; 0.22361 ; 0.22614 ; 0.22995 ; 0.23567 ; 0.24424 ; 0.2571 ; 0.27638 ; 0.29567 ; 0.31496 ; 0.34389 ; 0.38728 ; 0.40356 ; 0.42797 ; 0.46458 ; 0.5195 ; 0.5401 ; 0.571 ; 0.61734 ; 0.68685 ; 0.71291 ; 0.75201 ; 0.81066 ; 0.89864 ; 1.0306 ; 1.0801 ; 1.1543 ; 1.1822 ; 1.2239 ; 1.2865 ; 1.3805 ; 1.5214 ; 1.5742 ; 1.6535 ; 1.7724 ; 1.9508 ; 2.2008 ; 2.4508 ; 2.5]

Force (kips): [-0.956552 ; 2.97466 ; 5.88677 ; 9.42887 ; 13.6213 ; 14.9033 ; 16.512 ; 18.5244 ; 20.9426 ; 23.1338 ; 24.8849 ; 26.532 ; 28.2457 ; 30.2631 ; 30.8008 ; 31.2134 ; 31.4881 ; 31.5088 ; 31.697 ; 31.8742 ; 31.8785 ; 31.878 ; 31.8768 ; 31.9008 ; 31.939 ; 31.9962 ; 32.0821 ; 32.2072 ; 32.386 ; 32.6364 ; 32.7365 ; 32.8831 ; 33.0991 ; 33.4118 ; 33.8457 ; 34.4715 ; 35.032 ; 35.5917 ; 36.3269 ; 37.2162 ; 37.5203 ; 37.9489 ; 38.5251 ; 39.3101 ; 39.5901 ; 39.992 ; 40.5413 ; 41.2625 ; 41.5114 ; 41.8623 ; 42.3561 ; 43.0212 ; 43.8007 ; 44.0422 ; 44.3938 ; 44.52 ; 44.7054 ; 44.966 ; 45.326 ; 45.8116 ; 45.9825 ; 46.2487 ; 46.5991 ; 47.0739 ; 47.6634 ; 48.163 ; 48.2533]

Bolt 1 - Tensile Force (kips): [34.7118 ; 34.5914 ; 34.4924 ; 34.356 ; 34.1729 ; 34.1121 ; 34.0311 ; 33.9198 ; 33.769 ; 33.2607 ; 31.8216 ; 29.7183 ; 27.3203 ; 24.1532 ; 24.0102 ; 23.9616 ; 23.7552 ; 23.7496 ; 23.7492 ; 23.7483 ; 23.7476 ; 23.7474 ; 23.7471 ; 23.7457 ; 23.7408 ; 23.7335 ; 23.7216 ; 23.7071 ; 23.6926 ; 23.6829 ; 23.6675 ; 23.6498 ; 23.6348 ; 23.629 ; 23.6134 ; 23.4637 ; 23.3535 ; 23.1913 ; 22.9163 ; 22.6304 ; 22.4432 ; 22.1001 ; 21.7379 ; 21.1893 ; 20.9436 ; 20.6026 ; 20.1271 ; 19.5042 ; 19.3302 ; 19.1044 ; 18.8326 ; 18.4774 ; 18.0581 ; 17.965 ; 17.6606 ; 17.5574 ; 17.4061 ; 17.2368 ; 17.0139 ; 16.7475 ; 16.6631 ; 16.5605 ; 16.4566 ; 16.3592 ; 16.2792 ; 16.2222 ; 16.2123]

Bolt 1 - Shear Force (kips): [0.0485867 ; 0.156222 ; 0.298491 ; 0.47627 ; 0.695886 ; 0.765603 ; 0.855803 ; 0.972964 ; 1.12357 ; 1.60882 ; 2.78557 ; 4.32759 ; 5.93198 ; 7.84057 ; 7.92106 ; 7.95463 ; 8.18673 ; 8.1893 ; 8.18898 ; 8.18832 ; 8.18781 ; 8.18761 ; 8.18729 ; 8.1973 ; 8.23163 ; 8.28484 ; 8.3735 ; 8.48719 ; 8.61006 ; 8.70257 ; 8.81056 ; 8.94446 ; 9.07836 ; 9.20684 ; 9.37082 ; 10.0055 ; 10.4319 ; 11.2968 ; 12.6089 ; 13.7687 ; 14.2637 ; 15.09 ; 15.98 ; 17.2736 ; 17.7944 ; 18.5844 ; 19.6526 ; 21.1349 ; 21.5681 ; 22.1981 ; 23.0244 ; 24.158 ; 25.7332 ; 26.2516 ; 27.2318 ; 27.5466 ; 27.965 ; 28.4916 ; 29.1869 ; 30.0161 ; 30.2748 ; 30.6308 ; 31.1355 ; 31.8385 ; 32.7164 ; 33.5239 ; 33.6764]

Bolt 2 - Tensile Force (kips): [34.7215 ; 34.5914 ; 34.4823 ; 34.3442 ; 34.1976 ; 34.1596 ; 34.1181 ; 34.0738 ; 34.0456 ; 33.7205 ; 32.5616 ; 31.008 ; 29.9158 ; 28.9014 ; 28.059 ; 27.3546 ; 27.5395 ; 27.5375 ; 27.5928 ; 27.6407 ; 27.6371 ; 27.6347 ; 27.632 ; 27.6579 ; 27.6961 ; 27.7535 ; 27.8412 ; 27.9687 ; 28.1497 ; 28.4079 ; 28.5176 ; 28.6791 ; 28.9193 ; 29.2555 ; 29.7475 ; 30.5311 ; 31.2432 ; 31.9323 ; 32.9011 ; 34.0446 ; 34.4273 ; 34.9561 ; 35.6305 ; 36.5896 ; 36.9233 ; 37.391 ; 38.0047 ; 38.8738 ; 39.1627 ; 39.583 ; 40.21 ; 40.9887 ; 41.8599 ; 42.1898 ; 42.644 ; 42.8076 ; 43.0569 ; 43.4014 ; 43.8984 ; 44.6788 ; 44.9846 ; 45.4358 ; 46.0994 ; 47.0652 ; 48.484 ; 49.6777 ; 49.9048]

Bolt 2 - Shear Force (kips): [0.0629696 ; 0.155563 ; 0.306197 ; 0.494059 ; 0.724377 ; 0.797135 ; 0.890693 ; 1.01145 ; 1.16371 ; 1.62465 ; 2.76505 ; 4.25957 ; 5.75314 ; 7.50507 ; 8.34756 ; 9.01872 ; 9.08495 ; 9.10754 ; 9.29539 ; 9.47857 ; 9.4854 ; 9.48606 ; 9.48613 ; 9.4939 ; 9.50386 ; 9.51813 ; 9.53691 ; 9.56585 ; 9.61151 ; 9.68298 ; 9.69873 ; 9.74102 ; 9.88275 ; 10.1607 ; 10.4752 ; 10.7049 ; 11.0046 ; 11.2888 ; 11.4876 ; 11.9732 ; 12.1115 ; 12.2686 ; 12.6086 ; 12.996 ; 13.1707 ; 13.48 ; 13.9512 ; 14.4811 ; 14.7656 ; 15.0982 ; 15.4986 ; 16.2128 ; 17.1921 ; 17.4624 ; 17.7842 ; 17.9155 ; 18.0891 ; 18.3124 ; 18.5556 ; 18.7574 ; 18.788 ; 18.831 ; 18.8629 ; 18.9033 ; 18.9062 ; 18.8254 ; 18.799]

Bolt 3 - Tensile Force (kips): [36 ; 35.9428 ; 35.997 ; 36.2599 ; 36.8065 ; 37.0669 ; 37.5277 ; 38.2068 ; 39.1048 ; 40.3283 ; 41.9144 ; 44.1993 ; 47.5527 ; 51.7252 ; 52.8134 ; 53.6239 ; 54.108 ; 54.1445 ; 54.4688 ; 54.77 ; 54.7773 ; 54.7767 ; 54.7753 ; 54.8144 ; 54.8755 ; 54.9668 ; 55.1025 ; 55.3016 ; 55.5893 ; 56.0002 ; 56.1546 ; 56.3813 ; 56.7119 ; 57.1865 ; 57.849 ; 58.7621 ; 59.5753 ; 60.338 ; 61.3483 ; 62.6154 ; 63.0397 ; 63.6109 ; 64.3488 ; 65.3297 ; 65.6678 ; 66.1531 ; 66.8241 ; 67.7138 ; 68.0152 ; 68.438 ; 68.9958 ; 69.7 ; 70.2785 ; 70.3891 ; 70.474 ; 70.4998 ; 70.5118 ; 70.5316 ; 70.5742 ; 70.7041 ; 70.7139 ; 70.8002 ; 70.9181 ; 71.0903 ; 71.1258 ; 71.2009 ; 71.2243]

Bolt 3 - Shear Force (kips): [0.033838 ; 0.020438 ; 0.06251 ; 0.13065 ; 0.21257 ; 0.23852 ; 0.27157 ; 0.31665 ; 0.37672 ; 0.44953 ; 0.53167 ; 0.67346 ; 0.85245 ; 0.94143 ; 0.95241 ; 0.9613 ; 0.9687 ; 0.96937 ; 0.97548 ; 0.98131 ; 0.98149 ; 0.98149 ; 0.98142 ; 0.98222 ; 0.98326 ; 0.98481 ; 0.98701 ; 0.99023 ; 0.99473 ; 1.0006 ; 1.0022 ; 1.0041 ; 1.0061 ; 1.0078 ; 1.0088 ; 1.0078 ; 1.0073 ; 1.0051 ; 1.0057 ; 1.009 ; 1.0103 ; 1.0135 ; 1.0154 ; 1.0008 ; 0.98956 ; 0.96569 ; 0.92125 ; 0.84601 ; 0.81676 ; 0.77314 ; 0.83401 ; 0.88825 ; 0.86053 ; 0.82749 ; 0.91568 ; 0.97386 ; 1.1028 ; 1.3141 ; 1.7162 ; 2.3523 ; 2.6873 ; 2.9237 ; 3.2367 ; 3.6025 ; 4.4187 ; 5.0189 ; 5.1126]

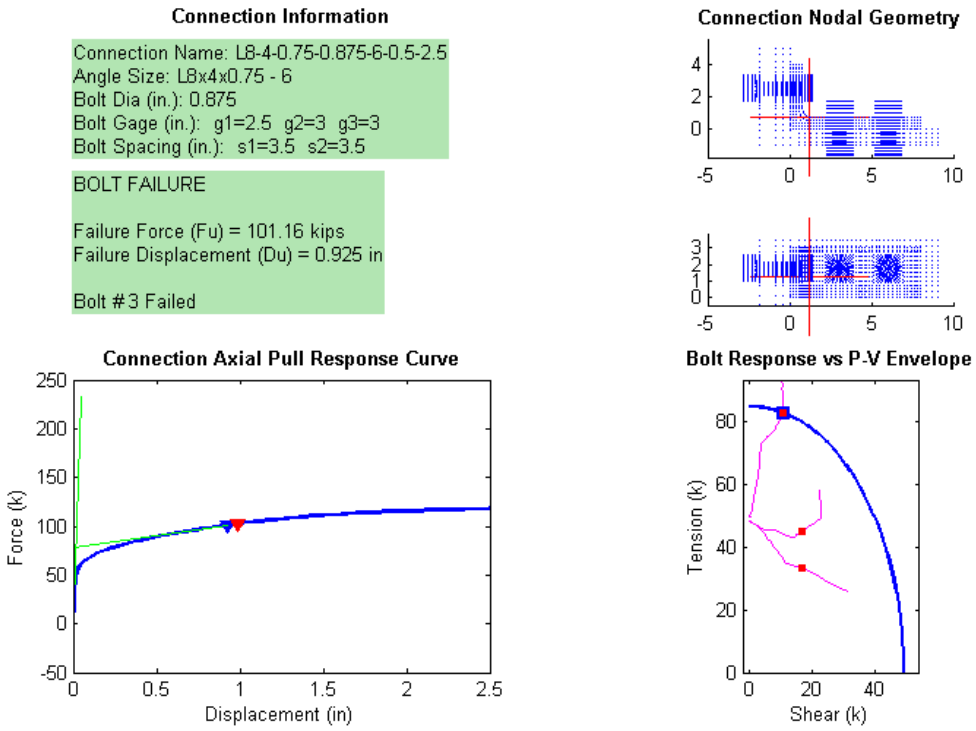


Figure B.187 Connection L8_4_0.75_0.875_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_0.875_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4.9323e+003

Plastic Stiffness (k/in): 24.3025

Displacement (in): [6.1376e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.13464 ; 0.15048 ; 0.17424 ; 0.20987 ; 0.26332 ; 0.34351 ; 0.37357 ; 0.40364 ; 0.43371 ; 0.47881 ; 0.54646 ; 0.57183 ; 0.58135 ; 0.59562 ; 0.61702 ; 0.64913 ; 0.66117 ; 0.67923 ; 0.68601 ; 0.68855 ; 0.69236 ; 0.69807 ; 0.70664 ; 0.7195 ; 0.73879 ; 0.76772 ; 0.77857 ; 0.79484 ; 0.81925 ; 0.85586 ; 0.8696 ; 0.89019 ; 0.92109 ; 0.96742 ; 0.9848 ; 1.0109 ; 1.05 ; 1.1086 ; 1.1966 ; 1.3286 ; 1.378 ; 1.4523 ; 1.5636 ; 1.7306 ; 1.9806 ; 2.2306 ; 2.4806 ; 2.5]

Force (kips): [-1.50526 ; 4.15003 ; 8.12817 ; 12.8681 ; 18.2604 ; 19.8577 ; 21.8516 ; 24.1435 ; 26.5371 ; 28.7644 ; 30.4381 ; 31.9007 ; 33.5366 ; 35.5056 ; 36.1417 ; 36.9923 ; 38.0935 ; 39.5445 ; 41.4462 ; 42.1316 ; 42.774 ; 43.3715 ; 44.211 ; 45.3468 ; 45.7595 ; 45.9084 ; 46.1473 ; 46.466 ; 46.917 ; 47.0973 ; 47.3236 ; 47.3596 ; 47.3593 ; 47.4221 ; 47.5133 ; 47.6433 ; 47.8275 ; 48.1093 ; 48.52 ; 48.6824 ; 48.9109 ; 49.2472 ; 49.7303 ; 49.9026 ; 50.1602 ; 50.5356 ; 51.0488 ; 51.2441 ; 51.5279 ; 51.9222 ; 52.4609 ; 53.2458 ; 54.3645 ; 54.7448 ; 55.2602 ; 55.9358 ; 56.8049 ; 57.8071 ; 58.4786 ; 58.9745 ; 59.0082]

Bolt 1 - Tensile Force (kips): [48.4649 ; 48.2851 ; 48.1489 ; 47.9711 ; 47.7538 ; 47.6847 ; 47.5942 ; 47.4826 ; 47.3454 ; 47.174 ; 46.7694 ; 45.7787 ; 44.3474 ; 42.3247 ; 41.6001 ; 40.5461 ; 39.0626 ; 37.076 ; 34.9253 ; 34.9024 ; 34.8889 ; 34.88 ; 34.8712 ; 34.8622 ; 34.8591 ; 34.8578 ; 34.7227 ; 34.677 ; 34.6602 ; 34.6565 ; 34.651 ; 34.648 ; 34.6462 ; 34.6283 ; 34.6001 ; 34.5691 ; 34.5472 ; 34.4768 ; 34.3605 ; 34.265 ; 34.1581 ; 34.0352 ; 33.8673 ; 33.8006 ; 33.6372 ; 33.4012 ; 33.0258 ; 32.8688 ; 32.5501 ; 32.1971 ; 31.7179 ; 30.8362 ; 29.2903 ; 28.7986 ; 28.2357 ; 27.7376 ; 27.2103 ; 26.5855 ; 26.2095 ; 26.0665 ; 26.059]

Bolt 1 - Shear Force (kips): [0.0868427 ; 0.191161 ; 0.372811 ; 0.598465 ; 0.86876 ; 0.951902 ; 1.05864 ; 1.18688 ; 1.34115 ; 1.53105 ; 1.98054 ; 3.00523 ; 4.34285 ; 6.08707 ; 6.67838 ; 7.51094 ; 8.6369 ; 10.0714 ; 11.5042 ; 11.5107 ; 11.5109 ; 11.5095 ; 11.5072 ; 11.5045 ; 11.5034 ; 11.503 ; 11.7343 ; 11.7881 ; 11.7871 ; 11.7846 ; 11.7806 ; 11.7786 ; 11.7815 ; 11.8973 ; 12.0634 ; 12.2526 ; 12.3889 ; 12.7736 ; 13.2013 ; 13.5195 ; 13.8303 ; 14.2365 ; 15.0006 ; 15.3081 ; 15.865 ; 16.6508 ; 17.6706 ; 18.004 ; 18.6573 ; 19.3762 ; 20.3004 ; 21.7169 ; 24.134 ; 24.8845 ; 25.7952 ; 26.9208 ; 28.1644 ; 29.5205 ; 30.5243 ; 31.2668 ; 31.3188]

Bolt 2 - Tensile Force (kips): [48.4641 ; 48.2231 ; 48.0339 ; 47.8034 ; 47.552 ; 47.4807 ; 47.3943 ; 47.2959 ; 47.1953 ; 47.0809 ; 46.7827 ; 46.1527 ; 45.6947 ; 45.5703 ; 45.4782 ; 45.3442 ; 45.109 ; 44.7215 ; 44.2283 ; 44.0084 ; 43.8064 ; 43.6257 ; 43.4181 ; 43.2405 ; 43.1885 ; 43.1537 ; 43.1789 ; 43.162 ; 42.9945 ; 43.0156 ; 43.0382 ; 43.0502 ; 43.0352 ; 43.0861 ; 43.1474 ; 43.2376 ; 43.4209 ; 43.6629 ; 43.9089 ; 43.9961 ; 44.1411 ; 44.3143 ; 44.6339 ; 44.7698 ; 44.9457 ; 45.1881 ; 45.5531 ; 45.6796 ; 45.8785 ; 46.1207 ; 46.4585 ; 46.9558 ; 47.7943 ; 48.1118 ; 48.6205 ; 49.6439 ; 51.5767 ; 54.1344 ; 56.2619 ; 58.1518 ; 58.2925]

Bolt 2 - Shear Force (kips): [0.0702813 ; 0.280249 ; 0.520822 ; 0.821558 ; 1.1802 ; 1.29016 ; 1.43236 ; 1.60649 ; 1.82534 ; 2.11207 ; 2.66469 ; 3.73058 ; 5.05876 ; 6.64549 ; 7.15887 ; 7.7968 ; 8.58453 ; 9.51992 ; 10.6625 ; 11.1028 ; 11.5102 ; 11.8899 ; 12.3931 ; 13.0435 ; 13.2675 ; 13.3575 ; 13.4351 ; 13.5975 ; 14.0647 ; 14.2628 ; 14.4883 ; 14.5089 ; 14.5077 ; 14.5213 ; 14.5367 ; 14.5593 ; 14.6098 ; 14.6742 ; 14.9987 ; 15.0843 ; 15.2606 ; 15.6657 ; 16.0304 ; 16.1267 ; 16.2978 ; 16.6013 ; 17.0349 ; 17.2205 ; 17.4027 ; 17.8717 ; 18.6005 ; 19.6859 ; 20.9281 ; 21.3773 ; 22.0762 ; 22.5887 ; 22.6419 ; 22.6027 ; 22.4777 ; 22.3855 ; 22.374]

Bolt 3 - Tensile Force (kips): [50 ; 49.9067 ; 49.9295 ; 50.0737 ; 50.4593 ; 50.6338 ; 50.9982 ; 51.6049 ; 52.4143 ; 53.4637 ; 54.7254 ; 56.2154 ; 58.0331 ; 60.4025 ; 61.2179 ; 62.3724 ; 63.9875 ; 66.2374 ; 69.265 ; 70.3002 ; 71.1798 ; 71.9487 ; 73.0742 ; 74.6612 ; 75.3509 ; 75.5936 ; 75.9602 ; 76.4854 ; 77.2257 ; 77.5106 ; 77.871 ; 77.929 ; 77.9296 ; 78.0188 ; 78.151 ; 78.3446 ; 78.6232 ; 79.0247 ; 79.6356 ; 79.88 ; 80.2403 ; 80.7727 ; 81.5487 ; 81.8232 ; 82.23 ; 82.8403 ; 83.6873 ; 84.0203 ; 84.4827 ; 85.1178 ; 85.9986 ; 87.3836 ; 89.2984 ; 89.9199 ; 90.7039 ; 91.7321 ; 93.0646 ; 94.5291 ; 95.4083 ; 96.0148 ; 96.0514]

Bolt 3 - Shear Force (kips): [0.0283373 ; 0.0573521 ; 0.127051 ; 0.227286 ; 0.375582 ; 0.43243 ; 0.515179 ; 0.627034 ; 0.774993 ; 0.972365 ; 1.20881 ; 1.46316 ; 1.78777 ; 2.16834 ; 2.28232 ; 2.43222 ; 2.63287 ; 2.89672 ; 3.1871 ; 3.30061 ; 3.40121 ; 3.52535 ; 3.66967 ; 4.76848 ; 5.66066 ; 5.98105 ; 6.48706 ; 7.08597 ; 7.69878 ; 7.89593 ; 8.11559 ; 8.15199 ; 8.15407 ; 8.1975 ; 8.26007 ; 8.34748 ; 8.46731 ; 8.63474 ; 9.00759 ; 9.173 ; 9.37566 ; 9.60038 ; 9.93681 ; 10.0657 ; 10.2143 ; 10.3882 ; 10.5622 ; 10.473 ; 10.4491 ; 10.4873 ; 10.548 ; 10.5301 ; 10.3965 ; 10.3913 ; 10.3367 ; 10.356 ; 10.2407 ; 9.64396 ; 8.83603 ; 7.94168 ; 7.84128]

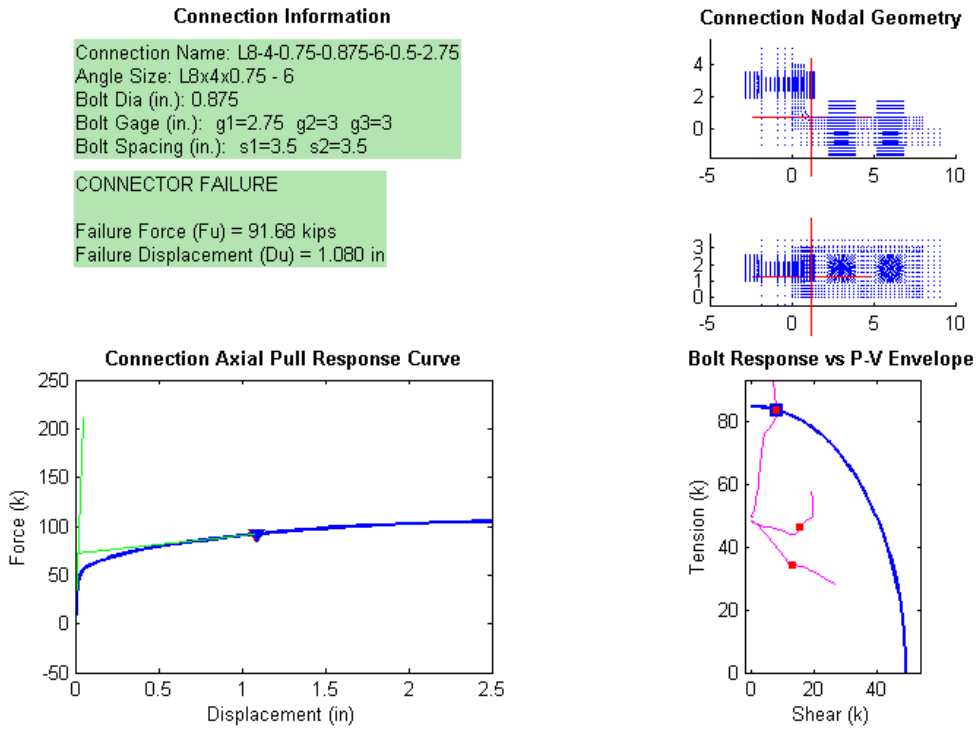


Figure B.188 Connection L8_4_0.75_0.875_6_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_0.875_6_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 4.1598e+003

Plastic Stiffness (k/in): 17.8210

Displacement (in): [4.5033e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.13464 ; 0.19799 ; 0.29302 ; 0.43556 ; 0.43891 ; 0.44392 ; 0.45143 ; 0.46271 ; 0.47962 ; 0.50499 ; 0.54305 ; 0.60013 ; 0.68575 ; 0.71786 ; 0.76602 ; 0.83827 ; 0.94663 ; 0.98727 ; 1.0025 ; 1.0254 ; 1.0597 ; 1.0725 ; 1.0918 ; 1.099 ; 1.1099 ; 1.1262 ; 1.1506 ; 1.1872 ; 1.2421 ; 1.2627 ; 1.2936 ; 1.3399 ; 1.3573 ; 1.3834 ; 1.4225 ; 1.4811 ; 1.5691 ; 1.6021 ; 1.6516 ; 1.7258 ; 1.8372 ; 2.0042 ; 2.2542 ; 2.5]

Force (kips): [-1.49866 ; 3.2583 ; 6.62592 ; 10.6694 ; 15.4503 ; 16.8718 ; 18.755 ; 20.949 ; 23.2508 ; 25.4168 ; 27.1258 ; 28.6022 ; 30.0365 ; 31.749 ; 33.6673 ; 35.7975 ; 38.3993 ; 38.4525 ; 38.5383 ; 38.6652 ; 38.8438 ; 39.1225 ; 39.5211 ; 40.0589 ; 40.8455 ; 41.9087 ; 42.2846 ; 42.8372 ; 43.5966 ; 44.6519 ; 45.0112 ; 45.139 ; 45.3591 ; 45.6623 ; 45.7768 ; 45.9375 ; 46.0031 ; 46.0992 ; 46.2322 ; 46.4317 ; 46.7338 ; 47.1563 ; 47.3161 ; 47.5425 ; 47.8667 ; 47.9858 ; 48.1581 ; 48.4074 ; 48.7722 ; 49.2996 ; 49.486 ; 49.7502 ; 50.1109 ; 50.5977 ; 51.2241 ; 51.9232 ; 52.3926]

Bolt 1 - Tensile Force (kips): [48.464 ; 48.3141 ; 48.2008 ; 48.0527 ; 47.8633 ; 47.8041 ; 47.722 ; 47.6198 ; 47.5015 ; 47.3637 ; 47.1949 ; 46.6932 ; 45.4538 ; 43.6731 ; 41.3893 ; 38.5054 ; 35.0049 ; 34.9669 ; 34.96 ; 34.9533 ; 34.9455 ; 34.9369 ; 34.9283 ; 34.9205 ; 34.9138 ; 34.9083 ; 34.9067 ; 34.7505 ; 34.7326 ; 34.7278 ; 34.7311 ; 34.7327 ; 34.6535 ; 34.5834 ; 34.5361 ; 34.4829 ; 34.4351 ; 34.3544 ; 34.2597 ; 34.1389 ; 33.9878 ; 33.7513 ; 33.606 ; 33.3891 ; 33.0402 ; 32.8946 ; 32.6547 ; 32.3533 ; 31.9773 ; 31.3356 ; 31.0185 ; 30.5897 ; 30.1636 ; 29.6759 ; 29.1403 ; 28.5343 ; 28.1351]

Bolt 1 - Shear Force (kips): [0.0858036 ; 0.152952 ; 0.305136 ; 0.496936 ; 0.735772 ; 0.809775 ; 0.910206 ; 1.03231 ; 1.17002 ; 1.32755 ; 1.5187 ; 2.07889 ; 3.33095 ; 4.95519 ; 6.86423 ; 9.07452 ; 11.4864 ; 11.5109 ; 11.5149 ; 11.5179 ; 11.5208 ; 11.5228 ; 11.5234 ; 11.5227 ; 11.5212 ; 11.5196 ; 11.5192 ; 11.7721 ; 11.7729 ; 11.754 ; 11.7475 ; 11.7452 ; 12.2388 ; 12.6559 ; 12.8691 ; 13.066 ; 13.2453 ; 13.5156 ; 13.793 ; 14.1994 ; 14.8945 ; 15.8983 ; 16.3858 ; 17.0449 ; 17.878 ; 18.1857 ; 18.676 ; 19.2863 ; 20.0566 ; 21.1158 ; 21.6259 ; 22.3028 ; 22.9733 ; 23.7393 ; 24.6114 ; 25.6208 ; 26.5891]

Bolt 2 - Tensile Force (kips): [48.4596 ; 48.2591 ; 48.1006 ; 47.9052 ; 47.6903 ; 47.6295 ; 47.5554 ; 47.4709 ; 47.3986 ; 47.3336 ; 47.2725 ; 47.0177 ; 46.5292 ; 46.4006 ; 46.129 ; 45.6723 ; 45.0547 ; 45.0378 ; 45.0071 ; 44.9611 ; 44.8957 ; 44.796 ; 44.6609 ; 44.4904 ; 44.2849 ; 44.1244 ; 44.104 ; 44.1521 ; 44.2406 ; 44.8485 ; 45.352 ; 45.5418 ; 45.7628 ; 46.1274 ; 46.2561 ; 46.4665 ; 46.5313 ; 46.6272 ; 46.7869 ; 46.9937 ; 47.211 ; 47.5301 ; 47.6475 ; 47.8309 ; 48.1268 ; 48.2093 ; 48.3497 ; 48.5535 ; 48.8738 ; 49.3259 ; 49.5295 ; 49.8499 ; 50.5802 ; 51.7824 ; 53.4935 ; 55.8015 ; 57.8042]

Bolt 2 - Shear Force (kips): [0.069134 ; 0.231553 ; 0.437191 ; 0.695731 ; 1.01794 ; 1.11727 ; 1.25166 ; 1.4169 ; 1.61053 ; 1.84956 ; 2.15852 ; 2.83139 ; 4.10173 ; 5.62722 ; 7.25238 ; 8.75418 ; 10.3987 ; 10.4374 ; 10.5005 ; 10.5945 ; 10.7316 ; 10.9351 ; 11.2236 ; 11.6219 ; 12.1661 ; 12.8749 ; 13.1112 ; 13.3925 ; 13.9449 ; 14.9245 ; 15.0737 ; 15.13 ; 15.1969 ; 15.301 ; 15.3352 ; 15.3892 ; 15.4051 ; 15.4285 ; 15.4672 ; 15.6019 ; 15.9583 ; 16.4349 ; 16.5574 ; 16.7199 ; 16.9674 ; 17.1375 ; 17.3329 ; 17.6699 ; 18.146 ; 18.9059 ; 19.1105 ; 19.3858 ; 19.5038 ; 19.5226 ; 19.4631 ; 19.3422 ; 18.9786]

Bolt 3 - Tensile Force (kips): [50 ; 49.891 ; 49.8841 ; 49.9821 ; 50.2514 ; 50.3915 ; 50.6148 ; 51.1089 ; 51.8865 ; 52.8942 ; 54.1091 ; 55.6077 ; 57.2947 ; 59.4669 ; 62.3685 ; 66.0669 ; 70.6193 ; 70.7091 ; 70.8432 ; 71.0389 ; 71.3207 ; 71.7422 ; 72.3613 ; 73.1905 ; 74.4412 ; 76.0852 ; 76.6712 ; 77.5762 ; 78.9959 ; 81.0849 ; 81.9107 ; 82.1899 ; 82.5977 ; 83.1991 ; 83.4224 ; 83.736 ; 83.8541 ; 84.0259 ; 84.2698 ; 84.6361 ; 85.1871 ; 85.9539 ; 86.2553 ; 86.6889 ; 87.3009 ; 87.5108 ; 87.8059 ; 88.2366 ; 88.8624 ; 89.8436 ; 90.1907 ; 90.6686 ; 91.3843 ; 92.3138 ; 93.5574 ; 94.8563 ; 95.4356]

Bolt 3 - Shear Force (kips): [0.03422 ; 0.047354 ; 0.10772 ; 0.19588 ; 0.32435 ; 0.37273 ; 0.44515 ; 0.54735 ; 0.67871 ; 0.8481 ; 1.0682 ; 1.3189 ; 1.5997 ; 1.963 ; 2.3266 ; 2.7434 ; 3.1606 ; 3.1672 ; 3.1811 ; 3.2033 ; 3.2321 ; 3.2913 ; 3.3637 ; 3.434 ; 3.5876 ; 4.2096 ; 4.6922 ; 5.3443 ; 6.2977 ; 7.3535 ; 7.703 ; 7.8035 ; 7.8999 ; 7.8838 ; 7.852 ; 7.83 ; 7.8208 ; 7.8116 ; 7.8051 ; 7.7894 ; 7.775 ; 7.732 ; 7.7097 ; 7.6895 ; 7.5174 ; 7.4735 ; 7.4194 ; 7.263 ; 7.1554 ; 7.1932 ; 7.1974 ; 7.146 ; 7.0852 ; 7.0101 ; 6.5605 ; 5.945 ; 5.445]

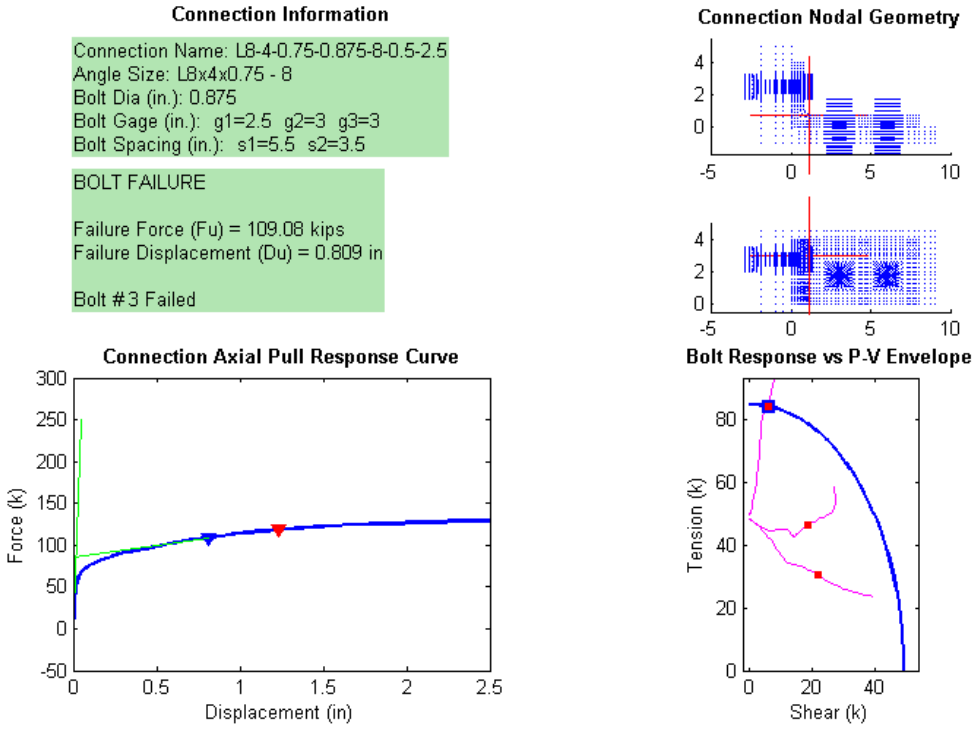


Figure B.189 Connection L8_4_0.75_0.875_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_0.875_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4.9235e+003

Plastic Stiffness (k/in): 28.9163

Displacement (in): [3.9791e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.10296 ; 0.1188 ; 0.14256 ; 0.17819 ; 0.23165 ; 0.31183 ; 0.3419 ; 0.387 ; 0.38806 ; 0.38964 ; 0.39202 ; 0.39559 ; 0.40094 ; 0.40897 ; 0.41198 ; 0.41311 ; 0.4148 ; 0.41734 ; 0.42115 ; 0.42686 ; 0.43544 ; 0.43865 ; 0.44347 ; 0.4507 ; 0.46155 ; 0.47783 ; 0.50224 ; 0.51139 ; 0.52512 ; 0.54572 ; 0.57661 ; 0.5882 ; 0.60557 ; 0.63164 ; 0.67074 ; 0.6854 ; 0.7074 ; 0.74039 ; 0.78987 ; 0.80843 ; 0.83627 ; 0.87802 ; 0.94065 ; 0.96414 ; 0.99937 ; 1.0522 ; 1.1315 ; 1.1612 ; 1.2058 ; 1.2727 ; 1.373 ; 1.4106 ; 1.4671 ; 1.5517 ; 1.6787 ; 1.8691 ; 2.1191 ; 2.3691 ; 2.5]

Force (kips): [-1.32447 ; 4.23237 ; 8.29176 ; 13.1727 ; 18.8977 ; 20.6377 ; 22.8202 ; 25.3886 ; 28.3649 ; 31.2742 ; 33.4818 ; 35.3688 ; 37.3379 ; 37.9671 ; 38.8237 ; 39.9562 ; 41.421 ; 43.2899 ; 45.4452 ; 46.0983 ; 46.8821 ; 46.8973 ; 46.9348 ; 46.9901 ; 47.0727 ; 47.1931 ; 47.2927 ; 47.3019 ; 47.2958 ; 47.3316 ; 47.3859 ; 47.4637 ; 47.587 ; 47.6499 ; 47.6801 ; 47.8032 ; 47.9839 ; 48.2412 ; 48.6145 ; 49.1411 ; 49.3582 ; 49.6558 ; 50.0905 ; 50.7026 ; 50.9343 ; 51.2683 ; 51.7552 ; 52.4319 ; 52.6842 ; 53.0446 ; 53.5484 ; 54.2649 ; 54.5332 ; 54.9116 ; 55.4537 ; 56.1954 ; 56.4575 ; 56.8456 ; 57.4409 ; 58.2566 ; 58.538 ; 58.9399 ; 59.5047 ; 60.2675 ; 60.5384 ; 60.9278 ; 61.4698 ; 62.134 ; 62.899 ; 63.6872 ; 64.3123 ; 64.587]

Bolt 1 - Tensile Force (kips): [48.4646 ; 48.2755 ; 48.1241 ; 47.9245 ; 47.669 ; 47.5843 ; 47.4722 ; 47.3299 ; 47.1453 ; 46.7967 ; 45.867 ; 44.6877 ; 42.935 ; 42.3599 ; 41.5363 ; 40.3455 ; 38.6258 ; 36.2346 ; 34.8434 ; 34.8003 ; 34.7388 ; 34.7362 ; 34.7198 ; 34.6914 ; 34.6334 ; 34.55 ; 34.5226 ; 34.512 ; 34.5081 ; 34.5065 ; 34.5043 ; 34.5006 ; 34.4954 ; 34.4888 ; 34.4845 ; 34.4523 ; 34.414 ; 34.3844 ; 34.3033 ; 34.1692 ; 34.0611 ; 33.9403 ; 33.7722 ; 33.5704 ; 33.4283 ; 33.2125 ; 32.919 ; 32.42 ; 32.1962 ; 31.9126 ; 31.5186 ; 30.8909 ; 30.5001 ; 29.9573 ; 29.2644 ; 28.4256 ; 28.1283 ; 27.7449 ; 27.2474 ; 26.6295 ; 26.3791 ; 26.0671 ; 25.744 ; 25.4894 ; 25.4058 ; 25.1476 ; 24.7531 ; 24.4348 ; 24.2184 ; 24.0815 ; 23.8942 ; 23.6898]

Bolt 1 - Shear Force (kips): [0.07983 ; 0.21742 ; 0.422501 ; 0.678437 ; 0.993344 ; 1.09232 ; 1.21986 ; 1.37631 ; 1.5734 ; 1.94449 ; 2.90492 ; 4.01379 ; 5.55289 ; 6.03095 ; 6.69965 ; 7.63003 ; 8.91575 ; 10.5889 ; 11.4897 ; 11.4822 ; 11.4636 ; 11.4666 ; 11.5095 ; 11.5679 ; 11.6588 ; 11.7719 ; 11.7851 ; 11.7856 ; 11.7852 ; 11.7846 ; 11.7836 ; 11.7819 ; 11.7793 ; 11.7758 ; 11.7928 ; 11.9664 ; 12.1707 ; 12.3216 ; 12.7118 ; 13.1616 ; 13.5025 ; 13.8258 ; 14.3826 ; 15.2197 ; 15.6865 ; 16.3534 ; 17.1823 ; 18.2734 ; 18.7225 ; 19.292 ; 20.0626 ; 21.0884 ; 21.7162 ; 22.5763 ; 23.6548 ; 24.9439 ; 25.4124 ; 26.0651 ; 27.3037 ; 28.7214 ; 29.2183 ; 29.8908 ; 30.694 ; 31.6181 ; 31.9966 ; 32.7814 ; 33.9236 ; 35.102 ; 36.2445 ; 37.3679 ; 38.4432 ; 39.0394]

Bolt 2 - Tensile Force (kips): [48.462 ; 48.2379 ; 48.0456 ; 47.8078 ; 47.5289 ; 47.4456 ; 47.3429 ; 47.2283 ; 47.0977 ; 46.8433 ; 46.1096 ; 45.3602 ; 44.5784 ; 44.5444 ; 44.6051 ; 44.7357 ; 44.9538 ; 45.1789 ; 45.0528 ; 44.3503 ; 42.8169 ; 42.7888 ; 42.8096 ; 42.84 ; 42.8844 ; 42.9479 ; 42.7894 ; 42.6945 ; 42.6516 ; 42.6583 ; 42.6525 ; 42.6391 ; 42.6157 ; 42.597 ; 42.6126 ; 42.6937 ; 42.8113 ; 42.9832 ; 43.217 ; 43.4747 ; 43.5867 ; 43.7368 ; 43.9565 ; 44.2933 ; 44.4201 ; 44.6128 ; 44.8599 ; 45.2353 ; 45.3661 ; 45.5719 ; 45.8979 ; 46.2707 ; 46.4109 ; 46.6286 ; 46.8878 ; 47.2944 ; 47.4681 ; 47.7124 ; 48.0893 ; 48.5518 ; 48.7216 ; 48.9668 ; 49.2971 ; 49.8271 ; 50.016 ; 50.3315 ; 50.8405 ; 51.858 ; 53.5986 ; 55.7227 ; 57.7404 ; 58.7761]

Bolt 2 - Shear Force (kips): [0.0621927 ; 0.281222 ; 0.528372 ; 0.838018 ; 1.21631 ; 1.33435 ; 1.48766 ; 1.67768 ; 1.92095 ; 2.35835 ; 3.32445 ; 4.44356 ; 5.93619 ; 6.37475 ; 6.96579 ; 7.75262 ; 8.74579 ; 9.98739 ; 11.5664 ; 12.4339 ; 13.7894 ; 13.8122 ; 13.8173 ; 13.8254 ; 13.8373 ; 13.8565 ; 13.9851 ; 14.0277 ; 14.0364 ; 14.0742 ; 14.1372 ; 14.2315 ; 14.3744 ; 14.4513 ; 14.4624 ; 14.4855 ; 14.5189 ; 14.5666 ; 14.6291 ; 14.9651 ; 15.0738 ; 15.2967 ; 15.5525 ; 15.8882 ; 15.9937 ; 16.128 ; 16.4389 ; 16.9151 ; 17.1149 ; 17.3588 ; 17.6371 ; 18.3812 ; 18.6209 ; 18.9752 ; 19.6302 ; 20.5471 ; 20.831 ; 21.2246 ; 21.6512 ; 22.6616 ; 23.034 ; 23.5399 ; 24.2731 ; 25.3357 ; 25.7032 ; 26.107 ; 26.6459 ; 27.0786 ; 27.2447 ; 27.2382 ; 27.0527 ; 26.889]

Bolt 3 - Tensile Force (kips): [50 ; 49.9076 ; 49.9333 ; 50.0826 ; 50.4964 ; 50.6914 ; 51.102 ; 51.8029 ; 52.788 ; 54.1095 ; 55.6945 ; 57.8021 ; 60.4586 ; 61.3349 ; 62.5381 ; 64.1476 ; 66.2639 ; 68.9807 ; 72.1759 ; 73.0972 ; 74.2152 ; 74.2373 ; 74.2853 ; 74.3569 ; 74.4638 ; 74.622 ; 74.7696 ; 74.79 ; 74.7881 ; 74.8322 ; 74.9026 ; 75.0042 ; 75.1576 ; 75.2292 ; 75.2637 ; 75.4048 ; 75.6147 ; 75.9308 ; 76.4004 ; 77.074 ; 77.3474 ; 77.7311 ; 78.2929 ; 79.0641 ; 79.3429 ; 79.7516 ; 80.3811 ; 81.2551 ; 81.5881 ; 82.0931 ; 82.8112 ; 83.8516 ; 84.2506 ; 84.7912 ; 85.5706 ; 86.6487 ; 87.0276 ; 87.5707 ; 88.5144 ; 89.7401 ; 90.15 ; 90.7365 ; 91.5592 ; 92.6213 ; 92.9717 ; 93.4655 ; 94.1831 ; 94.9788 ; 95.8244 ; 96.5815 ; 97.0869 ; 97.2765]

Bolt 3 - Shear Force (kips): [0.034248 ; 0.053398 ; 0.12207 ; 0.22176 ; 0.37154 ; 0.42943 ; 0.51422 ; 0.62764 ; 0.78538 ; 0.99852 ; 1.2731 ; 1.6222 ; 2.0228 ; 2.1408 ; 2.296 ; 2.4924 ; 2.7344 ; 3.0165 ; 3.2767 ; 3.3457 ; 3.4236 ; 3.4251 ; 3.4282 ; 3.433 ; 3.4402 ; 3.451 ; 3.4613 ; 3.4627 ; 3.4625 ; 3.4655 ; 3.4705 ; 3.4778 ; 3.4911 ; 3.5007 ; 3.5049 ; 3.5179 ; 3.5334 ; 3.5689 ; 3.612 ; 3.6494 ; 3.6622 ; 3.6845 ; 3.7185 ; 3.7524 ; 3.7618 ; 3.7717 ; 3.8603 ; 4.0228 ; 4.0623 ; 4.3608 ; 4.879 ; 5.4972 ; 5.7539 ; 5.9911 ; 6.2473 ; 6.5403 ; 6.5914 ; 6.4379 ; 6.7187 ; 7.0103 ; 7.1102 ; 7.2892 ; 7.4887 ; 7.6149 ; 7.6311 ; 7.5549 ; 7.5791 ; 7.6581 ; 7.4493 ; 7.1186 ; 7.0185 ; 7.0077]

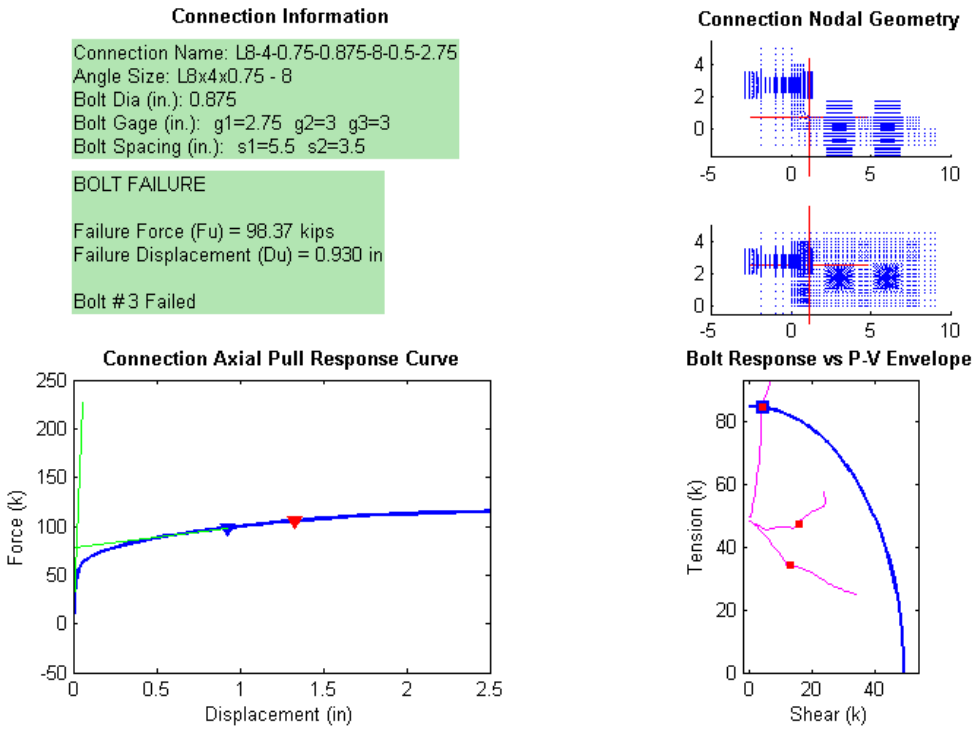


Figure B.190 Connection L8_4_0.75_0.875_8_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_0.875_8_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 4.1703e+003

Plastic Stiffness (k/in): 21.2475

Displacement (in): [5.2274e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.10296 ; 0.1188 ; 0.14256 ; 0.17819 ; 0.23165 ; 0.31183 ; 0.3419 ; 0.387 ; 0.45465 ; 0.55613 ; 0.59418 ; 0.65127 ; 0.73689 ; 0.769 ; 0.78104 ; 0.7991 ; 0.82619 ; 0.83635 ; 0.85159 ; 0.87445 ; 0.90874 ; 0.92159 ; 0.93445 ; 0.94731 ; 0.9666 ; 0.99553 ; 1.0389 ; 1.0552 ; 1.0796 ; 1.1162 ; 1.1711 ; 1.1917 ; 1.2226 ; 1.269 ; 1.2864 ; 1.3124 ; 1.3515 ; 1.4102 ; 1.4981 ; 1.5311 ; 1.5806 ; 1.5992 ; 1.627 ; 1.6688 ; 1.7314 ; 1.8253 ; 1.9663 ; 2.1776 ; 2.4276 ; 2.5]

Force (kips): [-1.31389 ; 3.36459 ; 6.83124 ; 11.0219 ; 16.0633 ; 17.6133 ; 19.6673 ; 22.088 ; 24.8251 ; 27.667 ; 30.0079 ; 31.6765 ; 33.4098 ; 33.9678 ; 34.7276 ; 35.7371 ; 37.0292 ; 38.6474 ; 40.5669 ; 41.1898 ; 42.0343 ; 43.1856 ; 44.7666 ; 45.3228 ; 46.0883 ; 47.0991 ; 47.4585 ; 47.5994 ; 47.8026 ; 48.0945 ; 48.1988 ; 48.358 ; 48.5919 ; 48.9621 ; 49.0987 ; 49.2329 ; 49.3605 ; 49.5605 ; 49.8424 ; 50.2654 ; 50.4249 ; 50.6609 ; 51.0072 ; 51.4922 ; 51.6684 ; 51.9182 ; 52.2922 ; 52.4286 ; 52.6285 ; 52.9257 ; 53.3376 ; 53.9046 ; 54.1099 ; 54.411 ; 54.5226 ; 54.6858 ; 54.9222 ; 55.2561 ; 55.7071 ; 56.2493 ; 56.8915 ; 57.4874 ; 57.6364]

Bolt 1 - Tensile Force (kips): [48.4633 ; 48.305 ; 48.1782 ; 48.0095 ; 47.7899 ; 47.717 ; 47.6156 ; 47.487 ; 47.3269 ; 47.129 ; 46.7316 ; 45.721 ; 44.3099 ; 43.8052 ; 43.0746 ; 42.0187 ; 40.5152 ; 38.4041 ; 35.7906 ; 35.0418 ; 34.8661 ; 34.8203 ; 34.7769 ; 34.7629 ; 34.599 ; 34.5605 ; 34.551 ; 34.5471 ; 34.5414 ; 34.5326 ; 34.5291 ; 34.5235 ; 34.5112 ; 34.4082 ; 34.3554 ; 34.3067 ; 34.2636 ; 34.1292 ; 33.9314 ; 33.6885 ; 33.5492 ; 33.3393 ; 33.0206 ; 32.4621 ; 32.2078 ; 31.905 ; 31.4262 ; 31.256 ; 30.9704 ; 30.3057 ; 29.3999 ; 28.3475 ; 28.0527 ; 27.6831 ; 27.5325 ; 27.323 ; 27.0529 ; 26.6006 ; 26.0925 ; 25.7095 ; 25.4735 ; 24.983 ; 24.8682]

Bolt 1 - Shear Force (kips): [0.0784822 ; 0.17611 ; 0.350647 ; 0.570076 ; 0.847818 ; 0.936429 ; 1.05656 ; 1.20412 ; 1.38104 ; 1.59338 ; 2.02149 ; 3.05481 ; 4.36569 ; 4.81367 ; 5.44295 ; 6.31817 ; 7.50891 ; 9.08858 ; 10.897 ; 11.3848 ; 11.4933 ; 11.488 ; 11.4758 ; 11.4714 ; 11.7442 ; 11.7359 ; 11.7283 ; 11.725 ; 11.7198 ; 11.7117 ; 11.7086 ; 11.7038 ; 11.7292 ; 12.3255 ; 12.5803 ; 12.7991 ; 12.9462 ; 13.3939 ; 13.9525 ; 15.0209 ; 15.5393 ; 16.2342 ; 17.1769 ; 18.417 ; 18.926 ; 19.5439 ; 20.4213 ; 20.7001 ; 21.162 ; 22.2251 ; 23.6465 ; 25.2707 ; 25.7516 ; 26.5907 ; 26.9614 ; 27.4723 ; 28.1324 ; 29.0507 ; 30.1533 ; 31.2996 ; 32.3257 ; 33.7292 ; 34.0855]

Bolt 2 - Tensile Force (kips): [48.4573 ; 48.2701 ; 48.1067 ; 47.9025 ; 47.6629 ; 47.5914 ; 47.5002 ; 47.3997 ; 47.294 ; 47.2011 ; 46.9708 ; 46.3078 ; 45.7312 ; 45.6782 ; 45.7262 ; 45.8665 ; 46.067 ; 46.2838 ; 46.4638 ; 46.4915 ; 46.463 ; 46.3735 ; 46.2395 ; 46.1926 ; 46.1955 ; 46.2882 ; 46.3603 ; 46.3646 ; 46.3942 ; 46.4626 ; 46.5012 ; 46.5612 ; 46.7001 ; 47.0563 ; 47.1966 ; 47.3376 ; 47.4785 ; 47.6683 ; 47.9407 ; 48.3394 ; 48.4833 ; 48.6409 ; 48.9012 ; 49.2672 ; 49.4057 ; 49.6189 ; 49.9108 ; 50.0049 ; 50.1446 ; 50.3716 ; 50.7408 ; 51.2547 ; 51.3894 ; 51.6126 ; 51.685 ; 51.7939 ; 51.9596 ; 52.2176 ; 52.5788 ; 53.1792 ; 54.7897 ; 56.9688 ; 57.5807]

Bolt 2 - Shear Force (kips): [0.0603354 ; 0.232961 ; 0.446172 ; 0.714412 ; 1.05269 ; 1.1599 ; 1.30455 ; 1.48428 ; 1.70303 ; 1.97421 ; 2.47609 ; 3.52489 ; 4.82457 ; 5.24721 ; 5.81795 ; 6.58336 ; 7.5768 ; 8.75865 ; 10.0763 ; 10.497 ; 11.1091 ; 11.9077 ; 12.9024 ; 13.2353 ; 13.6468 ; 14.1926 ; 14.3677 ; 14.5092 ; 14.703 ; 15.006 ; 15.1002 ; 15.2732 ; 15.5053 ; 15.6408 ; 15.6849 ; 15.7251 ; 15.7642 ; 15.8135 ; 15.887 ; 16.004 ; 16.0432 ; 16.2616 ; 16.5164 ; 16.9975 ; 17.1571 ; 17.3593 ; 17.7163 ; 17.9459 ; 18.2651 ; 18.5582 ; 18.9275 ; 19.6202 ; 20.0665 ; 20.5573 ; 20.7093 ; 20.9635 ; 21.3426 ; 21.8693 ; 22.6249 ; 23.4998 ; 24.0819 ; 23.8615 ; 23.775]

Bolt 3 - Tensile Force (kips): [50 ; 49.8926 ; 49.8899 ; 49.996 ; 50.299 ; 50.4601 ; 50.7306 ; 51.3252 ; 52.2603 ; 53.534 ; 55.1766 ; 57.1238 ; 59.5752 ; 60.3861 ; 61.5003 ; 62.9937 ; 64.9456 ; 67.481 ; 70.6471 ; 71.6473 ; 72.9823 ; 74.7791 ; 77.2958 ; 78.2108 ; 79.3995 ; 81.052 ; 81.6706 ; 81.9194 ; 82.2814 ; 82.781 ; 82.9574 ; 83.2254 ; 83.6178 ; 84.1882 ; 84.3933 ; 84.6112 ; 84.8302 ; 85.1586 ; 85.6216 ; 86.2816 ; 86.5209 ; 86.8709 ; 87.3927 ; 88.1489 ; 88.4347 ; 88.8405 ; 89.4229 ; 89.6301 ; 89.9325 ; 90.3875 ; 91.0332 ; 91.885 ; 92.1883 ; 92.6563 ; 92.8264 ; 93.0663 ; 93.39 ; 93.8598 ; 94.5318 ; 95.18 ; 95.7412 ; 96.1123 ; 96.2133]

Bolt 3 - Shear Force (kips): [0.03859 ; 0.044011 ; 0.10398 ; 0.19249 ; 0.32303 ; 0.37291 ; 0.44838 ; 0.55616 ; 0.69701 ; 0.89938 ; 1.1785 ; 1.5265 ; 1.9408 ; 2.0613 ; 2.2154 ; 2.4078 ; 2.6419 ; 2.9228 ; 3.1939 ; 3.2656 ; 3.361 ; 3.4838 ; 3.6652 ; 3.7054 ; 3.7383 ; 3.7702 ; 3.7618 ; 3.7799 ; 3.7933 ; 3.8034 ; 3.808 ; 3.8886 ; 4.0373 ; 4.1872 ; 4.2349 ; 4.2155 ; 4.1972 ; 4.2273 ; 4.3424 ; 4.5156 ; 4.5737 ; 4.6449 ; 4.6807 ; 4.9841 ; 5.1717 ; 5.3695 ; 5.5424 ; 5.592 ; 5.7043 ; 5.9222 ; 6.1281 ; 6.4032 ; 6.4531 ; 6.3328 ; 6.3058 ; 6.2867 ; 6.3404 ; 6.3811 ; 6.2919 ; 6.3473 ; 6.1842 ; 6.2629 ; 6.2937]

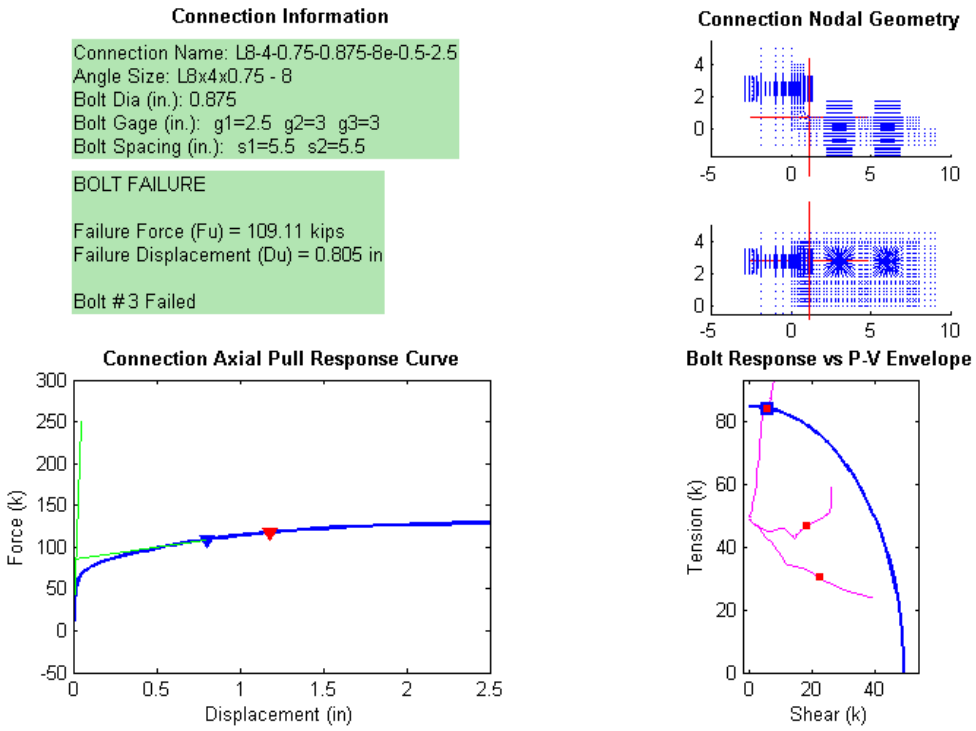


Figure B.191 Connection L8_4_0.75_0.875_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_0.875_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4.8979e+003

Plastic Stiffness (k/in): 29.0094

Displacement (in): [4.3848e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.10296 ; 0.1188 ; 0.14256 ; 0.17819 ; 0.23165 ; 0.31183 ; 0.3419 ; 0.387 ; 0.40391 ; 0.41025 ; 0.41977 ; 0.42334 ; 0.42467 ; 0.42668 ; 0.42969 ; 0.43421 ; 0.44098 ; 0.44352 ; 0.44733 ; 0.45304 ; 0.46162 ; 0.47447 ; 0.4793 ; 0.48653 ; 0.49738 ; 0.51365 ; 0.53806 ; 0.57467 ; 0.5884 ; 0.609 ; 0.63989 ; 0.65148 ; 0.66886 ; 0.69492 ; 0.73402 ; 0.79267 ; 0.81467 ; 0.84766 ; 0.89714 ; 0.97137 ; 0.99921 ; 1.041 ; 1.1036 ; 1.1271 ; 1.1623 ; 1.2152 ; 1.235 ; 1.2647 ; 1.3093 ; 1.3762 ; 1.4013 ; 1.4389 ; 1.4953 ; 1.5799 ; 1.7069 ; 1.8974 ; 2.1474 ; 2.3974 ; 2.5]

Force (kips): [-1.59336 ; 3.93327 ; 7.97294 ; 12.8397 ; 18.5457 ; 20.2824 ; 22.4846 ; 25.0795 ; 28.0994 ; 31.1433 ; 33.4406 ; 35.337 ; 37.2781 ; 37.8849 ; 38.7067 ; 39.8103 ; 41.2777 ; 43.1731 ; 45.4023 ; 46.0778 ; 46.9497 ; 47.2789 ; 47.4183 ; 47.5286 ; 47.5359 ; 47.527 ; 47.5636 ; 47.6348 ; 47.7391 ; 47.8508 ; 47.8643 ; 47.8981 ; 48.0495 ; 48.2672 ; 48.5569 ; 48.6704 ; 48.8323 ; 49.0614 ; 49.4259 ; 49.956 ; 50.7121 ; 50.9892 ; 51.3869 ; 51.9607 ; 52.1642 ; 52.4695 ; 52.9097 ; 53.524 ; 54.3747 ; 54.6913 ; 55.1337 ; 55.7518 ; 56.6062 ; 56.9197 ; 57.3834 ; 58.0413 ; 58.2731 ; 58.6068 ; 59.0694 ; 59.243 ; 59.4935 ; 59.8512 ; 60.3578 ; 60.5403 ; 60.8038 ; 61.1762 ; 61.6741 ; 62.2786 ; 63.0001 ; 63.7424 ; 64.3292 ; 64.5333]

Bolt 1 - Tensile Force (kips): [48.5348 ; 48.3296 ; 48.1648 ; 47.9502 ; 47.6745 ; 47.5833 ; 47.4618 ; 47.3078 ; 47.1129 ; 46.7645 ; 45.796 ; 44.5537 ; 42.914 ; 42.3624 ; 41.5769 ; 40.4384 ; 38.7752 ; 36.4318 ; 34.8758 ; 34.8394 ; 34.7981 ; 34.7144 ; 34.6236 ; 34.5799 ; 34.5659 ; 34.5614 ; 34.5593 ; 34.5586 ; 34.5576 ; 34.5548 ; 34.5527 ; 34.5471 ; 34.5093 ; 34.4637 ; 34.4309 ; 34.3945 ; 34.3501 ; 34.2904 ; 34.1647 ; 33.9597 ; 33.6723 ; 33.5205 ; 33.2779 ; 32.8915 ; 32.7521 ; 32.4729 ; 32.0896 ; 31.5949 ; 30.7494 ; 30.2905 ; 29.6704 ; 28.8867 ; 28.0625 ; 27.8014 ; 27.4526 ; 26.8459 ; 26.6573 ; 26.4192 ; 26.1578 ; 26.0623 ; 25.9474 ; 25.7777 ; 25.5272 ; 25.4314 ; 25.3173 ; 25.2127 ; 25.1086 ; 24.8306 ; 24.5036 ; 24.2054 ; 24.0361 ; 23.9953]

Bolt 1 - Shear Force (kips): [0.0728965 ; 0.231093 ; 0.443799 ; 0.710645 ; 1.03897 ; 1.14194 ; 1.27593 ; 1.44077 ; 1.64337 ; 2.01055 ; 3.00159 ; 4.1619 ; 5.59545 ; 6.0543 ; 6.69242 ; 7.5842 ; 8.83345 ; 10.4837 ; 11.4985 ; 11.4948 ; 11.4831 ; 11.6225 ; 11.7478 ; 11.7758 ; 11.7782 ; 11.778 ; 11.7775 ; 11.7768 ; 11.7758 ; 11.7739 ; 11.7729 ; 11.7897 ; 11.99 ; 12.2313 ; 12.4056 ; 12.5767 ; 12.7781 ; 12.9911 ; 13.4222 ; 14.0526 ; 15.2402 ; 15.7563 ; 16.5166 ; 17.556 ; 17.8897 ; 18.4774 ; 19.2448 ; 20.2114 ; 21.6887 ; 22.4206 ; 23.4056 ; 24.6644 ; 26.2211 ; 26.8174 ; 27.6516 ; 28.9322 ; 29.3495 ; 29.9211 ; 30.6598 ; 30.9455 ; 31.3181 ; 31.8631 ; 32.6132 ; 32.886 ; 33.2546 ; 33.7063 ; 34.3325 ; 35.386 ; 36.5936 ; 37.8134 ; 38.7231 ; 39.024]

Bolt 2 - Tensile Force (kips): [48.5418 ; 48.3116 ; 48.1203 ; 47.8813 ; 47.6115 ; 47.5337 ; 47.4373 ; 47.3319 ; 47.2303 ; 47.0278 ; 46.3033 ; 45.5169 ; 44.9009 ; 44.8755 ; 44.9616 ; 45.1333 ; 45.401 ; 45.78 ; 45.8946 ; 45.2035 ; 43.6532 ; 43.3767 ; 43.4309 ; 43.1505 ; 43.0163 ; 42.9657 ; 42.9561 ; 42.9542 ; 42.9575 ; 42.9394 ; 42.9214 ; 42.9315 ; 43.0388 ; 43.1866 ; 43.4051 ; 43.4801 ; 43.5924 ; 43.7601 ; 44.0179 ; 44.3211 ; 44.6811 ; 44.8293 ; 45.0621 ; 45.3991 ; 45.529 ; 45.6762 ; 45.9169 ; 46.2927 ; 46.7363 ; 46.8953 ; 47.1005 ; 47.4129 ; 47.8189 ; 47.9435 ; 48.1802 ; 48.6339 ; 48.783 ; 48.9754 ; 49.2778 ; 49.3931 ; 49.5426 ; 49.8065 ; 50.2438 ; 50.4228 ; 50.7032 ; 51.1578 ; 51.8749 ; 53.0129 ; 54.676 ; 56.6901 ; 58.487 ; 59.2427]

Bolt 2 - Shear Force (kips): [0.0961058 ; 0.242033 ; 0.477439 ; 0.772229 ; 1.1306 ; 1.24179 ; 1.38658 ; 1.56481 ; 1.78562 ; 2.17743 ; 3.15788 ; 4.32463 ; 5.7069 ; 6.12394 ; 6.67871 ; 7.41603 ; 8.38721 ; 9.56486 ; 11.1194 ; 12.0264 ; 13.5041 ; 13.8409 ; 13.88 ; 14.0771 ; 14.1314 ; 14.1401 ; 14.1839 ; 14.2612 ; 14.3716 ; 14.5017 ; 14.5237 ; 14.5403 ; 14.5709 ; 14.6121 ; 14.6714 ; 14.691 ; 14.7201 ; 14.7632 ; 14.8318 ; 15.13 ; 15.6058 ; 15.7819 ; 15.9974 ; 16.2614 ; 16.3575 ; 16.594 ; 16.9023 ; 17.2304 ; 17.8825 ; 18.1462 ; 18.5845 ; 19.2184 ; 20.201 ; 20.5957 ; 21.1143 ; 21.6793 ; 21.9219 ; 22.3539 ; 22.921 ; 23.1143 ; 23.4571 ; 23.8705 ; 24.4843 ; 24.6839 ; 24.9714 ; 25.3444 ; 25.6828 ; 25.8162 ; 25.9354 ; 25.9795 ; 25.9447 ; 25.9116]

Bolt 3 - Tensile Force (kips): [50 ; 49.9062 ; 49.9286 ; 50.072 ; 50.4749 ; 50.6676 ; 51.0678 ; 51.7677 ; 52.7578 ; 54.1095 ; 55.7258 ; 57.8504 ; 60.5359 ; 61.4122 ; 62.6145 ; 64.2317 ; 66.3669 ; 69.1125 ; 72.3282 ; 73.2467 ; 74.4396 ; 74.8802 ; 75.0597 ; 75.2201 ; 75.2373 ; 75.2321 ; 75.2719 ; 75.3528 ; 75.4739 ; 75.6081 ; 75.6235 ; 75.6606 ; 75.8276 ; 76.0788 ; 76.4402 ; 76.5756 ; 76.773 ; 77.059 ; 77.5107 ; 78.1761 ; 79.1108 ; 79.443 ; 79.9285 ; 80.6718 ; 80.9319 ; 81.3118 ; 81.8954 ; 82.7689 ; 84.0012 ; 84.4835 ; 85.1227 ; 86.0273 ; 87.2781 ; 87.7122 ; 88.3792 ; 89.4238 ; 89.7653 ; 90.2534 ; 90.92 ; 91.1778 ; 91.5361 ; 92.0498 ; 92.7693 ; 93.0297 ; 93.3897 ; 93.8805 ; 94.5335 ; 95.2343 ; 96.0473 ; 96.778 ; 97.2466 ; 97.3922]

Bolt 3 - Shear Force (kips): [0.045304 ; 0.043707 ; 0.11073 ; 0.20874 ; 0.35535 ; 0.41159 ; 0.49474 ; 0.60637 ; 0.76131 ; 0.97227 ; 1.2356 ; 1.5638 ; 1.9547 ; 2.0697 ; 2.2211 ; 2.4132 ; 2.6511 ; 2.9304 ; 3.1905 ; 3.2592 ; 3.3451 ; 3.3756 ; 3.388 ; 3.3991 ; 3.4009 ; 3.4005 ; 3.4048 ; 3.4137 ; 3.4266 ; 3.4402 ; 3.4413 ; 3.4438 ; 3.4607 ; 3.491 ; 3.5276 ; 3.5389 ; 3.5534 ; 3.5721 ; 3.5924 ; 3.6361 ; 3.6859 ; 3.7 ; 3.7153 ; 3.8558 ; 3.9205 ; 4.0052 ; 4.1213 ; 4.8037 ; 5.5081 ; 5.7967 ; 6.0508 ; 6.3363 ; 6.6299 ; 6.5871 ; 6.6264 ; 6.878 ; 6.9658 ; 7.1057 ; 7.2319 ; 7.3099 ; 7.4309 ; 7.5416 ; 7.6562 ; 7.6889 ; 7.7005 ; 7.609 ; 7.6074 ; 7.6617 ; 7.539 ; 7.1671 ; 7.041 ; 7.0157]

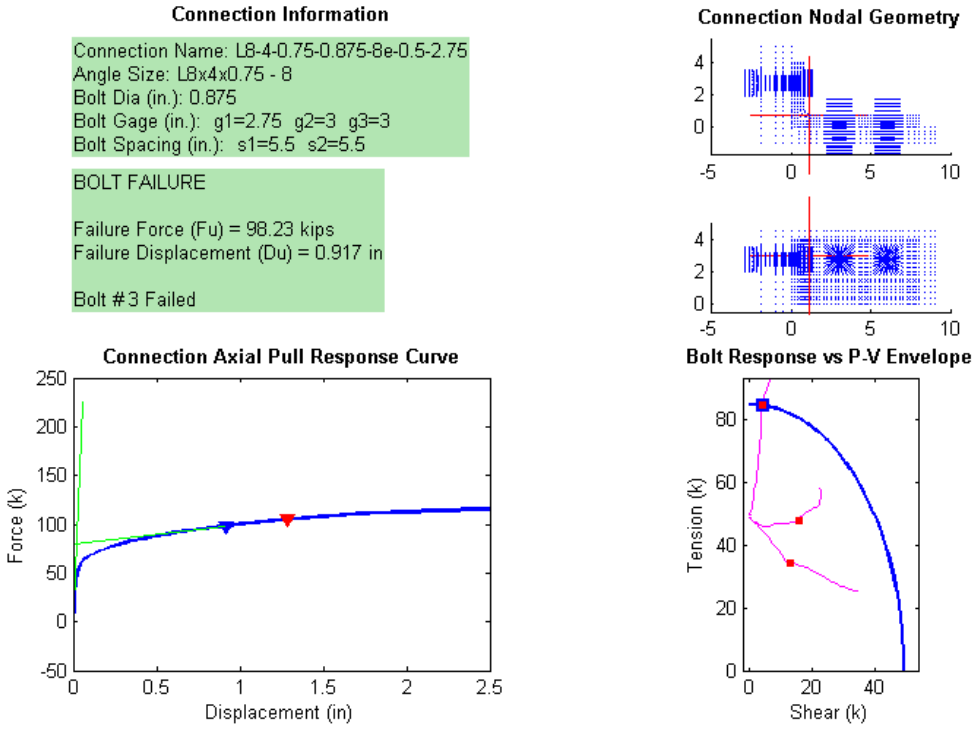


Figure B.192 Connection L8_4_0.75_0.875_8e_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_0.875_8e_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 4.1686e+003

Plastic Stiffness (k/in): 20.9103

Displacement (in): [6.3861e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.10296 ; 0.1188 ; 0.14256 ; 0.17819 ; 0.23165 ; 0.31183 ; 0.3419 ; 0.35317 ; 0.37009 ; 0.39546 ; 0.43351 ; 0.49059 ; 0.57622 ; 0.60832 ; 0.62036 ; 0.63843 ; 0.66552 ; 0.70615 ; 0.76711 ; 0.78997 ; 0.79854 ; 0.8114 ; 0.83069 ; 0.85962 ; 0.87046 ; 0.88674 ; 0.91115 ; 0.94776 ; 0.96149 ; 0.98209 ; 1.013 ; 1.0593 ; 1.0767 ; 1.1028 ; 1.1419 ; 1.2005 ; 1.2225 ; 1.2555 ; 1.305 ; 1.3236 ; 1.3514 ; 1.3931 ; 1.4558 ; 1.4793 ; 1.5145 ; 1.5673 ; 1.5871 ; 1.6169 ; 1.6615 ; 1.7283 ; 1.8287 ; 1.9791 ; 2.2049 ; 2.4549 ; 2.5]

Force (kips): [-1.59383 ; 3.09878 ; 6.54805 ; 10.715 ; 15.7341 ; 17.2799 ; 19.3371 ; 21.7802 ; 24.5487 ; 27.4841 ; 29.9412 ; 31.6193 ; 33.3335 ; 33.87 ; 34.601 ; 35.58 ; 36.8722 ; 38.5389 ; 40.5224 ; 41.1641 ; 41.3875 ; 41.7118 ; 42.1782 ; 42.8425 ; 43.7885 ; 45.0824 ; 45.5391 ; 45.7077 ; 45.9568 ; 46.3017 ; 46.7952 ; 47.4903 ; 47.7456 ; 47.8404 ; 47.9873 ; 48.1949 ; 48.4915 ; 48.622 ; 48.8039 ; 49.0591 ; 49.4315 ; 49.579 ; 49.7877 ; 50.0991 ; 50.5423 ; 50.7053 ; 50.9433 ; 51.2991 ; 51.7964 ; 51.9707 ; 52.2272 ; 52.6186 ; 52.7616 ; 52.9696 ; 53.2645 ; 53.6808 ; 53.8353 ; 54.0569 ; 54.3784 ; 54.4984 ; 54.6748 ; 54.9297 ; 55.2868 ; 55.7526 ; 56.2999 ; 56.9486 ; 57.5075 ; 57.598]

Bolt 1 - Tensile Force (kips): [48.5321 ; 48.3582 ; 48.2196 ; 48.0371 ; 47.7996 ; 47.7207 ; 47.6108 ; 47.4708 ; 47.2975 ; 47.0907 ; 46.6819 ; 45.6734 ; 44.2927 ; 43.8071 ; 43.0946 ; 42.0608 ; 40.5551 ; 38.3996 ; 35.6354 ; 34.9246 ; 34.9073 ; 34.8887 ; 34.869 ; 34.848 ; 34.8232 ; 34.8003 ; 34.7932 ; 34.7622 ; 34.6579 ; 34.6362 ; 34.6238 ; 34.621 ; 34.6214 ; 34.6218 ; 34.6235 ; 34.6262 ; 34.6262 ; 34.5687 ; 34.5201 ; 34.4558 ; 34.2886 ; 34.1913 ; 34.0741 ; 33.871 ; 33.5393 ; 33.3665 ; 33.0863 ; 32.6899 ; 32.0785 ; 31.8578 ; 31.5843 ; 30.8031 ; 30.4862 ; 30.0275 ; 29.401 ; 28.6626 ; 28.4369 ; 28.1565 ; 27.7505 ; 27.5693 ; 27.3239 ; 27.0067 ; 26.6648 ; 26.3225 ; 25.9907 ; 25.5511 ; 25.3423 ; 25.2905]

Bolt 1 - Shear Force (kips): [0.0722601 ; 0.190715 ; 0.372982 ; 0.602261 ; 0.893227 ; 0.986004 ; 1.112 ; 1.26791 ; 1.45465 ; 1.67101 ; 2.10914 ; 3.12975 ; 4.40889 ; 4.8393 ; 5.45271 ; 6.30996 ; 7.50463 ; 9.12135 ; 11.027 ; 11.4868 ; 11.4944 ; 11.4995 ; 11.5006 ; 11.4975 ; 11.4909 ; 11.4838 ; 11.4815 ; 11.5598 ; 11.7325 ; 11.7478 ; 11.7487 ; 11.74 ; 11.7362 ; 11.7348 ; 11.7329 ; 11.7302 ; 11.7459 ; 12.0334 ; 12.3071 ; 12.6562 ; 13.2766 ; 13.5963 ; 14.0014 ; 14.8435 ; 16.1012 ; 16.626 ; 17.3699 ; 18.2994 ; 19.5692 ; 20.0053 ; 20.5431 ; 21.8629 ; 22.3746 ; 23.1058 ; 24.1022 ; 25.3649 ; 25.8091 ; 26.4275 ; 27.4081 ; 27.7809 ; 28.3081 ; 29.0116 ; 29.8365 ; 30.7952 ; 31.8874 ; 33.1871 ; 34.1456 ; 34.3405]

Bolt 2 - Tensile Force (kips): [48.5332 ; 48.3409 ; 48.179 ; 47.9759 ; 47.7449 ; 47.6792 ; 47.5964 ; 47.5048 ; 47.4245 ; 47.372 ; 47.1754 ; 46.55 ; 46.0208 ; 45.9814 ; 46.0134 ; 46.1688 ; 46.3938 ; 46.7408 ; 47.0536 ; 47.123 ; 47.13 ; 47.1319 ; 47.1193 ; 47.0943 ; 47.0804 ; 47.1218 ; 47.1433 ; 47.1629 ; 47.2003 ; 47.2386 ; 47.2925 ; 47.383 ; 47.4239 ; 47.435 ; 47.4438 ; 47.4806 ; 47.5689 ; 47.6274 ; 47.7023 ; 47.84 ; 48.0786 ; 48.1609 ; 48.3055 ; 48.555 ; 48.9065 ; 49.0291 ; 49.2239 ; 49.4379 ; 49.6902 ; 49.8219 ; 50.0441 ; 50.2786 ; 50.3612 ; 50.4941 ; 50.715 ; 51.0142 ; 51.1246 ; 51.3137 ; 51.6161 ; 51.7063 ; 51.8111 ; 51.941 ; 52.2015 ; 52.7739 ; 53.9166 ; 55.8322 ; 57.8155 ; 58.1776]

Bolt 2 - Shear Force (kips): [0.0954684 ; 0.197111 ; 0.39823 ; 0.651212 ; 0.969198 ; 1.06942 ; 1.20453 ; 1.3725 ; 1.57418 ; 1.81628 ; 2.29321 ; 3.32741 ; 4.58999 ; 4.99157 ; 5.54446 ; 6.28499 ; 7.26247 ; 8.46112 ; 9.82768 ; 10.264 ; 10.4301 ; 10.67 ; 11.0081 ; 11.4707 ; 12.0804 ; 12.8581 ; 13.1218 ; 13.2069 ; 13.3242 ; 13.5174 ; 13.7989 ; 14.1911 ; 14.3299 ; 14.4007 ; 14.5883 ; 14.8133 ; 15.0771 ; 15.1492 ; 15.2981 ; 15.4741 ; 15.6748 ; 15.7767 ; 15.8922 ; 15.9723 ; 16.0654 ; 16.0946 ; 16.1523 ; 16.4964 ; 17.1189 ; 17.2809 ; 17.4876 ; 17.828 ; 17.9688 ; 18.1559 ; 18.3843 ; 18.9178 ; 19.1564 ; 19.4395 ; 19.7659 ; 19.9339 ; 20.244 ; 20.7281 ; 21.4012 ; 22.0524 ; 22.4175 ; 22.5451 ; 22.5099 ; 22.4571]

Bolt 3 - Tensile Force (kips): [50 ; 49.8912 ; 49.8848 ; 49.9891 ; 50.2851 ; 50.4403 ; 50.704 ; 51.2922 ; 52.2321 ; 53.5308 ; 55.218 ; 57.2091 ; 59.6827 ; 60.4926 ; 61.6041 ; 63.0963 ; 65.0566 ; 67.5991 ; 70.7614 ; 71.7678 ; 72.117 ; 72.6225 ; 73.3431 ; 74.3669 ; 75.8505 ; 77.9399 ; 78.6744 ; 78.9304 ; 79.3045 ; 79.8356 ; 80.6242 ; 81.7944 ; 82.2858 ; 82.463 ; 82.7177 ; 83.0701 ; 83.5675 ; 83.7668 ; 84.0523 ; 84.4546 ; 85.0503 ; 85.2893 ; 85.6305 ; 86.1196 ; 86.8083 ; 87.0529 ; 87.4082 ; 87.9321 ; 88.6981 ; 88.9805 ; 89.3951 ; 89.9844 ; 90.1965 ; 90.5063 ; 90.9556 ; 91.6155 ; 91.8457 ; 92.1623 ; 92.6373 ; 92.8243 ; 93.0958 ; 93.4681 ; 93.985 ; 94.6835 ; 95.331 ; 95.8735 ; 96.2354 ; 96.2974]

Bolt 3 - Shear Force (kips): [0.050025 ; 0.034523 ; 0.092471 ; 0.17884 ; 0.30614 ; 0.35461 ; 0.42784 ; 0.53289 ; 0.67077 ; 0.86783 ; 1.1412 ; 1.4765 ; 1.8847 ; 2.0035 ; 2.1544 ; 2.3431 ; 2.5738 ; 2.853 ; 3.1226 ; 3.1935 ; 3.2176 ; 3.2528 ; 3.3031 ; 3.3717 ; 3.4842 ; 3.6027 ; 3.6409 ; 3.6514 ; 3.6622 ; 3.6707 ; 3.691 ; 3.7008 ; 3.7262 ; 3.7318 ; 3.7375 ; 3.7445 ; 3.8024 ; 3.8923 ; 4.0068 ; 4.1293 ; 4.1928 ; 4.1867 ; 4.2364 ; 4.3664 ; 4.549 ; 4.6097 ; 4.6822 ; 4.7071 ; 5.0425 ; 5.2336 ; 5.4302 ; 5.5939 ; 5.641 ; 5.7449 ; 5.9371 ; 6.1522 ; 6.2528 ; 6.3774 ; 6.4743 ; 6.4178 ; 6.3594 ; 6.3379 ; 6.4014 ; 6.3508 ; 6.4133 ; 6.2764 ; 6.3115 ; 6.3245]

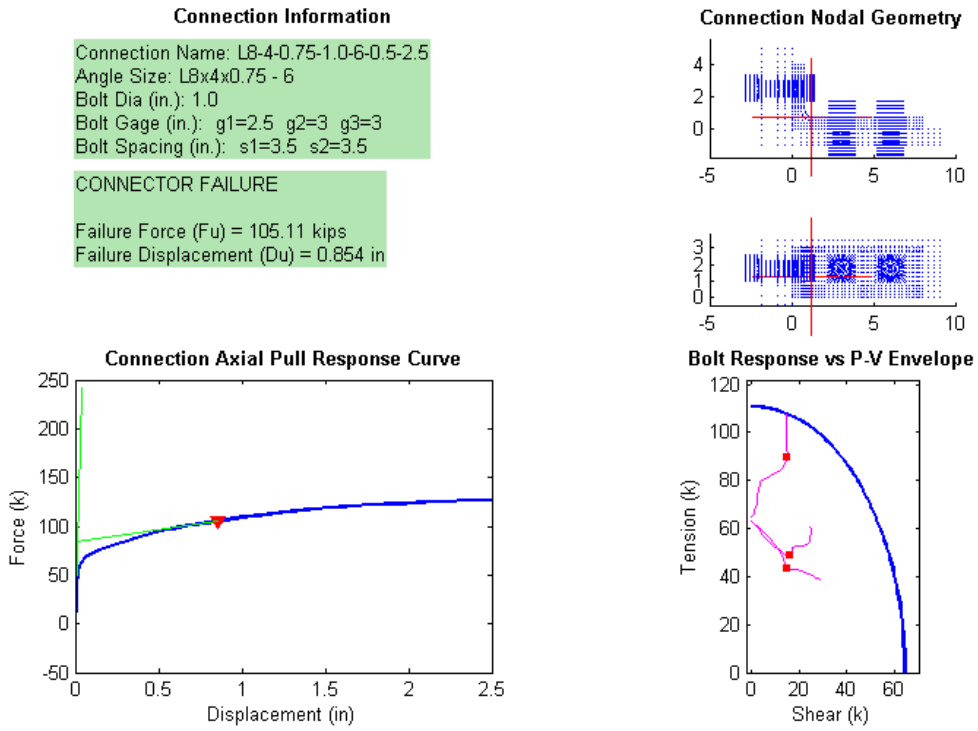


Figure B.193 Connection L8_4_0.75_1.0_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_1.0_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 5.8388e+003

Plastic Stiffness (k/in): 24.6391

Displacement (in): [9.4991e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.34649 ; 0.36233 ; 0.38608 ; 0.42172 ; 0.47517 ; 0.55535 ; 0.58542 ; 0.63052 ; 0.69817 ; 0.79965 ; 0.83771 ; 0.85198 ; 0.87338 ; 0.90549 ; 0.95366 ; 1.0259 ; 1.053 ; 1.0936 ; 1.1089 ; 1.1317 ; 1.166 ; 1.2174 ; 1.2367 ; 1.2657 ; 1.3091 ; 1.3253 ; 1.3497 ; 1.3864 ; 1.4413 ; 1.5237 ; 1.5546 ; 1.6009 ; 1.6704 ; 1.7747 ; 1.9311 ; 2.1657 ; 2.4157 ; 2.5]

Force (kips): [-2.37205 ; 4.37091 ; 9.03186 ; 14.5053 ; 20.5618 ; 26.1348 ; 29.9039 ; 31.9434 ; 33.8336 ; 35.8061 ; 37.8452 ; 40.2161 ; 43.2078 ; 43.4645 ; 43.9061 ; 44.5073 ; 45.4272 ; 46.6204 ; 48.1572 ; 48.6806 ; 49.4157 ; 50.4565 ; 51.8196 ; 52.3464 ; 52.5222 ; 52.7933 ; 53.1939 ; 53.7781 ; 54.5744 ; 54.8929 ; 55.3605 ; 55.5308 ; 55.7845 ; 56.1821 ; 56.7306 ; 56.9316 ; 57.2286 ; 57.6394 ; 57.7916 ; 58.013 ; 58.3301 ; 58.7837 ; 59.3926 ; 59.6048 ; 59.9058 ; 60.3176 ; 60.8753 ; 61.5872 ; 62.4471 ; 63.1818 ; 63.3958]

Bolt 1 - Tensile Force (kips): [63.2342 ; 62.9798 ; 62.7921 ; 62.5594 ; 62.281 ; 61.9982 ; 61.7625 ; 61.5486 ; 61.2567 ; 60.4034 ; 58.6552 ; 56.2407 ; 52.5067 ; 52.1362 ; 51.5411 ; 50.6459 ; 49.2165 ; 47.0514 ; 44.4684 ; 44.2946 ; 44.1717 ; 44.0922 ; 44.0396 ; 43.7411 ; 43.663 ; 43.5889 ; 43.5305 ; 43.4958 ; 43.4857 ; 43.4451 ; 43.3385 ; 43.2888 ; 43.1955 ; 43.0403 ; 42.8926 ; 42.8449 ; 42.6905 ; 42.4564 ; 42.3673 ; 42.2388 ; 42.0708 ; 41.7858 ; 41.4342 ; 41.3028 ; 41.1137 ; 40.8883 ; 40.5838 ; 40.1447 ; 39.5987 ; 39.1094 ; 38.963]

Bolt 1 - Shear Force (kips): [0.136918 ; 0.217385 ; 0.43631 ; 0.708614 ; 1.02615 ; 1.34047 ; 1.60018 ; 1.84961 ; 2.19266 ; 3.2416 ; 5.19586 ; 7.47336 ; 10.4872 ; 10.7575 ; 11.1796 ; 11.7792 ; 12.647 ; 13.7314 ; 14.5653 ; 14.5734 ; 14.5646 ; 14.5482 ; 14.5328 ; 14.7055 ; 14.7144 ; 14.7133 ; 14.7036 ; 14.6883 ; 14.6709 ; 14.982 ; 15.7422 ; 16.0091 ; 16.4752 ; 17.2954 ; 18.3136 ; 18.5876 ; 19.2208 ; 20.0764 ; 20.3854 ; 20.813 ; 21.3392 ; 22.2332 ; 23.2912 ; 23.6167 ; 24.0532 ; 24.5403 ; 25.167 ; 26.0278 ; 27.1359 ; 28.1634 ; 28.4664]

Bolt 2 - Tensile Force (kips): [63.2306 ; 62.8447 ; 62.542 ; 62.171 ; 61.7295 ; 61.3164 ; 60.9432 ; 60.4407 ; 59.4897 ; 57.7867 ; 55.7357 ; 53.804 ; 52.368 ; 52.2408 ; 52.0345 ; 51.7534 ; 51.31 ; 50.7048 ; 49.9182 ; 49.6471 ; 49.3284 ; 49.0295 ; 49.0551 ; 48.945 ; 48.9422 ; 49.0509 ; 49.4928 ; 50.1697 ; 51.1891 ; 51.5122 ; 51.9186 ; 52.0756 ; 52.2809 ; 52.4034 ; 52.5941 ; 52.562 ; 52.5537 ; 52.643 ; 52.6667 ; 52.7085 ; 52.7658 ; 52.9224 ; 53.2644 ; 53.3859 ; 53.5843 ; 54.0088 ; 54.8565 ; 56.2516 ; 58.2807 ; 60.2527 ; 60.8693]

Bolt 2 - Shear Force (kips): [0.106945 ; 0.363633 ; 0.683361 ; 1.08016 ; 1.54428 ; 2.01562 ; 2.4515 ; 2.923 ; 3.53226 ; 4.68685 ; 6.44587 ; 8.26151 ; 10.0786 ; 10.24 ; 10.492 ; 10.8468 ; 11.3876 ; 12.1614 ; 13.2785 ; 13.6584 ; 14.1524 ; 14.7566 ; 15.4021 ; 15.9612 ; 16.1021 ; 16.3479 ; 16.5469 ; 16.7635 ; 17.0466 ; 17.1374 ; 17.244 ; 17.2826 ; 17.3785 ; 17.8424 ; 18.5181 ; 18.9844 ; 19.4652 ; 19.9831 ; 20.2042 ; 20.5582 ; 21.1428 ; 21.8016 ; 22.621 ; 22.9472 ; 23.3937 ; 23.9142 ; 24.4294 ; 24.7959 ; 24.9311 ; 24.8296 ; 24.7976]

Bolt 3 - Tensile Force (kips): [65 ; 64.8494 ; 64.8182 ; 64.9213 ; 65.1062 ; 65.4765 ; 66.2994 ; 66.9924 ; 67.8186 ; 68.9375 ; 70.5233 ; 73.0566 ; 76.8946 ; 77.2237 ; 77.7177 ; 78.3998 ; 79.4885 ; 80.9746 ; 83.0671 ; 83.8366 ; 84.99 ; 86.6774 ; 88.8257 ; 89.566 ; 89.82 ; 90.1853 ; 90.7612 ; 91.6456 ; 92.8233 ; 93.343 ; 93.9356 ; 94.1297 ; 94.4276 ; 94.9872 ; 95.8064 ; 96.1016 ; 96.5621 ; 97.2059 ; 97.4369 ; 97.7909 ; 98.3054 ; 99.05 ; 100.043 ; 100.403 ; 100.92 ; 101.627 ; 102.606 ; 103.9 ; 105.504 ; 106.922 ; 107.347]

Bolt 3 - Shear Force (kips): [0.0438625 ; 0.0805473 ; 0.180707 ; 0.331841 ; 0.537417 ; 0.810758 ; 1.10953 ; 1.3777 ; 1.63568 ; 1.94557 ; 2.3561 ; 2.85375 ; 3.36999 ; 3.41079 ; 3.52134 ; 3.66136 ; 4.01053 ; 6.33948 ; 10.0414 ; 11.4246 ; 12.9952 ; 14.1304 ; 14.7772 ; 14.8258 ; 14.8467 ; 15.001 ; 15.0899 ; 15.0654 ; 14.9024 ; 14.6789 ; 14.6314 ; 14.6682 ; 14.71 ; 14.6936 ; 14.7125 ; 14.7114 ; 14.6471 ; 14.6386 ; 14.6406 ; 14.6194 ; 14.5829 ; 14.5423 ; 14.4859 ; 14.4815 ; 14.4744 ; 14.4909 ; 14.5303 ; 14.6008 ; 14.7002 ; 14.8018 ; 14.868]

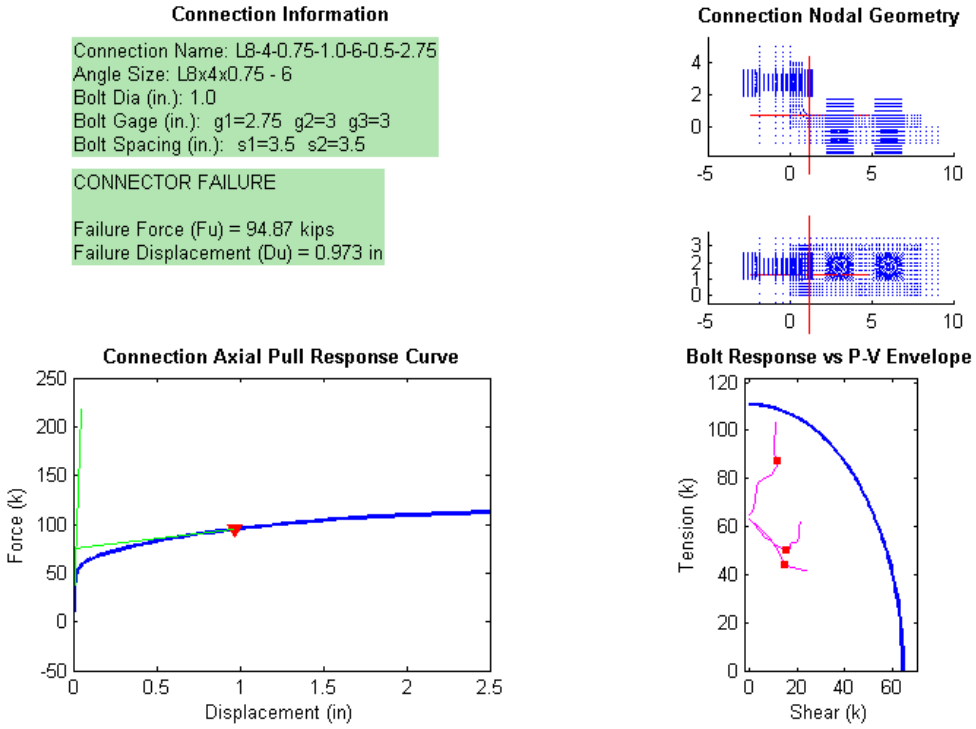


Figure B.194 Connection L8_4_0.75_1.0_6_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_1.0_6_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 4.9182e+003

Plastic Stiffness (k/in): 19.7844

Displacement (in): [9.5381e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.34102 ; 0.39447 ; 0.39948 ; 0.407 ; 0.41828 ; 0.43519 ; 0.46056 ; 0.49861 ; 0.55569 ; 0.64132 ; 0.76975 ; 0.81791 ; 0.89016 ; 0.91725 ; 0.95789 ; 1.0188 ; 1.0341 ; 1.0493 ; 1.0722 ; 1.1065 ; 1.1579 ; 1.2351 ; 1.264 ; 1.3074 ; 1.3237 ; 1.3481 ; 1.3572 ; 1.3709 ; 1.3915 ; 1.4224 ; 1.4688 ; 1.4862 ; 1.5122 ; 1.5513 ; 1.61 ; 1.6979 ; 1.8299 ; 2.0278 ; 2.2778 ; 2.5]

Force (kips): [-2.38093 ; 3.33652 ; 7.22491 ; 11.8648 ; 17.1677 ; 22.3617 ; 26.1756 ; 26.9496 ; 27.6691 ; 28.4979 ; 29.5092 ; 30.7445 ; 32.1752 ; 33.6373 ; 35.2848 ; 37.4132 ; 38.1489 ; 39.1765 ; 39.269 ; 39.423 ; 39.6474 ; 39.9921 ; 40.5143 ; 41.214 ; 42.1833 ; 43.4952 ; 45.1784 ; 45.7838 ; 46.5847 ; 46.8772 ; 47.2792 ; 47.8975 ; 48.0684 ; 48.2293 ; 48.4444 ; 48.7704 ; 49.223 ; 49.8442 ; 50.0684 ; 50.4247 ; 50.5624 ; 50.7593 ; 50.8358 ; 50.941 ; 51.1059 ; 51.3616 ; 51.7268 ; 51.8564 ; 52.0487 ; 52.3318 ; 52.7195 ; 53.2413 ; 53.9141 ; 54.7443 ; 55.5756 ; 56.1707]

Bolt 1 - Tensile Force (kips): [63.233 ; 63.0189 ; 62.8634 ; 62.6689 ; 62.4293 ; 62.1718 ; 61.9506 ; 61.8929 ; 61.8242 ; 61.7266 ; 61.5845 ; 61.3778 ; 61.0404 ; 60.1266 ; 58.7169 ; 56.6175 ; 55.7667 ; 54.4704 ; 54.3453 ; 54.1457 ; 53.8463 ; 53.3802 ; 52.6434 ; 51.5216 ; 49.7545 ; 46.9638 ; 44.3708 ; 44.2363 ; 44.1525 ; 44.1311 ; 44.1109 ; 44.0919 ; 43.9988 ; 43.8605 ; 43.7559 ; 43.6686 ; 43.6152 ; 43.5988 ; 43.5975 ; 43.546 ; 43.5076 ; 43.462 ; 43.4306 ; 43.4024 ; 43.3239 ; 43.2046 ; 43.0471 ; 43.0177 ; 42.9927 ; 42.8314 ; 42.6307 ; 42.3962 ; 42.2021 ; 41.9625 ; 41.7824 ; 41.5907]

Bolt 1 - Shear Force (kips): [0.136009 ; 0.173197 ; 0.351782 ; 0.580618 ; 0.857586 ; 1.14908 ; 1.39666 ; 1.46247 ; 1.54326 ; 1.65989 ; 1.83154 ; 2.07815 ; 2.47266 ; 3.61054 ; 5.16719 ; 7.1762 ; 7.92607 ; 9.00959 ; 9.11047 ; 9.27019 ; 9.50726 ; 9.86946 ; 10.4242 ; 11.2298 ; 12.3675 ; 13.7962 ; 14.5853 ; 14.581 ; 14.567 ; 14.5617 ; 14.556 ; 14.5501 ; 14.6231 ; 14.6864 ; 14.7005 ; 14.6966 ; 14.6822 ; 14.6641 ; 14.6577 ; 15.0627 ; 15.3505 ; 15.6866 ; 15.8737 ; 16.0218 ; 16.4283 ; 17.0131 ; 18.0371 ; 18.266 ; 18.4936 ; 19.1541 ; 19.916 ; 20.7623 ; 21.4622 ; 22.3591 ; 23.1216 ; 23.7257]

Bolt 2 - Tensile Force (kips): [63.2247 ; 62.8992 ; 62.6466 ; 62.3421 ; 61.9738 ; 61.6164 ; 61.3266 ; 61.2377 ; 61.1057 ; 60.8945 ; 60.5057 ; 59.7993 ; 58.753 ; 57.4697 ; 56.003 ; 54.7031 ; 54.3503 ; 53.8697 ; 53.8242 ; 53.7485 ; 53.6408 ; 53.4762 ; 53.2207 ; 52.8717 ; 52.4005 ; 51.755 ; 50.8634 ; 50.5485 ; 50.2409 ; 50.1378 ; 50.0194 ; 49.9175 ; 49.8752 ; 49.8243 ; 49.7679 ; 49.897 ; 50.519 ; 51.4952 ; 51.8646 ; 52.327 ; 52.4678 ; 52.7055 ; 52.7816 ; 52.9193 ; 53.0837 ; 53.1884 ; 53.3939 ; 53.4564 ; 53.4634 ; 53.5015 ; 53.7306 ; 54.4013 ; 55.7479 ; 57.7924 ; 59.9907 ; 61.7531]

Bolt 2 - Shear Force (kips): [0.106188 ; 0.301055 ; 0.570812 ; 0.911487 ; 1.32346 ; 1.76182 ; 2.17022 ; 2.28881 ; 2.44407 ; 2.67021 ; 2.99561 ; 3.42359 ; 3.96302 ; 5.03646 ; 6.389 ; 7.9521 ; 8.43849 ; 9.11116 ; 9.17359 ; 9.2731 ; 9.41924 ; 9.64129 ; 9.97749 ; 10.449 ; 11.1189 ; 12.1056 ; 13.5609 ; 14.048 ; 14.6426 ; 14.8467 ; 15.1208 ; 15.5448 ; 15.7313 ; 15.9408 ; 16.1964 ; 16.5727 ; 16.8231 ; 17.1073 ; 17.2171 ; 17.3453 ; 17.3809 ; 17.4373 ; 17.4562 ; 17.4945 ; 17.5403 ; 17.9234 ; 18.2176 ; 18.4303 ; 18.9359 ; 19.4352 ; 19.9727 ; 20.3613 ; 20.656 ; 20.7816 ; 21.0335 ; 21.1779]

Bolt 3 - Tensile Force (kips): [65 ; 64.83 ; 64.761 ; 64.7876 ; 64.898 ; 65.052 ; 65.3895 ; 65.5282 ; 65.7413 ; 65.979 ; 66.3041 ; 66.8338 ; 67.6971 ; 68.8986 ; 70.6935 ; 73.4504 ; 74.4454 ; 75.9143 ; 76.0472 ; 76.2501 ; 76.5287 ; 76.95 ; 77.5892 ; 78.4813 ; 79.7632 ; 81.6301 ; 84.17 ; 85.0679 ; 86.2614 ; 86.7206 ; 87.3602 ; 88.4789 ; 88.7952 ; 89.078 ; 89.4232 ; 89.8907 ; 90.5534 ; 91.5354 ; 91.9196 ; 92.5915 ; 92.8349 ; 93.1737 ; 93.2929 ; 93.4688 ; 93.7398 ; 94.1521 ; 94.7542 ; 94.9692 ; 95.2902 ; 95.7728 ; 96.4653 ; 97.4363 ; 98.769 ; 100.508 ; 102.272 ; 103.578]

Bolt 3 - Shear Force (kips): [0.0515189 ; 0.0666712 ; 0.149392 ; 0.277026 ; 0.455321 ; 0.691516 ; 0.943021 ; 1.01666 ; 1.09786 ; 1.21101 ; 1.3685 ; 1.51749 ; 1.72148 ; 1.99803 ; 2.36485 ; 2.79811 ; 2.92816 ; 3.0859 ; 3.09917 ; 3.13684 ; 3.19552 ; 3.30679 ; 3.52319 ; 3.8135 ; 5.82916 ; 8.95552 ; 11.2854 ; 11.5896 ; 11.7834 ; 11.6503 ; 11.5789 ; 11.2698 ; 11.1008 ; 10.9651 ; 10.8645 ; 10.7825 ; 10.6718 ; 10.6178 ; 10.6008 ; 10.4585 ; 10.4151 ; 10.3899 ; 10.4008 ; 10.4238 ; 10.4619 ; 10.515 ; 10.5833 ; 10.6085 ; 10.6408 ; 10.6695 ; 10.7113 ; 10.7667 ; 10.8281 ; 10.8812 ; 10.9715 ; 11.0972]

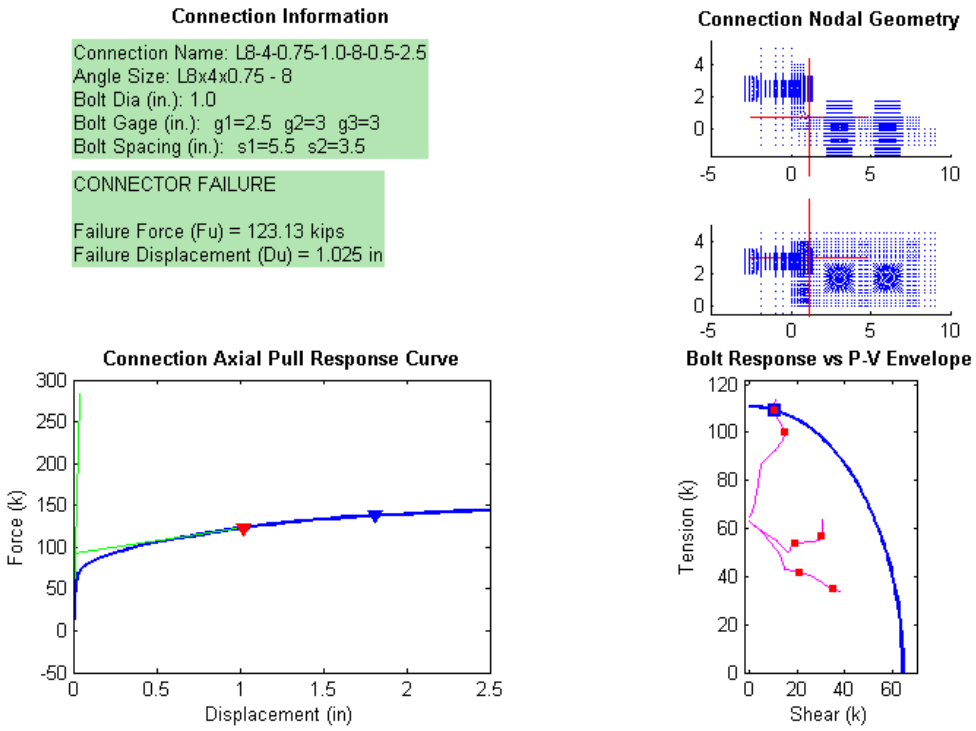


Figure B.195 Connection L8_4_0.75_1.0_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_1.0_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 7.4903e+003

Plastic Stiffness (k/in): 29.6982

Displacement (in): [8.4122e-036 ; 0.00048828 ; 0.00097656 ; 0.001709 ; 0.0028076 ; 0.0044556 ; 0.0069275 ; 0.010635 ; 0.016197 ; 0.018283 ; 0.021411 ; 0.026104 ; 0.033143 ; 0.043702 ; 0.05954 ; 0.083298 ; 0.11893 ; 0.17239 ; 0.25257 ; 0.28264 ; 0.32774 ; 0.34465 ; 0.37002 ; 0.40808 ; 0.44613 ; 0.48418 ; 0.54127 ; 0.62689 ; 0.659 ; 0.67104 ; 0.6891 ; 0.71619 ; 0.75683 ; 0.81778 ; 0.84064 ; 0.84921 ; 0.86207 ; 0.88136 ; 0.88859 ; 0.89944 ; 0.91571 ; 0.94012 ; 0.97674 ; 1.0317 ; 1.0523 ; 1.0832 ; 1.1295 ; 1.199 ; 1.3033 ; 1.3424 ; 1.401 ; 1.489 ; 1.522 ; 1.5715 ; 1.6457 ; 1.757 ; 1.9241 ; 2.1741 ; 2.2366 ; 2.3303 ; 2.4709 ; 2.5]

Force (kips): [-2.05481 ; -0.0457938 ; 1.60256 ; 3.82257 ; 6.70388 ; 10.3971 ; 15.0224 ; 20.6237 ; 26.5813 ; 28.237 ; 30.2547 ; 32.4812 ; 34.7039 ; 36.5431 ; 38.1429 ; 39.7316 ; 41.6317 ; 43.9545 ; 46.6513 ; 47.5258 ; 48.7333 ; 49.16 ; 49.8583 ; 50.8128 ; 51.7086 ; 52.5559 ; 53.6897 ; 55.2509 ; 55.8171 ; 56.0214 ; 56.3239 ; 56.7592 ; 57.408 ; 58.337 ; 58.7217 ; 58.8555 ; 59.0804 ; 59.384 ; 59.5124 ; 59.6924 ; 59.9591 ; 60.3337 ; 60.8774 ; 61.6545 ; 61.9537 ; 62.3736 ; 62.9639 ; 63.7745 ; 64.8841 ; 65.2795 ; 65.8352 ; 66.5964 ; 66.8662 ; 67.2577 ; 67.8101 ; 68.5407 ; 69.4885 ; 70.6517 ; 70.9084 ; 71.2734 ; 71.7859 ; 71.8849]

Bolt 1 - Tensile Force (kips): [63.2365 ; 63.1598 ; 63.0954 ; 63.0056 ; 62.8849 ; 62.7243 ; 62.5121 ; 62.2361 ; 61.9142 ; 61.8177 ; 61.6951 ; 61.5489 ; 61.3698 ; 61.1549 ; 60.6491 ; 59.4108 ; 57.5534 ; 54.8241 ; 50.8041 ; 49.2728 ; 47.0332 ; 46.2486 ; 45.1325 ; 44.3479 ; 44.1675 ; 44.0672 ; 43.9806 ; 43.8607 ; 43.4956 ; 43.4321 ; 43.3655 ; 43.304 ; 43.2575 ; 43.2034 ; 43.1092 ; 43.0838 ; 43.0014 ; 42.9136 ; 42.8503 ; 42.7659 ; 42.6558 ; 42.5574 ; 42.329 ; 41.8729 ; 41.6635 ; 41.3795 ; 41.0505 ; 40.4002 ; 39.0393 ; 38.5735 ; 37.9492 ; 37.1943 ; 36.9191 ; 36.5477 ; 35.8925 ; 35.2886 ; 34.7781 ; 34.3818 ; 34.2475 ; 34.0729 ; 33.8316 ; 33.7749]

Bolt 1 - Shear Force (kips): [0.125858 ; 0.0754047 ; 0.117396 ; 0.220516 ; 0.370632 ; 0.571668 ; 0.832602 ; 1.16229 ; 1.53386 ; 1.64283 ; 1.78054 ; 1.94295 ; 2.14293 ; 2.39037 ; 3.00193 ; 4.45248 ; 6.32418 ; 8.72505 ; 11.7133 ; 12.6444 ; 13.7496 ; 14.0527 ; 14.4046 ; 14.5606 ; 14.5528 ; 14.5352 ; 14.5118 ; 14.5284 ; 14.6936 ; 14.6929 ; 14.6843 ; 14.6685 ; 14.6484 ; 14.7022 ; 15.2417 ; 15.3788 ; 15.8143 ; 16.193 ; 16.4952 ; 16.8492 ; 17.4796 ; 18.15 ; 19.3431 ; 20.9965 ; 21.6835 ; 22.579 ; 23.5235 ; 24.9195 ; 27.5497 ; 28.4172 ; 29.5311 ; 30.7304 ; 31.1786 ; 31.876 ; 33.0859 ; 34.2336 ; 35.3969 ; 36.5829 ; 36.9297 ; 37.3875 ; 37.9941 ; 38.1197]

Bolt 2 - Tensile Force (kips): [63.2307 ; 63.1351 ; 63.0523 ; 62.9298 ; 62.7583 ; 62.5323 ; 62.2407 ; 61.8698 ; 61.4728 ; 61.3623 ; 61.224 ; 61.0724 ; 60.8784 ; 60.6231 ; 60.1557 ; 59.1208 ; 57.8776 ; 56.6598 ; 55.385 ; 54.8559 ; 54.0835 ; 53.7857 ; 53.3152 ; 52.662 ; 52.0859 ; 51.5733 ; 51.0121 ; 50.7134 ; 50.6245 ; 50.578 ; 50.504 ; 50.5188 ; 51.0009 ; 51.808 ; 52.1145 ; 52.2309 ; 52.3857 ; 52.6304 ; 52.7074 ; 52.8317 ; 53.0019 ; 53.2026 ; 53.4901 ; 53.8035 ; 53.8435 ; 53.9275 ; 54.0093 ; 54.1755 ; 54.5088 ; 54.5563 ; 54.6684 ; 54.8426 ; 54.9187 ; 55.0588 ; 55.364 ; 56.3373 ; 58.0382 ; 60.5641 ; 61.225 ; 62.1771 ; 63.503 ; 63.7733]

Bolt 2 - Shear Force (kips): [0.0924566 ; 0.076342 ; 0.171735 ; 0.316416 ; 0.512043 ; 0.771202 ; 1.10769 ; 1.53061 ; 2.00745 ; 2.14949 ; 2.33341 ; 2.558 ; 2.8482 ; 3.22708 ; 3.96456 ; 5.40757 ; 7.14875 ; 9.07239 ; 10.8648 ; 11.4364 ; 12.2307 ; 12.5283 ; 12.976 ; 13.5819 ; 14.1109 ; 14.5804 ; 15.1532 ; 15.721 ; 16.0078 ; 16.1835 ; 16.4711 ; 16.7611 ; 17.0632 ; 17.3435 ; 17.429 ; 17.4604 ; 17.4997 ; 17.5605 ; 17.5785 ; 17.6137 ; 17.6615 ; 17.9277 ; 18.2848 ; 19.1062 ; 19.5296 ; 20.0879 ; 21.175 ; 22.5876 ; 23.9873 ; 24.6858 ; 25.7422 ; 27.3783 ; 27.9455 ; 28.7433 ; 29.6092 ; 30.1277 ; 30.501 ; 30.7651 ; 30.6716 ; 30.569 ; 30.4364 ; 30.39]

Bolt 3 - Tensile Force (kips): [65 ; 64.952 ; 64.9063 ; 64.8551 ; 64.8169 ; 64.8253 ; 64.93 ; 65.1161 ; 65.5036 ; 65.7249 ; 66.1663 ; 66.8725 ; 67.7362 ; 68.6672 ; 69.7963 ; 71.1463 ; 72.9578 ; 75.4832 ; 78.8983 ; 80.0753 ; 81.7772 ; 82.3914 ; 83.2879 ; 84.5665 ; 85.8115 ; 87.086 ; 88.8691 ; 91.5457 ; 92.4125 ; 92.7142 ; 93.1573 ; 93.798 ; 94.7005 ; 95.9187 ; 96.4073 ; 96.5892 ; 96.8643 ; 97.2482 ; 97.4127 ; 97.6466 ; 97.9839 ; 98.4656 ; 99.1915 ; 100.277 ; 100.685 ; 101.265 ; 102.035 ; 103.006 ; 104.472 ; 104.949 ; 105.616 ; 106.575 ; 106.931 ; 107.429 ; 108.05 ; 108.869 ; 110.128 ; 111.698 ; 112.059 ; 112.649 ; 113.607 ; 113.779]

Bolt 3 - Shear Force (kips): [0.0538664 ; 0.0282428 ; 0.0308531 ; 0.0632639 ; 0.117407 ; 0.202151 ; 0.329833 ; 0.510881 ; 0.771853 ; 0.866127 ; 1.00331 ; 1.18127 ; 1.40013 ; 1.66612 ; 1.95632 ; 2.32621 ; 2.78948 ; 3.31937 ; 3.8502 ; 4.01201 ; 4.2192 ; 4.29041 ; 4.43742 ; 4.62487 ; 4.80685 ; 5.13303 ; 6.92791 ; 10.1556 ; 10.8577 ; 11.0709 ; 11.3435 ; 11.836 ; 12.4714 ; 13.2704 ; 13.7157 ; 13.8721 ; 14.0116 ; 14.1943 ; 14.2123 ; 14.2578 ; 14.3514 ; 14.5 ; 14.6872 ; 14.9481 ; 14.728 ; 14.3757 ; 13.916 ; 13.4004 ; 12.7712 ; 12.3606 ; 11.9675 ; 11.6285 ; 11.4938 ; 11.2449 ; 10.8996 ; 10.6283 ; 10.5333 ; 10.5649 ; 10.578 ; 10.7144 ; 11.1136 ; 11.1503]

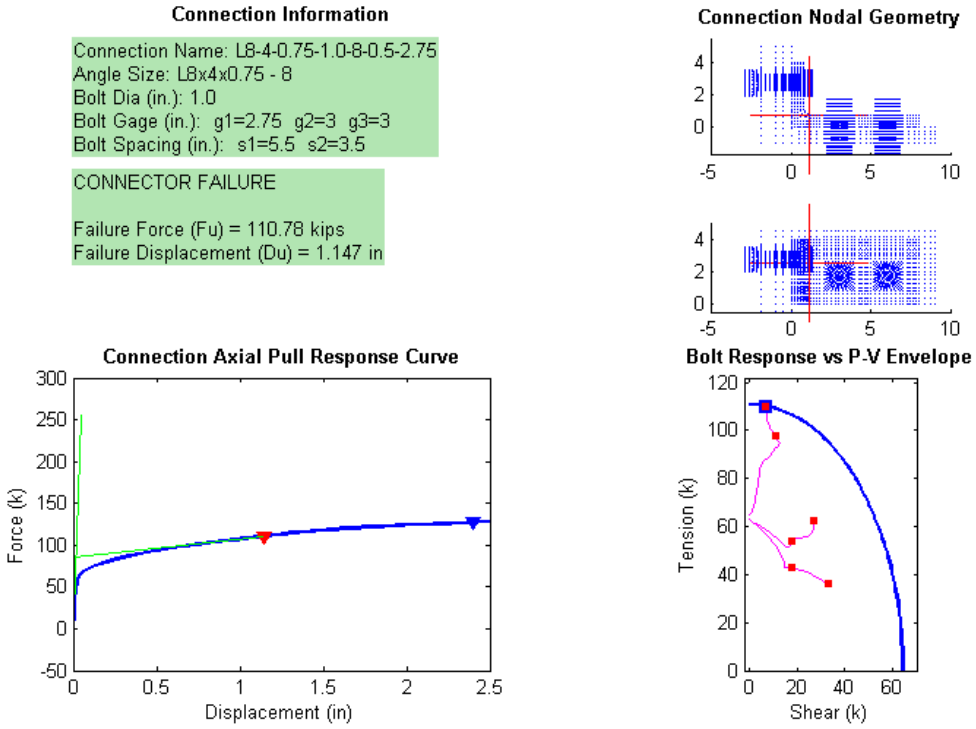


Figure B.196 Connection L8_4_0.75_1.0_8_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_1.0_8_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 4.8725e+003

Plastic Stiffness (k/in): 22.7527

Displacement (in): [1.0402e-035 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.20294 ; 0.29797 ; 0.44051 ; 0.49396 ; 0.51401 ; 0.54408 ; 0.58918 ; 0.65683 ; 0.75831 ; 0.78368 ; 0.80905 ; 0.8471 ; 0.86137 ; 0.88278 ; 0.91489 ; 0.96305 ; 1.0353 ; 1.0624 ; 1.0725 ; 1.0878 ; 1.1106 ; 1.1192 ; 1.1321 ; 1.1514 ; 1.1803 ; 1.1911 ; 1.2074 ; 1.2318 ; 1.2684 ; 1.3234 ; 1.4057 ; 1.4366 ; 1.483 ; 1.5525 ; 1.6568 ; 1.8132 ; 2.0478 ; 2.1103 ; 2.204 ; 2.3446 ; 2.5]

Force (kips): [-2.04749 ; 3.47967 ; 7.46913 ; 12.2786 ; 17.9718 ; 23.908 ; 25.5541 ; 27.5083 ; 29.6023 ; 31.5598 ; 33.1062 ; 34.6437 ; 36.1797 ; 37.9491 ; 40.029 ; 42.4454 ; 45.4779 ; 46.5549 ; 46.9309 ; 47.4581 ; 48.2048 ; 49.221 ; 50.6281 ; 50.9597 ; 51.2917 ; 51.8067 ; 51.9875 ; 52.2559 ; 52.6726 ; 53.2455 ; 54.081 ; 54.4051 ; 54.5312 ; 54.7103 ; 54.9673 ; 55.07 ; 55.2163 ; 55.4392 ; 55.7484 ; 55.8743 ; 56.0597 ; 56.3224 ; 56.7013 ; 57.2584 ; 58.0144 ; 58.2838 ; 58.6664 ; 59.214 ; 59.9698 ; 60.9514 ; 62.1429 ; 62.4214 ; 62.8107 ; 63.3361 ; 63.8508]

Bolt 1 - Tensile Force (kips): [63.2347 ; 63.0178 ; 62.8495 ; 62.6349 ; 62.3597 ; 62.0416 ; 61.9457 ; 61.8259 ; 61.6861 ; 61.5298 ; 61.3409 ; 61.0453 ; 59.9812 ; 58.1615 ; 55.6742 ; 52.1864 ; 46.6696 ; 44.807 ; 44.462 ; 44.2891 ; 44.1551 ; 44.0505 ; 43.9526 ; 43.8882 ; 43.6114 ; 43.4719 ; 43.4309 ; 43.3878 ; 43.348 ; 43.3119 ; 43.2372 ; 43.1618 ; 43.1164 ; 43.0481 ; 42.9439 ; 42.881 ; 42.7998 ; 42.6946 ; 42.6108 ; 42.5642 ; 42.4599 ; 42.2982 ; 42.0318 ; 41.6107 ; 41.1139 ; 40.8992 ; 40.5465 ; 39.7992 ; 38.7896 ; 37.8508 ; 37.1581 ; 36.9874 ; 36.7495 ; 36.3414 ; 35.9523]

Bolt 1 - Shear Force (kips): [0.124008 ; 0.204538 ; 0.413222 ; 0.679971 ; 1.0129 ; 1.38501 ; 1.49497 ; 1.63114 ; 1.78901 ; 1.96629 ; 2.18798 ; 2.54058 ; 3.83811 ; 5.76424 ; 8.0381 ; 10.7909 ; 13.9222 ; 14.5066 ; 14.5685 ; 14.5716 ; 14.5578 ; 14.5336 ; 14.5037 ; 14.5559 ; 14.6867 ; 14.6835 ; 14.6765 ; 14.665 ; 14.649 ; 14.6283 ; 14.8817 ; 15.3072 ; 15.5667 ; 15.9001 ; 16.356 ; 16.6401 ; 16.9936 ; 17.6689 ; 18.2867 ; 18.5583 ; 19.0733 ; 19.7587 ; 20.7391 ; 22.1081 ; 23.6038 ; 24.0998 ; 24.8384 ; 26.3107 ; 28.2294 ; 29.9259 ; 31.0657 ; 31.3907 ; 31.8756 ; 32.6634 ; 33.4074]

Bolt 2 - Tensile Force (kips): [63.2241 ; 62.9381 ; 62.6959 ; 62.3991 ; 62.0343 ; 61.6607 ; 61.5589 ; 61.4393 ; 61.3179 ; 61.1784 ; 60.9847 ; 60.7229 ; 59.8903 ; 58.6942 ; 57.7 ; 56.5932 ; 54.8367 ; 54.0418 ; 53.7434 ; 53.3329 ; 52.7795 ; 52.1168 ; 51.6101 ; 51.5611 ; 51.5391 ; 51.4274 ; 51.413 ; 51.4122 ; 51.6126 ; 52.1513 ; 53.0447 ; 53.345 ; 53.4497 ; 53.6079 ; 53.8443 ; 53.9206 ; 54.0407 ; 54.1969 ; 54.4581 ; 54.5177 ; 54.6127 ; 54.7762 ; 54.9883 ; 55.1351 ; 55.3543 ; 55.4014 ; 55.5138 ; 55.734 ; 56.0673 ; 56.9361 ; 59.1799 ; 59.7964 ; 60.7224 ; 62.1226 ; 63.6038]

Bolt 2 - Shear Force (kips): [0.0899775 ; 0.298574 ; 0.575651 ; 0.925836 ; 1.36075 ; 1.84381 ; 1.98785 ; 2.17171 ; 2.39324 ; 2.65768 ; 3.011 ; 3.53378 ; 4.85715 ; 6.62992 ; 8.48646 ; 10.1475 ; 12.1695 ; 12.9662 ; 13.2508 ; 13.6418 ; 14.1717 ; 14.8483 ; 15.5852 ; 15.7268 ; 15.855 ; 16.3774 ; 16.5438 ; 16.7765 ; 17.1132 ; 17.3652 ; 17.6587 ; 17.7399 ; 17.7713 ; 17.8176 ; 17.8841 ; 17.9051 ; 17.9375 ; 17.9777 ; 18.1338 ; 18.2841 ; 18.4368 ; 18.6205 ; 18.9703 ; 19.8379 ; 21.1645 ; 21.7607 ; 22.4993 ; 23.2511 ; 24.397 ; 25.9403 ; 26.7692 ; 26.8596 ; 26.8989 ; 26.8657 ; 26.7528]

Bolt 3 - Tensile Force (kips): [65 ; 64.825 ; 64.7589 ; 64.7951 ; 64.9355 ; 65.2233 ; 65.36 ; 65.7272 ; 66.3823 ; 67.2796 ; 68.1459 ; 69.244 ; 70.5992 ; 72.4056 ; 74.8976 ; 78.27 ; 82.8258 ; 84.3555 ; 84.9134 ; 85.7286 ; 86.9421 ; 88.6947 ; 91.0767 ; 91.6337 ; 92.1523 ; 92.8899 ; 93.1415 ; 93.5194 ; 94.1324 ; 94.9978 ; 96.2351 ; 96.6762 ; 96.8374 ; 97.0578 ; 97.369 ; 97.4928 ; 97.6737 ; 97.9456 ; 98.3682 ; 98.564 ; 98.8574 ; 99.2559 ; 99.801 ; 100.565 ; 101.651 ; 102.024 ; 102.605 ; 103.41 ; 104.564 ; 106.091 ; 108.002 ; 108.436 ; 109.056 ; 109.911 ; 110.727]

Bolt 3 - Shear Force (kips): [0.0589645 ; 0.0617044 ; 0.144142 ; 0.274193 ; 0.461316 ; 0.727359 ; 0.819577 ; 0.957246 ; 1.14937 ; 1.37622 ; 1.65881 ; 1.98255 ; 2.36074 ; 2.80769 ; 3.28711 ; 3.7469 ; 4.24569 ; 4.5395 ; 4.6884 ; 4.8612 ; 5.89764 ; 7.8368 ; 9.77988 ; 10.3316 ; 10.76 ; 11.3969 ; 11.6523 ; 12.0094 ; 12.4099 ; 12.6264 ; 11.9851 ; 11.6386 ; 11.4551 ; 11.2535 ; 11.0692 ; 10.9926 ; 10.9094 ; 10.83 ; 10.6978 ; 10.4826 ; 10.222 ; 9.91257 ; 9.57272 ; 9.17996 ; 8.59819 ; 8.37737 ; 8.12243 ; 7.85815 ; 7.56255 ; 7.29076 ; 7.04912 ; 7.00671 ; 6.96482 ; 6.87763 ; 6.79588]

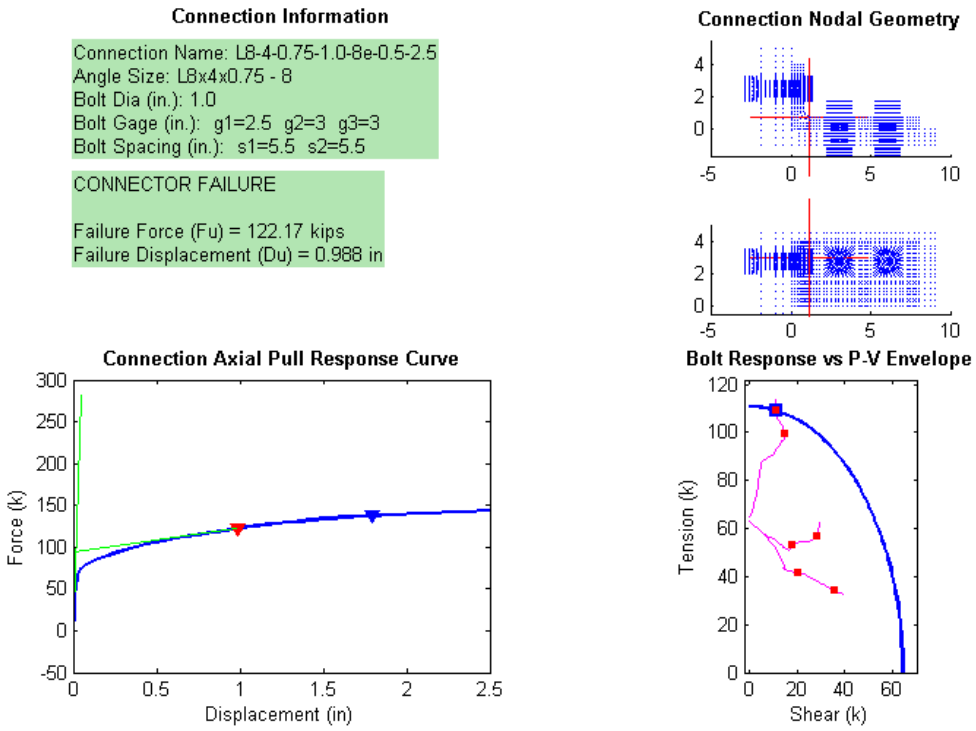


Figure B.197 Connection L8_4_0.75_1.0_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_1.0_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 5.7672e+003

Plastic Stiffness (k/in): 28.5104

Displacement (in): [9.8945e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.15542 ; 0.17918 ; 0.21482 ; 0.26827 ; 0.34845 ; 0.37852 ; 0.40858 ; 0.43865 ; 0.48375 ; 0.55141 ; 0.57678 ; 0.61483 ; 0.67191 ; 0.69332 ; 0.72543 ; 0.73747 ; 0.75553 ; 0.78262 ; 0.79278 ; 0.80802 ; 0.83088 ; 0.83945 ; 0.85231 ; 0.87159 ; 0.87883 ; 0.88968 ; 0.90595 ; 0.93036 ; 0.93951 ; 0.95324 ; 0.97384 ; 1.0047 ; 1.0163 ; 1.0337 ; 1.0598 ; 1.0989 ; 1.1135 ; 1.1355 ; 1.1685 ; 1.218 ; 1.2922 ; 1.3201 ; 1.3618 ; 1.4244 ; 1.5184 ; 1.6593 ; 1.7122 ; 1.7914 ; 1.9103 ; 2.0887 ; 2.3387 ; 2.5]

Force (kips): [-2.46935 ; 4.08619 ; 8.79476 ; 14.406 ; 20.9091 ; 27.4587 ; 29.2011 ; 31.2535 ; 33.489 ; 35.5748 ; 37.2281 ; 38.7098 ; 40.3387 ; 42.3751 ; 43.0757 ; 44.0546 ; 45.3667 ; 47.0752 ; 49.2682 ; 50.106 ; 50.8575 ; 51.5733 ; 52.5923 ; 53.9317 ; 54.4079 ; 55.106 ; 56.0847 ; 56.4464 ; 56.9552 ; 57.1473 ; 57.4206 ; 57.843 ; 57.9985 ; 58.2401 ; 58.6213 ; 58.7685 ; 58.9771 ; 59.2809 ; 59.4056 ; 59.5867 ; 59.8608 ; 60.2363 ; 60.3816 ; 60.5901 ; 60.8837 ; 61.3269 ; 61.495 ; 61.7485 ; 62.1038 ; 62.6096 ; 62.794 ; 63.0678 ; 63.4661 ; 64.0383 ; 64.8415 ; 65.1286 ; 65.5423 ; 66.113 ; 66.8851 ; 67.8951 ; 68.2396 ; 68.7185 ; 69.3668 ; 70.2143 ; 71.1878 ; 71.7523]

Bolt 1 - Tensile Force (kips): [63.3106 ; 63.0232 ; 62.8011 ; 62.5186 ; 62.164 ; 61.7673 ; 61.6524 ; 61.5106 ; 61.3431 ; 61.1523 ; 60.8939 ; 60.1449 ; 58.7445 ; 56.5765 ; 55.748 ; 54.5105 ; 52.6354 ; 49.7806 ; 45.6915 ; 44.4991 ; 44.2108 ; 44.0654 ; 43.9301 ; 43.7789 ; 43.7239 ; 43.5583 ; 43.2126 ; 43.1283 ; 43.0458 ; 43.0197 ; 42.988 ; 42.9497 ; 42.9355 ; 42.8849 ; 42.7711 ; 42.7071 ; 42.6272 ; 42.5194 ; 42.4538 ; 42.3642 ; 42.2315 ; 42.0981 ; 42.0078 ; 41.8813 ; 41.7056 ; 41.4153 ; 41.2928 ; 41.1063 ; 40.8418 ; 40.4277 ; 40.2714 ; 40.0048 ; 39.5728 ; 38.9532 ; 37.9228 ; 37.5656 ; 37.1286 ; 36.5804 ; 35.7768 ; 34.8925 ; 34.5934 ; 34.2304 ; 33.8921 ; 33.5199 ; 33.1293 ; 32.8522]

Bolt 1 - Shear Force (kips): [0.112179 ; 0.272752 ; 0.537167 ; 0.867635 ; 1.27025 ; 1.70365 ; 1.82641 ; 1.97649 ; 2.15173 ; 2.35376 ; 2.63881 ; 3.55137 ; 5.09371 ; 7.15438 ; 7.87801 ; 8.90693 ; 10.3542 ; 12.2567 ; 14.1888 ; 14.5178 ; 14.5378 ; 14.5227 ; 14.4917 ; 14.4457 ; 14.4281 ; 14.5316 ; 14.6076 ; 14.5941 ; 14.5702 ; 14.5608 ; 14.5478 ; 14.5302 ; 14.5234 ; 14.6687 ; 15.1608 ; 15.4546 ; 15.7799 ; 16.1775 ; 16.4566 ; 16.8579 ; 17.5496 ; 18.2804 ; 18.6995 ; 19.265 ; 19.9687 ; 21.0279 ; 21.4269 ; 21.9969 ; 22.782 ; 23.8446 ; 24.1996 ; 24.7888 ; 25.6597 ; 26.8683 ; 28.7892 ; 29.4151 ; 30.1506 ; 31.1129 ; 32.6213 ; 34.1756 ; 34.7095 ; 35.401 ; 36.1966 ; 37.1722 ; 38.2341 ; 38.8329]

Bolt 2 - Tensile Force (kips): [63.3114 ; 62.9506 ; 62.6523 ; 62.281 ; 61.8161 ; 61.3551 ; 61.235 ; 61.1016 ; 60.9528 ; 60.7598 ; 60.4036 ; 59.617 ; 58.3781 ; 56.9911 ; 56.6257 ; 56.1878 ; 55.7791 ; 55.1227 ; 54.0259 ; 53.5864 ; 53.1823 ; 52.8125 ; 52.331 ; 51.7634 ; 51.5786 ; 51.4039 ; 51.278 ; 51.1655 ; 51.1476 ; 51.1846 ; 51.3231 ; 51.6132 ; 51.7249 ; 51.9062 ; 52.17 ; 52.2568 ; 52.3928 ; 52.6019 ; 52.6667 ; 52.7639 ; 52.8965 ; 53.1278 ; 53.1978 ; 53.3093 ; 53.4968 ; 53.6773 ; 53.7076 ; 53.7723 ; 53.912 ; 54.1021 ; 54.1358 ; 54.1787 ; 54.2592 ; 54.3631 ; 54.6309 ; 54.7048 ; 54.7136 ; 54.8387 ; 55.242 ; 55.9985 ; 56.344 ; 56.9374 ; 57.8699 ; 59.3105 ; 61.2837 ; 62.634]

Bolt 2 - Shear Force (kips): [0.143826 ; 0.303024 ; 0.609793 ; 0.992977 ; 1.45573 ; 1.94919 ; 2.0918 ; 2.27085 ; 2.49103 ; 2.77396 ; 3.19391 ; 4.19342 ; 5.68635 ; 7.49481 ; 8.08416 ; 8.8657 ; 9.77666 ; 10.91 ; 12.3842 ; 12.9178 ; 13.4003 ; 13.8316 ; 14.3882 ; 15.0775 ; 15.3123 ; 15.6022 ; 15.9904 ; 16.3794 ; 16.7267 ; 16.8705 ; 17.0099 ; 17.1882 ; 17.2453 ; 17.3149 ; 17.3955 ; 17.4199 ; 17.4569 ; 17.5109 ; 17.5267 ; 17.5504 ; 17.5836 ; 17.642 ; 17.6584 ; 17.6838 ; 17.7243 ; 18.0741 ; 18.2959 ; 18.5737 ; 18.8839 ; 19.4189 ; 19.7175 ; 20.1564 ; 20.8033 ; 21.7247 ; 22.7455 ; 23.1952 ; 24.1147 ; 25.2417 ; 26.2326 ; 27.4257 ; 27.7361 ; 28.085 ; 28.4558 ; 28.8305 ; 29.1224 ; 29.1326]

Bolt 3 - Tensile Force (kips): [65 ; 64.8445 ; 64.8108 ; 64.9147 ; 65.1339 ; 65.6568 ; 65.9714 ; 66.523 ; 67.3194 ; 68.1967 ; 69.2158 ; 70.4134 ; 71.9228 ; 73.9919 ; 74.74 ; 75.8254 ; 77.3756 ; 79.5624 ; 82.6114 ; 83.6745 ; 84.6799 ; 85.6558 ; 87.1673 ; 89.2883 ; 90.1012 ; 91.2929 ; 92.8635 ; 93.3948 ; 94.1459 ; 94.4199 ; 94.8045 ; 95.3643 ; 95.5674 ; 95.867 ; 96.322 ; 96.4844 ; 96.7226 ; 97.096 ; 97.2448 ; 97.4723 ; 97.8256 ; 98.3447 ; 98.5331 ; 98.8064 ; 99.2103 ; 99.8288 ; 100.058 ; 100.427 ; 100.947 ; 101.645 ; 101.883 ; 102.226 ; 102.709 ; 103.393 ; 104.421 ; 104.771 ; 105.244 ; 105.945 ; 106.961 ; 108.223 ; 108.635 ; 109.229 ; 110.119 ; 111.284 ; 112.753 ; 113.857]

Bolt 3 - Shear Force (kips): [0.0652962 ; 0.0629951 ; 0.159284 ; 0.307467 ; 0.517336 ; 0.813447 ; 0.921154 ; 1.07083 ; 1.25444 ; 1.48812 ; 1.75056 ; 2.06422 ; 2.46291 ; 2.96234 ; 3.12571 ; 3.33591 ; 3.5961 ; 3.90505 ; 4.26836 ; 4.40393 ; 4.55171 ; 4.69898 ; 5.15042 ; 7.45365 ; 8.70301 ; 10.2952 ; 11.3512 ; 11.6497 ; 12.2763 ; 12.5054 ; 12.77 ; 13.0764 ; 13.191 ; 13.4021 ; 13.8128 ; 14.0218 ; 14.3359 ; 14.6189 ; 14.6622 ; 14.7343 ; 14.809 ; 14.8554 ; 14.8783 ; 14.9197 ; 14.9848 ; 15.0764 ; 15.1095 ; 14.993 ; 14.7758 ; 14.4236 ; 14.3151 ; 14.1442 ; 13.8757 ; 13.5443 ; 12.8895 ; 12.612 ; 12.2914 ; 11.9929 ; 11.7066 ; 11.1841 ; 10.9782 ; 10.8328 ; 10.7549 ; 10.7711 ; 10.9043 ; 11.3279]

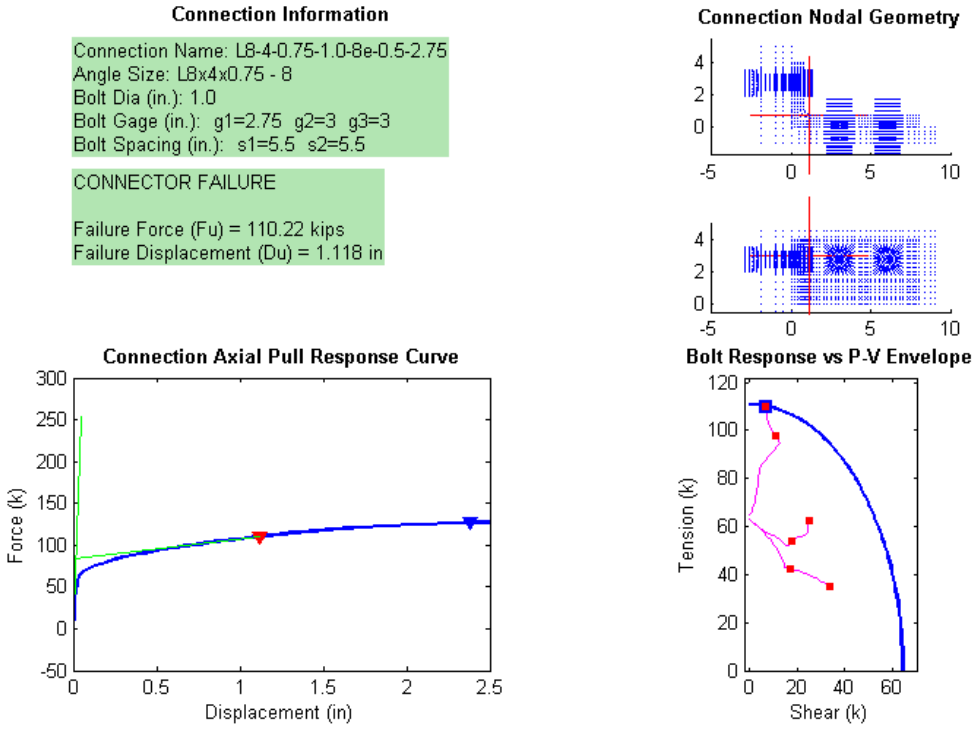


Figure B.198 Connection L8_4_0.75_1.0_8e_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_0.75_1.0_8e_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 4.8979e+003

Plastic Stiffness (k/in): 23.9953

Displacement (in): [9.0782e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.20294 ; 0.22669 ; 0.26233 ; 0.31578 ; 0.39596 ; 0.42603 ; 0.47113 ; 0.53879 ; 0.60644 ; 0.67409 ; 0.691 ; 0.71637 ; 0.75443 ; 0.81151 ; 0.83292 ; 0.86503 ; 0.91319 ; 0.93125 ; 0.95834 ; 0.99898 ; 1.0599 ; 1.0828 ; 1.1171 ; 1.1685 ; 1.1878 ; 1.2167 ; 1.2601 ; 1.3252 ; 1.3496 ; 1.3862 ; 1.4412 ; 1.4618 ; 1.4927 ; 1.5042 ; 1.5216 ; 1.5477 ; 1.5868 ; 1.6454 ; 1.7334 ; 1.8654 ; 2.0633 ; 2.3133 ; 2.5]

Force (kips): [-2.47992 ; 3.12196 ; 7.08624 ; 11.8632 ; 17.5286 ; 23.4998 ; 25.1701 ; 27.1798 ; 29.3666 ; 31.4415 ; 33.0358 ; 34.5233 ; 36.0135 ; 37.7618 ; 39.9205 ; 40.6314 ; 41.5832 ; 42.8605 ; 44.6224 ; 45.2345 ; 46.1524 ; 47.3953 ; 48.5042 ; 49.5042 ; 49.7594 ; 50.1185 ; 50.627 ; 51.3593 ; 51.6491 ; 52.0646 ; 52.653 ; 52.8817 ; 53.2058 ; 53.6777 ; 54.4195 ; 54.6897 ; 55.1011 ; 55.6731 ; 55.8909 ; 56.206 ; 56.6706 ; 57.3186 ; 57.549 ; 57.8893 ; 58.3827 ; 58.558 ; 58.8131 ; 58.9069 ; 59.0445 ; 59.2451 ; 59.5335 ; 59.941 ; 60.4945 ; 61.2307 ; 62.1775 ; 63.1548 ; 63.7645]

Bolt 1 - Tensile Force (kips): [63.3071 ; 63.0618 ; 62.8747 ; 62.6357 ; 62.3304 ; 61.9744 ; 61.8661 ; 61.7298 ; 61.5708 ; 61.3998 ; 61.2136 ; 60.9216 ; 59.9373 ; 58.0925 ; 55.3751 ; 54.3756 ; 52.9199 ; 50.7693 ; 47.4588 ; 46.2661 ; 44.7012 ; 44.1696 ; 43.9813 ; 43.8442 ; 43.8105 ; 43.764 ; 43.6632 ; 43.3196 ; 43.2384 ; 43.1535 ; 43.0701 ; 43.0419 ; 43.0051 ; 42.9437 ; 42.6516 ; 42.5299 ; 42.2889 ; 41.9965 ; 41.8491 ; 41.6283 ; 41.254 ; 40.6993 ; 40.4567 ; 40.0837 ; 39.5156 ; 39.312 ; 39.0137 ; 38.8976 ; 38.7233 ; 38.4571 ; 38.0835 ; 37.6297 ; 37.1137 ; 36.586 ; 35.8906 ; 35.1889 ; 34.7186]

Bolt 1 - Shear Force (kips): [0.111563 ; 0.223821 ; 0.446474 ; 0.729265 ; 1.08256 ; 1.48089 ; 1.5993 ; 1.74722 ; 1.91798 ; 2.10054 ; 2.30455 ; 2.63287 ; 3.82493 ; 5.76851 ; 8.22155 ; 9.04338 ; 10.1727 ; 11.6744 ; 13.502 ; 14.0031 ; 14.488 ; 14.5415 ; 14.5064 ; 14.4666 ; 14.4561 ; 14.4413 ; 14.483 ; 14.6028 ; 14.5955 ; 14.5747 ; 14.5429 ; 14.5307 ; 14.5134 ; 14.5227 ; 15.7828 ; 16.2503 ; 17.4026 ; 18.8988 ; 19.5177 ; 20.3836 ; 21.6356 ; 23.2609 ; 23.866 ; 24.7086 ; 25.858 ; 26.2533 ; 26.8313 ; 27.0564 ; 27.3933 ; 27.8872 ; 28.5571 ; 29.3579 ; 30.2347 ; 31.1558 ; 32.4311 ; 33.59 ; 34.3682]

Bolt 2 - Tensile Force (kips): [63.2998 ; 62.994 ; 62.7429 ; 62.4338 ; 62.0456 ; 61.6431 ; 61.5401 ; 61.4185 ; 61.3036 ; 61.1814 ; 60.9856 ; 60.5954 ; 59.6718 ; 58.3157 ; 57.2377 ; 56.9835 ; 56.6543 ; 56.1164 ; 55.2509 ; 54.9317 ; 54.4278 ; 53.7294 ; 53.1531 ; 52.6693 ; 52.5623 ; 52.4214 ; 52.2592 ; 52.1567 ; 52.0979 ; 52.0243 ; 52.0903 ; 52.1845 ; 52.4454 ; 52.8902 ; 53.4405 ; 53.6551 ; 53.9246 ; 54.3485 ; 54.4999 ; 54.7262 ; 54.9341 ; 55.2528 ; 55.4011 ; 55.4923 ; 55.5568 ; 55.6035 ; 55.6804 ; 55.7167 ; 55.7833 ; 55.8958 ; 56.0787 ; 56.3837 ; 56.9741 ; 58.0226 ; 59.7405 ; 61.7987 ; 63.3044]

Bolt 2 - Shear Force (kips): [0.143844 ; 0.246577 ; 0.504993 ; 0.833233 ; 1.24002 ; 1.69145 ; 1.82565 ; 1.99841 ; 2.20694 ; 2.45224 ; 2.77683 ; 3.2774 ; 4.513 ; 6.28556 ; 8.27436 ; 8.84691 ; 9.53615 ; 10.4177 ; 11.6186 ; 12.0518 ; 12.6972 ; 13.5653 ; 14.288 ; 14.9099 ; 15.0538 ; 15.2568 ; 15.531 ; 15.865 ; 16.0835 ; 16.5202 ; 16.9771 ; 17.1642 ; 17.3416 ; 17.5309 ; 17.6925 ; 17.7497 ; 17.8142 ; 17.9111 ; 17.9486 ; 18.0073 ; 18.4694 ; 19.2024 ; 19.3796 ; 19.9424 ; 20.9597 ; 21.2998 ; 21.7578 ; 21.905 ; 22.0955 ; 22.3446 ; 22.6876 ; 23.2059 ; 23.7169 ; 24.2765 ; 24.5908 ; 24.81 ; 24.808]

Bolt 3 - Tensile Force (kips): [65 ; 64.8264 ; 64.7559 ; 64.7871 ; 64.9239 ; 65.2159 ; 65.3487 ; 65.7052 ; 66.3813 ; 67.316 ; 68.2198 ; 69.3192 ; 70.6813 ; 72.4736 ; 74.9444 ; 75.8232 ; 77.1033 ; 78.9136 ; 81.4964 ; 82.4155 ; 83.6987 ; 85.5435 ; 87.4249 ; 89.1941 ; 89.625 ; 90.2237 ; 91.0587 ; 92.2553 ; 92.7104 ; 93.3047 ; 94.2084 ; 94.5623 ; 95.0668 ; 95.7952 ; 96.8124 ; 97.1769 ; 97.6773 ; 98.4041 ; 98.6923 ; 99.1735 ; 99.8373 ; 100.748 ; 101.087 ; 101.587 ; 102.27 ; 102.523 ; 102.88 ; 103.007 ; 103.199 ; 103.492 ; 103.92 ; 104.564 ; 105.476 ; 106.661 ; 108.219 ; 109.805 ; 110.8]

Bolt 3 - Shear Force (kips): [0.0711335 ; 0.0500009 ; 0.129452 ; 0.254602 ; 0.437238 ; 0.693869 ; 0.782575 ; 0.915692 ; 1.10253 ; 1.32594 ; 1.60154 ; 1.92527 ; 2.29976 ; 2.74679 ; 3.22983 ; 3.37292 ; 3.55076 ; 3.77165 ; 4.07026 ; 4.16138 ; 4.38353 ; 4.93162 ; 6.60399 ; 8.28533 ; 8.80712 ; 9.43372 ; 10.0071 ; 10.9987 ; 11.2934 ; 11.8332 ; 12.4275 ; 12.6673 ; 12.8842 ; 12.5085 ; 11.87 ; 11.5168 ; 11.2274 ; 10.9905 ; 10.6877 ; 10.2357 ; 9.74301 ; 9.17513 ; 9.01938 ; 8.75535 ; 8.41524 ; 8.30586 ; 8.15865 ; 8.10482 ; 8.03135 ; 7.942 ; 7.81717 ; 7.66749 ; 7.49133 ; 7.30023 ; 7.10632 ; 6.94904 ; 6.858]

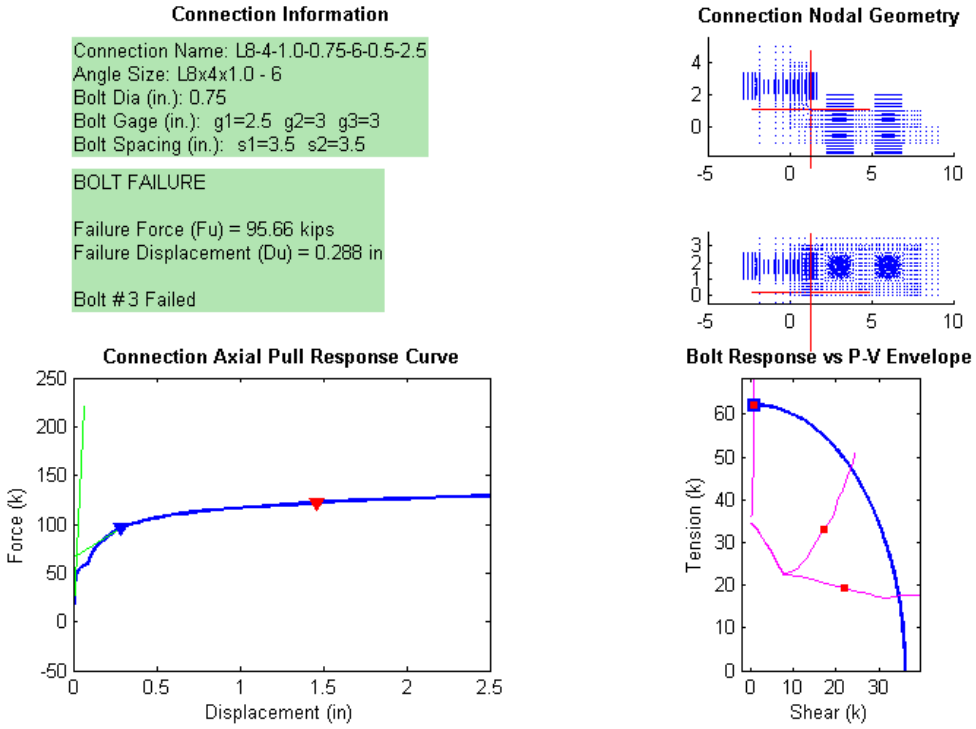


Figure B.199 Connection L8_4_1.0_0.75_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_0.75_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3164

Plastic Stiffness (k/in): 107.3766

Displacement (in): [2.5658e-036 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.035156 ; 0.052734 ; 0.059326 ; 0.061798 ; 0.065506 ; 0.071068 ; 0.073153 ; 0.076282 ; 0.080975 ; 0.088014 ; 0.098573 ; 0.10913 ; 0.11969 ; 0.13553 ; 0.15929 ; 0.19492 ; 0.20829 ; 0.22833 ; 0.2584 ; 0.3035 ; 0.37115 ; 0.39652 ; 0.43458 ; 0.49166 ; 0.57728 ; 0.60939 ; 0.65755 ; 0.7298 ; 0.75689 ; 0.79753 ; 0.85848 ; 0.94992 ; 1.0871 ; 1.2928 ; 1.5428 ; 1.6053 ; 1.699 ; 1.8397 ; 1.8924 ; 1.9715 ; 2.0902 ; 2.2681 ; 2.5]

Force (kips): [-0.834744 ; 18.1298 ; 23.8842 ; 25.178 ; 26.7596 ; 28.4468 ; 28.8376 ; 28.8384 ; 28.8349 ; 28.8287 ; 29.0498 ; 29.4265 ; 29.4269 ; 29.6882 ; 32.0748 ; 34.0223 ; 35.9489 ; 37.9222 ; 40.1633 ; 42.7382 ; 43.7013 ; 44.9862 ; 46.6005 ; 48.4994 ; 50.4346 ; 51.0648 ; 51.9458 ; 53.1388 ; 54.506 ; 54.9295 ; 55.5076 ; 56.2499 ; 56.5124 ; 56.8627 ; 57.343 ; 58.0143 ; 58.9124 ; 60.1112 ; 61.3495 ; 61.6286 ; 62.0194 ; 62.5718 ; 62.773 ; 63.0482 ; 63.4187 ; 63.9128 ; 64.4723]

Bolt 1 - Tensile Force (kips): [34.5282 ; 33.9593 ; 33.0079 ; 31.1073 ; 28.1246 ; 23.7992 ; 22.6862 ; 22.679 ; 22.672 ; 22.6654 ; 22.5386 ; 22.4168 ; 22.4097 ; 22.3958 ; 22.3288 ; 22.2837 ; 22.1863 ; 21.8456 ; 21.4896 ; 20.8633 ; 20.3979 ; 19.9238 ; 19.5835 ; 19.008 ; 18.6831 ; 18.5062 ; 18.2477 ; 17.8933 ; 17.4658 ; 17.2703 ; 17.103 ; 17.0492 ; 17.0648 ; 17.1144 ; 17.2465 ; 17.41 ; 17.6563 ; 17.8118 ; 17.8211 ; 17.7599 ; 17.7314 ; 17.7514 ; 17.77 ; 17.8285 ; 17.9249 ; 18.2007 ; 18.4514]

Bolt 1 - Shear Force (kips): [0.0470471 ; 0.642562 ; 1.45491 ; 2.75958 ; 4.58518 ; 6.92329 ; 7.48109 ; 7.48233 ; 7.48137 ; 7.47954 ; 7.66239 ; 7.83479 ; 7.83667 ; 7.99024 ; 9.10674 ; 9.99745 ; 11.1701 ; 12.8215 ; 14.2405 ; 16.3286 ; 17.5248 ; 18.9636 ; 20.5677 ; 22.5019 ; 24.2517 ; 24.9788 ; 26.097 ; 27.7175 ; 29.6068 ; 30.2372 ; 31.0117 ; 31.9054 ; 32.1959 ; 32.6025 ; 33.1615 ; 34.037 ; 35.1159 ; 36.5334 ; 38.0731 ; 38.4941 ; 39.0627 ; 39.8318 ; 40.1249 ; 40.4805 ; 40.9232 ; 41.3624 ; 41.7379]

Bolt 2 - Tensile Force (kips): [34.5299 ; 33.9135 ; 32.9839 ; 31.1026 ; 28.2018 ; 24.1024 ; 23.0043 ; 22.988 ; 22.9794 ; 22.9732 ; 22.9213 ; 22.7877 ; 22.7806 ; 22.8021 ; 23.0943 ; 23.4969 ; 23.9942 ; 24.945 ; 26.3827 ; 28.5318 ; 29.3508 ; 30.4864 ; 32.0491 ; 33.5853 ; 35.3998 ; 36.0121 ; 36.8598 ; 38.006 ; 39.4513 ; 39.9413 ; 40.575 ; 41.397 ; 41.7071 ; 42.1261 ; 42.6913 ; 43.4059 ; 44.3997 ; 45.7829 ; 47.271 ; 47.6068 ; 48.0893 ; 48.7356 ; 48.953 ; 49.2596 ; 49.6773 ; 50.2215 ; 50.8392]

Bolt 2 - Shear Force (kips): [0.0348259 ; 0.744656 ; 1.57243 ; 2.87077 ; 4.68312 ; 6.98035 ; 7.57246 ; 7.57982 ; 7.58186 ; 7.58098 ; 7.69171 ; 7.97414 ; 7.97737 ; 8.07603 ; 9.24058 ; 10.2265 ; 10.9162 ; 11.6064 ; 13.089 ; 14.2249 ; 14.8019 ; 15.5189 ; 16.3024 ; 17.4496 ; 18.7288 ; 19.0501 ; 19.3851 ; 19.7207 ; 20.0967 ; 20.2217 ; 20.5142 ; 21.0228 ; 21.1858 ; 21.4155 ; 21.7015 ; 22.0488 ; 22.3814 ; 22.7557 ; 23.2981 ; 23.4411 ; 23.6392 ; 23.8523 ; 23.9182 ; 23.998 ; 24.0732 ; 24.1438 ; 24.1466]

Bolt 3 - Tensile Force (kips): [36 ; 36.9343 ; 38.2502 ; 38.6714 ; 39.3165 ; 40.2052 ; 40.4436 ; 40.4444 ; 40.4414 ; 40.4346 ; 40.5709 ; 40.8171 ; 40.8166 ; 40.9875 ; 42.7051 ; 44.3519 ; 46.4318 ; 49.2646 ; 52.7282 ; 56.2007 ; 57.2945 ; 58.786 ; 60.7545 ; 63.1833 ; 65.3838 ; 66.0602 ; 66.9924 ; 68.0416 ; 69.2769 ; 69.6098 ; 69.9517 ; 70.1197 ; 70.0387 ; 70.0361 ; 70.0718 ; 70.1364 ; 70.1938 ; 70.0788 ; 70.1448 ; 70.1681 ; 70.1947 ; 70.1888 ; 70.1297 ; 70.1056 ; 70.1102 ; 70.1366 ; 70.1758]

Bolt 3 - Shear Force (kips): [0.0068006 ; 0.15943 ; 0.20215 ; 0.20978 ; 0.21974 ; 0.23969 ; 0.24614 ; 0.24614 ; 0.24601 ; 0.24576 ; 0.25018 ; 0.25911 ; 0.25924 ; 0.26577 ; 0.33361 ; 0.40337 ; 0.48898 ; 0.56166 ; 0.57409 ; 0.5823 ; 0.59342 ; 0.59601 ; 0.57376 ; 0.52147 ; 0.49418 ; 0.49468 ; 0.51324 ; 0.72219 ; 1.1329 ; 1.204 ; 1.3995 ; 1.8986 ; 2.3766 ; 2.6985 ; 3.0016 ; 3.338 ; 3.789 ; 4.7457 ; 5.2428 ; 5.3429 ; 5.5045 ; 5.8307 ; 6.059 ; 6.2674 ; 6.4878 ; 6.7459 ; 7.0374]

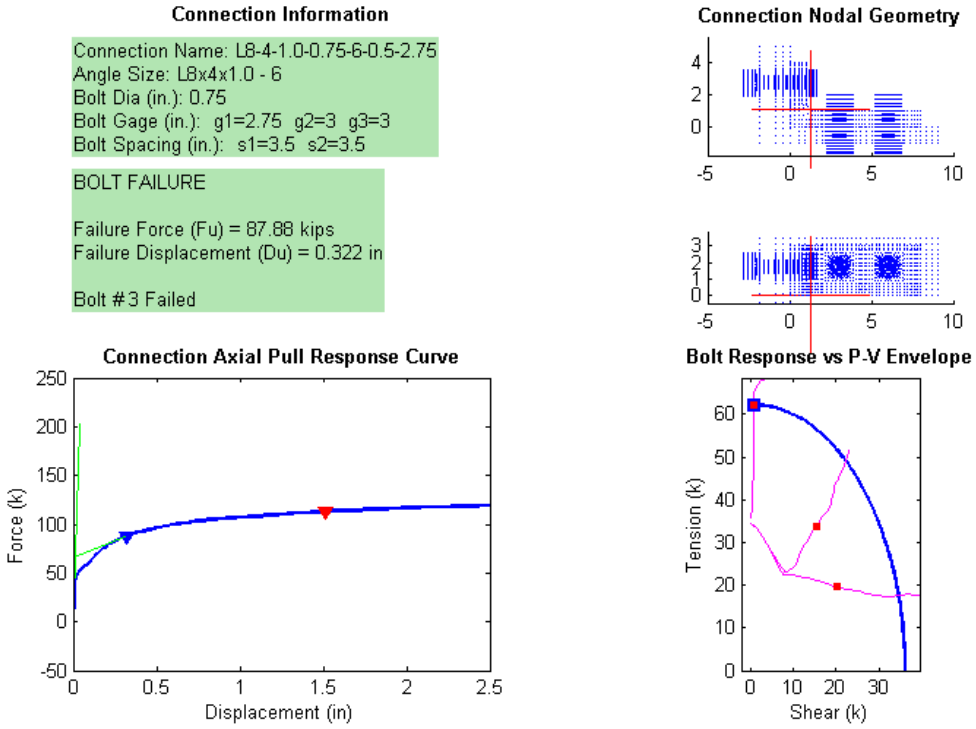


Figure B.200 Connection L8_4_1.0_0.75_6_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_0.75_6_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 5.3349e+003

Plastic Stiffness (k/in): 67.6829

Displacement (in): [2.6962e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.073132 ; 0.07626 ; 0.080953 ; 0.082713 ; 0.085352 ; 0.089312 ; 0.095251 ; 0.097478 ; 0.10082 ; 0.10583 ; 0.10771 ; 0.11053 ; 0.11476 ; 0.1211 ; 0.13061 ; 0.14488 ; 0.16629 ; 0.17432 ; 0.18636 ; 0.19087 ; 0.19764 ; 0.2078 ; 0.22304 ; 0.2459 ; 0.28019 ; 0.29305 ; 0.31233 ; 0.34126 ; 0.38466 ; 0.40093 ; 0.42534 ; 0.46196 ; 0.51688 ; 0.59926 ; 0.63016 ; 0.6765 ; 0.74601 ; 0.85028 ; 0.88938 ; 0.90404 ; 0.92603 ; 0.95902 ; 1.0085 ; 1.0827 ; 1.1941 ; 1.3611 ; 1.6111 ; 1.8611 ; 1.9236 ; 2.0174 ; 2.158 ; 2.3689 ; 2.5]

Force (kips): [-0.888339 ; 5.14718 ; 9.53135 ; 14.583 ; 19.6381 ; 23.2947 ; 24.7477 ; 26.5363 ; 28.5917 ; 28.8635 ; 28.8603 ; 28.8537 ; 29.0206 ; 29.361 ; 29.484 ; 29.4791 ; 29.4998 ; 30.22 ; 31.0786 ; 31.3441 ; 31.7444 ; 32.2329 ; 32.8949 ; 33.7363 ; 34.9328 ; 36.6375 ; 37.1935 ; 37.964 ; 38.2544 ; 38.6781 ; 39.2756 ; 40.0635 ; 41.1517 ; 42.5439 ; 42.9992 ; 43.6519 ; 44.5361 ; 45.635 ; 46.0044 ; 46.5645 ; 47.3301 ; 48.3262 ; 49.6211 ; 50.1042 ; 50.725 ; 51.5439 ; 52.4942 ; 52.8007 ; 52.9097 ; 53.0703 ; 53.3041 ; 53.6385 ; 54.1068 ; 54.7693 ; 55.6595 ; 56.805 ; 57.7524 ; 57.9674 ; 58.2723 ; 58.6929 ; 59.2575 ; 59.5708]

Bolt 1 - Tensile Force (kips): [34.5271 ; 34.3806 ; 34.2529 ; 34.0823 ; 33.8832 ; 33.3576 ; 31.2091 ; 27.7717 ; 23.1405 ; 22.6878 ; 22.6815 ; 22.6749 ; 22.539 ; 22.4282 ; 22.4223 ; 22.4165 ; 22.4133 ; 22.3838 ; 22.3646 ; 22.3528 ; 22.3377 ; 22.324 ; 22.3238 ; 22.2887 ; 22.2118 ; 21.9027 ; 21.7725 ; 21.6343 ; 21.5325 ; 21.3798 ; 21.1911 ; 21.0183 ; 20.6596 ; 20.0052 ; 19.884 ; 19.7812 ; 19.5395 ; 19.0991 ; 18.9779 ; 18.8748 ; 18.7877 ; 18.537 ; 18.1126 ; 17.9846 ; 17.8089 ; 17.5014 ; 17.2362 ; 17.1881 ; 17.1796 ; 17.1773 ; 17.2005 ; 17.269 ; 17.396 ; 17.5697 ; 17.7902 ; 17.8499 ; 17.8155 ; 17.7505 ; 17.695 ; 17.6655 ; 17.6604 ; 17.6037]

Bolt 1 - Shear Force (kips): [0.0489303 ; 0.177506 ; 0.333231 ; 0.517539 ; 0.71637 ; 1.18589 ; 2.69399 ; 4.79111 ; 7.25586 ; 7.48542 ; 7.48451 ; 7.48266 ; 7.67504 ; 7.83535 ; 7.83852 ; 7.83699 ; 7.85555 ; 8.24133 ; 8.58711 ; 8.7409 ; 8.92388 ; 9.14619 ; 9.40909 ; 9.78333 ; 10.5189 ; 12.5655 ; 13.098 ; 13.7225 ; 14.09 ; 14.6062 ; 15.2006 ; 15.7925 ; 16.9415 ; 18.7853 ; 19.2513 ; 19.8427 ; 20.8385 ; 22.2967 ; 22.7499 ; 23.3051 ; 24.0348 ; 25.2449 ; 27.2094 ; 27.8978 ; 28.7842 ; 29.9566 ; 31.3659 ; 31.8088 ; 31.962 ; 32.1797 ; 32.4813 ; 32.8985 ; 33.501 ; 34.401 ; 35.4454 ; 36.8961 ; 38.1667 ; 38.5129 ; 38.9895 ; 39.6328 ; 40.5195 ; 40.99]

Bolt 2 - Tensile Force (kips): [34.5266 ; 34.3618 ; 34.2184 ; 34.0467 ; 33.8843 ; 33.4252 ; 31.331 ; 28.1028 ; 24.0901 ; 23.3412 ; 23.3312 ; 23.3233 ; 23.3526 ; 23.2317 ; 23.1753 ; 23.1676 ; 23.1727 ; 23.3096 ; 23.4941 ; 23.5699 ; 23.6799 ; 23.8342 ; 24.1233 ; 24.6336 ; 25.5712 ; 27.1899 ; 27.7357 ; 28.4886 ; 28.7653 ; 29.1615 ; 29.7085 ; 30.4439 ; 31.4352 ; 32.5967 ; 32.9759 ; 33.5067 ; 34.3222 ; 35.4574 ; 35.8596 ; 36.378 ; 37.0795 ; 38.0705 ; 39.5006 ; 40.0518 ; 40.8405 ; 41.9502 ; 43.3492 ; 43.804 ; 43.9484 ; 44.1449 ; 44.4125 ; 44.7911 ; 45.2956 ; 45.9661 ; 46.9008 ; 48.2293 ; 49.4002 ; 49.6693 ; 50.054 ; 50.5683 ; 51.2558 ; 51.6239]

Bolt 2 - Shear Force (kips): [0.0362339 ; 0.218265 ; 0.395282 ; 0.605839 ; 0.830675 ; 1.30574 ; 2.79931 ; 4.86709 ; 7.25956 ; 7.69463 ; 7.69721 ; 7.69636 ; 7.70614 ; 7.96252 ; 8.1034 ; 8.10374 ; 8.10526 ; 8.4036 ; 8.87855 ; 8.97609 ; 9.17833 ; 9.42844 ; 9.809 ; 10.234 ; 10.8735 ; 11.3968 ; 11.5503 ; 11.8359 ; 11.9512 ; 12.1888 ; 12.6288 ; 13.1824 ; 13.8269 ; 14.4574 ; 14.7097 ; 15.1898 ; 15.7324 ; 16.3237 ; 16.5505 ; 16.9968 ; 17.6493 ; 18.3165 ; 18.8534 ; 18.9945 ; 19.1673 ; 19.3779 ; 19.6625 ; 19.7668 ; 19.8323 ; 19.9594 ; 20.1514 ; 20.4008 ; 20.7011 ; 21.02 ; 21.3939 ; 21.8108 ; 22.2681 ; 22.3807 ; 22.5286 ; 22.6819 ; 22.7808 ; 22.8068]

Bolt 3 - Tensile Force (kips): [36 ; 35.9777 ; 36.1194 ; 36.5931 ; 37.6388 ; 38.8676 ; 39.4923 ; 40.4244 ; 41.8085 ; 42.0187 ; 42.016 ; 42.0089 ; 42.131 ; 42.3865 ; 42.4802 ; 42.4745 ; 42.4906 ; 43.0515 ; 43.806 ; 44.0681 ; 44.4935 ; 45.0765 ; 46.0053 ; 47.3648 ; 49.3644 ; 52.0542 ; 52.9157 ; 54.0512 ; 54.4309 ; 54.9632 ; 55.7138 ; 56.7706 ; 58.2477 ; 60.2699 ; 60.9581 ; 61.9179 ; 63.1579 ; 64.4844 ; 64.8867 ; 65.3744 ; 66.081 ; 66.9802 ; 67.9401 ; 68.1774 ; 68.5745 ; 68.8946 ; 69.0625 ; 69.1191 ; 69.1396 ; 69.1695 ; 69.1743 ; 69.1558 ; 69.1959 ; 69.2802 ; 69.3927 ; 69.5358 ; 69.6433 ; 69.6691 ; 69.7061 ; 69.762 ; 69.8403 ; 69.8871]

Bolt 3 - Shear Force (kips): [0.011014 ; 0.033448 ; 0.077416 ; 0.136 ; 0.17919 ; 0.21156 ; 0.22722 ; 0.26017 ; 0.3249 ; 0.33492 ; 0.33479 ; 0.33449 ; 0.34068 ; 0.35352 ; 0.35837 ; 0.35819 ; 0.35908 ; 0.38865 ; 0.42896 ; 0.44295 ; 0.46575 ; 0.49679 ; 0.54326 ; 0.59814 ; 0.64139 ; 0.6603 ; 0.66242 ; 0.66616 ; 0.66941 ; 0.67553 ; 0.68555 ; 0.69535 ; 0.69629 ; 0.6731 ; 0.66198 ; 0.64448 ; 0.61951 ; 0.60545 ; 0.61142 ; 0.72904 ; 0.87057 ; 1.6059 ; 2.4377 ; 3.0069 ; 3.4144 ; 4.06 ; 4.8006 ; 4.9465 ; 4.9888 ; 5.0514 ; 5.2188 ; 5.4956 ; 5.7699 ; 6.087 ; 6.4702 ; 6.8949 ; 7.2493 ; 7.3559 ; 7.4968 ; 7.6833 ; 7.9384 ; 8.0889]

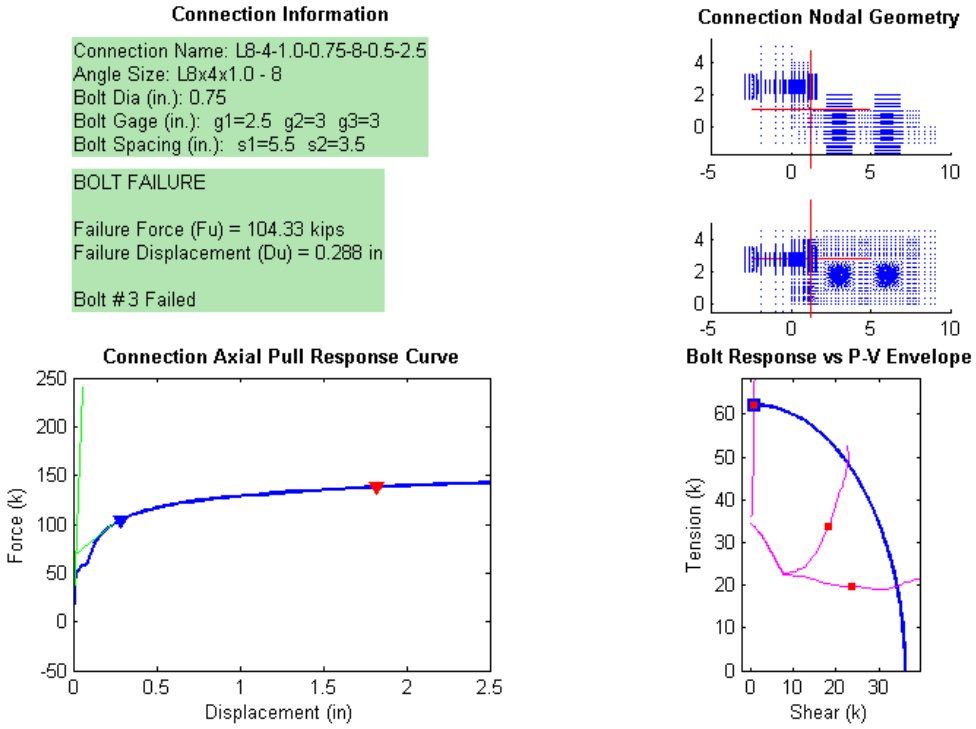


Figure B.201 Connection L8_4_1.0_0.75_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_0.75_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4.4014e+003

Plastic Stiffness (k/in): 133.4646

Displacement (in): [2.0256e-036 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.055916 ; 0.058001 ; 0.06113 ; 0.065823 ; 0.067583 ; 0.070222 ; 0.074182 ; 0.080121 ; 0.082348 ; 0.085689 ; 0.090701 ; 0.098217 ; 0.10104 ; 0.10527 ; 0.10949 ; 0.11372 ; 0.12006 ; 0.12958 ; 0.13315 ; 0.1385 ; 0.14652 ; 0.15856 ; 0.17663 ; 0.20372 ; 0.24435 ; 0.30531 ; 0.32817 ; 0.36246 ; 0.41389 ; 0.43317 ; 0.4621 ; 0.5055 ; 0.57059 ; 0.5767 ; 0.58585 ; 0.59958 ; 0.62018 ; 0.65107 ; 0.69741 ; 0.76692 ; 0.87119 ; 0.91029 ; 0.96894 ; 1.0569 ; 1.0899 ; 1.1394 ; 1.2136 ; 1.325 ; 1.4363 ; 1.5477 ; 1.7147 ; 1.7772 ; 1.8006 ; 1.8358 ; 1.8885 ; 1.9676 ; 2.0863 ; 2.1307 ; 2.1975 ; 2.2976 ; 2.3351 ; 2.3914 ; 2.4759 ; 2.5]

Force (kips): [-0.675098 ; 18.2072 ; 20.816 ; 22.8682 ; 23.8342 ; 24.636 ; 25.6928 ; 27.0465 ; 28.5446 ; 28.9282 ; 28.9593 ; 28.9579 ; 28.9523 ; 28.95 ; 29.0185 ; 29.492 ; 29.4891 ; 29.4862 ; 29.9025 ; 31.3285 ; 33.0215 ; 33.6659 ; 34.9465 ; 36.1857 ; 37.2893 ; 38.7936 ; 40.4659 ; 40.9962 ; 41.6911 ; 42.5581 ; 43.6945 ; 45.2868 ; 47.3533 ; 50.0651 ; 53.0321 ; 53.8525 ; 54.9058 ; 56.2969 ; 56.7974 ; 57.498 ; 58.426 ; 59.5965 ; 59.6977 ; 59.8636 ; 60.1058 ; 60.4436 ; 60.9084 ; 61.5032 ; 62.2568 ; 63.2238 ; 63.563 ; 64.0393 ; 64.7218 ; 64.9687 ; 65.3248 ; 65.8427 ; 66.5622 ; 67.2324 ; 67.8475 ; 68.6541 ; 68.9289 ; 69.0277 ; 69.17 ; 69.3753 ; 69.6647 ; 70.0712 ; 70.2173 ; 70.4279 ; 70.7294 ; 70.8386 ; 70.9965 ; 71.2259 ; 71.2922]

Bolt 1 - Tensile Force (kips): [34.5287 ; 33.9104 ; 33.7933 ; 33.6599 ; 33.0953 ; 32.0179 ; 30.3108 ; 27.6807 ; 23.8832 ; 22.7424 ; 22.6797 ; 22.6716 ; 22.6641 ; 22.6617 ; 22.6093 ; 22.4102 ; 22.4018 ; 22.3994 ; 22.3748 ; 22.323 ; 22.2934 ; 22.248 ; 22.1927 ; 22.1157 ; 21.948 ; 21.7801 ; 21.616 ; 21.5123 ; 21.3355 ; 21.1151 ; 20.9058 ; 20.337 ; 19.9359 ; 19.6189 ; 19.609 ; 19.5494 ; 19.3791 ; 19.2362 ; 19.1402 ; 19.043 ; 18.9881 ; 19.0112 ; 19.0194 ; 19.0384 ; 19.068 ; 19.1106 ; 19.2012 ; 19.3659 ; 19.6364 ; 20.0161 ; 20.1443 ; 20.33 ; 20.596 ; 20.6682 ; 20.766 ; 20.9024 ; 21.1335 ; 21.3286 ; 21.5002 ; 21.6862 ; 21.7011 ; 21.7065 ; 21.7151 ; 21.7217 ; 21.7383 ; 21.7901 ; 21.8429 ; 21.9531 ; 22.1163 ; 22.1715 ; 22.2529 ; 22.3707 ; 22.4035]

Bolt 1 - Shear Force (kips): [0.0412051 ; 0.700597 ; 0.808955 ; 0.928437 ; 1.39141 ; 2.15585 ; 3.26549 ; 4.83921 ; 6.87609 ; 7.449 ; 7.48062 ; 7.48069 ; 7.47899 ; 7.47828 ; 7.56153 ; 7.83519 ; 7.83589 ; 7.83512 ; 8.11385 ; 8.78032 ; 9.55811 ; 9.86227 ; 10.5142 ; 11.382 ; 12.2372 ; 12.9281 ; 13.6557 ; 14.0402 ; 14.6225 ; 15.291 ; 15.9828 ; 17.588 ; 19.5852 ; 21.995 ; 24.1444 ; 24.9325 ; 26.2191 ; 27.8219 ; 28.4041 ; 29.1631 ; 30.1342 ; 31.3617 ; 31.462 ; 31.6061 ; 31.8173 ; 32.12 ; 32.5287 ; 33.1132 ; 33.9252 ; 34.8608 ; 35.1656 ; 35.5952 ; 36.2057 ; 36.4459 ; 36.8076 ; 37.3519 ; 38.1261 ; 38.8487 ; 39.5077 ; 40.196 ; 40.4115 ; 40.4793 ; 40.571 ; 40.7019 ; 40.8562 ; 41.0249 ; 41.0589 ; 41.0884 ; 41.136 ; 41.1581 ; 41.1891 ; 41.2321 ; 41.2435]

Bolt 2 - Tensile Force (kips): [34.5285 ; 33.9042 ; 33.7994 ; 33.6827 ; 33.1189 ; 32.0471 ; 30.3622 ; 27.7863 ; 24.1095 ; 22.9983 ; 22.8867 ; 22.8752 ; 22.8683 ; 22.8662 ; 22.8654 ; 22.636 ; 22.6265 ; 22.6237 ; 22.6406 ; 22.7549 ; 22.9765 ; 23.0749 ; 23.2486 ; 23.4593 ; 23.6923 ; 23.9849 ; 24.5082 ; 24.7185 ; 25.041 ; 25.5223 ; 26.169 ; 27.2689 ; 29.0976 ; 31.769 ; 34.7027 ; 35.531 ; 36.5605 ; 37.8982 ; 38.378 ; 39.0814 ; 40.0887 ; 41.3525 ; 41.4502 ; 41.6131 ; 41.8521 ; 42.2111 ; 42.7258 ; 43.3575 ; 44.1319 ; 45.1382 ; 45.4711 ; 45.9738 ; 46.7092 ; 46.9901 ; 47.4046 ; 48.0053 ; 48.8545 ; 49.5839 ; 50.174 ; 50.8582 ; 51.0692 ; 51.1432 ; 51.2479 ; 51.4 ; 51.6115 ; 51.914 ; 52.0177 ; 52.1595 ; 52.3754 ; 52.456 ; 52.5706 ; 52.7287 ; 52.7722]

Bolt 2 - Shear Force (kips): [0.0301968 ; 0.7616 ; 0.876499 ; 1.00013 ; 1.45674 ; 2.21774 ; 3.32225 ; 4.88758 ; 6.90219 ; 7.48222 ; 7.54104 ; 7.54577 ; 7.54603 ; 7.54563 ; 7.55368 ; 7.92515 ; 7.92733 ; 7.9266 ; 8.08843 ; 8.79777 ; 9.63052 ; 9.93662 ; 10.4787 ; 10.7973 ; 11.0452 ; 11.8723 ; 12.844 ; 13.0575 ; 13.3181 ; 13.6354 ; 14.1983 ; 15.0921 ; 16.0282 ; 17.2055 ; 18.6812 ; 18.9889 ; 19.2824 ; 19.6313 ; 19.7441 ; 19.8966 ; 20.0866 ; 20.5373 ; 20.5989 ; 20.6817 ; 20.7961 ; 20.9374 ; 21.1194 ; 21.4168 ; 21.7099 ; 21.9867 ; 22.0852 ; 22.2077 ; 22.3676 ; 22.4134 ; 22.4748 ; 22.569 ; 22.7181 ; 22.7904 ; 22.7947 ; 22.793 ; 22.7842 ; 22.7809 ; 22.7756 ; 22.7637 ; 22.7434 ; 22.7091 ; 22.7019 ; 22.6979 ; 22.6878 ; 22.682 ; 22.6747 ; 22.6712 ; 22.6714]

Bolt 3 - Tensile Force (kips): [36 ; 36.903 ; 37.4127 ; 37.8899 ; 38.1301 ; 38.3385 ; 38.6511 ; 39.1209 ; 39.7273 ; 39.9093 ; 39.9247 ; 39.9238 ; 39.9186 ; 39.9163 ; 39.9506 ; 40.1775 ; 40.1743 ; 40.1713 ; 40.3787 ; 41.1567 ; 42.1526 ; 42.5524 ; 43.3623 ; 44.213 ; 45.0453 ; 46.3083 ; 48.0592 ; 48.6889 ; 49.5912 ; 50.8272 ; 52.4949 ; 54.5737 ; 56.9358 ; 59.9299 ; 63.316 ; 64.1737 ; 65.2167 ; 66.6197 ; 67.0664 ; 67.6276 ; 68.309 ; 69.1639 ; 69.2293 ; 69.2971 ; 69.4292 ; 69.5836 ; 69.6834 ; 69.757 ; 69.8286 ; 69.8682 ; 69.863 ; 69.898 ; 69.9004 ; 69.8772 ; 69.89 ; 69.9002 ; 69.9006 ; 69.9424 ; 69.9812 ; 70.0388 ; 70.0596 ; 70.0669 ; 70.078 ; 70.0932 ; 70.1163 ; 70.1018 ; 70.0981 ; 70.1035 ; 70.1208 ; 70.1283 ; 70.1404 ; 70.1622 ; 70.1725]

Bolt 3 - Shear Force (kips): [0.010977 ; 0.15852 ; 0.17705 ; 0.19091 ; 0.19895 ; 0.20432 ; 0.21016 ; 0.2175 ; 0.23068 ; 0.23525 ; 0.23565 ; 0.23564 ; 0.23542 ; 0.23533 ; 0.23639 ; 0.24268 ; 0.24271 ; 0.24256 ; 0.24862 ; 0.27683 ; 0.31573 ; 0.33167 ; 0.3657 ; 0.40258 ; 0.43802 ; 0.4902 ; 0.54904 ; 0.56299 ; 0.57649 ; 0.58642 ; 0.58745 ; 0.58096 ; 0.6009 ; 0.59663 ; 0.52797 ; 0.50823 ; 0.49846 ; 0.49639 ; 0.5399 ; 0.59442 ; 0.93029 ; 1.3015 ; 1.3255 ; 1.3983 ; 1.4704 ; 1.6066 ; 1.9906 ; 2.4587 ; 2.9446 ; 3.5657 ; 3.8128 ; 4.0496 ; 4.4497 ; 4.6329 ; 4.7974 ; 5.0389 ; 5.3685 ; 5.5723 ; 5.7449 ; 5.9948 ; 6.0882 ; 6.1247 ; 6.1738 ; 6.2493 ; 6.3606 ; 6.6105 ; 6.7031 ; 6.8097 ; 6.9405 ; 6.9867 ; 7.0458 ; 7.1246 ; 7.1414]

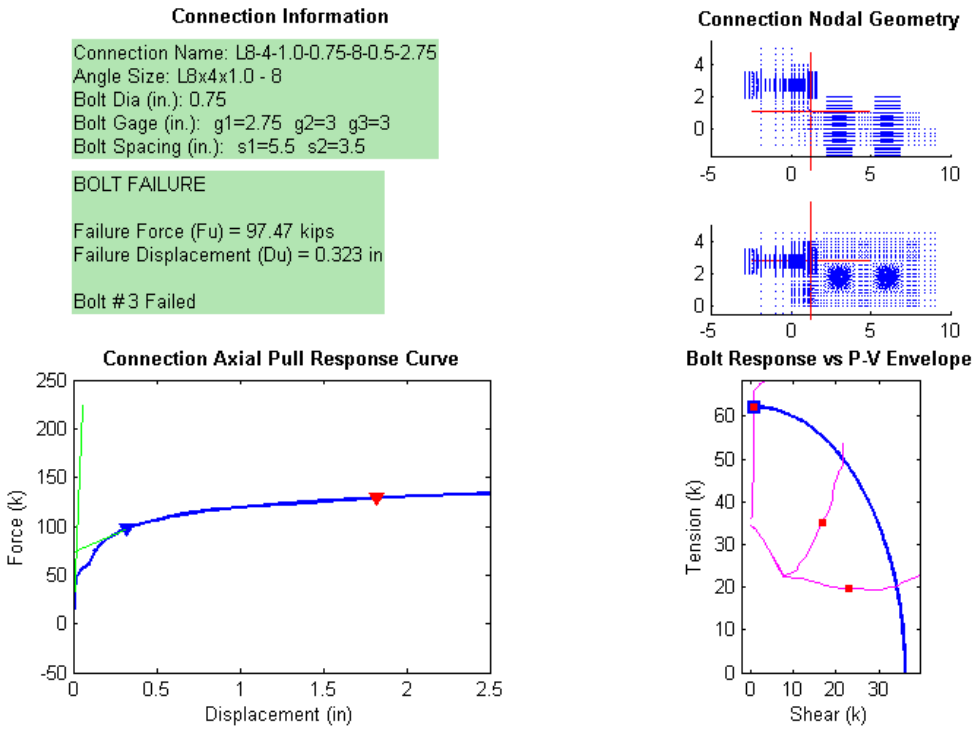


Figure B.202 Connection L8_4_1.0_0.75_8_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_0.75_8_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 3.9291e+003

Plastic Stiffness (k/in): 73.5354

Displacement (in): [2.2205e-036 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.055916 ; 0.064259 ; 0.067387 ; 0.07208 ; 0.07384 ; 0.076479 ; 0.077469 ; 0.078954 ; 0.081181 ; 0.084522 ; 0.089534 ; 0.091413 ; 0.094232 ; 0.09846 ; 0.1048 ; 0.10718 ; 0.11075 ; 0.11209 ; 0.11409 ; 0.1171 ; 0.12162 ; 0.12839 ; 0.13855 ; 0.15379 ; 0.1595 ; 0.16808 ; 0.18093 ; 0.20022 ; 0.22915 ; 0.27255 ; 0.28882 ; 0.31323 ; 0.34985 ; 0.36357 ; 0.38417 ; 0.39189 ; 0.40348 ; 0.42086 ; 0.44692 ; 0.48602 ; 0.54467 ; 0.55017 ; 0.55842 ; 0.57079 ; 0.58935 ; 0.61718 ; 0.65894 ; 0.72157 ; 0.81551 ; 0.85074 ; 0.90359 ; 0.98286 ; 1.1018 ; 1.2801 ; 1.5301 ; 1.5926 ; 1.6551 ; 1.7489 ; 1.8895 ; 2.1004 ; 2.3504 ; 2.5]

Force (kips): [-0.740213 ; 16.1095 ; 18.4449 ; 20.4052 ; 22.603 ; 23.8118 ; 24.843 ; 26.1676 ; 27.7977 ; 28.285 ; 28.8021 ; 28.8018 ; 28.7956 ; 28.7929 ; 28.8859 ; 29.0644 ; 29.3251 ; 29.4244 ; 29.4255 ; 29.4193 ; 29.4888 ; 30.3171 ; 31.2928 ; 32.6032 ; 33.0419 ; 33.6889 ; 33.9682 ; 34.416 ; 35.0516 ; 35.8892 ; 36.9223 ; 38.0485 ; 39.4652 ; 39.968 ; 40.648 ; 41.5479 ; 42.8495 ; 44.6908 ; 46.8636 ; 47.529 ; 48.4265 ; 49.5963 ; 49.9867 ; 50.536 ; 50.7349 ; 51.0375 ; 51.4722 ; 52.1123 ; 52.9738 ; 54.0949 ; 54.2008 ; 54.375 ; 54.6194 ; 54.9655 ; 55.4452 ; 56.0907 ; 56.935 ; 57.9892 ; 58.335 ; 58.8226 ; 59.4835 ; 60.3818 ; 61.5906 ; 63.0685 ; 63.4095 ; 63.73 ; 64.1839 ; 64.7902 ; 65.563 ; 66.3341 ; 66.7412]

Bolt 1 - Tensile Force (kips): [34.5274 ; 33.9865 ; 33.8847 ; 33.7917 ; 33.6004 ; 32.8133 ; 31.2706 ; 28.8277 ; 25.1489 ; 23.8844 ; 22.6788 ; 22.6698 ; 22.6608 ; 22.6581 ; 22.5892 ; 22.4799 ; 22.4137 ; 22.4077 ; 22.4018 ; 22.3971 ; 22.3901 ; 22.3514 ; 22.3176 ; 22.2885 ; 22.2811 ; 22.2354 ; 22.2181 ; 22.2015 ; 22.1677 ; 22.113 ; 21.9736 ; 21.7508 ; 21.5445 ; 21.3904 ; 21.1896 ; 21.005 ; 20.564 ; 20.0601 ; 19.8801 ; 19.7577 ; 19.6935 ; 19.7468 ; 19.7554 ; 19.7223 ; 19.7108 ; 19.7028 ; 19.6992 ; 19.5782 ; 19.5238 ; 19.4381 ; 19.428 ; 19.4212 ; 19.4198 ; 19.4264 ; 19.4225 ; 19.4464 ; 19.5766 ; 19.8885 ; 19.9998 ; 20.2008 ; 20.5056 ; 20.9383 ; 21.5513 ; 22.1516 ; 22.2433 ; 22.3514 ; 22.4915 ; 22.644 ; 22.7421 ; 22.776 ; 22.821]

Bolt 1 - Shear Force (kips): [0.0434559 ; 0.624607 ; 0.722971 ; 0.809033 ; 0.981192 ; 1.59804 ; 2.65234 ; 4.16825 ; 6.22931 ; 6.87381 ; 7.47965 ; 7.47991 ; 7.47789 ; 7.47709 ; 7.5843 ; 7.73543 ; 7.83019 ; 7.83378 ; 7.83406 ; 7.83229 ; 7.89415 ; 8.3365 ; 8.78606 ; 9.34424 ; 9.55024 ; 9.85928 ; 10.0229 ; 10.2341 ; 10.5793 ; 11.1655 ; 12.087 ; 13.0166 ; 13.9413 ; 14.4757 ; 15.1258 ; 15.7821 ; 17.1639 ; 19.189 ; 21.2306 ; 21.8895 ; 22.6232 ; 23.4221 ; 23.7101 ; 24.2376 ; 24.4456 ; 24.7431 ; 25.1937 ; 26.0949 ; 27.2005 ; 28.6559 ; 28.7816 ; 28.9594 ; 29.2039 ; 29.5451 ; 30.0592 ; 30.7745 ; 31.6738 ; 32.7888 ; 33.1792 ; 33.766 ; 34.4441 ; 35.2814 ; 36.3419 ; 37.8798 ; 38.2824 ; 38.628 ; 39.1282 ; 39.7054 ; 40.2752 ; 40.6892 ; 40.8442]

Bolt 2 - Tensile Force (kips): [34.5257 ; 33.9867 ; 33.8991 ; 33.8275 ; 33.6693 ; 32.9027 ; 31.3912 ; 29.0271 ; 25.5423 ; 24.3717 ; 23.0667 ; 23.0488 ; 23.0393 ; 23.0365 ; 23.0459 ; 23.0234 ; 22.9176 ; 22.8612 ; 22.8537 ; 22.847 ; 22.8592 ; 22.9302 ; 23.0646 ; 23.2752 ; 23.3773 ; 23.529 ; 23.6031 ; 23.7178 ; 23.9103 ; 24.2497 ; 24.773 ; 25.4945 ; 26.4405 ; 26.8054 ; 27.366 ; 28.2049 ; 29.5175 ; 31.2808 ; 33.4796 ; 34.1633 ; 35.0281 ; 36.0873 ; 36.4612 ; 37.0068 ; 37.2063 ; 37.5055 ; 37.9427 ; 38.567 ; 39.4638 ; 40.7551 ; 40.8792 ; 41.0769 ; 41.3621 ; 41.7889 ; 42.4096 ; 43.2877 ; 44.4038 ; 45.6025 ; 45.9634 ; 46.4725 ; 47.118 ; 47.979 ; 49.1857 ; 50.7743 ; 51.1023 ; 51.3953 ; 51.7766 ; 52.2369 ; 52.7672 ; 53.2848 ; 53.5585]

Bolt 2 - Shear Force (kips): [0.0313939 ; 0.682034 ; 0.78699 ; 0.878003 ; 1.05235 ; 1.6594 ; 2.7066 ; 4.21028 ; 6.24283 ; 6.87498 ; 7.59287 ; 7.60103 ; 7.6021 ; 7.60166 ; 7.60501 ; 7.66821 ; 7.88502 ; 7.99737 ; 8.00108 ; 7.99976 ; 8.00346 ; 8.36082 ; 8.83305 ; 9.49499 ; 9.70346 ; 10.0234 ; 10.1229 ; 10.3172 ; 10.5524 ; 10.7854 ; 11.0201 ; 11.3653 ; 12.4181 ; 12.7089 ; 13.0457 ; 13.4608 ; 13.9207 ; 14.9041 ; 15.8819 ; 16.0886 ; 16.4947 ; 17.2354 ; 17.4964 ; 17.8092 ; 17.9126 ; 18.0562 ; 18.2447 ; 18.4532 ; 18.7298 ; 19.0166 ; 19.0389 ; 19.0691 ; 19.1146 ; 19.1743 ; 19.2515 ; 19.3548 ; 19.6016 ; 20.0908 ; 20.2307 ; 20.4173 ; 20.7123 ; 21.0577 ; 21.4477 ; 21.7112 ; 21.7124 ; 21.7225 ; 21.7253 ; 21.7321 ; 21.7221 ; 21.6817 ; 21.6577]

Bolt 3 - Tensile Force (kips): [36 ; 36.7806 ; 37.2519 ; 37.7429 ; 38.3565 ; 38.7564 ; 39.1142 ; 39.6296 ; 40.3577 ; 40.6089 ; 40.8873 ; 40.8872 ; 40.8815 ; 40.8787 ; 40.9289 ; 41.0219 ; 41.1606 ; 41.2147 ; 41.2148 ; 41.2083 ; 41.247 ; 41.6994 ; 42.2527 ; 43.063 ; 43.3549 ; 43.8055 ; 44.0059 ; 44.3377 ; 44.8458 ; 45.6075 ; 46.7117 ; 48.2114 ; 50.282 ; 51.0093 ; 52.0203 ; 53.3543 ; 54.9999 ; 57.0915 ; 59.7703 ; 60.671 ; 61.916 ; 63.4606 ; 63.9093 ; 64.4857 ; 64.6852 ; 64.9447 ; 65.323 ; 65.8416 ; 66.5542 ; 67.4078 ; 67.4587 ; 67.5448 ; 67.7147 ; 67.9015 ; 68.1663 ; 68.4829 ; 68.8281 ; 68.9114 ; 68.9418 ; 69 ; 69.0917 ; 69.176 ; 69.2709 ; 69.423 ; 69.4566 ; 69.4863 ; 69.531 ; 69.5987 ; 69.6961 ; 69.8053 ; 69.8661]

Bolt 3 - Shear Force (kips): [0.013973 ; 0.14945 ; 0.16915 ; 0.18295 ; 0.20192 ; 0.21213 ; 0.22092 ; 0.23593 ; 0.26368 ; 0.27487 ; 0.28801 ; 0.28807 ; 0.28782 ; 0.2877 ; 0.29029 ; 0.29499 ; 0.30207 ; 0.30487 ; 0.30501 ; 0.30477 ; 0.30673 ; 0.32939 ; 0.35698 ; 0.39941 ; 0.41499 ; 0.43912 ; 0.44991 ; 0.46783 ; 0.49516 ; 0.53509 ; 0.58705 ; 0.63789 ; 0.67356 ; 0.67984 ; 0.6851 ; 0.68851 ; 0.69918 ; 0.71811 ; 0.70249 ; 0.68849 ; 0.66433 ; 0.62906 ; 0.62148 ; 0.61697 ; 0.61848 ; 0.67203 ; 0.73112 ; 0.81146 ; 1.2994 ; 1.915 ; 2.004 ; 2.1756 ; 2.3566 ; 2.6931 ; 3.0615 ; 3.5223 ; 4.0252 ; 4.8839 ; 5.1051 ; 5.3691 ; 5.6793 ; 6.1304 ; 6.681 ; 7.1912 ; 7.2994 ; 7.4016 ; 7.5241 ; 7.6962 ; 7.9235 ; 8.1832 ; 8.3278]

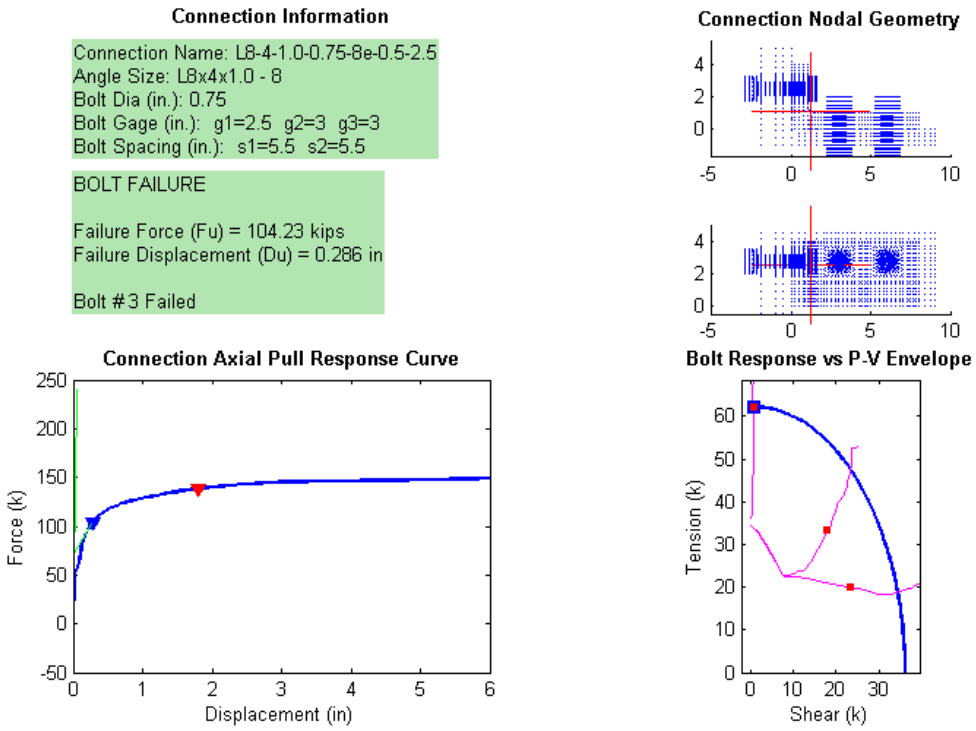


Figure B.203 Connection L8_4_1.0_0.75_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_0.75_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4413

Plastic Stiffness (k/in): 120.7306

Displacement (in): [2.5284e-036 ; 0.0046875 ; 0.009375 ; 0.016406 ; 0.026953 ; 0.042773 ; 0.066504 ; 0.068729 ; 0.072066 ; 0.073317 ; 0.075194 ; 0.07801 ; 0.082234 ; 0.083817 ; 0.086193 ; 0.089757 ; 0.091093 ; 0.093098 ; 0.096104 ; 0.10061 ; 0.10231 ; 0.10484 ; 0.10579 ; 0.10722 ; 0.10936 ; 0.11257 ; 0.11739 ; 0.12461 ; 0.13545 ; 0.15171 ; 0.17609 ; 0.20047 ; 0.22485 ; 0.26143 ; 0.31629 ; 0.33686 ; 0.36772 ; 0.41401 ; 0.43136 ; 0.43787 ; 0.44764 ; 0.46228 ; 0.48425 ; 0.51721 ; 0.56664 ; 0.64078 ; 0.66859 ; 0.71029 ; 0.77285 ; 0.79631 ; 0.8315 ; 0.88429 ; 0.96347 ; 1.0822 ; 1.1268 ; 1.1936 ; 1.2938 ; 1.3314 ; 1.3877 ; 1.4723 ; 1.5991 ; 1.6467 ; 1.718 ; 1.825 ; 1.8652 ; 1.9253 ; 1.9855 ; 2.0457 ; 2.136 ; 2.2715 ; 2.4746 ; 2.5508 ; 2.6651 ; 2.8365 ; 2.9007 ; 2.9972 ; 3.0333 ; 3.0876 ; 3.1689 ; 3.2909 ; 3.474 ; 3.7485 ; 3.8515 ; 4.006 ; 4.2376 ; 4.5851 ; 5.1064 ; 5.7064 ; 6]

Force (kips): [-0.857534 ; 12.1231 ; 19.8284 ; 24.0789 ; 25.796 ; 27.7935 ; 29.0005 ; 28.9974 ; 29.1725 ; 29.3839 ; 29.5041 ; 29.5068 ; 29.5031 ; 29.5015 ; 29.6994 ; 30.7808 ; 31.1218 ; 31.6001 ; 32.3 ; 33.3064 ; 33.6864 ; 34.3761 ; 34.6769 ; 35.1144 ; 35.7774 ; 36.6763 ; 37.8359 ; 39.4442 ; 41.2726 ; 43.0789 ; 45.2137 ; 47.0971 ; 48.8 ; 51.0078 ; 53.4793 ; 54.1798 ; 55.1148 ; 56.3717 ; 56.8124 ; 56.9758 ; 57.2206 ; 57.5687 ; 58.0573 ; 58.7171 ; 59.5856 ; 60.6925 ; 61.1028 ; 61.6422 ; 62.3238 ; 62.5572 ; 62.8878 ; 63.3518 ; 64.013 ; 64.9247 ; 65.2523 ; 65.7263 ; 66.3935 ; 66.6404 ; 67.0041 ; 67.5095 ; 68.2036 ; 68.4505 ; 68.8007 ; 69.2797 ; 69.4471 ; 69.6857 ; 69.9135 ; 70.1318 ; 70.443 ; 70.8745 ; 71.465 ; 71.6701 ; 71.9647 ; 72.3349 ; 72.4406 ; 72.5769 ; 72.6236 ; 72.6866 ; 72.7688 ; 72.8672 ; 72.9871 ; 73.1184 ; 73.1533 ; 73.1998 ; 73.3465 ; 73.5943 ; 73.9372 ; 74.2999 ; 74.468]

Bolt 1 - Tensile Force (kips): [34.5958 ; 34.1756 ; 33.8427 ; 32.7904 ; 30.1259 ; 25.9922 ; 22.7092 ; 22.7053 ; 22.5238 ; 22.4605 ; 22.4539 ; 22.4474 ; 22.4422 ; 22.4407 ; 22.4258 ; 22.4014 ; 22.397 ; 22.3853 ; 22.3943 ; 22.4241 ; 22.4194 ; 22.4239 ; 22.425 ; 22.4248 ; 22.384 ; 22.2438 ; 22.0746 ; 22.0131 ; 21.845 ; 21.5831 ; 21.1448 ; 20.6193 ; 20.4786 ; 20.0155 ; 19.7588 ; 19.5874 ; 19.2833 ; 18.9348 ; 18.7629 ; 18.703 ; 18.6203 ; 18.5082 ; 18.3501 ; 18.1999 ; 18.1751 ; 18.4137 ; 18.4981 ; 18.6232 ; 18.8362 ; 18.9072 ; 19.0065 ; 19.1388 ; 19.329 ; 19.5928 ; 19.6789 ; 19.8843 ; 20.2633 ; 20.4 ; 20.5997 ; 20.89 ; 21.267 ; 21.3893 ; 21.5494 ; 21.735 ; 21.8003 ; 21.9021 ; 22.0072 ; 22.111 ; 22.2653 ; 22.4893 ; 22.781 ; 22.8763 ; 23.0112 ; 23.1989 ; 23.2625 ; 23.3399 ; 23.367 ; 23.4076 ; 23.4677 ; 23.5431 ; 23.6593 ; 23.8231 ; 23.8837 ; 23.9692 ; 24.0518 ; 24.1374 ; 24.2433 ; 24.3457 ; 24.3905]

Bolt 1 - Shear Force (kips): [0.0387427 ; 0.482644 ; 0.801227 ; 1.64034 ; 3.40272 ; 5.80786 ; 7.49334 ; 7.49251 ; 7.73342 ; 7.82598 ; 7.83202 ; 7.83439 ; 7.83389 ; 7.83346 ; 8.03411 ; 8.57942 ; 8.72457 ; 8.97929 ; 9.32087 ; 9.76806 ; 9.95413 ; 10.4207 ; 10.5745 ; 10.7883 ; 11.2303 ; 11.9113 ; 12.7712 ; 13.3622 ; 14.3639 ; 15.5712 ; 17.2675 ; 19.2162 ; 20.5165 ; 22.5173 ; 24.4142 ; 25.2019 ; 26.4307 ; 27.9926 ; 28.5605 ; 28.758 ; 29.0395 ; 29.4385 ; 30.0089 ; 30.7566 ; 31.6772 ; 32.742 ; 33.1553 ; 33.714 ; 34.4031 ; 34.638 ; 34.9613 ; 35.4069 ; 36.0205 ; 36.9143 ; 37.2533 ; 37.7118 ; 38.3364 ; 38.6047 ; 38.9369 ; 39.3716 ; 39.8841 ; 40.0303 ; 40.2193 ; 40.4426 ; 40.5055 ; 40.578 ; 40.6353 ; 40.6834 ; 40.7441 ; 40.8218 ; 40.9468 ; 40.9886 ; 41.0486 ; 41.1228 ; 41.1441 ; 41.1634 ; 41.1674 ; 41.1908 ; 41.2279 ; 41.2473 ; 41.2667 ; 41.3291 ; 41.3393 ; 41.3507 ; 41.3695 ; 41.4031 ; 41.4597 ; 41.531 ; 41.5676]

Bolt 2 - Tensile Force (kips): [34.6048 ; 34.1947 ; 33.9068 ; 32.9469 ; 30.3495 ; 26.3511 ; 22.9237 ; 22.9192 ; 22.9262 ; 22.7857 ; 22.685 ; 22.6776 ; 22.6716 ; 22.6699 ; 22.6862 ; 22.7512 ; 22.7831 ; 22.8312 ; 22.9039 ; 23.0622 ; 23.1185 ; 23.2042 ; 23.2395 ; 23.2949 ; 23.3829 ; 23.5252 ; 23.7286 ; 23.8869 ; 24.4252 ; 25.4133 ; 26.9057 ; 28.5411 ; 30.1438 ; 32.2408 ; 34.5958 ; 35.2903 ; 36.1593 ; 37.3006 ; 37.692 ; 37.8351 ; 38.0488 ; 38.3593 ; 38.8066 ; 39.4354 ; 40.2221 ; 41.3002 ; 41.6685 ; 42.1892 ; 42.8823 ; 43.1203 ; 43.453 ; 43.9331 ; 44.607 ; 45.6188 ; 45.9869 ; 46.538 ; 47.307 ; 47.5761 ; 47.9556 ; 48.4426 ; 49.0528 ; 49.2653 ; 49.5646 ; 49.9621 ; 50.0964 ; 50.2844 ; 50.4639 ; 50.6394 ; 50.8771 ; 51.1987 ; 51.6259 ; 51.7764 ; 51.9985 ; 52.2042 ; 52.2631 ; 52.3382 ; 52.3638 ; 52.3997 ; 52.4453 ; 52.4893 ; 52.5291 ; 52.5631 ; 52.563 ; 52.56 ; 52.5852 ; 52.6506 ; 52.7721 ; 52.9316 ; 53.0136]

Bolt 2 - Shear Force (kips): [0.0471227 ; 0.479388 ; 0.791262 ; 1.60306 ; 3.35231 ; 5.7409 ; 7.56231 ; 7.56245 ; 7.56541 ; 7.76725 ; 7.92582 ; 7.93077 ; 7.93091 ; 7.93052 ; 7.93571 ; 8.46527 ; 8.64578 ; 8.84702 ; 9.17267 ; 9.65734 ; 9.82845 ; 10.0142 ; 10.1404 ; 10.334 ; 10.5299 ; 10.7727 ; 11.1042 ; 12.1512 ; 13.0194 ; 13.7111 ; 14.6455 ; 15.4778 ; 16.2617 ; 17.3647 ; 18.6719 ; 18.9457 ; 19.2332 ; 19.6023 ; 19.7318 ; 19.781 ; 19.8543 ; 19.9616 ; 20.1122 ; 20.3216 ; 20.8211 ; 21.5114 ; 21.7427 ; 22.0041 ; 22.2546 ; 22.3265 ; 22.4454 ; 22.5826 ; 22.744 ; 22.9504 ; 23.0144 ; 23.131 ; 23.3187 ; 23.3726 ; 23.4363 ; 23.5412 ; 23.6322 ; 23.6483 ; 23.6557 ; 23.6461 ; 23.6391 ; 23.6249 ; 23.6065 ; 23.584 ; 23.5587 ; 23.5201 ; 23.4597 ; 23.4382 ; 23.3999 ; 23.4063 ; 23.4237 ; 23.4602 ; 23.4762 ; 23.5009 ; 23.5433 ; 23.6242 ; 23.7604 ; 23.9828 ; 24.0886 ; 24.2334 ; 24.3618 ; 24.4991 ; 24.698 ; 24.9383 ; 25.0677]

Bolt 3 - Tensile Force (kips): [36 ; 36.2586 ; 37.2688 ; 38.2974 ; 38.8342 ; 39.6136 ; 40.2015 ; 40.199 ; 40.2839 ; 40.3898 ; 40.4516 ; 40.4532 ; 40.45 ; 40.4484 ; 40.5491 ; 41.1252 ; 41.315 ; 41.5874 ; 41.9997 ; 42.6097 ; 42.8467 ; 43.2774 ; 43.467 ; 43.75 ; 44.195 ; 44.829 ; 45.7093 ; 47.0904 ; 49.0586 ; 51.5966 ; 54.578 ; 56.7542 ; 58.6563 ; 61.0968 ; 63.8443 ; 64.5456 ; 65.4715 ; 66.7312 ; 67.1598 ; 67.3092 ; 67.5103 ; 67.7887 ; 68.1528 ; 68.6244 ; 69.2668 ; 69.9187 ; 70.0343 ; 70.0711 ; 70.0523 ; 70.0512 ; 70.075 ; 70.1208 ; 70.1159 ; 70.1502 ; 70.141 ; 70.1107 ; 70.1436 ; 70.164 ; 70.1589 ; 70.1645 ; 70.2228 ; 70.2499 ; 70.2861 ; 70.3351 ; 70.3525 ; 70.3794 ; 70.4041 ; 70.4259 ; 70.4582 ; 70.5046 ; 70.5114 ; 70.5288 ; 70.5644 ; 70.6751 ; 70.7813 ; 71.0065 ; 71.1016 ; 71.2509 ; 71.4689 ; 71.7613 ; 72.1535 ; 72.6782 ; 72.8614 ; 73.1065 ; 73.3342 ; 73.5845 ; 73.9309 ; 74.2979 ; 74.468]

Bolt 3 - Shear Force (kips): [0.022735 ; 0.0914 ; 0.16186 ; 0.19109 ; 0.20068 ; 0.21534 ; 0.2299 ; 0.22978 ; 0.23217 ; 0.23525 ; 0.23714 ; 0.23718 ; 0.23703 ; 0.23697 ; 0.24011 ; 0.26087 ; 0.26805 ; 0.27834 ; 0.29435 ; 0.3187 ; 0.32856 ; 0.34688 ; 0.35507 ; 0.36731 ; 0.38666 ; 0.41329 ; 0.44907 ; 0.50082 ; 0.54711 ; 0.56167 ; 0.54887 ; 0.56225 ; 0.57143 ; 0.54346 ; 0.48341 ; 0.47051 ; 0.46448 ; 0.46426 ; 0.46021 ; 0.47041 ; 0.50297 ; 0.53163 ; 0.55508 ; 0.88134 ; 1.1123 ; 1.3693 ; 1.5905 ; 2.0768 ; 2.6627 ; 2.8455 ; 3.0381 ; 3.2626 ; 3.7113 ; 4.1775 ; 4.3799 ; 4.6974 ; 4.9533 ; 5.0204 ; 5.194 ; 5.4098 ; 5.6108 ; 5.6701 ; 5.76

; 5.8926 ; 5.9412 ; 6.0048 ; 6.0693 ; 6.1353 ; 6.2333 ; 6.3853 ; 6.7129 ; 6.7966 ; 6.9011 ; 6.6735 ; 6.4207 ; 5.9124 ; 5.6885 ; 5.3255 ; 4.7823 ; 4.0638 ; 3.0662 ; 1.6124 ; 1.0598 ; 0.30925 ; 0.014255 ; 0.014585 ; 0.015958 ; 0.017418 ; 0.018207]

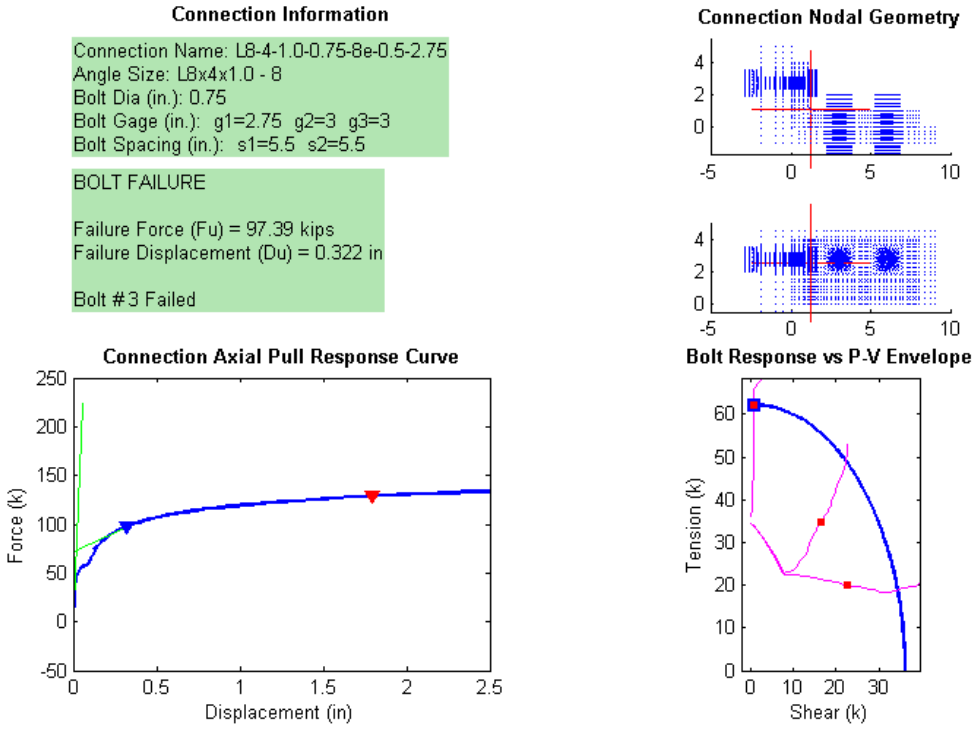


Figure B.204 Connection L8_4_1.0_0.75_8e_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_0.75_8e_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 3.8695e+003

Plastic Stiffness (k/in): 82.7456

Displacement (in): [2.7354e-036 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.072601 ; 0.074687 ; 0.077815 ; 0.078989 ; 0.080749 ; 0.083388 ; 0.087348 ; 0.093287 ; 0.095514 ; 0.098855 ; 0.10387 ; 0.10575 ; 0.10856 ; 0.11279 ; 0.11914 ; 0.12865 ; 0.14292 ; 0.14827 ; 0.1563 ; 0.16834 ; 0.1864 ; 0.21349 ; 0.25413 ; 0.26937 ; 0.29223 ; 0.32651 ; 0.37794 ; 0.39723 ; 0.42616 ; 0.43701 ; 0.45328 ; 0.47769 ; 0.51431 ; 0.56923 ; 0.58983 ; 0.62072 ; 0.64389 ; 0.67865 ; 0.73078 ; 0.80898 ; 0.83831 ; 0.88229 ; 0.94827 ; 1.0473 ; 1.1957 ; 1.2514 ; 1.3349 ; 1.4601 ; 1.5071 ; 1.5776 ; 1.6833 ; 1.7229 ; 1.7824 ; 1.8715 ; 2.0053 ; 2.0555 ; 2.1307 ; 2.2435 ; 2.4129 ; 2.5]

Force (kips): [-0.934045 ; 15.6316 ; 17.9601 ; 19.9056 ; 22.1935 ; 23.6723 ; 24.7045 ; 26.0317 ; 27.6918 ; 28.8674 ; 28.8644 ; 28.9576 ; 29.117 ; 29.3111 ; 29.4446 ; 29.445 ; 29.6886 ; 30.2299 ; 31.0924 ; 32.1614 ; 32.5144 ; 33.0924 ; 33.8666 ; 35.1961 ; 36.8906 ; 38.44 ; 38.9247 ; 39.6545 ; 40.6382 ; 41.8896 ; 43.664 ; 45.9745 ; 46.7135 ; 47.6592 ; 48.8655 ; 50.3772 ; 50.8847 ; 51.6276 ; 51.9013 ; 52.2984 ; 52.8465 ; 53.5891 ; 54.553 ; 54.9067 ; 55.4309 ; 55.8077 ; 56.3143 ; 57.0157 ; 57.8959 ; 58.2004 ; 58.6158 ; 59.1842 ; 59.9588 ; 61.0037 ; 61.3726 ; 61.9066 ; 62.656 ; 62.9311 ; 63.3297 ; 63.8781 ; 64.0727 ; 64.3522 ; 64.7374 ; 65.2612 ; 65.4456 ; 65.7062 ; 66.0741 ; 66.5712 ; 66.8078]

Bolt 1 - Tensile Force (kips): [34.5932 ; 34.0202 ; 33.9127 ; 33.8155 ; 33.6434 ; 32.9737 ; 31.4675 ; 29.066 ; 25.4186 ; 22.723 ; 22.7189 ; 22.6362 ; 22.5052 ; 22.4827 ; 22.4778 ; 22.4721 ; 22.4566 ; 22.4349 ; 22.4415 ; 22.4492 ; 22.4683 ; 22.4949 ; 22.5083 ; 22.5141 ; 22.2732 ; 22.064 ; 22.011 ; 21.903 ; 21.6863 ; 21.5207 ; 20.9735 ; 20.6316 ; 20.4741 ; 20.2188 ; 19.9886 ; 19.882 ; 19.7627 ; 19.564 ; 19.4571 ; 19.3095 ; 19.146 ; 18.8846 ; 18.5676 ; 18.4443 ; 18.3196 ; 18.2733 ; 18.2875 ; 18.4145 ; 18.6204 ; 18.692 ; 18.8249 ; 19.0175 ; 19.251 ; 19.505 ; 19.5438 ; 19.6027 ; 19.7964 ; 19.8624 ; 20.0791 ; 20.4118 ; 20.524 ; 20.6781 ; 20.9009 ; 21.1527 ; 21.2294 ; 21.3534 ; 21.5422 ; 21.809 ; 21.9307]

Bolt 1 - Shear Force (kips): [0.041554 ; 0.635539 ; 0.737197 ; 0.825851 ; 0.978586 ; 1.50972 ; 2.55032 ; 4.05343 ; 6.11846 ; 7.49769 ; 7.4969 ; 7.60924 ; 7.79523 ; 7.82876 ; 7.8339 ; 7.83436 ; 8.04957 ; 8.46591 ; 8.71991 ; 9.24387 ; 9.42079 ; 9.64784 ; 10.0581 ; 10.8944 ; 12.1096 ; 13.2318 ; 13.5395 ; 14.089 ; 14.9905 ; 15.8628 ; 17.8681 ; 20.0663 ; 20.8073 ; 21.7855 ; 22.8739 ; 24.0333 ; 24.614 ; 25.5578 ; 25.9557 ; 26.5567 ; 27.3422 ; 28.3981 ; 29.6932 ; 30.1487 ; 30.7589 ; 31.1895 ; 31.7546 ; 32.4606 ; 33.4639 ; 33.7974 ; 34.2629 ; 34.8611 ; 35.636 ; 36.6722 ; 37.0791 ; 37.6803 ; 38.4781 ; 38.8008 ; 39.1734 ; 39.6849 ; 39.8581 ; 40.0877 ; 40.3437 ; 40.6311 ; 40.7168 ; 40.8094 ; 40.9099 ; 41.0219 ; 41.0705]

Bolt 2 - Tensile Force (kips): [34.5998 ; 34.0696 ; 33.9888 ; 33.9237 ; 33.8184 ; 33.2211 ; 31.7754 ; 29.4803 ; 26.0621 ; 23.1175 ; 23.1118 ; 23.119 ; 23.1328 ; 23.0022 ; 22.9202 ; 22.9125 ; 22.9478 ; 23.0158 ; 23.0952 ; 23.2488 ; 23.3012 ; 23.4115 ; 23.5743 ; 23.8547 ; 24.4082 ; 25.393 ; 25.7565 ; 26.2765 ; 27.0709 ; 28.3073 ; 30.0953 ; 32.3076 ; 33.0445 ; 33.9561 ; 35.0878 ; 36.4215 ; 36.9041 ; 37.603 ; 37.85 ; 38.2162 ; 38.7435 ; 39.4703 ; 40.4635 ; 40.8372 ; 41.417 ; 41.8635 ; 42.5104 ; 43.3385 ; 44.3019 ; 44.6265 ; 45.0405 ; 45.5956 ; 46.3519 ; 47.41 ; 47.8143 ; 48.4149 ; 49.2574 ; 49.5422 ; 49.9507 ; 50.4779 ; 50.6478 ; 50.8812 ; 51.1892 ; 51.6 ; 51.7457 ; 51.9433 ; 52.2339 ; 52.6274 ; 52.8223]

Bolt 2 - Shear Force (kips): [0.0499512 ; 0.624039 ; 0.721779 ; 0.805831 ; 0.942371 ; 1.45161 ; 2.47938 ; 3.9649 ; 6.00392 ; 7.62485 ; 7.62545 ; 7.62886 ; 7.6335 ; 7.83981 ; 7.99318 ; 7.99751 ; 8.00913 ; 8.09866 ; 8.65274 ; 9.12047 ; 9.28224 ; 9.58928 ; 9.90022 ; 10.3092 ; 10.8569 ; 11.308 ; 11.5182 ; 12.0577 ; 12.6697 ; 13.2622 ; 13.849 ; 15.092 ; 15.4715 ; 15.8606 ; 16.3609 ; 17.4721 ; 17.8005 ; 18.1804 ; 18.299 ; 18.4546 ; 18.6697 ; 18.9584 ; 19.326 ; 19.448 ; 19.6055 ; 19.6975 ; 19.8124 ; 20.1092 ; 20.5816 ; 20.7344 ; 20.9768 ; 21.2764 ; 21.597 ; 21.9299 ; 22.0186 ; 22.1335 ; 22.2922 ; 22.3398 ; 22.3993 ; 22.4651 ; 22.4825 ; 22.5056 ; 22.5365 ; 22.5615 ; 22.5604 ; 22.5606 ; 22.5459 ; 22.51 ; 22.4844]

Bolt 3 - Tensile Force (kips): [36 ; 36.7509 ; 37.2154 ; 37.7057 ; 38.355 ; 38.8687 ; 39.2463 ; 39.7818 ; 40.5379 ; 41.1724 ; 41.1697 ; 41.2188 ; 41.3023 ; 41.4094 ; 41.4834 ; 41.4837 ; 41.6119 ; 41.9048 ; 42.3934 ; 43.0304 ; 43.2515 ; 43.6254 ; 44.1568 ; 45.1614 ; 46.7534 ; 48.8554 ; 49.586 ; 50.6522 ; 52.1172 ; 53.9469 ; 56.0482 ; 58.7348 ; 59.6287 ; 60.8941 ; 62.565 ; 64.3507 ; 64.8523 ; 65.5037 ; 65.7267 ; 66.0376 ; 66.486 ; 67.0588 ; 67.7647 ; 67.9465 ; 68.2397 ; 68.4027 ; 68.6807 ; 68.9097 ; 69.0983 ; 69.0428 ; 69.0593 ; 69.1215 ; 69.2207 ; 69.3162 ; 69.3125 ; 69.3564 ; 69.4248 ; 69.4507 ; 69.4873 ; 69.5346 ; 69.5517 ; 69.5779 ; 69.6175 ; 69.6778 ; 69.6998 ; 69.7317 ; 69.7781 ; 69.8468 ; 69.88]

Bolt 3 - Shear Force (kips): [0.026282 ; 0.13608 ; 0.1553 ; 0.16836 ; 0.18741 ; 0.20024 ; 0.20952 ; 0.22653 ; 0.25509 ; 0.28519 ; 0.28507 ; 0.28756 ; 0.29164 ; 0.2969 ; 0.30057 ; 0.30078 ; 0.30705 ; 0.32156 ; 0.34607 ; 0.37922 ; 0.39094 ; 0.41102 ; 0.4394 ; 0.49213 ; 0.56563 ; 0.62308 ; 0.6337 ; 0.64296 ; 0.64814 ; 0.65027 ; 0.67151 ; 0.67518 ; 0.66671 ; 0.64739 ; 0.61442 ; 0.58374 ; 0.58259 ; 0.66688 ; 0.70267 ; 0.75333 ; 0.95696 ; 1.4801 ; 1.9367 ; 2.2425 ; 2.68 ; 3.0329 ; 3.3026 ; 3.8217 ; 4.3644 ; 4.7201 ; 5.0111 ; 5.3229 ; 5.693 ; 6.2008 ; 6.4228 ; 6.6365 ; 6.9036 ; 6.9917 ; 7.1193 ; 7.2949 ; 7.3512 ; 7.4302 ; 7.5486 ; 7.7158 ; 7.77 ; 7.8478 ; 7.9746 ; 8.1523 ; 8.243]

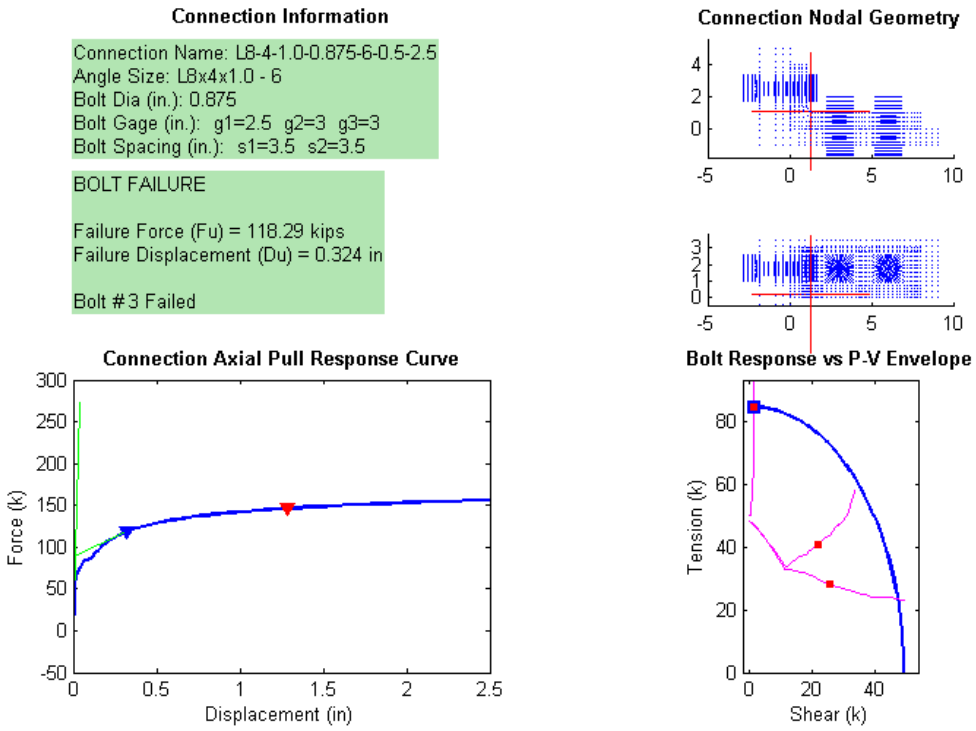


Figure B.205 Connection L8_4_1.0_0.875_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_0.875_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 7.4025e+003

Plastic Stiffness (k/in): 90.0954

Displacement (in): [4.3479e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.073132 ; 0.07626 ; 0.080953 ; 0.087992 ; 0.090632 ; 0.094591 ; 0.10053 ; 0.10944 ; 0.1228 ; 0.12781 ; 0.13533 ; 0.14661 ; 0.15084 ; 0.15718 ; 0.16669 ; 0.18096 ; 0.18631 ; 0.19434 ; 0.20638 ; 0.22444 ; 0.25153 ; 0.26169 ; 0.27693 ; 0.29979 ; 0.33408 ; 0.38551 ; 0.46266 ; 0.49159 ; 0.53498 ; 0.60008 ; 0.69772 ; 0.73433 ; 0.78925 ; 0.87164 ; 0.90253 ; 0.94887 ; 1.0184 ; 1.1226 ; 1.1618 ; 1.2204 ; 1.3084 ; 1.4403 ; 1.4898 ; 1.564 ; 1.6754 ; 1.7172 ; 1.7589 ; 1.8007 ; 1.8633 ; 1.9572 ; 1.9925 ; 2.0453 ; 2.1246 ; 2.2435 ; 2.4218 ; 2.5]

Force (kips): [-1.45317 ; 6.89022 ; 13.0049 ; 20.0577 ; 27.2613 ; 32.8051 ; 35.3691 ; 38.3032 ; 41.4471 ; 42.2654 ; 42.3009 ; 42.2981 ; 42.2819 ; 42.5056 ; 42.9602 ; 42.9728 ; 43.1435 ; 44.9426 ; 45.5425 ; 46.3716 ; 47.5536 ; 48.0416 ; 48.8058 ; 49.8662 ; 51.2157 ; 51.6707 ; 52.3124 ; 53.2234 ; 54.3829 ; 55.8768 ; 56.407 ; 57.1361 ; 58.1658 ; 59.5405 ; 61.2076 ; 63.2686 ; 63.9506 ; 64.8854 ; 66.1364 ; 67.6918 ; 68.1919 ; 68.8683 ; 69.7976 ; 70.1033 ; 70.5297 ; 71.1202 ; 71.9424 ; 72.2395 ; 72.6593 ; 73.2402 ; 74.0134 ; 74.29 ; 74.6831 ; 75.2276 ; 75.4135 ; 75.5926 ; 75.7644 ; 76.0107 ; 76.3718 ; 76.503 ; 76.692 ; 76.9611 ; 77.3252 ; 77.8179 ; 78.02]

Bolt 1 - Tensile Force (kips): [48.339 ; 48.0842 ; 47.8698 ; 47.6021 ; 47.2865 ; 46.6118 ; 43.9245 ; 39.8566 ; 34.7112 ; 33.2745 ; 33.2481 ; 33.2278 ; 33.2104 ; 33.0885 ; 32.959 ; 32.9343 ; 32.9105 ; 32.8063 ; 32.7726 ; 32.735 ; 32.6338 ; 32.5735 ; 32.4333 ; 32.1923 ; 31.9676 ; 31.8703 ; 31.6814 ; 31.26 ; 30.8366 ; 30.1295 ; 29.7568 ; 29.2683 ; 28.5828 ; 27.7845 ; 27.1872 ; 26.6316 ; 26.4237 ; 26.2065 ; 25.8726 ; 25.1248 ; 24.8731 ; 24.5697 ; 24.2315 ; 24.1345 ; 24.0266 ; 23.9333 ; 23.9012 ; 23.9001 ; 23.9172 ; 23.9702 ; 24.0361 ; 23.9999 ; 23.9186 ; 23.8076 ; 23.7653 ; 23.6996 ; 23.6319 ; 23.5515 ; 23.4302 ; 23.3853 ; 23.3221 ; 23.2517 ; 23.1712 ; 23.0733 ; 23.0321]

Bolt 1 - Shear Force (kips): [0.0740999 ; 0.262331 ; 0.497581 ; 0.781849 ; 1.09294 ; 1.73318 ; 3.94845 ; 6.87082 ; 10.1188 ; 10.9579 ; 10.9654 ; 10.964 ; 10.9593 ; 11.1689 ; 11.3517 ; 11.3593 ; 11.4835 ; 12.3663 ; 12.6056 ; 13.0269 ; 13.6418 ; 14.0575 ; 14.9493 ; 16.0968 ; 17.0799 ; 17.4131 ; 17.9312 ; 18.9287 ; 19.8765 ; 21.218 ; 21.8857 ; 22.7548 ; 24.0519 ; 25.8735 ; 27.7293 ; 29.8162 ; 30.5599 ; 31.5655 ; 33.0684 ; 35.6853 ; 36.5729 ; 37.6707 ; 38.8787 ; 39.2564 ; 39.7614 ; 40.4554 ; 41.4489 ; 41.7943 ; 42.2781 ; 42.9475 ; 43.8699 ; 44.3398 ; 45.0035 ; 45.8802 ; 46.1704 ; 46.4634 ; 46.7408 ; 47.1118 ; 47.6225 ; 47.8015 ; 48.0509 ; 48.3683 ; 48.761 ; 49.2639 ; 49.4641]

Bolt 2 - Tensile Force (kips): [48.3405 ; 48.0349 ; 47.7765 ; 47.4652 ; 47.1199 ; 46.45 ; 43.7934 ; 39.9181 ; 35.541 ; 34.2792 ; 34.1509 ; 34.1068 ; 34.0844 ; 34.1082 ; 33.9736 ; 33.9552 ; 34.0035 ; 34.541 ; 34.7424 ; 35.0541 ; 35.5541 ; 35.7527 ; 36.0606 ; 36.4783 ; 36.9311 ; 37.0846 ; 37.341 ; 37.7812 ; 38.3824 ; 39.1331 ; 39.3443 ; 39.684 ; 40.1744 ; 40.9284 ; 41.8619 ; 42.9812 ; 43.3357 ; 43.8594 ; 44.5411 ; 45.4492 ; 45.7819 ; 46.2393 ; 46.9115 ; 47.1354 ; 47.4802 ; 48.0486 ; 48.9868 ; 49.3562 ; 49.917 ; 50.7138 ; 51.7809 ; 52.1599 ; 52.7144 ; 53.5142 ; 53.7915 ; 54.0542 ; 54.3134 ; 54.6956 ; 55.2615 ; 55.4701 ; 55.7791 ; 56.224 ; 56.8008 ; 57.6151 ; 57.9625]

Bolt 2 - Shear Force (kips): [0.0523918 ; 0.344344 ; 0.629816 ; 0.972639 ; 1.34542 ; 2.03344 ; 4.23659 ; 7.12821 ; 10.2365 ; 11.1473 ; 11.2285 ; 11.2477 ; 11.2471 ; 11.311 ; 11.705 ; 11.7232 ; 11.7748 ; 12.7341 ; 13.1031 ; 13.5267 ; 14.1092 ; 14.3129 ; 14.6272 ; 15.1694 ; 16.3102 ; 16.7319 ; 17.2647 ; 17.831 ; 18.5014 ; 19.4473 ; 19.8378 ; 20.3272 ; 21.0145 ; 21.7722 ; 22.87 ; 24.3251 ; 24.795 ; 25.3701 ; 26.102 ; 26.7977 ; 27.0152 ; 27.3599 ; 28.0987 ; 28.3924 ; 28.8093 ; 29.3469 ; 30.0091 ; 30.2256 ; 30.5228 ; 30.9722 ; 31.6035 ; 31.7579 ; 31.9411 ; 32.14 ; 32.2156 ; 32.3088 ; 32.3952 ; 32.5133 ; 32.6815 ; 32.7477 ; 32.8443 ; 32.9864 ; 33.1843 ; 33.4245 ; 33.5283]

Bolt 3 - Tensile Force (kips): [50 ; 49.9564 ; 50.0409 ; 50.3755 ; 51.3567 ; 52.7527 ; 53.7129 ; 55.4831 ; 58.659 ; 59.6866 ; 59.7394 ; 59.7408 ; 59.7252 ; 60.0114 ; 60.6477 ; 60.6664 ; 60.9129 ; 63.8022 ; 64.8079 ; 66.2325 ; 68.2582 ; 69.0452 ; 70.2064 ; 71.7906 ; 73.7337 ; 74.3576 ; 75.2375 ; 76.4775 ; 78.1317 ; 80.2955 ; 81.0387 ; 82.078 ; 83.5066 ; 85.3542 ; 87.4126 ; 89.8262 ; 90.6134 ; 91.6301 ; 92.7792 ; 94.0663 ; 94.4295 ; 94.855 ; 95.0113 ; 95.032 ; 95.095 ; 95.199 ; 95.3185 ; 95.3117 ; 95.3302 ; 95.3301 ; 95.4408 ; 95.4854 ; 95.5507 ; 95.6454 ; 95.6755 ; 95.7048 ; 95.7333 ; 95.7765 ; 95.8077 ; 95.7955 ; 95.7738 ; 95.7853 ; 95.8246 ; 95.897 ; 95.9307]

Bolt 3 - Shear Force (kips): [0.010079 ; 0.065533 ; 0.13476 ; 0.23072 ; 0.35007 ; 0.46066 ; 0.51422 ; 0.59391 ; 0.76 ; 0.81686 ; 0.81984 ; 0.82006 ; 0.81911 ; 0.83579 ; 0.87247 ; 0.87372 ; 0.88804 ; 1.0362 ; 1.0722 ; 1.1083 ; 1.1388 ; 1.1449 ; 1.1494 ; 1.1537 ; 1.1669 ; 1.1756 ; 1.1901 ; 1.2067 ; 1.2191 ; 1.2084 ; 1.2005 ; 1.1873 ; 1.1647 ; 1.1318 ; 1.1102 ; 1.0997 ; 1.0778 ; 1.087 ; 1.1443 ; 1.1807 ; 1.3456 ; 1.6208 ; 2.5455 ; 2.8765 ; 3.252 ; 3.7041 ; 4.3006 ; 4.5793 ; 4.9006 ; 5.3859 ; 5.8321 ; 5.972 ; 6.1686 ; 6.4152 ; 6.4809 ; 6.5479 ; 6.616 ; 6.7145 ; 6.9364 ; 7.0604 ; 7.2453 ; 7.4298 ; 7.6538 ; 7.966 ; 8.0955]

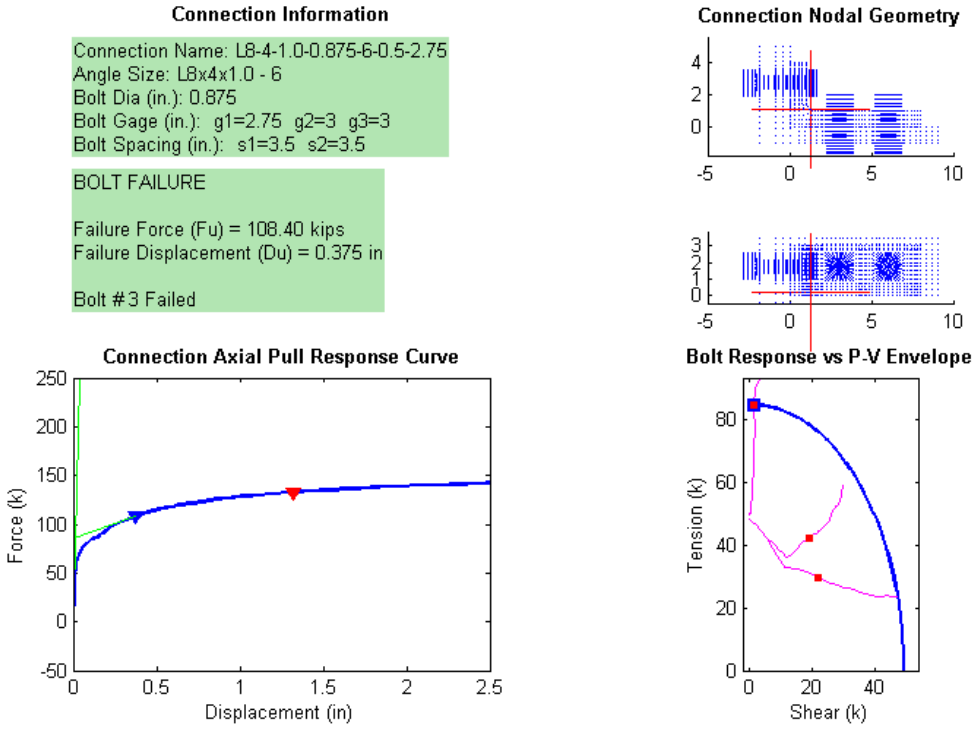


Figure B.206 Connection L8_4_1.0_0.875_6_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_0.875_6_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 6.5158e+003

Plastic Stiffness (k/in): 62.7340

Displacement (in): [4.6389e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.10296 ; 0.1188 ; 0.12474 ; 0.12697 ; 0.13031 ; 0.13156 ; 0.13344 ; 0.13626 ; 0.13732 ; 0.1389 ; 0.14128 ; 0.14485 ; 0.1502 ; 0.15221 ; 0.15522 ; 0.15973 ; 0.1665 ; 0.17666 ; 0.18047 ; 0.18619 ; 0.19476 ; 0.20333 ; 0.21191 ; 0.22476 ; 0.24405 ; 0.27298 ; 0.28383 ; 0.3001 ; 0.32451 ; 0.36113 ; 0.37486 ; 0.39545 ; 0.42635 ; 0.43793 ; 0.45531 ; 0.48138 ; 0.52048 ; 0.53514 ; 0.55713 ; 0.59012 ; 0.63961 ; 0.71384 ; 0.82518 ; 0.86694 ; 0.92957 ; 1.0235 ; 1.0587 ; 1.1116 ; 1.1909 ; 1.3098 ; 1.3543 ; 1.4212 ; 1.5216 ; 1.672 ; 1.8978 ; 2.1477 ; 2.2102 ; 2.304 ; 2.4446 ; 2.5]

Force (kips): [-1.54566 ; 5.83991 ; 11.1806 ; 17.3934 ; 23.9763 ; 25.7135 ; 27.9016 ; 30.5071 ; 32.6017 ; 34.2865 ; 36.3858 ; 38.6576 ; 41.0157 ; 41.7587 ; 42.6035 ; 42.6764 ; 42.6771 ; 42.6704 ; 42.755 ; 42.8953 ; 43.0547 ; 43.0579 ; 43.1647 ; 43.3271 ; 43.4619 ; 43.4661 ; 43.4629 ; 43.5161 ; 43.9235 ; 44.4991 ; 45.2717 ; 45.5507 ; 45.9446 ; 46.5044 ; 47.0441 ; 47.5374 ; 48.3723 ; 49.4191 ; 50.659 ; 51.1046 ; 51.7329 ; 52.5964 ; 53.7636 ; 54.1943 ; 54.7903 ; 55.6033 ; 55.8914 ; 56.3243 ; 56.9292 ; 57.736 ; 58.0225 ; 58.4268 ; 58.9913 ; 59.7667 ; 60.7995 ; 62.2624 ; 62.7599 ; 63.4394 ; 64.3051 ; 64.5934 ; 64.9953 ; 65.5584 ; 66.3398 ; 66.6178 ; 67.0035 ; 67.5385 ; 68.2606 ; 69.1782 ; 70.0501 ; 70.2495 ; 70.5392 ; 70.9419 ; 71.0956]

Bolt 1 - Tensile Force (kips): [48.3373 ; 48.1144 ; 47.9291 ; 47.6958 ; 47.4159 ; 47.3327 ; 47.2163 ; 47.025 ; 46.2912 ; 44.4767 ; 42.0374 ; 38.9345 ; 35.1373 ; 33.8713 ; 33.2343 ; 33.2127 ; 33.2055 ; 33.197 ; 33.1594 ; 33.0649 ; 32.9504 ; 32.9406 ; 32.9355 ; 32.9288 ; 32.9188 ; 32.9086 ; 32.9056 ; 32.8995 ; 32.8542 ; 32.8128 ; 32.7643 ; 32.7422 ; 32.7184 ; 32.6867 ; 32.6337 ; 32.5671 ; 32.3598 ; 32.0432 ; 31.7204 ; 31.4583 ; 31.1134 ; 30.7985 ; 30.1815 ; 29.7938 ; 29.266 ; 28.5256 ; 28.2851 ; 27.9963 ; 27.6585 ; 27.3194 ; 27.2005 ; 27.0719 ; 26.8302 ; 26.5335 ; 26.2156 ; 25.8424 ; 25.5437 ; 25.1221 ; 24.6048 ; 24.4324 ; 24.2334 ; 23.982 ; 23.768 ; 23.7177 ; 23.6841 ; 23.6895 ; 23.7421 ; 23.8446 ; 23.7679 ; 23.7278 ; 23.6492 ; 23.4873 ; 23.4213]

Bolt 1 - Shear Force (kips): [0.0769071 ; 0.224094 ; 0.429757 ; 0.681327 ; 0.967191 ; 1.04813 ; 1.15836 ; 1.33763 ; 2.02221 ; 3.51807 ; 5.34839 ; 7.48217 ; 9.85564 ; 10.5936 ; 10.9621 ; 10.9593 ; 10.9575 ; 10.9549 ; 11.0326 ; 11.1759 ; 11.3385 ; 11.3445 ; 11.3458 ; 11.3464 ; 11.3467 ; 11.3443 ; 11.3432 ; 11.3783 ; 11.735 ; 12.0669 ; 12.4227 ; 12.5591 ; 12.7037 ; 13.0493 ; 13.413 ; 13.6761 ; 15.0616 ; 16.566 ; 17.7751 ; 18.4424 ; 19.218 ; 19.9319 ; 21.1611 ; 21.8651 ; 22.8148 ; 24.2394 ; 24.7445 ; 25.3876 ; 26.2445 ; 27.2628 ; 27.6564 ; 28.1649 ; 28.9361 ; 29.8998 ; 31.1452 ; 32.9647 ; 33.858 ; 35.1226 ; 36.8362 ; 37.3837 ; 38.099 ; 39.0257 ; 40.1136 ; 40.4898 ; 41.0063 ; 41.6858 ; 42.5539 ; 43.6751 ; 45.1644 ; 45.5277 ; 46.0271 ; 46.7038 ; 46.9445]

Bolt 2 - Tensile Force (kips): [48.3351 ; 48.0722 ; 47.8491 ; 47.5841 ; 47.2849 ; 47.206 ; 47.1024 ; 46.9375 ; 46.2631 ; 44.5328 ; 42.3864 ; 40.1398 ; 38.2576 ; 37.6374 ; 36.2891 ; 36.0787 ; 36.0511 ; 36.0309 ; 36.0749 ; 36.1408 ; 36.2144 ; 36.214 ; 36.1896 ; 36.17 ; 36.1633 ; 36.1485 ; 36.1433 ; 36.1817 ; 36.4109 ; 36.6847 ; 37.0697 ; 37.2109 ; 37.453 ; 37.8273 ; 38.1741 ; 38.5002 ; 39.0254 ; 39.6773 ; 40.4653 ; 40.7523 ; 41.1023 ; 41.4996 ; 42.1894 ; 42.413 ; 42.7475 ; 43.1565 ; 43.2962 ; 43.4832 ; 43.7778 ; 44.2358 ; 44.4188 ; 44.7009 ; 45.0854 ; 45.5582 ; 46.2273 ; 47.5892 ; 48.0953 ; 48.7865 ; 49.7086 ; 50.0531 ; 50.5404 ; 51.1674 ; 52.0343 ; 52.3241 ; 52.7188 ; 53.3616 ; 54.4594 ; 55.9729 ; 57.3617 ; 57.6824 ; 58.1625 ; 58.8595 ; 59.1223]

Bolt 2 - Shear Force (kips): [0.0548159 ; 0.299628 ; 0.551841 ; 0.85863 ; 1.20417 ; 1.30204 ; 1.43644 ; 1.65045 ; 2.32915 ; 3.81061 ; 5.60032 ; 7.62687 ; 9.7649 ; 10.4795 ; 11.7078 ; 11.868 ; 11.8821 ; 11.8863 ; 11.9012 ; 11.9231 ; 11.9484 ; 11.9492 ; 12.0777 ; 12.2661 ; 12.42 ; 12.4348 ; 12.435 ; 12.4475 ; 12.6279 ; 13.0271 ; 13.4918 ; 13.6716 ; 13.9241 ; 14.1919 ; 14.5574 ; 14.9028 ; 15.2689 ; 15.7697 ; 16.408 ; 16.5902 ; 17.0086 ; 17.9196 ; 18.8517 ; 19.1416 ; 19.5165 ; 20.0095 ; 20.2023 ; 20.5904 ; 21.1043 ; 21.7208 ; 21.9124 ; 22.1734 ; 22.5252 ; 23.1261 ; 24.0712 ; 25.0937 ; 25.3218 ; 25.6223 ; 25.9743 ; 26.0946 ; 26.2888 ; 26.6517 ; 27.2533 ; 27.5188 ; 27.94 ; 28.4271 ; 28.8204 ; 29.2442 ; 29.431 ; 29.4578 ; 29.5242 ; 29.6488 ; 29.7074]

Bolt 3 - Tensile Force (kips): [50 ; 49.931 ; 49.9904 ; 50.266 ; 51.0972 ; 51.5024 ; 52.1043 ; 52.9523 ; 53.933 ; 54.9928 ; 56.7794 ; 59.5712 ; 63.6881 ; 65.059 ; 66.6554 ; 66.8014 ; 66.806 ; 66.8022 ; 66.9431 ; 67.1874 ; 67.464 ; 67.4699 ; 67.6577 ; 67.9417 ; 68.1771 ; 68.1857 ; 68.1823 ; 68.271 ; 68.9284 ; 69.8697 ; 71.1622 ; 71.6184 ; 72.2608 ; 73.143 ; 73.9533 ; 74.698 ; 75.8207 ; 77.3606 ; 79.3653 ; 80.062 ; 81.0463 ; 82.4009 ; 84.1913 ; 84.8029 ; 85.627 ; 86.6695 ; 87.0146 ; 87.4477 ; 88.0648 ; 88.9835 ; 89.2816 ; 89.7168 ; 90.3523 ; 91.1691 ; 92.1281 ; 93.3493 ; 93.6442 ; 94.0126 ; 94.2879 ; 94.3104 ; 94.3639 ; 94.4538 ; 94.5426 ; 94.5734 ; 94.6285 ; 94.709 ; 94.8239 ; 94.9939 ; 95.1679 ; 95.209 ; 95.282 ; 95.3889 ; 95.4352]

Bolt 3 - Shear Force (kips): [0.01675 ; 0.056706 ; 0.12037 ; 0.20776 ; 0.31909 ; 0.35322 ; 0.39738 ; 0.45615 ; 0.51824 ; 0.58647 ; 0.72098 ; 0.9332 ; 1.2039 ; 1.2618 ; 1.3121 ; 1.3159 ; 1.316 ; 1.3157 ; 1.3198 ; 1.3263 ; 1.3333 ; 1.3335 ; 1.3381 ; 1.3449 ; 1.3504 ; 1.3508 ; 1.3507 ; 1.3529 ; 1.3662 ; 1.3839 ; 1.4065 ; 1.415 ; 1.4279 ; 1.4491 ; 1.4705 ; 1.4898 ; 1.5077 ; 1.514 ; 1.5035 ; 1.4958 ; 1.4835 ; 1.4657 ; 1.4451 ; 1.4368 ; 1.4277 ; 1.4265 ; 1.4275 ; 1.5156 ; 1.6351 ; 1.7152 ; 1.7613 ; 1.8136 ; 1.8505 ; 1.9612 ; 2.513 ; 3.2181 ; 3.5719 ; 3.9566 ; 4.5921 ; 4.9054 ; 5.2926 ; 5.7886 ; 6.4211 ; 6.6414 ; 6.9317 ; 7.3215 ; 7.8354 ; 8.4646 ; 9.0262 ; 9.1538 ; 9.3075 ; 9.51 ; 9.575]

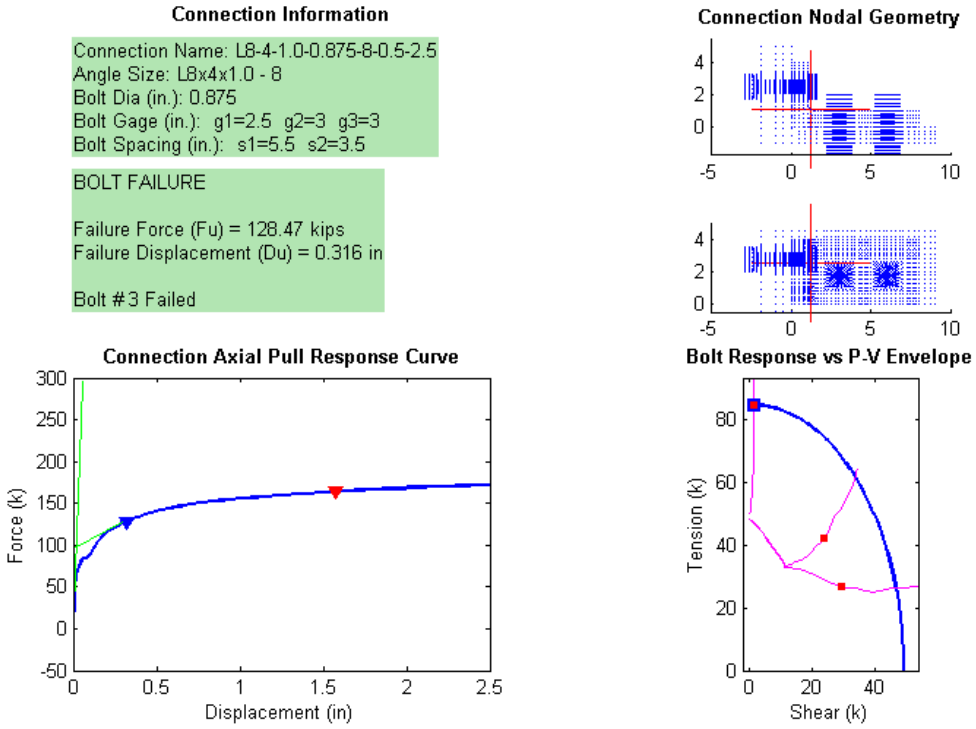


Figure B.207 Connection L8_4_1.0_0.875_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_0.875_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 5.4808e+003

Plastic Stiffness (k/in): 102.1384

Displacement (in): [3.6172e-036 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.055916 ; 0.064259 ; 0.067387 ; 0.07208 ; 0.079119 ; 0.081759 ; 0.085718 ; 0.091658 ; 0.093885 ; 0.097226 ; 0.098479 ; 0.10036 ; 0.10318 ; 0.10741 ; 0.10899 ; 0.11137 ; 0.11375 ; 0.11613 ; 0.11969 ; 0.12504 ; 0.13307 ; 0.14511 ; 0.14963 ; 0.1564 ; 0.15894 ; 0.16275 ; 0.16847 ; 0.17704 ; 0.1899 ; 0.20918 ; 0.23811 ; 0.28151 ; 0.29778 ; 0.32219 ; 0.35881 ; 0.41373 ; 0.43432 ; 0.46522 ; 0.49611 ; 0.527 ; 0.57335 ; 0.64286 ; 0.66892 ; 0.70802 ; 0.76667 ; 0.85465 ; 0.88764 ; 0.93712 ; 1.0114 ; 1.0392 ; 1.0809 ; 1.1436 ; 1.2375 ; 1.3784 ; 1.5194 ; 1.6603 ; 1.7131 ; 1.7924 ; 1.9113 ; 2.0896 ; 2.1521 ; 2.2459 ; 2.3396 ; 2.4334 ; 2.5]

Force (kips): [-1.20361 ; 22.1533 ; 25.5579 ; 28.3123 ; 31.5774 ; 33.5682 ; 35.3513 ; 37.6305 ; 40.4561 ; 41.3225 ; 42.3284 ; 42.3427 ; 42.335 ; 42.3166 ; 42.7254 ; 43.0092 ; 43.0015 ; 42.9958 ; 42.9886 ; 43.2318 ; 43.765 ; 44.4507 ; 45.2798 ; 45.5515 ; 45.9939 ; 46.4302 ; 46.8568 ; 47.4018 ; 48.414 ; 49.7704 ; 51.4765 ; 52.0369 ; 52.8274 ; 53.1286 ; 53.5622 ; 54.1684 ; 54.9832 ; 56.133 ; 57.7977 ; 59.9932 ; 62.5826 ; 63.4137 ; 64.5217 ; 65.9136 ; 67.6924 ; 68.3304 ; 69.2486 ; 70.0986 ; 70.8607 ; 71.8711 ; 73.1714 ; 73.6643 ; 74.3392 ; 75.1957 ; 76.2362 ; 76.5935 ; 77.1012 ; 77.8263 ; 78.0837 ; 78.4579 ; 78.9908 ; 79.7291 ; 80.7411 ; 81.6598 ; 82.483 ; 82.7729 ; 83.1863 ; 83.778 ; 84.5862 ; 84.8471 ; 85.2098 ; 85.5456 ; 85.8603 ; 86.0714]

Bolt 1 - Tensile Force (kips): [48.342 ; 47.4565 ; 47.2919 ; 47.1471 ; 46.9232 ; 45.9358 ; 43.9855 ; 40.9731 ; 36.6129 ; 35.0661 ; 33.2638 ; 33.2356 ; 33.2135 ; 33.1939 ; 33.0055 ; 32.9367 ; 32.916 ; 32.9108 ; 32.9056 ; 32.8786 ; 32.8485 ; 32.8174 ; 32.7657 ; 32.7529 ; 32.725 ; 32.7159 ; 32.6784 ; 32.6074 ; 32.4636 ; 32.2224 ; 31.9747 ; 31.8829 ; 31.6884 ; 31.5653 ; 31.3809 ; 31.1365 ; 30.874 ; 30.4885 ; 29.4923 ; 28.1362 ; 27.2332 ; 26.9928 ; 26.7098 ; 26.5442 ; 26.4016 ; 26.1834 ; 25.8292 ; 25.5224 ; 25.3229 ; 25.1699 ; 25.1889 ; 25.2421 ; 25.348 ; 25.5584 ; 25.8115 ; 25.914 ; 26.0576 ; 26.2317 ; 26.2663 ; 26.265 ; 26.2361 ; 26.2235 ; 26.2916 ; 26.4197 ; 26.5779 ; 26.6362 ; 26.7223 ; 26.8137 ; 26.78 ; 26.7323 ; 26.708 ; 26.7002 ; 26.703 ; 26.7092]

Bolt 1 - Shear Force (kips): [0.0670411 ; 0.951453 ; 1.10967 ; 1.24335 ; 1.44767 ; 2.33567 ; 3.90397 ; 6.10198 ; 8.96952 ; 9.8978 ; 10.9544 ; 10.9616 ; 10.9594 ; 10.9539 ; 11.2724 ; 11.3601 ; 11.3615 ; 11.3602 ; 11.3581 ; 11.5831 ; 11.8372 ; 12.1104 ; 12.5515 ; 12.641 ; 12.9176 ; 13.091 ; 13.3558 ; 13.6825 ; 14.7063 ; 15.9053 ; 16.9866 ; 17.3169 ; 17.8426 ; 18.1522 ; 18.5813 ; 19.1207 ; 19.7089 ; 20.468 ; 22.3123 ; 25.0832 ; 27.7211 ; 28.5351 ; 29.613 ; 30.8586 ; 32.7739 ; 33.7552 ; 35.2829 ; 36.592 ; 37.6517 ; 38.834 ; 40.1488 ; 40.5501 ; 41.0976 ; 41.9147 ; 43.0913 ; 43.4986 ; 44.1056 ; 45.0405 ; 45.395 ; 45.9393 ; 46.7429 ; 47.7483 ; 48.9717 ; 49.9755 ; 50.8419 ; 51.1421 ; 51.5848 ; 52.2276 ; 53.2322 ; 53.5178 ; 53.8286 ; 54.0885 ; 54.3265 ; 54.4854]

Bolt 2 - Tensile Force (kips): [48.3401 ; 47.3931 ; 47.2268 ; 47.0858 ; 46.8745 ; 45.9021 ; 43.9784 ; 41.0429 ; 36.9295 ; 35.51 ; 33.7798 ; 33.7078 ; 33.6758 ; 33.6555 ; 33.5987 ; 33.4505 ; 33.4274 ; 33.4211 ; 33.415 ; 33.4586 ; 33.5156 ; 33.5998 ; 33.716 ; 33.7571 ; 33.8301 ; 33.9127 ; 34.004 ; 34.1461 ; 34.3858 ; 34.6673 ; 35.0632 ; 35.1991 ; 35.4277 ; 35.5308 ; 35.691 ; 35.9419 ; 36.34 ; 36.8902 ; 37.871 ; 39.2395 ; 40.9803 ; 41.5794 ; 42.4189 ; 43.6668 ; 45.3984 ; 45.9682 ; 46.7831 ; 47.5424 ; 48.2447 ; 49.137 ; 50.1749 ; 50.5191 ; 51.0336 ; 51.8044 ; 52.8998 ; 53.3002 ; 53.8779 ; 54.6575 ; 54.9211 ; 55.3214 ; 55.9049 ; 56.6515 ; 57.7161 ; 58.7118 ; 59.6597 ; 60.0051 ; 60.5075 ; 61.2312 ; 62.2857 ; 62.651 ; 63.1738 ; 63.6437 ; 64.068 ; 64.3402]

Bolt 2 - Shear Force (kips): [0.0469146 ; 1.08154 ; 1.25614 ; 1.40406 ; 1.62786 ; 2.50596 ; 4.06673 ; 6.25012 ; 9.05208 ; 9.95477 ; 11.0581 ; 11.0977 ; 11.1084 ; 11.1058 ; 11.2793 ; 11.5468 ; 11.5512 ; 11.55 ; 11.5476 ; 11.5615 ; 11.8339 ; 12.2345 ; 12.6128 ; 12.8121 ; 12.9971 ; 13.2618 ; 13.43 ; 13.6705 ; 13.8817 ; 14.6534 ; 16.0899 ; 16.5422 ; 17.0948 ; 17.2548 ; 17.48 ; 17.7802 ; 18.1597 ; 19.0063 ; 19.8922 ; 20.9562 ; 22.5448 ; 23.0819 ; 23.7188 ; 24.4961 ; 25.4399 ; 25.711 ; 26.0167 ; 26.2784 ; 26.5164 ; 26.9717 ; 27.8198 ; 28.1839 ; 28.6562 ; 29.2065 ; 29.834 ; 30.0396 ; 30.3254 ; 30.6746 ; 30.8005 ; 30.9743 ; 31.1922 ; 31.5319 ; 31.9511 ; 32.4308 ; 32.8795 ; 33.0398 ; 33.2685 ; 33.5639 ; 33.8407 ; 33.9166 ; 34.0359 ; 34.1417 ; 34.2265 ; 34.2765]

Bolt 3 - Tensile Force (kips): [50 ; 50.5278 ; 50.9613 ; 51.4858 ; 52.2217 ; 52.7522 ; 53.2986 ; 54.2346 ; 55.8886 ; 56.5035 ; 57.2789 ; 57.2942 ; 57.2905 ; 57.2727 ; 57.5993 ; 57.8316 ; 57.825 ; 57.8191 ; 57.8115 ; 58.0139 ; 58.4685 ; 59.0734 ; 59.8427 ; 60.1094 ; 60.5602 ; 61.0298 ; 61.5136 ; 62.1753 ; 63.4565 ; 65.3058 ; 67.8143 ; 68.6761 ; 69.9001 ; 70.3461 ; 70.9875 ; 71.8858 ; 73.0712 ; 74.5993 ; 76.6678 ; 79.3837 ; 82.7014 ; 83.7698 ; 85.1888 ; 86.8462 ; 88.7753 ; 89.4307 ; 90.322 ; 91.0689 ; 91.7325 ; 92.5734 ; 93.5565 ; 93.8034 ; 94.0927 ; 94.4744 ; 94.7261 ; 94.7587 ; 94.8363 ; 94.85 ; 94.8756 ; 94.8994 ; 94.9362 ; 95.0318 ; 95.1855 ; 95.3293 ; 95.4549 ; 95.4984 ; 95.5612 ; 95.6331 ; 95.7028 ; 95.7338 ; 95.7864 ; 95.8399 ; 95.8921 ; 95.9285]

Bolt 3 - Shear Force (kips): [0.017038 ; 0.25806 ; 0.31167 ; 0.35774 ; 0.41387 ; 0.45299 ; 0.48733 ; 0.53264 ; 0.61404 ; 0.64704 ; 0.6896 ; 0.69038 ; 0.6901 ; 0.68895 ; 0.70754 ; 0.72079 ; 0.72055 ; 0.72024 ; 0.71984 ; 0.73112 ; 0.75621 ; 0.79003 ; 0.83476 ; 0.85047 ; 0.87704 ; 0.90485 ; 0.9334 ; 0.97194 ; 1.0385 ; 1.1081 ; 1.1619 ; 1.1735 ; 1.1848 ; 1.1877 ; 1.191 ; 1.1957 ; 1.2035 ; 1.2264 ; 1.2584 ; 1.2639 ; 1.2283 ; 1.2107 ; 1.1824 ; 1.1569 ; 1.1588 ; 1.154 ; 1.1851 ; 1.2758 ; 1.3164 ; 1.3669 ; 1.7113 ; 1.9971 ; 2.5189 ; 2.9271 ; 3.6341 ; 3.9341 ; 4.2672 ; 4.876 ; 5.0425 ; 5.2963 ; 5.6379 ; 6.0373 ; 6.5301 ; 6.9092 ; 7.2263 ; 7.3333 ; 7.4836 ; 7.7139 ; 8.1153 ; 8.24 ; 8.3868 ; 8.5239 ; 8.6601 ; 8.7589]

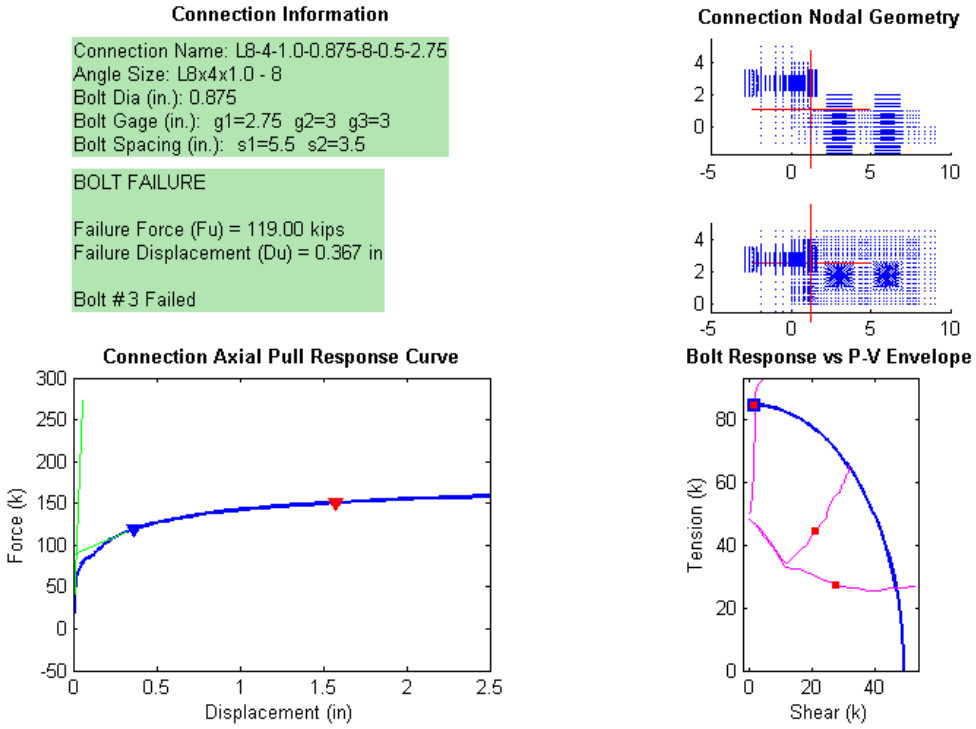


Figure B.208 Connection L8_4_1.0_0.875_8_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_0.875_8_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 4.8694e+003

Plastic Stiffness (k/in): 86.2859

Displacement (in): [5.1974e-036 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.072601 ; 0.080944 ; 0.084073 ; 0.088765 ; 0.095805 ; 0.098444 ; 0.099434 ; 0.10092 ; 0.10315 ; 0.10649 ; 0.1115 ; 0.11338 ; 0.1162 ; 0.12043 ; 0.12677 ; 0.13628 ; 0.14579 ; 0.15531 ; 0.16958 ; 0.19098 ; 0.19901 ; 0.21105 ; 0.22309 ; 0.23513 ; 0.25319 ; 0.28029 ; 0.32092 ; 0.38188 ; 0.40474 ; 0.41331 ; 0.42617 ; 0.44545 ; 0.47439 ; 0.48523 ; 0.50151 ; 0.52592 ; 0.56253 ; 0.61745 ; 0.69984 ; 0.82341 ; 0.86975 ; 0.93927 ; 1.0435 ; 1.0826 ; 1.1413 ; 1.2293 ; 1.3612 ; 1.4107 ; 1.4849 ; 1.5128 ; 1.5545 ; 1.6172 ; 1.7111 ; 1.852 ; 1.9049 ; 1.9841 ; 2.103 ; 2.2814 ; 2.5]

Force (kips): [-1.29729 ; 19.3803 ; 22.4791 ; 24.9976 ; 28.0557 ; 31.3455 ; 33.6126 ; 35.7747 ; 38.5588 ; 41.6113 ; 42.3194 ; 42.3658 ; 42.364 ; 42.3954 ; 42.6907 ; 42.7761 ; 42.9286 ; 43.0634 ; 43.0725 ; 43.0624 ; 43.0578 ; 43.1819 ; 43.7443 ; 44.4986 ; 45.4713 ; 46.3623 ; 47.2432 ; 48.6906 ; 50.6438 ; 51.2921 ; 52.2282 ; 53.0426 ; 53.7654 ; 54.7516 ; 56.091 ; 57.8442 ; 60.0429 ; 60.7526 ; 61.0136 ; 61.3908 ; 61.9274 ; 62.6741 ; 62.9439 ; 63.3353 ; 63.8916 ; 64.6765 ; 65.7582 ; 67.2485 ; 69.0836 ; 69.6803 ; 70.4738 ; 71.4807 ; 71.8267 ; 72.3172 ; 73.0116 ; 73.9678 ; 74.3055 ; 74.7876 ; 74.9621 ; 75.2201 ; 75.5876 ; 76.1016 ; 76.8076 ; 77.0573 ; 77.4143 ; 77.9238 ; 78.6206 ; 79.3921]

Bolt 1 - Tensile Force (kips): [48.34 ; 47.565 ; 47.4193 ; 47.2908 ; 47.1203 ; 46.7704 ; 45.4378 ; 42.8811 ; 39.2316 ; 34.251 ; 33.2531 ; 33.2282 ; 33.2054 ; 33.1629 ; 32.9597 ; 32.9472 ; 32.938 ; 32.925 ; 32.9112 ; 32.9003 ; 32.8972 ; 32.8827 ; 32.8263 ; 32.7827 ; 32.7047 ; 32.6434 ; 32.5449 ; 32.2601 ; 31.8125 ; 31.6232 ; 31.2071 ; 30.8936 ; 30.6603 ; 30.1982 ; 29.155 ; 28.0574 ; 27.2502 ; 26.9321 ; 26.8418 ; 26.7349 ; 26.6322 ; 26.5925 ; 26.5959 ; 26.561 ; 26.4216 ; 26.172 ; 25.6989 ; 25.3493 ; 25.3307 ; 25.4015 ; 25.5883 ; 25.8674 ; 25.974 ; 26.1302 ; 26.3149 ; 26.3937 ; 26.3514 ; 26.3102 ; 26.2897 ; 26.2756 ; 26.2738 ; 26.3087 ; 26.4196 ; 26.4611 ; 26.5298 ; 26.6384 ; 26.7908 ; 26.8716]

Bolt 1 - Shear Force (kips): [0.0697549 ; 0.838583 ; 0.984095 ; 1.1075 ; 1.26519 ; 1.59112 ; 2.74682 ; 4.73331 ; 7.28275 ; 10.3767 ; 10.957 ; 10.9604 ; 10.9569 ; 11.0013 ; 11.3243 ; 11.3386 ; 11.343 ; 11.3477 ; 11.349 ; 11.3463 ; 11.3451 ; 11.4466 ; 11.8557 ; 12.1195 ; 12.5845 ; 13.024 ; 13.5062 ; 15.2611 ; 17.2597 ; 17.7937 ; 18.8078 ; 19.5077 ; 20.0332 ; 20.9682 ; 22.9342 ; 25.3265 ; 27.8645 ; 28.8567 ; 29.1861 ; 29.6275 ; 30.1958 ; 30.9331 ; 31.2094 ; 31.6754 ; 32.4662 ; 33.7869 ; 35.8641 ; 38.0741 ; 40.1815 ; 40.8042 ; 41.6108 ; 42.8101 ; 43.2179 ; 43.7931 ; 44.7099 ; 46.0347 ; 46.553 ; 47.2428 ; 47.4872 ; 47.8304 ; 48.3023 ; 48.9197 ; 49.7239 ; 50.006 ; 50.3978 ; 50.9422 ; 51.6893 ; 52.6201]

Bolt 2 - Tensile Force (kips): [48.3353 ; 47.5152 ; 47.37 ; 47.2463 ; 47.0949 ; 46.7889 ; 45.5151 ; 43.0641 ; 39.7362 ; 35.6855 ; 34.5406 ; 34.3956 ; 34.3427 ; 34.3308 ; 34.4075 ; 34.3749 ; 34.3053 ; 34.2551 ; 34.2386 ; 34.2214 ; 34.2163 ; 34.2705 ; 34.4899 ; 34.7164 ; 35.1332 ; 35.5556 ; 35.9914 ; 36.7253 ; 37.93 ; 38.3477 ; 38.8991 ; 39.4506 ; 39.992 ; 40.8152 ; 41.8575 ; 43.0596 ; 44.8015 ; 45.4461 ; 45.6808 ; 46.0076 ; 46.4851 ; 47.1784 ; 47.4489 ; 47.8459 ; 48.4011 ; 49.2169 ; 50.3407 ; 51.9471 ; 53.9842 ; 54.6388 ; 55.3722 ; 56.1973 ; 56.4797 ; 56.9214 ; 57.5662 ; 58.5317 ; 58.8797 ; 59.3738 ; 59.5587 ; 59.8222 ; 60.182 ; 60.6989 ; 61.4599 ; 61.75 ; 62.1795 ; 62.8513 ; 63.8099 ; 64.924]

Bolt 2 - Shear Force (kips): [0.0479188 ; 0.96129 ; 1.12255 ; 1.25984 ; 1.43507 ; 1.77615 ; 2.91519 ; 4.88111 ; 7.37495 ; 10.3307 ; 11.1961 ; 11.2972 ; 11.3232 ; 11.328 ; 11.3533 ; 11.4462 ; 11.6289 ; 11.792 ; 11.81 ; 11.8104 ; 11.8091 ; 11.8262 ; 11.9891 ; 12.5402 ; 13.0376 ; 13.501 ; 13.9904 ; 14.5284 ; 15.5023 ; 15.9885 ; 16.733 ; 17.3543 ; 17.8414 ; 18.3298 ; 18.7983 ; 19.8443 ; 21.2295 ; 21.6105 ; 21.7781 ; 22.0591 ; 22.4561 ; 23.0871 ; 23.3126 ; 23.6072 ; 23.9698 ; 24.3607 ; 24.7594 ; 25.255 ; 26.0386 ; 26.3445 ; 26.992 ; 27.9161 ; 28.2161 ; 28.5791 ; 28.9296 ; 29.2289 ; 29.3576 ; 29.5556 ; 29.6341 ; 29.7614 ; 29.9565 ; 30.2087 ; 30.5584 ; 30.6947 ; 30.8749 ; 31.1041 ; 31.391 ; 31.6254]

Bolt 3 - Tensile Force (kips): [50 ; 50.4036 ; 50.7598 ; 51.236 ; 51.9668 ; 52.9088 ; 53.786 ; 54.8439 ; 56.651 ; 59.2563 ; 60.064 ; 60.1276 ; 60.1316 ; 60.169 ; 60.5177 ; 60.6234 ; 60.8174 ; 60.9937 ; 61.007 ; 60.9973 ; 60.9926 ; 61.1496 ; 61.9396 ; 63.0846 ; 64.652 ; 66.1396 ; 67.5858 ; 69.7208 ; 72.5012 ; 73.3726 ; 74.5627 ; 75.644 ; 76.6451 ; 78.0449 ; 79.9845 ; 82.5447 ; 85.5481 ; 86.3974 ; 86.656 ; 87.0148 ; 87.5128 ; 88.2682 ; 88.5194 ; 88.8815 ; 89.4316 ; 90.1422 ; 91.0272 ; 92.2528 ; 93.2795 ; 93.4909 ; 93.6314 ; 93.8135 ; 93.871 ; 93.9505 ; 94.0653 ; 94.2293 ; 94.285 ; 94.3746 ; 94.4064 ; 94.4571 ; 94.5303 ; 94.6324 ; 94.7764 ; 94.7686 ; 94.7365 ; 94.7124 ; 94.7364 ; 94.7842]

Bolt 3 - Shear Force (kips): [0.0221272 ; 0.235252 ; 0.286166 ; 0.330743 ; 0.388282 ; 0.458252 ; 0.51795 ; 0.587112 ; 0.721253 ; 0.925035 ; 0.988598 ; 0.993588 ; 0.993996 ; 0.997114 ; 1.02458 ; 1.03297 ; 1.04834 ; 1.06231 ; 1.06354 ; 1.06302 ; 1.06274 ; 1.07495 ; 1.13387 ; 1.20881 ; 1.2891 ; 1.34863 ; 1.39289 ; 1.43965 ; 1.48118 ; 1.49867 ; 1.52407 ; 1.54339 ; 1.55494 ; 1.55786 ; 1.54151 ; 1.49973 ; 1.45462 ; 1.45269 ; 1.49549 ; 1.56806 ; 1.68015 ; 1.77217 ; 1.82012 ; 1.89067 ; 1.95562 ; 2.05435 ; 2.64702 ; 3.37302 ; 4.44213 ; 4.76434 ; 5.36771 ; 6.06205 ; 6.29421 ; 6.59948 ; 6.99744 ; 7.48669 ; 7.66055 ; 7.91849 ; 8.00733 ; 8.12516 ; 8.28937 ; 8.52028 ; 8.83034 ; 9.26186 ; 9.98738 ; 10.9414 ; 11.8859 ; 12.7247]

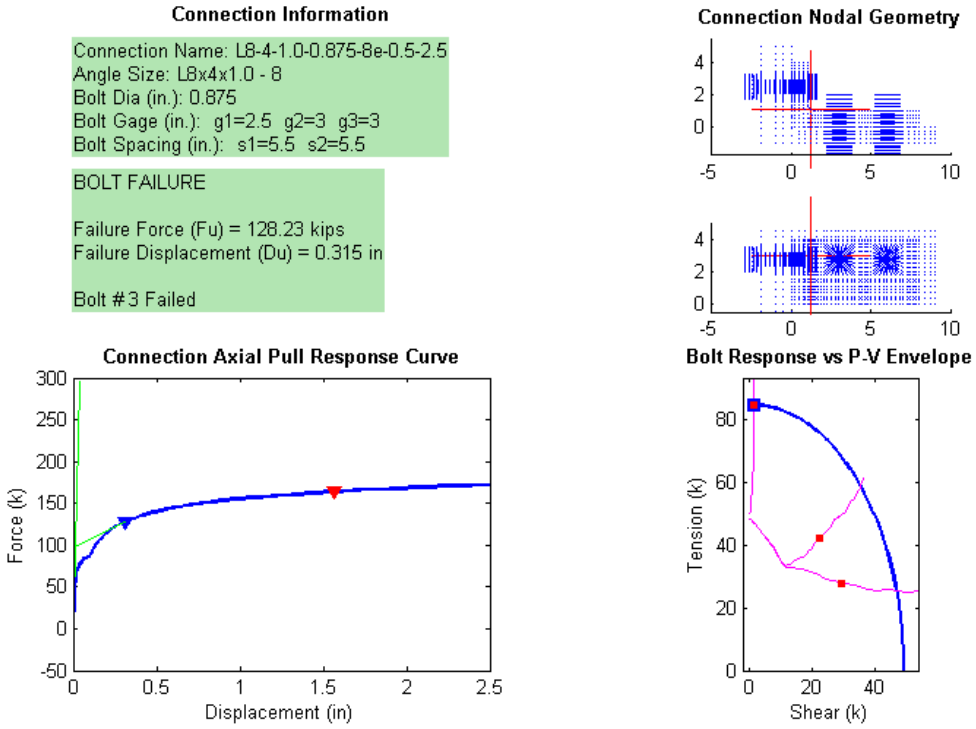


Figure B.209 Connection L8_4_1.0_0.875_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_0.875_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 7.0892e+003

Plastic Stiffness (k/in): 98.1792

Displacement (in): [4.3836e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0079346 ; 0.0095825 ; 0.012054 ; 0.015762 ; 0.021324 ; 0.029667 ; 0.042181 ; 0.060952 ; 0.067991 ; 0.070631 ; 0.074591 ; 0.08053 ; 0.082757 ; 0.083592 ; 0.084845 ; 0.086724 ; 0.089543 ; 0.093772 ; 0.10011 ; 0.10249 ; 0.10606 ; 0.11141 ; 0.11342 ; 0.11643 ; 0.12094 ; 0.12772 ; 0.13788 ; 0.15312 ; 0.15883 ; 0.1674 ; 0.18026 ; 0.19955 ; 0.20678 ; 0.21763 ; 0.2339 ; 0.25831 ; 0.29493 ; 0.30866 ; 0.32925 ; 0.36015 ; 0.40649 ; 0.42386 ; 0.44993 ; 0.48903 ; 0.52813 ; 0.56723 ; 0.58189 ; 0.60389 ; 0.63688 ; 0.68636 ; 0.70492 ; 0.73276 ; 0.77451 ; 0.79017 ; 0.81366 ; 0.84889 ; 0.90173 ; 0.981 ; 1.0999 ; 1.2783 ; 1.3408 ; 1.4345 ; 1.5751 ; 1.7861 ; 1.8486 ; 1.9423 ; 2.0829 ; 2.2939 ; 2.5]

Force (kips): [-1.50685 ; 6.32853 ; 12.3392 ; 19.4229 ; 21.6222 ; 24.5102 ; 27.9962 ; 31.7655 ; 34.002 ; 36.1189 ; 38.7484 ; 41.813 ; 42.3667 ; 42.3704 ; 42.3616 ; 42.3464 ; 42.6395 ; 42.7313 ; 42.9153 ; 42.9928 ; 42.998 ; 42.991 ; 43.3806 ; 43.9223 ; 44.7751 ; 45.8288 ; 46.1778 ; 46.7798 ; 47.6119 ; 48.879 ; 50.4173 ; 52.3774 ; 53.0484 ; 53.9902 ; 55.2152 ; 56.81 ; 57.4368 ; 58.3157 ; 59.549 ; 61.1729 ; 63.1632 ; 63.8372 ; 64.7467 ; 65.9042 ; 67.42 ; 67.9665 ; 68.744 ; 69.8206 ; 70.7837 ; 71.6284 ; 71.9275 ; 72.3595 ; 72.9582 ; 73.7684 ; 74.0715 ; 74.5163 ; 75.1115 ; 75.3212 ; 75.6148 ; 76.0235 ; 76.5969 ; 77.4025 ; 78.4863 ; 79.9167 ; 80.3729 ; 81.0158 ; 81.9091 ; 83.0776 ; 83.3991 ; 83.8647 ; 84.4991 ; 85.3333 ; 86.0364]

Bolt 1 - Tensile Force (kips): [48.4186 ; 48.138 ; 47.8915 ; 47.5753 ; 47.4689 ; 47.3197 ; 47.1246 ; 46.7852 ; 45.4471 ; 42.9789 ; 39.211 ; 34.0583 ; 33.3051 ; 33.2901 ; 33.2749 ; 33.2602 ; 33.0504 ; 33.0386 ; 33.0292 ; 33.0159 ; 33.0028 ; 32.9926 ; 32.9554 ; 32.9268 ; 32.9148 ; 32.8799 ; 32.8841 ; 32.864 ; 32.7964 ; 32.5832 ; 32.3036 ; 32.0952 ; 31.9402 ; 31.6253 ; 31.3093 ; 30.8692 ; 30.5047 ; 30.0274 ; 29.3166 ; 28.6498 ; 28.2593 ; 28.0575 ; 27.8228 ; 27.6247 ; 27.3741 ; 27.1572 ; 26.8032 ; 26.3648 ; 26.0281 ; 25.7808 ; 25.71 ; 25.6469 ; 25.6005 ; 25.6072 ; 25.6199 ; 25.6504 ; 25.7135 ; 25.739 ; 25.7726 ; 25.7993 ; 25.8307 ; 25.7651 ; 25.595 ; 25.2636 ; 25.1558 ; 25.0779 ; 25.0585 ; 25.1385 ; 25.1686 ; 25.198 ; 25.313 ; 25.454 ; 25.5412]

Bolt 1 - Shear Force (kips): [0.0588766 ; 0.292984 ; 0.556543 ; 0.881275 ; 0.985147 ; 1.12475 ; 1.30148 ; 1.61282 ; 2.77097 ; 4.69263 ; 7.3323 ; 10.5371 ; 10.9821 ; 10.983 ; 10.9801 ; 10.9758 ; 11.3251 ; 11.3388 ; 11.3489 ; 11.3586 ; 11.362 ; 11.3605 ; 11.7227 ; 12.1053 ; 12.3739 ; 12.9256 ; 13.1208 ; 13.411 ; 13.9466 ; 15.1709 ; 16.5177 ; 17.504 ; 17.9705 ; 18.8091 ; 19.6694 ; 20.8111 ; 21.5596 ; 22.5639 ; 24.2406 ; 26.2486 ; 28.1508 ; 28.8688 ; 29.7765 ; 30.8469 ; 32.5258 ; 33.3653 ; 34.6352 ; 36.3396 ; 37.6925 ; 38.7835 ; 39.1415 ; 39.5995 ; 40.2129 ; 41.0168 ; 41.284 ; 41.6809 ; 42.2808 ; 42.4929 ; 42.8012 ; 43.2663 ; 43.9997 ; 45.0964 ; 46.4955 ; 48.2716 ; 48.8015 ; 49.4967 ; 50.371 ; 51.4963 ; 51.7856 ; 52.2391 ; 52.7325 ; 53.3106 ; 53.6829]

Bolt 2 - Tensile Force (kips): [48.4242 ; 48.1457 ; 47.893 ; 47.5773 ; 47.475 ; 47.3374 ; 47.1696 ; 46.8964 ; 45.6419 ; 43.2685 ; 39.6958 ; 34.9414 ; 33.7774 ; 33.7302 ; 33.7041 ; 33.6865 ; 33.7167 ; 33.6643 ; 33.5386 ; 33.4878 ; 33.473 ; 33.4614 ; 33.5191 ; 33.5733 ; 33.6746 ; 33.8302 ; 33.8899 ; 34.0062 ; 34.2009 ; 34.5359 ; 35.0598 ; 35.7149 ; 35.9407 ; 36.3014 ; 36.8547 ; 37.7684 ; 38.0762 ; 38.5602 ; 39.3107 ; 40.2803 ; 41.561 ; 41.9814 ; 42.5592 ; 43.4282 ; 44.7034 ; 45.1263 ; 45.7137 ; 46.4948 ; 47.1801 ; 47.7839 ; 47.991 ; 48.219 ; 48.5302 ; 48.9113 ; 49.0445 ; 49.2712 ; 49.6471 ; 49.7914 ; 50.0209 ; 50.3668 ; 50.8806 ; 51.6726 ; 52.7985 ; 54.1647 ; 54.5812 ; 55.1944 ; 56.1052 ; 57.4035 ; 57.796 ; 58.3965 ; 59.2579 ; 60.3488 ; 61.1948]

Bolt 2 - Shear Force (kips): [0.0719746 ; 0.294263 ; 0.564702 ; 0.892864 ; 0.996773 ; 1.13522 ; 1.30764 ; 1.59031 ; 2.71476 ; 4.61188 ; 7.21215 ; 10.3529 ; 11.089 ; 11.1119 ; 11.1183 ; 11.116 ; 11.1262 ; 11.227 ; 11.4451 ; 11.5306 ; 11.5413 ; 11.5421 ; 11.5602 ; 11.7107 ; 12.2748 ; 12.767 ; 12.9308 ; 13.2353 ; 13.5345 ; 13.7492 ; 14.2893 ; 15.8833 ; 16.3961 ; 16.9632 ; 17.6727 ; 18.3641 ; 18.7463 ; 19.2676 ; 19.8276 ; 20.62 ; 21.7106 ; 22.1914 ; 22.846 ; 23.666 ; 24.6619 ; 24.9591 ; 25.3397 ; 25.8098 ; 26.2244 ; 26.59 ; 26.7382 ; 27.0777 ; 27.5407 ; 28.2195 ; 28.4926 ; 28.8761 ; 29.3699 ; 29.5479 ; 29.7903 ; 30.1137 ; 30.5302 ; 31.0691 ; 31.7764 ; 32.6757 ; 33.0004 ; 33.4241 ; 33.9903 ; 34.715 ; 34.891 ; 35.1016 ; 35.4147 ; 35.8714 ; 36.1796]

Bolt 3 - Tensile Force (kips): [50 ; 49.9471 ; 50.0212 ; 50.3318 ; 50.5124 ; 50.8582 ; 51.507 ; 52.3946 ; 53.0374 ; 53.8063 ; 55.117 ; 57.2112 ; 57.6548 ; 57.6604 ; 57.6545 ; 57.6396 ; 57.8677 ; 57.9414 ; 58.0914 ; 58.1556 ; 58.1603 ; 58.1537 ; 58.4655 ; 58.9175 ; 59.6673 ; 60.6432 ; 60.9876 ; 61.6097 ; 62.54 ; 64.1504 ; 66.392 ; 69.4099 ; 70.4398 ; 71.8582 ; 73.6238 ; 75.7688 ; 76.5327 ; 77.6148 ; 79.1141 ; 81.1068 ; 83.6409 ; 84.4818 ; 85.6069 ; 86.9402 ; 88.5696 ; 89.1338 ; 89.9367 ; 90.991 ; 91.8335 ; 92.5658 ; 92.7864 ; 93.1079 ; 93.561 ; 94.0867 ; 94.2319 ; 94.4154 ; 94.5799 ; 94.641 ; 94.7216 ; 94.8285 ; 94.9339 ; 94.9959 ; 95.1221 ; 95.2046 ; 95.2276 ; 95.3055 ; 95.4289 ; 95.5945 ; 95.6393 ; 95.7056 ; 95.8073 ; 95.8801 ; 95.9557]

Bolt 3 - Shear Force (kips): [0.030348 ; 0.050644 ; 0.11828 ; 0.21168 ; 0.24351 ; 0.28809 ; 0.34537 ; 0.41138 ; 0.45515 ; 0.49456 ; 0.55125 ; 0.6611 ; 0.6851 ; 0.68536 ; 0.68492 ; 0.68402 ; 0.69649 ; 0.70049 ; 0.7086 ; 0.71208 ; 0.71237 ; 0.71201 ; 0.72875 ; 0.75285 ; 0.79417 ; 0.8482 ; 0.86714 ; 0.90114 ; 0.95035 ; 1.0216 ; 1.0823 ; 1.1148 ; 1.1186 ; 1.1218 ; 1.1318 ; 1.165 ; 1.1748 ; 1.1839 ; 1.1849 ; 1.1699 ; 1.1364 ; 1.1221 ; 1.1007 ; 1.0852 ; 1.091 ; 1.0915 ; 1.0838 ; 1.1191 ; 1.2065 ; 1.2301 ; 1.2565 ; 1.3138 ; 1.4662 ; 1.7849 ; 1.9462 ; 2.206 ; 2.6551 ; 2.7769 ; 2.9548 ; 3.2005 ; 3.5906 ; 4.21 ; 4.8601 ; 5.7821 ; 6.0898 ; 6.4258 ; 6.7972 ; 7.2362 ; 7.352 ; 7.5145 ; 7.7134 ; 8.1421 ; 8.509]

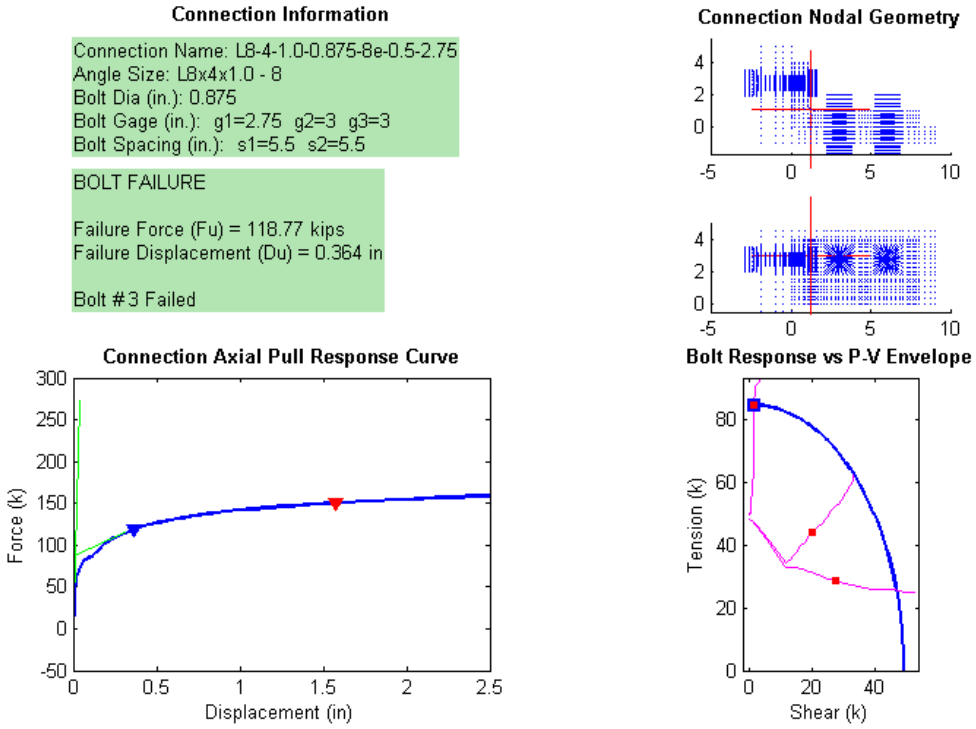


Figure B.210 Connection L8_4_1.0_0.875_8e_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_0.875_8e_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 6.2907e+003

Plastic Stiffness (k/in): 89.6867

Displacement (in): [4.6932e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.095045 ; 0.096034 ; 0.097519 ; 0.099747 ; 0.10058 ; 0.10183 ; 0.10371 ; 0.10653 ; 0.11076 ; 0.1171 ; 0.12662 ; 0.14089 ; 0.16229 ; 0.1837 ; 0.2051 ; 0.21313 ; 0.22517 ; 0.24323 ; 0.27032 ; 0.31096 ; 0.37192 ; 0.38716 ; 0.4024 ; 0.42525 ; 0.45954 ; 0.51097 ; 0.58812 ; 0.61705 ; 0.66045 ; 0.72554 ; 0.82318 ; 0.85979 ; 0.91472 ; 0.9971 ; 1.0795 ; 1.1619 ; 1.2854 ; 1.4708 ; 1.5333 ; 1.6271 ; 1.7677 ; 1.9786 ; 2.2286 ; 2.4786 ; 2.5]

Force (kips): [-1.61474 ; 5.38343 ; 10.6717 ; 16.9164 ; 23.7145 ; 25.5852 ; 27.9865 ; 30.7699 ; 33.0772 ; 34.9642 ; 37.4525 ; 40.4598 ; 42.4629 ; 42.4557 ; 42.4522 ; 42.6122 ; 42.7655 ; 42.7813 ; 42.9122 ; 43.0926 ; 43.1215 ; 43.1189 ; 43.3137 ; 44.438 ; 45.9311 ; 47.8899 ; 49.9497 ; 51.6149 ; 52.2032 ; 53.0129 ; 54.1095 ; 55.5521 ; 57.3744 ; 59.6685 ; 60.1691 ; 60.6397 ; 61.2913 ; 62.2124 ; 63.4589 ; 65.0841 ; 65.6385 ; 66.4071 ; 67.5004 ; 68.8937 ; 69.3673 ; 70.0288 ; 70.8834 ; 71.6576 ; 72.3695 ; 73.3451 ; 74.6263 ; 75.0224 ; 75.5849 ; 76.3525 ; 77.3524 ; 78.385 ; 79.3042 ; 79.3773]

Bolt 1 - Tensile Force (kips): [48.4145 ; 48.1651 ; 47.9484 ; 47.672 ; 47.3266 ; 47.2186 ; 47.0719 ; 46.7851 ; 45.8768 ; 43.7528 ; 40.5965 ; 36.1053 ; 33.3121 ; 33.3015 ; 33.298 ; 33.1853 ; 33.0603 ; 33.05 ; 33.045 ; 33.0396 ; 33.0269 ; 33.0157 ; 32.9942 ; 32.9264 ; 32.8655 ; 32.7747 ; 32.2844 ; 31.9382 ; 31.6675 ; 31.3887 ; 31.1318 ; 30.4143 ; 29.2508 ; 28.5334 ; 28.3895 ; 28.1791 ; 27.9335 ; 27.734 ; 27.5125 ; 26.8253 ; 26.5661 ; 26.2571 ; 25.9266 ; 25.758 ; 25.7431 ; 25.7764 ; 25.8814 ; 25.9129 ; 25.8996 ; 25.725 ; 25.4324 ; 25.3038 ; 25.1587 ; 25.0457 ; 25.0066 ; 24.9847 ; 24.953 ; 24.9536]

Bolt 1 - Shear Force (kips): [0.0626844 ; 0.255384 ; 0.489254 ; 0.779377 ; 1.11507 ; 1.21428 ; 1.34752 ; 1.61262 ; 2.41478 ; 4.1128 ; 6.39952 ; 9.32487 ; 10.9908 ; 10.9888 ; 10.9879 ; 11.1677 ; 11.3445 ; 11.3535 ; 11.3584 ; 11.3632 ; 11.3665 ; 11.3649 ; 11.5259 ; 12.2415 ; 12.8819 ; 13.938 ; 16.5823 ; 18.0064 ; 18.7382 ; 19.5024 ; 20.2799 ; 21.9597 ; 24.764 ; 27.5058 ; 28.1377 ; 28.8326 ; 29.7292 ; 30.7618 ; 32.2545 ; 35.0835 ; 36.0896 ; 37.3322 ; 38.8015 ; 40.4619 ; 40.9902 ; 41.6577 ; 42.6471 ; 43.5898 ; 44.5093 ; 45.8842 ; 47.4941 ; 48.0066 ; 48.6838 ; 49.5483 ; 50.5746 ; 51.6552 ; 52.5268 ; 52.586]

Bolt 2 - Tensile Force (kips): [48.4156 ; 48.1747 ; 47.9555 ; 47.6851 ; 47.3782 ; 47.2924 ; 47.1825 ; 46.985 ; 46.2069 ; 44.2208 ; 41.3457 ; 37.562 ; 34.4066 ; 34.3866 ; 34.3806 ; 34.4218 ; 34.4564 ; 34.4524 ; 34.3907 ; 34.3055 ; 34.2864 ; 34.2698 ; 34.3482 ; 34.8344 ; 35.4518 ; 36.5938 ; 37.7859 ; 38.836 ; 39.2624 ; 39.7911 ; 40.4242 ; 41.445 ; 42.7084 ; 44.1377 ; 44.5184 ; 44.8818 ; 45.4096 ; 46.168 ; 47.0804 ; 48.3266 ; 48.7905 ; 49.4503 ; 50.4164 ; 51.6588 ; 52.0731 ; 52.5512 ; 53.1863 ; 53.765 ; 54.4598 ; 55.5069 ; 56.8561 ; 57.2135 ; 57.7312 ; 58.5023 ; 59.6158 ; 60.9541 ; 62.2855 ; 62.3925]

Bolt 2 - Shear Force (kips): [0.0760146 ; 0.252934 ; 0.49149 ; 0.783305 ; 1.11418 ; 1.20994 ; 1.33707 ; 1.57062 ; 2.32398 ; 3.98815 ; 6.21428 ; 8.99571 ; 11.3388 ; 11.3426 ; 11.3426 ; 11.3568 ; 11.3692 ; 11.3816 ; 11.5398 ; 11.7562 ; 11.7943 ; 11.802 ; 11.8283 ; 12.1957 ; 13.0423 ; 13.9575 ; 14.6222 ; 15.4878 ; 15.7578 ; 16.3116 ; 17.2948 ; 18.0973 ; 18.7012 ; 20.223 ; 20.5584 ; 20.8288 ; 21.264 ; 21.9542 ; 23.1729 ; 24.2735 ; 24.6237 ; 25.096 ; 25.6951 ; 26.4449 ; 26.7216 ; 27.3303 ; 28.1595 ; 28.9118 ; 29.412 ; 29.93 ; 30.6367 ; 30.909 ; 31.2859 ; 31.7451 ; 32.3225 ; 32.791 ; 33.0681 ; 33.1072]

Bolt 3 - Tensile Force (kips): [50 ; 49.9249 ; 49.9783 ; 50.2426 ; 51.0513 ; 51.4705 ; 52.0811 ; 52.8944 ; 53.8024 ; 54.7062 ; 56.1782 ; 58.4129 ; 60.4024 ; 60.3975 ; 60.3945 ; 60.565 ; 60.7365 ; 60.7551 ; 60.9139 ; 61.1418 ; 61.1795 ; 61.178 ; 61.4255 ; 63.0642 ; 65.5191 ; 68.8218 ; 71.8296 ; 74.1369 ; 74.8896 ; 75.9505 ; 77.4203 ; 79.4069 ; 82.0423 ; 85.2054 ; 85.8283 ; 86.3819 ; 87.1091 ; 87.9787 ; 89.203 ; 90.7128 ; 91.1343 ; 91.7376 ; 92.5732 ; 93.3821 ; 93.5618 ; 93.8192 ; 93.9511 ; 94.0343 ; 94.1376 ; 94.2852 ; 94.5019 ; 94.5699 ; 94.6694 ; 94.8134 ; 95.0131 ; 95.1622 ; 95.0458 ; 95.0359]

Bolt 3 - Shear Force (kips): [0.0367826 ; 0.04186 ; 0.103842 ; 0.189111 ; 0.297386 ; 0.330785 ; 0.374957 ; 0.433497 ; 0.492201 ; 0.54621 ; 0.649982 ; 0.822369 ; 0.968584 ; 0.968218 ; 0.968011 ; 0.980565 ; 0.993071 ; 0.994461 ; 1.0061 ; 1.02275 ; 1.02554 ; 1.02564 ; 1.04334 ; 1.14559 ; 1.24745 ; 1.32512 ; 1.36259 ; 1.40595 ; 1.42172 ; 1.43993 ; 1.45022 ; 1.44404 ; 1.41136 ; 1.36951 ; 1.36562 ; 1.36686 ; 1.37677 ; 1.56904 ; 1.73888 ; 1.94281 ; 2.29331 ; 2.75893 ; 3.29396 ; 4.09985 ; 4.42 ; 4.74619 ; 5.3998 ; 6.00888 ; 6.44806 ; 6.98569 ; 7.6107 ; 7.82176 ; 8.09449 ; 8.44104 ; 8.8594 ; 9.5785 ; 11.4374 ; 11.5755]

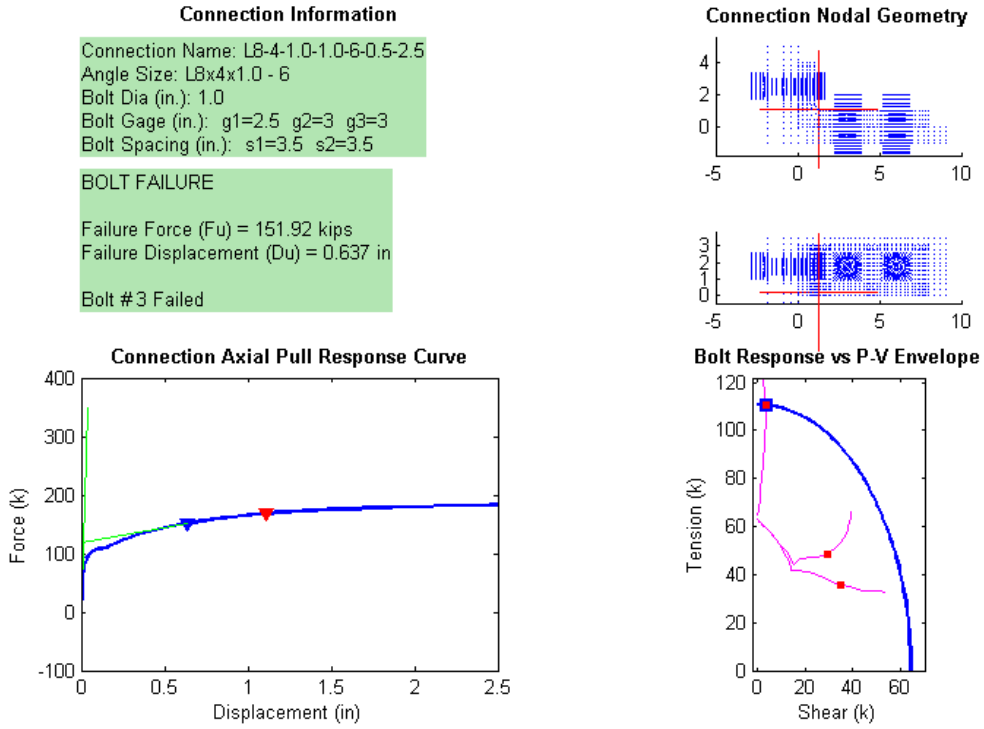


Figure B.211 Connection L8_4_1.0_1.0_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_1.0_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 8.7693e+003

Plastic Stiffness (k/in): 53.1344

Displacement (in): [8.6919e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.10296 ; 0.1188 ; 0.12474 ; 0.12697 ; 0.13031 ; 0.13156 ; 0.13344 ; 0.13626 ; 0.14049 ; 0.14683 ; 0.14921 ; 0.15278 ; 0.15813 ; 0.16616 ; 0.16917 ; 0.17368 ; 0.18045 ; 0.19061 ; 0.20585 ; 0.22871 ; 0.263 ; 0.27586 ; 0.28068 ; 0.28791 ; 0.29876 ; 0.31503 ; 0.33944 ; 0.37606 ; 0.43098 ; 0.51336 ; 0.54426 ; 0.5906 ; 0.60798 ; 0.63404 ; 0.67314 ; 0.73179 ; 0.81977 ; 0.85276 ; 0.90224 ; 0.97647 ; 1.0043 ; 1.0461 ; 1.1087 ; 1.2026 ; 1.2379 ; 1.2907 ; 1.3105 ; 1.3403 ; 1.37 ; 1.3997 ; 1.4443 ; 1.5112 ; 1.6115 ; 1.762 ; 1.9877 ; 2.2377 ; 2.3002 ; 2.3939 ; 2.5]

Force (kips): [-2.29615 ; 7.60674 ; 14.8314 ; 23.1945 ; 31.8513 ; 34.1523 ; 37.0406 ; 40.3464 ; 43.1998 ; 45.6571 ; 48.3329 ; 50.8182 ; 53.4139 ; 54.1129 ; 54.354 ; 54.2654 ; 54.2342 ; 54.3417 ; 54.4157 ; 54.514 ; 54.5637 ; 54.4935 ; 54.4267 ; 54.7158 ; 55.0529 ; 55.5056 ; 56.1003 ; 56.3241 ; 56.6424 ; 57.093 ; 57.7752 ; 58.7815 ; 60.2658 ; 62.3291 ; 63.0257 ; 63.2827 ; 63.6532 ; 64.1797 ; 64.9242 ; 65.9887 ; 67.4965 ; 69.5942 ; 72.3963 ; 73.362 ; 74.7055 ; 75.1845 ; 75.877 ; 76.8234 ; 78.1169 ; 79.8025 ; 80.3846 ; 81.2045 ; 82.3225 ; 82.7153 ; 83.2702 ; 84.0325 ; 85.0526 ; 85.4139 ; 85.9173 ; 86.0917 ; 86.3463 ; 86.5758 ; 86.7952 ; 87.0998 ; 87.5246 ; 88.1014 ; 88.8686 ; 89.8184 ; 90.7009 ; 90.9386 ; 91.2449 ; 91.5661]

Bolt 1 - Tensile Force (kips): [63.1239 ; 62.7717 ; 62.4953 ; 62.1469 ; 61.7477 ; 61.6282 ; 61.4594 ; 61.2035 ; 60.3013 ; 58.2222 ; 55.3884 ; 52.0885 ; 47.4071 ; 45.2577 ; 42.9195 ; 42.8279 ; 42.8072 ; 42.5142 ; 42.4054 ; 42.3245 ; 42.2034 ; 42.1051 ; 42.0557 ; 42.0248 ; 41.9835 ; 41.9363 ; 41.8937 ; 41.8603 ; 41.8248 ; 41.7865 ; 41.7015 ; 41.5852 ; 41.344 ; 41.0816 ; 40.9372 ; 40.8671 ; 40.7589 ; 40.5983 ; 40.3363 ; 39.9372 ; 39.1737 ; 37.9962 ; 36.7558 ; 36.3881 ; 35.9699 ; 35.807 ; 35.5854 ; 35.3633 ; 35.1477 ; 34.7546 ; 34.4979 ; 34.1896 ; 33.8088 ; 33.6503 ; 33.4867 ; 33.3369 ; 33.1979 ; 33.1638 ; 33.1267 ; 33.1147 ; 33.101 ; 33.1031 ; 33.106 ; 33.115 ; 33.1446 ; 33.1926 ; 33.1244 ; 32.9995 ; 32.767 ; 32.6776 ; 32.554 ; 32.4312]

Bolt 1 - Shear Force (kips): [0.114736 ; 0.317361 ; 0.618794 ; 0.985136 ; 1.39373 ; 1.51357 ; 1.67988 ; 1.93709 ; 2.92178 ; 4.87256 ; 7.21651 ; 9.60267 ; 12.4122 ; 13.3941 ; 14.1382 ; 14.1294 ; 14.1249 ; 14.3472 ; 14.4049 ; 14.4238 ; 14.4374 ; 14.431 ; 14.4196 ; 14.6054 ; 14.8608 ; 15.1459 ; 15.3567 ; 15.5442 ; 15.7121 ; 15.8854 ; 16.4982 ; 17.5757 ; 19.186 ; 20.9448 ; 21.6448 ; 21.9722 ; 22.4275 ; 23.0156 ; 23.7715 ; 24.6682 ; 26.2793 ; 28.6112 ; 31.3218 ; 32.3336 ; 33.7367 ; 34.2643 ; 35.0071 ; 35.9262 ; 37.0526 ; 38.7767 ; 39.5621 ; 40.6029 ; 41.9801 ; 42.5391 ; 43.3433 ; 44.3723 ; 45.6786 ; 46.0869 ; 46.6336 ; 46.8221 ; 47.0821 ; 47.3255 ; 47.5512 ; 47.8635 ; 48.287 ; 48.9424 ; 49.8968 ; 51.0983 ; 52.3543 ; 52.6462 ; 53.0278 ; 53.4239]

Bolt 2 - Tensile Force (kips): [63.1254 ; 62.6513 ; 62.2451 ; 61.7165 ; 61.115 ; 60.9299 ; 60.676 ; 60.3262 ; 59.3947 ; 57.3413 ; 54.7115 ; 52.1332 ; 49.4386 ; 48.0503 ; 45.2034 ; 44.8497 ; 44.7782 ; 44.7585 ; 44.7467 ; 44.6445 ; 44.4219 ; 44.2392 ; 44.1388 ; 44.2864 ; 44.4635 ; 44.6901 ; 44.978 ; 45.0883 ; 45.2267 ; 45.4352 ; 45.7454 ; 46.1458 ; 46.5722 ; 46.9035 ; 47.0063 ; 47.0441 ; 47.1002 ; 47.1815 ; 47.3026 ; 47.3656 ; 47.4005 ; 47.5376 ; 47.8461 ; 47.9953 ; 48.3103 ; 48.4366 ; 48.6419 ; 49.0027 ; 49.5871 ; 50.5281 ; 50.895 ; 51.4004 ; 52.1314 ; 52.392 ; 52.7908 ; 53.3538 ; 54.2135 ; 54.5451 ; 55.0667 ; 55.2507 ; 55.5598 ; 55.8737 ; 56.2101 ; 56.7436 ; 57.5187 ; 58.6179 ; 60.1708 ; 62.1072 ; 63.954 ; 64.4701 ; 65.2033 ; 66.0258]

Bolt 2 - Shear Force (kips): [0.0779349 ; 0.457425 ; 0.846939 ; 1.32216 ; 1.84779 ; 2.00444 ; 2.22395 ; 2.55621 ; 3.56203 ; 5.50395 ; 7.80746 ; 10.044 ; 12.5241 ; 13.4737 ; 14.7055 ; 14.7608 ; 14.7602 ; 14.7642 ; 14.8297 ; 14.9832 ; 15.139 ; 15.1604 ; 15.1469 ; 15.2385 ; 15.4784 ; 15.7725 ; 16.1625 ; 16.2409 ; 16.434 ; 16.7352 ; 17.0086 ; 17.4747 ; 18.5065 ; 20.3672 ; 20.8166 ; 20.9431 ; 21.1159 ; 21.3578 ; 21.7418 ; 22.5953 ; 23.6235 ; 24.989 ; 26.9483 ; 27.5839 ; 28.4217 ; 28.712 ; 29.1108 ; 29.7391 ; 30.7037 ; 31.8949 ; 32.2272 ; 32.7354 ; 33.4728 ; 33.725 ; 34.0836 ; 34.6597 ; 35.4048 ; 35.6825 ; 36.0797 ; 36.2316 ; 36.4394 ; 36.638 ; 36.8177 ; 37.0487 ; 37.3509 ; 37.7135 ; 38.1198 ; 38.6674 ; 39.102 ; 39.1788 ; 39.286 ; 39.3766]

Bolt 3 - Tensile Force (kips): [65 ; 64.9165 ; 64.9969 ; 65.3223 ; 66.2176 ; 66.6863 ; 67.3814 ; 68.3227 ; 69.3251 ; 70.4535 ; 72.5033 ; 75.9335 ; 79.9972 ; 81.0605 ; 81.5186 ; 81.453 ; 81.4253 ; 81.5408 ; 81.6333 ; 81.7702 ; 81.8444 ; 81.7739 ; 81.7021 ; 82.0594 ; 82.4995 ; 83.1031 ; 83.9152 ; 84.2141 ; 84.642 ; 85.2499 ; 86.1487 ; 87.4667 ; 89.4038 ; 92.1383 ; 93.0714 ; 93.4141 ; 93.9117 ; 94.6233 ; 95.6309 ; 97.0701 ; 99.108 ; 101.955 ; 105.777 ; 107.09 ; 108.921 ; 109.577 ; 110.538 ; 111.788 ; 113.568 ; 115.793 ; 116.563 ; 117.65 ; 119.125 ; 119.637 ; 120.363 ; 121.367 ; 122.714 ; 123.164 ; 123.794 ; 124.001 ; 124.159 ; 124.306 ; 124.392 ; 124.522 ; 124.757 ; 124.985 ; 125.187 ; 125.531 ; 125.705 ; 125.776 ; 125.843 ; 125.908]

Bolt 3 - Shear Force (kips): [0.012456 ; 0.10317 ; 0.21701 ; 0.37473 ; 0.59414 ; 0.66729 ; 0.76401 ; 0.88721 ; 1.0183 ; 1.1464 ; 1.3274 ; 1.5951 ; 1.9375 ; 2.0336 ; 2.0733 ; 2.0671 ; 2.0646 ; 2.0757 ; 2.0834 ; 2.0957 ; 2.1026 ; 2.0974 ; 2.0923 ; 2.1225 ; 2.1579 ; 2.2098 ; 2.2859 ; 2.3131 ; 2.3543 ; 2.4158 ; 2.5019 ; 2.6184 ; 2.7772 ; 2.9985 ; 3.0763 ; 3.1029 ; 3.1414 ; 3.1942 ; 3.2627 ; 3.3409 ; 3.4216 ; 3.4968 ; 3.5803 ; 3.6033 ; 3.6168 ; 3.6095 ; 3.5852 ; 3.5361 ; 3.4177 ; 3.2192 ; 3.1344 ; 2.9989 ; 2.807 ; 2.7397 ; 2.6476 ; 2.6105 ; 2.8829 ; 2.9122 ; 2.9007 ; 2.8846 ; 3.2921 ; 3.5482 ; 3.8965 ; 4.2692 ; 4.6806 ; 5.4276 ; 6.5915 ; 7.4943 ; 7.8922 ; 7.9928 ; 8.1551 ; 8.3784]

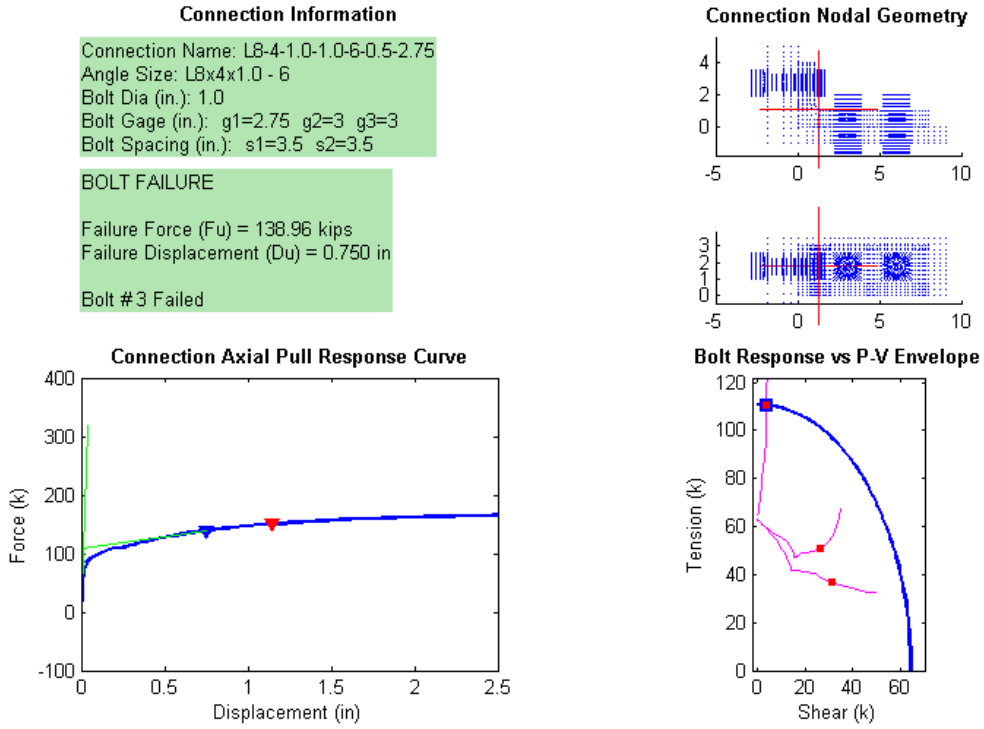


Figure B.212 Connection L8_4_1.0_1.0_6_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_1.0_6_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 7.6938e+003

Plastic Stiffness (k/in): 40.7319

Displacement (in): [8.8039e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.13464 ; 0.15048 ; 0.17424 ; 0.20987 ; 0.22323 ; 0.22825 ; 0.23576 ; 0.23764 ; 0.23952 ; 0.24234 ; 0.24287 ; 0.24366 ; 0.24485 ; 0.24663 ; 0.24931 ; 0.25332 ; 0.25483 ; 0.25709 ; 0.25793 ; 0.2592 ; 0.26047 ; 0.26174 ; 0.26365 ; 0.2665 ; 0.27079 ; 0.27722 ; 0.28686 ; 0.30133 ; 0.30675 ; 0.31489 ; 0.3271 ; 0.33167 ; 0.33854 ; 0.34884 ; 0.36428 ; 0.38745 ; 0.42221 ; 0.43524 ; 0.45479 ; 0.48412 ; 0.5281 ; 0.5446 ; 0.56934 ; 0.60646 ; 0.66213 ; 0.74564 ; 0.8709 ; 0.91787 ; 0.98833 ; 1.094 ; 1.1337 ; 1.1931 ; 1.2823 ; 1.3157 ; 1.3659 ; 1.4411 ; 1.4693 ; 1.5117 ; 1.5752 ; 1.6704 ; 1.7061 ; 1.7596 ; 1.84 ; 1.9605 ; 2.1413 ; 2.2038 ; 2.2976 ; 2.4382 ; 2.5]

Force (kips): [-2.44431 ; 6.31847 ; 12.5827 ; 19.9002 ; 27.8089 ; 29.9656 ; 32.6423 ; 35.7797 ; 39.2544 ; 41.9501 ; 44.1746 ; 46.2233 ; 48.6819 ; 51.3835 ; 52.2004 ; 53.2643 ; 54.545 ; 54.8101 ; 54.8505 ; 54.8064 ; 54.8867 ; 54.9529 ; 54.974 ; 54.9592 ; 54.9366 ; 54.9048 ; 54.9801 ; 55.0544 ; 55.0379 ; 55.0163 ; 54.9883 ; 55.0694 ; 55.1348 ; 55.1984 ; 55.2605 ; 55.3515 ; 55.4863 ; 55.6824 ; 55.9526 ; 56.3483 ; 56.9107 ; 57.1315 ; 57.4607 ; 57.9153 ; 58.1023 ; 58.3815 ; 58.7858 ; 59.3595 ; 60.18 ; 61.3337 ; 61.757 ; 62.3635 ; 63.2177 ; 64.4075 ; 64.8517 ; 65.5001 ; 66.4299 ; 67.7119 ; 69.4126 ; 71.5434 ; 72.2505 ; 73.2309 ; 74.5225 ; 74.9665 ; 75.5906 ; 76.4423 ; 76.7493 ; 77.2112 ; 77.8564 ; 78.0844 ; 78.4091 ; 78.857 ; 79.4441 ; 79.6467 ; 79.9284 ; 80.3119 ; 80.8099 ; 81.4676 ; 81.6879 ; 81.9903 ; 82.4057 ; 82.5798]

Bolt 1 - Tensile Force (kips): [63.1216 ; 62.8108 ; 62.5725 ; 62.2708 ; 61.9098 ; 61.8025 ; 61.66 ; 61.4685 ; 61.1668 ; 60.3002 ; 58.9722 ; 57.103 ; 54.4496 ; 50.5887 ; 49.1731 ; 47.1409 ; 43.3948 ; 42.8492 ; 42.7663 ; 42.7038 ; 42.6176 ; 42.4925 ; 42.2471 ; 42.2107 ; 42.1659 ; 42.1158 ; 42.0753 ; 42.0481 ; 42.0091 ; 41.999 ; 41.9897 ; 41.9794 ; 41.966 ; 41.9529 ; 41.94 ; 41.9212 ; 41.8991 ; 41.8734 ; 41.8466 ; 41.8031 ; 41.7302 ; 41.6961 ; 41.6409 ; 41.5581 ; 41.5345 ; 41.4931 ; 41.4131 ; 41.2741 ; 41.1184 ; 40.907 ; 40.7884 ; 40.6043 ; 40.3029 ; 39.7349 ; 39.3957 ; 38.953 ; 38.3404 ; 37.5234 ; 36.6185 ; 35.7443 ; 35.4656 ; 35.1747 ; 34.85 ; 34.6679 ; 34.3463 ; 33.9376 ; 33.8157 ; 33.6348 ; 33.3388 ; 33.2546 ; 33.1499 ; 33.0471 ; 32.9242 ; 32.8826 ; 32.8311 ; 32.7899 ; 32.7679 ; 32.7995 ; 32.8036 ; 32.8245 ; 32.8258 ; 32.7996]

Bolt 1 - Shear Force (kips): [0.118995 ; 0.267396 ; 0.528597 ; 0.849977 ; 1.2237 ; 1.33293 ; 1.47647 ; 1.66587 ; 1.97175 ; 2.91892 ; 4.19363 ; 5.82284 ; 7.91087 ; 10.5622 ; 11.4207 ; 12.5163 ; 14.018 ; 14.1149 ; 14.106 ; 14.0913 ; 14.1795 ; 14.2708 ; 14.3872 ; 14.3929 ; 14.3972 ; 14.3978 ; 14.3948 ; 14.3904 ; 14.382 ; 14.3791 ; 14.3759 ; 14.4355 ; 14.514 ; 14.5912 ; 14.6677 ; 14.7795 ; 14.9122 ; 15.0661 ; 15.2111 ; 15.4353 ; 15.7587 ; 15.9575 ; 16.3452 ; 16.7652 ; 17.1009 ; 17.5989 ; 18.2281 ; 19.0669 ; 20.1518 ; 21.4096 ; 21.9958 ; 22.7593 ; 23.7173 ; 25.0024 ; 25.7237 ; 26.6276 ; 27.8254 ; 29.3933 ; 31.3665 ; 34.0476 ; 35.0001 ; 36.227 ; 37.8366 ; 38.4684 ; 39.4654 ; 40.8037 ; 41.2285 ; 41.829 ; 42.8398 ; 43.19 ; 43.6733 ; 44.3219 ; 45.1782 ; 45.4696 ; 45.8674 ; 46.3832 ; 47.05 ; 47.87 ; 48.1129 ; 48.4964 ; 49.0698 ; 49.3192]

Bolt 2 - Tensile Force (kips): [63.1175 ; 62.7043 ; 62.3569 ; 61.9051 ; 61.3806 ; 61.2227 ; 61.0155 ; 60.7625 ; 60.4109 ; 59.6475 ; 58.6368 ; 57.4771 ; 56.5077 ; 55.2378 ; 54.7211 ; 53.9159 ; 51.5252 ; 49.6731 ; 48.8572 ; 47.831 ; 47.8453 ; 47.8577 ; 47.7022 ; 47.657 ; 47.5986 ; 47.5302 ; 47.3732 ; 47.2952 ; 47.0374 ; 46.9672 ; 46.8997 ; 46.9537 ; 47.0208 ; 47.0803 ; 47.1349 ; 47.2094 ; 47.2997 ; 47.4022 ; 47.5489 ; 47.7307 ; 47.9922 ; 48.0788 ; 48.2038 ; 48.3911 ; 48.4516 ; 48.538 ; 48.6431 ; 48.797 ; 48.9816 ; 49.0594 ; 49.0623 ; 49.0779 ; 49.1716 ; 49.4991 ; 49.6139 ; 49.7639 ; 49.9165 ; 50.2631 ; 50.8805 ; 51.882 ; 52.3031 ; 53.0186 ; 54.0615 ; 54.5065 ; 55.2188 ; 56.1414 ; 56.4958 ; 57.1187 ; 58.0581 ; 58.4139 ; 58.9454 ; 59.6532 ; 60.589 ; 60.9549 ; 61.481 ; 62.2338 ; 63.282 ; 64.6408 ; 65.152 ; 65.9034 ; 66.9479 ; 67.4365]

Bolt 2 - Shear Force (kips): [0.08192 ; 0.395947 ; 0.739562 ; 1.1624 ; 1.64924 ; 1.79212 ; 1.98214 ; 2.23636 ; 2.63466 ; 3.60491 ; 4.86984 ; 6.4546 ; 8.31144 ; 10.4944 ; 11.188 ; 12.1139 ; 13.9181 ; 14.8813 ; 15.2268 ; 15.5477 ; 15.5746 ; 15.5957 ; 15.6344 ; 15.6386 ; 15.6423 ; 15.6438 ; 15.8035 ; 15.9291 ; 16.016 ; 16.0211 ; 16.0176 ; 16.0353 ; 16.0549 ; 16.0722 ; 16.0881 ; 16.11 ; 16.1906 ; 16.3542 ; 16.5549 ; 16.8627 ; 17.218 ; 17.3681 ; 17.5256 ; 17.7222 ; 17.7625 ; 17.8621 ; 18.0772 ; 18.3575 ; 18.8739 ; 19.9246 ; 20.2883 ; 20.8003 ; 21.4377 ; 22.1607 ; 22.3913 ; 22.8321 ; 23.6049 ; 24.6386 ; 25.9899 ; 27.607 ; 28.1544 ; 28.8908 ; 30.0025 ; 30.3754 ; 30.8337 ; 31.5061 ; 31.7659 ; 32.0544 ; 32.3558 ; 32.4599 ; 32.6031 ; 32.8536 ; 33.2844 ; 33.4082 ; 33.5715 ; 33.7977 ; 34.0723 ; 34.5081 ; 34.659 ; 34.8557 ; 35.0639 ; 35.1026]

Bolt 3 - Tensile Force (kips): [65 ; 64.8814 ; 64.9231 ; 65.1843 ; 65.8673 ; 66.2492 ; 66.9271 ; 67.8872 ; 69.2061 ; 70.8219 ; 73.2482 ; 76.494 ; 80.4829 ; 84.5424 ; 85.7733 ; 87.3988 ; 89.3714 ; 89.83 ; 89.9279 ; 89.9514 ; 90.0386 ; 90.1296 ; 90.17 ; 90.1582 ; 90.1387 ; 90.1095 ; 90.1943 ; 90.2974 ; 90.2922 ; 90.273 ; 90.2453 ; 90.3273 ; 90.4098 ; 90.4912 ; 90.5718 ; 90.6914 ; 90.8704 ; 91.1363 ; 91.5149 ; 92.0695 ; 92.8599 ; 93.1592 ; 93.6042 ; 94.2321 ; 94.4762 ; 94.8384 ; 95.3653 ; 96.1267 ; 97.2305 ; 98.8122 ; 99.3932 ; 100.239 ; 101.453 ; 103.17 ; 103.808 ; 104.755 ; 106.124 ; 108.022 ; 110.514 ; 113.492 ; 114.447 ; 115.568 ; 116.931 ; 117.406 ; 118.127 ; 119.154 ; 119.516 ; 120.05 ; 120.733 ; 120.957 ; 121.283 ; 121.772 ; 122.325 ; 122.461 ; 122.628 ; 122.77 ; 122.977 ; 123.228 ; 123.151 ; 123.183 ; 123.296 ; 123.26]

Bolt 3 - Shear Force (kips): [0.021808 ; 0.087875 ; 0.18952 ; 0.3316 ; 0.52893 ; 0.59843 ; 0.69159 ; 0.81214 ; 0.97113 ; 1.1634 ; 1.4235 ; 1.7825 ; 2.2029 ; 2.6161 ; 2.744 ; 2.9209 ; 3.1392 ; 3.1861 ; 3.1956 ; 3.1981 ; 3.2061 ; 3.2154 ; 3.2194 ; 3.2182 ; 3.2163 ; 3.2136 ; 3.2223 ; 3.2334 ; 3.2338 ; 3.2321 ; 3.2298 ; 3.2373 ; 3.2448 ; 3.2524 ; 3.26 ; 3.2715 ; 3.2883 ; 3.3128 ; 3.3499 ; 3.4042 ; 3.4827 ; 3.509 ; 3.5466 ; 3.6018 ; 3.6188 ; 3.6424 ; 3.6763 ; 3.723 ; 3.7812 ; 3.8504 ; 3.8704 ; 3.8996 ; 3.942 ; 4.0018 ; 4.0171 ; 4.0316 ; 4.0436 ; 4.0297 ; 3.9446 ; 3.7229 ; 3.6251 ; 3.6738 ; 3.821 ; 3.8387 ; 3.7886 ; 3.6548 ; 3.6984 ; 3.9881 ; 4.3117 ; 4.4771 ; 4.733 ; 4.9906 ; 5.2622 ; 5.3935 ; 5.5642 ; 5.8454 ; 6.1757 ; 6.7607 ; 7.2951 ; 7.9022 ; 8.5665 ; 8.9848]

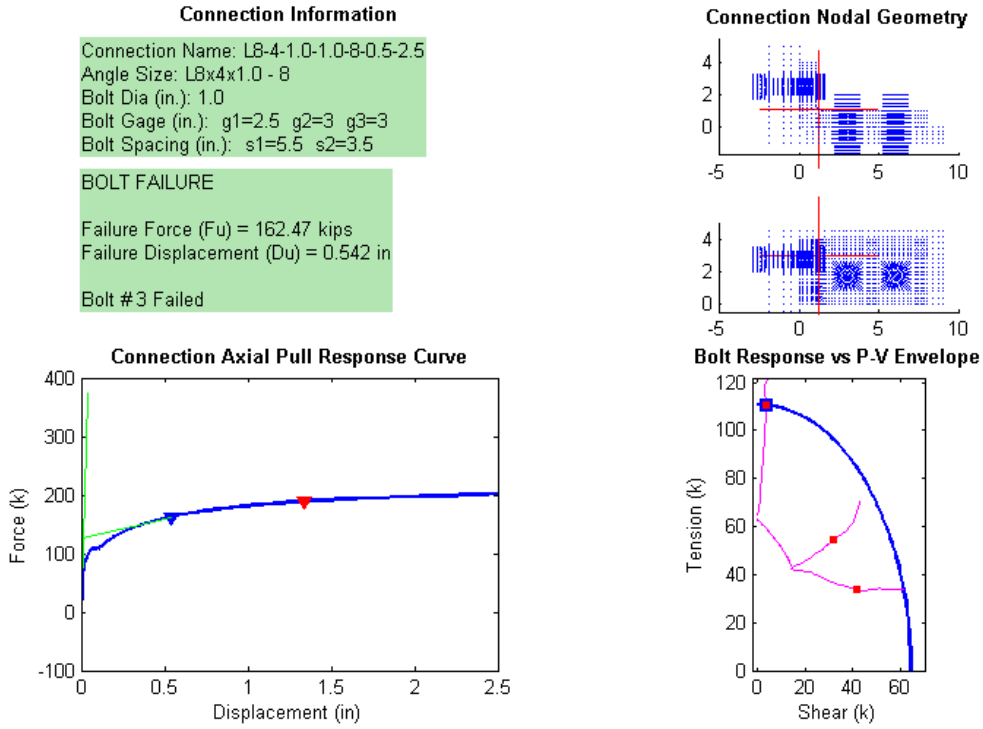


Figure B.213 Connection L8_4_1.0_1.0_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_1.0_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 8.6303e+003

Plastic Stiffness (k/in): 65.6237

Displacement (in): [7.7279e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.071287 ; 0.081846 ; 0.085806 ; 0.089765 ; 0.093725 ; 0.09521 ; 0.097437 ; 0.10078 ; 0.10579 ; 0.11331 ; 0.12458 ; 0.12881 ; 0.13304 ; 0.13727 ; 0.14361 ; 0.15312 ; 0.16739 ; 0.1888 ; 0.19683 ; 0.20887 ; 0.21338 ; 0.22015 ; 0.23031 ; 0.24555 ; 0.26841 ; 0.3027 ; 0.31556 ; 0.33484 ; 0.34208 ; 0.35292 ; 0.3692 ; 0.39361 ; 0.43022 ; 0.44395 ; 0.46455 ; 0.49544 ; 0.54178 ; 0.6113 ; 0.68081 ; 0.75032 ; 0.77638 ; 0.81548 ; 0.87413 ; 0.89613 ; 0.92912 ; 0.9786 ; 1.0528 ; 1.0807 ; 1.1224 ; 1.185 ; 1.279 ; 1.4199 ; 1.6313 ; 1.6938 ; 1.7876 ; 1.9282 ; 2.1391 ; 2.3891 ; 2.5]

Force (kips): [-1.93122 ; 7.69141 ; 14.9249 ; 23.426 ; 32.5563 ; 35.0366 ; 38.147 ; 41.5762 ; 44.319 ; 47.0806 ; 50.3015 ; 53.5203 ; 54.2035 ; 54.3005 ; 54.227 ; 54.1755 ; 54.1421 ; 54.2184 ; 54.4447 ; 54.4355 ; 54.3499 ; 54.6997 ; 56.3596 ; 56.879 ; 57.3926 ; 57.9303 ; 58.6803 ; 59.8331 ; 61.4379 ; 63.5176 ; 64.2409 ; 65.2189 ; 65.571 ; 66.0839 ; 66.8255 ; 67.8942 ; 69.3891 ; 71.3838 ; 72.1016 ; 73.0981 ; 73.4617 ; 73.9902 ; 74.7419 ; 75.8049 ; 77.2716 ; 77.8072 ; 78.5885 ; 79.7007 ; 81.2212 ; 83.1757 ; 84.843 ; 86.2953 ; 86.8023 ; 87.5217 ; 88.5216 ; 88.9186 ; 89.4701 ; 90.2304 ; 91.2855 ; 91.6655 ; 92.2093 ; 92.9439 ; 93.8486 ; 95.0105 ; 96.482 ; 96.8815 ; 97.43 ; 98.1825 ; 99.1896 ; 100.216 ; 100.631]

Bolt 1 - Tensile Force (kips): [63.1304 ; 62.7727 ; 62.4781 ; 62.0996 ; 61.6447 ; 61.5069 ; 61.3192 ; 60.9411 ; 59.6729 ; 57.0878 ; 53.2594 ; 47.6749 ; 45.3582 ; 43.0418 ; 42.9276 ; 42.8762 ; 42.848 ; 42.7065 ; 42.4385 ; 42.2545 ; 42.1419 ; 42.066 ; 41.9392 ; 41.8934 ; 41.8443 ; 41.7911 ; 41.7219 ; 41.5919 ; 41.3693 ; 41.0707 ; 40.8742 ; 40.5834 ; 40.441 ; 40.2226 ; 39.9173 ; 39.2724 ; 38.1479 ; 37.0722 ; 36.7301 ; 36.3314 ; 36.1594 ; 35.9238 ; 35.6583 ; 35.3564 ; 35.0852 ; 34.9382 ; 34.6987 ; 34.329 ; 33.9012 ; 33.476 ; 33.4357 ; 33.5769 ; 33.6395 ; 33.7162 ; 33.8433 ; 33.8893 ; 33.9605 ; 34.0724 ; 34.1765 ; 34.1421 ; 34.0857 ; 33.9734 ; 33.835 ; 33.7565 ; 33.8249 ; 33.8443 ; 33.8658 ; 33.8986 ; 33.9059 ; 33.8466 ; 33.7117]

Bolt 1 - Shear Force (kips): [0.106519 ; 0.360319 ; 0.693856 ; 1.10526 ; 1.57829 ; 1.71526 ; 1.89951 ; 2.29779 ; 3.5999 ; 5.89289 ; 8.84567 ; 12.3385 ; 13.4104 ; 14.1577 ; 14.1552 ; 14.1466 ; 14.1393 ; 14.2749 ; 14.4331 ; 14.4652 ; 14.4577 ; 14.7961 ; 15.561 ; 15.7921 ; 16.0967 ; 16.5258 ; 17.0168 ; 18.3328 ; 19.6584 ; 21.4239 ; 22.3289 ; 23.334 ; 23.6975 ; 24.1798 ; 24.7853 ; 26.0675 ; 28.2512 ; 30.5181 ; 31.3746 ; 32.4483 ; 32.9113 ; 33.5958 ; 34.4842 ; 35.6057 ; 36.9518 ; 37.5162 ; 38.3756 ; 39.6939 ; 41.5331 ; 43.9678 ; 45.845 ; 47.1136 ; 47.5081 ; 48.062 ; 48.848 ; 49.1161 ; 49.4936 ; 50.0917 ; 51.0306 ; 51.42 ; 51.9513 ; 52.7585 ; 53.8399 ; 55.1233 ; 56.5495 ; 56.9201 ; 57.4362 ; 58.1854 ; 59.1985 ; 60.2874 ; 60.8144]

Bolt 2 - Tensile Force (kips): [63.1271 ; 62.7137 ; 62.3399 ; 61.8515 ; 61.282 ; 61.1169 ; 60.8913 ; 60.4647 ; 59.2008 ; 56.6381 ; 52.9574 ; 48.029 ; 46.0916 ; 43.8289 ; 43.6043 ; 43.512 ; 43.4693 ; 43.4647 ; 43.2289 ; 42.9601 ; 42.8148 ; 42.8453 ; 43.2844 ; 43.4227 ; 43.5671 ; 43.7482 ; 44.0138 ; 44.4551 ; 44.9665 ; 45.7957 ; 46.0945 ; 46.4938 ; 46.6404 ; 46.8481 ; 47.1016 ; 47.5515 ; 48.305 ; 49.2997 ; 49.5467 ; 49.9474 ; 50.1027 ; 50.3495 ; 50.7536 ; 51.4126 ; 52.3614 ; 52.6187 ; 53.0175 ; 53.5906 ; 54.3341 ; 55.2524 ; 55.8967 ; 56.3982 ; 56.5755 ; 56.8568 ; 57.3294 ; 57.5461 ; 57.8842 ; 58.3973 ; 59.1947 ; 59.4929 ; 59.9086 ; 60.5166 ; 61.3882 ; 62.6175 ; 64.407 ; 64.9148 ; 65.6542 ; 66.6959 ; 68.0511 ; 69.5063 ; 70.1501]

Bolt 2 - Shear Force (kips): [0.0710984 ; 0.455707 ; 0.84652 ; 1.32639 ; 1.87116 ; 2.02927 ; 2.24465 ; 2.68102 ; 3.96943 ; 6.24298 ; 9.12612 ; 12.4021 ; 13.4527 ; 14.3207 ; 14.3525 ; 14.3502 ; 14.3428 ; 14.3422 ; 14.5977 ; 14.7088 ; 14.7086 ; 14.7587 ; 15.6941 ; 16.0085 ; 16.2462 ; 16.4191 ; 16.7918 ; 17.2616 ; 18.7365 ; 20.4323 ; 20.7823 ; 21.3186 ; 21.5246 ; 21.8951 ; 22.5848 ; 23.3122 ; 24.0534 ; 25.3753 ; 25.9814 ; 26.7707 ; 27.0183 ; 27.3451 ; 27.7787 ; 28.3923 ; 29.2148 ; 29.5832 ; 30.121 ; 30.7908 ; 31.5791 ; 32.5108 ; 33.5687 ; 34.7265 ; 35.1613 ; 35.7416 ; 36.4684 ; 36.7242 ; 37.0734 ; 37.5076 ; 38.0779 ; 38.2674 ; 38.5709 ; 38.9855 ; 39.4993 ; 40.0724 ; 40.7803 ; 41.0144 ; 41.3316 ; 41.7203 ; 42.234 ; 42.6768 ; 42.7973]

Bolt 3 - Tensile Force (kips): [65 ; 64.9086 ; 64.988 ; 65.3129 ; 66.2458 ; 66.7379 ; 67.4951 ; 68.4367 ; 69.3389 ; 70.4055 ; 72.2818 ; 75.3173 ; 76.1639 ; 76.3663 ; 76.3052 ; 76.2576 ; 76.2252 ; 76.3119 ; 76.5775 ; 76.5769 ; 76.4892 ; 76.911 ; 79.2133 ; 79.9661 ; 80.7261 ; 81.5201 ; 82.632 ; 84.2044 ; 86.2913 ; 88.896 ; 89.7747 ; 90.9934 ; 91.4346 ; 92.0781 ; 92.9975 ; 94.28 ; 96.042 ; 98.433 ; 99.282 ; 100.497 ; 100.941 ; 101.591 ; 102.528 ; 103.865 ; 105.732 ; 106.403 ; 107.38 ; 108.767 ; 110.625 ; 112.94 ; 114.87 ; 116.553 ; 117.13 ; 117.947 ; 119.055 ; 119.268 ; 119.664 ; 120.355 ; 121.231 ; 121.493 ; 121.875 ; 122.249 ; 122.709 ; 123.302 ; 123.905 ; 124.076 ; 124.299 ; 124.476 ; 124.645 ; 124.842 ; 124.818]

Bolt 3 - Shear Force (kips): [0.023842 ; 0.10168 ; 0.21715 ; 0.37639 ; 0.59855 ; 0.6732 ; 0.76824 ; 0.88734 ; 0.9994 ; 1.1157 ; 1.2719 ; 1.4916 ; 1.5574 ; 1.5735 ; 1.5681 ; 1.564 ; 1.5613 ; 1.5679 ; 1.5899 ; 1.5907 ; 1.5844 ; 1.6165 ; 1.7884 ; 1.8443 ; 1.8997 ; 1.9553 ; 2.0299 ; 2.1257 ; 2.2518 ; 2.431 ; 2.4974 ; 2.6011 ; 2.639 ; 2.6957 ; 2.7827 ; 2.9051 ; 3.0566 ; 3.2222 ; 3.2673 ; 3.3286 ; 3.3485 ; 3.377 ; 3.4179 ; 3.4735 ; 3.5479 ; 3.5707 ; 3.5993 ; 3.6288 ; 3.6235 ; 3.5384 ; 3.4027 ; 3.2407 ; 3.1741 ; 3.0738 ; 2.96 ; 3.3527 ; 3.6903 ; 3.8989 ; 4.1719 ; 4.3782 ; 4.6025 ; 4.9833 ; 5.2374 ; 5.4937 ; 5.8728 ; 5.9978 ; 6.2055 ; 6.5657 ; 6.7496 ; 7.2226 ; 7.7621]

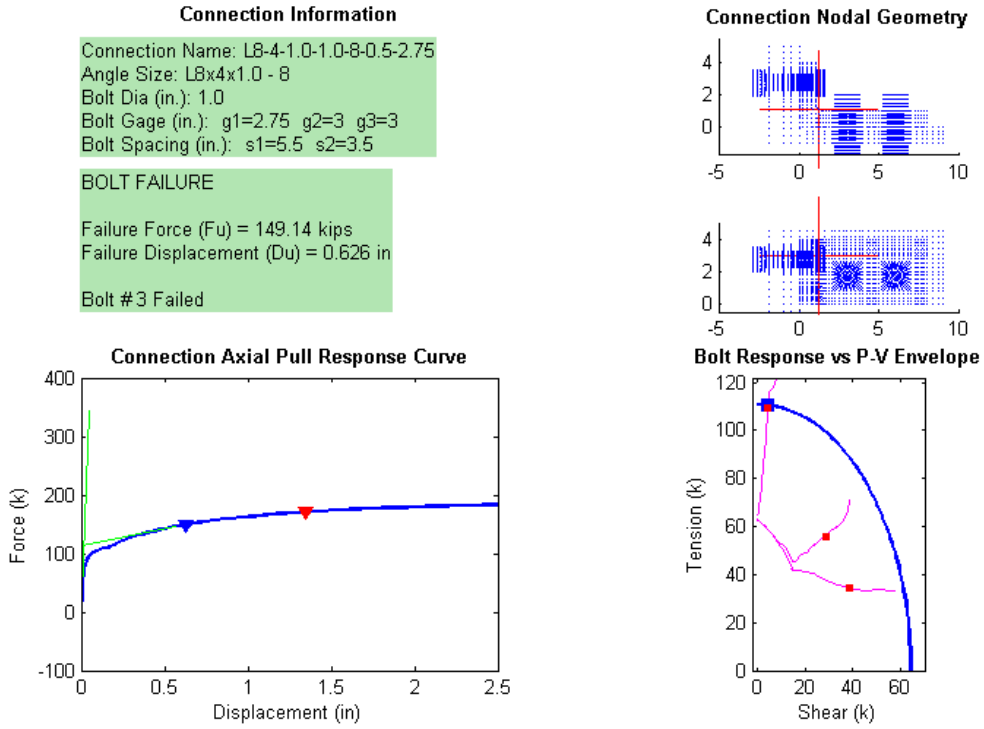


Figure B.214 Connection L8_4_1.0_1.0_8_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_1.0_8_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 7.5873e+003

Plastic Stiffness (k/in): 56.1023

Displacement (in): [8.1944e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.13464 ; 0.1386 ; 0.14008 ; 0.14231 ; 0.14565 ; 0.15066 ; 0.15818 ; 0.15889 ; 0.15994 ; 0.16153 ; 0.16391 ; 0.16747 ; 0.17283 ; 0.18085 ; 0.19289 ; 0.19741 ; 0.20418 ; 0.21434 ; 0.22958 ; 0.25244 ; 0.26101 ; 0.27387 ; 0.29316 ; 0.32209 ; 0.33293 ; 0.34921 ; 0.37362 ; 0.41023 ; 0.42396 ; 0.44456 ; 0.47545 ; 0.48704 ; 0.50442 ; 0.53048 ; 0.56958 ; 0.62823 ; 0.71621 ; 0.7492 ; 0.79868 ; 0.87291 ; 0.98426 ; 1.026 ; 1.0886 ; 1.1121 ; 1.1474 ; 1.2002 ; 1.2795 ; 1.3984 ; 1.5767 ; 1.6392 ; 1.733 ; 1.8736 ; 1.9263 ; 2.0054 ; 2.1241 ; 2.3021 ; 2.5]

Force (kips): [-2.04937 ; 6.4482 ; 12.7696 ; 20.2391 ; 28.5451 ; 30.8432 ; 33.7078 ; 37.1957 ; 40.791 ; 43.9949 ; 46.8838 ; 49.7068 ; 52.5095 ; 54.4071 ; 54.3365 ; 54.3082 ; 54.4171 ; 54.458 ; 54.5934 ; 54.5095 ; 54.499 ; 54.6428 ; 54.7892 ; 54.9982 ; 55.3051 ; 55.7311 ; 56.3531 ; 57.1891 ; 57.521 ; 57.9807 ; 58.7119 ; 59.6944 ; 61.0571 ; 61.544 ; 62.2431 ; 63.1998 ; 64.4815 ; 64.942 ; 65.6368 ; 66.6323 ; 68.0243 ; 68.5263 ; 69.2533 ; 70.3066 ; 70.6928 ; 71.2502 ; 72.0426 ; 73.1394 ; 74.6165 ; 76.5396 ; 77.2029 ; 78.1341 ; 79.3922 ; 81.0753 ; 81.672 ; 82.5053 ; 82.806 ; 83.2451 ; 83.8644 ; 84.7324 ; 85.8747 ; 87.2556 ; 87.6757 ; 88.2429 ; 89.0092 ; 89.2862 ; 89.6797 ; 90.2172 ; 90.954 ; 91.6948]

Bolt 1 - Tensile Force (kips): [63.1275 ; 62.8112 ; 62.555 ; 62.2243 ; 61.8156 ; 61.6905 ; 61.5243 ; 61.2991 ; 60.7749 ; 59.408 ; 56.6907 ; 53.3843 ; 48.9837 ; 42.9342 ; 42.8612 ; 42.8419 ; 42.5654 ; 42.3041 ; 42.1755 ; 42.0942 ; 42.0881 ; 42.0674 ; 42.0423 ; 42.0095 ; 41.9705 ; 41.9327 ; 41.8558 ; 41.7546 ; 41.7051 ; 41.6295 ; 41.5423 ; 41.3316 ; 41.0625 ; 40.9465 ; 40.7444 ; 40.4196 ; 39.8072 ; 39.5201 ; 38.8838 ; 37.9881 ; 37.0981 ; 36.7764 ; 36.3722 ; 35.8331 ; 35.6675 ; 35.4705 ; 35.2273 ; 35.0141 ; 34.5591 ; 33.8806 ; 33.7066 ; 33.4228 ; 33.2599 ; 33.4106 ; 33.4852 ; 33.559 ; 33.5849 ; 33.6308 ; 33.7167 ; 33.8407 ; 33.9123 ; 33.7306 ; 33.608 ; 33.5021 ; 33.4176 ; 33.3885 ; 33.3806 ; 33.3928 ; 33.4353 ; 33.4913]

Bolt 1 - Shear Force (kips): [0.109549 ; 0.307446 ; 0.60001 ; 0.963325 ; 1.39671 ; 1.52447 ; 1.69072 ; 1.91253 ; 2.47274 ; 3.83857 ; 6.21097 ; 8.74088 ; 11.5919 ; 14.1477 ; 14.1393 ; 14.1353 ; 14.3483 ; 14.4475 ; 14.4491 ; 14.4344 ; 14.4327 ; 14.5564 ; 14.7033 ; 14.8926 ; 15.1028 ; 15.2578 ; 15.5985 ; 15.9883 ; 16.3179 ; 16.7138 ; 17.7978 ; 19.1322 ; 20.7084 ; 21.2363 ; 22.0944 ; 23.195 ; 24.5943 ; 25.175 ; 26.4532 ; 28.1861 ; 30.0275 ; 30.779 ; 31.8373 ; 33.3129 ; 33.8454 ; 34.5434 ; 35.4494 ; 36.5582 ; 38.3805 ; 41.201 ; 42.1234 ; 43.506 ; 45.2176 ; 46.9167 ; 47.4239 ; 48.1209 ; 48.3658 ; 48.7023 ; 49.175 ; 49.8768 ; 50.9616 ; 52.5866 ; 53.1716 ; 53.8758 ; 54.7691 ; 55.1088 ; 55.491 ; 55.9832 ; 56.7088 ; 57.484]

Bolt 2 - Tensile Force (kips): [63.12 ; 62.7596 ; 62.4335 ; 62.0074 ; 61.5023 ; 61.3542 ; 61.1639 ; 60.9023 ; 60.3779 ; 59.1003 ; 56.6088 ; 53.9837 ; 51.5133 ; 45.7972 ; 45.4587 ; 45.3737 ; 45.3501 ; 45.2666 ; 44.9662 ; 44.7287 ; 44.7105 ; 44.7752 ; 44.8865 ; 45.0408 ; 45.2398 ; 45.4881 ; 45.8111 ; 46.2408 ; 46.4257 ; 46.6872 ; 47.0725 ; 47.5975 ; 48.313 ; 48.5534 ; 48.8875 ; 49.3585 ; 50.1311 ; 50.4488 ; 50.9133 ; 51.545 ; 52.2227 ; 52.5046 ; 52.943 ; 53.564 ; 53.7516 ; 54.0492 ; 54.5001 ; 55.1709 ; 56.0377 ; 57.1358 ; 57.4883 ; 57.9152 ; 58.5549 ; 59.5196 ; 59.8659 ; 60.3319 ; 60.511 ; 60.7772 ; 61.2034 ; 61.9007 ; 62.9542 ; 64.518 ; 65.0428 ; 65.8119 ; 66.8833 ; 67.2632 ; 67.8789 ; 68.7613 ; 69.972 ; 71.2385]

Bolt 2 - Shear Force (kips): [0.0710415 ; 0.395606 ; 0.74262 ; 1.1715 ; 1.67551 ; 1.82399 ; 2.01868 ; 2.28141 ; 2.87504 ; 4.21752 ; 6.54607 ; 8.94056 ; 11.4499 ; 14.8602 ; 14.9247 ; 14.9309 ; 14.9426 ; 15.0025 ; 15.2923 ; 15.3196 ; 15.3175 ; 15.3384 ; 15.3716 ; 15.4172 ; 15.5721 ; 15.8724 ; 16.2851 ; 16.772 ; 16.928 ; 17.1194 ; 17.3597 ; 17.7675 ; 18.7387 ; 19.1995 ; 19.8044 ; 20.5863 ; 21.4446 ; 21.7292 ; 22.0019 ; 22.4948 ; 23.645 ; 23.9617 ; 24.4209 ; 25.1615 ; 25.4896 ; 25.949 ; 26.5993 ; 27.5064 ; 28.5546 ; 29.6812 ; 30.078 ; 30.7213 ; 31.6456 ; 32.87 ; 33.303 ; 33.9321 ; 34.1513 ; 34.4821 ; 34.906 ; 35.4325 ; 36.1409 ; 36.9057 ; 37.1256 ; 37.4103 ; 37.7258 ; 37.8086 ; 37.9505 ; 38.1761 ; 38.4727 ; 38.7226]

Bolt 3 - Tensile Force (kips): [65 ; 64.8765 ; 64.92 ; 65.1848 ; 65.9053 ; 66.3253 ; 67.0417 ; 68.0445 ; 69.3039 ; 70.8373 ; 72.8953 ; 76.1097 ; 80.3832 ; 83.5339 ; 83.4916 ; 83.47 ; 83.5852 ; 83.6495 ; 83.8583 ; 83.7829 ; 83.7726 ; 83.9384 ; 84.1359 ; 84.4227 ; 84.8409 ; 85.431 ; 86.2701 ; 87.409 ; 87.8374 ; 88.4467 ; 89.3506 ; 90.5873 ; 92.2984 ; 92.91 ; 93.7856 ; 94.996 ; 96.6326 ; 97.2115 ; 98.0689 ; 99.3027 ; 101.042 ; 101.668 ; 102.581 ; 103.911 ; 104.396 ; 105.108 ; 106.137 ; 107.583 ; 109.529 ; 111.708 ; 112.292 ; 113.149 ; 114.446 ; 116.241 ; 116.767 ; 117.505 ; 117.78 ; 118.2 ; 118.755 ; 119.514 ; 120.406 ; 121.215 ; 121.307 ; 121.498 ; 121.651 ; 121.725 ; 121.816 ; 121.961 ; 122.241 ; 122.54]

Bolt 3 - Shear Force (kips): [0.031362 ; 0.08668 ; 0.19055 ; 0.33555 ; 0.53926 ; 0.61021 ; 0.70524 ; 0.83253 ; 0.99643 ; 1.1869 ; 1.4074 ; 1.7643 ; 2.198 ; 2.45 ; 2.4455 ; 2.4434 ; 2.4536 ; 2.4587 ; 2.4756 ; 2.4696 ; 2.4687 ; 2.4825 ; 2.4973 ; 2.5191 ; 2.5512 ; 2.5988 ; 2.668 ; 2.7706 ; 2.8078 ; 2.8642 ; 2.9463 ; 3.0689 ; 3.2442 ; 3.3034 ; 3.3846 ; 3.493 ; 3.635 ; 3.6822 ; 3.7449 ; 3.8282 ; 3.9392 ; 3.9758 ; 4.0267 ; 4.0933 ; 4.1158 ; 4.1465 ; 4.1829 ; 4.2102 ; 4.1925 ; 4.3099 ; 4.4905 ; 4.6246 ; 4.6947 ; 5.0639 ; 5.4568 ; 6.0095 ; 6.2368 ; 6.5572 ; 6.8866 ; 7.1865 ; 7.5721 ; 7.8878 ; 8.0217 ; 8.21 ; 8.4355 ; 8.545 ; 8.7351 ; 8.8974 ; 9.064 ; 9.1266]

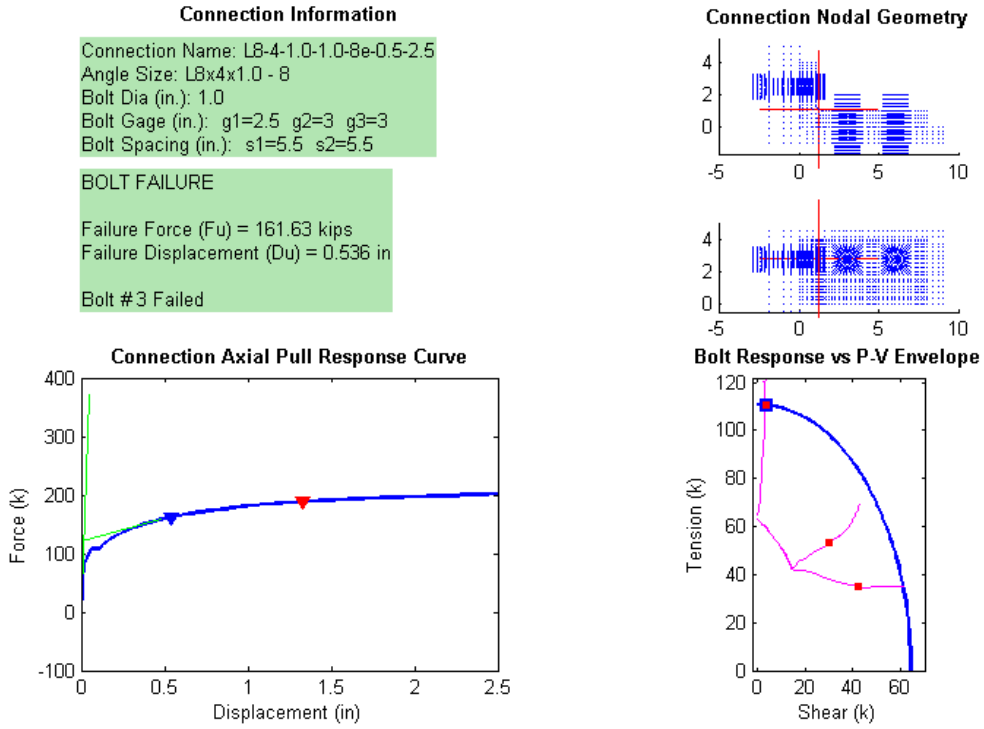


Figure B.215 Connection L8_4_1.0_1.0_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_1.0_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 8.3714e+003

Plastic Stiffness (k/in): 74.5473

Displacement (in): [8.5593e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.071287 ; 0.081846 ; 0.085806 ; 0.091745 ; 0.093972 ; 0.094807 ; 0.09606 ; 0.097939 ; 0.10076 ; 0.10499 ; 0.11133 ; 0.11371 ; 0.11728 ; 0.12263 ; 0.13065 ; 0.13868 ; 0.14069 ; 0.1437 ; 0.14821 ; 0.15499 ; 0.16514 ; 0.18038 ; 0.1861 ; 0.19467 ; 0.20753 ; 0.22681 ; 0.23405 ; 0.2449 ; 0.26117 ; 0.28558 ; 0.3222 ; 0.33593 ; 0.35652 ; 0.38742 ; 0.399 ; 0.41638 ; 0.44244 ; 0.48155 ; 0.54019 ; 0.62817 ; 0.66116 ; 0.71065 ; 0.78487 ; 0.81271 ; 0.85447 ; 0.9171 ; 0.94058 ; 0.97581 ; 1.0287 ; 1.1079 ; 1.1377 ; 1.1822 ; 1.2491 ; 1.3494 ; 1.4999 ; 1.5563 ; 1.641 ; 1.768 ; 1.8156 ; 1.887 ; 1.9941 ; 2.1548 ; 2.3959 ; 2.5]

Force (kips): [-2.36916 ; 6.8913 ; 13.9813 ; 22.3594 ; 31.5203 ; 34.0369 ; 37.1974 ; 40.8434 ; 43.8792 ; 46.671 ; 49.9657 ; 53.3103 ; 54.034 ; 54.206 ; 54.1356 ; 54.0716 ; 54.052 ; 54.115 ; 54.1688 ; 54.3007 ; 54.2965 ; 54.2211 ; 54.2314 ; 54.6995 ; 55.2197 ; 56.0394 ; 57.0319 ; 58.0272 ; 58.257 ; 58.6378 ; 59.1815 ; 59.9329 ; 60.9773 ; 62.4915 ; 63.0288 ; 63.819 ; 64.8953 ; 66.3226 ; 66.8459 ; 67.6306 ; 68.7362 ; 70.2427 ; 72.2271 ; 72.9278 ; 73.9236 ; 75.2922 ; 75.78 ; 76.4929 ; 77.521 ; 78.9784 ; 80.9613 ; 83.4308 ; 84.2371 ; 85.3451 ; 86.8266 ; 87.3429 ; 88.08 ; 89.1027 ; 89.4734 ; 90.0491 ; 90.8384 ; 91.9021 ; 92.2847 ; 92.8148 ; 93.5215 ; 94.4174 ; 95.5478 ; 95.9665 ; 96.5252 ; 97.2773 ; 97.5575 ; 97.9485 ; 98.4995 ; 99.2606 ; 100.262 ; 100.647]

Bolt 1 - Tensile Force (kips): [63.2134 ; 62.8308 ; 62.5111 ; 62.1001 ; 61.6069 ; 61.4581 ; 61.2547 ; 60.8908 ; 59.7342 ; 57.1571 ; 53.2238 ; 47.3907 ; 45.0676 ; 43.0855 ; 42.9808 ; 42.9221 ; 42.9072 ; 42.7853 ; 42.5672 ; 42.4445 ; 42.3057 ; 42.2101 ; 42.1553 ; 42.099 ; 42.0544 ; 42.0169 ; 41.9411 ; 41.8684 ; 41.8499 ; 41.8368 ; 41.7795 ; 41.6585 ; 41.5073 ; 41.3599 ; 41.2775 ; 41.0854 ; 40.8052 ; 40.3509 ; 40.0915 ; 39.5702 ; 38.8858 ; 38.0721 ; 37.3208 ; 37.0623 ; 36.7148 ; 36.3907 ; 36.2924 ; 36.1688 ; 35.9586 ; 35.584 ; 35.0922 ; 34.7015 ; 34.6307 ; 34.6417 ; 34.7867 ; 34.815 ; 34.8777 ; 34.9291 ; 34.9217 ; 34.9395 ; 34.9275 ; 34.9239 ; 34.92 ; 34.8847 ; 34.8584 ; 34.7819 ; 34.82 ; 34.8328 ; 34.8604 ; 34.9162 ; 34.9211 ; 34.941 ; 34.9907 ; 35.0045 ; 34.9909 ; 34.9729]

Bolt 1 - Shear Force (kips): [0.088383 ; 0.363881 ; 0.706948 ; 1.13383 ; 1.63272 ; 1.77855 ; 1.97509 ; 2.34307 ; 3.52831 ; 5.82946 ; 8.86993 ; 12.4912 ; 13.5437 ; 14.1764 ; 14.1736 ; 14.1628 ; 14.1587 ; 14.2718 ; 14.4095 ; 14.4438 ; 14.4602 ; 14.4529 ; 14.5171 ; 14.9433 ; 15.2916 ; 15.557 ; 16.0724 ; 16.6997 ; 16.8548 ; 17.283 ; 17.8894 ; 18.6842 ; 19.651 ; 20.8121 ; 21.2584 ; 22.1999 ; 23.2914 ; 24.5387 ; 25.1394 ; 26.2722 ; 27.7824 ; 29.6906 ; 31.9373 ; 32.8548 ; 34.131 ; 35.6634 ; 36.1815 ; 36.9195 ; 38.0414 ; 39.6901 ; 42.0796 ; 44.8515 ; 45.7488 ; 46.8573 ; 48.1937 ; 48.6737 ; 49.3223 ; 50.2276 ; 50.5956 ; 51.0896 ; 51.7895 ; 52.7946 ; 53.1515 ; 53.6924 ; 54.3927 ; 55.434 ; 56.6408 ; 57.0456 ; 57.5754 ; 58.2145 ; 58.4603 ; 58.7539 ; 59.2101 ; 59.9002 ; 60.8448 ; 61.2443]

Bolt 2 - Tensile Force (kips): [63.2158 ; 62.7915 ; 62.4027 ; 61.8863 ; 61.2501 ; 61.064 ; 60.8158 ; 60.4409 ; 59.3905 ; 56.9347 ; 53.2498 ; 48.1531 ; 46.1618 ; 43.6818 ; 43.4218 ; 43.2974 ; 43.2708 ; 43.2688 ; 43.2658 ; 43.0351 ; 42.7791 ; 42.6264 ; 42.5536 ; 42.6874 ; 42.8264 ; 43.0344 ; 43.3476 ; 43.7387 ; 43.8334 ; 44.0041 ; 44.2417 ; 44.605 ; 45.1445 ; 45.8062 ; 46.0353 ; 46.4068 ; 46.9012 ; 47.5588 ; 47.8066 ; 48.1657 ; 48.5693 ; 49.1236 ; 49.8453 ; 50.0716 ; 50.3835 ; 50.7839 ; 50.9569 ; 51.2648 ; 51.7562 ; 52.5164 ; 53.5117 ; 54.5614 ; 54.8757 ; 55.3512 ; 56.041 ; 56.2495 ; 56.5492 ; 57.0239 ; 57.2264 ; 57.5654 ; 58.1021 ; 58.9097 ; 59.2181 ; 59.6983 ; 60.4088 ; 61.3761 ; 62.6658 ; 63.1281 ; 63.8178 ; 64.7429 ; 65.0765 ; 65.5522 ; 66.2504 ; 67.271 ; 68.7661 ; 69.396]

Bolt 2 - Shear Force (kips): [0.106242 ; 0.376984 ; 0.740909 ; 1.1846 ; 1.69186 ; 1.8387 ; 2.0345 ; 2.3759 ; 3.49943 ; 5.75525 ; 8.69008 ; 12.0877 ; 13.2092 ; 14.2355 ; 14.2812 ; 14.2808 ; 14.2765 ; 14.2766 ; 14.2764 ; 14.5049 ; 14.6148 ; 14.6213 ; 14.6099 ; 14.6508 ; 14.8273 ; 15.3928 ; 15.8836 ; 16.2478 ; 16.3193 ; 16.3954 ; 16.5585 ; 16.8222 ; 17.3194 ; 18.64 ; 19.0878 ; 19.5613 ; 20.2714 ; 21.1446 ; 21.4128 ; 21.8132 ; 22.5317 ; 23.4697 ; 24.7159 ; 25.1343 ; 25.7476 ; 26.6866 ; 27.0373 ; 27.522 ; 28.1635 ; 28.9798 ; 30.0628 ; 31.603 ; 32.1431 ; 32.9115 ; 33.9556 ; 34.3173 ; 34.8628 ; 35.607 ; 35.8582 ; 36.2627 ; 36.8003 ; 37.4543 ; 37.685 ; 37.9772 ; 38.3875 ; 38.8815 ; 39.603 ; 39.8633 ; 40.204 ; 40.7114 ; 40.8939 ; 41.1557 ; 41.4812 ; 41.9045 ; 42.3969 ; 42.5704]

Bolt 3 - Tensile Force (kips): [65 ; 64.9028 ; 64.9698 ; 65.276 ; 66.1523 ; 66.6266 ; 67.3801 ; 68.3681 ; 69.3725 ; 70.4535 ; 72.3053 ; 75.264 ; 76.09 ; 76.3857 ; 76.33 ; 76.2701 ; 76.2507 ; 76.3239 ; 76.3826 ; 76.5275 ; 76.5329 ; 76.457 ; 76.4721 ; 77.009 ; 77.6746 ; 78.815 ; 80.2806 ; 81.7936 ; 82.1467 ; 82.7006 ; 83.4865 ; 84.5659 ; 86.0327 ; 88.0205 ; 88.7056 ; 89.6791 ; 91.005 ; 92.8011 ; 93.4382 ; 94.356 ; 95.6323 ; 97.3839 ; 99.7752 ; 100.62 ; 101.838 ; 103.55 ; 104.163 ; 105.058 ; 106.348 ; 108.165 ; 110.583 ; 113.46 ; 114.372 ; 115.634 ; 117.323 ; 117.901 ; 118.722 ; 119.854 ; 120.235 ; 120.568 ; 121.145 ; 122.033 ; 122.241 ; 122.502 ; 122.762 ; 123.175 ; 123.701 ; 123.85 ; 124.073 ; 124.368 ; 124.485 ; 124.635 ; 124.769 ; 124.923 ; 125.192 ; 125.232]

Bolt 3 - Shear Force (kips): [0.038177 ; 0.083799 ; 0.19476 ; 0.34824 ; 0.56276 ; 0.63603 ; 0.73091 ; 0.85253 ; 0.97179 ; 1.0826 ; 1.2249 ; 1.4199 ; 1.4772 ; 1.4991 ; 1.4946 ; 1.4897 ; 1.4882 ; 1.4938 ; 1.4999 ; 1.5094 ; 1.5101 ; 1.5043 ; 1.5053 ; 1.5423 ; 1.5875 ; 1.6643 ; 1.7639 ; 1.8601 ; 1.8815 ; 1.9119 ; 1.9533 ; 2.0105 ; 2.0885 ; 2.2019 ; 2.2447 ; 2.3096 ; 2.4139 ; 2.5721 ; 2.6315 ; 2.7164 ; 2.8304 ; 2.9673 ; 3.1131 ; 3.1554 ; 3.2116 ; 3.2877 ; 3.3136 ; 3.3482 ; 3.3947 ; 3.454 ; 3.4844 ; 3.3969 ; 3.3389 ; 3.2399 ; 3.0685 ; 2.9997 ; 2.8945 ; 2.7343 ; 2.7484 ; 3.2929 ; 3.654 ; 3.8049 ; 4.0315 ; 4.282 ; 4.6175 ; 4.8649 ; 5.0893 ; 5.2825 ; 5.4438 ; 5.7581 ; 5.8796 ; 6.0879 ; 6.509 ; 7.1522 ; 7.8045 ; 7.8776]

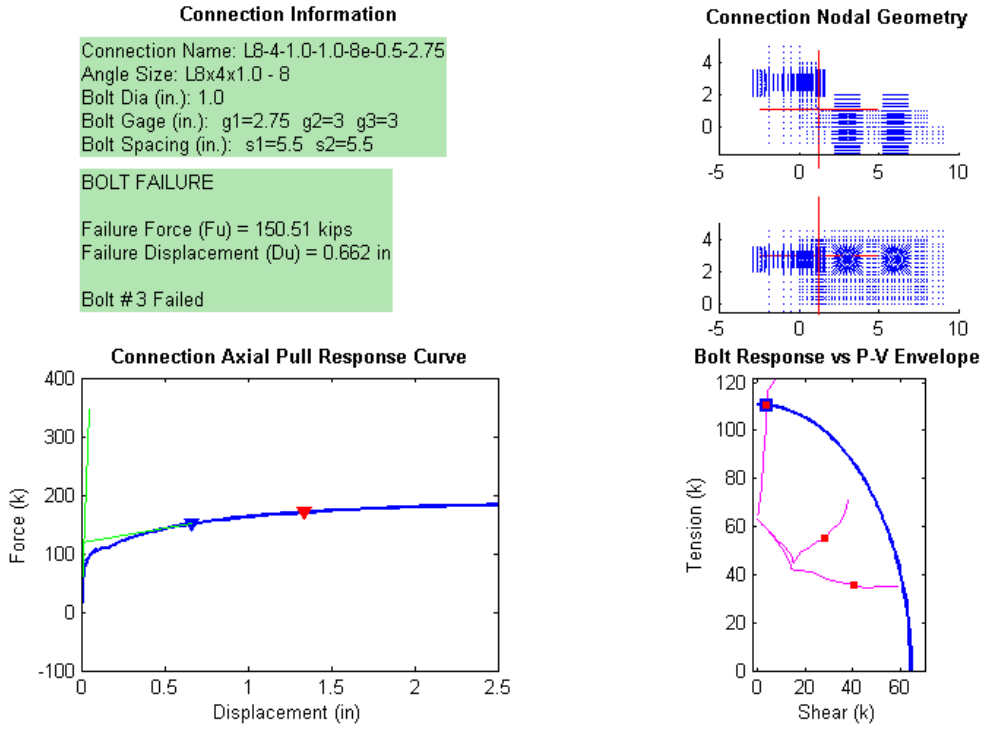


Figure B.216 Connection L8_4_1.0_1.0_8e_0.5_2.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_4_1.0_1.0_8e_0.5_2.75 Analysis Response Variables.
Initial Stiffness (k/in): 7.4033e+003

Plastic Stiffness (k/in): 48.2520

Displacement (in): [9.7538e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.071287 ; 0.081846 ; 0.097684 ; 0.12144 ; 0.13035 ; 0.14371 ; 0.14873 ; 0.15624 ; 0.15906 ; 0.16012 ; 0.1617 ; 0.16408 ; 0.16765 ; 0.173 ; 0.18103 ; 0.19307 ; 0.19758 ; 0.20436 ; 0.21452 ; 0.22975 ; 0.25261 ; 0.26119 ; 0.2644 ; 0.26922 ; 0.27646 ; 0.2873 ; 0.30358 ; 0.32799 ; 0.3646 ; 0.41952 ; 0.44012 ; 0.44784 ; 0.45943 ; 0.47681 ; 0.50287 ; 0.54197 ; 0.55664 ; 0.57863 ; 0.61162 ; 0.66111 ; 0.67966 ; 0.7075 ; 0.74925 ; 0.81188 ; 0.83537 ; 0.8706 ; 0.92344 ; 0.94326 ; 0.97299 ; 1.0176 ; 1.0343 ; 1.0594 ; 1.097 ; 1.1534 ; 1.2381 ; 1.365 ; 1.5555 ; 1.8055 ; 1.868 ; 1.9618 ; 2.1024 ; 2.1551 ; 2.2342 ; 2.3529 ; 2.5]

Force (kips): [-2.52682 ; 5.73687 ; 11.9328 ; 19.2883 ; 27.5687 ; 29.8916 ; 32.7934 ; 36.3444 ; 40.1585 ; 43.5585 ; 46.6186 ; 49.6898 ; 50.5105 ; 51.5877 ; 52.933 ; 54.3394 ; 54.5256 ; 54.5261 ; 54.5203 ; 54.6695 ; 54.6249 ; 54.607 ; 54.6924 ; 54.9069 ; 55.2132 ; 55.6275 ; 56.1978 ; 57.0284 ; 57.3404 ; 57.8197 ; 58.526 ; 59.5339 ; 60.8695 ; 61.3482 ; 61.5328 ; 61.8043 ; 62.1948 ; 62.7387 ; 63.5063 ; 64.5896 ; 66.1199 ; 68.1622 ; 68.8932 ; 69.1658 ; 69.5677 ; 70.1489 ; 70.9799 ; 72.1403 ; 72.5601 ; 73.1657 ; 74.0333 ; 75.2272 ; 75.6464 ; 76.2467 ; 77.0999 ; 78.2709 ; 78.6842 ; 79.2676 ; 80.0847 ; 80.3784 ; 80.8065 ; 81.4395 ; 81.6819 ; 82.0308 ; 82.5358 ; 83.2493 ; 84.245 ; 85.5581 ; 87.1085 ; 88.6555 ; 88.9988 ; 89.4769 ; 90.1217 ; 90.3477 ; 90.6919 ; 91.1684 ; 91.7146]

Bolt 1 - Tensile Force (kips): [63.2078 ; 62.8649 ; 62.5857 ; 62.2242 ; 61.7794 ; 61.6446 ; 61.464 ; 61.2185 ; 60.7135 ; 59.3666 ; 56.569 ; 52.9566 ; 51.8018 ; 50.1338 ; 47.6445 ; 43.5775 ; 43.0379 ; 42.7411 ; 42.3557 ; 42.2208 ; 42.1842 ; 42.1735 ; 42.1574 ; 42.1321 ; 42.0972 ; 42.0663 ; 42.0279 ; 41.9752 ; 41.9532 ; 41.9116 ; 41.8508 ; 41.6275 ; 41.3985 ; 41.289 ; 41.2275 ; 41.1416 ; 41.0146 ; 40.8409 ; 40.628 ; 40.1204 ; 38.9741 ; 37.7532 ; 37.4316 ; 37.3126 ; 37.1339 ; 36.8845 ; 36.6089 ; 36.3597 ; 36.2663 ; 36.121 ; 35.8384 ; 35.4956 ; 35.3438 ; 35.1622 ; 34.924 ; 34.7201 ; 34.6744 ; 34.6139 ; 34.5882 ; 34.6037 ; 34.6305 ; 34.6926 ; 34.6973 ; 34.7107 ; 34.7489 ; 34.7893 ; 34.8047 ; 34.8199 ; 34.8219 ; 34.783 ; 34.7665 ; 34.7716 ; 34.8147 ; 34.8218 ; 34.8426 ; 34.8691 ; 34.8795]

Bolt 1 - Shear Force (kips): [0.0942048 ; 0.31377 ; 0.617376 ; 0.996734 ; 1.45483 ; 1.59132 ; 1.76997 ; 2.00867 ; 2.53337 ; 3.87573 ; 6.31529 ; 9.05662 ; 9.84967 ; 10.9268 ; 12.3471 ; 14.0579 ; 14.1693 ; 14.2842 ; 14.4338 ; 14.4297 ; 14.4221 ; 14.4194 ; 14.5004 ; 14.6909 ; 14.9558 ; 15.2123 ; 15.5308 ; 15.9346 ; 16.1596 ; 16.5799 ; 17.4011 ; 18.9245 ; 20.667 ; 21.2886 ; 21.599 ; 22.0152 ; 22.5558 ; 23.2123 ; 23.9234 ; 25.2171 ; 27.8205 ; 30.9265 ; 32.0009 ; 32.4077 ; 33.0111 ; 33.8687 ; 34.9955 ; 36.3948 ; 36.9187 ; 37.6962 ; 38.8977 ; 40.4361 ; 41.0705 ; 41.9205 ; 43.049 ; 44.4918 ; 45.0388 ; 45.787 ; 46.731 ; 47.0487 ; 47.505 ; 48.1085 ; 48.3312 ; 48.6508 ; 49.1068 ; 49.7345 ; 50.6357 ; 51.8415 ; 53.4448 ; 55.2869 ; 55.7083 ; 56.2814 ; 56.9666 ; 57.2019 ; 57.5104 ; 57.9447 ; 58.4636]

Bolt 2 - Tensile Force (kips): [63.2035 ; 62.832 ; 62.4941 ; 62.0497 ; 61.4911 ; 61.327 ; 61.1154 ; 60.843 ; 60.4065 ; 59.2757 ; 56.8329 ; 54.0677 ; 53.4097 ; 52.6018 ; 51.5443 ; 48.8545 ; 47.0798 ; 45.59 ; 45.3954 ; 45.0086 ; 44.8879 ; 44.8524 ; 44.8716 ; 45.0608 ; 45.3122 ; 45.6417 ; 46.0622 ; 46.5347 ; 46.7127 ; 46.9845 ; 47.3979 ; 48.0076 ; 48.7688 ; 49.0328 ; 49.1333 ; 49.2705 ; 49.4689 ; 49.7425 ; 50.0276 ; 50.4487 ; 51.1606 ; 52.099 ; 52.3516 ; 52.4455 ; 52.5949 ; 52.8401 ; 53.2032 ; 53.6835 ; 53.8617 ; 54.1465 ; 54.5666 ; 55.2144 ; 55.4625 ; 55.8624 ; 56.467 ; 57.3542 ; 57.6845 ; 58.1495 ; 58.7079 ; 58.9009 ; 59.1962 ; 59.5953 ; 59.746 ; 59.9743 ; 60.3075 ; 60.7717 ; 61.4915 ; 62.6136 ; 64.302 ; 66.4423 ; 66.9417 ; 67.6312 ; 68.6006 ; 68.9559 ; 69.4705 ; 70.2233 ; 71.1378]

Bolt 2 - Shear Force (kips): [0.11286 ; 0.320865 ; 0.641691 ; 1.03512 ; 1.49905 ; 1.63541 ; 1.81377 ; 2.0491 ; 2.52182 ; 3.78015 ; 6.13344 ; 8.68278 ; 9.38015 ; 10.3041 ; 11.5352 ; 13.6101 ; 14.4757 ; 14.9544 ; 14.9863 ; 15.327 ; 15.3363 ; 15.334 ; 15.3455 ; 15.4009 ; 15.4737 ; 15.5681 ; 15.6871 ; 16.1387 ; 16.3074 ; 16.6054 ; 16.9504 ; 17.2449 ; 17.6913 ; 17.9229 ; 17.9924 ; 18.1454 ; 18.4109 ; 18.7871 ; 19.5463 ; 20.4207 ; 21.2707 ; 22.416 ; 23.0151 ; 23.2608 ; 23.6008 ; 24.0345 ; 24.6316 ; 25.5219 ; 25.8651 ; 26.3091 ; 26.9176 ; 27.8595 ; 28.1728 ; 28.6207 ; 29.2362 ; 29.9966 ; 30.2501 ; 30.6046 ; 31.2055 ; 31.4302 ; 31.7448 ; 32.2606 ; 32.4656 ; 32.7454 ; 33.1348 ; 33.6638 ; 34.3251 ; 35.1273 ; 35.9018 ; 36.5971 ; 36.7613 ; 37.0356 ; 37.3296 ; 37.4079 ; 37.5425 ; 37.7267 ; 37.9475]

Bolt 3 - Tensile Force (kips): [65 ; 64.8718 ; 64.9045 ; 65.1557 ; 65.8411 ; 66.2394 ; 66.9463 ; 67.964 ; 69.2774 ; 70.8846 ; 72.9512 ; 76.1351 ; 77.2999 ; 78.9613 ; 81.1688 ; 83.5742 ; 83.98 ; 84.1086 ; 84.1218 ; 84.3559 ; 84.316 ; 84.2985 ; 84.3969 ; 84.6902 ; 85.114 ; 85.7057 ; 86.5222 ; 87.67 ; 88.0851 ; 88.6961 ; 89.5891 ; 90.8391 ; 92.523 ; 93.1134 ; 93.3334 ; 93.6596 ; 94.1348 ; 94.8131 ; 95.7724 ; 97.1257 ; 99.0225 ; 101.593 ; 102.501 ; 102.835 ; 103.332 ; 104.061 ; 105.123 ; 106.635 ; 107.177 ; 107.961 ; 109.079 ; 110.571 ; 111.071 ; 111.779 ; 112.647 ; 113.73 ; 114.074 ; 114.616 ; 115.438 ; 115.735 ; 116.174 ; 116.809 ; 117.027 ; 117.357 ; 117.769 ; 118.38 ; 119.323 ; 120.438 ; 121.418 ; 121.975 ; 122.058 ; 122.079 ; 122.123 ; 122.16 ; 122.299 ; 122.493 ; 122.723]

Bolt 3 - Shear Force (kips): [0.048036 ; 0.068196 ; 0.167 ; 0.3064 ; 0.49998 ; 0.56812 ; 0.66103 ; 0.7841 ; 0.94756 ; 1.1324 ; 1.3344 ; 1.6582 ; 1.7717 ; 1.9265 ; 2.1067 ; 2.2726 ; 2.2988 ; 2.3066 ; 2.3075 ; 2.3225 ; 2.319 ; 2.3176 ; 2.3252 ; 2.3438 ; 2.3716 ; 2.4133 ; 2.4755 ; 2.5693 ; 2.6042 ; 2.6567 ; 2.7343 ; 2.851 ; 3.0243 ; 3.0863 ; 3.1084 ; 3.1408 ; 3.1873 ; 3.2515 ; 3.3392 ; 3.4524 ; 3.5914 ; 3.7643 ; 3.8201 ; 3.8395 ; 3.8673 ; 3.9073 ; 3.9607 ; 4.0247 ; 4.0395 ; 4.0525 ; 4.0529 ; 4.0185 ; 3.9988 ; 3.9643 ; 4.0562 ; 4.2509 ; 4.3299 ; 4.4034 ; 4.4573 ; 4.4705 ; 4.4772 ; 4.6607 ; 4.8544 ; 5.0668 ; 5.3474 ; 5.7369 ; 6.3522 ; 6.8792 ; 7.3307 ; 7.7429 ; 7.8604 ; 8.0439 ; 8.3381 ; 8.4368 ; 8.5759 ; 8.8125 ; 9.1936]

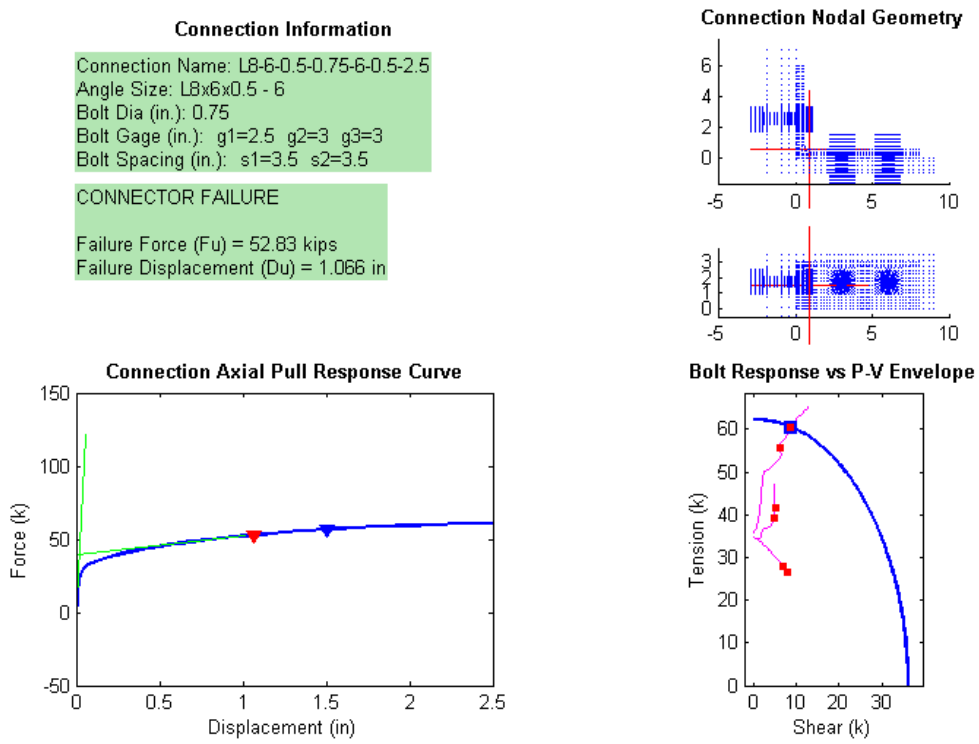


Figure B.217 Connection L8_6_0.5_0.75_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.75_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2031

Plastic Stiffness (k/in): 12.3439

Displacement (in): [2.0835e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.19827 ; 0.24833 ; 0.32341 ; 0.43604 ; 0.4466 ; 0.46244 ; 0.48619 ; 0.52183 ; 0.53519 ; 0.55524 ; 0.58531 ; 0.63041 ; 0.69806 ; 0.79954 ; 0.95176 ; 1.0088 ; 1.0945 ; 1.1266 ; 1.1747 ; 1.247 ; 1.3553 ; 1.5179 ; 1.5789 ; 1.6703 ; 1.8074 ; 2.0132 ; 2.1382 ; 2.3257 ; 2.5]

Force (kips): [-0.744309 ; 1.56725 ; 3.22258 ; 5.305 ; 7.92016 ; 10.8606 ; 13.2193 ; 14.7407 ; 15.8297 ; 16.804 ; 17.9535 ; 18.9041 ; 19.6817 ; 20.6471 ; 21.859 ; 21.9783 ; 22.1409 ; 22.3827 ; 22.7374 ; 22.8689 ; 23.0582 ; 23.3193 ; 23.6888 ; 24.1974 ; 24.8764 ; 25.7515 ; 26.1038 ; 26.575 ; 26.7366 ; 26.9861 ; 27.327 ; 27.8041 ; 28.4122 ; 28.6279 ; 28.9119 ; 29.2828 ; 29.734 ; 29.9587 ; 30.2518 ; 30.4926]

Bolt 1 - Tensile Force (kips): [34.7767 ; 34.7186 ; 34.6731 ; 34.6104 ; 34.525 ; 34.421 ; 34.328 ; 34.2591 ; 34.1989 ; 34.1236 ; 34.0434 ; 33.9795 ; 33.9121 ; 33.6602 ; 32.891 ; 32.7913 ; 32.6515 ; 32.4397 ; 32.1227 ; 32.004 ; 31.8305 ; 31.5816 ; 31.2153 ; 30.6868 ; 29.9427 ; 28.9105 ; 28.4811 ; 27.893 ; 27.6854 ; 27.5208 ; 27.3495 ; 26.9943 ; 26.4995 ; 26.4284 ; 26.3146 ; 26.1396 ; 25.9128 ; 25.8121 ; 25.8086 ; 25.8317]

Bolt 1 - Shear Force (kips): [0.058273 ; 0.082377 ; 0.16484 ; 0.27402 ; 0.41652 ; 0.58385 ; 0.72794 ; 0.83494 ; 0.93183 ; 1.0508 ; 1.1752 ; 1.2732 ; 1.3718 ; 1.6928 ; 2.5278 ; 2.6273 ; 2.7653 ; 2.9716 ; 3.2744 ; 3.3862 ; 3.5484 ; 3.778 ; 4.1088 ; 4.5729 ; 5.2051 ; 6.0462 ; 6.3848 ; 6.8423 ; 7.0019 ; 7.1317 ; 7.2692 ; 7.5419 ; 7.9141 ; 7.9732 ; 8.0663 ; 8.2075 ; 8.393 ; 8.4802 ; 8.512 ; 8.5186]

Bolt 2 - Tensile Force (kips): [34.7803 ; 34.6838 ; 34.6077 ; 34.5148 ; 34.4137 ; 34.3314 ; 34.3165 ; 34.3847 ; 34.5343 ; 34.8427 ; 35.4511 ; 35.9635 ; 36.3713 ; 36.7277 ; 36.8932 ; 36.9077 ; 36.9374 ; 36.9793 ; 37.0471 ; 37.0735 ; 37.1167 ; 37.1926 ; 37.3256 ; 37.5588 ; 37.983 ; 38.6983 ; 38.929 ; 39.309 ; 39.4561 ; 39.7686 ; 40.2658 ; 40.9223 ; 41.8698 ; 42.2781 ; 42.8605 ; 43.6802 ; 44.8129 ; 45.4559 ; 46.3324 ; 47.0545]

Bolt 2 - Shear Force (kips): [0.052632 ; 0.12789 ; 0.241 ; 0.3893 ; 0.58434 ; 0.81549 ; 1.0249 ; 1.1996 ; 1.3733 ; 1.5584 ; 1.7219 ; 1.8278 ; 1.9232 ; 2.1994 ; 2.853 ; 2.9144 ; 2.9966 ; 3.1189 ; 3.2943 ; 3.3579 ; 3.4482 ; 3.5711 ; 3.7404 ; 3.9642 ; 4.2427 ; 4.5743 ; 4.7165 ; 4.8918 ; 4.9492 ; 4.9526 ; 4.9214 ; 4.9384 ; 4.9601 ; 4.9072 ; 4.8426 ; 4.7692 ; 4.6809 ; 4.6325 ; 4.6103 ; 4.6741]

Bolt 3 - Tensile Force (kips): [36 ; 35.9368 ; 35.9362 ; 36.0292 ; 36.2645 ; 36.645 ; 37.2449 ; 37.9555 ; 38.496 ; 39.2865 ; 40.6253 ; 42.0284 ; 43.4282 ; 45.4081 ; 47.9145 ; 48.1138 ; 48.3843 ; 48.7481 ; 49.2713 ; 49.4738 ; 49.7672 ; 50.1692 ; 50.739 ; 51.5599 ; 52.7339 ; 54.1168 ; 54.9562 ; 56.135 ; 56.587 ; 57.2031 ; 57.9849 ; 59.1383 ; 60.6271 ; 61.2039 ; 61.917 ; 62.7996 ; 63.751 ; 64.1745 ; 64.7019 ; 65.2594]

Bolt 3 - Shear Force (kips): [0.0258337 ; 0.0275339 ; 0.0678582 ; 0.134437 ; 0.228845 ; 0.351563 ; 0.498613 ; 0.662537 ; 0.858435 ; 1.05768 ; 1.29573 ; 1.48073 ; 1.6116 ; 1.74708 ; 1.952 ; 1.9823 ; 2.01876 ; 2.0781 ; 2.17692 ; 2.22933 ; 2.32948 ; 2.54186 ; 3.32432 ; 4.34312 ; 5.47799 ; 6.46797 ; 6.30606 ; 6.09676 ; 6.17187 ; 6.64389 ; 7.35727 ; 8.00637 ; 8.77976 ; 9.19167 ; 9.68935 ; 10.4037 ; 11.184 ; 11.6083 ; 12.1905 ; 12.5024]

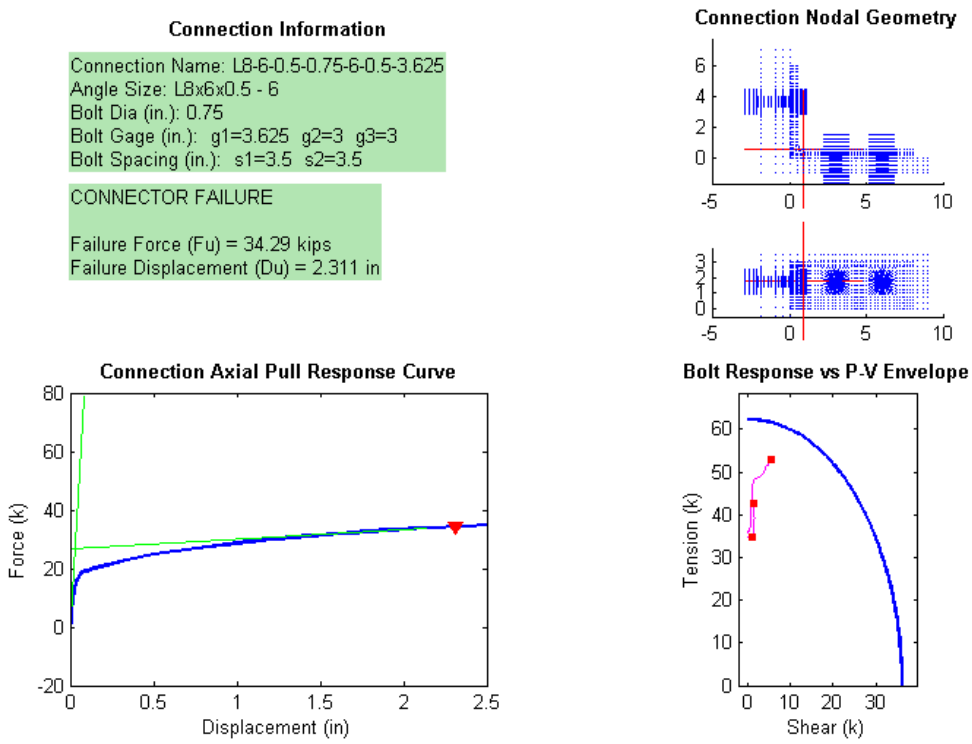


Figure B.218 Connection L8_6_0.5_0.75_6_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.75_6_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 909.9356

Plastic Stiffness (k/in): 3.2968

Displacement (in): [3.3931e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.75487 ; 1.0049 ; 1.0674 ; 1.1611 ; 1.1963 ; 1.249 ; 1.3281 ; 1.4468 ; 1.6247 ; 1.6872 ; 1.781 ; 1.9216 ; 2.1326 ; 2.3826 ; 2.5]

Force (kips): [-0.682128 ; 0.435 ; 1.09509 ; 1.9759 ; 3.15831 ; 4.73135 ; 6.61702 ; 8.1663 ; 9.06455 ; 9.61895 ; 10.0352 ; 10.5994 ; 11.398 ; 12.3755 ; 13.4872 ; 14.3432 ; 14.5374 ; 14.8111 ; 14.9114 ; 15.0564 ; 15.2625 ; 15.5481 ; 15.9548 ; 16.0948 ; 16.2906 ; 16.5574 ; 16.9051 ; 17.2429 ; 17.3873]

Bolt 1 - Tensile Force (kips): [34.7767 ; 34.7499 ; 34.7338 ; 34.711 ; 34.6792 ; 34.6328 ; 34.5716 ; 34.5179 ; 34.4861 ; 34.4715 ; 34.4681 ; 34.4601 ; 34.4461 ; 34.4324 ; 34.4404 ; 34.4648 ; 34.472 ; 34.4833 ; 34.4877 ; 34.4944 ; 34.5047 ; 34.521 ; 34.5455 ; 34.5538 ; 34.567 ; 34.5883 ; 34.6229 ; 34.6678 ; 34.6895]

Bolt 1 - Shear Force (kips): [0.055107 ; 0.039959 ; 0.062353 ; 0.10321 ; 0.16377 ; 0.24882 ; 0.35653 ; 0.45263 ; 0.51572 ; 0.55575 ; 0.58332 ; 0.62813 ; 0.6967 ; 0.78439 ; 0.86641 ; 0.92075 ; 0.93236 ; 0.9488 ; 0.95466 ; 0.96338 ; 0.97588 ; 0.99332 ; 1.0191 ; 1.0285 ; 1.0415 ; 1.0586 ; 1.0803 ; 1.0997 ; 1.1077]

Bolt 2 - Tensile Force (kips): [34.7794 ; 34.733 ; 34.7002 ; 34.657 ; 34.6064 ; 34.5537 ; 34.5275 ; 34.5722 ; 34.7045 ; 34.9075 ; 35.1048 ; 35.3785 ; 35.9062 ; 36.6835 ; 37.7275 ; 38.5729 ; 38.776 ; 39.074 ; 39.1862 ; 39.3634 ; 39.6316 ; 40.0227 ; 40.6064 ; 40.8151 ; 41.1263 ; 41.5929 ; 42.2723 ; 43.0407 ; 43.3941]

Bolt 2 - Shear Force (kips): [0.048719 ; 0.06157 ; 0.10325 ; 0.16561 ; 0.2541 ; 0.37779 ; 0.53617 ; 0.68634 ; 0.80736 ; 0.9043 ; 0.97474 ; 1.067 ; 1.1922 ; 1.3094 ; 1.4044 ; 1.4793 ; 1.4984 ; 1.5172 ; 1.5209 ; 1.5171 ; 1.507 ; 1.4954 ; 1.4828 ; 1.4804 ; 1.4781 ; 1.4745 ; 1.4704 ; 1.4671 ; 1.4672]

Bolt 3 - Tensile Force (kips): [36 ; 35.9507 ; 35.9153 ; 35.8961 ; 35.9243 ; 36.064 ; 36.2788 ; 36.6072 ; 36.9416 ; 37.2008 ; 37.564 ; 38.1125 ; 39.3898 ; 41.4436 ; 44.3975 ; 46.8261 ; 47.2951 ; 47.8649 ; 48.076 ; 48.384 ; 48.822 ; 49.4131 ; 50.332 ; 50.6742 ; 51.1043 ; 51.7277 ; 52.5707 ; 53.3456 ; 53.6549]

Bolt 3 - Shear Force (kips): [0.027614 ; 0.012149 ; 0.026847 ; 0.05655 ; 0.10581 ; 0.1832 ; 0.27582 ; 0.3638 ; 0.46245 ; 0.561 ; 0.63396 ; 0.72944 ; 0.63486 ; 0.68657 ; 0.85069 ; 1.0481 ; 1.1058 ; 1.2222 ; 1.3377 ; 1.9479 ; 2.6292 ; 3.2409 ; 3.8753 ; 3.9391 ; 4.2028 ; 4.6479 ; 5.143 ; 5.6696 ; 5.8765]

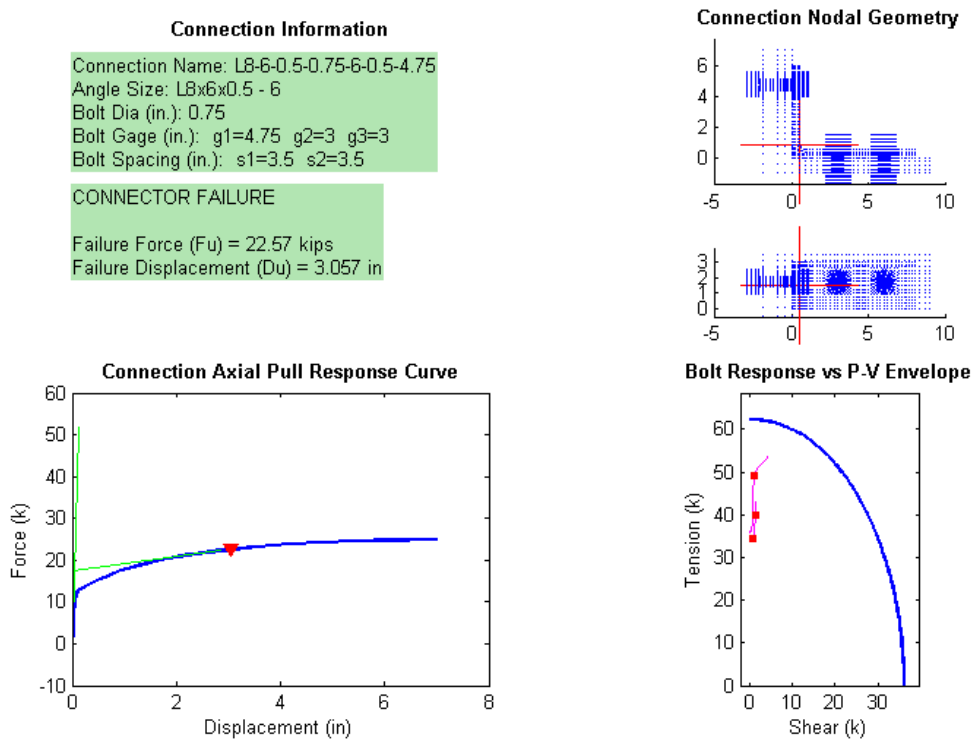


Figure B.219 Connection L8_6_0.5_0.75_6_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.75_6_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 380.4807

Plastic Stiffness (k/in): 1.6363

Displacement (in): [3.403e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.9406 ; 1.4136 ; 1.5886 ; 1.8511 ; 2.2449 ; 2.3925 ; 2.4479 ; 2.531 ; 2.6555 ; 2.8424 ; 3.1227 ; 3.5432 ; 4.1739 ; 4.8046 ; 5.4353 ; 6.1353 ; 6.8354 ; 7]

Force (kips): [-0.672064 ; 0.671509 ; 1.40869 ; 2.40717 ; 3.74333 ; 5.1385 ; 6.00064 ; 6.33141 ; 6.55736 ; 6.89977 ; 7.36315 ; 7.98445 ; 8.74021 ; 9.58919 ; 9.84163 ; 10.1709 ; 10.5912 ; 10.7354 ; 10.7893 ; 10.8661 ; 10.9725 ; 11.1254 ; 11.3319 ; 11.6028 ; 11.9008 ; 12.1093 ; 12.2584 ; 12.3769 ; 12.4574 ; 12.4724]

Bolt 1 - Tensile Force (kips): [34.7768 ; 34.7447 ; 34.7265 ; 34.7002 ; 34.6624 ; 34.6173 ; 34.5869 ; 34.5751 ; 34.5674 ; 34.5539 ; 34.5549 ; 34.551 ; 34.546 ; 34.5518 ; 34.5575 ; 34.569 ; 34.5881 ; 34.5952 ; 34.5975 ; 34.6009 ; 34.6066 ; 34.6142 ; 34.6263 ; 34.646 ; 34.6798 ; 34.7174 ; 34.7577 ; 34.8037 ; 34.8516 ; 34.863]

Bolt 1 - Shear Force (kips): [0.05483 ; 0.046948 ; 0.076911 ; 0.12613 ; 0.1988 ; 0.28108 ; 0.33864 ; 0.36627 ; 0.39049 ; 0.42991 ; 0.45246 ; 0.49409 ; 0.55155 ; 0.61269 ; 0.62877 ; 0.64767 ; 0.67238 ; 0.68146 ; 0.68539 ; 0.69128 ; 0.69926 ; 0.71272 ; 0.73164 ; 0.75743 ; 0.7893 ; 0.8153 ; 0.83695 ; 0.8585 ; 0.87653 ; 0.88049]

Bolt 2 - Tensile Force (kips): [34.7802 ; 34.719 ; 34.6792 ; 34.6374 ; 34.6058 ; 34.6191 ; 34.6869 ; 34.7441 ; 34.8244 ; 34.9813 ; 35.3022 ; 35.7413 ; 36.4027 ; 37.3947 ; 37.7196 ; 38.1584 ; 38.7329 ; 38.9441 ; 39.0234 ; 39.1395 ; 39.3094 ; 39.5746 ; 39.9567 ; 40.5002 ; 41.1955 ; 41.7773 ; 42.2569 ; 42.702 ; 43.0618 ; 43.1385]

Bolt 2 - Shear Force (kips): [0.048526 ; 0.078995 ; 0.13203 ; 0.21064 ; 0.32289 ; 0.45227 ; 0.54945 ; 0.60008 ; 0.64799 ; 0.73084 ; 0.81586 ; 0.92625 ; 1.0453 ; 1.1413 ; 1.1661 ; 1.1974 ; 1.2531 ; 1.273 ; 1.2797 ; 1.289 ; 1.2986 ; 1.2955 ; 1.2857 ; 1.2739 ; 1.2619 ; 1.2563 ; 1.2551 ; 1.2586 ; 1.2641 ; 1.2654]

Bolt 3 - Tensile Force (kips): [36 ; 35.9237 ; 35.8879 ; 35.9041 ; 36.0368 ; 36.2285 ; 36.4864 ; 36.688 ; 36.9044 ; 37.2285 ; 37.6953 ; 38.5176 ; 40.3301 ; 43.0306 ; 43.952 ; 45.2357 ; 46.9405 ; 47.5889 ; 47.7904 ; 48.0453 ; 48.3861 ; 48.7926 ; 49.4087 ; 50.2305 ; 51.2012 ; 51.9682 ; 52.5873 ; 53.0844 ; 53.5204 ; 53.6101]

Bolt 3 - Shear Force (kips): [0.027335 ; 0.020634 ; 0.049598 ; 0.1008 ; 0.18131 ; 0.25832 ; 0.30031 ; 0.30818 ; 0.31423 ; 0.37625 ; 0.50657 ; 0.62246 ; 0.51645 ; 0.52531 ; 0.54875 ; 0.59135 ; 0.63732 ; 1.1245 ; 1.0492 ; 0.94256 ; 0.7546 ; 0.71969 ; 0.86506 ; 1.3351 ; 2.0282 ; 2.7866 ; 3.3235 ; 3.6403 ; 3.9521 ; 4.0266]

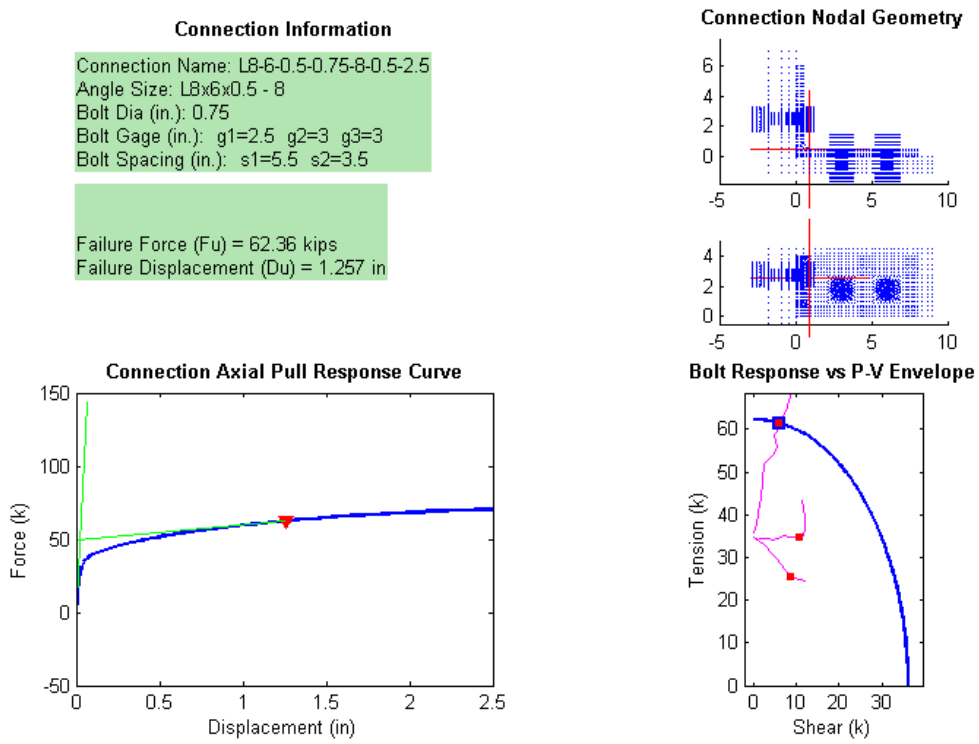


Figure B.220 Connection L8_6_0.5_0.75_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.75_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.0536e+003

Plastic Stiffness (k/in): 10.5217

Displacement (in): [2.1131e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.033569 ; 0.048401 ; 0.070648 ; 0.10402 ; 0.15408 ; 0.22916 ; 0.34179 ; 0.38402 ; 0.39986 ; 0.42362 ; 0.45925 ; 0.47262 ; 0.49266 ; 0.52273 ; 0.56783 ; 0.63548 ; 0.73696 ; 0.88918 ; 0.94626 ; 1.0319 ; 1.064 ; 1.1122 ; 1.1844 ; 1.2115 ; 1.2521 ; 1.2674 ; 1.2902 ; 1.3245 ; 1.376 ; 1.3952 ; 1.4242 ; 1.4676 ; 1.4838 ; 1.5082 ; 1.5449 ; 1.5998 ; 1.6822 ; 1.8057 ; 1.8521 ; 1.9216 ; 2.0259 ; 2.1823 ; 2.2996 ; 2.4755 ; 2.5]

Force (kips): [-0.668216 ; 1.6199 ; 3.3428 ; 5.52407 ; 7.42544 ; 9.12314 ; 11.2687 ; 13.6035 ; 15.733 ; 17.3666 ; 18.6489 ; 19.7895 ; 20.9782 ; 22.3634 ; 23.9423 ; 24.4531 ; 24.6358 ; 24.9173 ; 25.3295 ; 25.4861 ; 25.699 ; 26.0168 ; 26.4711 ; 27.0586 ; 27.8502 ; 28.8877 ; 29.31 ; 29.8807 ; 30.0823 ; 30.3782 ; 30.7899 ; 30.9377 ; 31.1515 ; 31.2301 ; 31.3504 ; 31.5214 ; 31.7579 ; 31.8456 ; 31.9905 ; 32.1953 ; 32.2751 ; 32.3849 ; 32.5427 ; 32.7684 ; 33.0785 ; 33.4899 ; 33.6339 ; 33.8409 ; 34.132 ; 34.5184 ; 34.7774 ; 35.1242 ; 35.1686]

Bolt 1 - Tensile Force (kips): [34.7724 ; 34.7112 ; 34.6601 ; 34.588 ; 34.5208 ; 34.4575 ; 34.372 ; 34.2706 ; 34.1676 ; 34.0685 ; 33.9591 ; 33.7756 ; 32.773 ; 31.1366 ; 29.1988 ; 28.5504 ; 28.3149 ; 27.9519 ; 27.4146 ; 27.2086 ; 26.9179 ; 26.4762 ; 25.8489 ; 25.5188 ; 25.5161 ; 25.5238 ; 25.5273 ; 25.5348 ; 25.4062 ; 25.4111 ; 25.4235 ; 25.4286 ; 25.4358 ; 25.4384 ; 25.4428 ; 25.4491 ; 25.4585 ; 25.4631 ; 25.4074 ; 25.3303 ; 25.275 ; 25.2328 ; 25.1976 ; 25.1667 ; 25.0936 ; 24.9966 ; 24.9739 ; 24.9541 ; 24.8785 ; 24.7512 ; 24.6622 ; 24.5423 ; 24.5262]

Bolt 1 - Shear Force (kips): [0.052494 ; 0.093378 ; 0.189915 ; 0.315862 ; 0.428836 ; 0.531929 ; 0.665601 ; 0.816929 ; 0.966415 ; 1.10658 ; 1.25726 ; 1.49261 ; 2.57418 ; 4.09193 ; 5.70713 ; 6.21527 ; 6.39673 ; 6.67366 ; 7.07722 ; 7.22961 ; 7.44121 ; 7.75571 ; 8.1897 ; 8.41779 ; 8.41965 ; 8.42273 ; 8.42393 ; 8.42643 ; 8.59711 ; 8.59642 ; 8.59115 ; 8.58885 ; 8.58508 ; 8.58363 ; 8.58155 ; 8.57833 ; 8.5735 ; 8.57203 ; 8.83192 ; 9.15145 ; 9.331 ; 9.47171 ; 9.59374 ; 9.70507 ; 9.95489 ; 10.2847 ; 10.3648 ; 10.4872 ; 10.8059 ; 11.2656 ; 11.5675 ; 11.9537 ; 12.004]

Bolt 2 - Tensile Force (kips): [34.7749 ; 34.6814 ; 34.6012 ; 34.5013 ; 34.4203 ; 34.359 ; 34.2918 ; 34.2495 ; 34.2406 ; 34.2865 ; 34.3837 ; 34.6205 ; 34.4503 ; 34.1337 ; 34.3652 ; 34.5219 ; 34.581 ; 34.6585 ; 34.7648 ; 34.7993 ; 34.8628 ; 34.9414 ; 35.037 ; 34.9935 ; 34.8506 ; 34.7522 ; 34.7034 ; 34.6707 ; 34.7372 ; 34.7928 ; 34.8923 ; 34.8973 ; 34.9147 ; 34.931 ; 34.9094 ; 34.9211 ; 35.0404 ; 35.198 ; 35.4177 ; 35.7287 ; 35.84 ; 36.0145 ; 36.3048 ; 36.7048 ; 37.4597 ; 38.4577 ; 38.7479 ; 39.1752 ; 39.9992 ; 41.1695 ; 41.9846 ; 43.1129 ; 43.2633]

Bolt 2 - Shear Force (kips): [0.0453626 ; 0.127952 ; 0.248175 ; 0.405148 ; 0.546478 ; 0.675825 ; 0.84428 ; 1.03741 ; 1.2347 ; 1.43293 ; 1.65498 ; 1.9585 ; 2.99528 ; 4.35871 ; 5.43748 ; 5.72623 ; 5.82631 ; 5.97768 ; 6.19546 ; 6.27884 ; 6.39033 ; 6.56182 ; 6.81903 ; 7.31554 ; 8.05317 ; 8.95987 ; 9.28335 ; 9.72331 ; 9.83342 ; 10.0201 ; 10.2773 ; 10.4414 ; 10.6941 ; 10.7781 ; 10.9792 ; 11.2639 ; 11.5932 ; 11.6295 ; 11.682 ; 11.7556 ; 11.7827 ; 11.8176 ; 11.8591 ; 11.9392 ; 11.8934 ; 11.8636 ; 11.9101 ; 11.9679 ; 11.8663 ; 11.6993 ; 11.5909 ; 11.4336 ; 11.4113]

Bolt 3 - Tensile Force (kips): [36 ; 35.938 ; 35.9398 ; 36.0393 ; 36.2052 ; 36.3749 ; 36.6588 ; 37.1601 ; 37.9925 ; 38.8435 ; 39.7493 ; 40.8983 ; 42.3922 ; 44.5652 ; 47.4902 ; 48.4846 ; 48.8433 ; 49.3562 ; 50.0526 ; 50.2862 ; 50.6011 ; 51.0844 ; 51.8213 ; 52.7871 ; 54.2293 ; 56.1028 ; 57.2088 ; 58.7734 ; 59.2713 ; 59.8905 ; 60.7276 ; 60.9995 ; 61.3974 ; 61.5609 ; 61.8092 ; 62.1727 ; 62.6877 ; 62.8471 ; 63.1012 ; 63.4997 ; 63.6616 ; 63.8621 ; 64.1505 ; 64.6344 ; 65.2398 ; 65.9633 ; 66.2073 ; 66.5682 ; 67.0613 ; 67.6345 ; 68.014 ; 68.5291 ; 68.5933]

Bolt 3 - Shear Force (kips): [0.028817 ; 0.02503 ; 0.061579 ; 0.12489 ; 0.18854 ; 0.24544 ; 0.32614 ; 0.43328 ; 0.57236 ; 0.74644 ; 0.93099 ; 1.1433 ; 1.3962 ; 1.6575 ; 1.9133 ; 1.9908 ; 2.0188 ; 2.0754 ; 2.1641 ; 2.2031 ; 2.2422 ; 2.304 ; 2.4339 ; 3.0464 ; 4.6947 ; 5.4797 ; 5.1224 ; 4.8648 ; 5.0989 ; 5.5149 ; 5.765 ; 5.7929 ; 5.8378 ; 5.9108 ; 6.0584 ; 6.245 ; 6.4853 ; 6.6096 ; 6.8203 ; 7.0392 ; 7.097 ; 7.1889 ; 7.3487 ; 7.5795 ; 7.7961 ; 7.983 ; 8.045 ; 8.143 ; 8.2878 ; 8.5029 ; 8.6568 ; 8.9118 ; 8.942]

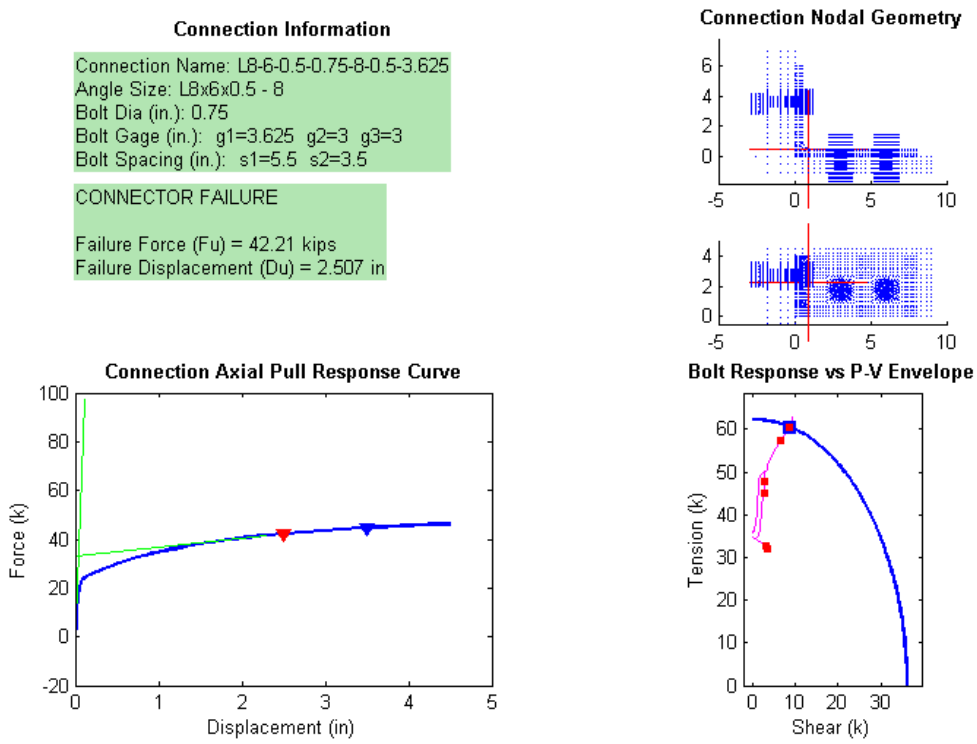


Figure B.221 Connection L8_6_0.5_0.75_8_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.75_8_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 802.0119

Plastic Stiffness (k/in): 3.6933

Displacement (in): [2.3431e-036 ; 0.0035156 ; 0.0070313 ; 0.012305 ; 0.020215 ; 0.03208 ; 0.049878 ; 0.076575 ; 0.11662 ; 0.17669 ; 0.26679 ; 0.40194 ; 0.45262 ; 0.52865 ; 0.64268 ; 0.81373 ; 0.81725 ; 0.82252 ; 0.83043 ; 0.8423 ; 0.8601 ; 0.88679 ; 0.92684 ; 0.98691 ; 1.0094 ; 1.0432 ; 1.0939 ; 1.1699 ; 1.284 ; 1.3267 ; 1.3909 ; 1.4871 ; 1.6314 ; 1.8479 ; 2.0729 ; 2.2979 ; 2.5229 ; 2.7479 ; 2.9729 ; 3.1979 ; 3.4229 ; 3.6479 ; 3.8729 ; 3.9291 ; 4.0135 ; 4.1401 ; 4.3299 ; 4.5]

Force (kips): [-0.574103 ; 1.06987 ; 2.24547 ; 3.79214 ; 5.82627 ; 8.18296 ; 10.1358 ; 11.3057 ; 12.0985 ; 12.7255 ; 13.428 ; 14.3855 ; 14.7148 ; 15.1666 ; 15.7724 ; 16.556 ; 16.5709 ; 16.5931 ; 16.6284 ; 16.683 ; 16.7589 ; 16.8721 ; 17.0397 ; 17.2742 ; 17.361 ; 17.4864 ; 17.6687 ; 17.9278 ; 18.3075 ; 18.4605 ; 18.6663 ; 18.9521 ; 19.3373 ; 19.8635 ; 20.3393 ; 20.7548 ; 21.1294 ; 21.4534 ; 21.7526 ; 22.0278 ; 22.2716 ; 22.4856 ; 22.6756 ; 22.7212 ; 22.7868 ; 22.8802 ; 23.0102 ; 23.1159]

Bolt 1 - Tensile Force (kips): [34.7721 ; 34.7295 ; 34.6958 ; 34.648 ; 34.5771 ; 34.4863 ; 34.3996 ; 34.3346 ; 34.2812 ; 34.2487 ; 34.2048 ; 34.1439 ; 34.1249 ; 34.1021 ; 34.075 ; 34.0422 ; 34.0417 ; 34.0407 ; 34.0391 ; 34.0367 ; 34.0334 ; 34.0284 ; 34.0206 ; 34.0092 ; 34.0048 ; 33.9983 ; 33.9881 ; 33.9717 ; 33.9406 ; 33.923 ; 33.8965 ; 33.8487 ; 33.7275 ; 33.4888 ; 33.2131 ; 32.9274 ; 32.6528 ; 32.4124 ; 32.2518 ; 32.2116 ; 32.1923 ; 32.158 ; 32.1273 ; 32.1304 ; 32.1321 ; 32.1302 ; 32.1237 ; 32.1156]

Bolt 1 - Shear Force (kips): [0.047086 ; 0.066194 ; 0.13006 ; 0.22001 ; 0.34365 ; 0.49667 ; 0.63799 ; 0.74622 ; 0.83987 ; 0.90361 ; 0.98702 ; 1.0979 ; 1.1325 ; 1.1755 ; 1.2298 ; 1.2989 ; 1.3003 ; 1.3023 ; 1.3055 ; 1.3103 ; 1.3171 ; 1.3275 ; 1.3431 ; 1.366 ; 1.3746 ; 1.3874 ; 1.407 ; 1.4378 ; 1.4908 ; 1.5176 ; 1.558 ; 1.6272 ; 1.7869 ; 2.0766 ; 2.3873 ; 2.6951 ; 2.9842 ; 3.2364 ; 3.4127 ; 3.4782 ; 3.5244 ; 3.5841 ; 3.6402 ; 3.6444 ; 3.6535 ; 3.6711 ; 3.7009 ; 3.7294]

Bolt 2 - Tensile Force (kips): [34.7728 ; 34.699 ; 34.6387 ; 34.5687 ; 34.5009 ; 34.475 ; 34.5428 ; 34.7101 ; 34.9325 ; 35.1992 ; 35.6325 ; 36.3799 ; 36.6807 ; 37.1512 ; 37.8287 ; 38.7201 ; 38.7375 ; 38.7634 ; 38.8022 ; 38.8602 ; 38.9463 ; 39.0731 ; 39.2568 ; 39.5283 ; 39.6302 ; 39.7798 ; 40.0054 ; 40.3396 ; 40.8146 ; 40.9951 ; 41.2578 ; 41.6426 ; 42.1885 ; 42.9647 ; 43.7347 ; 44.4726 ; 45.1745 ; 45.8484 ; 46.5047 ; 47.1457 ; 47.7578 ; 48.3354 ; 48.8874 ; 49.0229 ; 49.2212 ; 49.5099 ; 49.926 ; 50.2802]

Bolt 2 - Shear Force (kips): [0.039036 ; 0.096387 ; 0.18203 ; 0.30013 ; 0.46381 ; 0.66724 ; 0.86466 ; 1.0365 ; 1.1949 ; 1.3073 ; 1.4365 ; 1.5927 ; 1.6381 ; 1.6939 ; 1.7634 ; 1.8507 ; 1.8523 ; 1.8548 ; 1.8586 ; 1.8644 ; 1.8723 ; 1.8824 ; 1.8949 ; 1.8999 ; 1.8986 ; 1.8968 ; 1.8968 ; 1.9 ; 1.9143 ; 1.926 ; 1.9442 ; 1.977 ; 2.0541 ; 2.1915 ; 2.3286 ; 2.451 ; 2.5563 ; 2.6363 ; 2.6739 ; 2.6562 ; 2.6326 ; 2.6204 ; 2.6098 ; 2.6024 ; 2.5933 ; 2.5827 ; 2.5708 ; 2.5644]

Bolt 3 - Tensile Force (kips): [36 ; 35.9221 ; 35.9017 ; 35.9612 ; 36.1696 ; 36.5095 ; 37.1072 ; 37.6475 ; 38.1071 ; 38.8268 ; 40.0948 ; 42.0597 ; 42.7761 ; 43.8535 ; 45.3908 ; 47.4338 ; 47.4728 ; 47.5311 ; 47.6128 ; 47.7256 ; 47.8965 ; 48.1399 ; 48.4717 ; 48.9051 ; 49.0601 ; 49.299 ; 49.6588 ; 50.1858 ; 51.0173 ; 51.3826 ; 51.8779 ; 52.4839 ; 53.3323 ; 54.6101 ; 55.7447 ; 56.6767 ; 57.5864 ; 58.2809 ; 59.0165 ; 59.7418 ; 60.3951 ; 60.954 ; 61.4627 ; 61.6175 ; 61.8377 ; 62.148 ; 62.5555 ; 62.8827]

Bolt 3 - Shear Force (kips): [0.030272 ; 0.023255 ; 0.057603 ; 0.11796 ; 0.20926 ; 0.315 ; 0.42294 ; 0.55684 ; 0.7204 ; 0.81692 ; 0.83945 ; 0.95388 ; 1.0097 ; 1.0936 ; 1.1934 ; 1.3182 ; 1.3205 ; 1.3241 ; 1.3344 ; 1.3562 ; 1.3782 ; 1.4139 ; 1.482 ; 1.5718 ; 1.6266 ; 1.7208 ; 2.1381 ; 2.9327 ; 3.3989 ; 3.3546 ; 3.3899 ; 3.5953 ; 4.1859 ; 4.7451 ; 5.3758 ; 6.0351 ; 6.6653 ; 7.088 ; 7.4324 ; 7.9582 ; 8.4056 ; 8.6645 ; 8.8583 ; 8.9071 ; 8.9743 ; 9.0687 ; 9.2015 ; 9.3057]

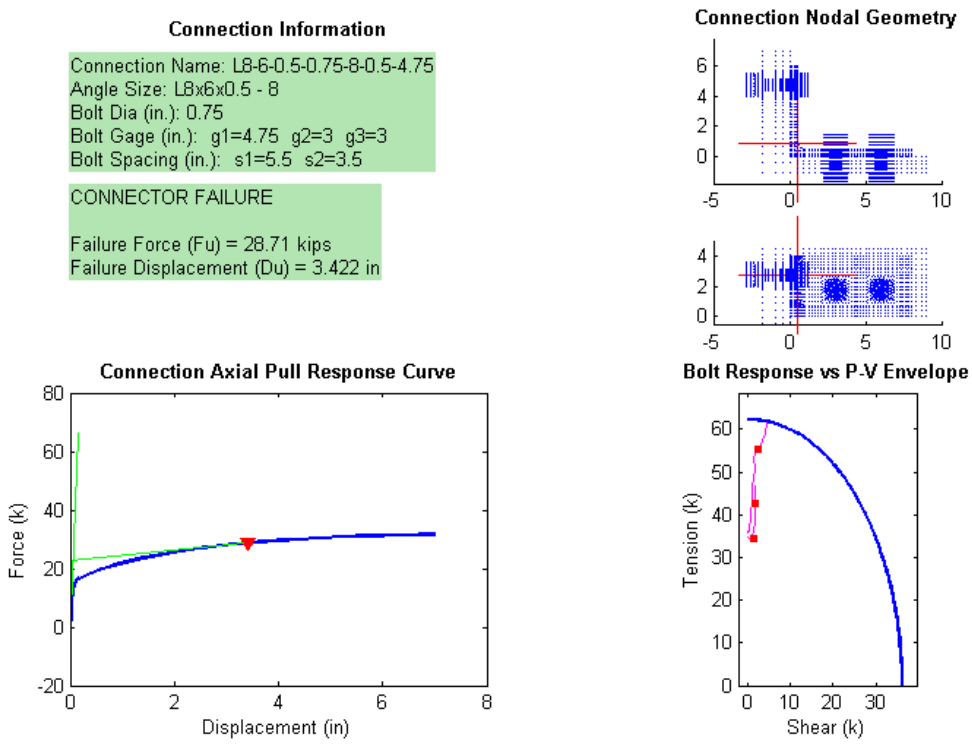


Figure B.222 Connection L8_6_0.5_0.75_8_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.75_8_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 401.3381

Plastic Stiffness (k/in): 1.7295

Displacement (in): [1.7511e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.9406 ; 1.4136 ; 2.1136 ; 2.1246 ; 2.141 ; 2.1656 ; 2.2025 ; 2.2579 ; 2.3409 ; 2.4655 ; 2.5901 ; 2.7147 ; 2.9016 ; 3.1819 ; 3.2519 ; 3.322 ; 3.4272 ; 3.5848 ; 3.644 ; 3.7327 ; 3.8657 ; 4.0652 ; 4.3646 ; 4.8136 ; 5.2626 ; 5.7116 ; 6.3852 ; 7]

Force (kips): [-0.571628 ; 0.775047 ; 1.62319 ; 2.77263 ; 4.30822 ; 6.0497 ; 7.3487 ; 7.99131 ; 8.35379 ; 8.76907 ; 9.30663 ; 10.0027 ; 10.8637 ; 11.8593 ; 12.9256 ; 12.9435 ; 12.9694 ; 13.0067 ; 13.0593 ; 13.1342 ; 13.2406 ; 13.3968 ; 13.54 ; 13.6768 ; 13.8749 ; 14.1454 ; 14.2094 ; 14.27 ; 14.3571 ; 14.4816 ; 14.5266 ; 14.5914 ; 14.6835 ; 14.8139 ; 14.9902 ; 15.2128 ; 15.394 ; 15.5455 ; 15.734 ; 15.8696]

Bolt 1 - Tensile Force (kips): [34.7722 ; 34.7379 ; 34.7145 ; 34.6805 ; 34.6292 ; 34.5627 ; 34.5058 ; 34.4728 ; 34.4518 ; 34.4203 ; 34.4001 ; 34.3729 ; 34.3399 ; 34.3213 ; 34.317 ; 34.3166 ; 34.3159 ; 34.315 ; 34.314 ; 34.3129 ; 34.3118 ; 34.3109 ; 34.3109 ; 34.3112 ; 34.312 ; 34.3157 ; 34.3172 ; 34.3189 ; 34.3216 ; 34.3264 ; 34.3284 ; 34.3315 ; 34.3362 ; 34.3436 ; 34.3557 ; 34.3756 ; 34.396 ; 34.4173 ; 34.4519 ; 34.4829]

Bolt 1 - Shear Force (kips): [0.047096 ; 0.052607 ; 0.096574 ; 0.16295 ; 0.25755 ; 0.3742 ; 0.47385 ; 0.53545 ; 0.58057 ; 0.64798 ; 0.7053 ; 0.781 ; 0.87523 ; 0.96203 ; 1.0494 ; 1.0513 ; 1.054 ; 1.058 ; 1.0633 ; 1.071 ; 1.0817 ; 1.0969 ; 1.1106 ; 1.1237 ; 1.1428 ; 1.1683 ; 1.1739 ; 1.1794 ; 1.1874 ; 1.1983 ; 1.2022 ; 1.2079 ; 1.2162 ; 1.2284 ; 1.2453 ; 1.2685 ; 1.2908 ; 1.3119 ; 1.3399 ; 1.3659]

Bolt 2 - Tensile Force (kips): [34.7735 ; 34.7102 ; 34.6618 ; 34.6091 ; 34.5662 ; 34.5756 ; 34.666 ; 34.7847 ; 34.8837 ; 35.0396 ; 35.3906 ; 35.9583 ; 36.8882 ; 38.3588 ; 40.0345 ; 40.0607 ; 40.0999 ; 40.1585 ; 40.2441 ; 40.3698 ; 40.5533 ; 40.8199 ; 41.0731 ; 41.3287 ; 41.6895 ; 42.2098 ; 42.3399 ; 42.4668 ; 42.6534 ; 42.9358 ; 43.0405 ; 43.1944 ; 43.4184 ; 43.7415 ; 44.1968 ; 44.8088 ; 45.3413 ; 45.8051 ; 46.4035 ; 46.8534]

Bolt 2 - Shear Force (kips): [0.039196 ; 0.079419 ; 0.14333 ; 0.23592 ; 0.36707 ; 0.52959 ; 0.67431 ; 0.77186 ; 0.84472 ; 0.95535 ; 1.0745 ; 1.2189 ; 1.3766 ; 1.5245 ; 1.6431 ; 1.6437 ; 1.6443 ; 1.6452 ; 1.6459 ; 1.6459 ; 1.6455 ; 1.6438 ; 1.6434 ; 1.6455 ; 1.6487 ; 1.6533 ; 1.6544 ; 1.6554 ; 1.6569 ; 1.6599 ; 1.6608 ; 1.6621 ; 1.6644 ; 1.6698 ; 1.6808 ; 1.696 ; 1.7084 ; 1.7188 ; 1.7307 ; 1.7419]

Bolt 3 - Tensile Force (kips): [36 ; 35.9229 ; 35.8912 ; 35.9232 ; 36.0969 ; 36.3948 ; 36.9018 ; 37.3835 ; 37.8558 ; 38.3996 ; 39.1453 ; 40.7518 ; 43.3251 ; 46.7487 ; 50.7024 ; 50.7857 ; 50.8946 ; 51.0301 ; 51.2294 ; 51.4774 ; 51.7938 ; 52.2356 ; 52.6255 ; 52.9838 ; 53.5772 ; 54.4973 ; 54.7365 ; 54.9475 ; 55.2405 ; 55.6605 ; 55.8155 ; 56.0258 ; 56.318 ; 56.7696 ; 57.4385 ; 58.3492 ; 59.1145 ; 59.834 ; 60.7088 ; 61.4245]

Bolt 3 - Shear Force (kips): [0.029684 ; 0.020877 ; 0.051465 ; 0.10663 ; 0.19224 ; 0.28107 ; 0.34534 ; 0.3921 ; 0.44488 ; 0.54483 ; 0.71051 ; 0.74546 ; 0.87391 ; 1.056 ; 1.4533 ; 1.5035 ; 1.5463 ; 1.5815 ; 1.5814 ; 1.5458 ; 1.5177 ; 1.2144 ; 1.2752 ; 1.2899 ; 1.2429 ; 1.6156 ; 1.9854 ; 2.2446 ; 2.5092 ; 2.8016 ; 2.8513 ; 2.9412 ; 3.0728 ; 3.1258 ; 3.4934 ; 3.7365 ; 3.9416 ; 4.0929 ; 4.2739 ; 4.4119]

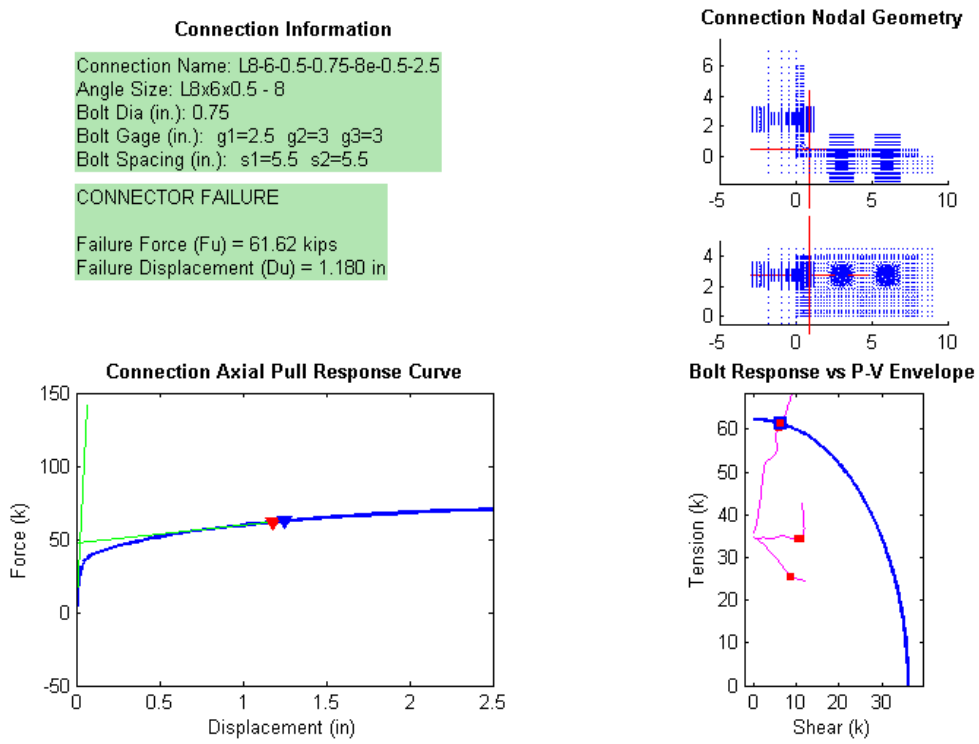


Figure B.223 Connection L8_6_0.5_0.75_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.75_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.0972e+003

Plastic Stiffness (k/in): 11.7977

Displacement (in): [2.433e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.033569 ; 0.048401 ; 0.070648 ; 0.10402 ; 0.15408 ; 0.22916 ; 0.25732 ; 0.29955 ; 0.3629 ; 0.38666 ; 0.4223 ; 0.43566 ; 0.45571 ; 0.48578 ; 0.53088 ; 0.59853 ; 0.6239 ; 0.66195 ; 0.71903 ; 0.80466 ; 0.93309 ; 0.9652 ; 0.99731 ; 1.0455 ; 1.1177 ; 1.1448 ; 1.1854 ; 1.2464 ; 1.2693 ; 1.3036 ; 1.355 ; 1.3743 ; 1.4032 ; 1.4466 ; 1.5117 ; 1.5361 ; 1.5727 ; 1.6276 ; 1.71 ; 1.8336 ; 2.0189 ; 2.0814 ; 2.1752 ; 2.3158 ; 2.5]

Force (kips): [-0.810664 ; 1.55321 ; 3.28544 ; 5.47557 ; 7.38017 ; 9.0706 ; 11.2054 ; 13.5226 ; 15.6838 ; 17.3597 ; 18.6427 ; 19.7683 ; 20.9356 ; 22.3037 ; 22.7569 ; 23.3753 ; 24.1998 ; 24.4888 ; 24.9212 ; 25.0784 ; 25.3243 ; 25.6595 ; 26.1486 ; 26.7955 ; 27.0142 ; 27.3298 ; 27.7708 ; 28.3677 ; 29.258 ; 29.4933 ; 29.7163 ; 30.0227 ; 30.4577 ; 30.6175 ; 30.8416 ; 31.1681 ; 31.2927 ; 31.47 ; 31.7074 ; 31.8035 ; 31.9466 ; 32.149 ; 32.4434 ; 32.5503 ; 32.7024 ; 32.9146 ; 33.2107 ; 33.6088 ; 34.1238 ; 34.2852 ; 34.5097 ; 34.8121 ; 35.153]

Bolt 1 - Tensile Force (kips): [34.833 ; 34.7638 ; 34.7074 ; 34.6287 ; 34.5561 ; 34.4883 ; 34.3966 ; 34.2889 ; 34.1784 ; 34.0778 ; 33.9757 ; 33.8212 ; 32.9852 ; 31.5038 ; 30.9854 ; 30.2367 ; 29.16 ; 28.7693 ; 28.1852 ; 27.972 ; 27.6397 ; 27.1702 ; 26.4701 ; 25.5702 ; 25.5302 ; 25.5265 ; 25.524 ; 25.5247 ; 25.5306 ; 25.5323 ; 25.5343 ; 25.4181 ; 25.4216 ; 25.4244 ; 25.4301 ; 25.439 ; 25.4426 ; 25.4485 ; 25.4573 ; 25.4315 ; 25.3883 ; 25.3351 ; 25.2501 ; 25.2257 ; 25.1931 ; 25.1578 ; 25.0753 ; 24.9855 ; 24.8786 ; 24.8264 ; 24.7535 ; 24.6485 ; 24.5235]

Bolt 1 - Shear Force (kips): [0.051048 ; 0.107723 ; 0.20708 ; 0.336957 ; 0.453608 ; 0.559452 ; 0.696658 ; 0.851564 ; 1.00546 ; 1.14225 ; 1.28027 ; 1.47893 ; 2.39889 ; 3.79947 ; 4.25616 ; 4.89128 ; 5.76182 ; 6.06774 ; 6.51649 ; 6.67842 ; 6.92806 ; 7.27574 ; 7.77466 ; 8.39223 ; 8.42088 ; 8.42213 ; 8.4224 ; 8.423 ; 8.42507 ; 8.42564 ; 8.42628 ; 8.58782 ; 8.58837 ; 8.58664 ; 8.58325 ; 8.5775 ; 8.57536 ; 8.57226 ; 8.5676 ; 8.6887 ; 8.89106 ; 9.11315 ; 9.41718 ; 9.50167 ; 9.61025 ; 9.72717 ; 10.001 ; 10.2934 ; 10.7349 ; 10.9244 ; 11.184 ; 11.5313 ; 11.9199]

Bolt 2 - Tensile Force (kips): [34.8497 ; 34.751 ; 34.6704 ; 34.5695 ; 34.4886 ; 34.4281 ; 34.3624 ; 34.3274 ; 34.3193 ; 34.3681 ; 34.4673 ; 34.696 ; 34.6205 ; 34.4299 ; 34.4162 ; 34.4874 ; 34.6726 ; 34.7415 ; 34.8412 ; 34.8762 ; 34.9105 ; 34.9728 ; 35.0468 ; 35.1084 ; 35.0333 ; 34.916 ; 34.7668 ; 34.6054 ; 34.5205 ; 34.5039 ; 34.4906 ; 34.53 ; 34.5729 ; 34.582 ; 34.5777 ; 34.5777 ; 34.5711 ; 34.5551 ; 34.7836 ; 34.9152 ; 35.1215 ; 35.4282 ; 35.9829 ; 36.1752 ; 36.4427 ; 36.7842 ; 37.461 ; 38.3732 ; 39.6712 ; 40.1241 ; 40.7848 ; 41.7035 ; 42.7557]

Bolt 2 - Shear Force (kips): [0.0719628 ; 0.116489 ; 0.231195 ; 0.384231 ; 0.522118 ; 0.647616 ; 0.810904 ; 0.996767 ; 1.18978 ; 1.38249 ; 1.5965 ; 1.86889 ; 2.75012 ; 3.99263 ; 4.3789 ; 4.8311 ; 5.34131 ; 5.51352 ; 5.75979 ; 5.84826 ; 5.9885 ; 6.17692 ; 6.45442 ; 6.86242 ; 7.08449 ; 7.40801 ; 7.8573 ; 8.45445 ; 9.18906 ; 9.36041 ; 9.52448 ; 9.7233 ; 10.0128 ; 10.1203 ; 10.3279 ; 10.7453 ; 10.9423 ; 11.2429 ; 11.4609 ; 11.4921 ; 11.5402 ; 11.6148 ; 11.6488 ; 11.6677 ; 11.7057 ; 11.8012 ; 11.7813 ; 11.7974 ; 11.7388 ; 11.6774 ; 11.5736 ; 11.4023 ; 11.1938]

Bolt 3 - Tensile Force (kips): [36 ; 35.9378 ; 35.9367 ; 36.0345 ; 36.2016 ; 36.3701 ; 36.6521 ; 37.1464 ; 37.9831 ; 38.8441 ; 39.7587 ; 40.9077 ; 42.4218 ; 44.6073 ; 45.3764 ; 46.4654 ; 47.9978 ; 48.5419 ; 49.3107 ; 49.5732 ; 49.9408 ; 50.4317 ; 51.2004 ; 52.2797 ; 52.6572 ; 53.2085 ; 54.0008 ; 55.0202 ; 56.9099 ; 57.5734 ; 58.2122 ; 59.053 ; 59.9368 ; 60.2628 ; 60.7098 ; 61.3725 ; 61.65 ; 62.0386 ; 62.5578 ; 62.7253 ; 62.9897 ; 63.3753 ; 63.977 ; 64.214 ; 64.5305 ; 64.9397 ; 65.4726 ; 66.1715 ; 67.0275 ; 67.2814 ; 67.6126 ; 68.0681 ; 68.5786]

Bolt 3 - Shear Force (kips): [0.037077 ; 0.016014 ; 0.055916 ; 0.1199 ; 0.18421 ; 0.24131 ; 0.32243 ; 0.42943 ; 0.56825 ; 0.74235 ; 0.92762 ; 1.1388 ; 1.3882 ; 1.6491 ; 1.7303 ; 1.8389 ; 1.9816 ; 2.0296 ; 2.1173 ; 2.1491 ; 2.2097 ; 2.2759 ; 2.3953 ; 2.6483 ; 3.0934 ; 3.9573 ; 4.8261 ; 5.4813 ; 5.4161 ; 5.1684 ; 4.95 ; 5.1235 ; 5.6967 ; 5.7696 ; 5.9108 ; 6.1107 ; 6.2435 ; 6.4356 ; 6.6149 ; 6.7911 ; 6.9892 ; 7.1802 ; 7.4912 ; 7.6022 ; 7.7337 ; 7.8705 ; 8.0053 ; 8.1666 ; 8.3899 ; 8.4972 ; 8.6743 ; 8.8985 ; 9.1126]

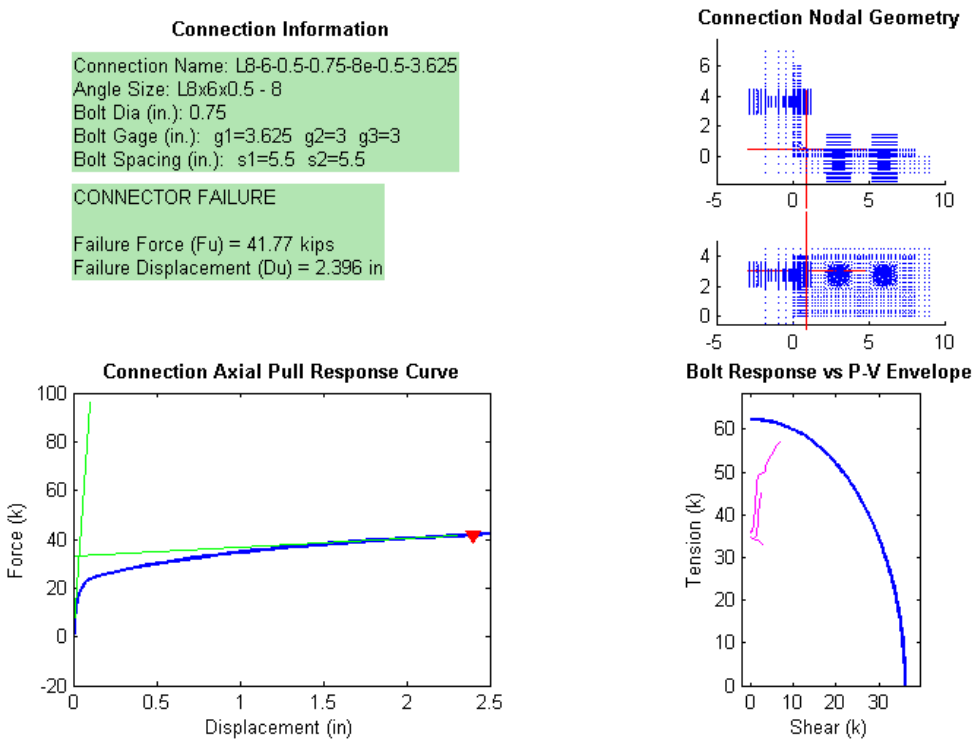


Figure B.224 Connection L8_6_0.5_0.75_8e_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.75_8e_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 953.1904

Plastic Stiffness (k/in): 3.6648

Displacement (in): [2.0685e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.38012 ; 0.44347 ; 0.5385 ; 0.68104 ; 0.7345 ; 0.81468 ; 0.84474 ; 0.88985 ; 0.90676 ; 0.93213 ; 0.97018 ; 0.98445 ; 1.0059 ; 1.038 ; 1.0861 ; 1.1584 ; 1.2667 ; 1.3074 ; 1.3683 ; 1.4598 ; 1.5969 ; 1.8027 ; 2.0526 ; 2.3026 ; 2.5]

Force (kips): [-0.69487 ; 0.443429 ; 1.16683 ; 1.82876 ; 2.73449 ; 3.98039 ; 5.66327 ; 7.70684 ; 9.62339 ; 10.9536 ; 11.7943 ; 12.465 ; 13.0837 ; 13.9103 ; 14.2022 ; 14.6157 ; 15.1796 ; 15.9172 ; 16.1691 ; 16.5233 ; 16.6603 ; 16.8548 ; 16.9284 ; 17.0374 ; 17.1873 ; 17.2437 ; 17.3275 ; 17.448 ; 17.6239 ; 17.8743 ; 18.2361 ; 18.3779 ; 18.58 ; 18.859 ; 19.2321 ; 19.7391 ; 20.2745 ; 20.7326 ; 21.0599]

Bolt 1 - Tensile Force (kips): [34.8328 ; 34.8007 ; 34.7789 ; 34.7581 ; 34.7286 ; 34.6843 ; 34.6202 ; 34.536 ; 34.4481 ; 34.3802 ; 34.3366 ; 34.3115 ; 34.2905 ; 34.2527 ; 34.2397 ; 34.2231 ; 34.2029 ; 34.1811 ; 34.1743 ; 34.1653 ; 34.1617 ; 34.1569 ; 34.1551 ; 34.1525 ; 34.1493 ; 34.1482 ; 34.1465 ; 34.1441 ; 34.1406 ; 34.1347 ; 34.1217 ; 34.1133 ; 34.0982 ; 34.0704 ; 34.018 ; 33.8431 ; 33.6134 ; 33.3698 ; 33.1713]

Bolt 1 - Shear Force (kips): [0.045481 ; 0.053211 ; 0.089822 ; 0.12756 ; 0.18162 ; 0.25804 ; 0.36552 ; 0.5033 ; 0.64286 ; 0.75314 ; 0.83368 ; 0.89127 ; 0.94918 ; 1.0414 ; 1.0725 ; 1.1142 ; 1.1681 ; 1.2348 ; 1.2572 ; 1.2887 ; 1.3006 ; 1.3177 ; 1.3241 ; 1.3335 ; 1.3466 ; 1.3515 ; 1.3588 ; 1.3695 ; 1.3857 ; 1.4106 ; 1.4523 ; 1.4722 ; 1.5048 ; 1.5594 ; 1.6535 ; 1.9009 ; 2.202 ; 2.5012 ; 2.7371]

Bolt 2 - Tensile Force (kips): [34.8485 ; 34.7982 ; 34.7622 ; 34.7289 ; 34.6868 ; 34.6351 ; 34.5842 ; 34.5617 ; 34.6155 ; 34.7537 ; 34.9771 ; 35.2886 ; 35.6273 ; 36.2096 ; 36.4592 ; 36.8534 ; 37.4515 ; 38.2953 ; 38.5885 ; 38.9989 ; 39.1492 ; 39.3672 ; 39.4478 ; 39.5675 ; 39.7411 ; 39.805 ; 39.9007 ; 40.0415 ; 40.2497 ; 40.5601 ; 41.0029 ; 41.1647 ; 41.401 ; 41.7465 ; 42.2396 ; 42.9312 ; 43.7584 ; 44.5385 ; 45.1235]

Bolt 2 - Shear Force (kips): [0.064621 ; 0.059135 ; 0.098017 ; 0.14093 ; 0.20412 ; 0.29468 ; 0.42311 ; 0.58763 ; 0.76018 ; 0.92006 ; 1.0675 ; 1.19 ; 1.289 ; 1.4122 ; 1.451 ; 1.5003 ; 1.5619 ; 1.6362 ; 1.6615 ; 1.6991 ; 1.7137 ; 1.7355 ; 1.744 ; 1.7562 ; 1.7718 ; 1.7777 ; 1.7859 ; 1.7966 ; 1.8072 ; 1.8121 ; 1.8226 ; 1.8297 ; 1.843 ; 1.8681 ; 1.9122 ; 2.0307 ; 2.1692 ; 2.2951 ; 2.3891]

Bolt 3 - Tensile Force (kips): [36 ; 35.951 ; 35.9167 ; 35.8989 ; 35.9072 ; 35.9734 ; 36.1458 ; 36.4124 ; 36.91 ; 37.4769 ; 37.9138 ; 38.4398 ; 39.4588 ; 41.0252 ; 41.6117 ; 42.5011 ; 43.8482 ; 45.722 ; 46.3651 ; 47.2844 ; 47.5765 ; 47.9911 ; 48.132 ; 48.327 ; 48.5984 ; 48.6972 ; 48.8484 ; 49.0781 ; 49.4185 ; 49.9266 ; 50.6949 ; 51.0313 ; 51.5073 ; 52.0995 ; 52.9261 ; 54.1142 ; 55.3641 ; 56.3927 ; 57.1568]

Bolt 3 - Shear Force (kips): [0.038754 ; 0.015723 ; 0.018263 ; 0.038121 ; 0.071236 ; 0.12331 ; 0.20004 ; 0.29202 ; 0.38958 ; 0.50571 ; 0.65376 ; 0.79457 ; 0.82179 ; 0.91719 ; 0.96472 ; 1.0355 ; 1.1358 ; 1.2545 ; 1.2935 ; 1.3482 ; 1.3945 ; 1.4521 ; 1.4807 ; 1.5318 ; 1.5807 ; 1.6098 ; 1.6663 ; 1.7619 ; 2.1771 ; 3.0217 ; 3.5058 ; 3.5378 ; 3.5262 ; 3.6544 ; 4.2391 ; 4.7657 ; 5.5033 ; 6.2372 ; 6.7749]

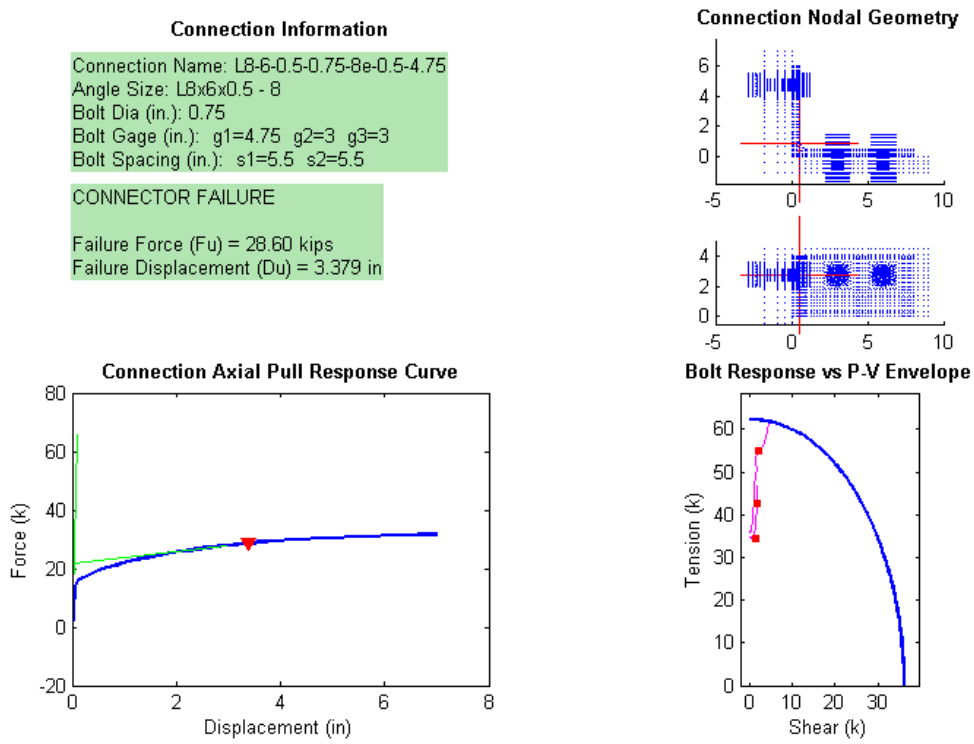


Figure B.225 Connection L8_6_0.5_0.75_8e_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.75_8e_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 702.4949

Plastic Stiffness (k/in): 2.1184

Displacement (in): [2.0062e-036 ; 0.0013672 ; 0.0027344 ; 0.0047852 ; 0.0078613 ; 0.012476 ; 0.019397 ; 0.029779 ; 0.045352 ; 0.068712 ; 0.10375 ; 0.15631 ; 0.23515 ; 0.35341 ; 0.5308 ; 0.59732 ; 0.6971 ; 0.84677 ; 1.0713 ; 1.408 ; 1.9132 ; 2.0882 ; 2.1538 ; 2.2522 ; 2.3999 ; 2.6214 ; 2.9536 ; 3.4519 ; 3.6269 ; 3.8894 ; 4.2832 ; 4.8738 ; 5.5738 ; 6.2738 ; 6.9738 ; 7]

Force (kips): [-0.671709 ; 0.0421248 ; 0.288735 ; 0.638292 ; 1.12827 ; 1.81411 ; 2.76671 ; 4.06474 ; 5.64246 ; 7.00651 ; 7.8317 ; 8.23465 ; 8.5957 ; 9.06456 ; 9.68718 ; 9.90229 ; 10.2021 ; 10.6119 ; 11.1538 ; 11.8341 ; 12.6392 ; 12.8891 ; 12.9853 ; 13.1192 ; 13.3083 ; 13.5658 ; 13.9177 ; 14.368 ; 14.5054 ; 14.6908 ; 14.9355 ; 15.2305 ; 15.4931 ; 15.6987 ; 15.8583 ; 15.8636]

Bolt 1 - Tensile Force (kips): [34.8334 ; 34.8131 ; 34.806 ; 34.7957 ; 34.7804 ; 34.7581 ; 34.7256 ; 34.6763 ; 34.6103 ; 34.5465 ; 34.5038 ; 34.4821 ; 34.4594 ; 34.445 ; 34.4282 ; 34.4197 ; 34.4078 ; 34.3932 ; 34.376 ; 34.3583 ; 34.3426 ; 34.3377 ; 34.3348 ; 34.3315 ; 34.3277 ; 34.3243 ; 34.3211 ; 34.3244 ; 34.3276 ; 34.3335 ; 34.3447 ; 34.3645 ; 34.3924 ; 34.4248 ; 34.4575 ; 34.4587]

Bolt 1 - Shear Force (kips): [0.044699 ; 0.039268 ; 0.04738 ; 0.063399 ; 0.089925 ; 0.1305 ; 0.1899 ; 0.2746 ; 0.38517 ; 0.49066 ; 0.564 ; 0.60734 ; 0.65642 ; 0.69821 ; 0.75078 ; 0.77267 ; 0.80333 ; 0.84324 ; 0.89379 ; 0.95237 ; 1.0207 ; 1.0439 ; 1.0539 ; 1.0675 ; 1.0864 ; 1.1122 ; 1.1483 ; 1.1915 ; 1.2043 ; 1.2225 ; 1.2469 ; 1.2804 ; 1.3156 ; 1.3468 ; 1.3767 ; 1.3779]

Bolt 2 - Tensile Force (kips): [34.8508 ; 34.8203 ; 34.8069 ; 34.7875 ; 34.7601 ; 34.7242 ; 34.6855 ; 34.6517 ; 34.6581 ; 34.7387 ; 34.858 ; 34.9715 ; 35.1043 ; 35.4121 ; 35.8871 ; 36.063 ; 36.3326 ; 36.7897 ; 37.5298 ; 38.5841 ; 39.8085 ; 40.1786 ; 40.3221 ; 40.532 ; 40.8415 ; 41.2906 ; 41.9134 ; 42.7637 ; 43.0509 ; 43.4613 ; 44.04 ; 44.7856 ; 45.5204 ; 46.1343 ; 46.628 ; 46.6453]

Bolt 2 - Shear Force (kips): [0.063718 ; 0.04852 ; 0.054704 ; 0.070364 ; 0.099402 ; 0.14586 ; 0.21605 ; 0.31754 ; 0.44982 ; 0.57974 ; 0.68327 ; 0.75625 ; 0.84199 ; 0.93996 ; 1.054 ; 1.0938 ; 1.1452 ; 1.2098 ; 1.288 ; 1.3794 ; 1.4896 ; 1.5271 ; 1.5396 ; 1.5515 ; 1.5573 ; 1.5612 ; 1.5696 ; 1.5836 ; 1.5897 ; 1.5993 ; 1.6158 ; 1.6369 ; 1.6563 ; 1.6727 ; 1.6913 ; 1.692]

Bolt 3 - Tensile Force (kips): [36 ; 35.9784 ; 35.9575 ; 35.9308 ; 35.9027 ; 35.8889 ; 35.9202 ; 36.0622 ; 36.2964 ; 36.7299 ; 37.213 ; 37.6506 ; 38.1589 ; 38.7506 ; 39.9619 ; 40.4565 ; 41.24 ; 42.4486 ; 44.2321 ; 46.6149 ; 49.5895 ; 50.5832 ; 50.9341 ; 51.3689 ; 51.9333 ; 52.6511 ; 53.6605 ; 55.2268 ; 55.711 ; 56.3116 ; 57.1897 ; 58.3578 ; 59.4819 ; 60.4569 ; 61.3091 ; 61.3398]

Bolt 3 - Shear Force (kips): [0.037873 ; 0.025505 ; 0.017905 ; 0.013313 ; 0.025707 ; 0.055532 ; 0.1034 ; 0.17707 ; 0.26041 ; 0.32781 ; 0.38289 ; 0.43046 ; 0.50318 ; 0.65425 ; 0.73198 ; 0.74987 ; 0.78269 ; 0.85003 ; 0.95717 ; 1.0739 ; 1.3673 ; 1.7771 ; 1.728 ; 1.5492 ; 1.2288 ; 1.2751 ; 1.2586 ; 2.2522 ; 2.6861 ; 2.9697 ; 3.3536 ; 3.6748 ; 3.9576 ; 4.1873 ; 4.3926 ; 4.4051]

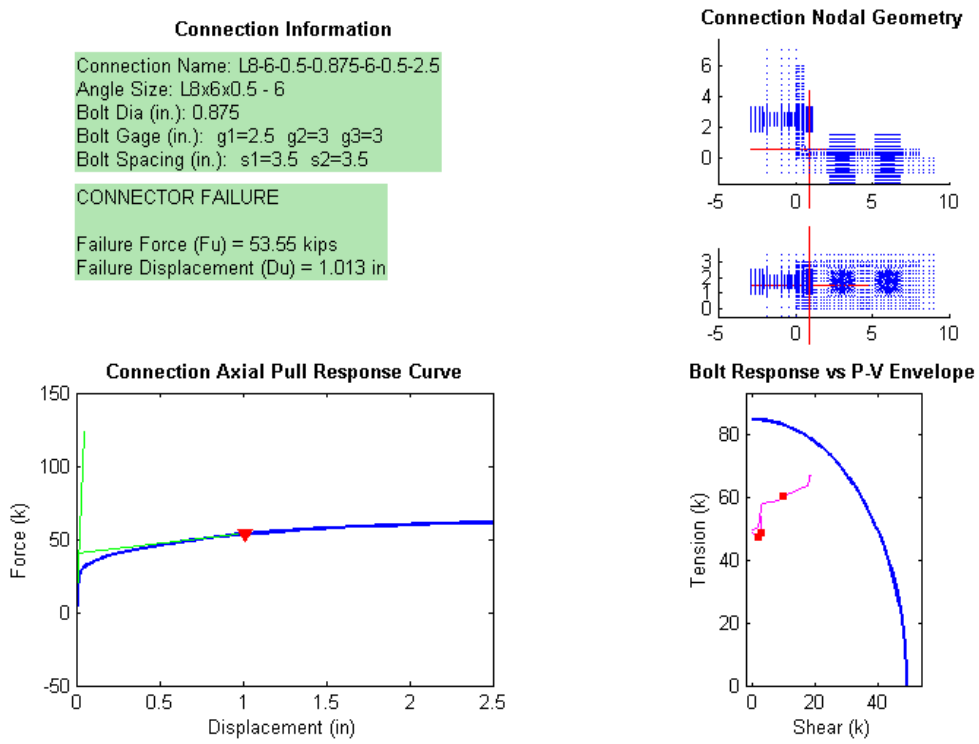


Figure B.226 Connection L8_6_0.5_0.875_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.875_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.3995e+003

Plastic Stiffness (k/in): 12.5525

Displacement (in): [3.779e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.11067 ; 0.12945 ; 0.1576 ; 0.19984 ; 0.26319 ; 0.35822 ; 0.50076 ; 0.55422 ; 0.57426 ; 0.58178 ; 0.59305 ; 0.60997 ; 0.63534 ; 0.67339 ; 0.68766 ; 0.70907 ; 0.74118 ; 0.78934 ; 0.86158 ; 0.88867 ; 0.89883 ; 0.91407 ; 0.93693 ; 0.97122 ; 1.0227 ; 1.0998 ; 1.2155 ; 1.3891 ; 1.4516 ; 1.5454 ; 1.686 ; 1.8969 ; 1.9594 ; 2.0532 ; 2.1938 ; 2.4047 ; 2.5]

Force (kips): [-1.25533 ; 1.52109 ; 3.43128 ; 5.78709 ; 8.71617 ; 11.8119 ; 14.0263 ; 15.2006 ; 16.1333 ; 17.2084 ; 17.5586 ; 18.0221 ; 18.6128 ; 19.3566 ; 20.3018 ; 21.4707 ; 22.9098 ; 23.3783 ; 23.5585 ; 23.632 ; 23.7322 ; 23.89 ; 24.126 ; 24.4479 ; 24.563 ; 24.737 ; 24.9806 ; 25.3197 ; 25.7947 ; 25.9723 ; 26.0487 ; 26.1614 ; 26.323 ; 26.5382 ; 26.8309 ; 27.2198 ; 27.7279 ; 28.3953 ; 28.6024 ; 28.8894 ; 29.2679 ; 29.7202 ; 29.8527 ; 30.0269 ; 30.2579 ; 30.5463 ; 30.6595]

Bolt 1 - Tensile Force (kips): [48.5902 ; 48.5015 ; 48.438 ; 48.3577 ; 48.2537 ; 48.1374 ; 48.0496 ; 48.0056 ; 47.9719 ; 47.9324 ; 47.9183 ; 47.8949 ; 47.8612 ; 47.8204 ; 47.7721 ; 47.7196 ; 47.6636 ; 47.6463 ; 47.6398 ; 47.6372 ; 47.6336 ; 47.6281 ; 47.6203 ; 47.6106 ; 47.6074 ; 47.6031 ; 47.5978 ; 47.5912 ; 47.5832 ; 47.5796 ; 47.5775 ; 47.5745 ; 47.5704 ; 47.5659 ; 47.5613 ; 47.557 ; 47.5525 ; 47.5495 ; 47.5502 ; 47.5521 ; 47.5565 ; 47.5712 ; 47.5771 ; 47.5795 ; 47.5844 ; 47.5924 ; 47.5965]

Bolt 1 - Shear Force (kips): [0.088786 ; 0.090942 ; 0.18219 ; 0.3062 ; 0.46872 ; 0.64752 ; 0.78145 ; 0.85243 ; 0.91179 ; 0.98306 ; 1.0088 ; 1.052 ; 1.1142 ; 1.1911 ; 1.2851 ; 1.3949 ; 1.5229 ; 1.5649 ; 1.5807 ; 1.5868 ; 1.5955 ; 1.6087 ; 1.6279 ; 1.6539 ; 1.663 ; 1.6761 ; 1.6941 ; 1.7193 ; 1.7549 ; 1.7691 ; 1.7754 ; 1.7846 ; 1.798 ; 1.8158 ; 1.8401 ; 1.8729 ; 1.9194 ; 1.9841 ; 2.0051 ; 2.0352 ; 2.078 ; 2.1319 ; 2.1457 ; 2.1756 ; 2.2188 ; 2.2834 ; 2.312]

Bolt 2 - Tensile Force (kips): [48.591 ; 48.44 ; 48.3268 ; 48.1911 ; 48.0192 ; 47.8359 ; 47.6675 ; 47.556 ; 47.4715 ; 47.46 ; 47.4585 ; 47.45 ; 47.443 ; 47.4211 ; 47.376 ; 47.3735 ; 47.5552 ; 47.6381 ; 47.6706 ; 47.6828 ; 47.7029 ; 47.7331 ; 47.7841 ; 47.8727 ; 47.9074 ; 47.9611 ; 48.0464 ; 48.1798 ; 48.379 ; 48.4509 ; 48.4752 ; 48.5118 ; 48.5687 ; 48.6584 ; 48.7942 ; 49.0121 ; 49.3788 ; 49.9489 ; 50.15 ; 50.45 ; 50.9077 ; 51.5885 ; 51.8278 ; 52.1985 ; 52.744 ; 53.5768 ; 53.9503]

Bolt 2 - Shear Force (kips): [0.078075 ; 0.16442 ; 0.30994 ; 0.50052 ; 0.74823 ; 1.024 ; 1.2471 ; 1.4047 ; 1.5723 ; 1.7447 ; 1.7878 ; 1.8337 ; 1.8799 ; 1.931 ; 1.9846 ; 2.0508 ; 2.1742 ; 2.2136 ; 2.228 ; 2.2339 ; 2.2417 ; 2.2538 ; 2.2721 ; 2.2986 ; 2.3085 ; 2.3245 ; 2.3483 ; 2.3818 ; 2.4351 ; 2.456 ; 2.4655 ; 2.48 ; 2.5004 ; 2.527 ; 2.5638 ; 2.5984 ; 2.633 ; 2.6986 ; 2.7212 ; 2.7509 ; 2.7883 ; 2.8216 ; 2.8237 ; 2.8293 ; 2.8291 ; 2.7985 ; 2.7779]

Bolt 3 - Tensile Force (kips): [50 ; 49.8927 ; 49.8329 ; 49.8048 ; 49.8151 ; 49.863 ; 49.9776 ; 49.9907 ; 49.998 ; 50.0458 ; 50.098 ; 50.1552 ; 50.5038 ; 51.2284 ; 52.3223 ; 53.8707 ; 56.1208 ; 56.9327 ; 57.2064 ; 57.2875 ; 57.4066 ; 57.5678 ; 57.7559 ; 58.0019 ; 58.0832 ; 58.1837 ; 58.346 ; 58.5877 ; 58.9349 ; 59.1144 ; 59.2162 ; 59.3572 ; 59.5862 ; 59.9282 ; 60.3294 ; 60.7461 ; 61.2556 ; 62.0446 ; 62.3117 ; 62.7131 ; 63.1841 ; 63.6036 ; 64.11 ; 64.8487 ; 65.7621 ; 66.7821 ; 67.1726]

Bolt 3 - Shear Force (kips): [0.0419357 ; 0.0364074 ; 0.0885295 ; 0.166749 ; 0.280617 ; 0.43011 ; 0.598098 ; 0.769862 ; 0.931535 ; 1.17548 ; 1.28298 ; 1.50035 ; 1.68991 ; 1.82772 ; 1.96492 ; 2.18815 ; 2.51011 ; 2.61349 ; 2.67402 ; 2.70719 ; 2.74553 ; 2.83415 ; 3.00466 ; 3.24035 ; 3.32815 ; 3.59656 ; 4.83407 ; 6.17217 ; 7.90372 ; 8.34683 ; 8.46526 ; 8.60476 ; 8.85614 ; 9.16905 ; 9.54037 ; 10.6816 ; 12.0029 ; 13.6138 ; 14.1527 ; 14.8621 ; 15.9916 ; 17.438 ; 17.6163 ; 17.6814 ; 17.8695 ; 18.2394 ; 18.3723]

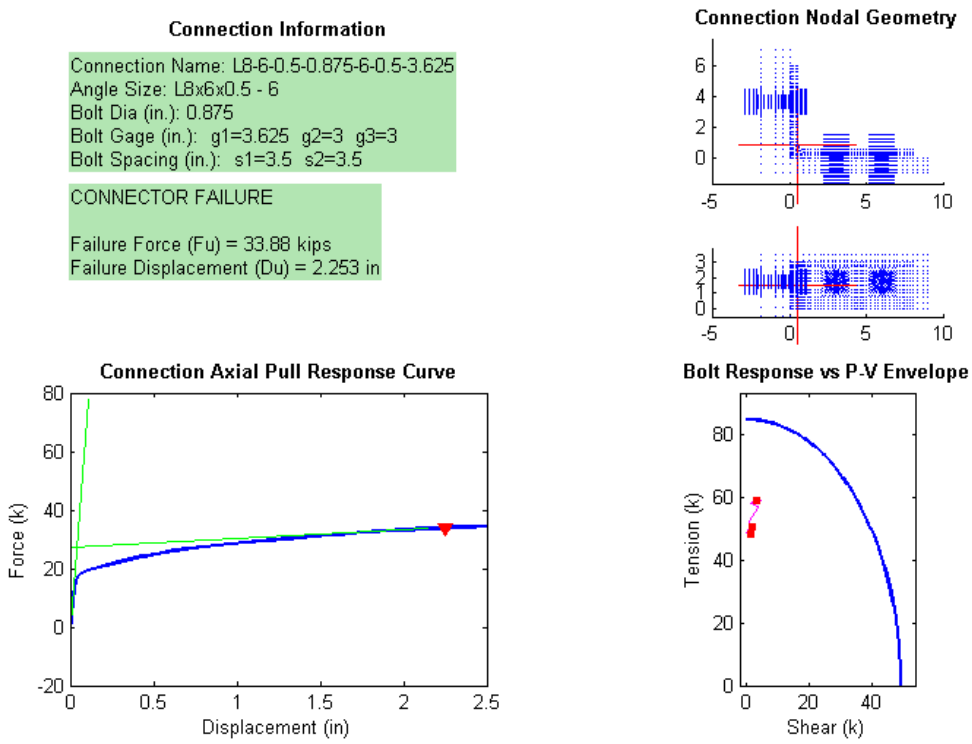


Figure B.227 Connection L8_6_0.5_0.875_6_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.875_6_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 719.6403

Plastic Stiffness (k/in): 2.9635

Displacement (in): [4.8293e-036 ; 0.0078125 ; 0.015625 ; 0.027344 ; 0.044922 ; 0.071289 ; 0.11084 ; 0.17017 ; 0.25916 ; 0.39264 ; 0.4427 ; 0.51778 ; 0.63041 ; 0.79935 ; 1.0494 ; 1.2994 ; 1.5494 ; 1.565 ; 1.5884 ; 1.6236 ; 1.6763 ; 1.7554 ; 1.7851 ; 1.8296 ; 1.8963 ; 1.9964 ; 2.1466 ; 2.3718 ; 2.5]

Force (kips): [-1.18244 ; 2.31133 ; 4.43975 ; 6.83711 ; 8.50175 ; 9.2669 ; 9.70964 ; 10.149 ; 10.8355 ; 11.7598 ; 12.0648 ; 12.4786 ; 13.0147 ; 13.6759 ; 14.465 ; 15.1228 ; 15.6747 ; 15.7111 ; 15.7708 ; 15.8514 ; 15.9743 ; 16.1433 ; 16.2026 ; 16.2878 ; 16.4109 ; 16.5782 ; 16.8007 ; 17.0969 ; 17.2486]

Bolt 1 - Tensile Force (kips): [48.5902 ; 48.4803 ; 48.4102 ; 48.3273 ; 48.2688 ; 48.2482 ; 48.2421 ; 48.2423 ; 48.2383 ; 48.2306 ; 48.2295 ; 48.2309 ; 48.2378 ; 48.2572 ; 48.29 ; 48.3206 ; 48.3569 ; 48.3592 ; 48.3624 ; 48.3676 ; 48.3762 ; 48.3902 ; 48.3956 ; 48.404 ; 48.4171 ; 48.4375 ; 48.4691 ; 48.5173 ; 48.545]

Bolt 1 - Shear Force (kips): [0.085314 ; 0.12741 ; 0.23582 ; 0.37005 ; 0.46987 ; 0.51471 ; 0.54323 ; 0.57014 ; 0.61705 ; 0.68964 ; 0.71376 ; 0.74482 ; 0.78295 ; 0.82427 ; 0.87936 ; 0.93954 ; 0.99022 ; 0.99343 ; 0.99832 ; 1.0052 ; 1.014 ; 1.0258 ; 1.0299 ; 1.0355 ; 1.0432 ; 1.0533 ; 1.0668 ; 1.0856 ; 1.0957]

Bolt 2 - Tensile Force (kips): [48.5901 ; 48.3779 ; 48.2525 ; 48.1328 ; 48.0579 ; 48.0442 ; 48.0695 ; 48.1409 ; 48.2401 ; 48.4372 ; 48.493 ; 48.5805 ; 48.7061 ; 48.8799 ; 49.1408 ; 49.4722 ; 49.8109 ; 49.8324 ; 49.8648 ; 49.9137 ; 49.9886 ; 50.1061 ; 50.1508 ; 50.2183 ; 50.3203 ; 50.4723 ; 50.6968 ; 51.0466 ; 51.2508]

Bolt 2 - Shear Force (kips): [0.073413 ; 0.24006 ; 0.4259 ; 0.65173 ; 0.83486 ; 0.95604 ; 1.0482 ; 1.1287 ; 1.2455 ; 1.3526 ; 1.373 ; 1.3926 ; 1.4076 ; 1.4204 ; 1.437 ; 1.4694 ; 1.5237 ; 1.5278 ; 1.5344 ; 1.5434 ; 1.556 ; 1.575 ; 1.5821 ; 1.5941 ; 1.6103 ; 1.6321 ; 1.6643 ; 1.7003 ; 1.7123]

Bolt 3 - Tensile Force (kips): [50 ; 49.7743 ; 49.6692 ; 49.5669 ; 49.4878 ; 49.2165 ; 48.9825 ; 48.9442 ; 49.1973 ; 49.8735 ; 50.1112 ; 50.4782 ; 51.2722 ; 52.3554 ; 53.9416 ; 55.5198 ; 56.9559 ; 57.0583 ; 57.1973 ; 57.3684 ; 57.6165 ; 57.8817 ; 57.9626 ; 58.0674 ; 58.2158 ; 58.4067 ; 58.655 ; 58.9957 ; 59.1612]

Bolt 3 - Shear Force (kips): [0.043323 ; 0.080019 ; 0.17357 ; 0.29145 ; 0.38812 ; 0.49369 ; 0.55061 ; 0.61162 ; 0.74382 ; 0.95328 ; 1.0324 ; 1.1208 ; 1.0514 ; 1.0067 ; 1.5379 ; 2.6619 ; 3.4282 ; 3.4318 ; 3.2476 ; 3.1051 ; 2.3864 ; 1.374 ; 1.0842 ; 1.1641 ; 1.3048 ; 1.5945 ; 2.6467 ; 3.9289 ; 4.5152]

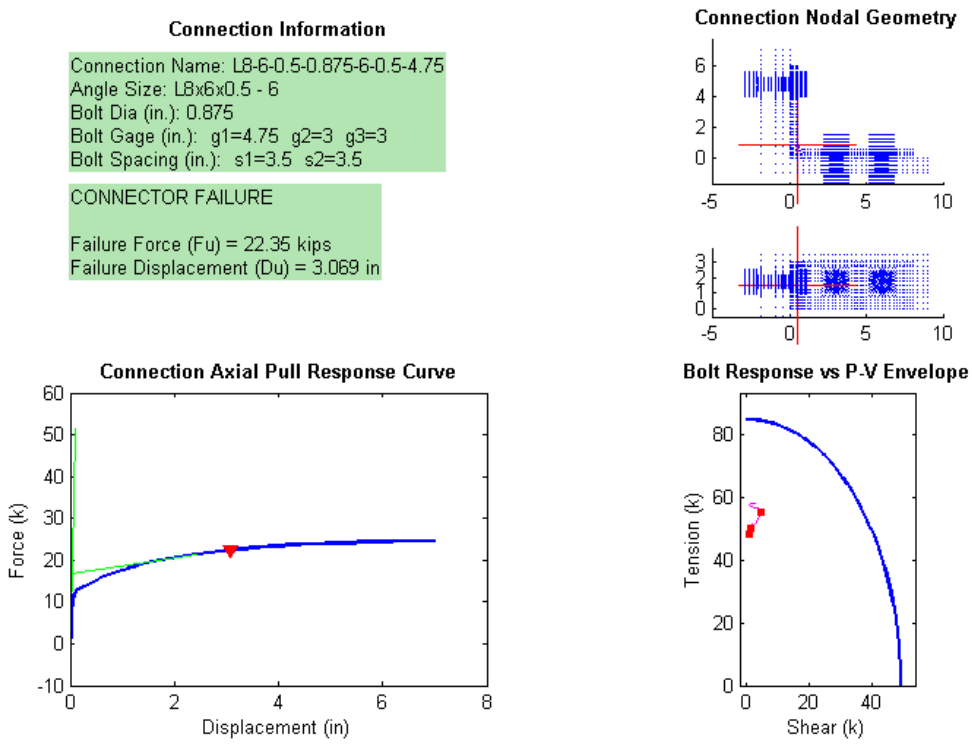


Figure B.228 Connection L8_6_0.5_0.875_6_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.875_6_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 471.5246

Plastic Stiffness (k/in): 1.9440

Displacement (in): [3.5499e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.46757 ; 0.5464 ; 0.66466 ; 0.84205 ; 1.1081 ; 1.2079 ; 1.3576 ; 1.5821 ; 1.9188 ; 2.424 ; 3.124 ; 3.299 ; 3.5615 ; 3.5676 ; 3.5769 ; 3.5907 ; 3.6115 ; 3.6426 ; 3.6893 ; 3.7594 ; 3.8645 ; 4.0222 ; 4.2587 ; 4.6135 ; 5.1457 ; 5.8457 ; 6.5457 ; 7]

Force (kips): [-1.16481 ; 0.628452 ; 1.41384 ; 2.46535 ; 3.85308 ; 5.20916 ; 5.99641 ; 6.2966 ; 6.51978 ; 6.85859 ; 7.3184 ; 7.48146 ; 7.71503 ; 8.04025 ; 8.48085 ; 9.03802 ; 9.22925 ; 9.48061 ; 9.80602 ; 10.2089 ; 10.6999 ; 11.214 ; 11.324 ; 11.4753 ; 11.4789 ; 11.4842 ; 11.4928 ; 11.5052 ; 11.523 ; 11.5484 ; 11.5852 ; 11.6372 ; 11.7091 ; 11.8029 ; 11.9211 ; 12.0583 ; 12.1909 ; 12.2809 ; 12.3242]

Bolt 1 - Tensile Force (kips): [48.5904 ; 48.5343 ; 48.5097 ; 48.4759 ; 48.429 ; 48.381 ; 48.3517 ; 48.3403 ; 48.3328 ; 48.3204 ; 48.3263 ; 48.3275 ; 48.3282 ; 48.3279 ; 48.3264 ; 48.3249 ; 48.324 ; 48.3248 ; 48.3302 ; 48.3432 ; 48.3647 ; 48.4025 ; 48.4122 ; 48.4275 ; 48.428 ; 48.4286 ; 48.4292 ; 48.4302 ; 48.4319 ; 48.4345 ; 48.4387 ; 48.4447 ; 48.454 ; 48.4691 ; 48.4934 ; 48.532 ; 48.5848 ; 48.6388 ; 48.6745]

Bolt 1 - Shear Force (kips): [0.084906 ; 0.0619 ; 0.088517 ; 0.13616 ; 0.20834 ; 0.28636 ; 0.33772 ; 0.36376 ; 0.38734 ; 0.4245 ; 0.43674 ; 0.44315 ; 0.45498 ; 0.47524 ; 0.50715 ; 0.55356 ; 0.57149 ; 0.59483 ; 0.62261 ; 0.65593 ; 0.70238 ; 0.75334 ; 0.76553 ; 0.78285 ; 0.78334 ; 0.78403 ; 0.7851 ; 0.78667 ; 0.78891 ; 0.79209 ; 0.79659 ; 0.80368 ; 0.81394 ; 0.82758 ; 0.84524 ; 0.86784 ; 0.89376 ; 0.91703 ; 0.93051]

Bolt 2 - Tensile Force (kips): [48.5912 ; 48.4876 ; 48.428 ; 48.3554 ; 48.2762 ; 48.2243 ; 48.2012 ; 48.1946 ; 48.1985 ; 48.2098 ; 48.3359 ; 48.3833 ; 48.4426 ; 48.521 ; 48.6684 ; 48.8715 ; 48.9454 ; 49.0466 ; 49.1723 ; 49.3499 ; 49.5968 ; 49.9903 ; 50.0857 ; 50.2293 ; 50.2327 ; 50.2377 ; 50.2453 ; 50.2565 ; 50.2734 ; 50.2984 ; 50.3356 ; 50.389 ; 50.467 ; 50.5816 ; 50.7466 ; 50.9656 ; 51.2195 ; 51.4333 ; 51.5548]

Bolt 2 - Shear Force (kips): [0.073043 ; 0.11179 ; 0.1772 ; 0.27225 ; 0.40655 ; 0.55051 ; 0.6497 ; 0.69929 ; 0.74969 ; 0.83871 ; 0.9327 ; 0.96483 ; 1.0084 ; 1.0622 ; 1.1158 ; 1.1545 ; 1.1616 ; 1.1683 ; 1.1732 ; 1.1798 ; 1.1876 ; 1.2319 ; 1.2477 ; 1.2736 ; 1.2742 ; 1.2751 ; 1.2766 ; 1.279 ; 1.2826 ; 1.2878 ; 1.2952 ; 1.3065 ; 1.3231 ; 1.347 ; 1.3819 ; 1.4273 ; 1.4744 ; 1.512 ; 1.5295]

Bolt 3 - Tensile Force (kips): [50 ; 49.8831 ; 49.7911 ; 49.6879 ; 49.5513 ; 49.34 ; 49.123 ; 48.851 ; 48.6646 ; 48.5786 ; 48.5976 ; 48.6638 ; 48.8283 ; 49.1338 ; 49.617 ; 50.2937 ; 50.6 ; 51.1218 ; 51.7654 ; 52.6149 ; 53.801 ; 55.3423 ; 55.7064 ; 56.2119 ; 56.2226 ; 56.2378 ; 56.2651 ; 56.3005 ; 56.3459 ; 56.4041 ; 56.4981 ; 56.6307 ; 56.8058 ; 57.0049 ; 57.2759 ; 57.5981 ; 57.929 ; 58.172 ; 58.2916]

Bolt 3 - Shear Force (kips): [0.042651 ; 0.028566 ; 0.058619 ; 0.10921 ; 0.18143 ; 0.23486 ; 0.23573 ; 0.17682 ; 0.16758 ; 0.23351 ; 0.3984 ; 0.44916 ; 0.51836 ; 0.60662 ; 0.72882 ; 0.88953 ; 1.5344 ; 2.0858 ; 2.7532 ; 3.2372 ; 4.0076 ; 4.4849 ; 4.5481 ; 4.4219 ; 4.4052 ; 4.3802 ; 4.2976 ; 4.1718 ; 3.9885 ; 3.7361 ; 3.3702 ; 2.8804 ; 2.4174 ; 1.8665 ; 1.3158 ; 0.96391 ; 1.7105 ; 2.2488 ; 2.5199]

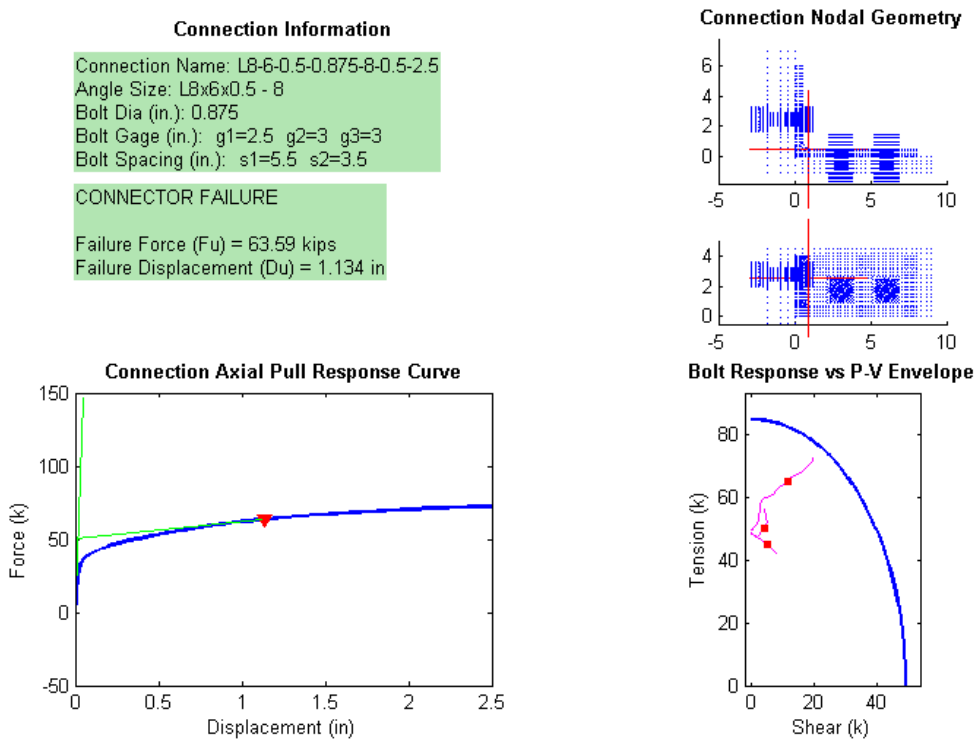


Figure B.229 Connection L8_6_0.5_0.875_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.875_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3088

Plastic Stiffness (k/in): 11.7664

Displacement (in): [4.2919e-036 ; 0.00048828 ; 0.00097656 ; 0.001709 ; 0.0028076 ; 0.0044556 ; 0.0069275 ; 0.010635 ; 0.014343 ; 0.018051 ; 0.023613 ; 0.031956 ; 0.04447 ; 0.063241 ; 0.091398 ; 0.13363 ; 0.19699 ; 0.29202 ; 0.32765 ; 0.3811 ; 0.46129 ; 0.49135 ; 0.50263 ; 0.51954 ; 0.54491 ; 0.58297 ; 0.64005 ; 0.66145 ; 0.69356 ; 0.74172 ; 0.81397 ; 0.84106 ; 0.8817 ; 0.92234 ; 0.96297 ; 1.0239 ; 1.1154 ; 1.2525 ; 1.4582 ; 1.7082 ; 1.7122 ; 1.718 ; 1.7268 ; 1.74 ; 1.7597 ; 1.7894 ; 1.8339 ; 1.9007 ; 2.0008 ; 2.1509 ; 2.2073 ; 2.2917 ; 2.4184 ; 2.5]

Force (kips): [-1.0961 ; -0.248845 ; 0.411718 ; 1.29512 ; 2.47123 ; 4.04004 ; 6.07573 ; 8.73586 ; 10.9577 ; 12.7765 ; 14.7287 ; 16.5017 ; 17.7948 ; 18.8937 ; 20.049 ; 21.2449 ; 22.563 ; 24.0671 ; 24.5548 ; 25.2253 ; 26.1342 ; 26.4487 ; 26.575 ; 26.754 ; 27.0476 ; 27.4569 ; 28.032 ; 28.2403 ; 28.5376 ; 28.9639 ; 29.5862 ; 29.8384 ; 30.1854 ; 30.497 ; 30.7738 ; 31.1603 ; 31.6982 ; 32.4135 ; 33.3154 ; 34.2143 ; 34.2288 ; 34.2502 ; 34.2815 ; 34.3271 ; 34.3933 ; 34.493 ; 34.6406 ; 34.8491 ; 35.1327 ; 35.5053 ; 35.6362 ; 35.8198 ; 36.0756 ; 36.2297]

Bolt 1 - Tensile Force (kips): [48.5862 ; 48.558 ; 48.5356 ; 48.5049 ; 48.4633 ; 48.4066 ; 48.3312 ; 48.2283 ; 48.1371 ; 48.0585 ; 47.9702 ; 47.8851 ; 47.8166 ; 47.7506 ; 47.678 ; 47.5896 ; 47.489 ; 47.3863 ; 47.3536 ; 47.3078 ; 47.24 ; 47.2128 ; 47.2011 ; 47.1836 ; 47.1544 ; 47.1103 ; 47.0369 ; 47.0052 ; 46.9492 ; 46.8102 ; 46.4687 ; 46.3143 ; 46.0842 ; 45.8668 ; 45.6696 ; 45.3832 ; 44.9637 ; 44.379 ; 43.6121 ; 42.8358 ; 42.836 ; 42.8358 ; 42.8341 ; 42.8307 ; 42.8229 ; 42.8131 ; 42.8163 ; 42.8113 ; 42.7623 ; 42.6637 ; 42.6423 ; 42.6074 ; 42.491 ; 42.3751]

Bolt 1 - Shear Force (kips): [0.078974 ; 0.050234 ; 0.053523 ; 0.088793 ; 0.15156 ; 0.24203 ; 0.36416 ; 0.52913 ; 0.67133 ; 0.79092 ; 0.92338 ; 1.0513 ; 1.1567 ; 1.2616 ; 1.3795 ; 1.5233 ; 1.6879 ; 1.8585 ; 1.9131 ; 1.9898 ; 2.1028 ; 2.1468 ; 2.165 ; 2.1923 ; 2.2369 ; 2.3039 ; 2.4135 ; 2.4597 ; 2.5394 ; 2.7307 ; 3.1788 ; 3.3706 ; 3.65 ; 3.9079 ; 4.1392 ; 4.4703 ; 4.945 ; 5.5917 ; 6.42 ; 7.2382 ; 7.2393 ; 7.2412 ; 7.2449 ; 7.2516 ; 7.2642 ; 7.2814 ; 7.2901 ; 7.3125 ; 7.386 ; 7.5187 ; 7.5537 ; 7.6086 ; 7.75 ; 7.878]

Bolt 2 - Tensile Force (kips): [48.5848 ; 48.5434 ; 48.5085 ; 48.4596 ; 48.3913 ; 48.2986 ; 48.1796 ; 48.0278 ; 47.8988 ; 47.7942 ; 47.6776 ; 47.5575 ; 47.4536 ; 47.3787 ; 47.3847 ; 47.5245 ; 47.7899 ; 48.1118 ; 48.2061 ; 48.3459 ; 48.5536 ; 48.6308 ; 48.6592 ; 48.7027 ; 48.7645 ; 48.8623 ; 49.0044 ; 49.0568 ; 49.1408 ; 49.2602 ; 49.3787 ; 49.4118 ; 49.4741 ; 49.554 ; 49.6529 ; 49.8191 ; 50.0996 ; 50.5782 ; 51.3845 ; 52.4413 ; 52.4638 ; 52.4972 ; 52.5467 ; 52.6199 ; 52.7277 ; 52.888 ; 53.1314 ; 53.4851 ; 53.9842 ; 54.6992 ; 54.9668 ; 55.3593 ; 55.9353 ; 56.2991]

Bolt 2 - Shear Force (kips): [0.065115 ; 0.044616 ; 0.077452 ; 0.13901 ; 0.22831 ; 0.35236 ; 0.51889 ; 0.74328 ; 0.93619 ; 1.0989 ; 1.2832 ; 1.4712 ; 1.6474 ; 1.8376 ; 2.0554 ; 2.2507 ; 2.4044 ; 2.5218 ; 2.5572 ; 2.6065 ; 2.6773 ; 2.706 ; 2.718 ; 2.736 ; 2.7666 ; 2.8127 ; 2.8944 ; 2.9266 ; 2.9731 ; 3.0667 ; 3.3028 ; 3.4074 ; 3.5545 ; 3.6829 ; 3.7894 ; 3.933 ; 4.1242 ; 4.3558 ; 4.5955 ; 4.7616 ; 4.7556 ; 4.7468 ; 4.7344 ; 4.7173 ; 4.6944 ; 4.6603 ; 4.5988 ; 4.5193 ; 4.4395 ; 4.3511 ; 4.3094 ; 4.2527 ; 4.211 ; 4.2063]

Bolt 3 - Tensile Force (kips): [50 ; 49.9686 ; 49.94 ; 49.9023 ; 49.8627 ; 49.8278 ; 49.8149 ; 49.8383 ; 49.881 ; 49.9378 ; 50.0901 ; 50.3166 ; 50.5375 ; 50.729 ; 50.9606 ; 51.5278 ; 52.7361 ; 54.7446 ; 55.4649 ; 56.5277 ; 58.0276 ; 58.5537 ; 58.7287 ; 58.9647 ; 59.2433 ; 59.5959 ; 60.0357 ; 60.19 ; 60.4303 ; 60.8954 ; 61.7015 ; 62.1087 ; 62.661 ; 63.1307 ; 63.4758 ; 63.9936 ; 64.8002 ; 65.8062 ; 66.9178 ; 67.9907 ; 68.0099 ; 68.0373 ; 68.0755 ; 68.1255 ; 68.186 ; 68.342 ; 68.6533 ; 69.117 ; 69.7159 ; 70.5677 ; 70.8805 ; 71.3403 ; 72.1528 ; 72.7216]

Bolt 3 - Shear Force (kips): [0.0477817 ; 0.0323189 ; 0.0245603 ; 0.0302559 ; 0.0537679 ; 0.0935555 ; 0.154977 ; 0.249465 ; 0.339006 ; 0.420213 ; 0.52586 ; 0.652936 ; 0.812674 ; 1.01771 ; 1.31898 ; 1.70916 ; 2.06263 ; 2.39605 ; 2.50752 ; 2.6528 ; 2.83518 ; 2.89778 ; 2.93764 ; 2.9916 ; 3.1365 ; 3.36071 ; 3.84352 ; 4.6069 ; 5.89124 ; 6.98312 ; 7.54391 ; 7.71359 ; 8.12778 ; 8.85701 ; 9.57847 ; 10.368 ; 11.2038 ; 12.2178 ; 13.6662 ; 15.5142 ; 15.5772 ; 15.6653 ; 15.7863 ; 15.9542 ; 16.1945 ; 16.4321 ; 16.7994 ; 17.2344 ; 17.7743 ; 18.3656 ; 18.6834 ; 19.0639 ; 19.3756 ; 19.4613]

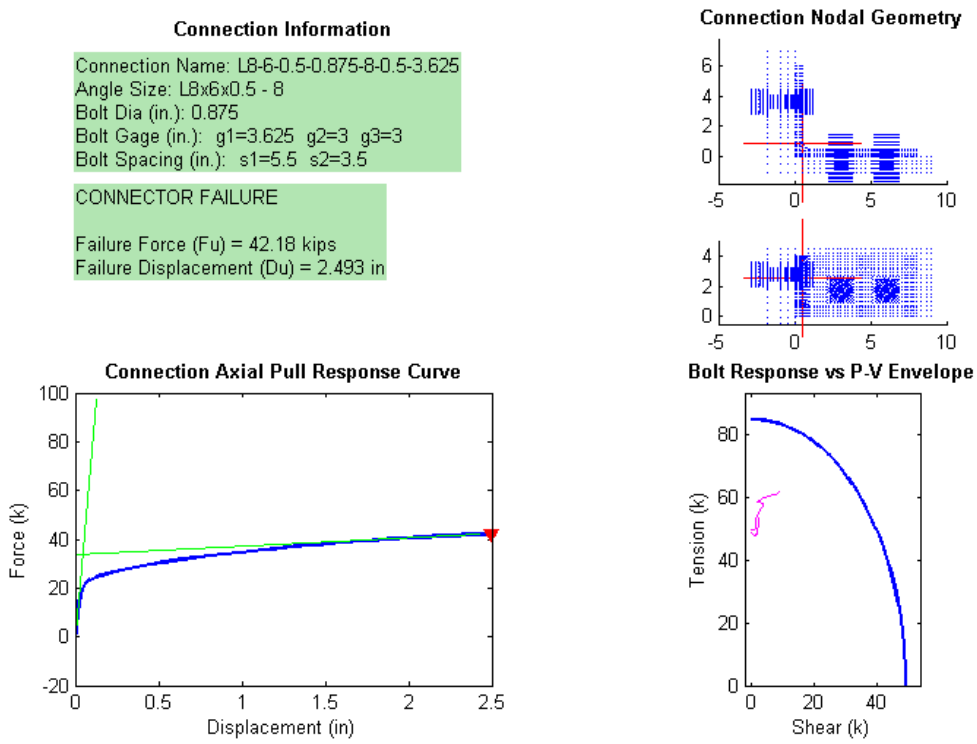


Figure B.230 Connection L8_6_0.5_0.875_8_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.875_8_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 759.5008

Plastic Stiffness (k/in): 3.3005

Displacement (in): [4.0747e-036 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.03125 ; 0.042969 ; 0.060547 ; 0.086914 ; 0.12646 ; 0.18579 ; 0.27478 ; 0.40826 ; 0.45832 ; 0.53341 ; 0.64603 ; 0.81497 ; 1.065 ; 1.1275 ; 1.1509 ; 1.1861 ; 1.2388 ; 1.2586 ; 1.2882 ; 1.3327 ; 1.3995 ; 1.4245 ; 1.4621 ; 1.5184 ; 1.6028 ; 1.7295 ; 1.9196 ; 1.9821 ; 2.0758 ; 2.2165 ; 2.4274 ; 2.5]

Force (kips): [-1.01876 ; 2.55342 ; 4.91484 ; 6.90558 ; 8.41703 ; 9.89403 ; 10.9662 ; 11.7052 ; 12.286 ; 12.8378 ; 13.5828 ; 14.5744 ; 14.9026 ; 15.3413 ; 15.9219 ; 16.6685 ; 17.6 ; 17.8119 ; 17.8882 ; 18.0075 ; 18.1964 ; 18.2719 ; 18.3779 ; 18.5219 ; 18.727 ; 18.805 ; 18.9239 ; 19.089 ; 19.3212 ; 19.6328 ; 20.0666 ; 20.1999 ; 20.3847 ; 20.6395 ; 20.9876 ; 21.1005]

Bolt 1 - Tensile Force (kips): [48.5858 ; 48.4643 ; 48.3784 ; 48.3015 ; 48.2396 ; 48.1755 ; 48.1257 ; 48.0901 ; 48.0688 ; 48.0583 ; 48.0399 ; 48.0148 ; 48.0073 ; 47.9969 ; 47.9847 ; 47.9773 ; 47.9791 ; 47.9805 ; 47.9813 ; 47.9824 ; 47.9838 ; 47.9843 ; 47.9855 ; 47.9882 ; 47.9934 ; 47.9955 ; 47.9981 ; 48.0027 ; 48.0096 ; 48.0222 ; 48.0447 ; 48.0531 ; 48.0666 ; 48.0883 ; 48.1231 ; 48.1356]

Bolt 1 - Shear Force (kips): [0.07459 ; 0.15768 ; 0.29796 ; 0.42471 ; 0.52576 ; 0.63102 ; 0.71679 ; 0.78592 ; 0.83843 ; 0.88131 ; 0.95037 ; 1.0474 ; 1.08 ; 1.1275 ; 1.1925 ; 1.2715 ; 1.3684 ; 1.391 ; 1.3991 ; 1.4112 ; 1.4297 ; 1.4366 ; 1.4462 ; 1.4594 ; 1.4774 ; 1.484 ; 1.4945 ; 1.5093 ; 1.5317 ; 1.5618 ; 1.6009 ; 1.6122 ; 1.6279 ; 1.6492 ; 1.6782 ; 1.6875]

Bolt 2 - Tensile Force (kips): [48.5827 ; 48.3627 ; 48.2161 ; 48.1077 ; 48.0407 ; 47.9762 ; 47.9359 ; 47.9384 ; 48.0119 ; 48.1032 ; 48.2497 ; 48.5817 ; 48.7004 ; 48.8957 ; 49.1822 ; 49.5538 ; 50.0438 ; 50.1666 ; 50.2123 ; 50.2803 ; 50.3859 ; 50.4259 ; 50.4852 ; 50.5736 ; 50.705 ; 50.7545 ; 50.8294 ; 50.9463 ; 51.1352 ; 51.4336 ; 51.897 ; 52.0464 ; 52.2679 ; 52.5957 ; 53.0838 ; 53.2495]

Bolt 2 - Shear Force (kips): [0.059773 ; 0.25159 ; 0.45996 ; 0.64527 ; 0.79358 ; 0.9535 ; 1.1011 ; 1.2434 ; 1.3665 ; 1.4663 ; 1.6003 ; 1.7353 ; 1.7674 ; 1.8029 ; 1.84 ; 1.8765 ; 1.9332 ; 1.9445 ; 1.9484 ; 1.9555 ; 1.9689 ; 1.9744 ; 1.983 ; 1.9949 ; 2.0147 ; 2.0215 ; 2.0322 ; 2.0444 ; 2.0475 ; 2.0363 ; 2.0259 ; 2.0247 ; 2.0242 ; 2.0263 ; 2.036 ; 2.0402]

Bolt 3 - Tensile Force (kips): [50 ; 49.775 ; 49.6852 ; 49.6354 ; 49.631 ; 49.6659 ; 49.662 ; 49.6007 ; 49.5968 ; 49.8373 ; 50.3557 ; 51.3298 ; 51.7139 ; 52.2897 ; 53.1665 ; 54.5217 ; 56.6996 ; 57.2626 ; 57.4644 ; 57.7583 ; 58.1384 ; 58.2868 ; 58.4411 ; 58.5915 ; 58.8042 ; 58.8837 ; 58.9988 ; 59.1935 ; 59.4465 ; 59.7561 ; 60.2767 ; 60.4596 ; 60.6832 ; 61.0448 ; 61.5758 ; 61.7533]

Bolt 3 - Shear Force (kips): [0.048261 ; 0.078474 ; 0.17321 ; 0.26391 ; 0.33443 ; 0.4121 ; 0.51166 ; 0.64106 ; 0.78584 ; 0.91632 ; 1.0976 ; 1.2723 ; 1.2882 ; 1.3388 ; 1.4402 ; 1.5985 ; 2.9483 ; 3.5692 ; 3.7564 ; 3.7645 ; 3.4023 ; 3.0139 ; 2.3632 ; 1.9105 ; 2.0497 ; 2.1291 ; 2.2477 ; 2.486 ; 3.0544 ; 4.0918 ; 5.5409 ; 6.1268 ; 6.8256 ; 7.5727 ; 8.4747 ; 8.8063]

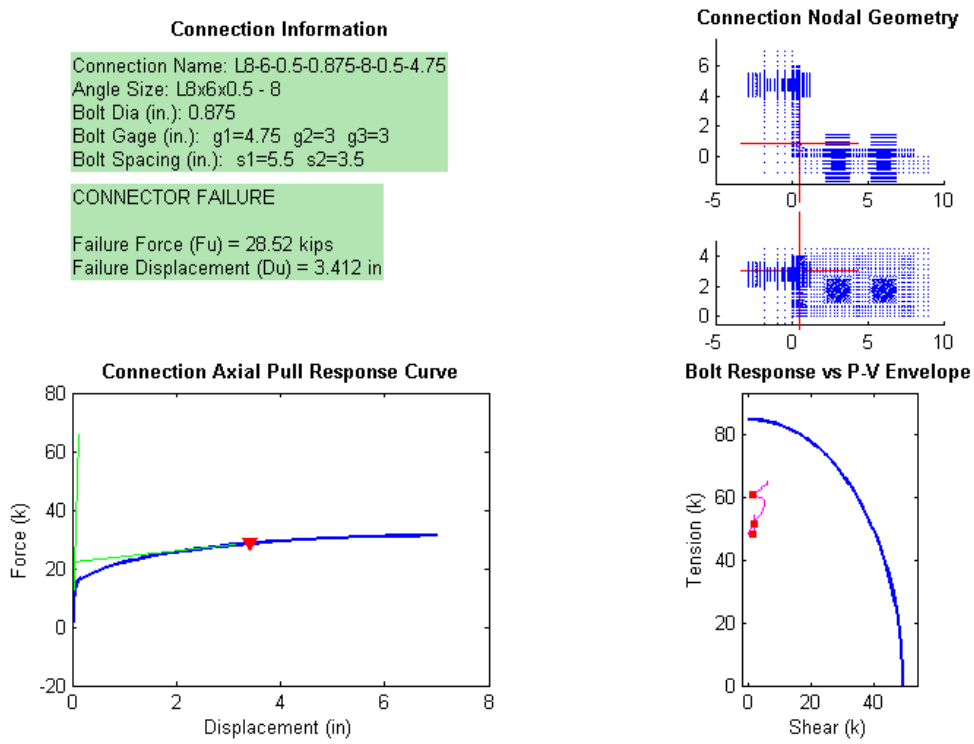


Figure B.231 Connection L8_6_0.5_0.875_8_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.875_8_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 482.6021

Plastic Stiffness (k/in): 1.8765

Displacement (in): [3.0987e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.46757 ; 0.5464 ; 0.66466 ; 0.84205 ; 1.1081 ; 1.2079 ; 1.3576 ; 1.5821 ; 1.9188 ; 2.424 ; 2.599 ; 2.6646 ; 2.763 ; 2.9107 ; 3.1322 ; 3.4644 ; 3.9628 ; 4.4611 ; 4.9594 ; 5.6594 ; 6.3594 ; 7]

Force (kips): [-1.01095 ; 0.727034 ; 1.62828 ; 2.83944 ; 4.44507 ; 6.19106 ; 7.43145 ; 7.99681 ; 8.34249 ; 8.76109 ; 9.30373 ; 9.49456 ; 9.76735 ; 10.145 ; 10.6493 ; 11.2819 ; 11.4995 ; 11.7921 ; 12.1738 ; 12.6693 ; 13.2866 ; 13.483 ; 13.5543 ; 13.6607 ; 13.8208 ; 14.0286 ; 14.3049 ; 14.6589 ; 14.9401 ; 15.161 ; 15.4006 ; 15.5912 ; 15.7252]

Bolt 1 - Tensile Force (kips): [48.586 ; 48.528 ; 48.4967 ; 48.453 ; 48.3918 ; 48.3194 ; 48.262 ; 48.2324 ; 48.2116 ; 48.1818 ; 48.1715 ; 48.1663 ; 48.1573 ; 48.1432 ; 48.1226 ; 48.0996 ; 48.0924 ; 48.0846 ; 48.0785 ; 48.0762 ; 48.0793 ; 48.0818 ; 48.0828 ; 48.0842 ; 48.086 ; 48.091 ; 48.1006 ; 48.1199 ; 48.1425 ; 48.168 ; 48.2084 ; 48.2525 ; 48.2936]

Bolt 1 - Shear Force (kips): [0.074454 ; 0.065459 ; 0.10851 ; 0.17679 ; 0.27604 ; 0.3948 ; 0.49115 ; 0.54601 ; 0.59078 ; 0.65683 ; 0.69757 ; 0.71494 ; 0.74321 ; 0.7859 ; 0.84847 ; 0.92695 ; 0.95368 ; 0.98843 ; 1.0306 ; 1.0829 ; 1.1502 ; 1.1715 ; 1.1793 ; 1.1912 ; 1.2096 ; 1.2336 ; 1.2666 ; 1.3082 ; 1.3451 ; 1.3779 ; 1.4172 ; 1.4504 ; 1.4793]

Bolt 2 - Tensile Force (kips): [48.5835 ; 48.4824 ; 48.4107 ; 48.3225 ; 48.2245 ; 48.1538 ; 48.1155 ; 48.1086 ; 48.1164 ; 48.1337 ; 48.3135 ; 48.3686 ; 48.4378 ; 48.5878 ; 48.8282 ; 49.2137 ; 49.3546 ; 49.5538 ; 49.8141 ; 50.1641 ; 50.657 ; 50.8256 ; 50.8891 ; 50.9847 ; 51.1273 ; 51.3345 ; 51.6564 ; 52.1651 ; 52.6328 ; 53.0509 ; 53.5538 ; 53.9924 ; 54.3323]

Bolt 2 - Shear Force (kips): [0.059801 ; 0.10716 ; 0.18522 ; 0.29679 ; 0.45393 ; 0.63828 ; 0.79266 ; 0.88474 ; 0.96119 ; 1.0847 ; 1.2157 ; 1.2598 ; 1.3192 ; 1.3921 ; 1.4717 ; 1.5384 ; 1.5526 ; 1.5677 ; 1.5826 ; 1.6097 ; 1.6656 ; 1.6894 ; 1.6987 ; 1.7129 ; 1.7348 ; 1.7656 ; 1.7953 ; 1.8019 ; 1.8162 ; 1.834 ; 1.8575 ; 1.8789 ; 1.8983]

Bolt 3 - Tensile Force (kips): [50 ; 49.8791 ; 49.7897 ; 49.6858 ; 49.5723 ; 49.4481 ; 49.4249 ; 49.4022 ; 49.4795 ; 49.5905 ; 49.8045 ; 49.9593 ; 50.2537 ; 50.7321 ; 51.3999 ; 52.522 ; 53.01 ; 53.7109 ; 54.7018 ; 56.0986 ; 58.1098 ; 58.7938 ; 59.0222 ; 59.3589 ; 59.7905 ; 60.2358 ; 60.8183 ; 61.6841 ; 62.3969 ; 63.0018 ; 63.7209 ; 64.3945 ; 64.9376]

Bolt 3 - Shear Force (kips): [0.046429 ; 0.029272 ; 0.060008 ; 0.11453 ; 0.19629 ; 0.27467 ; 0.32418 ; 0.32743 ; 0.35302 ; 0.43907 ; 0.62671 ; 0.684 ; 0.76419 ; 0.88734 ; 1.0701 ; 1.382 ; 2.1018 ; 3.0343 ; 3.856 ; 4.3626 ; 4.8256 ; 5.0224 ; 4.9468 ; 4.7226 ; 3.4137 ; 2.0259 ; 0.97358 ; 2.4018 ; 3.468 ; 4.1309 ; 5.1017 ; 5.6911 ; 6.0465]

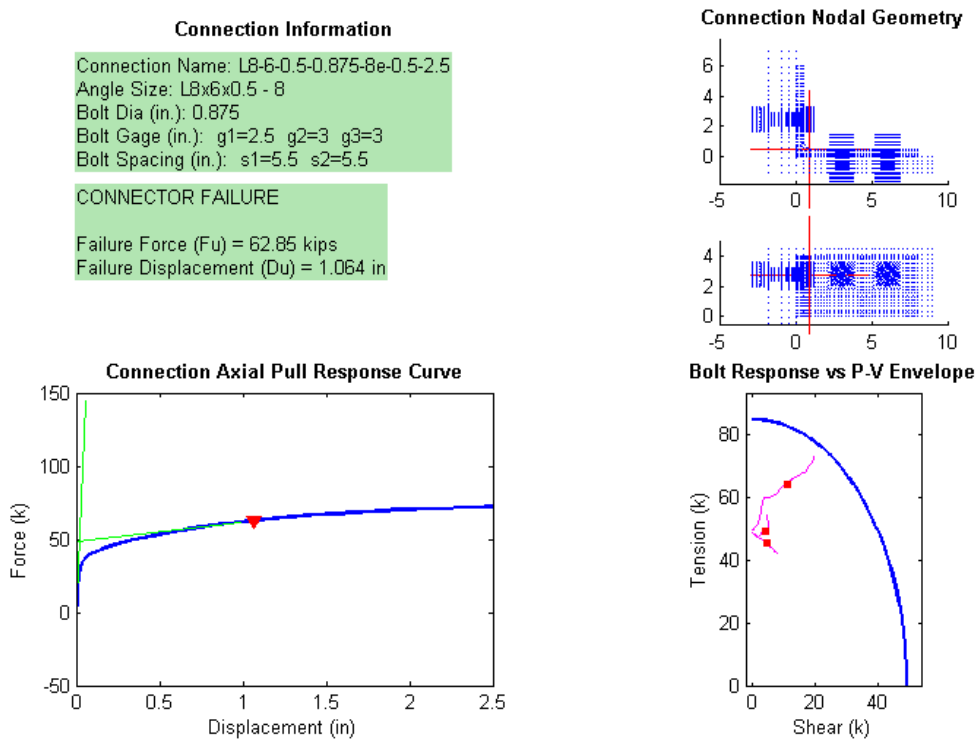


Figure B.232 Connection L8_6_0.5_0.875_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.875_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.4588e+003

Plastic Stiffness (k/in): 13.2578

Displacement (in): [5.3547e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.026611 ; 0.036499 ; 0.051331 ; 0.073578 ; 0.10695 ; 0.15701 ; 0.23209 ; 0.34472 ; 0.51366 ; 0.5163 ; 0.51894 ; 0.5229 ; 0.52884 ; 0.53775 ; 0.55111 ; 0.57115 ; 0.60122 ; 0.6125 ; 0.62941 ; 0.65478 ; 0.69283 ; 0.74992 ; 0.83554 ; 0.86765 ; 0.91581 ; 0.98805 ; 1.0964 ; 1.259 ; 1.2628 ; 1.2685 ; 1.2771 ; 1.2899 ; 1.3092 ; 1.3381 ; 1.3815 ; 1.4466 ; 1.5443 ; 1.6907 ; 1.7456 ; 1.828 ; 1.9516 ; 2.137 ; 2.387 ; 2.5]

Force (kips): [-1.33832 ; 1.47585 ; 3.46407 ; 5.9359 ; 9.05682 ; 11.5494 ; 13.4547 ; 15.3959 ; 17.0409 ; 18.2347 ; 19.3102 ; 20.4831 ; 21.715 ; 23.1262 ; 24.7662 ; 26.6968 ; 26.7247 ; 26.7568 ; 26.8029 ; 26.8786 ; 26.9926 ; 27.1472 ; 27.363 ; 27.6809 ; 27.8033 ; 27.9765 ; 28.2231 ; 28.5744 ; 29.0736 ; 29.8332 ; 30.1162 ; 30.4941 ; 30.973 ; 31.6204 ; 32.4703 ; 32.4893 ; 32.5174 ; 32.5587 ; 32.6192 ; 32.7088 ; 32.8413 ; 33.0285 ; 33.2932 ; 33.6683 ; 34.1761 ; 34.3645 ; 34.6389 ; 35.0038 ; 35.4654 ; 35.9863 ; 36.1956]

Bolt 1 - Tensile Force (kips): [48.6534 ; 48.5485 ; 48.4714 ; 48.3723 ; 48.2399 ; 48.127 ; 48.0363 ; 47.9395 ; 47.8534 ; 47.7893 ; 47.7281 ; 47.6636 ; 47.5785 ; 47.4731 ; 47.3575 ; 47.2083 ; 47.2058 ; 47.2025 ; 47.1979 ; 47.1904 ; 47.1791 ; 47.163 ; 47.1395 ; 47.1015 ; 47.0865 ; 47.0639 ; 47.0274 ; 46.9652 ; 46.8143 ; 46.384 ; 46.2081 ; 45.9598 ; 45.6262 ; 45.1316 ; 44.4222 ; 44.4058 ; 44.382 ; 44.3469 ; 44.2953 ; 44.2181 ; 44.1036 ; 43.942 ; 43.7125 ; 43.3762 ; 42.9599 ; 42.9124 ; 42.8752 ; 42.7867 ; 42.5983 ; 42.3265 ; 42.1223]

Bolt 1 - Shear Force (kips): [0.074896 ; 0.12391 ; 0.23985 ; 0.39333 ; 0.595 ; 0.76185 ; 0.89336 ; 1.0324 ; 1.1562 ; 1.2523 ; 1.3478 ; 1.4492 ; 1.586 ; 1.7553 ; 1.9385 ; 2.1671 ; 2.171 ; 2.1754 ; 2.1818 ; 2.192 ; 2.2075 ; 2.2297 ; 2.2622 ; 2.3144 ; 2.3349 ; 2.3656 ; 2.415 ; 2.4988 ; 2.7015 ; 3.256 ; 3.4708 ; 3.7665 ; 4.1535 ; 4.7118 ; 5.4877 ; 5.5052 ; 5.5308 ; 5.5684 ; 5.6235 ; 5.7058 ; 5.8275 ; 5.9989 ; 6.2409 ; 6.5913 ; 7.022 ; 7.0769 ; 7.1255 ; 7.2299 ; 7.4396 ; 7.736 ; 7.945]

Bolt 2 - Tensile Force (kips): [48.6663 ; 48.5131 ; 48.3966 ; 48.2538 ; 48.076 ; 47.9346 ; 47.8217 ; 47.695 ; 47.5875 ; 47.476 ; 47.3856 ; 47.3777 ; 47.5137 ; 47.7641 ; 48.1381 ; 48.5868 ; 48.5924 ; 48.5973 ; 48.6049 ; 48.6151 ; 48.6299 ; 48.6548 ; 48.6933 ; 48.7487 ; 48.7678 ; 48.7972 ; 48.8422 ; 48.9089 ; 48.9778 ; 49.0038 ; 49.0292 ; 49.0939 ; 49.2298 ; 49.4614 ; 49.8602 ; 49.8693 ; 49.8834 ; 49.9051 ; 49.9385 ; 49.989 ; 50.066 ; 50.1886 ; 50.3838 ; 50.6879 ; 51.1939 ; 51.437 ; 51.8085 ; 52.331 ; 53.0526 ; 54.0275 ; 54.4591]

Bolt 2 - Shear Force (kips): [0.10666 ; 0.14446 ; 0.28853 ; 0.48116 ; 0.73566 ; 0.94595 ; 1.1128 ; 1.2942 ; 1.4745 ; 1.6485 ; 1.8606 ; 2.0732 ; 2.2284 ; 2.3438 ; 2.4449 ; 2.608 ; 2.611 ; 2.6145 ; 2.6196 ; 2.6281 ; 2.6411 ; 2.6592 ; 2.686 ; 2.7293 ; 2.747 ; 2.7732 ; 2.8139 ; 2.8842 ; 3.046 ; 3.4147 ; 3.541 ; 3.7061 ; 3.9036 ; 4.1654 ; 4.4902 ; 4.4975 ; 4.5078 ; 4.5227 ; 4.5441 ; 4.5757 ; 4.6214 ; 4.6813 ; 4.7595 ; 4.8632 ; 4.9537 ; 4.919 ; 4.8511 ; 4.7829 ; 4.725 ; 4.6445 ; 4.6395]

Bolt 3 - Tensile Force (kips): [50 ; 49.8956 ; 49.837 ; 49.8143 ; 49.8393 ; 49.8977 ; 49.9751 ; 50.1696 ; 50.4013 ; 50.6184 ; 50.8811 ; 51.3093 ; 52.1261 ; 53.5591 ; 55.7877 ; 58.8568 ; 58.8943 ; 58.9255 ; 58.9718 ; 59.0309 ; 59.1098 ; 59.2397 ; 59.4157 ; 59.6545 ; 59.7354 ; 59.8606 ; 60.0403 ; 60.3165 ; 60.8464 ; 61.9279 ; 62.413 ; 63.0215 ; 63.67 ; 64.6234 ; 65.7627 ; 65.793 ; 65.8305 ; 65.8807 ; 65.9497 ; 66.0424 ; 66.1876 ; 66.3988 ; 66.6958 ; 67.1891 ; 67.8112 ; 68.0877 ; 68.714 ; 69.5464 ; 70.6124 ; 72.0978 ; 72.8344]

Bolt 3 - Shear Force (kips): [0.0555156 ; 0.0224809 ; 0.0681373 ; 0.146864 ; 0.260604 ; 0.365461 ; 0.45691 ; 0.573715 ; 0.712396 ; 0.884795 ; 1.07721 ; 1.34581 ; 1.69532 ; 2.12044 ; 2.58132 ; 3.04963 ; 3.0571 ; 3.06935 ; 3.08748 ; 3.12875 ; 3.1997 ; 3.28487 ; 3.39321 ; 3.58746 ; 3.71588 ; 4.02289 ; 5.01302 ; 6.44122 ; 7.45818 ; 8.02237 ; 8.35251 ; 9.05801 ; 10.178 ; 11.2725 ; 12.4425 ; 12.483 ; 12.5508 ; 12.6452 ; 12.7696 ; 12.9384 ; 13.1885 ; 13.5568 ; 14.0719 ; 14.8384 ; 15.8713 ; 16.4281 ; 16.9873 ; 17.6293 ; 18.3681 ; 19.2297 ; 19.3609]

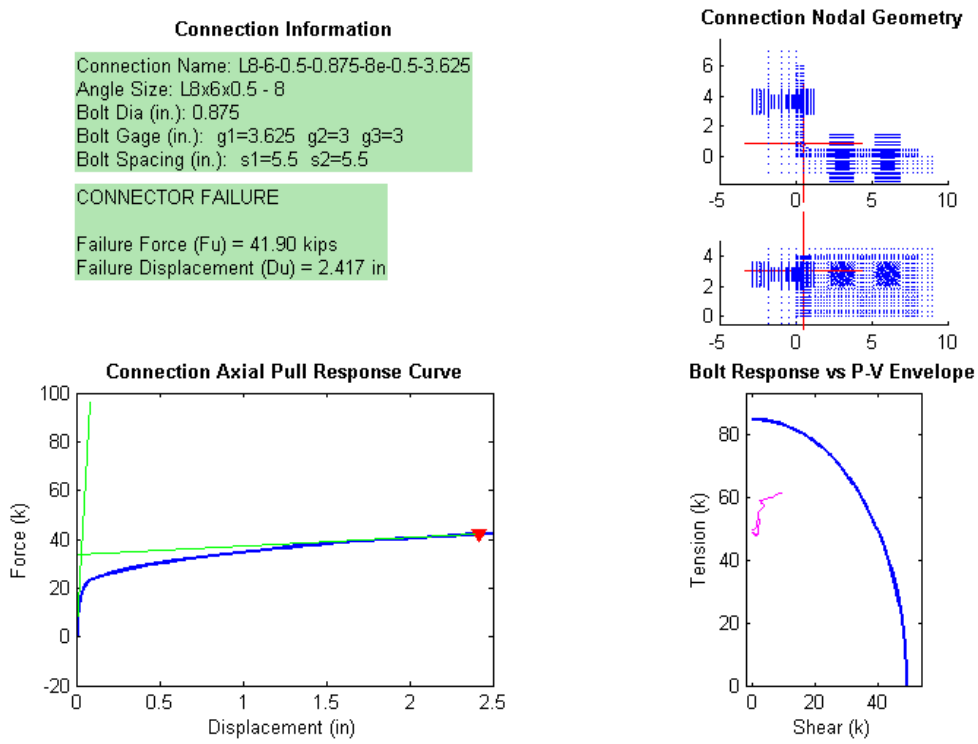


Figure B.233 Connection L8_6_0.5_0.875_8e_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.875_8e_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 1.1709e+003

Plastic Stiffness (k/in): 3.3156

Displacement (in): [4.7201e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.33788 ; 0.38012 ; 0.44347 ; 0.5385 ; 0.68104 ; 0.89486 ; 1.1449 ; 1.2074 ; 1.2699 ; 1.3324 ; 1.3949 ; 1.4183 ; 1.4534 ; 1.5062 ; 1.5853 ; 1.7039 ; 1.8819 ; 1.9444 ; 2.0382 ; 2.1788 ; 2.3897 ; 2.5]

Force (kips): [-1.18513 ; 0.306204 ; 1.10175 ; 1.81911 ; 2.81208 ; 4.15077 ; 5.94867 ; 8.05899 ; 9.95376 ; 11.1473 ; 11.8883 ; 12.5047 ; 13.1469 ; 14.0375 ; 14.3477 ; 14.7759 ; 15.3376 ; 16.0524 ; 16.953 ; 17.8431 ; 18.0672 ; 18.2985 ; 18.5095 ; 18.7032 ; 18.7774 ; 18.8892 ; 19.0407 ; 19.2636 ; 19.5599 ; 19.9734 ; 20.1108 ; 20.298 ; 20.5557 ; 20.9054 ; 21.0771]

Bolt 1 - Tensile Force (kips): [48.6535 ; 48.5983 ; 48.5682 ; 48.5404 ; 48.5012 ; 48.4471 ; 48.3712 ; 48.2764 ; 48.1853 ; 48.1282 ; 48.0986 ; 48.0885 ; 48.0782 ; 48.0602 ; 48.0533 ; 48.0441 ; 48.0322 ; 48.0154 ; 47.9994 ; 47.9893 ; 47.9869 ; 47.9851 ; 47.9853 ; 47.9875 ; 47.9883 ; 47.989 ; 47.9915 ; 47.9947 ; 48.0027 ; 48.0169 ; 48.0224 ; 48.0316 ; 48.047 ; 48.0725 ; 48.0864]

Bolt 1 - Shear Force (kips): [0.067462 ; 0.067648 ; 0.10639 ; 0.14725 ; 0.20752 ; 0.29272 ; 0.41301 ; 0.56135 ; 0.70347 ; 0.79819 ; 0.85802 ; 0.89157 ; 0.93714 ; 1.0086 ; 1.0352 ; 1.0731 ; 1.1274 ; 1.2056 ; 1.2998 ; 1.3951 ; 1.4182 ; 1.4403 ; 1.4592 ; 1.4755 ; 1.4818 ; 1.4915 ; 1.5042 ; 1.524 ; 1.549 ; 1.5837 ; 1.5949 ; 1.6103 ; 1.6314 ; 1.6592 ; 1.6727]

Bolt 2 - Tensile Force (kips): [48.6651 ; 48.5799 ; 48.528 ; 48.4801 ; 48.4153 ; 48.335 ; 48.24 ; 48.1437 ; 48.0748 ; 48.0522 ; 48.086 ; 48.1902 ; 48.2757 ; 48.5193 ; 48.6177 ; 48.7689 ; 49.0065 ; 49.366 ; 49.8334 ; 50.3413 ; 50.4587 ; 50.5738 ; 50.6878 ; 50.8012 ; 50.843 ; 50.9062 ; 51.0022 ; 51.1463 ; 51.3687 ; 51.7222 ; 51.849 ; 52.048 ; 52.3473 ; 52.7884 ; 53.0125]

Bolt 2 - Shear Force (kips): [0.096834 ; 0.080346 ; 0.12679 ; 0.17822 ; 0.25494 ; 0.36403 ; 0.51684 ; 0.70579 ; 0.89427 ; 1.0563 ; 1.2149 ; 1.3317 ; 1.4367 ; 1.5618 ; 1.596 ; 1.6361 ; 1.6743 ; 1.707 ; 1.7489 ; 1.8014 ; 1.8193 ; 1.8375 ; 1.8566 ; 1.8765 ; 1.8843 ; 1.8964 ; 1.9134 ; 1.9384 ; 1.9676 ; 2.0078 ; 2.0192 ; 2.0272 ; 2.0376 ; 2.0578 ; 2.0713]

Bolt 3 - Tensile Force (kips): [50 ; 49.9297 ; 49.8666 ; 49.8188 ; 49.7631 ; 49.708 ; 49.6586 ; 49.6154 ; 49.6636 ; 49.6436 ; 49.6214 ; 49.7088 ; 50.0692 ; 50.7828 ; 51.0545 ; 51.5547 ; 52.2948 ; 53.3875 ; 55.0897 ; 57.2686 ; 57.7874 ; 58.1946 ; 58.4311 ; 58.6201 ; 58.6902 ; 58.807 ; 58.9539 ; 59.1807 ; 59.4832 ; 59.9666 ; 60.1571 ; 60.3711 ; 60.6992 ; 61.2082 ; 61.4518]

Bolt 3 - Shear Force (kips): [0.056792 ; 0.028717 ; 0.024975 ; 0.042287 ; 0.077259 ; 0.13217 ; 0.2181 ; 0.31757 ; 0.41796 ; 0.53955 ; 0.67027 ; 0.81603 ; 0.97739 ; 1.1975 ; 1.2616 ; 1.2837 ; 1.3353 ; 1.4941 ; 1.8678 ; 3.446 ; 3.4458 ; 2.5465 ; 1.9899 ; 2.1313 ; 2.2173 ; 2.3166 ; 2.5761 ; 3.11 ; 4.1825 ; 5.6101 ; 6.1952 ; 6.8995 ; 7.6488 ; 8.5757 ; 9.0987]

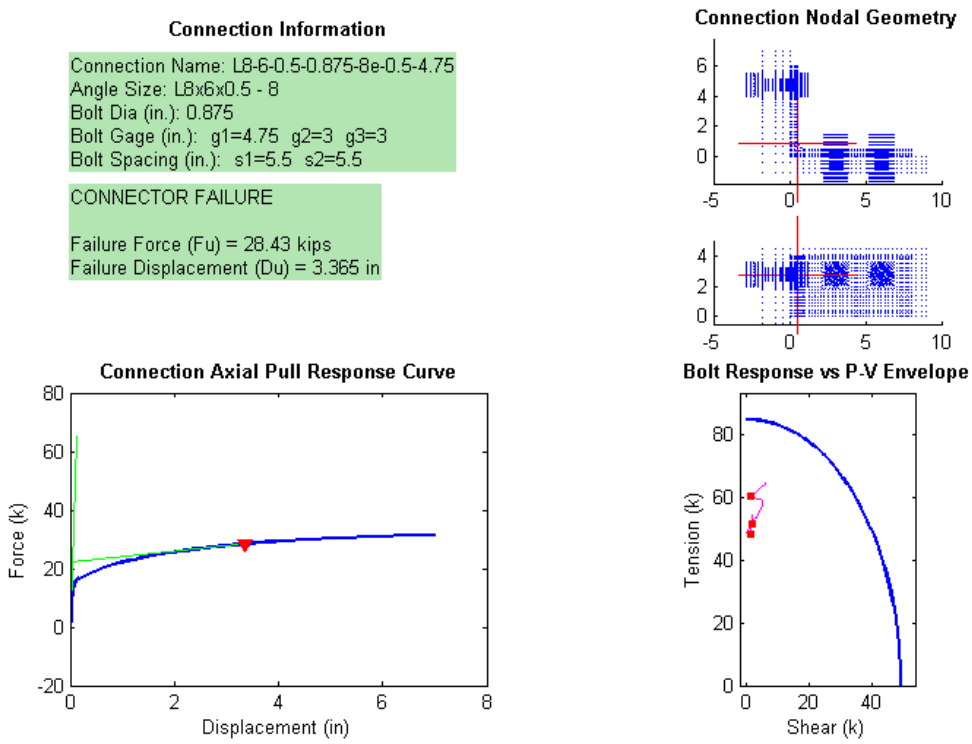


Figure B.234 Connection L8_6_0.5_0.875_8e_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_0.875_8e_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 503.2759

Plastic Stiffness (k/in): 1.7784

Displacement (in): [3.4876e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.46757 ; 0.5464 ; 0.66466 ; 0.84205 ; 1.1081 ; 1.2079 ; 1.3576 ; 1.5821 ; 1.9188 ; 2.424 ; 2.599 ; 2.6646 ; 2.763 ; 2.9107 ; 3.0584 ; 3.206 ; 3.4275 ; 3.5106 ; 3.6351 ; 3.822 ; 4.1023 ; 4.5228 ; 5.1535 ; 5.8535 ; 6.5535 ; 7]

Force (kips): [-1.16281 ; 0.6952 ; 1.58948 ; 2.79319 ; 4.38774 ; 6.12849 ; 7.40012 ; 7.99452 ; 8.34226 ; 8.75099 ; 9.28942 ; 9.48002 ; 9.75147 ; 10.1269 ; 10.6285 ; 11.2601 ; 11.4768 ; 11.771 ; 12.158 ; 12.6579 ; 13.2744 ; 13.4705 ; 13.5427 ; 13.6494 ; 13.8111 ; 13.9536 ; 14.0849 ; 14.2681 ; 14.3355 ; 14.4291 ; 14.5616 ; 14.737 ; 14.9622 ; 15.2264 ; 15.4516 ; 15.6296 ; 15.72]

Bolt 1 - Tensile Force (kips): [48.6541 ; 48.5844 ; 48.5489 ; 48.4994 ; 48.4301 ; 48.3487 ; 48.2836 ; 48.252 ; 48.2321 ; 48.2101 ; 48.207 ; 48.2027 ; 48.1951 ; 48.1839 ; 48.1657 ; 48.1424 ; 48.1341 ; 48.1233 ; 48.1113 ; 48.1 ; 48.0921 ; 48.0903 ; 48.0896 ; 48.0888 ; 48.0874 ; 48.0873 ; 48.0881 ; 48.0906 ; 48.0922 ; 48.0948 ; 48.0998 ; 48.108 ; 48.1218 ; 48.1459 ; 48.1779 ; 48.2136 ; 48.2369]

Bolt 1 - Shear Force (kips): [0.066844 ; 0.086573 ; 0.13736 ; 0.21342 ; 0.3224 ; 0.45164 ; 0.5559 ; 0.61194 ; 0.65394 ; 0.70476 ; 0.72979 ; 0.74471 ; 0.76855 ; 0.80387 ; 0.85857 ; 0.93315 ; 0.95925 ; 0.99443 ; 1.0375 ; 1.0906 ; 1.158 ; 1.1799 ; 1.1882 ; 1.2008 ; 1.2197 ; 1.2367 ; 1.2524 ; 1.274 ; 1.2814 ; 1.2918 ; 1.3061 ; 1.3265 ; 1.3562 ; 1.3976 ; 1.4367 ; 1.4712 ; 1.4932]

Bolt 2 - Tensile Force (kips): [48.6677 ; 48.5532 ; 48.4863 ; 48.4034 ; 48.319 ; 48.2544 ; 48.2393 ; 48.2468 ; 48.2532 ; 48.3037 ; 48.4782 ; 48.5186 ; 48.5965 ; 48.7468 ; 48.9952 ; 49.3756 ; 49.5214 ; 49.7217 ; 49.9863 ; 50.3493 ; 50.8626 ; 51.0291 ; 51.0918 ; 51.1853 ; 51.3245 ; 51.461 ; 51.5941 ; 51.792 ; 51.867 ; 51.9793 ; 52.1445 ; 52.3908 ; 52.7459 ; 53.2235 ; 53.6777 ; 54.0634 ; 54.2734]

Bolt 2 - Shear Force (kips): [0.096135 ; 0.10453 ; 0.1691 ; 0.26733 ; 0.40678 ; 0.57083 ; 0.71029 ; 0.79962 ; 0.87646 ; 0.98904 ; 1.1008 ; 1.1398 ; 1.1918 ; 1.2516 ; 1.3145 ; 1.3715 ; 1.3847 ; 1.4004 ; 1.4218 ; 1.4494 ; 1.5 ; 1.5264 ; 1.5366 ; 1.5529 ; 1.5806 ; 1.6071 ; 1.6327 ; 1.6681 ; 1.6799 ; 1.6971 ; 1.7217 ; 1.7498 ; 1.7803 ; 1.8107 ; 1.8439 ; 1.8747 ; 1.8942]

Bolt 3 - Tensile Force (kips): [50 ; 49.883 ; 49.7932 ; 49.6887 ; 49.5678 ; 49.4362 ; 49.4064 ; 49.3693 ; 49.4407 ; 49.5313 ; 49.7341 ; 49.8854 ; 50.1786 ; 50.6502 ; 51.3124 ; 52.4195 ; 52.8999 ; 53.6019 ; 54.6098 ; 56.021 ; 58.0107 ; 58.7005 ; 58.9321 ; 59.2693 ; 59.7023 ; 60.0128 ; 60.268 ; 60.6521 ; 60.8 ; 61.0099 ; 61.3299 ; 61.742 ; 62.324 ; 63.0264 ; 63.7543 ; 64.4036 ; 64.7729]

Bolt 3 - Shear Force (kips): [0.054938 ; 0.023871 ; 0.047821 ; 0.10336 ; 0.19003 ; 0.27149 ; 0.32514 ; 0.33705 ; 0.36243 ; 0.45254 ; 0.64224 ; 0.70069 ; 0.78172 ; 0.90639 ; 1.0905 ; 1.3594 ; 2.0153 ; 2.9476 ; 3.8135 ; 4.3579 ; 4.8143 ; 5.0564 ; 4.9675 ; 4.7307 ; 3.412 ; 2.3948 ; 1.5559 ; 1.0003 ; 1.3564 ; 1.6889 ; 2.5366 ; 3.2887 ; 3.7709 ; 4.6529 ; 5.4348 ; 5.8863 ; 6.1452]

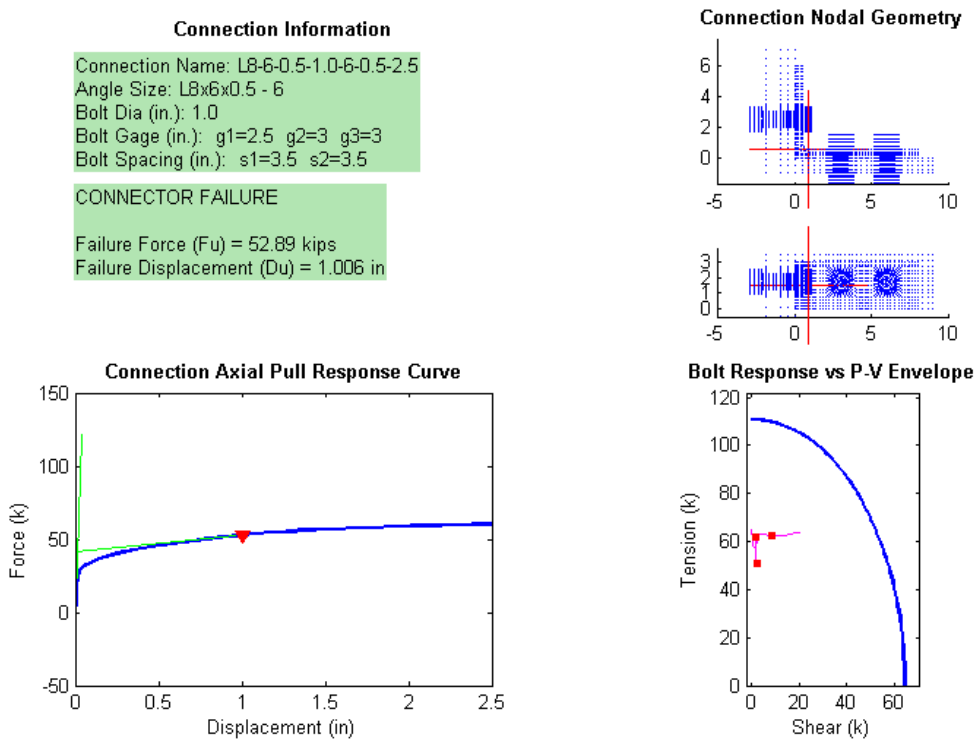


Figure B.235 Connection L8_6_0.5_1.0_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_1.0_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.8858e+003

Plastic Stiffness (k/in): 11.5732

Displacement (in): [8.2101e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.25146 ; 0.29369 ; 0.35705 ; 0.45208 ; 0.59462 ; 0.64807 ; 0.72825 ; 0.73577 ; 0.74704 ; 0.76396 ; 0.78933 ; 0.79884 ; 0.81311 ; 0.83452 ; 0.86663 ; 0.91479 ; 0.96295 ; 1.0111 ; 1.0834 ; 1.1917 ; 1.2324 ; 1.2933 ; 1.3847 ; 1.5219 ; 1.7276 ; 1.9776 ; 2.0401 ; 2.1339 ; 2.2745 ; 2.4854 ; 2.5]

Force (kips): [-2.04938 ; 1.43883 ; 3.587 ; 6.20414 ; 9.3287 ; 12.3649 ; 14.2584 ; 15.2273 ; 16.109 ; 17.1359 ; 18.3226 ; 19.6271 ; 20.0454 ; 20.6039 ; 21.3447 ; 22.315 ; 23.5115 ; 23.9018 ; 24.4455 ; 24.5284 ; 24.6417 ; 24.7936 ; 25.0094 ; 25.0996 ; 25.2252 ; 25.3992 ; 25.6256 ; 25.9363 ; 26.215 ; 26.472 ; 26.8365 ; 27.3234 ; 27.4955 ; 27.7399 ; 28.0611 ; 28.4839 ; 28.993 ; 29.4581 ; 29.558 ; 29.6977 ; 29.8785 ; 30.1067 ; 30.1211]

Bolt 1 - Tensile Force (kips): [63.3353 ; 63.1935 ; 63.1033 ; 62.9879 ; 62.843 ; 62.6943 ; 62.5995 ; 62.5554 ; 62.5129 ; 62.4511 ; 62.3698 ; 62.2742 ; 62.2417 ; 62.2002 ; 62.1449 ; 62.0706 ; 61.9882 ; 61.9634 ; 61.9312 ; 61.9266 ; 61.9205 ; 61.9134 ; 61.9026 ; 61.8984 ; 61.893 ; 61.8856 ; 61.8774 ; 61.8703 ; 61.8663 ; 61.8637 ; 61.8601 ; 61.8552 ; 61.8513 ; 61.8456 ; 61.8395 ; 61.834 ; 61.8363 ; 61.8544 ; 61.8598 ; 61.8683 ; 61.8837 ; 61.9114 ; 61.9134]

Bolt 1 - Shear Force (kips): [0.14924 ; 0.10831 ; 0.19621 ; 0.32836 ; 0.49792 ; 0.67093 ; 0.78078 ; 0.83353 ; 0.88628 ; 0.96345 ; 1.071 ; 1.2157 ; 1.2654 ; 1.3306 ; 1.4191 ; 1.54 ; 1.6846 ; 1.7315 ; 1.7954 ; 1.8028 ; 1.8131 ; 1.8261 ; 1.8461 ; 1.8536 ; 1.8639 ; 1.8785 ; 1.8975 ; 1.9193 ; 1.9372 ; 1.9534 ; 1.9784 ; 2.017 ; 2.0351 ; 2.0621 ; 2.0999 ; 2.1528 ; 2.2204 ; 2.2856 ; 2.301 ; 2.3233 ; 2.3537 ; 2.3937 ; 2.3964]

Bolt 2 - Tensile Force (kips): [63.3352 ; 63.0701 ; 62.8871 ; 62.6382 ; 62.3051 ; 61.8964 ; 61.4825 ; 60.9453 ; 60.1334 ; 58.9268 ; 57.4554 ; 55.8232 ; 55.2349 ; 54.5198 ; 53.6452 ; 52.6701 ; 51.7153 ; 51.467 ; 51.1845 ; 51.1526 ; 51.1088 ; 51.0518 ; 50.97 ; 50.938 ; 50.8947 ; 50.8378 ; 50.7777 ; 50.7289 ; 50.7008 ; 50.6945 ; 50.6972 ; 50.7484 ; 50.7752 ; 50.8489 ; 51.0285 ; 51.3309 ; 51.9033 ; 52.683 ; 52.8613 ; 53.118 ; 53.482 ; 53.9976 ; 54.0298]

Bolt 2 - Shear Force (kips): [0.12517 ; 0.2214 ; 0.40192 ; 0.63706 ; 0.9316 ; 1.2331 ; 1.4409 ; 1.5621 ; 1.6663 ; 1.7334 ; 1.765 ; 1.7669 ; 1.7597 ; 1.7585 ; 1.7723 ; 1.8122 ; 1.8887 ; 1.9326 ; 2.0145 ; 2.0263 ; 2.0427 ; 2.0648 ; 2.0991 ; 2.1125 ; 2.1317 ; 2.1601 ; 2.2008 ; 2.2583 ; 2.312 ; 2.3629 ; 2.4371 ; 2.5218 ; 2.5402 ; 2.5446 ; 2.5158 ; 2.4418 ; 2.2958 ; 2.0892 ; 2.0364 ; 1.9576 ; 1.8415 ; 1.6867 ; 1.6768]

Bolt 3 - Tensile Force (kips): [65 ; 64.8281 ; 64.6621 ; 64.4301 ; 64.0836 ; 63.516 ; 62.6079 ; 61.2941 ; 59.7631 ; 58.3804 ; 57.5286 ; 57.7538 ; 57.988 ; 58.3742 ; 59.0203 ; 60.0736 ; 61.4875 ; 61.9478 ; 62.6633 ; 62.7477 ; 62.8258 ; 62.8852 ; 62.9691 ; 63.0057 ; 63.0236 ; 63.0184 ; 62.9692 ; 62.8766 ; 62.7149 ; 62.5339 ; 62.3715 ; 62.1999 ; 62.3187 ; 62.5071 ; 62.7134 ; 62.9791 ; 63.2749 ; 63.5725 ; 63.6829 ; 63.8102 ; 63.9145 ; 63.9904 ; 63.9959]

Bolt 3 - Shear Force (kips): [0.0695712 ; 0.0452206 ; 0.0962306 ; 0.174239 ; 0.280488 ; 0.391893 ; 0.489044 ; 0.564845 ; 0.694646 ; 0.952831 ; 1.34659 ; 1.69426 ; 1.73654 ; 1.96498 ; 2.245 ; 2.4225 ; 2.57347 ; 2.62315 ; 2.8079 ; 2.77935 ; 2.84598 ; 2.9197 ; 3.09251 ; 3.15331 ; 3.27619 ; 3.46158 ; 3.71886 ; 5.32367 ; 7.1727 ; 8.70898 ; 10.4871 ; 12.343 ; 12.9224 ; 13.6508 ; 14.5036 ; 15.6451 ; 16.8238 ; 18.1798 ; 18.4855 ; 18.9198 ; 19.539 ; 20.3171 ; 20.3661]

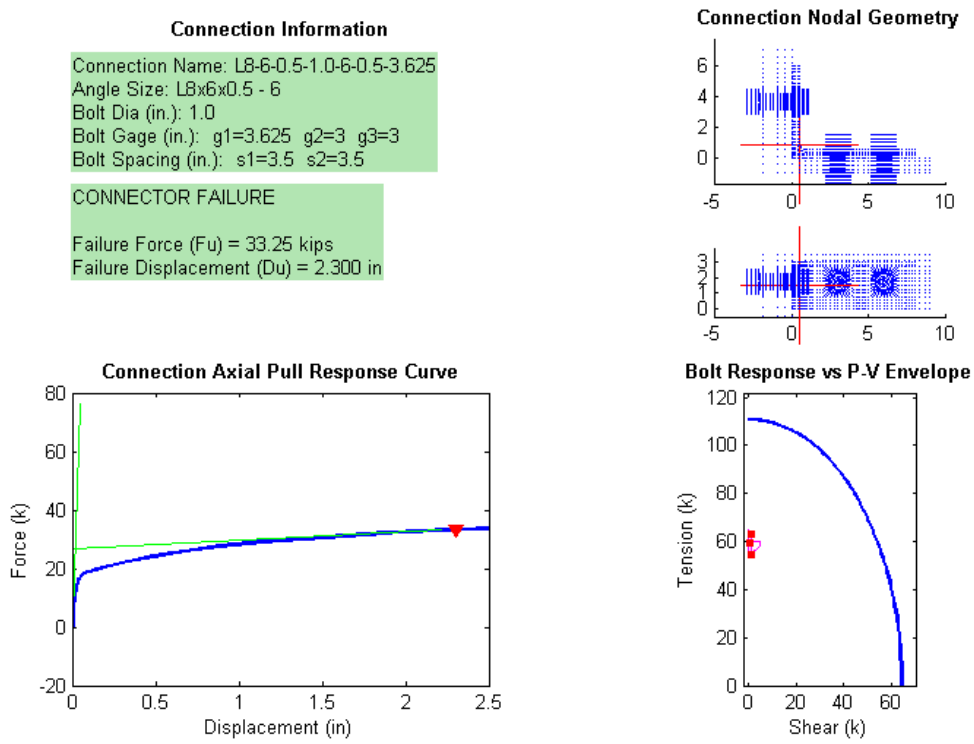


Figure B.236 Connection L8_6_0.5_1.0_6_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_1.0_6_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 1.5207e+003

Plastic Stiffness (k/in): 2.7632

Displacement (in): [7.9626e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.53655 ; 0.67909 ; 0.8929 ; 1.1429 ; 1.3929 ; 1.6429 ; 1.8929 ; 1.9554 ; 2.0492 ; 2.0843 ; 2.137 ; 2.2161 ; 2.3348 ; 2.5]

Force (kips): [-1.98131 ; 0.208449 ; 0.988793 ; 2.03161 ; 3.40104 ; 5.13362 ; 6.99567 ; 8.35336 ; 9.05717 ; 9.48312 ; 9.85738 ; 10.4159 ; 11.2051 ; 11.4751 ; 11.8416 ; 12.3287 ; 12.983 ; 13.7753 ; 14.5068 ; 15.0988 ; 15.5835 ; 16.0085 ; 16.1286 ; 16.2786 ; 16.3294 ; 16.4076 ; 16.5169 ; 16.6718 ; 16.87]

Bolt 1 - Tensile Force (kips): [63.3353 ; 63.2469 ; 63.2156 ; 63.1728 ; 63.1145 ; 63.0373 ; 62.9499 ; 62.8843 ; 62.8544 ; 62.8389 ; 62.8332 ; 62.8278 ; 62.8111 ; 62.8046 ; 62.7965 ; 62.7886 ; 62.7798 ; 62.7826 ; 62.8036 ; 62.827 ; 62.8572 ; 62.8976 ; 62.9093 ; 62.9287 ; 62.9363 ; 62.9484 ; 62.9668 ; 62.9949 ; 63.0345]

Bolt 1 - Shear Force (kips): [0.14612 ; 0.089098 ; 0.098337 ; 0.13024 ; 0.1894 ; 0.2761 ; 0.37817 ; 0.45748 ; 0.49824 ; 0.5296 ; 0.55348 ; 0.58655 ; 0.64912 ; 0.6736 ; 0.7098 ; 0.75844 ; 0.82604 ; 0.90623 ; 0.97788 ; 1.0476 ; 1.1077 ; 1.1536 ; 1.1627 ; 1.1736 ; 1.1775 ; 1.1817 ; 1.1877 ; 1.1958 ; 1.2063]

Bolt 2 - Tensile Force (kips): [63.3343 ; 63.1703 ; 63.0986 ; 62.9972 ; 62.8543 ; 62.6643 ; 62.4352 ; 62.1974 ; 61.9222 ; 61.628 ; 61.3131 ; 60.812 ; 59.9448 ; 59.6131 ; 59.1157 ; 58.4012 ; 57.4741 ; 56.3916 ; 55.5906 ; 55.0575 ; 54.7585 ; 54.6784 ; 54.6696 ; 54.676 ; 54.6793 ; 54.6889 ; 54.7079 ; 54.7554 ; 54.8637]

Bolt 2 - Shear Force (kips): [0.12067 ; 0.13184 ; 0.19625 ; 0.29042 ; 0.42159 ; 0.59701 ; 0.79749 ; 0.96266 ; 1.0705 ; 1.145 ; 1.1954 ; 1.2438 ; 1.264 ; 1.2608 ; 1.2491 ; 1.2248 ; 1.1925 ; 1.153 ; 1.1593 ; 1.2158 ; 1.2859 ; 1.3719 ; 1.3944 ; 1.4259 ; 1.4373 ; 1.4535 ; 1.4772 ; 1.511 ; 1.5622]

Bolt 3 - Tensile Force (kips): [65 ; 64.8955 ; 64.786 ; 64.6167 ; 64.336 ; 63.867 ; 63.0703 ; 61.9555 ; 60.4647 ; 58.8407 ; 57.3019 ; 56.2107 ; 55.6388 ; 55.5461 ; 55.4806 ; 55.486 ; 55.6544 ; 56.4324 ; 57.412 ; 58.2695 ; 59.0315 ; 59.7442 ; 59.8365 ; 59.8084 ; 59.7851 ; 59.7441 ; 59.6629 ; 59.6169 ; 59.4932]

Bolt 3 - Shear Force (kips): [0.069657 ; 0.041234 ; 0.04219 ; 0.06531 ; 0.1018 ; 0.1381 ; 0.14025 ; 0.097076 ; 0.071131 ; 0.095085 ; 0.13667 ; 0.20259 ; 0.40005 ; 0.49488 ; 0.6392 ; 0.84567 ; 1.8585 ; 3.3078 ; 4.2504 ; 4.8111 ; 4.9892 ; 4.7406 ; 3.7291 ; 2.5369 ; 2.2031 ; 1.443 ; 0.52415 ; 0.78333 ; 1.9801]

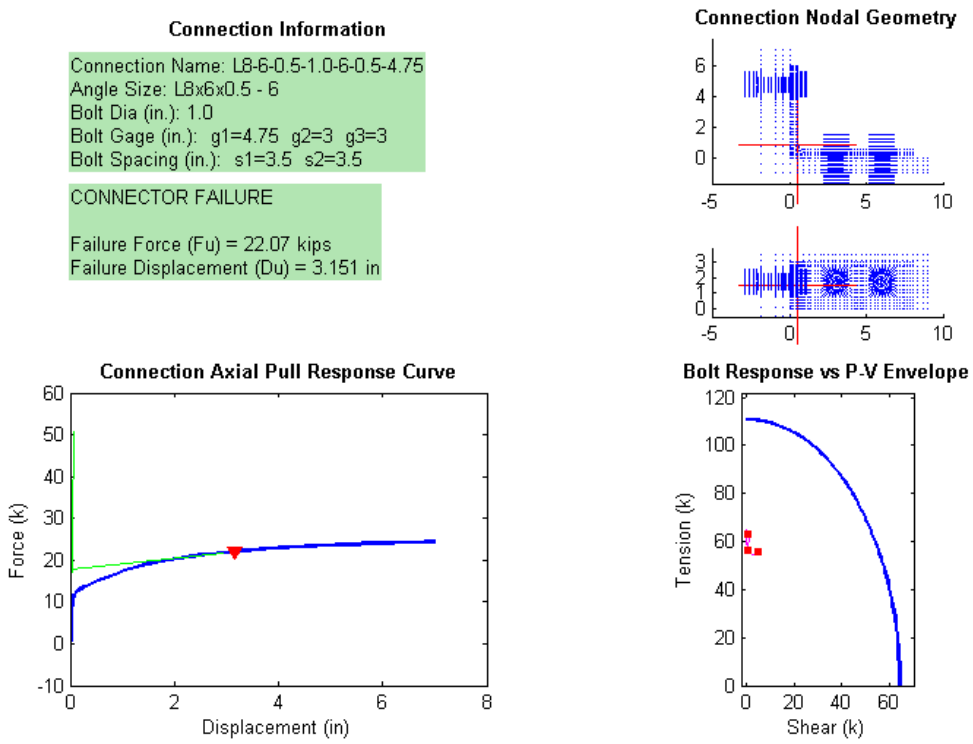


Figure B.237 Connection L8_6_0.5_1.0_6_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_1.0_6_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 616.1317

Plastic Stiffness (k/in): 1.4034

Displacement (in): [7.9727e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.9406 ; 1.0589 ; 1.2362 ; 1.5023 ; 1.9015 ; 2.5001 ; 2.6751 ; 2.9376 ; 3.3314 ; 3.922 ; 4.097 ; 4.3595 ; 4.622 ; 4.8845 ; 5.2783 ; 5.8689 ; 6.5689 ; 7]

Force (kips): [-1.95451 ; 0.589114 ; 1.41496 ; 2.51483 ; 3.89944 ; 5.18152 ; 5.91756 ; 6.21705 ; 6.4434 ; 6.78117 ; 7.22235 ; 7.80567 ; 8.55502 ; 8.81829 ; 9.14194 ; 9.54912 ; 10.032 ; 10.5869 ; 10.7211 ; 10.9053 ; 11.1462 ; 11.4358 ; 11.5073 ; 11.6075 ; 11.6944 ; 11.7726 ; 11.8837 ; 12.0041 ; 12.11 ; 12.1599]

Bolt 1 - Tensile Force (kips): [63.3356 ; 63.2328 ; 63.1986 ; 63.1508 ; 63.0872 ; 63.0233 ; 62.9831 ; 62.9652 ; 62.9532 ; 62.9333 ; 62.9325 ; 62.9296 ; 62.9178 ; 62.9085 ; 62.899 ; 62.8902 ; 62.8884 ; 62.9024 ; 62.9083 ; 62.9183 ; 62.9363 ; 62.9704 ; 62.9805 ; 62.9964 ; 63.0128 ; 63.0284 ; 63.048 ; 63.0854 ; 63.1322 ; 63.1624]

Bolt 1 - Shear Force (kips): [0.14559 ; 0.09271 ; 0.11135 ; 0.15241 ; 0.21811 ; 0.28943 ; 0.33845 ; 0.36658 ; 0.39088 ; 0.42955 ; 0.43814 ; 0.4637 ; 0.52195 ; 0.55368 ; 0.59439 ; 0.6475 ; 0.71062 ; 0.78133 ; 0.79981 ; 0.82581 ; 0.86063 ; 0.90259 ; 0.91506 ; 0.93234 ; 0.9488 ; 0.96595 ; 0.99601 ; 1.0303 ; 1.0669 ; 1.0872]

Bolt 2 - Tensile Force (kips): [63.336 ; 63.1369 ; 63.0451 ; 62.9136 ; 62.7441 ; 62.5659 ; 62.4218 ; 62.3278 ; 62.2142 ; 61.984 ; 61.6106 ; 61.0467 ; 60.1749 ; 59.7482 ; 59.1328 ; 58.3901 ; 57.4849 ; 56.6991 ; 56.512 ; 56.2894 ; 56.056 ; 55.9244 ; 55.899 ; 55.874 ; 55.8665 ; 55.8701 ; 55.8808 ; 55.9198 ; 55.9509 ; 55.9717]

Bolt 2 - Shear Force (kips): [0.12014 ; 0.16786 ; 0.24816 ; 0.3624 ; 0.51569 ; 0.67118 ; 0.77458 ; 0.82663 ; 0.8759 ; 0.96129 ; 1.0212 ; 1.063 ; 1.047 ; 1.0289 ; 0.99648 ; 0.95212 ; 0.89555 ; 0.89477 ; 0.90241 ; 0.91689 ; 0.95079 ; 1.0173 ; 1.0365 ; 1.0649 ; 1.0917 ; 1.1184 ; 1.1655 ; 1.2246 ; 1.2859 ; 1.3218]

Bolt 3 - Tensile Force (kips): [65 ; 64.8162 ; 64.6146 ; 64.2502 ; 63.5677 ; 62.4374 ; 61.0227 ; 59.531 ; 58.1836 ; 56.966 ; 55.8546 ; 55.0809 ; 54.8834 ; 54.8006 ; 54.6694 ; 54.7076 ; 54.9737 ; 55.5446 ; 55.6524 ; 55.858 ; 56.1709 ; 56.6887 ; 56.8527 ; 57.0122 ; 57.0087 ; 56.9705 ; 57.1084 ; 57.1227 ; 57.1145 ; 57.0985]

Bolt 3 - Shear Force (kips): [0.067634 ; 0.0455 ; 0.059841 ; 0.080417 ; 0.077982 ; 0.039504 ; 0.21124 ; 0.40623 ; 0.51558 ; 0.52094 ; 0.37608 ; 0.24034 ; 1.111 ; 2.7481 ; 3.7145 ; 4.6729 ; 5.0453 ; 5.1015 ; 5.1415 ; 5.257 ; 5.2713 ; 5.4201 ; 5.5981 ; 5.2957 ; 4.6928 ; 4.076 ; 4.0991 ; 3.9028 ; 3.6906 ; 3.5331]

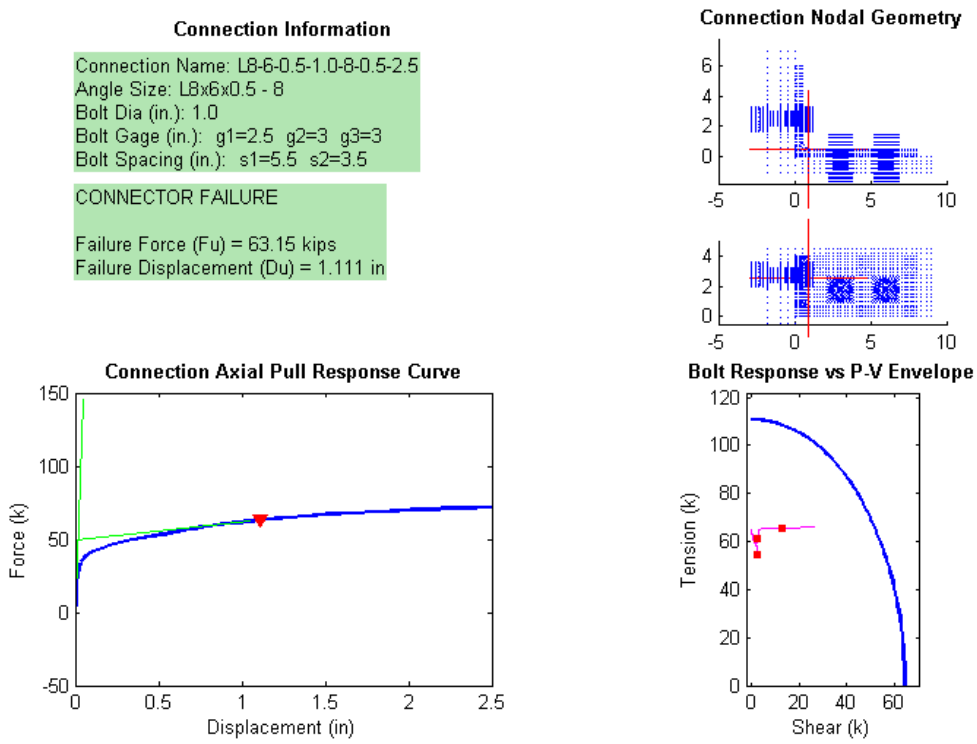


Figure B.238 Connection L8_6_0.5_1.0_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_1.0_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.8135e+003

Plastic Stiffness (k/in): 12.8604

Displacement (in): [8.9431e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.024414 ; 0.031006 ; 0.040894 ; 0.055725 ; 0.077972 ; 0.11134 ; 0.1614 ; 0.23649 ; 0.34911 ; 0.51805 ; 0.58055 ; 0.60399 ; 0.61278 ; 0.62596 ; 0.64574 ; 0.66057 ; 0.68282 ; 0.69116 ; 0.70367 ; 0.72245 ; 0.7506 ; 0.79284 ; 0.85619 ; 0.87995 ; 0.91558 ; 0.96904 ; 1.0492 ; 1.1695 ; 1.2146 ; 1.2822 ; 1.3837 ; 1.5359 ; 1.6501 ; 1.8214 ; 2.0713 ; 2.3213 ; 2.5]

Force (kips): [-1.78586 ; 1.49737 ; 3.70917 ; 6.43219 ; 9.77273 ; 13.3715 ; 15.4893 ; 16.7354 ; 17.7452 ; 18.6779 ; 19.6671 ; 20.769 ; 21.9894 ; 23.3032 ; 24.835 ; 26.6442 ; 27.2169 ; 27.4255 ; 27.5096 ; 27.6589 ; 27.8845 ; 28.0533 ; 28.3049 ; 28.4014 ; 28.5303 ; 28.7306 ; 29.0116 ; 29.3945 ; 29.9004 ; 30.0813 ; 30.3411 ; 30.7111 ; 31.2267 ; 31.8998 ; 32.1328 ; 32.4633 ; 32.9184 ; 33.524 ; 33.9242 ; 34.4474 ; 35.069 ; 35.5575 ; 35.855]

Bolt 1 - Tensile Force (kips): [63.3335 ; 63.1973 ; 63.1015 ; 62.9773 ; 62.8159 ; 62.6305 ; 62.515 ; 62.4435 ; 62.3824 ; 62.3222 ; 62.2561 ; 62.1776 ; 62.0768 ; 61.9567 ; 61.8178 ; 61.6615 ; 61.6128 ; 61.5954 ; 61.5889 ; 61.5785 ; 61.5619 ; 61.5495 ; 61.5316 ; 61.5249 ; 61.5162 ; 61.502 ; 61.482 ; 61.4544 ; 61.4204 ; 61.4078 ; 61.3898 ; 61.3636 ; 61.324 ; 61.2733 ; 61.2562 ; 61.2314 ; 61.1972 ; 61.1532 ; 61.1238 ; 61.0861 ; 61.0436 ; 61.0153 ; 61.007]

Bolt 1 - Shear Force (kips): [0.13396 ; 0.11889 ; 0.23457 ; 0.39598 ; 0.60574 ; 0.8429 ; 0.98979 ; 1.0812 ; 1.1617 ; 1.2438 ; 1.3345 ; 1.4372 ; 1.5817 ; 1.7748 ; 1.9947 ; 2.2476 ; 2.3286 ; 2.3577 ; 2.3685 ; 2.385 ; 2.4117 ; 2.4314 ; 2.4596 ; 2.4701 ; 2.4839 ; 2.5063 ; 2.5383 ; 2.5821 ; 2.6369 ; 2.6572 ; 2.6867 ; 2.7306 ; 2.7986 ; 2.8924 ; 2.9251 ; 2.9738 ; 3.0453 ; 3.1456 ; 3.2185 ; 3.322 ; 3.4623 ; 3.5905 ; 3.6693]

Bolt 2 - Tensile Force (kips): [63.3308 ; 63.1063 ; 62.933 ; 62.6967 ; 62.3716 ; 61.9782 ; 61.6781 ; 61.4373 ; 61.1199 ; 60.7024 ; 60.1168 ; 59.3578 ; 58.4708 ; 57.3721 ; 56.028 ; 54.7986 ; 54.4609 ; 54.373 ; 54.3436 ; 54.3011 ; 54.2435 ; 54.2074 ; 54.1717 ; 54.158 ; 54.142 ; 54.1192 ; 54.0951 ; 54.0752 ; 54.0981 ; 54.1099 ; 54.1449 ; 54.2204 ; 54.3815 ; 54.6824 ; 54.7993 ; 54.98 ; 55.2684 ; 55.7276 ; 56.0646 ; 56.5867 ; 57.2999 ; 57.927 ; 58.3695]

Bolt 2 - Shear Force (kips): [0.10411 ; 0.207 ; 0.39575 ; 0.64041 ; 0.95278 ; 1.3032 ; 1.5248 ; 1.6685 ; 1.8013 ; 1.934 ; 2.0666 ; 2.1708 ; 2.2442 ; 2.2679 ; 2.2997 ; 2.3601 ; 2.3893 ; 2.4055 ; 2.4124 ; 2.4243 ; 2.4442 ; 2.4599 ; 2.4839 ; 2.4933 ; 2.5061 ; 2.5282 ; 2.561 ; 2.6091 ; 2.6708 ; 2.6919 ; 2.7209 ; 2.7512 ; 2.7588 ; 2.7586 ; 2.757 ; 2.7518 ; 2.7377 ; 2.7061 ; 2.6761 ; 2.624 ; 2.5383 ; 2.446 ; 2.3749]

Bolt 3 - Tensile Force (kips): [65 ; 64.8226 ; 64.6572 ; 64.4255 ; 64.1117 ; 63.6303 ; 63.1824 ; 62.6949 ; 61.9872 ; 61.078 ; 60.1029 ; 59.3497 ; 58.9853 ; 59.6151 ; 61.1838 ; 63.392 ; 64.129 ; 64.4189 ; 64.5142 ; 64.6021 ; 64.7433 ; 64.8661 ; 64.9922 ; 65.041 ; 65.0844 ; 65.1474 ; 65.2503 ; 65.3684 ; 65.3896 ; 65.381 ; 65.391 ; 65.4091 ; 65.4644 ; 65.5097 ; 65.4849 ; 65.4933 ; 65.5596 ; 65.7211 ; 65.8225 ; 65.9347 ; 66.0113 ; 66.0161 ; 66.2336]

Bolt 3 - Shear Force (kips): [0.078955 ; 0.0460281 ; 0.087676 ; 0.156386 ; 0.259939 ; 0.382658 ; 0.468898 ; 0.533932 ; 0.630618 ; 0.803993 ; 1.07724 ; 1.4554 ; 1.96715 ; 2.39687 ; 2.67841 ; 2.91715 ; 3.12232 ; 3.40413 ; 3.31699 ; 3.0998 ; 3.17646 ; 3.26285 ; 3.45178 ; 3.53463 ; 3.6731 ; 3.92979 ; 4.29502 ; 4.68295 ; 6.81561 ; 7.69843 ; 8.83797 ; 10.2418 ; 11.9042 ; 13.8466 ; 14.7063 ; 15.8493 ; 17.1882 ; 18.9766 ; 20.2136 ; 21.7199 ; 23.578 ; 25.2148 ; 26.0907]

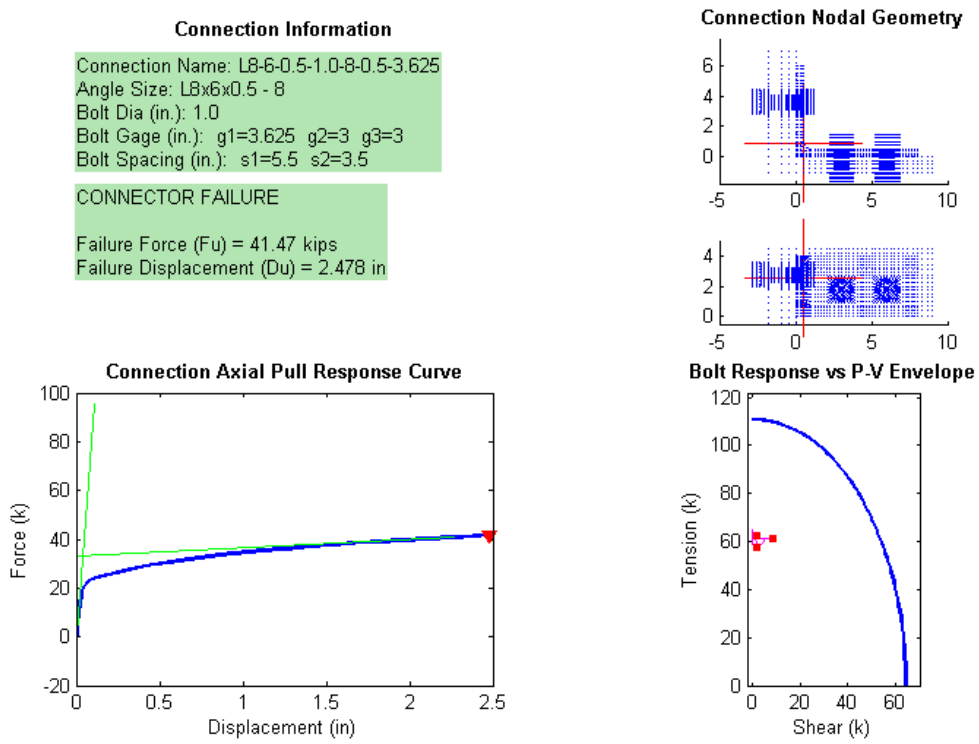


Figure B.239 Connection L8_6_0.5_1.0_8_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_1.0_8_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 870.7366

Plastic Stiffness (k/in): 3.5094

Displacement (in): [7.1041e-036 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.03125 ; 0.039063 ; 0.050781 ; 0.068359 ; 0.094727 ; 0.13428 ; 0.1936 ; 0.28259 ; 0.41608 ; 0.6163 ; 0.8663 ; 1.1163 ; 1.3663 ; 1.3819 ; 1.4054 ; 1.4405 ; 1.4933 ; 1.5724 ; 1.602 ; 1.6465 ; 1.7133 ; 1.8134 ; 1.9635 ; 2.1137 ; 2.2639 ; 2.4891 ; 2.5]

Force (kips): [-1.72291 ; 2.59707 ; 5.07972 ; 7.09331 ; 8.5728 ; 9.599 ; 10.5285 ; 11.2267 ; 11.7964 ; 12.2849 ; 12.7935 ; 13.5169 ; 14.4674 ; 15.6179 ; 16.7592 ; 17.6065 ; 18.3204 ; 18.3731 ; 18.4596 ; 18.5692 ; 18.7185 ; 18.94 ; 19.0206 ; 19.1349 ; 19.2965 ; 19.5212 ; 19.8376 ; 20.1306 ; 20.3941 ; 20.75 ; 20.7658]

Bolt 1 - Tensile Force (kips): [63.3331 ; 63.1526 ; 63.0388 ; 62.94 ; 62.863 ; 62.8071 ; 62.7543 ; 62.7129 ; 62.678 ; 62.656 ; 62.6395 ; 62.6128 ; 62.5724 ; 62.523 ; 62.4804 ; 62.4676 ; 62.4684 ; 62.4682 ; 62.4678 ; 62.4688 ; 62.4717 ; 62.477 ; 62.4792 ; 62.4832 ; 62.4904 ; 62.5033 ; 62.525 ; 62.5489 ; 62.5751 ; 62.6161 ; 62.6183]

Bolt 1 - Shear Force (kips): [0.13012 ; 0.17546 ; 0.31964 ; 0.4479 ; 0.5481 ; 0.62138 ; 0.69227 ; 0.75198 ; 0.80852 ; 0.84951 ; 0.89091 ; 0.95372 ; 1.0509 ; 1.1906 ; 1.3583 ; 1.4865 ; 1.5919 ; 1.599 ; 1.6089 ; 1.6216 ; 1.6385 ; 1.6615 ; 1.6695 ; 1.6808 ; 1.696 ; 1.7159 ; 1.743 ; 1.767 ; 1.7884 ; 1.8203 ; 1.8218]

Bolt 2 - Tensile Force (kips): [63.3287 ; 62.9894 ; 62.7307 ; 62.5071 ; 62.3321 ; 62.1858 ; 62.009 ; 61.7704 ; 61.4912 ; 61.2244 ; 60.9347 ; 60.4873 ; 59.8972 ; 58.9184 ; 57.8678 ; 57.2212 ; 56.8526 ; 56.8335 ; 56.8063 ; 56.7757 ; 56.7455 ; 56.7192 ; 56.7115 ; 56.7048 ; 56.7105 ; 56.7656 ; 56.8827 ; 57.0259 ; 57.1987 ; 57.5106 ; 57.5254]

Bolt 2 - Shear Force (kips): [0.099434 ; 0.3244 ; 0.56984 ; 0.77906 ; 0.94053 ; 1.06 ; 1.1817 ; 1.297 ; 1.4046 ; 1.4827 ; 1.5447 ; 1.6036 ; 1.6403 ; 1.618 ; 1.5989 ; 1.6081 ; 1.6705 ; 1.6757 ; 1.6836 ; 1.6943 ; 1.7101 ; 1.7352 ; 1.7447 ; 1.7582 ; 1.779 ; 1.8115 ; 1.8585 ; 1.9038 ; 1.9369 ; 1.9403 ; 1.9395]

Bolt 3 - Tensile Force (kips): [65 ; 64.5489 ; 64.0348 ; 63.4251 ; 62.8629 ; 62.3185 ; 61.5732 ; 60.6084 ; 59.4193 ; 58.2047 ; 57.3689 ; 56.9145 ; 56.9839 ; 57.8783 ; 59.4491 ; 60.4534 ; 61.3423 ; 61.4066 ; 61.4653 ; 61.4748 ; 61.4585 ; 61.3595 ; 61.3027 ; 61.218 ; 61.1133 ; 60.9598 ; 60.9544 ; 61.0525 ; 61.1853 ; 61.2746 ; 61.2759]

Bolt 3 - Shear Force (kips): [0.076813 ; 0.074872 ; 0.13012 ; 0.1611 ; 0.16998 ; 0.17024 ; 0.18266 ; 0.2435 ; 0.36061 ; 0.48733 ; 0.64397 ; 0.91352 ; 1.2888 ; 2.1405 ; 4.4115 ; 5.0956 ; 5.8084 ; 5.7158 ; 5.0901 ; 4.3239 ; 3.43 ; 2.0841 ; 1.7465 ; 1.6402 ; 1.9654 ; 2.9506 ; 4.4513 ; 5.8989 ; 7.1531 ; 8.604 ; 8.6742]

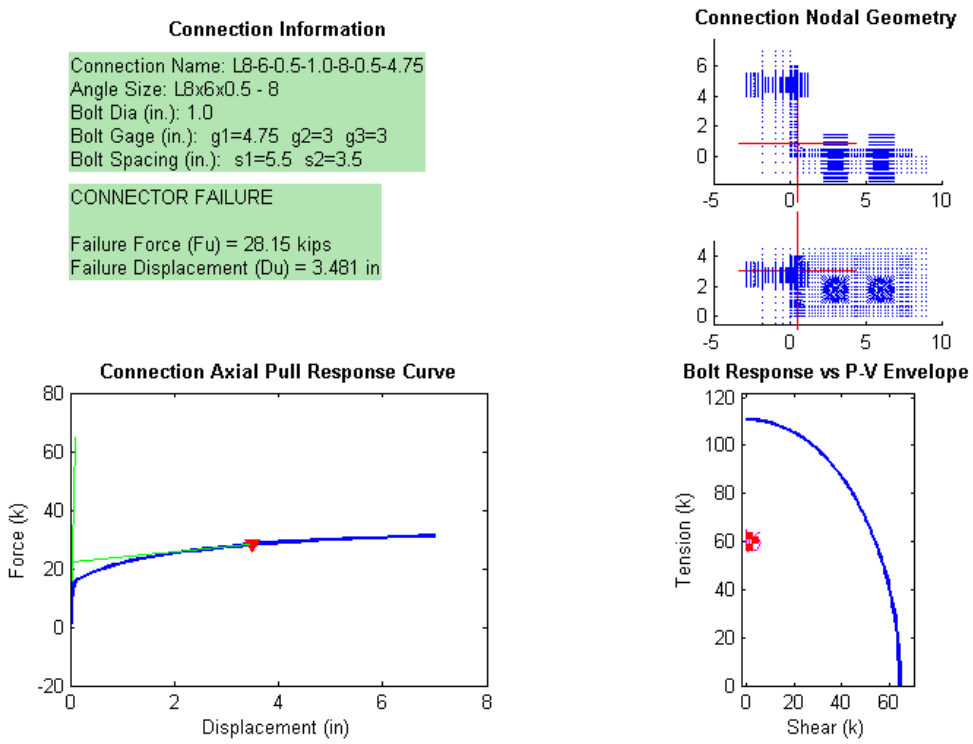


Figure B.240 Connection L8_6_0.5_1.0_8_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_1.0_8_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 610.9824

Plastic Stiffness (k/in): 1.6687

Displacement (in): [7.0137e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.46757 ; 0.5464 ; 0.66466 ; 0.84205 ; 0.90857 ; 1.0084 ; 1.158 ; 1.3825 ; 1.7193 ; 2.2244 ; 2.3994 ; 2.6619 ; 3.0557 ; 3.2033 ; 3.4248 ; 3.757 ; 4.2554 ; 4.9554 ; 4.9991 ; 5.0648 ; 5.1632 ; 5.3109 ; 5.5323 ; 5.8646 ; 6.3629 ; 7]

Force (kips): [-1.70976 ; 0.680451 ; 1.63155 ; 2.89138 ; 4.50956 ; 6.20637 ; 7.38614 ; 7.92237 ; 8.26556 ; 8.67978 ; 9.20548 ; 9.38855 ; 9.65039 ; 10.0145 ; 10.5163 ; 10.708 ; 10.9595 ; 11.2949 ; 11.7165 ; 12.2477 ; 12.9009 ; 13.096 ; 13.3616 ; 13.7179 ; 13.8508 ; 14.0356 ; 14.2793 ; 14.5805 ; 14.902 ; 14.9251 ; 14.9557 ; 14.9971 ; 15.0539 ; 15.137 ; 15.2475 ; 15.3906 ; 15.5417]

Bolt 1 - Tensile Force (kips): [63.3334 ; 63.2349 ; 63.193 ; 63.1349 ; 63.0551 ; 62.9628 ; 62.89 ; 62.8518 ; 62.8244 ; 62.787 ; 62.7673 ; 62.7588 ; 62.7462 ; 62.7284 ; 62.6994 ; 62.6859 ; 62.6683 ; 62.6455 ; 62.6227 ; 62.6012 ; 62.5864 ; 62.5846 ; 62.5848 ; 62.5901 ; 62.5926 ; 62.5972 ; 62.6083 ; 62.6319 ; 62.6695 ; 62.6702 ; 62.6716 ; 62.6742 ; 62.679 ; 62.6868 ; 62.7007 ; 62.7256 ; 62.7595]

Bolt 1 - Shear Force (kips): [0.12982 ; 0.092128 ; 0.12959 ; 0.19604 ; 0.29432 ; 0.41123 ; 0.5063 ; 0.56324 ; 0.61074 ; 0.67734 ; 0.71299 ; 0.72887 ; 0.7541 ; 0.79292 ; 0.85975 ; 0.89101 ; 0.93336 ; 0.99272 ; 1.0628 ; 1.1476 ; 1.2479 ; 1.2769 ; 1.3152 ; 1.3655 ; 1.3835 ; 1.4097 ; 1.4428 ; 1.4839 ; 1.537 ; 1.5426 ; 1.5503 ; 1.5613 ; 1.5764 ; 1.598 ; 1.6269 ; 1.6639 ; 1.7073]

Bolt 2 - Tensile Force (kips): [63.3298 ; 63.1586 ; 63.0532 ; 62.9031 ; 62.7038 ; 62.483 ; 62.2817 ; 62.1299 ; 61.9842 ; 61.7376 ; 61.3905 ; 61.2486 ; 61.0553 ; 60.8181 ; 60.4621 ; 60.2971 ; 60.0375 ; 59.6055 ; 59.0855 ; 58.4569 ; 57.8788 ; 57.7318 ; 57.5636 ; 57.4579 ; 57.4422 ; 57.4344 ; 57.4702 ; 57.6297 ; 57.9123 ; 57.9298 ; 57.9595 ; 58.0028 ; 58.0658 ; 58.1574 ; 58.2902 ; 58.4833 ; 58.6928]

Bolt 2 - Shear Force (kips): [0.099386 ; 0.153 ; 0.24824 ; 0.3809 ; 0.56011 ; 0.76163 ; 0.92273 ; 1.0125 ; 1.0858 ; 1.2004 ; 1.2916 ; 1.3175 ; 1.3453 ; 1.3679 ; 1.3782 ; 1.3747 ; 1.3625 ; 1.3301 ; 1.2835 ; 1.2501 ; 1.2752 ; 1.2929 ; 1.3213 ; 1.3725 ; 1.3934 ; 1.4241 ; 1.4697 ; 1.5368 ; 1.6195 ; 1.6256 ; 1.6343 ; 1.6463 ; 1.6622 ; 1.6831 ; 1.6995 ; 1.7062 ; 1.716]

Bolt 3 - Tensile Force (kips): [65 ; 64.8064 ; 64.5946 ; 64.2069 ; 63.4989 ; 62.4104 ; 61.0495 ; 59.5875 ; 58.3352 ; 57.3153 ; 56.3655 ; 56.1014 ; 55.8739 ; 55.8098 ; 56.0796 ; 56.1929 ; 56.3224 ; 56.6735 ; 57.1903 ; 57.818 ; 58.791 ; 59.121 ; 59.6169 ; 60.3467 ; 60.5476 ; 60.6714 ; 60.761 ; 60.9449 ; 61.2418 ; 61.342 ; 61.4588 ; 61.6246 ; 61.8134 ; 62.1781 ; 62.6517 ; 63.228 ; 63.8888]

Bolt 3 - Shear Force (kips): [0.07133 ; 0.043962 ; 0.059625 ; 0.083248 ; 0.092022 ; 0.056409 ; 0.12318 ; 0.26809 ; 0.36374 ; 0.35755 ; 0.33814 ; 0.36704 ; 0.43686 ; 0.565 ; 1.352 ; 2.5874 ; 3.4869 ; 4.4857 ; 4.7296 ; 5.1204 ; 5.6899 ; 5.9162 ; 5.9794 ; 5.6029 ; 5.1151 ; 3.7247 ; 2.5098 ; 2.7215 ; 3.5587 ; 3.5223 ; 3.4931 ; 3.4808 ; 3.429 ; 3.6293 ; 3.8477 ; 4.4422 ; 5.3793]

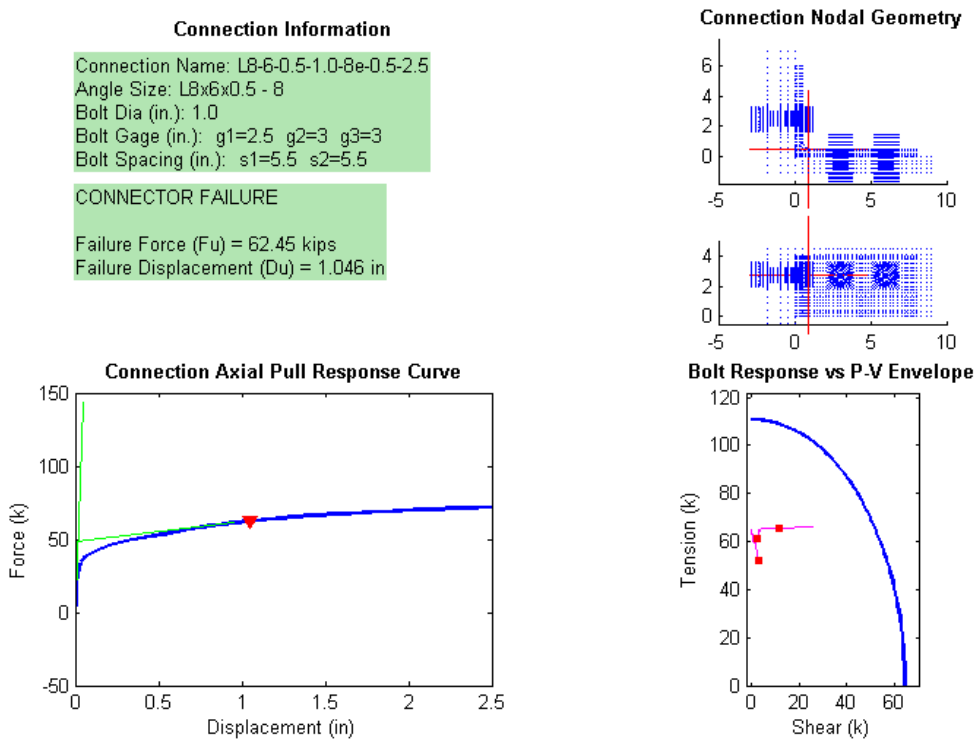


Figure B.241 Connection L8_6_0.5_1.0_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_1.0_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.9306e+003

Plastic Stiffness (k/in): 13.8120

Displacement (in): [1.068e-035 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.024414 ; 0.031006 ; 0.040894 ; 0.055725 ; 0.077972 ; 0.11134 ; 0.1614 ; 0.23649 ; 0.34911 ; 0.51805 ; 0.58055 ; 0.60399 ; 0.61278 ; 0.62596 ; 0.64574 ; 0.65315 ; 0.66428 ; 0.68096 ; 0.68722 ; 0.69661 ; 0.71068 ; 0.7318 ; 0.76348 ; 0.81099 ; 0.82881 ; 0.85554 ; 0.89563 ; 0.95576 ; 1.046 ; 1.1813 ; 1.232 ; 1.3081 ; 1.4223 ; 1.5935 ; 1.8435 ; 2.0935 ; 2.3435 ; 2.5]

Force (kips): [-2.13493 ; 1.35308 ; 3.58882 ; 6.33109 ; 9.67324 ; 13.2449 ; 15.3741 ; 16.6561 ; 17.7087 ; 18.6249 ; 19.5816 ; 20.6581 ; 21.8893 ; 23.2927 ; 24.8592 ; 26.6686 ; 27.2463 ; 27.455 ; 27.5306 ; 27.6874 ; 27.9199 ; 27.9961 ; 28.1331 ; 28.3199 ; 28.3929 ; 28.4932 ; 28.6388 ; 28.864 ; 29.162 ; 29.5781 ; 29.7214 ; 29.9326 ; 30.2316 ; 30.6469 ; 31.2253 ; 31.9809 ; 32.2357 ; 32.5967 ; 33.089 ; 33.7271 ; 34.4885 ; 35.0792 ; 35.5406 ; 35.7881]

Bolt 1 - Tensile Force (kips): [63.403 ; 63.2405 ; 63.1313 ; 62.9901 ; 62.8072 ; 62.5992 ; 62.4675 ; 62.3851 ; 62.3175 ; 62.2584 ; 62.1903 ; 62.1058 ; 61.9946 ; 61.8592 ; 61.7003 ; 61.5185 ; 61.4583 ; 61.436 ; 61.4279 ; 61.4126 ; 61.3897 ; 61.3819 ; 61.369 ; 61.3508 ; 61.3438 ; 61.3342 ; 61.32 ; 61.2971 ; 61.2662 ; 61.2236 ; 61.209 ; 61.1874 ; 61.1553 ; 61.1079 ; 61.0368 ; 60.9303 ; 60.8912 ; 60.8312 ; 60.7399 ; 60.6024 ; 60.4039 ; 60.2188 ; 60.0435 ; 59.9205]

Bolt 1 - Shear Force (kips): [0.12286 ; 0.14318 ; 0.27075 ; 0.44253 ; 0.66323 ; 0.91066 ; 1.0651 ; 1.1615 ; 1.2413 ; 1.3114 ; 1.3916 ; 1.4884 ; 1.621 ; 1.7981 ; 2.0177 ; 2.2631 ; 2.3412 ; 2.3702 ; 2.3807 ; 2.3991 ; 2.4267 ; 2.4362 ; 2.4511 ; 2.4721 ; 2.4799 ; 2.4904 ; 2.5062 ; 2.5317 ; 2.5658 ; 2.61 ; 2.6244 ; 2.6449 ; 2.675 ; 2.7192 ; 2.7859 ; 2.8882 ; 2.9248 ; 2.9822 ; 3.0719 ; 3.2103 ; 3.4177 ; 3.6263 ; 3.8412 ; 4.0128]

Bolt 2 - Tensile Force (kips): [63.4116 ; 63.1527 ; 62.9718 ; 62.7263 ; 62.3917 ; 61.9735 ; 61.6555 ; 61.3904 ; 61.0327 ; 60.5121 ; 59.7249 ; 58.7814 ; 57.62 ; 56.3404 ; 54.9456 ; 53.604 ; 53.1943 ; 53.0482 ; 52.9964 ; 52.9122 ; 52.7971 ; 52.7574 ; 52.6976 ; 52.6156 ; 52.5853 ; 52.5443 ; 52.484 ; 52.3964 ; 52.286 ; 52.186 ; 52.161 ; 52.1348 ; 52.1145 ; 52.1063 ; 52.1379 ; 52.301 ; 52.3714 ; 52.4894 ; 52.68 ; 53.0013 ; 53.5414 ; 54.1025 ; 54.6689 ; 54.999]

Bolt 2 - Shear Force (kips): [0.16422 ; 0.18852 ; 0.36453 ; 0.60013 ; 0.90077 ; 1.2356 ; 1.4474 ; 1.5882 ; 1.7232 ; 1.8638 ; 2.0112 ; 2.1315 ; 2.2278 ; 2.2802 ; 2.2986 ; 2.3632 ; 2.3964 ; 2.4108 ; 2.4164 ; 2.4309 ; 2.4542 ; 2.4622 ; 2.4776 ; 2.4984 ; 2.5061 ; 2.5173 ; 2.5343 ; 2.5627 ; 2.6024 ; 2.6642 ; 2.6868 ; 2.7222 ; 2.7767 ; 2.8525 ; 2.9484 ; 3.0061 ; 3.0174 ; 3.0289 ; 3.0341 ; 3.0127 ; 2.9436 ; 2.8356 ; 2.702 ; 2.6297]

Bolt 3 - Tensile Force (kips): [65 ; 64.8312 ; 64.667 ; 64.4364 ; 64.118 ; 63.6291 ; 63.1596 ; 62.6779 ; 61.971 ; 61.1368 ; 60.2602 ; 59.6247 ; 59.3651 ; 59.9052 ; 61.25 ; 63.3818 ; 64.1133 ; 64.393 ; 64.4923 ; 64.6099 ; 64.7825 ; 64.8444 ; 64.92 ; 65.0088 ; 65.04 ; 65.0707 ; 65.1034 ; 65.1715 ; 65.2521 ; 65.33 ; 65.3421 ; 65.374 ; 65.3964 ; 65.4146 ; 65.4687 ; 65.6392 ; 65.6473 ; 65.6916 ; 65.7799 ; 65.9852 ; 66.167 ; 66.2449 ; 66.2374 ; 66.2566]

Bolt 3 - Shear Force (kips): [0.0870093 ; 0.0351092 ; 0.0684703 ; 0.142209 ; 0.254103 ; 0.384368 ; 0.472017 ; 0.537443 ; 0.62442 ; 0.749766 ; 0.954046 ; 1.27349 ; 1.6578 ; 2.06672 ; 2.5727 ; 2.95036 ; 3.22548 ; 3.4801 ; 3.54554 ; 3.16537 ; 3.20001 ; 3.22988 ; 3.30805 ; 3.43985 ; 3.50236 ; 3.60319 ; 3.78311 ; 4.02096 ; 4.47586 ; 5.20965 ; 5.84554 ; 6.88645 ; 8.29277 ; 9.97103 ; 11.8524 ; 13.922 ; 14.8215 ; 16.0332 ; 17.4807 ; 19.3039 ; 21.5914 ; 23.3867 ; 24.9924 ; 25.8394]

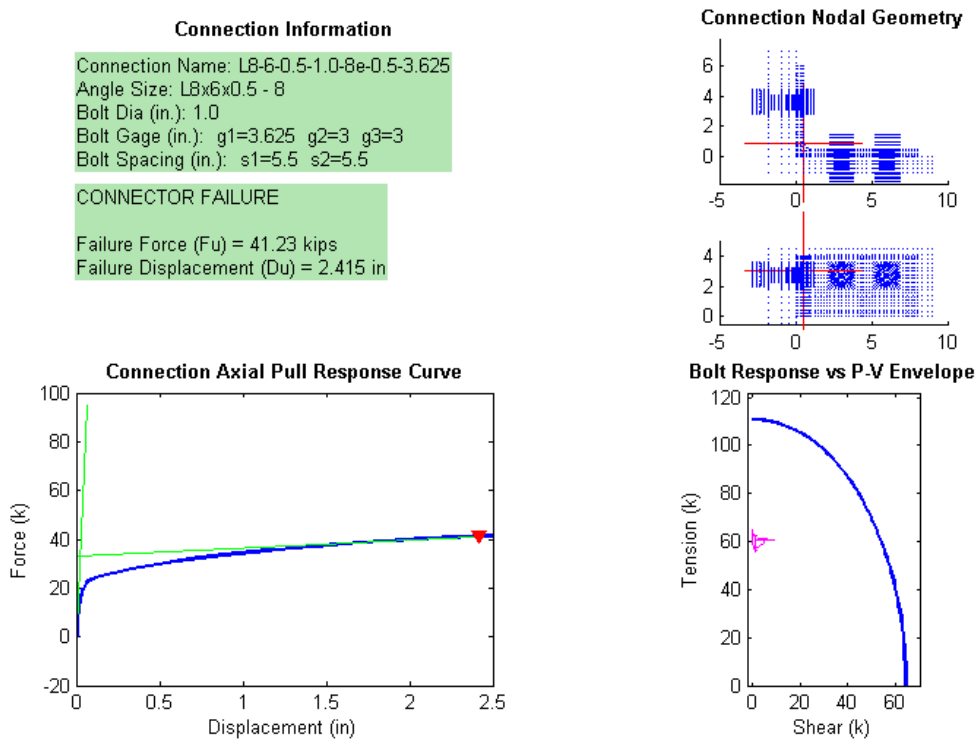


Figure B.242 Connection L8_6_0.5_1.0_8e_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_1.0_8e_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 1.5327e+003

Plastic Stiffness (k/in): 3.2923

Displacement (in): [9.9095e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.53655 ; 0.67909 ; 0.8929 ; 1.1429 ; 1.2054 ; 1.2992 ; 1.3343 ; 1.387 ; 1.4662 ; 1.4958 ; 1.5403 ; 1.6071 ; 1.7072 ; 1.8573 ; 2.0826 ; 2.1451 ; 2.2388 ; 2.3795 ; 2.5]

Force (kips): [-1.96709 ; 0.170353 ; 1.02642 ; 2.17479 ; 3.67869 ; 5.61187 ; 7.85971 ; 9.84821 ; 11.0688 ; 11.803 ; 12.3891 ; 13.0109 ; 13.8784 ; 14.18 ; 14.5978 ; 15.1571 ; 15.9177 ; 16.8328 ; 17.6673 ; 17.8584 ; 18.1233 ; 18.2193 ; 18.3826 ; 18.63 ; 18.7141 ; 18.8393 ; 19.0213 ; 19.2685 ; 19.601 ; 20.0497 ; 20.1671 ; 20.3294 ; 20.5609 ; 20.7406]

Bolt 1 - Tensile Force (kips): [63.4034 ; 63.304 ; 63.2627 ; 63.2058 ; 63.128 ; 63.0226 ; 62.8921 ; 62.7687 ; 62.6937 ; 62.6528 ; 62.6315 ; 62.6108 ; 62.573 ; 62.5579 ; 62.5359 ; 62.507 ; 62.4678 ; 62.4224 ; 62.3897 ; 62.3817 ; 62.3724 ; 62.3696 ; 62.364 ; 62.3572 ; 62.3557 ; 62.3538 ; 62.3515 ; 62.3519 ; 62.3556 ; 62.3669 ; 62.3704 ; 62.3768 ; 62.3869 ; 62.397]

Bolt 1 - Shear Force (kips): [0.11432 ; 0.091901 ; 0.12917 ; 0.1931 ; 0.28655 ; 0.41566 ; 0.57625 ; 0.72845 ; 0.82415 ; 0.88101 ; 0.90947 ; 0.95071 ; 1.0193 ; 1.0473 ; 1.0905 ; 1.1513 ; 1.243 ; 1.3778 ; 1.5004 ; 1.5298 ; 1.5704 ; 1.5843 ; 1.6061 ; 1.6345 ; 1.6434 ; 1.6555 ; 1.6731 ; 1.6944 ; 1.7226 ; 1.755 ; 1.7634 ; 1.7743 ; 1.7916 ; 1.8044]

Bolt 2 - Tensile Force (kips): [63.4112 ; 63.2474 ; 63.1717 ; 63.0653 ; 62.9162 ; 62.7123 ; 62.4614 ; 62.1752 ; 61.8668 ; 61.4592 ; 61.0729 ; 60.6448 ; 59.9747 ; 59.7126 ; 59.321 ; 58.7956 ; 58.0823 ; 57.216 ; 56.6223 ; 56.4821 ; 56.3033 ; 56.2445 ; 56.1631 ; 56.0623 ; 56.0308 ; 55.9927 ; 55.9627 ; 55.9407 ; 55.9534 ; 56.0765 ; 56.1101 ; 56.166 ; 56.2585 ; 56.3522]

Bolt 2 - Shear Force (kips): [0.15357 ; 0.1183 ; 0.17476 ; 0.26791 ; 0.40152 ; 0.58302 ; 0.80294 ; 1.0142 ; 1.1853 ; 1.3319 ; 1.4161 ; 1.4801 ; 1.5415 ; 1.5572 ; 1.5721 ; 1.5833 ; 1.5792 ; 1.5498 ; 1.5462 ; 1.5584 ; 1.5767 ; 1.5843 ; 1.6018 ; 1.6294 ; 1.6396 ; 1.6554 ; 1.6798 ; 1.7148 ; 1.7651 ; 1.834 ; 1.8526 ; 1.8788 ; 1.91 ; 1.9318]

Bolt 3 - Tensile Force (kips): [65 ; 64.8956 ; 64.7859 ; 64.615 ; 64.3342 ; 63.8776 ; 63.133 ; 62.1307 ; 60.8692 ; 59.4269 ; 58.0331 ; 57.2306 ; 56.8984 ; 56.8744 ; 56.9946 ; 57.2864 ; 58.1864 ; 59.4026 ; 60.4396 ; 60.6659 ; 60.9744 ; 61.0861 ; 61.26 ; 61.3144 ; 61.3096 ; 61.2579 ; 61.0989 ; 60.9214 ; 60.6949 ; 60.7711 ; 60.8283 ; 60.8848 ; 60.9116 ; 60.9235]

Bolt 3 - Shear Force (kips): [0.086597 ; 0.051871 ; 0.040726 ; 0.050374 ; 0.081448 ; 0.12518 ; 0.16263 ; 0.17374 ; 0.22023 ; 0.34987 ; 0.50361 ; 0.71508 ; 1.0498 ; 1.1732 ; 1.3418 ; 1.6184 ; 3.0683 ; 4.6916 ; 5.2506 ; 5.5908 ; 5.8145 ; 5.9317 ; 5.378 ; 3.7646 ; 3.2242 ; 2.2963 ; 1.7671 ; 2.1179 ; 3.645 ; 5.8203 ; 6.4821 ; 7.3684 ; 8.3952 ; 9.2238]

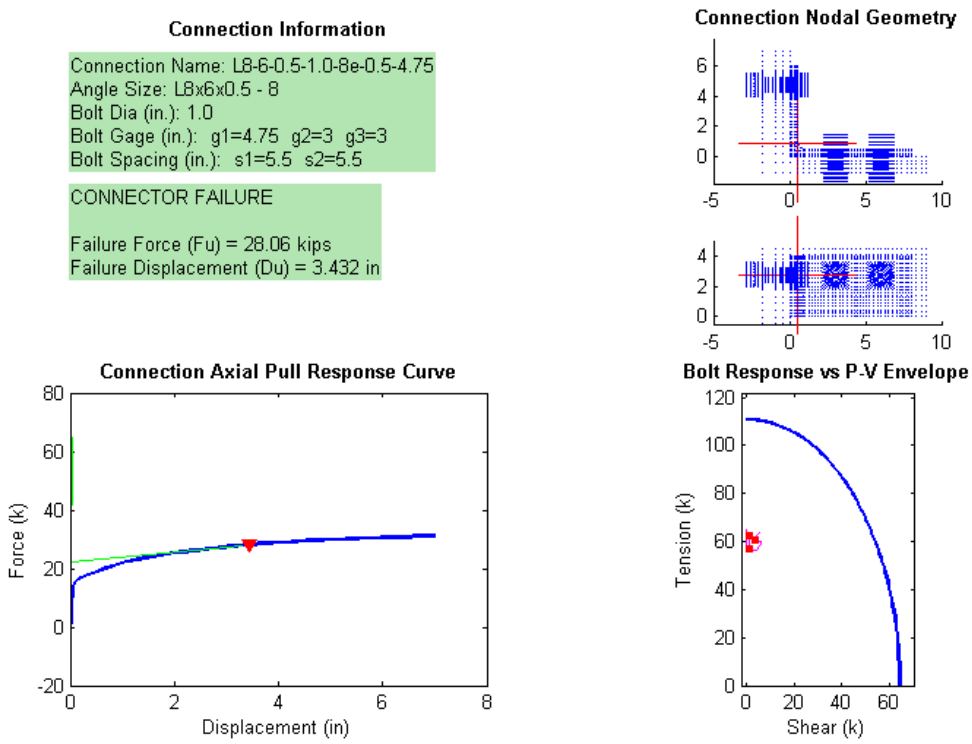


Figure B.243 Connection L8_6_0.5_1.0_8e_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.5_1.0_8e_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.5202e+003

Plastic Stiffness (k/in): 1.7524

Displacement (in): [7.8752e-036 ; 0.0013672 ; 0.0027344 ; 0.0047852 ; 0.0078613 ; 0.012476 ; 0.019397 ; 0.029779 ; 0.045352 ; 0.068712 ; 0.10375 ; 0.15631 ; 0.23515 ; 0.35341 ; 0.5308 ; 0.59732 ; 0.6971 ; 0.84677 ; 0.90289 ; 0.98708 ; 1.1134 ; 1.3028 ; 1.5869 ; 2.0132 ; 2.173 ; 2.4127 ; 2.7723 ; 2.9072 ; 3.1095 ; 3.1853 ; 3.2991 ; 3.4698 ; 3.7258 ; 4.1098 ; 4.6859 ; 4.8609 ; 4.9265 ; 5.0249 ; 5.1726 ; 5.3941 ; 5.7263 ; 6.2246 ; 6.9246 ; 7]

Force (kips): [-1.95069 ; -0.162534 ; 0.127763 ; 0.517358 ; 1.07096 ; 1.83472 ; 2.87673 ; 4.24933 ; 5.80773 ; 7.08501 ; 7.7879 ; 8.15109 ; 8.51012 ; 8.97014 ; 9.58089 ; 9.79355 ; 10.0893 ; 10.5085 ; 10.6715 ; 10.8828 ; 11.1813 ; 11.5575 ; 12.0353 ; 12.6353 ; 12.8329 ; 13.0996 ; 13.4559 ; 13.5765 ; 13.7611 ; 13.8283 ; 13.928 ; 14.0621 ; 14.2518 ; 14.4917 ; 14.7784 ; 14.8524 ; 14.8822 ; 14.9276 ; 14.9906 ; 15.0737 ; 15.1901 ; 15.343 ; 15.5162 ; 15.5327]

Bolt 1 - Tensile Force (kips): [63.4042 ; 63.321 ; 63.3069 ; 63.2875 ; 63.2593 ; 63.2194 ; 63.1626 ; 63.0834 ; 62.9869 ; 62.9004 ; 62.8491 ; 62.8207 ; 62.7904 ; 62.7722 ; 62.7481 ; 62.7375 ; 62.7223 ; 62.696 ; 62.6829 ; 62.6662 ; 62.6408 ; 62.6113 ; 62.5784 ; 62.5433 ; 62.5324 ; 62.5204 ; 62.5085 ; 62.5046 ; 62.4986 ; 62.4963 ; 62.4933 ; 62.4903 ; 62.4879 ; 62.4889 ; 62.4962 ; 62.4986 ; 62.4987 ; 62.4975 ; 62.4953 ; 62.4941 ; 62.4952 ; 62.5032 ; 62.5217 ; 62.5236]

Bolt 1 - Shear Force (kips): [0.11427 ; 0.081797 ; 0.090459 ; 0.10643 ; 0.13437 ; 0.17876 ; 0.24544 ; 0.34106 ; 0.45972 ; 0.56743 ; 0.63578 ; 0.6795 ; 0.72979 ; 0.75421 ; 0.79193 ; 0.81033 ; 0.83899 ; 0.89134 ; 0.9174 ; 0.95099 ; 1.0021 ; 1.0637 ; 1.1386 ; 1.2291 ; 1.2593 ; 1.2984 ; 1.349 ; 1.3669 ; 1.3928 ; 1.4023 ; 1.4163 ; 1.4354 ; 1.4608 ; 1.4938 ; 1.5386 ; 1.5524 ; 1.5587 ; 1.5697 ; 1.5867 ; 1.61 ; 1.6417 ; 1.6818 ; 1.7314 ; 1.737]

Bolt 2 - Tensile Force (kips): [63.4145 ; 63.2827 ; 63.2547 ; 63.2152 ; 63.1574 ; 63.0735 ; 62.9552 ; 62.7918 ; 62.6043 ; 62.4019 ; 62.2387 ; 62.101 ; 61.9015 ; 61.5687 ; 61.1091 ; 60.9344 ; 60.673 ; 60.2967 ; 60.1115 ; 59.857 ; 59.4798 ; 58.9823 ; 58.3872 ; 57.7965 ; 57.6265 ; 57.439 ; 57.2562 ; 57.2018 ; 57.1423 ; 57.1233 ; 57.1049 ; 57.1028 ; 57.1272 ; 57.1923 ; 57.3462 ; 57.3916 ; 57.4068 ; 57.4278 ; 57.4566 ; 57.5035 ; 57.5744 ; 57.6789 ; 57.8056 ; 57.8193]

Bolt 2 - Shear Force (kips): [0.1536 ; 0.10291 ; 0.11741 ; 0.14303 ; 0.18633 ; 0.25309 ; 0.35076 ; 0.48602 ; 0.64667 ; 0.79276 ; 0.89262 ; 0.96582 ; 1.0594 ; 1.1474 ; 1.2225 ; 1.2372 ; 1.2473 ; 1.2552 ; 1.2542 ; 1.2496 ; 1.241 ; 1.2225 ; 1.196 ; 1.173 ; 1.1786 ; 1.1935 ; 1.2281 ; 1.2428 ; 1.2694 ; 1.2809 ; 1.2996 ; 1.3272 ; 1.3659 ; 1.4216 ; 1.4949 ; 1.5153 ; 1.5234 ; 1.5363 ; 1.5555 ; 1.5793 ; 1.6109 ; 1.6434 ; 1.6733 ; 1.6763]

Bolt 3 - Tensile Force (kips): [65 ; 64.9565 ; 64.9084 ; 64.8367 ; 64.7229 ; 64.5406 ; 64.2077 ; 63.6208 ; 62.6662 ; 61.4458 ; 60.0009 ; 58.7045 ; 57.6081 ; 56.6207 ; 55.8934 ; 55.7396 ; 55.7174 ; 55.9284 ; 56.0244 ; 56.1094 ; 56.3851 ; 56.864 ; 57.4688 ; 58.2556 ; 58.5308 ; 59.0025 ; 59.7128 ; 59.9647 ; 60.29 ; 60.3795 ; 60.4622 ; 60.5042 ; 60.5836 ; 60.7184 ; 60.9129 ; 60.9567 ; 61.0181 ; 61.1623 ; 61.3496 ; 61.5931 ; 62.0725 ; 62.7715 ; 63.5786 ; 63.6556]

Bolt 3 - Shear Force (kips): [0.081288 ; 0.06168 ; 0.05291 ; 0.045496 ; 0.043187 ; 0.05228 ; 0.069868 ; 0.084543 ; 0.060904 ; 0.080612 ; 0.21384 ; 0.32785 ; 0.36374 ; 0.32697 ; 0.43209 ; 0.50759 ; 0.63272 ; 1.3934 ; 2.4701 ; 3.1781 ; 4.3451 ; 4.6956 ; 4.9049 ; 5.4571 ; 5.8023 ; 5.9336 ; 5.9694 ; 5.9477 ; 5.2704 ; 5.0127 ; 4.2686 ; 3.3336 ; 2.4238 ; 2.6405 ; 3.3562 ; 3.6458 ; 3.7161 ; 3.716 ; 3.6839 ; 3.7914 ; 3.9451 ; 4.5141 ; 5.7073 ; 5.7791]

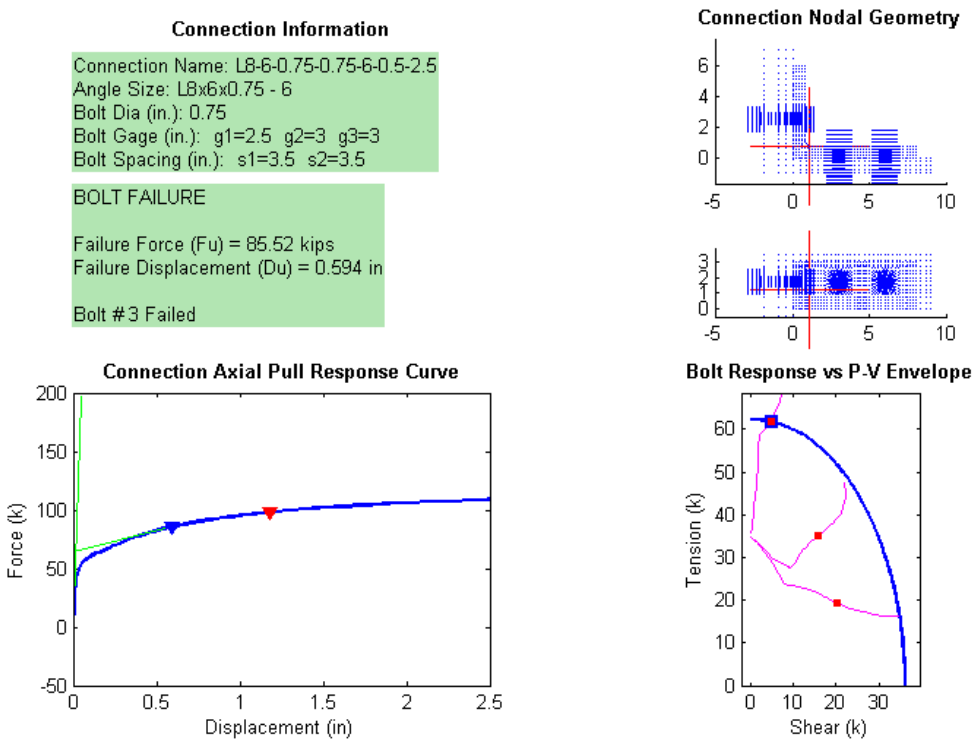


Figure B.244 Connection L8_6_0.75_0.75_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.75_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4.0883e+003

Plastic Stiffness (k/in): 36.5533

Displacement (in): [2.7258e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.13464 ; 0.15048 ; 0.15642 ; 0.15865 ; 0.16199 ; 0.167 ; 0.16888 ; 0.17169 ; 0.17592 ; 0.18227 ; 0.19178 ; 0.20605 ; 0.2114 ; 0.21943 ; 0.23147 ; 0.24953 ; 0.27662 ; 0.31726 ; 0.3325 ; 0.35536 ; 0.36393 ; 0.37679 ; 0.39607 ; 0.425 ; 0.4684 ; 0.48467 ; 0.50908 ; 0.5457 ; 0.60062 ; 0.683 ; 0.7139 ; 0.76024 ; 0.82975 ; 0.85581 ; 0.89492 ; 0.95357 ; 1.0415 ; 1.1735 ; 1.223 ; 1.2972 ; 1.4086 ; 1.4503 ; 1.513 ; 1.6069 ; 1.7478 ; 1.9592 ; 2.2092 ; 2.4592 ; 2.5]

Force (kips): [-0.887069 ; 3.77319 ; 7.09798 ; 11.0727 ; 15.6233 ; 16.9331 ; 18.6383 ; 20.7936 ; 23.0264 ; 24.7737 ; 26.3451 ; 27.8947 ; 29.5479 ; 31.3588 ; 31.7205 ; 31.717 ; 31.7484 ; 31.8989 ; 32.0955 ; 32.0981 ; 32.1615 ; 32.3322 ; 32.5227 ; 32.6051 ; 33.2618 ; 33.4916 ; 33.8376 ; 34.2989 ; 34.9626 ; 35.845 ; 37.0445 ; 37.4423 ; 37.9986 ; 38.2109 ; 38.5472 ; 38.9926 ; 39.63 ; 40.5225 ; 40.8435 ; 41.3175 ; 41.9867 ; 42.8662 ; 44.0284 ; 44.4514 ; 45.0572 ; 45.8772 ; 46.1621 ; 46.5721 ; 47.1464 ; 47.937 ; 48.967 ; 49.3194 ; 49.815 ; 50.4844 ; 50.718 ; 51.0541 ; 51.5139 ; 52.1192 ; 52.924 ; 53.7062 ; 54.3339 ; 54.4272]

Bolt 1 - Tensile Force (kips): [34.6521 ; 34.528 ; 34.4297 ; 34.2966 ; 34.1241 ; 34.0699 ; 33.9953 ; 33.8873 ; 33.6305 ; 32.6747 ; 30.8583 ; 28.717 ; 26.1913 ; 23.9914 ; 23.9728 ; 23.9662 ; 23.9551 ; 23.8643 ; 23.7235 ; 23.7186 ; 23.715 ; 23.7109 ; 23.7056 ; 23.7004 ; 23.6403 ; 23.6202 ; 23.5835 ; 23.5518 ; 23.38 ; 23.1377 ; 22.7595 ; 22.6155 ; 22.3485 ; 22.1941 ; 21.972 ; 21.6628 ; 21.2903 ; 20.8319 ; 20.5978 ; 20.2536 ; 19.7799 ; 19.1629 ; 18.595 ; 18.3971 ; 18.1257 ; 17.8287 ; 17.716 ; 17.5358 ; 17.334 ; 17.1726 ; 16.8766 ; 16.7687 ; 16.6772 ; 16.4886 ; 16.4082 ; 16.3242 ; 16.2629 ; 16.2671 ; 16.1683 ; 16.2214 ; 16.4221 ; 16.4566]

Bolt 1 - Shear Force (kips): [0.0553248 ; 0.159216 ; 0.303618 ; 0.480759 ; 0.692339 ; 0.755936 ; 0.840786 ; 0.9582 ; 1.22604 ; 2.07959 ; 3.48987 ; 4.99396 ; 6.6251 ; 7.9152 ; 7.91086 ; 7.90883 ; 7.92992 ; 8.04902 ; 8.20817 ; 8.2112 ; 8.21141 ; 8.20995 ; 8.20779 ; 8.24239 ; 8.6861 ; 8.82469 ; 9.09487 ; 9.33836 ; 9.98624 ; 10.8463 ; 12.8008 ; 13.3551 ; 14.0498 ; 14.4003 ; 14.8899 ; 15.5538 ; 16.3072 ; 17.2174 ; 17.6449 ; 18.241 ; 19.152 ; 20.4418 ; 21.903 ; 22.3971 ; 23.0894 ; 24.0219 ; 24.3585 ; 24.851 ; 25.5345 ; 26.4862 ; 27.9902 ; 28.4692 ; 29.0606 ; 29.9085 ; 30.1961 ; 30.5824 ; 31.0924 ; 31.7677 ; 32.7453 ; 33.6947 ; 34.4847 ; 34.6189]

Bolt 2 - Tensile Force (kips): [34.6541 ; 34.4968 ; 34.3721 ; 34.2203 ; 34.0652 ; 34.0235 ; 33.976 ; 33.9169 ; 33.7343 ; 32.8942 ; 31.3083 ; 29.8157 ; 28.8482 ; 27.923 ; 27.328 ; 27.3084 ; 27.3324 ; 27.446 ; 27.5972 ; 27.5985 ; 27.6027 ; 27.6701 ; 27.7414 ; 27.8185 ; 28.434 ; 28.6554 ; 28.9718 ; 29.4162 ; 30.0983 ; 30.8818 ; 31.8914 ; 32.2012 ; 32.5492 ; 32.6737 ; 32.8504 ; 33.1149 ; 33.4863 ; 33.9644 ; 34.1271 ; 34.386 ; 34.7561 ; 35.3158 ; 35.9218 ; 36.1603 ; 36.5472 ; 37.0928 ; 37.2794 ; 37.5448 ; 37.9382 ; 38.4714 ; 39.3219 ; 39.5968 ; 40.0184 ; 40.6874 ; 40.958 ; 41.3732 ; 41.993 ; 42.8966 ; 44.2712 ; 45.7731 ; 47.2176 ; 47.4673]

Bolt 2 - Shear Force (kips): [0.0459772 ; 0.208992 ; 0.383957 ; 0.599914 ; 0.858604 ; 0.93586 ; 1.03867 ; 1.18058 ; 1.47415 ; 2.31482 ; 3.7083 ; 5.17023 ; 6.66102 ; 8.40034 ; 9.00304 ; 9.00974 ; 9.01872 ; 9.05614 ; 9.10622 ; 9.10711 ; 9.17639 ; 9.34301 ; 9.5358 ; 9.56818 ; 10.05 ; 10.1955 ; 10.4299 ; 10.7109 ; 11.0506 ; 11.6699 ; 12.2662 ; 12.4965 ; 12.9096 ; 13.0269 ; 13.1899 ; 13.3958 ; 13.7587 ; 14.387 ; 14.6625 ; 15.0124 ; 15.4453 ; 15.933 ; 16.7709 ; 17.1335 ; 17.587 ; 18.1179 ; 18.3021 ; 18.5834 ; 19.006 ; 19.5953 ; 20.3158 ; 20.5708 ; 20.8787 ; 21.1978 ; 21.318 ; 21.4806 ; 21.6728 ; 21.8813 ; 22.1013 ; 22.1653 ; 22.0145 ; 21.9377]

Bolt 3 - Tensile Force (kips): [36 ; 35.9587 ; 36.0512 ; 36.3729 ; 37.0056 ; 37.2997 ; 37.7532 ; 38.3553 ; 39.0499 ; 39.7592 ; 40.6763 ; 42.1307 ; 44.2614 ; 46.8986 ; 47.4466 ; 47.4434 ; 47.4856 ; 47.6977 ; 47.9759 ; 47.9792 ; 48.0703 ; 48.3125 ; 48.584 ; 48.6982 ; 49.5681 ; 49.8774 ; 50.333 ; 50.9658 ; 51.8549 ; 53.0222 ; 54.4933 ; 54.9779 ; 55.6652 ; 55.9188 ; 56.3132 ; 56.8635 ; 57.6516 ; 58.7591 ; 59.1353 ; 59.7466 ; 60.6875 ; 61.9128 ; 63.3948 ; 63.8663 ; 64.6399 ; 65.7768 ; 66.1299 ; 66.6086 ; 67.258 ; 68.1305 ; 69.1907 ; 69.5263 ; 70.0253 ; 70.6083 ; 70.7745 ; 70.9723 ; 71.0484 ; 71.2293 ; 71.5619 ; 71.6887 ; 71.8411 ; 71.8629]

Bolt 3 - Shear Force (kips): [0.018392 ; 0.037071 ; 0.088415 ; 0.16476 ; 0.25485 ; 0.28306 ; 0.32325 ; 0.3776 ; 0.4489 ; 0.53202 ; 0.64079 ; 0.80824 ; 1.044 ; 1.2992 ; 1.3452 ; 1.3452 ; 1.3488 ; 1.3664 ; 1.3892 ; 1.3896 ; 1.3971 ; 1.4167 ; 1.4386 ; 1.448 ; 1.511 ; 1.5329 ; 1.5635 ; 1.6048 ; 1.6545 ; 1.7052 ; 1.7586 ; 1.7759 ; 1.798 ; 1.8068 ; 1.8252 ; 1.8462 ; 1.8681 ; 2.1699 ; 2.4338 ; 3.1376 ; 4.1664 ; 4.9473 ; 5.3637 ; 5.517 ; 5.8824 ; 6.4626 ; 6.6294 ; 6.8128 ; 6.9843 ; 7.2393 ; 7.4258 ; 7.4913 ; 7.6157 ; 7.5552 ; 7.414 ; 7.1307 ; 6.8742 ; 6.7091 ; 6.1298 ; 5.4802 ; 5.2171 ; 5.1898]

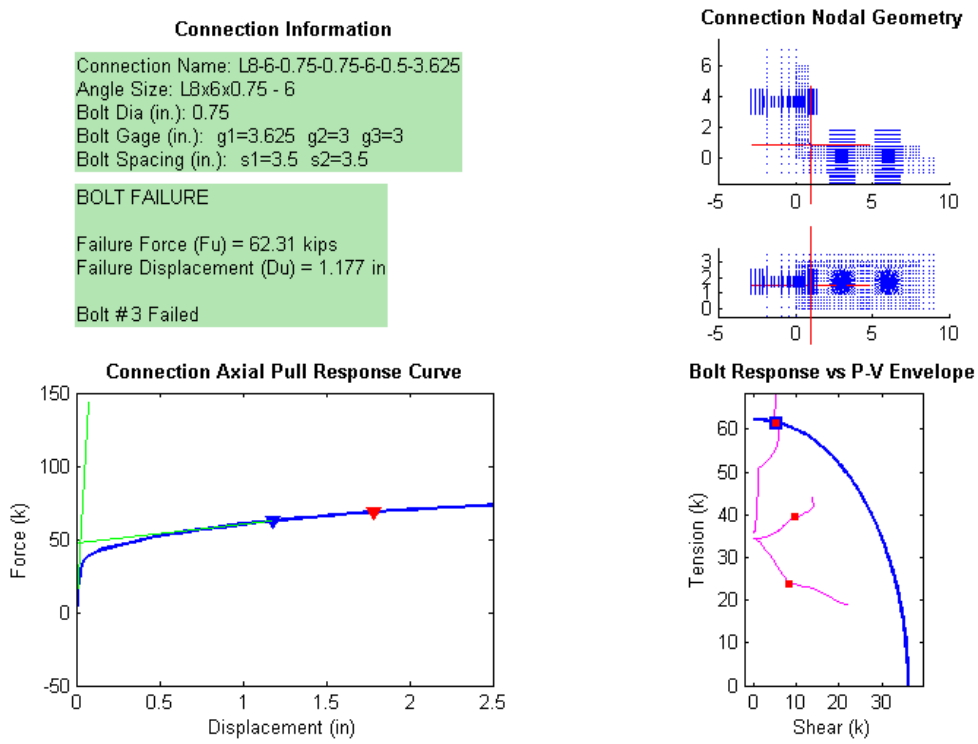


Figure B.245 Connection L8_6_0.75_0.75_6_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.75_6_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 2.0165e+003

Plastic Stiffness (k/in): 12.8431

Displacement (in): [2.437e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.20294 ; 0.29797 ; 0.3336 ; 0.38705 ; 0.4071 ; 0.43717 ; 0.48227 ; 0.54992 ; 0.57529 ; 0.61335 ; 0.67043 ; 0.75605 ; 0.88448 ; 0.93265 ; 1.0049 ; 1.1133 ; 1.1539 ; 1.1691 ; 1.192 ; 1.2263 ; 1.2391 ; 1.2584 ; 1.2874 ; 1.3308 ; 1.3958 ; 1.4935 ; 1.5301 ; 1.585 ; 1.6674 ; 1.6983 ; 1.7446 ; 1.8141 ; 1.9184 ; 1.9575 ; 2.0162 ; 2.1041 ; 2.2361 ; 2.4341 ; 2.5]

Force (kips): [-0.815706 ; 1.47054 ; 3.12273 ; 5.19799 ; 7.83407 ; 11.0531 ; 12.0266 ; 13.2675 ; 14.8147 ; 16.505 ; 18.0596 ; 19.1659 ; 20.0465 ; 21.0221 ; 22.0695 ; 23.4951 ; 23.9903 ; 24.7275 ; 24.9945 ; 25.3694 ; 25.8743 ; 26.5561 ; 26.8046 ; 27.1581 ; 27.6515 ; 28.3268 ; 29.2332 ; 29.5984 ; 30.0869 ; 30.7562 ; 31.0012 ; 31.099 ; 31.2564 ; 31.4646 ; 31.5439 ; 31.659 ; 31.8214 ; 32.062 ; 32.402 ; 32.9337 ; 33.1344 ; 33.4136 ; 33.7992 ; 33.9398 ; 34.1418 ; 34.4301 ; 34.8172 ; 34.9586 ; 35.1605 ; 35.4539 ; 35.8503 ; 36.3735 ; 36.5349]

Bolt 1 - Tensile Force (kips): [34.651 ; 34.5922 ; 34.5472 ; 34.4875 ; 34.4026 ; 34.2842 ; 34.2447 ; 34.1914 ; 34.1195 ; 34.0292 ; 33.9157 ; 33.6241 ; 32.834 ; 31.7356 ; 30.5633 ; 28.7221 ; 27.9837 ; 26.8713 ; 26.4632 ; 25.8741 ; 25.0664 ; 24.0931 ; 24.0543 ; 24.048 ; 24.0428 ; 24.0409 ; 24.0469 ; 23.9024 ; 23.9078 ; 23.9253 ; 23.9337 ; 23.9375 ; 23.892 ; 23.8639 ; 23.8449 ; 23.8219 ; 23.8095 ; 23.7141 ; 23.5459 ; 23.2516 ; 23.0899 ; 22.8886 ; 22.663 ; 22.4569 ; 22.15 ; 21.717 ; 21.1212 ; 20.8236 ; 20.3825 ; 19.8537 ; 19.3883 ; 19.0543 ; 18.9673]

Bolt 1 - Shear Force (kips): [0.0515724 ; 0.0667376 ; 0.135046 ; 0.22761 ; 0.350155 ; 0.508378 ; 0.558736 ; 0.625235 ; 0.713169 ; 0.820319 ; 0.948917 ; 1.25841 ; 1.9726 ; 2.85624 ; 3.73796 ; 5.02895 ; 5.52142 ; 6.24386 ; 6.50033 ; 6.86076 ; 7.34481 ; 7.90888 ; 7.93211 ; 7.93354 ; 7.93351 ; 7.93336 ; 7.93544 ; 8.14565 ; 8.14008 ; 8.12836 ; 8.12428 ; 8.12292 ; 8.48851 ; 8.77785 ; 8.92305 ; 9.10459 ; 9.2715 ; 9.74284 ; 10.2825 ; 11.8686 ; 12.5184 ; 13.2554 ; 14.0188 ; 14.4899 ; 15.1694 ; 16.0779 ; 17.2584 ; 17.7981 ; 18.5554 ; 19.6214 ; 20.6164 ; 21.512 ; 21.7562]

Bolt 2 - Tensile Force (kips): [34.6479 ; 34.5751 ; 34.5161 ; 34.444 ; 34.3623 ; 34.2977 ; 34.2873 ; 34.2863 ; 34.2986 ; 34.3496 ; 34.4691 ; 34.5583 ; 34.6409 ; 34.8917 ; 35.1831 ; 35.6911 ; 35.8979 ; 36.2355 ; 36.3693 ; 36.5614 ; 36.8413 ; 37.256 ; 37.3963 ; 37.5958 ; 37.8836 ; 38.2568 ; 38.7465 ; 38.9054 ; 39.1263 ; 39.4242 ; 39.5307 ; 39.5582 ; 39.6067 ; 39.6719 ; 39.6842 ; 39.7047 ; 39.7606 ; 39.8706 ; 40.0374 ; 40.2984 ; 40.3869 ; 40.4786 ; 40.6624 ; 40.745 ; 40.8732 ; 41.0387 ; 41.2817 ; 41.3718 ; 41.5221 ; 41.7774 ; 42.3579 ; 43.6353 ; 44.0641]

Bolt 2 - Shear Force (kips): [0.0417334 ; 0.0973766 ; 0.186121 ; 0.303268 ; 0.457871 ; 0.657112 ; 0.72047 ; 0.803817 ; 0.912086 ; 1.04406 ; 1.20677 ; 1.54428 ; 2.21412 ; 3.00152 ; 3.75331 ; 4.79043 ; 5.16157 ; 5.6687 ; 5.84154 ; 6.08307 ; 6.40891 ; 6.82908 ; 6.98785 ; 7.21624 ; 7.53184 ; 7.96776 ; 8.53289 ; 8.71169 ; 8.98132 ; 9.35108 ; 9.47863 ; 9.61849 ; 9.75115 ; 9.99302 ; 10.1071 ; 10.2894 ; 10.5222 ; 10.7777 ; 11.2597 ; 11.6601 ; 11.7978 ; 12.0725 ; 12.5999 ; 12.7134 ; 12.8651 ; 13.0722 ; 13.3482 ; 13.422 ; 13.5261 ; 13.7056 ; 13.8705 ; 13.7377 ; 13.6874]

Bolt 3 - Tensile Force (kips): [36 ; 35.9282 ; 35.9114 ; 35.9911 ; 36.2647 ; 36.7624 ; 36.9723 ; 37.3481 ; 37.8768 ; 38.5234 ; 39.2585 ; 40.1558 ; 41.3291 ; 42.996 ; 45.3677 ; 48.2735 ; 49.2414 ; 50.5565 ; 50.9691 ; 51.5467 ; 52.3515 ; 53.4068 ; 53.8597 ; 54.4949 ; 55.388 ; 56.5626 ; 58.0577 ; 58.6957 ; 59.5761 ; 60.8495 ; 61.3808 ; 61.5755 ; 61.848 ; 62.1895 ; 62.3109 ; 62.4715 ; 62.6853 ; 62.9972 ; 63.4228 ; 64.2835 ; 64.662 ; 65.1694 ; 65.8613 ; 66.0915 ; 66.3855 ; 66.8833 ; 67.4231 ; 67.6062 ; 67.8464 ; 68.1974 ; 68.6496 ; 69.2327 ; 69.4072]

Bolt 3 - Shear Force (kips): [0.02832 ; 0.013513 ; 0.040771 ; 0.086636 ; 0.1559 ; 0.23949 ; 0.26703 ; 0.30339 ; 0.35532 ; 0.42387 ; 0.51978 ; 0.60973 ; 0.68443 ; 0.78513 ; 0.88521 ; 0.98301 ; 1.0183 ; 1.1071 ; 1.1654 ; 1.8901 ; 2.7356 ; 3.6127 ; 4.0535 ; 4.5494 ; 5.0193 ; 5.4705 ; 5.9276 ; 5.8137 ; 5.666 ; 5.3816 ; 5.3176 ; 5.27 ; 5.1946 ; 5.1123 ; 5.0794 ; 5.0334 ; 4.9942 ; 4.937 ; 4.8369 ; 4.8274 ; 4.9032 ; 5.0549 ; 5.0714 ; 5.058 ; 5.0618 ; 5.0896 ; 5.1249 ; 5.1659 ; 5.2052 ; 5.2183 ; 5.2264 ; 5.241 ; 5.2729]

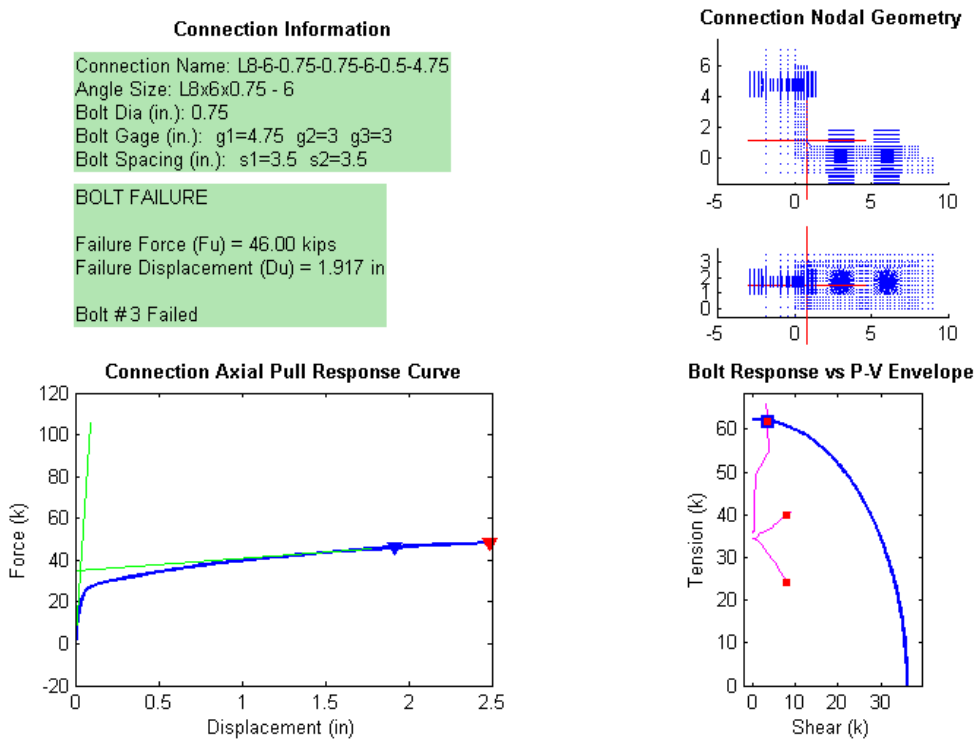


Figure B.246 Connection L8_6_0.75_0.75_6_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.75_6_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.1509e+003

Plastic Stiffness (k/in): 5.7377

Displacement (in): [3.1592e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.56737 ; 0.59081 ; 0.62596 ; 0.6787 ; 0.7578 ; 0.87645 ; 1.0544 ; 1.1169 ; 1.2107 ; 1.3513 ; 1.404 ; 1.4831 ; 1.6018 ; 1.7798 ; 2.0298 ; 2.0923 ; 2.186 ; 2.3266 ; 2.5]

Force (kips): [-0.788784 ; 0.601164 ; 1.45916 ; 2.58999 ; 4.08823 ; 6.05879 ; 8.50037 ; 10.8979 ; 12.7965 ; 13.7986 ; 14.353 ; 15.0553 ; 15.9776 ; 17.1835 ; 17.5841 ; 17.7389 ; 17.9597 ; 18.2685 ; 18.7078 ; 19.3091 ; 20.1062 ; 20.373 ; 20.7668 ; 21.2983 ; 21.4882 ; 21.7566 ; 22.1377 ; 22.6483 ; 23.2874 ; 23.4385 ; 23.6531 ; 23.9438 ; 24.262]

Bolt 1 - Tensile Force (kips): [34.6511 ; 34.616 ; 34.594 ; 34.5635 ; 34.521 ; 34.4595 ; 34.3713 ; 34.2692 ; 34.1684 ; 34.0982 ; 34.0511 ; 33.945 ; 33.263 ; 31.6932 ; 31.1362 ; 30.9233 ; 30.6141 ; 30.1718 ; 29.5208 ; 28.4987 ; 26.9969 ; 26.4751 ; 25.7004 ; 24.6672 ; 24.3361 ; 24.2198 ; 24.2257 ; 24.2426 ; 24.2726 ; 24.2808 ; 24.27 ; 24.2953 ; 24.3322]

Bolt 1 - Shear Force (kips): [0.050619 ; 0.038873 ; 0.06766 ; 0.11483 ; 0.18286 ; 0.27801 ; 0.4045 ; 0.54322 ; 0.67538 ; 0.77083 ; 0.84246 ; 0.98298 ; 1.6736 ; 2.9721 ; 3.4005 ; 3.5607 ; 3.7904 ; 4.1132 ; 4.5792 ; 5.2856 ; 6.2851 ; 6.6174 ; 7.0969 ; 7.7182 ; 7.9124 ; 7.9871 ; 7.993 ; 7.9997 ; 8.0099 ; 8.0124 ; 8.0547 ; 8.0452 ; 8.0295]

Bolt 2 - Tensile Force (kips): [34.6484 ; 34.608 ; 34.5757 ; 34.5364 ; 34.4892 ; 34.4437 ; 34.4288 ; 34.4908 ; 34.6339 ; 34.8034 ; 34.9582 ; 35.3293 ; 35.7513 ; 36.2122 ; 36.3909 ; 36.4566 ; 36.556 ; 36.7152 ; 36.9708 ; 37.3761 ; 38.0011 ; 38.2065 ; 38.4926 ; 38.8599 ; 38.9837 ; 39.1517 ; 39.3818 ; 39.7096 ; 40.1027 ; 40.1987 ; 40.3353 ; 40.5237 ; 40.7402]

Bolt 2 - Shear Force (kips): [0.040803 ; 0.056851 ; 0.10166 ; 0.16591 ; 0.25596 ; 0.37976 ; 0.54297 ; 0.7213 ; 0.89007 ; 1.014 ; 1.1047 ; 1.2737 ; 1.9161 ; 3.0551 ; 3.4177 ; 3.5509 ; 3.7393 ; 3.9986 ; 4.362 ; 4.8831 ; 5.5486 ; 5.7628 ; 6.0715 ; 6.496 ; 6.6502 ; 6.8913 ; 7.2409 ; 7.6963 ; 8.2283 ; 8.3456 ; 8.508 ; 8.7343 ; 8.9858]

Bolt 3 - Tensile Force (kips): [36 ; 35.9439 ; 35.9073 ; 35.8949 ; 35.9673 ; 36.2161 ; 36.6746 ; 37.5269 ; 38.6235 ; 39.601 ; 40.744 ; 42.2681 ; 44.4319 ; 47.5746 ; 48.6405 ; 48.9963 ; 49.5075 ; 50.2318 ; 51.2316 ; 52.5791 ; 54.3416 ; 54.9633 ; 55.9088 ; 57.22 ; 57.7549 ; 58.4674 ; 59.5651 ; 60.9883 ; 62.9187 ; 63.4589 ; 64.1784 ; 65.1414 ; 66.0222]

Bolt 3 - Shear Force (kips): [0.028312 ; 0.0092006 ; 0.0189 ; 0.043586 ; 0.085417 ; 0.15004 ; 0.22689 ; 0.30506 ; 0.38462 ; 0.47351 ; 0.4278 ; 0.40304 ; 0.44327 ; 0.52917 ; 0.5575 ; 0.59573 ; 0.65704 ; 0.83571 ; 1.6243 ; 2.5245 ; 3.469 ; 3.6885 ; 3.7447 ; 3.692 ; 3.6433 ; 3.5237 ; 3.5313 ; 3.53 ; 3.4286 ; 3.3436 ; 3.245 ; 3.0429 ; 2.8877]

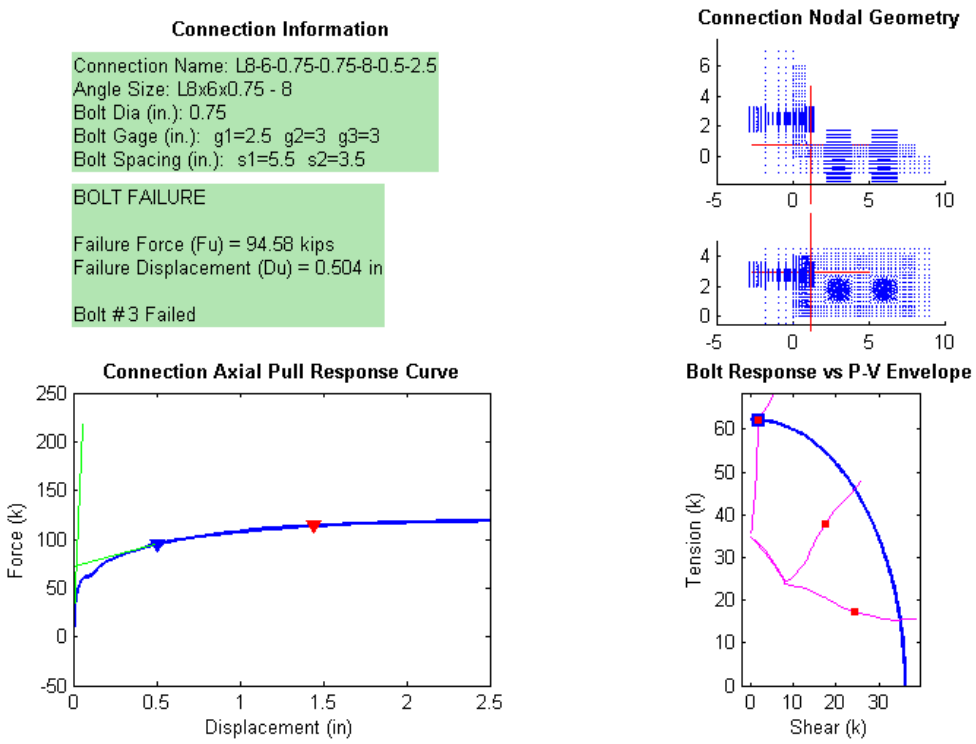


Figure B.247 Connection L8_6_0.75_0.75_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.75_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4.1119e+003

Plastic Stiffness (k/in): 45.3057

Displacement (in): [2.334e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.033569 ; 0.048401 ; 0.070648 ; 0.072734 ; 0.075862 ; 0.080555 ; 0.087594 ; 0.090234 ; 0.091224 ; 0.092709 ; 0.094936 ; 0.098277 ; 0.10329 ; 0.11081 ; 0.12208 ; 0.13899 ; 0.14534 ; 0.15485 ; 0.16912 ; 0.19053 ; 0.22263 ; 0.23467 ; 0.25274 ; 0.27983 ; 0.28999 ; 0.30523 ; 0.32809 ; 0.36237 ; 0.4138 ; 0.49095 ; 0.5681 ; 0.64525 ; 0.76097 ; 0.93455 ; 0.97794 ; 1.0213 ; 1.0864 ; 1.1841 ; 1.3305 ; 1.3855 ; 1.4678 ; 1.5914 ; 1.6378 ; 1.7073 ; 1.8115 ; 1.8376 ; 1.8637 ; 1.9028 ; 1.9614 ; 2.0494 ; 2.1374 ; 2.2253 ; 2.3573 ; 2.5]

Force (kips): [-0.77693 ; 3.84908 ; 7.25408 ; 11.3962 ; 14.7948 ; 17.5579 ; 20.812 ; 24.0122 ; 26.0486 ; 28.3955 ; 30.8029 ; 30.8684 ; 30.8752 ; 30.8704 ; 30.8591 ; 30.855 ; 30.8536 ; 30.9937 ; 31.2473 ; 31.3409 ; 31.338 ; 31.4249 ; 32.7256 ; 34.1872 ; 34.6789 ; 35.3301 ; 36.2862 ; 37.603 ; 39.2178 ; 39.7815 ; 40.5438 ; 41.5229 ; 41.8714 ; 42.371 ; 43.0676 ; 44.0241 ; 45.2947 ; 47.0423 ; 48.5147 ; 49.7546 ; 51.3638 ; 53.2589 ; 53.682 ; 54.0783 ; 54.6264 ; 55.3358 ; 56.2272 ; 56.526 ; 56.9343 ; 57.4833 ; 57.6712 ; 57.9256 ; 58.2475 ; 58.3196 ; 58.3872 ; 58.4804 ; 58.6048 ; 58.7628 ; 58.9067 ; 59.0416 ; 59.2277 ; 59.4092]

Bolt 1 - Tensile Force (kips): [34.6502 ; 34.5187 ; 34.4089 ; 34.2562 ; 34.116 ; 33.9908 ; 33.8247 ; 33.3378 ; 31.3613 ; 28.2272 ; 24.0185 ; 23.9843 ; 23.9737 ; 23.9636 ; 23.9537 ; 23.9506 ; 23.9495 ; 23.8282 ; 23.7052 ; 23.6967 ; 23.6913 ; 23.6796 ; 23.598 ; 23.4393 ; 23.3504 ; 23.2542 ; 23.0453 ; 22.7451 ; 22.2572 ; 21.9323 ; 21.4389 ; 20.8623 ; 20.589 ; 20.1554 ; 19.5663 ; 18.8211 ; 18.0877 ; 17.3663 ; 16.8494 ; 16.6423 ; 16.1357 ; 15.6418 ; 15.5644 ; 15.5336 ; 15.5072 ; 15.3781 ; 15.3741 ; 15.3711 ; 15.3841 ; 15.4509 ; 15.4712 ; 15.5013 ; 15.5481 ; 15.5585 ; 15.5677 ; 15.5814 ; 15.601 ; 15.6329 ; 15.6608 ; 15.6881 ; 15.6169 ; 15.4669]

Bolt 1 - Shear Force (kips): [0.0500733 ; 0.179112 ; 0.340221 ; 0.540598 ; 0.710097 ; 0.852503 ; 1.02699 ; 1.50355 ; 3.10779 ; 5.31162 ; 7.89224 ; 7.91051 ; 7.91018 ; 7.90779 ; 7.90471 ; 7.90369 ; 7.90334 ; 8.07389 ; 8.21588 ; 8.21949 ; 8.2204 ; 8.30184 ; 8.94643 ; 9.77088 ; 10.0569 ; 10.2829 ; 11.2364 ; 12.6048 ; 14.0232 ; 14.7207 ; 15.7159 ; 16.7905 ; 17.2867 ; 18.0288 ; 19.053 ; 20.5357 ; 22.1289 ; 23.9497 ; 25.4347 ; 26.7851 ; 28.6939 ; 30.7014 ; 31.1245 ; 31.5135 ; 32.0418 ; 32.9018 ; 33.9366 ; 34.3073 ; 34.8574 ; 35.5456 ; 35.7651 ; 36.0624 ; 36.4565 ; 36.5516 ; 36.6448 ; 36.7811 ; 36.9795 ; 37.2522 ; 37.5153 ; 37.7654 ; 38.1664 ; 38.6135]

Bolt 2 - Tensile Force (kips): [34.6511 ; 34.5 ; 34.3707 ; 34.2035 ; 34.0706 ; 33.9675 ; 33.8521 ; 33.4484 ; 31.5642 ; 28.674 ; 24.962 ; 24.7347 ; 24.6876 ; 24.6675 ; 24.6541 ; 24.6499 ; 24.6486 ; 24.6817 ; 24.5669 ; 24.4813 ; 24.472 ; 24.4979 ; 24.856 ; 25.4891 ; 25.7249 ; 26.1035 ; 26.7663 ; 27.8186 ; 29.4022 ; 29.9718 ; 30.8702 ; 32.1255 ; 32.5609 ; 33.1697 ; 34.0241 ; 35.0923 ; 36.3022 ; 37.8608 ; 38.9769 ; 39.8696 ; 40.9082 ; 42.0685 ; 42.3573 ; 42.6141 ; 42.9009 ; 43.4165 ; 44.0691 ; 44.3034 ; 44.6455 ; 45.169 ; 45.3477 ; 45.5993 ; 45.9506 ; 46.0349 ; 46.1137 ; 46.2302 ; 46.4004 ; 46.6445 ; 46.8954 ; 47.1431 ; 47.5084 ; 47.8678]

Bolt 2 - Shear Force (kips): [0.0403238 ; 0.21388 ; 0.396122 ; 0.623534 ; 0.816052 ; 0.976713 ; 1.17256 ; 1.65758 ; 3.24258 ; 5.41657 ; 7.96518 ; 8.10427 ; 8.13066 ; 8.13745 ; 8.13554 ; 8.13438 ; 8.13396 ; 8.14519 ; 8.36009 ; 8.49001 ; 8.49114 ; 8.50016 ; 9.21926 ; 9.89523 ; 10.166 ; 10.6184 ; 11.08 ; 11.8769 ; 12.9284 ; 13.3055 ; 13.7022 ; 14.1857 ; 14.3136 ; 14.5852 ; 15.0328 ; 15.6499 ; 16.4354 ; 17.373 ; 18.1929 ; 18.8626 ; 19.6361 ; 20.6457 ; 20.8945 ; 21.1256 ; 21.5684 ; 22.0241 ; 22.7331 ; 22.9703 ; 23.2811 ; 23.6748 ; 23.8274 ; 24.0418 ; 24.3285 ; 24.3971 ; 24.4725 ; 24.5775 ; 24.7199 ; 24.9054 ; 25.071 ; 25.2242 ; 25.3971 ; 25.5504]

Bolt 3 - Tensile Force (kips): [36 ; 35.959 ; 36.053 ; 36.3728 ; 36.7676 ; 37.2777 ; 38.0998 ; 38.9801 ; 39.6466 ; 40.6951 ; 42.3104 ; 42.3681 ; 42.3752 ; 42.3715 ; 42.3591 ; 42.3545 ; 42.353 ; 42.4731 ; 42.6975 ; 42.7828 ; 42.7797 ; 42.8583 ; 44.2014 ; 45.9757 ; 46.607 ; 47.4674 ; 48.6887 ; 50.3556 ; 52.4342 ; 53.1236 ; 54.0336 ; 55.1913 ; 55.596 ; 56.1785 ; 57.0005 ; 58.1452 ; 59.7014 ; 61.9439 ; 63.8007 ; 65.2576 ; 67.0285 ; 69.0146 ; 69.4755 ; 69.8751 ; 70.3691 ; 70.8884 ; 71.5129 ; 71.7038 ; 71.9227 ; 72.2045 ; 72.2785 ; 72.3327 ; 72.3943 ; 72.4304 ; 72.4595 ; 72.4938 ; 72.5309 ; 72.5567 ; 72.5806 ; 72.6113 ; 72.6505 ; 72.6783]

Bolt 3 - Shear Force (kips): [0.021428 ; 0.035275 ; 0.085089 ; 0.16065 ; 0.22306 ; 0.27558 ; 0.3434 ; 0.42134 ; 0.48033 ; 0.56569 ; 0.68533 ; 0.68976 ; 0.6904 ; 0.69025 ; 0.6895 ; 0.68924 ; 0.68915 ; 0.69806 ; 0.71471 ; 0.72147 ; 0.7214 ; 0.72769 ; 0.83634 ; 0.9835 ; 1.0306 ; 1.0948 ; 1.1769 ; 1.2767 ; 1.3893 ; 1.4172 ; 1.4507 ; 1.4906 ; 1.5018 ; 1.5153 ; 1.5319 ; 1.549 ; 1.5661 ; 1.6077 ; 2.6564 ; 3.5929 ; 4.7412 ; 5.2435 ; 5.3752 ; 5.4558 ; 5.5209 ; 5.5647 ; 5.5643 ; 5.449 ; 5.4097 ; 5.2122 ; 5.1229 ; 5.0157 ; 4.8791 ; 4.8796 ; 4.8747 ; 4.8576 ; 4.8081 ; 4.6938 ; 4.5992 ; 4.507 ; 4.397 ; 4.3262]

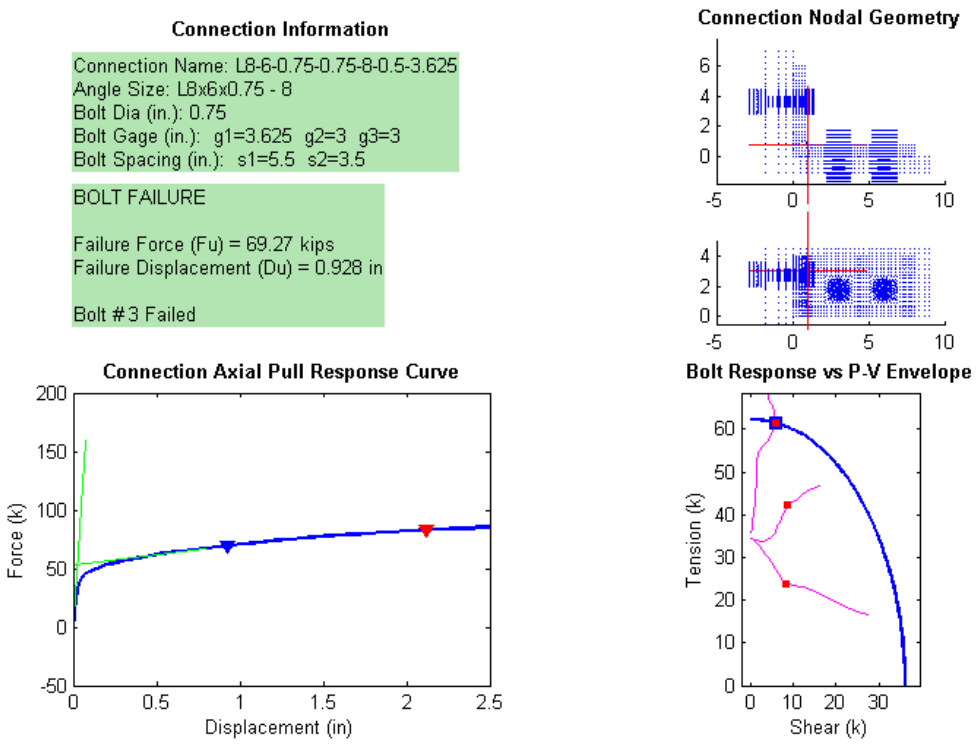


Figure B.248 Connection L8_6_0.75_0.75_8_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.75_8_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 2.0802e+003

Plastic Stiffness (k/in): 17.7719

Displacement (in): [2.5817e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.018738 ; 0.02121 ; 0.024918 ; 0.030479 ; 0.038822 ; 0.051336 ; 0.070108 ; 0.098264 ; 0.1405 ; 0.20385 ; 0.22761 ; 0.26325 ; 0.3167 ; 0.39688 ; 0.42695 ; 0.47205 ; 0.5397 ; 0.64118 ; 0.7934 ; 1.0217 ; 1.0842 ; 1.1077 ; 1.1164 ; 1.1296 ; 1.1494 ; 1.1791 ; 1.2236 ; 1.2903 ; 1.3904 ; 1.4155 ; 1.4405 ; 1.478 ; 1.5343 ; 1.6188 ; 1.6505 ; 1.698 ; 1.7693 ; 1.8762 ; 2.0365 ; 2.0967 ; 2.1869 ; 2.3222 ; 2.5]

Force (kips): [-0.671057 ; 1.60725 ; 3.39178 ; 5.65083 ; 7.62917 ; 9.40845 ; 11.7631 ; 12.5564 ; 13.6217 ; 15.0022 ; 16.7963 ; 18.9328 ; 21.0206 ; 22.5386 ; 23.7873 ; 25.1289 ; 26.6604 ; 27.107 ; 27.6714 ; 28.4584 ; 29.5622 ; 29.9762 ; 30.5289 ; 31.282 ; 32.2908 ; 33.6434 ; 35.3196 ; 35.8394 ; 36.0229 ; 36.0963 ; 36.2082 ; 36.3637 ; 36.5808 ; 36.9148 ; 37.3874 ; 38.0093 ; 38.1626 ; 38.3075 ; 38.5192 ; 38.8214 ; 39.2571 ; 39.4179 ; 39.6488 ; 39.9846 ; 40.4555 ; 41.0878 ; 41.3089 ; 41.6195 ; 42.0418 ; 42.5376]

Bolt 1 - Tensile Force (kips): [34.6481 ; 34.5852 ; 34.5324 ; 34.4601 ; 34.3899 ; 34.3213 ; 34.222 ; 34.1861 ; 34.136 ; 34.0671 ; 33.9695 ; 33.8343 ; 33.4961 ; 32.745 ; 31.7435 ; 30.3435 ; 28.5056 ; 27.941 ; 27.2472 ; 26.2209 ; 24.6786 ; 24.1758 ; 23.9786 ; 23.9457 ; 23.9208 ; 23.7677 ; 23.7934 ; 23.705 ; 23.6891 ; 23.6574 ; 23.6073 ; 23.5381 ; 23.47 ; 23.3081 ; 23.0255 ; 22.6016 ; 22.4083 ; 22.1985 ; 21.8979 ; 21.5425 ; 20.8566 ; 20.5703 ; 20.1616 ; 19.5019 ; 18.7147 ; 18.0196 ; 17.7136 ; 17.3541 ; 17.0898 ; 16.7548]

Bolt 1 - Shear Force (kips): [0.044199 ; 0.0794943 ; 0.162687 ; 0.273288 ; 0.372743 ; 0.464631 ; 0.590683 ; 0.634478 ; 0.694806 ; 0.775685 ; 0.885546 ; 1.0275 ; 1.3662 ; 2.02681 ; 2.82694 ; 3.86673 ; 5.13512 ; 5.50727 ; 5.95668 ; 6.59955 ; 7.51205 ; 7.79761 ; 7.90561 ; 7.90029 ; 7.89342 ; 8.12091 ; 8.1954 ; 9.02964 ; 9.22312 ; 9.38185 ; 9.61796 ; 9.89266 ; 10.1282 ; 10.8958 ; 12.2861 ; 13.8093 ; 14.2724 ; 14.7351 ; 15.3929 ; 16.1641 ; 17.4813 ; 17.9913 ; 18.7326 ; 20.0403 ; 21.6552 ; 23.3566 ; 24.0378 ; 24.8938 ; 25.9307 ; 27.4075]

Bolt 2 - Tensile Force (kips): [34.6432 ; 34.5732 ; 34.5072 ; 34.4235 ; 34.353 ; 34.2958 ; 34.2351 ; 34.22 ; 34.2007 ; 34.1829 ; 34.1735 ; 34.1953 ; 34.0864 ; 33.8005 ; 33.8317 ; 34.2504 ; 34.9417 ; 35.2348 ; 35.6388 ; 36.33 ; 37.4982 ; 37.944 ; 38.5717 ; 39.3931 ; 40.3959 ; 41.5572 ; 42.6759 ; 42.9429 ; 43.0336 ; 43.0688 ; 43.1103 ; 43.1853 ; 43.2887 ; 43.4746 ; 43.755 ; 44.1844 ; 44.2742 ; 44.3556 ; 44.4883 ; 44.6797 ; 44.9214 ; 45.0127 ; 45.1388 ; 45.3056 ; 45.5542 ; 45.9066 ; 46.0168 ; 46.138 ; 46.3977 ; 46.821]

Bolt 2 - Shear Force (kips): [0.0332827 ; 0.101663 ; 0.199981 ; 0.328923 ; 0.444743 ; 0.551873 ; 0.698292 ; 0.748848 ; 0.818179 ; 0.910267 ; 1.03298 ; 1.1896 ; 1.53411 ; 2.16793 ; 2.89977 ; 3.77759 ; 4.75849 ; 5.01983 ; 5.32022 ; 5.71923 ; 6.24497 ; 6.4251 ; 6.68443 ; 7.03561 ; 7.49458 ; 8.06578 ; 9.1061 ; 9.49539 ; 9.61233 ; 9.66141 ; 9.7893 ; 9.94905 ; 10.2133 ; 10.4823 ; 10.8321 ; 11.4191 ; 11.5617 ; 11.6734 ; 11.8156 ; 12.0425 ; 12.3238 ; 12.4394 ; 12.6481 ; 12.8309 ; 13.1353 ; 13.7415 ; 14.0034 ; 14.4968 ; 15.264 ; 15.9796]

Bolt 3 - Tensile Force (kips): [36 ; 35.9293 ; 35.9188 ; 36.0109 ; 36.1983 ; 36.4129 ; 36.7834 ; 36.9345 ; 37.2097 ; 37.6537 ; 38.2568 ; 39.0312 ; 40.0197 ; 41.2405 ; 42.8345 ; 44.9141 ; 47.5165 ; 48.3958 ; 49.6287 ; 51.2843 ; 53.3619 ; 54.039 ; 54.8201 ; 55.9304 ; 57.5323 ; 59.8357 ; 62.7675 ; 63.7125 ; 64.0337 ; 64.1533 ; 64.3388 ; 64.5981 ; 64.9569 ; 65.4949 ; 66.1417 ; 66.8887 ; 67.1007 ; 67.2655 ; 67.4926 ; 67.8391 ; 68.3913 ; 68.6237 ; 68.8954 ; 69.2348 ; 69.6938 ; 70.2593 ; 70.4398 ; 70.6644 ; 70.8752 ; 71.0359]

Bolt 3 - Shear Force (kips): [0.029856 ; 0.014601 ; 0.042255 ; 0.089788 ; 0.13922 ; 0.18135 ; 0.23821 ; 0.25815 ; 0.28545 ; 0.3232 ; 0.37641 ; 0.45106 ; 0.55995 ; 0.69195 ; 0.84471 ; 1.0392 ; 1.2246 ; 1.2702 ; 1.3217 ; 1.3847 ; 1.4736 ; 1.5306 ; 1.6661 ; 2.7447 ; 4.0189 ; 5.2262 ; 5.9264 ; 5.4811 ; 5.3936 ; 5.4071 ; 5.3836 ; 5.3204 ; 5.1806 ; 4.9863 ; 4.8084 ; 4.4634 ; 4.3646 ; 4.2998 ; 4.2451 ; 4.2399 ; 4.0503 ; 3.9477 ; 3.8271 ; 3.7051 ; 3.5816 ; 3.437 ; 3.3928 ; 3.3288 ; 3.2377 ; 3.1226]

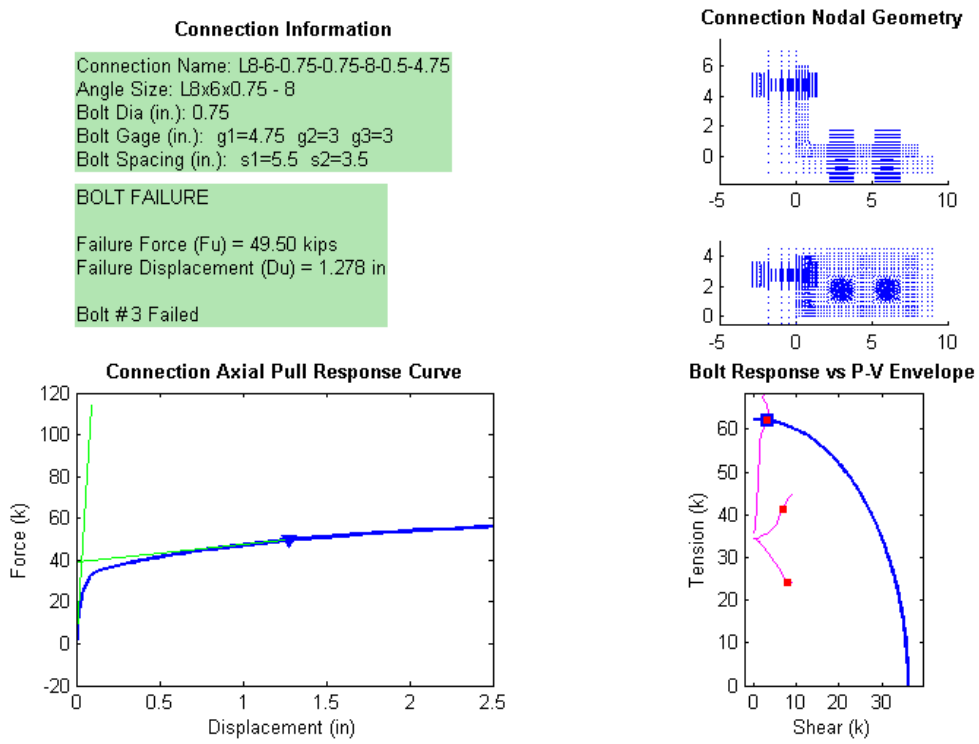


Figure B.249 Connection L8_6_0.75_0.75_8_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.75_8_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.1853e+003

Plastic Stiffness (k/in): 8.0192

Displacement (in): [2.5707e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.033371 ; 0.038933 ; 0.047275 ; 0.05979 ; 0.078561 ; 0.10672 ; 0.14895 ; 0.2123 ; 0.30733 ; 0.34297 ; 0.39642 ; 0.47661 ; 0.59688 ; 0.64198 ; 0.70963 ; 0.81111 ; 0.96333 ; 1.1917 ; 1.2542 ; 1.3479 ; 1.4885 ; 1.6995 ; 1.7522 ; 1.8049 ; 1.8247 ; 1.8544 ; 1.8989 ; 1.9656 ; 2.0657 ; 2.2159 ; 2.4411 ; 2.5]

Force (kips): [-0.652919 ; 0.698716 ; 1.66221 ; 2.53079 ; 3.71629 ; 5.31128 ; 7.4138 ; 9.99878 ; 10.7546 ; 11.7483 ; 13.0148 ; 14.4188 ; 15.7835 ; 16.7834 ; 17.5953 ; 18.3433 ; 19.2304 ; 19.5375 ; 19.9746 ; 20.5826 ; 21.3893 ; 21.6691 ; 22.0837 ; 22.6566 ; 23.4101 ; 24.4107 ; 24.6613 ; 25.0138 ; 25.5014 ; 26.1667 ; 26.3198 ; 26.4659 ; 26.5206 ; 26.5984 ; 26.7125 ; 26.8789 ; 27.1147 ; 27.4454 ; 27.919 ; 28.0394]

Bolt 1 - Tensile Force (kips): [34.6481 ; 34.6115 ; 34.5843 ; 34.5586 ; 34.5221 ; 34.4691 ; 34.3905 ; 34.279 ; 34.2424 ; 34.1914 ; 34.1211 ; 34.0329 ; 33.9303 ; 33.8293 ; 33.6508 ; 33.0276 ; 31.9282 ; 31.5307 ; 30.9384 ; 30.0542 ; 28.7764 ; 28.3066 ; 27.6064 ; 26.5891 ; 25.1626 ; 24.1058 ; 24.1003 ; 24.0971 ; 24.0982 ; 24.1103 ; 24.1151 ; 24.1204 ; 24.0829 ; 24.0761 ; 24.0825 ; 24.0945 ; 24.1147 ; 24.1503 ; 24.1387 ; 24.1068]

Bolt 1 - Shear Force (kips): [0.043451 ; 0.043139 ; 0.083766 ; 0.12471 ; 0.18334 ; 0.26543 ; 0.3784 ; 0.52729 ; 0.57388 ; 0.63752 ; 0.72316 ; 0.82741 ; 0.94402 ; 1.0561 ; 1.247 ; 1.8298 ; 2.7338 ; 3.044 ; 3.4919 ; 4.1356 ; 5.0249 ; 5.3401 ; 5.8016 ; 6.4534 ; 7.3219 ; 7.9465 ; 7.9491 ; 7.9503 ; 7.9517 ; 7.9561 ; 7.9577 ; 7.9591 ; 8.0362 ; 8.0514 ; 8.0494 ; 8.0434 ; 8.0336 ; 8.0197 ; 8.4315 ; 8.7483]

Bolt 2 - Tensile Force (kips): [34.6433 ; 34.6065 ; 34.5686 ; 34.5363 ; 34.4937 ; 34.4407 ; 34.3856 ; 34.3645 ; 34.3676 ; 34.3838 ; 34.4218 ; 34.5013 ; 34.6142 ; 34.7827 ; 34.8966 ; 34.9986 ; 35.3353 ; 35.4726 ; 35.7002 ; 36.0949 ; 36.8324 ; 37.1369 ; 37.6154 ; 38.3449 ; 39.3866 ; 40.8078 ; 41.1433 ; 41.6128 ; 42.2154 ; 42.9487 ; 43.109 ; 43.2591 ; 43.3119 ; 43.3903 ; 43.5038 ; 43.6677 ; 43.8941 ; 44.2027 ; 44.5816 ; 44.6598]

Bolt 2 - Shear Force (kips): [0.032583 ; 0.056389 ; 0.10916 ; 0.1592 ; 0.22997 ; 0.32814 ; 0.4629 ; 0.63915 ; 0.69426 ; 0.76896 ; 0.86746 ; 0.98485 ; 1.1152 ; 1.2423 ; 1.4382 ; 1.9665 ; 2.7523 ; 3.0124 ; 3.3777 ; 3.8811 ; 4.5148 ; 4.7228 ; 5.0114 ; 5.3918 ; 5.8723 ; 6.4699 ; 6.6228 ; 6.8366 ; 7.1284 ; 7.5345 ; 7.6311 ; 7.7256 ; 7.7546 ; 7.8053 ; 7.8818 ; 7.992 ; 8.1501 ; 8.3687 ; 8.8837 ; 9.0378]

Bolt 3 - Tensile Force (kips): [36 ; 35.943 ; 35.9096 ; 35.8998 ; 35.9336 ; 36.0855 ; 36.411 ; 37.0379 ; 37.3513 ; 37.8395 ; 38.4922 ; 39.337 ; 40.5817 ; 42.2953 ; 44.416 ; 46.5727 ; 48.9974 ; 49.834 ; 50.9841 ; 52.5274 ; 54.4306 ; 55.0499 ; 55.9529 ; 57.243 ; 58.9231 ; 61.2919 ; 61.9037 ; 62.7147 ; 63.9039 ; 65.529 ; 65.9023 ; 66.238 ; 66.3563 ; 66.5226 ; 66.762 ; 67.1008 ; 67.5745 ; 68.3728 ; 69.5213 ; 69.8148]

Bolt 3 - Shear Force (kips): [0.029706 ; 0.0096062 ; 0.020959 ; 0.03878 ; 0.068305 ; 0.11646 ; 0.17933 ; 0.25599 ; 0.27933 ; 0.31272 ; 0.35927 ; 0.42866 ; 0.53844 ; 0.66215 ; 0.80542 ; 0.94767 ; 1.0724 ; 1.109 ; 1.161 ; 1.232 ; 1.3104 ; 1.3295 ; 1.3756 ; 1.4583 ; 1.6307 ; 2.7173 ; 3.0072 ; 3.2771 ; 3.5104 ; 3.1145 ; 3.0142 ; 2.822 ; 2.7648 ; 2.6981 ; 2.5016 ; 2.248 ; 2.1568 ; 2.5221 ; 2.6486 ; 2.5858]

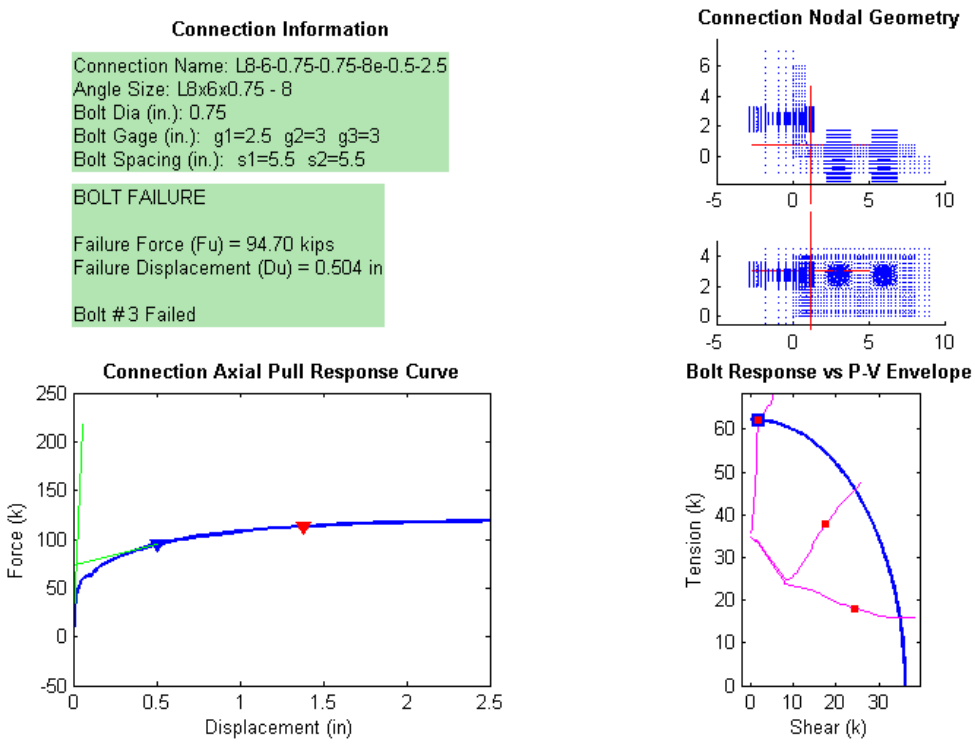


Figure B.250 Connection L8_6_0.75_0.75_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.75_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4088

Plastic Stiffness (k/in): 42.2315

Displacement (in): [3.8224e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.033569 ; 0.048401 ; 0.070648 ; 0.072734 ; 0.075862 ; 0.080555 ; 0.087594 ; 0.090234 ; 0.091224 ; 0.092709 ; 0.094936 ; 0.098277 ; 0.10329 ; 0.11081 ; 0.11151 ; 0.11257 ; 0.11415 ; 0.11653 ; 0.1201 ; 0.12545 ; 0.13348 ; 0.14552 ; 0.15756 ; 0.1696 ; 0.18766 ; 0.21475 ; 0.22153 ; 0.2283 ; 0.23846 ; 0.2537 ; 0.27655 ; 0.28513 ; 0.29798 ; 0.31727 ; 0.3462 ; 0.3896 ; 0.40587 ; 0.43028 ; 0.4669 ; 0.48063 ; 0.50122 ; 0.53212 ; 0.57846 ; 0.64797 ; 0.67403 ; 0.71313 ; 0.77178 ; 0.85976 ; 0.99172 ; 1.0412 ; 1.1154 ; 1.2268 ; 1.3938 ; 1.6438 ; 1.7063 ; 1.7688 ; 1.8313 ; 1.8547 ; 1.8899 ; 1.9426 ; 2.0217 ; 2.1008 ; 2.1799 ; 2.2986 ; 2.3431 ; 2.4098 ; 2.5]

Force (kips): [-0.949819 ; 3.64034 ; 7.03453 ; 11.1613 ; 14.5447 ; 17.3036 ; 20.5515 ; 23.8275 ; 25.9854 ; 28.3661 ; 30.8528 ; 30.9713 ; 31.0201 ; 31.0198 ; 31.0101 ; 31.0063 ; 31.005 ; 31.0665 ; 31.2367 ; 31.4589 ; 31.4642 ; 31.4602 ; 31.5287 ; 31.6627 ; 31.8403 ; 32.1302 ; 32.509 ; 33.044 ; 33.7291 ; 34.6567 ; 35.4582 ; 36.2469 ; 37.3292 ; 38.7143 ; 39.0265 ; 39.3379 ; 39.7873 ; 40.4156 ; 41.2368 ; 41.5341 ; 41.9605 ; 42.5694 ; 43.4429 ; 44.6539 ; 45.0736 ; 45.6881 ; 46.5513 ; 46.868 ; 47.3029 ; 47.9146 ; 48.7392 ; 49.8137 ; 50.2185 ; 50.7759 ; 51.5369 ; 52.5513 ; 53.8651 ; 54.3121 ; 54.9096 ; 55.6584 ; 56.6137 ; 57.7049 ; 57.939 ; 58.1428 ; 58.3168 ; 58.3744 ; 58.4576 ; 58.569 ; 58.7144 ; 58.8467 ; 58.971 ; 59.1413 ; 59.2014 ; 59.2866 ; 59.396]

Bolt 1 - Tensile Force (kips): [34.7136 ; 34.5725 ; 34.4543 ; 34.2914 ; 34.1431 ; 34.0113 ; 33.8362 ; 33.3585 ; 31.455 ; 28.3309 ; 24.0961 ; 24.0128 ; 24.0024 ; 23.9921 ; 23.9822 ; 23.979 ; 23.9779 ; 23.9348 ; 23.7493 ; 23.7404 ; 23.7334 ; 23.7297 ; 23.7212 ; 23.704 ; 23.6828 ; 23.6708 ; 23.6515 ; 23.6095 ; 23.5749 ; 23.3982 ; 23.2835 ; 23.1144 ; 22.8759 ; 22.5475 ; 22.4586 ; 22.3015 ; 22.0411 ; 21.7087 ; 21.3413 ; 21.1497 ; 20.8663 ; 20.4099 ; 19.8254 ; 19.1006 ; 18.9076 ; 18.6473 ; 18.403 ; 18.3007 ; 18.1024 ; 17.8806 ; 17.6813 ; 17.4019 ; 17.2483 ; 17.0543 ; 16.771 ; 16.4191 ; 16.1684 ; 16.0792 ; 16.0146 ; 15.9641 ; 16.0004 ; 15.989 ; 15.9854 ; 15.9888 ; 16.0006 ; 16.0052 ; 16.0125 ; 16.0227 ; 16.0187 ; 15.9999 ; 15.9907 ; 15.9657 ; 15.9451 ; 15.9233 ; 15.8983]

Bolt 1 - Shear Force (kips): [0.0486253 ; 0.186535 ; 0.351094 ; 0.556431 ; 0.730368 ; 0.876553 ; 1.05542 ; 1.51724 ; 3.0634 ; 5.26805 ; 7.87174 ; 7.91831 ; 7.91909 ; 7.91712 ; 7.91409 ; 7.91305 ; 7.9127 ; 7.98374 ; 8.20379 ; 8.20933 ; 8.21141 ; 8.20975 ; 8.27334 ; 8.40155 ; 8.57101 ; 8.66352 ; 8.81167 ; 9.13076 ; 9.38859 ; 10.0584 ; 10.4067 ; 11.2306 ; 12.3976 ; 13.6518 ; 13.888 ; 14.2601 ; 14.8547 ; 15.5955 ; 16.4172 ; 16.8146 ; 17.3938 ; 18.3139 ; 19.6394 ; 21.3806 ; 21.8861 ; 22.6118 ; 23.4425 ; 23.7686 ; 24.2668 ; 24.933 ; 25.7829 ; 27.013 ; 27.5146 ; 28.1319 ; 28.98 ; 30.0714 ; 31.3519 ; 31.8095 ; 32.4278 ; 33.2944 ; 34.4183 ; 35.8057 ; 36.0693 ; 36.304 ; 36.5187 ; 36.5972 ; 36.7096 ; 36.868 ; 37.1127 ; 37.3511 ; 37.5748 ; 37.9099 ; 38.0406 ; 38.224 ; 38.4567]

Bolt 2 - Tensile Force (kips): [34.727 ; 34.5732 ; 34.4434 ; 34.2789 ; 34.1527 ; 34.0587 ; 33.9601 ; 33.6169 ; 31.8521 ; 29.0288 ; 25.3632 ; 25.012 ; 24.8135 ; 24.7793 ; 24.765 ; 24.7612 ; 24.76 ; 24.7755 ; 24.8092 ; 24.6079 ; 24.6002 ; 24.5968 ; 24.6185 ; 24.6571 ; 24.7095 ; 24.7603 ; 24.8735 ; 25.0593 ; 25.3524 ; 25.8523 ; 26.3406 ; 26.9151 ; 27.7397 ; 28.9143 ; 29.2012 ; 29.4999 ; 29.946 ; 30.5687 ; 31.518 ; 31.8792 ; 32.4038 ; 33.1534 ; 34.1418 ; 35.3698 ; 35.7642 ; 36.3247 ; 37.0775 ; 37.3386 ; 37.7099 ; 38.2244 ; 38.906 ; 39.6903 ; 39.9542 ; 40.3313 ; 40.8743 ; 41.6004 ; 42.4779 ; 42.7952 ; 43.2415 ; 43.7785 ; 44.4602 ; 45.325 ; 45.5044 ; 45.6735 ; 45.8307 ; 45.8892 ; 45.9768 ; 46.1109 ; 46.3258 ; 46.5549 ; 46.7965 ; 47.1322 ; 47.2459 ; 47.4032 ; 47.6053]

Bolt 2 - Shear Force (kips): [0.063109 ; 0.187903 ; 0.362702 ; 0.579809 ; 0.762395 ; 0.914574 ; 1.09822 ; 1.54381 ; 3.06073 ; 5.22702 ; 7.81046 ; 8.03447 ; 8.15531 ; 8.17138 ; 8.17186 ; 8.17101 ; 8.17071 ; 8.17583 ; 8.19175 ; 8.50074 ; 8.50941 ; 8.50911 ; 8.51587 ; 8.52779 ; 8.54388 ; 8.76567 ; 9.01877 ; 9.26091 ; 9.70808 ; 9.99308 ; 10.5077 ; 10.8612 ; 11.4015 ; 12.3167 ; 12.5447 ; 12.7144 ; 12.9357 ; 13.3906 ; 13.9016 ; 14.041 ; 14.2255 ; 14.4769 ; 14.9779 ; 15.8663 ; 16.1818 ; 16.5392 ; 17.0905 ; 17.2826 ; 17.5413 ; 17.889 ; 18.3195 ; 18.9002 ; 19.0974 ; 19.3867 ; 19.7721 ; 20.2717 ; 21.0243 ; 21.3345 ; 21.7771 ; 22.37 ; 23.0855 ; 23.8681 ; 24.0654 ; 24.2477 ; 24.4222 ; 24.4868 ; 24.5875 ; 24.7328 ; 24.9264 ; 25.0999 ; 25.2537 ; 25.443 ; 25.5071 ; 25.5977 ; 25.7032]

Bolt 3 - Tensile Force (kips): [36 ; 35.9565 ; 36.0453 ; 36.3602 ; 36.7537 ; 37.2535 ; 38.0749 ; 38.9724 ; 39.6775 ; 40.7355 ; 42.3802 ; 42.4821 ; 42.5269 ; 42.5272 ; 42.5168 ; 42.5124 ; 42.5109 ; 42.5662 ; 42.717 ; 42.9238 ; 42.9281 ; 42.923 ; 42.9871 ; 43.115 ; 43.2884 ; 43.5832 ; 43.9911 ; 44.5978 ; 45.4251 ; 46.6197 ; 47.6997 ; 48.7234 ; 50.126 ; 51.9405 ; 52.3489 ; 52.7441 ; 53.3009 ; 54.0538 ; 55.0313 ; 55.377 ; 55.8745 ; 56.5827 ; 57.5863 ; 58.9814 ; 59.4716 ; 60.2106 ; 61.3 ; 61.692 ; 62.2077 ; 62.9377 ; 63.9762 ; 65.2235 ; 65.7314 ; 66.3764 ; 67.1987 ; 68.2252 ; 69.6087 ; 70.0593 ; 70.57 ; 71.0629 ; 71.7143 ; 72.2107 ; 72.2658 ; 72.3279 ; 72.3937 ; 72.414 ; 72.4412 ; 72.4792 ; 72.5293 ; 72.5595 ; 72.5922 ; 72.6364 ; 72.651 ; 72.6708 ; 72.6964]

Bolt 3 - Shear Force (kips): [0.03219 ; 0.026529 ; 0.075328 ; 0.15032 ; 0.21231 ; 0.2644 ; 0.33177 ; 0.40981 ; 0.47179 ; 0.55573 ; 0.67183 ; 0.67947 ; 0.68292 ; 0.68327 ; 0.68273 ; 0.6825 ; 0.68242 ; 0.68612 ; 0.69697 ; 0.71294 ; 0.71343 ; 0.7133 ; 0.71822 ; 0.72799 ; 0.74136 ; 0.76473 ; 0.79656 ; 0.8444 ; 0.90983 ; 0.99879 ; 1.0765 ; 1.1422 ; 1.2269 ; 1.328 ; 1.3486 ; 1.3661 ; 1.3884 ; 1.4165 ; 1.4508 ; 1.4606 ; 1.4734 ; 1.4885 ; 1.5029 ; 1.513 ; 1.5156 ; 1.5201 ; 1.5598 ; 1.5729 ; 1.6421 ; 2.2178 ; 3.1867 ; 3.8551 ; 4.2765 ; 4.6858 ; 4.9737 ; 5.1911 ; 5.4387 ; 5.5166 ; 5.5739 ; 5.5822 ; 5.4917 ; 5.0472 ; 4.8916 ; 4.8175 ; 4.7513 ; 4.722 ; 4.6843 ; 4.6224 ; 4.5724 ; 4.503 ; 4.4737 ; 4.4368 ; 4.4251 ; 4.4075 ; 4.3875]

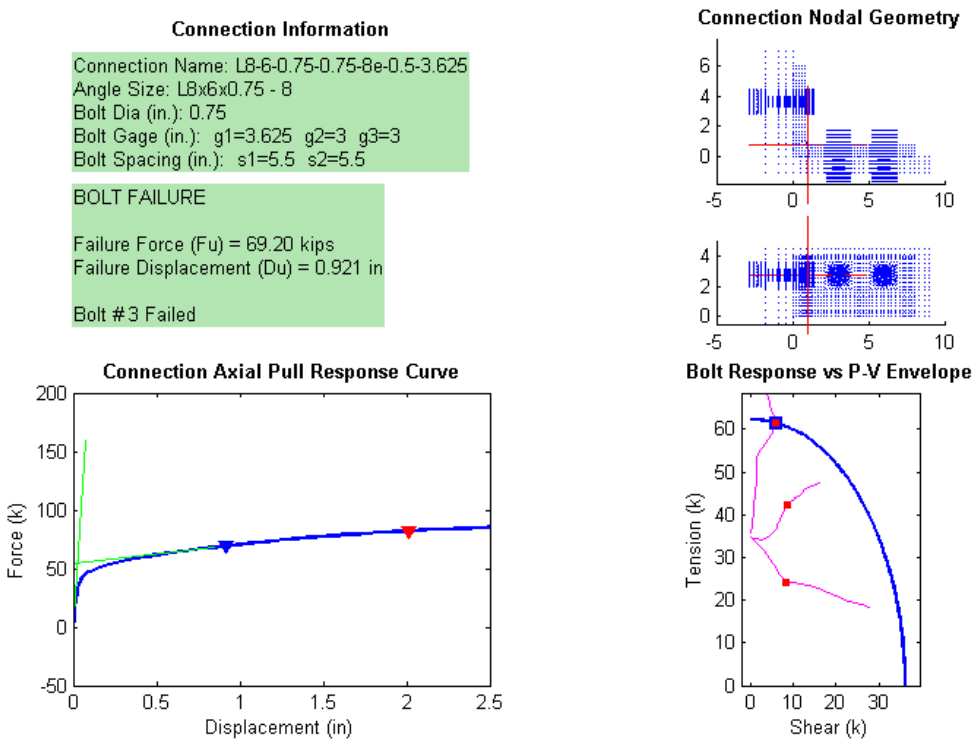


Figure B.251 Connection L8_6_0.75_0.75_8e_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.75_8e_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 2.0956e+003

Plastic Stiffness (k/in): 16.2782

Displacement (in): [2.5737e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.076231 ; 0.08679 ; 0.10263 ; 0.12639 ; 0.16202 ; 0.21548 ; 0.29566 ; 0.32572 ; 0.37083 ; 0.38774 ; 0.41311 ; 0.45116 ; 0.50824 ; 0.59387 ; 0.7223 ; 0.77046 ; 0.84271 ; 0.95108 ; 0.99171 ; 1.007 ; 1.0298 ; 1.0641 ; 1.1155 ; 1.1348 ; 1.1638 ; 1.2071 ; 1.2722 ; 1.2966 ; 1.3333 ; 1.3882 ; 1.4088 ; 1.4397 ; 1.486 ; 1.5555 ; 1.6598 ; 1.6989 ; 1.7575 ; 1.8455 ; 1.9775 ; 2.1754 ; 2.2379 ; 2.3317 ; 2.4723 ; 2.5]

Force (kips): [-0.85226 ; 1.47137 ; 3.24069 ; 5.47652 ; 8.33974 ; 11.8903 ; 13.004 ; 14.4438 ; 16.2966 ; 18.5364 ; 20.7902 ; 22.4163 ; 22.8041 ; 23.2896 ; 23.89 ; 24.6395 ; 25.6159 ; 26.7982 ; 28.0873 ; 28.5238 ; 29.142 ; 29.3816 ; 29.735 ; 30.2271 ; 30.8918 ; 31.8055 ; 33.0159 ; 33.4382 ; 34.0262 ; 34.8242 ; 35.1209 ; 35.2434 ; 35.4382 ; 35.7179 ; 36.1018 ; 36.2507 ; 36.4633 ; 36.7966 ; 37.2644 ; 37.4315 ; 37.6731 ; 38.0032 ; 38.1291 ; 38.3101 ; 38.5714 ; 38.9441 ; 39.4769 ; 39.6691 ; 39.9471 ; 40.3433 ; 40.885 ; 41.6066 ; 41.8109 ; 42.0977 ; 42.4974 ; 42.5713]

Bolt 1 - Tensile Force (kips): [34.7096 ; 34.6388 ; 34.5812 ; 34.5022 ; 34.3876 ; 34.2268 ; 34.1718 ; 34.0961 ; 33.9902 ; 33.8446 ; 33.5179 ; 32.7508 ; 32.4924 ; 32.1213 ; 31.5797 ; 30.7858 ; 29.6568 ; 28.1698 ; 26.5113 ; 25.9154 ; 25.0539 ; 24.7448 ; 24.3159 ; 24.0889 ; 24.0981 ; 24.1359 ; 24.2042 ; 24.059 ; 24.1134 ; 24.2254 ; 24.2721 ; 24.2584 ; 24.2102 ; 24.2115 ; 24.216 ; 24.1615 ; 24.1248 ; 23.9498 ; 23.6892 ; 23.5676 ; 23.4413 ; 23.3447 ; 23.2178 ; 22.997 ; 22.7172 ; 22.3746 ; 21.7101 ; 21.4635 ; 21.0137 ; 20.4491 ; 19.8848 ; 19.277 ; 19.0854 ; 18.9148 ; 18.4758 ; 18.3788]

Bolt 1 - Shear Force (kips): [0.043752 ; 0.0891053 ; 0.175921 ; 0.290611 ; 0.442659 ; 0.641454 ; 0.70669 ; 0.793895 ; 0.910654 ; 1.06112 ; 1.38426 ; 2.05546 ; 2.26655 ; 2.56342 ; 2.98379 ; 3.57634 ; 4.38084 ; 5.39148 ; 6.47012 ; 6.83842 ; 7.35951 ; 7.54373 ; 7.79597 ; 7.93505 ; 7.94843 ; 7.96388 ; 7.9871 ; 8.19374 ; 8.21764 ; 8.23864 ; 8.24686 ; 8.38159 ; 8.74869 ; 9.09081 ; 9.59885 ; 9.90847 ; 10.1747 ; 10.9623 ; 12.2803 ; 12.7667 ; 13.3241 ; 13.9377 ; 14.2903 ; 14.8462 ; 15.5845 ; 16.5483 ; 18.2229 ; 18.8546 ; 19.9163 ; 21.2414 ; 22.8088 ; 24.6402 ; 25.2533 ; 25.9999 ; 27.362 ; 27.6018]

Bolt 2 - Tensile Force (kips): [34.7141 ; 34.6417 ; 34.576 ; 34.4951 ; 34.403 ; 34.3219 ; 34.3092 ; 34.2976 ; 34.306 ; 34.3403 ; 34.3087 ; 34.0231 ; 33.9988 ; 34.0194 ; 34.1206 ; 34.3466 ; 34.7522 ; 35.3896 ; 36.2711 ; 36.631 ; 37.2148 ; 37.4417 ; 37.7923 ; 38.3025 ; 39.0029 ; 39.9456 ; 41.0669 ; 41.4371 ; 41.9423 ; 42.5487 ; 42.7222 ; 42.8058 ; 42.9328 ; 43.0896 ; 43.3288 ; 43.4127 ; 43.5137 ; 43.6985 ; 44.0051 ; 44.1051 ; 44.2482 ; 44.4851 ; 44.5603 ; 44.685 ; 44.8825 ; 45.1363 ; 45.4977 ; 45.6367 ; 45.8218 ; 46.0552 ; 46.3985 ; 46.7969 ; 46.9007 ; 47.034 ; 47.3156 ; 47.3778]

Bolt 2 - Shear Force (kips): [0.0568878 ; 0.0846027 ; 0.174014 ; 0.293729 ; 0.451384 ; 0.65525 ; 0.721339 ; 0.809261 ; 0.92441 ; 1.07088 ; 1.37407 ; 2.00931 ; 2.20566 ; 2.47512 ; 2.84446 ; 3.34486 ; 3.98817 ; 4.74059 ; 5.47489 ; 5.70901 ; 6.02876 ; 6.14392 ; 6.30727 ; 6.54121 ; 6.85841 ; 7.26547 ; 7.78321 ; 7.94221 ; 8.18276 ; 8.53934 ; 8.67796 ; 8.74497 ; 8.91432 ; 9.18602 ; 9.44494 ; 9.55274 ; 9.83688 ; 10.1031 ; 10.3353 ; 10.4901 ; 10.8092 ; 11.1863 ; 11.3116 ; 11.4609 ; 11.6581 ; 11.9679 ; 12.2689 ; 12.3659 ; 12.482 ; 12.8617 ; 13.349 ; 14.4171 ; 14.7122 ; 15.2589 ; 15.84 ; 15.9346]

Bolt 3 - Tensile Force (kips): [36 ; 35.9277 ; 35.9145 ; 36.0019 ; 36.2888 ; 36.8318 ; 37.0781 ; 37.518 ; 38.1354 ; 38.9279 ; 39.9414 ; 41.1875 ; 41.6137 ; 42.2234 ; 43.0763 ; 44.2632 ; 45.8697 ; 47.9436 ; 50.6186 ; 51.5156 ; 52.7163 ; 53.1213 ; 53.6682 ; 54.3883 ; 55.3556 ; 56.773 ; 58.745 ; 59.4321 ; 60.5181 ; 61.9008 ; 62.4408 ; 62.6459 ; 62.9477 ; 63.3794 ; 63.9265 ; 64.1598 ; 64.4996 ; 65.0375 ; 65.7488 ; 65.9725 ; 66.2977 ; 66.7161 ; 66.8868 ; 67.0972 ; 67.4039 ; 67.8765 ; 68.5534 ; 68.8023 ; 69.1015 ; 69.5003 ; 70.0156 ; 70.6307 ; 70.7579 ; 70.8925 ; 71.0304 ; 71.0506]

Bolt 3 - Shear Force (kips): [0.040999 ; 0.0086621 ; 0.032572 ; 0.078059 ; 0.14761 ; 0.23161 ; 0.25928 ; 0.29578 ; 0.3489 ; 0.42209 ; 0.52902 ; 0.65621 ; 0.69343 ; 0.74834 ; 0.82679 ; 0.93652 ; 1.0656 ; 1.1973 ; 1.308 ; 1.3398 ; 1.3831 ; 1.4057 ; 1.4667 ; 1.5896 ; 2.2379 ; 3.4456 ; 4.7571 ; 5.1016 ; 5.5713 ; 5.918 ; 5.8748 ; 5.7954 ; 5.6283 ; 5.3199 ; 5.053 ; 4.9279 ; 4.7889 ; 4.661 ; 4.5864 ; 4.5532 ; 4.4213 ; 4.2769 ; 4.1985 ; 4.1078 ; 4.0456 ; 4.0481 ; 3.8044 ; 3.7022 ; 3.6145 ; 3.5425 ; 3.4346 ; 3.3049 ; 3.2612 ; 3.2008 ; 3.1062 ; 3.0901]

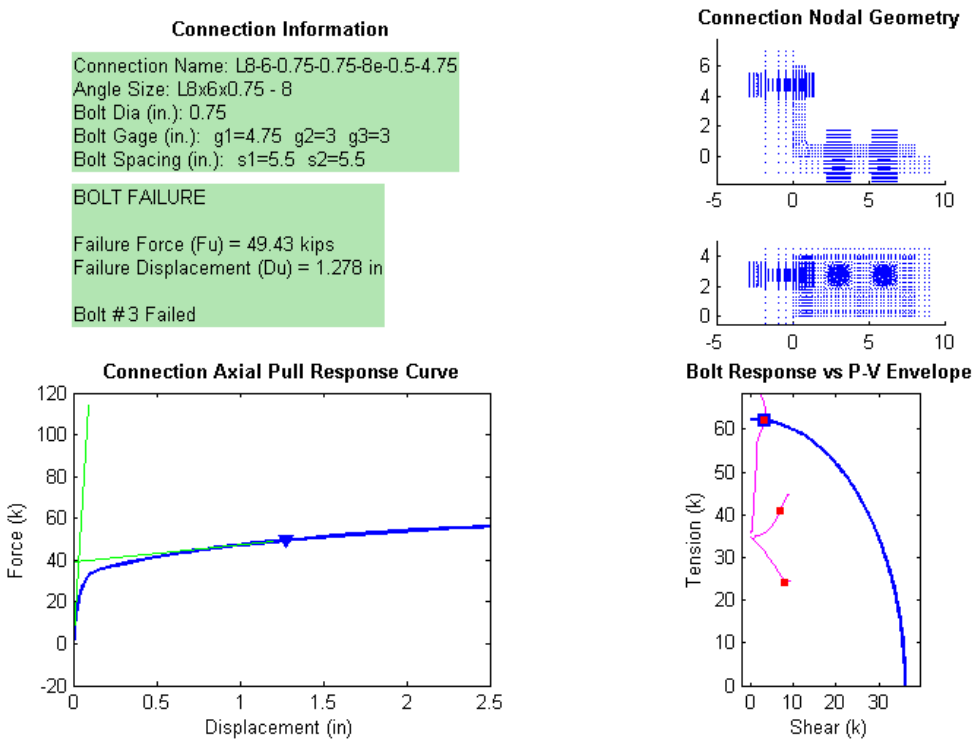


Figure B.252 Connection L8_6_0.75_0.75_8e_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.75_8e_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.2046e+003

Plastic Stiffness (k/in): 8.2701

Displacement (in): [3.1691e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.44793 ; 0.66174 ; 0.67736 ; 0.7008 ; 0.73596 ; 0.78869 ; 0.86779 ; 0.98645 ; 1.0309 ; 1.0977 ; 1.1978 ; 1.348 ; 1.5732 ; 1.8232 ; 2.0732 ; 2.3232 ; 2.3674 ; 2.4337 ; 2.5]

Force (kips): [-0.7867 ; 0.619558 ; 1.56606 ; 2.82551 ; 4.49118 ; 6.66074 ; 9.36582 ; 10.1872 ; 11.2456 ; 12.5742 ; 14.1012 ; 15.5949 ; 16.7082 ; 17.5478 ; 18.2994 ; 19.1793 ; 20.3199 ; 21.7403 ; 21.8365 ; 21.9886 ; 22.205 ; 22.5042 ; 22.9219 ; 23.5002 ; 23.7064 ; 23.9978 ; 24.4118 ; 24.9851 ; 25.7529 ; 26.4916 ; 27.1103 ; 27.6529 ; 27.7547 ; 27.8953 ; 28.0284]

Bolt 1 - Tensile Force (kips): [34.7099 ; 34.6674 ; 34.6368 ; 34.5946 ; 34.5346 ; 34.4461 ; 34.3207 ; 34.2783 ; 34.2206 ; 34.1431 ; 34.0433 ; 33.9272 ; 33.8151 ; 33.5239 ; 32.8795 ; 31.7443 ; 30.1238 ; 27.7874 ; 27.6201 ; 27.3634 ; 26.9852 ; 26.4335 ; 25.6446 ; 24.6292 ; 24.3215 ; 24.2272 ; 24.2457 ; 24.289 ; 24.3651 ; 24.3864 ; 24.5303 ; 24.658 ; 24.6088 ; 24.6054 ; 24.6174]

Bolt 1 - Shear Force (kips): [0.041086 ; 0.052908 ; 0.097279 ; 0.16212 ; 0.25228 ; 0.37507 ; 0.53887 ; 0.59172 ; 0.66262 ; 0.75614 ; 0.87215 ; 0.99967 ; 1.1197 ; 1.4153 ; 1.9899 ; 2.9078 ; 4.1169 ; 5.7332 ; 5.8444 ; 6.014 ; 6.2617 ; 6.6145 ; 7.1067 ; 7.7265 ; 7.9098 ; 7.9793 ; 7.9959 ; 8.0139 ; 8.0401 ; 8.145 ; 8.1614 ; 8.3161 ; 8.6502 ; 8.9488 ; 9.1701]

Bolt 2 - Tensile Force (kips): [34.7145 ; 34.6735 ; 34.6375 ; 34.5911 ; 34.5361 ; 34.4839 ; 34.4665 ; 34.4724 ; 34.4933 ; 34.5525 ; 34.6415 ; 34.7984 ; 34.9867 ; 35.0726 ; 35.1798 ; 35.5047 ; 36.1581 ; 37.349 ; 37.449 ; 37.6047 ; 37.8389 ; 38.1884 ; 38.7203 ; 39.4825 ; 39.7534 ; 40.1334 ; 40.6753 ; 41.4168 ; 42.3632 ; 43.2354 ; 43.9375 ; 44.5134 ; 44.6045 ; 44.7178 ; 44.8269]

Bolt 2 - Shear Force (kips): [0.053656 ; 0.050382 ; 0.092477 ; 0.15806 ; 0.25045 ; 0.37562 ; 0.53986 ; 0.59238 ; 0.66256 ; 0.75391 ; 0.86613 ; 0.98928 ; 1.1151 ; 1.3975 ; 1.9148 ; 2.7053 ; 3.6751 ; 4.8265 ; 4.8999 ; 5.0099 ; 5.1671 ; 5.3871 ; 5.6786 ; 6.0514 ; 6.1788 ; 6.3672 ; 6.6226 ; 6.9572 ; 7.3927 ; 7.8008 ; 8.1621 ; 8.466 ; 8.5767 ; 8.7896 ; 8.98]

Bolt 3 - Tensile Force (kips): [36 ; 35.9425 ; 35.9074 ; 35.9012 ; 35.9946 ; 36.297 ; 36.8702 ; 37.1504 ; 37.6281 ; 38.3172 ; 39.1871 ; 40.4391 ; 42.1869 ; 44.3101 ; 46.4986 ; 48.9236 ; 51.93 ; 55.2952 ; 55.4988 ; 55.8094 ; 56.278 ; 56.9425 ; 57.863 ; 59.1862 ; 59.6983 ; 60.3898 ; 61.3678 ; 62.7405 ; 64.6597 ; 66.5653 ; 67.8489 ; 69.1553 ; 69.4269 ; 69.7535 ; 70.039]

Bolt 3 - Shear Force (kips): [0.040882 ; 0.012753 ; 0.013664 ; 0.038347 ; 0.082296 ; 0.1479 ; 0.2258 ; 0.25006 ; 0.28293 ; 0.32951 ; 0.39715 ; 0.50607 ; 0.63596 ; 0.78341 ; 0.92878 ; 1.0541 ; 1.191 ; 1.3172 ; 1.3245 ; 1.3492 ; 1.3937 ; 1.445 ; 1.5277 ; 1.9025 ; 2.2253 ; 2.5446 ; 2.9266 ; 3.3074 ; 3.2489 ; 2.9234 ; 2.2734 ; 2.5809 ; 2.669 ; 2.8112 ; 2.7025]

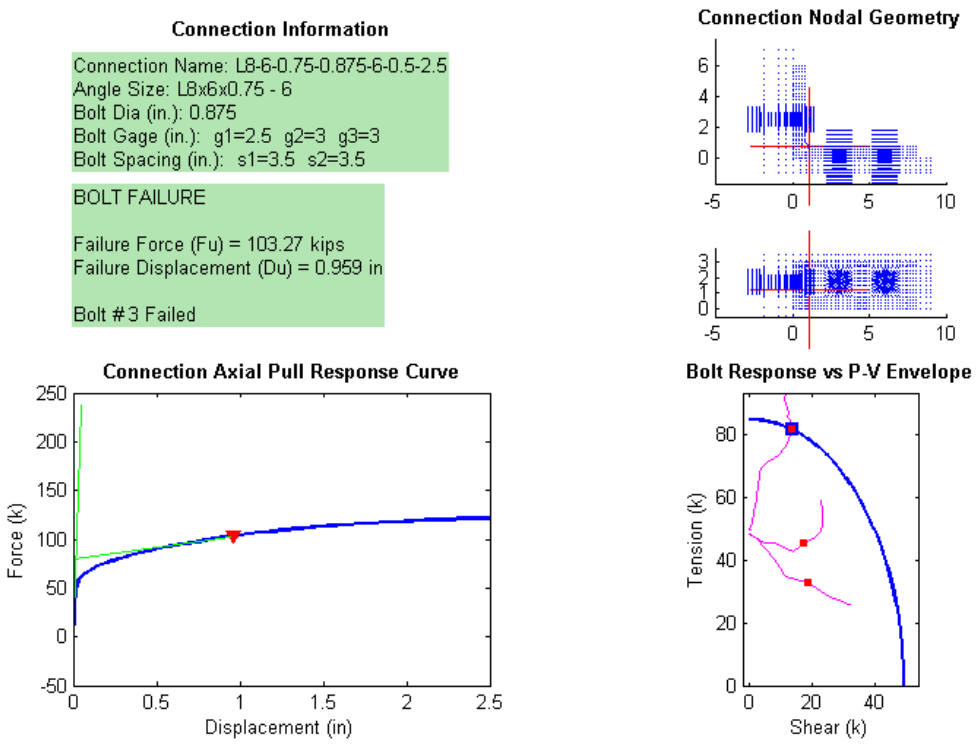


Figure B.253 Connection L8_6_0.75_0.875_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.875_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4.9195e+003

Plastic Stiffness (k/in): 24.7988

Displacement (in): [4.5466e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.13464 ; 0.15048 ; 0.17424 ; 0.20987 ; 0.26332 ; 0.28337 ; 0.31344 ; 0.32471 ; 0.34163 ; 0.367 ; 0.40505 ; 0.46213 ; 0.48354 ; 0.51565 ; 0.56381 ; 0.58187 ; 0.60896 ; 0.61912 ; 0.63436 ; 0.65722 ; 0.65936 ; 0.66017 ; 0.66137 ; 0.66318 ; 0.66589 ; 0.66996 ; 0.67606 ; 0.68522 ; 0.69895 ; 0.71954 ; 0.75044 ; 0.79678 ; 0.86629 ; 0.89236 ; 0.93146 ; 0.94612 ; 0.96811 ; 1.0011 ; 1.0506 ; 1.1248 ; 1.1527 ; 1.1944 ; 1.257 ; 1.351 ; 1.4919 ; 1.5448 ; 1.624 ; 1.7429 ; 1.9213 ; 2.1713 ; 2.4213 ; 2.5]

Force (kips): [-1.50833 ; 4.12989 ; 8.10006 ; 12.837 ; 18.239 ; 19.8425 ; 21.8481 ; 24.1703 ; 26.6177 ; 28.8846 ; 30.5266 ; 31.9702 ; 33.6071 ; 35.5938 ; 36.2346 ; 37.0915 ; 38.2008 ; 39.6612 ; 40.1754 ; 40.9437 ; 41.2508 ; 41.6663 ; 42.2767 ; 43.1102 ; 44.2798 ; 44.6902 ; 45.2626 ; 46.0586 ; 46.3686 ; 46.7518 ; 46.9096 ; 47.1534 ; 47.4098 ; 47.4054 ; 47.4075 ; 47.4307 ; 47.4629 ; 47.5105 ; 47.5806 ; 47.6813 ; 47.8251 ; 48.0414 ; 48.3657 ; 48.8366 ; 49.524 ; 50.4734 ; 50.8128 ; 51.291 ; 51.4728 ; 51.7385 ; 52.112 ; 52.6378 ; 53.3898 ; 53.6655 ; 54.0853 ; 54.6884 ; 55.5048 ; 56.5619 ; 56.9179 ; 57.4093 ; 58.0607 ; 58.8844 ; 59.8125 ; 60.5612 ; 60.7636]

Bolt 1 - Tensile Force (kips): [48.4649 ; 48.2857 ; 48.1499 ; 47.9724 ; 47.7549 ; 47.6855 ; 47.5946 ; 47.4816 ; 47.3414 ; 47.1649 ; 46.7366 ; 45.7352 ; 44.2839 ; 42.223 ; 41.4843 ; 40.4078 ; 38.9026 ; 36.9081 ; 36.2188 ; 35.3129 ; 35.0257 ; 34.9142 ; 34.8964 ; 34.8812 ; 34.8682 ; 34.8643 ; 34.8591 ; 34.8521 ; 34.6814 ; 34.656 ; 34.6503 ; 34.645 ; 34.6373 ; 34.6358 ; 34.635 ; 34.63 ; 34.6208 ; 34.6064 ; 34.5859 ; 34.5624 ; 34.5409 ; 34.5033 ; 34.4121 ; 34.2364 ; 33.9649 ; 33.5974 ; 33.3738 ; 33.0012 ; 32.8591 ; 32.5693 ; 32.2461 ; 31.8385 ; 31.1077 ; 30.6925 ; 30.1136 ; 29.3356 ; 28.4144 ; 27.6177 ; 27.3879 ; 27.1166 ; 26.7321 ; 26.2821 ; 26.0323 ; 25.9177 ; 25.8704]

Bolt 1 - Shear Force (kips): [0.0869387 ; 0.190324 ; 0.371506 ; 0.596813 ; 0.867399 ; 0.950844 ; 1.05813 ; 1.18788 ; 1.34533 ; 1.54068 ; 2.01662 ; 3.04718 ; 4.39961 ; 6.17033 ; 6.77091 ; 7.61717 ; 8.75494 ; 10.1858 ; 10.6503 ; 11.2491 ; 11.4347 ; 11.506 ; 11.5099 ; 11.5091 ; 11.5062 ; 11.505 ; 11.5034 ; 11.5012 ; 11.7784 ; 11.7896 ; 11.7885 ; 11.7855 ; 11.7802 ; 11.7793 ; 11.7812 ; 11.8176 ; 11.8756 ; 11.9608 ; 12.0815 ; 12.224 ; 12.354 ; 12.5699 ; 12.9747 ; 13.5611 ; 14.5087 ; 16.0826 ; 16.7884 ; 17.7135 ; 18.0137 ; 18.611 ; 19.2704 ; 20.0928 ; 21.2787 ; 21.9316 ; 22.8255 ; 24.0144 ; 25.4303 ; 27.1319 ; 27.66 ; 28.2928 ; 29.1048 ; 30.1063 ; 31.0893 ; 31.9177 ; 32.1902]

Bolt 2 - Tensile Force (kips): [48.4641 ; 48.2241 ; 48.0356 ; 47.8055 ; 47.554 ; 47.4823 ; 47.3954 ; 47.2959 ; 47.1929 ; 47.0738 ; 46.7578 ; 46.1323 ; 45.6915 ; 45.5593 ; 45.4623 ; 45.3223 ; 45.0748 ; 44.6798 ; 44.5344 ; 44.3338 ; 44.2528 ; 44.1268 ; 43.9332 ; 43.6783 ; 43.383 ; 43.2915 ; 43.1916 ; 43.0493 ; 43.078 ; 42.899 ; 42.8473 ; 42.8463 ; 42.8647 ; 42.8442 ; 42.8414 ; 42.8656 ; 42.8885 ; 42.9187 ; 42.9604 ; 43.0243 ; 43.1382 ; 43.3274 ; 43.5576 ; 43.8107 ; 44.1905 ; 44.8497 ; 45.0766 ; 45.396 ; 45.5151 ; 45.6993 ; 45.9005 ; 46.1881 ; 46.6159 ; 46.7857 ; 47.0527 ; 47.4754 ; 48.1238 ; 49.3164 ; 49.9482 ; 50.901 ; 52.2614 ; 54.1424 ; 56.5037 ; 58.6165 ; 59.2412]

Bolt 2 - Shear Force (kips): [0.0705202 ; 0.278744 ; 0.518413 ; 0.818319 ; 1.17698 ; 1.28733 ; 1.43 ; 1.60535 ; 1.82713 ; 2.11881 ; 2.69402 ; 3.76841 ; 5.10905 ; 6.7153 ; 7.23339 ; 7.87158 ; 8.66102 ; 9.59478 ; 9.90975 ; 10.3527 ; 10.5192 ; 10.7754 ; 11.1518 ; 11.6686 ; 12.3462 ; 12.5802 ; 12.9047 ; 13.3647 ; 13.4689 ; 13.7535 ; 13.9464 ; 14.2224 ; 14.4706 ; 14.4694 ; 14.4697 ; 14.4765 ; 14.4827 ; 14.4905 ; 14.5009 ; 14.5169 ; 14.5472 ; 14.5995 ; 14.7456 ; 15.1031 ; 15.7399 ; 16.3884 ; 16.6373 ; 17.0626 ; 17.2157 ; 17.3679 ; 17.8008 ; 18.4802 ; 19.471 ; 19.7915 ; 20.2431 ; 20.8613 ; 21.8248 ; 22.8605 ; 22.9473 ; 23.0667 ; 23.1511 ; 23.1192 ; 23.0295 ; 22.8705 ; 22.7888]

Bolt 3 - Tensile Force (kips): [50 ; 49.9048 ; 49.9274 ; 50.0717 ; 50.4614 ; 50.6387 ; 51.0025 ; 51.5866 ; 52.3464 ; 53.3023 ; 54.4101 ; 55.7464 ; 57.4103 ; 59.6348 ; 60.3967 ; 61.4833 ; 63.0055 ; 65.1334 ; 65.888 ; 66.9749 ; 67.3343 ; 67.8376 ; 68.5095 ; 69.4394 ; 70.9912 ; 71.6395 ; 72.5037 ; 73.7011 ; 74.1581 ; 74.7683 ; 75.0067 ; 75.3704 ; 75.7531 ; 75.7494 ; 75.7519 ; 75.7805 ; 75.8231 ; 75.887 ; 75.9834 ; 76.1276 ; 76.3427 ; 76.6567 ; 77.1333 ; 77.8357 ; 78.793 ; 80.091 ; 80.5539 ; 81.2238 ; 81.4942 ; 81.859 ; 82.3886 ; 83.1402 ; 84.1539 ; 84.484 ; 85.0711 ; 85.9561 ; 87.118 ; 88.4991 ; 88.9349 ; 89.4793 ; 90.1862 ; 91.1014 ; 92.052 ; 92.7717 ; 92.9345]

Bolt 3 - Shear Force (kips): [0.0303761 ; 0.0572194 ; 0.129263 ; 0.23195 ; 0.382326 ; 0.439385 ; 0.523001 ; 0.637541 ; 0.791154 ; 0.996344 ; 1.22501 ; 1.46307 ; 1.77863 ; 2.1576 ; 2.27045 ; 2.4174 ; 2.61371 ; 2.87141 ; 2.96021 ; 3.09084 ; 3.14848 ; 3.22119 ; 3.31525 ; 3.44062 ; 5.29273 ; 6.40792 ; 7.61323 ; 9.04082 ; 9.55681 ; 10.1463 ; 10.3507 ; 10.6288 ; 10.9339 ; 10.9349 ; 10.9374 ; 10.9612 ; 10.9971 ; 11.0496 ; 11.1253 ; 11.23 ; 11.3743 ; 11.5751 ; 11.828 ; 12.1273 ; 12.4555 ; 12.9251 ; 13.0784 ; 13.2633 ; 13.1963 ; 13.2068 ; 13.2693 ; 13.2718 ; 12.9431 ; 12.737 ; 12.3501 ; 12.1408 ; 12.2406 ; 11.952 ; 11.7836 ; 11.5875 ; 11.3406 ; 11.1902 ; 11.2071 ; 11.2937 ; 11.3115]

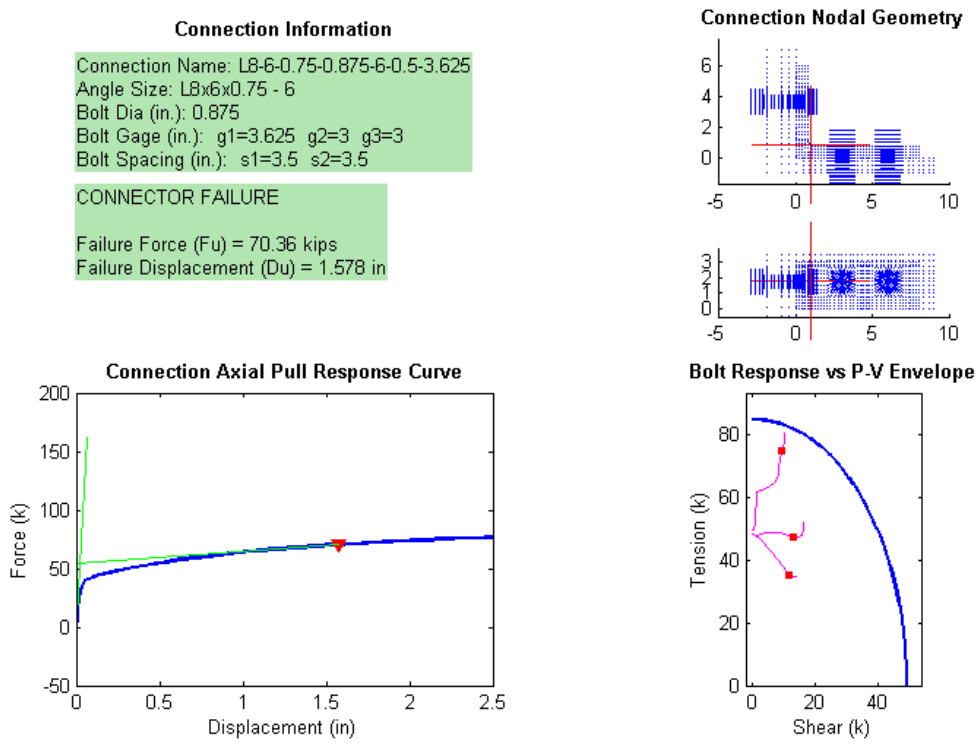


Figure B.254 Connection L8_6_0.75_0.875_6_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.875_6_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 2.3998e+003

Plastic Stiffness (k/in): 9.8749

Displacement (in): [5.716e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.44793 ; 0.46129 ; 0.48133 ; 0.48885 ; 0.50013 ; 0.51704 ; 0.54241 ; 0.58046 ; 0.63755 ; 0.72317 ; 0.8516 ; 1.0442 ; 1.1067 ; 1.2005 ; 1.3411 ; 1.5521 ; 1.556 ; 1.5618 ; 1.5706 ; 1.5838 ; 1.6036 ; 1.6332 ; 1.6777 ; 1.7445 ; 1.7695 ; 1.8071 ; 1.8634 ; 1.9478 ; 1.9795 ; 2.027 ; 2.0983 ; 2.2052 ; 2.2453 ; 2.3054 ; 2.3956 ; 2.5]

Force (kips): [-1.42699 ; 1.37745 ; 3.2602 ; 5.63068 ; 8.62257 ; 12.2129 ; 15.7409 ; 16.6605 ; 17.7521 ; 18.8156 ; 19.7583 ; 20.6069 ; 21.3936 ; 22.187 ; 23.3338 ; 24.8328 ; 26.6357 ; 26.8121 ; 27.0533 ; 27.1457 ; 27.284 ; 27.4869 ; 27.7809 ; 28.2072 ; 28.7966 ; 29.5909 ; 30.7381 ; 32.2627 ; 32.684 ; 33.2513 ; 34.0297 ; 35.0556 ; 35.0742 ; 35.1017 ; 35.1451 ; 35.2056 ; 35.2905 ; 35.4133 ; 35.5942 ; 35.8758 ; 35.9742 ; 36.1208 ; 36.3296 ; 36.6388 ; 36.7534 ; 36.937 ; 37.185 ; 37.5289 ; 37.6488 ; 37.8256 ; 38.0767 ; 38.349]

Bolt 1 - Tensile Force (kips): [48.4634 ; 48.3774 ; 48.3159 ; 48.2356 ; 48.1261 ; 47.9808 ; 47.8218 ; 47.7754 ; 47.716 ; 47.6475 ; 47.5619 ; 47.4509 ; 47.327 ; 47.1945 ; 46.7142 ; 45.4283 ; 43.6808 ; 43.4805 ; 43.2037 ; 43.0937 ; 42.9268 ; 42.6782 ; 42.3122 ; 41.7736 ; 41.0124 ; 39.9329 ; 38.1492 ; 35.4233 ; 35.0872 ; 35.0753 ; 35.077 ; 35.0915 ; 35.0921 ; 35.0926 ; 35.0527 ; 35.0208 ; 35.0155 ; 35.012 ; 35.0126 ; 35.0179 ; 35.0203 ; 35.0245 ; 35.0314 ; 35.045 ; 35.0456 ; 34.9631 ; 34.923 ; 34.8711 ; 34.8596 ; 34.8066 ; 34.7264 ; 34.6575]

Bolt 1 - Shear Force (kips): [0.0823119 ; 0.0784313 ; 0.155771 ; 0.264898 ; 0.411198 ; 0.598375 ; 0.802317 ; 0.86104 ; 0.935495 ; 1.02123 ; 1.12814 ; 1.26563 ; 1.41711 ; 1.57848 ; 2.12839 ; 3.43299 ; 5.04445 ; 5.21979 ; 5.46027 ; 5.55479 ; 5.69736 ; 5.90799 ; 6.21448 ; 6.65977 ; 7.27412 ; 8.11988 ; 9.45867 ; 11.3395 ; 11.5632 ; 11.5712 ; 11.5748 ; 11.5801 ; 11.5803 ; 11.5805 ; 11.658 ; 11.709 ; 11.7136 ; 11.7147 ; 11.7112 ; 11.7021 ; 11.6984 ; 11.6929 ; 11.6845 ; 11.6728 ; 11.7203 ; 12.2314 ; 12.5384 ; 12.8861 ; 12.9742 ; 13.2251 ; 13.5525 ; 13.7908]

Bolt 2 - Tensile Force (kips): [48.4556 ; 48.3437 ; 48.2523 ; 48.1421 ; 48.0051 ; 47.8708 ; 47.784 ; 47.775 ; 47.771 ; 47.7893 ; 47.8284 ; 47.8988 ; 47.9983 ; 48.1123 ; 48.4465 ; 48.6706 ; 48.8435 ; 48.8295 ; 48.8359 ; 48.8348 ; 48.831 ; 48.8249 ; 48.8156 ; 48.7928 ; 48.7776 ; 48.7741 ; 48.6489 ; 48.2885 ; 48.0999 ; 47.8329 ; 47.5643 ; 47.3743 ; 47.3711 ; 47.3666 ; 47.37 ; 47.3678 ; 47.3581 ; 47.3463 ; 47.3357 ; 47.3461 ; 47.3737 ; 47.4189 ; 47.5556 ; 47.8155 ; 48.0755 ; 48.3803 ; 48.9001 ; 49.6974 ; 49.964 ; 50.4931 ; 51.2642 ; 52.0437]

Bolt 2 - Shear Force (kips): [0.0654995 ; 0.128054 ; 0.24454 ; 0.399798 ; 0.605509 ; 0.868873 ; 1.15243 ; 1.23623 ; 1.34405 ; 1.47722 ; 1.65387 ; 1.88745 ; 2.13551 ; 2.38226 ; 2.98526 ; 4.22071 ; 5.64566 ; 5.78987 ; 5.97039 ; 6.03891 ; 6.14169 ; 6.2917 ; 6.50423 ; 6.8061 ; 7.20996 ; 7.73284 ; 8.53915 ; 9.79446 ; 10.2466 ; 10.9123 ; 11.7972 ; 12.9432 ; 12.9632 ; 12.9932 ; 13.0251 ; 13.0825 ; 13.1779 ; 13.3181 ; 13.551 ; 14.1235 ; 14.2911 ; 14.5927 ; 14.9836 ; 15.6097 ; 15.6833 ; 15.7555 ; 15.8731 ; 16.0155 ; 16.0858 ; 16.0404 ; 15.9753 ; 16.0397]

Bolt 3 - Tensile Force (kips): [50 ; 49.8885 ; 49.8294 ; 49.8278 ; 49.9135 ; 50.1243 ; 50.5741 ; 50.7698 ; 51.1273 ; 51.5655 ; 51.9899 ; 52.4521 ; 53.1845 ; 54.2356 ; 55.7434 ; 57.9569 ; 61.0234 ; 61.2528 ; 61.5722 ; 61.68 ; 61.8319 ; 62.0541 ; 62.3818 ; 62.8847 ; 63.668 ; 64.8468 ; 66.9556 ; 69.927 ; 70.6459 ; 71.5156 ; 72.7228 ; 74.492 ; 74.5383 ; 74.6041 ; 74.6975 ; 74.8215 ; 74.9864 ; 75.2084 ; 75.5228 ; 76.0068 ; 76.1883 ; 76.4478 ; 76.8042 ; 77.3187 ; 77.5203 ; 77.8479 ; 78.3353 ; 78.9999 ; 79.2298 ; 79.565 ; 80.0222 ; 80.5298]

Bolt 3 - Shear Force (kips): [0.0449418 ; 0.0201859 ; 0.0564264 ; 0.115472 ; 0.200068 ; 0.319427 ; 0.47169 ; 0.521074 ; 0.588514 ; 0.670436 ; 0.777811 ; 0.871097 ; 0.858787 ; 0.828552 ; 0.870907 ; 1.05706 ; 1.35651 ; 1.39761 ; 1.44899 ; 1.47629 ; 1.52534 ; 1.588 ; 2.47279 ; 3.85337 ; 5.33713 ; 6.82326 ; 8.11893 ; 8.19706 ; 8.3011 ; 8.4946 ; 8.76412 ; 9.2099 ; 9.21927 ; 9.23343 ; 9.25411 ; 9.2846 ; 9.32768 ; 9.38676 ; 9.45888 ; 9.62068 ; 9.67384 ; 9.73632 ; 9.81573 ; 9.95077 ; 10.0159 ; 10.0808 ; 10.1732 ; 10.2667 ; 10.2962 ; 10.3176 ; 10.3284 ; 10.3099]

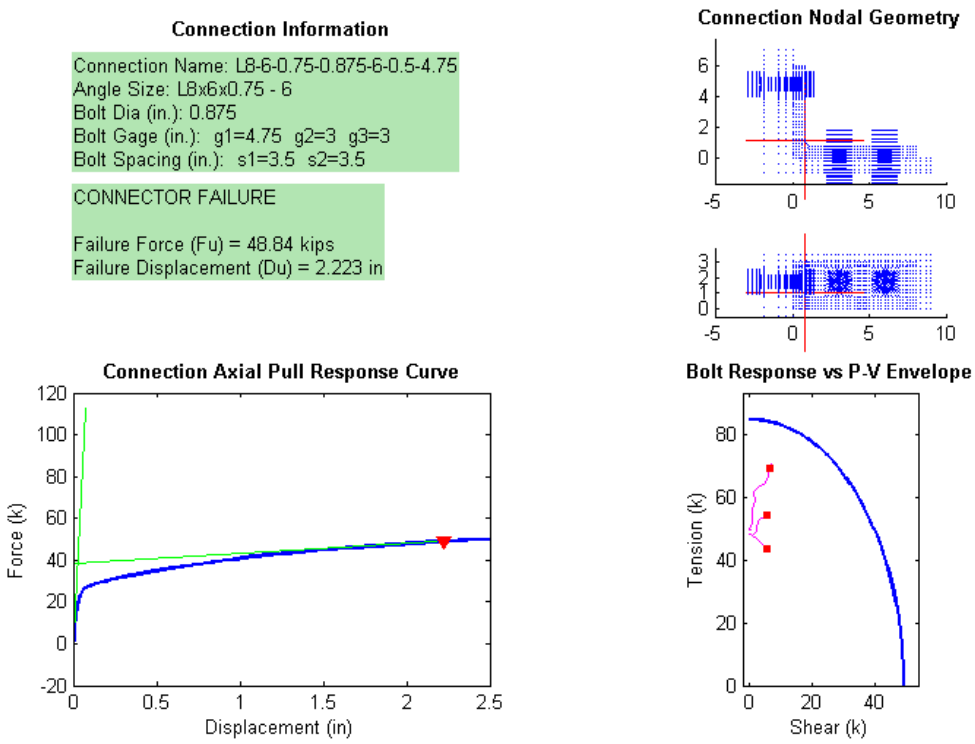


Figure B.255 Connection L8_6_0.75_0.875_6_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.875_6_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 1433

Plastic Stiffness (k/in): 4.8392

Displacement (in): [4.16e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.16699 ; 0.19514 ; 0.23738 ; 0.30073 ; 0.39576 ; 0.53831 ; 0.75212 ; 0.81462 ; 0.83806 ; 0.87321 ; 0.92595 ; 0.94572 ; 0.97539 ; 1.0199 ; 1.0866 ; 1.1867 ; 1.2243 ; 1.2806 ; 1.3651 ; 1.4918 ; 1.6818 ; 1.9318 ; 2.1818 ; 2.4318 ; 2.5]

Force (kips): [-1.38764 ; 0.489963 ; 1.41118 ; 2.66191 ; 4.31439 ; 6.47375 ; 9.0806 ; 11.5404 ; 13.2454 ; 13.9432 ; 14.4814 ; 14.6886 ; 14.9866 ; 15.4069 ; 15.9788 ; 16.7532 ; 17.725 ; 18.9779 ; 19.3139 ; 19.4353 ; 19.6472 ; 19.9423 ; 20.0621 ; 20.2335 ; 20.4714 ; 20.8079 ; 21.2542 ; 21.4123 ; 21.639 ; 21.9612 ; 22.4123 ; 23.0219 ; 23.7303 ; 24.3352 ; 24.8583 ; 24.9898]

Bolt 1 - Tensile Force (kips): [48.4636 ; 48.4067 ; 48.378 ; 48.3372 ; 48.2811 ; 48.203 ; 48.0973 ; 47.9826 ; 47.8894 ; 47.8467 ; 47.8097 ; 47.7911 ; 47.7621 ; 47.7146 ; 47.656 ; 47.6101 ; 47.572 ; 47.5323 ; 47.5151 ; 47.5084 ; 47.4915 ; 47.4657 ; 47.4513 ; 47.4284 ; 47.3916 ; 47.3215 ; 47.1204 ; 47.0185 ; 46.8616 ; 46.5943 ; 46.1378 ; 45.456 ; 44.5976 ; 43.8298 ; 43.1208 ; 42.9361]

Bolt 1 - Shear Force (kips): [0.081102 ; 0.054038 ; 0.081241 ; 0.13292 ; 0.20976 ; 0.31852 ; 0.4611 ; 0.61429 ; 0.74339 ; 0.81258 ; 0.88095 ; 0.91226 ; 0.96035 ; 1.0358 ; 1.1303 ; 1.2201 ; 1.3148 ; 1.4322 ; 1.472 ; 1.4872 ; 1.5172 ; 1.5624 ; 1.5844 ; 1.6186 ; 1.6727 ; 1.7703 ; 2.0258 ; 2.1485 ; 2.332 ; 2.6305 ; 3.1125 ; 3.8057 ; 4.648 ; 5.3792 ; 6.0357 ; 6.2041]

Bolt 2 - Tensile Force (kips): [48.4565 ; 48.3851 ; 48.3416 ; 48.279 ; 48.2029 ; 48.1104 ; 48.031 ; 48.0085 ; 48.0473 ; 48.0953 ; 48.1531 ; 48.179 ; 48.2238 ; 48.2975 ; 48.4769 ; 48.8979 ; 49.7537 ; 50.9939 ; 51.3384 ; 51.4643 ; 51.6496 ; 51.915 ; 52.0107 ; 52.1524 ; 52.3531 ; 52.6317 ; 52.9425 ; 53.029 ; 53.1494 ; 53.2927 ; 53.4808 ; 53.7494 ; 54.0608 ; 54.3889 ; 54.7288 ; 54.8226]

Bolt 2 - Shear Force (kips): [0.064165 ; 0.078545 ; 0.13713 ; 0.22097 ; 0.33801 ; 0.499 ; 0.70773 ; 0.92926 ; 1.1189 ; 1.2253 ; 1.3342 ; 1.3853 ; 1.4653 ; 1.5917 ; 1.759 ; 1.9435 ; 2.1328 ; 2.3636 ; 2.4372 ; 2.4652 ; 2.5145 ; 2.5882 ; 2.6205 ; 2.6695 ; 2.743 ; 2.8604 ; 3.1106 ; 3.2242 ; 3.392 ; 3.6549 ; 4.0279 ; 4.5045 ; 5.0591 ; 5.5179 ; 5.9087 ; 6.0062]

Bolt 3 - Tensile Force (kips): [50 ; 49.9191 ; 49.857 ; 49.7987 ; 49.7856 ; 49.8351 ; 49.9594 ; 50.2337 ; 50.7245 ; 51.1831 ; 51.6742 ; 51.8303 ; 52.0535 ; 52.4637 ; 53.1377 ; 54.1413 ; 55.6384 ; 58.2104 ; 59.0207 ; 59.3122 ; 59.7393 ; 60.308 ; 60.5009 ; 60.7575 ; 61.1314 ; 61.7317 ; 62.4782 ; 62.7184 ; 63.0592 ; 63.5589 ; 64.3837 ; 65.7221 ; 67.441 ; 69.0336 ; 70.3856 ; 70.7411]

Bolt 3 - Shear Force (kips): [0.043737 ; 0.016418 ; 0.026709 ; 0.056815 ; 0.10706 ; 0.18042 ; 0.27886 ; 0.38037 ; 0.45651 ; 0.54744 ; 0.65649 ; 0.70117 ; 0.76884 ; 0.79302 ; 0.76696 ; 0.7331 ; 0.74353 ; 1.4345 ; 1.7986 ; 1.9233 ; 1.6908 ; 1.3998 ; 1.1355 ; 1.0667 ; 1.2788 ; 1.339 ; 1.792 ; 2.2189 ; 2.7884 ; 3.5306 ; 4.3565 ; 5.2847 ; 5.9397 ; 6.4902 ; 6.9092 ; 7.0357]

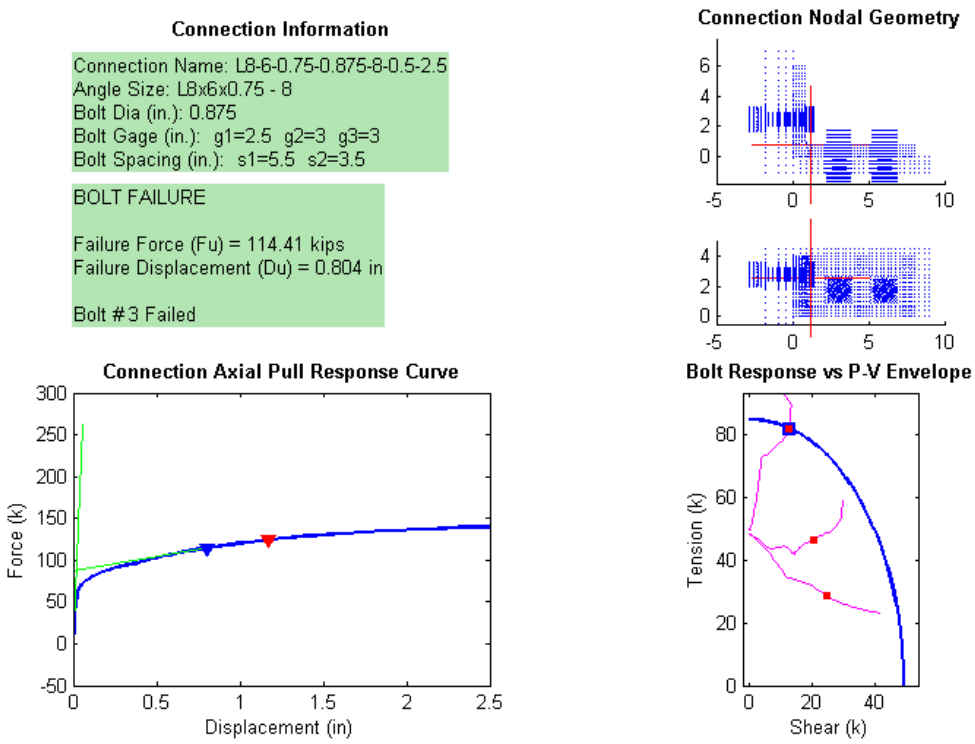


Figure B.256 Connection L8_6_0.75_0.875_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.875_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4.9309e+003

Plastic Stiffness (k/in): 33.6540

Displacement (in): [3.9695e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.016724 ; 0.018372 ; 0.020844 ; 0.024551 ; 0.030113 ; 0.038456 ; 0.05097 ; 0.069741 ; 0.097898 ; 0.10846 ; 0.1243 ; 0.14805 ; 0.18369 ; 0.23714 ; 0.25719 ; 0.28725 ; 0.29853 ; 0.31544 ; 0.32179 ; 0.3313 ; 0.34557 ; 0.34691 ; 0.34825 ; 0.34958 ; 0.35159 ; 0.3546 ; 0.35912 ; 0.36589 ; 0.36843 ; 0.37224 ; 0.37795 ; 0.38653 ; 0.39938 ; 0.41867 ; 0.4259 ; 0.43675 ; 0.45302 ; 0.47743 ; 0.48659 ; 0.50032 ; 0.52091 ; 0.55181 ; 0.56339 ; 0.58077 ; 0.60684 ; 0.64594 ; 0.6606 ; 0.68259 ; 0.71559 ; 0.76507 ; 0.8393 ; 0.95064 ; 0.9924 ; 1.055 ; 1.1177 ; 1.1803 ; 1.2742 ; 1.4151 ; 1.6265 ; 1.8765 ; 2.1265 ; 2.3765 ; 2.5]

Force (kips): [-1.3289 ; 4.22775 ; 8.30175 ; 13.2098 ; 19.0407 ; 23.3393 ; 24.2053 ; 25.3872 ; 27.0027 ; 29.0397 ; 31.3239 ; 33.4008 ; 35.2349 ; 36.9858 ; 38.9056 ; 39.5275 ; 40.3813 ; 41.513 ; 42.9923 ; 44.8504 ; 45.4367 ; 46.2049 ; 46.4674 ; 46.8463 ; 46.9554 ; 47.1006 ; 47.3895 ; 47.3809 ; 47.4098 ; 47.4511 ; 47.5101 ; 47.5957 ; 47.6832 ; 47.7094 ; 47.7337 ; 47.8552 ; 48.0387 ; 48.2981 ; 48.6617 ; 49.2 ; 49.4095 ; 49.7134 ; 50.124 ; 50.7588 ; 50.9991 ; 51.3542 ; 51.8611 ; 52.5611 ; 52.8131 ; 53.1984 ; 53.7424 ; 54.5047 ; 54.7823 ; 55.1843 ; 55.7717 ; 56.6044 ; 57.7433 ; 59.325 ; 59.9243 ; 60.7401 ; 61.4932 ; 62.171 ; 63.0941 ; 64.3373 ; 65.8945 ; 67.3942 ; 68.5739 ; 69.511 ; 69.9104]

Bolt 1 - Tensile Force (kips): [48.4645 ; 48.2753 ; 48.1234 ; 47.9229 ; 47.6631 ; 47.4473 ; 47.4004 ; 47.3348 ; 47.2414 ; 47.1083 ; 46.8588 ; 46.1395 ; 45.0639 ; 43.4534 ; 41.6024 ; 40.9963 ; 40.1145 ; 38.8449 ; 37.0281 ; 34.8663 ; 34.827 ; 34.7776 ; 34.7597 ; 34.7331 ; 34.7215 ; 34.6816 ; 34.497 ; 34.4908 ; 34.4876 ; 34.4856 ; 34.4825 ; 34.4782 ; 34.4725 ; 34.4677 ; 34.4644 ; 34.4337 ; 34.397 ; 34.3659 ; 34.3014 ; 34.1876 ; 34.1198 ; 33.988 ; 33.847 ; 33.6392 ; 33.5679 ; 33.3721 ; 33.0979 ; 32.6942 ; 32.5286 ; 32.2175 ; 31.8372 ; 31.2919 ; 31.0949 ; 30.7531 ; 30.0096 ; 29.0792 ; 27.9878 ; 26.8958 ; 26.4671 ; 25.9668 ; 25.6776 ; 25.4864 ; 25.1003 ; 24.4648 ; 24.1251 ; 23.7907 ; 23.3844 ; 23.2722 ; 23.2698]

Bolt 1 - Shear Force (kips): [0.0800347 ; 0.217354 ; 0.423106 ; 0.680255 ; 1.00028 ; 1.24781 ; 1.29953 ; 1.37125 ; 1.47165 ; 1.61246 ; 1.8772 ; 2.63504 ; 3.66514 ; 5.10887 ; 6.64684 ; 7.1263 ; 7.80555 ; 8.75336 ; 10.0512 ; 11.4765 ; 11.4824 ; 11.4746 ; 11.4698 ; 11.4616 ; 11.4579 ; 11.5203 ; 11.7851 ; 11.786 ; 11.7858 ; 11.7851 ; 11.7841 ; 11.7825 ; 11.7804 ; 11.7779 ; 11.792 ; 11.9541 ; 12.1442 ; 12.2976 ; 12.6112 ; 13.0257 ; 13.2448 ; 13.6477 ; 14.0022 ; 14.8712 ; 15.1621 ; 15.8133 ; 16.6664 ; 17.6888 ; 18.0347 ; 18.6654 ; 19.43 ; 20.4204 ; 20.7383 ; 21.2802 ; 22.4628 ; 23.9165 ; 25.6033 ; 28.1453 ; 29.0064 ; 30.0829 ; 30.8815 ; 31.5596 ; 32.8948 ; 34.9594 ; 36.8496 ; 38.5644 ; 40.0057 ; 40.9089 ; 41.2676]

Bolt 2 - Tensile Force (kips): [48.4619 ; 48.2383 ; 48.0456 ; 47.8068 ; 47.523 ; 47.3188 ; 47.2794 ; 47.2271 ; 47.1574 ; 47.0585 ; 46.8667 ; 46.2766 ; 45.4351 ; 44.3273 ; 43.7095 ; 43.7371 ; 43.8311 ; 44.0081 ; 44.2373 ; 44.4148 ; 44.3183 ; 43.609 ; 43.2303 ; 42.5153 ; 42.2575 ; 42.061 ; 42.0935 ; 42.0563 ; 42.0479 ; 42.0322 ; 42.01 ; 41.9824 ; 41.9598 ; 41.9464 ; 41.9613 ; 42.0407 ; 42.153 ; 42.3184 ; 42.5496 ; 42.7769 ; 42.8893 ; 43.0345 ; 43.2539 ; 43.5664 ; 43.688 ; 43.8661 ; 44.1113 ; 44.433 ; 44.5478 ; 44.7201 ; 44.9954 ; 45.332 ; 45.4362 ; 45.5956 ; 45.884 ; 46.2298 ; 46.8064 ; 47.6286 ; 47.9161 ; 48.3083 ; 48.6451 ; 48.9917 ; 49.56 ; 50.4294 ; 51.9899 ; 54.0531 ; 56.0248 ; 57.8957 ; 58.8005]

Bolt 2 - Shear Force (kips): [0.0621863 ; 0.280439 ; 0.528172 ; 0.839053 ; 1.22303 ; 1.51886 ; 1.58102 ; 1.66759 ; 1.78885 ; 1.9623 ; 2.27586 ; 3.03363 ; 4.07276 ; 5.5031 ; 6.95978 ; 7.38242 ; 7.95728 ; 8.70673 ; 9.67255 ; 10.9065 ; 11.3843 ; 12.3612 ; 12.7616 ; 13.3996 ; 13.6002 ; 13.7661 ; 13.8532 ; 13.857 ; 13.8918 ; 13.9426 ; 14.0158 ; 14.118 ; 14.2235 ; 14.2572 ; 14.2651 ; 14.2884 ; 14.3206 ; 14.3674 ; 14.4309 ; 14.7375 ; 14.8628 ; 15.0778 ; 15.3566 ; 15.6456 ; 15.7506 ; 15.8716 ; 16.1136 ; 16.5696 ; 16.7723 ; 17.0312 ; 17.3247 ; 17.8843 ; 18.1929 ; 18.6222 ; 19.0705 ; 19.8909 ; 20.9731 ; 22.3667 ; 22.9692 ; 23.8188 ; 24.71 ; 25.469 ; 26.3626 ; 27.5056 ; 28.5014 ; 29.1037 ; 29.3996 ; 29.6813 ; 29.8169]

Bolt 3 - Tensile Force (kips): [50 ; 49.9054 ; 49.9312 ; 50.083 ; 50.4813 ; 51.1028 ; 51.2954 ; 51.5887 ; 51.9964 ; 52.5953 ; 53.3973 ; 54.3524 ; 55.5816 ; 57.2013 ; 59.3031 ; 60.0116 ; 61.0005 ; 62.3538 ; 64.1805 ; 66.6144 ; 67.4297 ; 68.515 ; 68.8873 ; 69.3926 ; 69.5333 ; 69.7222 ; 70.0575 ; 70.052 ; 70.0801 ; 70.1212 ; 70.1811 ; 70.2701 ; 70.3611 ; 70.3864 ; 70.4109 ; 70.5303 ; 70.7031 ; 70.9586 ; 71.3184 ; 71.8479 ; 72.0468 ; 72.3234 ; 72.7075 ; 73.3578 ; 73.6577 ; 74.0995 ; 74.7098 ; 75.5344 ; 75.8274 ; 76.318 ; 77.0908 ; 78.271 ; 78.7071 ; 79.3014 ; 80.1482 ; 81.2868 ; 82.8677 ; 84.9468 ; 85.8322 ; 86.8632 ; 87.7926 ; 88.5857 ; 89.5503 ; 90.8036 ; 92.1429 ; 93.2109 ; 93.6632 ; 93.8372 ; 93.9542]

Bolt 3 - Shear Force (kips): [0.0363574 ; 0.0553395 ; 0.125626 ; 0.226868 ; 0.379688 ; 0.534218 ; 0.57072 ; 0.622149 ; 0.698498 ; 0.806332 ; 0.956066 ; 1.14691 ; 1.38218 ; 1.67384 ; 2.04606 ; 2.16689 ; 2.32637 ; 2.52674 ; 2.77429 ; 3.07897 ; 3.17553 ; 3.28532 ; 3.3185 ; 3.36863 ; 3.38475 ; 3.40373 ; 3.44397 ; 3.44349 ; 3.44753 ; 3.45359 ; 3.46206 ; 3.47387 ; 3.48592 ; 3.49051 ; 3.49374 ; 3.50684 ; 3.53614 ; 3.55514 ; 3.58409 ; 3.63218 ; 3.65993 ; 3.70084 ; 3.80155 ; 4.61341 ; 5.26417 ; 5.96452 ; 6.80168 ; 7.53828 ; 7.76455 ; 8.46822 ; 9.40213 ; 10.4215 ; 10.7518 ; 11.1463 ; 11.5508 ; 12.0431 ; 12.5897 ; 12.9147 ; 13.0235 ; 12.8541 ; 13.0147 ; 13.0843 ; 13.1864 ; 12.356 ; 11.5832 ; 10.4382 ; 9.58368 ; 9.13839 ; 9.04013]

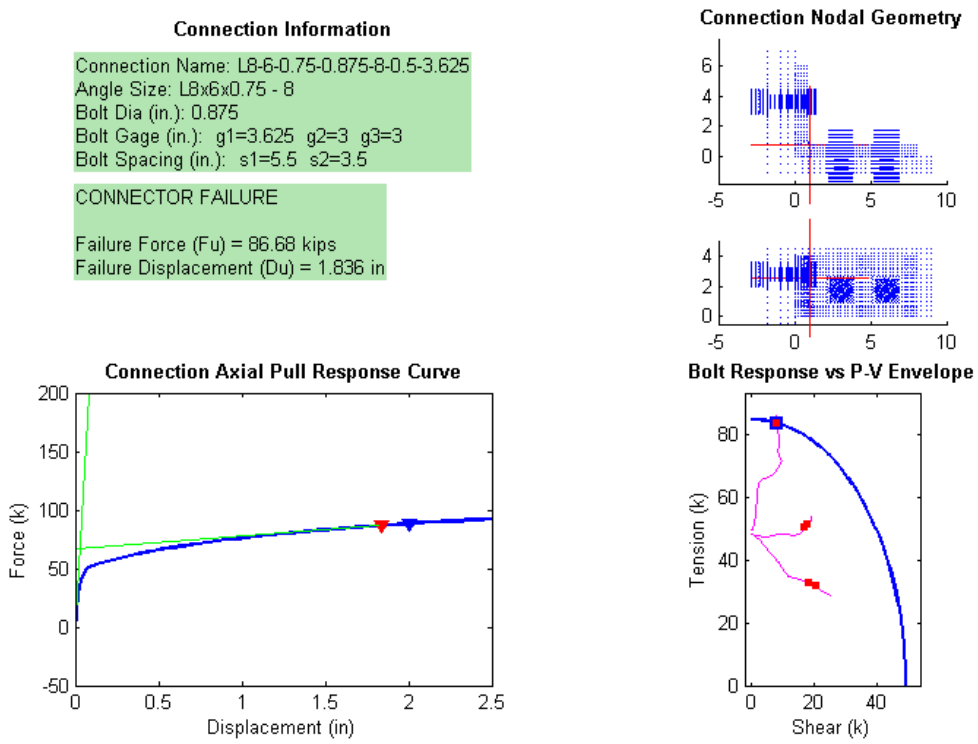


Figure B.257 Connection L8_6_0.75_0.875_8_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.875_8_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 2.4389e+003

Plastic Stiffness (k/in): 10.4920

Displacement (in): [4.7892e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.026611 ; 0.036499 ; 0.051331 ; 0.073578 ; 0.10695 ; 0.15701 ; 0.23209 ; 0.26025 ; 0.30248 ; 0.36584 ; 0.38959 ; 0.3985 ; 0.41186 ; 0.43191 ; 0.46198 ; 0.50708 ; 0.52399 ; 0.54936 ; 0.58742 ; 0.6445 ; 0.73012 ; 0.85855 ; 0.90672 ; 0.97896 ; 1.0873 ; 1.2499 ; 1.3108 ; 1.3337 ; 1.368 ; 1.3808 ; 1.4001 ; 1.429 ; 1.4725 ; 1.4887 ; 1.5131 ; 1.5375 ; 1.5619 ; 1.5986 ; 1.6535 ; 1.7084 ; 1.7221 ; 1.7427 ; 1.7736 ; 1.82 ; 1.8374 ; 1.8634 ; 1.9025 ; 1.9612 ; 1.9832 ; 2.0162 ; 2.0656 ; 2.1399 ; 2.2512 ; 2.4182 ; 2.5]

Force (kips): [-1.19566 ; 1.53238 ; 3.56778 ; 6.14293 ; 9.42293 ; 12.2446 ; 14.6313 ; 17.4262 ; 20.428 ; 23.0598 ; 24.844 ; 26.1511 ; 27.3735 ; 28.739 ; 29.2389 ; 29.9564 ; 30.9431 ; 31.2895 ; 31.4183 ; 31.627 ; 31.9103 ; 32.3446 ; 32.9443 ; 33.1683 ; 33.4927 ; 33.953 ; 34.5899 ; 35.477 ; 36.7205 ; 37.1933 ; 37.8044 ; 38.6429 ; 39.7923 ; 40.2175 ; 40.3712 ; 40.5875 ; 40.6659 ; 40.7883 ; 40.9699 ; 41.2543 ; 41.3539 ; 41.5093 ; 41.654 ; 41.8048 ; 42.0224 ; 42.3467 ; 42.655 ; 42.7324 ; 42.8473 ; 43.0157 ; 43.2588 ; 43.348 ; 43.4809 ; 43.673 ; 43.9457 ; 44.045 ; 44.1918 ; 44.4038 ; 44.7216 ; 45.1626 ; 45.7499 ; 46.0188]

Bolt 1 - Tensile Force (kips): [48.4616 ; 48.3712 ; 48.2989 ; 48.2029 ; 48.0681 ; 47.9432 ; 47.8305 ; 47.6853 ; 47.5071 ; 47.3113 ; 47.0743 ; 46.2436 ; 44.9946 ; 43.5098 ; 42.9043 ; 41.9924 ; 40.6415 ; 40.1365 ; 39.9458 ; 39.651 ; 39.2242 ; 38.5814 ; 37.6641 ; 37.3225 ; 36.8244 ; 36.1204 ; 35.2143 ; 34.9386 ; 34.9014 ; 34.8906 ; 34.8799 ; 34.8005 ; 34.7578 ; 34.7529 ; 34.7503 ; 34.7467 ; 34.7454 ; 34.7425 ; 34.7243 ; 34.6141 ; 34.5962 ; 34.5253 ; 34.482 ; 34.3729 ; 34.201 ; 33.953 ; 33.7272 ; 33.6418 ; 33.5071 ; 33.335 ; 33.0512 ; 32.9323 ; 32.7049 ; 32.3876 ; 32.0504 ; 31.9155 ; 31.6899 ; 31.3878 ; 30.7211 ; 29.8058 ; 28.9553 ; 28.6559]

Bolt 1 - Shear Force (kips): [0.0722726 ; 0.0927272 ; 0.190352 ; 0.323645 ; 0.501634 ; 0.662702 ; 0.806076 ; 0.983988 ; 1.19291 ; 1.41349 ; 1.67711 ; 2.5712 ; 3.77621 ; 5.11365 ; 5.63123 ; 6.38767 ; 7.46398 ; 7.85299 ; 7.99818 ; 8.22123 ; 8.54092 ; 9.01642 ; 9.68096 ; 9.92222 ; 10.2656 ; 10.7392 ; 11.3373 ; 11.5175 ; 11.5154 ; 11.5129 ; 11.5099 ; 11.6482 ; 11.7047 ; 11.6927 ; 11.6876 ; 11.6799 ; 11.677 ; 11.6724 ; 11.7672 ; 12.3392 ; 12.4235 ; 12.7384 ; 12.907 ; 13.2886 ; 13.7756 ; 14.7746 ; 15.674 ; 15.9556 ; 16.382 ; 16.9027 ; 17.6066 ; 17.8635 ; 18.3467 ; 18.9845 ; 19.6808 ; 19.94 ; 20.3368 ; 20.8388 ; 21.9197 ; 23.3719 ; 24.7063 ; 25.1763]

Bolt 2 - Tensile Force (kips): [48.4509 ; 48.3488 ; 48.2499 ; 48.1262 ; 47.968 ; 47.8477 ; 47.7562 ; 47.6745 ; 47.6073 ; 47.6095 ; 47.659 ; 47.4096 ; 47.3184 ; 47.5458 ; 47.644 ; 47.7881 ; 47.96 ; 48.0163 ; 48.0378 ; 48.0664 ; 48.1059 ; 48.1538 ; 48.2206 ; 48.2404 ; 48.2667 ; 48.3015 ; 48.3365 ; 48.2699 ; 48.0686 ; 47.9825 ; 47.9006 ; 47.8806 ; 48.0388 ; 48.1128 ; 48.1427 ; 48.2343 ; 48.2758 ; 48.3342 ; 48.4525 ; 48.6564 ; 48.7364 ; 48.8664 ; 48.9912 ; 49.1152 ; 49.35 ; 49.6899 ; 50.0253 ; 50.1041 ; 50.2174 ; 50.3534 ; 50.5689 ; 50.6566 ; 50.787 ; 50.9714 ; 51.2197 ; 51.3191 ; 51.4728 ; 51.6972 ; 51.9958 ; 52.5374 ; 53.5578 ; 54.1079]

Bolt 2 - Shear Force (kips): [0.0529557 ; 0.129557 ; 0.257347 ; 0.426385 ; 0.65108 ; 0.853972 ; 1.03152 ; 1.24939 ; 1.50716 ; 1.79177 ; 2.16507 ; 3.10689 ; 4.26401 ; 5.46 ; 5.90773 ; 6.54494 ; 7.39851 ; 7.69062 ; 7.79696 ; 7.95872 ; 8.18706 ; 8.51952 ; 8.97587 ; 9.14011 ; 9.3793 ; 9.7197 ; 10.1989 ; 10.9375 ; 11.9646 ; 12.3262 ; 12.8035 ; 13.4102 ; 14.1679 ; 14.5529 ; 14.7509 ; 14.9888 ; 15.067 ; 15.2474 ; 15.4512 ; 15.6847 ; 15.7784 ; 15.8751 ; 15.9776 ; 16.054 ; 16.1467 ; 16.2497 ; 16.3405 ; 16.3594 ; 16.3857 ; 16.539 ; 16.7918 ; 16.8656 ; 16.9433 ; 17.0985 ; 17.4367 ; 17.5479 ; 17.7041 ; 17.9835 ; 18.4192 ; 18.8603 ; 19.151 ; 19.2031]

Bolt 3 - Tensile Force (kips): [50 ; 49.8869 ; 49.8325 ; 49.8429 ; 49.9429 ; 50.1026 ; 50.3097 ; 50.7271 ; 51.6295 ; 52.711 ; 53.8574 ; 55.1115 ; 56.7368 ; 58.9905 ; 59.7892 ; 60.9515 ; 62.5868 ; 63.1678 ; 63.3785 ; 63.6583 ; 64.0612 ; 64.5954 ; 65.2859 ; 65.5505 ; 65.9823 ; 66.6583 ; 67.6186 ; 69.0854 ; 71.5341 ; 72.5515 ; 73.601 ; 74.8401 ; 76.7754 ; 77.7189 ; 78.0059 ; 78.3746 ; 78.5033 ; 78.707 ; 79.0087 ; 79.4455 ; 79.6086 ; 79.8598 ; 80.1055 ; 80.3485 ; 80.6917 ; 81.1849 ; 81.6488 ; 81.7619 ; 81.9279 ; 82.1669 ; 82.5166 ; 82.6484 ; 82.8409 ; 83.1204 ; 83.5144 ; 83.6566 ; 83.8631 ; 84.1471 ; 84.5515 ; 85.1205 ; 85.923 ; 86.325]

Bolt 3 - Shear Force (kips): [0.047888 ; 0.022672 ; 0.059216 ; 0.12037 ; 0.2091 ; 0.29625 ; 0.3826 ; 0.50455 ; 0.67 ; 0.8744 ; 1.0489 ; 1.194 ; 1.3571 ; 1.5799 ; 1.6644 ; 1.778 ; 1.9343 ; 1.9894 ; 2.0126 ; 2.0715 ; 2.1445 ; 2.2979 ; 2.5182 ; 3.0104 ; 4.1899 ; 5.5846 ; 6.7551 ; 8.386 ; 9.5539 ; 8.9825 ; 8.5085 ; 8.3439 ; 8.6931 ; 8.7084 ; 8.7163 ; 8.7208 ; 8.7202 ; 8.6942 ; 8.6427 ; 8.5738 ; 8.5478 ; 8.5011 ; 8.4472 ; 8.3941 ; 8.3202 ; 8.2132 ; 8.1073 ; 8.0794 ; 8.0375 ; 7.9759 ; 7.8911 ; 7.8701 ; 7.8433 ; 7.8073 ; 7.7721 ; 7.7651 ; 7.7555 ; 7.7422 ; 7.7216 ; 7.7429 ; 7.7896 ; 7.8751]

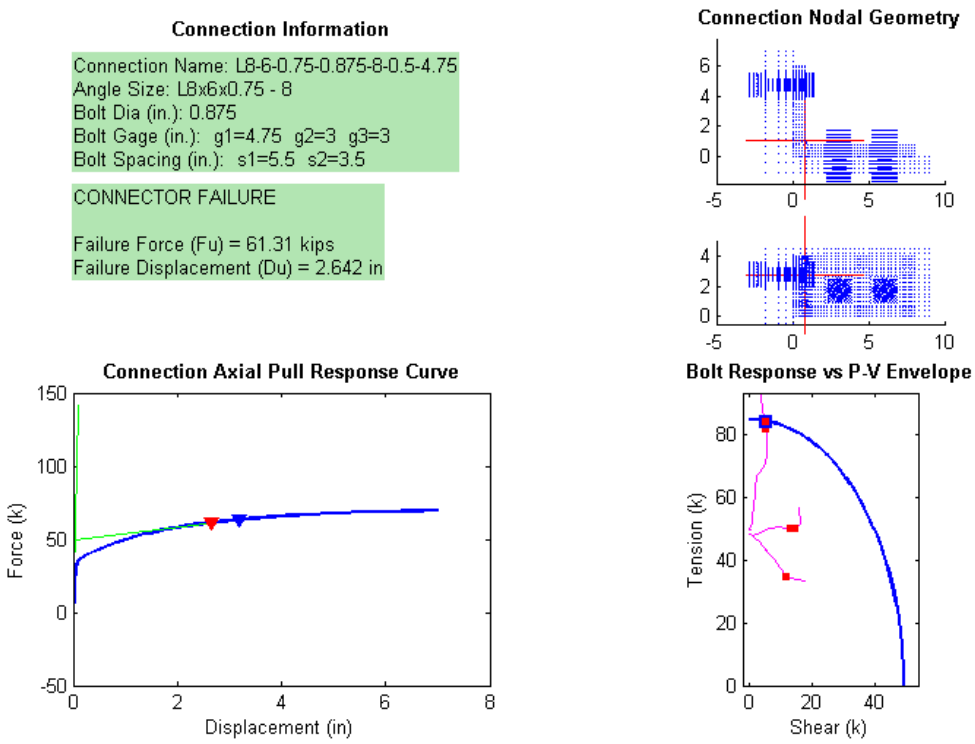


Figure B.258 Connection L8_6_0.75_0.875_8_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.875_8_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 1599

Plastic Stiffness (k/in): 4.6430

Displacement (in): [3.5703e-036 ; 0.0013672 ; 0.0027344 ; 0.0047852 ; 0.0078613 ; 0.012476 ; 0.019397 ; 0.029779 ; 0.045352 ; 0.051192 ; 0.059952 ; 0.073092 ; 0.092801 ; 0.12237 ; 0.16671 ; 0.23323 ; 0.33301 ; 0.48268 ; 0.63236 ; 0.66977 ; 0.7259 ; 0.74695 ; 0.77852 ; 0.82588 ; 0.89691 ; 0.92355 ; 0.96351 ; 1.0234 ; 1.1134 ; 1.1471 ; 1.1976 ; 1.2735 ; 1.3873 ; 1.4299 ; 1.4939 ; 1.59 ; 1.734 ; 1.788 ; 1.869 ; 1.9905 ; 2.1727 ; 2.4461 ; 2.5486 ; 2.7024 ; 2.9331 ; 3.0196 ; 3.1494 ; 3.344 ; 3.417 ; 3.5265 ; 3.6907 ; 3.7523 ; 3.8446 ; 3.9832 ; 4.191 ; 4.5028 ; 4.9704 ; 5.6704 ; 5.8454 ; 6.1079 ; 6.5017 ; 7]

Force (kips): [-1.1747 ; 0.251609 ; 1.01139 ; 2.06847 ; 3.49698 ; 5.39747 ; 7.86875 ; 10.8966 ; 13.9388 ; 14.7272 ; 15.6615 ; 16.6077 ; 17.343 ; 17.9164 ; 18.4934 ; 19.2579 ; 20.2406 ; 21.4859 ; 22.5325 ; 22.7757 ; 23.1422 ; 23.2792 ; 23.4869 ; 23.7829 ; 24.2057 ; 24.3567 ; 24.595 ; 24.9503 ; 25.4763 ; 25.6614 ; 25.9209 ; 26.2826 ; 26.7804 ; 26.9643 ; 27.2292 ; 27.6095 ; 28.1485 ; 28.338 ; 28.6031 ; 28.986 ; 29.5139 ; 30.2144 ; 30.4524 ; 30.7869 ; 31.2402 ; 31.3979 ; 31.626 ; 31.9475 ; 32.0634 ; 32.2372 ; 32.4795 ; 32.566 ; 32.6898 ; 32.8653 ; 33.1035 ; 33.4161 ; 33.8108 ; 34.268 ; 34.3621 ; 34.4916 ; 34.6715 ; 34.8687]

Bolt 1 - Tensile Force (kips): [48.4617 ; 48.4153 ; 48.3894 ; 48.3515 ; 48.2985 ; 48.2245 ; 48.1185 ; 47.9722 ; 47.8032 ; 47.7535 ; 47.6898 ; 47.6179 ; 47.5501 ; 47.4915 ; 47.4181 ; 47.2769 ; 47.0353 ; 45.8753 ; 44.5941 ; 44.295 ; 43.8424 ; 43.6683 ; 43.3969 ; 42.9861 ; 42.3575 ; 42.1179 ; 41.7332 ; 41.1306 ; 40.1969 ; 39.8499 ; 39.3415 ; 38.6063 ; 37.5648 ; 37.1752 ; 36.6052 ; 35.7958 ; 34.9427 ; 34.9207 ; 34.8998 ; 34.8799 ; 34.862 ; 34.8476 ; 34.8433 ; 34.7065 ; 34.6898 ; 34.6863 ; 34.6848 ; 34.6801 ; 34.6768 ; 34.6101 ; 34.5099 ; 34.4523 ; 34.3769 ; 34.1992 ; 34.033 ; 33.8917 ; 33.7617 ; 33.5519 ; 33.5063 ; 33.4468 ; 33.3808 ; 33.2807]

Bolt 1 - Shear Force (kips): [0.0715361 ; 0.0487881 ; 0.0726237 ; 0.120353 ; 0.192714 ; 0.295509 ; 0.437187 ; 0.625653 ; 0.839519 ; 0.900612 ; 0.977879 ; 1.06423 ; 1.14523 ; 1.21647 ; 1.30517 ; 1.47148 ; 1.74365 ; 2.95441 ; 4.1542 ; 4.42374 ; 4.82482 ; 4.97685 ; 5.21106 ; 5.56029 ; 6.08347 ; 6.28002 ; 6.59267 ; 7.07346 ; 7.79824 ; 8.06207 ; 8.44434 ; 8.98908 ; 9.74125 ; 10.0137 ; 10.4023 ; 10.941 ; 11.4977 ; 11.5056 ; 11.5088 ; 11.5074 ; 11.5035 ; 11.4994 ; 11.498 ; 11.7326 ; 11.7247 ; 11.719 ; 11.7104 ; 11.6954 ; 11.6893 ; 12.0776 ; 12.6062 ; 12.8436 ; 13.1047 ; 13.6649 ; 14.2602 ; 14.9526 ; 15.6148 ; 16.4716 ; 16.6536 ; 16.8935 ; 17.1766 ; 17.5155]

Bolt 2 - Tensile Force (kips): [48.4513 ; 48.4025 ; 48.3717 ; 48.3163 ; 48.2435 ; 48.1495 ; 48.037 ; 47.9327 ; 47.8894 ; 47.8894 ; 47.9006 ; 47.919 ; 47.9601 ; 47.994 ; 48.0434 ; 48.1757 ; 48.4655 ; 48.8921 ; 49.3066 ; 49.4162 ; 49.5742 ; 49.6307 ; 49.707 ; 49.8125 ; 49.9735 ; 50.0338 ; 50.1067 ; 50.2005 ; 50.3099 ; 50.3426 ; 50.3874 ; 50.4425 ; 50.5175 ; 50.5383 ; 50.5576 ; 50.556 ; 50.4853 ; 50.426 ; 50.337 ; 50.2201 ; 50.0906 ; 50.0092 ; 49.9914 ; 50.0185 ; 50.0681 ; 50.0918 ; 50.1245 ; 50.2508 ; 50.3178 ; 50.4773 ; 50.7336 ; 50.8376 ; 50.9613 ; 51.2081 ; 51.6788 ; 52.4309 ; 53.6143 ; 55.0626 ; 55.3658 ; 55.7567 ; 56.238 ; 56.6858]

Bolt 2 - Shear Force (kips): [0.0522713 ; 0.053627 ; 0.102301 ; 0.171814 ; 0.269974 ; 0.405903 ; 0.591486 ; 0.835458 ; 1.10467 ; 1.18224 ; 1.28029 ; 1.39185 ; 1.49974 ; 1.5974 ; 1.71868 ; 1.95308 ; 2.31561 ; 3.46502 ; 4.52303 ; 4.75262 ; 5.09002 ; 5.21684 ; 5.4113 ; 5.6995 ; 6.11832 ; 6.26863 ; 6.50436 ; 6.85749 ; 7.37439 ; 7.55792 ; 7.8184 ; 8.17831 ; 8.66261 ; 8.84029 ; 9.10209 ; 9.48911 ; 10.0871 ; 10.3302 ; 10.6766 ; 11.1586 ; 11.7995 ; 12.6028 ; 12.8748 ; 13.2061 ; 13.6998 ; 13.8721 ; 14.2103 ; 14.7886 ; 15.0486 ; 15.303 ; 15.6152 ; 15.6981 ; 15.8703 ; 16.0137 ; 16.1102 ; 16.1244 ; 16.0175 ; 15.7897 ; 15.7401 ; 15.6816 ; 15.6316 ; 15.6383]

Bolt 3 - Tensile Force (kips): [50 ; 49.9417 ; 49.8898 ; 49.8362 ; 49.7972 ; 49.8135 ; 49.9163 ; 50.1654 ; 50.8046 ; 51.1484 ; 51.6376 ; 52.2655 ; 52.9296 ; 53.7673 ; 54.8312 ; 56.245 ; 58.2173 ; 60.9197 ; 63.2951 ; 63.8399 ; 64.5928 ; 64.8431 ; 65.2038 ; 65.7372 ; 66.49 ; 66.7667 ; 67.2233 ; 67.9816 ; 69.2249 ; 69.7081 ; 70.3355 ; 71.1824 ; 72.2724 ; 72.6338 ; 73.1643 ; 73.9737 ; 75.2413 ; 75.7482 ; 76.4085 ; 77.3834 ; 78.8586 ; 80.8257 ; 81.4579 ; 82.2989 ; 83.3778 ; 83.7418 ; 84.2618 ; 84.9966 ; 85.2511 ; 85.6123 ; 86.1485 ; 86.3557 ; 86.6606 ; 87.0878 ; 87.6698 ; 88.4551 ; 89.454 ; 90.6692 ; 90.9342 ; 91.3209 ; 92.0476 ; 92.9673]

Bolt 3 - Shear Force (kips): [0.046152 ; 0.02128 ; 0.019687 ; 0.039129 ; 0.076425 ; 0.13548 ; 0.2193 ; 0.33784 ; 0.48335 ; 0.52956 ; 0.59361 ; 0.68132 ; 0.79999 ; 0.90441 ; 0.99373 ; 1.1362 ; 1.3378 ; 1.5957 ; 1.7808 ; 1.8223 ; 1.9216 ; 1.9628 ; 2.0116 ; 2.1068 ; 2.2578 ; 2.3045 ; 2.5084 ; 3.1844 ; 4.1597 ; 4.2988 ; 4.7386 ; 4.9954 ; 5.1392 ; 5.4532 ; 5.6406 ; 5.5282 ; 5.5967 ; 5.4025 ; 5.3213 ; 5.4295 ; 5.3097 ; 5.2656 ; 5.2518 ; 5.1755 ; 5.006 ; 4.9376 ; 4.8281 ; 4.667 ; 4.6076 ; 4.5354 ; 4.4476 ; 4.4134 ; 4.3577 ; 4.2787 ; 4.1832 ; 4.0241 ; 3.832 ; 3.6078 ; 3.5611 ; 3.5195 ; 3.7239 ; 3.6246]

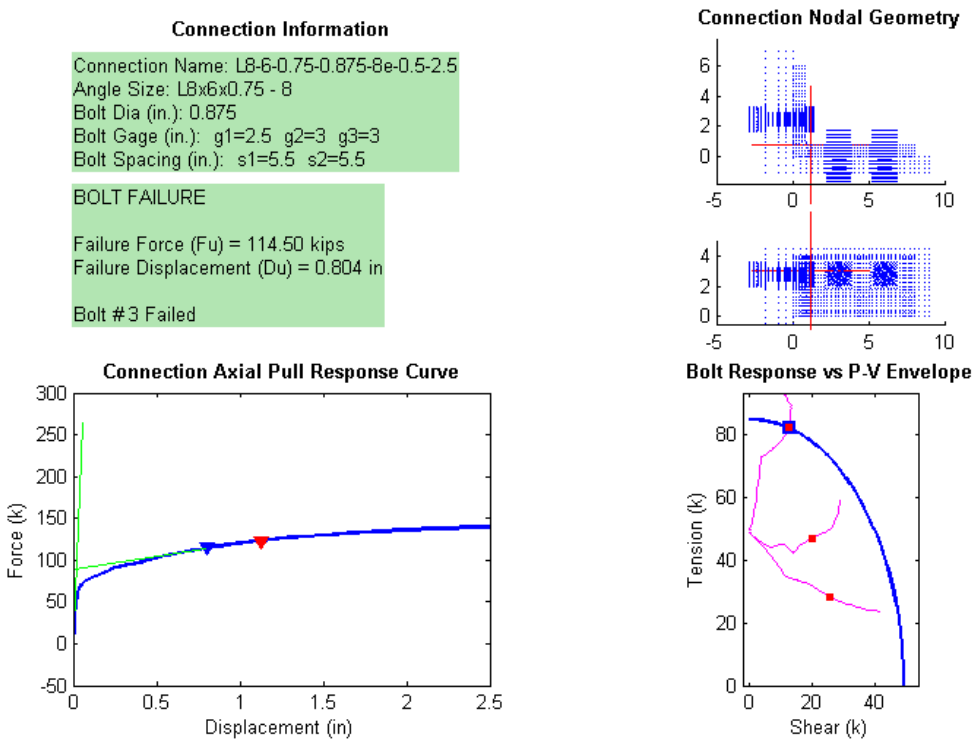


Figure B.259 Connection L8_6_0.75_0.875_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.875_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4904

Plastic Stiffness (k/in): 32.0753

Displacement (in): [4.8076e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.016724 ; 0.018372 ; 0.020844 ; 0.024551 ; 0.030113 ; 0.038456 ; 0.05097 ; 0.069741 ; 0.097898 ; 0.14013 ; 0.20349 ; 0.22724 ; 0.26288 ; 0.31633 ; 0.33638 ; 0.3439 ; 0.35517 ; 0.35623 ; 0.35781 ; 0.36019 ; 0.36376 ; 0.36911 ; 0.37714 ; 0.38918 ; 0.40724 ; 0.43433 ; 0.44449 ; 0.45973 ; 0.48259 ; 0.49116 ; 0.50402 ; 0.52331 ; 0.55224 ; 0.56308 ; 0.57936 ; 0.60377 ; 0.64038 ; 0.6953 ; 0.7159 ; 0.74679 ; 0.79314 ; 0.86265 ; 0.88871 ; 0.92781 ; 0.94247 ; 0.96447 ; 0.99746 ; 1.047 ; 1.0655 ; 1.0933 ; 1.1351 ; 1.1977 ; 1.2212 ; 1.2564 ; 1.3093 ; 1.3886 ; 1.5075 ; 1.6858 ; 1.7483 ; 1.8421 ; 1.9827 ; 2.1936 ; 2.4436 ; 2.5]

Force (kips): [-1.59696 ; 3.92742 ; 7.98117 ; 12.87 ; 18.6675 ; 22.9731 ; 23.8444 ; 25.0391 ; 26.6747 ; 28.7453 ; 31.1567 ; 33.2989 ; 35.1782 ; 36.9424 ; 38.8153 ; 40.9788 ; 43.5643 ; 44.4016 ; 45.4935 ; 46.8066 ; 47.1912 ; 47.4297 ; 47.5369 ; 47.5495 ; 47.5961 ; 47.6643 ; 47.7623 ; 47.8497 ; 47.9453 ; 48.3326 ; 48.8408 ; 49.5908 ; 49.8657 ; 50.266 ; 50.8679 ; 51.1011 ; 51.4377 ; 51.9161 ; 52.5763 ; 52.8218 ; 53.1797 ; 53.6954 ; 54.4185 ; 55.448 ; 55.8167 ; 56.3408 ; 57.084 ; 58.1456 ; 58.5365 ; 59.0756 ; 59.2722 ; 59.5638 ; 60.0221 ; 60.6526 ; 60.8845 ; 61.2219 ; 61.7148 ; 62.3862 ; 62.6225 ; 62.9677 ; 63.459 ; 64.1537 ; 65.0903 ; 66.2972 ; 66.6809 ; 67.2183 ; 67.929 ; 68.8199 ; 69.6803 ; 69.8544]

Bolt 1 - Tensile Force (kips): [48.5347 ; 48.3296 ; 48.1644 ; 47.9493 ; 47.67 ; 47.4377 ; 47.3872 ; 47.3163 ; 47.2155 ; 47.0796 ; 46.8457 ; 46.0952 ; 45.0327 ; 43.4859 ; 41.6665 ; 39.4443 ; 36.3869 ; 35.3943 ; 34.874 ; 34.8086 ; 34.7856 ; 34.6521 ; 34.5643 ; 34.5608 ; 34.5591 ; 34.557 ; 34.554 ; 34.5479 ; 34.5332 ; 34.4513 ; 34.3687 ; 34.145 ; 34.029 ; 33.8847 ; 33.6706 ; 33.5823 ; 33.4005 ; 33.1277 ; 32.7165 ; 32.5099 ; 32.2148 ; 31.8213 ; 31.36 ; 30.2569 ; 29.8162 ; 29.225 ; 28.4757 ; 27.7281 ; 27.4614 ; 26.9905 ; 26.8413 ; 26.6453 ; 26.3841 ; 26.0978 ; 25.9965 ; 25.8706 ; 25.6877 ; 25.4224 ; 25.3331 ; 25.2339 ; 25.1455 ; 24.923 ; 24.5884 ; 24.2317 ; 24.1168 ; 24.0066 ; 23.9281 ; 23.8132 ; 23.6077 ; 23.5821]

Bolt 1 - Shear Force (kips): [0.07307 ; 0.230926 ; 0.444065 ; 0.711588 ; 1.04402 ; 1.30191 ; 1.3561 ; 1.4316 ; 1.53699 ; 1.67699 ; 1.92028 ; 2.7065 ; 3.71948 ; 5.10389 ; 6.61857 ; 8.33644 ; 10.5131 ; 11.166 ; 11.4958 ; 11.4859 ; 11.4801 ; 11.699 ; 11.7815 ; 11.7819 ; 11.7815 ; 11.781 ; 11.7799 ; 11.7783 ; 11.8293 ; 12.2462 ; 12.6466 ; 13.3973 ; 13.7309 ; 14.2153 ; 15.073 ; 15.411 ; 15.983 ; 16.8246 ; 17.856 ; 18.291 ; 18.8867 ; 19.6609 ; 20.5364 ; 22.3759 ; 23.0776 ; 24.0116 ; 25.2842 ; 26.8774 ; 27.5099 ; 28.4796 ; 28.8035 ; 29.2367 ; 29.8476 ; 30.6413 ; 30.9442 ; 31.3543 ; 31.9498 ; 32.7861 ; 33.084 ; 33.4691 ; 33.9821 ; 34.9061 ; 36.1419 ; 37.586 ; 38.0304 ; 38.5858 ; 39.2668 ; 40.2078 ; 41.2383 ; 41.437]

Bolt 2 - Tensile Force (kips): [48.5418 ; 48.3121 ; 48.1208 ; 47.8815 ; 47.6088 ; 47.4196 ; 47.383 ; 47.3341 ; 47.2752 ; 47.2033 ; 47.0707 ; 46.4828 ; 45.6976 ; 44.6761 ; 44.1434 ; 44.4542 ; 45.0006 ; 45.1413 ; 45.099 ; 43.2964 ; 42.3822 ; 42.4921 ; 42.2767 ; 42.2597 ; 42.2512 ; 42.2412 ; 42.2289 ; 42.1975 ; 42.2317 ; 42.4814 ; 42.8281 ; 43.302 ; 43.464 ; 43.6365 ; 43.9165 ; 44.0285 ; 44.1981 ; 44.4539 ; 44.8186 ; 44.9222 ; 45.0896 ; 45.3524 ; 45.7071 ; 46.1193 ; 46.2501 ; 46.4561 ; 46.7781 ; 47.1427 ; 47.314 ; 47.6362 ; 47.7284 ; 47.8602 ; 48.0847 ; 48.4296 ; 48.5496 ; 48.6977 ; 48.9128 ; 49.3109 ; 49.4723 ; 49.7331 ; 50.1525 ; 50.8124 ; 51.8155 ; 53.2753 ; 53.7722 ; 54.4673 ; 55.4611 ; 56.9071 ; 58.5612 ; 58.9356]

Bolt 2 - Shear Force (kips): [0.096215 ; 0.241079 ; 0.476672 ; 0.771808 ; 1.13381 ; 1.41115 ; 1.46933 ; 1.55023 ; 1.66267 ; 1.81436 ; 2.07388 ; 2.84146 ; 3.85417 ; 5.23031 ; 6.65625 ; 8.07784 ; 9.67883 ; 10.1899 ; 11.0231 ; 13.0316 ; 13.7521 ; 13.7903 ; 13.9159 ; 13.9356 ; 13.9893 ; 14.0649 ; 14.1759 ; 14.2833 ; 14.3253 ; 14.3966 ; 14.4913 ; 14.616 ; 14.7612 ; 15.083 ; 15.4091 ; 15.5528 ; 15.7244 ; 15.922 ; 16.2501 ; 16.4412 ; 16.6657 ; 16.9209 ; 17.3859 ; 18.1629 ; 18.503 ; 18.976 ; 19.5973 ; 20.7243 ; 21.0776 ; 21.4591 ; 21.6612 ; 21.9881 ; 22.4195 ; 22.9758 ; 23.1809 ; 23.5503 ; 24.1261 ; 24.8184 ; 25.0432 ; 25.3862 ; 25.8403 ; 26.323 ; 26.8163 ; 27.4332 ; 27.6314 ; 27.8799 ; 28.182 ; 28.5183 ; 28.7579 ; 28.8015]

Bolt 3 - Tensile Force (kips): [50 ; 49.9038 ; 49.9264 ; 50.0734 ; 50.464 ; 51.0729 ; 51.2645 ; 51.5572 ; 51.9626 ; 52.5695 ; 53.389 ; 54.3577 ; 55.6163 ; 57.2603 ; 59.3658 ; 61.9706 ; 65.2118 ; 66.3014 ; 67.7853 ; 69.5899 ; 70.0912 ; 70.3369 ; 70.4527 ; 70.4657 ; 70.5121 ; 70.5806 ; 70.6796 ; 70.7656 ; 70.8531 ; 71.2092 ; 71.6989 ; 72.4079 ; 72.6486 ; 73.0013 ; 73.6068 ; 73.8802 ; 74.2844 ; 74.8506 ; 75.6151 ; 75.8915 ; 76.3206 ; 77.0181 ; 78.0966 ; 79.6464 ; 80.1684 ; 80.8863 ; 81.9109 ; 83.3474 ; 83.8958 ; 84.5748 ; 84.8091 ; 85.1652 ; 85.798 ; 86.5688 ; 86.8398 ; 87.2273 ; 87.8584 ; 88.6275 ; 88.8975 ; 89.2672 ; 89.7914 ; 90.5049 ; 91.4195 ; 92.4009 ; 92.7217 ; 93.1352 ; 93.48 ; 93.7092 ; 93.9206 ; 93.9782]

Bolt 3 - Shear Force (kips): [0.048144 ; 0.0446716 ; 0.113242 ; 0.212709 ; 0.362011 ; 0.513314 ; 0.549297 ; 0.600007 ; 0.675556 ; 0.78203 ; 0.933469 ; 1.11802 ; 1.34206 ; 1.61578 ; 1.96856 ; 2.36041 ; 2.77456 ; 2.90935 ; 3.0819 ; 3.25648 ; 3.3104 ; 3.34902 ; 3.36616 ; 3.36804 ; 3.3742 ; 3.38306 ; 3.39508 ; 3.40789 ; 3.42645 ; 3.45999 ; 3.50078 ; 3.59734 ; 3.65305 ; 3.81838 ; 4.79227 ; 5.37707 ; 6.04294 ; 6.82065 ; 7.51624 ; 7.73039 ; 8.2201 ; 9.14347 ; 10.1867 ; 11.1879 ; 11.4652 ; 11.7907 ; 12.2199 ; 12.6933 ; 12.7418 ; 12.8705 ; 12.9239 ; 12.9994 ; 13.1466 ; 13.0432 ; 12.9705 ; 12.9794 ; 13.1319 ; 13.175 ; 13.1534 ; 13.1711 ; 13.0996 ; 12.5046 ; 11.9485 ; 11.4202 ; 11.1137 ; 10.6399 ; 10.044 ; 9.49999 ; 9.21661 ; 9.18157]

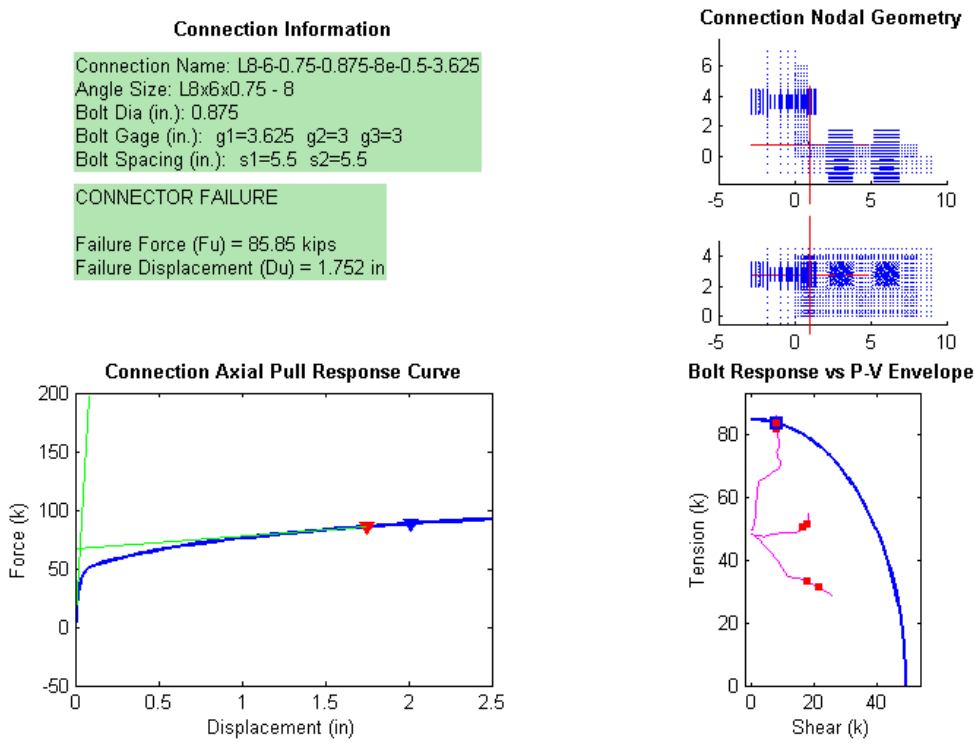


Figure B.260 Connection L8_6_0.75_0.875_8e_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.875_8e_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 2.4733e+003

Plastic Stiffness (k/in): 10.9840

Displacement (in): [4.3982e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.34102 ; 0.39447 ; 0.41452 ; 0.44458 ; 0.48969 ; 0.55734 ; 0.65882 ; 0.69687 ; 0.75395 ; 0.83958 ; 0.87169 ; 0.91985 ; 0.99209 ; 1.0192 ; 1.0598 ; 1.1208 ; 1.2122 ; 1.2465 ; 1.2979 ; 1.3751 ; 1.3944 ; 1.4137 ; 1.4426 ; 1.4534 ; 1.4697 ; 1.4941 ; 1.5307 ; 1.5857 ; 1.668 ; 1.6989 ; 1.7453 ; 1.7627 ; 1.7887 ; 1.8278 ; 1.8865 ; 1.9744 ; 2.0074 ; 2.0569 ; 2.1311 ; 2.2425 ; 2.4095 ; 2.5]

Force (kips): [-1.46357 ; 1.35807 ; 3.36709 ; 5.91474 ; 9.15808 ; 13.1904 ; 17.5327 ; 18.7801 ; 20.3272 ; 22.0387 ; 23.647 ; 24.9165 ; 25.9813 ; 27.1019 ; 28.2829 ; 29.9255 ; 30.5031 ; 31.3039 ; 31.6114 ; 32.0503 ; 32.6793 ; 33.5591 ; 34.7069 ; 35.1046 ; 35.6706 ; 36.5199 ; 36.8394 ; 37.2896 ; 37.8883 ; 38.1035 ; 38.4206 ; 38.8751 ; 39.5182 ; 39.768 ; 40.1209 ; 40.6191 ; 40.7572 ; 40.89 ; 41.0726 ; 41.143 ; 41.2459 ; 41.3981 ; 41.6339 ; 41.9754 ; 42.4567 ; 42.6344 ; 42.8889 ; 42.9816 ; 43.1204 ; 43.3252 ; 43.6171 ; 44.0191 ; 44.1677 ; 44.3858 ; 44.6943 ; 45.1193 ; 45.6961 ; 45.9856]

Bolt 1 - Tensile Force (kips): [48.5295 ; 48.4251 ; 48.3453 ; 48.2389 ; 48.0904 ; 47.8898 ; 47.6446 ; 47.5666 ; 47.4631 ; 47.3366 ; 47.1909 ; 47.0003 ; 46.2458 ; 45.0416 ; 43.7231 ; 41.6472 ; 40.8518 ; 39.673 ; 39.2129 ; 38.5345 ; 37.5535 ; 36.1828 ; 34.981 ; 34.9594 ; 34.9391 ; 34.9178 ; 34.9117 ; 34.9063 ; 34.9007 ; 34.9001 ; 34.8025 ; 34.7819 ; 34.7799 ; 34.7814 ; 34.7882 ; 34.8014 ; 34.7352 ; 34.6874 ; 34.6512 ; 34.6177 ; 34.5769 ; 34.5173 ; 34.3602 ; 34.1187 ; 33.7521 ; 33.5429 ; 33.2178 ; 33.0895 ; 32.8363 ; 32.5357 ; 32.169 ; 31.6692 ; 31.3414 ; 30.8614 ; 30.2771 ; 29.6716 ; 29.0537 ; 28.7844]

Bolt 1 - Shear Force (kips): [0.0659566 ; 0.107382 ; 0.212983 ; 0.354976 ; 0.544234 ; 0.795099 ; 1.08791 ; 1.17739 ; 1.29346 ; 1.4326 ; 1.59029 ; 1.79614 ; 2.60179 ; 3.76102 ; 4.95228 ; 6.69494 ; 7.32705 ; 8.23412 ; 8.5795 ; 9.08223 ; 9.78815 ; 10.7247 ; 11.517 ; 11.5246 ; 11.5257 ; 11.5217 ; 11.5201 ; 11.5187 ; 11.517 ; 11.5168 ; 11.7046 ; 11.7211 ; 11.7143 ; 11.7096 ; 11.703 ; 11.6933 ; 12.0336 ; 12.2936 ; 12.5056 ; 12.6647 ; 12.8448 ; 13.0718 ; 13.6338 ; 14.5898 ; 16.041 ; 16.6824 ; 17.5381 ; 17.8499 ; 18.3909 ; 19.0103 ; 19.7728 ; 20.756 ; 21.3052 ; 22.0976 ; 23.0495 ; 24.0362 ; 25.1038 ; 25.6172]

Bolt 2 - Tensile Force (kips): [48.5237 ; 48.4148 ; 48.3185 ; 48.199 ; 48.0484 ; 47.8971 ; 47.7945 ; 47.7772 ; 47.767 ; 47.7814 ; 47.8267 ; 47.914 ; 47.6678 ; 47.5862 ; 47.7527 ; 48.0776 ; 48.2067 ; 48.3994 ; 48.4538 ; 48.5226 ; 48.595 ; 48.6897 ; 48.7214 ; 48.7012 ; 48.6655 ; 48.615 ; 48.6013 ; 48.5929 ; 48.6076 ; 48.6181 ; 48.6577 ; 48.7019 ; 48.8048 ; 48.8394 ; 48.8956 ; 49.0388 ; 49.1025 ; 49.1634 ; 49.2637 ; 49.3067 ; 49.371 ; 49.455 ; 49.5614 ; 49.755 ; 50.0456 ; 50.1861 ; 50.4226 ; 50.5121 ; 50.6374 ; 50.7532 ; 50.9416 ; 51.305 ; 51.4449 ; 51.6668 ; 52.035 ; 52.7641 ; 53.9523 ; 54.6062]

Bolt 2 - Shear Force (kips): [0.0880797 ; 0.1063 ; 0.219745 ; 0.374857 ; 0.580729 ; 0.849152 ; 1.15418 ; 1.24752 ; 1.37048 ; 1.52367 ; 1.72049 ; 2.00025 ; 2.83545 ; 3.94269 ; 5.00657 ; 6.4747 ; 6.97841 ; 7.65383 ; 7.89767 ; 8.24371 ; 8.73374 ; 9.38791 ; 10.2751 ; 10.609 ; 11.0836 ; 11.7487 ; 11.983 ; 12.3132 ; 12.76 ; 12.9183 ; 13.1214 ; 13.4404 ; 13.8736 ; 14.0312 ; 14.3439 ; 14.9221 ; 15.0265 ; 15.1401 ; 15.3074 ; 15.3536 ; 15.4282 ; 15.5539 ; 15.7464 ; 15.9635 ; 16.2035 ; 16.2662 ; 16.3462 ; 16.374 ; 16.4094 ; 16.6951 ; 17.144 ; 17.5605 ; 17.6437 ; 17.7691 ; 17.9877 ; 18.1246 ; 18.2027 ; 18.1992]

Bolt 3 - Tensile Force (kips): [50 ; 49.8869 ; 49.8303 ; 49.8386 ; 49.9392 ; 50.1953 ; 50.8148 ; 51.142 ; 51.6557 ; 52.3184 ; 53.0933 ; 53.9967 ; 55.0243 ; 56.3741 ; 58.295 ; 60.9833 ; 61.9228 ; 63.2645 ; 63.707 ; 64.3096 ; 65.0585 ; 66.1778 ; 67.9336 ; 68.544 ; 69.5037 ; 71.0756 ; 71.7272 ; 72.6177 ; 73.6107 ; 73.9533 ; 74.3975 ; 75.0541 ; 76.1047 ; 76.6419 ; 77.2898 ; 78.1665 ; 78.3864 ; 78.6081 ; 78.9186 ; 79.0331 ; 79.1996 ; 79.454 ; 79.8433 ; 80.4011 ; 81.1752 ; 81.448 ; 81.8349 ; 81.9757 ; 82.1811 ; 82.4794 ; 82.9137 ; 83.5153 ; 83.7295 ; 84.0348 ; 84.4447 ; 85.0214 ; 85.8382 ; 86.2198]

Bolt 3 - Shear Force (kips): [0.060841 ; 0.015718 ; 0.047546 ; 0.10554 ; 0.19093 ; 0.31606 ; 0.4919 ; 0.5555 ; 0.64089 ; 0.7563 ; 0.902 ; 1.0226 ; 1.1467 ; 1.2975 ; 1.4835 ; 1.7419 ; 1.8258 ; 1.9435 ; 2.0169 ; 2.1383 ; 2.3817 ; 4.0427 ; 6.5489 ; 7.3499 ; 8.5696 ; 9.1706 ; 8.9602 ; 8.4424 ; 8.1647 ; 8.0397 ; 8.0061 ; 8.2581 ; 8.5104 ; 8.5232 ; 8.5933 ; 8.6065 ; 8.5722 ; 8.5153 ; 8.4571 ; 8.4358 ; 8.4039 ; 8.3795 ; 8.3214 ; 8.2303 ; 8.0915 ; 8.0396 ; 7.9607 ; 7.9316 ; 7.8886 ; 7.845 ; 7.7989 ; 7.7771 ; 7.77 ; 7.7589 ; 7.7432 ; 7.7755 ; 7.8203 ; 7.8298]

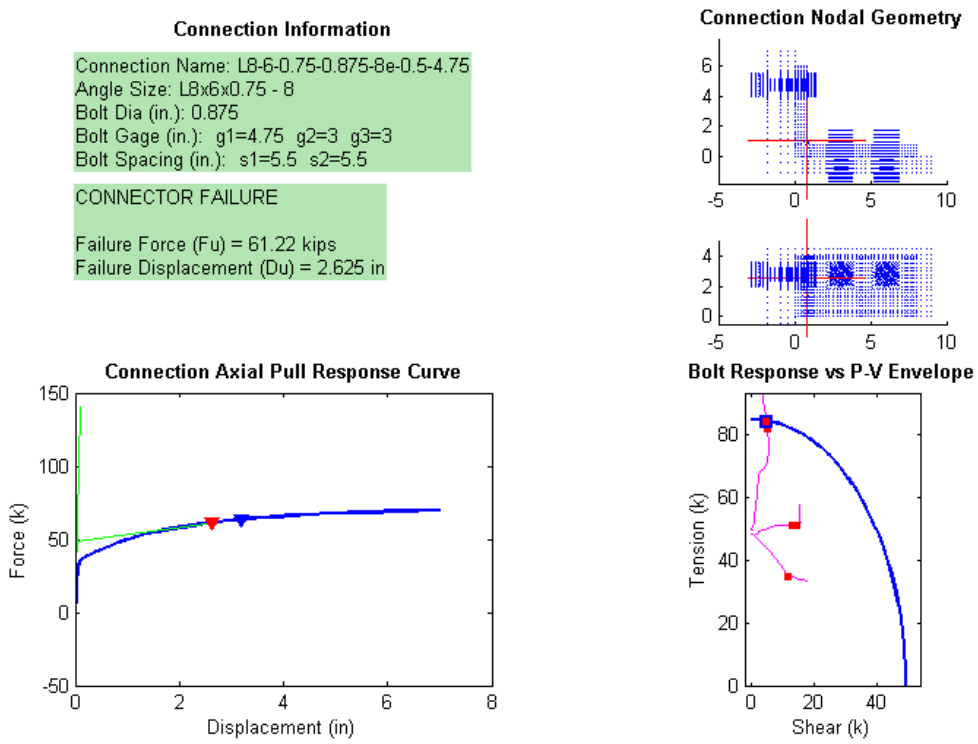


Figure B.261 Connection L8_6_0.75_0.875_8e_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_0.875_8e_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.6684e+003

Plastic Stiffness (k/in): 4.7815

Displacement (in): [5.504e-036 ; 0.0013672 ; 0.0027344 ; 0.0047852 ; 0.0078613 ; 0.012476 ; 0.019397 ; 0.029779 ; 0.045352 ; 0.051192 ; 0.059952 ; 0.073092 ; 0.092801 ; 0.12237 ; 0.16671 ; 0.23323 ; 0.33301 ; 0.37043 ; 0.42656 ; 0.51075 ; 0.63703 ; 0.82646 ; 0.8975 ; 0.92413 ; 0.96409 ; 1.024 ; 1.1139 ; 1.1476 ; 1.1982 ; 1.2741 ; 1.3879 ; 1.5585 ; 1.6225 ; 1.7185 ; 1.8625 ; 2.0786 ; 2.4026 ; 2.5241 ; 2.7064 ; 2.9797 ; 3.0823 ; 3.1207 ; 3.1784 ; 3.2649 ; 3.3946 ; 3.5893 ; 3.8812 ; 4.1732 ; 4.4651 ; 4.903 ; 5.5599 ; 6.2599 ; 6.9599 ; 7]

Force (kips): [-1.37636 ; 0.154137 ; 0.904664 ; 1.94202 ; 3.3512 ; 5.22728 ; 7.66883 ; 10.6723 ; 13.7478 ; 14.5638 ; 15.5293 ; 16.5258 ; 17.3119 ; 17.914 ; 18.4831 ; 19.2399 ; 20.2068 ; 20.5433 ; 21.02 ; 21.679 ; 22.5683 ; 23.7711 ; 24.1907 ; 24.3496 ; 24.5851 ; 24.941 ; 25.4682 ; 25.6501 ; 25.9134 ; 26.2735 ; 26.7737 ; 27.4762 ; 27.7233 ; 28.085 ; 28.5724 ; 29.2367 ; 30.1008 ; 30.3913 ; 30.7915 ; 31.3235 ; 31.5072 ; 31.5764 ; 31.6777 ; 31.8228 ; 32.0402 ; 32.3424 ; 32.7466 ; 33.092 ; 33.3893 ; 33.7661 ; 34.2135 ; 34.5697 ; 34.86 ; 34.8748]

Bolt 1 - Tensile Force (kips): [48.5302 ; 48.4742 ; 48.4447 ; 48.4023 ; 48.343 ; 48.2601 ; 48.1405 ; 47.9786 ; 47.7895 ; 47.7335 ; 47.6626 ; 47.5814 ; 47.5047 ; 47.4374 ; 47.3623 ; 47.2242 ; 47.0298 ; 46.9244 ; 46.4967 ; 45.7165 ; 44.4951 ; 42.8003 ; 42.1555 ; 41.9027 ; 41.5124 ; 40.8791 ; 39.902 ; 39.5469 ; 39.0232 ; 38.2868 ; 37.2436 ; 35.7619 ; 35.2756 ; 34.9773 ; 34.9403 ; 34.9132 ; 34.8989 ; 34.8691 ; 34.7649 ; 34.7615 ; 34.7629 ; 34.7641 ; 34.7672 ; 34.7716 ; 34.6888 ; 34.567 ; 34.3007 ; 34.1313 ; 34.0218 ; 33.8783 ; 33.6476 ; 33.4663 ; 33.3202 ; 33.3099]

Bolt 1 - Shear Force (kips): [0.0624318 ; 0.0553057 ; 0.087724 ; 0.142339 ; 0.222106 ; 0.333696 ; 0.487239 ; 0.69192 ; 0.926346 ; 0.99361 ; 1.07752 ; 1.17263 ; 1.26183 ; 1.34068 ; 1.42862 ; 1.58514 ; 1.79816 ; 1.91209 ; 2.37379 ; 3.1465 ; 4.28131 ; 5.75718 ; 6.2914 ; 6.49767 ; 6.81276 ; 7.31343 ; 8.06573 ; 8.33368 ; 8.72457 ; 9.26547 ; 10.0071 ; 11.0048 ; 11.3228 ; 11.514 ; 11.5225 ; 11.5196 ; 11.5162 ; 11.5832 ; 11.7397 ; 11.7341 ; 11.7287 ; 11.7267 ; 11.7238 ; 11.7195 ; 12.1641 ; 12.814 ; 13.7561 ; 14.4995 ; 14.9947 ; 15.6438 ; 16.4828 ; 17.1336 ; 17.6198 ; 17.6517]

Bolt 2 - Tensile Force (kips): [48.5251 ; 48.4671 ; 48.4374 ; 48.3852 ; 48.3153 ; 48.2285 ; 48.1281 ; 48.0503 ; 48.0468 ; 48.058 ; 48.0901 ; 48.1319 ; 48.1847 ; 48.2333 ; 48.3016 ; 48.4526 ; 48.9043 ; 49.1501 ; 49.3578 ; 49.6261 ; 49.9283 ; 50.3904 ; 50.5515 ; 50.6033 ; 50.6742 ; 50.7561 ; 50.8468 ; 50.8797 ; 50.9242 ; 50.9974 ; 51.0845 ; 51.1736 ; 51.1911 ; 51.1425 ; 51.0363 ; 50.9289 ; 50.8711 ; 50.8734 ; 50.8992 ; 50.9326 ; 50.9454 ; 50.9398 ; 50.94 ; 50.9703 ; 51.1055 ; 51.3894 ; 51.8471 ; 52.6977 ; 53.4344 ; 54.4496 ; 55.7407 ; 56.6993 ; 57.3726 ; 57.4108]

Bolt 2 - Shear Force (kips): [0.0838975 ; 0.0557789 ; 0.0869917 ; 0.143475 ; 0.228837 ; 0.349193 ; 0.513181 ; 0.726531 ; 0.964339 ; 1.03387 ; 1.12289 ; 1.22765 ; 1.33649 ; 1.4397 ; 1.55577 ; 1.77365 ; 2.06021 ; 2.18541 ; 2.61497 ; 3.31241 ; 4.30653 ; 5.52826 ; 5.95187 ; 6.11352 ; 6.35474 ; 6.71446 ; 7.2352 ; 7.41474 ; 7.67293 ; 8.02067 ; 8.49728 ; 9.17007 ; 9.42086 ; 9.84987 ; 10.4714 ; 11.2877 ; 12.2956 ; 12.6117 ; 13.0336 ; 13.6347 ; 13.847 ; 14.0028 ; 14.2301 ; 14.5008 ; 14.7787 ; 15.1153 ; 15.5005 ; 15.4264 ; 15.4328 ; 15.3843 ; 15.2349 ; 15.1308 ; 15.09 ; 15.0851]

Bolt 3 - Tensile Force (kips): [50 ; 49.9439 ; 49.8899 ; 49.8355 ; 49.795 ; 49.8101 ; 49.9138 ; 50.1613 ; 50.7934 ; 51.1344 ; 51.6314 ; 52.2669 ; 52.9291 ; 53.7603 ; 54.8154 ; 56.2239 ; 58.1727 ; 58.8784 ; 59.9074 ; 61.3864 ; 63.4333 ; 65.9112 ; 66.6697 ; 66.9704 ; 67.4353 ; 68.1689 ; 69.3941 ; 69.8416 ; 70.4719 ; 71.2847 ; 72.3602 ; 73.8431 ; 74.3823 ; 75.2361 ; 76.4509 ; 78.1759 ; 80.5761 ; 81.3457 ; 82.351 ; 83.6032 ; 84.0232 ; 84.178 ; 84.4031 ; 84.7295 ; 85.2026 ; 85.8558 ; 86.8099 ; 87.6545 ; 88.3967 ; 89.3462 ; 90.5199 ; 91.592 ; 92.9254 ; 92.9989]

Bolt 3 - Shear Force (kips): [0.059053 ; 0.031899 ; 0.016893 ; 0.030069 ; 0.063891 ; 0.11973 ; 0.19969 ; 0.31253 ; 0.45182 ; 0.49649 ; 0.55932 ; 0.6494 ; 0.77311 ; 0.88533 ; 0.97728 ; 1.1191 ; 1.3206 ; 1.3966 ; 1.4977 ; 1.6174 ; 1.7549 ; 2.0411 ; 2.2027 ; 2.2739 ; 2.3932 ; 2.8801 ; 3.9046 ; 4.0763 ; 4.5334 ; 4.8271 ; 4.9803 ; 5.4507 ; 5.4439 ; 5.5325 ; 5.2415 ; 5.3694 ; 5.1729 ; 5.1771 ; 5.0973 ; 4.9024 ; 4.8216 ; 4.79 ; 4.7413 ; 4.6691 ; 4.5601 ; 4.4385 ; 4.2884 ; 4.1424 ; 4.0063 ; 3.8261 ; 3.606 ; 3.5028 ; 3.5526 ; 3.5615]

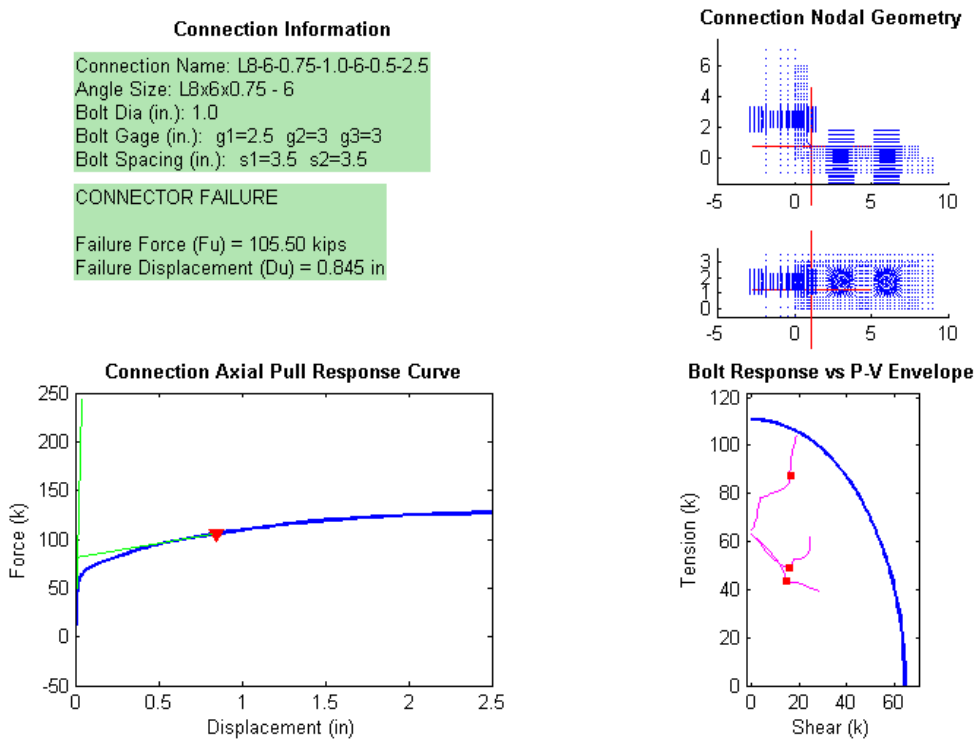


Figure B.262 Connection L8_6_0.75_1.0_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_1.0_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 5.8224e+003

Plastic Stiffness (k/in): 28.1577

Displacement (in): [9.0499e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.34649 ; 0.35045 ; 0.35639 ; 0.36529 ; 0.37866 ; 0.39202 ; 0.40539 ; 0.42543 ; 0.4555 ; 0.46677 ; 0.48369 ; 0.50906 ; 0.54711 ; 0.60419 ; 0.68981 ; 0.81825 ; 0.86641 ; 0.93866 ; 1.047 ; 1.0877 ; 1.1029 ; 1.1086 ; 1.1172 ; 1.13 ; 1.1493 ; 1.1783 ; 1.2217 ; 1.2379 ; 1.2623 ; 1.299 ; 1.3539 ; 1.4363 ; 1.5598 ; 1.7452 ; 1.8077 ; 1.9015 ; 2.0421 ; 2.253 ; 2.5]

Force (kips): [-2.37691 ; 4.34388 ; 8.995 ; 14.4644 ; 20.5381 ; 26.1437 ; 29.9322 ; 31.983 ; 33.8662 ; 35.8456 ; 37.8979 ; 40.2823 ; 43.3089 ; 43.6101 ; 43.7224 ; 43.8874 ; 44.115 ; 44.5126 ; 44.8896 ; 45.2306 ; 45.7043 ; 46.4016 ; 46.6564 ; 47.0199 ; 47.5329 ; 48.2472 ; 49.2274 ; 50.576 ; 52.3842 ; 53.0336 ; 53.9303 ; 55.1488 ; 55.6262 ; 55.797 ; 55.8592 ; 55.9644 ; 56.1265 ; 56.3542 ; 56.6833 ; 57.1522 ; 57.3267 ; 57.5759 ; 57.9264 ; 58.4288 ; 59.1215 ; 60.0222 ; 61.0947 ; 61.4115 ; 61.8369 ; 62.3934 ; 63.0869 ; 63.7409]

Bolt 1 - Tensile Force (kips): [63.2342 ; 62.9807 ; 62.7934 ; 62.5611 ; 62.282 ; 61.9973 ; 61.7603 ; 61.5449 ; 61.2521 ; 60.3861 ; 58.6329 ; 56.2222 ; 52.4508 ; 52.0548 ; 51.9044 ; 51.6787 ; 51.3446 ; 50.8069 ; 50.2645 ; 49.7263 ; 48.9152 ; 47.6676 ; 47.202 ; 46.5159 ; 45.5486 ; 44.4541 ; 44.2119 ; 44.0893 ; 43.7904 ; 43.5974 ; 43.5082 ; 43.4508 ; 43.3434 ; 43.3041 ; 43.2894 ; 43.2368 ; 43.1726 ; 43.0892 ; 42.9596 ; 42.8871 ; 42.8011 ; 42.668 ; 42.4734 ; 42.2024 ; 41.8071 ; 41.3278 ; 40.824 ; 40.6453 ; 40.398 ; 40.0721 ; 39.621 ; 39.1649]

Bolt 1 - Shear Force (kips): [0.137024 ; 0.216334 ; 0.434703 ; 0.706671 ; 1.02506 ; 1.34135 ; 1.60244 ; 1.85341 ; 2.19753 ; 3.26253 ; 5.2182 ; 7.48921 ; 10.5274 ; 10.8149 ; 10.9224 ; 11.0821 ; 11.3141 ; 11.6733 ; 12.019 ; 12.3484 ; 12.8152 ; 13.4544 ; 13.6661 ; 13.9501 ; 14.284 ; 14.5633 ; 14.5669 ; 14.5464 ; 14.6884 ; 14.7049 ; 14.6845 ; 15.0423 ; 15.8001 ; 16.0135 ; 16.0904 ; 16.3796 ; 16.7006 ; 17.0509 ; 17.8527 ; 18.4145 ; 18.7839 ; 19.3113 ; 20.0261 ; 20.942 ; 22.1818 ; 23.5683 ; 24.7174 ; 25.082 ; 25.5758 ; 26.2267 ; 27.1464 ; 28.1031]

Bolt 2 - Tensile Force (kips): [63.2305 ; 62.846 ; 62.5441 ; 62.174 ; 61.7314 ; 61.315 ; 60.9401 ; 60.434 ; 59.4783 ; 57.766 ; 55.7126 ; 53.7952 ; 52.347 ; 52.2025 ; 52.149 ; 52.0707 ; 51.9616 ; 51.7769 ; 51.5973 ; 51.4291 ; 51.1908 ; 50.8337 ; 50.6961 ; 50.5002 ; 50.2242 ; 49.8424 ; 49.3771 ; 48.9927 ; 48.9412 ; 49.0806 ; 50.1267 ; 51.5879 ; 52.0046 ; 52.1739 ; 52.2395 ; 52.302 ; 52.3437 ; 52.4327 ; 52.5873 ; 52.6297 ; 52.6216 ; 52.6342 ; 52.7177 ; 52.8367 ; 53.0971 ; 53.7652 ; 55.1945 ; 55.7532 ; 56.6264 ; 57.9084 ; 59.6967 ; 61.5731]

Bolt 2 - Shear Force (kips): [0.107312 ; 0.361469 ; 0.67995 ; 1.07569 ; 1.54047 ; 2.01442 ; 2.45216 ; 2.92625 ; 3.5367 ; 4.70432 ; 6.46457 ; 8.27212 ; 10.1032 ; 10.2775 ; 10.3423 ; 10.4379 ; 10.5749 ; 10.7921 ; 11.0057 ; 11.2109 ; 11.5095 ; 11.9552 ; 12.1262 ; 12.3801 ; 12.7552 ; 13.2885 ; 13.974 ; 14.761 ; 15.8139 ; 16.3409 ; 16.7195 ; 17.1245 ; 17.2361 ; 17.2787 ; 17.2952 ; 17.3104 ; 17.5139 ; 17.8058 ; 18.0036 ; 18.9429 ; 19.2305 ; 19.6027 ; 20.0413 ; 20.8201 ; 21.8507 ; 22.9033 ; 23.9247 ; 24.1386 ; 24.3285 ; 24.4852 ; 24.4696 ; 24.2907]

Bolt 3 - Tensile Force (kips): [65 ; 64.8465 ; 64.8146 ; 64.9212 ; 65.1175 ; 65.5198 ; 66.3483 ; 66.9892 ; 67.7664 ; 68.7898 ; 70.2519 ; 72.5904 ; 76.2303 ; 76.5255 ; 76.6299 ; 76.7824 ; 77.0034 ; 77.3709 ; 77.7161 ; 78.0347 ; 78.4967 ; 79.2268 ; 79.4957 ; 79.8912 ; 80.475 ; 81.3344 ; 82.6193 ; 84.5749 ; 87.1653 ; 88.0097 ; 89.1307 ; 90.7089 ; 91.3769 ; 91.6399 ; 91.7314 ; 91.8734 ; 92.0912 ; 92.3925 ; 92.8259 ; 93.5092 ; 93.7674 ; 94.1335 ; 94.6439 ; 95.3707 ; 96.3499 ; 97.8184 ; 99.593 ; 100.145 ; 100.87 ; 101.836 ; 103.048 ; 104.192]

Bolt 3 - Shear Force (kips): [0.0478659 ; 0.0790163 ; 0.183125 ; 0.338697 ; 0.54748 ; 0.821473 ; 1.12015 ; 1.38429 ; 1.62612 ; 1.91859 ; 2.3042 ; 2.77017 ; 3.25891 ; 3.32478 ; 3.34867 ; 3.38795 ; 3.4363 ; 3.55639 ; 3.69111 ; 3.80347 ; 4.40137 ; 6.70327 ; 7.689 ; 8.92733 ; 10.4109 ; 12.2496 ; 14.1857 ; 16.0877 ; 16.8271 ; 16.5151 ; 16.2257 ; 16.4012 ; 16.594 ; 16.6279 ; 16.6391 ; 16.6308 ; 16.6207 ; 16.6134 ; 16.6237 ; 16.6461 ; 16.6607 ; 16.6837 ; 16.7212 ; 16.8574 ; 17.0692 ; 17.3729 ; 17.7827 ; 17.9395 ; 18.116 ; 18.336 ; 18.6068 ; 18.8786]

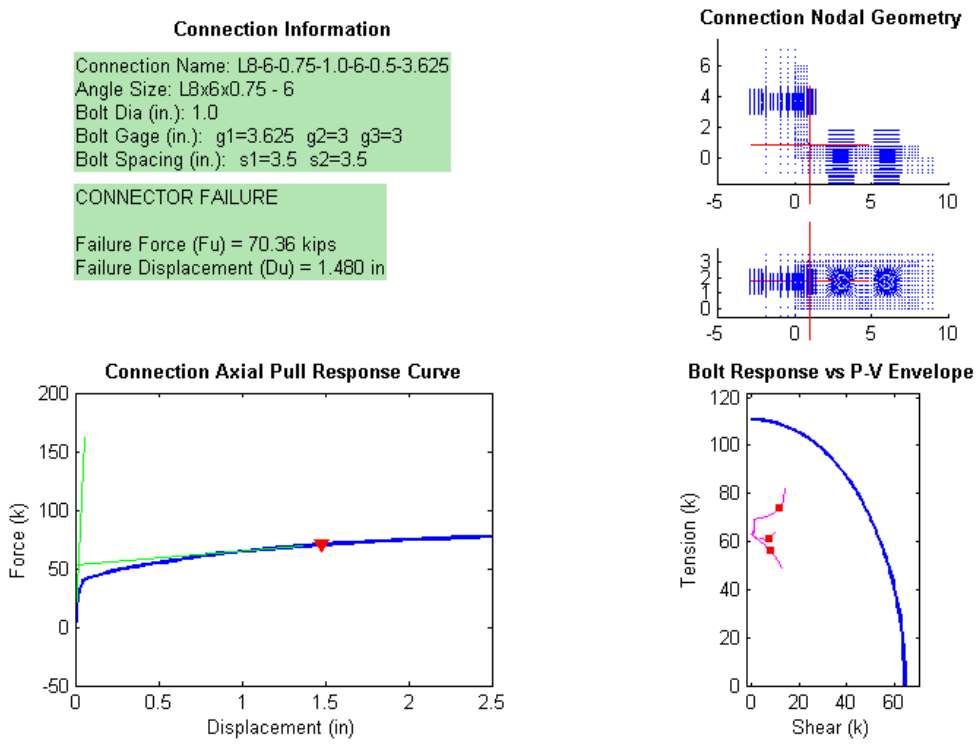


Figure B.263 Connection L8_6_0.75_1.0_6_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_1.0_6_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 2.8958e+003

Plastic Stiffness (k/in): 11.8880

Displacement (in): [9.261e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.048103 ; 0.056446 ; 0.06896 ; 0.087731 ; 0.11589 ; 0.15812 ; 0.17396 ; 0.19772 ; 0.23336 ; 0.28681 ; 0.36699 ; 0.48726 ; 0.53236 ; 0.60001 ; 0.62538 ; 0.66344 ; 0.67771 ; 0.69912 ; 0.73122 ; 0.77939 ; 0.79745 ; 0.82454 ; 0.86518 ; 0.92613 ; 1.0176 ; 1.1547 ; 1.3604 ; 1.6104 ; 1.8604 ; 1.9229 ; 2.0167 ; 2.1573 ; 2.3683 ; 2.5]

Force (kips): [-2.31112 ; 1.24365 ; 3.34476 ; 5.99919 ; 9.28577 ; 13.0777 ; 16.6231 ; 19.081 ; 19.5221 ; 20.0017 ; 20.5257 ; 21.0791 ; 21.6595 ; 22.5224 ; 22.8422 ; 23.2951 ; 23.9391 ; 24.7919 ; 25.8619 ; 27.2371 ; 27.7162 ; 28.4177 ; 28.7338 ; 29.1849 ; 29.3736 ; 29.6149 ; 29.9598 ; 30.4682 ; 30.649 ; 30.9032 ; 31.2603 ; 31.7564 ; 32.4455 ; 33.384 ; 34.6068 ; 35.8006 ; 36.7741 ; 37.0136 ; 37.3438 ; 37.7935 ; 38.3777 ; 38.6991]

Bolt 1 - Tensile Force (kips): [63.2323 ; 63.1011 ; 63.0193 ; 62.9109 ; 62.7691 ; 62.5923 ; 62.4062 ; 62.2484 ; 62.2098 ; 62.1598 ; 62.0949 ; 62.0165 ; 61.9425 ; 61.8484 ; 61.818 ; 61.7819 ; 61.7335 ; 61.677 ; 61.6154 ; 61.5411 ; 61.5131 ; 61.4649 ; 61.4332 ; 61.3784 ; 61.3492 ; 61.3089 ; 61.2387 ; 61.0824 ; 60.9903 ; 60.8296 ; 60.5842 ; 60.198 ; 59.5755 ; 58.6012 ; 57.1556 ; 55.5222 ; 53.9542 ; 53.4785 ; 52.7684 ; 51.6976 ; 50.1108 ; 49.1008]

Bolt 1 - Shear Force (kips): [0.132358 ; 0.0965341 ; 0.177156 ; 0.301094 ; 0.46756 ; 0.675216 ; 0.891956 ; 1.07956 ; 1.1277 ; 1.19142 ; 1.27586 ; 1.38007 ; 1.48083 ; 1.60971 ; 1.65218 ; 1.70457 ; 1.77623 ; 1.86298 ; 1.96311 ; 2.0884 ; 2.13509 ; 2.21225 ; 2.25649 ; 2.33145 ; 2.36951 ; 2.42301 ; 2.51533 ; 2.71926 ; 2.84352 ; 3.05846 ; 3.37575 ; 3.85436 ; 4.57672 ; 5.61391 ; 7.03079 ; 8.51102 ; 9.82465 ; 10.2001 ; 10.7443 ; 11.5223 ; 12.5542 ; 13.1347]

Bolt 2 - Tensile Force (kips): [63.22 ; 63.0228 ; 62.8845 ; 62.7073 ; 62.4956 ; 62.2568 ; 62.0613 ; 61.9259 ; 61.8936 ; 61.845 ; 61.7792 ; 61.6562 ; 61.5087 ; 61.2832 ; 61.1873 ; 61.0798 ; 60.9549 ; 60.7943 ; 60.7386 ; 60.8608 ; 60.9322 ; 61.0577 ; 61.0877 ; 61.1215 ; 61.1185 ; 61.1283 ; 61.1444 ; 61.1397 ; 61.1138 ; 61.068 ; 61.0063 ; 60.9251 ; 60.853 ; 60.8608 ; 61.1227 ; 61.7186 ; 62.4522 ; 62.5771 ; 62.7769 ; 63.0875 ; 63.622 ; 63.9516]

Bolt 2 - Shear Force (kips): [0.102798 ; 0.170504 ; 0.321361 ; 0.523457 ; 0.788698 ; 1.11554 ; 1.4595 ; 1.78573 ; 1.87935 ; 2.00677 ; 2.17257 ; 2.36579 ; 2.54957 ; 2.7934 ; 2.87489 ; 2.97678 ; 3.10797 ; 3.24352 ; 3.38168 ; 3.55634 ; 3.62597 ; 3.74281 ; 3.80198 ; 3.89987 ; 3.94623 ; 4.01122 ; 4.11606 ; 4.32328 ; 4.43703 ; 4.62609 ; 4.90181 ; 5.2971 ; 5.8269 ; 6.51959 ; 7.36247 ; 8.10587 ; 8.66875 ; 8.84048 ; 9.07609 ; 9.39332 ; 9.79511 ; 10.0336]

Bolt 3 - Tensile Force (kips): [65 ; 64.8415 ; 64.7267 ; 64.6248 ; 64.573 ; 64.5289 ; 64.35 ; 64.1296 ; 63.9804 ; 63.7734 ; 63.5337 ; 63.3489 ; 63.3709 ; 63.6596 ; 63.769 ; 63.952 ; 64.2782 ; 64.8183 ; 65.6854 ; 67.1005 ; 67.6245 ; 68.4936 ; 68.7569 ; 69.1197 ; 69.2748 ; 69.4046 ; 69.569 ; 69.8508 ; 69.9509 ; 70.0534 ; 70.219 ; 70.5076 ; 70.9176 ; 71.7834 ; 73.326 ; 75.0145 ; 76.5645 ; 77.2156 ; 78.0377 ; 79.2777 ; 80.8775 ; 81.7546]

Bolt 3 - Shear Force (kips): [0.0674523 ; 0.0258867 ; 0.0684007 ; 0.141027 ; 0.248919 ; 0.394644 ; 0.53817 ; 0.649872 ; 0.688345 ; 0.736896 ; 0.806496 ; 0.884273 ; 0.991231 ; 1.11713 ; 1.12747 ; 1.12586 ; 1.11402 ; 1.11034 ; 1.14391 ; 1.16458 ; 1.1653 ; 1.57149 ; 1.21734 ; 1.43821 ; 1.51502 ; 1.98736 ; 2.81246 ; 4.03807 ; 4.34547 ; 4.92167 ; 5.75969 ; 6.72771 ; 8.06969 ; 9.5048 ; 11.0563 ; 12.4158 ; 13.5191 ; 13.4769 ; 13.3835 ; 13.5501 ; 13.8972 ; 14.0938]

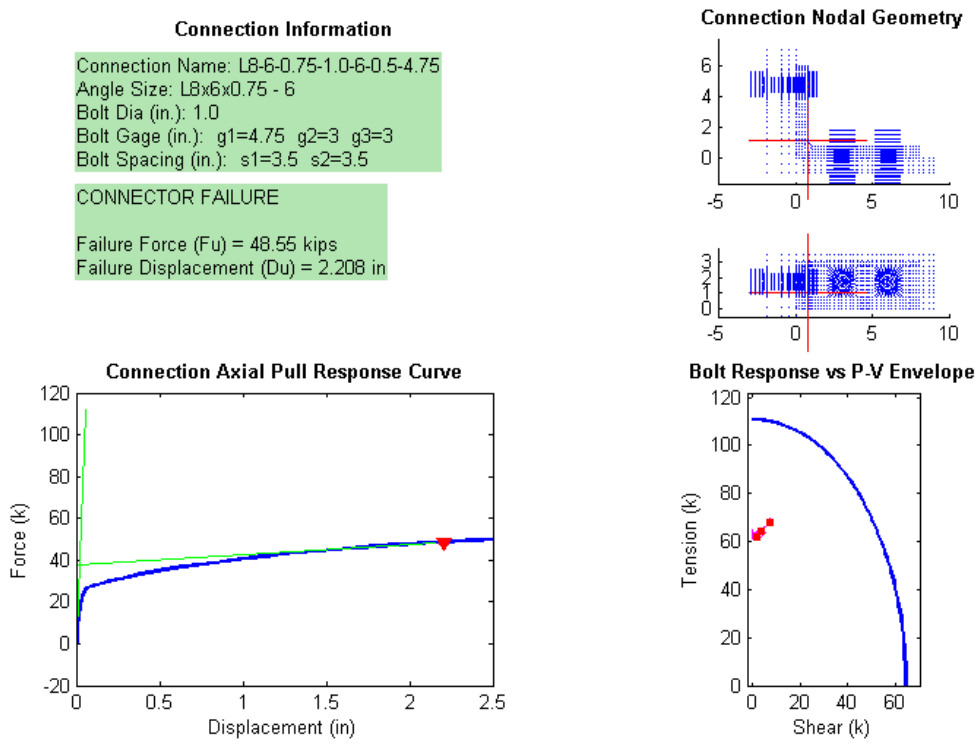


Figure B.264 Connection L8_6_0.75_1.0_6_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_1.0_6_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.8471e+003

Plastic Stiffness (k/in): 4.7691

Displacement (in): [9.0196e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.11067 ; 0.12945 ; 0.1576 ; 0.19984 ; 0.26319 ; 0.35822 ; 0.39386 ; 0.44731 ; 0.52749 ; 0.64776 ; 0.82817 ; 0.89067 ; 0.9141 ; 0.94926 ; 0.96244 ; 0.98222 ; 1.0119 ; 1.0564 ; 1.1231 ; 1.1482 ; 1.1857 ; 1.242 ; 1.3265 ; 1.4532 ; 1.6432 ; 1.7057 ; 1.7995 ; 1.9401 ; 2.1511 ; 2.4011 ; 2.5]

Force (kips): [-2.25121 ; 0.349321 ; 1.35637 ; 2.70994 ; 4.49893 ; 6.78761 ; 9.44551 ; 11.8302 ; 13.2845 ; 13.8282 ; 13.9583 ; 14.1456 ; 14.4478 ; 14.8961 ; 15.5329 ; 16.3812 ; 16.6918 ; 17.1213 ; 17.679 ; 18.4 ; 19.359 ; 19.6652 ; 19.7755 ; 19.9398 ; 20.0231 ; 20.1405 ; 20.3003 ; 20.5189 ; 20.8209 ; 20.9333 ; 21.0945 ; 21.3326 ; 21.6751 ; 22.1435 ; 22.7819 ; 22.9806 ; 23.2647 ; 23.6448 ; 24.1478 ; 24.7063 ; 24.9103]

Bolt 1 - Tensile Force (kips): [63.2326 ; 63.1363 ; 63.0991 ; 63.0454 ; 62.9712 ; 62.8703 ; 62.7424 ; 62.6117 ; 62.5179 ; 62.4815 ; 62.473 ; 62.4601 ; 62.4371 ; 62.3971 ; 62.3384 ; 62.2821 ; 62.2657 ; 62.2429 ; 62.2189 ; 62.1945 ; 62.1702 ; 62.1649 ; 62.1635 ; 62.161 ; 62.1572 ; 62.1519 ; 62.1456 ; 62.1389 ; 62.1314 ; 62.1281 ; 62.124 ; 62.1189 ; 62.1131 ; 62.1116 ; 62.1154 ; 62.1167 ; 62.1209 ; 62.1306 ; 62.1498 ; 62.1584 ; 62.1599]

Bolt 1 - Shear Force (kips): [0.13067 ; 0.078186 ; 0.10152 ; 0.15386 ; 0.23672 ; 0.35436 ; 0.5062 ; 0.66487 ; 0.78586 ; 0.84567 ; 0.86209 ; 0.88675 ; 0.92827 ; 0.99733 ; 1.0972 ; 1.2071 ; 1.2436 ; 1.2963 ; 1.3627 ; 1.4461 ; 1.5514 ; 1.5829 ; 1.5939 ; 1.6106 ; 1.6203 ; 1.6341 ; 1.6531 ; 1.6785 ; 1.7137 ; 1.7275 ; 1.7471 ; 1.7753 ; 1.815 ; 1.8656 ; 1.934 ; 1.9565 ; 1.9877 ; 2.0305 ; 2.0898 ; 2.1766 ; 2.2134]

Bolt 2 - Tensile Force (kips): [63.2215 ; 63.0794 ; 63.0167 ; 62.9202 ; 62.7973 ; 62.6518 ; 62.4971 ; 62.3927 ; 62.344 ; 62.3273 ; 62.3224 ; 62.3175 ; 62.3111 ; 62.2982 ; 62.2979 ; 62.3294 ; 62.3186 ; 62.3107 ; 62.3189 ; 62.3081 ; 62.4072 ; 62.4789 ; 62.5136 ; 62.5668 ; 62.5833 ; 62.6077 ; 62.6415 ; 62.6914 ; 62.762 ; 62.7833 ; 62.8166 ; 62.873 ; 62.9656 ; 63.1402 ; 63.3831 ; 63.4543 ; 63.5655 ; 63.7421 ; 63.9949 ; 64.2472 ; 64.3443]

Bolt 2 - Shear Force (kips): [0.10067 ; 0.1105 ; 0.18838 ; 0.29574 ; 0.44564 ; 0.6492 ; 0.90337 ; 1.1629 ; 1.3611 ; 1.4566 ; 1.4843 ; 1.5281 ; 1.6059 ; 1.7409 ; 1.9443 ; 2.2011 ; 2.2853 ; 2.3939 ; 2.5214 ; 2.6649 ; 2.827 ; 2.8735 ; 2.8888 ; 2.9107 ; 2.9221 ; 2.9381 ; 2.9607 ; 2.9924 ; 3.0389 ; 3.0572 ; 3.0846 ; 3.1257 ; 3.1884 ; 3.28 ; 3.4279 ; 3.4787 ; 3.5537 ; 3.6602 ; 3.8175 ; 4.0094 ; 4.082]

Bolt 3 - Tensile Force (kips): [65 ; 64.8934 ; 64.7924 ; 64.6734 ; 64.5383 ; 64.3755 ; 64.083 ; 63.5245 ; 62.6821 ; 61.8916 ; 61.6543 ; 61.4133 ; 61.2241 ; 61.133 ; 61.1223 ; 61.3119 ; 61.4958 ; 61.781 ; 62.0142 ; 62.2104 ; 62.9564 ; 63.3892 ; 63.5428 ; 63.7632 ; 63.8121 ; 63.8235 ; 63.7952 ; 63.7467 ; 63.764 ; 63.7426 ; 63.7189 ; 63.7582 ; 63.9148 ; 64.2605 ; 65.1067 ; 65.4034 ; 65.8724 ; 66.5331 ; 67.4957 ; 69.1959 ; 69.8889]

Bolt 3 - Shear Force (kips): [0.063214 ; 0.02909 ; 0.035554 ; 0.066648 ; 0.12033 ; 0.19725 ; 0.28774 ; 0.33603 ; 0.32266 ; 0.3054 ; 0.30766 ; 0.32588 ; 0.37963 ; 0.49591 ; 0.68858 ; 0.94084 ; 1.4495 ; 2.4922 ; 3.6727 ; 4.4362 ; 5.1265 ; 5.3915 ; 5.467 ; 5.4918 ; 5.2097 ; 4.6907 ; 3.9435 ; 2.9646 ; 1.8754 ; 1.3682 ; 0.7099 ; 0.17971 ; 1.1902 ; 2.5435 ; 4.0581 ; 4.5569 ; 5.3905 ; 6.2815 ; 7.1779 ; 7.2612 ; 7.4493]

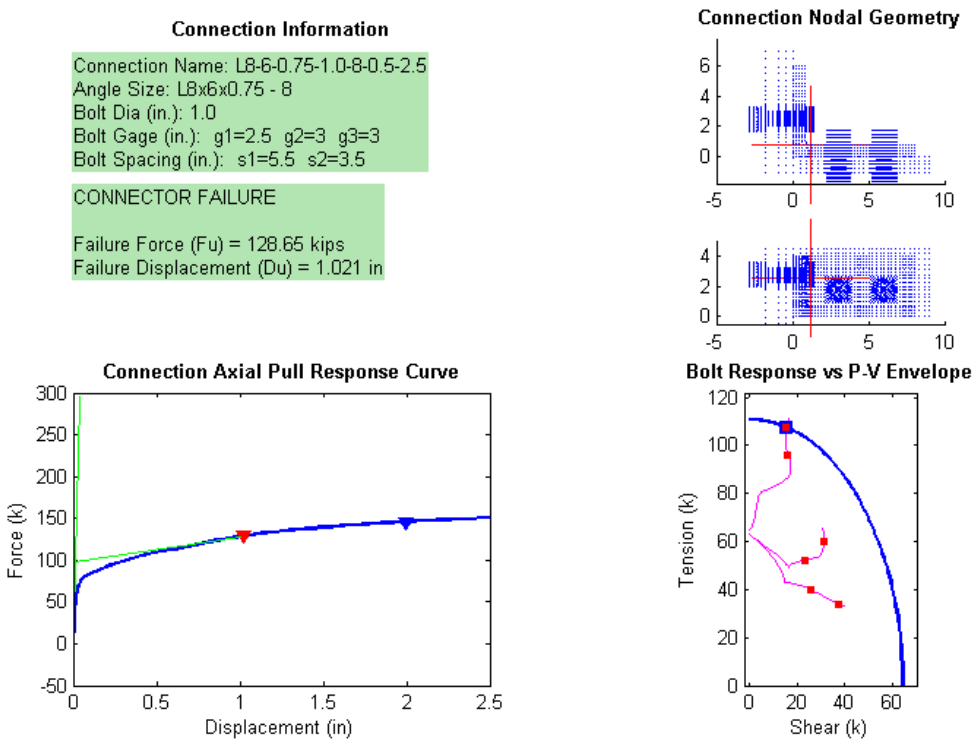


Figure B.265 Connection L8_6_0.75_1.0_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_1.0_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 7.4729e+003

Plastic Stiffness (k/in): 30.7452

Displacement (in): [8.2593e-036 ; 0.00048828 ; 0.00097656 ; 0.001709 ; 0.0028076 ; 0.0044556 ; 0.0069275 ; 0.010635 ; 0.014343 ; 0.018051 ; 0.023613 ; 0.031956 ; 0.04447 ; 0.063241 ; 0.091398 ; 0.13363 ; 0.19699 ; 0.29202 ; 0.30092 ; 0.31429 ; 0.3193 ; 0.32682 ; 0.33809 ; 0.355 ; 0.38037 ; 0.41843 ; 0.4327 ; 0.4541 ; 0.48621 ; 0.53438 ; 0.55244 ; 0.55921 ; 0.56937 ; 0.58461 ; 0.60747 ; 0.61604 ; 0.61925 ; 0.62407 ; 0.63131 ; 0.64216 ; 0.65843 ; 0.68284 ; 0.68894 ; 0.69504 ; 0.7042 ; 0.71793 ; 0.73852 ; 0.76942 ; 0.781 ; 0.79838 ; 0.82445 ; 0.86355 ; 0.87821 ; 0.9002 ; 0.9332 ; 0.98268 ; 1.0012 ; 1.0291 ; 1.0708 ; 1.0865 ; 1.11 ; 1.1452 ; 1.1981 ; 1.2773 ; 1.307 ; 1.3516 ; 1.4185 ; 1.5188 ; 1.6693 ; 1.895 ; 1.9575 ; 2.0513 ; 2.0864 ; 2.1392 ; 2.2183 ; 2.3369 ; 2.5]

Force (kips): [-2.06023 ; -0.0551843 ; 1.58867 ; 3.81164 ; 6.69981 ; 10.4094 ; 15.0677 ; 20.7306 ; 25.11 ; 28.4022 ; 31.9157 ; 35.1546 ; 37.5526 ; 39.3956 ; 41.3236 ; 43.5439 ; 46.1426 ; 49.0742 ; 49.366 ; 49.7682 ; 49.9443 ; 50.1979 ; 50.5626 ; 51.1026 ; 51.8061 ; 52.7985 ; 53.1553 ; 53.6629 ; 54.3917 ; 55.3567 ; 55.688 ; 55.8088 ; 56.0036 ; 56.2635 ; 56.6887 ; 56.7624 ; 56.7368 ; 56.7848 ; 56.9516 ; 57.1816 ; 57.5244 ; 58.0345 ; 58.1751 ; 58.3137 ; 58.5097 ; 58.7931 ; 59.231 ; 59.8713 ; 60.1173 ; 60.4785 ; 60.9858 ; 61.7179 ; 61.9936 ; 62.3876 ; 62.9609 ; 63.7521 ; 64.0374 ; 64.453 ; 65.0461 ; 65.26 ; 65.572 ; 66.0225 ; 66.6605 ; 67.5511 ; 67.8723 ; 68.3302 ; 68.9691 ; 69.8378 ; 70.9863 ; 72.433 ; 72.7875 ; 73.2856 ; 73.4616 ; 73.7284 ; 74.105 ; 74.6245 ; 75.2563]

Bolt 1 - Tensile Force (kips): [63.2364 ; 63.1598 ; 63.0954 ; 63.0054 ; 62.8844 ; 62.7232 ; 62.5097 ; 62.2309 ; 61.9985 ; 61.8113 ; 61.5958 ; 61.3522 ; 61.0621 ; 60.1959 ; 58.6053 ; 56.2746 ; 52.8594 ; 47.7712 ; 47.2872 ; 46.5962 ; 46.3364 ; 45.9554 ; 45.4147 ; 44.7116 ; 44.3309 ; 44.1556 ; 44.1073 ; 44.0549 ; 43.9993 ; 43.9345 ; 43.91 ; 43.901 ; 43.7412 ; 43.4914 ; 43.3447 ; 43.2852 ; 43.266 ; 43.2509 ; 43.2051 ; 43.1636 ; 43.1079 ; 42.9986 ; 42.9596 ; 42.9088 ; 42.8328 ; 42.7327 ; 42.6255 ; 42.4997 ; 42.3991 ; 42.2509 ; 42.0276 ; 41.6384 ; 41.4935 ; 41.312 ; 41.0738 ; 40.5782 ; 40.3207 ; 39.9429 ; 39.3852 ; 39.1834 ; 38.8922 ; 38.4707 ; 37.8982 ; 37.1936 ; 36.9438 ; 36.6221 ; 36.1084 ; 35.4573 ; 34.8256 ; 34.3246 ; 34.1555 ; 33.928 ; 33.8445 ; 33.7306 ; 33.5722 ; 33.3521 ; 33.0878]

Bolt 1 - Shear Force (kips): [0.126104 ; 0.0753287 ; 0.116929 ; 0.22026 ; 0.370786 ; 0.572718 ; 0.835402 ; 1.16854 ; 1.43825 ; 1.65086 ; 1.89204 ; 2.16341 ; 2.498 ; 3.55771 ; 5.29618 ; 7.48883 ; 10.2628 ; 13.423 ; 13.6441 ; 13.927 ; 14.0231 ; 14.1552 ; 14.3255 ; 14.5094 ; 14.5632 ; 14.5526 ; 14.5447 ; 14.5332 ; 14.5179 ; 14.4978 ; 14.49 ; 14.487 ; 14.6292 ; 14.7135 ; 14.7047 ; 14.6929 ; 14.6874 ; 14.7247 ; 14.9923 ; 15.2403 ; 15.5616 ; 16.0645 ; 16.2428 ; 16.4868 ; 16.8052 ; 17.2676 ; 17.9589 ; 18.7439 ; 19.1838 ; 19.7401 ; 20.5247 ; 21.7649 ; 22.2107 ; 22.7609 ; 23.4394 ; 24.531 ; 25.0515 ; 25.7873 ; 26.8389 ; 27.214 ; 27.7638 ; 28.5453 ; 29.5771 ; 30.7015 ; 31.1061 ; 31.6834 ; 32.6495 ; 33.8639 ; 35.2064 ; 36.6274 ; 37.0588 ; 37.6268 ; 37.8281 ; 38.0855 ; 38.4468 ; 38.9664 ; 39.5838]

Bolt 2 - Tensile Force (kips): [63.2306 ; 63.1355 ; 63.0535 ; 62.9306 ; 62.759 ; 62.5324 ; 62.2395 ; 61.865 ; 61.5701 ; 61.3541 ; 61.1174 ; 60.8544 ; 60.5166 ; 59.7381 ; 58.5116 ; 57.0716 ; 56.0292 ; 54.4102 ; 54.2319 ; 53.9687 ; 53.8623 ; 53.7063 ; 53.476 ; 53.132 ; 52.6766 ; 52.0814 ; 51.8649 ; 51.5436 ; 51.1034 ; 50.5729 ; 50.3628 ; 50.2782 ; 50.2188 ; 50.0161 ; 49.6022 ; 49.4433 ; 49.337 ; 49.3448 ; 49.4333 ; 49.5702 ; 49.8599 ; 50.2104 ; 50.2743 ; 50.3389 ; 50.4399 ; 50.5961 ; 50.7945 ; 51.0543 ; 51.1157 ; 51.1886 ; 51.3292 ; 51.5633 ; 51.6291 ; 51.7064 ; 51.8169 ; 52.1 ; 52.2049 ; 52.2855 ; 52.4102 ; 52.4512 ; 52.5212 ; 52.6371 ; 52.8358 ; 53.136 ; 53.2425 ; 53.4957 ; 54.0972 ; 55.1181 ; 56.6746 ; 59.0022 ; 59.6585 ; 60.629 ; 60.9805 ; 61.5517 ; 62.4139 ; 63.615 ; 65.2274]

Bolt 2 - Shear Force (kips): [0.092305 ; 0.0752549 ; 0.17025 ; 0.314955 ; 0.51087 ; 0.770817 ; 1.10909 ; 1.53609 ; 1.88132 ; 2.15594 ; 2.47833 ; 2.86305 ; 3.36225 ; 4.51741 ; 6.2169 ; 8.16717 ; 10.0513 ; 11.9672 ; 12.1467 ; 12.4094 ; 12.5121 ; 12.6619 ; 12.8806 ; 13.1985 ; 13.6229 ; 14.177 ; 14.3723 ; 14.6581 ; 15.0513 ; 15.5453 ; 15.7241 ; 15.791 ; 15.8575 ; 16.0315 ; 16.589 ; 16.6755 ; 16.6735 ; 16.6841 ; 16.7071 ; 16.7455 ; 16.8342 ; 17.1372 ; 17.2446 ; 17.3206 ; 17.4208 ; 17.5447 ; 17.8065 ; 18.3333 ; 18.5271 ; 18.8911 ; 19.3963 ; 20.1038 ; 20.4126 ; 20.9254 ; 21.7299 ; 22.5932 ; 22.865 ; 23.4201 ; 24.1329 ; 24.4124 ; 24.8154 ; 25.4226 ; 26.3496 ; 27.7903 ; 28.3418 ; 28.986 ; 29.489 ; 30.0603 ; 30.6325 ; 31.1791 ; 31.2501 ; 31.2713 ; 31.2737 ; 31.227 ; 31.1499 ; 31.064 ; 30.8259]

Bolt 3 - Tensile Force (kips): [65 ; 64.9511 ; 64.9042 ; 64.8524 ; 64.8139 ; 64.823 ; 64.9332 ; 65.1319 ; 65.3698 ; 65.6924 ; 66.4288 ; 67.391 ; 68.2596 ; 69.1832 ; 70.336 ; 71.9982 ; 74.4821 ; 77.9721 ; 78.2482 ; 78.6547 ; 78.8023 ; 79.0126 ; 79.3142 ; 79.8122 ; 80.5374 ; 81.628 ; 82.0387 ; 82.6497 ; 83.6033 ; 84.9842 ; 85.4882 ; 85.6717 ; 85.9484 ; 86.3354 ; 86.9238 ; 87.0263 ; 87.0015 ; 87.0552 ; 87.2701 ; 87.5812 ; 88.0455 ; 88.7485 ; 88.9367 ; 89.1176 ; 89.3726 ; 89.7297 ; 90.2694 ; 91.0162 ; 91.3005 ; 91.7174 ; 92.2666 ; 93.0486 ; 93.361 ; 93.7838 ; 94.4817 ; 95.5535 ; 95.9359 ; 96.4466 ; 97.2387 ; 97.5138 ; 97.9018 ; 98.4413 ; 99.2552 ; 100.435 ; 100.863 ; 101.46 ; 102.294 ; 103.44 ; 104.974 ; 106.917 ; 107.386 ; 108.029 ; 108.256 ; 108.739 ; 109.416 ; 110.314 ; 111.301]

Bolt 3 - Shear Force (kips): [0.0585186 ; 0.0314949 ; 0.032893 ; 0.0654537 ; 0.121083 ; 0.208185 ; 0.338678 ; 0.522206 ; 0.702615 ; 0.871016 ; 1.10821 ; 1.38211 ; 1.67752 ; 1.96677 ; 2.3321 ; 2.81139 ; 3.35442 ; 3.88702 ; 3.95517 ; 4.04001 ; 4.08654 ; 4.14863 ; 4.24688 ; 4.42927 ; 4.96598 ; 7.57608 ; 8.68088 ; 10.0934 ; 12.1649 ; 14.1124 ; 14.7504 ; 14.9998 ; 15.4007 ; 15.9047 ; 16.2767 ; 16.3565 ; 16.3561 ; 16.3943 ; 16.4964 ; 16.6647 ; 16.9193 ; 17.2341 ; 17.1989 ; 17.185 ; 17.2028 ; 17.2773 ; 17.3 ; 17.2988 ; 17.2512 ; 17.114 ; 17.0262 ; 16.9822 ; 16.8783 ; 16.8644 ; 16.6896 ; 16.2928 ; 16.1559 ; 16.0698 ; 15.8656 ; 15.7879 ; 15.6777 ; 15.5208 ; 15.4304 ; 15.3605 ; 15.343 ; 15.3168 ; 15.2437 ; 15.1636 ; 15.1298 ; 15.1946 ; 15.2224 ; 15.2357 ; 15.2464 ; 15.612 ; 16.0665 ; 16.447 ; 16.7038]

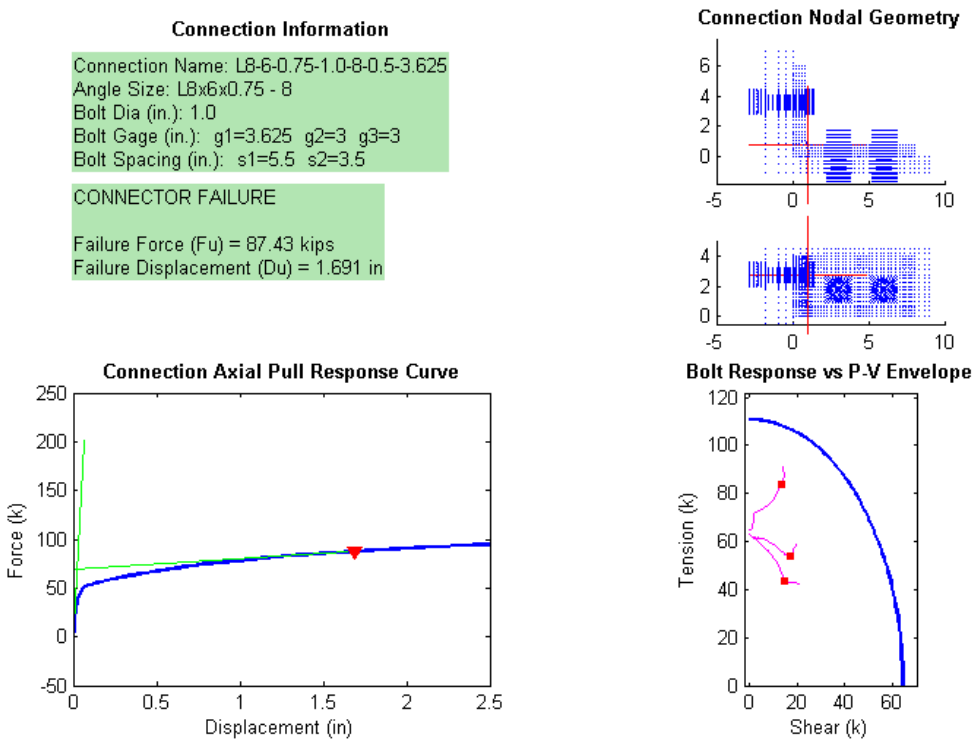


Figure B.266 Connection L8_6_0.75_1.0_8_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_1.0_8_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 2.8867e+003

Plastic Stiffness (k/in): 10.6990

Displacement (in): [7.8942e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.16699 ; 0.19514 ; 0.23738 ; 0.30073 ; 0.39576 ; 0.4314 ; 0.48485 ; 0.5049 ; 0.51241 ; 0.52369 ; 0.5406 ; 0.56597 ; 0.60403 ; 0.6183 ; 0.6397 ; 0.67181 ; 0.71997 ; 0.79222 ; 0.90058 ; 1.0631 ; 1.307 ; 1.3695 ; 1.4632 ; 1.4984 ; 1.5511 ; 1.5709 ; 1.6005 ; 1.645 ; 1.7118 ; 1.7785 ; 1.8453 ; 1.9454 ; 1.9829 ; 2.0392 ; 2.0603 ; 2.092 ; 2.1395 ; 2.2108 ; 2.3177 ; 2.4781 ; 2.5]

Force (kips): [-1.96167 ; 1.40423 ; 3.67646 ; 6.56561 ; 10.1704 ; 14.5714 ; 19.1369 ; 22.8645 ; 25.0161 ; 26.5347 ; 27.7758 ; 28.1922 ; 28.7861 ; 29.6077 ; 30.6947 ; 32.1049 ; 32.5809 ; 33.2557 ; 33.5302 ; 33.6328 ; 33.8037 ; 34.0475 ; 34.3861 ; 34.8833 ; 35.0804 ; 35.3607 ; 35.8242 ; 36.4451 ; 37.2764 ; 38.3504 ; 39.7432 ; 41.4835 ; 41.8882 ; 42.4576 ; 42.6603 ; 42.9583 ; 43.0696 ; 43.2332 ; 43.4712 ; 43.8254 ; 44.1574 ; 44.4724 ; 44.9555 ; 45.1301 ; 45.3989 ; 45.5079 ; 45.6697 ; 45.8945 ; 46.2123 ; 46.6594 ; 47.2497 ; 47.3261]

Bolt 1 - Tensile Force (kips): [63.2326 ; 63.1027 ; 63.0083 ; 62.8823 ; 62.716 ; 62.4945 ; 62.2357 ; 61.9834 ; 61.7677 ; 61.5294 ; 61.3319 ; 61.2626 ; 61.1462 ; 60.8463 ; 60.006 ; 58.7689 ; 58.2962 ; 57.5459 ; 57.2197 ; 57.0945 ; 56.8887 ; 56.5807 ; 56.1233 ; 55.4145 ; 55.1233 ; 54.6952 ; 53.9671 ; 52.9001 ; 51.2852 ; 48.6723 ; 44.9112 ; 44.2507 ; 44.1812 ; 44.1175 ; 44.0973 ; 43.8978 ; 43.841 ; 43.7811 ; 43.7248 ; 43.6761 ; 43.6485 ; 43.6352 ; 43.4961 ; 43.4332 ; 43.2908 ; 43.2103 ; 43.1056 ; 42.9864 ; 42.8675 ; 42.6173 ; 42.3587 ; 42.3244]

Bolt 1 - Shear Force (kips): [0.118837 ; 0.11212 ; 0.219929 ; 0.37579 ; 0.583115 ; 0.854323 ; 1.1647 ; 1.46337 ; 1.72628 ; 2.02744 ; 2.27798 ; 2.36544 ; 2.51109 ; 2.88273 ; 3.91327 ; 5.26139 ; 5.7395 ; 6.46917 ; 6.77658 ; 6.89326 ; 7.08293 ; 7.36265 ; 7.77006 ; 8.38377 ; 8.62911 ; 8.98332 ; 9.5679 ; 10.3889 ; 11.5433 ; 13.1008 ; 14.5394 ; 14.5894 ; 14.5751 ; 14.5574 ; 14.5513 ; 14.6309 ; 14.6317 ; 14.6253 ; 14.6098 ; 14.5847 ; 14.5625 ; 14.5437 ; 15.3505 ; 15.6998 ; 16.3373 ; 16.6946 ; 17.3348 ; 18.0916 ; 18.892 ; 19.9272 ; 20.9344 ; 21.0603]

Bolt 2 - Tensile Force (kips): [63.2168 ; 63.0494 ; 62.9059 ; 62.7199 ; 62.4953 ; 62.2298 ; 61.979 ; 61.8138 ; 61.7175 ; 61.6006 ; 61.5317 ; 61.5312 ; 61.5627 ; 61.4967 ; 61.1697 ; 61.0253 ; 60.9538 ; 60.8025 ; 60.719 ; 60.686 ; 60.6229 ; 60.5283 ; 60.3907 ; 60.1802 ; 60.0827 ; 59.9514 ; 59.6945 ; 59.3395 ; 58.8382 ; 58.0157 ; 56.639 ; 55.165 ; 54.8553 ; 54.504 ; 54.3985 ; 54.2681 ; 54.2222 ; 54.1618 ; 54.1008 ; 54.1145 ; 54.4244 ; 54.9342 ; 55.6491 ; 55.9052 ; 56.2852 ; 56.4073 ; 56.5669 ; 56.8254 ; 57.1711 ; 57.7406 ; 58.8084 ; 58.9568]

Bolt 2 - Shear Force (kips): [0.0840446 ; 0.166622 ; 0.330778 ; 0.549456 ; 0.83651 ; 1.20609 ; 1.62088 ; 2.03783 ; 2.46067 ; 2.94389 ; 3.31678 ; 3.43885 ; 3.6237 ; 4.00703 ; 4.92651 ; 6.06023 ; 6.4386 ; 6.95751 ; 7.15684 ; 7.23169 ; 7.35432 ; 7.53173 ; 7.78388 ; 8.15656 ; 8.30803 ; 8.52195 ; 8.88369 ; 9.37538 ; 10.0451 ; 11.0404 ; 12.6224 ; 14.4769 ; 14.8796 ; 15.41 ; 15.5898 ; 15.9132 ; 16.0914 ; 16.3466 ; 16.7185 ; 17.365 ; 17.7522 ; 17.9725 ; 18.2097 ; 18.2809 ; 18.3836 ; 18.419 ; 18.4654 ; 18.5411 ; 18.8577 ; 19.2145 ; 19.4192 ; 19.4381]

Bolt 3 - Tensile Force (kips): [65 ; 64.8376 ; 64.7267 ; 64.6347 ; 64.6178 ; 64.6222 ; 64.6287 ; 64.7419 ; 64.9112 ; 65.2239 ; 66.0018 ; 66.2529 ; 66.6314 ; 67.1955 ; 68.1128 ; 69.6677 ; 70.2599 ; 71.1581 ; 71.4434 ; 71.5476 ; 71.7128 ; 71.9475 ; 72.277 ; 72.7628 ; 72.9376 ; 73.1858 ; 73.6535 ; 74.1539 ; 74.8693 ; 75.7319 ; 77.3985 ; 80.117 ; 80.828 ; 81.785 ; 82.1183 ; 82.6019 ; 82.7779 ; 83.0412 ; 83.4339 ; 84.0171 ; 84.6021 ; 85.1676 ; 85.9813 ; 86.276 ; 86.7639 ; 87.0093 ; 87.3827 ; 87.9231 ; 88.6841 ; 89.7705 ; 91.1099 ; 91.281]

Bolt 3 - Shear Force (kips): [0.0725481 ; 0.0300438 ; 0.0728129 ; 0.149329 ; 0.266907 ; 0.435343 ; 0.63899 ; 0.849714 ; 1.09901 ; 1.31993 ; 1.39624 ; 1.4257 ; 1.47958 ; 1.57165 ; 1.71976 ; 1.90268 ; 1.96836 ; 2.04913 ; 2.13545 ; 2.16967 ; 2.26869 ; 2.41001 ; 3.04569 ; 4.46976 ; 4.63246 ; 5.44627 ; 5.63232 ; 6.48994 ; 7.36104 ; 8.90531 ; 10.004 ; 11.6131 ; 11.945 ; 12.334 ; 12.5212 ; 12.7773 ; 12.8703 ; 13.0061 ; 13.1998 ; 13.4484 ; 13.6387 ; 13.8509 ; 14.2548 ; 14.429 ; 14.6107 ; 14.545 ; 14.5004 ; 14.51 ; 14.5451 ; 14.423 ; 14.3243 ; 14.3207]

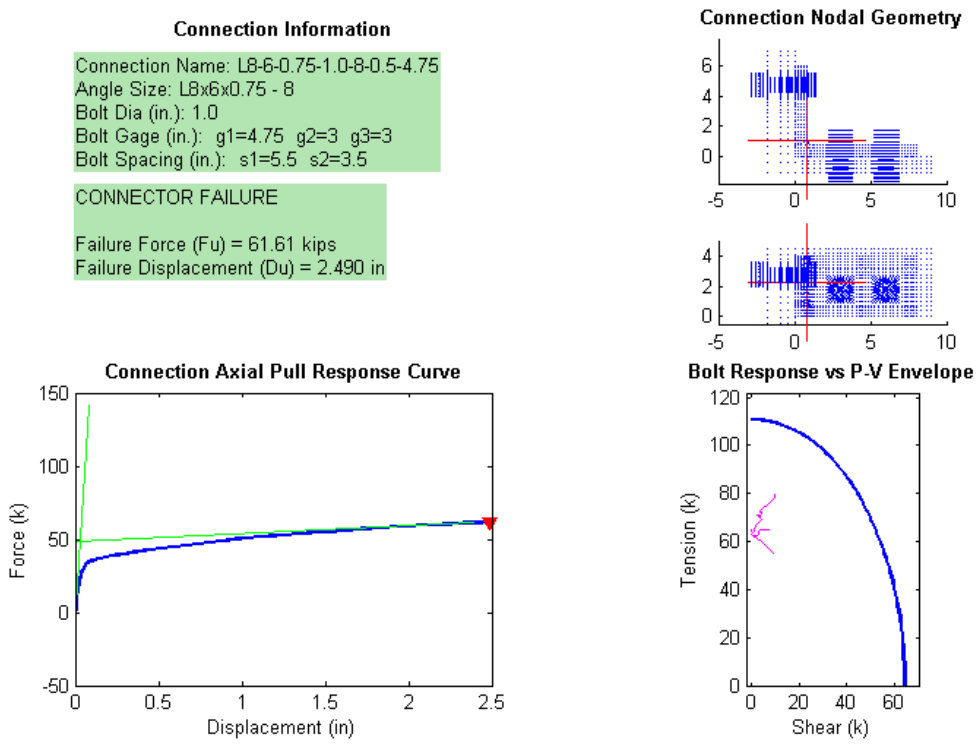


Figure B.267 Connection L8_6_0.75_1.0_8_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_1.0_8_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 1794

Plastic Stiffness (k/in): 5.4288

Displacement (in): [7.7453e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.25146 ; 0.29369 ; 0.35705 ; 0.45208 ; 0.59462 ; 0.80843 ; 0.87093 ; 0.89437 ; 0.91781 ; 0.94125 ; 0.9764 ; 1.0291 ; 1.1082 ; 1.1379 ; 1.1824 ; 1.2491 ; 1.3493 ; 1.4994 ; 1.6496 ; 1.6871 ; 1.7434 ; 1.8279 ; 1.9546 ; 2.1447 ; 2.3947 ; 2.5]

Force (kips): [-1.92494 ; 0.443982 ; 1.57894 ; 3.10533 ; 5.12982 ; 7.7388 ; 10.9289 ; 14.1155 ; 16.4892 ; 17.6103 ; 18.3322 ; 19.253 ; 19.5602 ; 19.9853 ; 20.5888 ; 21.3978 ; 22.4475 ; 23.8372 ; 24.2754 ; 24.4539 ; 24.6219 ; 24.7892 ; 25.0248 ; 25.3442 ; 25.7766 ; 25.9396 ; 26.1665 ; 26.4932 ; 26.982 ; 27.6422 ; 28.2426 ; 28.3934 ; 28.6019 ; 28.8942 ; 29.311 ; 29.8939 ; 30.5725 ; 30.8318]

Bolt 1 - Tensile Force (kips): [63.2329 ; 63.1422 ; 63.0963 ; 63.0308 ; 62.9397 ; 62.8154 ; 62.6484 ; 62.4568 ; 62.2862 ; 62.1886 ; 62.1212 ; 62.0048 ; 61.9593 ; 61.8972 ; 61.8212 ; 61.7375 ; 61.6489 ; 61.5359 ; 61.4912 ; 61.4694 ; 61.4472 ; 61.4223 ; 61.3832 ; 61.3202 ; 61.2028 ; 61.1394 ; 61.0088 ; 60.7646 ; 60.3623 ; 59.6879 ; 58.9969 ; 58.8141 ; 58.5541 ; 58.1765 ; 57.6126 ; 56.7678 ; 55.6838 ; 55.2326]

Bolt 1 - Shear Force (kips): [0.11763 ; 0.081273 ; 0.12192 ; 0.19668 ; 0.30769 ; 0.46246 ; 0.66983 ; 0.90574 ; 1.1185 ; 1.2511 ; 1.3559 ; 1.5336 ; 1.6012 ; 1.6944 ; 1.8121 ; 1.9493 ; 2.1049 ; 2.3066 ; 2.3799 ; 2.4133 ; 2.4471 ; 2.4842 ; 2.5422 ; 2.6354 ; 2.8047 ; 2.8928 ; 3.0735 ; 3.4009 ; 3.9137 ; 4.7093 ; 5.4689 ; 5.662 ; 5.9333 ; 6.3211 ; 6.8862 ; 7.6986 ; 8.6906 ; 9.0866]

Bolt 2 - Tensile Force (kips): [63.2176 ; 63.1041 ; 63.0352 ; 62.9277 ; 62.7899 ; 62.623 ; 62.4412 ; 62.2923 ; 62.2182 ; 62.1989 ; 62.1934 ; 62.2221 ; 62.2287 ; 62.2527 ; 62.3497 ; 62.5979 ; 62.9812 ; 63.8498 ; 64.0996 ; 64.1895 ; 64.277 ; 64.3578 ; 64.4711 ; 64.6322 ; 64.8294 ; 64.8789 ; 64.9137 ; 64.9158 ; 64.8895 ; 64.8462 ; 64.8245 ; 64.8106 ; 64.7983 ; 64.7876 ; 64.7706 ; 64.7597 ; 64.7967 ; 64.8203]

Bolt 2 - Shear Force (kips): [0.082744 ; 0.099759 ; 0.18886 ; 0.30994 ; 0.47774 ; 0.7058 ; 1.0021 ; 1.3278 ; 1.6245 ; 1.8109 ; 1.9627 ; 2.2446 ; 2.3535 ; 2.5054 ; 2.6987 ; 2.9087 ; 3.1042 ; 3.3111 ; 3.3811 ; 3.4117 ; 3.4425 ; 3.476 ; 3.5282 ; 3.6111 ; 3.7597 ; 3.8346 ; 3.9821 ; 4.2434 ; 4.6394 ; 5.1816 ; 5.6653 ; 5.7881 ; 5.9563 ; 6.1903 ; 6.5242 ; 6.9837 ; 7.5161 ; 7.7245]

Bolt 3 - Tensile Force (kips): [65 ; 64.8884 ; 64.786 ; 64.6712 ; 64.5444 ; 64.4124 ; 64.2304 ; 63.9843 ; 63.7124 ; 63.5457 ; 63.6469 ; 63.92 ; 64.0041 ; 64.2007 ; 64.6205 ; 65.3662 ; 66.8676 ; 69.4733 ; 70.1903 ; 70.4013 ; 70.5857 ; 70.7517 ; 70.9657 ; 71.2192 ; 71.6127 ; 71.7998 ; 72.0562 ; 72.3874 ; 73.0194 ; 73.9088 ; 74.8036 ; 75.0757 ; 75.4154 ; 75.8777 ; 76.5856 ; 77.7073 ; 79.1434 ; 79.7111]

Bolt 3 - Shear Force (kips): [0.0666472 ; 0.0291917 ; 0.038807 ; 0.0756175 ; 0.139059 ; 0.233792 ; 0.365832 ; 0.498049 ; 0.611235 ; 0.714182 ; 0.852163 ; 1.04204 ; 1.07435 ; 1.11355 ; 1.18151 ; 1.30697 ; 2.24064 ; 4.09184 ; 3.81151 ; 3.20693 ; 2.82939 ; 2.79706 ; 3.10585 ; 3.61844 ; 4.16007 ; 3.99244 ; 3.9101 ; 4.21328 ; 4.00866 ; 5.15918 ; 6.28043 ; 6.53701 ; 6.91125 ; 7.41541 ; 8.04423 ; 8.96182 ; 9.70804 ; 10.0819]

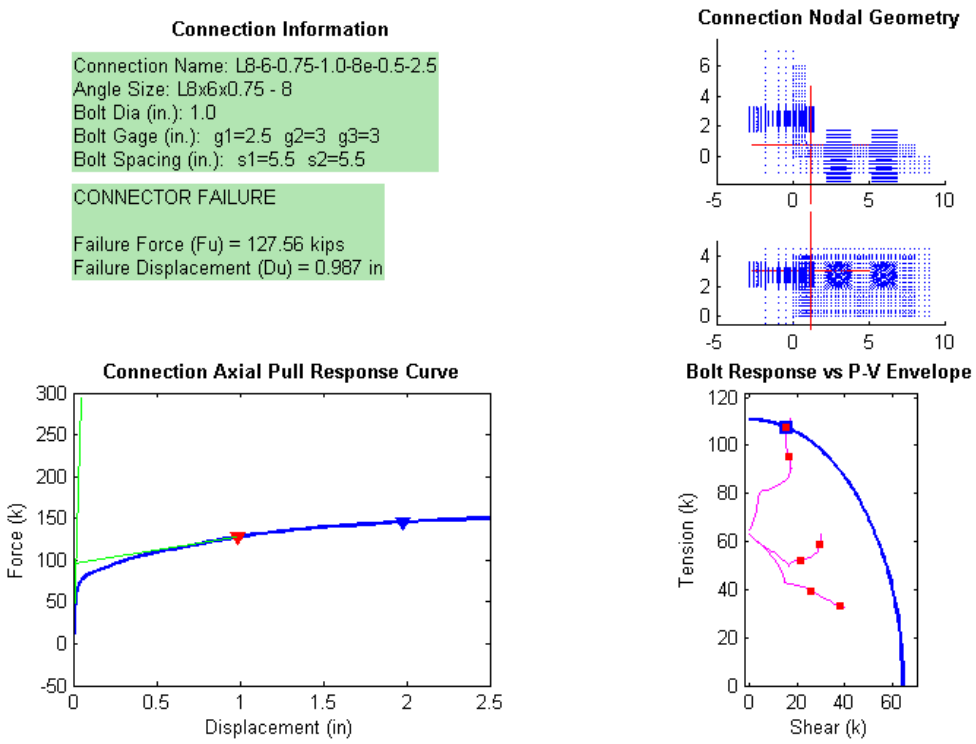


Figure B.268 Connection L8_6_0.75_1.0_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_1.0_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 5.7707e+003

Plastic Stiffness (k/in): 32.6840

Displacement (in): [9.9178e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.026611 ; 0.036499 ; 0.051331 ; 0.073578 ; 0.10695 ; 0.15701 ; 0.17578 ; 0.20393 ; 0.24617 ; 0.26201 ; 0.28576 ; 0.29467 ; 0.30804 ; 0.31305 ; 0.32056 ; 0.33184 ; 0.34875 ; 0.35509 ; 0.36461 ; 0.37888 ; 0.40029 ; 0.40831 ; 0.42035 ; 0.43841 ; 0.46551 ; 0.50614 ; 0.5671 ; 0.58996 ; 0.59853 ; 0.61139 ; 0.61621 ; 0.61802 ; 0.62073 ; 0.6248 ; 0.6309 ; 0.64005 ; 0.65378 ; 0.67438 ; 0.6821 ; 0.69369 ; 0.71107 ; 0.73713 ; 0.74691 ; 0.76157 ; 0.78356 ; 0.81656 ; 0.82893 ; 0.84748 ; 0.87532 ; 0.91707 ; 0.9797 ; 1.0032 ; 1.0384 ; 1.0913 ; 1.1111 ; 1.1408 ; 1.1854 ; 1.2523 ; 1.3526 ; 1.5031 ; 1.5595 ; 1.6442 ; 1.7711 ; 1.9616 ; 2.0241 ; 2.1178 ; 2.2585 ; 2.4694 ; 2.5]

Force (kips): [-2.47552 ; 4.07376 ; 8.79535 ; 14.4393 ; 21.0043 ; 25.8544 ; 29.3858 ; 32.9762 ; 36.0947 ; 38.2217 ; 39.9741 ; 41.9621 ; 44.3537 ; 45.153 ; 46.237 ; 47.6657 ; 48.1626 ; 48.8685 ; 49.1238 ; 49.5492 ; 49.6949 ; 49.9546 ; 50.3266 ; 50.878 ; 51.0794 ; 51.3597 ; 51.7544 ; 52.3168 ; 52.5332 ; 52.848 ; 53.289 ; 53.925 ; 54.8062 ; 55.9773 ; 56.3256 ; 56.4884 ; 56.6819 ; 56.6828 ; 56.6625 ; 56.7208 ; 56.8202 ; 56.9613 ; 57.1544 ; 57.4505 ; 57.8648 ; 58.0283 ; 58.276 ; 58.6598 ; 59.1929 ; 59.4023 ; 59.7238 ; 60.1725 ; 60.8175 ; 61.055 ; 61.3975 ; 61.9136 ; 62.648 ; 63.6715 ; 64.0306 ; 64.55 ; 65.2979 ; 65.5638 ; 65.9456 ; 66.4892 ; 67.243 ; 68.2736 ; 69.6129 ; 70.0666 ; 70.7 ; 71.556 ; 72.6583 ; 72.981 ; 73.4382 ; 74.0774 ; 74.902 ; 75.0114]

Bolt 1 - Tensile Force (kips): [63.3105 ; 63.0231 ; 62.8005 ; 62.5166 ; 62.1586 ; 61.8704 ; 61.6432 ; 61.3919 ; 61.1243 ; 60.7529 ; 59.6083 ; 57.7813 ; 55.051 ; 54.0106 ; 52.4374 ; 50.0529 ; 49.1404 ; 47.7841 ; 47.2889 ; 46.5502 ; 46.282 ; 45.8801 ; 45.3128 ; 44.5894 ; 44.3977 ; 44.2942 ; 44.1819 ; 44.0692 ; 44.0326 ; 43.9865 ; 43.9297 ; 43.8587 ; 43.7638 ; 43.4355 ; 43.1988 ; 43.1495 ; 43.0808 ; 43.0539 ; 43.047 ; 43.0335 ; 43.0008 ; 42.9565 ; 42.9152 ; 42.8307 ; 42.7211 ; 42.6545 ; 42.5517 ; 42.4022 ; 42.2563 ; 42.1846 ; 42.0415 ; 41.85 ; 41.5204 ; 41.3617 ; 41.1464 ; 40.8801 ; 40.4703 ; 39.6679 ; 39.3138 ; 38.7991 ; 38.0394 ; 37.8079 ; 37.4988 ; 37.0815 ; 36.5166 ; 35.6797 ; 34.7672 ; 34.4323 ; 34.055 ; 33.6839 ; 33.2466 ; 33.1212 ; 32.9345 ; 32.7124 ; 32.4234 ; 32.3724]

Bolt 1 - Shear Force (kips): [0.112433 ; 0.272375 ; 0.537552 ; 0.869806 ; 1.27612 ; 1.59248 ; 1.83613 ; 2.10033 ; 2.38155 ; 2.79618 ; 4.16313 ; 6.03458 ; 8.45908 ; 9.29955 ; 10.4943 ; 12.0909 ; 12.6215 ; 13.3263 ; 13.5554 ; 13.8693 ; 13.9749 ; 14.1217 ; 14.3058 ; 14.4952 ; 14.5325 ; 14.5377 ; 14.5357 ; 14.5232 ; 14.5168 ; 14.5069 ; 14.4923 ; 14.4713 ; 14.4412 ; 14.6005 ; 14.6257 ; 14.6182 ; 14.6029 ; 14.5952 ; 14.5927 ; 14.6309 ; 14.7855 ; 14.9934 ; 15.1746 ; 15.5536 ; 15.9581 ; 16.2497 ; 16.6731 ; 17.4081 ; 18.1614 ; 18.4915 ; 19.0895 ; 19.8161 ; 20.983 ; 21.493 ; 22.1305 ; 22.8819 ; 23.8605 ; 25.5383 ; 26.2184 ; 27.2041 ; 28.5948 ; 29.0028 ; 29.5355 ; 30.2357 ; 31.2249 ; 32.7854 ; 34.369 ; 34.9847 ; 35.7587 ; 36.7014 ; 37.9061 ; 38.232 ; 38.6654 ; 39.1661 ; 39.8456 ; 39.9503]

Bolt 2 - Tensile Force (kips): [63.3112 ; 62.9511 ; 62.6525 ; 62.2796 ; 61.8109 ; 61.4618 ; 61.2225 ; 60.9903 ; 60.724 ; 60.2309 ; 59.1202 ; 57.6084 ; 56.2958 ; 55.9613 ; 55.6473 ; 55.1186 ; 54.8858 ; 54.5277 ; 54.3859 ; 54.1581 ; 54.0765 ; 53.94 ; 53.7479 ; 53.4672 ; 53.3604 ; 53.2118 ; 53.0036 ; 52.716 ; 52.6109 ; 52.4613 ; 52.2425 ; 51.9077 ; 51.4441 ; 50.8311 ; 50.1834 ; 50.0317 ; 49.7669 ; 49.5908 ; 49.5258 ; 49.5635 ; 49.6199 ; 49.695 ; 49.8085 ; 50.0062 ; 50.3103 ; 50.4089 ; 50.568 ; 50.7794 ; 51.0135 ; 51.0629 ; 51.1436 ; 51.2831 ; 51.5326 ; 51.6301 ; 51.731 ; 51.8198 ; 51.8999 ; 52.1805 ; 52.3226 ; 52.5044 ; 52.7096 ; 52.7555 ; 52.8659 ; 53.0436 ; 53.3657 ; 53.9733 ; 55.0023 ; 55.429 ; 56.0946 ; 57.0993 ; 58.6048 ; 59.0897 ; 59.8685 ; 61.1511 ; 62.8466 ; 63.0845]

Bolt 2 - Shear Force (kips): [0.143957 ; 0.301333 ; 0.608535 ; 0.993189 ; 1.45965 ; 1.81932 ; 2.09791 ; 2.41363 ; 2.79115 ; 3.36927 ; 4.78416 ; 6.54479 ; 8.54727 ; 9.15436 ; 9.88544 ; 10.8336 ; 11.1735 ; 11.6583 ; 11.8376 ; 12.1092 ; 12.2085 ; 12.3625 ; 12.5863 ; 12.9101 ; 13.0292 ; 13.1987 ; 13.4384 ; 13.7709 ; 13.8881 ; 14.0573 ; 14.3006 ; 14.6515 ; 15.127 ; 15.7449 ; 16.158 ; 16.3991 ; 16.6593 ; 16.699 ; 16.6968 ; 16.7122 ; 16.726 ; 16.7442 ; 16.7722 ; 16.8245 ; 16.9067 ; 16.9332 ; 16.9801 ; 17.0411 ; 17.4038 ; 17.5969 ; 17.8016 ; 18.068 ; 18.3688 ; 18.4461 ; 18.7009 ; 19.2816 ; 20.2962 ; 21.3798 ; 21.6748 ; 22.151 ; 22.9933 ; 23.3884 ; 23.9321 ; 24.7121 ; 25.6646 ; 26.5724 ; 27.7592 ; 28.0747 ; 28.4711 ; 28.9279 ; 29.4549 ; 29.6118 ; 29.7818 ; 29.8818 ; 30.0025 ; 30.0171]

Bolt 3 - Tensile Force (kips): [65 ; 64.8415 ; 64.8077 ; 64.9172 ; 65.1505 ; 65.4503 ; 65.9051 ; 66.8035 ; 67.7528 ; 68.661 ; 69.6368 ; 70.9494 ; 72.9217 ; 73.653 ; 74.7309 ; 76.3045 ; 76.8753 ; 77.7189 ; 78.0291 ; 78.448 ; 78.6002 ; 78.8239 ; 79.1463 ; 79.6187 ; 79.8035 ; 80.0769 ; 80.4807 ; 81.0794 ; 81.3076 ; 81.6417 ; 82.1448 ; 82.9124 ; 84.1035 ; 85.8389 ; 86.3737 ; 86.5993 ; 86.8763 ; 86.8852 ; 86.8656 ; 86.9353 ; 87.063 ; 87.2484 ; 87.5133 ; 87.9128 ; 88.4967 ; 88.7187 ; 89.0509 ; 89.5627 ; 90.2517 ; 90.4933 ; 90.867 ; 91.3765 ; 92.1018 ; 92.3567 ; 92.7121 ; 93.265 ; 94.0758 ; 95.4413 ; 95.9072 ; 96.5601 ; 97.5938 ; 97.9361 ; 98.4072 ; 99.0719 ; 100.075 ; 101.455 ; 103.255 ; 103.865 ; 104.719 ; 105.917 ; 107.429 ; 107.858 ; 108.552 ; 109.696 ; 111.029 ; 111.206]

Bolt 3 - Shear Force (kips): [0.0708465 ; 0.0635547 ; 0.162574 ; 0.314099 ; 0.526379 ; 0.730568 ; 0.922146 ; 1.17331 ; 1.46274 ; 1.74704 ; 2.05663 ; 2.45093 ; 2.96863 ; 3.13912 ; 3.35882 ; 3.62509 ; 3.71307 ; 3.83297 ; 3.87566 ; 3.9703 ; 3.99971 ; 4.06397 ; 4.15161 ; 4.31735 ; 4.38701 ; 4.47639 ; 4.77263 ; 6.04625 ; 6.78141 ; 7.88837 ; 9.10834 ; 10.853 ; 13.0637 ; 15.0759 ; 15.7734 ; 16.0492 ; 16.244 ; 16.2653 ; 16.2599 ; 16.2947 ; 16.3507 ; 16.4449 ; 16.5997 ; 16.8295 ; 17.1536 ; 17.2652 ; 17.3838 ; 17.354 ; 17.4632 ; 17.5011 ; 17.3306 ; 17.2889 ; 17.2262 ; 17.1636 ; 17.1181 ; 16.9957 ; 16.9578 ; 16.4826 ; 16.2685 ; 16.1659 ; 15.9481 ; 15.8592 ; 15.7312 ; 15.6195 ; 15.561 ; 15.5277 ; 15.4147 ; 15.3723 ; 15.3466 ; 15.4094 ; 15.4636 ; 15.4711 ; 15.6808 ; 16.4871 ; 16.9909 ; 17.0138]

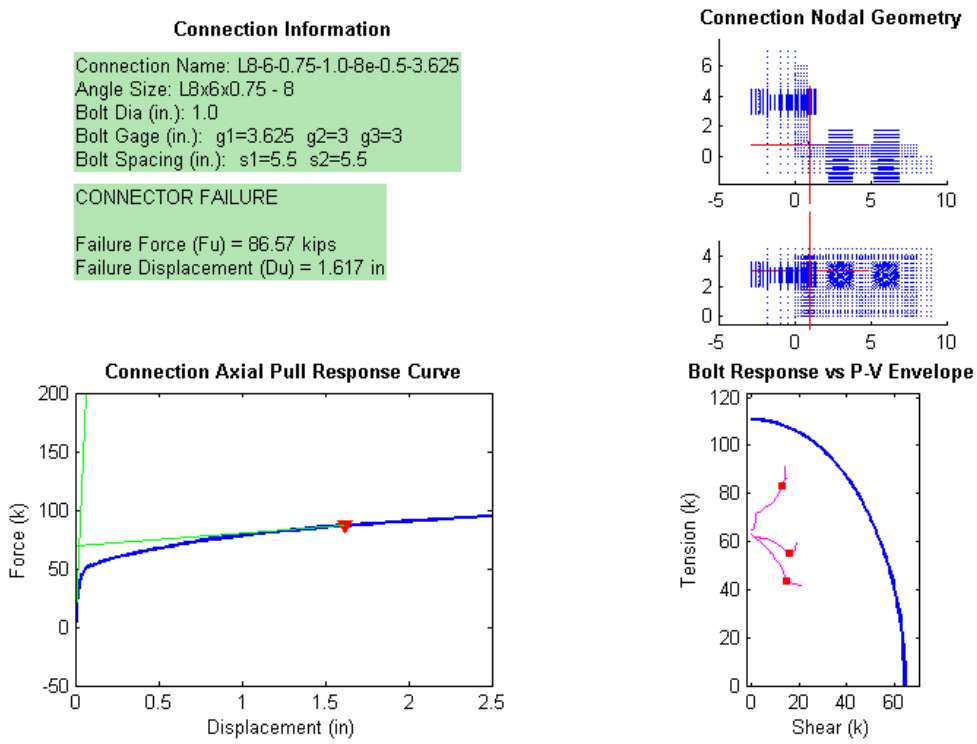


Figure B.269 Connection L8_6_0.75_1.0_8e_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_1.0_8e_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 2.9503e+003

Plastic Stiffness (k/in): 10.8392

Displacement (in): [9.3472e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.25146 ; 0.29369 ; 0.35705 ; 0.45208 ; 0.48771 ; 0.50107 ; 0.52112 ; 0.55119 ; 0.58125 ; 0.61132 ; 0.6226 ; 0.63951 ; 0.66488 ; 0.70293 ; 0.76002 ; 0.84564 ; 0.97407 ; 1.1667 ; 1.4167 ; 1.4792 ; 1.5027 ; 1.5378 ; 1.5905 ; 1.6103 ; 1.64 ; 1.6845 ; 1.7012 ; 1.7262 ; 1.7637 ; 1.8201 ; 1.9045 ; 1.9362 ; 1.9837 ; 2.0015 ; 2.0082 ; 2.0182 ; 2.0333 ; 2.0558 ; 2.0896 ; 2.1404 ; 2.2165 ; 2.3307 ; 2.5]

Force (kips): [-2.33606 ; 1.17588 ; 3.42623 ; 6.27951 ; 9.84321 ; 14.1967 ; 18.7894 ; 22.6575 ; 24.8765 ; 26.4333 ; 27.7187 ; 29.2418 ; 29.7752 ; 30.5143 ; 31.5201 ; 32.8146 ; 33.2629 ; 33.4533 ; 33.7259 ; 34.1528 ; 34.5452 ; 34.9626 ; 35.1085 ; 35.3429 ; 35.709 ; 36.2082 ; 36.9067 ; 37.8034 ; 39.0111 ; 40.5227 ; 42.1693 ; 42.5389 ; 42.6706 ; 42.8647 ; 43.1406 ; 43.2478 ; 43.4069 ; 43.6303 ; 43.7138 ; 43.8433 ; 44.0348 ; 44.3049 ; 44.7075 ; 44.8606 ; 45.0839 ; 45.1663 ; 45.2012 ; 45.2552 ; 45.333 ; 45.4452 ; 45.6117 ; 45.8443 ; 46.1743 ; 46.6347 ; 47.2524]

Bolt 1 - Tensile Force (kips): [63.3043 ; 63.1512 ; 63.0443 ; 62.9025 ; 62.7152 ; 62.4673 ; 62.1755 ; 61.8883 ; 61.6582 ; 61.4092 ; 61.2035 ; 60.9307 ; 60.7639 ; 60.2016 ; 59.3201 ; 58.0509 ; 57.5703 ; 57.3611 ; 57.0464 ; 56.5239 ; 56.0087 ; 55.4288 ; 55.2168 ; 54.8709 ; 54.3079 ; 53.4844 ; 52.2544 ; 50.388 ; 47.2744 ; 44.3674 ; 43.97 ; 43.8892 ; 43.8608 ; 43.7389 ; 43.5942 ; 43.551 ; 43.5026 ; 43.4505 ; 43.433 ; 43.4057 ; 43.3659 ; 43.3156 ; 43.1581 ; 43.0785 ; 42.9573 ; 42.9141 ; 42.8868 ; 42.8465 ; 42.7884 ; 42.7091 ; 42.5901 ; 42.457 ; 42.2848 ; 42.0365 ; 41.7085]

Bolt 1 - Shear Force (kips): [0.104135 ; 0.126572 ; 0.249953 ; 0.419962 ; 0.644398 ; 0.937145 ; 1.27529 ; 1.60113 ; 1.86508 ; 2.15569 ; 2.39704 ; 2.71974 ; 2.9206 ; 3.61532 ; 4.61445 ; 5.90642 ; 6.36783 ; 6.56469 ; 6.85614 ; 7.32952 ; 7.78458 ; 8.28351 ; 8.4623 ; 8.74957 ; 9.20661 ; 9.85441 ; 10.7669 ; 12.0126 ; 13.6662 ; 14.5753 ; 14.5052 ; 14.4814 ; 14.4726 ; 14.5351 ; 14.5465 ; 14.5407 ; 14.5287 ; 14.5088 ; 14.5009 ; 14.4878 ; 14.4676 ; 14.4397 ; 14.9143 ; 15.2413 ; 15.718 ; 15.8675 ; 15.9898 ; 16.1665 ; 16.4055 ; 16.739 ; 17.3333 ; 18.0212 ; 18.8503 ; 19.7951 ; 20.9089]

Bolt 2 - Tensile Force (kips): [63.2892 ; 63.1014 ; 62.9571 ; 62.7713 ; 62.5452 ; 62.2696 ; 62.0271 ; 61.898 ; 61.8387 ; 61.7076 ; 61.5901 ; 61.5304 ; 61.5697 ; 61.4236 ; 61.2626 ; 61.2123 ; 61.1639 ; 61.1247 ; 61.0656 ; 60.9581 ; 60.8632 ; 60.7143 ; 60.6644 ; 60.5694 ; 60.3991 ; 60.1712 ; 59.8743 ; 59.4585 ; 58.6889 ; 57.3459 ; 55.9698 ; 55.6665 ; 55.5624 ; 55.4281 ; 55.2361 ; 55.1543 ; 55.0536 ; 54.9614 ; 54.9331 ; 54.894 ; 54.8651 ; 55.0069 ; 55.4941 ; 55.6874 ; 55.9892 ; 56.1082 ; 56.1451 ; 56.2003 ; 56.2852 ; 56.4147 ; 56.5972 ; 56.8893 ; 57.3581 ; 58.0965 ; 59.2355]

Bolt 2 - Shear Force (kips): [0.135927 ; 0.135704 ; 0.277253 ; 0.473931 ; 0.733272 ; 1.06583 ; 1.43978 ; 1.82147 ; 2.217 ; 2.69654 ; 3.07209 ; 3.48006 ; 3.68296 ; 4.29771 ; 5.13606 ; 6.15369 ; 6.4985 ; 6.64423 ; 6.85288 ; 7.16006 ; 7.4392 ; 7.74692 ; 7.85523 ; 8.03113 ; 8.31233 ; 8.69887 ; 9.23022 ; 9.95456 ; 11.1149 ; 12.9246 ; 14.7094 ; 15.0963 ; 15.2319 ; 15.4168 ; 15.6877 ; 15.879 ; 16.1902 ; 16.5257 ; 16.6657 ; 16.9371 ; 17.3365 ; 17.7403 ; 18.0073 ; 18.0809 ; 18.1744 ; 18.2146 ; 18.2258 ; 18.2421 ; 18.2668 ; 18.3025 ; 18.3473 ; 18.418 ; 18.5189 ; 18.6577 ; 18.7876]

Bolt 3 - Tensile Force (kips): [65 ; 64.8414 ; 64.7265 ; 64.6318 ; 64.6102 ; 64.6194 ; 64.6383 ; 64.7838 ; 64.9659 ; 65.2358 ; 65.9663 ; 67.0173 ; 67.3846 ; 67.9944 ; 69.0306 ; 70.6476 ; 71.238 ; 71.4301 ; 71.7124 ; 72.1307 ; 72.5144 ; 72.9028 ; 73.0132 ; 73.2158 ; 73.564 ; 73.9557 ; 74.5609 ; 75.2991 ; 76.5066 ; 78.6151 ; 81.4441 ; 82.1307 ; 82.3484 ; 82.6518 ; 83.0906 ; 83.2576 ; 83.5074 ; 83.8686 ; 84.0048 ; 84.2129 ; 84.5284 ; 84.9905 ; 85.6669 ; 85.9159 ; 86.289 ; 86.4276 ; 86.4876 ; 86.5937 ; 86.7495 ; 86.9866 ; 87.3576 ; 87.9049 ; 88.6916 ; 89.8196 ; 91.2442]

Bolt 3 - Shear Force (kips): [0.0877197 ; 0.0246879 ; 0.0591462 ; 0.129952 ; 0.240823 ; 0.402988 ; 0.59602 ; 0.795333 ; 1.03614 ; 1.2763 ; 1.37778 ; 1.49093 ; 1.55991 ; 1.65691 ; 1.78181 ; 1.92732 ; 1.98223 ; 2.04907 ; 2.14568 ; 2.40134 ; 3.48026 ; 4.24747 ; 4.45686 ; 5.06755 ; 5.21731 ; 5.89395 ; 6.80081 ; 7.86111 ; 9.23171 ; 10.6556 ; 12.0441 ; 12.2812 ; 12.3947 ; 12.5766 ; 12.8317 ; 12.9231 ; 13.0538 ; 13.2369 ; 13.3038 ; 13.3811 ; 13.4953 ; 13.6831 ; 14.0095 ; 14.1504 ; 14.3586 ; 14.4564 ; 14.4584 ; 14.3901 ; 14.3365 ; 14.3047 ; 14.3075 ; 14.3728 ; 14.4231 ; 14.3611 ; 14.3362]

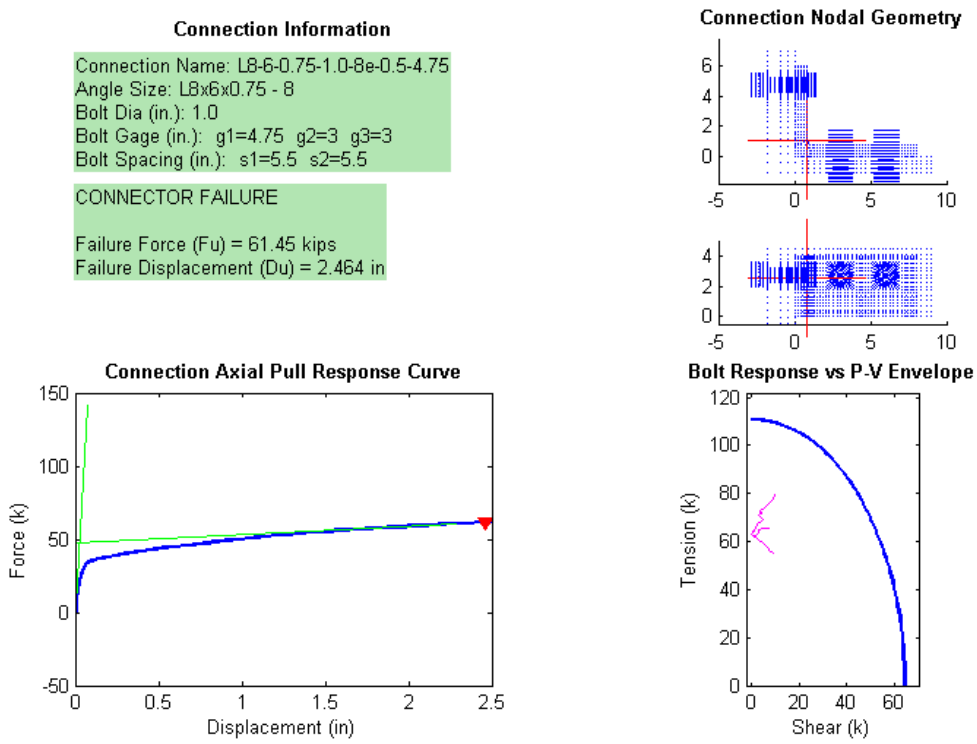


Figure B.270 Connection L8_6_0.75_1.0_8e_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_0.75_1.0_8e_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.8758e+003

Plastic Stiffness (k/in): 5.6971

Displacement (in): [8.9069e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.16699 ; 0.19514 ; 0.23738 ; 0.30073 ; 0.39576 ; 0.53831 ; 0.59176 ; 0.67194 ; 0.79221 ; 0.83731 ; 0.85423 ; 0.8796 ; 0.91765 ; 0.97473 ; 1.0603 ; 1.0925 ; 1.1406 ; 1.2129 ; 1.24 ; 1.2806 ; 1.3416 ; 1.433 ; 1.4673 ; 1.5187 ; 1.5959 ; 1.7116 ; 1.755 ; 1.8201 ; 1.9177 ; 2.0642 ; 2.2839 ; 2.5]

Force (kips): [-2.22415 ; 0.323777 ; 1.43961 ; 2.9411 ; 4.93646 ; 7.5116 ; 10.6756 ; 13.9045 ; 16.3906 ; 17.6087 ; 18.3277 ; 18.5747 ; 18.9257 ; 19.4013 ; 20.0321 ; 20.902 ; 22.0446 ; 22.4412 ; 22.9842 ; 23.7325 ; 24.0344 ; 24.1553 ; 24.3403 ; 24.608 ; 24.989 ; 25.4904 ; 25.665 ; 25.9275 ; 26.2899 ; 26.4263 ; 26.6364 ; 26.9301 ; 27.3413 ; 27.4931 ; 27.7146 ; 28.0231 ; 28.4674 ; 28.6277 ; 28.8539 ; 29.1782 ; 29.6434 ; 30.2692 ; 30.8195]

Bolt 1 - Tensile Force (kips): [63.3053 ; 63.1947 ; 63.1418 ; 63.0666 ; 62.9625 ; 62.8204 ; 62.6303 ; 62.4103 ; 62.2109 ; 62.0931 ; 62.0198 ; 61.9892 ; 61.9408 ; 61.8705 ; 61.7934 ; 61.7076 ; 61.6 ; 61.5637 ; 61.5178 ; 61.4501 ; 61.4141 ; 61.3981 ; 61.3716 ; 61.3295 ; 61.2615 ; 61.1555 ; 61.1121 ; 61.035 ; 60.8392 ; 60.7315 ; 60.5653 ; 60.3273 ; 59.9568 ; 59.8082 ; 59.5756 ; 59.2188 ; 58.6604 ; 58.4515 ; 58.1451 ; 57.6903 ; 57.0094 ; 56.0102 ; 55.0625]

Bolt 1 - Shear Force (kips): [0.099597 ; 0.088089 ; 0.14383 ; 0.23192 ; 0.35769 ; 0.5306 ; 0.76145 ; 1.0271 ; 1.2677 ; 1.4186 ; 1.5252 ; 1.5689 ; 1.6369 ; 1.7341 ; 1.8423 ; 1.9708 ; 2.1373 ; 2.194 ; 2.2693 ; 2.379 ; 2.4314 ; 2.4538 ; 2.49 ; 2.5466 ; 2.6375 ; 2.7805 ; 2.8385 ; 2.9407 ; 3.2 ; 3.3395 ; 3.5505 ; 3.8464 ; 4.2889 ; 4.4604 ; 4.7219 ; 5.1115 ; 5.6953 ; 5.9085 ; 6.2161 ; 6.6632 ; 7.3115 ; 8.2258 ; 9.0522]

Bolt 2 - Tensile Force (kips): [63.2918 ; 63.1527 ; 63.0864 ; 62.9819 ; 62.8481 ; 62.6862 ; 62.5016 ; 62.3712 ; 62.3427 ; 62.3576 ; 62.3594 ; 62.3614 ; 62.3685 ; 62.4023 ; 62.5282 ; 62.6974 ; 63.0375 ; 63.2125 ; 63.4858 ; 63.9201 ; 64.0868 ; 64.1503 ; 64.2446 ; 64.3875 ; 64.5934 ; 64.8563 ; 64.9439 ; 65.0574 ; 65.1617 ; 65.1766 ; 65.1937 ; 65.2217 ; 65.2557 ; 65.266 ; 65.2881 ; 65.3276 ; 65.3736 ; 65.3883 ; 65.4112 ; 65.4488 ; 65.508 ; 65.6188 ; 65.7334]

Bolt 2 - Shear Force (kips): [0.13059 ; 0.090973 ; 0.15648 ; 0.25807 ; 0.40307 ; 0.60133 ; 0.86017 ; 1.146 ; 1.4176 ; 1.6125 ; 1.7645 ; 1.8298 ; 1.9369 ; 2.0955 ; 2.2837 ; 2.5151 ; 2.762 ; 2.8342 ; 2.9248 ; 3.0422 ; 3.0922 ; 3.1129 ; 3.1457 ; 3.1953 ; 3.2726 ; 3.3958 ; 3.4455 ; 3.532 ; 3.7387 ; 3.8475 ; 4.0111 ; 4.2379 ; 4.5689 ; 4.6952 ; 4.871 ; 5.1118 ; 5.4627 ; 5.5895 ; 5.7695 ; 6.0247 ; 6.3844 ; 6.867 ; 7.2895]

Bolt 3 - Tensile Force (kips): [65 ; 64.8923 ; 64.7868 ; 64.6726 ; 64.5452 ; 64.4133 ; 64.2415 ; 64.0149 ; 63.7775 ; 63.6335 ; 63.7336 ; 63.7572 ; 63.8259 ; 63.9723 ; 64.281 ; 64.9833 ; 66.4174 ; 67.0649 ; 67.9504 ; 69.3525 ; 69.8415 ; 70.0089 ; 70.2283 ; 70.5303 ; 70.9073 ; 71.3366 ; 71.4816 ; 71.7739 ; 72.1897 ; 72.3093 ; 72.5638 ; 72.9181 ; 73.427 ; 73.6285 ; 73.9392 ; 74.3792 ; 75.084 ; 75.3585 ; 75.7293 ; 76.2766 ; 77.1481 ; 78.4188 ; 79.6528]

Bolt 3 - Shear Force (kips): [0.0817137 ; 0.0383791 ; 0.032206 ; 0.0626221 ; 0.119872 ; 0.207821 ; 0.332398 ; 0.45683 ; 0.566432 ; 0.677917 ; 0.815975 ; 0.876747 ; 0.970344 ; 1.03524 ; 1.0932 ; 1.19393 ; 1.71866 ; 2.52955 ; 3.47644 ; 4.79121 ; 4.58877 ; 4.34996 ; 3.76331 ; 3.09932 ; 3.21575 ; 3.93041 ; 4.18262 ; 3.99963 ; 3.97733 ; 4.14451 ; 3.81978 ; 3.87712 ; 4.64001 ; 4.95833 ; 5.40048 ; 5.94552 ; 6.72703 ; 7.00965 ; 7.39474 ; 7.86627 ; 8.64637 ; 9.41598 ; 10.096]

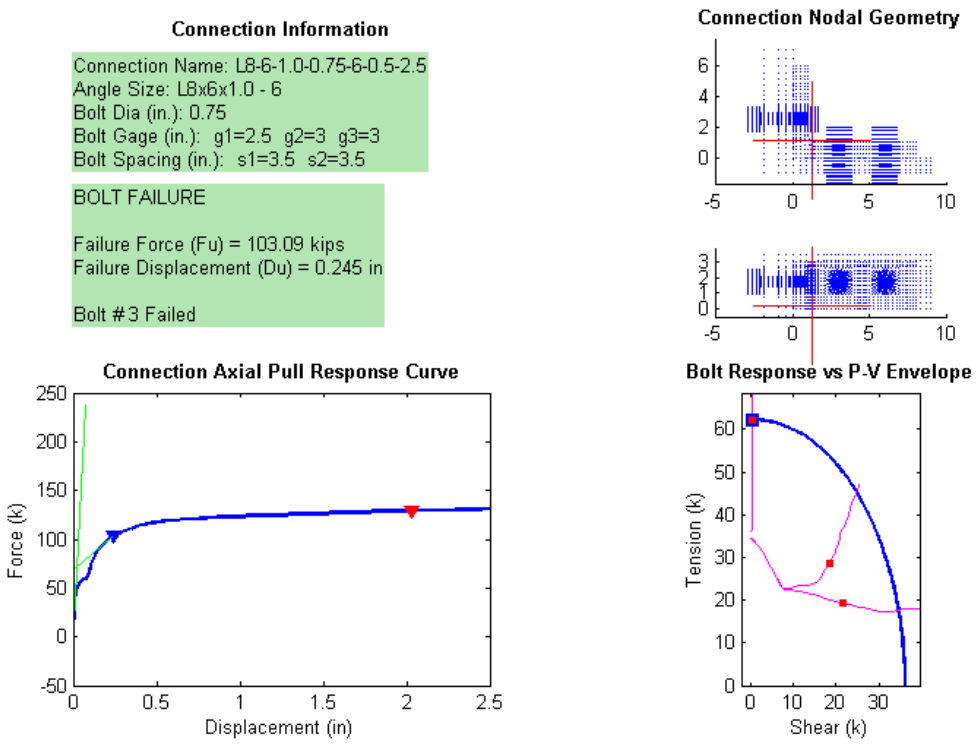


Figure B.271 Connection L8_6_1.0_0.75_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.75_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.2023e+003

Plastic Stiffness (k/in): 141.9419

Displacement (in): [2.513e-036 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.035156 ; 0.052734 ; 0.059326 ; 0.069214 ; 0.072922 ; 0.078484 ; 0.080569 ; 0.083698 ; 0.088391 ; 0.09543 ; 0.09807 ; 0.10203 ; 0.10797 ; 0.11688 ; 0.13024 ; 0.13525 ; 0.14277 ; 0.15404 ; 0.17096 ; 0.19633 ; 0.23438 ; 0.29146 ; 0.31287 ; 0.3209 ; 0.33294 ; 0.351 ; 0.37809 ; 0.41873 ; 0.47968 ; 0.57112 ; 0.70827 ; 0.914 ; 1.164 ; 1.414 ; 1.664 ; 1.914 ; 2.164 ; 2.414 ; 2.5]

Force (kips): [-0.837519 ; 18.2199 ; 24.1804 ; 25.5889 ; 27.3732 ; 29.249 ; 29.4543 ; 29.4771 ; 30.0344 ; 30.0348 ; 30.0331 ; 30.0606 ; 31.7116 ; 33.4213 ; 34.019 ; 35.0912 ; 36.6963 ; 38.8815 ; 41.3762 ; 42.1819 ; 43.2644 ; 44.6162 ; 46.2265 ; 48.36 ; 51.0608 ; 53.6937 ; 54.4181 ; 54.6808 ; 55.0617 ; 55.6056 ; 56.3773 ; 57.4032 ; 58.6014 ; 59.5913 ; 60.4234 ; 61.3573 ; 62.2595 ; 63.0276 ; 63.7084 ; 64.3189 ; 64.8646 ; 65.3544 ; 65.511]

Bolt 1 - Tensile Force (kips): [34.5283 ; 33.9572 ; 32.8929 ; 30.8913 ; 27.7099 ; 23.2247 ; 22.6823 ; 22.6539 ; 22.4166 ; 22.4103 ; 22.4089 ; 22.4063 ; 22.3438 ; 22.32 ; 22.2874 ; 22.2469 ; 22.1397 ; 21.8628 ; 21.5419 ; 21.3476 ; 21.1599 ; 20.9429 ; 20.5316 ; 19.9132 ; 19.4213 ; 18.8633 ; 18.7767 ; 18.7062 ; 18.6009 ; 18.4815 ; 18.3063 ; 17.9959 ; 17.723 ; 17.3834 ; 17.197 ; 17.3838 ; 17.6525 ; 17.836 ; 17.9323 ; 17.93 ; 18.0026 ; 18.1838 ; 18.2874]

Bolt 1 - Shear Force (kips): [0.0471331 ; 0.644653 ; 1.53943 ; 2.89846 ; 4.82484 ; 7.20986 ; 7.48334 ; 7.51115 ; 7.82656 ; 7.82834 ; 7.82803 ; 7.84729 ; 8.65224 ; 9.46405 ; 9.79652 ; 10.3281 ; 11.5364 ; 12.7579 ; 14.1317 ; 14.7728 ; 15.3528 ; 16.0292 ; 17.1629 ; 18.9468 ; 20.9827 ; 23.2533 ; 23.9144 ; 24.1957 ; 24.5977 ; 25.1387 ; 26.0004 ; 27.3106 ; 28.7605 ; 30.2079 ; 31.6922 ; 33.1793 ; 34.7505 ; 36.0186 ; 37.1137 ; 38.1879 ; 39.1777 ; 40.0611 ; 40.3089]

Bolt 2 - Tensile Force (kips): [34.5299 ; 33.9108 ; 32.8601 ; 30.8744 ; 27.7579 ; 23.436 ; 22.9015 ; 22.8901 ; 22.6575 ; 22.6516 ; 22.6501 ; 22.6518 ; 22.7451 ; 22.9288 ; 23.0079 ; 23.131 ; 23.325 ; 23.3696 ; 23.5943 ; 23.7459 ; 23.9251 ; 24.2726 ; 24.9602 ; 26.1617 ; 28.1762 ; 30.7208 ; 31.527 ; 31.8067 ; 32.2073 ; 32.7721 ; 33.5355 ; 34.4903 ; 35.6704 ; 36.8806 ; 38.3119 ; 39.9932 ; 41.6137 ; 42.9386 ; 44.0727 ; 45.1169 ; 46.0926 ; 46.9626 ; 47.2344]

Bolt 2 - Shear Force (kips): [0.0349926 ; 0.74658 ; 1.65467 ; 3.00719 ; 4.92103 ; 7.27167 ; 7.55222 ; 7.55813 ; 7.92438 ; 7.92677 ; 7.92646 ; 7.93381 ; 8.71864 ; 9.58808 ; 9.86908 ; 10.4305 ; 10.9159 ; 12.2144 ; 13.6273 ; 13.8969 ; 14.5352 ; 15.3149 ; 16.0251 ; 16.8146 ; 18.1365 ; 19.4107 ; 19.7328 ; 19.8414 ; 19.9969 ; 20.2118 ; 20.4572 ; 20.7181 ; 21.0248 ; 21.6004 ; 22.3351 ; 23.0287 ; 23.3748 ; 23.7161 ; 24.183 ; 24.5984 ; 24.9712 ; 25.2433 ; 25.3114]

Bolt 3 - Tensile Force (kips): [36 ; 36.9144 ; 38.0184 ; 38.3073 ; 38.7229 ; 39.2498 ; 39.3153 ; 39.3201 ; 39.5065 ; 39.5048 ; 39.5032 ; 39.5133 ; 40.1799 ; 41.1138 ; 41.5161 ; 42.3506 ; 43.8335 ; 46.1768 ; 49.2397 ; 50.2967 ; 51.7755 ; 53.645 ; 55.7821 ; 58.4976 ; 61.7832 ; 64.7647 ; 65.5416 ; 65.8215 ; 66.2286 ; 66.8137 ; 67.6492 ; 68.7714 ; 70.0638 ; 70.8755 ; 71.192 ; 71.4587 ; 71.6681 ; 71.83 ; 71.9667 ; 72.0908 ; 72.2031 ; 72.3062 ; 72.3327]

Bolt 3 - Shear Force (kips): [0.0072169 ; 0.16137 ; 0.21081 ; 0.22287 ; 0.23634 ; 0.24985 ; 0.25138 ; 0.25153 ; 0.25635 ; 0.25642 ; 0.25637 ; 0.25658 ; 0.2741 ; 0.2941 ; 0.302 ; 0.317 ; 0.34488 ; 0.39004 ; 0.4359 ; 0.43692 ; 0.42529 ; 0.39303 ; 0.36341 ; 0.3875 ; 0.3641 ; 0.28081 ; 0.27046 ; 0.26979 ; 0.27106 ; 0.27764 ; 0.28964 ; 0.28114 ; 0.21277 ; 0.12993 ; 0.079896 ; 0.050595 ; 0.038946 ; 0.035473 ; 0.033903 ; 0.033436 ; 0.032549 ; 0.032036 ; 0.036843]

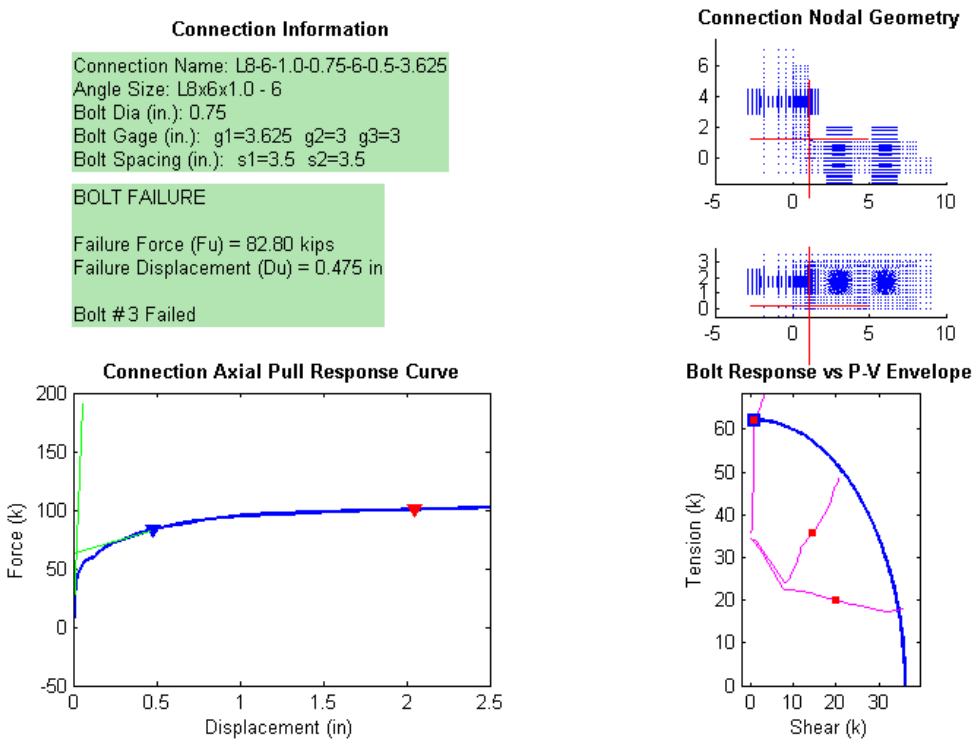


Figure B.272 Connection L8_6_1.0_0.75_6_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.75_6_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 3.4469e+003

Plastic Stiffness (k/in): 41.7328

Displacement (in): [3.5415e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.10129 ; 0.10598 ; 0.10774 ; 0.11038 ; 0.11434 ; 0.12028 ; 0.12251 ; 0.12585 ; 0.1271 ; 0.12898 ; 0.1318 ; 0.13603 ; 0.14237 ; 0.15188 ; 0.16615 ; 0.18756 ; 0.21967 ; 0.23171 ; 0.24977 ; 0.27686 ; 0.28702 ; 0.30226 ; 0.32512 ; 0.3594 ; 0.41084 ; 0.46227 ; 0.47513 ; 0.49441 ; 0.52334 ; 0.56674 ; 0.63183 ; 0.72947 ; 0.76609 ; 0.82101 ; 0.90339 ; 1.027 ; 1.2123 ; 1.4623 ; 1.5248 ; 1.5483 ; 1.5717 ; 1.5951 ; 1.6303 ; 1.683 ; 1.7621 ; 1.8808 ; 2.0588 ; 2.0627 ; 2.0666 ; 2.0705 ; 2.0763 ; 2.0851 ; 2.0983 ; 2.1181 ; 2.1478 ; 2.1923 ; 2.259 ; 2.3591 ; 2.5]

Force (kips): [-0.885341 ; 2.98928 ; 5.84698 ; 9.33125 ; 13.537 ; 18.2202 ; 22.5614 ; 25.1504 ; 27.3814 ; 29.2216 ; 29.255 ; 29.2516 ; 29.2757 ; 29.4635 ; 29.6238 ; 29.8574 ; 29.8565 ; 29.8525 ; 29.8796 ; 30.0414 ; 30.2743 ; 30.6047 ; 31.0457 ; 31.6314 ; 32.4146 ; 33.4605 ; 34.9317 ; 35.4307 ; 36.0495 ; 36.7914 ; 37.0667 ; 37.4623 ; 38.0328 ; 38.8507 ; 40.0591 ; 41.1323 ; 41.4001 ; 41.7916 ; 42.3197 ; 43.0096 ; 43.9158 ; 45.0737 ; 45.4696 ; 46.0182 ; 46.74 ; 47.5568 ; 48.2926 ; 49.0407 ; 49.2045 ; 49.2585 ; 49.3109 ; 49.3626 ; 49.439 ; 49.5511 ; 49.714 ; 49.9455 ; 50.2647 ; 50.2713 ; 50.2778 ; 50.2843 ; 50.2941 ; 50.3089 ; 50.3317 ; 50.3659 ; 50.4153 ; 50.4865 ; 50.5901 ; 50.7859 ; 51.0191]

Bolt 1 - Tensile Force (kips): [34.5255 ; 34.435 ; 34.3586 ; 34.2523 ; 34.1033 ; 33.9087 ; 33.4203 ; 31.1733 ; 27.0617 ; 22.6991 ; 22.6926 ; 22.6844 ; 22.6683 ; 22.4915 ; 22.4347 ; 22.431 ; 22.4285 ; 22.4259 ; 22.4235 ; 22.4105 ; 22.3923 ; 22.3749 ; 22.3598 ; 22.3384 ; 22.3194 ; 22.3289 ; 22.2481 ; 22.0848 ; 21.8906 ; 21.7501 ; 21.6263 ; 21.4441 ; 21.2463 ; 21.0894 ; 20.441 ; 20.0415 ; 19.9853 ; 19.906 ; 19.677 ; 19.3776 ; 19.1358 ; 18.9083 ; 18.8098 ; 18.6129 ; 18.3097 ; 18.0431 ; 17.6789 ; 17.457 ; 17.441 ; 17.4404 ; 17.4414 ; 17.4445 ; 17.4527 ; 17.4722 ; 17.522 ; 17.6181 ; 17.74 ; 17.7423 ; 17.7445 ; 17.7467 ; 17.7501 ; 17.7552 ; 17.7631 ; 17.775 ; 17.7924 ; 17.8165 ; 17.8512 ; 17.9042 ; 17.9531]

Bolt 1 - Shear Force (kips): [0.0487668 ; 0.104639 ; 0.207033 ; 0.336435 ; 0.499733 ; 0.697973 ; 1.14123 ; 2.7225 ; 5.20338 ; 7.48841 ; 7.4879 ; 7.48573 ; 7.51426 ; 7.75631 ; 7.83608 ; 7.83681 ; 7.83611 ; 7.83483 ; 7.85416 ; 7.98389 ; 8.16883 ; 8.36052 ; 8.54602 ; 8.82838 ; 9.19469 ; 9.72465 ; 11.3104 ; 12.149 ; 12.9852 ; 13.7272 ; 14.1765 ; 14.7832 ; 15.441 ; 16.1634 ; 18.0238 ; 19.5335 ; 19.8454 ; 20.3042 ; 21.0653 ; 22.0463 ; 23.1494 ; 24.5039 ; 25.0196 ; 25.8824 ; 27.1397 ; 28.5808 ; 30.1492 ; 31.7552 ; 32.092 ; 32.2069 ; 32.321 ; 32.432 ; 32.594 ; 32.8308 ; 33.1587 ; 33.6226 ; 34.3085 ; 34.3217 ; 34.3348 ; 34.3477 ; 34.3667 ; 34.3948 ; 34.436 ; 34.4958 ; 34.5821 ; 34.7044 ; 34.8822 ; 35.1359 ; 35.4733]

Bolt 2 - Tensile Force (kips): [34.5212 ; 34.4266 ; 34.3437 ; 34.2391 ; 34.1235 ; 34.0267 ; 33.7082 ; 31.7222 ; 28.3587 ; 24.2608 ; 24.1086 ; 24.0872 ; 24.0932 ; 24.1532 ; 24.1186 ; 24.0902 ; 24.0847 ; 24.0793 ; 24.0978 ; 24.1982 ; 24.3487 ; 24.5787 ; 24.949 ; 25.5303 ; 26.4028 ; 27.7046 ; 29.444 ; 30.0053 ; 30.7059 ; 31.5269 ; 31.8164 ; 32.2353 ; 32.7684 ; 33.5089 ; 34.5325 ; 35.5468 ; 35.7922 ; 36.1652 ; 36.6475 ; 37.3395 ; 38.329 ; 39.59 ; 39.9619 ; 40.5037 ; 41.2821 ; 42.3249 ; 43.6089 ; 45.0963 ; 45.4246 ; 45.5399 ; 45.6528 ; 45.7635 ; 45.9262 ; 46.1569 ; 46.4478 ; 46.7865 ; 47.2446 ; 47.2543 ; 47.264 ; 47.2737 ; 47.2884 ; 47.3106 ; 47.3443 ; 47.3949 ; 47.4714 ; 47.5917 ; 47.7653 ; 48.0376 ; 48.4139]

Bolt 2 - Shear Force (kips): [0.0359707 ; 0.135914 ; 0.255426 ; 0.404012 ; 0.590876 ; 0.810161 ; 1.24515 ; 2.77906 ; 5.16679 ; 7.84509 ; 7.93773 ; 7.94567 ; 7.94927 ; 7.96944 ; 8.11202 ; 8.39202 ; 8.39437 ; 8.39382 ; 8.39955 ; 8.42975 ; 8.48588 ; 8.68623 ; 8.97119 ; 9.25461 ; 9.69674 ; 10.2887 ; 10.9556 ; 11.0924 ; 11.31 ; 11.5453 ; 11.5944 ; 11.6698 ; 11.9753 ; 12.5836 ; 13.5082 ; 14.2054 ; 14.3532 ; 14.5356 ; 14.9333 ; 15.3922 ; 16.0565 ; 16.7833 ; 17.1044 ; 17.4841 ; 17.8933 ; 18.3533 ; 18.7862 ; 19.2142 ; 19.3033 ; 19.3342 ; 19.3643 ; 19.3938 ; 19.4369 ; 19.4987 ; 19.6428 ; 19.885 ; 20.1657 ; 20.1709 ; 20.1763 ; 20.1816 ; 20.1894 ; 20.2008 ; 20.2176 ; 20.2422 ; 20.2772 ; 20.318 ; 20.3863 ; 20.4729 ; 20.5482]

Bolt 3 - Tensile Force (kips): [36 ; 35.9395 ; 35.9803 ; 36.2272 ; 36.7796 ; 37.8138 ; 39.0111 ; 40.0821 ; 41.6696 ; 43.8077 ; 43.8584 ; 43.8556 ; 43.8876 ; 44.1495 ; 44.3824 ; 44.7358 ; 44.7347 ; 44.7293 ; 44.7702 ; 45.0222 ; 45.3908 ; 45.9223 ; 46.6526 ; 47.6324 ; 48.9249 ; 50.5672 ; 52.6952 ; 53.4046 ; 54.3076 ; 55.4444 ; 55.8633 ; 56.4648 ; 57.3279 ; 58.5548 ; 60.3313 ; 61.9064 ; 62.3234 ; 62.9453 ; 63.71 ; 64.6932 ; 65.9789 ; 67.6666 ; 68.2311 ; 69.0004 ; 69.9877 ; 70.9844 ; 71.5311 ; 71.7661 ; 71.802 ; 71.8147 ; 71.8266 ; 71.838 ; 71.8541 ; 71.8761 ; 71.9036 ; 71.9401 ; 71.9874 ; 71.9883 ; 71.9893 ; 71.9902 ; 71.9917 ; 71.9918 ; 71.9826 ; 71.9653 ; 71.9501 ; 71.9427 ; 71.9416 ; 71.8795 ; 71.8095]

Bolt 3 - Shear Force (kips): [0.021359 ; 0.017277 ; 0.049011 ; 0.099634 ; 0.1559 ; 0.20755 ; 0.26532 ; 0.31049 ; 0.35796 ; 0.42581 ; 0.42763 ; 0.42752 ; 0.42875 ; 0.43811 ; 0.44669 ; 0.46018 ; 0.46019 ; 0.46003 ; 0.46158 ; 0.47109 ; 0.48512 ; 0.50522 ; 0.53251 ; 0.56397 ; 0.59399 ; 0.62146 ; 0.64968 ; 0.65748 ; 0.67308 ; 0.70358 ; 0.71199 ; 0.72277 ; 0.73241 ; 0.73096 ; 0.71078 ; 0.68771 ; 0.68317 ; 0.70611 ; 1.2738 ; 2.0003 ; 2.4851 ; 3.0181 ; 3.1597 ; 3.2672 ; 3.3418 ; 3.3467 ; 3.2116 ; 3.1137 ; 3.0804 ; 3.0627 ; 3.045 ; 3.0274 ; 3.0011 ; 2.9615 ; 2.9023 ; 2.8154 ; 2.6905 ; 2.6878 ; 2.6852 ; 2.6826 ; 2.6786 ; 2.6805 ; 2.709 ; 2.7454 ; 2.776 ; 2.7909 ; 2.7891 ; 3.1155 ; 3.42]

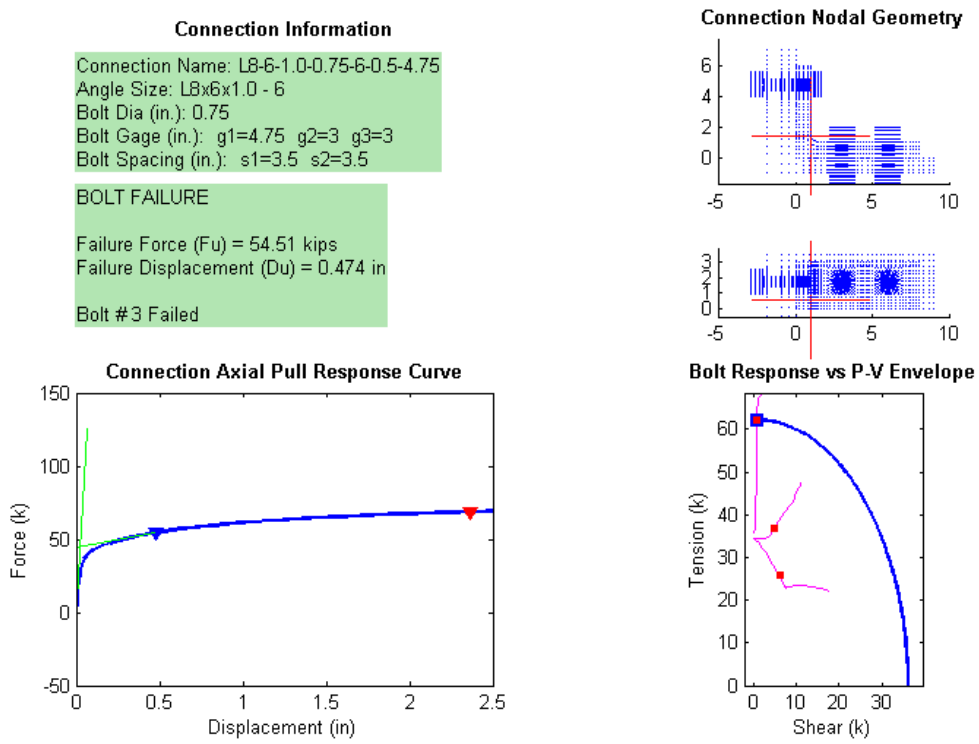


Figure B.273 Connection L8_6_1.0_0.75_6_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.75_6_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 2.0373e+003

Plastic Stiffness (k/in): 21.3442

Displacement (in): [3.4468e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.20294 ; 0.29797 ; 0.3336 ; 0.38705 ; 0.46724 ; 0.58751 ; 0.63261 ; 0.70026 ; 0.72563 ; 0.76369 ; 0.82077 ; 0.90639 ; 0.9385 ; 0.98666 ; 1.0589 ; 1.1673 ; 1.2079 ; 1.2689 ; 1.2917 ; 1.326 ; 1.3774 ; 1.4546 ; 1.5703 ; 1.686 ; 1.715 ; 1.7584 ; 1.8235 ; 1.9211 ; 1.9577 ; 2.0126 ; 2.095 ; 2.2186 ; 2.404 ; 2.5]

Force (kips): [-0.861739 ; 1.46578 ; 3.11738 ; 5.219 ; 7.88226 ; 11.1072 ; 12.0861 ; 13.3606 ; 14.894 ; 16.6393 ; 18.3942 ; 19.8934 ; 21.1618 ; 22.395 ; 23.7375 ; 25.2138 ; 25.6914 ; 26.3439 ; 27.1996 ; 28.2121 ; 28.5283 ; 28.9758 ; 29.1316 ; 29.3555 ; 29.673 ; 30.117 ; 30.2811 ; 30.5024 ; 30.8186 ; 31.3015 ; 31.4813 ; 31.7288 ; 31.8143 ; 31.9393 ; 32.1204 ; 32.3514 ; 32.6687 ; 32.964 ; 33.0379 ; 33.1482 ; 33.3025 ; 33.5171 ; 33.5962 ; 33.7107 ; 33.8709 ; 34.0921 ; 34.3955 ; 34.5426]

Bolt 1 - Tensile Force (kips): [34.5252 ; 34.4726 ; 34.4316 ; 34.3744 ; 34.2929 ; 34.1756 ; 34.1358 ; 34.0807 ; 34.0087 ; 33.9142 ; 33.7832 ; 33.3437 ; 32.8554 ; 32.1656 ; 30.8666 ; 28.7781 ; 28.0996 ; 27.1682 ; 25.8137 ; 24.0295 ; 23.4777 ; 22.8931 ; 22.9038 ; 22.9284 ; 22.9713 ; 23.0311 ; 22.9163 ; 22.9888 ; 23.1073 ; 23.2957 ; 23.2701 ; 23.2578 ; 23.2855 ; 23.3256 ; 23.3952 ; 23.5102 ; 23.6503 ; 23.4409 ; 23.3684 ; 23.2837 ; 23.2054 ; 23.1596 ; 23.0783 ; 22.9668 ; 22.8249 ; 22.7114 ; 22.5218 ; 22.2562]

Bolt 1 - Shear Force (kips): [0.0481079 ; 0.0552037 ; 0.112171 ; 0.190626 ; 0.295322 ; 0.430019 ; 0.473846 ; 0.533606 ; 0.610395 ; 0.706669 ; 0.834329 ; 1.2214 ; 1.59416 ; 2.0837 ; 2.94799 ; 4.23837 ; 4.64125 ; 5.18462 ; 5.95234 ; 6.91937 ; 7.21451 ; 7.5441 ; 7.55314 ; 7.56385 ; 7.58005 ; 7.62058 ; 7.83859 ; 7.85752 ; 7.88324 ; 7.92291 ; 8.33107 ; 8.85639 ; 9.00261 ; 9.27003 ; 9.56503 ; 9.83988 ; 10.7088 ; 11.9809 ; 12.3205 ; 12.768 ; 13.2973 ; 13.8628 ; 14.1928 ; 14.6309 ; 15.2005 ; 15.8422 ; 16.8601 ; 17.6084]

Bolt 2 - Tensile Force (kips): [34.5206 ; 34.4715 ; 34.4263 ; 34.3723 ; 34.3066 ; 34.2512 ; 34.2445 ; 34.2448 ; 34.2543 ; 34.3026 ; 34.4033 ; 34.3462 ; 34.348 ; 34.4241 ; 34.5028 ; 35.0004 ; 35.3446 ; 35.9299 ; 36.7512 ; 37.7499 ; 38.0793 ; 38.5298 ; 38.6791 ; 38.8956 ; 39.2053 ; 39.6481 ; 39.8371 ; 40.0742 ; 40.4198 ; 41.0041 ; 41.273 ; 41.6812 ; 41.8343 ; 42.0692 ; 42.3454 ; 42.7767 ; 43.4659 ; 44.1095 ; 44.266 ; 44.5109 ; 44.8753 ; 45.3796 ; 45.5342 ; 45.749 ; 46.0614 ; 46.5155 ; 47.1129 ; 47.412]

Bolt 2 - Shear Force (kips): [0.0354049 ; 0.0773803 ; 0.147584 ; 0.240921 ; 0.362678 ; 0.518 ; 0.568005 ; 0.634894 ; 0.719436 ; 0.821294 ; 0.948648 ; 1.28493 ; 1.59891 ; 2.00569 ; 2.71106 ; 3.67586 ; 3.93511 ; 4.25588 ; 4.70635 ; 5.2984 ; 5.49251 ; 5.77649 ; 5.88371 ; 6.0373 ; 6.25223 ; 6.5403 ; 6.61487 ; 6.74999 ; 6.9828 ; 7.66777 ; 7.80244 ; 7.98863 ; 8.05082 ; 8.12251 ; 8.49427 ; 9.00063 ; 9.28418 ; 9.49349 ; 9.53354 ; 9.58427 ; 9.65684 ; 9.86024 ; 9.95499 ; 10.1207 ; 10.3177 ; 10.5319 ; 10.7723 ; 10.8131]

Bolt 3 - Tensile Force (kips): [36 ; 35.9354 ; 35.9183 ; 35.9875 ; 36.2831 ; 36.9287 ; 37.2504 ; 37.741 ; 38.4432 ; 39.4767 ; 41.0471 ; 43.1295 ; 46.0458 ; 49.7337 ; 53.8266 ; 57.6206 ; 58.7782 ; 60.3084 ; 62.2139 ; 64.2333 ; 64.7893 ; 65.4825 ; 65.7274 ; 66.0854 ; 66.5932 ; 67.2395 ; 67.463 ; 67.7738 ; 68.1937 ; 68.6407 ; 68.7865 ; 68.9988 ; 69.069 ; 69.1699 ; 69.2984 ; 69.3953 ; 69.3684 ; 69.3928 ; 69.4064 ; 69.4374 ; 69.4782 ; 69.5338 ; 69.5522 ; 69.564 ; 69.5635 ; 69.5613 ; 69.5613 ; 69.5706]

Bolt 3 - Shear Force (kips): [0.023524 ; 0.0078297 ; 0.025903 ; 0.057306 ; 0.1062 ; 0.15581 ; 0.16747 ; 0.18132 ; 0.20157 ; 0.231 ; 0.2912 ; 0.39423 ; 0.53863 ; 0.63229 ; 0.67012 ; 0.71602 ; 0.71083 ; 0.69722 ; 0.68034 ; 0.67174 ; 0.68781 ; 0.79919 ; 0.83044 ; 0.86271 ; 0.88662 ; 1.1276 ; 1.2459 ; 1.3775 ; 1.5419 ; 2.297 ; 2.5103 ; 2.7383 ; 2.8203 ; 2.9349 ; 3.0984 ; 3.4179 ; 4.0722 ; 4.5187 ; 4.6073 ; 4.7094 ; 4.8593 ; 5.0676 ; 5.1436 ; 5.2812 ; 5.5023 ; 5.8055 ; 6.2191 ; 6.3985]

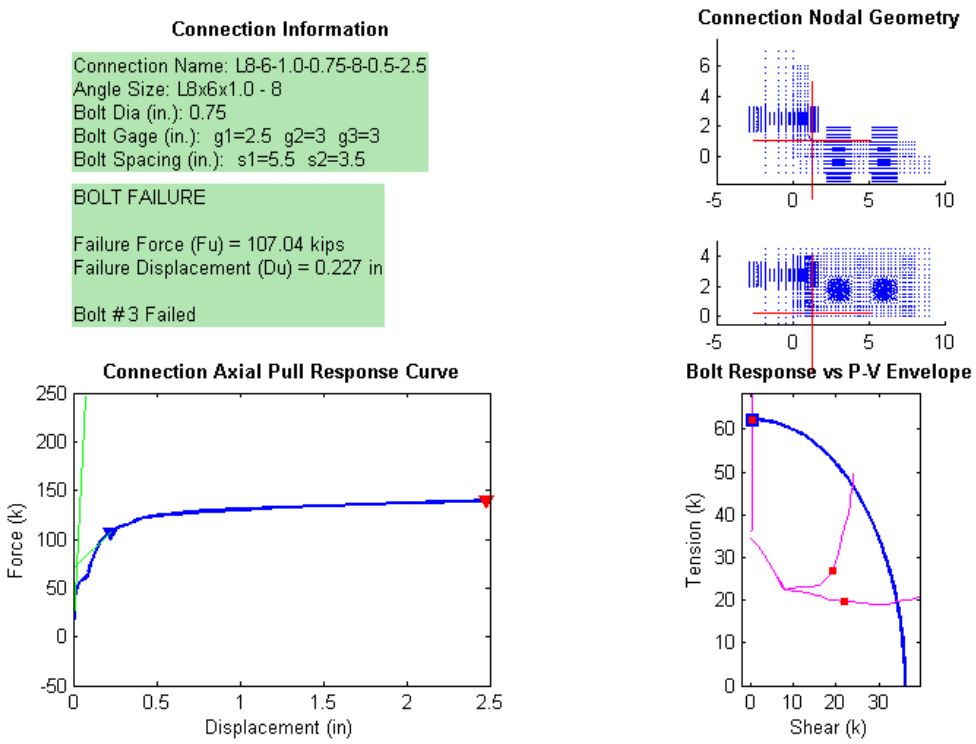


Figure B.274 Connection L8_6_1.0_0.75_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.75_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.2039e+003

Plastic Stiffness (k/in): 161.5609

Displacement (in): [2.1512e-036 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.035156 ; 0.052734 ; 0.059326 ; 0.061798 ; 0.065506 ; 0.066896 ; 0.068982 ; 0.072111 ; 0.076803 ; 0.078563 ; 0.081203 ; 0.082193 ; 0.083678 ; 0.085905 ; 0.089246 ; 0.094257 ; 0.096136 ; 0.098955 ; 0.10318 ; 0.10953 ; 0.11904 ; 0.11993 ; 0.12127 ; 0.12328 ; 0.12629 ; 0.1308 ; 0.13757 ; 0.14773 ; 0.16297 ; 0.18583 ; 0.22012 ; 0.27155 ; 0.29084 ; 0.31977 ; 0.36316 ; 0.42826 ; 0.5259 ; 0.56251 ; 0.61743 ; 0.69982 ; 0.82339 ; 1.0088 ; 1.2588 ; 1.5088 ; 1.7588 ; 2.0088 ; 2.0713 ; 2.165 ; 2.3056 ; 2.5]

Force (kips): [-0.677556 ; 18.5273 ; 24.3533 ; 25.7619 ; 27.5383 ; 29.3278 ; 29.402 ; 29.3994 ; 29.3949 ; 29.3933 ; 29.8399 ; 29.9587 ; 29.9551 ; 29.9529 ; 29.9499 ; 30.181 ; 30.874 ; 31.5371 ; 32.4744 ; 33.7108 ; 34.1612 ; 35.1149 ; 36.4738 ; 38.455 ; 40.8363 ; 41.0538 ; 41.3775 ; 41.8414 ; 42.5023 ; 43.4812 ; 44.7366 ; 46.4265 ; 48.2277 ; 50.4017 ; 53.1715 ; 55.7752 ; 56.5218 ; 57.5973 ; 59.1503 ; 60.9384 ; 62.2501 ; 62.5764 ; 62.9932 ; 63.5471 ; 64.2693 ; 65.194 ; 66.2103 ; 67.0804 ; 67.8613 ; 68.5704 ; 68.7383 ; 68.9776 ; 69.3115 ; 69.7358]

Bolt 1 - Tensile Force (kips): [34.5286 ; 33.9001 ; 32.683 ; 30.6114 ; 27.3317 ; 22.8689 ; 22.6814 ; 22.6769 ; 22.6719 ; 22.6703 ; 22.4437 ; 22.4074 ; 22.4007 ; 22.399 ; 22.3972 ; 22.3816 ; 22.3533 ; 22.3314 ; 22.2931 ; 22.2718 ; 22.2393 ; 22.1996 ; 22.1117 ; 21.8864 ; 21.6156 ; 21.5723 ; 21.5004 ; 21.3915 ; 21.2424 ; 21.1014 ; 20.9224 ; 20.5012 ; 20.1075 ; 19.9611 ; 19.7154 ; 19.5722 ; 19.5742 ; 19.4675 ; 19.2202 ; 18.9919 ; 18.8647 ; 18.8636 ; 18.9187 ; 19.0468 ; 19.2738 ; 19.6163 ; 19.9863 ; 20.1955 ; 20.4154 ; 20.8284 ; 20.9485 ; 21.1309 ; 21.3558 ; 21.6213]

Bolt 1 - Shear Force (kips): [0.0412422 ; 0.710346 ; 1.69277 ; 3.07715 ; 5.03991 ; 7.3879 ; 7.48372 ; 7.48302 ; 7.48166 ; 7.48116 ; 7.79195 ; 7.83963 ; 7.83984 ; 7.83931 ; 7.83843 ; 8.00357 ; 8.32478 ; 8.63011 ; 9.10788 ; 9.72105 ; 9.92908 ; 10.4423 ; 11.445 ; 12.5482 ; 13.7409 ; 13.9006 ; 14.1549 ; 14.5246 ; 15.0005 ; 15.4561 ; 16.0804 ; 17.2908 ; 18.6069 ; 19.8743 ; 21.6547 ; 23.4508 ; 24.0191 ; 24.9579 ; 26.5984 ; 28.5074 ; 30.2832 ; 30.8265 ; 31.4897 ; 32.3176 ; 33.381 ; 34.7381 ; 36.0564 ; 37.3242 ; 38.5264 ; 39.5035 ; 39.7062 ; 39.9452 ; 40.2519 ; 40.5438]

Bolt 2 - Tensile Force (kips): [34.5282 ; 33.8913 ; 32.6923 ; 30.6331 ; 27.399 ; 23.0249 ; 22.8252 ; 22.8211 ; 22.8173 ; 22.8161 ; 22.6312 ; 22.5601 ; 22.553 ; 22.551 ; 22.549 ; 22.5548 ; 22.5791 ; 22.6129 ; 22.6645 ; 22.7858 ; 22.8214 ; 22.8942 ; 23.0154 ; 23.0013 ; 23.0822 ; 23.0995 ; 23.1292 ; 23.1757 ; 23.2449 ; 23.2428 ; 23.3241 ; 23.6353 ; 24.2254 ; 25.1038 ; 26.7085 ; 29.0984 ; 29.9757 ; 31.2178 ; 32.8915 ; 34.8704 ; 36.8753 ; 37.4807 ; 38.3011 ; 39.3764 ; 40.7508 ; 42.4692 ; 44.2059 ; 45.6821 ; 47.0396 ; 48.1582 ; 48.3895 ; 48.6948 ; 49.1055 ; 49.578]

Bolt 2 - Shear Force (kips): [0.0299247 ; 0.77186 ; 1.75667 ; 3.13605 ; 5.08978 ; 7.42492 ; 7.52926 ; 7.52997 ; 7.52949 ; 7.52919 ; 7.79821 ; 7.90528 ; 7.90588 ; 7.90532 ; 7.90433 ; 7.97093 ; 8.33468 ; 8.67266 ; 9.11725 ; 9.72737 ; 9.97459 ; 10.4066 ; 10.807 ; 11.9008 ; 13.3715 ; 13.4558 ; 13.5668 ; 13.7224 ; 13.9933 ; 14.6637 ; 15.463 ; 16.0811 ; 16.6794 ; 17.781 ; 19.0354 ; 19.9649 ; 20.207 ; 20.5041 ; 20.806 ; 21.1114 ; 21.7477 ; 21.9741 ; 22.2421 ; 22.6454 ; 22.9898 ; 23.1477 ; 23.3921 ; 23.6707 ; 23.9238 ; 24.0297 ; 24.0375 ; 24.0517 ; 24.0606 ; 24.0635]

Bolt 3 - Tensile Force (kips): [36 ; 36.8601 ; 37.8951 ; 38.1657 ; 38.5425 ; 39.0015 ; 39.0223 ; 39.0204 ; 39.0166 ; 39.0151 ; 39.152 ; 39.1897 ; 39.1864 ; 39.1844 ; 39.1817 ; 39.2603 ; 39.5058 ; 39.7754 ; 40.2194 ; 40.9243 ; 41.2128 ; 41.8849 ; 42.9793 ; 44.7855 ; 47.1617 ; 47.3906 ; 47.7335 ; 48.2294 ; 48.9454 ; 50.021 ; 51.452 ; 53.4591 ; 55.6423 ; 58.3741 ; 61.9287 ; 64.9259 ; 65.6888 ; 66.7789 ; 68.3553 ; 70.1137 ; 70.9092 ; 71.0145 ; 71.1353 ; 71.2724 ; 71.4312 ; 71.607 ; 71.7837 ; 71.9312 ; 72.0614 ; 72.1803 ; 72.201 ; 72.2196 ; 72.2683 ; 72.3388]

Bolt 3 - Shear Force (kips): [0.01147 ; 0.15955 ; 0.20143 ; 0.21176 ; 0.2229 ; 0.23156 ; 0.23188 ; 0.2318 ; 0.23164 ; 0.23158 ; 0.23411 ; 0.23471 ; 0.23464 ; 0.23458 ; 0.23449 ; 0.23577 ; 0.23958 ; 0.24414 ; 0.25137 ; 0.26279 ; 0.26816 ; 0.2793 ; 0.29726 ; 0.32986 ; 0.37003 ; 0.37375 ; 0.37916 ; 0.38627 ; 0.39388 ; 0.39669 ; 0.38599 ; 0.34568 ; 0.31054 ; 0.33198 ; 0.31053 ; 0.22542 ; 0.2189 ; 0.22547 ; 0.24087 ; 0.17843 ; 0.11282 ; 0.098854 ; 0.082115 ; 0.066755 ; 0.05219 ; 0.040133 ; 0.037122 ; 0.034284 ; 0.033857 ; 0.033434 ; 0.037707 ; 0.12551 ; 0.18208 ; 0.21908]

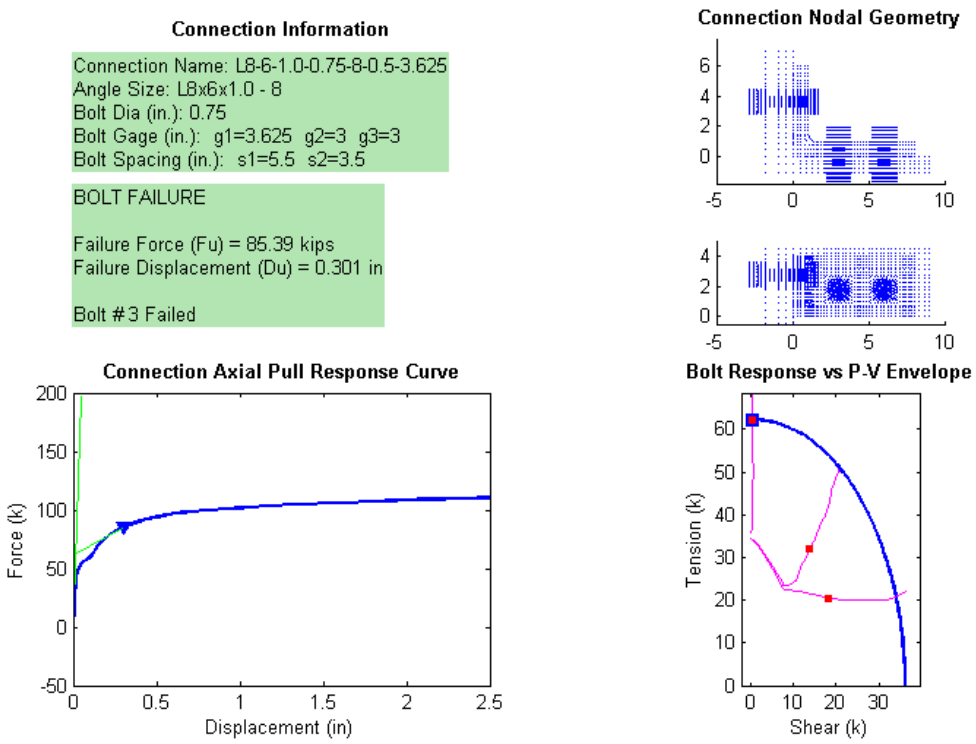


Figure B.275 Connection L8_6_1.0_0.75_8_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.75_8_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 4.3119e+003

Plastic Stiffness (k/in): 80.9832

Displacement (in): [2.2164e-036 ; 0.00048828 ; 0.00097656 ; 0.001709 ; 0.0028076 ; 0.0044556 ; 0.0069275 ; 0.010635 ; 0.012026 ; 0.014112 ; 0.01724 ; 0.021933 ; 0.028972 ; 0.039531 ; 0.055369 ; 0.079126 ; 0.081353 ; 0.084694 ; 0.089706 ; 0.091585 ; 0.094404 ; 0.095461 ; 0.097046 ; 0.099425 ; 0.10299 ; 0.10834 ; 0.11035 ; 0.11336 ; 0.11788 ; 0.12465 ; 0.12719 ; 0.131 ; 0.13671 ; 0.14529 ; 0.15814 ; 0.17743 ; 0.20636 ; 0.21721 ; 0.23348 ; 0.25789 ; 0.29451 ; 0.34943 ; 0.37002 ; 0.40092 ; 0.44726 ; 0.51677 ; 0.62104 ; 0.66014 ; 0.71879 ; 0.80676 ; 0.93873 ; 0.98821 ; 1.0624 ; 1.1738 ; 1.3408 ; 1.5908 ; 1.8408 ; 1.9033 ; 1.9971 ; 2.1377 ; 2.3486 ; 2.5]

Force (kips): [-0.730533 ; 0.378978 ; 1.37491 ; 2.74478 ; 4.56387 ; 6.94248 ; 10.0155 ; 13.8781 ; 15.1211 ; 16.8046 ; 19.0727 ; 21.7249 ; 23.9594 ; 25.439 ; 27.2348 ; 29.0436 ; 29.115 ; 29.1337 ; 29.1283 ; 29.1252 ; 29.331 ; 29.4042 ; 29.5612 ; 29.6809 ; 29.682 ; 29.6751 ; 29.9525 ; 30.48 ; 31.15 ; 32.0428 ; 32.3591 ; 32.8024 ; 33.4242 ; 34.3108 ; 35.5293 ; 36.9921 ; 38.5441 ; 39.1075 ; 39.9191 ; 41.0142 ; 42.4968 ; 44.0427 ; 44.4786 ; 45.0884 ; 45.9671 ; 47.1553 ; 48.5044 ; 48.8969 ; 49.3738 ; 49.9238 ; 50.6228 ; 50.8595 ; 51.1821 ; 51.6339 ; 52.2403 ; 53.0113 ; 53.6818 ; 53.8614 ; 54.1344 ; 54.4954 ; 54.9847 ; 55.3103]

Bolt 1 - Tensile Force (kips): [34.5248 ; 34.4985 ; 34.474 ; 34.4381 ; 34.3868 ; 34.3138 ; 34.2058 ; 34.0543 ; 34.0014 ; 33.9253 ; 33.8137 ; 33.584 ; 32.8218 ; 30.6651 ; 27.2498 ; 22.6956 ; 22.6857 ; 22.6758 ; 22.6657 ; 22.6625 ; 22.4786 ; 22.4191 ; 22.416 ; 22.4115 ; 22.4057 ; 22.4007 ; 22.3751 ; 22.3516 ; 22.3302 ; 22.2913 ; 22.287 ; 22.2911 ; 22.2532 ; 22.205 ; 22.1246 ; 21.8579 ; 21.595 ; 21.4204 ; 21.2273 ; 21.0673 ; 20.4914 ; 20.2455 ; 20.2583 ; 20.2167 ; 20.0483 ; 19.9591 ; 20.0615 ; 20.0622 ; 20.0085 ; 19.963 ; 19.9603 ; 19.9479 ; 19.9758 ; 20.022 ; 20.1832 ; 20.5662 ; 21.0114 ; 21.1225 ; 21.2959 ; 21.5493 ; 21.9222 ; 22.1594]

Bolt 1 - Shear Force (kips): [0.0426437 ; 0.0289759 ; 0.0566636 ; 0.107092 ; 0.177641 ; 0.272329 ; 0.396215 ; 0.558159 ; 0.612294 ; 0.687413 ; 0.792238 ; 0.998554 ; 1.59338 ; 3.04336 ; 5.08705 ; 7.47978 ; 7.48235 ; 7.48202 ; 7.47954 ; 7.47855 ; 7.74731 ; 7.83261 ; 7.83508 ; 7.83669 ; 7.83598 ; 7.8337 ; 8.1076 ; 8.38334 ; 8.66708 ; 9.12811 ; 9.28979 ; 9.44234 ; 9.75879 ; 10.1994 ; 11.2105 ; 12.7152 ; 14.0067 ; 14.6444 ; 15.3252 ; 16.0287 ; 17.865 ; 19.507 ; 19.8894 ; 20.4762 ; 21.4778 ; 22.7639 ; 24.1461 ; 24.7057 ; 25.6245 ; 26.9186 ; 28.4752 ; 28.9825 ; 29.6358 ; 30.5748 ; 31.8074 ; 33.2529 ; 34.4181 ; 34.6469 ; 34.962 ; 35.3986 ; 35.992 ; 36.4035]

Bolt 2 - Tensile Force (kips): [34.5192 ; 34.4984 ; 34.4765 ; 34.4389 ; 34.3842 ; 34.3093 ; 34.2081 ; 34.0803 ; 34.0419 ; 33.9898 ; 33.9217 ; 33.7666 ; 33.1049 ; 31.0553 ; 27.9336 ; 23.8633 ; 23.5501 ; 23.4457 ; 23.4302 ; 23.4263 ; 23.4563 ; 23.4566 ; 23.3455 ; 23.2739 ; 23.2644 ; 23.2562 ; 23.3253 ; 23.3953 ; 23.5138 ; 23.7312 ; 23.829 ; 24.0138 ; 24.278 ; 24.6793 ; 25.4085 ; 26.5608 ; 28.076 ; 28.6003 ; 29.3371 ; 30.3962 ; 31.8495 ; 33.4528 ; 33.9289 ; 34.5818 ; 35.6034 ; 37.1308 ; 38.8211 ; 39.3046 ; 40.007 ; 41.0253 ; 42.4939 ; 43.0181 ; 43.7655 ; 44.8094 ; 46.1667 ; 47.5379 ; 48.5559 ; 48.7814 ; 49.1139 ; 49.5881 ; 50.2512 ; 50.7166]

Bolt 2 - Shear Force (kips): [0.0292499 ; 0.0303364 ; 0.0689881 ; 0.12608 ; 0.203468 ; 0.30602 ; 0.439749 ; 0.613696 ; 0.671001 ; 0.750245 ; 0.859167 ; 1.06209 ; 1.63316 ; 3.06179 ; 5.0668 ; 7.48329 ; 7.66695 ; 7.72552 ; 7.73013 ; 7.72994 ; 7.74021 ; 7.75651 ; 7.96737 ; 8.12655 ; 8.13317 ; 8.13207 ; 8.15306 ; 8.45438 ; 8.88827 ; 9.34255 ; 9.49649 ; 9.77168 ; 10.0611 ; 10.4657 ; 10.9212 ; 11.3303 ; 11.792 ; 12.0466 ; 12.5695 ; 13.155 ; 13.6943 ; 14.2725 ; 14.5679 ; 14.9743 ; 15.4249 ; 15.9284 ; 16.8962 ; 17.2623 ; 17.6132 ; 17.9298 ; 18.2451 ; 18.3475 ; 18.4901 ; 18.6786 ; 18.9257 ; 19.4373 ; 19.852 ; 19.9664 ; 20.1214 ; 20.321 ; 20.549 ; 20.6868]

Bolt 3 - Tensile Force (kips): [36 ; 35.9764 ; 35.9584 ; 35.9439 ; 35.9492 ; 36.0188 ; 36.2519 ; 36.7307 ; 36.9457 ; 37.3049 ; 37.8465 ; 38.5378 ; 39.2862 ; 39.9399 ; 41.0205 ; 42.5224 ; 42.5951 ; 42.6151 ; 42.609 ; 42.605 ; 42.8016 ; 42.8724 ; 43.0296 ; 43.1517 ; 43.153 ; 43.1442 ; 43.4279 ; 43.9789 ; 44.7168 ; 45.7942 ; 46.202 ; 46.8054 ; 47.6989 ; 49.0673 ; 51.0598 ; 53.5391 ; 56.0971 ; 56.9541 ; 58.1842 ; 59.8616 ; 62.0422 ; 64.3154 ; 64.9071 ; 65.7288 ; 66.8744 ; 68.3812 ; 69.9717 ; 70.357 ; 70.7118 ; 70.9304 ; 71.1112 ; 71.1644 ; 71.2349 ; 71.3135 ; 71.3666 ; 71.4608 ; 71.5393 ; 71.5302 ; 71.4716 ; 71.4304 ; 71.4175 ; 71.3929]

Bolt 3 - Shear Force (kips): [0.022151 ; 0.0097791 ; 0.0058836 ; 0.014652 ; 0.032489 ; 0.060685 ; 0.10464 ; 0.15343 ; 0.16709 ; 0.18296 ; 0.20385 ; 0.23118 ; 0.25492 ; 0.27133 ; 0.2959 ; 0.33131 ; 0.33312 ; 0.33366 ; 0.33345 ; 0.33331 ; 0.33852 ; 0.34033 ; 0.34444 ; 0.34765 ; 0.34773 ; 0.34746 ; 0.35481 ; 0.36941 ; 0.38894 ; 0.41796 ; 0.4288 ; 0.44448 ; 0.46545 ; 0.48552 ; 0.48648 ; 0.45666 ; 0.43521 ; 0.44061 ; 0.45336 ; 0.4511 ; 0.40887 ; 0.34241 ; 0.33063 ; 0.32527 ; 0.33548 ; 0.32934 ; 0.24692 ; 0.21661 ; 0.18188 ; 0.14448 ; 0.1096 ; 0.099273 ; 0.086453 ; 0.079312 ; 0.25359 ; 0.37833 ; 0.46226 ; 0.62779 ; 1.0559 ; 1.4467 ; 1.7903 ; 2.0801]

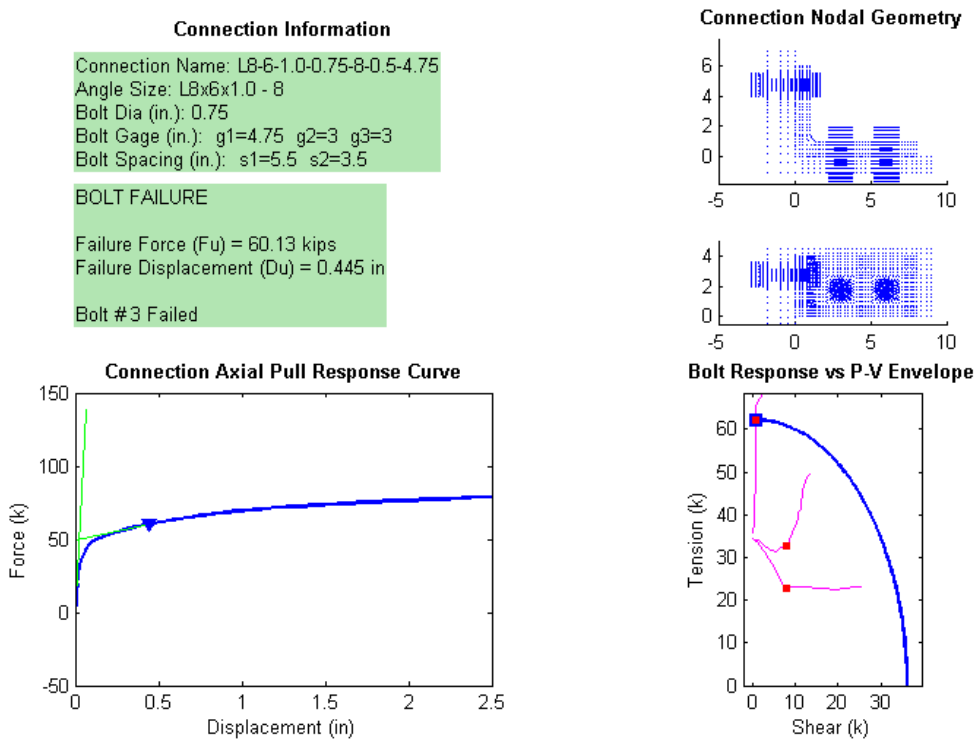


Figure B.276 Connection L8_6_1.0_0.75_8_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.75_8_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 2126

Plastic Stiffness (k/in): 23.8972

Displacement (in): [2.8299e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.25341 ; 0.29565 ; 0.359 ; 0.38276 ; 0.41839 ; 0.47185 ; 0.51194 ; 0.57207 ; 0.59462 ; 0.62845 ; 0.67919 ; 0.7553 ; 0.86946 ; 0.91227 ; 0.97649 ; 1.0006 ; 1.0367 ; 1.0502 ; 1.0706 ; 1.101 ; 1.1467 ; 1.2153 ; 1.3182 ; 1.4725 ; 1.5304 ; 1.6171 ; 1.7473 ; 1.9426 ; 2.1926 ; 2.4426 ; 2.5]

Force (kips): [-0.698603 ; 1.6431 ; 3.4538 ; 5.02774 ; 7.09825 ; 9.73035 ; 12.7898 ; 16.0833 ; 19.0981 ; 21.6845 ; 23.8329 ; 25.4283 ; 27.0035 ; 27.4805 ; 28.15 ; 29.035 ; 29.3285 ; 29.7543 ; 30.3874 ; 30.7891 ; 31.4017 ; 31.643 ; 31.9713 ; 32.4286 ; 33.0372 ; 33.8244 ; 34.1062 ; 34.5274 ; 34.6737 ; 34.8774 ; 34.9522 ; 35.0647 ; 35.2258 ; 35.4559 ; 35.7608 ; 36.1701 ; 36.724 ; 36.9226 ; 37.2017 ; 37.5876 ; 38.1218 ; 38.7298 ; 39.2676 ; 39.3846]

Bolt 1 - Tensile Force (kips): [34.5241 ; 34.4672 ; 34.4177 ; 34.3709 ; 34.3033 ; 34.2045 ; 34.0726 ; 33.9009 ; 33.6499 ; 32.846 ; 31.2543 ; 28.4825 ; 25.4922 ; 24.6429 ; 23.5302 ; 22.7425 ; 22.7585 ; 22.7629 ; 22.6614 ; 22.7649 ; 22.9015 ; 22.8562 ; 22.9032 ; 22.9932 ; 23.1516 ; 23.3131 ; 23.146 ; 23.0152 ; 22.9968 ; 23.015 ; 23.0064 ; 22.9337 ; 22.8375 ; 22.7569 ; 22.7727 ; 22.7152 ; 22.4735 ; 22.4687 ; 22.5761 ; 22.711 ; 22.7963 ; 23.0367 ; 23.1981 ; 23.1881]

Bolt 1 - Shear Force (kips): [0.0414147 ; 0.0679287 ; 0.137889 ; 0.20174 ; 0.288379 ; 0.402295 ; 0.545328 ; 0.719043 ; 0.951943 ; 1.58837 ; 2.67428 ; 4.38168 ; 6.05698 ; 6.50062 ; 7.07025 ; 7.49905 ; 7.50884 ; 7.56926 ; 7.84702 ; 7.87382 ; 7.90657 ; 8.34327 ; 8.70119 ; 9.13155 ; 9.71849 ; 11.0646 ; 11.9747 ; 13.0213 ; 13.3206 ; 13.6483 ; 13.8234 ; 14.1825 ; 14.6647 ; 15.2278 ; 15.828 ; 16.9913 ; 18.9203 ; 19.4871 ; 20.1129 ; 21.0006 ; 22.3946 ; 23.7517 ; 25.0951 ; 25.4904]

Bolt 2 - Tensile Force (kips): [34.5177 ; 34.4707 ; 34.4182 ; 34.3728 ; 34.3133 ; 34.2384 ; 34.1732 ; 34.1448 ; 34.1508 ; 33.8728 ; 33.2235 ; 31.7997 ; 31.3164 ; 31.5878 ; 32.1162 ; 32.5238 ; 32.4878 ; 32.5343 ; 33.0833 ; 33.2245 ; 34.1561 ; 34.5326 ; 35.0652 ; 35.7694 ; 36.7365 ; 38.0258 ; 38.5123 ; 39.2737 ; 39.5532 ; 39.9652 ; 40.1204 ; 40.3395 ; 40.6606 ; 41.1237 ; 41.7606 ; 42.6139 ; 43.8476 ; 44.2726 ; 44.8788 ; 45.7256 ; 46.9492 ; 48.1681 ; 49.1956 ; 49.4259]

Bolt 2 - Shear Force (kips): [0.0280073 ; 0.0826292 ; 0.161397 ; 0.231878 ; 0.326082 ; 0.449927 ; 0.603735 ; 0.784567 ; 1.01037 ; 1.56696 ; 2.52628 ; 4.07172 ; 5.44266 ; 5.75527 ; 6.15513 ; 6.85965 ; 7.18725 ; 7.58815 ; 7.86447 ; 8.19748 ; 8.61145 ; 8.65133 ; 8.72152 ; 9.05681 ; 9.60852 ; 10.2 ; 10.3053 ; 10.4856 ; 10.5595 ; 10.6612 ; 10.6865 ; 10.7075 ; 10.763 ; 10.9018 ; 11.1238 ; 11.3574 ; 11.4472 ; 11.514 ; 11.6272 ; 11.744 ; 11.8754 ; 12.4732 ; 13.1111 ; 13.1973]

Bolt 3 - Tensile Force (kips): [36 ; 35.9363 ; 35.9252 ; 35.972 ; 36.1496 ; 36.5696 ; 37.4256 ; 38.7776 ; 40.6889 ; 43.2343 ; 46.5756 ; 50.6348 ; 55.1185 ; 56.3475 ; 57.9884 ; 60.0607 ; 60.7291 ; 61.6778 ; 63.0003 ; 63.7652 ; 64.7466 ; 65.0558 ; 65.501 ; 66.1285 ; 66.9296 ; 67.8367 ; 68.094 ; 68.4298 ; 68.5323 ; 68.6965 ; 68.7549 ; 68.8416 ; 68.9616 ; 69.0784 ; 69.1777 ; 69.2353 ; 69.3149 ; 69.341 ; 69.3672 ; 69.4283 ; 69.4894 ; 69.5025 ; 69.548 ; 69.5628]

Bolt 3 - Shear Force (kips): [0.024051 ; 0.00904 ; 0.029634 ; 0.052488 ; 0.088984 ; 0.13267 ; 0.17022 ; 0.21075 ; 0.27963 ; 0.41243 ; 0.58106 ; 0.65505 ; 0.68636 ; 0.6998 ; 0.70351 ; 0.68399 ; 0.67506 ; 0.66105 ; 0.63973 ; 0.62951 ; 0.65029 ; 0.70615 ; 0.76928 ; 0.87378 ; 1.4658 ; 1.9877 ; 2.1438 ; 2.6488 ; 2.8255 ; 3.005 ; 3.0617 ; 3.1383 ; 3.2451 ; 3.4866 ; 3.8261 ; 4.3198 ; 4.8764 ; 5.0514 ; 5.3056 ; 5.6053 ; 6.0148 ; 6.5609 ; 6.9365 ; 7.0024]

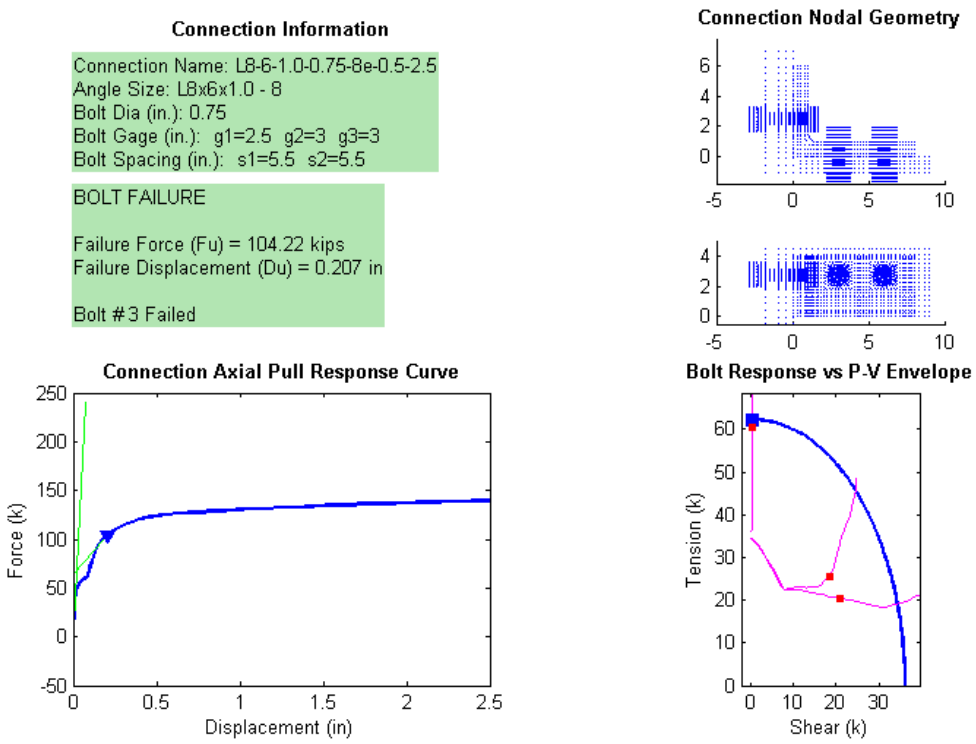


Figure B.277 Connection L8_6_1.0_0.75_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.75_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.2193e+003

Plastic Stiffness (k/in): 195.5059

Displacement (in): [2.5882e-036 ; 0.0078125 ; 0.015625 ; 0.023438 ; 0.035156 ; 0.052734 ; 0.059326 ; 0.069214 ; 0.072922 ; 0.078484 ; 0.080569 ; 0.083698 ; 0.088391 ; 0.09015 ; 0.09279 ; 0.09675 ; 0.10269 ; 0.1116 ; 0.11494 ; 0.11995 ; 0.12183 ; 0.12465 ; 0.12888 ; 0.13522 ; 0.14473 ; 0.159 ; 0.18041 ; 0.21252 ; 0.26068 ; 0.33292 ; 0.36002 ; 0.40065 ; 0.46161 ; 0.55304 ; 0.64448 ; 0.73591 ; 0.87306 ; 1.0788 ; 1.3288 ; 1.5788 ; 1.8288 ; 1.8913 ; 1.985 ; 2.1257 ; 2.1784 ; 2.1982 ; 2.2278 ; 2.2723 ; 2.3391 ; 2.4392 ; 2.5]

Force (kips): [-0.857327 ; 18.0076 ; 24.2937 ; 25.7128 ; 27.4999 ; 29.3296 ; 29.4687 ; 29.7287 ; 30.0009 ; 29.9996 ; 29.9977 ; 30.5278 ; 32.0811 ; 32.5471 ; 33.2172 ; 34.087 ; 35.9693 ; 38.6066 ; 39.509 ; 40.7425 ; 41.2129 ; 41.876 ; 42.7872 ; 44.1055 ; 45.8188 ; 47.8092 ; 49.9017 ; 52.6171 ; 55.331 ; 58.0313 ; 59.0047 ; 60.269 ; 61.5389 ; 62.5037 ; 63.1922 ; 63.7763 ; 64.5472 ; 65.5039 ; 66.4656 ; 67.3077 ; 68.0809 ; 68.2654 ; 68.5316 ; 68.9046 ; 69.0378 ; 69.0868 ; 69.1607 ; 69.2697 ; 69.427 ; 69.6537 ; 69.7856]

Bolt 1 - Tensile Force (kips): [34.5957 ; 33.9342 ; 32.7828 ; 30.728 ; 27.4716 ; 22.9993 ; 22.7125 ; 22.5084 ; 22.4576 ; 22.4505 ; 22.4487 ; 22.4119 ; 22.381 ; 22.3753 ; 22.397 ; 22.3839 ; 22.3394 ; 22.0271 ; 21.9721 ; 21.8769 ; 21.8062 ; 21.7046 ; 21.5852 ; 21.5318 ; 21.2985 ; 20.8771 ; 20.651 ; 20.4279 ; 20.0086 ; 19.7244 ; 19.4621 ; 19.1406 ; 18.6936 ; 18.4615 ; 18.4441 ; 18.6486 ; 18.914 ; 19.3416 ; 19.7934 ; 20.3177 ; 20.9145 ; 21.0473 ; 21.231 ; 21.4848 ; 21.5674 ; 21.5982 ; 21.644 ; 21.7122 ; 21.8029 ; 21.901 ; 21.9554]

Bolt 1 - Shear Force (kips): [0.0387135 ; 0.719613 ; 1.64754 ; 3.02738 ; 4.98474 ; 7.34691 ; 7.49378 ; 7.74958 ; 7.81671 ; 7.81768 ; 7.81716 ; 8.27486 ; 8.9043 ; 9.1266 ; 9.43106 ; 9.91108 ; 11.1509 ; 12.7972 ; 13.1704 ; 13.8162 ; 14.154 ; 14.6411 ; 15.2396 ; 15.7694 ; 16.8616 ; 18.2714 ; 19.5279 ; 20.9874 ; 22.9092 ; 24.9654 ; 26.0449 ; 27.4774 ; 29.132 ; 30.6741 ; 31.8224 ; 32.685 ; 33.9495 ; 35.2452 ; 36.5167 ; 37.6822 ; 38.7321 ; 38.9802 ; 39.3288 ; 39.7397 ; 39.8738 ; 39.9189 ; 39.9819 ; 40.0666 ; 40.1849 ; 40.3514 ; 40.4368]

Bolt 2 - Tensile Force (kips): [34.6046 ; 33.9778 ; 32.9192 ; 30.9012 ; 27.7089 ; 23.3059 ; 22.8602 ; 22.8021 ; 22.6086 ; 22.6022 ; 22.6007 ; 22.6161 ; 22.673 ; 22.6984 ; 22.755 ; 22.8563 ; 23.0137 ; 23.0427 ; 22.9893 ; 22.9628 ; 22.9779 ; 23.0109 ; 23.0561 ; 23.0014 ; 23.1691 ; 23.618 ; 24.475 ; 25.7657 ; 28.0795 ; 31.1622 ; 32.1868 ; 33.5197 ; 35.0739 ; 36.6322 ; 37.8797 ; 38.9025 ; 40.2579 ; 41.8199 ; 43.3599 ; 44.7517 ; 46.0403 ; 46.3362 ; 46.78 ; 47.3867 ; 47.5891 ; 47.6619 ; 47.7681 ; 47.9214 ; 48.1392 ; 48.4601 ; 48.64]

Bolt 2 - Shear Force (kips): [0.0469874 ; 0.712599 ; 1.61398 ; 2.98605 ; 4.93398 ; 7.30756 ; 7.53889 ; 7.61446 ; 7.8876 ; 7.88961 ; 7.88922 ; 7.94286 ; 8.80653 ; 9.04177 ; 9.40201 ; 9.79532 ; 10.49 ; 11.7625 ; 12.4104 ; 13.1616 ; 13.3527 ; 13.6053 ; 14.0184 ; 14.9698 ; 15.7589 ; 16.4243 ; 17.2745 ; 18.6331 ; 19.5348 ; 20.3415 ; 20.536 ; 20.7806 ; 21.1309 ; 21.8683 ; 22.4022 ; 22.9036 ; 23.2834 ; 23.6796 ; 24.035 ; 24.3716 ; 24.6667 ; 24.7148 ; 24.757 ; 24.7936 ; 24.797 ; 24.7973 ; 24.7962 ; 24.7936 ; 24.7891 ; 24.7661 ; 24.7507]

Bolt 3 - Tensile Force (kips): [36 ; 36.8288 ; 37.9455 ; 38.2241 ; 38.6091 ; 39.0905 ; 39.1342 ; 39.2132 ; 39.3022 ; 39.2998 ; 39.298 ; 39.4804 ; 40.1484 ; 40.3911 ; 40.7728 ; 41.3319 ; 42.7633 ; 45.1715 ; 46.0464 ; 47.289 ; 47.7767 ; 48.4739 ; 49.4502 ; 50.8892 ; 52.8205 ; 55.12 ; 57.7306 ; 61.2417 ; 64.4977 ; 67.2863 ; 68.2704 ; 69.5252 ; 70.5976 ; 70.9946 ; 71.1856 ; 71.3231 ; 71.4835 ; 71.6594 ; 71.8268 ; 71.9676 ; 72.0949 ; 72.1252 ; 72.169 ; 72.2311 ; 72.2537 ; 72.2621 ; 72.2664 ; 72.2698 ; 72.2875 ; 72.321 ; 72.3419]

Bolt 3 - Shear Force (kips): [0.023878 ; 0.14643 ; 0.19163 ; 0.20198 ; 0.21372 ; 0.22365 ; 0.22437 ; 0.22578 ; 0.2274 ; 0.2274 ; 0.22735 ; 0.23053 ; 0.24273 ; 0.2464 ; 0.25255 ; 0.26243 ; 0.28519 ; 0.32716 ; 0.3415 ; 0.36082 ; 0.36818 ; 0.37727 ; 0.38394 ; 0.37881 ; 0.34552 ; 0.29774 ; 0.30672 ; 0.308 ; 0.21513 ; 0.21488 ; 0.22441 ; 0.19916 ; 0.12872 ; 0.092684 ; 0.069595 ; 0.056872 ; 0.043689 ; 0.034973 ; 0.032912 ; 0.031615 ; 0.03183 ; 0.031908 ; 0.031766 ; 0.031667 ; 0.03166 ; 0.031664 ; 0.036906 ; 0.094419 ; 0.14799 ; 0.18542 ; 0.20151]

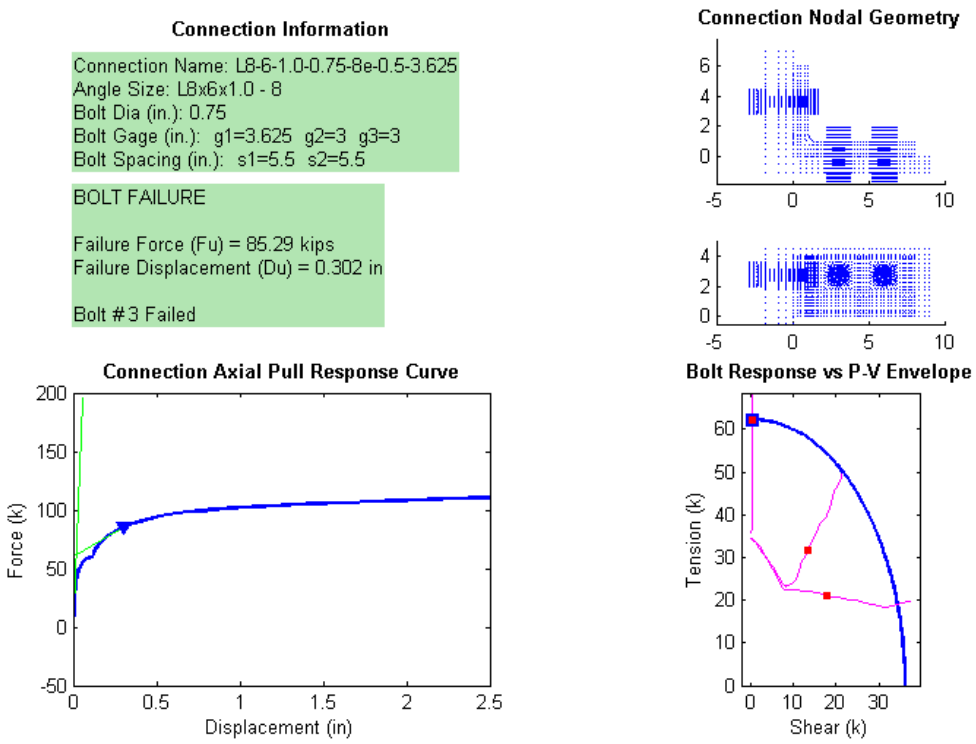


Figure B.278 Connection L8_6_1.0_0.75_8e_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.75_8e_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 3.4784e+003

Plastic Stiffness (k/in): 84.9568

Displacement (in): [3.7497e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.071287 ; 0.081846 ; 0.085806 ; 0.091745 ; 0.093972 ; 0.094807 ; 0.09606 ; 0.097939 ; 0.10076 ; 0.10499 ; 0.11133 ; 0.12084 ; 0.12441 ; 0.12976 ; 0.13779 ; 0.14983 ; 0.16789 ; 0.19498 ; 0.20514 ; 0.22038 ; 0.24324 ; 0.27753 ; 0.32896 ; 0.40611 ; 0.52183 ; 0.56522 ; 0.63032 ; 0.69541 ; 0.7605 ; 0.85814 ; 0.89476 ; 0.94968 ; 1.0321 ; 1.1144 ; 1.1968 ; 1.2277 ; 1.2741 ; 1.3436 ; 1.4478 ; 1.6042 ; 1.8388 ; 1.9013 ; 1.9951 ; 2.0303 ; 2.083 ; 2.1621 ; 2.2807 ; 2.4587 ; 2.5]

Force (kips): [-0.936879 ; 2.89538 ; 5.8568 ; 9.5289 ; 13.9909 ; 15.3981 ; 17.2859 ; 19.797 ; 22.4114 ; 24.4489 ; 26.0674 ; 27.9753 ; 28.5213 ; 29.1344 ; 29.2218 ; 29.2168 ; 29.2129 ; 29.2971 ; 29.4241 ; 29.4776 ; 29.73 ; 29.7375 ; 29.9357 ; 31.3863 ; 31.8473 ; 32.5139 ; 33.4447 ; 34.7227 ; 36.3 ; 37.9435 ; 38.4555 ; 39.2254 ; 40.3317 ; 41.7882 ; 43.5557 ; 45.1655 ; 47.2408 ; 47.8698 ; 48.6446 ; 49.2434 ; 49.685 ; 50.2343 ; 50.4261 ; 50.6961 ; 51.0594 ; 51.3974 ; 51.7161 ; 51.8313 ; 52.0004 ; 52.2395 ; 52.5786 ; 53.0428 ; 53.6649 ; 53.8229 ; 54.0512 ; 54.136 ; 54.2888 ; 54.5041 ; 54.7938 ; 55.1882 ; 55.2743]

Bolt 1 - Tensile Force (kips): [34.5884 ; 34.481 ; 34.3857 ; 34.2494 ; 34.0614 ; 33.9966 ; 33.9033 ; 33.769 ; 33.4007 ; 32.2209 ; 29.63 ; 25.6577 ; 24.2275 ; 22.7482 ; 22.7398 ; 22.7279 ; 22.7242 ; 22.6627 ; 22.5438 ; 22.5001 ; 22.5011 ; 22.4945 ; 22.4805 ; 22.4749 ; 22.4814 ; 22.5171 ; 22.5487 ; 22.5527 ; 22.2772 ; 22.053 ; 21.971 ; 21.7751 ; 21.6138 ; 21.3988 ; 20.7747 ; 20.6733 ; 20.1748 ; 20.1048 ; 19.9509 ; 19.709 ; 19.449 ; 19.1377 ; 19.0048 ; 18.8443 ; 18.6476 ; 18.4986 ; 18.4713 ; 18.4834 ; 18.5123 ; 18.5793 ; 18.7079 ; 18.916 ; 19.2203 ; 19.2978 ; 19.411 ; 19.4523 ; 19.507 ; 19.5888 ; 19.6791 ; 19.7861 ; 19.7941]

Bolt 1 - Shear Force (kips): [0.0419053 ; 0.126785 ; 0.248148 ; 0.401765 ; 0.597236 ; 0.661496 ; 0.750168 ; 0.872895 ; 1.18951 ; 2.05026 ; 3.7201 ; 6.00463 ; 6.74749 ; 7.50032 ; 7.50257 ; 7.5 ; 7.49891 ; 7.60522 ; 7.77503 ; 7.83618 ; 7.84196 ; 7.84288 ; 8.03933 ; 8.88829 ; 9.12271 ; 9.4676 ; 9.89547 ; 10.6962 ; 12.1373 ; 13.4103 ; 13.8908 ; 14.7595 ; 15.5737 ; 16.7605 ; 19.0346 ; 20.4963 ; 22.8902 ; 23.5794 ; 24.5434 ; 25.6885 ; 26.821 ; 28.2217 ; 28.7135 ; 29.3501 ; 30.2059 ; 30.978 ; 31.6773 ; 31.9128 ; 32.2503 ; 32.7238 ; 33.4102 ; 34.257 ; 35.2594 ; 35.4848 ; 35.8064 ; 35.9232 ; 36.1023 ; 36.3567 ; 36.7563 ; 37.3463 ; 37.4903]

Bolt 2 - Tensile Force (kips): [34.5896 ; 34.4986 ; 34.4096 ; 34.2921 ; 34.1584 ; 34.1193 ; 34.0731 ; 34.0165 ; 33.7881 ; 32.7605 ; 30.3586 ; 26.8293 ; 25.5915 ; 23.9191 ; 23.5004 ; 23.4693 ; 23.4631 ; 23.4771 ; 23.4944 ; 23.4924 ; 23.3068 ; 23.2951 ; 23.334 ; 23.5626 ; 23.6627 ; 23.7967 ; 24.07 ; 24.57 ; 25.5874 ; 27.1323 ; 27.6906 ; 28.4853 ; 29.5111 ; 30.974 ; 32.8057 ; 34.534 ; 36.9351 ; 37.7517 ; 38.616 ; 39.3685 ; 40.0515 ; 41.0265 ; 41.3873 ; 41.9123 ; 42.6742 ; 43.3974 ; 44.1087 ; 44.3664 ; 44.7354 ; 45.2469 ; 45.8296 ; 46.5267 ; 47.4206 ; 47.6096 ; 47.9058 ; 48.0178 ; 48.2096 ; 48.4937 ; 48.9172 ; 49.533 ; 49.6738]

Bolt 2 - Shear Force (kips): [0.0494606 ; 0.117105 ; 0.235125 ; 0.383566 ; 0.568586 ; 0.628733 ; 0.710388 ; 0.821367 ; 1.09845 ; 1.92114 ; 3.55963 ; 5.79592 ; 6.52938 ; 7.49488 ; 7.7307 ; 7.74174 ; 7.7417 ; 7.74654 ; 7.75248 ; 7.76656 ; 8.10616 ; 8.11955 ; 8.13413 ; 8.83945 ; 9.0785 ; 9.41456 ; 9.90698 ; 10.3194 ; 10.8933 ; 11.3952 ; 11.5063 ; 11.7341 ; 12.422 ; 13.0958 ; 13.7023 ; 14.5785 ; 15.7717 ; 16.1509 ; 16.9131 ; 17.481 ; 17.8494 ; 18.2462 ; 18.3684 ; 18.5427 ; 18.7659 ; 18.9596 ; 19.1093 ; 19.1629 ; 19.243 ; 19.3606 ; 19.6671 ; 20.0713 ; 20.5843 ; 20.7174 ; 20.885 ; 20.9406 ; 21.0017 ; 21.097 ; 21.1957 ; 21.3281 ; 21.3531]

Bolt 3 - Tensile Force (kips): [36 ; 35.9389 ; 35.9801 ; 36.2212 ; 36.79 ; 37.0497 ; 37.4781 ; 38.0983 ; 38.8286 ; 39.5907 ; 40.4201 ; 41.7731 ; 42.2433 ; 42.8324 ; 42.9257 ; 42.9211 ; 42.9161 ; 42.9982 ; 43.1229 ; 43.1762 ; 43.4358 ; 43.4437 ; 43.6439 ; 45.2158 ; 45.7565 ; 46.5906 ; 47.8397 ; 49.7926 ; 52.423 ; 55.2082 ; 56.0335 ; 57.2231 ; 58.9049 ; 61.1026 ; 63.6412 ; 65.8638 ; 68.4974 ; 69.2513 ; 70.1033 ; 70.6221 ; 70.8483 ; 71.0186 ; 71.0666 ; 71.1291 ; 71.2124 ; 71.2826 ; 71.3439 ; 71.3642 ; 71.372 ; 71.3837 ; 71.4164 ; 71.4709 ; 71.5465 ; 71.5632 ; 71.5891 ; 71.5949 ; 71.5463 ; 71.5061 ; 71.4782 ; 71.4613 ; 71.459]

Bolt 3 - Shear Force (kips): [0.036008 ; 0.0077063 ; 0.03791 ; 0.087607 ; 0.14232 ; 0.15683 ; 0.17314 ; 0.19704 ; 0.2245 ; 0.24639 ; 0.2668 ; 0.29785 ; 0.30856 ; 0.32233 ; 0.32463 ; 0.32454 ; 0.32434 ; 0.32651 ; 0.32949 ; 0.33081 ; 0.33725 ; 0.33749 ; 0.34259 ; 0.38237 ; 0.3962 ; 0.41696 ; 0.44441 ; 0.46297 ; 0.44341 ; 0.4062 ; 0.40393 ; 0.41261 ; 0.42705 ; 0.40295 ; 0.33547 ; 0.30371 ; 0.3071 ; 0.27615 ; 0.22065 ; 0.17829 ; 0.14896 ; 0.11858 ; 0.10968 ; 0.098941 ; 0.084139 ; 0.07292 ; 0.063937 ; 0.061311 ; 0.072583 ; 0.18972 ; 0.29201 ; 0.36309 ; 0.43185 ; 0.45617 ; 0.4835 ; 0.51089 ; 0.8222 ; 1.1356 ; 1.4322 ; 1.7372 ; 1.7983]

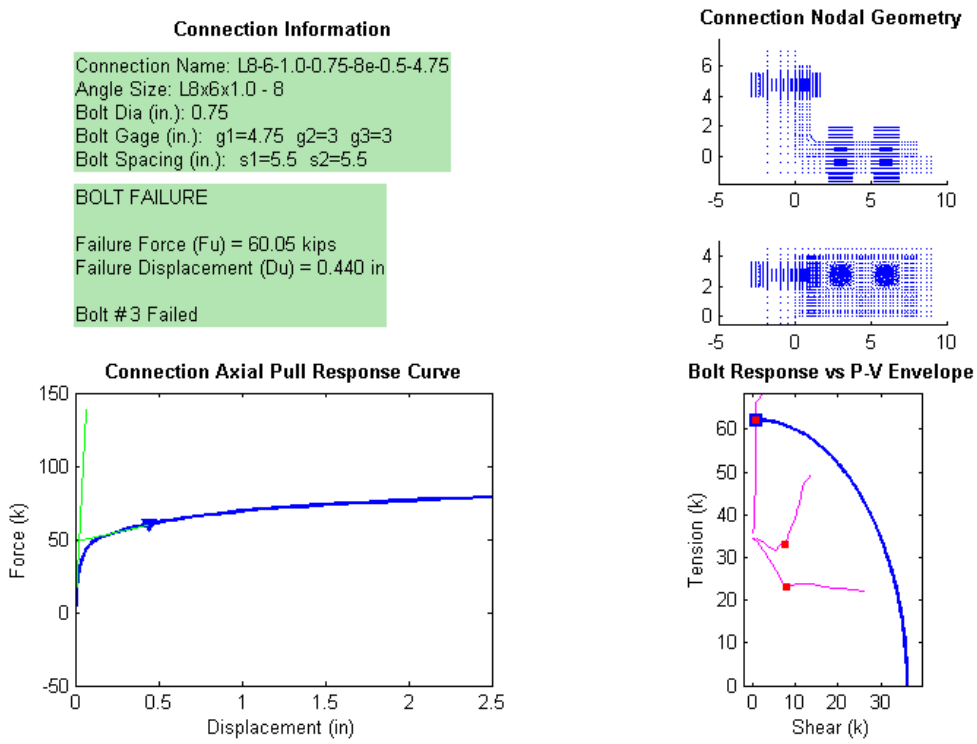


Figure B.279 Connection L8_6_1.0_0.75_8e_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.75_8e_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 2.0989e+003

Plastic Stiffness (k/in): 26.3021

Displacement (in): [2.6335e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.25146 ; 0.29369 ; 0.35705 ; 0.3808 ; 0.41644 ; 0.4298 ; 0.43481 ; 0.44233 ; 0.45361 ; 0.47052 ; 0.49589 ; 0.53394 ; 0.56248 ; 0.6053 ; 0.62135 ; 0.64543 ; 0.68155 ; 0.73574 ; 0.81701 ; 0.93892 ; 0.98464 ; 1.0532 ; 1.0789 ; 1.1175 ; 1.1561 ; 1.1947 ; 1.2525 ; 1.3393 ; 1.4695 ; 1.5183 ; 1.5915 ; 1.619 ; 1.6602 ; 1.722 ; 1.8147 ; 1.9537 ; 2.1622 ; 2.2247 ; 2.3185 ; 2.4591 ; 2.5]

Force (kips): [-0.869532 ; 1.45806 ; 3.2298 ; 5.48843 ; 8.31171 ; 11.6439 ; 15.1588 ; 18.4369 ; 21.2758 ; 23.6984 ; 25.3783 ; 26.9603 ; 27.4315 ; 28.1053 ; 29.0155 ; 29.3163 ; 29.7424 ; 29.8944 ; 29.9603 ; 30.0583 ; 30.2025 ; 30.3981 ; 30.6593 ; 31.0212 ; 31.301 ; 31.7281 ; 31.8889 ; 32.1199 ; 32.4378 ; 32.8802 ; 33.4741 ; 34.2483 ; 34.5237 ; 34.9226 ; 35.0593 ; 35.2659 ; 35.4588 ; 35.6379 ; 35.8823 ; 36.219 ; 36.6841 ; 36.8441 ; 37.0722 ; 37.1574 ; 37.2864 ; 37.4699 ; 37.7389 ; 38.117 ; 38.6233 ; 38.7703 ; 38.98 ; 39.2754 ; 39.3573]

Bolt 1 - Tensile Force (kips): [34.5874 ; 34.5228 ; 34.4677 ; 34.3917 ; 34.2815 ; 34.133 ; 33.9475 ; 33.7043 ; 32.8725 ; 31.4338 ; 28.7148 ; 25.8032 ; 24.9843 ; 23.9375 ; 22.9857 ; 23.0101 ; 23.0671 ; 23.0912 ; 23.0628 ; 23.0176 ; 22.9638 ; 22.9787 ; 23.0529 ; 23.1859 ; 23.2818 ; 23.392 ; 23.3864 ; 23.3759 ; 23.4678 ; 23.6287 ; 23.8367 ; 23.8851 ; 23.7408 ; 23.6591 ; 23.6668 ; 23.5248 ; 23.4171 ; 23.343 ; 23.3029 ; 23.1942 ; 22.8365 ; 22.7655 ; 22.7434 ; 22.7547 ; 22.7886 ; 22.801 ; 22.8123 ; 22.606 ; 22.4891 ; 22.4033 ; 22.2828 ; 22.152 ; 22.0978]

Bolt 1 - Shear Force (kips): [0.0395973 ; 0.0735689 ; 0.147034 ; 0.245523 ; 0.372758 ; 0.533602 ; 0.724134 ; 0.957222 ; 1.62525 ; 2.63153 ; 4.33583 ; 6.01178 ; 6.45558 ; 7.01745 ; 7.57208 ; 7.58985 ; 7.61155 ; 7.61984 ; 7.66918 ; 7.74958 ; 7.86733 ; 7.92375 ; 7.95488 ; 7.99379 ; 8.01951 ; 8.24863 ; 8.48105 ; 8.8011 ; 9.12027 ; 9.63999 ; 10.3691 ; 12.0113 ; 12.8497 ; 13.7339 ; 13.964 ; 14.614 ; 15.1563 ; 15.6426 ; 16.2333 ; 17.2004 ; 18.8615 ; 19.3635 ; 20.0162 ; 20.2232 ; 20.5071 ; 20.9476 ; 21.5735 ; 22.6935 ; 23.9819 ; 24.3956 ; 24.9827 ; 25.8527 ; 26.1355]

Bolt 2 - Tensile Force (kips): [34.5879 ; 34.5406 ; 34.491 ; 34.4272 ; 34.3535 ; 34.2863 ; 34.2722 ; 34.3378 ; 34.0734 ; 33.6283 ; 32.4003 ; 31.7169 ; 31.8807 ; 32.3703 ; 32.934 ; 32.9709 ; 32.9662 ; 32.9572 ; 33.0559 ; 33.2036 ; 33.4197 ; 33.6199 ; 33.7358 ; 33.9481 ; 34.367 ; 35.0323 ; 35.299 ; 35.6869 ; 36.2157 ; 36.9345 ; 37.8965 ; 39.1836 ; 39.6758 ; 40.4283 ; 40.7189 ; 41.1461 ; 41.5463 ; 41.9162 ; 42.4075 ; 43.0726 ; 44.0456 ; 44.3847 ; 44.8589 ; 45.037 ; 45.3031 ; 45.6753 ; 46.2062 ; 46.9528 ; 47.8778 ; 48.0953 ; 48.415 ; 48.9217 ; 49.0685]

Bolt 2 - Shear Force (kips): [0.0465538 ; 0.0643874 ; 0.133031 ; 0.225465 ; 0.344087 ; 0.490311 ; 0.657873 ; 0.846736 ; 1.40005 ; 2.24702 ; 3.77128 ; 5.18951 ; 5.52197 ; 5.92728 ; 6.5367 ; 6.83779 ; 7.277 ; 7.43536 ; 7.43783 ; 7.44045 ; 7.44378 ; 7.51186 ; 7.70245 ; 7.94184 ; 8.06449 ; 8.33766 ; 8.38622 ; 8.43872 ; 8.51375 ; 8.722 ; 9.33091 ; 9.92008 ; 10.0727 ; 10.258 ; 10.318 ; 10.3751 ; 10.4864 ; 10.612 ; 10.8332 ; 11.0987 ; 11.2439 ; 11.2997 ; 11.3817 ; 11.4067 ; 11.4385 ; 11.4766 ; 11.5669 ; 11.77 ; 12.2727 ; 12.5303 ; 12.8783 ; 13.2455 ; 13.3258]

Bolt 3 - Tensile Force (kips): [36 ; 35.9347 ; 35.9213 ; 36.0044 ; 36.347 ; 37.1031 ; 38.4779 ; 40.398 ; 42.9633 ; 46.4163 ; 50.5235 ; 55.0622 ; 56.3019 ; 57.9673 ; 60.0935 ; 60.7783 ; 61.7278 ; 62.0584 ; 62.1957 ; 62.3977 ; 62.6899 ; 63.0839 ; 63.5854 ; 64.2188 ; 64.6706 ; 65.2872 ; 65.5012 ; 65.8055 ; 66.2337 ; 66.8255 ; 67.5398 ; 68.3328 ; 68.576 ; 68.8348 ; 68.9246 ; 69.0608 ; 69.1854 ; 69.285 ; 69.3386 ; 69.386 ; 69.3974 ; 69.4036 ; 69.4333 ; 69.4509 ; 69.4873 ; 69.5163 ; 69.5229 ; 69.5596 ; 69.606 ; 69.5838 ; 69.5789 ; 69.5924 ; 69.5971]

Bolt 3 - Shear Force (kips): [0.037934 ; 0.0070922 ; 0.017462 ; 0.049343 ; 0.098019 ; 0.14282 ; 0.18257 ; 0.24813 ; 0.37169 ; 0.54328 ; 0.61925 ; 0.64996 ; 0.6637 ; 0.66714 ; 0.64592 ; 0.63607 ; 0.62166 ; 0.61617 ; 0.61401 ; 0.61079 ; 0.60638 ; 0.60121 ; 0.59539 ; 0.59288 ; 0.59444 ; 0.65413 ; 0.6859 ; 0.72956 ; 0.78148 ; 1.1478 ; 1.6438 ; 2.0469 ; 2.2 ; 2.7039 ; 2.8441 ; 2.9925 ; 3.1213 ; 3.2547 ; 3.5841 ; 3.9875 ; 4.5751 ; 4.766 ; 4.9898 ; 5.0542 ; 5.124 ; 5.2636 ; 5.5103 ; 5.7947 ; 6.1865 ; 6.3574 ; 6.5442 ; 6.7594 ; 6.8163]

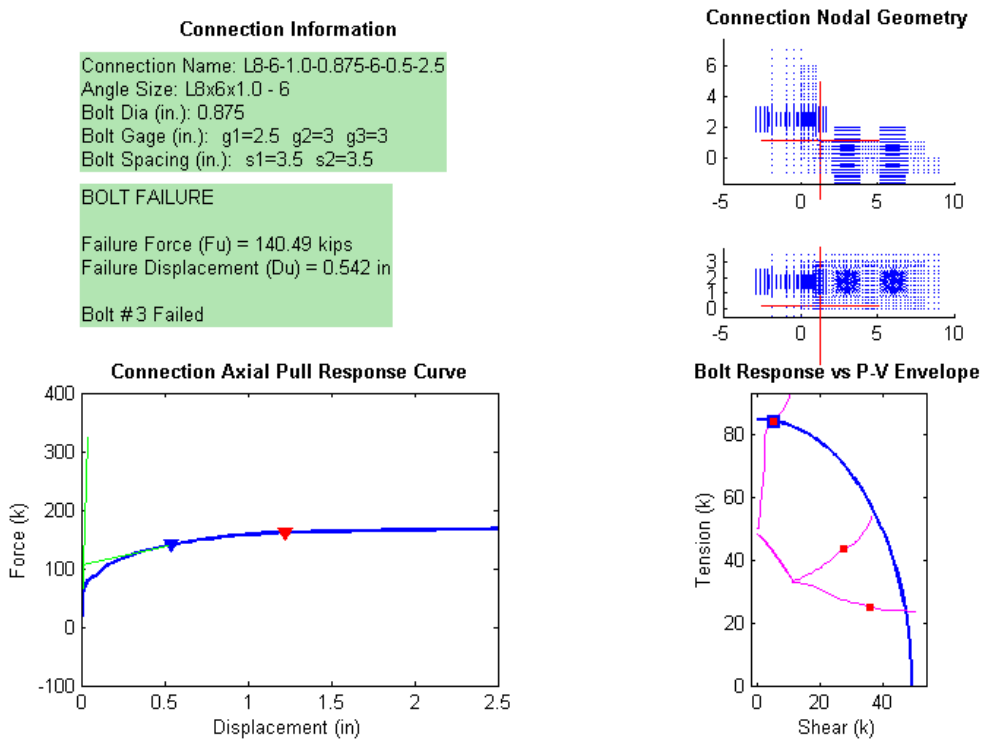


Figure B.280 Connection L8_6_1.0_0.875_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.875_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 7.3958e+003

Plastic Stiffness (k/in): 64.4761

Displacement (in): [4.3797e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.073132 ; 0.07626 ; 0.080953 ; 0.082713 ; 0.085352 ; 0.089312 ; 0.095251 ; 0.097478 ; 0.10082 ; 0.10583 ; 0.10771 ; 0.11053 ; 0.11476 ; 0.1211 ; 0.12348 ; 0.12704 ; 0.1324 ; 0.14042 ; 0.15246 ; 0.15698 ; 0.16375 ; 0.17391 ; 0.18915 ; 0.21201 ; 0.22058 ; 0.23344 ; 0.25273 ; 0.28166 ; 0.29251 ; 0.30878 ; 0.33319 ; 0.34234 ; 0.35607 ; 0.37667 ; 0.40756 ; 0.4539 ; 0.52341 ; 0.62768 ; 0.65375 ; 0.67981 ; 0.71891 ; 0.77756 ; 0.86554 ; 0.89853 ; 0.94802 ; 1.0223 ; 1.1336 ; 1.2449 ; 1.3563 ; 1.398 ; 1.4607 ; 1.5546 ; 1.6955 ; 1.9069 ; 1.9694 ; 2.0631 ; 2.2038 ; 2.4147 ; 2.5]

Force (kips): [-1.45844 ; 6.87425 ; 12.9864 ; 20.053 ; 27.4587 ; 33.3223 ; 36.1276 ; 39.5877 ; 42.9383 ; 42.9388 ; 42.9311 ; 43.1819 ; 43.5421 ; 43.5866 ; 43.584 ; 43.5742 ; 43.6018 ; 44.5484 ; 45.5381 ; 45.8948 ; 46.3315 ; 46.9996 ; 47.8613 ; 48.2441 ; 48.8034 ; 49.5814 ; 50.6104 ; 51.8977 ; 52.3409 ; 52.9809 ; 53.8621 ; 55.0331 ; 56.6205 ; 57.1799 ; 57.9575 ; 59.0555 ; 60.5427 ; 61.069 ; 61.8188 ; 62.8643 ; 63.2432 ; 63.7964 ; 64.6104 ; 65.8219 ; 67.5018 ; 69.7427 ; 72.4773 ; 73.0756 ; 73.642 ; 74.4348 ; 75.5539 ; 77.0416 ; 77.5492 ; 78.2552 ; 79.1528 ; 80.0324 ; 80.6581 ; 81.1435 ; 81.301 ; 81.51 ; 81.7975 ; 82.1829 ; 82.6898 ; 82.8298 ; 83.0311 ; 83.3174 ; 83.7072 ; 83.8553]

Bolt 1 - Tensile Force (kips): [48.339 ; 48.0848 ; 47.8709 ; 47.6032 ; 47.2805 ; 46.4855 ; 43.5934 ; 39.0393 ; 33.2734 ; 33.2355 ; 33.2264 ; 33.1155 ; 32.9754 ; 32.9548 ; 32.9398 ; 32.9302 ; 32.9255 ; 32.8686 ; 32.8155 ; 32.7945 ; 32.7678 ; 32.7564 ; 32.6564 ; 32.605 ; 32.5087 ; 32.353 ; 32.1484 ; 31.9372 ; 31.8116 ; 31.5569 ; 31.1378 ; 30.7283 ; 29.8132 ; 29.3874 ; 28.8588 ; 28.2018 ; 27.5301 ; 27.3385 ; 27.1029 ; 26.844 ; 26.7257 ; 26.5838 ; 26.3902 ; 26.188 ; 25.9609 ; 25.2605 ; 24.535 ; 24.3938 ; 24.2798 ; 24.1607 ; 24.0726 ; 24.0685 ; 24.0729 ; 24.1065 ; 24.1816 ; 24.2323 ; 24.135 ; 24.0436 ; 24.0184 ; 23.9657 ; 23.873 ; 23.7313 ; 23.5824 ; 23.5486 ; 23.5078 ; 23.4588 ; 23.4 ; 23.3772]

Bolt 1 - Shear Force (kips): [0.0742306 ; 0.261601 ; 0.496393 ; 0.780644 ; 1.09863 ; 1.84816 ; 4.20106 ; 7.41724 ; 10.9641 ; 10.9664 ; 10.9643 ; 11.1443 ; 11.3433 ; 11.3572 ; 11.3595 ; 11.3567 ; 11.3842 ; 11.8882 ; 12.4017 ; 12.569 ; 12.8176 ; 13.1315 ; 13.6526 ; 14.0592 ; 14.6547 ; 15.4384 ; 16.3627 ; 17.2652 ; 17.6264 ; 18.2689 ; 19.2197 ; 20.121 ; 21.8033 ; 22.5545 ; 23.5256 ; 24.919 ; 26.5885 ; 27.1436 ; 27.903 ; 28.8572 ; 29.2322 ; 29.7208 ; 30.4283 ; 31.3875 ; 32.7379 ; 35.2768 ; 38.1084 ; 38.6221 ; 39.0721 ; 39.6651 ; 40.4564 ; 41.5788 ; 41.9564 ; 42.4749 ; 43.1616 ; 44.0421 ; 45.0488 ; 45.9074 ; 46.1857 ; 46.5845 ; 47.1224 ; 47.8076 ; 48.557 ; 48.7516 ; 49.0213 ; 49.3852 ; 49.8652 ; 50.0461]

Bolt 2 - Tensile Force (kips): [48.3404 ; 48.0356 ; 47.7778 ; 47.4666 ; 47.1127 ; 46.316 ; 43.449 ; 39.0635 ; 33.8307 ; 33.7596 ; 33.7487 ; 33.6904 ; 33.5597 ; 33.5278 ; 33.5152 ; 33.507 ; 33.5107 ; 33.6257 ; 33.7717 ; 33.8218 ; 33.8972 ; 34.0573 ; 34.317 ; 34.4206 ; 34.5664 ; 34.7759 ; 35.097 ; 35.5305 ; 35.7044 ; 35.9814 ; 36.4205 ; 36.9791 ; 37.7749 ; 38.0461 ; 38.4378 ; 38.9613 ; 39.6598 ; 39.8986 ; 40.2782 ; 40.8602 ; 41.0523 ; 41.3249 ; 41.6914 ; 42.1454 ; 42.7225 ; 43.3866 ; 44.1394 ; 44.284 ; 44.4121 ; 44.6485 ; 45.103 ; 45.8918 ; 46.1935 ; 46.6402 ; 47.2536 ; 47.9541 ; 48.5396 ; 49.0855 ; 49.2913 ; 49.6026 ; 50.0512 ; 50.6786 ; 51.5036 ; 51.7414 ; 52.1088 ; 52.6674 ; 53.4852 ; 53.7858]

Bolt 2 - Shear Force (kips): [0.05268 ; 0.343207 ; 0.627963 ; 0.97062 ; 1.35015 ; 2.14025 ; 4.4787 ; 7.65852 ; 11.1025 ; 11.1354 ; 11.1357 ; 11.2699 ; 11.5272 ; 11.5757 ; 11.5802 ; 11.5781 ; 11.579 ; 12.0426 ; 12.5466 ; 12.7591 ; 12.9908 ; 13.4068 ; 13.7948 ; 13.9301 ; 14.2271 ; 14.8006 ; 15.6981 ; 16.874 ; 17.2187 ; 17.6316 ; 18.0973 ; 19.0305 ; 20.1891 ; 20.5287 ; 21.0303 ; 21.731 ; 22.6257 ; 22.9611 ; 23.4344 ; 24.0382 ; 24.2407 ; 24.5659 ; 25.0197 ; 25.6176 ; 26.3879 ; 27.2342 ; 28.5515 ; 28.9362 ; 29.3322 ; 29.8401 ; 30.4581 ; 31.1877 ; 31.4603 ; 31.8376 ; 32.3344 ; 33.0402 ; 33.5664 ; 34.0137 ; 34.1716 ; 34.3731 ; 34.6448 ; 34.9864 ; 35.4255 ; 35.5476 ; 35.7104 ; 35.9185 ; 36.1877 ; 36.3005]

Bolt 3 - Tensile Force (kips): [50 ; 49.9562 ; 50.042 ; 50.3761 ; 51.3052 ; 52.471 ; 53.1277 ; 54.2003 ; 55.8034 ; 55.8045 ; 55.7977 ; 55.9438 ; 56.1602 ; 56.1871 ; 56.1846 ; 56.1746 ; 56.1935 ; 56.8204 ; 57.5624 ; 57.8547 ; 58.2336 ; 58.8476 ; 59.7307 ; 60.1233 ; 60.6984 ; 61.5229 ; 62.6352 ; 64.058 ; 64.5481 ; 65.2515 ; 66.2287 ; 67.553 ; 69.3595 ; 69.9974 ; 70.8945 ; 72.1355 ; 73.758 ; 74.321 ; 75.1247 ; 76.2593 ; 76.6715 ; 77.2756 ; 78.1834 ; 79.548 ; 81.4178 ; 83.8182 ; 86.9744 ; 87.7064 ; 88.3803 ; 89.3215 ; 90.6129 ; 92.3254 ; 92.9081 ; 93.7322 ; 94.7854 ; 95.8001 ; 96.492 ; 97.0133 ; 97.1831 ; 97.4204 ; 97.7347 ; 98.1291 ; 98.5551 ; 98.6455 ; 98.716 ; 98.7677 ; 98.817 ; 98.835]

Bolt 3 - Shear Force (kips): [0.0109564 ; 0.0648539 ; 0.135546 ; 0.232766 ; 0.358058 ; 0.483865 ; 0.552643 ; 0.650716 ; 0.77742 ; 0.777888 ; 0.777466 ; 0.788274 ; 0.803985 ; 0.806061 ; 0.80605 ; 0.805542 ; 0.806953 ; 0.851832 ; 0.908835 ; 0.931949 ; 0.962502 ; 1.01528 ; 1.10221 ; 1.14061 ; 1.19788 ; 1.27888 ; 1.38644 ; 1.52153 ; 1.56683 ; 1.6299 ; 1.71586 ; 1.83146 ; 1.97112 ; 2.01549 ; 2.07429 ; 2.14238 ; 2.22172 ; 2.24604 ; 2.28023 ; 2.32459 ; 2.33828 ; 2.35751 ; 2.37991 ; 2.40689 ; 2.55133 ; 4.55504 ; 7.24509 ; 7.90272 ; 8.3888 ; 8.92783 ; 9.47684 ; 10.0256 ; 10.1896 ; 10.3918 ; 10.5662 ; 10.3942 ; 9.87171 ; 9.1816 ; 8.8927 ; 8.45959 ; 7.87132 ; 7.08781 ; 6.09675 ; 5.8325 ; 5.48839 ; 5.0273 ; 4.4147 ; 4.17905]

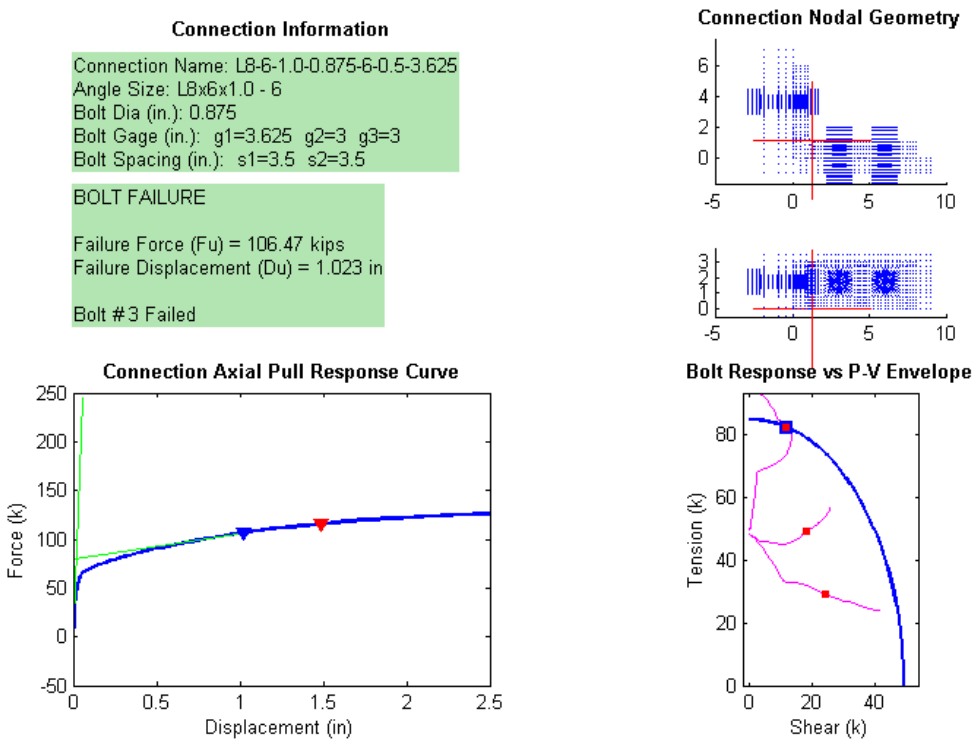


Figure B.281 Connection L8_6_1.0_0.875_6_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.875_6_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 4.1108e+003

Plastic Stiffness (k/in): 26.5812

Displacement (in): [6.2312e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.048103 ; 0.056446 ; 0.06896 ; 0.087731 ; 0.11589 ; 0.15812 ; 0.22148 ; 0.24523 ; 0.28087 ; 0.29423 ; 0.29924 ; 0.30676 ; 0.31804 ; 0.33495 ; 0.36032 ; 0.39837 ; 0.41264 ; 0.43405 ; 0.44208 ; 0.45412 ; 0.47218 ; 0.49927 ; 0.53991 ; 0.60086 ; 0.6161 ; 0.63134 ; 0.63706 ; 0.64563 ; 0.65849 ; 0.67777 ; 0.7067 ; 0.7501 ; 0.81519 ; 0.8396 ; 0.87622 ; 0.93114 ; 0.95174 ; 0.98263 ; 1.029 ; 1.0985 ; 1.2028 ; 1.2418 ; 1.3005 ; 1.3885 ; 1.5204 ; 1.5699 ; 1.6442 ; 1.7555 ; 1.9225 ; 2.1725 ; 2.235 ; 2.3288 ; 2.4694 ; 2.5]

Force (kips): [-1.55653 ; 3.13047 ; 6.47237 ; 10.5663 ; 15.5256 ; 20.9618 ; 26.3258 ; 30.515 ; 31.3883 ; 32.2849 ; 33.2257 ; 34.2768 ; 35.5427 ; 37.0473 ; 38.8294 ; 39.4581 ; 40.3436 ; 40.6658 ; 40.8157 ; 41.0358 ; 41.3185 ; 41.7314 ; 42.3366 ; 43.1573 ; 43.4445 ; 43.9002 ; 44.0791 ; 44.3279 ; 44.6639 ; 45.1452 ; 45.8196 ; 46.8845 ; 47.1448 ; 47.4002 ; 47.4997 ; 47.6444 ; 47.8555 ; 48.178 ; 48.6873 ; 49.4237 ; 50.386 ; 50.7411 ; 51.261 ; 52.01 ; 52.2984 ; 52.709 ; 53.314 ; 54.1589 ; 55.3068 ; 55.715 ; 56.3013 ; 57.1153 ; 58.1954 ; 58.5765 ; 59.1111 ; 59.8448 ; 60.8124 ; 61.9858 ; 62.2201 ; 62.5379 ; 62.9683 ; 63.0538]

Bolt 1 - Tensile Force (kips): [48.3351 ; 48.1975 ; 48.0878 ; 47.9397 ; 47.7444 ; 47.4998 ; 47.1996 ; 46.3034 ; 45.9116 ; 45.3478 ; 44.5547 ; 43.4281 ; 41.8208 ; 39.6866 ; 36.9693 ; 35.9281 ; 34.4505 ; 33.9482 ; 33.7667 ; 33.5084 ; 33.2691 ; 33.2476 ; 33.2279 ; 33.2157 ; 33.215 ; 33.2154 ; 33.1366 ; 33.0203 ; 33.0138 ; 33.0176 ; 33.0398 ; 32.988 ; 32.9696 ; 32.9541 ; 32.9404 ; 32.9287 ; 32.9361 ; 32.9053 ; 32.7338 ; 32.3257 ; 31.8782 ; 31.5472 ; 31.1947 ; 30.6055 ; 30.2271 ; 29.7244 ; 29.0099 ; 28.1887 ; 27.5591 ; 27.2909 ; 26.9755 ; 26.6417 ; 26.1339 ; 25.8185 ; 25.3605 ; 24.7989 ; 24.2931 ; 23.9152 ; 23.8723 ; 23.8409 ; 23.8315 ; 23.8321]

Bolt 1 - Shear Force (kips): [0.0769369 ; 0.126675 ; 0.254462 ; 0.420012 ; 0.633849 ; 0.890353 ; 1.18319 ; 2.02073 ; 2.3582 ; 2.82554 ; 3.4612 ; 4.32667 ; 5.49952 ; 6.97636 ; 8.74812 ; 9.38551 ; 10.2626 ; 10.5533 ; 10.66 ; 10.8115 ; 10.9524 ; 10.9613 ; 10.9624 ; 10.9606 ; 10.9607 ; 10.9609 ; 11.1256 ; 11.3001 ; 11.3069 ; 11.3078 ; 11.3075 ; 12.0804 ; 12.3508 ; 12.6075 ; 12.7618 ; 12.9671 ; 13.1579 ; 13.5137 ; 14.5297 ; 16.3807 ; 18.1455 ; 18.9532 ; 19.8238 ; 21.1672 ; 21.8719 ; 22.8165 ; 24.2668 ; 26.1356 ; 28.1267 ; 28.8498 ; 29.7899 ; 30.9672 ; 32.8782 ; 33.7341 ; 34.942 ; 36.5372 ; 38.3002 ; 40.0139 ; 40.3304 ; 40.7986 ; 41.4194 ; 41.546]

Bolt 2 - Tensile Force (kips): [48.3268 ; 48.1762 ; 48.0423 ; 47.8779 ; 47.6834 ; 47.4752 ; 47.2892 ; 46.6835 ; 46.4526 ; 46.1803 ; 45.9842 ; 45.9276 ; 45.9283 ; 45.7192 ; 45.3693 ; 45.2714 ; 45.1952 ; 45.1941 ; 45.1866 ; 45.1806 ; 45.185 ; 45.1644 ; 45.1399 ; 45.1659 ; 45.1909 ; 45.2238 ; 45.2668 ; 45.3251 ; 45.3707 ; 45.4432 ; 45.5653 ; 46.0187 ; 46.1537 ; 46.2894 ; 46.349 ; 46.4396 ; 46.5687 ; 46.7363 ; 46.96 ; 47.3556 ; 47.9295 ; 48.1156 ; 48.4075 ; 48.8203 ; 48.9243 ; 49.0375 ; 49.2363 ; 49.6169 ; 50.2365 ; 50.3834 ; 50.6452 ; 51.1205 ; 51.915 ; 52.1754 ; 52.5621 ; 53.1388 ; 53.9686 ; 55.0924 ; 55.3794 ; 55.7982 ; 56.3951 ; 56.5227]

Bolt 2 - Shear Force (kips): [0.0553837 ; 0.182268 ; 0.345047 ; 0.553265 ; 0.818714 ; 1.12757 ; 1.46955 ; 2.30598 ; 2.63027 ; 3.07678 ; 3.66014 ; 4.41707 ; 5.40318 ; 6.61649 ; 8.0252 ; 8.53492 ; 9.25362 ; 9.50638 ; 9.60775 ; 9.75802 ; 9.97312 ; 10.3069 ; 10.7802 ; 11.4061 ; 11.6183 ; 11.9282 ; 12.0156 ; 12.1492 ; 12.3718 ; 12.6835 ; 13.1427 ; 14.0738 ; 14.2534 ; 14.452 ; 14.5093 ; 14.592 ; 14.8147 ; 15.1892 ; 15.6549 ; 16.0073 ; 16.5471 ; 16.7591 ; 17.0947 ; 17.4886 ; 17.6357 ; 17.9478 ; 18.3094 ; 18.6576 ; 19.3047 ; 19.7529 ; 20.361 ; 21.177 ; 21.9371 ; 22.2671 ; 22.7148 ; 23.2818 ; 24.0569 ; 25.0428 ; 25.1883 ; 25.3737 ; 25.6541 ; 25.7085]

Bolt 3 - Tensile Force (kips): [50 ; 49.8896 ; 49.8782 ; 49.992 ; 50.3349 ; 51.1554 ; 52.4705 ; 53.901 ; 54.3476 ; 54.9547 ; 55.7898 ; 56.9571 ; 58.5849 ; 60.8446 ; 63.7697 ; 64.7449 ; 66.1105 ; 66.598 ; 66.7758 ; 67.0257 ; 67.3673 ; 67.8195 ; 68.4235 ; 69.2303 ; 69.5188 ; 70.0495 ; 70.2633 ; 70.5781 ; 71.0175 ; 71.6533 ; 72.5961 ; 74.0458 ; 74.3908 ; 74.7193 ; 74.8442 ; 75.0282 ; 75.3002 ; 75.7118 ; 76.3371 ; 77.2815 ; 78.6468 ; 79.1412 ; 79.8882 ; 80.9146 ; 81.287 ; 81.774 ; 82.4837 ; 83.401 ; 84.5108 ; 84.9225 ; 85.5589 ; 86.564 ; 87.9154 ; 88.3295 ; 88.9364 ; 89.8817 ; 91.0581 ; 92.3729 ; 92.581 ; 92.8462 ; 93.1841 ; 93.2471]

Bolt 3 - Shear Force (kips): [0.0341261 ; 0.0275511 ; 0.0747659 ; 0.141124 ; 0.231794 ; 0.353834 ; 0.512612 ; 0.724072 ; 0.793367 ; 0.882438 ; 0.999826 ; 1.15909 ; 1.38101 ; 1.63904 ; 1.88472 ; 1.9647 ; 2.07811 ; 2.1199 ; 2.14414 ; 2.18198 ; 2.23072 ; 2.31512 ; 2.91929 ; 5.00277 ; 5.55926 ; 7.06327 ; 7.53835 ; 8.08332 ; 8.78472 ; 9.71064 ; 10.7396 ; 11.7656 ; 11.9663 ; 12.1203 ; 12.1756 ; 12.2605 ; 12.3792 ; 12.5376 ; 12.777 ; 13.0825 ; 13.3845 ; 13.4762 ; 13.3529 ; 12.9142 ; 12.6355 ; 12.2764 ; 11.6337 ; 10.7785 ; 9.62615 ; 9.22128 ; 8.8407 ; 8.37343 ; 7.55872 ; 7.26105 ; 6.83424 ; 6.23361 ; 5.46095 ; 4.38418 ; 4.04008 ; 3.50872 ; 2.8245 ; 2.68547]

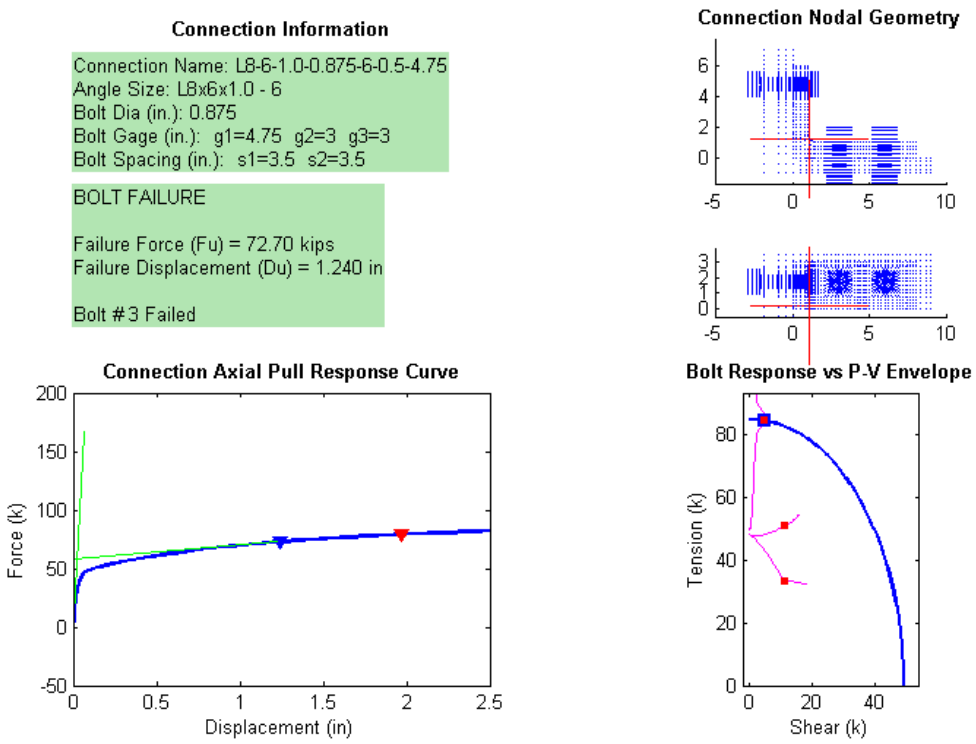


Figure B.282 Connection L8_6_1.0_0.875_6_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.875_6_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 2.4406e+003

Plastic Stiffness (k/in): 12.0268

Displacement (in): [6.1151e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.16699 ; 0.19514 ; 0.23738 ; 0.30073 ; 0.39576 ; 0.53831 ; 0.59176 ; 0.67194 ; 0.70201 ; 0.74711 ; 0.81476 ; 0.91624 ; 0.9543 ; 1.0114 ; 1.097 ; 1.2254 ; 1.2736 ; 1.3458 ; 1.4542 ; 1.4948 ; 1.5558 ; 1.6472 ; 1.7844 ; 1.7972 ; 1.8165 ; 1.8455 ; 1.8889 ; 1.954 ; 2.0516 ; 2.198 ; 2.4177 ; 2.5]

Force (kips): [-1.53349 ; 1.38048 ; 3.23339 ; 5.6289 ; 8.67025 ; 12.442 ; 16.4117 ; 20.1189 ; 22.8164 ; 24.245 ; 25.4371 ; 25.8136 ; 26.3124 ; 26.977 ; 27.9167 ; 29.207 ; 30.8358 ; 31.3908 ; 32.1767 ; 32.4637 ; 32.8716 ; 33.4485 ; 34.24 ; 34.5188 ; 34.9252 ; 35.4964 ; 36.2687 ; 36.5419 ; 36.9277 ; 37.4552 ; 37.6557 ; 37.9379 ; 38.3421 ; 38.8929 ; 38.9432 ; 39.0168 ; 39.1233 ; 39.2759 ; 39.4955 ; 39.8149 ; 40.2548 ; 40.8084 ; 40.9873]

Bolt 1 - Tensile Force (kips): [48.3348 ; 48.25 ; 48.1936 ; 48.1133 ; 48.0003 ; 47.8457 ; 47.6595 ; 47.4477 ; 47.2594 ; 47.1387 ; 46.7014 ; 46.4156 ; 45.9496 ; 45.1927 ; 43.9909 ; 42.1995 ; 39.5458 ; 38.529 ; 37.0197 ; 36.4605 ; 35.6607 ; 34.5652 ; 33.4059 ; 33.3895 ; 33.3804 ; 33.3819 ; 33.3917 ; 33.2891 ; 33.2939 ; 33.3193 ; 33.3365 ; 33.3646 ; 33.3153 ; 33.2525 ; 33.2374 ; 33.2245 ; 33.2193 ; 33.2319 ; 33.2371 ; 33.0826 ; 32.7933 ; 32.5348 ; 32.3757]

Bolt 1 - Shear Force (kips): [0.0765556 ; 0.0684752 ; 0.134285 ; 0.229765 ; 0.358945 ; 0.532398 ; 0.737315 ; 0.958983 ; 1.14741 ; 1.26987 ; 1.70227 ; 1.96514 ; 2.37187 ; 3.00158 ; 3.95612 ; 5.29612 ; 7.15299 ; 7.83086 ; 8.80716 ; 9.15298 ; 9.64174 ; 10.2974 ; 10.9936 ; 11.005 ; 11.011 ; 11.0149 ; 11.019 ; 11.2234 ; 11.2229 ; 11.2114 ; 11.2088 ; 11.2052 ; 11.6681 ; 12.5272 ; 12.6657 ; 12.8235 ; 13.004 ; 13.187 ; 13.4272 ; 14.4187 ; 15.8985 ; 17.3019 ; 17.8644]

Bolt 2 - Tensile Force (kips): [48.3261 ; 48.2406 ; 48.1741 ; 48.079 ; 47.9663 ; 47.8391 ; 47.7306 ; 47.6845 ; 47.7238 ; 47.7662 ; 47.6546 ; 47.6213 ; 47.6445 ; 47.7647 ; 48.0051 ; 48.2945 ; 48.5733 ; 48.7366 ; 49.0489 ; 49.1755 ; 49.3831 ; 49.6851 ; 50.1262 ; 50.2599 ; 50.4556 ; 50.7272 ; 51.1288 ; 51.2813 ; 51.4757 ; 51.742 ; 51.7794 ; 51.883 ; 52.1488 ; 52.5671 ; 52.6063 ; 52.6543 ; 52.7346 ; 52.8403 ; 53.0068 ; 53.2891 ; 53.6885 ; 54.2892 ; 54.5067]

Bolt 2 - Shear Force (kips): [0.055295 ; 0.103728 ; 0.197805 ; 0.32373 ; 0.4911 ; 0.711911 ; 0.963027 ; 1.2253 ; 1.44816 ; 1.59671 ; 2.02455 ; 2.26629 ; 2.6316 ; 3.17713 ; 3.97038 ; 5.0448 ; 6.46868 ; 6.95825 ; 7.6445 ; 7.88791 ; 8.23104 ; 8.70904 ; 9.35112 ; 9.59675 ; 9.94743 ; 10.4326 ; 11.073 ; 11.2642 ; 11.5682 ; 11.9816 ; 12.3226 ; 12.7852 ; 13.179 ; 13.7293 ; 13.7652 ; 13.847 ; 13.9754 ; 14.1886 ; 14.5713 ; 14.8434 ; 15.1204 ; 15.4863 ; 15.5815]

Bolt 3 - Tensile Force (kips): [50 ; 49.9015 ; 49.8452 ; 49.8442 ; 49.9726 ; 50.3247 ; 51.2062 ; 52.7319 ; 54.9569 ; 58.0379 ; 61.0303 ; 61.904 ; 63.069 ; 64.6364 ; 66.7939 ; 69.6514 ; 73.1381 ; 74.2549 ; 75.7985 ; 76.3554 ; 77.1447 ; 78.3033 ; 79.9078 ; 80.4823 ; 81.3396 ; 82.5746 ; 84.2861 ; 84.8779 ; 85.71 ; 86.7752 ; 87.1607 ; 87.6772 ; 88.4087 ; 89.4633 ; 89.5565 ; 89.6927 ; 89.8898 ; 90.1876 ; 90.6659 ; 91.3886 ; 92.1472 ; 92.9581 ; 93.1759]

Bolt 3 - Shear Force (kips): [0.036057 ; 0.012769 ; 0.038004 ; 0.080967 ; 0.14164 ; 0.22591 ; 0.32988 ; 0.45856 ; 0.62794 ; 0.8351 ; 1.0146 ; 1.0633 ; 1.1156 ; 1.1639 ; 1.2396 ; 1.3898 ; 1.6423 ; 1.7121 ; 1.7948 ; 1.8328 ; 1.8825 ; 1.9589 ; 2.0868 ; 2.3309 ; 2.8748 ; 3.6491 ; 4.5613 ; 4.8313 ; 4.8041 ; 4.5956 ; 4.3356 ; 3.9965 ; 3.404 ; 2.6754 ; 2.6248 ; 2.5578 ; 2.4708 ; 2.3754 ; 2.2974 ; 2.2897 ; 2.2338 ; 2.3332 ; 2.4037]

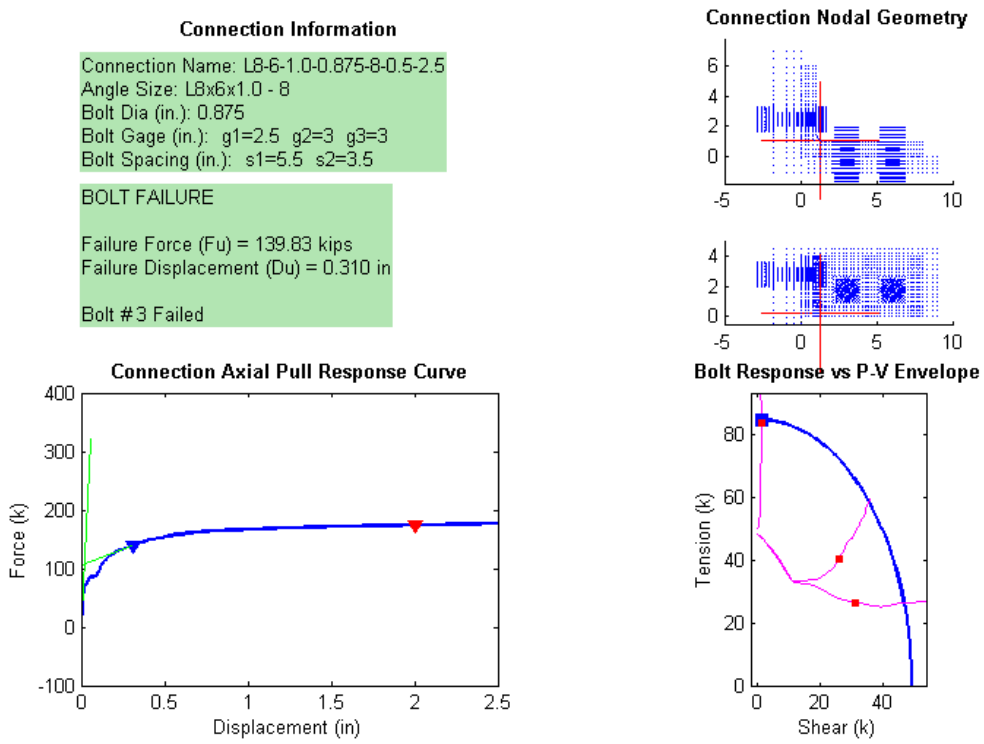


Figure B.283 Connection L8_6_1.0_0.875_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.875_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 5.5695e+003

Plastic Stiffness (k/in): 107.5078

Displacement (in): [3.7875e-036 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.055916 ; 0.064259 ; 0.067387 ; 0.07208 ; 0.07384 ; 0.076479 ; 0.080439 ; 0.086378 ; 0.088606 ; 0.091946 ; 0.096958 ; 0.098837 ; 0.10166 ; 0.10588 ; 0.10747 ; 0.10985 ; 0.11342 ; 0.11877 ; 0.12679 ; 0.1298 ; 0.13432 ; 0.14109 ; 0.14787 ; 0.15464 ; 0.1648 ; 0.18004 ; 0.20289 ; 0.23718 ; 0.25004 ; 0.26933 ; 0.29826 ; 0.34165 ; 0.35793 ; 0.38234 ; 0.41895 ; 0.47387 ; 0.5288 ; 0.58372 ; 0.6661 ; 0.697 ; 0.74334 ; 0.81285 ; 0.83891 ; 0.87801 ; 0.93666 ; 1.0246 ; 1.1566 ; 1.2061 ; 1.2803 ; 1.3917 ; 1.5587 ; 1.8087 ; 2.0587 ; 2.3087 ; 2.5]

Force (kips): [-1.20758 ; 22.3813 ; 25.9875 ; 28.9877 ; 32.3827 ; 34.2141 ; 36.1452 ; 38.6978 ; 41.7599 ; 42.6113 ; 42.9266 ; 42.9201 ; 42.9075 ; 42.903 ; 43.4773 ; 43.5757 ; 43.5653 ; 43.56 ; 43.74 ; 45.3522 ; 45.8829 ; 46.5426 ; 47.547 ; 47.9167 ; 48.7419 ; 49.987 ; 51.6123 ; 53.5654 ; 54.1881 ; 55.0377 ; 56.2318 ; 57.3071 ; 58.2549 ; 59.4833 ; 61.1088 ; 63.1546 ; 65.7867 ; 66.6318 ; 67.7901 ; 69.3452 ; 71.384 ; 72.089 ; 73.0621 ; 74.3702 ; 76.0897 ; 77.5809 ; 78.8661 ; 80.4474 ; 80.9395 ; 81.5152 ; 82.1344 ; 82.3361 ; 82.6227 ; 83.0143 ; 83.5374 ; 84.2213 ; 84.4505 ; 84.7757 ; 85.2277 ; 85.8496 ; 86.6851 ; 87.4191 ; 88.0747 ; 88.5251]

Bolt 1 - Tensile Force (kips): [48.3418 ; 47.4487 ; 47.2761 ; 47.1211 ; 46.8201 ; 45.653 ; 43.5772 ; 40.3068 ; 35.4243 ; 33.8253 ; 33.2437 ; 33.2304 ; 33.2168 ; 33.2124 ; 32.9699 ; 32.9385 ; 32.9203 ; 32.9157 ; 32.8947 ; 32.8115 ; 32.7781 ; 32.7464 ; 32.6866 ; 32.6418 ; 32.554 ; 32.4191 ; 32.222 ; 32.0181 ; 31.9374 ; 31.7564 ; 31.3469 ; 31.0776 ; 30.8958 ; 30.4992 ; 29.6181 ; 28.4602 ; 27.448 ; 27.2086 ; 26.8885 ; 26.6035 ; 26.5074 ; 26.3441 ; 26.0247 ; 25.5953 ; 25.2634 ; 25.1898 ; 25.2972 ; 25.5668 ; 25.6474 ; 25.7512 ; 25.9282 ; 25.9922 ; 26.0669 ; 26.1727 ; 26.2401 ; 26.1948 ; 26.1837 ; 26.1842 ; 26.2265 ; 26.3624 ; 26.6236 ; 26.8511 ; 26.9014 ; 26.8607]

Bolt 1 - Shear Force (kips): [0.0670674 ; 0.959115 ; 1.1245 ; 1.26706 ; 1.54636 ; 2.57257 ; 4.21577 ; 6.56174 ; 9.68858 ; 10.6261 ; 10.9666 ; 10.965 ; 10.9614 ; 10.96 ; 11.3394 ; 11.3645 ; 11.3646 ; 11.3631 ; 11.5325 ; 12.3122 ; 12.5823 ; 12.9237 ; 13.5131 ; 13.727 ; 14.4093 ; 15.1501 ; 16.0755 ; 16.9969 ; 17.3035 ; 17.8144 ; 18.8092 ; 19.4234 ; 19.8541 ; 20.599 ; 22.233 ; 24.4751 ; 27.1915 ; 28.0005 ; 29.1112 ; 30.4819 ; 32.3273 ; 33.1698 ; 34.5868 ; 36.445 ; 38.3423 ; 39.6053 ; 40.5677 ; 41.8108 ; 42.2596 ; 42.8543 ; 43.5957 ; 43.8519 ; 44.2749 ; 44.8964 ; 45.7933 ; 47.0841 ; 47.5074 ; 48.0828 ; 48.8304 ; 49.7875 ; 50.9719 ; 52.0182 ; 53.1088 ; 53.7032]

Bolt 2 - Tensile Force (kips): [48.3396 ; 47.3828 ; 47.2074 ; 47.055 ; 46.7638 ; 45.6029 ; 43.5477 ; 40.3388 ; 35.6478 ; 34.0946 ; 33.5312 ; 33.5157 ; 33.5032 ; 33.4994 ; 33.3144 ; 33.2419 ; 33.2234 ; 33.2186 ; 33.2267 ; 33.31 ; 33.3436 ; 33.3984 ; 33.5206 ; 33.5536 ; 33.5949 ; 33.5745 ; 33.5651 ; 33.6045 ; 33.6425 ; 33.7219 ; 33.8973 ; 33.9573 ; 34.0463 ; 34.3241 ; 34.9474 ; 35.881 ; 37.0763 ; 37.6416 ; 38.5661 ; 39.9252 ; 41.7572 ; 42.2888 ; 43.0339 ; 44.0572 ; 45.333 ; 46.2641 ; 47.0641 ; 48.2232 ; 48.6282 ; 49.1921 ; 49.9414 ; 50.2066 ; 50.599 ; 51.1455 ; 51.8542 ; 52.7703 ; 53.093 ; 53.5401 ; 54.1732 ; 55.093 ; 56.3905 ; 57.5219 ; 58.6091 ; 59.4259]

Bolt 2 - Shear Force (kips): [0.0464067 ; 1.08945 ; 1.27145 ; 1.42808 ; 1.72202 ; 2.73766 ; 4.37273 ; 6.70315 ; 9.76616 ; 10.7091 ; 11.053 ; 11.0568 ; 11.0554 ; 11.0545 ; 11.3802 ; 11.4863 ; 11.4867 ; 11.4858 ; 11.4969 ; 12.3267 ; 12.6053 ; 12.9537 ; 13.4071 ; 13.5883 ; 13.7883 ; 14.4271 ; 15.3181 ; 16.5352 ; 16.9016 ; 17.3339 ; 17.7145 ; 18.3728 ; 19.0562 ; 19.7642 ; 20.4892 ; 21.5934 ; 23.4959 ; 24.0236 ; 24.681 ; 25.4987 ; 26.4386 ; 26.7964 ; 27.1924 ; 27.644 ; 28.3802 ; 29.2683 ; 29.9912 ; 30.7322 ; 30.9653 ; 31.2629 ; 31.685 ; 31.8482 ; 32.0621 ; 32.3323 ; 32.6965 ; 33.1819 ; 33.3283 ; 33.5267 ; 33.7949 ; 34.1549 ; 34.6025 ; 35.0626 ; 35.4529 ; 35.7127]

Bolt 3 - Tensile Force (kips): [50 ; 50.5116 ; 50.9082 ; 51.3944 ; 52.0186 ; 52.3873 ; 52.8019 ; 53.4364 ; 54.4785 ; 54.8531 ; 55.0041 ; 54.9994 ; 54.9882 ; 54.9841 ; 55.2758 ; 55.3268 ; 55.317 ; 55.3117 ; 55.4118 ; 56.3663 ; 56.7194 ; 57.1897 ; 57.9562 ; 58.2615 ; 58.9536 ; 60.076 ; 61.7099 ; 63.9529 ; 64.7193 ; 65.7968 ; 67.344 ; 68.7636 ; 70.0268 ; 71.6567 ; 73.706 ; 76.113 ; 79.0215 ; 79.9585 ; 81.2496 ; 82.9902 ; 85.276 ; 86.0472 ; 87.0875 ; 88.4825 ; 90.3464 ; 91.966 ; 93.3592 ; 95.0247 ; 95.5029 ; 95.9933 ; 96.3749 ; 96.4755 ; 96.6058 ; 96.7668 ; 96.9599 ; 97.1867 ; 97.2597 ; 97.3581 ; 97.4844 ; 97.6503 ; 97.8702 ; 98.0656 ; 98.2445 ; 98.3708]

Bolt 3 - Shear Force (kips): [0.018424 ; 0.25949 ; 0.31556 ; 0.36537 ; 0.42518 ; 0.46055 ; 0.49738 ; 0.54901 ; 0.61411 ; 0.63231 ; 0.63921 ; 0.6389 ; 0.63821 ; 0.63795 ; 0.65109 ; 0.65336 ; 0.65293 ; 0.65267 ; 0.65681 ; 0.69124 ; 0.70401 ; 0.72004 ; 0.74495 ; 0.75385 ; 0.77449 ; 0.80883 ; 0.86115 ; 0.93418 ; 0.95448 ; 0.97692 ; 0.99797 ; 1.0088 ; 1.0147 ; 1.0214 ; 1.0279 ; 1.069 ; 1.1405 ; 1.1548 ; 1.1678 ; 1.1761 ; 1.1608 ; 1.1449 ; 1.121 ; 1.1014 ; 1.0659 ; 0.98956 ; 0.8831 ; 0.71176 ; 0.6455 ; 0.54594 ; 0.4176 ; 0.37899 ; 0.32918 ; 0.27128 ; 0.21018 ; 0.15193 ; 0.13626 ; 0.1194 ; 0.10583 ; 0.096371 ; 0.088146 ; 0.083895 ; 0.079603 ; 0.077833]

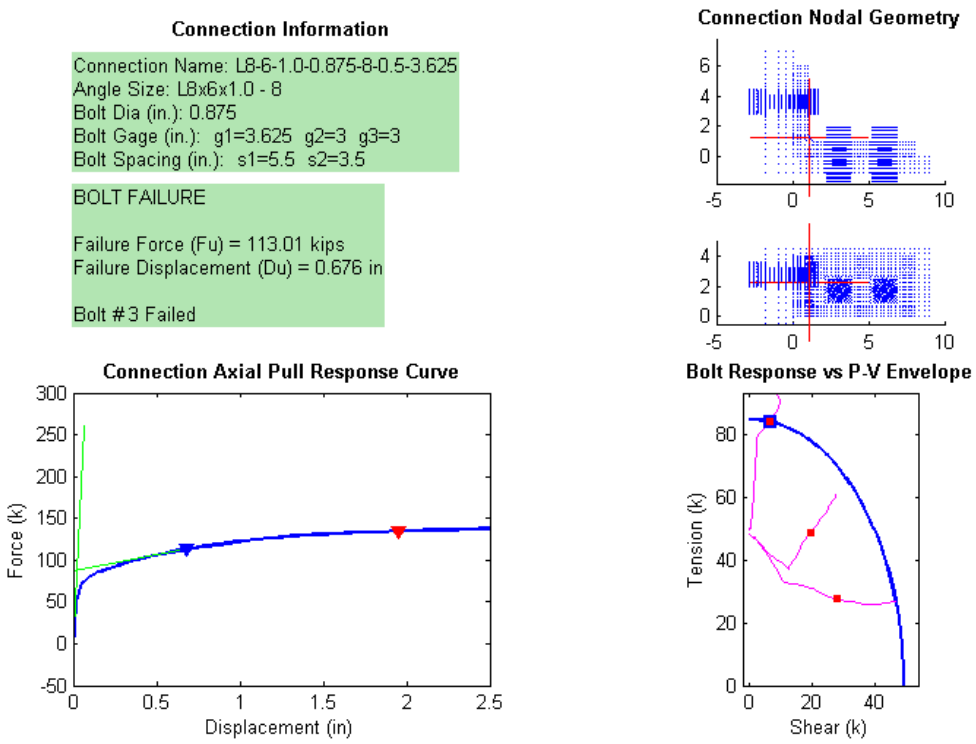


Figure B.284 Connection L8_6_1.0_0.875_8_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.875_8_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 4.1868e+003

Plastic Stiffness (k/in): 39.5629

Displacement (in): [3.8321e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.014831 ; 0.017303 ; 0.021011 ; 0.026573 ; 0.034916 ; 0.04743 ; 0.066201 ; 0.094358 ; 0.13659 ; 0.15243 ; 0.17619 ; 0.1851 ; 0.19846 ; 0.21851 ; 0.24857 ; 0.25985 ; 0.27676 ; 0.30213 ; 0.31165 ; 0.32592 ; 0.34732 ; 0.37943 ; 0.39147 ; 0.39599 ; 0.40276 ; 0.41292 ; 0.42816 ; 0.45102 ; 0.4853 ; 0.53674 ; 0.58817 ; 0.6396 ; 0.71675 ; 0.79389 ; 0.87104 ; 0.98676 ; 1.0302 ; 1.0953 ; 1.1929 ; 1.3394 ; 1.3943 ; 1.4767 ; 1.6002 ; 1.6466 ; 1.7161 ; 1.8203 ; 1.9768 ; 2.2113 ; 2.2738 ; 2.3676 ; 2.5]

Force (kips): [-1.27722 ; 3.36324 ; 6.90015 ; 9.9067 ; 13.8027 ; 18.676 ; 20.2351 ; 22.3046 ; 24.9167 ; 28.1858 ; 31.4446 ; 34.5319 ; 37.2008 ; 39.7759 ; 42.2812 ; 42.9352 ; 43.6033 ; 44.0332 ; 44.3928 ; 44.9307 ; 46.1331 ; 46.5261 ; 47.0855 ; 47.821 ; 48.1078 ; 48.5435 ; 49.1629 ; 50.0039 ; 50.3059 ; 50.4235 ; 50.5982 ; 50.8669 ; 51.2609 ; 51.7984 ; 52.5972 ; 53.7604 ; 54.8609 ; 55.8783 ; 57.21 ; 58.37 ; 59.4254 ; 60.854 ; 61.3526 ; 62.0653 ; 63.0557 ; 64.3401 ; 64.7594 ; 65.2891 ; 65.9299 ; 66.1449 ; 66.4424 ; 66.8361 ; 67.353 ; 68.0054 ; 68.1615 ; 68.3803 ; 68.6703]

Bolt 1 - Tensile Force (kips): [48.3362 ; 48.1894 ; 48.0618 ; 47.9439 ; 47.7815 ; 47.558 ; 47.48 ; 47.3699 ; 47.2194 ; 47.0016 ; 46.2551 ; 44.6027 ; 41.3143 ; 37.4443 ; 33.5057 ; 33.2129 ; 33.1252 ; 32.9134 ; 32.8651 ; 32.8344 ; 32.674 ; 32.6446 ; 32.6078 ; 32.5301 ; 32.4803 ; 32.3545 ; 32.1373 ; 31.9097 ; 31.8061 ; 31.7321 ; 31.6103 ; 31.4253 ; 31.1748 ; 30.9385 ; 30.4702 ; 29.2635 ; 28.3258 ; 27.8064 ; 27.3004 ; 27.0597 ; 26.8936 ; 26.3337 ; 26.1065 ; 25.8786 ; 25.7404 ; 25.797 ; 25.8358 ; 25.9452 ; 26.0791 ; 26.1354 ; 26.234 ; 26.3758 ; 26.5547 ; 26.7148 ; 26.6904 ; 26.6678 ; 26.6099]

Bolt 1 - Shear Force (kips): [0.0679833 ; 0.151631 ; 0.301118 ; 0.433533 ; 0.61215 ; 0.848051 ; 0.927206 ; 1.03559 ; 1.17842 ; 1.37785 ; 2.06094 ; 3.41829 ; 5.85777 ; 8.4339 ; 10.7883 ; 10.9513 ; 10.9717 ; 11.3024 ; 11.3105 ; 11.3183 ; 12.4068 ; 12.5853 ; 12.9936 ; 13.5299 ; 13.9739 ; 14.8515 ; 16.0148 ; 17.1729 ; 17.5606 ; 17.7766 ; 18.1102 ; 18.5828 ; 19.1836 ; 19.8127 ; 20.9118 ; 23.2408 ; 25.3977 ; 27.0174 ; 28.9434 ; 30.5477 ; 32.0975 ; 34.9609 ; 35.9921 ; 37.2454 ; 38.6533 ; 40.1906 ; 40.6722 ; 41.3071 ; 42.1819 ; 42.5052 ; 42.9448 ; 43.5373 ; 44.3192 ; 45.417 ; 45.7241 ; 46.132 ; 46.7062]

Bolt 2 - Tensile Force (kips): [48.3253 ; 48.1852 ; 48.042 ; 47.9159 ; 47.7567 ; 47.5484 ; 47.4804 ; 47.391 ; 47.2798 ; 47.138 ; 46.5402 ; 45.1625 ; 42.437 ; 40.133 ; 38.764 ; 37.9855 ; 37.31 ; 37.6763 ; 37.8374 ; 38.297 ; 39.5095 ; 39.8708 ; 40.3733 ; 41.0702 ; 41.3324 ; 41.7253 ; 42.323 ; 43.1689 ; 43.4828 ; 43.6015 ; 43.7769 ; 44.0318 ; 44.3914 ; 44.9036 ; 45.6619 ; 46.5567 ; 47.3933 ; 48.2417 ; 49.5101 ; 50.655 ; 51.6613 ; 52.9754 ; 53.3483 ; 53.9139 ; 54.7545 ; 55.9867 ; 56.4173 ; 56.9986 ; 57.751 ; 58.0046 ; 58.3604 ; 58.8517 ; 59.4294 ; 60.1111 ; 60.2822 ; 60.5459 ; 60.9565]

Bolt 2 - Shear Force (kips): [0.04424 ; 0.189357 ; 0.362614 ; 0.514871 ; 0.71821 ; 0.982249 ; 1.06963 ; 1.18803 ; 1.34301 ; 1.55597 ; 2.21387 ; 3.52422 ; 5.8825 ; 8.24157 ; 10.3891 ; 11.2897 ; 12.2429 ; 12.3522 ; 12.6636 ; 13.0988 ; 13.5289 ; 13.8413 ; 14.3001 ; 14.7812 ; 14.9116 ; 15.0559 ; 15.2842 ; 15.6959 ; 15.8506 ; 15.9028 ; 15.975 ; 16.0821 ; 16.2381 ; 16.4729 ; 16.7859 ; 17.5192 ; 18.2762 ; 19.0213 ; 19.9249 ; 20.7581 ; 21.6245 ; 22.457 ; 22.8187 ; 23.3299 ; 24.0519 ; 24.7972 ; 25.0065 ; 25.2835 ; 25.6596 ; 25.8102 ; 26.0206 ; 26.2825 ; 26.7142 ; 27.1703 ; 27.2627 ; 27.3649 ; 27.4593]

Bolt 3 - Tensile Force (kips): [50 ; 49.8907 ; 49.8852 ; 49.9548 ; 50.1454 ; 50.5875 ; 50.8137 ; 51.2133 ; 51.8261 ; 52.6699 ; 53.7196 ; 55.1945 ; 57.1836 ; 60.1674 ; 63.9118 ; 64.9221 ; 65.9482 ; 66.5739 ; 67.1115 ; 67.8998 ; 69.6455 ; 70.243 ; 71.1024 ; 72.2597 ; 72.6841 ; 73.3094 ; 74.1935 ; 75.3923 ; 75.819 ; 75.9819 ; 76.2241 ; 76.6029 ; 77.1547 ; 77.9042 ; 79.0081 ; 80.4978 ; 81.967 ; 83.3114 ; 84.9621 ; 86.3631 ; 87.6947 ; 89.5222 ; 90.1581 ; 91.0436 ; 92.2153 ; 93.4246 ; 93.7945 ; 94.194 ; 94.6679 ; 94.8257 ; 95.0465 ; 95.4235 ; 95.9571 ; 96.6137 ; 96.7542 ; 96.9386 ; 97.1855]

Bolt 3 - Shear Force (kips): [0.035809 ; 0.030196 ; 0.079367 ; 0.12633 ; 0.19179 ; 0.28282 ; 0.31541 ; 0.36108 ; 0.42215 ; 0.50968 ; 0.6209 ; 0.75236 ; 0.88843 ; 1.1019 ; 1.3797 ; 1.4465 ; 1.5159 ; 1.5556 ; 1.5934 ; 1.6498 ; 1.7634 ; 1.8034 ; 1.8589 ; 1.9295 ; 1.9499 ; 1.9745 ; 2.0022 ; 2.0388 ; 2.0498 ; 2.0529 ; 2.0575 ; 2.0639 ; 2.0778 ; 2.1263 ; 2.2408 ; 3.1764 ; 4.6735 ; 6.0163 ; 7.1285 ; 7.8914 ; 8.6261 ; 9.298 ; 9.4911 ; 9.7748 ; 9.3339 ; 8.1036 ; 7.7828 ; 7.3288 ; 6.8332 ; 6.7151 ; 6.5557 ; 6.3566 ; 6.1788 ; 5.9269 ; 5.8611 ; 5.7822 ; 5.6931]

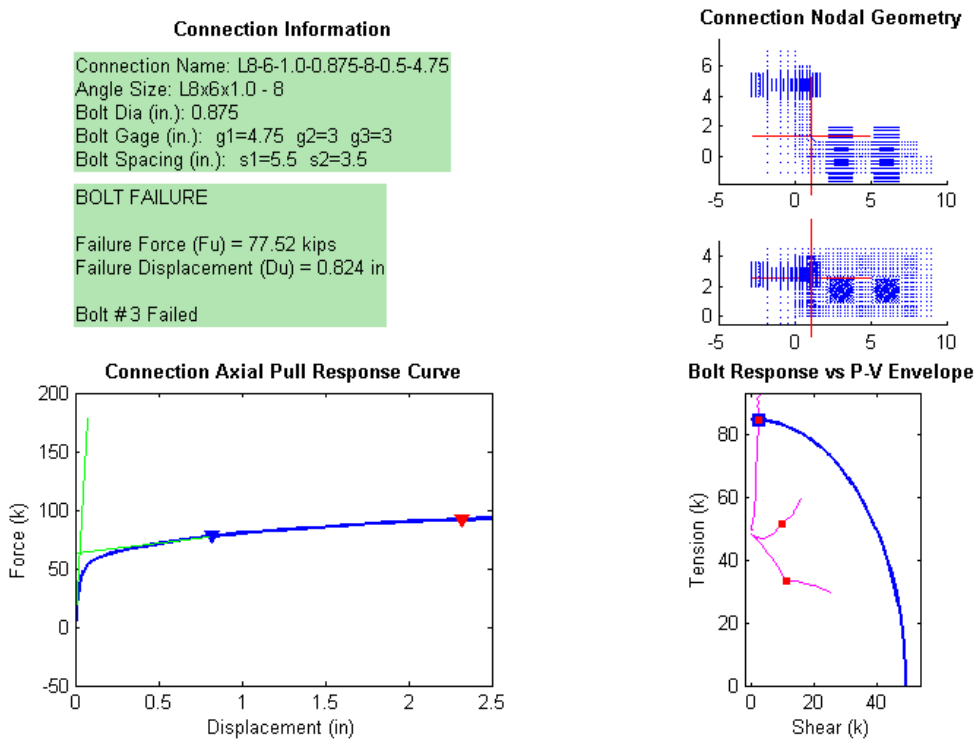


Figure B.285 Connection L8_6_1.0_0.875_8_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.875_8_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 2.5044e+003

Plastic Stiffness (k/in): 17.1947

Displacement (in): [4.5515e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.15542 ; 0.17918 ; 0.21482 ; 0.26827 ; 0.34845 ; 0.46872 ; 0.64913 ; 0.71163 ; 0.80538 ; 0.946 ; 0.99874 ; 1.0185 ; 1.0482 ; 1.0927 ; 1.1594 ; 1.2595 ; 1.2971 ; 1.3534 ; 1.4379 ; 1.5646 ; 1.6121 ; 1.6833 ; 1.7902 ; 1.8303 ; 1.8454 ; 1.8679 ; 1.9018 ; 1.9525 ; 2.0286 ; 2.1428 ; 2.314 ; 2.5]

Force (kips): [-1.27234 ; 1.57796 ; 3.61914 ; 6.25918 ; 9.58374 ; 13.6491 ; 14.9555 ; 16.6249 ; 18.6384 ; 21.1038 ; 23.7884 ; 26.1122 ; 27.815 ; 29.3747 ; 29.8479 ; 30.4747 ; 31.3098 ; 32.3694 ; 33.6768 ; 35.2978 ; 37.2259 ; 37.8158 ; 38.6218 ; 39.6726 ; 40.0274 ; 40.1598 ; 40.3543 ; 40.6263 ; 41.0115 ; 41.5528 ; 41.758 ; 42.0621 ; 42.5013 ; 43.1029 ; 43.3378 ; 43.6951 ; 44.1759 ; 44.344 ; 44.4067 ; 44.4979 ; 44.6295 ; 44.8197 ; 45.0774 ; 45.4263 ; 45.8814 ; 46.2979]

Bolt 1 - Tensile Force (kips): [48.3355 ; 48.2467 ; 48.1777 ; 48.0787 ; 47.941 ; 47.7553 ; 47.6903 ; 47.6012 ; 47.4833 ; 47.3214 ; 47.1146 ; 46.6937 ; 46.0031 ; 45.1818 ; 44.879 ; 44.3978 ; 43.5879 ; 42.3679 ; 40.6381 ; 38.0629 ; 34.57 ; 33.6098 ; 33.2672 ; 33.2504 ; 33.2585 ; 33.2191 ; 33.1365 ; 33.155 ; 33.1973 ; 33.2869 ; 33.3265 ; 33.3145 ; 33.2837 ; 33.3453 ; 33.1402 ; 32.8446 ; 32.6399 ; 32.5348 ; 32.4516 ; 32.3315 ; 32.1601 ; 31.9629 ; 31.7937 ; 31.3638 ; 30.362 ; 29.5638]

Bolt 1 - Shear Force (kips): [0.0679077 ; 0.0838671 ; 0.167516 ; 0.284286 ; 0.440008 ; 0.645585 ; 0.716158 ; 0.810403 ; 0.93159 ; 1.09177 ; 1.28703 ; 1.68299 ; 2.29507 ; 2.97552 ; 3.21926 ; 3.59972 ; 4.22119 ; 5.12001 ; 6.33637 ; 8.04013 ; 10.1798 ; 10.7474 ; 10.9589 ; 10.9697 ; 10.9739 ; 11.0676 ; 11.2214 ; 11.2299 ; 11.234 ; 11.2426 ; 11.2475 ; 11.6071 ; 12.4389 ; 13.4275 ; 14.4119 ; 15.8518 ; 17.14 ; 17.5968 ; 17.8413 ; 18.179 ; 18.6375 ; 19.19 ; 19.7822 ; 20.9247 ; 22.9724 ; 24.8896]

Bolt 2 - Tensile Force (kips): [48.3238 ; 48.2483 ; 48.1722 ; 48.0623 ; 47.9312 ; 47.7765 ; 47.7282 ; 47.6721 ; 47.6083 ; 47.5486 ; 47.5131 ; 47.357 ; 47.0138 ; 46.8339 ; 46.822 ; 46.839 ; 46.9669 ; 47.241 ; 47.6581 ; 48.4471 ; 50.0674 ; 50.6029 ; 51.3069 ; 52.0895 ; 52.3344 ; 52.4349 ; 52.5847 ; 52.7684 ; 53.0264 ; 53.3869 ; 53.5091 ; 53.7901 ; 54.2805 ; 54.9923 ; 55.282 ; 55.7534 ; 56.4 ; 56.6469 ; 56.7368 ; 56.8671 ; 57.0566 ; 57.3419 ; 57.7553 ; 58.3053 ; 58.9327 ; 59.517]

Bolt 2 - Shear Force (kips): [0.0444832 ; 0.107401 ; 0.211498 ; 0.350009 ; 0.532249 ; 0.769016 ; 0.848477 ; 0.954087 ; 1.08794 ; 1.26213 ; 1.46895 ; 1.85917 ; 2.42736 ; 3.043 ; 3.2544 ; 3.57755 ; 4.0864 ; 4.79402 ; 5.70944 ; 6.87789 ; 8.24777 ; 8.67619 ; 9.32463 ; 10.2092 ; 10.5048 ; 10.5982 ; 10.7314 ; 10.9488 ; 11.2513 ; 11.7065 ; 12.0385 ; 12.369 ; 12.7043 ; 13.2821 ; 13.3911 ; 13.4933 ; 13.8995 ; 14.0187 ; 14.06 ; 14.1361 ; 14.2402 ; 14.3832 ; 14.5752 ; 14.7914 ; 15.2288 ; 15.5787]

Bolt 3 - Tensile Force (kips): [50 ; 49.9007 ; 49.8496 ; 49.8609 ; 50.0218 ; 50.4779 ; 50.696 ; 51.1672 ; 51.8932 ; 52.9085 ; 54.5198 ; 57.025 ; 60.4276 ; 64.7293 ; 66.0797 ; 67.8566 ; 70.0483 ; 72.6038 ; 75.2919 ; 78.3428 ; 81.9519 ; 83.0457 ; 84.5304 ; 86.3329 ; 86.9053 ; 87.1163 ; 87.4278 ; 87.8736 ; 88.5161 ; 89.4004 ; 89.6536 ; 90.0537 ; 90.6786 ; 91.5501 ; 91.8655 ; 92.2815 ; 92.8165 ; 92.9949 ; 93.0639 ; 93.1696 ; 93.32 ; 93.5071 ; 93.7666 ; 94.1248 ; 94.429 ; 94.7036]

Bolt 3 - Shear Force (kips): [0.037094 ; 0.015084 ; 0.044447 ; 0.092276 ; 0.15813 ; 0.24794 ; 0.28057 ; 0.32373 ; 0.38279 ; 0.46922 ; 0.60199 ; 0.78801 ; 1.0444 ; 1.2909 ; 1.342 ; 1.4052 ; 1.4876 ; 1.6091 ; 1.752 ; 1.8758 ; 2.0072 ; 2.0455 ; 2.0765 ; 2.0664 ; 2.0499 ; 2.0412 ; 2.0261 ; 2.0015 ; 1.9567 ; 1.9111 ; 1.9671 ; 2.0038 ; 2.005 ; 1.9418 ; 1.8844 ; 2.156 ; 2.5213 ; 2.6611 ; 2.7025 ; 2.7502 ; 2.8228 ; 3.0676 ; 3.5995 ; 4.2523 ; 5.1696 ; 5.8249]

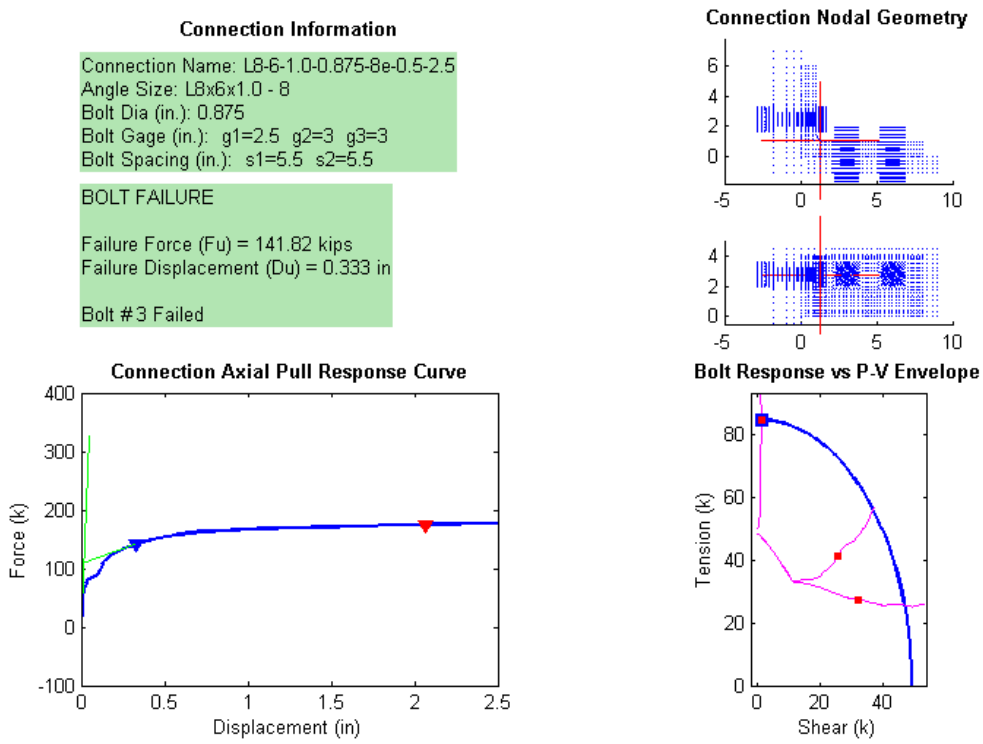


Figure B.286 Connection L8_6_1.0_0.875_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.875_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 7.1121e+003

Plastic Stiffness (k/in): 98.4842

Displacement (in): [4.557e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.033569 ; 0.048401 ; 0.070648 ; 0.072734 ; 0.075862 ; 0.077036 ; 0.078795 ; 0.081435 ; 0.085395 ; 0.091334 ; 0.093561 ; 0.096902 ; 0.098155 ; 0.10003 ; 0.10285 ; 0.10567 ; 0.10849 ; 0.11272 ; 0.11906 ; 0.12857 ; 0.13214 ; 0.13348 ; 0.13549 ; 0.1385 ; 0.14301 ; 0.14979 ; 0.15995 ; 0.17518 ; 0.19804 ; 0.23233 ; 0.24519 ; 0.26448 ; 0.27171 ; 0.28256 ; 0.29883 ; 0.32324 ; 0.35985 ; 0.41478 ; 0.43537 ; 0.46627 ; 0.51261 ; 0.52999 ; 0.55605 ; 0.59515 ; 0.6538 ; 0.74178 ; 0.87374 ; 0.92322 ; 0.99745 ; 1.1088 ; 1.1506 ; 1.2132 ; 1.3071 ; 1.4481 ; 1.6594 ; 1.9094 ; 2.1594 ; 2.4094 ; 2.5]

Force (kips): [-1.50851 ; 6.33918 ; 12.3824 ; 19.5657 ; 25.1931 ; 29.5563 ; 33.37 ; 35.4356 ; 38.081 ; 41.3151 ; 43.036 ; 43.0306 ; 43.1451 ; 43.3496 ; 43.61 ; 43.6271 ; 43.6237 ; 43.6139 ; 44.026 ; 45.0726 ; 45.4452 ; 45.8658 ; 46.5595 ; 47.2961 ; 48.0012 ; 49.4079 ; 51.3983 ; 53.8189 ; 54.5688 ; 54.8454 ; 55.2457 ; 55.8016 ; 56.5484 ; 57.5536 ; 58.9112 ; 60.6018 ; 62.6501 ; 65.2816 ; 66.167 ; 67.3674 ; 67.7996 ; 68.4192 ; 69.2912 ; 70.4932 ; 72.1048 ; 74.1442 ; 74.8364 ; 75.7898 ; 77.0682 ; 77.5124 ; 78.1455 ; 79.0116 ; 80.1423 ; 81.4004 ; 82.4961 ; 82.8387 ; 83.2966 ; 83.903 ; 84.1143 ; 84.4033 ; 84.806 ; 85.3633 ; 86.1238 ; 86.9364 ; 87.6601 ; 88.2896 ; 88.4986]

Bolt 1 - Tensile Force (kips): [48.4184 ; 48.1375 ; 47.8903 ; 47.5709 ; 47.2897 ; 47.0451 ; 46.3629 ; 44.3673 ; 41.1499 ; 36.2719 ; 33.2884 ; 33.2813 ; 33.1794 ; 33.0421 ; 33.0235 ; 33.0048 ; 32.991 ; 32.9819 ; 32.9389 ; 32.9055 ; 32.8851 ; 32.8658 ; 32.8547 ; 32.8415 ; 32.774 ; 32.5562 ; 32.3197 ; 32.1457 ; 32.0425 ; 31.9771 ; 31.8728 ; 31.7158 ; 31.4989 ; 31.3101 ; 31.0516 ; 30.4443 ; 29.4076 ; 28.5188 ; 28.3285 ; 28.1047 ; 27.9858 ; 27.8374 ; 27.6926 ; 27.514 ; 27.2034 ; 26.4144 ; 26.1854 ; 25.9161 ; 25.696 ; 25.6407 ; 25.6096 ; 25.6287 ; 25.7164 ; 25.8737 ; 25.9282 ; 25.8345 ; 25.7479 ; 25.6331 ; 25.5401 ; 25.4325 ; 25.3082 ; 25.1948 ; 25.2896 ; 25.5721 ; 25.7787 ; 25.9491 ; 26.0103]

Bolt 1 - Shear Force (kips): [0.0588594 ; 0.293371 ; 0.557892 ; 0.885891 ; 1.15257 ; 1.37252 ; 1.99615 ; 3.63541 ; 6.00733 ; 9.21348 ; 10.9835 ; 10.9822 ; 11.1314 ; 11.3274 ; 11.3458 ; 11.3572 ; 11.3585 ; 11.3557 ; 11.7674 ; 12.2026 ; 12.428 ; 12.6389 ; 13.0521 ; 13.3995 ; 13.9192 ; 15.2243 ; 16.4141 ; 17.3485 ; 17.6993 ; 17.8901 ; 18.183 ; 18.5998 ; 19.156 ; 19.7116 ; 20.3612 ; 21.6971 ; 23.9736 ; 26.7436 ; 27.5009 ; 28.5807 ; 29.0201 ; 29.6165 ; 30.3621 ; 31.4529 ; 33.2218 ; 36.1669 ; 37.0415 ; 38.1117 ; 39.3443 ; 39.7327 ; 40.2406 ; 40.9049 ; 41.8239 ; 43.0157 ; 44.5885 ; 45.2328 ; 45.9877 ; 46.9036 ; 47.2699 ; 47.7699 ; 48.4328 ; 49.2721 ; 50.2753 ; 51.2385 ; 52.1116 ; 52.7459 ; 52.9323]

Bolt 2 - Tensile Force (kips): [48.4237 ; 48.1454 ; 47.8919 ; 47.5731 ; 47.3092 ; 47.0976 ; 46.4982 ; 44.5655 ; 41.446 ; 36.7919 ; 33.5397 ; 33.5302 ; 33.5276 ; 33.4955 ; 33.2824 ; 33.2626 ; 33.2486 ; 33.2397 ; 33.2651 ; 33.3058 ; 33.3278 ; 33.3557 ; 33.4033 ; 33.4725 ; 33.5593 ; 33.6858 ; 33.6842 ; 33.6863 ; 33.7229 ; 33.7476 ; 33.7888 ; 33.8626 ; 33.9797 ; 34.0922 ; 34.2944 ; 34.8382 ; 35.8356 ; 37.1662 ; 37.5937 ; 38.3646 ; 38.6688 ; 39.1392 ; 39.8381 ; 40.8537 ; 42.1519 ; 43.5139 ; 43.8873 ; 44.4003 ; 44.975 ; 45.1663 ; 45.3815 ; 45.6885 ; 46.1816 ; 46.9608 ; 48.0634 ; 48.4646 ; 49.0302 ; 49.7515 ; 49.9965 ; 50.3674 ; 50.902 ; 51.6683 ; 52.7581 ; 54.0059 ; 55.1579 ; 56.2505 ; 56.6136]

Bolt 2 - Shear Force (kips): [0.071876 ; 0.294186 ; 0.565561 ; 0.896848 ; 1.16178 ; 1.37465 ; 1.95266 ; 3.57122 ; 5.91871 ; 9.06394 ; 11.0614 ; 11.0624 ; 11.0634 ; 11.1278 ; 11.45 ; 11.4682 ; 11.4721 ; 11.4701 ; 11.4779 ; 12.1083 ; 12.2659 ; 12.4848 ; 12.7997 ; 13.2139 ; 13.4333 ; 13.6534 ; 14.682 ; 16.3569 ; 16.8165 ; 16.9361 ; 17.0955 ; 17.308 ; 17.5971 ; 18.1595 ; 19.0746 ; 19.8602 ; 20.6194 ; 22.1583 ; 22.861 ; 23.6565 ; 23.9151 ; 24.2681 ; 24.7457 ; 25.3466 ; 26.0353 ; 26.8087 ; 27.1955 ; 27.7132 ; 28.4917 ; 28.7723 ; 29.2419 ; 29.8467 ; 30.5687 ; 31.3208 ; 32.0734 ; 32.3575 ; 32.7877 ; 33.4259 ; 33.6233 ; 33.8823 ; 34.2467 ; 34.717 ; 35.3057 ; 35.8838 ; 36.3909 ; 36.8846 ; 37.0639]

Bolt 3 - Tensile Force (kips): [50 ; 49.9467 ; 50.0233 ; 50.3283 ; 50.8559 ; 51.56 ; 52.3043 ; 52.7412 ; 53.3748 ; 54.4335 ; 55.2065 ; 55.2021 ; 55.259 ; 55.3619 ; 55.5014 ; 55.5108 ; 55.508 ; 55.4981 ; 55.7227 ; 56.3413 ; 56.5783 ; 56.8566 ; 57.3518 ; 57.9036 ; 58.475 ; 59.6808 ; 61.5909 ; 64.2815 ; 65.1932 ; 65.5352 ; 66.0362 ; 66.7482 ; 67.7295 ; 69.0663 ; 70.8868 ; 73.0922 ; 75.5862 ; 78.56 ; 79.5422 ; 80.8795 ; 81.3599 ; 82.0483 ; 83.02 ; 84.3643 ; 86.1454 ; 88.3234 ; 89.0604 ; 90.0932 ; 91.4899 ; 91.9712 ; 92.6566 ; 93.5938 ; 94.786 ; 95.9761 ; 96.5914 ; 96.7325 ; 96.9043 ; 97.108 ; 97.1739 ; 97.2649 ; 97.3851 ; 97.5354 ; 97.7343 ; 97.9432 ; 98.1309 ; 98.3027 ; 98.3613]

Bolt 3 - Shear Force (kips): [0.032744 ; 0.049876 ; 0.11782 ; 0.21152 ; 0.29526 ; 0.36793 ; 0.43984 ; 0.4795 ; 0.53422 ; 0.60366 ; 0.64076 ; 0.64051 ; 0.64288 ; 0.64681 ; 0.65205 ; 0.6524 ; 0.65232 ; 0.65185 ; 0.65986 ; 0.68118 ; 0.68926 ; 0.69897 ; 0.71435 ; 0.73157 ; 0.74714 ; 0.78067 ; 0.83504 ; 0.91104 ; 0.93009 ; 0.93629 ; 0.94422 ; 0.95308 ; 0.96135 ; 0.96715 ; 0.97044 ; 0.9737 ; 1.0023 ; 1.0753 ; 1.091 ; 1.1038 ; 1.1061 ; 1.1083 ; 1.1083 ; 1.1033 ; 1.0789 ; 1.0443 ; 1.0362 ; 1.0201 ; 0.97282 ; 0.94767 ; 0.90257 ; 0.82635 ; 0.71004 ; 0.53469 ; 0.32669 ; 0.27416 ; 0.2174 ; 0.1617 ; 0.14592 ; 0.12711 ; 0.10867 ; 0.09712 ; 0.088405 ; 0.083241 ; 0.079289 ; 0.076409 ; 0.07594]

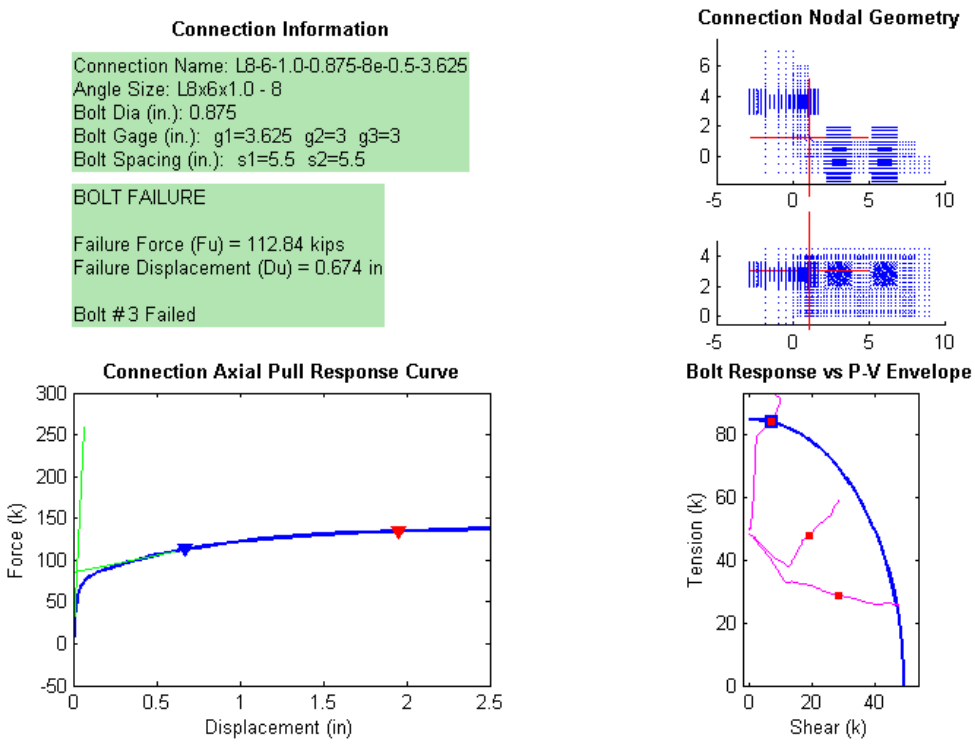


Figure B.287 Connection L8_6_1.0_0.875_8e_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.875_8e_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 4.1331e+003

Plastic Stiffness (k/in): 40.5386

Displacement (in): [4.8615e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.15542 ; 0.17918 ; 0.18809 ; 0.20145 ; 0.20646 ; 0.21398 ; 0.22526 ; 0.22631 ; 0.2279 ; 0.23028 ; 0.23384 ; 0.23919 ; 0.24722 ; 0.25926 ; 0.27732 ; 0.30442 ; 0.31457 ; 0.32981 ; 0.35267 ; 0.38696 ; 0.39982 ; 0.40464 ; 0.41187 ; 0.42272 ; 0.439 ; 0.46341 ; 0.50002 ; 0.51375 ; 0.53435 ; 0.56524 ; 0.61158 ; 0.68109 ; 0.70716 ; 0.74626 ; 0.80491 ; 0.89288 ; 1.0249 ; 1.0743 ; 1.1486 ; 1.2599 ; 1.3713 ; 1.4826 ; 1.6496 ; 1.6914 ; 1.7331 ; 1.7957 ; 1.8897 ; 2.0306 ; 2.242 ; 2.492 ; 2.5]

Force (kips): [-1.61867 ; 2.98787 ; 6.45378 ; 10.7481 ; 16.0345 ; 22.0775 ; 23.8429 ; 26.1937 ; 29.0361 ; 31.9889 ; 34.8694 ; 37.5176 ; 40.0279 ; 42.4528 ; 43.0755 ; 43.8811 ; 44.1703 ; 44.5467 ; 44.6302 ; 44.9301 ; 45.219 ; 45.2239 ; 45.2928 ; 45.3955 ; 45.5514 ; 45.7684 ; 46.0623 ; 46.4814 ; 47.0557 ; 47.8498 ; 48.1526 ; 48.6128 ; 49.2739 ; 50.1636 ; 50.4873 ; 50.6124 ; 50.8049 ; 51.1012 ; 51.4952 ; 52.0642 ; 52.9118 ; 53.2226 ; 53.6807 ; 54.3409 ; 55.2802 ; 56.5495 ; 56.991 ; 57.6048 ; 58.4481 ; 59.6441 ; 61.2093 ; 61.7474 ; 62.512 ; 63.58 ; 64.5059 ; 65.2581 ; 66.0816 ; 66.2749 ; 66.4542 ; 66.7006 ; 67.0369 ; 67.4928 ; 68.0765 ; 68.6535 ; 68.6707]

Bolt 1 - Tensile Force (kips): [48.4076 ; 48.245 ; 48.105 ; 47.9175 ; 47.6685 ; 47.3376 ; 47.2288 ; 47.0741 ; 46.7588 ; 45.9208 ; 44.1518 ; 40.8334 ; 37.0974 ; 33.4397 ; 33.3431 ; 33.3411 ; 33.267 ; 33.1053 ; 33.0953 ; 33.1111 ; 33.1234 ; 33.1222 ; 33.1131 ; 33.105 ; 33.0922 ; 33.085 ; 33.0911 ; 33.0957 ; 33.1101 ; 33.1513 ; 33.0952 ; 32.9072 ; 32.656 ; 32.4721 ; 32.3456 ; 32.2643 ; 32.1436 ; 31.9694 ; 31.7752 ; 31.6212 ; 31.1096 ; 30.8148 ; 30.3255 ; 29.7434 ; 29.1878 ; 28.7867 ; 28.5321 ; 28.2445 ; 28.0484 ; 27.61 ; 26.824 ; 26.5977 ; 26.3191 ; 26.1125 ; 26.0793 ; 26.1168 ; 26.2195 ; 26.2187 ; 26.2176 ; 26.2185 ; 26.1572 ; 26.0083 ; 25.8569 ; 25.6727 ; 25.6636]

Bolt 1 - Shear Force (kips): [0.0630837 ; 0.159082 ; 0.315832 ; 0.51956 ; 0.784451 ; 1.11075 ; 1.21263 ; 1.35446 ; 1.64785 ; 2.38888 ; 3.81886 ; 6.24978 ; 8.72337 ; 10.9307 ; 10.9949 ; 11.0017 ; 11.1301 ; 11.3652 ; 11.3697 ; 11.3743 ; 11.3773 ; 11.3768 ; 11.4541 ; 11.5719 ; 11.7792 ; 12.0126 ; 12.2192 ; 12.5561 ; 13.0094 ; 13.5652 ; 14.0092 ; 14.9128 ; 16.147 ; 17.3542 ; 17.8464 ; 18.091 ; 18.4449 ; 18.9366 ; 19.5242 ; 20.1806 ; 21.5895 ; 22.2653 ; 23.3992 ; 24.8228 ; 26.536 ; 28.3042 ; 29.0963 ; 30.1305 ; 31.312 ; 33.3631 ; 36.4322 ; 37.3522 ; 38.5125 ; 39.9212 ; 41.003 ; 41.8875 ; 43.051 ; 43.3548 ; 43.6456 ; 44.0482 ; 44.6092 ; 45.4248 ; 46.3414 ; 47.2431 ; 47.2751]

Bolt 2 - Tensile Force (kips): [48.3996 ; 48.2591 ; 48.123 ; 47.9485 ; 47.738 ; 47.5054 ; 47.4442 ; 47.3628 ; 47.1903 ; 46.585 ; 45.162 ; 42.5157 ; 40.5447 ; 39.6158 ; 38.9515 ; 38.0198 ; 38.0109 ; 38.1623 ; 38.1596 ; 38.3566 ; 38.5219 ; 38.5181 ; 38.5871 ; 38.6882 ; 38.8375 ; 39.0506 ; 39.3466 ; 39.761 ; 40.3385 ; 41.0288 ; 41.3108 ; 41.7254 ; 42.289 ; 43.0878 ; 43.4029 ; 43.5209 ; 43.6946 ; 43.9461 ; 44.2983 ; 44.7888 ; 45.54 ; 45.819 ; 46.2128 ; 46.647 ; 47.2173 ; 48.0623 ; 48.405 ; 48.9234 ; 49.6571 ; 50.5332 ; 51.7448 ; 52.0601 ; 52.5146 ; 53.2589 ; 54.056 ; 54.8139 ; 55.8152 ; 56.0469 ; 56.275 ; 56.6046 ; 57.0185 ; 57.5552 ; 58.3076 ; 59.1322 ; 59.1584]

Bolt 2 - Shear Force (kips): [0.0758103 ; 0.149009 ; 0.305566 ; 0.506253 ; 0.762968 ; 1.06988 ; 1.16262 ; 1.29036 ; 1.53775 ; 2.19969 ; 3.54365 ; 5.87161 ; 8.09426 ; 10.123 ; 10.9886 ; 12.1651 ; 12.378 ; 12.552 ; 12.6422 ; 12.8924 ; 13.1463 ; 13.1539 ; 13.1742 ; 13.204 ; 13.2472 ; 13.3083 ; 13.3918 ; 13.505 ; 13.6662 ; 14.2576 ; 14.4164 ; 14.598 ; 14.9005 ; 15.3477 ; 15.4877 ; 15.5443 ; 15.6266 ; 15.7476 ; 15.9189 ; 16.1553 ; 16.5033 ; 16.6239 ; 16.7635 ; 17.1929 ; 17.9346 ; 19.1372 ; 19.4306 ; 19.772 ; 20.2762 ; 21.3767 ; 22.4609 ; 23.0393 ; 23.7899 ; 24.6333 ; 25.3544 ; 25.9213 ; 26.4169 ; 26.5203 ; 26.619 ; 26.7605 ; 27.0675 ; 27.5183 ; 27.9866 ; 28.3193 ; 28.3271]

Bolt 3 - Tensile Force (kips): [50 ; 49.889 ; 49.88 ; 49.9983 ; 50.3492 ; 51.2486 ; 51.6561 ; 52.2302 ; 53.0187 ; 54.0504 ; 55.5217 ; 57.5483 ; 60.5615 ; 64.2271 ; 65.2145 ; 66.4631 ; 66.8979 ; 67.4557 ; 67.5804 ; 68.0171 ; 68.4463 ; 68.4542 ; 68.5528 ; 68.6997 ; 68.9207 ; 69.2363 ; 69.6778 ; 70.3098 ; 71.1916 ; 72.419 ; 72.866 ; 73.5249 ; 74.455 ; 75.7122 ; 76.1648 ; 76.3363 ; 76.6036 ; 77.0169 ; 77.5554 ; 78.3619 ; 79.5113 ; 79.8998 ; 80.4722 ; 81.3314 ; 82.6006 ; 84.2304 ; 84.7599 ; 85.4885 ; 86.5257 ; 88.0354 ; 90.068 ; 90.7606 ; 91.7073 ; 92.7513 ; 93.5569 ; 94.0985 ; 94.7003 ; 94.8689 ; 95.0492 ; 95.2999 ; 95.645 ; 96.0912 ; 96.6259 ; 97.1318 ; 97.1468]

Bolt 3 - Shear Force (kips): [0.053241 ; 0.015981 ; 0.061323 ; 0.12666 ; 0.21584 ; 0.33603 ; 0.37581 ; 0.43298 ; 0.5137 ; 0.61928 ; 0.7385 ; 0.86366 ; 1.0552 ; 1.2938 ; 1.3523 ; 1.4287 ; 1.4552 ; 1.4901 ; 1.4984 ; 1.5275 ; 1.5568 ; 1.5573 ; 1.5629 ; 1.571 ; 1.583 ; 1.6012 ; 1.6292 ; 1.6703 ; 1.7303 ; 1.8087 ; 1.8318 ; 1.8594 ; 1.8914 ; 1.9293 ; 1.9397 ; 1.943 ; 1.9479 ; 1.9577 ; 1.9745 ; 2.0455 ; 2.3855 ; 2.726 ; 3.2373 ; 4.098 ; 5.5107 ; 6.7742 ; 7.1248 ; 7.5206 ; 8.0914 ; 8.8303 ; 9.4694 ; 9.6334 ; 9.5344 ; 8.4837 ; 7.7639 ; 7.1509 ; 6.613 ; 6.5681 ; 6.4913 ; 6.3823 ; 6.2394 ; 5.9891 ; 5.6998 ; 5.5404 ; 5.5355]

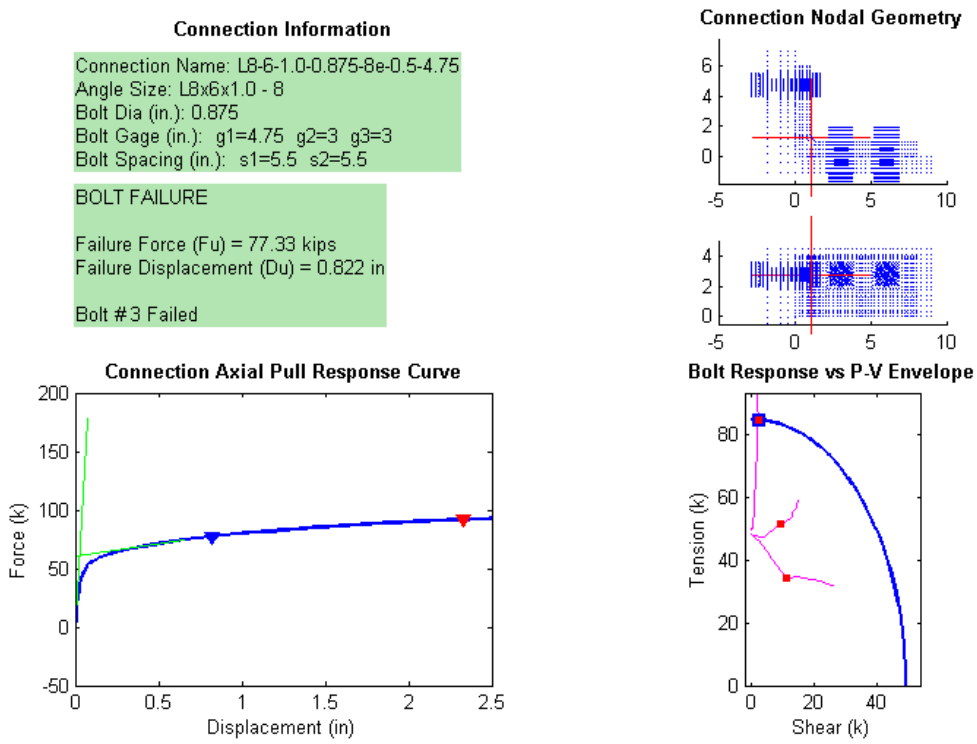


Figure B.288 Connection L8_6_1.0_0.875_8e_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_0.875_8e_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 2.4941e+003

Plastic Stiffness (k/in): 21.5391

Displacement (in): [4.6149e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.15542 ; 0.17918 ; 0.21482 ; 0.26827 ; 0.34845 ; 0.46872 ; 0.64913 ; 0.89913 ; 0.96163 ; 0.98506 ; 1.0202 ; 1.073 ; 1.1521 ; 1.2707 ; 1.3152 ; 1.382 ; 1.407 ; 1.4445 ; 1.5008 ; 1.5571 ; 1.6135 ; 1.6979 ; 1.7296 ; 1.7771 ; 1.7949 ; 1.8217 ; 1.8618 ; 1.9219 ; 2.0121 ; 2.0459 ; 2.0967 ; 2.1728 ; 2.2869 ; 2.4582 ; 2.5]

Force (kips): [-1.53101 ; 1.33653 ; 3.34025 ; 5.92232 ; 9.1854 ; 13.193 ; 14.4914 ; 16.161 ; 18.1988 ; 20.6866 ; 23.4546 ; 25.8972 ; 27.7599 ; 29.3425 ; 29.8153 ; 30.4464 ; 31.2775 ; 32.336 ; 33.6481 ; 35.2895 ; 37.2324 ; 39.3007 ; 39.7394 ; 39.8964 ; 40.1328 ; 40.4629 ; 40.9255 ; 41.5609 ; 41.8223 ; 42.1847 ; 42.3161 ; 42.5076 ; 42.7823 ; 43.0602 ; 43.3342 ; 43.7139 ; 43.8464 ; 44.0491 ; 44.128 ; 44.242 ; 44.4059 ; 44.6393 ; 44.9601 ; 45.0729 ; 45.2343 ; 45.461 ; 45.7686 ; 46.1688 ; 46.2594]

Bolt 1 - Tensile Force (kips): [48.4067 ; 48.3056 ; 48.2272 ; 48.1156 ; 47.9643 ; 47.7619 ; 47.6902 ; 47.5924 ; 47.4629 ; 47.2863 ; 47.0609 ; 46.5654 ; 45.7872 ; 44.9107 ; 44.6061 ; 44.143 ; 43.378 ; 42.2026 ; 40.5699 ; 38.1142 ; 34.752 ; 33.873 ; 33.9459 ; 33.9761 ; 33.8941 ; 33.9602 ; 34.1179 ; 34.4024 ; 34.361 ; 34.4491 ; 34.4909 ; 34.5608 ; 34.6919 ; 34.6021 ; 34.3661 ; 34.1678 ; 34.1429 ; 34.0975 ; 34.0081 ; 33.8822 ; 33.7295 ; 33.6062 ; 33.4383 ; 33.3138 ; 33.1489 ; 32.8513 ; 32.4141 ; 31.8845 ; 31.7782]

Bolt 1 - Shear Force (kips): [0.0603125 ; 0.091659 ; 0.183598 ; 0.309372 ; 0.477144 ; 0.698678 ; 0.774786 ; 0.876998 ; 1.00912 ; 1.18232 ; 1.39638 ; 1.86591 ; 2.54652 ; 3.27052 ; 3.51553 ; 3.88134 ; 4.47075 ; 5.34721 ; 6.52417 ; 8.21645 ; 10.3931 ; 11.1695 ; 11.1993 ; 11.2099 ; 11.4087 ; 11.4686 ; 11.5199 ; 11.5909 ; 12.176 ; 12.7346 ; 12.9813 ; 13.3757 ; 13.8326 ; 14.7418 ; 15.873 ; 17.1852 ; 17.5091 ; 17.9773 ; 18.2698 ; 18.6798 ; 19.215 ; 19.8016 ; 20.6615 ; 21.0666 ; 21.6433 ; 22.5675 ; 23.8486 ; 25.4886 ; 25.8446]

Bolt 2 - Tensile Force (kips): [48.3979 ; 48.3189 ; 48.2468 ; 48.1472 ; 48.0212 ; 47.8883 ; 47.8472 ; 47.8011 ; 47.7614 ; 47.728 ; 47.7318 ; 47.6106 ; 47.2883 ; 47.1698 ; 47.191 ; 47.2769 ; 47.5269 ; 47.9862 ; 48.6042 ; 49.4486 ; 50.6251 ; 51.6794 ; 51.8783 ; 51.9429 ; 52.0731 ; 52.2206 ; 52.4444 ; 52.75 ; 52.9805 ; 53.314 ; 53.4484 ; 53.6562 ; 53.9175 ; 54.26 ; 54.6258 ; 55.0987 ; 55.2402 ; 55.4812 ; 55.5878 ; 55.7476 ; 55.9829 ; 56.3119 ; 56.7798 ; 56.9502 ; 57.2129 ; 57.6431 ; 58.22 ; 58.936 ; 59.0764]

Bolt 2 - Shear Force (kips): [0.0723998 ; 0.0802214 ; 0.169857 ; 0.291139 ; 0.451094 ; 0.65766 ; 0.727318 ; 0.819729 ; 0.936343 ; 1.0877 ; 1.26846 ; 1.65635 ; 2.25879 ; 2.89435 ; 3.10022 ; 3.39926 ; 3.86261 ; 4.52422 ; 5.36079 ; 6.48498 ; 7.95383 ; 9.78444 ; 10.1682 ; 10.3054 ; 10.4755 ; 10.7417 ; 11.1044 ; 11.6314 ; 11.9255 ; 12.27 ; 12.3584 ; 12.4611 ; 12.7384 ; 12.8741 ; 12.9449 ; 13.1537 ; 13.2861 ; 13.4395 ; 13.47 ; 13.5133 ; 13.6003 ; 13.857 ; 14.1635 ; 14.2374 ; 14.329 ; 14.4058 ; 14.4968 ; 14.7793 ; 14.8761]

Bolt 3 - Tensile Force (kips): [50 ; 49.9006 ; 49.8468 ; 49.8545 ; 50.0132 ; 50.4595 ; 50.6682 ; 51.1194 ; 51.8504 ; 52.8691 ; 54.4961 ; 57.0084 ; 60.4093 ; 64.7424 ; 66.1112 ; 67.9239 ; 70.169 ; 72.7678 ; 75.4953 ; 78.5701 ; 82.1734 ; 85.9339 ; 86.6353 ; 86.8829 ; 87.2556 ; 87.7904 ; 88.5496 ; 89.622 ; 90.0236 ; 90.5 ; 90.6688 ; 90.9231 ; 91.2998 ; 91.6805 ; 92.0654 ; 92.5895 ; 92.763 ; 92.9877 ; 93.0657 ; 93.1881 ; 93.3688 ; 93.6061 ; 93.9272 ; 94.0292 ; 94.1253 ; 94.2935 ; 94.5439 ; 94.7615 ; 94.8106]

Bolt 3 - Shear Force (kips): [0.054512 ; 0.011031 ; 0.028948 ; 0.072294 ; 0.13352 ; 0.21694 ; 0.24735 ; 0.28838 ; 0.34502 ; 0.42927 ; 0.55547 ; 0.73611 ; 0.98486 ; 1.2243 ; 1.2719 ; 1.3289 ; 1.3994 ; 1.5098 ; 1.6479 ; 1.7662 ; 1.8941 ; 1.9849 ; 1.9778 ; 1.9725 ; 1.9596 ; 1.9355 ; 1.8891 ; 1.7985 ; 1.7544 ; 1.8226 ; 1.8442 ; 1.8606 ; 1.8625 ; 1.8362 ; 1.7449 ; 1.6776 ; 1.6521 ; 1.7939 ; 1.8779 ; 1.9794 ; 2.1077 ; 2.3338 ; 2.7797 ; 2.9627 ; 3.2903 ; 3.7637 ; 4.3789 ; 5.2225 ; 5.4014]

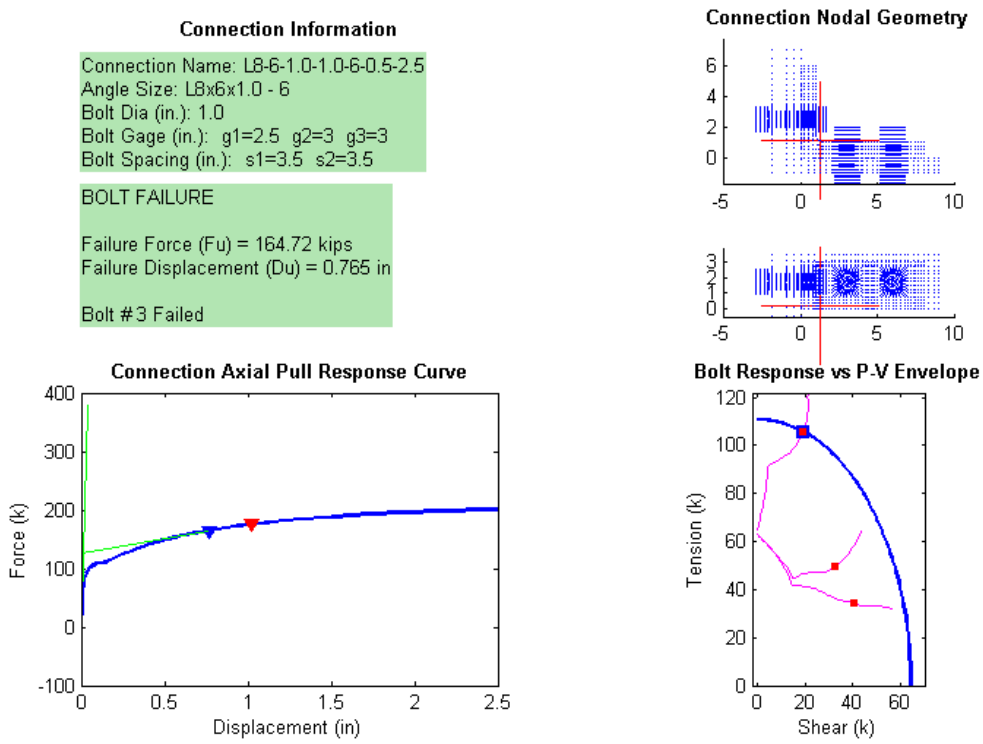


Figure B.289 Connection L8_6_1.0_1.0_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_1.0_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 8.7556e+003

Plastic Stiffness (k/in): 51.2478

Displacement (in): [9.2415e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.02462 ; 0.032963 ; 0.045477 ; 0.064248 ; 0.092405 ; 0.10296 ; 0.1188 ; 0.12474 ; 0.12697 ; 0.13031 ; 0.13532 ; 0.14284 ; 0.14566 ; 0.14671 ; 0.1483 ; 0.15068 ; 0.15424 ; 0.1596 ; 0.1616 ; 0.16461 ; 0.16913 ; 0.1759 ; 0.18606 ; 0.2013 ; 0.22416 ; 0.25845 ; 0.26166 ; 0.26648 ; 0.27371 ; 0.28456 ; 0.30084 ; 0.32525 ; 0.3344 ; 0.34813 ; 0.36873 ; 0.39962 ; 0.41121 ; 0.42858 ; 0.45465 ; 0.49375 ; 0.50841 ; 0.53041 ; 0.5634 ; 0.61288 ; 0.68711 ; 0.71495 ; 0.7567 ; 0.81933 ; 0.91328 ; 0.94851 ; 1.0014 ; 1.0806 ; 1.1103 ; 1.1549 ; 1.2218 ; 1.3221 ; 1.4726 ; 1.5291 ; 1.6137 ; 1.7407 ; 1.9311 ; 2.1811 ; 2.4311 ; 2.5]

Force (kips): [-2.30325 ; 7.58206 ; 14.7975 ; 23.1644 ; 31.89 ; 34.2598 ; 37.2911 ; 40.7983 ; 43.7792 ; 46.3916 ; 49.2761 ; 51.765 ; 54.1137 ; 54.7334 ; 54.8566 ; 54.7696 ; 54.7932 ; 54.9821 ; 55.1149 ; 55.0127 ; 54.978 ; 55.1782 ; 55.3299 ; 55.5506 ; 55.8512 ; 56.2638 ; 56.4041 ; 56.6319 ; 56.9482 ; 57.4097 ; 58.1095 ; 59.173 ; 60.7115 ; 62.8406 ; 63.0324 ; 63.3147 ; 63.7233 ; 64.3037 ; 65.1355 ; 66.3849 ; 66.884 ; 67.5963 ; 68.6928 ; 70.1591 ; 70.6988 ; 71.48 ; 72.6084 ; 74.1455 ; 74.6988 ; 75.493 ; 76.6172 ; 78.2053 ; 80.3393 ; 81.0891 ; 82.159 ; 83.6358 ; 85.6293 ; 86.312 ; 87.2682 ; 88.5758 ; 89.0423 ; 89.739 ; 90.6969 ; 91.996 ; 93.7217 ; 94.3178 ; 95.1463 ; 96.2702 ; 97.6981 ; 99.1362 ; 100.276 ; 100.56]

Bolt 1 - Tensile Force (kips): [63.1239 ; 62.7724 ; 62.4967 ; 62.1486 ; 61.7469 ; 61.6244 ; 61.4485 ; 61.1694 ; 60.2033 ; 58.041 ; 54.9557 ; 51.4353 ; 46.8255 ; 44.6934 ; 42.8917 ; 42.8186 ; 42.7313 ; 42.3851 ; 42.1984 ; 42.0821 ; 42.0593 ; 42.0342 ; 42.0121 ; 41.9831 ; 41.9481 ; 41.9182 ; 41.9085 ; 41.8712 ; 41.8307 ; 41.7876 ; 41.6959 ; 41.5652 ; 41.3058 ; 41.0119 ; 40.964 ; 40.8877 ; 40.7686 ; 40.5911 ; 40.2747 ; 39.8232 ; 39.5893 ; 39.2013 ; 38.6412 ; 37.8741 ; 37.632 ; 37.3205 ; 36.8672 ; 36.329 ; 36.1777 ; 35.9301 ; 35.6062 ; 35.3135 ; 34.9854 ; 34.7942 ; 34.4248 ; 34.0171 ; 33.514 ; 33.4003 ; 33.277 ; 33.2031 ; 33.1835 ; 33.1804 ; 33.2196 ; 33.2974 ; 33.2422 ; 33.1876 ; 33.0528 ; 32.8769 ; 32.5619 ; 32.3224 ; 32.1963 ; 32.1819]

Bolt 1 - Shear Force (kips): [0.11487 ; 0.316443 ; 0.617292 ; 0.983467 ; 1.39475 ; 1.51763 ; 1.69101 ; 1.97367 ; 3.02179 ; 5.03076 ; 7.54824 ; 10.0384 ; 12.7002 ; 13.6101 ; 14.1375 ; 14.1277 ; 14.1984 ; 14.4129 ; 14.4395 ; 14.428 ; 14.4221 ; 14.5846 ; 14.7226 ; 14.9032 ; 15.1194 ; 15.2676 ; 15.3123 ; 15.5247 ; 15.723 ; 15.9318 ; 16.5902 ; 17.8737 ; 19.4967 ; 21.3524 ; 21.5933 ; 21.9547 ; 22.4564 ; 23.1017 ; 23.9478 ; 24.9238 ; 25.4271 ; 26.2348 ; 27.3561 ; 28.8494 ; 29.33 ; 29.9734 ; 31.0129 ; 32.4898 ; 33.0242 ; 33.8428 ; 34.9537 ; 36.2551 ; 37.9766 ; 38.6876 ; 39.8421 ; 41.3484 ; 43.5591 ; 44.3057 ; 45.3068 ; 46.5092 ; 46.8897 ; 47.3927 ; 48.0397 ; 48.9507 ; 50.3226 ; 50.7861 ; 51.5452 ; 52.5133 ; 53.699 ; 54.8549 ; 55.7056 ; 55.9497]

Bolt 2 - Tensile Force (kips): [63.1252 ; 62.6522 ; 62.247 ; 61.7184 ; 61.1123 ; 60.9221 ; 60.6548 ; 60.271 ; 59.2787 ; 57.1382 ; 54.2601 ; 51.5621 ; 49.0858 ; 47.7023 ; 45.1159 ; 44.8355 ; 44.7882 ; 44.7987 ; 44.4744 ; 44.2546 ; 44.2085 ; 44.2998 ; 44.3877 ; 44.4992 ; 44.6553 ; 44.8489 ; 44.9217 ; 45.0319 ; 45.1724 ; 45.3711 ; 45.6684 ; 46.0769 ; 46.4769 ; 46.8003 ; 46.8238 ; 46.8595 ; 46.9135 ; 46.9967 ; 47.1072 ; 47.157 ; 47.1343 ; 47.0991 ; 47.0379 ; 47.0316 ; 47.005 ; 46.9927 ; 46.9877 ; 47.1049 ; 47.1702 ; 47.3101 ; 47.5304 ; 47.991 ; 48.7937 ; 49.0932 ; 49.5834 ; 50.2545 ; 51.1893 ; 51.5154 ; 52.0079 ; 52.7419 ; 53.0214 ; 53.4767 ; 54.2065 ; 55.3814 ; 57.0098 ; 57.573 ; 58.3132 ; 59.3447 ; 60.8842 ; 62.6781 ; 64.1322 ; 64.4967]

Bolt 2 - Shear Force (kips): [0.0783284 ; 0.455699 ; 0.844115 ; 1.31874 ; 1.84652 ; 2.00594 ; 2.23167 ; 2.58728 ; 3.64395 ; 5.63955 ; 8.10445 ; 10.4158 ; 12.7551 ; 13.6763 ; 14.7364 ; 14.7687 ; 14.7684 ; 14.8718 ; 15.1609 ; 15.1754 ; 15.1673 ; 15.1955 ; 15.2972 ; 15.4682 ; 15.6622 ; 16.0212 ; 16.1094 ; 16.1984 ; 16.3664 ; 16.7015 ; 17.0136 ; 17.5047 ; 18.6767 ; 20.5396 ; 20.6472 ; 20.7933 ; 20.9941 ; 21.2545 ; 21.6967 ; 22.6235 ; 22.9443 ; 23.3807 ; 24.0278 ; 24.9226 ; 25.311 ; 25.8606 ; 26.5903 ; 27.4917 ; 27.7946 ; 28.2033 ; 28.8351 ; 29.8589 ; 31.2335 ; 31.6926 ; 32.2308 ; 33.0213 ; 34.1147 ; 34.5537 ; 35.1878 ; 36.067 ; 36.3932 ; 36.87 ; 37.5137 ; 38.2948 ; 39.2703 ; 39.612 ; 40.1556 ; 40.9187 ; 41.7638 ; 42.5529 ; 43.1764 ; 43.3283]

Bolt 3 - Tensile Force (kips): [65 ; 64.915 ; 64.9965 ; 65.3243 ; 66.203 ; 66.6432 ; 67.2738 ; 68.0816 ; 68.8632 ; 69.7023 ; 70.8885 ; 72.585 ; 74.7907 ; 75.4404 ; 75.665 ; 75.6096 ; 75.6374 ; 75.8044 ; 75.9407 ; 75.8574 ; 75.8278 ; 76.0043 ; 76.138 ; 76.3356 ; 76.6179 ; 77.0211 ; 77.1647 ; 77.3864 ; 77.7055 ; 78.1741 ; 78.8737 ; 79.9322 ; 81.4901 ; 83.7513 ; 83.9565 ; 84.2617 ; 84.7115 ; 85.3689 ; 86.3322 ; 87.7364 ; 88.2282 ; 88.919 ; 89.887 ; 91.2174 ; 91.7091 ; 92.4324 ; 93.5914 ; 95.3053 ; 95.9311 ; 96.8575 ; 98.2332 ; 100.282 ; 103.08 ; 104.055 ; 105.423 ; 107.245 ; 109.562 ; 110.311 ; 111.328 ; 112.629 ; 113.098 ; 113.884 ; 114.916 ; 116.349 ; 118.01 ; 118.581 ; 119.382 ; 120.484 ; 121.874 ; 122.905 ; 123.585 ; 123.751]

Bolt 3 - Shear Force (kips): [0.0144864 ; 0.100822 ; 0.217609 ; 0.378229 ; 0.602275 ; 0.679263 ; 0.786095 ; 0.92913 ; 1.08622 ; 1.24451 ; 1.49347 ; 1.86191 ; 2.33785 ; 2.47949 ; 2.51813 ; 2.5114 ; 2.51438 ; 2.54503 ; 2.57382 ; 2.56609 ; 2.56338 ; 2.58837 ; 2.61397 ; 2.65112 ; 2.70562 ; 2.7842 ; 2.81292 ; 2.85406 ; 2.91444 ; 3.00049 ; 3.11684 ; 3.26731 ; 3.47263 ; 3.76586 ; 3.79177 ; 3.82992 ; 3.8869 ; 3.97202 ; 4.09333 ; 4.2622 ; 4.32302 ; 4.41021 ; 4.52042 ; 4.64802 ; 4.70569 ; 6.12738 ; 8.70846 ; 11.1683 ; 12.1519 ; 13.4302 ; 14.7886 ; 16.5485 ; 18.0893 ; 18.6236 ; 19.2121 ; 19.8679 ; 20.498 ; 20.668 ; 20.9524 ; 20.7724 ; 20.8177 ; 21.073 ; 21.3352 ; 21.6254 ; 21.3891 ; 21.2445 ; 21.1583 ; 21.1359 ; 21.2152 ; 21.0732 ; 20.4146 ; 20.2269]

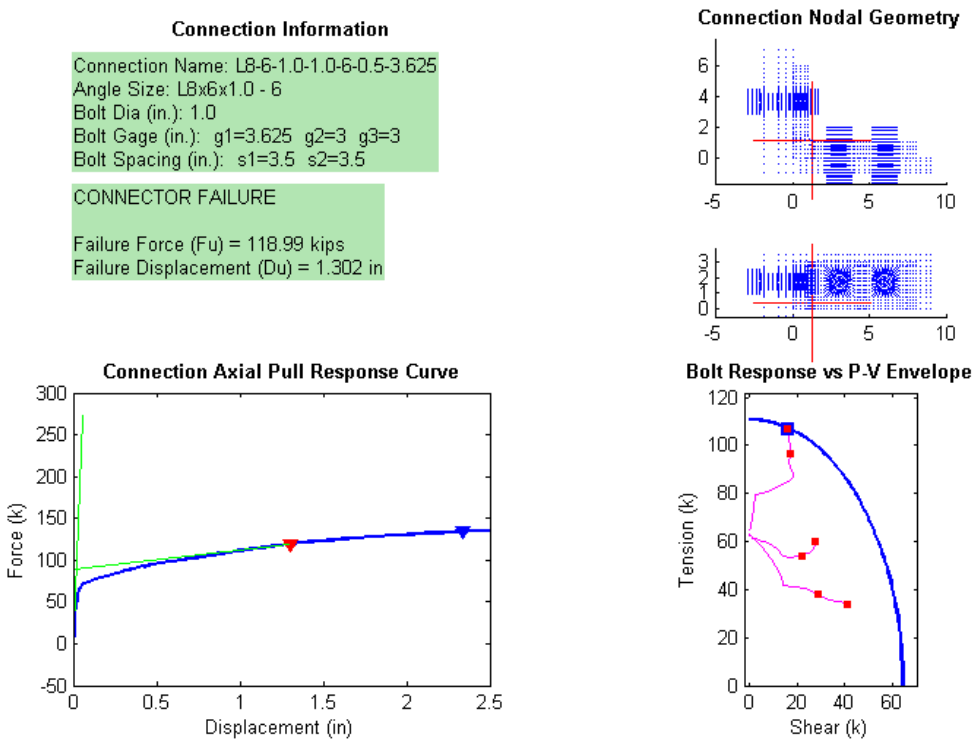


Figure B.290 Connection L8_6_1.0_1.0_6_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_1.0_6_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 4.8282e+003

Plastic Stiffness (k/in): 22.9260

Displacement (in): [9.9885e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.20294 ; 0.29797 ; 0.30688 ; 0.32024 ; 0.32525 ; 0.33277 ; 0.34404 ; 0.36096 ; 0.38632 ; 0.42438 ; 0.48146 ; 0.52427 ; 0.58849 ; 0.65271 ; 0.71692 ; 0.74101 ; 0.77713 ; 0.79067 ; 0.81099 ; 0.84147 ; 0.88719 ; 0.9329 ; 0.97862 ; 0.99576 ; 1.0215 ; 1.0311 ; 1.0456 ; 1.0673 ; 1.0998 ; 1.1486 ; 1.167 ; 1.1944 ; 1.2356 ; 1.2974 ; 1.3901 ; 1.4248 ; 1.477 ; 1.5552 ; 1.5845 ; 1.6285 ; 1.6945 ; 1.7934 ; 1.9419 ; 2.1646 ; 2.4146 ; 2.5]

Force (kips): [-2.49097 ; 3.12044 ; 6.93914 ; 11.6113 ; 17.229 ; 23.2812 ; 25.0039 ; 27.1823 ; 29.7921 ; 32.4866 ; 34.668 ; 35.9502 ; 37.1286 ; 38.5244 ; 40.547 ; 43.1303 ; 43.4112 ; 43.7738 ; 43.9012 ; 44.1119 ; 44.4101 ; 44.845 ; 45.47 ; 46.3034 ; 47.415 ; 48.1883 ; 49.2595 ; 50.2481 ; 51.1582 ; 51.5161 ; 52.0748 ; 52.282 ; 52.6354 ; 53.1114 ; 53.825 ; 54.5881 ; 55.2931 ; 55.5507 ; 55.9261 ; 56.0688 ; 56.2779 ; 56.584 ; 57.0258 ; 57.6569 ; 57.8896 ; 58.2388 ; 58.7387 ; 59.447 ; 60.4229 ; 60.7733 ; 61.2756 ; 61.999 ; 62.2543 ; 62.6258 ; 63.1508 ; 63.8788 ; 64.8729 ; 66.1627 ; 67.3741 ; 67.7475]

Bolt 1 - Tensile Force (kips): [63.1186 ; 62.9213 ; 62.7776 ; 62.5914 ; 62.3464 ; 62.049 ; 61.9559 ; 61.8302 ; 61.6634 ; 61.454 ; 61.1394 ; 60.232 ; 59.0348 ; 57.5229 ; 54.9655 ; 50.7783 ; 50.3272 ; 49.6728 ; 49.43 ; 49.0513 ; 48.4924 ; 47.6525 ; 46.4006 ; 44.6653 ; 43.0803 ; 42.8595 ; 42.6761 ; 42.2897 ; 42.0005 ; 41.9237 ; 41.8473 ; 41.8137 ; 41.7022 ; 41.5861 ; 41.3952 ; 41.1784 ; 40.9641 ; 40.8949 ; 40.7605 ; 40.6912 ; 40.5909 ; 40.4474 ; 40.2626 ; 39.876 ; 39.6903 ; 39.2741 ; 38.7235 ; 37.8985 ; 36.9817 ; 36.6584 ; 36.2613 ; 35.8208 ; 35.6638 ; 35.4799 ; 35.2634 ; 35.0716 ; 34.8745 ; 34.2565 ; 33.6977 ; 33.4861]

Bolt 1 - Shear Force (kips): [0.119977 ; 0.147147 ; 0.301392 ; 0.506372 ; 0.770008 ; 1.0826 ; 1.17945 ; 1.3094 ; 1.47984 ; 1.69057 ; 2.0233 ; 3.01885 ; 4.1712 ; 5.50715 ; 7.56915 ; 10.493 ; 10.7768 ; 11.1764 ; 11.3212 ; 11.5417 ; 11.8571 ; 12.3061 ; 12.9153 ; 13.6239 ; 14.1166 ; 14.1189 ; 14.0791 ; 14.2688 ; 14.2574 ; 14.2352 ; 14.2044 ; 14.2756 ; 14.9665 ; 15.49 ; 16.5488 ; 18.4303 ; 19.9345 ; 20.4278 ; 21.2013 ; 21.5756 ; 22.0997 ; 22.7487 ; 23.4762 ; 24.5247 ; 24.9571 ; 25.8572 ; 26.9867 ; 28.5657 ; 30.3986 ; 31.0963 ; 32.0736 ; 33.4253 ; 33.8882 ; 34.5295 ; 35.3711 ; 36.3386 ; 37.6024 ; 39.7324 ; 41.6751 ; 42.3762]

Bolt 2 - Tensile Force (kips): [63.1062 ; 62.854 ; 62.648 ; 62.3767 ; 62.0356 ; 61.6469 ; 61.534 ; 61.3896 ; 61.2288 ; 61.0815 ; 60.951 ; 60.4486 ; 60.0215 ; 59.7464 ; 59.2906 ; 58.1503 ; 57.9887 ; 57.7568 ; 57.6708 ; 57.5278 ; 57.3154 ; 57.0081 ; 56.5325 ; 55.8031 ; 54.8064 ; 54.2447 ; 53.6566 ; 53.4152 ; 53.3327 ; 53.3225 ; 53.2074 ; 53.1942 ; 53.2057 ; 53.278 ; 53.4407 ; 53.4726 ; 53.5328 ; 53.5518 ; 53.6125 ; 53.6268 ; 53.6599 ; 53.7095 ; 53.7479 ; 53.9389 ; 54.0143 ; 54.068 ; 54.0893 ; 54.1949 ; 54.3794 ; 54.4853 ; 54.6831 ; 55.0332 ; 55.1309 ; 55.3044 ; 55.5678 ; 56.0835 ; 57.149 ; 58.9296 ; 60.7106 ; 61.2928]

Bolt 2 - Shear Force (kips): [0.0846939 ; 0.237311 ; 0.45667 ; 0.738701 ; 1.0965 ; 1.51122 ; 1.6384 ; 1.80727 ; 2.02933 ; 2.30697 ; 2.73691 ; 3.73814 ; 4.83692 ; 6.03547 ; 7.74353 ; 10.0339 ; 10.2548 ; 10.5663 ; 10.6792 ; 10.8552 ; 11.1116 ; 11.4827 ; 12.0156 ; 12.7673 ; 13.7594 ; 14.3736 ; 15.1437 ; 15.7415 ; 16.2516 ; 16.4253 ; 16.9644 ; 17.1391 ; 17.2791 ; 17.4879 ; 17.751 ; 18.0806 ; 18.456 ; 18.6281 ; 18.8202 ; 18.866 ; 18.9336 ; 19.1549 ; 19.63 ; 20.1851 ; 20.3605 ; 20.5802 ; 21.1041 ; 21.7556 ; 22.7033 ; 23.0773 ; 23.5484 ; 24.1757 ; 24.4797 ; 24.9048 ; 25.5053 ; 26.2823 ; 27.0428 ; 27.4766 ; 27.8872 ; 27.9524]

Bolt 3 - Tensile Force (kips): [65 ; 64.8378 ; 64.7731 ; 64.8553 ; 65.1338 ; 65.65 ; 65.9359 ; 66.4345 ; 67.1489 ; 67.9832 ; 68.9201 ; 69.8098 ; 70.9861 ; 72.6566 ; 75.0574 ; 78.306 ; 78.5517 ; 78.8727 ; 78.9832 ; 79.1319 ; 79.3355 ; 79.6626 ; 80.1902 ; 80.9721 ; 82.142 ; 83.0047 ; 84.2776 ; 85.5502 ; 86.8242 ; 87.2785 ; 87.9753 ; 88.2146 ; 88.6083 ; 89.1929 ; 90.0591 ; 90.8985 ; 91.6166 ; 91.8735 ; 92.2541 ; 92.3926 ; 92.5954 ; 92.9017 ; 93.3793 ; 94.1133 ; 94.3858 ; 94.8157 ; 95.5092 ; 96.5483 ; 97.9372 ; 98.4334 ; 99.1659 ; 100.203 ; 100.528 ; 101.005 ; 101.698 ; 102.766 ; 104.184 ; 106.062 ; 107.754 ; 108.247]

Bolt 3 - Shear Force (kips): [0.0507241 ; 0.0359082 ; 0.103435 ; 0.207042 ; 0.347807 ; 0.541979 ; 0.609751 ; 0.708203 ; 0.843608 ; 1.0193 ; 1.18428 ; 1.32587 ; 1.47147 ; 1.70915 ; 2.03187 ; 2.4101 ; 2.45399 ; 2.5237 ; 2.54952 ; 2.6053 ; 2.68802 ; 3.22105 ; 5.51902 ; 7.95619 ; 10.7522 ; 12.5515 ; 15.1006 ; 16.9447 ; 18.2351 ; 18.299 ; 18.2382 ; 18.1962 ; 18.1295 ; 17.9398 ; 17.6691 ; 17.2597 ; 17.0367 ; 16.957 ; 16.8661 ; 16.8303 ; 16.7917 ; 16.7495 ; 16.7141 ; 16.7616 ; 16.8046 ; 16.8789 ; 16.9602 ; 17.0283 ; 17.1411 ; 17.1734 ; 17.1903 ; 17.1474 ; 17.1059 ; 17.0147 ; 16.8655 ; 16.6832 ; 16.5458 ; 16.3159 ; 16.0303 ; 15.9479]

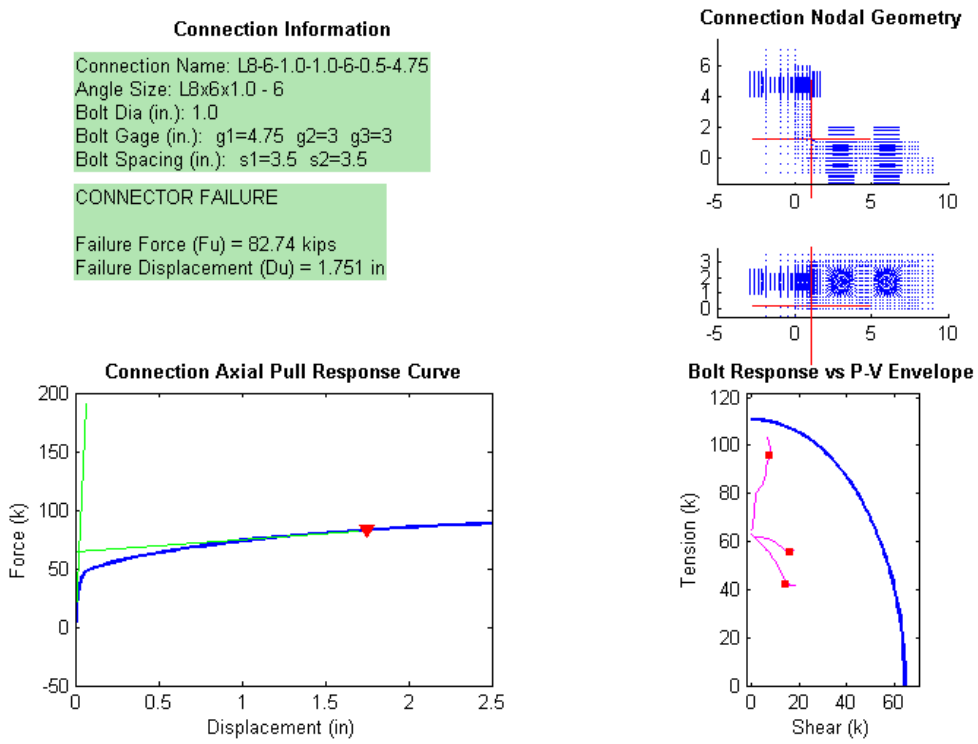


Figure B.291 Connection L8_6_1.0_1.0_6_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_1.0_6_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 2.9421e+003

Plastic Stiffness (k/in): 10.4128

Displacement (in): [9.4052e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.11067 ; 0.12945 ; 0.1576 ; 0.19984 ; 0.26319 ; 0.35822 ; 0.50076 ; 0.51413 ; 0.53417 ; 0.56424 ; 0.57551 ; 0.59243 ; 0.6178 ; 0.65585 ; 0.71293 ; 0.73434 ; 0.76645 ; 0.81461 ; 0.88685 ; 0.91395 ; 0.95458 ; 1.0155 ; 1.107 ; 1.2441 ; 1.4499 ; 1.6999 ; 1.9499 ; 2.0124 ; 2.1061 ; 2.2467 ; 2.2995 ; 2.3786 ; 2.4972 ; 2.5]

Force (kips): [-2.46167 ; 1.24566 ; 3.28469 ; 5.92134 ; 9.29787 ; 13.4319 ; 17.7337 ; 21.6379 ; 23.9843 ; 24.9311 ; 25.2083 ; 25.63 ; 26.2641 ; 27.1554 ; 28.3363 ; 29.7632 ; 31.5989 ; 31.7625 ; 32.0235 ; 32.3966 ; 32.5416 ; 32.7502 ; 33.0474 ; 33.469 ; 34.0777 ; 34.311 ; 34.6403 ; 35.1227 ; 35.7999 ; 36.0478 ; 36.4061 ; 36.9186 ; 37.6288 ; 38.6014 ; 39.845 ; 41.1466 ; 42.2466 ; 42.5134 ; 42.9117 ; 43.449 ; 43.6507 ; 43.9415 ; 44.3562 ; 44.3655]

Bolt 1 - Tensile Force (kips): [63.1183 ; 62.9891 ; 62.9138 ; 62.8107 ; 62.671 ; 62.4823 ; 62.2571 ; 62.014 ; 61.8475 ; 61.7804 ; 61.7593 ; 61.7223 ; 61.6553 ; 61.5381 ; 61.2613 ; 59.9421 ; 57.6989 ; 57.4774 ; 57.1285 ; 56.5983 ; 56.3925 ; 56.084 ; 55.6233 ; 54.9331 ; 53.8851 ; 53.4813 ; 52.8758 ; 51.9595 ; 50.576 ; 50.0464 ; 49.2507 ; 48.0624 ; 46.265 ; 43.9538 ; 43.0264 ; 42.7198 ; 42.4248 ; 42.3806 ; 42.2465 ; 42.0767 ; 42.0034 ; 41.9118 ; 41.7524 ; 41.7483]

Bolt 1 - Shear Force (kips): [0.119708 ; 0.0869847 ; 0.157628 ; 0.268739 ; 0.423576 ; 0.630477 ; 0.873819 ; 1.13364 ; 1.31568 ; 1.39979 ; 1.42698 ; 1.47331 ; 1.55404 ; 1.69123 ; 2.0153 ; 3.44626 ; 5.49966 ; 5.69061 ; 5.98757 ; 6.42897 ; 6.59758 ; 6.84743 ; 7.21408 ; 7.74825 ; 8.52847 ; 8.82073 ; 9.25053 ; 9.8794 ; 10.7834 ; 11.1117 ; 11.5855 ; 12.2447 ; 13.1141 ; 13.9767 ; 14.1722 ; 14.1727 ; 14.1186 ; 14.0935 ; 14.8578 ; 15.6798 ; 16.143 ; 16.923 ; 18.4142 ; 18.4464]

Bolt 2 - Tensile Force (kips): [63.1057 ; 62.9457 ; 62.8432 ; 62.6936 ; 62.4964 ; 62.2561 ; 61.9971 ; 61.7952 ; 61.7321 ; 61.7356 ; 61.7414 ; 61.755 ; 61.7847 ; 61.8536 ; 61.8955 ; 61.66 ; 61.5176 ; 61.4962 ; 61.4552 ; 61.3839 ; 61.3487 ; 61.2919 ; 61.2024 ; 61.0655 ; 60.8289 ; 60.7265 ; 60.567 ; 60.3008 ; 59.8628 ; 59.6941 ; 59.4446 ; 59.0625 ; 58.4776 ; 57.5811 ; 56.5308 ; 56.0141 ; 55.9811 ; 55.9335 ; 55.9083 ; 56.0691 ; 56.1053 ; 56.1865 ; 56.3221 ; 56.3244]

Bolt 2 - Shear Force (kips): [0.0849437 ; 0.139166 ; 0.262459 ; 0.42945 ; 0.654114 ; 0.945031 ; 1.27615 ; 1.61879 ; 1.85556 ; 1.96215 ; 1.99757 ; 2.05948 ; 2.17124 ; 2.36343 ; 2.77962 ; 4.11934 ; 5.88463 ; 6.0417 ; 6.28451 ; 6.6409 ; 6.77571 ; 6.97506 ; 7.26559 ; 7.68419 ; 8.2857 ; 8.50996 ; 8.83731 ; 9.31787 ; 10.0018 ; 10.2502 ; 10.6123 ; 11.1379 ; 11.8885 ; 12.9833 ; 14.3485 ; 15.5351 ; 16.3992 ; 16.7829 ; 17.173 ; 17.5562 ; 17.7097 ; 17.8723 ; 17.9895 ; 17.9934]

Bolt 3 - Tensile Force (kips): [65 ; 64.8661 ; 64.7634 ; 64.7029 ; 64.7677 ; 64.9682 ; 65.2919 ; 66.2669 ; 67.4824 ; 68.3294 ; 68.6161 ; 69.0489 ; 69.738 ; 70.8242 ; 72.4771 ; 74.8443 ; 78.3394 ; 78.6511 ; 79.1233 ; 79.7691 ; 80.0263 ; 80.4029 ; 80.946 ; 81.7338 ; 82.9259 ; 83.3668 ; 83.9597 ; 84.818 ; 85.9951 ; 86.4181 ; 87.0291 ; 87.9509 ; 89.2498 ; 90.9047 ; 92.9609 ; 95.5613 ; 98.053 ; 98.7216 ; 99.637 ; 100.836 ; 101.325 ; 102.028 ; 103.016 ; 103.038]

Bolt 3 - Shear Force (kips): [0.050203 ; 0.017035 ; 0.049791 ; 0.10629 ; 0.19549 ; 0.31685 ; 0.46786 ; 0.62989 ; 0.79558 ; 0.91756 ; 0.94383 ; 0.98072 ; 1.0389 ; 1.1484 ; 1.3083 ; 1.536 ; 1.7991 ; 1.819 ; 1.891 ; 2.0004 ; 2.0653 ; 2.1583 ; 2.2977 ; 3.3336 ; 4.5965 ; 4.7085 ; 4.962 ; 5.0768 ; 5.4741 ; 5.6354 ; 5.8423 ; 6.1678 ; 6.1375 ; 6.4074 ; 6.7513 ; 7.5219 ; 8.1164 ; 8.0473 ; 7.9142 ; 7.6882 ; 7.5187 ; 7.2645 ; 6.9206 ; 6.9128]

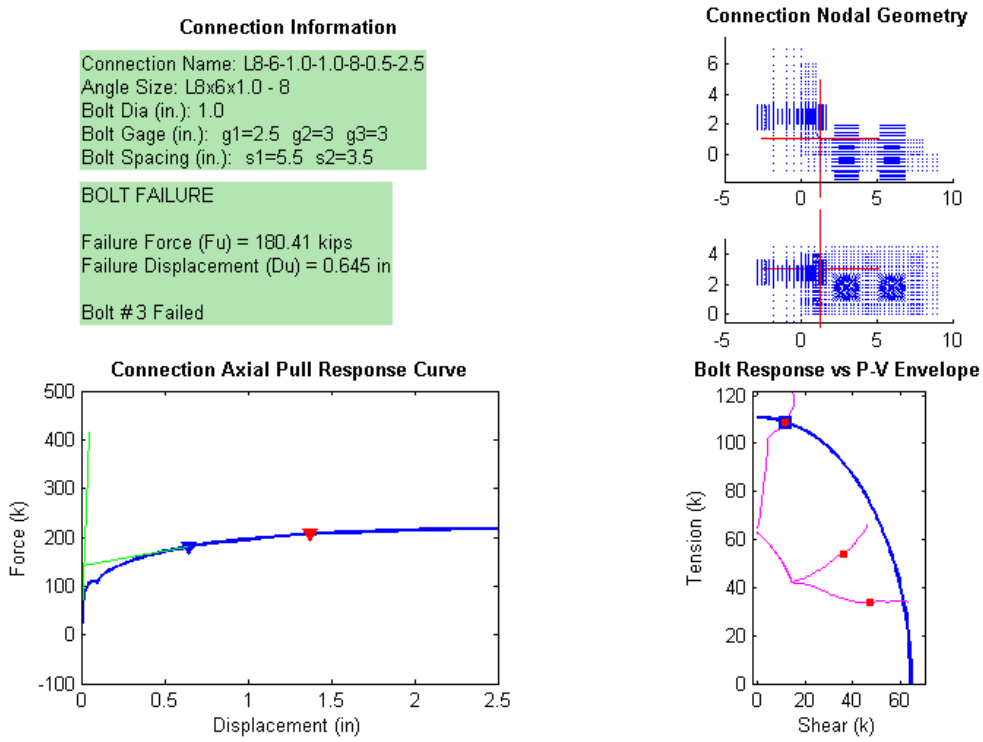


Figure B.292 Connection L8_6_1.0_1.0_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_1.0_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 8.6537e+003

Plastic Stiffness (k/in): 60.9312

Displacement (in): [7.5272e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012329 ; 0.013428 ; 0.015076 ; 0.017548 ; 0.021256 ; 0.026817 ; 0.03516 ; 0.047674 ; 0.066445 ; 0.073484 ; 0.084043 ; 0.085033 ; 0.086518 ; 0.088745 ; 0.092086 ; 0.097098 ; 0.098977 ; 0.1018 ; 0.10602 ; 0.10761 ; 0.1082 ; 0.1091 ; 0.11043 ; 0.11244 ; 0.11319 ; 0.11432 ; 0.11601 ; 0.11855 ; 0.12237 ; 0.12808 ; 0.13665 ; 0.14951 ; 0.15433 ; 0.16156 ; 0.16428 ; 0.16834 ; 0.17445 ; 0.1836 ; 0.18703 ; 0.19218 ; 0.19991 ; 0.21149 ; 0.22887 ; 0.25494 ; 0.26471 ; 0.27937 ; 0.30137 ; 0.30961 ; 0.32199 ; 0.34054 ; 0.36838 ; 0.41013 ; 0.47276 ; 0.49625 ; 0.53148 ; 0.54469 ; 0.56451 ; 0.59423 ; 0.63882 ; 0.7057 ; 0.80602 ; 0.84364 ; 0.90007 ; 0.98472 ; 1.1117 ; 1.3021 ; 1.3646 ; 1.4584 ; 1.4935 ; 1.5463 ; 1.6254 ; 1.744 ; 1.7885 ; 1.8553 ; 1.9554 ; 2.1056 ; 2.3308 ; 2.5]

Force (kips): [-1.93687 ; 7.69876 ; 14.9648 ; 23.5471 ; 33.0117 ; 34.8323 ; 36.4894 ; 38.734 ; 41.5033 ; 43.9034 ; 46.1417 ; 49.0176 ; 52.433 ; 54.9487 ; 54.8391 ; 54.7376 ; 54.7499 ; 54.995 ; 55.0543 ; 54.9834 ; 54.9047 ; 54.8812 ; 55.0611 ; 56.2472 ; 56.5371 ; 56.6701 ; 56.8624 ; 57.1304 ; 57.479 ; 57.6261 ; 57.8316 ; 58.1706 ; 58.6706 ; 59.3647 ; 60.4248 ; 61.7624 ; 63.4442 ; 63.9949 ; 64.764 ; 65.0499 ; 65.4723 ; 66.0716 ; 66.9061 ; 67.2245 ; 67.683 ; 68.3356 ; 69.2996 ; 70.7022 ; 72.6195 ; 73.3239 ; 74.3242 ; 75.7006 ; 76.1933 ; 76.8914 ; 77.8679 ; 79.2751 ; 81.3319 ; 84.1465 ; 85.1279 ; 86.4929 ; 86.985 ; 87.6921 ; 88.6794 ; 90.0378 ; 91.8186 ; 94.1341 ; 94.9608 ; 96.1326 ; 97.7246 ; 99.7841 ; 102.317 ; 102.991 ; 103.852 ; 104.142 ; 104.551 ; 105.113 ; 105.87 ; 106.128 ; 106.489 ; 106.978 ; 107.614 ; 108.383 ; 108.867]

Bolt 1 - Tensile Force (kips): [63.1301 ; 62.7719 ; 62.4764 ; 62.0953 ; 61.6271 ; 61.5283 ; 61.4352 ; 61.2998 ; 61.0562 ; 60.2885 ; 58.5265 ; 55.6402 ; 51.0519 ; 43.7773 ; 43.0076 ; 42.8843 ; 42.855 ; 42.5821 ; 42.376 ; 42.2354 ; 42.1506 ; 42.1306 ; 42.0964 ; 42.0146 ; 41.9983 ; 41.9826 ; 41.9582 ; 41.9323 ; 41.9117 ; 41.8969 ; 41.8787 ; 41.8541 ; 41.8172 ; 41.7738 ; 41.6988 ; 41.5394 ; 41.3469 ; 41.2904 ; 41.1525 ; 41.0867 ; 40.9759 ; 40.8047 ; 40.5877 ; 40.4679 ; 40.2881 ; 40.0132 ; 39.4987 ; 38.4828 ; 37.4339 ; 37.1116 ; 36.6701 ; 36.1103 ; 35.925 ; 35.699 ; 35.4375 ; 35.2013 ; 34.701 ; 34.01 ; 33.7695 ; 33.5788 ; 33.5509 ; 33.5382 ; 33.5663 ; 33.6885 ; 33.8933 ; 34.2088 ; 34.3046 ; 34.355 ; 34.2467 ; 34.1041 ; 34.1446 ; 34.1923 ; 34.2671 ; 34.2899 ; 34.3291 ; 34.3793 ; 34.434 ; 34.4468 ; 34.4668 ; 34.4978 ; 34.3748 ; 34.2077 ; 34.1078]

Bolt 1 - Shear Force (kips): [0.10654 ; 0.360773 ; 0.695477 ; 1.10987 ; 1.59647 ; 1.69488 ; 1.78665 ; 1.91986 ; 2.17056 ; 2.99401 ; 4.65188 ; 7.07168 ; 10.3508 ; 13.9825 ; 14.1644 ; 14.15 ; 14.1778 ; 14.3845 ; 14.4668 ; 14.477 ; 14.466 ; 14.4611 ; 14.6613 ; 15.2281 ; 15.3325 ; 15.4356 ; 15.5898 ; 15.742 ; 15.8491 ; 15.9536 ; 16.1075 ; 16.3533 ; 16.648 ; 17.1257 ; 17.9897 ; 18.9298 ; 20.2206 ; 20.6204 ; 21.335 ; 21.6474 ; 22.1392 ; 22.7799 ; 23.4839 ; 23.7762 ; 24.1734 ; 24.7262 ; 25.7513 ; 27.7524 ; 29.8851 ; 30.6656 ; 31.8062 ; 33.3583 ; 33.9514 ; 34.7347 ; 35.7433 ; 36.8943 ; 38.9004 ; 41.9029 ; 43.014 ; 44.4632 ; 44.9355 ; 45.5516 ; 46.3113 ; 47.2113 ; 48.3605 ; 49.8277 ; 50.3915 ; 51.275 ; 52.5804 ; 54.3757 ; 56.3266 ; 56.81 ; 57.4966 ; 57.7391 ; 58.086 ; 58.5778 ; 59.302 ; 59.5633 ; 59.9118 ; 60.3873 ; 61.2314 ; 62.2363 ; 62.9062]

Bolt 2 - Tensile Force (kips): [63.1264 ; 62.7128 ; 62.3376 ; 61.8448 ; 61.2562 ; 61.136 ; 61.0237 ; 60.8576 ; 60.5686 ; 59.7934 ; 58.027 ; 55.1476 ; 50.7107 ; 44.0785 ; 43.333 ; 43.1659 ; 43.1561 ; 42.9241 ; 42.6814 ; 42.5265 ; 42.4306 ; 42.4074 ; 42.4054 ; 42.5243 ; 42.5504 ; 42.5649 ; 42.5873 ; 42.6146 ; 42.6566 ; 42.677 ; 42.7064 ; 42.7571 ; 42.8385 ; 42.9664 ; 43.0993 ; 43.3113 ; 43.719 ; 43.8866 ; 44.1752 ; 44.2874 ; 44.4542 ; 44.6857 ; 44.9898 ; 45.0741 ; 45.2007 ; 45.4038 ; 45.7477 ; 46.3826 ; 47.168 ; 47.3958 ; 47.7536 ; 48.3289 ; 48.5654 ; 48.9434 ; 49.4673 ; 50.1626 ; 51.1428 ; 52.414 ; 52.8218 ; 53.1984 ; 53.3019 ; 53.4611 ; 53.7452 ; 54.104 ; 54.6741 ; 55.6282 ; 56.0125 ; 56.5666 ; 57.378 ; 58.4683 ; 60.0587 ; 60.5329 ; 61.1869 ; 61.4183 ; 61.7453 ; 62.1687 ; 62.7685 ; 62.979 ; 63.2865 ; 63.7163 ; 64.3464 ; 65.2645 ; 65.9259]

Bolt 2 - Shear Force (kips): [0.070195 ; 0.455397 ; 0.847332 ; 1.33048 ; 1.88933 ; 2.00194 ; 2.10733 ; 2.26136 ; 2.54145 ; 3.3559 ; 5.00081 ; 7.39242 ; 10.5539 ; 14.0385 ; 14.2402 ; 14.2407 ; 14.239 ; 14.4577 ; 14.5869 ; 14.6018 ; 14.5905 ; 14.585 ; 14.5848 ; 15.2273 ; 15.4207 ; 15.4556 ; 15.5022 ; 15.6307 ; 15.9156 ; 15.9728 ; 16.0445 ; 16.1567 ; 16.3816 ; 16.6223 ; 17.1907 ; 18.2097 ; 19.5304 ; 19.9496 ; 20.3935 ; 20.545 ; 20.7682 ; 21.1053 ; 21.6884 ; 21.9808 ; 22.3904 ; 22.9193 ; 23.628 ; 24.3878 ; 25.7263 ; 26.2827 ; 26.9988 ; 27.8789 ; 28.1682 ; 28.5489 ; 29.109 ; 30.103 ; 31.2646 ; 32.4221 ; 32.7955 ; 33.5522 ; 33.8465 ; 34.276 ; 34.8857 ; 35.853 ; 36.9411 ; 38.1149 ; 38.5289 ; 39.1262 ; 39.8679 ; 40.7851 ; 41.8663 ; 42.2372 ; 42.7546 ; 42.9423 ; 43.2129 ; 43.637 ; 44.1677 ; 44.3532 ; 44.6025 ; 44.901 ; 45.2089 ; 45.597 ; 45.8398]

Bolt 3 - Tensile Force (kips): [65 ; 64.9068 ; 64.9885 ; 65.317 ; 66.1919 ; 66.4886 ; 66.7987 ; 67.2534 ; 67.8495 ; 68.4283 ; 69.0067 ; 69.8308 ; 71.0541 ; 72.2903 ; 72.215 ; 72.1281 ; 72.1404 ; 72.332 ; 72.3652 ; 72.3015 ; 72.2289 ; 72.207 ; 72.3671 ; 73.0756 ; 73.2689 ; 73.3583 ; 73.4892 ; 73.6789 ; 73.9403 ; 74.0532 ; 74.2148 ; 74.4894 ; 74.9134 ; 75.5446 ; 76.5357 ; 77.892 ; 79.7004 ; 80.3112 ; 81.166 ; 81.4792 ; 81.9386 ; 82.5951 ; 83.5151 ; 83.8573 ; 84.3543 ; 85.0682 ; 86.1118 ; 87.6206 ; 89.7196 ; 90.4798 ; 91.5642 ; 93.0553 ; 93.5823 ; 94.3333 ; 95.3871 ; 96.9171 ; 99.0789 ; 101.97 ; 103.007 ; 104.46 ; 105.011 ; 105.853 ; 107.081 ; 108.797 ; 111.005 ; 113.714 ; 114.635 ; 115.974 ; 117.655 ; 119.783 ; 122.149 ; 122.539 ; 123.117 ; 123.323 ; 123.6 ; 123.989 ; 124.569 ; 124.778 ; 125.058 ; 125.439 ; 125.966 ; 126.644 ; 127.089]

Bolt 3 - Shear Force (kips): [0.0270872 ; 0.101204 ; 0.218287 ; 0.378789 ; 0.60627 ; 0.659714 ; 0.709899 ; 0.779697 ; 0.873165 ; 0.969867 ; 1.05835 ; 1.18016 ; 1.35081 ; 1.50226 ; 1.49572 ; 1.48797 ; 1.48897 ; 1.50867 ; 1.51298 ; 1.50803 ; 1.50223 ; 1.50048 ; 1.51443 ; 1.59039 ; 1.61005 ; 1.61904 ; 1.63233 ; 1.65172 ; 1.67826 ; 1.68941 ; 1.70537 ; 1.73247 ; 1.7749 ; 1.83766 ; 1.94021 ; 2.09586 ; 2.30788 ; 2.38182 ; 2.48561 ; 2.52247 ; 2.57633 ; 2.65483 ; 2.76914 ; 2.81045 ; 2.87183 ; 2.96222 ; 3.09018 ; 3.27102 ; 3.52397 ; 3.61077 ; 3.73021 ; 3.88242 ; 3.93149 ; 4.00108 ; 4.09593 ; 4.2134 ; 4.36733 ; 4.59168 ; 5.53356 ; 7.07459 ; 7.86372 ; 8.9548 ; 10.1189 ; 11.4076 ; 12.9409 ; 14.2004 ; 14.6737 ; 15.2497 ; 15.0578 ; 15.0889 ; 14.6842 ; 14.2255 ; 13.7335 ; 13.5084 ; 13.2264 ; 12.8233 ; 12.3789 ; 12.2179 ; 11.9756 ; 11.6115 ; 11.047 ; 10.276 ; 9.73448]

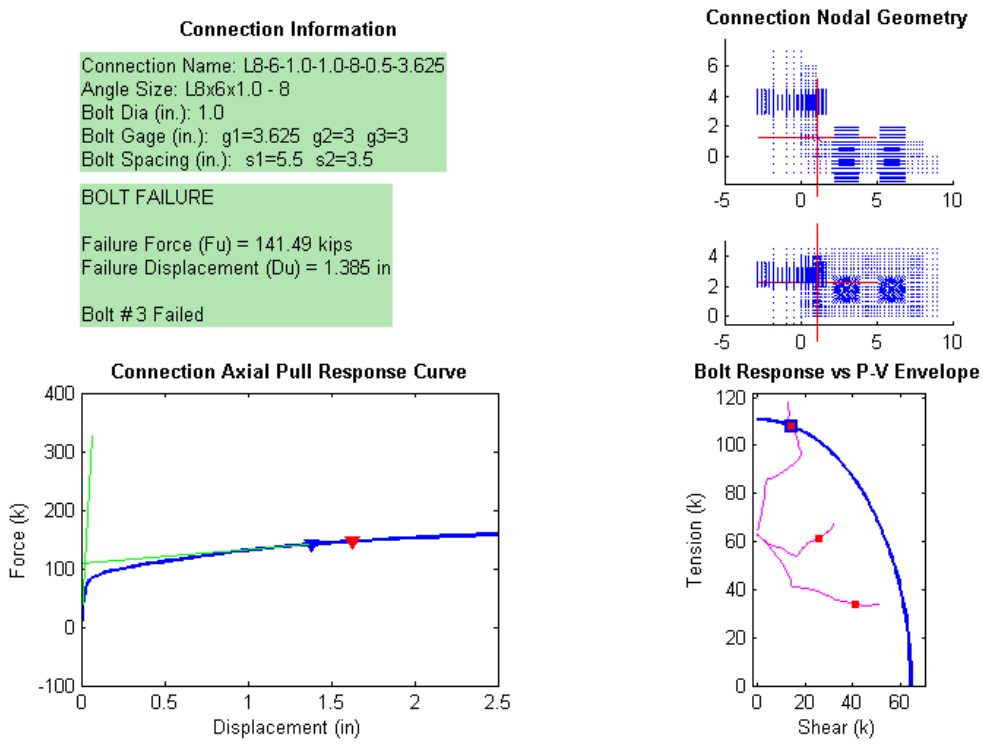


Figure B.293 Connection L8_6_1.0_1.0_8_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_1.0_8_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 4.8699e+003

Plastic Stiffness (k/in): 23.8286

Displacement (in): [8.2184e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.20294 ; 0.29797 ; 0.30688 ; 0.32024 ; 0.34028 ; 0.3478 ; 0.35908 ; 0.37599 ; 0.40136 ; 0.41087 ; 0.42514 ; 0.44655 ; 0.47866 ; 0.52682 ; 0.54488 ; 0.55165 ; 0.56181 ; 0.57705 ; 0.59991 ; 0.6342 ; 0.64706 ; 0.66634 ; 0.69527 ; 0.73867 ; 0.75494 ; 0.77935 ; 0.81597 ; 0.8297 ; 0.85029 ; 0.88119 ; 0.92753 ; 0.99704 ; 1.0231 ; 1.0622 ; 1.1209 ; 1.2088 ; 1.2418 ; 1.2913 ; 1.3655 ; 1.4769 ; 1.5186 ; 1.5813 ; 1.6752 ; 1.8161 ; 1.869 ; 1.9482 ; 2.0671 ; 2.2455 ; 2.4955 ; 2.5]

Force (kips): [-2.06679 ; 3.39809 ; 7.44483 ; 12.439 ; 18.5442 ; 25.4964 ; 27.4805 ; 30.069 ; 33.3262 ; 36.9216 ; 39.8881 ; 42.2069 ; 44.1989 ; 46.321 ; 48.5517 ; 51.2041 ; 51.4279 ; 51.8018 ; 52.3251 ; 52.5366 ; 52.8281 ; 53.2481 ; 53.8418 ; 54.0611 ; 54.3882 ; 54.8629 ; 55.5499 ; 56.4202 ; 56.6971 ; 56.8169 ; 57.0165 ; 57.3808 ; 57.8588 ; 58.5604 ; 58.8609 ; 59.3029 ; 59.9171 ; 60.8064 ; 61.1403 ; 61.6144 ; 62.3152 ; 62.5918 ; 62.9982 ; 63.584 ; 64.4033 ; 65.5414 ; 65.9653 ; 66.5769 ; 67.4197 ; 68.5961 ; 69.0237 ; 69.6415 ; 70.5259 ; 71.7395 ; 72.1724 ; 72.7865 ; 73.632 ; 74.8086 ; 75.214 ; 75.792 ; 76.5809 ; 77.639 ; 78.9342 ; 78.9563]

Bolt 1 - Tensile Force (kips): [63.1225 ; 62.9193 ; 62.7576 ; 62.5436 ; 62.2562 ; 61.8879 ; 61.7717 ; 61.6087 ; 61.3846 ; 61.0066 ; 59.9289 ; 58.443 ; 56.4023 ; 53.6367 ; 50.2269 ; 44.97 ; 44.5321 ; 43.93 ; 43.2033 ; 43.0661 ; 42.9376 ; 42.804 ; 42.6604 ; 42.6093 ; 42.5382 ; 42.436 ; 42.0682 ; 41.722 ; 41.6124 ; 41.5832 ; 41.5466 ; 41.4177 ; 41.2792 ; 41.0444 ; 40.9283 ; 40.7765 ; 40.5552 ; 40.2466 ; 40.1027 ; 39.9086 ; 39.5349 ; 39.2581 ; 38.7661 ; 38.0547 ; 37.1822 ; 36.2296 ; 35.8757 ; 35.4781 ; 35.134 ; 34.788 ; 34.6082 ; 34.3705 ; 34.0396 ; 33.6738 ; 33.5078 ; 33.3539 ; 33.2968 ; 33.3703 ; 33.3989 ; 33.4399 ; 33.5667 ; 33.753 ; 33.8345 ; 33.8338]

Bolt 1 - Shear Force (kips): [0.108339 ; 0.179878 ; 0.364667 ; 0.60843 ; 0.924909 ; 1.31934 ; 1.44083 ; 1.60719 ; 1.83136 ; 2.21902 ; 3.34391 ; 4.70783 ; 6.42889 ; 8.53123 ; 10.8185 ; 13.4862 ; 13.6478 ; 13.8557 ; 14.0701 ; 14.0924 ; 14.1009 ; 14.0955 ; 14.0682 ; 14.055 ; 14.0343 ; 14.0022 ; 14.2424 ; 14.2168 ; 14.1846 ; 14.1741 ; 14.1978 ; 14.8357 ; 15.3282 ; 16.2428 ; 16.9958 ; 18.124 ; 19.4628 ; 21.3448 ; 22.1807 ; 23.1279 ; 24.3556 ; 25.027 ; 26.128 ; 27.6431 ; 29.4297 ; 31.7181 ; 32.6436 ; 33.8672 ; 35.3149 ; 37.1777 ; 37.9103 ; 38.971 ; 40.4833 ; 42.4808 ; 43.2322 ; 44.1925 ; 45.3488 ; 46.6634 ; 47.0827 ; 47.6769 ; 48.4563 ; 49.4596 ; 50.8952 ; 50.9223]

Bolt 2 - Tensile Force (kips): [63.1065 ; 62.8865 ; 62.6799 ; 62.4035 ; 62.0501 ; 61.6358 ; 61.5083 ; 61.3363 ; 61.1293 ; 60.8126 ; 59.9874 ; 59.094 ; 58.3513 ; 57.8957 ; 57.3235 ; 56.0249 ; 55.8851 ; 55.6649 ; 55.3435 ; 55.2112 ; 55.0318 ; 54.8222 ; 54.6577 ; 54.6319 ; 54.5836 ; 54.5137 ; 54.5122 ; 54.2308 ; 53.8386 ; 53.7509 ; 53.7288 ; 53.9195 ; 54.1492 ; 54.5567 ; 54.7477 ; 55.0271 ; 55.433 ; 56.0352 ; 56.251 ; 56.5466 ; 57.0273 ; 57.1986 ; 57.456 ; 57.8286 ; 58.3488 ; 59.0537 ; 59.2104 ; 59.4221 ; 59.7825 ; 60.2881 ; 60.4541 ; 60.7217 ; 61.1028 ; 61.7685 ; 62.0066 ; 62.3674 ; 62.8909 ; 63.7499 ; 64.0802 ; 64.5465 ; 65.1979 ; 66.1582 ; 67.2459 ; 67.2626]

Bolt 2 - Shear Force (kips): [0.067381 ; 0.24234 ; 0.473724 ; 0.771449 ; 1.15287 ; 1.61346 ; 1.75399 ; 1.94608 ; 2.20164 ; 2.62886 ; 3.7212 ; 5.03268 ; 6.59389 ; 8.30736 ; 10.0438 ; 12.2891 ; 12.4844 ; 12.7717 ; 13.1765 ; 13.3322 ; 13.5546 ; 13.8604 ; 14.255 ; 14.3921 ; 14.5958 ; 14.8829 ; 15.2427 ; 15.8802 ; 16.2357 ; 16.4065 ; 16.6341 ; 16.7913 ; 17.0274 ; 17.2675 ; 17.3348 ; 17.4398 ; 17.6451 ; 18.053 ; 18.1805 ; 18.5186 ; 18.9553 ; 19.0559 ; 19.1695 ; 19.4396 ; 19.9432 ; 20.6316 ; 21.051 ; 21.68 ; 22.4793 ; 23.6038 ; 24.0334 ; 24.6695 ; 25.6638 ; 26.6545 ; 27.0093 ; 27.5144 ; 28.1971 ; 29.1205 ; 29.4303 ; 29.8361 ; 30.3589 ; 31.0457 ; 31.8474 ; 31.8631]

Bolt 3 - Tensile Force (kips): [65 ; 64.8367 ; 64.7816 ; 64.883 ; 65.1806 ; 65.8306 ; 66.1982 ; 66.8447 ; 67.7684 ; 68.9525 ; 70.2585 ; 71.7707 ; 73.6025 ; 75.9864 ; 79.1505 ; 82.9512 ; 83.2662 ; 83.7113 ; 84.3156 ; 84.5338 ; 84.8378 ; 85.2545 ; 85.8595 ; 86.0849 ; 86.448 ; 87.0225 ; 87.8956 ; 89.0709 ; 89.461 ; 89.6196 ; 89.8744 ; 90.314 ; 90.941 ; 91.9 ; 92.2922 ; 92.8852 ; 93.7498 ; 95.0268 ; 95.5067 ; 96.1934 ; 97.2314 ; 97.6184 ; 98.1789 ; 98.9593 ; 100.037 ; 101.454 ; 101.954 ; 102.726 ; 103.754 ; 105.26 ; 105.829 ; 106.634 ; 107.745 ; 109.118 ; 109.534 ; 110.159 ; 111.125 ; 112.848 ; 113.386 ; 114.142 ; 115.132 ; 116.381 ; 117.83 ; 117.856]

Bolt 3 - Shear Force (kips): [0.0536033 ; 0.0407742 ; 0.112229 ; 0.221823 ; 0.371876 ; 0.589545 ; 0.667691 ; 0.777251 ; 0.927057 ; 1.12863 ; 1.36044 ; 1.64286 ; 1.98562 ; 2.42057 ; 2.85906 ; 3.35839 ; 3.40345 ; 3.49643 ; 3.6582 ; 3.72075 ; 3.81411 ; 4.02686 ; 4.26685 ; 4.56815 ; 5.69325 ; 7.46751 ; 9.39297 ; 10.9764 ; 11.531 ; 11.7367 ; 12.0923 ; 12.7235 ; 13.6231 ; 14.9065 ; 15.356 ; 15.923 ; 16.6338 ; 17.5235 ; 17.8159 ; 18.2108 ; 18.33 ; 18.1882 ; 18.0023 ; 17.7572 ; 17.4559 ; 17.1884 ; 17.1298 ; 16.8068 ; 16.3402 ; 15.7113 ; 15.5251 ; 15.1914 ; 14.5098 ; 13.8176 ; 13.5612 ; 13.2996 ; 13.0828 ; 13.3415 ; 13.3399 ; 13.3611 ; 13.1738 ; 12.9774 ; 12.752 ; 12.7535]

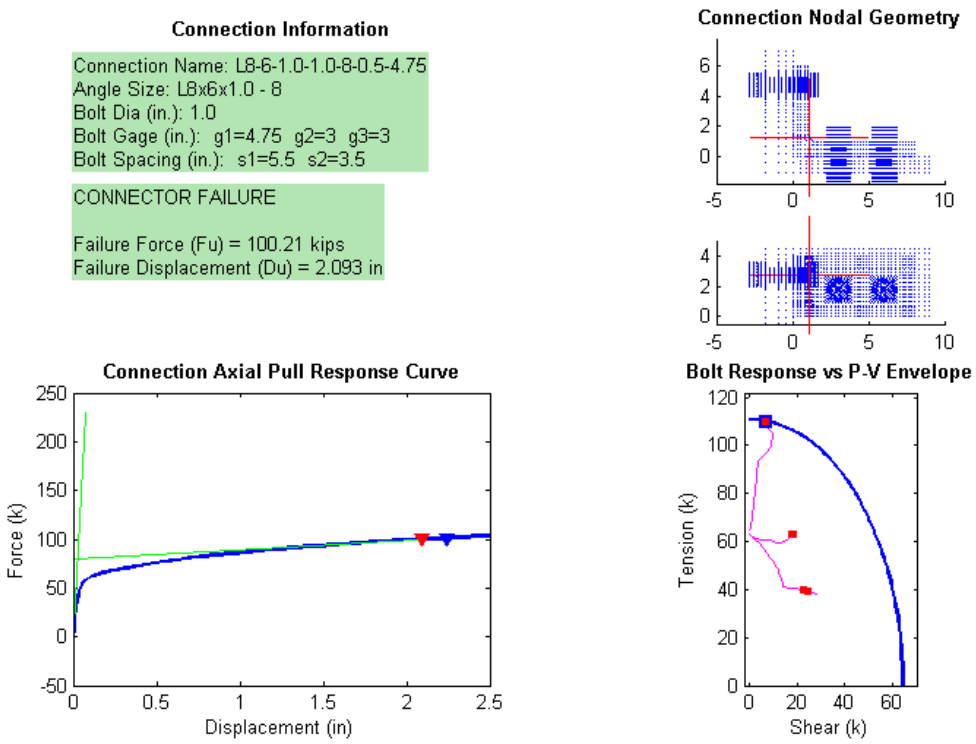


Figure B.294 Connection L8_6_1.0_1.0_8_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_1.0_8_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 2960

Plastic Stiffness (k/in): 9.4970

Displacement (in): [8.3577e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.11532 ; 0.13116 ; 0.15492 ; 0.19056 ; 0.24401 ; 0.32419 ; 0.44446 ; 0.48956 ; 0.55722 ; 0.58258 ; 0.62064 ; 0.67772 ; 0.69913 ; 0.73123 ; 0.7794 ; 0.85164 ; 0.96001 ; 1.1226 ; 1.1378 ; 1.1607 ; 1.1949 ; 1.2464 ; 1.3235 ; 1.4392 ; 1.4826 ; 1.5477 ; 1.6454 ; 1.682 ; 1.6957 ; 1.7163 ; 1.7472 ; 1.7936 ; 1.8631 ; 1.9673 ; 2.0064 ; 2.0651 ; 2.153 ; 2.285 ; 2.483 ; 2.5]

Force (kips): [-2.07121 ; 1.46207 ; 3.71011 ; 6.62693 ; 10.3595 ; 14.9209 ; 19.957 ; 21.3858 ; 23.2384 ; 25.3926 ; 27.6069 ; 29.3435 ; 30.5722 ; 30.9205 ; 31.3891 ; 32.0284 ; 32.8694 ; 33.9305 ; 35.3129 ; 37.1058 ; 37.7146 ; 38.6035 ; 38.9186 ; 39.3802 ; 40.0553 ; 40.3018 ; 40.6535 ; 41.1556 ; 41.8567 ; 42.8116 ; 44.0984 ; 44.2208 ; 44.3979 ; 44.6607 ; 45.0395 ; 45.5799 ; 46.3242 ; 46.5916 ; 47.0358 ; 47.6425 ; 47.8761 ; 47.966 ; 48.102 ; 48.2978 ; 48.5755 ; 48.9675 ; 49.5113 ; 49.7072 ; 49.9857 ; 50.3704 ; 50.9047 ; 51.6336 ; 51.6932]

Bolt 1 - Tensile Force (kips): [63.1218 ; 62.9915 ; 62.9023 ; 62.78 ; 62.6128 ; 62.3845 ; 62.0956 ; 62.0045 ; 61.8785 ; 61.7186 ; 61.5331 ; 61.3754 ; 61.2563 ; 61.2144 ; 61.1376 ; 60.8948 ; 60.2873 ; 59.1827 ; 57.3633 ; 54.6302 ; 53.5831 ; 51.9532 ; 51.3157 ; 50.3226 ; 48.7844 ; 48.1992 ; 47.3284 ; 46.0226 ; 44.3071 ; 43.018 ; 42.4894 ; 42.4405 ; 42.3708 ; 42.2714 ; 42.0174 ; 41.7786 ; 41.5243 ; 41.4379 ; 41.2159 ; 40.945 ; 40.8186 ; 40.7731 ; 40.7032 ; 40.6058 ; 40.4817 ; 40.2996 ; 40.0821 ; 39.9899 ; 39.8782 ; 39.7238 ; 39.238 ; 38.1629 ; 38.0688]

Bolt 1 - Shear Force (kips): [0.108731 ; 0.105824 ; 0.200253 ; 0.340292 ; 0.532298 ; 0.786056 ; 1.101 ; 1.19913 ; 1.33294 ; 1.5001 ; 1.69082 ; 1.85335 ; 1.98006 ; 2.0262 ; 2.11134 ; 2.38504 ; 3.03812 ; 4.10583 ; 5.70398 ; 7.88514 ; 8.65423 ; 9.78991 ; 10.212 ; 10.8446 ; 11.7496 ; 12.0701 ; 12.5174 ; 13.116 ; 13.7622 ; 14.0987 ; 14.0091 ; 13.9962 ; 13.9761 ; 13.945 ; 14.0798 ; 14.0485 ; 13.9506 ; 13.9129 ; 14.7087 ; 15.5159 ; 16.0884 ; 16.3699 ; 16.8744 ; 17.562 ; 18.4012 ; 19.5547 ; 21.1412 ; 21.8188 ; 22.6399 ; 23.576 ; 25.1768 ; 27.7434 ; 27.9479]

Bolt 2 - Tensile Force (kips): [63.1051 ; 62.9707 ; 62.862 ; 62.7006 ; 62.4839 ; 62.2237 ; 61.9332 ; 61.8482 ; 61.7516 ; 61.642 ; 61.5611 ; 61.5266 ; 61.5201 ; 61.5159 ; 61.4983 ; 61.394 ; 61.136 ; 60.8377 ; 60.7725 ; 60.7529 ; 60.6803 ; 60.5121 ; 60.4381 ; 60.323 ; 60.1048 ; 60.018 ; 59.8789 ; 59.6605 ; 59.3919 ; 59.4413 ; 59.7049 ; 59.7333 ; 59.775 ; 59.8462 ; 59.9776 ; 60.1609 ; 60.4184 ; 60.4948 ; 60.6941 ; 61.0229 ; 61.1983 ; 61.2578 ; 61.3456 ; 61.4786 ; 61.6793 ; 61.9909 ; 62.4103 ; 62.5604 ; 62.7805 ; 63.0918 ; 63.5103 ; 64.0747 ; 64.1205]

Bolt 2 - Shear Force (kips): [0.0686014 ; 0.139944 ; 0.275031 ; 0.457092 ; 0.700589 ; 1.0145 ; 1.38912 ; 1.50504 ; 1.66262 ; 1.85687 ; 2.07852 ; 2.26182 ; 2.40347 ; 2.45466 ; 2.54796 ; 2.82269 ; 3.44414 ; 4.42785 ; 5.79508 ; 7.48163 ; 8.05381 ; 8.87204 ; 9.17099 ; 9.61844 ; 10.2762 ; 10.5145 ; 10.8651 ; 11.3764 ; 12.0888 ; 12.9398 ; 13.9676 ; 14.0553 ; 14.184 ; 14.3692 ; 14.613 ; 14.9821 ; 15.4953 ; 15.7234 ; 16.1159 ; 16.6117 ; 16.7165 ; 16.7615 ; 16.8186 ; 16.8965 ; 17.015 ; 17.1637 ; 17.4228 ; 17.4947 ; 17.6896 ; 18.002 ; 18.3122 ; 18.7276 ; 18.7593]

Bolt 3 - Tensile Force (kips): [65 ; 64.8625 ; 64.7639 ; 64.7197 ; 64.8225 ; 65.1032 ; 65.7426 ; 66.1543 ; 66.896 ; 67.9223 ; 69.2394 ; 70.9031 ; 72.9828 ; 73.6827 ; 74.6641 ; 75.9777 ; 77.6633 ; 79.8134 ; 82.5426 ; 85.9921 ; 87.1638 ; 88.8646 ; 89.4449 ; 90.2958 ; 91.5165 ; 91.9486 ; 92.5676 ; 93.4528 ; 94.7379 ; 96.5805 ; 99.1417 ; 99.3597 ; 99.6739 ; 100.156 ; 100.825 ; 101.797 ; 103.07 ; 103.491 ; 104.218 ; 105.217 ; 105.522 ; 105.65 ; 105.852 ; 106.128 ; 106.534 ; 107.093 ; 107.903 ; 108.204 ; 108.68 ; 109.406 ; 110.51 ; 112.056 ; 112.191]

Bolt 3 - Shear Force (kips): [0.051956 ; 0.020593 ; 0.059925 ; 0.12573 ; 0.22751 ; 0.36542 ; 0.56183 ; 0.63125 ; 0.72823 ; 0.86991 ; 1.0762 ; 1.3314 ; 1.6157 ; 1.716 ; 1.8515 ; 2.0282 ; 2.2402 ; 2.4643 ; 2.7119 ; 3.0089 ; 3.1104 ; 3.3291 ; 3.3942 ; 3.4659 ; 3.6046 ; 3.6629 ; 3.7388 ; 3.847 ; 4.9393 ; 6.9753 ; 8.8428 ; 8.8842 ; 9.0125 ; 9.1742 ; 9.3698 ; 9.5278 ; 9.6019 ; 9.8005 ; 9.883 ; 9.5729 ; 9.2662 ; 9.0861 ; 8.8265 ; 8.4836 ; 8.1658 ; 7.9494 ; 7.6263 ; 7.4971 ; 7.3287 ; 7.1716 ; 6.8462 ; 6.4128 ; 6.4608]

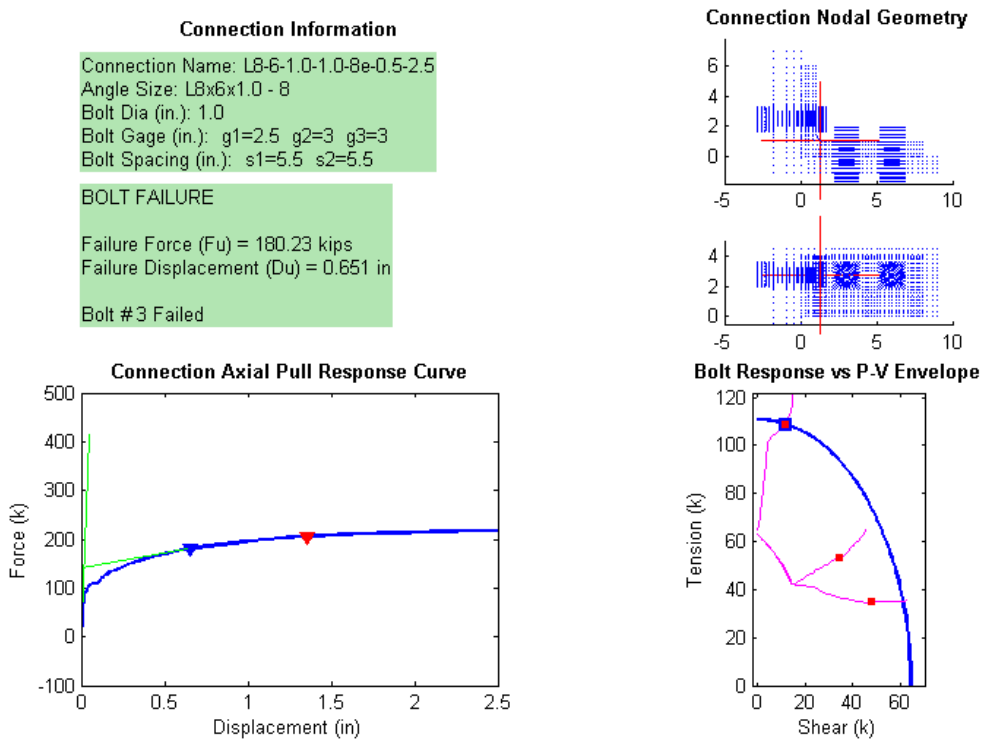


Figure B.295 Connection L8_6_1.0_1.0_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_1.0_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 8.3928e+003

Plastic Stiffness (k/in): 60.6894

Displacement (in): [9.5314e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012329 ; 0.013428 ; 0.015076 ; 0.017548 ; 0.021256 ; 0.026817 ; 0.03516 ; 0.047674 ; 0.066445 ; 0.073484 ; 0.084043 ; 0.088003 ; 0.093942 ; 0.10285 ; 0.10619 ; 0.1112 ; 0.11246 ; 0.11371 ; 0.11559 ; 0.11841 ; 0.12263 ; 0.12898 ; 0.13849 ; 0.15276 ; 0.15811 ; 0.16614 ; 0.17818 ; 0.19624 ; 0.20302 ; 0.21317 ; 0.22841 ; 0.25127 ; 0.28556 ; 0.29842 ; 0.3177 ; 0.32494 ; 0.33579 ; 0.35206 ; 0.37647 ; 0.40088 ; 0.42529 ; 0.4619 ; 0.51683 ; 0.53742 ; 0.56832 ; 0.61466 ; 0.63203 ; 0.6581 ; 0.6972 ; 0.75585 ; 0.84383 ; 0.97579 ; 1.0253 ; 1.0995 ; 1.2109 ; 1.2526 ; 1.3152 ; 1.4092 ; 1.4444 ; 1.4973 ; 1.5765 ; 1.6954 ; 1.74 ; 1.8069 ; 1.9072 ; 2.0577 ; 2.1141 ; 2.1988 ; 2.3257 ; 2.5]

Force (kips): [-2.37332 ; 6.8986 ; 14.0188 ; 22.4724 ; 31.9335 ; 33.7642 ; 35.4405 ; 37.7109 ; 40.595 ; 43.3526 ; 45.7365 ; 48.6398 ; 52.1231 ; 54.8411 ; 54.7644 ; 54.6575 ; 54.8986 ; 54.8606 ; 55.0956 ; 55.9317 ; 57.0185 ; 57.2865 ; 57.5706 ; 57.9791 ; 58.5086 ; 59.3754 ; 60.4821 ; 61.8798 ; 63.6271 ; 64.2102 ; 65.0422 ; 66.1978 ; 67.7248 ; 68.2868 ; 69.1514 ; 70.3859 ; 72.1 ; 74.3993 ; 75.2232 ; 76.3581 ; 76.7638 ; 77.3495 ; 78.1812 ; 79.4186 ; 80.6161 ; 81.8059 ; 83.4389 ; 85.6508 ; 86.4293 ; 87.5357 ; 89.0417 ; 89.569 ; 90.3238 ; 91.381 ; 92.8177 ; 94.7308 ; 97.3121 ; 98.2113 ; 99.4314 ; 101.053 ; 101.606 ; 102.361 ; 103.328 ; 103.657 ; 104.11 ; 104.723 ; 105.522 ; 105.797 ; 106.183 ; 106.713 ; 107.393 ; 107.619 ; 107.932 ; 108.355 ; 108.861]

Bolt 1 - Tensile Force (kips): [63.2132 ; 62.8302 ; 62.5098 ; 62.0966 ; 61.5915 ; 61.4856 ; 61.3855 ; 61.2397 ; 60.9889 ; 60.3009 ; 58.6048 ; 55.7255 ; 51.0849 ; 43.9137 ; 43.0563 ; 42.9289 ; 42.5316 ; 42.2853 ; 42.1664 ; 42.1001 ; 42.0344 ; 42.0179 ; 41.9996 ; 41.9746 ; 41.9277 ; 41.891 ; 41.764 ; 41.5917 ; 41.442 ; 41.3564 ; 41.1917 ; 40.9012 ; 40.4538 ; 40.2542 ; 39.7423 ; 39.0033 ; 38.0871 ; 37.2724 ; 36.9838 ; 36.6319 ; 36.527 ; 36.4094 ; 36.2608 ; 36.0517 ; 35.7888 ; 35.509 ; 35.1488 ; 34.7794 ; 34.7204 ; 34.6643 ; 34.6877 ; 34.7199 ; 34.7863 ; 34.8642 ; 34.9595 ; 35.0254 ; 35.0624 ; 35.0248 ; 34.9529 ; 34.9337 ; 34.9384 ; 34.9585 ; 35.0254 ; 35.0568 ; 35.1099 ; 35.154 ; 35.2262 ; 35.2081 ; 35.2208 ; 35.2758 ; 35.3197 ; 35.3226 ; 35.3244 ; 35.3226 ; 35.4352]

Bolt 1 - Shear Force (kips): [0.0883589 ; 0.364298 ; 0.708361 ; 1.1377 ; 1.64846 ; 1.75228 ; 1.84955 ; 1.99027 ; 2.23986 ; 2.96631 ; 4.57302 ; 6.99687 ; 10.3269 ; 13.9584 ; 14.177 ; 14.1643 ; 14.4286 ; 14.4632 ; 14.7683 ; 15.2993 ; 15.7849 ; 15.9102 ; 16.0791 ; 16.3704 ; 16.764 ; 17.3861 ; 18.3487 ; 19.3716 ; 20.5582 ; 21.0543 ; 21.8617 ; 23.0429 ; 24.3265 ; 24.7968 ; 25.9081 ; 27.5088 ; 29.6288 ; 32.1506 ; 33.1706 ; 34.5205 ; 34.9666 ; 35.5545 ; 36.3694 ; 37.5948 ; 38.8237 ; 40.0301 ; 41.8323 ; 44.0319 ; 44.8096 ; 45.8209 ; 47.0431 ; 47.4369 ; 47.9818 ; 48.7377 ; 49.7795 ; 51.2215 ; 53.1382 ; 53.8603 ; 54.8749 ; 56.1382 ; 56.5379 ; 57.1113 ; 57.7762 ; 57.9758 ; 58.2613 ; 58.7048 ; 59.2804 ; 59.5279 ; 59.8438 ; 60.2763 ; 60.8912 ; 61.1103 ; 61.4463 ; 61.9693 ; 62.5729]

Bolt 2 - Tensile Force (kips): [63.2149 ; 62.7909 ; 62.4016 ; 61.8833 ; 61.2343 ; 61.1011 ; 60.9773 ; 60.7993 ; 60.5236 ; 59.8951 ; 58.2811 ; 55.4906 ; 51.0856 ; 44.2636 ; 43.1732 ; 42.9483 ; 42.6911 ; 42.316 ; 42.2262 ; 42.2928 ; 42.3838 ; 42.4111 ; 42.4443 ; 42.4987 ; 42.5749 ; 42.7304 ; 43.0003 ; 43.4122 ; 43.9681 ; 44.2193 ; 44.5987 ; 45.1339 ; 45.8456 ; 46.0732 ; 46.4058 ; 46.9023 ; 47.6101 ; 48.3817 ; 48.5893 ; 48.9101 ; 49.0343 ; 49.2225 ; 49.5526 ; 50.0799 ; 50.5722 ; 50.9783 ; 51.5426 ; 52.2159 ; 52.4223 ; 52.7505 ; 53.1729 ; 53.3386 ; 53.5585 ; 53.8322 ; 54.2257 ; 54.9696 ; 56.3114 ; 56.8186 ; 57.4898 ; 58.4178 ; 58.7353 ; 59.152 ; 59.7055 ; 59.9043 ; 60.2094 ; 60.6567 ; 61.328 ; 61.5768 ; 61.9445 ; 62.4768 ; 63.2313 ; 63.4985 ; 63.9039 ; 64.5039 ; 65.1991]

Bolt 2 - Shear Force (kips): [0.10614 ; 0.376482 ; 0.741259 ; 1.18722 ; 1.70539 ; 1.80943 ; 1.90608 ; 2.04437 ; 2.27791 ; 2.94668 ; 4.51973 ; 6.89414 ; 10.0796 ; 13.8059 ; 14.1514 ; 14.1663 ; 14.374 ; 14.5028 ; 14.4998 ; 14.814 ; 15.4413 ; 15.5922 ; 15.7226 ; 15.8602 ; 16.0257 ; 16.3031 ; 16.6049 ; 17.3892 ; 18.7793 ; 19.1594 ; 19.6789 ; 20.3337 ; 21.2496 ; 21.6891 ; 22.2651 ; 23.0482 ; 23.9919 ; 25.3292 ; 25.8647 ; 26.5177 ; 26.7829 ; 27.196 ; 27.7426 ; 28.4651 ; 29.118 ; 29.7654 ; 30.6083 ; 31.7295 ; 32.1286 ; 32.6907 ; 33.5427 ; 33.8442 ; 34.2762 ; 34.9468 ; 35.9017 ; 37.0048 ; 38.2364 ; 38.6727 ; 39.3108 ; 40.1647 ; 40.4764 ; 40.9564 ; 41.5874 ; 41.7972 ; 42.1006 ; 42.5114 ; 43.08 ; 43.274 ; 43.5499 ; 43.9282 ; 44.3933 ; 44.5491 ; 44.7608 ; 45.03 ; 45.3881]

Bolt 3 - Tensile Force (kips): [65 ; 64.9008 ; 64.9702 ; 65.282 ; 66.1068 ; 66.3919 ; 66.6938 ; 67.1493 ; 67.7577 ; 68.4016 ; 69.0116 ; 69.836 ; 71.0315 ; 72.3204 ; 72.289 ; 72.1994 ; 72.3736 ; 72.349 ; 72.4778 ; 72.9493 ; 73.6462 ; 73.8356 ; 74.0417 ; 74.3504 ; 74.7722 ; 75.5311 ; 76.5961 ; 78.0598 ; 80.0062 ; 80.6704 ; 81.609 ; 82.9047 ; 84.6319 ; 85.2575 ; 86.1933 ; 87.5284 ; 89.3954 ; 91.9229 ; 92.8025 ; 94.0154 ; 94.446 ; 95.0669 ; 95.956 ; 97.2789 ; 98.5152 ; 99.7318 ; 101.379 ; 103.727 ; 104.555 ; 105.814 ; 107.69 ; 108.351 ; 109.295 ; 110.59 ; 112.267 ; 114.389 ; 117.247 ; 118.119 ; 119.312 ; 120.946 ; 121.504 ; 122.23 ; 122.962 ; 123.134 ; 123.382 ; 123.778 ; 124.386 ; 124.587 ; 124.888 ; 125.328 ; 125.863 ; 126.04 ; 126.296 ; 126.665 ; 127.13]

Bolt 3 - Shear Force (kips): [0.0431845 ; 0.0814385 ; 0.1937 ; 0.348196 ; 0.567291 ; 0.619351 ; 0.669743 ; 0.739127 ; 0.835143 ; 0.943491 ; 1.03813 ; 1.15676 ; 1.32092 ; 1.47766 ; 1.47666 ; 1.46893 ; 1.48553 ; 1.48344 ; 1.49685 ; 1.54291 ; 1.60563 ; 1.62186 ; 1.63974 ; 1.66638 ; 1.70264 ; 1.77046 ; 1.87446 ; 2.03118 ; 2.25002 ; 2.32339 ; 2.42538 ; 2.56841 ; 2.77211 ; 2.84364 ; 2.94476 ; 3.0926 ; 3.30375 ; 3.58514 ; 3.67207 ; 3.7873 ; 3.82602 ; 3.8802 ; 3.95299 ; 4.04979 ; 4.13805 ; 4.23199 ; 4.39948 ; 6.39082 ; 7.31686 ; 8.70163 ; 10.3906 ; 10.921 ; 11.6698 ; 12.6039 ; 13.451 ; 14.295 ; 15.0104 ; 14.7722 ; 14.7156 ; 14.7085 ; 14.7392 ; 14.7219 ; 14.2785 ; 13.9905 ; 13.6494 ; 13.2809 ; 12.6536 ; 12.4183 ; 12.1264 ; 11.7586 ; 11.1743 ; 10.9412 ; 10.6075 ; 10.1502 ; 9.58773]

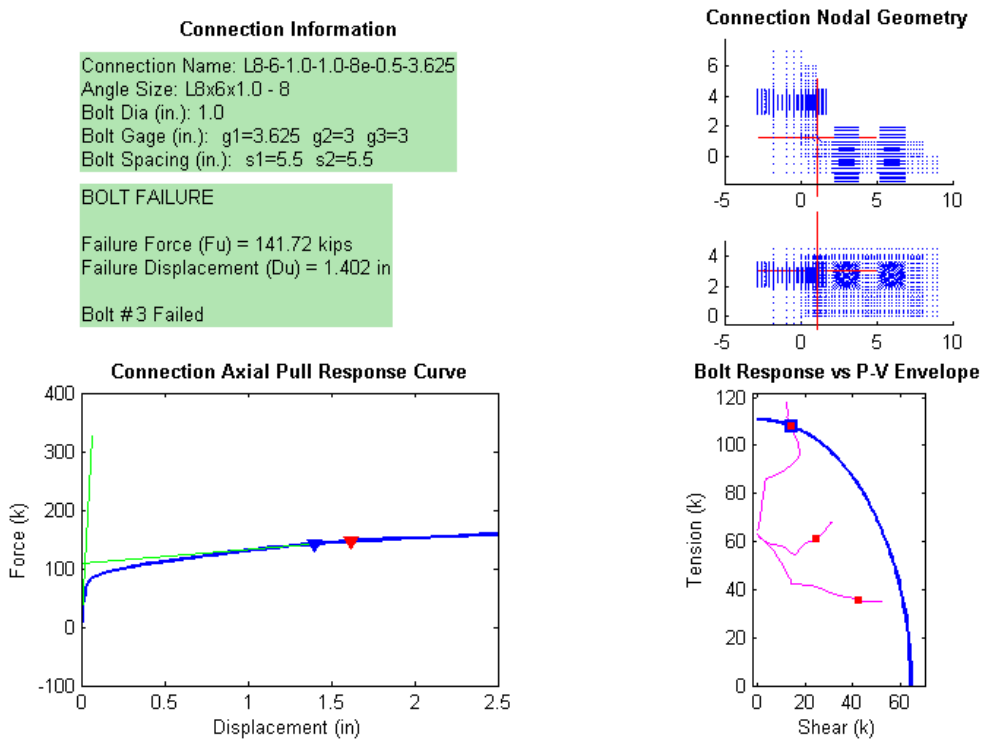


Figure B.296 Connection L8_6_1.0_1.0_8e_0.5_3.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_1.0_8e_0.5_3.625 Analysis Response Variables.
Initial Stiffness (k/in): 4.8275e+003

Plastic Stiffness (k/in): 24.3719

Displacement (in): [7.6825e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.20294 ; 0.29797 ; 0.30688 ; 0.32024 ; 0.34028 ; 0.3478 ; 0.35908 ; 0.37599 ; 0.40136 ; 0.43941 ; 0.45368 ; 0.47509 ; 0.5072 ; 0.55536 ; 0.57342 ; 0.60051 ; 0.61067 ; 0.62083 ; 0.63099 ; 0.64623 ; 0.66909 ; 0.70338 ; 0.75481 ; 0.77409 ; 0.80302 ; 0.84642 ; 0.91151 ; 0.93592 ; 0.97254 ; 0.98627 ; 1.0069 ; 1.0378 ; 1.0841 ; 1.1536 ; 1.1797 ; 1.2188 ; 1.2774 ; 1.3654 ; 1.4974 ; 1.6953 ; 1.7578 ; 1.8516 ; 1.9922 ; 2.2031 ; 2.4531 ; 2.5]

Force (kips): [-2.55213 ; 2.9109 ; 6.87655 ; 11.7641 ; 17.7654 ; 24.707 ; 26.7317 ; 29.3538 ; 32.6748 ; 36.4182 ; 39.6573 ; 42.1722 ; 44.177 ; 46.2689 ; 48.5289 ; 51.1627 ; 51.3871 ; 51.7418 ; 52.2654 ; 52.4649 ; 52.7627 ; 53.1828 ; 53.7787 ; 54.6141 ; 54.9269 ; 55.3829 ; 55.995 ; 56.818 ; 57.145 ; 57.7084 ; 57.9233 ; 58.1276 ; 58.3445 ; 58.665 ; 59.1834 ; 59.9182 ; 60.9339 ; 61.3096 ; 61.8516 ; 62.7199 ; 63.931 ; 64.3553 ; 64.9659 ; 65.1907 ; 65.5284 ; 66.019 ; 66.7116 ; 67.697 ; 68.0698 ; 68.6116 ; 69.3838 ; 70.4558 ; 71.9098 ; 73.7641 ; 74.2966 ; 75.056 ; 76.0857 ; 77.4164 ; 78.763 ; 78.9953]

Bolt 1 - Tensile Force (kips): [63.1988 ; 62.969 ; 62.7897 ; 62.5526 ; 62.2349 ; 61.8322 ; 61.7025 ; 61.5245 ; 61.2792 ; 60.8342 ; 59.7249 ; 58.228 ; 56.2597 ; 53.479 ; 49.8581 ; 44.7078 ; 44.3503 ; 43.8412 ; 43.3529 ; 43.2745 ; 43.1874 ; 43.1049 ; 43.037 ; 42.9907 ; 42.9751 ; 42.757 ; 42.5469 ; 42.472 ; 42.4329 ; 42.3793 ; 42.368 ; 42.3681 ; 42.3615 ; 42.3252 ; 42.139 ; 41.9015 ; 41.6585 ; 41.4712 ; 41.2189 ; 40.4385 ; 39.2324 ; 38.854 ; 38.4982 ; 38.3825 ; 38.118 ; 37.7749 ; 37.3705 ; 37.0519 ; 36.8609 ; 36.6046 ; 36.2816 ; 35.7902 ; 35.2914 ; 34.952 ; 34.941 ; 34.9647 ; 35.0098 ; 35.0675 ; 35.0263 ; 35.0079]

Bolt 1 - Shear Force (kips): [0.0957154 ; 0.189325 ; 0.388452 ; 0.648097 ; 0.986013 ; 1.41174 ; 1.54538 ; 1.72543 ; 1.96862 ; 2.42653 ; 3.5574 ; 4.91947 ; 6.57652 ; 8.69259 ; 11.122 ; 13.7154 ; 13.8507 ; 14.0297 ; 14.1725 ; 14.1854 ; 14.1952 ; 14.1979 ; 14.1922 ; 14.1836 ; 14.1796 ; 14.3588 ; 14.4328 ; 14.4396 ; 14.6401 ; 15.414 ; 15.692 ; 15.8724 ; 16.1956 ; 16.7147 ; 18.0292 ; 19.839 ; 22.02 ; 22.945 ; 24.0194 ; 26.1025 ; 29.1152 ; 30.0896 ; 31.2203 ; 31.6533 ; 32.4205 ; 33.5172 ; 35.0037 ; 36.7364 ; 37.4229 ; 38.3535 ; 39.5899 ; 41.4456 ; 43.7853 ; 46.3545 ; 46.9719 ; 47.7886 ; 48.8678 ; 50.3341 ; 51.9028 ; 52.197]

Bolt 2 - Tensile Force (kips): [63.1817 ; 62.9511 ; 62.74 ; 62.4635 ; 62.0952 ; 61.6519 ; 61.5169 ; 61.34 ; 61.123 ; 60.8217 ; 60.1003 ; 59.3641 ; 58.9993 ; 58.9141 ; 58.4902 ; 57.42 ; 57.3004 ; 57.0918 ; 56.7653 ; 56.6417 ; 56.4636 ; 56.2265 ; 55.9016 ; 55.5096 ; 55.3959 ; 55.285 ; 55.0963 ; 54.4859 ; 54.3744 ; 54.5435 ; 54.5872 ; 54.5975 ; 54.6476 ; 54.7551 ; 55.016 ; 55.4104 ; 55.9592 ; 56.1746 ; 56.4846 ; 56.9007 ; 57.4982 ; 57.7374 ; 58.1062 ; 58.2439 ; 58.4444 ; 58.7456 ; 59.1979 ; 59.702 ; 59.8176 ; 59.9529 ; 60.28 ; 60.9435 ; 61.9599 ; 63.3582 ; 63.7488 ; 64.322 ; 65.239 ; 66.5674 ; 67.8712 ; 68.1113]

Bolt 2 - Shear Force (kips): [0.114678 ; 0.183141 ; 0.390283 ; 0.65683 ; 0.995908 ; 1.40716 ; 1.53367 ; 1.70565 ; 1.9356 ; 2.33732 ; 3.36137 ; 4.62975 ; 6.07076 ; 7.706 ; 9.47176 ; 11.652 ; 11.8416 ; 12.1296 ; 12.5458 ; 12.6959 ; 12.912 ; 13.215 ; 13.6342 ; 14.1742 ; 14.3576 ; 14.592 ; 14.9361 ; 15.5896 ; 15.7705 ; 15.8993 ; 16.02 ; 16.1707 ; 16.2925 ; 16.438 ; 16.5483 ; 16.6709 ; 16.9342 ; 17.0336 ; 17.1866 ; 17.6197 ; 18.2861 ; 18.469 ; 18.9739 ; 19.1483 ; 19.364 ; 19.6432 ; 19.992 ; 20.8276 ; 21.2714 ; 21.9696 ; 22.8572 ; 23.8697 ; 25.1206 ; 26.7907 ; 27.3538 ; 28.1559 ; 29.0655 ; 30.0434 ; 30.8837 ; 31.0164]

Bolt 3 - Tensile Force (kips): [65 ; 64.837 ; 64.7754 ; 64.8672 ; 65.1644 ; 65.7879 ; 66.1381 ; 66.7783 ; 67.7137 ; 68.9028 ; 70.2721 ; 71.8726 ; 73.7596 ; 76.1516 ; 79.302 ; 83.1023 ; 83.4199 ; 83.8823 ; 84.5018 ; 84.7239 ; 85.0444 ; 85.4824 ; 86.1072 ; 87.0772 ; 87.4684 ; 88.0546 ; 88.8748 ; 90.0165 ; 90.4463 ; 91.1459 ; 91.4132 ; 91.6766 ; 91.9551 ; 92.3756 ; 93.0423 ; 94.0426 ; 95.4974 ; 96.0165 ; 96.7995 ; 97.9822 ; 99.55 ; 100.074 ; 100.817 ; 101.08 ; 101.499 ; 102.111 ; 102.948 ; 104.188 ; 104.645 ; 105.353 ; 106.382 ; 107.696 ; 109.315 ; 111.299 ; 111.942 ; 112.927 ; 114.293 ; 115.955 ; 117.499 ; 117.779]

Bolt 3 - Shear Force (kips): [0.075294 ; 0.021717 ; 0.0869995 ; 0.188238 ; 0.329175 ; 0.532663 ; 0.607297 ; 0.712035 ; 0.856119 ; 1.05266 ; 1.27906 ; 1.53747 ; 1.83977 ; 2.24005 ; 2.66702 ; 3.13025 ; 3.17104 ; 3.24631 ; 3.38744 ; 3.45867 ; 3.54783 ; 3.73831 ; 4.06683 ; 6.0326 ; 7.26074 ; 8.73225 ; 10.171 ; 11.5785 ; 12.1094 ; 13.0284 ; 13.4355 ; 13.8651 ; 14.2844 ; 14.8621 ; 15.5839 ; 16.422 ; 17.4032 ; 17.7549 ; 17.9773 ; 17.6701 ; 17.3429 ; 17.2074 ; 17.0351 ; 17.0231 ; 16.9809 ; 16.7649 ; 16.4164 ; 15.8616 ; 15.6467 ; 15.3686 ; 14.9654 ; 14.2071 ; 13.4318 ; 12.6885 ; 12.6085 ; 12.7289 ; 12.8142 ; 12.5511 ; 12.4347 ; 12.4538]

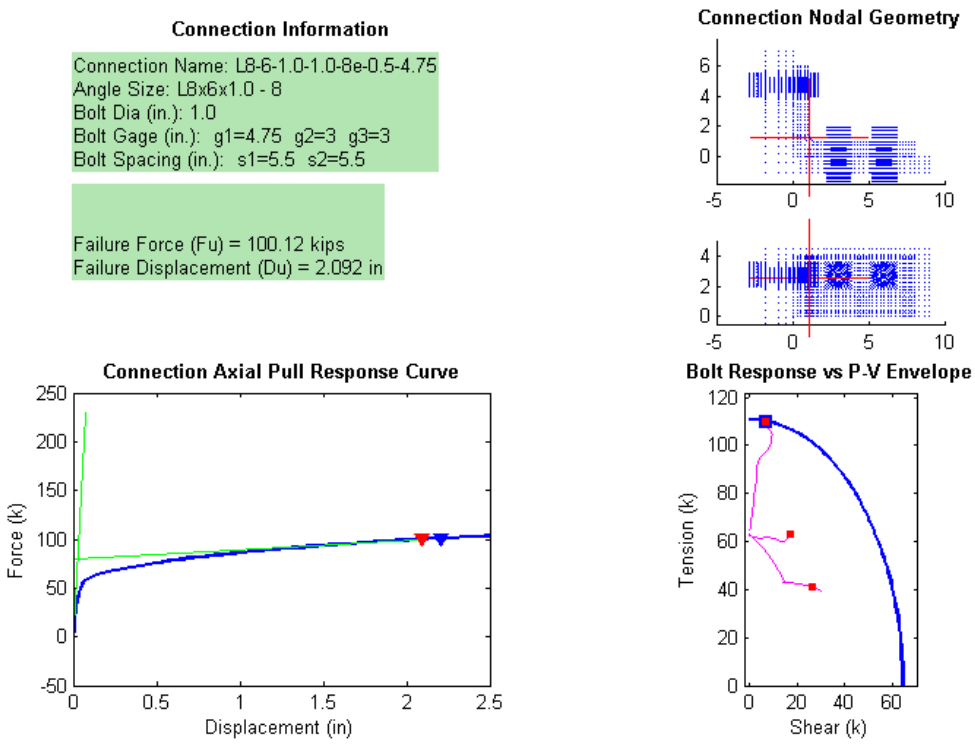


Figure B.297 Connection L8_6_1.0_1.0_8e_0.5_4.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_6_1.0_1.0_8e_0.5_4.75 Analysis Response Variables.
Initial Stiffness (k/in): 2.9735e+003

Plastic Stiffness (k/in): 9.4736

Displacement (in): [9.7682e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.44793 ; 0.50138 ; 0.58156 ; 0.6016 ; 0.62165 ; 0.65172 ; 0.69682 ; 0.76447 ; 0.86595 ; 1.0182 ; 1.0753 ; 1.0967 ; 1.1288 ; 1.1769 ; 1.2251 ; 1.2733 ; 1.3455 ; 1.4539 ; 1.4945 ; 1.5555 ; 1.5783 ; 1.6126 ; 1.664 ; 1.7412 ; 1.8569 ; 1.9003 ; 1.9654 ; 2.063 ; 2.2095 ; 2.4292 ; 2.5]

Force (kips): [-2.43678 ; 1.18113 ; 3.37078 ; 6.22264 ; 9.87166 ; 14.3668 ; 19.4367 ; 20.8866 ; 22.7564 ; 25.0092 ; 27.3613 ; 29.2824 ; 30.5792 ; 31.8089 ; 33.2763 ; 35 ; 37.1768 ; 37.8985 ; 38.925 ; 39.1626 ; 39.4019 ; 39.7517 ; 40.2601 ; 40.9675 ; 41.9315 ; 43.2132 ; 43.6594 ; 43.8343 ; 44.0841 ; 44.4544 ; 44.8098 ; 45.1546 ; 45.6425 ; 46.3493 ; 46.6312 ; 47.0222 ; 47.1758 ; 47.3962 ; 47.7373 ; 48.2292 ; 48.8926 ; 49.1338 ; 49.4697 ; 49.9322 ; 50.5738 ; 51.4218 ; 51.6717]

Bolt 1 - Tensile Force (kips): [63.198 ; 63.0445 ; 62.9443 ; 62.8061 ; 62.6174 ; 62.3617 ; 62.0407 ; 61.9399 ; 61.8013 ; 61.6216 ; 61.4129 ; 61.2236 ; 61.0654 ; 60.7135 ; 59.5668 ; 57.4327 ; 54.0821 ; 52.8073 ; 50.8029 ; 50.2837 ; 49.7492 ; 48.9325 ; 47.6983 ; 45.8713 ; 43.8804 ; 43.2969 ; 43.2257 ; 43.2058 ; 43.1867 ; 43.1722 ; 42.9828 ; 42.8887 ; 42.8612 ; 42.8482 ; 42.8011 ; 42.8148 ; 42.809 ; 42.805 ; 42.6688 ; 42.4516 ; 42.3029 ; 42.1551 ; 41.9524 ; 41.7269 ; 40.9389 ; 39.8606 ; 39.5735]

Bolt 1 - Shear Force (kips): [0.0922326 ; 0.112602 ; 0.221593 ; 0.376975 ; 0.587495 ; 0.866043 ; 1.21619 ; 1.32556 ; 1.47321 ; 1.66189 ; 1.87732 ; 2.07151 ; 2.24043 ; 2.6325 ; 3.79551 ; 5.70762 ; 8.38336 ; 9.31109 ; 10.6688 ; 10.9969 ; 11.3239 ; 11.8027 ; 12.4786 ; 13.3506 ; 14.1103 ; 14.2505 ; 14.2496 ; 14.2477 ; 14.2452 ; 14.2431 ; 14.3585 ; 14.3884 ; 14.3931 ; 14.7388 ; 15.3475 ; 15.8157 ; 16.1497 ; 16.5789 ; 17.6955 ; 19.3105 ; 21.0065 ; 21.8477 ; 22.9 ; 24.0961 ; 26.2981 ; 29.0877 ; 29.8168]

Bolt 2 - Tensile Force (kips): [63.1803 ; 63.031 ; 62.9236 ; 62.7617 ; 62.5519 ; 62.2752 ; 61.978 ; 61.892 ; 61.7894 ; 61.6877 ; 61.6327 ; 61.6404 ; 61.6594 ; 61.6146 ; 61.3316 ; 61.5254 ; 61.7748 ; 61.7908 ; 61.6834 ; 61.6335 ; 61.5702 ; 61.4627 ; 61.3165 ; 61.0502 ; 60.5899 ; 60.0552 ; 59.9602 ; 59.9292 ; 59.8967 ; 59.8514 ; 59.8501 ; 59.8533 ; 59.8769 ; 60.0223 ; 60.1762 ; 60.3023 ; 60.3547 ; 60.4495 ; 60.6769 ; 61.044 ; 61.572 ; 61.7647 ; 62.0567 ; 62.5061 ; 63.0752 ; 63.8443 ; 64.1079]

Bolt 2 - Shear Force (kips): [0.110413 ; 0.101899 ; 0.214409 ; 0.370854 ; 0.580161 ; 0.850966 ; 1.17338 ; 1.27361 ; 1.41046 ; 1.58371 ; 1.78474 ; 1.96664 ; 2.12567 ; 2.47197 ; 3.55535 ; 5.16127 ; 7.13171 ; 7.76862 ; 8.67546 ; 8.89525 ; 9.11737 ; 9.44914 ; 9.93452 ; 10.6401 ; 11.6203 ; 12.8303 ; 13.2015 ; 13.3361 ; 13.5291 ; 13.8022 ; 14.0433 ; 14.2785 ; 14.6086 ; 15.0197 ; 15.1047 ; 15.388 ; 15.5242 ; 15.7065 ; 15.8431 ; 15.9829 ; 16.2307 ; 16.3249 ; 16.459 ; 16.6527 ; 16.9402 ; 17.5423 ; 17.739]

Bolt 3 - Tensile Force (kips): [65 ; 64.8632 ; 64.7629 ; 64.7138 ; 64.8126 ; 65.1022 ; 65.7306 ; 66.1204 ; 66.8609 ; 67.9238 ; 69.2812 ; 71.0102 ; 73.1214 ; 75.7163 ; 78.7357 ; 82.2845 ; 86.5212 ; 87.9186 ; 89.8952 ; 90.3366 ; 90.7833 ; 91.429 ; 92.3494 ; 93.6117 ; 95.415 ; 97.9096 ; 98.7863 ; 99.1158 ; 99.5728 ; 100.254 ; 100.877 ; 101.473 ; 102.283 ; 103.444 ; 103.909 ; 104.561 ; 104.796 ; 105.152 ; 105.717 ; 106.542 ; 107.424 ; 107.728 ; 108.217 ; 108.994 ; 110.227 ; 111.96 ; 112.481]

Bolt 3 - Shear Force (kips): [0.073481 ; 0.016882 ; 0.039778 ; 0.098237 ; 0.19085 ; 0.31826 ; 0.50076 ; 0.56735 ; 0.65915 ; 0.79454 ; 0.99624 ; 1.252 ; 1.5476 ; 1.897 ; 2.247 ; 2.5521 ; 2.8944 ; 3.0118 ; 3.2703 ; 3.3125 ; 3.3483 ; 3.4129 ; 3.5384 ; 3.6863 ; 5.0022 ; 7.5132 ; 8.2567 ; 8.3142 ; 8.4467 ; 8.7309 ; 9.0015 ; 9.1336 ; 9.3419 ; 9.4636 ; 9.4185 ; 9.599 ; 9.582 ; 9.5463 ; 9.3602 ; 8.4501 ; 7.7292 ; 7.5869 ; 7.3738 ; 7.1743 ; 6.914 ; 6.4033 ; 6.2452]

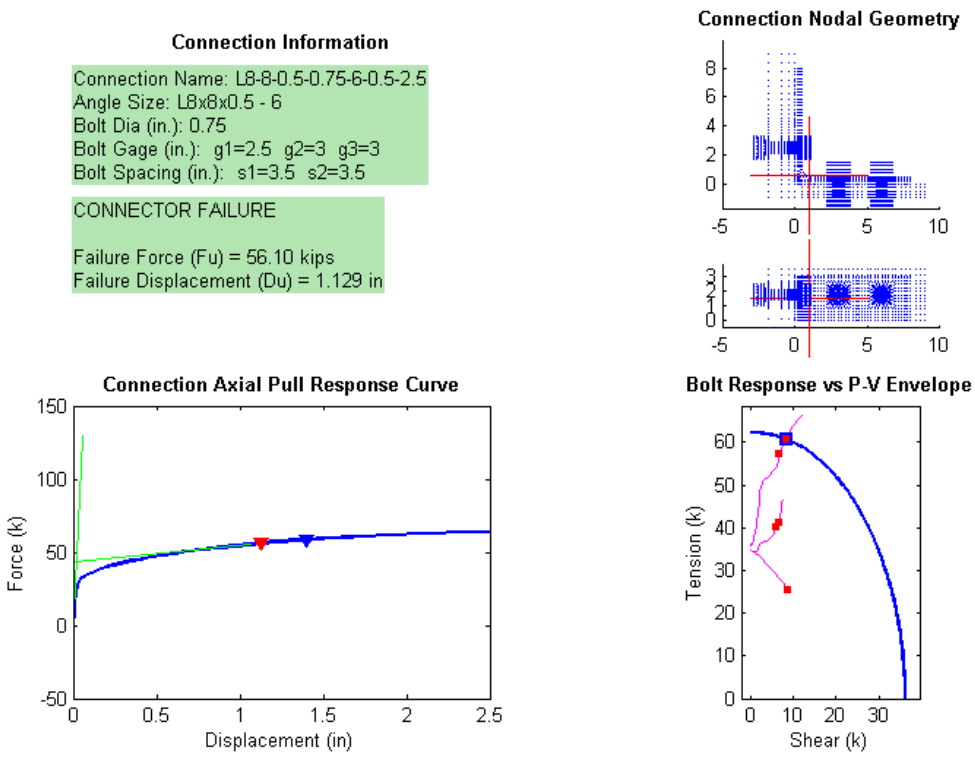


Figure B.298 Connection L8_8_0.5_0.75_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.75_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.1317e+003

Plastic Stiffness (k/in): 11.3956

Displacement (in): [2.9522e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.037598 ; 0.047485 ; 0.062317 ; 0.084564 ; 0.11794 ; 0.16799 ; 0.24308 ; 0.3557 ; 0.39794 ; 0.41378 ; 0.43753 ; 0.47317 ; 0.52662 ; 0.6068 ; 0.68698 ; 0.76717 ; 0.88744 ; 1.0678 ; 1.1303 ; 1.2241 ; 1.3647 ; 1.4175 ; 1.4966 ; 1.5262 ; 1.5707 ; 1.6375 ; 1.7376 ; 1.8877 ; 2.113 ; 2.363 ; 2.5]

Force (kips): [-0.750425 ; 1.67261 ; 3.41304 ; 5.59952 ; 8.33811 ; 11.3934 ; 13.8454 ; 15.0812 ; 15.8119 ; 16.5648 ; 17.3285 ; 18.2098 ; 19.2908 ; 20.5731 ; 22.0364 ; 22.5084 ; 22.6773 ; 22.9484 ; 23.3322 ; 23.8857 ; 24.6283 ; 25.2876 ; 25.8745 ; 26.6449 ; 27.6728 ; 28.0574 ; 28.5485 ; 29.1709 ; 29.3966 ; 29.7049 ; 29.8159 ; 29.9702 ; 30.1874 ; 30.4862 ; 30.8681 ; 31.3328 ; 31.757 ; 31.9615]

Bolt 1 - Tensile Force (kips): [34.7766 ; 34.7152 ; 34.6669 ; 34.5998 ; 34.509 ; 34.3988 ; 34.2987 ; 34.2396 ; 34.196 ; 34.1447 ; 34.0706 ; 33.9947 ; 33.8985 ; 33.4556 ; 32.3166 ; 31.8758 ; 31.7147 ; 31.4528 ; 31.0684 ; 30.4891 ; 29.6673 ; 28.8801 ; 28.1371 ; 27.1106 ; 25.6988 ; 25.611 ; 25.6197 ; 25.6353 ; 25.6417 ; 25.6522 ; 25.6564 ; 25.6627 ; 25.672 ; 25.6861 ; 25.7074 ; 25.7397 ; 25.7682 ; 25.7966]

Bolt 1 - Shear Force (kips): [0.058785 ; 0.087965 ; 0.17595 ; 0.29169 ; 0.44251 ; 0.6184 ; 0.77168 ; 0.86155 ; 0.92831 ; 1.0069 ; 1.1167 ; 1.2273 ; 1.3633 ; 1.9002 ; 3.0567 ; 3.4721 ; 3.6212 ; 3.8598 ; 4.2019 ; 4.7025 ; 5.3873 ; 6.0191 ; 6.5991 ; 7.3773 ; 8.3797 ; 8.4474 ; 8.4529 ; 8.4592 ; 8.4615 ; 8.4651 ; 8.4665 ; 8.4686 ; 8.4717 ; 8.4764 ; 8.4834 ; 8.4941 ; 8.5178 ; 8.5095]

Bolt 2 - Tensile Force (kips): [34.78 ; 34.6782 ; 34.5985 ; 34.5023 ; 34.4039 ; 34.3377 ; 34.3438 ; 34.4153 ; 34.4844 ; 34.6044 ; 34.8425 ; 35.3566 ; 36.0296 ; 36.5097 ; 36.6659 ; 36.7873 ; 36.8396 ; 36.9082 ; 37.0313 ; 37.2366 ; 37.5916 ; 37.9692 ; 38.3711 ; 39.0252 ; 39.9916 ; 40.297 ; 40.7763 ; 41.3257 ; 41.5401 ; 41.9452 ; 42.1204 ; 42.3885 ; 42.7572 ; 43.2755 ; 43.9953 ; 44.9717 ; 46.0001 ; 46.5476]

Bolt 2 - Shear Force (kips): [0.052988 ; 0.13552 ; 0.25566 ; 0.41305 ; 0.61972 ; 0.86385 ; 1.0873 ; 1.2301 ; 1.3416 ; 1.4753 ; 1.639 ; 1.7879 ; 1.9348 ; 2.3993 ; 3.278 ; 3.5211 ; 3.6054 ; 3.7411 ; 3.9263 ; 4.1844 ; 4.5126 ; 4.8003 ; 5.0443 ; 5.3442 ; 5.7621 ; 5.9185 ; 6.1153 ; 6.5008 ; 6.6231 ; 6.7295 ; 6.7484 ; 6.7682 ; 6.8138 ; 6.8892 ; 7.0056 ; 7.1863 ; 7.3232 ; 7.3743]

Bolt 3 - Tensile Force (kips): [36 ; 35.9373 ; 35.9402 ; 36.0418 ; 36.2817 ; 36.6845 ; 37.3392 ; 37.9159 ; 38.2936 ; 38.6827 ; 39.2624 ; 40.1589 ; 41.5456 ; 43.6088 ; 46.4883 ; 47.4393 ; 47.7809 ; 48.2538 ; 48.8696 ; 49.691 ; 50.9073 ; 52.0694 ; 53.1521 ; 54.4221 ; 56.4585 ; 57.4921 ; 58.7804 ; 60.3204 ; 60.9213 ; 61.7101 ; 61.9971 ; 62.3698 ; 62.884 ; 63.5701 ; 64.3515 ; 65.2033 ; 65.8888 ; 66.2266]

Bolt 3 - Shear Force (kips): [0.027039 ; 0.0301756 ; 0.0739324 ; 0.145281 ; 0.24378 ; 0.373208 ; 0.530888 ; 0.654286 ; 0.757962 ; 0.894184 ; 1.02982 ; 1.20778 ; 1.43228 ; 1.68839 ; 1.91333 ; 1.98977 ; 2.01779 ; 2.07839 ; 2.16655 ; 2.31835 ; 2.75699 ; 4.11641 ; 5.1557 ; 6.14276 ; 6.55095 ; 6.59443 ; 7.2602 ; 7.91776 ; 8.16045 ; 8.60463 ; 8.74963 ; 8.93086 ; 9.20842 ; 9.63119 ; 10.1986 ; 10.8851 ; 11.6203 ; 12.0023]

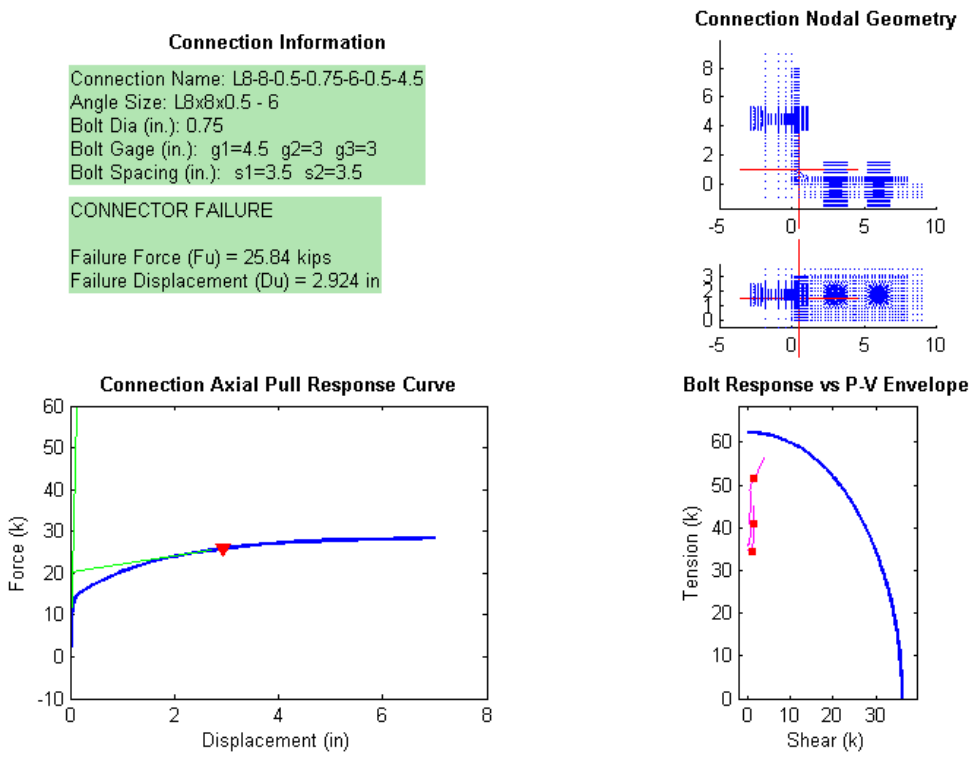


Figure B.299 Connection L8_8_0.5_0.75_6_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.75_6_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 444.7397

Plastic Stiffness (k/in): 1.9192

Displacement (in): [2.0612e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.9406 ; 1.4136 ; 1.5886 ; 1.8511 ; 1.9496 ; 1.9865 ; 2.0419 ; 2.1249 ; 2.2495 ; 2.4364 ; 2.7167 ; 3.1372 ; 3.7679 ; 4.4679 ; 5.1679 ; 5.8679 ; 6.5679 ; 7]

Force (kips): [-0.67818 ; 0.852182 ; 1.75399 ; 2.9634 ; 4.5464 ; 6.03361 ; 6.88848 ; 7.22552 ; 7.50367 ; 7.9314 ; 8.50397 ; 9.23355 ; 10.1092 ; 11.0823 ; 11.3749 ; 11.7539 ; 11.8898 ; 11.9434 ; 12.015 ; 12.1215 ; 12.2714 ; 12.4781 ; 12.7471 ; 13.0937 ; 13.4706 ; 13.7539 ; 13.9448 ; 14.0712 ; 14.1595 ; 14.2009]

Bolt 1 - Tensile Force (kips): [34.7766 ; 34.7396 ; 34.7165 ; 34.6834 ; 34.6353 ; 34.5842 ; 34.5519 ; 34.5384 ; 34.5271 ; 34.5047 ; 34.493 ; 34.481 ; 34.4707 ; 34.4755 ; 34.4801 ; 34.4895 ; 34.4926 ; 34.4935 ; 34.4952 ; 34.4975 ; 34.5015 ; 34.5084 ; 34.5198 ; 34.5382 ; 34.5708 ; 34.6081 ; 34.6486 ; 34.6914 ; 34.7365 ; 34.7652]

Bolt 1 - Shear Force (kips): [0.055164 ; 0.053508 ; 0.093891 ; 0.15665 ; 0.24563 ; 0.33672 ; 0.39718 ; 0.42759 ; 0.45738 ; 0.51104 ; 0.55406 ; 0.60772 ; 0.67046 ; 0.72964 ; 0.74644 ; 0.7669 ; 0.77508 ; 0.77862 ; 0.78315 ; 0.79042 ; 0.8003 ; 0.81388 ; 0.83242 ; 0.85852 ; 0.89063 ; 0.92458 ; 0.95349 ; 0.97905 ; 1.0005 ; 1.0124]

Bolt 2 - Tensile Force (kips): [34.7793 ; 34.7086 ; 34.663 ; 34.6158 ; 34.5932 ; 34.639 ; 34.731 ; 34.8292 ; 34.9355 ; 35.1261 ; 35.5128 ; 36.1155 ; 36.9826 ; 38.1712 ; 38.5487 ; 39.0492 ; 39.2366 ; 39.3092 ; 39.4159 ; 39.5809 ; 39.8271 ; 40.1839 ; 40.6969 ; 41.4336 ; 42.3676 ; 43.1906 ; 43.8455 ; 44.3728 ; 44.8021 ; 45.0334]

Bolt 2 - Shear Force (kips): [0.048651 ; 0.090675 ; 0.15723 ; 0.25378 ; 0.38965 ; 0.53309 ; 0.63636 ; 0.69402 ; 0.75253 ; 0.85791 ; 0.97084 ; 1.0959 ; 1.2039 ; 1.3007 ; 1.3353 ; 1.3851 ; 1.3994 ; 1.4041 ; 1.4083 ; 1.4069 ; 1.4026 ; 1.3963 ; 1.3873 ; 1.3831 ; 1.385 ; 1.3987 ; 1.4223 ; 1.4444 ; 1.4623 ; 1.4718]

Bolt 3 - Tensile Force (kips): [36 ; 35.9145 ; 35.8862 ; 35.9324 ; 36.1082 ; 36.3523 ; 36.6726 ; 36.9196 ; 37.2014 ; 37.6055 ; 38.1825 ; 39.5767 ; 41.8669 ; 45.1104 ; 46.1992 ; 47.6736 ; 48.192 ; 48.3927 ; 48.6414 ; 48.9811 ; 49.4319 ; 50.0836 ; 50.9319 ; 52.0164 ; 53.2541 ; 54.3128 ; 55.0682 ; 55.6458 ; 56.0486 ; 56.2562]

Bolt 3 - Shear Force (kips): [0.028904 ; 0.024323 ; 0.061721 ; 0.12506 ; 0.21634 ; 0.29382 ; 0.33378 ; 0.34257 ; 0.37464 ; 0.45768 ; 0.60916 ; 0.51609 ; 0.46923 ; 0.49083 ; 0.49429 ; 0.49145 ; 0.49986 ; 0.49237 ; 0.48732 ; 0.48426 ; 0.49367 ; 0.53862 ; 1.1137 ; 1.5527 ; 2.2429 ; 2.7875 ; 3.1578 ; 3.4439 ; 3.6663 ; 3.8027]

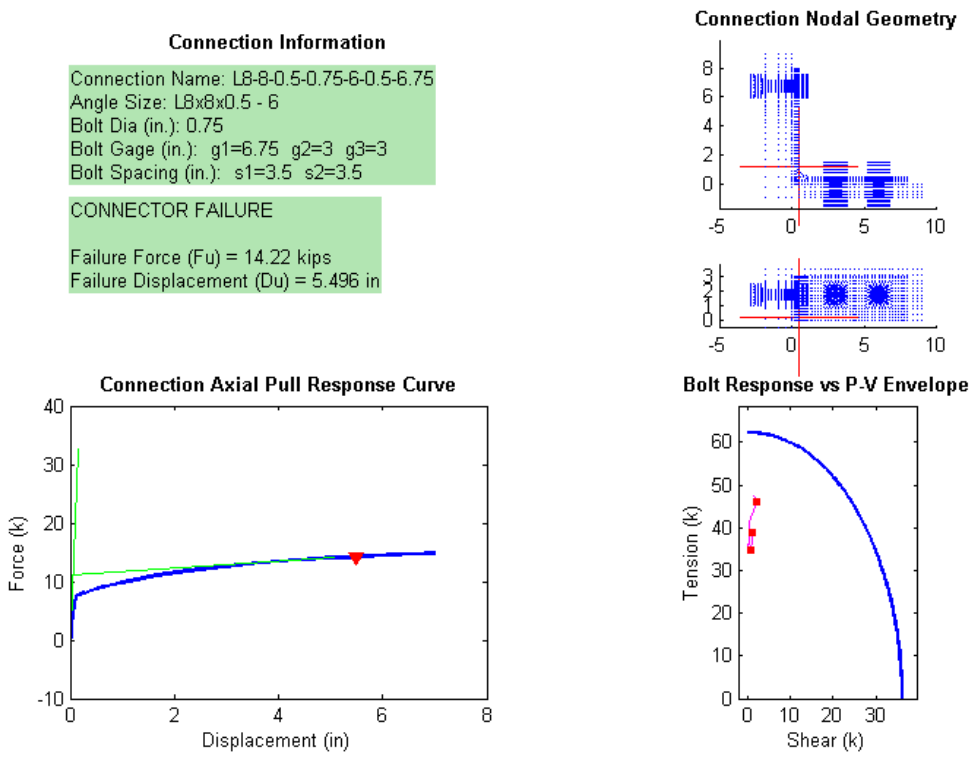


Figure B.300 Connection L8_8_0.5_0.75_6_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.75_6_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 212.8786

Plastic Stiffness (k/in): 0.5661

Displacement (in): [2.0235e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.70408 ; 0.82234 ; 0.99973 ; 1.2658 ; 1.6649 ; 2.2636 ; 2.9636 ; 3.6636 ; 4.3636 ; 5.0636 ; 5.7636 ; 5.9386 ; 6.2011 ; 6.5949 ; 7]

Force (kips): [-0.66541 ; 0.22475 ; 0.49878 ; 0.88942 ; 1.4409 ; 2.2142 ; 3.1286 ; 3.701 ; 3.8972 ; 4.0181 ; 4.2294 ; 4.5099 ; 4.605 ; 4.7382 ; 4.9276 ; 5.1799 ; 5.5086 ; 5.9114 ; 6.2792 ; 6.5735 ; 6.8164 ; 7.0145 ; 7.1724 ; 7.2083 ; 7.2587 ; 7.3247 ; 7.3835]

Bolt 1 - Tensile Force (kips): [34.7768 ; 34.7557 ; 34.7498 ; 34.7411 ; 34.7281 ; 34.7083 ; 34.6829 ; 34.6663 ; 34.6635 ; 34.6654 ; 34.6658 ; 34.6648 ; 34.6636 ; 34.661 ; 34.6546 ; 34.6629 ; 34.684 ; 34.7152 ; 34.7547 ; 34.8004 ; 34.8498 ; 34.9002 ; 34.9514 ; 34.9641 ; 34.9832 ; 35.0121 ; 35.042]

Bolt 1 - Shear Force (kips): [0.054845 ; 0.037514 ; 0.043026 ; 0.056523 ; 0.081284 ; 0.12173 ; 0.17619 ; 0.21494 ; 0.23055 ; 0.24281 ; 0.26521 ; 0.30203 ; 0.3172 ; 0.34145 ; 0.38191 ; 0.41144 ; 0.44037 ; 0.48198 ; 0.52208 ; 0.54957 ; 0.56938 ; 0.58613 ; 0.60085 ; 0.60455 ; 0.61017 ; 0.61764 ; 0.62496]

Bolt 2 - Tensile Force (kips): [34.7805 ; 34.7436 ; 34.7258 ; 34.7018 ; 34.6772 ; 34.661 ; 34.6801 ; 34.7321 ; 34.7612 ; 34.7851 ; 34.8341 ; 34.9463 ; 35.004 ; 35.0935 ; 35.2292 ; 35.5098 ; 35.933 ; 36.4979 ; 37.0893 ; 37.6638 ; 38.1746 ; 38.6115 ; 38.9725 ; 39.057 ; 39.1777 ; 39.3413 ; 39.4924]

Bolt 2 - Shear Force (kips): [0.048567 ; 0.053362 ; 0.072035 ; 0.10214 ; 0.14872 ; 0.21953 ; 0.31093 ; 0.37702 ; 0.40202 ; 0.41982 ; 0.45457 ; 0.5168 ; 0.54425 ; 0.58852 ; 0.66117 ; 0.73755 ; 0.82731 ; 0.92738 ; 0.9981 ; 1.0441 ; 1.0783 ; 1.1071 ; 1.1367 ; 1.1446 ; 1.1562 ; 1.1715 ; 1.1854]

Bolt 3 - Tensile Force (kips): [36 ; 35.9551 ; 35.9199 ; 35.8851 ; 35.8731 ; 35.9262 ; 36.0596 ; 36.1981 ; 36.3126 ; 36.4283 ; 36.6411 ; 37.0113 ; 37.1439 ; 37.3406 ; 37.6325 ; 38.0382 ; 38.5988 ; 39.8211 ; 41.3084 ; 42.79 ; 44.176 ; 45.3639 ; 46.3719 ; 46.5918 ; 46.8662 ; 47.1991 ; 47.4616]

Bolt 3 - Shear Force (kips): [0.027922 ; 0.013544 ; 0.020065 ; 0.039514 ; 0.074802 ; 0.13282 ; 0.19834 ; 0.21694 ; 0.19752 ; 0.16488 ; 0.14515 ; 0.16436 ; 0.18189 ; 0.21236 ; 0.26144 ; 0.35766 ; 0.4921 ; 0.44497 ; 0.39365 ; 0.70248 ; 1.37 ; 1.7884 ; 2.0911 ; 1.9477 ; 1.8148 ; 1.5668 ; 1.2668]

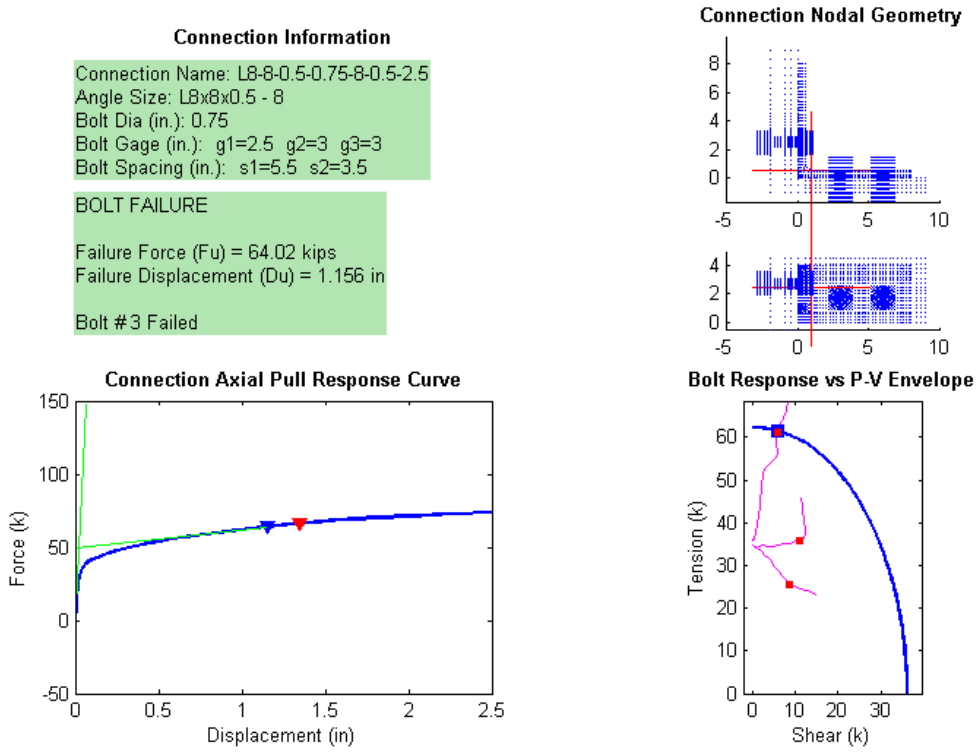


Figure B.301 Connection L8_8_0.5_0.75_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.75_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.1493e+003

Plastic Stiffness (k/in): 12.8149

Displacement (in): [1.671e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0078125 ; 0.010742 ; 0.013672 ; 0.016602 ; 0.020996 ; 0.027588 ; 0.037476 ; 0.052307 ; 0.074554 ; 0.10792 ; 0.1413 ; 0.17467 ; 0.20804 ; 0.2581 ; 0.33318 ; 0.36134 ; 0.40357 ; 0.41941 ; 0.44317 ; 0.4788 ; 0.49217 ; 0.51221 ; 0.54228 ; 0.58738 ; 0.65503 ; 0.6804 ; 0.71846 ; 0.77554 ; 0.86116 ; 0.89327 ; 0.90531 ; 0.92337 ; 0.95046 ; 0.9911 ; 1.0521 ; 1.0749 ; 1.1092 ; 1.1221 ; 1.1414 ; 1.1703 ; 1.2137 ; 1.23 ; 1.2544 ; 1.291 ; 1.3047 ; 1.3253 ; 1.3562 ; 1.4025 ; 1.472 ; 1.4981 ; 1.5372 ; 1.5959 ; 1.6838 ; 1.8158 ; 2.0137 ; 2.2637 ; 2.5]

Force (kips): [-0.674201 ; 1.71641 ; 3.5237 ; 5.09276 ; 6.49753 ; 8.40425 ; 10.106 ; 11.5735 ; 13.3598 ; 15.2513 ; 17.0345 ; 18.4822 ; 19.7123 ; 20.8328 ; 21.6757 ; 22.3978 ; 23.0382 ; 23.8641 ; 24.9351 ; 25.3056 ; 25.8244 ; 26.0288 ; 26.3172 ; 26.7312 ; 26.8752 ; 27.0862 ; 27.3979 ; 27.8158 ; 28.4053 ; 28.6171 ; 28.9187 ; 29.3384 ; 29.9275 ; 30.1709 ; 30.2621 ; 30.3999 ; 30.5938 ; 30.8913 ; 31.3311 ; 31.4909 ; 31.7097 ; 31.7916 ; 31.9152 ; 32.0952 ; 32.3444 ; 32.4369 ; 32.5822 ; 32.7932 ; 32.8766 ; 32.994 ; 33.1576 ; 33.3995 ; 33.7387 ; 33.8629 ; 34.0371 ; 34.2816 ; 34.6227 ; 35.0822 ; 35.6791 ; 36.2983 ; 36.7797]

Bolt 1 - Tensile Force (kips): [34.7723 ; 34.7077 ; 34.6532 ; 34.6011 ; 34.552 ; 34.4822 ; 34.4161 ; 34.3556 ; 34.2772 ; 34.1874 ; 34.0908 ; 33.9827 ; 33.8519 ; 33.3434 ; 32.5037 ; 31.6743 ; 30.8952 ; 29.7647 ; 28.1675 ; 27.5939 ; 26.7757 ; 26.4711 ; 26.0425 ; 25.5118 ; 25.4951 ; 25.4916 ; 25.4884 ; 25.4867 ; 25.4876 ; 25.4883 ; 25.49 ; 25.4937 ; 25.5013 ; 25.5042 ; 25.504 ; 25.3631 ; 25.3636 ; 25.3679 ; 25.3784 ; 25.3825 ; 25.3883 ; 25.3904 ; 25.3939 ; 25.3989 ; 25.4061 ; 25.4092 ; 25.3671 ; 25.2992 ; 25.231 ; 25.1488 ; 25.0552 ; 24.8819 ; 24.6514 ; 24.5845 ; 24.5128 ; 24.413 ; 24.2784 ; 24.1276 ; 23.8733 ; 23.5637 ; 23.2076]

Bolt 1 - Shear Force (kips): [0.0531302 ; 0.0993573 ; 0.201876 ; 0.293012 ; 0.376332 ; 0.491916 ; 0.597358 ; 0.690295 ; 0.806543 ; 0.936325 ; 1.07125 ; 1.21796 ; 1.38947 ; 1.98119 ; 2.82692 ; 3.60123 ; 4.29139 ; 5.23803 ; 6.49137 ; 6.92385 ; 7.52301 ; 7.73838 ; 8.03567 ; 8.39556 ; 8.40777 ; 8.40901 ; 8.40963 ; 8.40998 ; 8.41066 ; 8.41098 ; 8.41157 ; 8.41286 ; 8.41538 ; 8.41636 ; 8.41923 ; 8.60357 ; 8.6042 ; 8.60184 ; 8.59681 ; 8.59477 ; 8.59145 ; 8.59019 ; 8.58837 ; 8.58555 ; 8.58125 ; 8.57976 ; 8.78327 ; 9.07858 ; 9.29844 ; 9.55147 ; 9.81577 ; 10.3093 ; 11.0439 ; 11.242 ; 11.4557 ; 11.7405 ; 12.1109 ; 12.6149 ; 13.3596 ; 14.1065 ; 14.8031]

Bolt 2 - Tensile Force (kips): [34.7748 ; 34.676 ; 34.5914 ; 34.5195 ; 34.4586 ; 34.385 ; 34.3299 ; 34.2906 ; 34.2627 ; 34.2529 ; 34.2942 ; 34.3614 ; 34.5299 ; 34.6578 ; 34.541 ; 34.4406 ; 34.4323 ; 34.5375 ; 34.7197 ; 34.8004 ; 34.9198 ; 34.958 ; 35.0169 ; 35.0897 ; 35.0912 ; 35.0925 ; 35.0968 ; 35.1191 ; 35.1777 ; 35.1999 ; 35.2398 ; 35.3297 ; 35.4772 ; 35.5197 ; 35.5386 ; 35.62 ; 35.6681 ; 35.7459 ; 35.8823 ; 35.9 ; 35.9485 ; 35.9745 ; 35.9694 ; 35.9912 ; 36.0818 ; 36.1021 ; 36.2074 ; 36.3921 ; 36.5088 ; 36.6856 ; 36.9431 ; 37.3175 ; 37.8334 ; 38.1114 ; 38.5253 ; 39.0941 ; 39.8857 ; 40.9917 ; 42.5906 ; 44.3249 ; 45.8288]

Bolt 2 - Shear Force (kips): [0.0458997 ; 0.135304 ; 0.262694 ; 0.376184 ; 0.48038 ; 0.625276 ; 0.757722 ; 0.875119 ; 1.02258 ; 1.19017 ; 1.37181 ; 1.58133 ; 1.82364 ; 2.43287 ; 3.22513 ; 3.92037 ; 4.515 ; 5.1488 ; 5.90484 ; 6.1556 ; 6.49525 ; 6.62076 ; 6.7993 ; 7.06132 ; 7.1767 ; 7.34722 ; 7.59227 ; 7.92741 ; 8.37412 ; 8.53208 ; 8.75781 ; 9.06003 ; 9.47184 ; 9.62831 ; 9.68419 ; 9.73315 ; 9.85254 ; 10.0237 ; 10.255 ; 10.4173 ; 10.6417 ; 10.7157 ; 10.9006 ; 11.1731 ; 11.5189 ; 11.6646 ; 11.7988 ; 11.9612 ; 11.9888 ; 12.0305 ; 12.0905 ; 12.1711 ; 12.277 ; 12.2463 ; 12.2012 ; 12.1514 ; 12.0829 ; 11.9877 ; 11.7753 ; 11.5631 ; 11.2944]

Bolt 3 - Tensile Force (kips): [36 ; 35.9386 ; 35.9428 ; 35.9984 ; 36.1028 ; 36.2766 ; 36.4499 ; 36.6534 ; 36.9918 ; 37.6063 ; 38.4023 ; 39.2212 ; 40.2239 ; 41.4139 ; 42.4732 ; 43.5052 ; 44.4923 ; 45.8913 ; 47.834 ; 48.5149 ; 49.4965 ; 49.825 ; 50.3048 ; 50.9436 ; 51.1609 ; 51.487 ; 52.0014 ; 52.6703 ; 53.7029 ; 54.1172 ; 54.6691 ; 55.3721 ; 56.3587 ; 56.9289 ; 57.1258 ; 57.4285 ; 57.9276 ; 58.7598 ; 59.8777 ; 60.2445 ; 60.6594 ; 60.8365 ; 61.0794 ; 61.4476 ; 61.9315 ; 62.113 ; 62.3976 ; 62.828 ; 62.9749 ; 63.1759 ; 63.4638 ; 63.926 ; 64.5722 ; 64.8178 ; 65.1477 ; 65.5962 ; 66.2149 ; 66.9681 ; 67.8891 ; 68.7823 ; 69.4235]

Bolt 3 - Shear Force (kips): [0.029754 ; 0.027653 ; 0.067997 ; 0.11282 ; 0.15949 ; 0.22258 ; 0.2817 ; 0.33892 ; 0.41811 ; 0.52658 ; 0.6645 ; 0.84649 ; 1.0277 ; 1.2483 ; 1.4368 ; 1.5869 ; 1.7059 ; 1.8456 ; 2.0128 ; 2.0708 ; 2.1494 ; 2.1932 ; 2.2482 ; 2.3282 ; 2.3495 ; 2.3893 ; 2.4817 ; 2.5524 ; 3.7377 ; 4.2505 ; 4.8385 ; 5.3618 ; 5.9056 ; 5.824 ; 5.7681 ; 5.6849 ; 5.4586 ; 5.3052 ; 5.5681 ; 5.6955 ; 5.7835 ; 5.823 ; 5.8726 ; 5.8693 ; 5.8833 ; 5.9304 ; 6.0762 ; 6.3017 ; 6.3815 ; 6.4789 ; 6.6243 ; 6.8094 ; 7.0677 ; 7.1909 ; 7.3434 ; 7.5165 ; 7.7289 ; 7.9649 ; 8.2936 ; 8.6271 ; 8.9269]

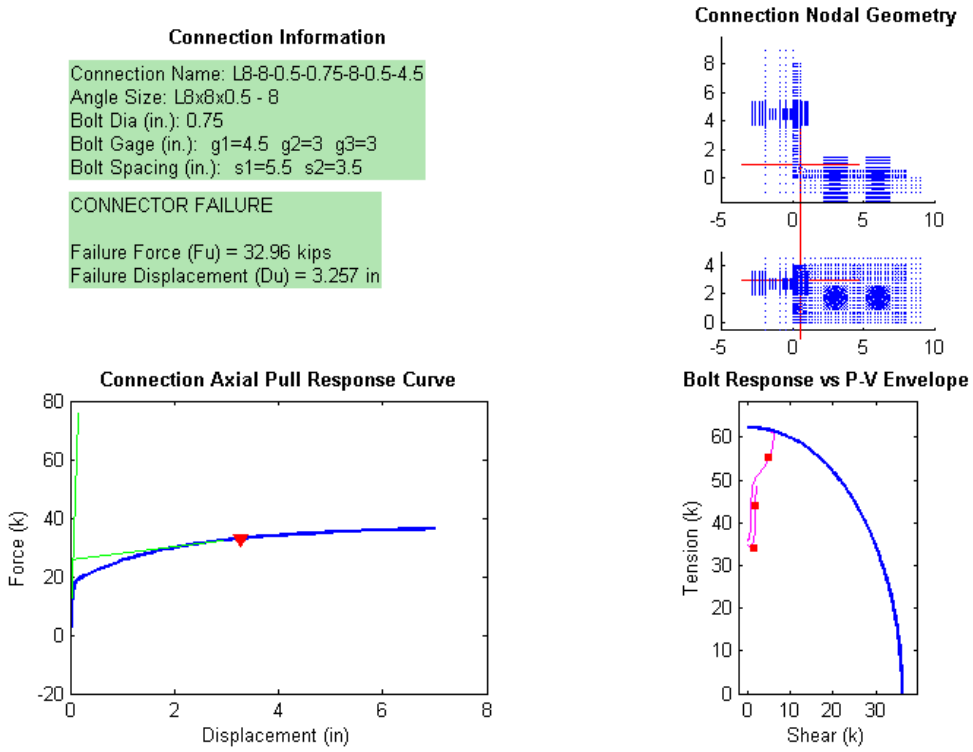


Figure B.302 Connection L8_8_0.5_0.75_8_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.75_8_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 471.5707

Plastic Stiffness (k/in): 2.2340

Displacement (in): [2.3494e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.9406 ; 1.0589 ; 1.2362 ; 1.3028 ; 1.4026 ; 1.44 ; 1.4961 ; 1.5803 ; 1.7066 ; 1.8329 ; 1.9591 ; 2.1486 ; 2.4327 ; 2.5393 ; 2.6991 ; 2.9388 ; 3.2984 ; 3.8379 ; 4.5379 ; 5.2379 ; 5.9379 ; 6.6379 ; 7]

Force (kips): [-0.575592 ; 0.972591 ; 2.00331 ; 3.38662 ; 5.21188 ; 7.14521 ; 8.50341 ; 9.14367 ; 9.55192 ; 10.0564 ; 10.7178 ; 11.5491 ; 12.5761 ; 12.9101 ; 13.3588 ; 13.5135 ; 13.7401 ; 13.8212 ; 13.9439 ; 14.1204 ; 14.3821 ; 14.6286 ; 14.8621 ; 15.1632 ; 15.5641 ; 15.7056 ; 15.8998 ; 16.1676 ; 16.5219 ; 16.9516 ; 17.3745 ; 17.6748 ; 17.9017 ; 18.0727 ; 18.154]

Bolt 1 - Tensile Force (kips): [34.772 ; 34.7319 ; 34.7024 ; 34.6596 ; 34.5947 ; 34.5169 ; 34.4531 ; 34.4169 ; 34.3912 ; 34.3506 ; 34.3192 ; 34.2911 ; 34.2485 ; 34.2372 ; 34.2242 ; 34.2202 ; 34.2147 ; 34.2128 ; 34.2101 ; 34.2061 ; 34.1995 ; 34.1936 ; 34.1884 ; 34.1853 ; 34.1835 ; 34.183 ; 34.1834 ; 34.1855 ; 34.1915 ; 34.2071 ; 34.233 ; 34.264 ; 34.2933 ; 34.3206 ; 34.3309]

Bolt 1 - Shear Force (kips): [0.047431 ; 0.062367 ; 0.11857 ; 0.20091 ; 0.31608 ; 0.44993 ; 0.55846 ; 0.62389 ; 0.67535 ; 0.75536 ; 0.82729 ; 0.9012 ; 1.002 ; 1.0319 ; 1.0703 ; 1.0834 ; 1.1019 ; 1.1086 ; 1.1183 ; 1.1322 ; 1.1536 ; 1.174 ; 1.1933 ; 1.2168 ; 1.2486 ; 1.2603 ; 1.2763 ; 1.2986 ; 1.3287 ; 1.3662 ; 1.4077 ; 1.4431 ; 1.4806 ; 1.5199 ; 1.5444]

Bolt 2 - Tensile Force (kips): [34.7728 ; 34.699 ; 34.6437 ; 34.5845 ; 34.5519 ; 34.5918 ; 34.7366 ; 34.8843 ; 34.999 ; 35.1981 ; 35.6711 ; 36.4239 ; 37.7849 ; 38.2768 ; 38.9689 ; 39.2114 ; 39.5542 ; 39.6788 ; 39.861 ; 40.1326 ; 40.5229 ; 40.8905 ; 41.2361 ; 41.7115 ; 42.3951 ; 42.6444 ; 43.0171 ; 43.5495 ; 44.2991 ; 45.3228 ; 46.3727 ; 47.1782 ; 47.8295 ; 48.3512 ; 48.6042]

Bolt 2 - Shear Force (kips): [0.039292 ; 0.093181 ; 0.17216 ; 0.28459 ; 0.44325 ; 0.62876 ; 0.78848 ; 0.89304 ; 0.97516 ; 1.1055 ; 1.2492 ; 1.3948 ; 1.5619 ; 1.613 ; 1.6821 ; 1.7056 ; 1.7381 ; 1.7479 ; 1.7607 ; 1.7673 ; 1.7721 ; 1.7756 ; 1.7789 ; 1.7836 ; 1.7868 ; 1.7878 ; 1.7915 ; 1.7972 ; 1.8058 ; 1.8211 ; 1.8444 ; 1.8627 ; 1.8828 ; 1.9045 ; 1.9178]

Bolt 3 - Tensile Force (kips): [36 ; 35.9151 ; 35.8945 ; 35.9602 ; 36.17 ; 36.5211 ; 37.0435 ; 37.4808 ; 37.9332 ; 38.4664 ; 39.5305 ; 41.3848 ; 44.2259 ; 45.2245 ; 46.6277 ; 47.1208 ; 47.7838 ; 48.0122 ; 48.3208 ; 48.7348 ; 49.4098 ; 50.0676 ; 50.7182 ; 51.5005 ; 52.5354 ; 52.9446 ; 53.4991 ; 54.2927 ; 55.3569 ; 56.5641 ; 57.9798 ; 59.0726 ; 59.9784 ; 60.7429 ; 61.3564]

Bolt 3 - Shear Force (kips): [0.031334 ; 0.026554 ; 0.065391 ; 0.1328 ; 0.22916 ; 0.32448 ; 0.40103 ; 0.46374 ; 0.52986 ; 0.64804 ; 0.63162 ; 0.62967 ; 0.75217 ; 0.79991 ; 0.85158 ; 0.86506 ; 0.91702 ; 0.93206 ; 0.97392 ; 1.0573 ; 1.2312 ; 1.5673 ; 1.837 ; 2.6418 ; 3.3926 ; 3.6339 ; 3.9807 ; 4.4236 ; 4.9451 ; 5.4114 ; 5.6925 ; 5.8614 ; 6.0542 ; 6.0036 ; 5.5829]

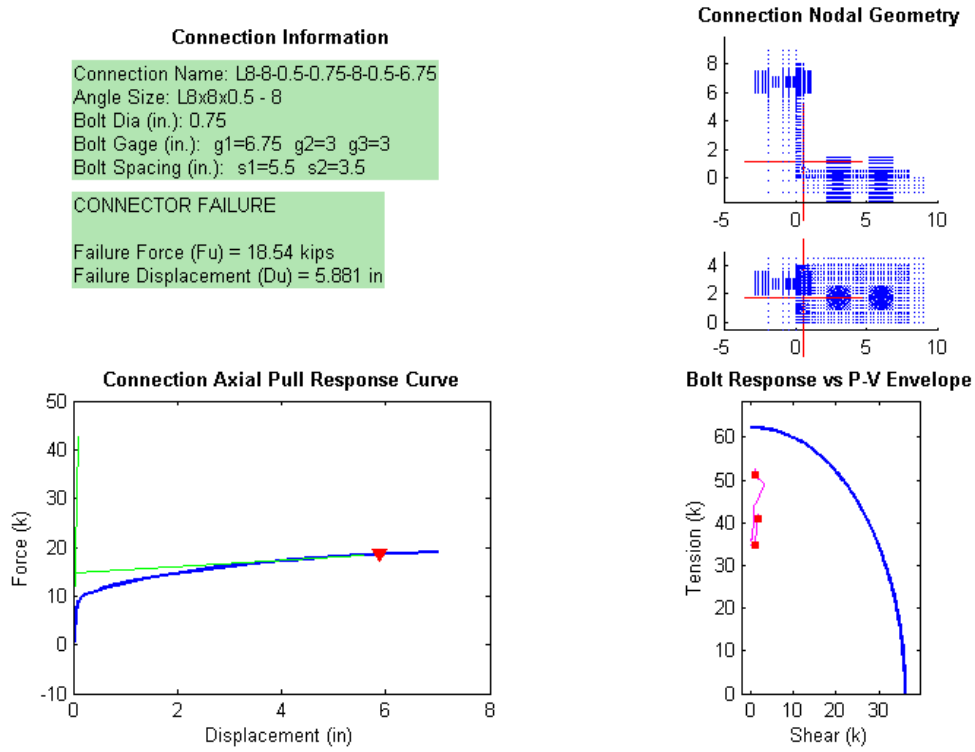


Figure B.303 Connection L8_8_0.5_0.75_8_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.75_8_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 482.1825

Plastic Stiffness (k/in): 0.6435

Displacement (in): [1.7355e-036 ; 0.0013672 ; 0.0027344 ; 0.0047852 ; 0.0078613 ; 0.012476 ; 0.019397 ; 0.029779 ; 0.045352 ; 0.068712 ; 0.10375 ; 0.15631 ; 0.23515 ; 0.35341 ; 0.5308 ; 0.59732 ; 0.6971 ; 0.84677 ; 1.0713 ; 1.408 ; 1.9132 ; 2.6132 ; 2.7882 ; 3.0507 ; 3.4444 ; 4.0351 ; 4.21 ; 4.2757 ; 4.3741 ; 4.5218 ; 4.7432 ; 5.0755 ; 5.5738 ; 6.2738 ; 6.9738 ; 7]

Force (kips): [-0.56722 ; 0.0049392 ; 0.092016 ; 0.22217 ; 0.41257 ; 0.68627 ; 1.0818 ; 1.6449 ; 2.4389 ; 3.4923 ; 4.4525 ; 4.9402 ; 5.1564 ; 5.3761 ; 5.701 ; 5.8069 ; 5.9547 ; 6.1581 ; 6.4422 ; 6.8123 ; 7.285 ; 7.8167 ; 7.9341 ; 8.0973 ; 8.3171 ; 8.6033 ; 8.6817 ; 8.7113 ; 8.7538 ; 8.8155 ; 8.904 ; 9.0257 ; 9.186 ; 9.3755 ; 9.5296 ; 9.5349]

Bolt 1 - Tensile Force (kips): [34.7722 ; 34.7576 ; 34.7556 ; 34.7525 ; 34.7478 ; 34.741 ; 34.7307 ; 34.715 ; 34.6911 ; 34.6557 ; 34.618 ; 34.599 ; 34.5934 ; 34.5902 ; 34.5809 ; 34.5766 ; 34.5698 ; 34.5571 ; 34.5377 ; 34.5441 ; 34.5525 ; 34.5769 ; 34.5838 ; 34.595 ; 34.6135 ; 34.6444 ; 34.654 ; 34.6575 ; 34.6628 ; 34.6708 ; 34.6826 ; 34.7009 ; 34.7287 ; 34.7695 ; 34.8121 ; 34.8138]

Bolt 1 - Shear Force (kips): [0.047226 ; 0.031015 ; 0.031586 ; 0.033515 ; 0.038936 ; 0.050161 ; 0.070062 ; 0.10181 ; 0.15069 ; 0.22139 ; 0.29359 ; 0.33476 ; 0.35627 ; 0.38022 ; 0.4245 ; 0.44273 ; 0.47095 ; 0.51753 ; 0.58704 ; 0.63209 ; 0.69605 ; 0.75701 ; 0.77035 ; 0.78872 ; 0.81313 ; 0.84345 ; 0.85165 ; 0.85485 ; 0.85942 ; 0.86613 ; 0.87634 ; 0.89063 ; 0.91077 ; 0.9366 ; 0.95968 ; 0.96055]

Bolt 2 - Tensile Force (kips): [34.7738 ; 34.7543 ; 34.7498 ; 34.7412 ; 34.7279 ; 34.7089 ; 34.6831 ; 34.6544 ; 34.6293 ; 34.6394 ; 34.6995 ; 34.7597 ; 34.7927 ; 34.8456 ; 34.9724 ; 35.0275 ; 35.1166 ; 35.2478 ; 35.4672 ; 35.9441 ; 36.609 ; 37.6293 ; 37.8705 ; 38.2243 ; 38.7349 ; 39.4257 ; 39.6202 ; 39.6931 ; 39.7986 ; 39.9525 ; 40.1708 ; 40.4802 ; 40.8959 ; 41.4047 ; 41.8288 ; 41.8434]

Bolt 2 - Shear Force (kips): [0.039363 ; 0.031426 ; 0.036852 ; 0.044462 ; 0.057852 ; 0.079031 ; 0.11155 ; 0.16078 ; 0.23446 ; 0.33979 ; 0.44698 ; 0.50658 ; 0.53346 ; 0.56628 ; 0.6324 ; 0.66128 ; 0.70597 ; 0.77887 ; 0.8909 ; 0.9981 ; 1.1301 ; 1.2557 ; 1.2804 ; 1.3155 ; 1.3655 ; 1.4291 ; 1.4464 ; 1.4528 ; 1.4621 ; 1.476 ; 1.4954 ; 1.5195 ; 1.5415 ; 1.5493 ; 1.5524 ; 1.5526]

Bolt 3 - Tensile Force (kips): [36 ; 35.9877 ; 35.9756 ; 35.9587 ; 35.9369 ; 35.9115 ; 35.8865 ; 35.8845 ; 35.9502 ; 36.1136 ; 36.372 ; 36.6841 ; 36.9497 ; 37.2783 ; 37.7559 ; 37.9212 ; 38.157 ; 38.4978 ; 38.9839 ; 39.8979 ; 41.5616 ; 43.9207 ; 44.5465 ; 45.4405 ; 46.6809 ; 48.3149 ; 48.7897 ; 48.9631 ; 49.1884 ; 49.4869 ; 49.8785 ; 50.3543 ; 50.9626 ; 51.7471 ; 52.5287 ; 52.5672]

Bolt 3 - Shear Force (kips): [0.030374 ; 0.021583 ; 0.016943 ; 0.014106 ; 0.016173 ; 0.025743 ; 0.04569 ; 0.080067 ; 0.13653 ; 0.21076 ; 0.25828 ; 0.25898 ; 0.24098 ; 0.24392 ; 0.28298 ; 0.30478 ; 0.34352 ; 0.40625 ; 0.51683 ; 0.57005 ; 0.59976 ; 0.6697 ; 1.0602 ; 1.5693 ; 2.1119 ; 2.6493 ; 2.975 ; 2.9846 ; 2.9457 ; 2.7606 ; 2.2112 ; 1.5616 ; 0.9379 ; 0.72131 ; 1.0465 ; 1.0832]

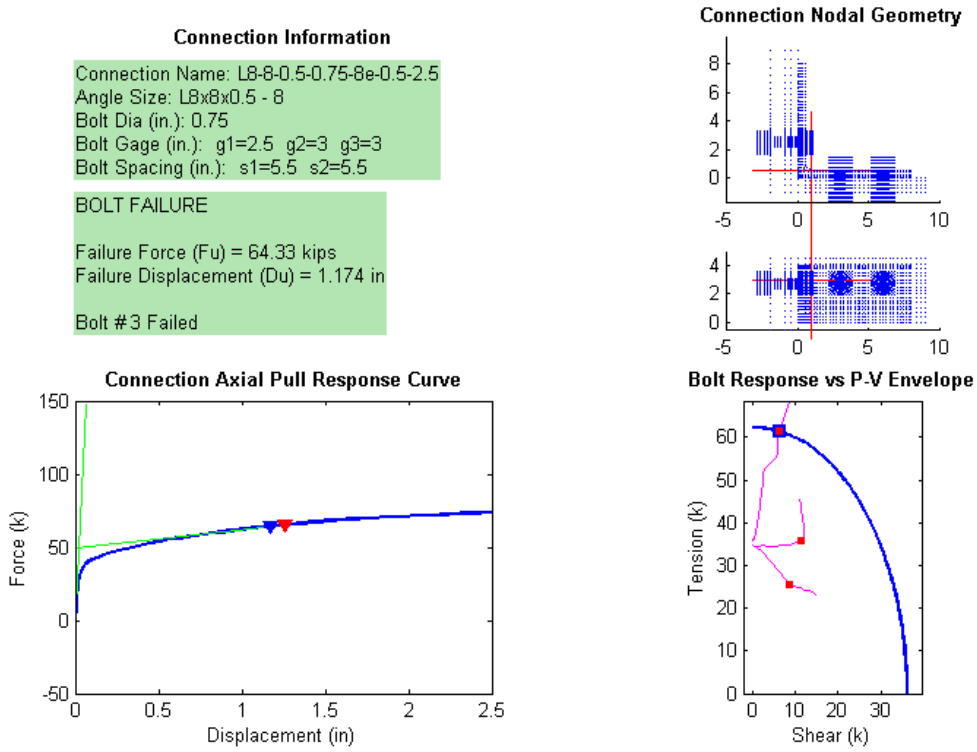


Figure B.304 Connection L8_8_0.5_0.75_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.75_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.1922e+003

Plastic Stiffness (k/in): 12.7658

Displacement (in): [2.4721e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0078125 ; 0.010742 ; 0.013672 ; 0.016602 ; 0.020996 ; 0.027588 ; 0.037476 ; 0.052307 ; 0.074554 ; 0.10792 ; 0.1413 ; 0.17467 ; 0.22472 ; 0.29981 ; 0.41244 ; 0.45467 ; 0.51802 ; 0.54178 ; 0.57742 ; 0.63087 ; 0.71105 ; 0.83132 ; 0.87642 ; 0.94408 ; 0.96945 ; 1.0075 ; 1.0218 ; 1.0432 ; 1.0753 ; 1.1235 ; 1.1957 ; 1.2228 ; 1.2329 ; 1.2482 ; 1.271 ; 1.3053 ; 1.3568 ; 1.4339 ; 1.5496 ; 1.593 ; 1.6581 ; 1.7558 ; 1.9022 ; 2.1219 ; 2.3719 ; 2.5]

Force (kips): [-0.821801 ; 1.64458 ; 3.45989 ; 5.03203 ; 6.44146 ; 8.35319 ; 10.0429 ; 11.5004 ; 13.2633 ; 15.1602 ; 16.9865 ; 18.4606 ; 19.6828 ; 20.7953 ; 21.6275 ; 22.3402 ; 23.2667 ; 24.4381 ; 25.9304 ; 26.4631 ; 27.1654 ; 27.4156 ; 27.7504 ; 28.2349 ; 28.8963 ; 29.7596 ; 30.0903 ; 30.5805 ; 30.77 ; 31.063 ; 31.1758 ; 31.3347 ; 31.5505 ; 31.8579 ; 32.2963 ; 32.4708 ; 32.5315 ; 32.6257 ; 32.7638 ; 32.9563 ; 33.2307 ; 33.6168 ; 34.1357 ; 34.3123 ; 34.5629 ; 34.9048 ; 35.3662 ; 35.9596 ; 36.514 ; 36.7542]

Bolt 1 - Tensile Force (kips): [34.8326 ; 34.7596 ; 34.6994 ; 34.6426 ; 34.5895 ; 34.5139 ; 34.4429 ; 34.3783 ; 34.2956 ; 34.1998 ; 34.0967 ; 33.9907 ; 33.8704 ; 33.3939 ; 32.572 ; 31.7584 ; 30.6091 ; 28.8853 ; 26.5199 ; 25.7348 ; 25.512 ; 25.5091 ; 25.5066 ; 25.5058 ; 25.5083 ; 25.5173 ; 25.4373 ; 25.3866 ; 25.3878 ; 25.392 ; 25.3939 ; 25.397 ; 25.402 ; 25.4098 ; 25.4052 ; 25.3443 ; 25.3265 ; 25.2554 ; 25.1612 ; 25.06 ; 24.9044 ; 24.75 ; 24.5249 ; 24.4481 ; 24.3372 ; 24.1894 ; 24.0068 ; 23.7418 ; 23.4084 ; 23.2211]

Bolt 1 - Shear Force (kips): [0.0519413 ; 0.113757 ; 0.219306 ; 0.313266 ; 0.399533 ; 0.519163 ; 0.627314 ; 0.72265 ; 0.841164 ; 0.974532 ; 1.11221 ; 1.25148 ; 1.4068 ; 1.96237 ; 2.79345 ; 3.55552 ; 4.56413 ; 5.9611 ; 7.72432 ; 8.26295 ; 8.41669 ; 8.41685 ; 8.41668 ; 8.41675 ; 8.41768 ; 8.42068 ; 8.5385 ; 8.59998 ; 8.59854 ; 8.59536 ; 8.59408 ; 8.59212 ; 8.58915 ; 8.58465 ; 8.64848 ; 8.92664 ; 9.0016 ; 9.23622 ; 9.53704 ; 9.83105 ; 10.2855 ; 10.7864 ; 11.4803 ; 11.6964 ; 11.9949 ; 12.3956 ; 12.9415 ; 13.6516 ; 14.3445 ; 14.6912]

Bolt 2 - Tensile Force (kips): [34.8493 ; 34.7457 ; 34.6607 ; 34.5881 ; 34.5274 ; 34.4551 ; 34.4001 ; 34.3629 ; 34.3421 ; 34.3346 ; 34.3793 ; 34.4535 ; 34.6193 ; 34.7227 ; 34.5914 ; 34.5332 ; 34.5043 ; 34.6005 ; 34.8175 ; 34.8775 ; 34.859 ; 34.8454 ; 34.8367 ; 34.8398 ; 34.8858 ; 35.0959 ; 35.201 ; 35.3296 ; 35.3764 ; 35.4556 ; 35.4698 ; 35.4737 ; 35.5355 ; 35.5687 ; 35.7233 ; 35.8478 ; 35.9077 ; 36.0437 ; 36.2459 ; 36.5272 ; 36.9425 ; 37.5289 ; 38.651 ; 39.076 ; 39.6851 ; 40.4729 ; 41.5768 ; 43.0916 ; 44.5817 ; 45.302]

Bolt 2 - Shear Force (kips): [0.0728076 ; 0.122511 ; 0.244316 ; 0.354583 ; 0.456186 ; 0.597486 ; 0.72539 ; 0.83883 ; 0.979937 ; 1.14182 ; 1.31911 ; 1.51899 ; 1.75019 ; 2.32986 ; 3.10144 ; 3.77697 ; 4.62375 ; 5.51561 ; 6.51122 ; 6.85335 ; 7.40978 ; 7.61215 ; 7.89218 ; 8.28033 ; 8.78641 ; 9.39299 ; 9.58258 ; 9.8671 ; 9.97048 ; 10.1165 ; 10.2011 ; 10.3801 ; 10.5752 ; 11.0064 ; 11.5712 ; 11.7121 ; 11.7605 ; 11.7928 ; 11.8384 ; 11.9039 ; 11.9915 ; 12.1105 ; 12.0158 ; 11.9614 ; 11.8793 ; 11.7934 ; 11.6583 ; 11.4276 ; 11.1697 ; 11.0157]

Bolt 3 - Tensile Force (kips): [36 ; 35.9379 ; 35.9397 ; 35.9957 ; 36.0995 ; 36.2714 ; 36.4427 ; 36.6471 ; 36.979 ; 37.591 ; 38.3898 ; 39.2279 ; 40.2292 ; 41.426 ; 42.5047 ; 43.543 ; 45.0182 ; 47.0442 ; 49.7456 ; 50.5776 ; 51.6569 ; 52.0911 ; 52.5934 ; 53.4053 ; 54.5613 ; 55.9581 ; 56.629 ; 57.8226 ; 58.3015 ; 59.026 ; 59.3428 ; 59.7248 ; 60.196 ; 60.8048 ; 61.7345 ; 62.1398 ; 62.2747 ; 62.4679 ; 62.7174 ; 63.08 ; 63.578 ; 64.3398 ; 65.3542 ; 65.691 ; 66.1579 ; 66.7295 ; 67.443 ; 68.3298 ; 69.1143 ; 69.4322]

Bolt 3 - Shear Force (kips): [0.038872 ; 0.018795 ; 0.06201 ; 0.10712 ; 0.15411 ; 0.21778 ; 0.27697 ; 0.33428 ; 0.41337 ; 0.52151 ; 0.65974 ; 0.84154 ; 1.0219 ; 1.2405 ; 1.424 ; 1.5711 ; 1.7384 ; 1.9318 ; 2.2002 ; 2.3127 ; 2.4503 ; 2.5069 ; 2.5709 ; 3.4407 ; 4.7811 ; 5.7795 ; 5.9505 ; 5.8381 ; 5.6514 ; 5.6725 ; 5.6677 ; 5.7412 ; 5.8785 ; 5.9566 ; 6.0778 ; 6.2074 ; 6.2497 ; 6.2975 ; 6.4371 ; 6.6535 ; 6.864 ; 7.1633 ; 7.5399 ; 7.6625 ; 7.7971 ; 7.9648 ; 8.2489 ; 8.6065 ; 8.9296 ; 9.1217]

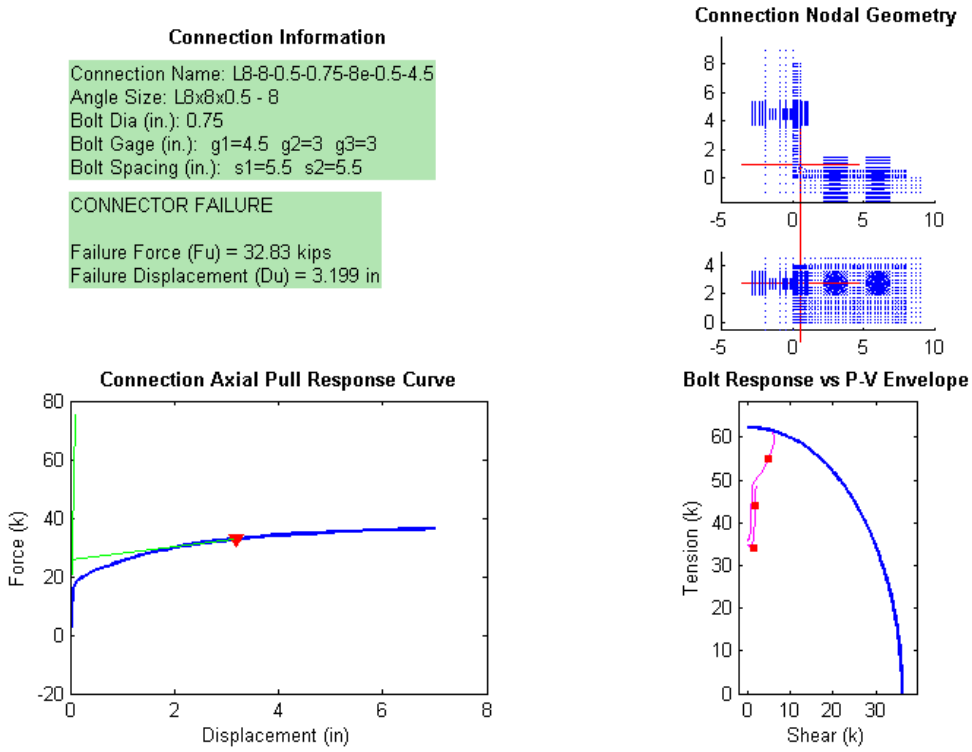


Figure B.305 Connection L8_8_0.5_0.75_8e_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.75_8e_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 772.6293

Plastic Stiffness (k/in): 2.2064

Displacement (in): [2.7172e-036 ; 0.0013672 ; 0.0027344 ; 0.0047852 ; 0.0078613 ; 0.012476 ; 0.019397 ; 0.029779 ; 0.045352 ; 0.068712 ; 0.10375 ; 0.15631 ; 0.23515 ; 0.35341 ; 0.5308 ; 0.79688 ; 1.196 ; 1.3457 ; 1.4018 ; 1.486 ; 1.6123 ; 1.6596 ; 1.7307 ; 1.8372 ; 1.997 ; 2.2368 ; 2.5964 ; 3.1358 ; 3.5404 ; 3.945 ; 4.5518 ; 5.2518 ; 5.9518 ; 6.6518 ; 7]

Force (kips): [-0.682649 ; 0.0666174 ; 0.373682 ; 0.803774 ; 1.40538 ; 2.2317 ; 3.37554 ; 4.91846 ; 6.69237 ; 8.14903 ; 8.96994 ; 9.40528 ; 9.84036 ; 10.4186 ; 11.1718 ; 12.1074 ; 13.2299 ; 13.5811 ; 13.7106 ; 13.8966 ; 14.159 ; 14.2634 ; 14.4075 ; 14.6164 ; 14.9082 ; 15.2758 ; 15.7614 ; 16.3565 ; 16.7171 ; 17.0174 ; 17.3745 ; 17.6745 ; 17.9002 ; 18.0691 ; 18.1476]

Bolt 1 - Tensile Force (kips): [34.8328 ; 34.8114 ; 34.8024 ; 34.7892 ; 34.77 ; 34.7426 ; 34.7012 ; 34.6398 ; 34.5617 ; 34.4894 ; 34.4438 ; 34.418 ; 34.3884 ; 34.367 ; 34.3458 ; 34.3037 ; 34.2537 ; 34.2391 ; 34.2341 ; 34.2273 ; 34.2191 ; 34.2154 ; 34.2102 ; 34.2032 ; 34.1939 ; 34.1869 ; 34.1814 ; 34.1823 ; 34.1897 ; 34.202 ; 34.2251 ; 34.256 ; 34.2862 ; 34.3125 ; 34.3207]

Bolt 1 - Shear Force (kips): [0.045244 ; 0.039933 ; 0.050979 ; 0.072216 ; 0.10641 ; 0.15679 ; 0.22958 ; 0.3328 ; 0.46086 ; 0.57723 ; 0.65344 ; 0.70193 ; 0.7607 ; 0.81191 ; 0.86706 ; 0.95609 ; 1.0604 ; 1.0923 ; 1.1036 ; 1.1195 ; 1.1405 ; 1.1491 ; 1.1614 ; 1.1791 ; 1.2044 ; 1.2335 ; 1.2721 ; 1.3211 ; 1.3517 ; 1.3781 ; 1.4117 ; 1.4445 ; 1.4778 ; 1.5151 ; 1.5391]

Bolt 2 - Tensile Force (kips): [34.8491 ; 34.8166 ; 34.8003 ; 34.777 ; 34.7442 ; 34.7047 ; 34.6611 ; 34.6345 ; 34.6684 ; 34.7881 ; 34.9618 ; 35.091 ; 35.2655 ; 35.6447 ; 36.275 ; 37.4128 ; 39.0407 ; 39.557 ; 39.7395 ; 39.9996 ; 40.3679 ; 40.5054 ; 40.705 ; 41.0065 ; 41.4544 ; 42.0715 ; 42.9375 ; 44.0777 ; 44.8523 ; 45.5326 ; 46.3707 ; 47.1065 ; 47.705 ; 48.182 ; 48.4025]

Bolt 2 - Shear Force (kips): [0.064238 ; 0.048594 ; 0.057334 ; 0.078754 ; 0.11659 ; 0.17497 ; 0.26109 ; 0.38468 ; 0.53722 ; 0.68361 ; 0.79695 ; 0.87704 ; 0.97848 ; 1.0935 ; 1.218 ; 1.3579 ; 1.5115 ; 1.563 ; 1.5816 ; 1.6073 ; 1.6412 ; 1.6521 ; 1.6633 ; 1.6703 ; 1.6791 ; 1.6897 ; 1.7071 ; 1.7388 ; 1.7616 ; 1.778 ; 1.8009 ; 1.8234 ; 1.8467 ; 1.8736 ; 1.89]

Bolt 3 - Tensile Force (kips): [36 ; 35.9748 ; 35.9508 ; 35.9221 ; 35.894 ; 35.8948 ; 35.9566 ; 36.1308 ; 36.4115 ; 36.8826 ; 37.3168 ; 37.7318 ; 38.2204 ; 38.9922 ; 40.4882 ; 42.8878 ; 46.2478 ; 47.3414 ; 47.6976 ; 48.1694 ; 48.7715 ; 49.0604 ; 49.4328 ; 49.9792 ; 50.7454 ; 51.6545 ; 53.0022 ; 54.7376 ; 55.7743 ; 56.6278 ; 57.8166 ; 58.9077 ; 59.8199 ; 60.5661 ; 61.1888]

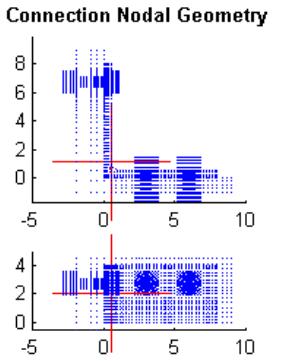
Bolt 3 - Shear Force (kips): [0.040245 ; 0.025207 ; 0.016283 ; 0.015705 ; 0.035882 ; 0.071749 ; 0.12935 ; 0.21243 ; 0.30192 ; 0.37748 ; 0.44748 ; 0.51314 ; 0.60272 ; 0.66573 ; 0.62222 ; 0.70984 ; 0.87138 ; 0.91355 ; 0.95162 ; 1.0095 ; 1.1231 ; 1.2391 ; 1.3993 ; 1.8058 ; 2.2126 ; 3.0538 ; 3.8651 ; 4.7694 ; 5.2815 ; 5.5977 ; 5.9148 ; 6.088 ; 6.2232 ; 6.1913 ; 5.7538]

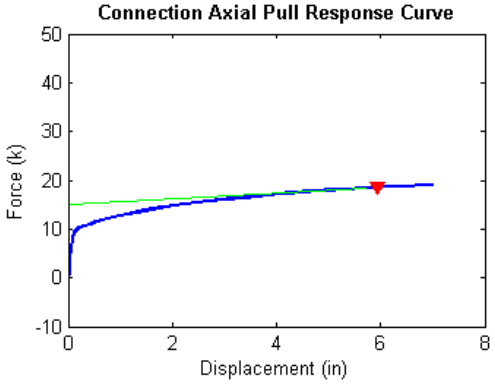
Connection Information

Connection Name: L8-8-0.5-0.75-8e-0.5-6.75
Angle Size: L8x8x0.5 - 8
Bolt Dia (in.): 0.75
Bolt Gage (in.): g1=6.75 g2=3 g3=3
Bolt Spacing (in.): s1=5.5 s2=5.5

CONNECTOR FAILURE

Failure Force (Fu) = 18.56 kips
Failure Displacement (Du) = 5.931 in





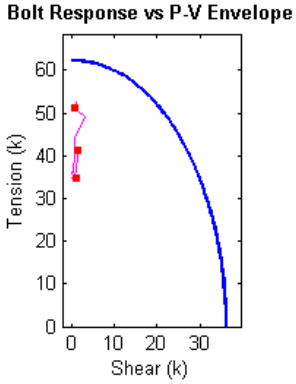


Figure B.306 Connection L8_8_0.5_0.75_8e_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.75_8e_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.8151e+003

Plastic Stiffness (k/in): 0.6048

Displacement (in): [2.6555e-036 ; 0.0003418 ; 0.00068359 ; 0.0011963 ; 0.0019653 ; 0.0031189 ; 0.0048492 ; 0.0074448 ; 0.011338 ; 0.017178 ; 0.025938 ; 0.039078 ; 0.058787 ; 0.088352 ; 0.1327 ; 0.19922 ; 0.299 ; 0.44867 ; 0.67318 ; 1.0099 ; 1.1362 ; 1.3257 ; 1.6098 ; 2.036 ; 2.6753 ; 3.3753 ; 4.0753 ; 4.2503 ; 4.3159 ; 4.4144 ; 4.562 ; 4.6174 ; 4.7005 ; 4.8251 ; 5.0119 ; 5.2922 ; 5.7127 ; 6.3434 ; 7]

Force (kips): [-0.66834 ; -0.071696 ; -0.047924 ; -0.013498 ; 0.03617 ; 0.11015 ; 0.21875 ; 0.37795 ; 0.60768 ; 0.94156 ; 1.4188 ; 2.098 ; 3.0358 ; 4.0916 ; 4.8052 ; 5.0929 ; 5.2798 ; 5.5599 ; 5.9173 ; 6.3615 ; 6.5113 ; 6.7214 ; 7.0045 ; 7.3819 ; 7.8506 ; 8.27 ; 8.6121 ; 8.6902 ; 8.7203 ; 8.7625 ; 8.8241 ; 8.8469 ; 8.8807 ; 8.9279 ; 8.996 ; 9.0937 ; 9.2208 ; 9.3866 ; 9.5297]

Bolt 1 - Tensile Force (kips): [34.8335 ; 34.8164 ; 34.8158 ; 34.8148 ; 34.8134 ; 34.8113 ; 34.8081 ; 34.8034 ; 34.7964 ; 34.7858 ; 34.7702 ; 34.7468 ; 34.7107 ; 34.6641 ; 34.6305 ; 34.6194 ; 34.6161 ; 34.6083 ; 34.592 ; 34.5685 ; 34.5726 ; 34.578 ; 34.5827 ; 34.5917 ; 34.6101 ; 34.6334 ; 34.6602 ; 34.6675 ; 34.6699 ; 34.6738 ; 34.6798 ; 34.682 ; 34.6853 ; 34.6906 ; 34.699 ; 34.7117 ; 34.7326 ; 34.7654 ; 34.8019]

Bolt 1 - Shear Force (kips): [0.045022 ; 0.036554 ; 0.037012 ; 0.037771 ; 0.039045 ; 0.041314 ; 0.045349 ; 0.052437 ; 0.064324 ; 0.083573 ; 0.11326 ; 0.15845 ; 0.22487 ; 0.3072 ; 0.36948 ; 0.39741 ; 0.4174 ; 0.45237 ; 0.51405 ; 0.60367 ; 0.61632 ; 0.63586 ; 0.66848 ; 0.71055 ; 0.76148 ; 0.80875 ; 0.84832 ; 0.85751 ; 0.86132 ; 0.86659 ; 0.87442 ; 0.8774 ; 0.88193 ; 0.88818 ; 0.89687 ; 0.90986 ; 0.92719 ; 0.95133 ; 0.97401]

Bolt 2 - Tensile Force (kips): [34.8524 ; 34.8293 ; 34.8279 ; 34.8258 ; 34.8227 ; 34.8179 ; 34.8109 ; 34.8006 ; 34.7855 ; 34.7648 ; 34.7404 ; 34.7177 ; 34.7161 ; 34.7674 ; 34.8578 ; 34.9014 ; 34.9402 ; 35.0276 ; 35.228 ; 35.5825 ; 35.7512 ; 36.0217 ; 36.3882 ; 36.9995 ; 37.9553 ; 38.8854 ; 39.6767 ; 39.8568 ; 39.9246 ; 40.0222 ; 40.1645 ; 40.2168 ; 40.2937 ; 40.4054 ; 40.5657 ; 40.7939 ; 41.0982 ; 41.5122 ; 41.893]

Bolt 2 - Shear Force (kips): [0.064338 ; 0.047634 ; 0.047835 ; 0.048216 ; 0.048949 ; 0.050476 ; 0.053653 ; 0.059971 ; 0.071798 ; 0.092431 ; 0.1263 ; 0.17942 ; 0.25888 ; 0.35598 ; 0.43086 ; 0.4633 ; 0.48706 ; 0.5324 ; 0.62725 ; 0.77771 ; 0.8131 ; 0.86522 ; 0.93847 ; 1.0276 ; 1.1326 ; 1.2252 ; 1.3026 ; 1.3213 ; 1.3285 ; 1.3386 ; 1.3533 ; 1.3587 ; 1.3669 ; 1.3782 ; 1.3948 ; 1.4187 ; 1.4422 ; 1.4579 ; 1.4638]

Bolt 3 - Tensile Force (kips): [36 ; 35.9969 ; 35.9939 ; 35.9894 ; 35.9829 ; 35.9732 ; 35.9593 ; 35.94 ; 35.9167 ; 35.89 ; 35.8786 ; 35.9085 ; 36.0363 ; 36.2412 ; 36.5484 ; 36.8307 ; 37.1147 ; 37.5208 ; 38.0892 ; 38.8334 ; 39.0932 ; 39.5869 ; 40.4806 ; 41.9036 ; 44.0623 ; 46.383 ; 48.3567 ; 48.8327 ; 49.0069 ; 49.2288 ; 49.525 ; 49.6319 ; 49.7847 ; 49.9781 ; 50.2399 ; 50.6159 ; 51.08 ; 51.7956 ; 52.5274]

Bolt 3 - Shear Force (kips): [0.038862 ; 0.032398 ; 0.031012 ; 0.029102 ; 0.026446 ; 0.02281 ; 0.018231 ; 0.014226 ; 0.017653 ; 0.033872 ; 0.06233 ; 0.10883 ; 0.17867 ; 0.24331 ; 0.26636 ; 0.25256 ; 0.23958 ; 0.26387 ; 0.33407 ; 0.49056 ; 0.55601 ; 0.58251 ; 0.594 ; 0.62558 ; 0.7267 ; 1.8244 ; 2.6095 ; 2.9521 ; 2.9405 ; 2.9212 ; 2.7291 ; 2.6048 ; 2.3354 ; 2.0681 ; 1.6631 ; 1.1813 ; 0.84986 ; 0.72239 ; 1.131]

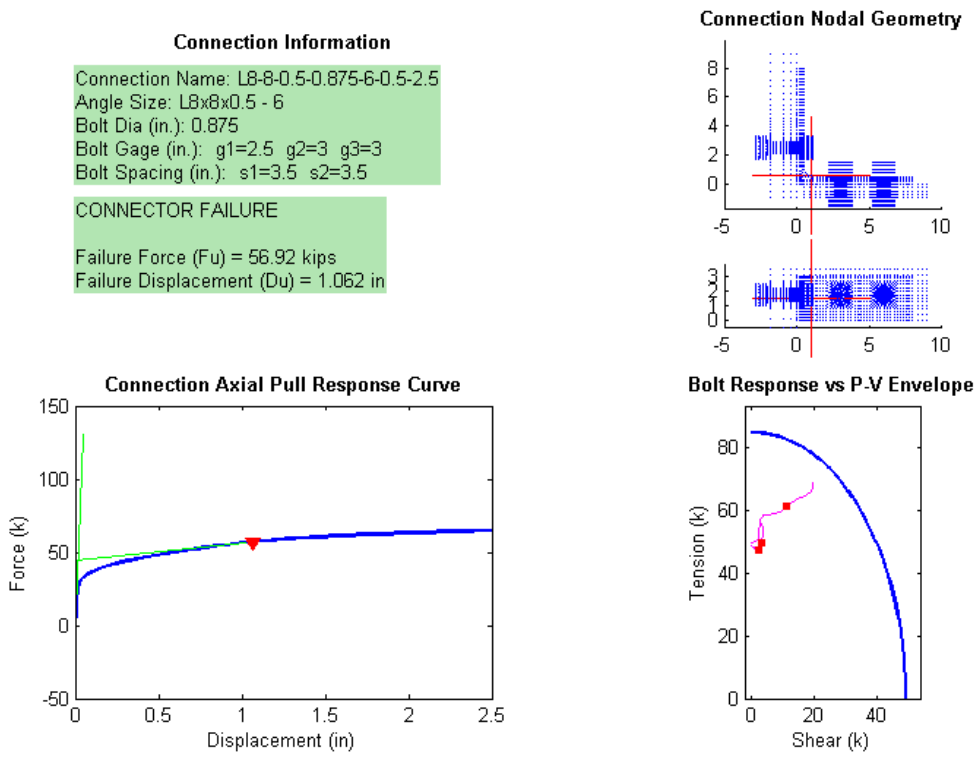


Figure B.307 Connection L8_8_0.5_0.875_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.875_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.5189e+003

Plastic Stiffness (k/in): 12.1512

Displacement (in): [3.7986e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.19827 ; 0.24833 ; 0.32341 ; 0.43604 ; 0.47828 ; 0.54163 ; 0.56539 ; 0.5743 ; 0.58766 ; 0.6077 ; 0.63777 ; 0.64905 ; 0.66596 ; 0.69133 ; 0.72938 ; 0.78647 ; 0.87209 ; 0.9042 ; 0.95236 ; 1.0246 ; 1.133 ; 1.2955 ; 1.3565 ; 1.4479 ; 1.5851 ; 1.7908 ; 2.0408 ; 2.2908 ; 2.5]

Force (kips): [-1.26669 ; 1.63997 ; 3.65295 ; 6.13465 ; 9.21146 ; 12.445 ; 14.7553 ; 16.0336 ; 17.0535 ; 18.1924 ; 19.397 ; 20.3452 ; 21.1499 ; 22.1795 ; 23.4652 ; 23.8974 ; 24.5001 ; 24.7408 ; 24.8309 ; 24.972 ; 25.1756 ; 25.4566 ; 25.5565 ; 25.7114 ; 25.9304 ; 26.2329 ; 26.6609 ; 27.2597 ; 27.4917 ; 27.8291 ; 28.268 ; 28.824 ; 29.5514 ; 29.799 ; 30.1339 ; 30.5718 ; 31.1145 ; 31.6873 ; 32.1186 ; 32.4047]

Bolt 1 - Tensile Force (kips): [48.59 ; 48.4964 ; 48.429 ; 48.3436 ; 48.2329 ; 48.1092 ; 48.0141 ; 47.9582 ; 47.908 ; 47.8572 ; 47.7868 ; 47.73 ; 47.6855 ; 47.634 ; 47.5749 ; 47.5555 ; 47.5299 ; 47.52 ; 47.5165 ; 47.511 ; 47.5035 ; 47.4933 ; 47.4898 ; 47.4846 ; 47.4776 ; 47.4685 ; 47.4566 ; 47.4377 ; 47.4282 ; 47.4125 ; 47.3908 ; 47.3605 ; 47.3075 ; 47.2855 ; 47.2484 ; 47.1819 ; 47.0682 ; 47.1178 ; 47.0029 ; 46.9052]

Bolt 1 - Shear Force (kips): [0.08963 ; 0.096814 ; 0.19521 ; 0.32767 ; 0.50065 ; 0.69007 ; 0.83412 ; 0.9231 ; 1.0088 ; 1.0969 ; 1.2201 ; 1.3204 ; 1.4014 ; 1.499 ; 1.6163 ; 1.6563 ; 1.7116 ; 1.7326 ; 1.7403 ; 1.7518 ; 1.7684 ; 1.7918 ; 1.8002 ; 1.8126 ; 1.8301 ; 1.8548 ; 1.8898 ; 1.9433 ; 1.9665 ; 2.0029 ; 2.0547 ; 2.1289 ; 2.2492 ; 2.2973 ; 2.3756 ; 2.5109 ; 2.7351 ; 2.7468 ; 2.993 ; 3.1867]

Bolt 2 - Tensile Force (kips): [48.5905 ; 48.4317 ; 48.3116 ; 48.1704 ; 47.991 ; 47.8038 ; 47.6373 ; 47.5285 ; 47.447 ; 47.4553 ; 47.4812 ; 47.4627 ; 47.4438 ; 47.4857 ; 47.6778 ; 47.7719 ; 47.9559 ; 48.0236 ; 48.0489 ; 48.0863 ; 48.1433 ; 48.2305 ; 48.2631 ; 48.3115 ; 48.3882 ; 48.5061 ; 48.6866 ; 48.9541 ; 49.0522 ; 49.2197 ; 49.4903 ; 49.9227 ; 50.574 ; 50.8098 ; 51.1668 ; 51.7037 ; 52.5158 ; 53.6847 ; 54.8307 ; 55.7414]

Bolt 2 - Shear Force (kips): [0.078744 ; 0.17397 ; 0.32962 ; 0.53285 ; 0.79647 ; 1.0896 ; 1.3313 ; 1.5177 ; 1.7184 ; 1.8883 ; 1.9904 ; 2.0474 ; 2.0955 ; 2.1755 ; 2.304 ; 2.3462 ; 2.409 ; 2.4359 ; 2.4463 ; 2.4624 ; 2.4867 ; 2.5219 ; 2.5343 ; 2.5535 ; 2.5829 ; 2.6275 ; 2.6942 ; 2.7964 ; 2.8303 ; 2.8785 ; 2.9388 ; 3.0268 ; 3.1582 ; 3.2065 ; 3.2713 ; 3.3601 ; 3.4587 ; 3.3772 ; 3.3642 ; 3.3118]

Bolt 3 - Tensile Force (kips): [50 ; 49.891 ; 49.8345 ; 49.8092 ; 49.8261 ; 49.8851 ; 50.0237 ; 50.0752 ; 50.0951 ; 50.1886 ; 50.649 ; 51.4605 ; 52.3282 ; 53.6806 ; 55.6275 ; 56.3208 ; 57.3276 ; 57.614 ; 57.7097 ; 57.8354 ; 57.9877 ; 58.2105 ; 58.2869 ; 58.3865 ; 58.5354 ; 58.7619 ; 59.0861 ; 59.608 ; 59.8979 ; 60.4592 ; 61.0544 ; 61.7142 ; 62.6241 ; 63.021 ; 63.5293 ; 64.0774 ; 64.6794 ; 65.9717 ; 67.7097 ; 68.7564]

Bolt 3 - Shear Force (kips): [0.0440551 ; 0.041421 ; 0.0981758 ; 0.183384 ; 0.30587 ; 0.467567 ; 0.648749 ; 0.840875 ; 1.0353 ; 1.31267 ; 1.75896 ; 1.98096 ; 2.12683 ; 2.30511 ; 2.58586 ; 2.68474 ; 2.82509 ; 2.91697 ; 2.95891 ; 3.04958 ; 3.19373 ; 3.38104 ; 3.44618 ; 3.5968 ; 4.30699 ; 5.56118 ; 7.21256 ; 9.01818 ; 9.65124 ; 9.91441 ; 10.4672 ; 11.7453 ; 13.2372 ; 13.8081 ; 14.417 ; 15.5707 ; 17.0594 ; 18.7867 ; 19.2466 ; 19.5318]

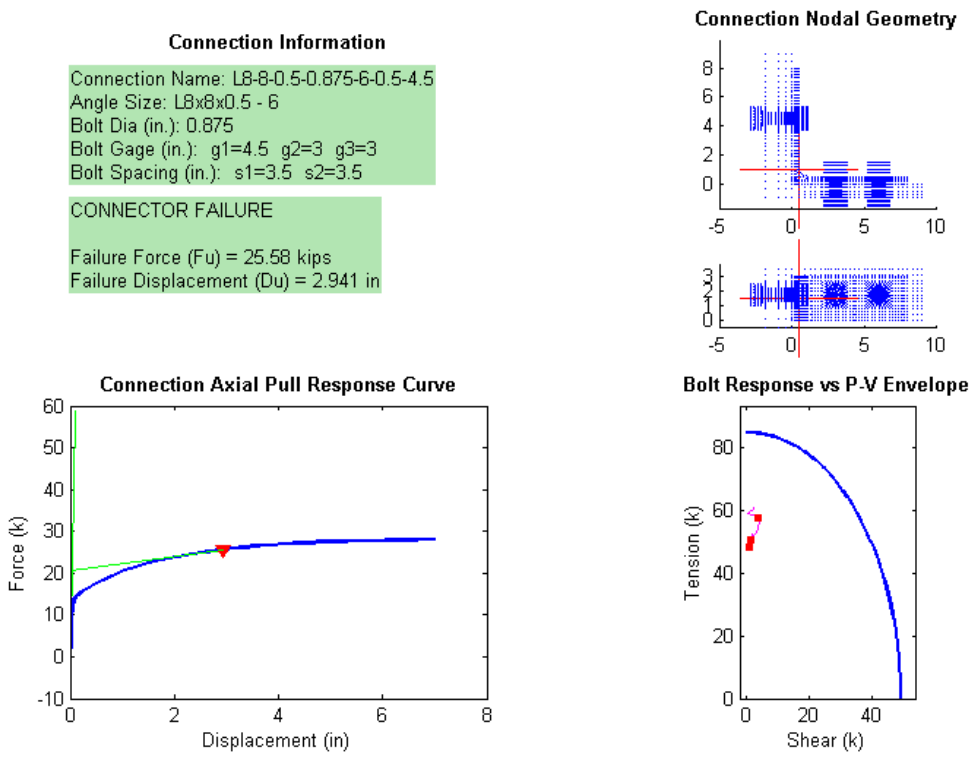


Figure B.308 Connection L8_8_0.5_0.875_6_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.875_6_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 540.8311

Plastic Stiffness (k/in): 1.6399

Displacement (in): [3.587e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.9406 ; 1.0589 ; 1.2362 ; 1.5023 ; 1.9015 ; 2.5001 ; 2.6751 ; 2.7408 ; 2.8392 ; 2.8761 ; 2.9315 ; 3.0145 ; 3.1391 ; 3.326 ; 3.6063 ; 3.7114 ; 3.8691 ; 4.1056 ; 4.4604 ; 4.9926 ; 5.6926 ; 6.3926 ; 7]

Force (kips): [-1.17698 ; 0.808912 ; 1.78069 ; 3.05862 ; 4.69516 ; 6.12166 ; 6.87754 ; 7.18669 ; 7.46378 ; 7.89093 ; 8.45709 ; 9.19033 ; 10.0776 ; 10.3673 ; 10.7355 ; 11.2071 ; 11.7725 ; 12.4137 ; 12.5677 ; 12.6225 ; 12.7049 ; 12.7374 ; 12.7828 ; 12.8499 ; 12.9442 ; 13.0749 ; 13.2387 ; 13.292 ; 13.3667 ; 13.4657 ; 13.5923 ; 13.7385 ; 13.8714 ; 13.973 ; 14.0418]

Bolt 1 - Tensile Force (kips): [48.5902 ; 48.5275 ; 48.4964 ; 48.4541 ; 48.3969 ; 48.3446 ; 48.3151 ; 48.3023 ; 48.2915 ; 48.2715 ; 48.267 ; 48.2575 ; 48.2436 ; 48.2387 ; 48.2362 ; 48.2378 ; 48.2472 ; 48.2719 ; 48.2801 ; 48.2833 ; 48.288 ; 48.2897 ; 48.2924 ; 48.2966 ; 48.3031 ; 48.3135 ; 48.3303 ; 48.3365 ; 48.3455 ; 48.3594 ; 48.3811 ; 48.4152 ; 48.4618 ; 48.5096 ; 48.5517]

Bolt 1 - Shear Force (kips): [0.085493 ; 0.067013 ; 0.10497 ; 0.1673 ; 0.25701 ; 0.34271 ; 0.39481 ; 0.42319 ; 0.45201 ; 0.50135 ; 0.53094 ; 0.58164 ; 0.65501 ; 0.68147 ; 0.71327 ; 0.75204 ; 0.79858 ; 0.85097 ; 0.86471 ; 0.86984 ; 0.87758 ; 0.88062 ; 0.88482 ; 0.89102 ; 0.89986 ; 0.91257 ; 0.92974 ; 0.93651 ; 0.9469 ; 0.96213 ; 0.98326 ; 1.0121 ; 1.0472 ; 1.0795 ; 1.1062]

Bolt 2 - Tensile Force (kips): [48.59 ; 48.4731 ; 48.4016 ; 48.3206 ; 48.2374 ; 48.1923 ; 48.1789 ; 48.1859 ; 48.1929 ; 48.2223 ; 48.3824 ; 48.595 ; 48.9161 ; 49.0202 ; 49.161 ; 49.3416 ; 49.6198 ; 50.0895 ; 50.2231 ; 50.2724 ; 50.3473 ; 50.3756 ; 50.4179 ; 50.4822 ; 50.5803 ; 50.7253 ; 50.931 ; 51.0024 ; 51.1048 ; 51.2521 ; 51.456 ; 51.7362 ; 52.0585 ; 52.3317 ; 52.545]

Bolt 2 - Shear Force (kips): [0.073394 ; 0.1252 ; 0.20771 ; 0.32492 ; 0.48612 ; 0.64304 ; 0.74387 ; 0.79918 ; 0.86232 ; 0.97699 ; 1.0985 ; 1.212 ; 1.2749 ; 1.2853 ; 1.2913 ; 1.3069 ; 1.3241 ; 1.3829 ; 1.4061 ; 1.4147 ; 1.4281 ; 1.4333 ; 1.4416 ; 1.4547 ; 1.4748 ; 1.5031 ; 1.5406 ; 1.554 ; 1.5737 ; 1.5975 ; 1.6306 ; 1.6609 ; 1.6763 ; 1.6912 ; 1.7049]

Bolt 3 - Tensile Force (kips): [50 ; 49.8669 ; 49.7676 ; 49.66 ; 49.5351 ; 49.4003 ; 49.2249 ; 49.0316 ; 48.9744 ; 49.0328 ; 49.2438 ; 49.8521 ; 50.7581 ; 51.306 ; 52.0956 ; 53.17 ; 54.6304 ; 56.4764 ; 56.9687 ; 57.1506 ; 57.4239 ; 57.524 ; 57.6379 ; 57.8144 ; 58.0393 ; 58.35 ; 58.7076 ; 58.827 ; 59.0062 ; 59.2451 ; 59.5655 ; 59.9098 ; 60.2391 ; 60.5974 ; 60.9097]

Bolt 3 - Shear Force (kips): [0.045686 ; 0.031457 ; 0.071635 ; 0.13488 ; 0.22114 ; 0.27856 ; 0.27879 ; 0.2265 ; 0.25226 ; 0.34036 ; 0.50194 ; 0.70302 ; 0.97834 ; 1.6016 ; 2.2617 ; 2.9245 ; 3.7041 ; 4.279 ; 4.3869 ; 4.4138 ; 4.2454 ; 4.0379 ; 3.7962 ; 3.3611 ; 2.7128 ; 1.8877 ; 1.029 ; 0.75731 ; 0.36714 ; 0.49614 ; 0.96894 ; 1.5106 ; 2.0321 ; 2.224 ; 2.0583]

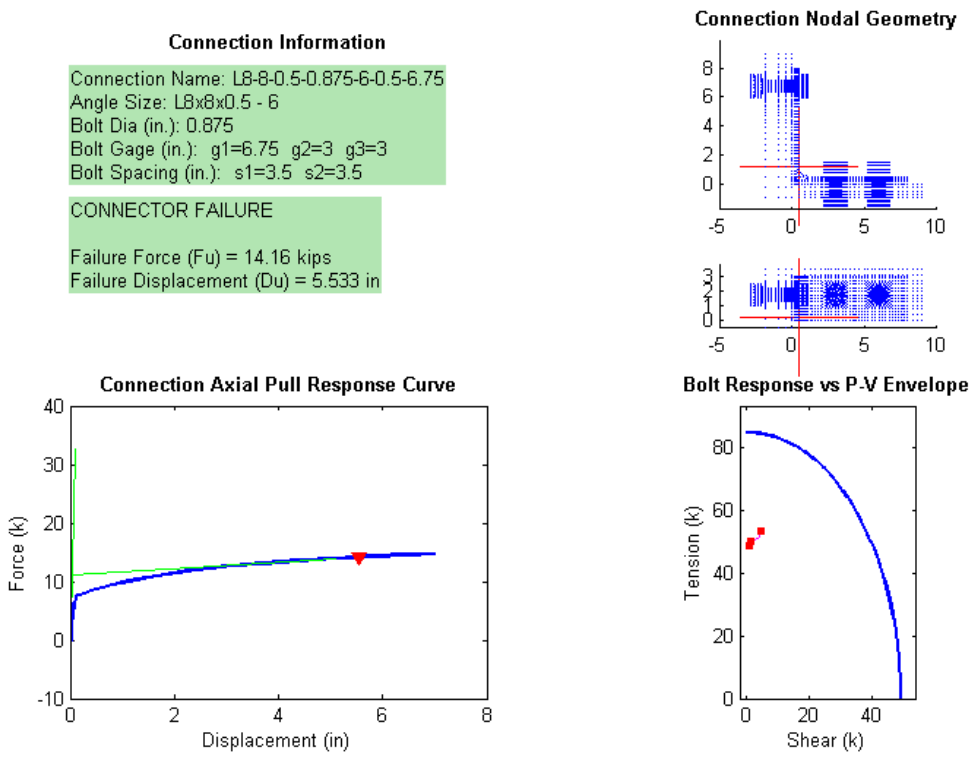


Figure B.309 Connection L8_8_0.5_0.875_6_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.875_6_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 298.8568

Plastic Stiffness (k/in): 0.5391

Displacement (in): [3.5203e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.70408 ; 0.82234 ; 0.99973 ; 1.2658 ; 1.6649 ; 2.2636 ; 2.4386 ; 2.7011 ; 3.0949 ; 3.6855 ; 4.3855 ; 5.0855 ; 5.7855 ; 6.4855 ; 7]

Force (kips): [-1.1553 ; 0.19407 ; 0.47909 ; 0.88511 ; 1.4563 ; 2.2484 ; 3.1474 ; 3.6876 ; 3.8783 ; 3.9989 ; 4.2024 ; 4.479 ; 4.5728 ; 4.7062 ; 4.8955 ; 5.1465 ; 5.471 ; 5.8796 ; 5.9888 ; 6.1331 ; 6.3223 ; 6.5612 ; 6.7937 ; 6.9824 ; 7.1319 ; 7.2519 ; 7.3236]

Bolt 1 - Tensile Force (kips): [48.5905 ; 48.548 ; 48.5397 ; 48.5277 ; 48.5103 ; 48.485 ; 48.4543 ; 48.4356 ; 48.4317 ; 48.4331 ; 48.4342 ; 48.4351 ; 48.4348 ; 48.4338 ; 48.4305 ; 48.4449 ; 48.4743 ; 48.5157 ; 48.5263 ; 48.543 ; 48.5699 ; 48.6128 ; 48.6672 ; 48.7234 ; 48.7805 ; 48.8379 ; 48.88]

Bolt 1 - Shear Force (kips): [0.085093 ; 0.055182 ; 0.059964 ; 0.071574 ; 0.093986 ; 0.13188 ; 0.18277 ; 0.21928 ; 0.23626 ; 0.2502 ; 0.27255 ; 0.30811 ; 0.32255 ; 0.34554 ; 0.38317 ; 0.40557 ; 0.42551 ; 0.46016 ; 0.47289 ; 0.49048 ; 0.51303 ; 0.54154 ; 0.56739 ; 0.58917 ; 0.60839 ; 0.62626 ; 0.63938]

Bolt 2 - Tensile Force (kips): [48.5918 ; 48.5203 ; 48.4951 ; 48.4582 ; 48.4113 ; 48.3617 ; 48.3291 ; 48.3244 ; 48.3297 ; 48.3362 ; 48.3473 ; 48.3774 ; 48.3891 ; 48.4067 ; 48.4398 ; 48.5738 ; 48.7723 ; 49.0369 ; 49.1097 ; 49.2045 ; 49.352 ; 49.5606 ; 49.7704 ; 49.9496 ; 50.1002 ; 50.2321 ; 50.3189]

Bolt 2 - Shear Force (kips): [0.073239 ; 0.081473 ; 0.10594 ; 0.14413 ; 0.20149 ; 0.28645 ; 0.39152 ; 0.4635 ; 0.49107 ; 0.51086 ; 0.54783 ; 0.61159 ; 0.63949 ; 0.68478 ; 0.76042 ; 0.84306 ; 0.93114 ; 1.006 ; 1.0199 ; 1.0335 ; 1.0428 ; 1.0459 ; 1.0433 ; 1.045 ; 1.0471 ; 1.0498 ; 1.0527]

Bolt 3 - Tensile Force (kips): [50 ; 49.936 ; 49.8785 ; 49.8035 ; 49.7081 ; 49.5635 ; 49.3151 ; 48.9816 ; 48.6349 ; 48.3027 ; 48.1007 ; 48.1149 ; 48.1613 ; 48.2738 ; 48.5179 ; 48.9056 ; 49.499 ; 50.2966 ; 50.5651 ; 50.8587 ; 51.286 ; 51.8531 ; 52.4583 ; 52.9692 ; 53.491 ; 53.9677 ; 54.2958]

Bolt 3 - Shear Force (kips): [0.043754 ; 0.024592 ; 0.028862 ; 0.046647 ; 0.079365 ; 0.12746 ; 0.1602 ; 0.11341 ; 0.041186 ; 0.10484 ; 0.14983 ; 0.15496 ; 0.14183 ; 0.12081 ; 0.10191 ; 0.14037 ; 0.25356 ; 1.0326 ; 2.0496 ; 2.8298 ; 3.4151 ; 4.0003 ; 4.3793 ; 4.6292 ; 4.7085 ; 4.768 ; 4.923]

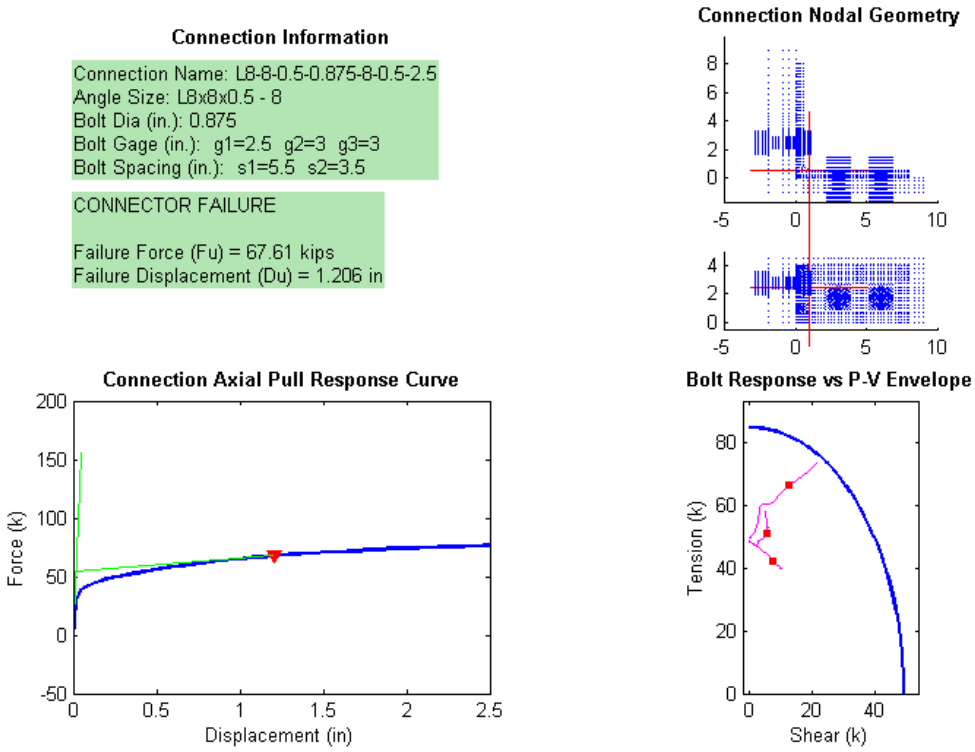


Figure B.310 Connection L8_8_0.5_0.875_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.875_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.2193e+003

Plastic Stiffness (k/in): 11.2369

Displacement (in): [4.3517e-036 ; 0.00048828 ; 0.00097656 ; 0.001709 ; 0.0028076 ; 0.0044556 ; 0.0069275 ; 0.010635 ; 0.016197 ; 0.021759 ; 0.027321 ; 0.035664 ; 0.048178 ; 0.066949 ; 0.095106 ; 0.13734 ; 0.20069 ; 0.26405 ; 0.3274 ; 0.42243 ; 0.45806 ; 0.47143 ; 0.49147 ; 0.52154 ; 0.53282 ; 0.54973 ; 0.5751 ; 0.58461 ; 0.59888 ; 0.62029 ; 0.6524 ; 0.70056 ; 0.7728 ; 0.88117 ; 0.98954 ; 1.0979 ; 1.1385 ; 1.1995 ; 1.2605 ; 1.3214 ; 1.4128 ; 1.55 ; 1.6014 ; 1.6786 ; 1.7943 ; 1.9679 ; 2.0304 ; 2.1241 ; 2.1593 ; 2.212 ; 2.2911 ; 2.4098 ; 2.5]

Force (kips): [-1.11066 ; -0.23046 ; 0.461262 ; 1.39126 ; 2.6279 ; 4.27705 ; 6.4167 ; 9.21082 ; 12.5373 ; 14.8817 ; 16.43 ; 17.8581 ; 18.995 ; 20.0935 ; 21.2843 ; 22.4673 ; 23.7981 ; 24.8739 ; 25.8061 ; 27.0141 ; 27.4261 ; 27.5781 ; 27.816 ; 28.1932 ; 28.3288 ; 28.5271 ; 28.8042 ; 28.9105 ; 29.0678 ; 29.2931 ; 29.609 ; 30.0651 ; 30.703 ; 31.692 ; 32.4979 ; 33.1904 ; 33.4307 ; 33.7732 ; 34.096 ; 34.3982 ; 34.8106 ; 35.3778 ; 35.5781 ; 35.8958 ; 36.329 ; 36.8842 ; 37.0671 ; 37.3198 ; 37.4095 ; 37.5386 ; 37.7219 ; 37.9758 ; 38.1538]

Bolt 1 - Tensile Force (kips): [48.586 ; 48.5566 ; 48.5328 ; 48.5002 ; 48.456 ; 48.3958 ; 48.3157 ; 48.2056 ; 48.0641 ; 47.957 ; 47.8822 ; 47.8074 ; 47.7388 ; 47.6573 ; 47.5591 ; 47.4583 ; 47.3527 ; 47.2689 ; 47.192 ; 47.0617 ; 47.001 ; 46.9746 ; 46.9291 ; 46.8361 ; 46.7863 ; 46.6877 ; 46.5341 ; 46.4746 ; 46.3844 ; 46.25 ; 46.0468 ; 45.7293 ; 45.2457 ; 44.4211 ; 43.7085 ; 43.0548 ; 42.8184 ; 42.4754 ; 42.1444 ; 41.829 ; 41.3876 ; 40.7709 ; 40.548 ; 40.4369 ; 40.3432 ; 40.1555 ; 40.0947 ; 40.0049 ; 39.9847 ; 39.959 ; 39.9227 ; 39.8519 ; 39.7873]

Bolt 1 - Shear Force (kips): [0.080187 ; 0.0501619 ; 0.0550089 ; 0.0942911 ; 0.161821 ; 0.258388 ; 0.388462 ; 0.564167 ; 0.781684 ; 0.941612 ; 1.05274 ; 1.16398 ; 1.26873 ; 1.39495 ; 1.54706 ; 1.70343 ; 1.86817 ; 1.99856 ; 2.11726 ; 2.30922 ; 2.39568 ; 2.43267 ; 2.49533 ; 2.62084 ; 2.68747 ; 2.81867 ; 3.01883 ; 3.0946 ; 3.20802 ; 3.37387 ; 3.61965 ; 3.99176 ; 4.54222 ; 5.44043 ; 6.19141 ; 6.8608 ; 7.09772 ; 7.43701 ; 7.7586 ; 8.06116 ; 8.47951 ; 9.05422 ; 9.25859 ; 9.37244 ; 9.4802 ; 9.68158 ; 9.74798 ; 9.84613 ; 9.87159 ; 9.90588 ; 9.95545 ; 10.043 ; 10.1181]

Bolt 2 - Tensile Force (kips): [48.5846 ; 48.5416 ; 48.5047 ; 48.4528 ; 48.38 ; 48.2819 ; 48.1579 ; 47.9989 ; 47.8097 ; 47.6753 ; 47.5815 ; 47.4956 ; 47.4196 ; 47.397 ; 47.4264 ; 47.6417 ; 47.9919 ; 48.2547 ; 48.4568 ; 48.7403 ; 48.8397 ; 48.8744 ; 48.9217 ; 48.9746 ; 48.9863 ; 48.993 ; 49.0233 ; 49.0345 ; 49.0529 ; 49.0869 ; 49.1486 ; 49.2512 ; 49.4355 ; 49.7149 ; 50.1208 ; 50.5893 ; 50.7687 ; 51.0475 ; 51.3348 ; 51.6313 ; 52.1002 ; 52.8225 ; 53.0921 ; 53.6005 ; 54.3546 ; 55.3901 ; 55.7497 ; 56.2719 ; 56.4688 ; 56.7601 ; 57.1854 ; 57.7961 ; 58.2406]

Bolt 2 - Shear Force (kips): [0.06623 ; 0.045307 ; 0.080893 ; 0.14686 ; 0.24218 ; 0.37423 ; 0.55139 ; 0.79019 ; 1.0856 ; 1.3057 ; 1.465 ; 1.6362 ; 1.8153 ; 2.035 ; 2.2744 ; 2.4481 ; 2.5711 ; 2.6556 ; 2.7354 ; 2.8716 ; 2.936 ; 2.9636 ; 3.0117 ; 3.1101 ; 3.159 ; 3.2481 ; 3.3613 ; 3.404 ; 3.4671 ; 3.5569 ; 3.6856 ; 3.8755 ; 4.1411 ; 4.564 ; 4.8641 ; 5.0984 ; 5.1763 ; 5.2813 ; 5.3736 ; 5.4532 ; 5.547 ; 5.655 ; 5.6895 ; 5.6075 ; 5.4612 ; 5.3086 ; 5.252 ; 5.1742 ; 5.1371 ; 5.0814 ; 5.0017 ; 4.9004 ; 4.8337]

Bolt 3 - Tensile Force (kips): [50 ; 49.9678 ; 49.9388 ; 49.9005 ; 49.8622 ; 49.8291 ; 49.8154 ; 49.8387 ; 49.9267 ; 50.0695 ; 50.2478 ; 50.4799 ; 50.7071 ; 50.914 ; 51.1959 ; 51.9299 ; 53.2357 ; 54.6058 ; 55.9818 ; 57.9348 ; 58.6058 ; 58.8459 ; 59.1441 ; 59.4989 ; 59.6245 ; 59.7844 ; 60.0098 ; 60.0905 ; 60.1993 ; 60.3631 ; 60.6123 ; 61.0589 ; 61.7479 ; 63.2617 ; 64.4781 ; 65.5263 ; 65.858 ; 66.2947 ; 66.7145 ; 67.1007 ; 67.5721 ; 68.2251 ; 68.5124 ; 69.0098 ; 69.7343 ; 70.7776 ; 71.1506 ; 71.6679 ; 71.8518 ; 72.1282 ; 72.5119 ; 73.0786 ; 73.4783]

Bolt 3 - Shear Force (kips): [0.0494531 ; 0.031767 ; 0.0238803 ; 0.0337351 ; 0.0605358 ; 0.105004 ; 0.17305 ; 0.274841 ; 0.417294 ; 0.540159 ; 0.643657 ; 0.772408 ; 0.934587 ; 1.15308 ; 1.47783 ; 1.82372 ; 2.19295 ; 2.46691 ; 2.68147 ; 2.91474 ; 2.99441 ; 3.02744 ; 3.10184 ; 3.28703 ; 3.35659 ; 3.4634 ; 3.61374 ; 3.71379 ; 3.90583 ; 4.58725 ; 5.86011 ; 7.18148 ; 8.41496 ; 9.03808 ; 10.4902 ; 11.508 ; 11.8949 ; 12.487 ; 13.0273 ; 13.5008 ; 14.1379 ; 15.09 ; 15.3855 ; 16.3011 ; 17.3534 ; 18.4583 ; 18.8604 ; 19.3594 ; 19.5611 ; 19.8433 ; 20.2888 ; 20.8808 ; 21.2402]

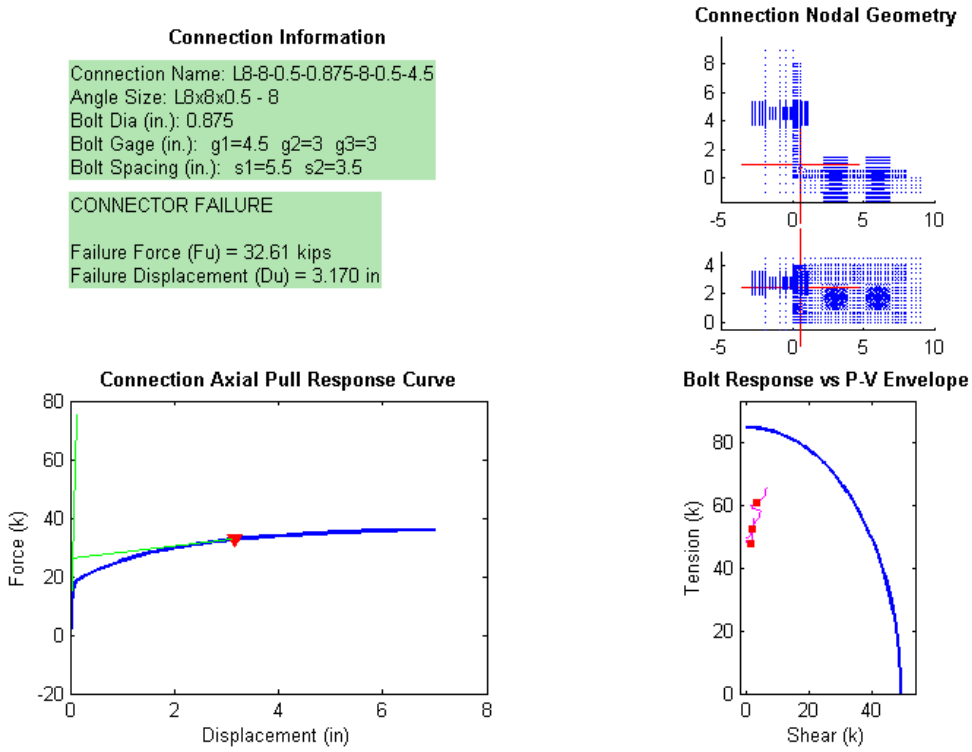


Figure B.311 Connection L8_8_0.5_0.875_8_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.875_8_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 558.6487

Plastic Stiffness (k/in): 1.9783

Displacement (in): [3.1288e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.9406 ; 1.4136 ; 1.5886 ; 1.8511 ; 1.9496 ; 1.9865 ; 2.0419 ; 2.1249 ; 2.2495 ; 2.2962 ; 2.3663 ; 2.4714 ; 2.6291 ; 2.6882 ; 2.7769 ; 2.9099 ; 3.1095 ; 3.4089 ; 3.8579 ; 4.0263 ; 4.2788 ; 4.6577 ; 5.226 ; 5.926 ; 6.6259 ; 7]

Force (kips): [-1.01979 ; 0.92889 ; 2.03532 ; 3.49647 ; 5.40753 ; 7.32514 ; 8.58386 ; 9.14091 ; 9.5348 ; 10.0483 ; 10.721 ; 11.5781 ; 12.6149 ; 13.7929 ; 14.1472 ; 14.6058 ; 14.7647 ; 14.8285 ; 14.9172 ; 15.0584 ; 15.2484 ; 15.3159 ; 15.4155 ; 15.5547 ; 15.7488 ; 15.817 ; 15.915 ; 16.0546 ; 16.252 ; 16.5174 ; 16.8475 ; 16.9534 ; 17.0987 ; 17.2859 ; 17.5224 ; 17.753 ; 17.9188 ; 17.9909]

Bolt 1 - Tensile Force (kips): [48.5857 ; 48.5199 ; 48.4807 ; 48.4267 ; 48.3515 ; 48.2692 ; 48.2083 ; 48.1783 ; 48.1541 ; 48.119 ; 48.0985 ; 48.0734 ; 48.0411 ; 48.007 ; 47.9958 ; 47.985 ; 47.9818 ; 47.9808 ; 47.9798 ; 47.9787 ; 47.9777 ; 47.9778 ; 47.9783 ; 47.98 ; 47.9819 ; 47.9828 ; 47.9845 ; 47.9874 ; 47.992 ; 48.0013 ; 48.0206 ; 48.0284 ; 48.0399 ; 48.0579 ; 48.0852 ; 48.1193 ; 48.1582 ; 48.1801]

Bolt 1 - Shear Force (kips): [0.075114 ; 0.074178 ; 0.13136 ; 0.21728 ; 0.33971 ; 0.4742 ; 0.57522 ; 0.62996 ; 0.67943 ; 0.75295 ; 0.80928 ; 0.88217 ; 0.97804 ; 1.0955 ; 1.1364 ; 1.1874 ; 1.2053 ; 1.2117 ; 1.2205 ; 1.2332 ; 1.2512 ; 1.2575 ; 1.2659 ; 1.2776 ; 1.2961 ; 1.3029 ; 1.3123 ; 1.3259 ; 1.3457 ; 1.3723 ; 1.4051 ; 1.417 ; 1.4354 ; 1.462 ; 1.5016 ; 1.5492 ; 1.5891 ; 1.6085]

Bolt 2 - Tensile Force (kips): [48.5826 ; 48.4667 ; 48.3819 ; 48.2831 ; 48.1789 ; 48.1138 ; 48.0939 ; 48.109 ; 48.1206 ; 48.1964 ; 48.3664 ; 48.7152 ; 49.2732 ; 50.0259 ; 50.2607 ; 50.5992 ; 50.7238 ; 50.7706 ; 50.8397 ; 50.9443 ; 51.1048 ; 51.1654 ; 51.2564 ; 51.393 ; 51.6088 ; 51.6898 ; 51.8097 ; 51.9881 ; 52.2508 ; 52.6376 ; 53.1766 ; 53.3594 ; 53.6184 ; 53.9763 ; 54.4669 ; 55.0108 ; 55.4554 ; 55.6696]

Bolt 2 - Shear Force (kips): [0.060186 ; 0.12317 ; 0.21994 ; 0.35597 ; 0.54533 ; 0.75287 ; 0.91697 ; 1.0127 ; 1.1021 ; 1.2488 ; 1.4023 ; 1.5461 ; 1.6485 ; 1.7189 ; 1.749 ; 1.7884 ; 1.8029 ; 1.8095 ; 1.8196 ; 1.8357 ; 1.8579 ; 1.8655 ; 1.8762 ; 1.8893 ; 1.8909 ; 1.8898 ; 1.8899 ; 1.891 ; 1.8948 ; 1.9034 ; 1.9245 ; 1.933 ; 1.9463 ; 1.9663 ; 1.9961 ; 2.0311 ; 2.0602 ; 2.0742]

Bolt 3 - Tensile Force (kips): [50 ; 49.8625 ; 49.7667 ; 49.6718 ; 49.572 ; 49.5366 ; 49.5215 ; 49.5379 ; 49.6517 ; 49.8158 ; 50.1671 ; 50.9615 ; 52.6566 ; 55.37 ; 56.3075 ; 57.5834 ; 58.048 ; 58.2172 ; 58.4326 ; 58.7711 ; 59.1334 ; 59.2515 ; 59.4226 ; 59.6368 ; 59.9441 ; 60.0507 ; 60.1801 ; 60.3768 ; 60.7048 ; 61.1525 ; 61.7768 ; 62.0209 ; 62.3908 ; 62.8639 ; 63.6316 ; 64.5628 ; 65.1923 ; 65.4649]

Bolt 3 - Shear Force (kips): [0.050058 ; 0.035982 ; 0.076965 ; 0.14426 ; 0.2423 ; 0.33237 ; 0.39559 ; 0.42117 ; 0.46501 ; 0.57858 ; 0.79821 ; 1.0723 ; 1.2002 ; 3.3403 ; 3.9577 ; 4.2822 ; 4.4423 ; 4.2113 ; 3.9224 ; 2.9656 ; 2.1017 ; 1.7386 ; 1.1699 ; 1.0491 ; 1.2139 ; 1.4061 ; 1.806 ; 2.3752 ; 2.995 ; 3.7681 ; 4.5205 ; 4.7643 ; 5.0695 ; 5.5589 ; 5.83 ; 5.8681 ; 6.1078 ; 6.2178]

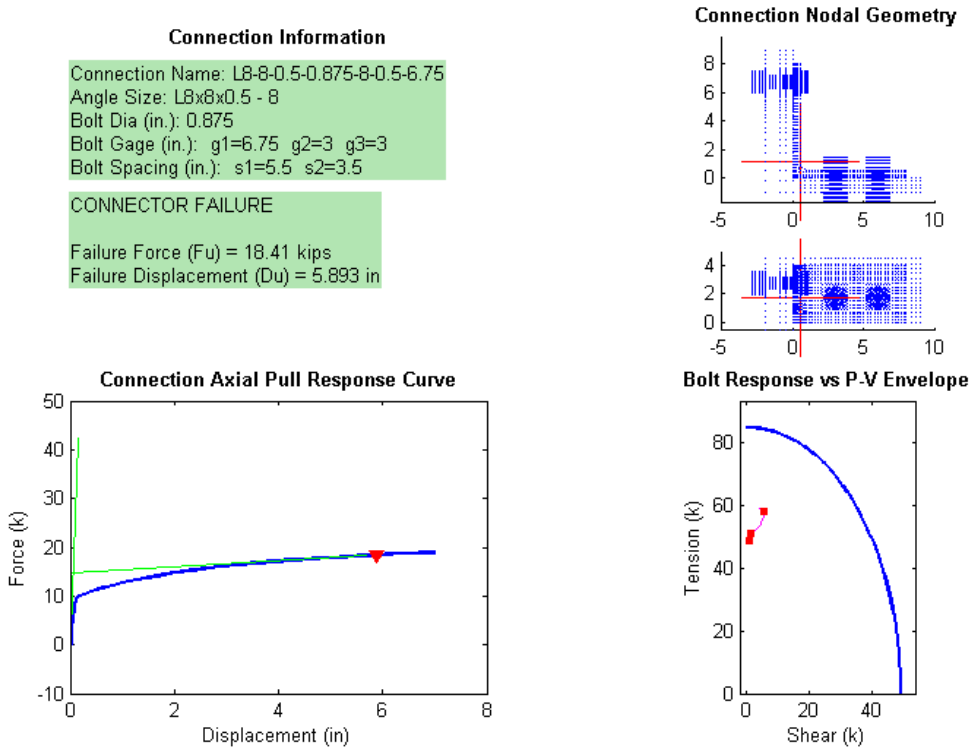


Figure B.312 Connection L8_8_0.5_0.875_8_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.875_8_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 288.3313

Plastic Stiffness (k/in): 0.6083

Displacement (in): [3.0775e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.70408 ; 0.82234 ; 0.99973 ; 1.2658 ; 1.6649 ; 1.8146 ; 2.0391 ; 2.3759 ; 2.881 ; 3.581 ; 4.281 ; 4.981 ; 5.681 ; 6.381 ; 7]

Force (kips): [-1.0036 ; 0.22819 ; 0.57321 ; 1.0619 ; 1.7512 ; 2.7053 ; 3.853 ; 4.6881 ; 5.0206 ; 5.2086 ; 5.4689 ; 5.8179 ; 5.9352 ; 6.0992 ; 6.3305 ; 6.6401 ; 7.0447 ; 7.1886 ; 7.394 ; 7.6565 ; 7.9952 ; 8.3721 ; 8.6818 ; 8.9407 ; 9.1536 ; 9.3297 ; 9.4628]

Bolt 1 - Tensile Force (kips): [48.586 ; 48.5451 ; 48.5337 ; 48.5172 ; 48.4929 ; 48.4574 ; 48.4104 ; 48.3731 ; 48.3599 ; 48.356 ; 48.3508 ; 48.3399 ; 48.3353 ; 48.3272 ; 48.3144 ; 48.3219 ; 48.3362 ; 48.3404 ; 48.3456 ; 48.3553 ; 48.3746 ; 48.4096 ; 48.4521 ; 48.4973 ; 48.545 ; 48.5948 ; 48.6392]

Bolt 1 - Shear Force (kips): [0.074764 ; 0.050836 ; 0.061353 ; 0.08293 ; 0.11984 ; 0.17771 ; 0.25671 ; 0.32348 ; 0.3557 ; 0.37786 ; 0.41063 ; 0.46591 ; 0.48786 ; 0.52336 ; 0.57778 ; 0.61384 ; 0.66228 ; 0.68174 ; 0.71253 ; 0.75434 ; 0.80751 ; 0.86495 ; 0.90812 ; 0.94519 ; 0.97671 ; 1.0047 ; 1.0286]

Bolt 2 - Tensile Force (kips): [48.5841 ; 48.5199 ; 48.4871 ; 48.4397 ; 48.3793 ; 48.3141 ; 48.2714 ; 48.261 ; 48.2609 ; 48.2683 ; 48.2889 ; 48.3371 ; 48.3573 ; 48.3855 ; 48.4634 ; 48.6427 ; 48.8903 ; 48.9992 ; 49.16 ; 49.3891 ; 49.7322 ; 50.177 ; 50.5663 ; 50.8996 ; 51.1886 ; 51.4413 ; 51.6445]

Bolt 2 - Shear Force (kips): [0.060084 ; 0.070564 ; 0.10163 ; 0.14918 ; 0.21989 ; 0.3238 ; 0.45924 ; 0.56917 ; 0.61417 ; 0.63996 ; 0.68658 ; 0.77469 ; 0.81187 ; 0.87335 ; 0.97256 ; 1.0758 ; 1.1914 ; 1.2259 ; 1.2678 ; 1.3117 ; 1.3513 ; 1.3766 ; 1.3928 ; 1.4103 ; 1.4332 ; 1.4599 ; 1.4865]

Bolt 3 - Tensile Force (kips): [50 ; 49.9327 ; 49.8733 ; 49.799 ; 49.6988 ; 49.5555 ; 49.351 ; 49.1527 ; 48.9627 ; 48.806 ; 48.8211 ; 49.0923 ; 49.1987 ; 49.3847 ; 49.6731 ; 50.1332 ; 50.8469 ; 51.12 ; 51.6172 ; 52.2962 ; 53.262 ; 54.4637 ; 55.6036 ; 56.701 ; 57.7124 ; 58.6273 ; 59.2046]

Bolt 3 - Shear Force (kips): [0.047506 ; 0.025216 ; 0.03096 ; 0.052192 ; 0.091446 ; 0.14982 ; 0.20403 ; 0.19672 ; 0.13048 ; 0.095792 ; 0.11741 ; 0.15772 ; 0.17652 ; 0.20338 ; 0.25747 ; 0.37043 ; 0.54265 ; 1.0775 ; 2.3328 ; 3.04 ; 4.0709 ; 4.5401 ; 4.928 ; 5.2912 ; 5.5099 ; 5.3102 ; 3.8694]

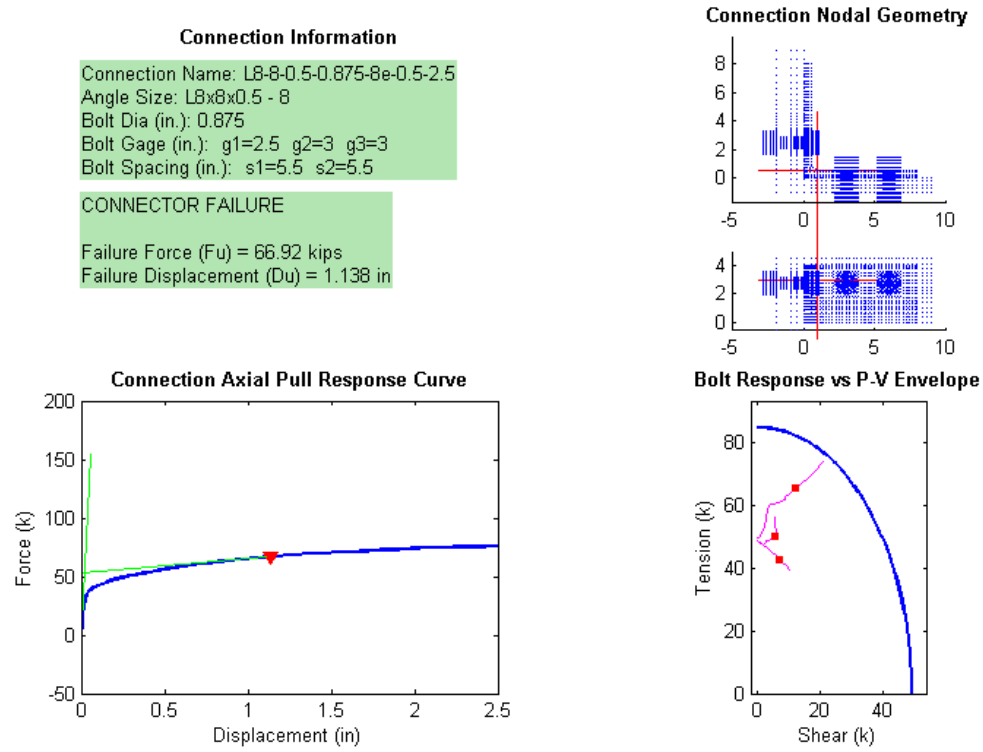


Figure B.313 Connection L8_8_0.5_0.875_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.875_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.5733e+003

Plastic Stiffness (k/in): 12.0522

Displacement (in): [4.1161e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0078125 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.033569 ; 0.048401 ; 0.070648 ; 0.10402 ; 0.15408 ; 0.20413 ; 0.25419 ; 0.30424 ; 0.37933 ; 0.40749 ; 0.44972 ; 0.46556 ; 0.4715 ; 0.48041 ; 0.49377 ; 0.51382 ; 0.52133 ; 0.53261 ; 0.54952 ; 0.57489 ; 0.61295 ; 0.67003 ; 0.72711 ; 0.78419 ; 0.8056 ; 0.83771 ; 0.88587 ; 0.95811 ; 1.0665 ; 1.1071 ; 1.1681 ; 1.2595 ; 1.3967 ; 1.6024 ; 1.8524 ; 2.1024 ; 2.3524 ; 2.5]

Force (kips): [-1.35852 ; 1.57935 ; 3.66749 ; 5.44008 ; 7.04476 ; 8.51821 ; 10.4713 ; 12.8815 ; 15.3789 ; 17.4979 ; 18.9663 ; 20.2043 ; 21.4882 ; 22.7693 ; 23.7877 ; 24.6715 ; 25.4604 ; 26.4949 ; 26.8516 ; 27.3536 ; 27.5358 ; 27.6151 ; 27.72 ; 27.8705 ; 28.1453 ; 28.2366 ; 28.3724 ; 28.5642 ; 28.8519 ; 29.2673 ; 29.8277 ; 30.3557 ; 30.8669 ; 31.0937 ; 31.3867 ; 31.801 ; 32.3322 ; 33.0372 ; 33.2821 ; 33.625 ; 34.1129 ; 34.7617 ; 35.5961 ; 36.5174 ; 37.2387 ; 37.8075 ; 38.093]

Bolt 1 - Tensile Force (kips): [48.6529 ; 48.5423 ; 48.4602 ; 48.3886 ; 48.3219 ; 48.2583 ; 48.1705 ; 48.0567 ; 47.9316 ; 47.8177 ; 47.7322 ; 47.6489 ; 47.5584 ; 47.456 ; 47.3718 ; 47.2997 ; 47.2327 ; 47.1298 ; 47.0865 ; 47.0169 ; 46.9872 ; 46.9738 ; 46.9546 ; 46.9253 ; 46.8669 ; 46.843 ; 46.8006 ; 46.7113 ; 46.5577 ; 46.3239 ; 45.9675 ; 45.5949 ; 45.2095 ; 45.0321 ; 44.7925 ; 44.4409 ; 43.9662 ; 43.3011 ; 43.0613 ; 42.7201 ; 42.2137 ; 41.5093 ; 40.6069 ; 40.2212 ; 39.8078 ; 39.5081 ; 39.3515]

Bolt 1 - Shear Force (kips): [0.0763904 ; 0.130795 ; 0.255071 ; 0.366268 ; 0.469277 ; 0.565882 ; 0.696744 ; 0.862574 ; 1.04172 ; 1.20291 ; 1.32761 ; 1.45376 ; 1.59106 ; 1.7484 ; 1.87564 ; 1.9824 ; 2.07966 ; 2.22351 ; 2.28216 ; 2.37524 ; 2.41431 ; 2.4316 ; 2.45671 ; 2.49491 ; 2.56998 ; 2.60112 ; 2.65657 ; 2.77467 ; 2.97362 ; 3.26622 ; 3.69341 ; 4.12141 ; 4.55128 ; 4.74494 ; 5.00441 ; 5.37886 ; 5.87525 ; 6.55534 ; 6.79551 ; 7.13295 ; 7.62277 ; 8.28573 ; 9.1152 ; 9.48241 ; 9.86666 ; 10.1515 ; 10.3006]

Bolt 2 - Tensile Force (kips): [48.6654 ; 48.5047 ; 48.382 ; 48.2788 ; 48.1891 ; 48.1055 ; 47.9946 ; 47.8598 ; 47.7091 ; 47.5892 ; 47.4831 ; 47.3957 ; 47.4031 ; 47.6031 ; 47.826 ; 48.0315 ; 48.2278 ; 48.4962 ; 48.5796 ; 48.6983 ; 48.7375 ; 48.7491 ; 48.7679 ; 48.7967 ; 48.8255 ; 48.836 ; 48.8467 ; 48.8442 ; 48.8321 ; 48.8375 ; 48.9168 ; 49.0232 ; 49.1321 ; 49.1503 ; 49.2036 ; 49.3032 ; 49.4999 ; 49.8449 ; 49.9807 ; 50.2014 ; 50.538 ; 51.0753 ; 51.9561 ; 53.305 ; 54.5152 ; 55.6522 ; 56.2831]

Bolt 2 - Shear Force (kips): [0.10817 ; 0.15194 ; 0.30542 ; 0.44423 ; 0.57388 ; 0.6955 ; 0.85965 ; 1.0683 ; 1.2966 ; 1.52 ; 1.7319 ; 1.9815 ; 2.2231 ; 2.3618 ; 2.4381 ; 2.4952 ; 2.5547 ; 2.6532 ; 2.6971 ; 2.769 ; 2.8004 ; 2.8148 ; 2.8354 ; 2.8668 ; 2.9293 ; 2.9542 ; 2.9987 ; 3.0921 ; 3.2453 ; 3.4583 ; 3.7096 ; 3.9444 ; 4.1707 ; 4.2779 ; 4.4121 ; 4.5964 ; 4.8169 ; 5.0861 ; 5.1755 ; 5.2924 ; 5.4541 ; 5.6419 ; 5.8073 ; 5.6394 ; 5.5193 ; 5.3529 ; 5.2494]

Bolt 3 - Tensile Force (kips): [50 ; 49.8942 ; 49.8365 ; 49.8194 ; 49.8173 ; 49.8305 ; 49.8604 ; 49.9284 ; 50.1234 ; 50.4255 ; 50.7058 ; 50.994 ; 51.481 ; 52.3734 ; 53.3784 ; 54.4274 ; 55.4829 ; 57.035 ; 57.5843 ; 58.3849 ; 58.6729 ; 58.7615 ; 58.8949 ; 59.0921 ; 59.295 ; 59.3808 ; 59.4942 ; 59.6591 ; 59.8794 ; 60.2001 ; 60.6808 ; 61.2514 ; 61.8513 ; 62.2299 ; 62.6719 ; 63.3225 ; 64.1273 ; 65.1982 ; 65.5683 ; 66.0134 ; 66.6217 ; 67.4339 ; 68.5221 ; 70.3106 ; 71.8326 ; 73.1496 ; 73.8215]

Bolt 3 - Shear Force (kips): [0.0583224 ; 0.0251694 ; 0.0798438 ; 0.137783 ; 0.192831 ; 0.247219 ; 0.325557 ; 0.435321 ; 0.575281 ; 0.738282 ; 0.934482 ; 1.16175 ; 1.4391 ; 1.83135 ; 2.1395 ; 2.39391 ; 2.61562 ; 2.87051 ; 2.95313 ; 3.06149 ; 3.10123 ; 3.13183 ; 3.16299 ; 3.20375 ; 3.36311 ; 3.40755 ; 3.47536 ; 3.5686 ; 3.76338 ; 4.58869 ; 6.71987 ; 7.76945 ; 8.62119 ; 8.5721 ; 8.83831 ; 9.50262 ; 10.5761 ; 11.6143 ; 11.9213 ; 12.4287 ; 13.2797 ; 14.3025 ; 15.6821 ; 17.6953 ; 18.9906 ; 20.082 ; 20.6721]

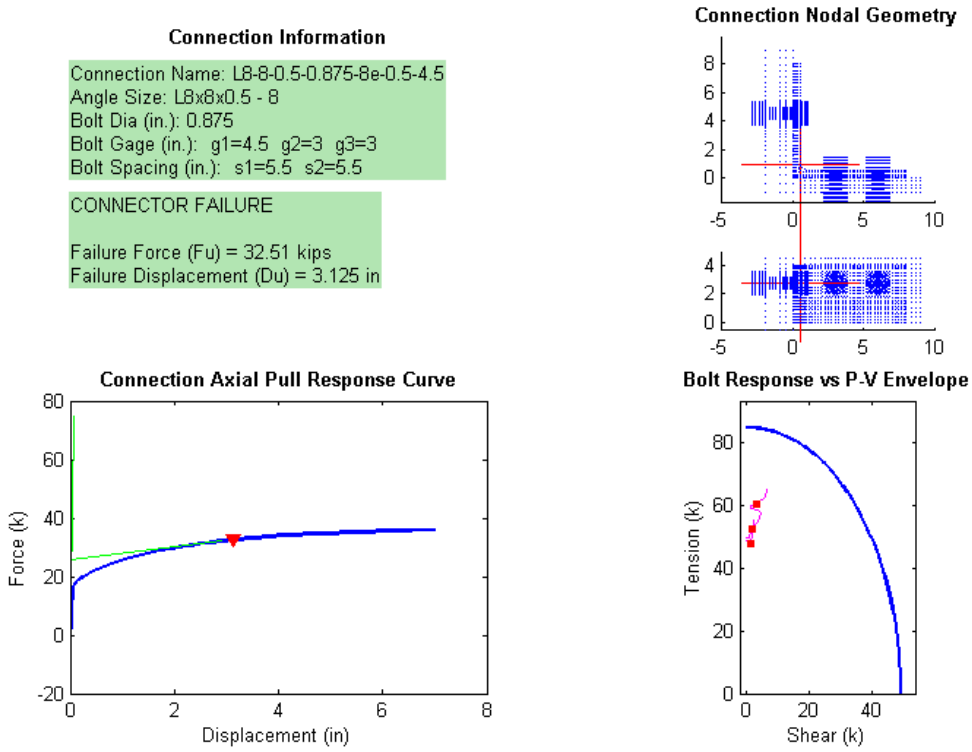


Figure B.314 Connection L8_8_0.5_0.875_8e_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.875_8e_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 1.0633e+003

Plastic Stiffness (k/in): 2.1339

Displacement (in): [4.7093e-036 ; 0.0013672 ; 0.0027344 ; 0.0047852 ; 0.0078613 ; 0.012476 ; 0.019397 ; 0.029779 ; 0.045352 ; 0.068712 ; 0.10375 ; 0.15631 ; 0.23515 ; 0.35341 ; 0.5308 ; 0.79688 ; 0.89666 ; 1.0463 ; 1.2708 ; 1.6076 ; 1.7339 ; 1.9233 ; 1.9943 ; 2.021 ; 2.0609 ; 2.1209 ; 2.2108 ; 2.3456 ; 2.5479 ; 2.6238 ; 2.7376 ; 2.9082 ; 3.1643 ; 3.5483 ; 4.1243 ; 4.8243 ; 5.5243 ; 6.2243 ; 6.9243 ; 7]

Force (kips): [-1.17623 ; -0.0453702 ; 0.277548 ; 0.73992 ; 1.38069 ; 2.27063 ; 3.47909 ; 5.09565 ; 6.87791 ; 8.26908 ; 8.98682 ; 9.38676 ; 9.82767 ; 10.4153 ; 11.1889 ; 12.1471 ; 12.4625 ; 12.9025 ; 13.4633 ; 14.1581 ; 14.3856 ; 14.7008 ; 14.8202 ; 14.8634 ; 14.9343 ; 15.0344 ; 15.1762 ; 15.3701 ; 15.6348 ; 15.729 ; 15.8596 ; 16.0417 ; 16.2932 ; 16.6158 ; 17.0021 ; 17.3466 ; 17.6196 ; 17.8211 ; 17.9676 ; 17.9823]

Bolt 1 - Tensile Force (kips): [48.6532 ; 48.611 ; 48.5987 ; 48.5806 ; 48.5549 ; 48.5185 ; 48.4674 ; 48.3955 ; 48.31 ; 48.2374 ; 48.1984 ; 48.1765 ; 48.1494 ; 48.1372 ; 48.1229 ; 48.094 ; 48.0836 ; 48.0676 ; 48.0456 ; 48.0137 ; 48.0043 ; 47.9921 ; 47.9884 ; 47.9872 ; 47.9855 ; 47.9833 ; 47.9795 ; 47.9763 ; 47.9753 ; 47.9748 ; 47.9746 ; 47.9753 ; 47.9777 ; 47.9842 ; 48.0002 ; 48.0223 ; 48.0422 ; 48.0663 ; 48.0965 ; 48.0996]

Bolt 1 - Shear Force (kips): [0.067379 ; 0.055666 ; 0.067155 ; 0.089365 ; 0.12566 ; 0.18078 ; 0.26037 ; 0.37369 ; 0.50772 ; 0.62125 ; 0.68651 ; 0.72929 ; 0.78533 ; 0.82145 ; 0.86684 ; 0.94444 ; 0.97164 ; 1.0113 ; 1.0659 ; 1.1456 ; 1.1712 ; 1.2068 ; 1.219 ; 1.2233 ; 1.2293 ; 1.2379 ; 1.2515 ; 1.2689 ; 1.2899 ; 1.2982 ; 1.3096 ; 1.3258 ; 1.349 ; 1.3799 ; 1.4201 ; 1.4683 ; 1.5204 ; 1.5686 ; 1.6092 ; 1.6138]

Bolt 2 - Tensile Force (kips): [48.6646 ; 48.6027 ; 48.5798 ; 48.5463 ; 48.4991 ; 48.4359 ; 48.3611 ; 48.2828 ; 48.2218 ; 48.2157 ; 48.2354 ; 48.2571 ; 48.3019 ; 48.4528 ; 48.7272 ; 49.198 ; 49.3796 ; 49.6342 ; 49.9938 ; 50.4905 ; 50.6694 ; 50.9234 ; 51.0186 ; 51.0539 ; 51.1079 ; 51.189 ; 51.3075 ; 51.479 ; 51.7303 ; 51.8243 ; 51.9616 ; 52.1638 ; 52.4622 ; 52.9115 ; 53.5139 ; 54.1132 ; 54.6245 ; 55.066 ; 55.4291 ; 55.4665]

Bolt 2 - Shear Force (kips): [0.096644 ; 0.068414 ; 0.080396 ; 0.10669 ; 0.15194 ; 0.22202 ; 0.32397 ; 0.46838 ; 0.63893 ; 0.79111 ; 0.89561 ; 0.97615 ; 1.0932 ; 1.2205 ; 1.3478 ; 1.452 ; 1.4734 ; 1.499 ; 1.526 ; 1.569 ; 1.5851 ; 1.6155 ; 1.6306 ; 1.636 ; 1.6444 ; 1.6576 ; 1.6779 ; 1.707 ; 1.7493 ; 1.7621 ; 1.781 ; 1.8053 ; 1.8376 ; 1.8663 ; 1.9077 ; 1.9597 ; 2.0127 ; 2.0602 ; 2.0997 ; 2.1042]

Bolt 3 - Tensile Force (kips): [50 ; 49.9644 ; 49.9299 ; 49.8808 ; 49.8214 ; 49.7492 ; 49.6686 ; 49.5817 ; 49.5101 ; 49.5113 ; 49.4859 ; 49.5577 ; 49.6932 ; 49.8962 ; 50.5132 ; 51.7986 ; 52.3224 ; 53.228 ; 54.4865 ; 56.2649 ; 56.8873 ; 57.7943 ; 58.1052 ; 58.2084 ; 58.3847 ; 58.6055 ; 58.8886 ; 59.216 ; 59.6342 ; 59.7902 ; 59.962 ; 60.1932 ; 60.5877 ; 61.1328 ; 61.9292 ; 62.8087 ; 63.8207 ; 64.6362 ; 65.1723 ; 65.2432]

Bolt 3 - Shear Force (kips): [0.059423 ; 0.040006 ; 0.030037 ; 0.025069 ; 0.040524 ; 0.078051 ; 0.13737 ; 0.2247 ; 0.31219 ; 0.3827 ; 0.42056 ; 0.46053 ; 0.53714 ; 0.72336 ; 0.97927 ; 1.0638 ; 1.193 ; 2.0578 ; 3.1307 ; 4.0523 ; 4.205 ; 4.4897 ; 4.203 ; 4.0791 ; 3.5067 ; 2.8173 ; 2.2068 ; 1.15 ; 1.238 ; 1.3133 ; 1.7895 ; 2.5205 ; 3.3537 ; 4.2023 ; 5.1146 ; 5.954 ; 6.0964 ; 6.2609 ; 6.4376 ; 6.4318]

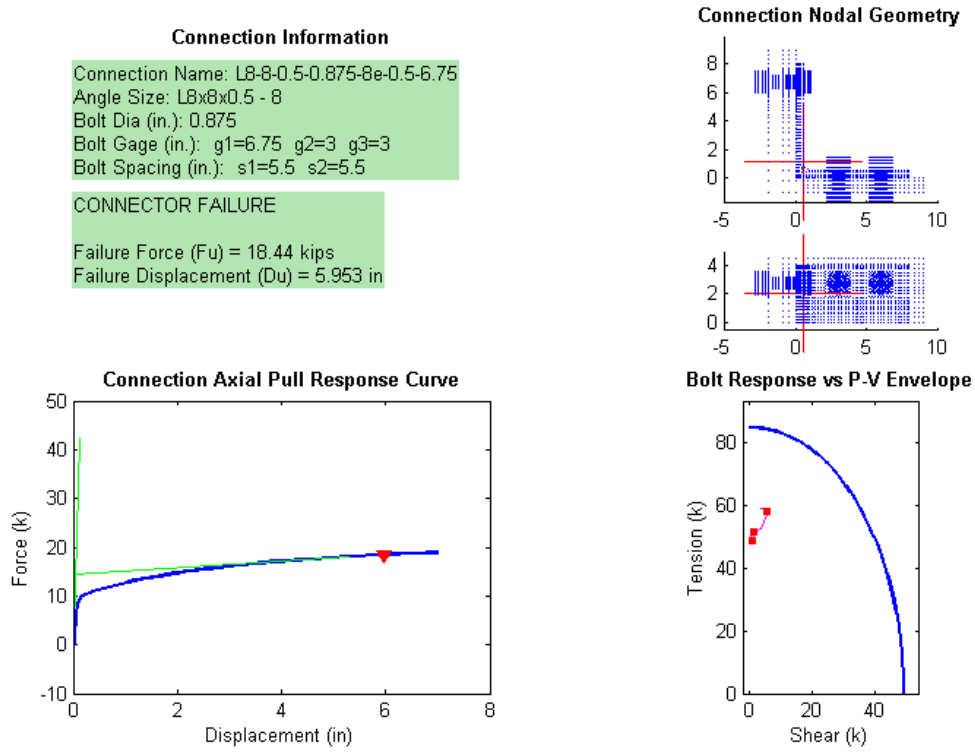


Figure B.315 Connection L8_8_0.5_0.875_8e_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_0.875_8e_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 342.1831

Plastic Stiffness (k/in): 0.6813

Displacement (in): [3.4915e-036 ; 0.0054687 ; 0.0095703 ; 0.013672 ; 0.019824 ; 0.029053 ; 0.042896 ; 0.06366 ; 0.094806 ; 0.14153 ; 0.2116 ; 0.31672 ; 0.4744 ; 0.71092 ; 1.0657 ; 1.1987 ; 1.3983 ; 1.6976 ; 1.8099 ; 1.9783 ; 2.2308 ; 2.6097 ; 3.178 ; 3.878 ; 4.578 ; 5.278 ; 5.978 ; 6.153 ; 6.4155 ; 6.5139 ; 6.6616 ; 6.883 ; 7]

Force (kips): [-1.1621 ; 0.21758 ; 0.47534 ; 0.72323 ; 1.0816 ; 1.5962 ; 2.3223 ; 3.2973 ; 4.2746 ; 4.8552 ; 5.1006 ; 5.2918 ; 5.5808 ; 5.9458 ; 6.4036 ; 6.5583 ; 6.7744 ; 7.0688 ; 7.1769 ; 7.3325 ; 7.5401 ; 7.8154 ; 8.1565 ; 8.5016 ; 8.7913 ; 9.0298 ; 9.225 ; 9.2683 ; 9.3332 ; 9.3565 ; 9.39 ; 9.4364 ; 9.4591]

Bolt 1 - Tensile Force (kips): [48.6541 ; 48.6024 ; 48.5923 ; 48.5822 ; 48.5675 ; 48.5458 ; 48.5141 ; 48.4689 ; 48.4201 ; 48.3902 ; 48.3799 ; 48.376 ; 48.3674 ; 48.3523 ; 48.3407 ; 48.3482 ; 48.3564 ; 48.3674 ; 48.3705 ; 48.3746 ; 48.3815 ; 48.3919 ; 48.4137 ; 48.4449 ; 48.4797 ; 48.5182 ; 48.5604 ; 48.5712 ; 48.5871 ; 48.5932 ; 48.6022 ; 48.6161 ; 48.6236]

Bolt 1 - Shear Force (kips): [0.067415 ; 0.065149 ; 0.077807 ; 0.091582 ; 0.11325 ; 0.14669 ; 0.19718 ; 0.27042 ; 0.35206 ; 0.40678 ; 0.43434 ; 0.45715 ; 0.49658 ; 0.5616 ; 0.64073 ; 0.6506 ; 0.67 ; 0.70068 ; 0.71353 ; 0.73373 ; 0.76232 ; 0.80447 ; 0.85481 ; 0.90668 ; 0.94844 ; 0.98373 ; 1.0141 ; 1.0214 ; 1.0329 ; 1.0372 ; 1.0434 ; 1.0524 ; 1.057]

Bolt 2 - Tensile Force (kips): [48.6684 ; 48.5884 ; 48.5655 ; 48.5432 ; 48.512 ; 48.4701 ; 48.4234 ; 48.3824 ; 48.3677 ; 48.3821 ; 48.3951 ; 48.408 ; 48.4428 ; 48.507 ; 48.6824 ; 48.7724 ; 48.889 ; 49.0918 ; 49.1749 ; 49.2991 ; 49.4739 ; 49.7318 ; 50.1085 ; 50.5116 ; 50.8598 ; 51.1732 ; 51.4473 ; 51.51 ; 51.6008 ; 51.6343 ; 51.6842 ; 51.7566 ; 51.7929]

Bolt 2 - Shear Force (kips): [0.097103 ; 0.080023 ; 0.095149 ; 0.11222 ; 0.13974 ; 0.18265 ; 0.24749 ; 0.34133 ; 0.44297 ; 0.50918 ; 0.5384 ; 0.56488 ; 0.61621 ; 0.72152 ; 0.88519 ; 0.92644 ; 0.98238 ; 1.0508 ; 1.0718 ; 1.0972 ; 1.1256 ; 1.1575 ; 1.1814 ; 1.2025 ; 1.2254 ; 1.2457 ; 1.2752 ; 1.2838 ; 1.2969 ; 1.3019 ; 1.3096 ; 1.3213 ; 1.3275]

Bolt 3 - Tensile Force (kips): [50 ; 49.9353 ; 49.8899 ; 49.8495 ; 49.7946 ; 49.7175 ; 49.6042 ; 49.4515 ; 49.2388 ; 49.0602 ; 48.8736 ; 48.7684 ; 48.8349 ; 49.1904 ; 49.7607 ; 49.9689 ; 50.3078 ; 50.8274 ; 51.0311 ; 51.3773 ; 51.9431 ; 52.6945 ; 53.6999 ; 54.879 ; 56.024 ; 57.0741 ; 58.0581 ; 58.2916 ; 58.6256 ; 58.7397 ; 58.8812 ; 59.0499 ; 59.1293]

Bolt 3 - Shear Force (kips): [0.05689 ; 0.029552 ; 0.02518 ; 0.029789 ; 0.045635 ; 0.076007 ; 0.12255 ; 0.18179 ; 0.20867 ; 0.17998 ; 0.11076 ; 0.10383 ; 0.13104 ; 0.18421 ; 0.29823 ; 0.35784 ; 0.44267 ; 0.57214 ; 1.075 ; 2.0371 ; 2.7258 ; 3.717 ; 4.2395 ; 4.6822 ; 5.1485 ; 5.3429 ; 5.5699 ; 5.5931 ; 5.1544 ; 4.9095 ; 4.4184 ; 3.794 ; 3.5096]

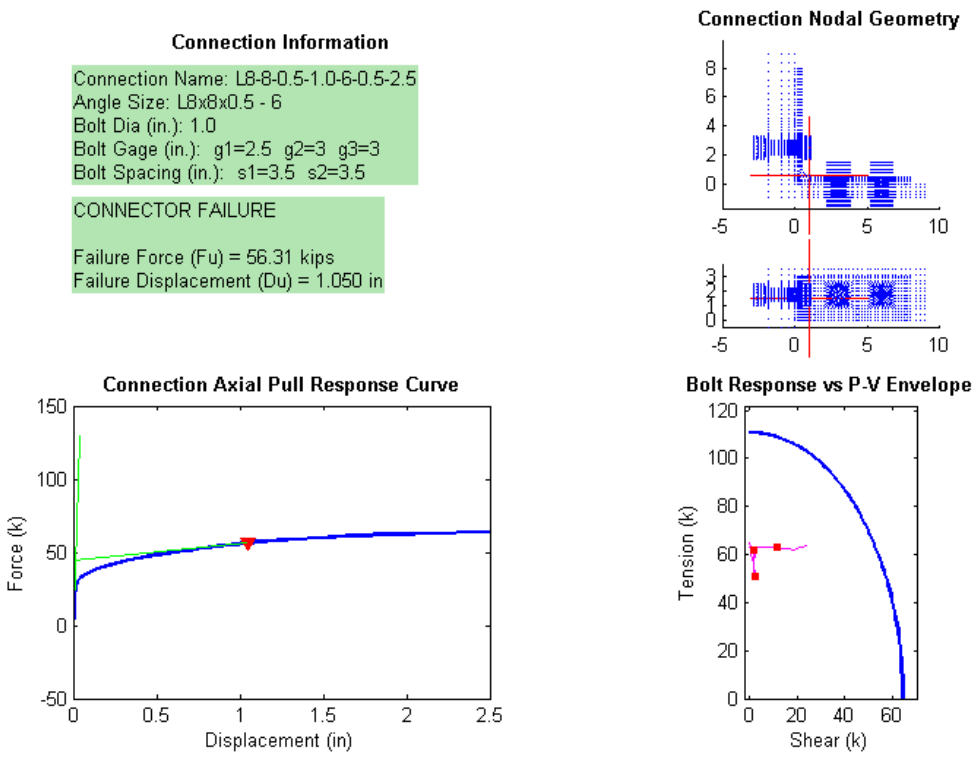


Figure B.316 Connection L8_8_0.5_1.0_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_1.0_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.0261e+003

Plastic Stiffness (k/in): 10.9326

Displacement (in): [8.2803e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.56737 ; 0.66112 ; 0.66991 ; 0.68309 ; 0.70287 ; 0.73253 ; 0.77702 ; 0.79371 ; 0.81874 ; 0.85628 ; 0.87036 ; 0.89148 ; 0.92315 ; 0.97067 ; 1.0419 ; 1.1488 ; 1.1889 ; 1.2491 ; 1.3393 ; 1.4746 ; 1.6775 ; 1.9275 ; 2.1775 ; 2.4275 ; 2.5]

Force (kips): [-2.06817 ; 1.56859 ; 3.8422 ; 6.60505 ; 9.89989 ; 13.0689 ; 15.0541 ; 16.1183 ; 17.069 ; 18.1426 ; 19.3657 ; 20.7079 ; 22.2522 ; 24.017 ; 24.5607 ; 25.2926 ; 25.3567 ; 25.486 ; 25.672 ; 25.9215 ; 26.3164 ; 26.4749 ; 26.6927 ; 26.9864 ; 27.0983 ; 27.2452 ; 27.447 ; 27.7258 ; 28.1154 ; 28.6572 ; 28.8449 ; 29.1081 ; 29.4637 ; 29.9321 ; 30.5132 ; 31.0577 ; 31.4559 ; 31.7687 ; 31.8491]

Bolt 1 - Tensile Force (kips): [63.335 ; 63.1862 ; 63.0896 ; 62.9663 ; 62.811 ; 62.6527 ; 62.5494 ; 62.4935 ; 62.4318 ; 62.3572 ; 62.2666 ; 62.1597 ; 62.0284 ; 61.8923 ; 61.8528 ; 61.8051 ; 61.8009 ; 61.7944 ; 61.7857 ; 61.7745 ; 61.7567 ; 61.7484 ; 61.7369 ; 61.7247 ; 61.7199 ; 61.7154 ; 61.7103 ; 61.704 ; 61.6956 ; 61.6825 ; 61.6782 ; 61.6727 ; 61.6673 ; 61.6632 ; 61.651 ; 61.6446 ; 61.6474 ; 61.6544 ; 61.6557]

Bolt 1 - Shear Force (kips): [0.15061 ; 0.11313 ; 0.21059 ; 0.35312 ; 0.53503 ; 0.719 ; 0.83931 ; 0.90932 ; 0.99186 ; 1.0867 ; 1.2006 ; 1.3551 ; 1.5505 ; 1.7632 ; 1.8287 ; 1.9133 ; 1.9208 ; 1.9318 ; 1.9471 ; 1.9681 ; 2.0007 ; 2.0149 ; 2.0353 ; 2.0597 ; 2.0692 ; 2.0801 ; 2.0947 ; 2.1154 ; 2.1452 ; 2.1911 ; 2.2078 ; 2.2317 ; 2.265 ; 2.3114 ; 2.3929 ; 2.4831 ; 2.5613 ; 2.6333 ; 2.6547]

Bolt 2 - Tensile Force (kips): [63.3344 ; 63.0574 ; 62.8604 ; 62.5933 ; 62.2353 ; 61.7942 ; 61.3244 ; 60.6745 ; 59.6285 ; 58.2429 ; 56.6267 ; 54.9394 ; 53.2672 ; 51.8682 ; 51.54 ; 51.2305 ; 51.203 ; 51.163 ; 51.1135 ; 51.0555 ; 50.9714 ; 50.9377 ; 50.8975 ; 50.859 ; 50.8434 ; 50.8345 ; 50.8358 ; 50.8566 ; 50.9126 ; 51.1415 ; 51.2357 ; 51.3924 ; 51.6615 ; 52.0753 ; 52.7535 ; 53.5717 ; 54.31 ; 54.9694 ; 55.1442]

Bolt 2 - Shear Force (kips): [0.12621 ; 0.23315 ; 0.42759 ; 0.67979 ; 0.99539 ; 1.3166 ; 1.5413 ; 1.6757 ; 1.7913 ; 1.8437 ; 1.8573 ; 1.8614 ; 1.9155 ; 2.0657 ; 2.1489 ; 2.2906 ; 2.3036 ; 2.3249 ; 2.3564 ; 2.4018 ; 2.4785 ; 2.5104 ; 2.5581 ; 2.6224 ; 2.6469 ; 2.6801 ; 2.7231 ; 2.7754 ; 2.8367 ; 2.8563 ; 2.8507 ; 2.8345 ; 2.7971 ; 2.7143 ; 2.545 ; 2.2929 ; 2.0666 ; 1.8588 ; 1.7982]

Bolt 3 - Tensile Force (kips): [65 ; 64.8243 ; 64.6593 ; 64.4354 ; 64.1137 ; 63.5755 ; 62.7035 ; 61.392 ; 59.922 ; 58.6113 ; 57.7641 ; 57.9897 ; 59.4533 ; 61.4465 ; 62.0524 ; 62.9245 ; 62.9984 ; 63.068 ; 63.0975 ; 63.0801 ; 63.1154 ; 63.1803 ; 63.1982 ; 63.2038 ; 63.2219 ; 63.175 ; 63.0577 ; 62.8936 ; 62.8026 ; 62.6447 ; 62.543 ; 62.4085 ; 62.2467 ; 62.0405 ; 62.5534 ; 62.9692 ; 63.274 ; 63.4519 ; 63.4896]

Bolt 3 - Shear Force (kips): [0.0727215 ; 0.0506439 ; 0.110918 ; 0.199804 ; 0.323633 ; 0.454272 ; 0.568984 ; 0.688961 ; 0.841403 ; 1.1312 ; 1.5756 ; 2.07474 ; 2.40162 ; 2.67505 ; 2.74811 ; 2.82789 ; 2.83476 ; 2.96542 ; 3.17188 ; 3.44942 ; 3.9927 ; 4.28136 ; 4.46386 ; 5.68598 ; 6.11005 ; 6.94835 ; 8.12726 ; 9.58171 ; 11.3662 ; 13.4861 ; 14.3704 ; 15.4092 ; 16.8254 ; 18.5609 ; 19.9937 ; 21.4372 ; 22.4936 ; 23.4152 ; 23.6974]

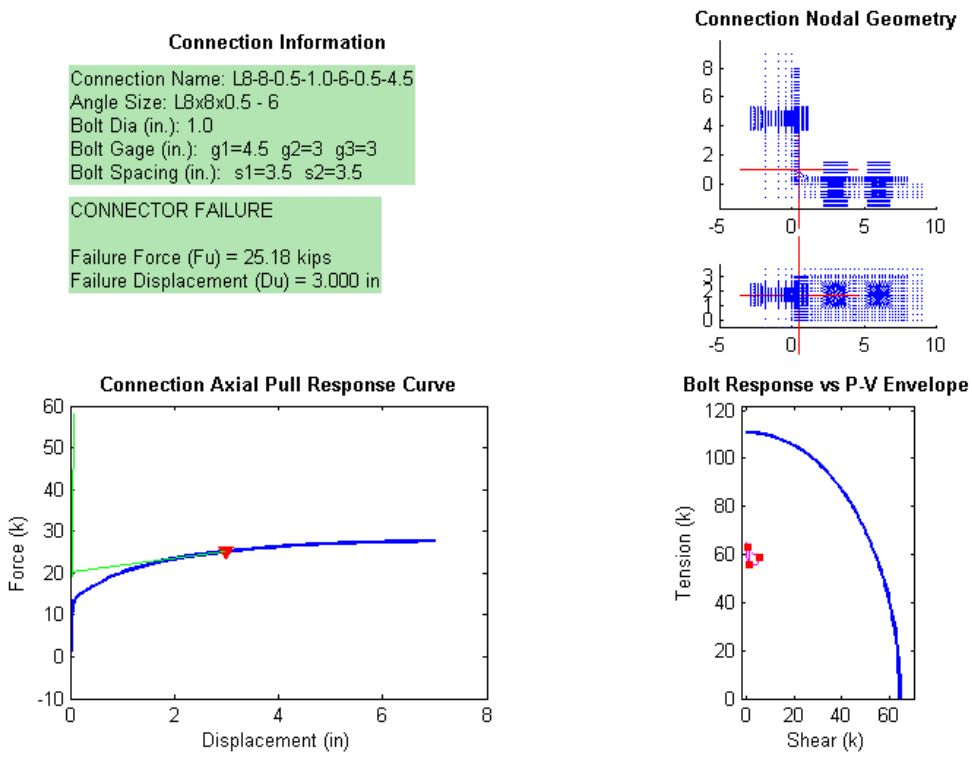


Figure B.317 Connection L8_8_0.5_1.0_6_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_1.0_6_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 689.2983

Plastic Stiffness (k/in): 1.6711

Displacement (in): [8.0531e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.70408 ; 0.82234 ; 0.99973 ; 1.2658 ; 1.6649 ; 2.2636 ; 2.9636 ; 3.6636 ; 3.8386 ; 3.9042 ; 4.0027 ; 4.1503 ; 4.3718 ; 4.704 ; 4.8286 ; 5.0155 ; 5.2958 ; 5.7163 ; 6.347 ; 7]

Force (kips): [-1.97421 ; 0.771426 ; 1.79539 ; 3.12858 ; 4.75165 ; 6.09304 ; 6.79033 ; 7.09263 ; 7.37477 ; 7.79714 ; 8.33659 ; 9.03367 ; 9.26673 ; 9.62212 ; 10.0853 ; 10.6348 ; 11.28 ; 11.9816 ; 12.5665 ; 12.9888 ; 13.0755 ; 13.1103 ; 13.1632 ; 13.2323 ; 13.321 ; 13.4317 ; 13.4681 ; 13.5205 ; 13.5919 ; 13.6735 ; 13.7701 ; 13.8404]

Bolt 1 - Tensile Force (kips): [63.3352 ; 63.2236 ; 63.1803 ; 63.121 ; 63.0441 ; 62.9749 ; 62.9355 ; 62.9167 ; 62.9003 ; 62.8719 ; 62.8604 ; 62.8445 ; 62.8367 ; 62.8191 ; 62.7933 ; 62.7677 ; 62.752 ; 62.758 ; 62.7854 ; 62.8245 ; 62.8335 ; 62.8359 ; 62.8381 ; 62.8421 ; 62.85 ; 62.8649 ; 62.8712 ; 62.8803 ; 62.8939 ; 62.9182 ; 62.959 ; 63.0045]

Bolt 1 - Shear Force (kips): [0.1466 ; 0.095643 ; 0.1245 ; 0.18113 ; 0.26454 ; 0.34342 ; 0.39248 ; 0.42207 ; 0.45177 ; 0.50171 ; 0.5273 ; 0.57157 ; 0.59254 ; 0.63388 ; 0.69467 ; 0.76753 ; 0.84513 ; 0.92206 ; 0.98578 ; 1.0355 ; 1.049 ; 1.0552 ; 1.0663 ; 1.0821 ; 1.1031 ; 1.1305 ; 1.1398 ; 1.1541 ; 1.1752 ; 1.2017 ; 1.2353 ; 1.2655]

Bolt 2 - Tensile Force (kips): [63.3343 ; 63.1169 ; 63.0039 ; 62.8479 ; 62.652 ; 62.4567 ; 62.3145 ; 62.207 ; 62.0562 ; 61.7564 ; 61.2542 ; 60.4388 ; 60.1165 ; 59.5809 ; 58.7843 ; 57.816 ; 56.882 ; 56.1742 ; 55.9011 ; 55.9478 ; 55.9598 ; 55.9622 ; 55.9632 ; 55.9669 ; 55.9785 ; 56.0033 ; 56.0133 ; 56.0337 ; 56.061 ; 56.1014 ; 56.1662 ; 56.2384]

Bolt 2 - Shear Force (kips): [0.12079 ; 0.18407 ; 0.28454 ; 0.42449 ; 0.60661 ; 0.77427 ; 0.87636 ; 0.93077 ; 0.99107 ; 1.094 ; 1.1628 ; 1.1689 ; 1.1582 ; 1.1395 ; 1.1058 ; 1.0549 ; 1.0184 ; 1.0684 ; 1.1705 ; 1.2806 ; 1.3076 ; 1.3188 ; 1.3359 ; 1.3613 ; 1.3968 ; 1.4453 ; 1.4626 ; 1.489 ; 1.5284 ; 1.5771 ; 1.6381 ; 1.6934]

Bolt 3 - Tensile Force (kips): [65 ; 64.7883 ; 64.5582 ; 64.1541 ; 63.3688 ; 62.2337 ; 60.8182 ; 59.3983 ; 58.1577 ; 57.0976 ; 56.18 ; 55.6687 ; 55.6013 ; 55.5652 ; 55.614 ; 56.0139 ; 56.7746 ; 57.8093 ; 58.7749 ; 59.5473 ; 59.6774 ; 59.7467 ; 59.898 ; 60.046 ; 60.1718 ; 60.2388 ; 60.2242 ; 60.259 ; 60.3259 ; 60.2977 ; 60.5292 ; 60.6394]

Bolt 3 - Shear Force (kips): [0.072962 ; 0.041672 ; 0.06454 ; 0.094308 ; 0.08947 ; 0.034182 ; 0.21197 ; 0.37428 ; 0.45059 ; 0.40986 ; 0.24526 ; 0.22267 ; 0.30553 ; 1.8078 ; 3.6511 ; 4.6177 ; 5.1077 ; 5.2216 ; 5.4535 ; 5.8025 ; 5.4773 ; 5.3198 ; 5.1872 ; 4.9407 ; 4.5873 ; 3.7606 ; 3.4677 ; 3.2008 ; 2.9152 ; 2.7055 ; 2.6318 ; 2.5799]

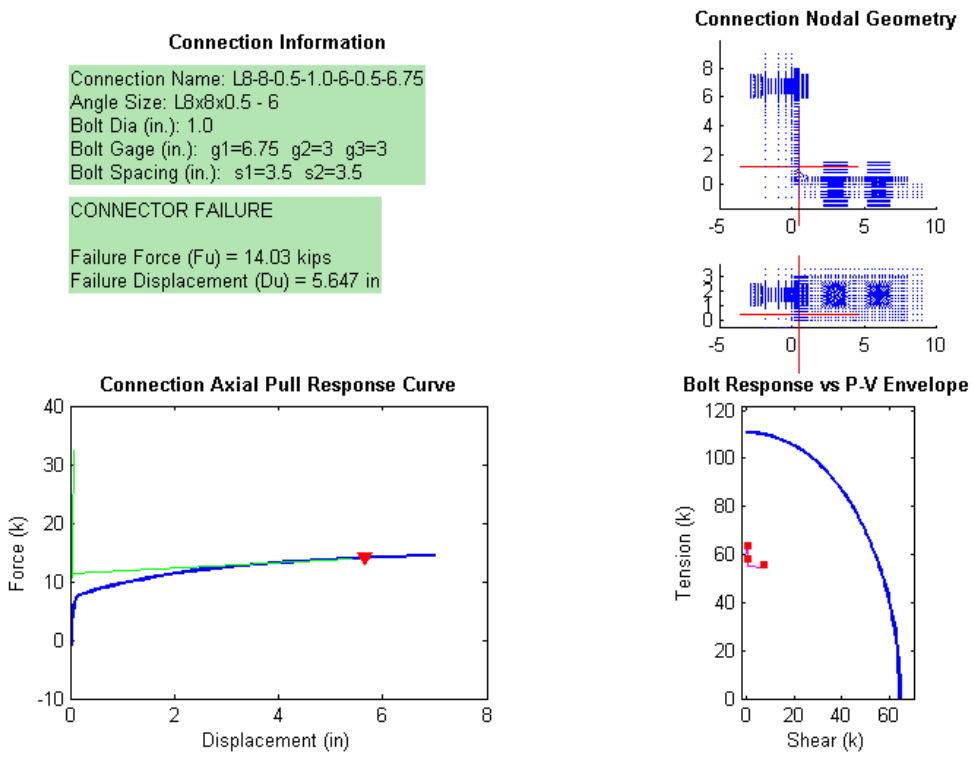


Figure B.318 Connection L8_8_0.5_1.0_6_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_1.0_6_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 440.8377

Plastic Stiffness (k/in): 0.4752

Displacement (in): [7.9264e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.70408 ; 0.82234 ; 0.99973 ; 1.2658 ; 1.3656 ; 1.5153 ; 1.7398 ; 2.0765 ; 2.5817 ; 3.2817 ; 3.9817 ; 4.1567 ; 4.4192 ; 4.8129 ; 5.4035 ; 6.1035 ; 6.8035 ; 7]

Force (kips): [-1.9432 ; 0.17305 ; 0.46766 ; 0.88698 ; 1.474 ; 2.2654 ; 3.1211 ; 3.645 ; 3.8457 ; 3.9669 ; 4.1665 ; 4.4379 ; 4.5282 ; 4.6568 ; 4.8391 ; 5.0835 ; 5.1668 ; 5.296 ; 5.4759 ; 5.7101 ; 6.0072 ; 6.3303 ; 6.5823 ; 6.6385 ; 6.7184 ; 6.8281 ; 6.9685 ; 7.1045 ; 7.2133 ; 7.2401]

Bolt 1 - Tensile Force (kips): [63.3357 ; 63.2496 ; 63.2378 ; 63.2202 ; 63.1942 ; 63.1573 ; 63.1139 ; 63.0855 ; 63.0769 ; 63.0769 ; 63.0758 ; 63.075 ; 63.0743 ; 63.0728 ; 63.0682 ; 63.0812 ; 63.09 ; 63.1016 ; 63.1176 ; 63.1425 ; 63.1759 ; 63.2219 ; 63.2703 ; 63.2827 ; 63.3016 ; 63.3299 ; 63.3737 ; 63.4279 ; 63.4843 ; 63.4999]

Bolt 1 - Shear Force (kips): [0.14621 ; 0.089643 ; 0.092928 ; 0.10119 ; 0.11876 ; 0.15095 ; 0.1961 ; 0.23191 ; 0.25136 ; 0.26525 ; 0.28739 ; 0.32024 ; 0.33321 ; 0.35363 ; 0.38781 ; 0.41027 ; 0.41261 ; 0.4192 ; 0.43215 ; 0.45005 ; 0.48391 ; 0.53099 ; 0.57349 ; 0.58361 ; 0.59821 ; 0.61972 ; 0.64965 ; 0.68042 ; 0.70679 ; 0.71437]

Bolt 2 - Tensile Force (kips): [63.337 ; 63.1796 ; 63.1419 ; 63.0847 ; 63.0003 ; 62.8862 ; 62.7631 ; 62.6761 ; 62.6429 ; 62.6245 ; 62.5835 ; 62.5043 ; 62.4591 ; 62.3799 ; 62.238 ; 62.0031 ; 61.913 ; 61.7566 ; 61.49 ; 61.1363 ; 60.6526 ; 59.9877 ; 59.3699 ; 59.2169 ; 58.9996 ; 58.7063 ; 58.3466 ; 58.0392 ; 57.8177 ; 57.7631]

Bolt 2 - Shear Force (kips): [0.12085 ; 0.13198 ; 0.1646 ; 0.21259 ; 0.28304 ; 0.38323 ; 0.50066 ; 0.58067 ; 0.61165 ; 0.63196 ; 0.67107 ; 0.73443 ; 0.76037 ; 0.80189 ; 0.86827 ; 0.92975 ; 0.94206 ; 0.95822 ; 0.96626 ; 0.95315 ; 0.91656 ; 0.85641 ; 0.79201 ; 0.77724 ; 0.75675 ; 0.7309 ; 0.70226 ; 0.68792 ; 0.69192 ; 0.69466]

Bolt 3 - Tensile Force (kips): [65 ; 64.9037 ; 64.8053 ; 64.6451 ; 64.358 ; 63.8136 ; 62.7577 ; 61.3929 ; 59.9469 ; 58.5862 ; 57.3376 ; 56.3794 ; 56.1128 ; 55.8455 ; 55.6054 ; 55.3371 ; 55.2541 ; 55.1698 ; 55.0247 ; 54.8813 ; 54.8105 ; 54.8519 ; 55.2045 ; 55.2725 ; 55.3883 ; 55.6069 ; 55.9141 ; 56.2478 ; 56.5399 ; 56.5979]

Bolt 3 - Shear Force (kips): [0.069296 ; 0.047126 ; 0.046494 ; 0.05181 ; 0.059431 ; 0.052568 ; 0.095469 ; 0.32424 ; 0.58182 ; 0.7713 ; 0.90995 ; 0.95841 ; 0.95128 ; 0.92433 ; 0.86833 ; 0.7487 ; 0.7 ; 0.74627 ; 1.7813 ; 3.2213 ; 4.9901 ; 6.1535 ; 6.2925 ; 6.3166 ; 6.4492 ; 6.7652 ; 7.2567 ; 7.6973 ; 8.0755 ; 8.3312]

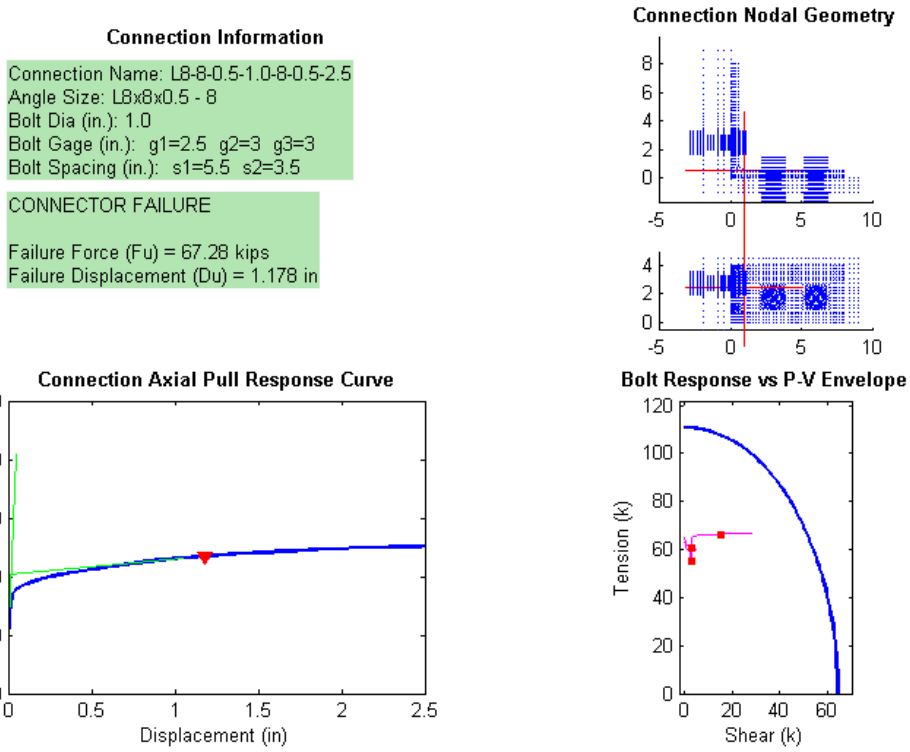


Figure B.319 Connection L8_8_0.5_1.0_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_1.0_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.9458e+003

Plastic Stiffness (k/in): 13.8847

Displacement (in): [9.1423e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.030273 ; 0.036865 ; 0.046753 ; 0.061585 ; 0.083832 ; 0.1172 ; 0.16726 ; 0.21732 ; 0.26737 ; 0.31743 ; 0.39251 ; 0.50514 ; 0.54737 ; 0.56321 ; 0.58697 ; 0.62261 ; 0.63597 ; 0.65602 ; 0.68608 ; 0.69736 ; 0.71427 ; 0.73964 ; 0.7777 ; 0.83478 ; 0.9204 ; 1.0488 ; 1.2415 ; 1.2897 ; 1.3378 ; 1.4101 ; 1.5184 ; 1.681 ; 1.9248 ; 2.1748 ; 2.2373 ; 2.331 ; 2.4717 ; 2.5]

Force (kips): [-1.80422 ; 1.6183 ; 3.94927 ; 6.81808 ; 9.27476 ; 11.3478 ; 13.7999 ; 16.1429 ; 17.5131 ; 18.3565 ; 19.1733 ; 20.049 ; 21.0345 ; 22.1273 ; 23.298 ; 24.2209 ; 25.0192 ; 25.7334 ; 26.6913 ; 27.9274 ; 28.3452 ; 28.4964 ; 28.7403 ; 29.148 ; 29.3027 ; 29.5252 ; 29.8928 ; 30.0211 ; 30.2064 ; 30.4586 ; 30.8481 ; 31.3484 ; 32.0098 ; 32.9014 ; 34.0055 ; 34.2537 ; 34.4856 ; 34.8127 ; 35.264 ; 35.868 ; 36.6105 ; 37.209 ; 37.3405 ; 37.5332 ; 37.8013 ; 37.8537]

Bolt 1 - Tensile Force (kips): [63.3333 ; 63.1901 ; 63.088 ; 62.9554 ; 62.8361 ; 62.7309 ; 62.601 ; 62.4704 ; 62.3895 ; 62.3363 ; 62.2802 ; 62.2132 ; 62.131 ; 62.0432 ; 61.9315 ; 61.8372 ; 61.7563 ; 61.6859 ; 61.594 ; 61.4807 ; 61.4428 ; 61.4292 ; 61.4081 ; 61.3741 ; 61.3617 ; 61.3431 ; 61.3106 ; 61.299 ; 61.2822 ; 61.2596 ; 61.2234 ; 61.1755 ; 61.1068 ; 61.0059 ; 60.869 ; 60.8333 ; 60.7983 ; 60.7458 ; 60.6649 ; 60.5294 ; 60.2617 ; 59.9871 ; 59.9249 ; 59.8949 ; 59.7759 ; 59.7531]

Bolt 1 - Shear Force (kips): [0.13562 ; 0.12517 ; 0.25073 ; 0.42376 ; 0.57945 ; 0.71477 ; 0.88048 ; 1.0458 ; 1.1489 ; 1.2181 ; 1.2939 ; 1.3879 ; 1.5041 ; 1.6207 ; 1.7884 ; 1.9317 ; 2.0537 ; 2.1597 ; 2.2957 ; 2.4669 ; 2.5244 ; 2.545 ; 2.5767 ; 2.625 ; 2.6424 ; 2.6687 ; 2.7145 ; 2.7311 ; 2.755 ; 2.7876 ; 2.8389 ; 2.9078 ; 3.0097 ; 3.1628 ; 3.3798 ; 3.4368 ; 3.4933 ; 3.5787 ; 3.7125 ; 3.9413 ; 4.4018 ; 4.8637 ; 4.9676 ; 5.0379 ; 5.2321 ; 5.2691]

Bolt 2 - Tensile Force (kips): [63.3305 ; 63.0948 ; 62.9092 ; 62.6567 ; 62.4177 ; 62.2048 ; 61.9274 ; 61.5963 ; 61.3272 ; 61.0845 ; 60.7371 ; 60.2566 ; 59.5853 ; 58.7955 ; 57.7834 ; 56.9236 ; 56.1817 ; 55.5597 ; 54.8769 ; 54.3023 ; 54.2019 ; 54.1794 ; 54.1516 ; 54.1249 ; 54.1188 ; 54.1145 ; 54.1048 ; 54.1076 ; 54.1164 ; 54.1395 ; 54.1821 ; 54.2967 ; 54.5192 ; 54.9224 ; 55.6313 ; 55.8051 ; 55.9808 ; 56.2474 ; 56.6396 ; 57.1847 ; 57.9451 ; 58.6848 ; 58.8727 ; 59.1745 ; 59.6247 ; 59.7263]

Bolt 2 - Shear Force (kips): [0.10545 ; 0.2184 ; 0.42024 ; 0.6815 ; 0.91313 ; 1.1133 ; 1.3567 ; 1.6058 ; 1.7657 ; 1.8759 ; 1.9936 ; 2.1262 ; 2.2532 ; 2.3309 ; 2.3645 ; 2.3747 ; 2.3948 ; 2.4162 ; 2.4585 ; 2.5514 ; 2.5999 ; 2.6191 ; 2.6514 ; 2.7025 ; 2.7211 ; 2.7486 ; 2.7961 ; 2.8135 ; 2.8384 ; 2.8705 ; 2.9162 ; 2.9412 ; 2.9636 ; 2.9874 ; 2.9901 ; 2.991 ; 2.9894 ; 2.985 ; 2.9775 ; 2.9663 ; 2.9786 ; 2.9585 ; 2.9528 ; 2.889 ; 3.5769 ; 3.7205]

Bolt 3 - Tensile Force (kips): [65 ; 64.8196 ; 64.6556 ; 64.4312 ; 64.2193 ; 64.0264 ; 63.7145 ; 63.3036 ; 62.8572 ; 62.3968 ; 61.7792 ; 60.9827 ; 60.2276 ; 59.6789 ; 59.5115 ; 59.8903 ; 60.5325 ; 61.2475 ; 62.4021 ; 64.0168 ; 64.562 ; 64.7598 ; 65.0279 ; 65.2561 ; 65.2777 ; 65.3223 ; 65.5079 ; 65.5759 ; 65.6366 ; 65.7141 ; 65.8823 ; 65.952 ; 66.0056 ; 66.1745 ; 66.4146 ; 66.4751 ; 66.515 ; 66.5157 ; 66.557 ; 66.6557 ; 66.6308 ; 66.5888 ; 66.5719 ; 66.6619 ; 66.8958 ; 66.9459]

Bolt 3 - Shear Force (kips): [0.0816993 ; 0.05027 ; 0.102224 ; 0.183578 ; 0.265095 ; 0.345523 ; 0.438194 ; 0.542436 ; 0.621633 ; 0.696201 ; 0.815091 ; 1.01166 ; 1.3102 ; 1.7079 ; 2.21065 ; 2.5186 ; 2.71865 ; 2.84334 ; 2.95691 ; 3.1147 ; 3.17221 ; 3.19328 ; 3.26914 ; 3.51151 ; 3.66833 ; 3.89114 ; 4.20189 ; 4.32414 ; 4.52189 ; 4.86925 ; 5.69328 ; 7.89129 ; 10.2925 ; 12.8767 ; 16.3278 ; 17.0295 ; 17.6758 ; 18.7306 ; 20.0673 ; 21.9093 ; 24.2019 ; 26.0407 ; 26.5215 ; 27.2661 ; 28.0151 ; 28.1689]

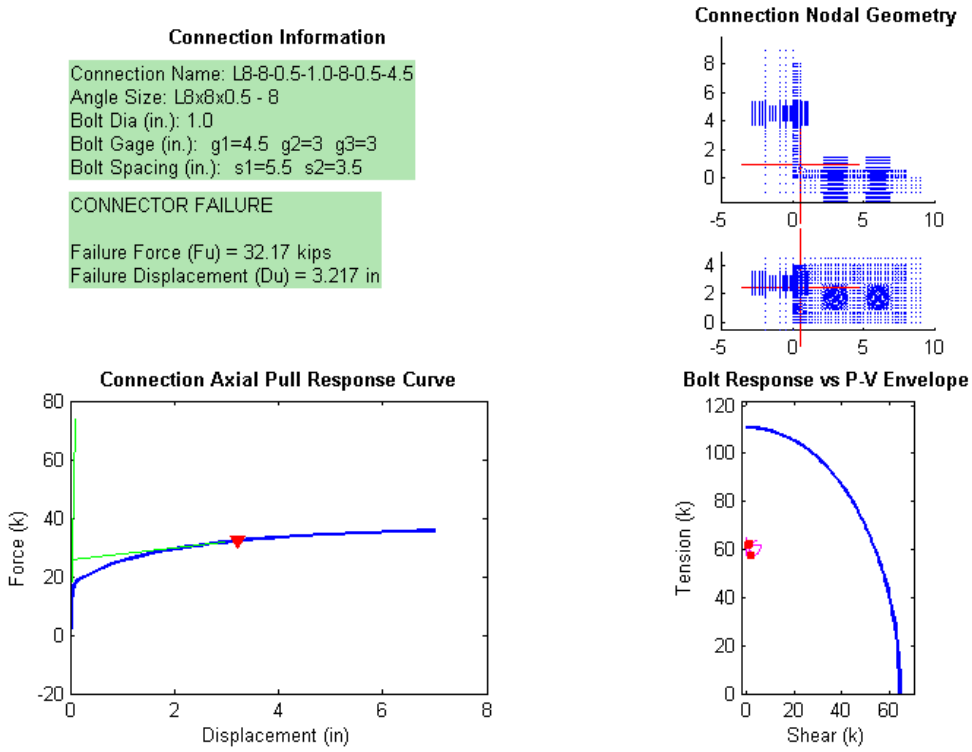


Figure B.320 Connection L8_8_0.5_1.0_8_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_1.0_8_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 690.7227

Plastic Stiffness (k/in): 2.0913

Displacement (in): [7.0745e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.70408 ; 0.82234 ; 0.99973 ; 1.2658 ; 1.6649 ; 2.2636 ; 2.4386 ; 2.5042 ; 2.6027 ; 2.7503 ; 2.9718 ; 3.304 ; 3.4286 ; 3.4754 ; 3.5454 ; 3.6506 ; 3.8082 ; 4.0447 ; 4.3995 ; 4.9317 ; 5.6317 ; 6.3317 ; 7]

Force (kips): [-1.72444 ; 0.884224 ; 2.05295 ; 3.58007 ; 5.50017 ; 7.35842 ; 8.53396 ; 9.05807 ; 9.44848 ; 9.9546 ; 10.6039 ; 11.4282 ; 11.7356 ; 12.1536 ; 12.6969 ; 13.354 ; 14.1442 ; 15.0265 ; 15.2434 ; 15.3378 ; 15.4575 ; 15.6249 ; 15.8565 ; 16.1625 ; 16.2766 ; 16.3192 ; 16.3793 ; 16.4635 ; 16.5798 ; 16.7455 ; 16.9508 ; 17.2005 ; 17.4559 ; 17.6445 ; 17.7829]

Bolt 1 - Tensile Force (kips): [63.333 ; 63.2244 ; 63.1723 ; 63.1005 ; 63.0033 ; 62.8995 ; 62.8257 ; 62.7888 ; 62.7572 ; 62.7136 ; 62.6813 ; 62.6408 ; 62.6214 ; 62.5927 ; 62.5527 ; 62.5083 ; 62.4645 ; 62.4336 ; 62.4292 ; 62.4276 ; 62.4262 ; 62.4256 ; 62.4271 ; 62.4329 ; 62.4344 ; 62.4347 ; 62.4355 ; 62.4374 ; 62.4414 ; 62.4484 ; 62.4595 ; 62.4792 ; 62.5082 ; 62.542 ; 62.5781]

Bolt 1 - Shear Force (kips): [0.13101 ; 0.098698 ; 0.15084 ; 0.23693 ; 0.35901 ; 0.49101 ; 0.58739 ; 0.64165 ; 0.69298 ; 0.7664 ; 0.81549 ; 0.88008 ; 0.91441 ; 0.96808 ; 1.0471 ; 1.1399 ; 1.2443 ; 1.3702 ; 1.402 ; 1.413 ; 1.4281 ; 1.4484 ; 1.4735 ; 1.5081 ; 1.5245 ; 1.5314 ; 1.5412 ; 1.5547 ; 1.5734 ; 1.5999 ; 1.6386 ; 1.6914 ; 1.7541 ; 1.8087 ; 1.8546]

Bolt 2 - Tensile Force (kips): [63.3287 ; 63.1382 ; 63.0105 ; 62.8333 ; 62.6039 ; 62.3624 ; 62.1579 ; 61.9997 ; 61.8281 ; 61.5556 ; 61.115 ; 60.6058 ; 60.3851 ; 60.0316 ; 59.4566 ; 58.7814 ; 58.1292 ; 57.7393 ; 57.6787 ; 57.6619 ; 57.6471 ; 57.6408 ; 57.6693 ; 57.8098 ; 57.8694 ; 57.8949 ; 57.9339 ; 57.9928 ; 58.0909 ; 58.2425 ; 58.4631 ; 58.7582 ; 59.0911 ; 59.3594 ; 59.57]

Bolt 2 - Shear Force (kips): [0.10009 ; 0.17198 ; 0.28937 ; 0.45085 ; 0.66565 ; 0.89075 ; 1.055 ; 1.1441 ; 1.2277 ; 1.3582 ; 1.4566 ; 1.4958 ; 1.4982 ; 1.4909 ; 1.4606 ; 1.4224 ; 1.4314 ; 1.5152 ; 1.5409 ; 1.5521 ; 1.5672 ; 1.5902 ; 1.6259 ; 1.6768 ; 1.6978 ; 1.7061 ; 1.717 ; 1.7318 ; 1.7513 ; 1.7728 ; 1.7774 ; 1.7767 ; 1.7786 ; 1.7863 ; 1.7974]

Bolt 3 - Tensile Force (kips): [65 ; 64.7797 ; 64.5438 ; 64.1292 ; 63.3837 ; 62.3601 ; 61.0575 ; 59.7565 ; 58.6436 ; 57.8149 ; 57.1563 ; 57.0825 ; 57.1633 ; 57.4103 ; 58.1405 ; 59.12 ; 60.2106 ; 61.4849 ; 61.8043 ; 61.8711 ; 61.8479 ; 61.8128 ; 61.7168 ; 61.6658 ; 61.7729 ; 61.8283 ; 61.9085 ; 61.9729 ; 62.0573 ; 62.4472 ; 62.8072 ; 63.182 ; 63.5401 ; 63.7635 ; 63.9492]

Bolt 3 - Shear Force (kips): [0.079515 ; 0.048795 ; 0.073946 ; 0.10906 ; 0.12875 ; 0.11054 ; 0.14043 ; 0.24082 ; 0.31121 ; 0.32575 ; 0.46599 ; 0.80835 ; 1.9871 ; 3.524 ; 4.7757 ; 5.0261 ; 5.4794 ; 5.9212 ; 5.9381 ; 5.1669 ; 4.4347 ; 3.3753 ; 1.7446 ; 0.67279 ; 0.67833 ; 0.68632 ; 0.81616 ; 0.9046 ; 1.0866 ; 1.5379 ; 2.2919 ; 3.1742 ; 3.7263 ; 4.2036 ; 4.5751]

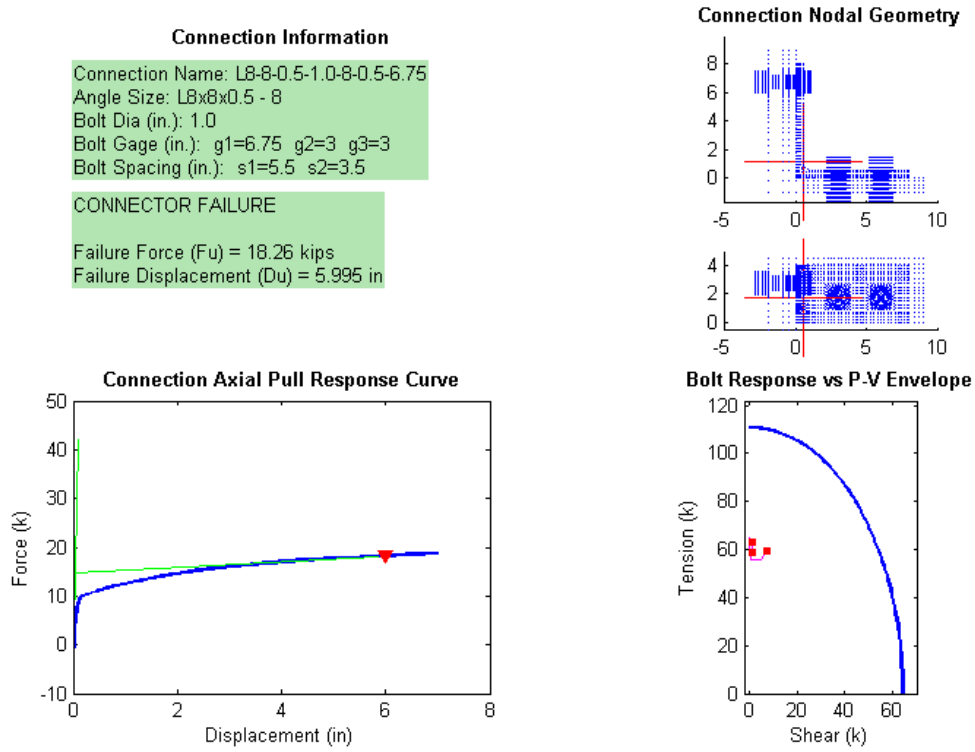


Figure B.321 Connection L8_8_0.5_1.0_8_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_1.0_8_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 412.5601

Plastic Stiffness (k/in): 0.5714

Displacement (in): [6.9783e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.46757 ; 0.5464 ; 0.66466 ; 0.84205 ; 1.1081 ; 1.2079 ; 1.2453 ; 1.3015 ; 1.3857 ; 1.5119 ; 1.7014 ; 1.9855 ; 2.4117 ; 3.051 ; 3.751 ; 4.451 ; 5.151 ; 5.851 ; 6.551 ; 7]

Force (kips): [-1.7014 ; 0.19876 ; 0.55477 ; 1.061 ; 1.7663 ; 2.7228 ; 3.8369 ; 4.6451 ; 4.9768 ; 5.1663 ; 5.4235 ; 5.5193 ; 5.6503 ; 5.8244 ; 6.0612 ; 6.3863 ; 6.4988 ; 6.5432 ; 6.6069 ; 6.7022 ; 6.8404 ; 7.0267 ; 7.2866 ; 7.6138 ; 8.0139 ; 8.3642 ; 8.6536 ; 8.895 ; 9.095 ; 9.2602 ; 9.3506]

Bolt 1 - Tensile Force (kips): [63.3335 ; 63.2555 ; 63.2398 ; 63.2167 ; 63.1831 ; 63.1349 ; 63.0726 ; 63.0222 ; 63.0029 ; 62.9962 ; 62.9875 ; 62.9838 ; 62.9788 ; 62.9709 ; 62.9578 ; 62.9448 ; 62.9491 ; 62.9505 ; 62.9526 ; 62.9548 ; 62.9573 ; 62.9629 ; 62.972 ; 62.9852 ; 63.0078 ; 63.0408 ; 63.0808 ; 63.1232 ; 63.1682 ; 63.2166 ; 63.2487]

Bolt 1 - Shear Force (kips): [0.13058 ; 0.082411 ; 0.090875 ; 0.10921 ; 0.14299 ; 0.1983 ; 0.27539 ; 0.34303 ; 0.37827 ; 0.40253 ; 0.4374 ; 0.45123 ; 0.47167 ; 0.50352 ; 0.55469 ; 0.62099 ; 0.63094 ; 0.63514 ; 0.64149 ; 0.65283 ; 0.67159 ; 0.69638 ; 0.73359 ; 0.79027 ; 0.87005 ; 0.94249 ; 1.0023 ; 1.0556 ; 1.1025 ; 1.1423 ; 1.166]

Bolt 2 - Tensile Force (kips): [63.3306 ; 63.2062 ; 63.1592 ; 63.0883 ; 62.9842 ; 62.8436 ; 62.6784 ; 62.5531 ; 62.5042 ; 62.4755 ; 62.4228 ; 62.4008 ; 62.3573 ; 62.28 ; 62.1488 ; 61.9349 ; 61.8487 ; 61.8131 ; 61.7607 ; 61.6735 ; 61.5475 ; 61.4006 ; 61.2087 ; 60.9241 ; 60.4243 ; 59.91 ; 59.4885 ; 59.1692 ; 58.9474 ; 58.8188 ; 58.7518]

Bolt 2 - Shear Force (kips): [0.10011 ; 0.11083 ; 0.15063 ; 0.20972 ; 0.29518 ; 0.41605 ; 0.56701 ; 0.68688 ; 0.73456 ; 0.75965 ; 0.80748 ; 0.82762 ; 0.85885 ; 0.90922 ; 0.99236 ; 1.1084 ; 1.1323 ; 1.1401 ; 1.1508 ; 1.1655 ; 1.1827 ; 1.1945 ; 1.1916 ; 1.1731 ; 1.1207 ; 1.0529 ; 1.0161 ; 1.0082 ; 1.0298 ; 1.06 ; 1.079]

Bolt 3 - Tensile Force (kips): [65 ; 64.897 ; 64.7921 ; 64.6194 ; 64.3043 ; 63.7047 ; 62.624 ; 61.2562 ; 59.8014 ; 58.4779 ; 57.3467 ; 57.0443 ; 56.7149 ; 56.4015 ; 56.1523 ; 55.9091 ; 55.8464 ; 55.822 ; 55.7921 ; 55.7316 ; 55.6883 ; 55.68 ; 55.7311 ; 56.1149 ; 56.9039 ; 57.5967 ; 58.1366 ; 58.7034 ; 59.3676 ; 60.0468 ; 60.4589]

Bolt 3 - Shear Force (kips): [0.07301 ; 0.046341 ; 0.046237 ; 0.054629 ; 0.067354 ; 0.068751 ; 0.077968 ; 0.2573 ; 0.48994 ; 0.66088 ; 0.76706 ; 0.78138 ; 0.78018 ; 0.75948 ; 0.70228 ; 0.56456 ; 0.49978 ; 0.52071 ; 0.59967 ; 1.1559 ; 2.311 ; 3.1907 ; 4.7435 ; 5.4545 ; 5.8063 ; 6.185 ; 6.3896 ; 6.8304 ; 7.5287 ; 8.0158 ; 8.3386]

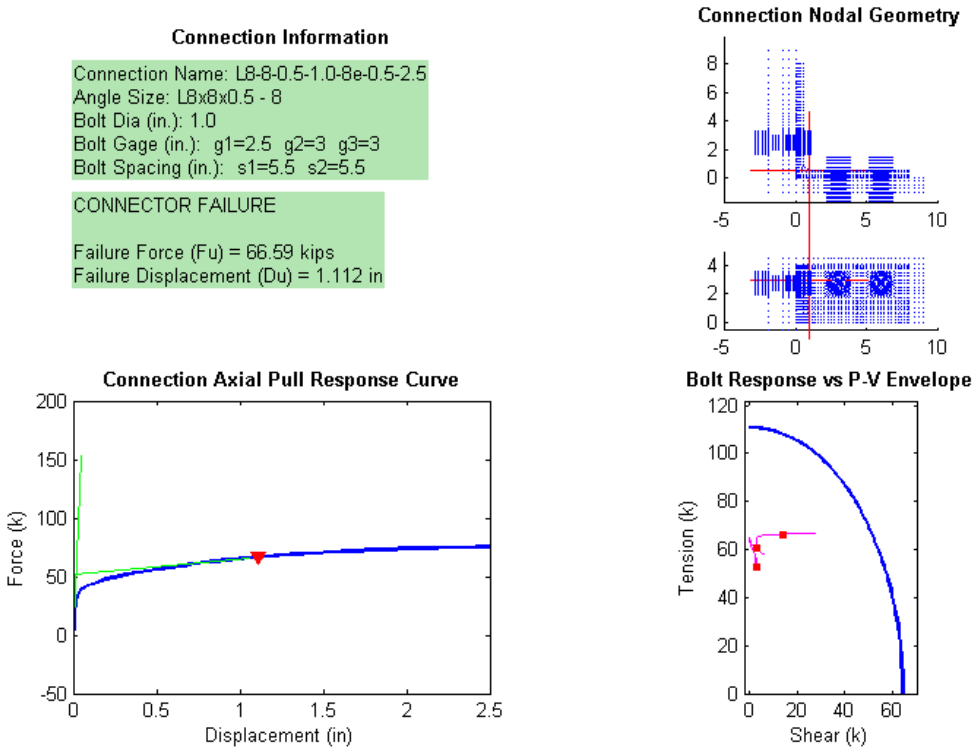


Figure B.322 Connection L8_8_0.5_1.0_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_1.0_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.0625e+003

Plastic Stiffness (k/in): 13.5598

Displacement (in): [8.8389e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.037598 ; 0.047485 ; 0.062317 ; 0.084564 ; 0.11794 ; 0.16799 ; 0.24308 ; 0.31816 ; 0.39325 ; 0.50587 ; 0.54811 ; 0.56395 ; 0.5877 ; 0.59661 ; 0.60998 ; 0.63002 ; 0.66009 ; 0.70519 ; 0.7221 ; 0.74747 ; 0.78553 ; 0.84261 ; 0.92823 ; 1.0567 ; 1.1851 ; 1.2172 ; 1.2654 ; 1.3376 ; 1.446 ; 1.5543 ; 1.6627 ; 1.8253 ; 2.0691 ; 2.3191 ; 2.5]

Force (kips): [-2.16295 ; 1.46424 ; 3.81857 ; 6.70448 ; 10.2311 ; 13.9739 ; 16.934 ; 18.3557 ; 19.1565 ; 19.991 ; 20.9337 ; 22.0073 ; 23.2235 ; 24.608 ; 25.7498 ; 26.7264 ; 27.9657 ; 28.3817 ; 28.532 ; 28.7678 ; 28.8915 ; 29.0459 ; 29.2642 ; 29.6113 ; 30.1431 ; 30.3238 ; 30.5832 ; 30.9537 ; 31.4524 ; 32.1012 ; 32.972 ; 33.72 ; 33.8915 ; 34.1384 ; 34.4906 ; 34.9639 ; 35.3933 ; 35.7824 ; 36.296 ; 36.9237 ; 37.4222 ; 37.7351]

Bolt 1 - Tensile Force (kips): [63.4023 ; 63.2319 ; 63.1153 ; 62.9643 ; 62.7676 ; 62.5448 ; 62.3546 ; 62.2583 ; 62.2032 ; 62.139 ; 62.0532 ; 61.9548 ; 61.8342 ; 61.6837 ; 61.5527 ; 61.4414 ; 61.2989 ; 61.2476 ; 61.2282 ; 61.1989 ; 61.1851 ; 61.167 ; 61.1412 ; 61.1001 ; 61.0349 ; 61.0115 ; 60.9769 ; 60.9264 ; 60.8548 ; 60.7485 ; 60.5791 ; 60.4043 ; 60.3593 ; 60.2902 ; 60.1833 ; 60.0201 ; 59.8436 ; 59.6391 ; 59.3278 ; 58.866 ; 58.4067 ; 58.1074]

Bolt 1 - Shear Force (kips): [0.12512 ; 0.15031 ; 0.28805 ; 0.47243 ; 0.70986 ; 0.97419 ; 1.196 ; 1.3092 ; 1.3758 ; 1.4554 ; 1.5622 ; 1.6778 ; 1.8197 ; 2.0178 ; 2.1866 ; 2.3234 ; 2.492 ; 2.5509 ; 2.5727 ; 2.605 ; 2.619 ; 2.6375 ; 2.6634 ; 2.704 ; 2.7687 ; 2.7917 ; 2.8254 ; 2.8725 ; 2.9364 ; 3.0341 ; 3.1953 ; 3.3634 ; 3.4074 ; 3.4761 ; 3.5864 ; 3.7622 ; 3.9752 ; 4.2457 ; 4.6478 ; 5.2275 ; 5.7862 ; 6.1291]

Bolt 2 - Tensile Force (kips): [63.4102 ; 63.1398 ; 62.947 ; 62.6854 ; 62.3261 ; 61.8755 ; 61.3815 ; 60.9587 ; 60.5347 ; 59.8777 ; 58.9712 ; 57.9049 ; 56.7324 ; 55.5027 ; 54.5508 ; 53.8459 ; 53.1135 ; 52.9142 ; 52.8442 ; 52.7504 ; 52.7102 ; 52.6593 ; 52.5927 ; 52.5072 ; 52.4113 ; 52.3843 ; 52.3533 ; 52.3349 ; 52.3538 ; 52.4552 ; 52.6853 ; 52.9443 ; 53.0124 ; 53.1171 ; 53.275 ; 53.5416 ; 53.8337 ; 54.1258 ; 54.5785 ; 55.2402 ; 55.8988 ; 56.3749]

Bolt 2 - Shear Force (kips): [0.16621 ; 0.19737 ; 0.38585 ; 0.63681 ; 0.95832 ; 1.3147 ; 1.6211 ; 1.7931 ; 1.908 ; 2.0432 ; 2.1839 ; 2.2757 ; 2.3406 ; 2.3689 ; 2.3924 ; 2.4369 ; 2.5328 ; 2.581 ; 2.5982 ; 2.6271 ; 2.643 ; 2.6634 ; 2.6936 ; 2.7452 ; 2.8316 ; 2.8638 ; 2.9123 ; 2.9817 ; 3.0738 ; 3.1674 ; 3.2436 ; 3.2979 ; 3.3113 ; 3.3285 ; 3.3483 ; 3.367 ; 3.3858 ; 3.4143 ; 3.4223 ; 3.3679 ; 3.2539 ; 3.1272]

Bolt 3 - Tensile Force (kips): [65 ; 64.8286 ; 64.6647 ; 64.4408 ; 64.1419 ; 63.6901 ; 63.06 ; 62.375 ; 61.7846 ; 61.0578 ; 60.4069 ; 59.9558 ; 59.8397 ; 60.5128 ; 61.4189 ; 62.4565 ; 64.0187 ; 64.5558 ; 64.7512 ; 65.0284 ; 65.0961 ; 65.1735 ; 65.2583 ; 65.3618 ; 65.6463 ; 65.7206 ; 65.813 ; 65.9427 ; 66.0298 ; 66.1117 ; 66.3391 ; 66.5096 ; 66.5472 ; 66.6012 ; 66.703 ; 66.7711 ; 66.8404 ; 66.9256 ; 66.9784 ; 66.9975 ; 66.9379 ; 66.9977]

Bolt 3 - Shear Force (kips): [0.0908853 ; 0.0359511 ; 0.083695 ; 0.172445 ; 0.304391 ; 0.451874 ; 0.595426 ; 0.709486 ; 0.807584 ; 0.951898 ; 1.17508 ; 1.50712 ; 1.82632 ; 2.32016 ; 2.68234 ; 2.92609 ; 3.15974 ; 3.23108 ; 3.25655 ; 3.31254 ; 3.38088 ; 3.46757 ; 3.6195 ; 3.91687 ; 4.40315 ; 4.60975 ; 4.99227 ; 6.04972 ; 8.2404 ; 10.5281 ; 12.9993 ; 15.4443 ; 15.9825 ; 16.6687 ; 17.531 ; 18.8637 ; 20.1559 ; 21.3508 ; 22.8596 ; 24.7068 ; 26.3964 ; 27.4831]

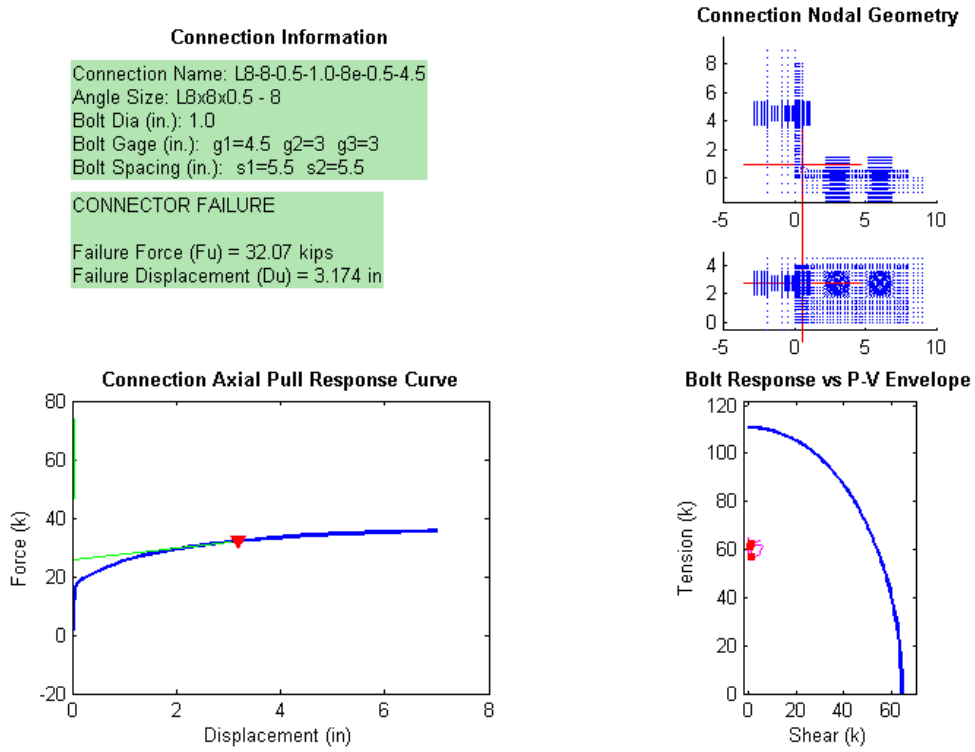


Figure B.323 Connection L8_8_0.5_1.0_8e_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_1.0_8e_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 1582

Plastic Stiffness (k/in): 2.0007

Displacement (in): [7.9393e-036 ; 0.0013672 ; 0.0027344 ; 0.0047852 ; 0.0078613 ; 0.012476 ; 0.019397 ; 0.029779 ; 0.045352 ; 0.068712 ; 0.10375 ; 0.15631 ; 0.23515 ; 0.35341 ; 0.5308 ; 0.59732 ; 0.6971 ; 0.73451 ; 0.79064 ; 0.87483 ; 1.0011 ; 1.1905 ; 1.4747 ; 1.9009 ; 2.0607 ; 2.3005 ; 2.3904 ; 2.4241 ; 2.4367 ; 2.4557 ; 2.4841 ; 2.5268 ; 2.5908 ; 2.6868 ; 2.8308 ; 3.0468 ; 3.3709 ; 3.8569 ; 4.5569 ; 5.2569 ; 5.9569 ; 6.6569 ; 7]

Force (kips): [-1.96878 ; -0.171201 ; 0.194055 ; 0.679197 ; 1.3659 ; 2.2989 ; 3.55643 ; 5.18727 ; 6.9237 ; 8.24203 ; 8.9125 ; 9.30289 ; 9.74031 ; 10.3108 ; 11.0542 ; 11.3058 ; 11.6788 ; 11.8287 ; 12.0256 ; 12.303 ; 12.6742 ; 13.1545 ; 13.7654 ; 14.5036 ; 14.7408 ; 15.0581 ; 15.1686 ; 15.2138 ; 15.2327 ; 15.2606 ; 15.3012 ; 15.3559 ; 15.431 ; 15.5443 ; 15.7041 ; 15.9202 ; 16.21 ; 16.5964 ; 17.0142 ; 17.3148 ; 17.538 ; 17.7053 ; 17.7731]

Bolt 1 - Tensile Force (kips): [63.403 ; 63.319 ; 63.3011 ; 63.2766 ; 63.2412 ; 63.1916 ; 63.1216 ; 63.0251 ; 62.9142 ; 62.8234 ; 62.7752 ; 62.7452 ; 62.7088 ; 62.683 ; 62.6514 ; 62.637 ; 62.6125 ; 62.6017 ; 62.587 ; 62.565 ; 62.535 ; 62.4961 ; 62.448 ; 62.3893 ; 62.3682 ; 62.3407 ; 62.3318 ; 62.3287 ; 62.3276 ; 62.3258 ; 62.3231 ; 62.3196 ; 62.3147 ; 62.3084 ; 62.3007 ; 62.2913 ; 62.2798 ; 62.2595 ; 62.2447 ; 62.2382 ; 62.2414 ; 62.2521 ; 62.259]

Bolt 1 - Shear Force (kips): [0.1153 ; 0.082067 ; 0.093274 ; 0.11455 ; 0.15146 ; 0.20853 ; 0.29204 ; 0.40941 ; 0.54472 ; 0.65646 ; 0.71989 ; 0.7644 ; 0.8206 ; 0.85042 ; 0.88457 ; 0.90237 ; 0.93832 ; 0.95597 ; 0.97944 ; 1.0158 ; 1.0658 ; 1.1284 ; 1.204 ; 1.305 ; 1.3414 ; 1.3899 ; 1.4067 ; 1.4124 ; 1.4145 ; 1.4175 ; 1.4222 ; 1.4289 ; 1.4387 ; 1.4518 ; 1.4685 ; 1.4913 ; 1.5242 ; 1.5841 ; 1.6567 ; 1.7251 ; 1.7866 ; 1.8429 ; 1.8691]

Bolt 2 - Tensile Force (kips): [63.411 ; 63.2769 ; 63.2425 ; 63.1943 ; 63.1241 ; 63.0227 ; 62.8822 ; 62.6915 ; 62.4798 ; 62.2652 ; 62.1067 ; 61.9445 ; 61.6897 ; 61.2893 ; 60.7291 ; 60.5192 ; 60.1738 ; 60.0198 ; 59.8179 ; 59.5198 ; 59.117 ; 58.6131 ; 58.0746 ; 57.6163 ; 57.4629 ; 57.2935 ; 57.2382 ; 57.2223 ; 57.2175 ; 57.2106 ; 57.2014 ; 57.1901 ; 57.1769 ; 57.1788 ; 57.1981 ; 57.2447 ; 57.3399 ; 57.5123 ; 57.7704 ; 57.9919 ; 58.2046 ; 58.388 ; 58.4635]

Bolt 2 - Shear Force (kips): [0.15436 ; 0.10292 ; 0.1212 ; 0.15443 ; 0.20994 ; 0.29353 ; 0.41374 ; 0.57765 ; 0.76111 ; 0.91947 ; 1.0188 ; 1.0971 ; 1.2061 ; 1.3018 ; 1.3522 ; 1.364 ; 1.3734 ; 1.3735 ; 1.3735 ; 1.3704 ; 1.3618 ; 1.351 ; 1.3333 ; 1.3564 ; 1.3721 ; 1.4032 ; 1.4184 ; 1.4248 ; 1.4276 ; 1.4317 ; 1.4378 ; 1.4464 ; 1.4585 ; 1.4757 ; 1.5009 ; 1.5358 ; 1.5885 ; 1.6662 ; 1.7358 ; 1.7698 ; 1.7768 ; 1.7863 ; 1.7915]

Bolt 3 - Tensile Force (kips): [65 ; 64.9502 ; 64.8952 ; 64.8138 ; 64.6844 ; 64.4805 ; 64.1274 ; 63.4972 ; 62.5927 ; 61.4172 ; 60.1145 ; 58.9512 ; 58.0238 ; 57.2619 ; 56.8661 ; 56.8576 ; 56.9838 ; 57.1061 ; 57.1962 ; 57.4576 ; 57.951 ; 58.6454 ; 59.539 ; 60.5845 ; 60.9003 ; 61.366 ; 61.5404 ; 61.6108 ; 61.6319 ; 61.6462 ; 61.6426 ; 61.6279 ; 61.6129 ; 61.592 ; 61.5154 ; 61.4166 ; 61.3578 ; 61.7485 ; 62.6153 ; 63.1223 ; 63.4214 ; 63.6465 ; 63.7352]

Bolt 3 - Shear Force (kips): [0.090226 ; 0.066098 ; 0.054669 ; 0.046286 ; 0.04772 ; 0.065989 ; 0.094454 ; 0.11909 ; 0.11422 ; 0.1172 ; 0.20066 ; 0.28455 ; 0.31451 ; 0.40129 ; 0.68031 ; 0.78831 ; 1.5989 ; 2.5446 ; 3.3121 ; 4.0823 ; 4.7507 ; 4.9038 ; 5.1792 ; 5.7204 ; 5.9288 ; 6.0092 ; 6.027 ; 5.8261 ; 5.6439 ; 5.3637 ; 5.0132 ; 4.6452 ; 4.3151 ; 3.502 ; 2.2169 ; 0.97856 ; 1.0347 ; 1.6227 ; 2.7813 ; 3.7142 ; 4.2701 ; 4.6799 ; 4.8778]

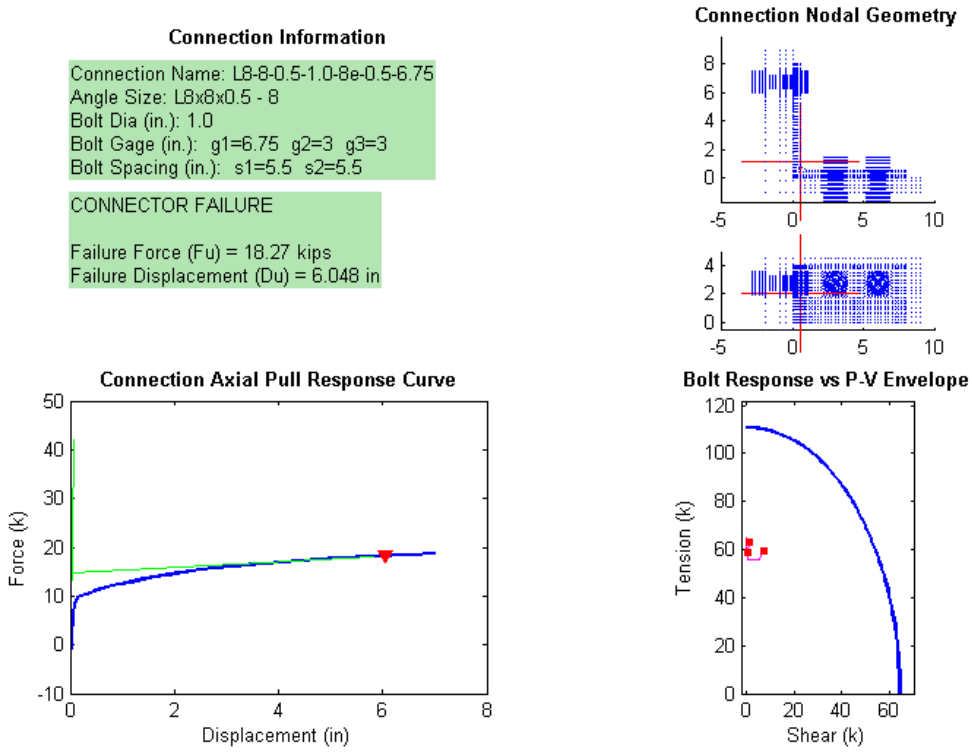


Figure B.324 Connection L8_8_0.5_1.0_8e_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.5_1.0_8e_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 501.6201

Plastic Stiffness (k/in): 0.5757

Displacement (in): [7.8414e-036 ; 0.0054687 ; 0.0095703 ; 0.013672 ; 0.019824 ; 0.029053 ; 0.042896 ; 0.06366 ; 0.094806 ; 0.14153 ; 0.2116 ; 0.31672 ; 0.4744 ; 0.71092 ; 0.94743 ; 1.184 ; 1.2726 ; 1.4057 ; 1.6053 ; 1.9046 ; 2.3536 ; 2.522 ; 2.7746 ; 3.1534 ; 3.7217 ; 4.4217 ; 5.1217 ; 5.8217 ; 6.5217 ; 7]

Force (kips): [-1.9469 ; 0.18819 ; 0.45344 ; 0.71084 ; 1.0816 ; 1.6076 ; 2.343 ; 3.3052 ; 4.2477 ; 4.8131 ; 5.0596 ; 5.2514 ; 5.5356 ; 5.8894 ; 6.1953 ; 6.4687 ; 6.5695 ; 6.7177 ; 6.9253 ; 7.2092 ; 7.5652 ; 7.6829 ; 7.8451 ; 8.0651 ; 8.3456 ; 8.6371 ; 8.8787 ; 9.0802 ; 9.2469 ; 9.3438]

Bolt 1 - Tensile Force (kips): [63.4042 ; 63.304 ; 63.2898 ; 63.2759 ; 63.2555 ; 63.2255 ; 63.1818 ; 63.1203 ; 63.0545 ; 63.0127 ; 62.9969 ; 62.9896 ; 62.9759 ; 62.9558 ; 62.935 ; 62.9432 ; 62.9465 ; 62.9492 ; 62.9522 ; 62.9568 ; 62.9661 ; 62.9687 ; 62.9741 ; 62.9835 ; 63.0032 ; 63.0329 ; 63.0664 ; 63.102 ; 63.1406 ; 63.1692]

Bolt 1 - Shear Force (kips): [0.11532 ; 0.093137 ; 0.10574 ; 0.11953 ; 0.14142 ; 0.17552 ; 0.22746 ; 0.30273 ; 0.38599 ; 0.4448 ; 0.47595 ; 0.50127 ; 0.54322 ; 0.60808 ; 0.67561 ; 0.69397 ; 0.70088 ; 0.71521 ; 0.73947 ; 0.77637 ; 0.83049 ; 0.85269 ; 0.88355 ; 0.92725 ; 0.98283 ; 1.0412 ; 1.0923 ; 1.1389 ; 1.1808 ; 1.2064]

Bolt 2 - Tensile Force (kips): [63.4163 ; 63.2526 ; 63.2194 ; 63.1863 ; 63.137 ; 63.065 ; 62.9638 ; 62.8275 ; 62.7009 ; 62.6024 ; 62.5594 ; 62.5284 ; 62.4691 ; 62.3121 ; 62.1028 ; 61.8925 ; 61.7998 ; 61.663 ; 61.4584 ; 61.1903 ; 60.7918 ; 60.6303 ; 60.3985 ; 60.0477 ; 59.617 ; 59.191 ; 58.8774 ; 58.6833 ; 58.5402 ; 58.4605]

Bolt 2 - Shear Force (kips): [0.15507 ; 0.12368 ; 0.14425 ; 0.16621 ; 0.2003 ; 0.25205 ; 0.32833 ; 0.43381 ; 0.5433 ; 0.61309 ; 0.64288 ; 0.66977 ; 0.72259 ; 0.82221 ; 0.93322 ; 0.98961 ; 1.0046 ; 1.0243 ; 1.0392 ; 1.0412 ; 1.0178 ; 1.0062 ; 0.98845 ; 0.95859 ; 0.91944 ; 0.88094 ; 0.87167 ; 0.88348 ; 0.89984 ; 0.91881]

Bolt 3 - Tensile Force (kips): [65 ; 64.9007 ; 64.8237 ; 64.7424 ; 64.6113 ; 64.384 ; 63.9643 ; 63.1726 ; 62.0251 ; 60.6578 ; 59.2448 ; 58.0476 ; 57.0368 ; 56.4255 ; 56.1061 ; 55.8267 ; 55.7708 ; 55.6981 ; 55.6809 ; 55.6881 ; 55.9841 ; 56.1628 ; 56.4541 ; 56.864 ; 57.4546 ; 58.0396 ; 58.5867 ; 59.2447 ; 59.9176 ; 60.3437]

Bolt 3 - Shear Force (kips): [0.083558 ; 0.051841 ; 0.046721 ; 0.045848 ; 0.049605 ; 0.058861 ; 0.06766 ; 0.055763 ; 0.13799 ; 0.34754 ; 0.55379 ; 0.69781 ; 0.77067 ; 0.73273 ; 0.63739 ; 0.49345 ; 0.51166 ; 1.1447 ; 2.4785 ; 4.2278 ; 5.315 ; 5.5312 ; 5.6237 ; 5.9966 ; 6.186 ; 6.3711 ; 6.7029 ; 7.4328 ; 7.9357 ; 8.2396]

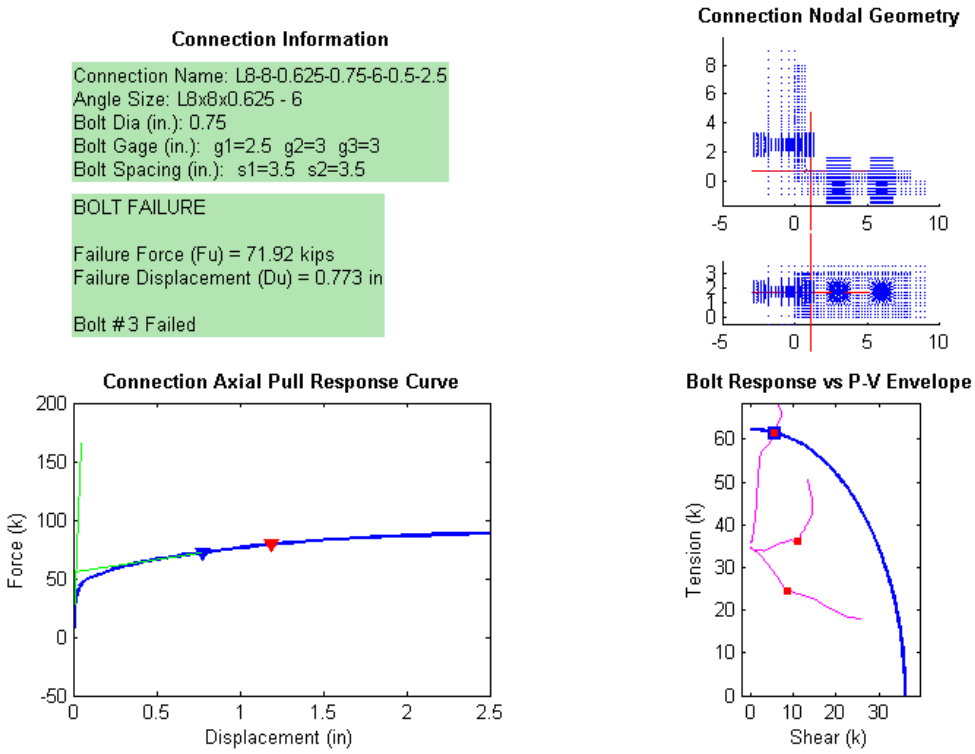


Figure B.325 Connection L8_8_0.625_0.75_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.75_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.1889e+003

Plastic Stiffness (k/in): 21.1610

Displacement (in): [2.5334e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.024414 ; 0.031006 ; 0.040894 ; 0.055725 ; 0.077972 ; 0.11134 ; 0.1614 ; 0.23649 ; 0.26464 ; 0.30688 ; 0.32271 ; 0.34647 ; 0.38211 ; 0.43556 ; 0.51574 ; 0.54581 ; 0.59091 ; 0.60782 ; 0.63319 ; 0.67125 ; 0.72833 ; 0.74974 ; 0.75776 ; 0.7698 ; 0.78787 ; 0.81496 ; 0.85559 ; 0.91655 ; 0.93941 ; 0.9737 ; 1.0251 ; 1.1023 ; 1.1312 ; 1.1746 ; 1.2397 ; 1.2641 ; 1.3007 ; 1.3556 ; 1.438 ; 1.5616 ; 1.747 ; 1.8095 ; 1.9032 ; 2.0438 ; 2.2548 ; 2.5]

Force (kips): [-0.845985 ; 2.7776 ; 5.3824 ; 8.54585 ; 12.3454 ; 16.2667 ; 18.7043 ; 20.274 ; 21.7379 ; 22.8725 ; 24.0873 ; 25.4883 ; 27.1146 ; 28.9637 ; 29.5376 ; 30.2899 ; 30.5493 ; 30.9104 ; 31.4719 ; 32.2477 ; 33.2872 ; 33.6623 ; 34.1781 ; 34.3749 ; 34.6545 ; 35.0186 ; 35.522 ; 35.7234 ; 35.7964 ; 35.9238 ; 36.0997 ; 36.3662 ; 36.7418 ; 37.2785 ; 37.503 ; 37.8324 ; 38.2867 ; 38.8899 ; 39.1076 ; 39.4239 ; 39.8625 ; 40.0271 ; 40.2518 ; 40.5655 ; 41.0155 ; 41.6335 ; 42.4074 ; 42.6352 ; 42.9409 ; 43.3435 ; 43.8492 ; 44.3292]

Bolt 1 - Tensile Force (kips): [34.7137 ; 34.6176 ; 34.5417 ; 34.4391 ; 34.3025 ; 34.142 ; 34.0246 ; 33.9269 ; 33.7574 ; 33.1857 ; 32.3187 ; 31.1094 ; 29.3813 ; 26.9729 ; 26.1429 ; 25.0539 ; 24.752 ; 24.7419 ; 24.7376 ; 24.7363 ; 24.7391 ; 24.7405 ; 24.7431 ; 24.6739 ; 24.5621 ; 24.5607 ; 24.5638 ; 24.566 ; 24.5663 ; 24.5263 ; 24.4999 ; 24.4111 ; 24.2137 ; 23.972 ; 23.8197 ; 23.6087 ; 23.2247 ; 22.7594 ; 22.4524 ; 21.9902 ; 21.452 ; 21.189 ; 20.8557 ; 20.3712 ; 19.7154 ; 18.8895 ; 18.3949 ; 18.3357 ; 18.2689 ; 18.2298 ; 18.0701 ; 17.942]

Bolt 1 - Shear Force (kips): [0.0583766 ; 0.13008 ; 0.254091 ; 0.409391 ; 0.603359 ; 0.815773 ; 0.963258 ; 1.08002 ; 1.27398 ; 1.87034 ; 2.65663 ; 3.67148 ; 5.0062 ; 6.72035 ; 7.27198 ; 7.96697 ; 8.15438 ; 8.16133 ; 8.16237 ; 8.16275 ; 8.16387 ; 8.16434 ; 8.16522 ; 8.26916 ; 8.3974 ; 8.39481 ; 8.38774 ; 8.3851 ; 8.39041 ; 8.64981 ; 8.83354 ; 9.29114 ; 9.93988 ; 10.8104 ; 11.3847 ; 12.184 ; 13.2547 ; 14.4383 ; 15.0302 ; 15.8582 ; 16.7822 ; 17.239 ; 17.8302 ; 18.6494 ; 19.7534 ; 21.3555 ; 22.7694 ; 23.0535 ; 23.4329 ; 23.9396 ; 24.7673 ; 25.5799]

Bolt 2 - Tensile Force (kips): [34.7159 ; 34.5808 ; 34.4729 ; 34.3482 ; 34.2233 ; 34.1454 ; 34.138 ; 34.1633 ; 34.1832 ; 33.9602 ; 33.9292 ; 34.3348 ; 34.9181 ; 35.5097 ; 35.6451 ; 35.7831 ; 35.8272 ; 35.8701 ; 35.9384 ; 36.0526 ; 36.2451 ; 36.305 ; 36.3836 ; 36.4401 ; 36.5211 ; 36.2418 ; 35.7917 ; 35.939 ; 35.9899 ; 36.117 ; 36.269 ; 36.5339 ; 36.9322 ; 37.4993 ; 37.7571 ; 38.1045 ; 38.6001 ; 39.264 ; 39.5328 ; 39.9043 ; 40.4076 ; 40.6097 ; 40.9013 ; 41.3099 ; 41.8598 ; 42.8015 ; 44.4764 ; 45.0862 ; 45.961 ; 47.1439 ; 48.7991 ; 50.6042]

Bolt 2 - Shear Force (kips): [0.050655 ; 0.181807 ; 0.339392 ; 0.538142 ; 0.788215 ; 1.06262 ; 1.25619 ; 1.41615 ; 1.66647 ; 2.27048 ; 3.04327 ; 3.97165 ; 5.07959 ; 6.21557 ; 6.56961 ; 7.03122 ; 7.19139 ; 7.43845 ; 7.78443 ; 8.23733 ; 8.8228 ; 9.03251 ; 9.33252 ; 9.42228 ; 9.55597 ; 9.95158 ; 10.644 ; 10.835 ; 10.8951 ; 10.9252 ; 11.033 ; 11.1472 ; 11.2635 ; 11.6053 ; 11.7148 ; 11.9179 ; 12.2704 ; 12.6559 ; 12.7757 ; 12.9787 ; 13.369 ; 13.4784 ; 13.6158 ; 13.7867 ; 14.0926 ; 14.4119 ; 14.3131 ; 14.3051 ; 14.2716 ; 14.146 ; 13.8047 ; 13.4211]

Bolt 3 - Tensile Force (kips): [36 ; 35.9456 ; 35.9958 ; 36.2268 ; 36.6683 ; 37.5382 ; 38.3865 ; 39.0552 ; 39.9488 ; 41.0879 ; 42.6609 ; 44.6585 ; 47.0843 ; 50.0693 ; 51.0551 ; 52.3898 ; 52.8376 ; 53.4535 ; 54.293 ; 55.4141 ; 57.0269 ; 57.6904 ; 58.554 ; 58.9198 ; 59.408 ; 60.0801 ; 60.9335 ; 61.2437 ; 61.3555 ; 61.5267 ; 61.7854 ; 62.1824 ; 62.7145 ; 63.4531 ; 63.7844 ; 64.2524 ; 64.8637 ; 65.8004 ; 66.1452 ; 66.6473 ; 67.3861 ; 67.7052 ; 68.0678 ; 68.5087 ; 69.1528 ; 69.9751 ; 70.9064 ; 71.1166 ; 71.291 ; 71.4695 ; 71.5534 ; 71.6196]

Bolt 3 - Shear Force (kips): [0.023959 ; 0.032534 ; 0.080734 ; 0.15707 ; 0.25279 ; 0.3796 ; 0.48507 ; 0.581 ; 0.71563 ; 0.86292 ; 1.0298 ; 1.2442 ; 1.4652 ; 1.6933 ; 1.757 ; 1.8264 ; 1.8469 ; 1.8765 ; 1.9397 ; 2.0207 ; 2.3538 ; 3.0667 ; 3.7643 ; 4.0745 ; 4.4414 ; 4.9003 ; 5.3158 ; 5.4436 ; 5.487 ; 5.5711 ; 5.6976 ; 5.8241 ; 5.9887 ; 6.146 ; 6.3153 ; 6.5908 ; 6.9449 ; 7.1522 ; 7.2412 ; 7.07 ; 6.7338 ; 6.5535 ; 6.3702 ; 6.2312 ; 5.9321 ; 5.6715 ; 5.3333 ; 5.2605 ; 5.1981 ; 5.2029 ; 5.2104 ; 5.251]

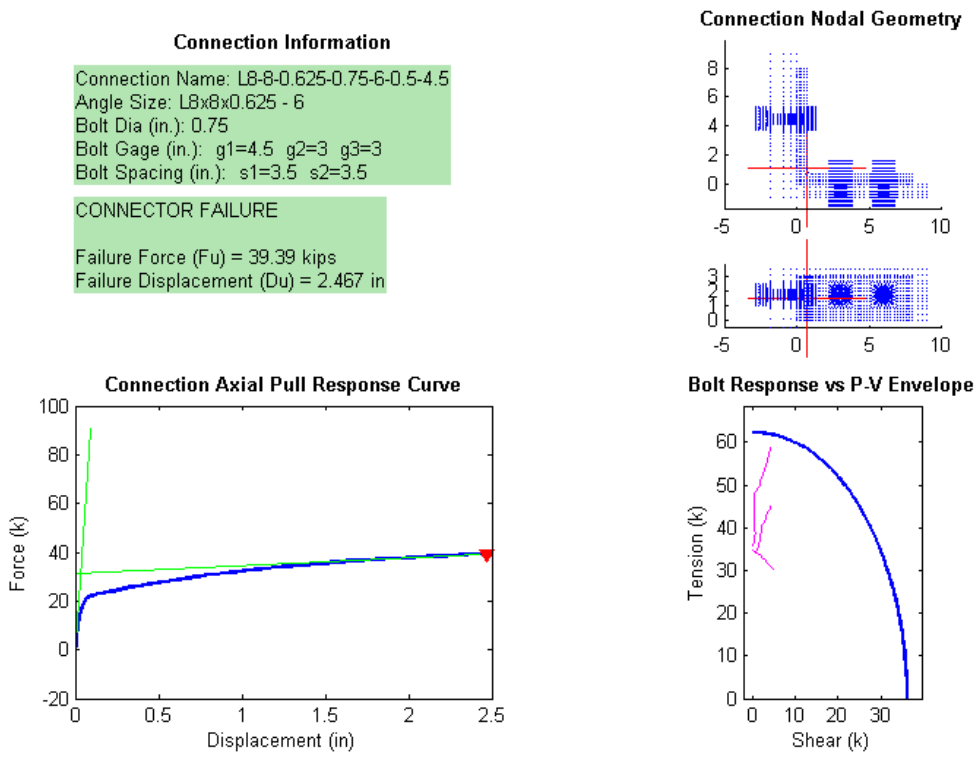


Figure B.326 Connection L8_8_0.625_0.75_6_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.75_6_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 941.2337

Plastic Stiffness (k/in): 3.2912

Displacement (in): [2.2299e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.53655 ; 0.67909 ; 0.73254 ; 0.81272 ; 0.84279 ; 0.88789 ; 0.95554 ; 1.057 ; 1.0951 ; 1.1522 ; 1.2092 ; 1.2663 ; 1.352 ; 1.4804 ; 1.673 ; 1.923 ; 2.173 ; 2.423 ; 2.5]

Force (kips): [-0.742617 ; 0.426804 ; 1.09573 ; 1.9935 ; 3.19256 ; 4.7922 ; 6.85667 ; 8.88254 ; 10.3541 ; 11.0531 ; 11.4705 ; 12.0373 ; 12.815 ; 13.0836 ; 13.4663 ; 13.999 ; 14.7299 ; 14.9834 ; 15.35 ; 15.4866 ; 15.6772 ; 15.9422 ; 16.3174 ; 16.4673 ; 16.6744 ; 16.8825 ; 17.0723 ; 17.3478 ; 17.7241 ; 18.2024 ; 18.7444 ; 19.2176 ; 19.629 ; 19.7463]

Bolt 1 - Tensile Force (kips): [34.7133 ; 34.6845 ; 34.6675 ; 34.6436 ; 34.6106 ; 34.5632 ; 34.4933 ; 34.4152 ; 34.3479 ; 34.3114 ; 34.2895 ; 34.2404 ; 34.1652 ; 34.1508 ; 34.1407 ; 34.1233 ; 34.0872 ; 34.0746 ; 34.0496 ; 34.0369 ; 34.0173 ; 33.9782 ; 33.8775 ; 33.8183 ; 33.7252 ; 33.6003 ; 33.4665 ; 33.2226 ; 32.8492 ; 32.3672 ; 31.771 ; 31.1977 ; 30.6666 ; 30.5115]

Bolt 1 - Shear Force (kips): [0.053146 ; 0.037999 ; 0.059093 ; 0.097886 ; 0.15563 ; 0.23796 ; 0.35135 ; 0.47443 ; 0.58051 ; 0.64498 ; 0.69447 ; 0.78964 ; 0.92817 ; 0.96056 ; 0.99474 ; 1.0466 ; 1.133 ; 1.1634 ; 1.2145 ; 1.2371 ; 1.2715 ; 1.3337 ; 1.4721 ; 1.5444 ; 1.6546 ; 1.7923 ; 1.9328 ; 2.1766 ; 2.5364 ; 2.9922 ; 3.537 ; 4.042 ; 4.4996 ; 4.632]

Bolt 2 - Tensile Force (kips): [34.7123 ; 34.6719 ; 34.6424 ; 34.6039 ; 34.56 ; 34.5162 ; 34.5039 ; 34.5686 ; 34.7247 ; 34.8599 ; 34.9812 ; 35.252 ; 35.7858 ; 36.076 ; 36.5544 ; 37.2595 ; 38.2622 ; 38.6248 ; 39.1396 ; 39.3276 ; 39.6013 ; 39.9809 ; 40.5021 ; 40.6849 ; 40.9449 ; 41.1866 ; 41.4253 ; 41.7473 ; 42.1857 ; 42.8089 ; 43.5501 ; 44.2056 ; 44.7891 ; 44.9616]

Bolt 2 - Shear Force (kips): [0.044728 ; 0.055343 ; 0.09368 ; 0.15104 ; 0.23277 ; 0.34713 ; 0.50444 ; 0.67674 ; 0.82999 ; 0.92497 ; 0.99933 ; 1.1405 ; 1.3466 ; 1.3998 ; 1.4642 ; 1.5612 ; 1.7173 ; 1.7746 ; 1.8626 ; 1.8978 ; 1.9499 ; 2.033 ; 2.1823 ; 2.2512 ; 2.3538 ; 2.4655 ; 2.5629 ; 2.7243 ; 2.9491 ; 3.2105 ; 3.4952 ; 3.7406 ; 3.9561 ; 4.0168]

Bolt 3 - Tensile Force (kips): [36 ; 35.9495 ; 35.9139 ; 35.8902 ; 35.9243 ; 36.0931 ; 36.4014 ; 36.8986 ; 37.557 ; 38.2055 ; 38.7655 ; 39.7078 ; 41.2067 ; 41.7743 ; 42.6498 ; 43.9916 ; 45.9956 ; 46.7123 ; 47.7007 ; 48.0159 ; 48.4647 ; 49.0827 ; 49.9666 ; 50.3445 ; 50.812 ; 51.3487 ; 51.8398 ; 52.5714 ; 53.5719 ; 54.7647 ; 56.1757 ; 57.4023 ; 58.411 ; 58.6905]

Bolt 3 - Shear Force (kips): [0.030629 ; 0.010138 ; 0.016067 ; 0.038109 ; 0.076593 ; 0.13955 ; 0.21805 ; 0.29589 ; 0.3512 ; 0.42546 ; 0.50714 ; 0.41397 ; 0.36484 ; 0.3601 ; 0.36076 ; 0.37075 ; 0.38825 ; 0.39215 ; 0.42992 ; 0.47192 ; 0.70894 ; 1.1496 ; 1.6412 ; 1.6317 ; 1.7083 ; 1.8436 ; 2.005 ; 2.2257 ; 2.5698 ; 2.995 ; 3.4503 ; 3.8495 ; 4.1471 ; 4.2317]

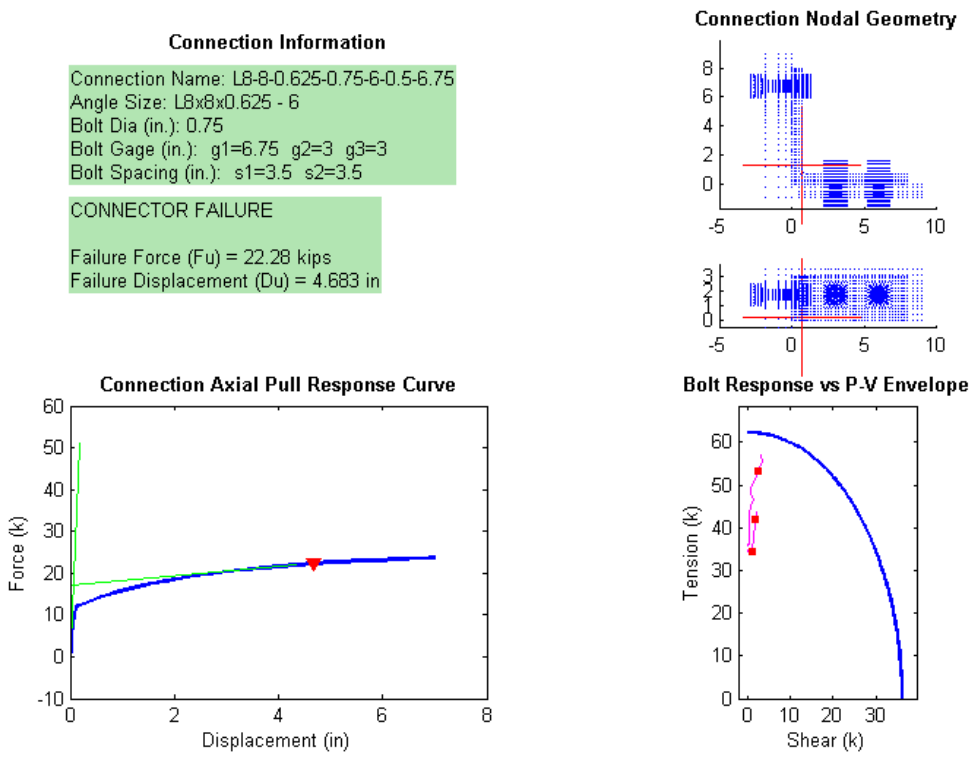


Figure B.327 Connection L8_8_0.625_0.75_6_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.75_6_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 303.4776

Plastic Stiffness (k/in): 1.0883

Displacement (in): [2.8939e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.9406 ; 1.4136 ; 1.5886 ; 1.8511 ; 2.2449 ; 2.3925 ; 2.614 ; 2.6971 ; 2.8217 ; 3.0085 ; 3.2889 ; 3.7093 ; 4.34 ; 5.04 ; 5.74 ; 6.44 ; 6.58 ; 6.79 ; 7]

Force (kips): [-0.717707 ; 0.436114 ; 0.941936 ; 1.64348 ; 2.61221 ; 3.91316 ; 5.19303 ; 5.89673 ; 6.16445 ; 6.37501 ; 6.73152 ; 7.20467 ; 7.80126 ; 8.52326 ; 8.75235 ; 9.06714 ; 9.48641 ; 9.63804 ; 9.84583 ; 9.92379 ; 10.0284 ; 10.1764 ; 10.3789 ; 10.6463 ; 10.9895 ; 11.2979 ; 11.5329 ; 11.7084 ; 11.7444 ; 11.7922 ; 11.8346]

Bolt 1 - Tensile Force (kips): [34.7136 ; 34.6853 ; 34.6729 ; 34.6543 ; 34.6273 ; 34.5873 ; 34.5402 ; 34.5122 ; 34.5047 ; 34.5016 ; 34.4932 ; 34.4728 ; 34.4168 ; 34.3674 ; 34.366 ; 34.3676 ; 34.3756 ; 34.38 ; 34.3879 ; 34.3907 ; 34.3957 ; 34.4034 ; 34.4162 ; 34.4375 ; 34.4713 ; 34.5119 ; 34.5563 ; 34.6035 ; 34.6116 ; 34.6245 ; 34.6381]

Bolt 1 - Shear Force (kips): [0.052417 ; 0.039106 ; 0.055104 ; 0.085367 ; 0.1338 ; 0.20693 ; 0.28842 ; 0.33963 ; 0.36081 ; 0.37999 ; 0.41442 ; 0.47724 ; 0.60492 ; 0.73899 ; 0.76442 ; 0.79662 ; 0.83573 ; 0.84796 ; 0.86447 ; 0.87095 ; 0.87948 ; 0.89195 ; 0.90868 ; 0.93098 ; 0.9612 ; 0.99036 ; 1.0139 ; 1.0334 ; 1.0391 ; 1.0465 ; 1.053]

Bolt 2 - Tensile Force (kips): [34.714 ; 34.6722 ; 34.6475 ; 34.6172 ; 34.5926 ; 34.5979 ; 34.6615 ; 34.7272 ; 34.7603 ; 34.8039 ; 34.8988 ; 35.0723 ; 35.4442 ; 36.3141 ; 36.7128 ; 37.2997 ; 38.1114 ; 38.4115 ; 38.8273 ; 38.9804 ; 39.2047 ; 39.5244 ; 39.9862 ; 40.6357 ; 41.4896 ; 42.2654 ; 42.8899 ; 43.3724 ; 43.4592 ; 43.5802 ; 43.694]

Bolt 2 - Shear Force (kips): [0.044171 ; 0.059297 ; 0.091964 ; 0.14228 ; 0.21786 ; 0.32705 ; 0.44623 ; 0.51897 ; 0.54758 ; 0.57359 ; 0.62473 ; 0.71745 ; 0.90529 ; 1.1272 ; 1.1799 ; 1.249 ; 1.3469 ; 1.3809 ; 1.4313 ; 1.4511 ; 1.4794 ; 1.5208 ; 1.5791 ; 1.6625 ; 1.7726 ; 1.8682 ; 1.9208 ; 1.9553 ; 1.9629 ; 1.973 ; 1.9818]

Bolt 3 - Tensile Force (kips): [36 ; 35.9362 ; 35.8946 ; 35.8808 ; 35.9544 ; 36.1861 ; 36.5088 ; 36.9561 ; 37.3199 ; 37.6606 ; 38.1596 ; 38.8736 ; 40.3304 ; 42.6972 ; 43.5701 ; 44.9388 ; 46.9143 ; 47.5579 ; 48.277 ; 48.5889 ; 48.9445 ; 49.4523 ; 50.1625 ; 51.1428 ; 52.5131 ; 53.8649 ; 54.9389 ; 55.8131 ; 56.1451 ; 56.5838 ; 56.9179]

Bolt 3 - Shear Force (kips): [0.028879 ; 0.011459 ; 0.021366 ; 0.047529 ; 0.094415 ; 0.16387 ; 0.21393 ; 0.21428 ; 0.22904 ; 0.25544 ; 0.32183 ; 0.4336 ; 0.35198 ; 0.29155 ; 0.28474 ; 0.65571 ; 1.2778 ; 1.137 ; 0.60483 ; 0.57176 ; 0.52724 ; 0.5958 ; 0.98919 ; 1.5525 ; 2.1656 ; 2.6821 ; 3.0892 ; 3.3633 ; 3.2739 ; 3.1766 ; 3.1488]

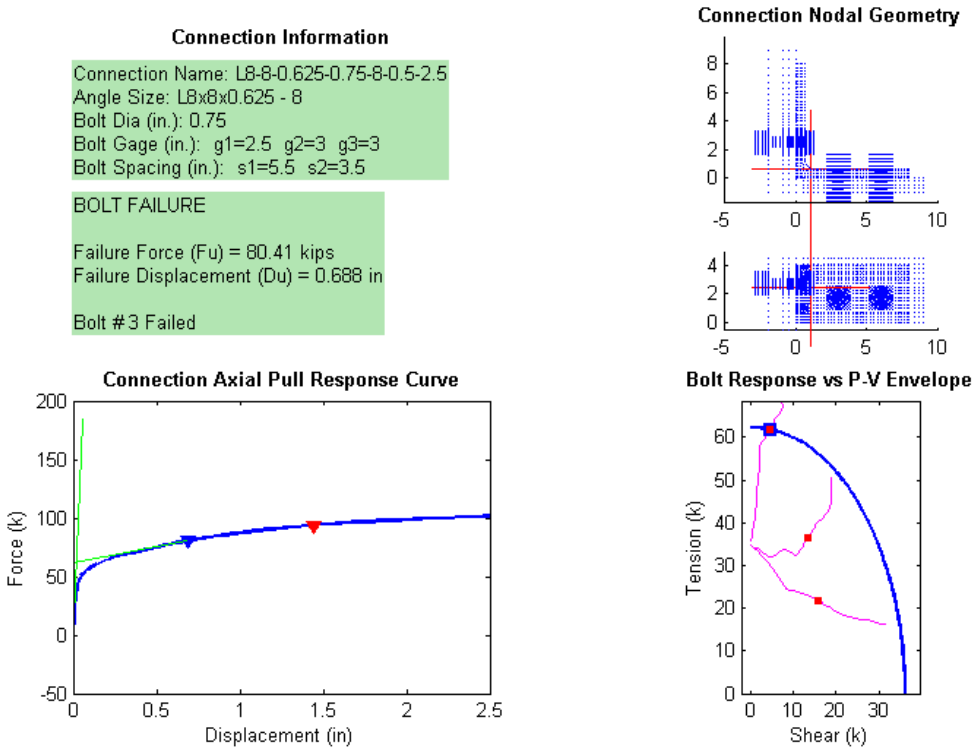


Figure B.328 Connection L8_8_0.625_0.75_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.75_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.2163e+003

Plastic Stiffness (k/in): 26.9547

Displacement (in): [2.4726e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.015747 ; 0.017395 ; 0.019867 ; 0.023575 ; 0.029137 ; 0.037479 ; 0.049994 ; 0.068765 ; 0.096921 ; 0.13916 ; 0.20251 ; 0.22627 ; 0.2619 ; 0.31536 ; 0.3354 ; 0.36547 ; 0.36829 ; 0.36934 ; 0.37093 ; 0.37331 ; 0.37688 ; 0.38223 ; 0.39026 ; 0.39828 ; 0.40631 ; 0.41835 ; 0.43641 ; 0.4635 ; 0.50414 ; 0.51938 ; 0.54224 ; 0.57653 ; 0.62796 ; 0.64724 ; 0.67617 ; 0.71957 ; 0.73584 ; 0.76025 ; 0.79687 ; 0.8106 ; 0.83119 ; 0.86209 ; 0.90843 ; 0.97794 ; 1.004 ; 1.0431 ; 1.1018 ; 1.1897 ; 1.3217 ; 1.5196 ; 1.7176 ; 1.9155 ; 2.1655 ; 2.4155 ; 2.5]

Force (kips): [-0.767583 ; 2.83966 ; 5.51435 ; 7.78657 ; 9.79526 ; 11.6161 ; 13.25 ; 15.3685 ; 16.0537 ; 16.9981 ; 18.2753 ; 19.8941 ; 21.8245 ; 23.6633 ; 25.3258 ; 26.7967 ; 28.3832 ; 30.1582 ; 32.1703 ; 32.7612 ; 33.4934 ; 34.4006 ; 34.7334 ; 35.1122 ; 35.1239 ; 35.1258 ; 35.1379 ; 35.1775 ; 35.2349 ; 35.3215 ; 35.4532 ; 35.614 ; 35.759 ; 35.9824 ; 36.3386 ; 36.8195 ; 37.5143 ; 37.7659 ; 38.1407 ; 38.6793 ; 39.4168 ; 39.6743 ; 40.0642 ; 40.6047 ; 40.792 ; 41.0732 ; 41.4732 ; 41.6223 ; 41.8583 ; 42.1972 ; 42.6908 ; 43.3494 ; 43.6 ; 43.95 ; 44.454 ; 45.1626 ; 46.1008 ; 47.2811 ; 48.2094 ; 48.9865 ; 49.8243 ; 50.5309 ; 50.7433]

Bolt 1 - Tensile Force (kips): [34.7106 ; 34.6083 ; 34.5231 ; 34.4436 ; 34.3683 ; 34.2957 ; 34.2266 ; 34.1317 ; 34.0994 ; 34.0534 ; 33.9877 ; 33.8975 ; 33.7618 ; 33.3156 ; 32.4911 ; 30.9499 ; 29.2435 ; 27.3962 ; 25.0405 ; 24.6991 ; 24.6744 ; 24.6456 ; 24.572 ; 24.4356 ; 24.4337 ; 24.4331 ; 24.4324 ; 24.4319 ; 24.4308 ; 24.4294 ; 24.4268 ; 24.392 ; 24.3705 ; 24.3412 ; 24.2273 ; 24.0582 ; 23.8189 ; 23.7321 ; 23.5202 ; 23.124 ; 22.6592 ; 22.4842 ; 22.0057 ; 21.4424 ; 21.2726 ; 20.8961 ; 20.4349 ; 20.2666 ; 20.0337 ; 19.6631 ; 19.106 ; 18.4183 ; 18.2286 ; 18.0773 ; 17.972 ; 17.7437 ; 17.3562 ; 17.1899 ; 17.0641 ; 16.7151 ; 16.349 ; 16.2752 ; 16.1956]

Bolt 1 - Shear Force (kips): [0.0538606 ; 0.146989 ; 0.286978 ; 0.408335 ; 0.517665 ; 0.61859 ; 0.710761 ; 0.83325 ; 0.873783 ; 0.930447 ; 1.00839 ; 1.11111 ; 1.2606 ; 1.7283 ; 2.48641 ; 3.77624 ; 5.08172 ; 6.39529 ; 7.93711 ; 8.14698 ; 8.14203 ; 8.13299 ; 8.24982 ; 8.40023 ; 8.39957 ; 8.3993 ; 8.39887 ; 8.39831 ; 8.39739 ; 8.39607 ; 8.39887 ; 8.6113 ; 8.74249 ; 8.91542 ; 9.38932 ; 9.89925 ; 10.6253 ; 10.996 ; 11.7962 ; 12.963 ; 14.0992 ; 14.4951 ; 15.3775 ; 16.346 ; 16.6244 ; 17.2698 ; 18.0704 ; 18.3531 ; 18.7339 ; 19.2972 ; 20.3075 ; 21.6841 ; 22.1755 ; 22.6957 ; 23.2589 ; 24.1675 ; 25.6386 ; 27.1716 ; 28.2878 ; 29.3601 ; 30.4836 ; 31.3028 ; 31.6198]

Bolt 2 - Tensile Force (kips): [34.7121 ; 34.5806 ; 34.4681 ; 34.3729 ; 34.2919 ; 34.2229 ; 34.1692 ; 34.1034 ; 34.0851 ; 34.0614 ; 34.0365 ; 34.0121 ; 33.9839 ; 33.6925 ; 33.1729 ; 32.192 ; 31.9434 ; 32.5879 ; 33.6522 ; 33.6649 ; 33.2831 ; 32.5809 ; 32.5641 ; 32.5021 ; 32.4689 ; 32.4571 ; 32.4512 ; 32.4605 ; 32.4663 ; 32.487 ; 32.5027 ; 32.6444 ; 32.7833 ; 32.9847 ; 33.2753 ; 33.6695 ; 34.1861 ; 34.3803 ; 34.6688 ; 35.1144 ; 35.699 ; 35.9065 ; 36.2387 ; 36.7212 ; 36.8955 ; 37.1643 ; 37.5412 ; 37.6893 ; 37.9014 ; 38.2041 ; 38.6758 ; 39.3495 ; 39.5923 ; 39.9389 ; 40.387 ; 41.0728 ; 42.0276 ; 43.3779 ; 44.9334 ; 46.5451 ; 48.4432 ; 50.0986 ; 50.6055]

Bolt 2 - Shear Force (kips): [0.0453673 ; 0.184312 ; 0.348942 ; 0.492253 ; 0.621795 ; 0.741578 ; 0.851234 ; 0.99592 ; 1.04372 ; 1.11063 ; 1.20239 ; 1.32357 ; 1.50257 ; 1.97626 ; 2.7269 ; 3.98851 ; 5.19569 ; 6.26009 ; 7.36626 ; 7.91183 ; 8.84405 ; 10.0728 ; 10.3408 ; 10.6579 ; 10.6825 ; 10.6889 ; 10.7046 ; 10.7451 ; 10.8077 ; 10.8971 ; 11.0334 ; 11.0718 ; 11.1091 ; 11.1618 ; 11.2355 ; 11.5486 ; 12.0302 ; 12.1574 ; 12.2872 ; 12.4446 ; 12.8957 ; 13.0683 ; 13.2181 ; 13.5255 ; 13.6594 ; 13.8063 ; 14.0221 ; 14.1248 ; 14.2858 ; 14.4941 ; 14.7081 ; 14.9508 ; 15.0358 ; 15.2753 ; 15.8486 ; 16.6483 ; 17.3902 ; 18.3859 ; 18.7603 ; 18.8946 ; 18.8415 ; 18.7601 ; 18.7009]

Bolt 3 - Tensile Force (kips): [36 ; 35.9459 ; 35.998 ; 36.1374 ; 36.3154 ; 36.5043 ; 36.7219 ; 37.0881 ; 37.257 ; 37.526 ; 37.9034 ; 38.4314 ; 39.1102 ; 39.9552 ; 41.0956 ; 42.5749 ; 44.6396 ; 47.1894 ; 50.2147 ; 51.1384 ; 52.3111 ; 53.7311 ; 54.2195 ; 54.7851 ; 54.8059 ; 54.8101 ; 54.8283 ; 54.8842 ; 54.966 ; 55.0889 ; 55.2537 ; 55.4528 ; 55.6432 ; 55.9314 ; 56.3879 ; 57.0158 ; 58.0139 ; 58.3694 ; 58.8665 ; 59.6133 ; 60.6991 ; 61.0663 ; 61.6441 ; 62.5176 ; 62.7951 ; 63.1613 ; 63.6606 ; 63.8552 ; 64.179 ; 64.6614 ; 65.3413 ; 66.1778 ; 66.5577 ; 66.9875 ; 67.5987 ; 68.5621 ; 69.8239 ; 71.134 ; 71.6425 ; 71.749 ; 71.7853 ; 71.8528 ; 71.8725]

Bolt 3 - Shear Force (kips): [0.02649 ; 0.03162 ; 0.078261 ; 0.12961 ; 0.1766 ; 0.2196 ; 0.2608 ; 0.31977 ; 0.3409 ; 0.37187 ; 0.41643 ; 0.47672 ; 0.565 ; 0.68508 ; 0.84507 ; 1.0219 ; 1.2463 ; 1.4913 ; 1.7339 ; 1.7956 ; 1.8591 ; 1.9242 ; 1.9461 ; 1.9699 ; 1.9708 ; 1.971 ; 1.9717 ; 1.9741 ; 1.9775 ; 1.9826 ; 1.9938 ; 2.0042 ; 2.0131 ; 2.0401 ; 2.0722 ; 2.0954 ; 2.1551 ; 2.2638 ; 2.4994 ; 2.9607 ; 3.6883 ; 3.8423 ; 4.2436 ; 4.7759 ; 4.924 ; 5.0862 ; 5.292 ; 5.39 ; 5.6132 ; 5.9634 ; 6.624 ; 7.171 ; 7.212 ; 7.3666 ; 7.5263 ; 7.1387 ; 6.4744 ; 5.635 ; 4.7468 ; 4.2805 ; 4.0299 ; 3.9414 ; 3.9281]

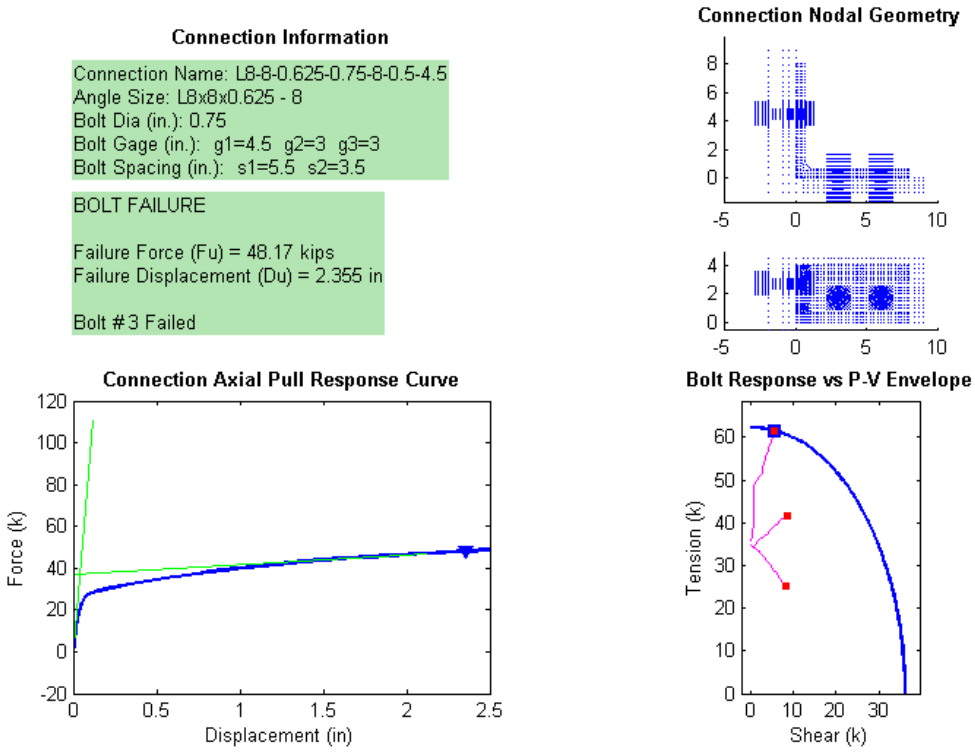


Figure B.329 Connection L8_8_0.625_0.75_8_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.75_8_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 958.9345

Plastic Stiffness (k/in): 4.7682

Displacement (in): [2.4845e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.026611 ; 0.036499 ; 0.051331 ; 0.073578 ; 0.10695 ; 0.15701 ; 0.23209 ; 0.34472 ; 0.38695 ; 0.45031 ; 0.54533 ; 0.68788 ; 0.74133 ; 0.82151 ; 0.90169 ; 0.98187 ; 1.0119 ; 1.057 ; 1.1247 ; 1.2262 ; 1.3784 ; 1.6067 ; 1.6692 ; 1.763 ; 1.9036 ; 2.1145 ; 2.3645 ; 2.5]

Force (kips): [-0.621319 ; 0.494874 ; 1.2516 ; 2.26589 ; 3.62541 ; 4.86219 ; 6.00859 ; 7.57743 ; 9.49095 ; 11.4716 ; 13.1048 ; 14.0111 ; 14.579 ; 15.2462 ; 16.1264 ; 16.4293 ; 16.8689 ; 17.4802 ; 18.3187 ; 18.6263 ; 19.0624 ; 19.4576 ; 19.8316 ; 19.9888 ; 20.2086 ; 20.5162 ; 20.9437 ; 21.5111 ; 22.2455 ; 22.4285 ; 22.6944 ; 23.0639 ; 23.5668 ; 24.1058 ; 24.3718]

Bolt 1 - Tensile Force (kips): [34.7093 ; 34.68 ; 34.6587 ; 34.6289 ; 34.5874 ; 34.5456 ; 34.5037 ; 34.442 ; 34.3579 ; 34.2577 ; 34.1581 ; 34.0851 ; 34.0338 ; 33.9443 ; 33.574 ; 33.2751 ; 32.7891 ; 32.0527 ; 30.9798 ; 30.5716 ; 29.9606 ; 29.3586 ; 28.7503 ; 28.5018 ; 28.1415 ; 27.6254 ; 26.8854 ; 25.8443 ; 24.9494 ; 24.9514 ; 24.958 ; 24.9722 ; 24.998 ; 25.031 ; 25.0496]

Bolt 1 - Shear Force (kips): [0.045614 ; 0.038901 ; 0.071235 ; 0.12289 ; 0.19699 ; 0.26682 ; 0.33373 ; 0.4291 ; 0.55331 ; 0.69445 ; 0.83235 ; 0.9367 ; 1.0156 ; 1.1444 ; 1.5776 ; 1.8828 ; 2.3406 ; 2.9963 ; 3.8957 ; 4.2229 ; 4.7016 ; 5.1609 ; 5.6129 ; 5.7942 ; 6.0551 ; 6.4238 ; 6.9406 ; 7.6364 ; 8.2254 ; 8.2297 ; 8.2342 ; 8.2401 ; 8.249 ; 8.26 ; 8.2632]

Bolt 2 - Tensile Force (kips): [34.7064 ; 34.6693 ; 34.6343 ; 34.5885 ; 34.5333 ; 34.4916 ; 34.4635 ; 34.4481 ; 34.4678 ; 34.5643 ; 34.7233 ; 34.9069 ; 35.0877 ; 35.4147 ; 36.0612 ; 36.2334 ; 36.5135 ; 36.9471 ; 37.6593 ; 37.9142 ; 38.2931 ; 38.6424 ; 38.953 ; 39.0613 ; 39.2133 ; 39.4284 ; 39.7381 ; 40.193 ; 40.7404 ; 40.8486 ; 41.0021 ; 41.2146 ; 41.4925 ; 41.7985 ; 41.9549]

Bolt 2 - Shear Force (kips): [0.035868 ; 0.052144 ; 0.098345 ; 0.16515 ; 0.25899 ; 0.34728 ; 0.43185 ; 0.55196 ; 0.70764 ; 0.88384 ; 1.055 ; 1.1897 ; 1.2896 ; 1.4545 ; 1.9021 ; 2.1836 ; 2.6001 ; 3.1774 ; 3.923 ; 4.1857 ; 4.5372 ; 4.853 ; 5.1518 ; 5.2702 ; 5.4376 ; 5.6678 ; 5.9793 ; 6.3879 ; 6.9905 ; 7.1626 ; 7.4101 ; 7.7518 ; 8.213 ; 8.6838 ; 8.907]

Bolt 3 - Tensile Force (kips): [36 ; 35.9482 ; 35.9137 ; 35.8969 ; 35.9471 ; 36.0669 ; 36.2149 ; 36.4456 ; 36.8521 ; 37.556 ; 38.4148 ; 39.1283 ; 40.0286 ; 41.2518 ; 43.0954 ; 43.7661 ; 44.7641 ; 46.2333 ; 48.3097 ; 48.9812 ; 49.8553 ; 50.6279 ; 51.3919 ; 51.726 ; 52.2445 ; 52.9973 ; 54.0716 ; 55.484 ; 57.2459 ; 57.711 ; 58.3347 ; 59.2365 ; 60.4529 ; 61.6976 ; 62.2719]

Bolt 3 - Shear Force (kips): [0.032466 ; 0.011792 ; 0.019123 ; 0.04291 ; 0.084952 ; 0.13087 ; 0.17333 ; 0.22993 ; 0.30293 ; 0.38425 ; 0.47226 ; 0.56304 ; 0.53496 ; 0.51174 ; 0.52904 ; 0.54384 ; 0.56981 ; 0.60016 ; 0.65062 ; 0.70878 ; 1.2303 ; 1.8243 ; 2.4641 ; 2.5688 ; 2.6923 ; 2.6961 ; 2.9929 ; 3.4722 ; 4.0529 ; 4.2549 ; 4.4782 ; 4.6937 ; 4.9529 ; 5.3358 ; 5.3411]

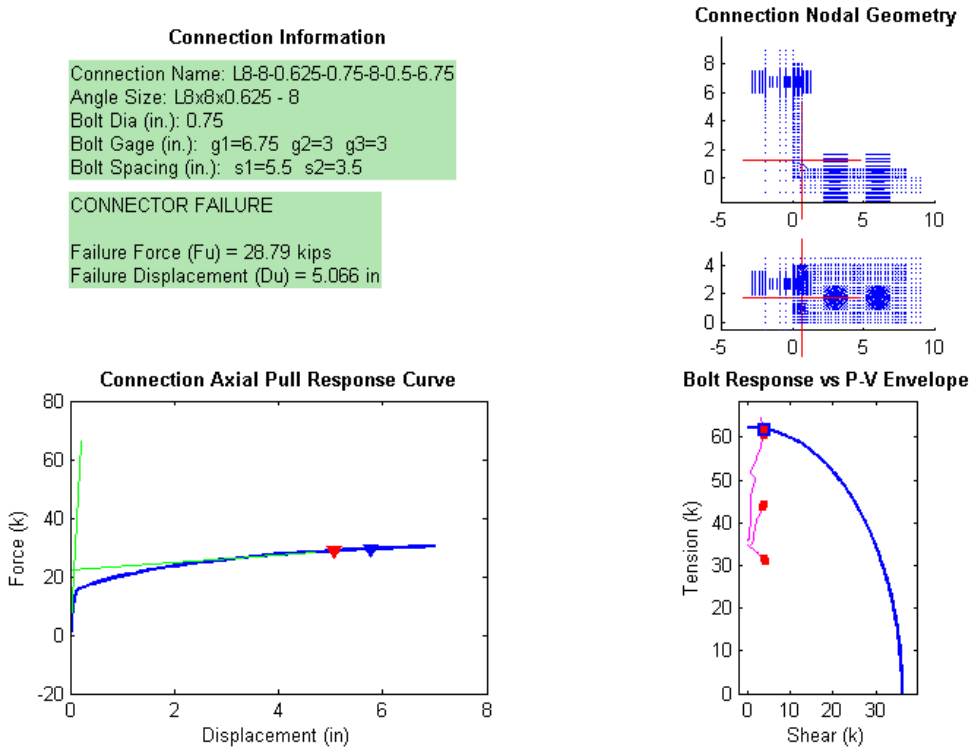


Figure B.330 Connection L8_8_0.625_0.75_8_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.75_8_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 316.4795

Plastic Stiffness (k/in): 1.2773

Displacement (in): [2.4408e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.46757 ; 0.5464 ; 0.66466 ; 0.84205 ; 1.1081 ; 1.2079 ; 1.3576 ; 1.5821 ; 1.9188 ; 1.9504 ; 1.9978 ; 2.0688 ; 2.1754 ; 2.3352 ; 2.5749 ; 2.9346 ; 3.0694 ; 3.2717 ; 3.5751 ; 4.0302 ; 4.713 ; 5.413 ; 5.588 ; 5.8505 ; 5.9489 ; 6.0966 ; 6.318 ; 6.6503 ; 7]

Force (kips): [-0.602017 ; 0.522259 ; 1.12873 ; 1.97017 ; 3.12324 ; 4.66423 ; 6.32897 ; 7.46442 ; 7.9318 ; 8.24963 ; 8.69612 ; 8.85164 ; 9.06392 ; 9.35744 ; 9.76464 ; 10.3068 ; 10.4932 ; 10.7592 ; 11.1288 ; 11.6342 ; 11.685 ; 11.7537 ; 11.8625 ; 12.0102 ; 12.2146 ; 12.4955 ; 12.8694 ; 12.9999 ; 13.1845 ; 13.4402 ; 13.7771 ; 14.2131 ; 14.569 ; 14.6483 ; 14.7554 ; 14.7977 ; 14.8574 ; 14.9395 ; 15.0496 ; 15.1542]

Bolt 1 - Tensile Force (kips): [34.7097 ; 34.6801 ; 34.663 ; 34.6377 ; 34.6008 ; 34.5435 ; 34.4692 ; 34.4106 ; 34.389 ; 34.3766 ; 34.3542 ; 34.3443 ; 34.3262 ; 34.2952 ; 34.2375 ; 34.1438 ; 34.1225 ; 34.1004 ; 34.0755 ; 34.0308 ; 34.0247 ; 34.0166 ; 34.0021 ; 33.9799 ; 33.9385 ; 33.8339 ; 33.5535 ; 33.4373 ; 33.2525 ; 32.9624 ; 32.5291 ; 31.8963 ; 31.334 ; 31.2029 ; 31.0224 ; 30.9382 ; 30.8164 ; 30.6444 ; 30.4056 ; 30.1846]

Bolt 1 - Shear Force (kips): [0.045005 ; 0.041009 ; 0.067697 ; 0.11191 ; 0.17864 ; 0.27581 ; 0.39424 ; 0.48586 ; 0.52473 ; 0.55475 ; 0.60505 ; 0.62594 ; 0.66165 ; 0.72055 ; 0.82273 ; 0.97669 ; 1.014 ; 1.0567 ; 1.1096 ; 1.1938 ; 1.2035 ; 1.217 ; 1.2396 ; 1.2731 ; 1.3307 ; 1.4622 ; 1.7764 ; 1.8978 ; 2.085 ; 2.3685 ; 2.7796 ; 3.3605 ; 3.8626 ; 3.9778 ; 4.1368 ; 4.2088 ; 4.3126 ; 4.4592 ; 4.6625 ; 4.852]

Bolt 2 - Tensile Force (kips): [34.7079 ; 34.6665 ; 34.6342 ; 34.5946 ; 34.5592 ; 34.5569 ; 34.6288 ; 34.7488 ; 34.8076 ; 34.8599 ; 34.9693 ; 35.0154 ; 35.1002 ; 35.2604 ; 35.5271 ; 36.0789 ; 36.3692 ; 36.834 ; 37.536 ; 38.5027 ; 38.592 ; 38.7223 ; 38.9195 ; 39.206 ; 39.6295 ; 40.1883 ; 40.8906 ; 41.1329 ; 41.476 ; 41.969 ; 42.6443 ; 43.4889 ; 44.1924 ; 44.3466 ; 44.5536 ; 44.6185 ; 44.7106 ; 44.8391 ; 45.0068 ; 45.1717]

Bolt 2 - Shear Force (kips): [0.035434 ; 0.057588 ; 0.098728 ; 0.1606 ; 0.25147 ; 0.38166 ; 0.53656 ; 0.65479 ; 0.70164 ; 0.7365 ; 0.7992 ; 0.82477 ; 0.8699 ; 0.94541 ; 1.0748 ; 1.2736 ; 1.3225 ; 1.3806 ; 1.4536 ; 1.5669 ; 1.5792 ; 1.5967 ; 1.6251 ; 1.667 ; 1.7334 ; 1.8655 ; 2.1448 ; 2.2511 ; 2.4108 ; 2.6397 ; 2.9248 ; 3.2894 ; 3.5799 ; 3.6452 ; 3.7349 ; 3.7774 ; 3.8384 ; 3.9234 ; 4.0408 ; 4.1468]

Bolt 3 - Tensile Force (kips): [36 ; 35.9349 ; 35.8963 ; 35.8931 ; 36.0104 ; 36.3128 ; 36.8569 ; 37.651 ; 38.3303 ; 38.9104 ; 39.7189 ; 40.0536 ; 40.5747 ; 41.3869 ; 42.6494 ; 44.5742 ; 45.2772 ; 46.3035 ; 47.8273 ; 50.0182 ; 50.2327 ; 50.4913 ; 50.8784 ; 51.3885 ; 52.076 ; 53.0338 ; 54.3367 ; 54.865 ; 55.6553 ; 56.6638 ; 57.9816 ; 59.8381 ; 61.3208 ; 61.6732 ; 62.1239 ; 62.4283 ; 62.8672 ; 63.4237 ; 64.1288 ; 64.7621]

Bolt 3 - Shear Force (kips): [0.030922 ; 0.012274 ; 0.025753 ; 0.057727 ; 0.11386 ; 0.19086 ; 0.26209 ; 0.29703 ; 0.35126 ; 0.42326 ; 0.49983 ; 0.5066 ; 0.51225 ; 0.5301 ; 0.55296 ; 0.60766 ; 0.62876 ; 0.65094 ; 0.97404 ; 1.7056 ; 1.7212 ; 1.73 ; 1.5104 ; 1.1211 ; 0.7925 ; 1.0393 ; 1.5826 ; 1.8679 ; 2.1847 ; 2.6257 ; 3.0986 ; 3.4898 ; 3.8188 ; 3.8471 ; 3.8958 ; 3.7683 ; 3.6146 ; 3.4132 ; 3.2058 ; 3.1384]

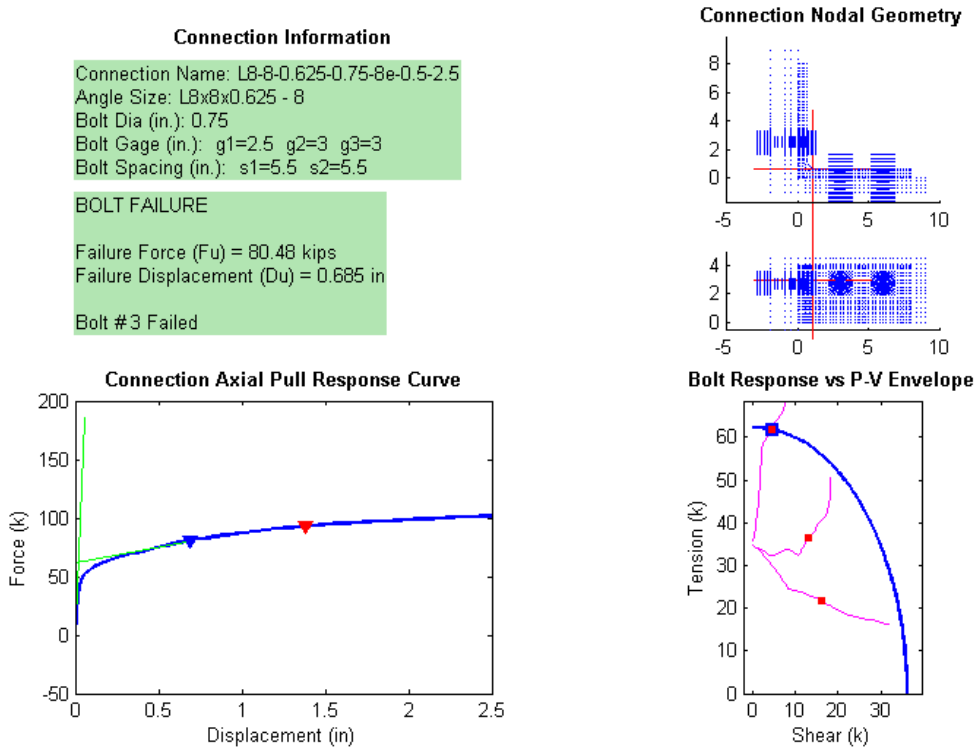


Figure B.331 Connection L8_8_0.625_0.75_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.75_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3228

Plastic Stiffness (k/in): 27.0102

Displacement (in): [2.842e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.04541 ; 0.055298 ; 0.070129 ; 0.092377 ; 0.12575 ; 0.1758 ; 0.25089 ; 0.27905 ; 0.32128 ; 0.33712 ; 0.34306 ; 0.35197 ; 0.36533 ; 0.37034 ; 0.37222 ; 0.37504 ; 0.37927 ; 0.38561 ; 0.39512 ; 0.4094 ; 0.4308 ; 0.46291 ; 0.49502 ; 0.52713 ; 0.53917 ; 0.55723 ; 0.58432 ; 0.62496 ; 0.6402 ; 0.66305 ; 0.69734 ; 0.74877 ; 0.76806 ; 0.79699 ; 0.84039 ; 0.90548 ; 1.0031 ; 1.1496 ; 1.2045 ; 1.2869 ; 1.4105 ; 1.5958 ; 1.8458 ; 2.0958 ; 2.3458 ; 2.5]

Force (kips): [-0.929461 ; 2.69883 ; 5.37525 ; 7.64658 ; 9.65345 ; 11.4694 ; 13.0963 ; 15.2092 ; 17.6988 ; 20.5214 ; 23.2221 ; 24.7842 ; 25.7665 ; 26.8496 ; 28.112 ; 29.5763 ; 31.2803 ; 33.1653 ; 33.7073 ; 34.4087 ; 34.6861 ; 34.7992 ; 34.9322 ; 35.0894 ; 35.1128 ; 35.1131 ; 35.1173 ; 35.1916 ; 35.3018 ; 35.4809 ; 35.7578 ; 36.1827 ; 36.7745 ; 37.3538 ; 37.9236 ; 38.1304 ; 38.4272 ; 38.8553 ; 39.4426 ; 39.6562 ; 39.9649 ; 40.4076 ; 41.0213 ; 41.242 ; 41.556 ; 42.0334 ; 42.7391 ; 43.6628 ; 44.9009 ; 45.335 ; 45.9218 ; 46.7 ; 47.6866 ; 48.7316 ; 49.6022 ; 50.3235 ; 50.7059]

Bolt 1 - Tensile Force (kips): [34.7727 ; 34.661 ; 34.5684 ; 34.4827 ; 34.4018 ; 34.3244 ; 34.2514 ; 34.1512 ; 34.0218 ; 33.8554 ; 33.4457 ; 32.8046 ; 32.1191 ; 30.9821 ; 29.6008 ; 28.0137 ; 26.0858 ; 24.7094 ; 24.6968 ; 24.6858 ; 24.5937 ; 24.5032 ; 24.4837 ; 24.4773 ; 24.4746 ; 24.4736 ; 24.4726 ; 24.4739 ; 24.4757 ; 24.4705 ; 24.4213 ; 24.3354 ; 24.1171 ; 23.8954 ; 23.6788 ; 23.536 ; 23.3021 ; 22.9545 ; 22.5868 ; 22.3683 ; 22.0245 ; 21.6 ; 20.8881 ; 20.6533 ; 20.312 ; 19.7671 ; 19.0314 ; 18.3879 ; 17.9688 ; 17.7949 ; 17.5864 ; 17.4519 ; 17.184 ; 16.8551 ; 16.5632 ; 16.3403 ; 16.2511]

Bolt 1 - Shear Force (kips): [0.0525862 ; 0.157952 ; 0.301319 ; 0.425957 ; 0.538354 ; 0.642016 ; 0.736535 ; 0.862007 ; 1.01551 ; 1.19904 ; 1.63165 ; 2.23585 ; 2.83584 ; 3.77448 ; 4.83677 ; 5.98268 ; 7.28814 ; 8.15242 ; 8.1496 ; 8.14626 ; 8.27724 ; 8.37679 ; 8.39637 ; 8.39856 ; 8.39795 ; 8.3975 ; 8.3968 ; 8.39655 ; 8.39615 ; 8.44057 ; 8.75741 ; 9.20345 ; 9.90359 ; 10.5884 ; 11.5109 ; 11.9857 ; 12.678 ; 13.5515 ; 14.4384 ; 14.8724 ; 15.5213 ; 16.2966 ; 17.5886 ; 18.0032 ; 18.5817 ; 19.5094 ; 20.9426 ; 22.5879 ; 24.3377 ; 24.9082 ; 25.6906 ; 26.6007 ; 27.7827 ; 29.0677 ; 30.1835 ; 31.141 ; 31.6856]

Bolt 2 - Tensile Force (kips): [34.7882 ; 34.6527 ; 34.5396 ; 34.445 ; 34.3666 ; 34.3004 ; 34.2494 ; 34.1911 ; 34.1457 ; 34.1219 ; 33.9367 ; 33.5519 ; 33.1448 ; 32.5074 ; 32.2754 ; 32.6163 ; 33.4553 ; 33.6038 ; 33.2603 ; 32.6557 ; 32.7184 ; 32.8241 ; 32.7477 ; 32.5246 ; 32.4525 ; 32.427 ; 32.4086 ; 32.4551 ; 32.5005 ; 32.5842 ; 32.8382 ; 33.2007 ; 33.7392 ; 34.1993 ; 34.6021 ; 34.7659 ; 35.0125 ; 35.3564 ; 35.7722 ; 35.9322 ; 36.1797 ; 36.5575 ; 37.1227 ; 37.3303 ; 37.6264 ; 38.0309 ; 38.6472 ; 39.4666 ; 40.6157 ; 41.0843 ; 41.757 ; 42.7459 ; 44.2913 ; 46.1999 ; 47.9755 ; 49.6508 ; 50.5994]

Bolt 2 - Shear Force (kips): [0.0703245 ; 0.162979 ; 0.321223 ; 0.459034 ; 0.583214 ; 0.697786 ; 0.802205 ; 0.939971 ; 1.10726 ; 1.30712 ; 1.74795 ; 2.33752 ; 2.92844 ; 3.84292 ; 4.82723 ; 5.79822 ; 6.74263 ; 8.36258 ; 9.07043 ; 10.0341 ; 10.2116 ; 10.2329 ; 10.3807 ; 10.6224 ; 10.6726 ; 10.6823 ; 10.6937 ; 10.7567 ; 10.8602 ; 10.9839 ; 11.0531 ; 11.1451 ; 11.3156 ; 11.593 ; 12.0153 ; 12.1001 ; 12.1965 ; 12.335 ; 12.7151 ; 12.86 ; 13.0252 ; 13.243 ; 13.523 ; 13.7347 ; 13.9926 ; 14.2836 ; 14.5854 ; 15.0263 ; 16.1243 ; 16.5491 ; 17.0016 ; 17.5281 ; 17.8798 ; 18.1775 ; 18.2748 ; 18.2617 ; 18.2073]

Bolt 3 - Tensile Force (kips): [36 ; 35.9441 ; 35.9943 ; 36.1314 ; 36.3092 ; 36.4997 ; 36.7172 ; 37.0769 ; 37.7709 ; 38.6837 ; 39.7771 ; 40.7167 ; 41.5766 ; 42.748 ; 44.3916 ; 46.5029 ; 49.0949 ; 52.0306 ; 52.8742 ; 53.9377 ; 54.3319 ; 54.4871 ; 54.682 ; 54.921 ; 54.9604 ; 54.9632 ; 54.9705 ; 55.0719 ; 55.2208 ; 55.4456 ; 55.7915 ; 56.331 ; 57.0686 ; 57.8734 ; 58.6169 ; 58.8757 ; 59.2456 ; 59.8346 ; 60.6892 ; 60.9851 ; 61.4248 ; 62.1542 ; 63.0327 ; 63.3215 ; 63.7043 ; 64.3635 ; 65.3356 ; 66.4928 ; 68.1403 ; 68.7626 ; 69.562 ; 70.5299 ; 71.4365 ; 71.7531 ; 71.7756 ; 71.826 ; 71.8615]

Bolt 3 - Shear Force (kips): [0.036738 ; 0.023302 ; 0.069035 ; 0.11962 ; 0.16649 ; 0.2091 ; 0.24981 ; 0.30784 ; 0.38901 ; 0.49529 ; 0.64061 ; 0.76957 ; 0.87481 ; 1.0044 ; 1.1806 ; 1.3811 ; 1.5961 ; 1.7905 ; 1.8316 ; 1.8828 ; 1.9009 ; 1.9079 ; 1.9166 ; 1.9273 ; 1.9291 ; 1.9293 ; 1.9298 ; 1.9341 ; 1.9411 ; 1.9562 ; 1.9745 ; 2.0154 ; 2.0568 ; 2.0924 ; 2.2981 ; 2.4389 ; 2.6175 ; 3.1533 ; 3.6967 ; 3.8148 ; 4.0186 ; 4.5286 ; 4.994 ; 5.1159 ; 5.2606 ; 5.6622 ; 6.4497 ; 7.1966 ; 7.4619 ; 7.1803 ; 6.6811 ; 6.2136 ; 5.329 ; 4.4946 ; 4.1493 ; 4.0144 ; 3.9817]

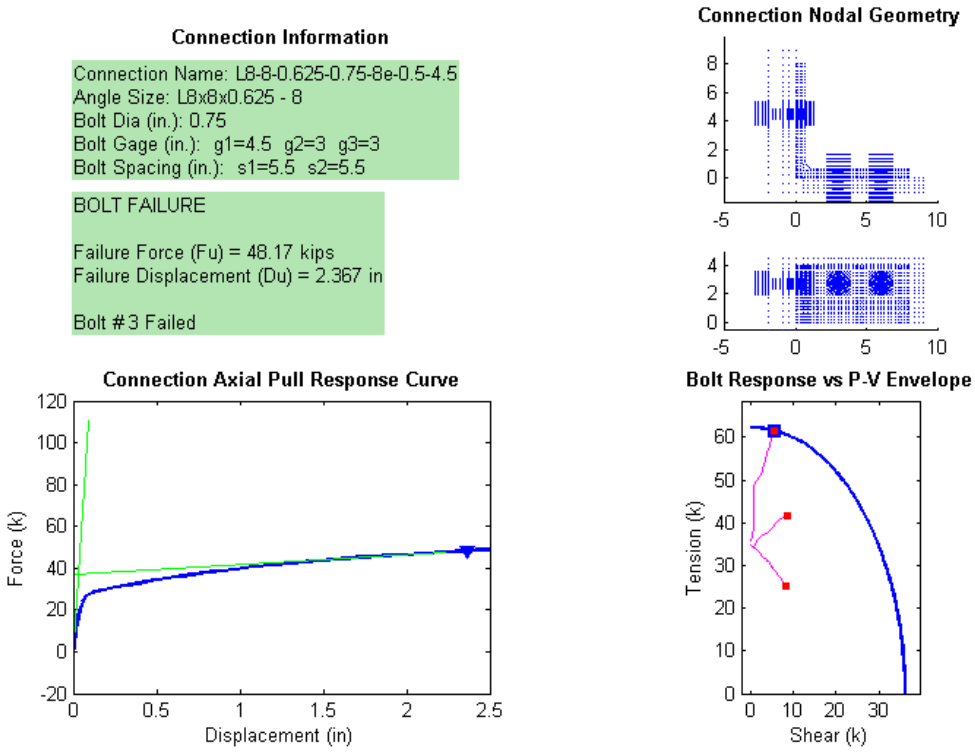


Figure B.332 Connection L8_8_0.625_0.75_8e_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.75_8e_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 1.2147e+003

Plastic Stiffness (k/in): 4.6064

Displacement (in): [2.267e-036 ; 0.00097656 ; 0.0019531 ; 0.003418 ; 0.0056152 ; 0.0089111 ; 0.013855 ; 0.018799 ; 0.023743 ; 0.031158 ; 0.042282 ; 0.058968 ; 0.083996 ; 0.12154 ; 0.17785 ; 0.26232 ; 0.38903 ; 0.43654 ; 0.50781 ; 0.61472 ; 0.65481 ; 0.71495 ; 0.80515 ; 0.83898 ; 0.88972 ; 0.96583 ; 1.08 ; 1.1942 ; 1.3083 ; 1.4796 ; 1.7296 ; 1.9796 ; 2.2296 ; 2.4796 ; 2.5]

Force (kips): [-0.747679 ; 0.034127 ; 0.438515 ; 1.0069 ; 1.78236 ; 2.84152 ; 4.27541 ; 5.58109 ; 6.78635 ; 8.38367 ; 10.2333 ; 12.0727 ; 13.4495 ; 14.209 ; 14.76 ; 15.4684 ; 16.4061 ; 16.7359 ; 17.2062 ; 17.8562 ; 18.09 ; 18.4399 ; 18.9415 ; 19.12 ; 19.3714 ; 19.7289 ; 20.2864 ; 20.7964 ; 21.2464 ; 21.8428 ; 22.5794 ; 23.2315 ; 23.8073 ; 24.3152 ; 24.3542]

Bolt 1 - Tensile Force (kips): [34.7707 ; 34.748 ; 34.7353 ; 34.7171 ; 34.6919 ; 34.6561 ; 34.6029 ; 34.5505 ; 34.499 ; 34.4249 ; 34.3291 ; 34.2209 ; 34.1229 ; 34.0487 ; 33.9901 ; 33.8735 ; 33.1441 ; 32.7844 ; 32.2061 ; 31.3423 ; 31.0177 ; 30.5266 ; 29.7993 ; 29.5292 ; 29.1319 ; 28.553 ; 27.6457 ; 26.773 ; 25.9744 ; 24.9826 ; 24.9785 ; 25.0114 ; 25.0509 ; 25.0894 ; 25.094]

Bolt 1 - Shear Force (kips): [0.043426 ; 0.036541 ; 0.050059 ; 0.077132 ; 0.11875 ; 0.17921 ; 0.26424 ; 0.34469 ; 0.42159 ; 0.52832 ; 0.66051 ; 0.80553 ; 0.93596 ; 1.0363 ; 1.1207 ; 1.2729 ; 2.0308 ; 2.3637 ; 2.8774 ; 3.6095 ; 3.8742 ; 4.2662 ; 4.8314 ; 5.0368 ; 5.3345 ; 5.7609 ; 6.4136 ; 7.0229 ; 7.5572 ; 8.2024 ; 8.2396 ; 8.2531 ; 8.2666 ; 8.2792 ; 8.2782]

Bolt 2 - Tensile Force (kips): [34.7792 ; 34.7527 ; 34.7362 ; 34.7108 ; 34.6759 ; 34.6314 ; 34.5839 ; 34.5512 ; 34.5382 ; 34.5464 ; 34.6136 ; 34.7563 ; 34.9649 ; 35.1671 ; 35.3536 ; 35.8385 ; 36.4851 ; 36.716 ; 37.0372 ; 37.5145 ; 37.6974 ; 37.9649 ; 38.3539 ; 38.5005 ; 38.7177 ; 39.0392 ; 39.4817 ; 39.8742 ; 40.2318 ; 40.6636 ; 41.0389 ; 41.3421 ; 41.6175 ; 41.8984 ; 41.9199]

Bolt 2 - Shear Force (kips): [0.059141 ; 0.042553 ; 0.051412 ; 0.076976 ; 0.12079 ; 0.18612 ; 0.27894 ; 0.36682 ; 0.45063 ; 0.56559 ; 0.70708 ; 0.86345 ; 1.0111 ; 1.1362 ; 1.2436 ; 1.4351 ; 2.1476 ; 2.4471 ; 2.9002 ; 3.5179 ; 3.733 ; 4.0473 ; 4.4807 ; 4.624 ; 4.8236 ; 5.0956 ; 5.4962 ; 5.8564 ; 6.1717 ; 6.6115 ; 7.3109 ; 7.9216 ; 8.4387 ; 8.8669 ; 8.8997]

Bolt 3 - Tensile Force (kips): [36 ; 35.9734 ; 35.9486 ; 35.9189 ; 35.8965 ; 35.9062 ; 36.0016 ; 36.1672 ; 36.3404 ; 36.628 ; 37.0984 ; 37.8882 ; 38.6656 ; 39.4017 ; 40.3597 ; 41.7225 ; 43.7567 ; 44.5008 ; 45.6037 ; 47.2028 ; 47.7803 ; 48.5716 ; 49.6011 ; 49.9567 ; 50.4487 ; 51.1714 ; 52.4947 ; 53.7857 ; 54.9333 ; 56.3803 ; 58.1467 ; 59.676 ; 61.031 ; 62.1737 ; 62.2612]

Bolt 3 - Shear Force (kips): [0.042856 ; 0.027141 ; 0.015949 ; 0.011557 ; 0.024071 ; 0.05185 ; 0.099511 ; 0.1485 ; 0.1908 ; 0.24852 ; 0.31687 ; 0.39567 ; 0.49351 ; 0.55043 ; 0.51688 ; 0.50595 ; 0.53742 ; 0.55625 ; 0.58286 ; 0.61004 ; 0.61833 ; 0.66764 ; 0.99602 ; 1.4034 ; 1.7582 ; 2.2733 ; 2.763 ; 2.8879 ; 3.2879 ; 3.6779 ; 4.3753 ; 4.7534 ; 5.2013 ; 5.3543 ; 5.3532]

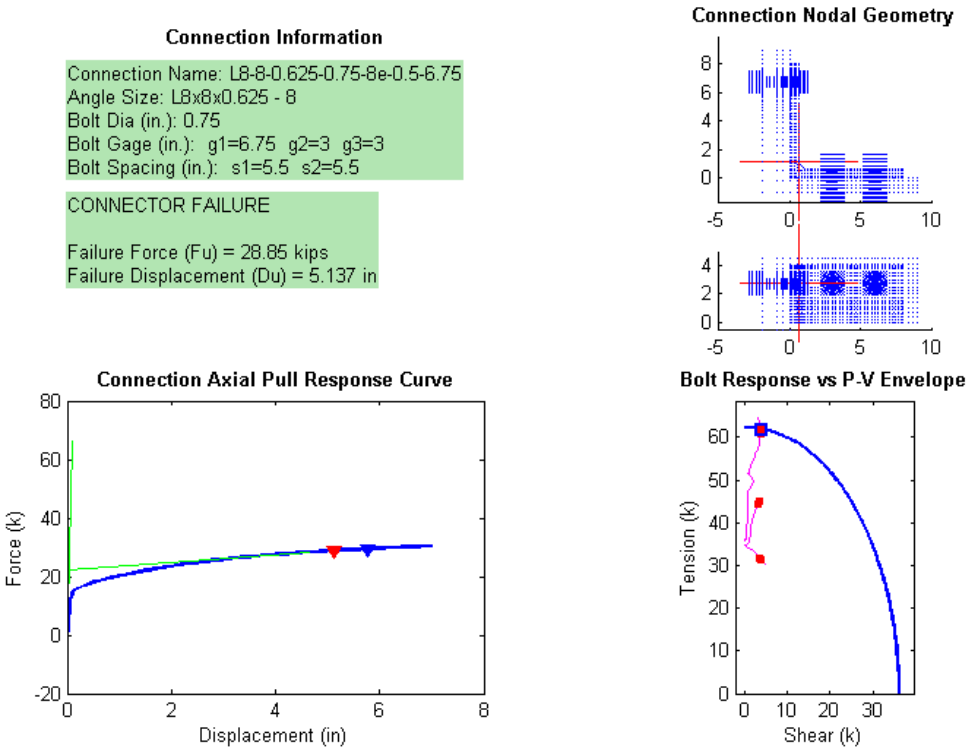


Figure B.333 Connection L8_8_0.625_0.75_8e_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.75_8e_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 645.9644

Plastic Stiffness (k/in): 1.2703

Displacement (in): [2.1014e-036 ; 0.0013672 ; 0.0027344 ; 0.0047852 ; 0.0078613 ; 0.012476 ; 0.019397 ; 0.029779 ; 0.045352 ; 0.068712 ; 0.10375 ; 0.15631 ; 0.23515 ; 0.35341 ; 0.5308 ; 0.59732 ; 0.6971 ; 0.84677 ; 1.0713 ; 1.408 ; 1.5343 ; 1.7237 ; 1.7948 ; 1.9013 ; 1.9413 ; 2.0012 ; 2.0911 ; 2.226 ; 2.2766 ; 2.3524 ; 2.4662 ; 2.6369 ; 2.8929 ; 3.2769 ; 3.3729 ; 3.4689 ; 3.6129 ; 3.8289 ; 4.153 ; 4.639 ; 5.339 ; 5.514 ; 5.7765 ; 5.8749 ; 6.0226 ; 6.2441 ; 6.5763 ; 7]

Force (kips): [-0.705301 ; 0.012804 ; 0.177855 ; 0.416904 ; 0.763214 ; 1.25573 ; 1.94941 ; 2.91489 ; 4.23254 ; 5.82754 ; 7.156 ; 7.80231 ; 8.12145 ; 8.5091 ; 9.02044 ; 9.19033 ; 9.43423 ; 9.77238 ; 10.2269 ; 10.8273 ; 11.0363 ; 11.3344 ; 11.4399 ; 11.6007 ; 11.6617 ; 11.7497 ; 11.8852 ; 12.0681 ; 12.134 ; 12.233 ; 12.3706 ; 12.561 ; 12.8274 ; 13.1825 ; 13.2663 ; 13.3471 ; 13.4651 ; 13.6285 ; 13.8558 ; 14.1645 ; 14.5298 ; 14.6108 ; 14.7226 ; 14.7645 ; 14.8257 ; 14.9103 ; 15.0235 ; 15.1506]

Bolt 1 - Tensile Force (kips): [34.7716 ; 34.7506 ; 34.7453 ; 34.7374 ; 34.7259 ; 34.7091 ; 34.6845 ; 34.6479 ; 34.5913 ; 34.5121 ; 34.4357 ; 34.3985 ; 34.3843 ; 34.3633 ; 34.3235 ; 34.3048 ; 34.273 ; 34.2161 ; 34.1505 ; 34.1048 ; 34.0876 ; 34.0624 ; 34.0535 ; 34.038 ; 34.0315 ; 34.0206 ; 34.0006 ; 33.9687 ; 33.9549 ; 33.9315 ; 33.8922 ; 33.798 ; 33.6343 ; 33.4026 ; 33.34 ; 33.2746 ; 33.1677 ; 32.9883 ; 32.6941 ; 32.2539 ; 31.6816 ; 31.5456 ; 31.3549 ; 31.275 ; 31.1503 ; 30.9713 ; 30.7247 ; 30.4504]

Bolt 1 - Shear Force (kips): [0.041903 ; 0.035939 ; 0.040879 ; 0.050802 ; 0.068082 ; 0.095555 ; 0.13738 ; 0.19952 ; 0.28973 ; 0.41056 ; 0.5239 ; 0.58219 ; 0.61155 ; 0.65542 ; 0.73134 ; 0.76488 ; 0.81926 ; 0.91056 ; 1.0125 ; 1.0939 ; 1.1234 ; 1.1665 ; 1.182 ; 1.2074 ; 1.2178 ; 1.2345 ; 1.2632 ; 1.3079 ; 1.3265 ; 1.3574 ; 1.4083 ; 1.5216 ; 1.7088 ; 1.9599 ; 2.0252 ; 2.0925 ; 2.2003 ; 2.3766 ; 2.6579 ; 3.0687 ; 3.5917 ; 3.7134 ; 3.884 ; 3.9538 ; 4.0617 ; 4.2159 ; 4.4282 ; 4.6654]

Bolt 2 - Tensile Force (kips): [34.7826 ; 34.7585 ; 34.7512 ; 34.7395 ; 34.7216 ; 34.6969 ; 34.667 ; 34.6436 ; 34.6414 ; 34.708 ; 34.854 ; 34.9432 ; 34.9887 ; 35.0807 ; 35.2787 ; 35.3644 ; 35.4996 ; 35.7176 ; 36.3053 ; 37.4298 ; 37.8329 ; 38.42 ; 38.6269 ; 38.9322 ; 39.0465 ; 39.2163 ; 39.473 ; 39.8343 ; 39.9656 ; 40.1558 ; 40.4259 ; 40.8023 ; 41.329 ; 42.0587 ; 42.2295 ; 42.3953 ; 42.6353 ; 42.9684 ; 43.421 ; 44.0093 ; 44.6785 ; 44.8212 ; 45.02 ; 45.0843 ; 45.1715 ; 45.2927 ; 45.4544 ; 45.6367]

Bolt 2 - Shear Force (kips): [0.057567 ; 0.043123 ; 0.045743 ; 0.052873 ; 0.069019 ; 0.096874 ; 0.14077 ; 0.20702 ; 0.30378 ; 0.42992 ; 0.54794 ; 0.60894 ; 0.63881 ; 0.68629 ; 0.77241 ; 0.81304 ; 0.8803 ; 0.99451 ; 1.1278 ; 1.2407 ; 1.2823 ; 1.3455 ; 1.3693 ; 1.4079 ; 1.423 ; 1.4464 ; 1.4843 ; 1.5422 ; 1.5651 ; 1.6012 ; 1.6572 ; 1.7644 ; 1.9341 ; 2.1607 ; 2.2172 ; 2.2746 ; 2.3643 ; 2.5025 ; 2.6962 ; 2.9552 ; 3.2617 ; 3.3313 ; 3.4275 ; 3.4678 ; 3.5305 ; 3.6193 ; 3.7394 ; 3.8716]

Bolt 3 - Tensile Force (kips): [36 ; 35.9821 ; 35.9647 ; 35.9411 ; 35.9139 ; 35.8884 ; 35.8912 ; 35.9798 ; 36.2313 ; 36.6624 ; 37.3823 ; 38.1151 ; 38.6892 ; 39.3495 ; 40.4729 ; 40.9151 ; 41.6024 ; 42.6621 ; 44.2731 ; 46.6068 ; 47.458 ; 48.7693 ; 49.2247 ; 49.9047 ; 50.1409 ; 50.4649 ; 50.9517 ; 51.5519 ; 51.768 ; 52.1075 ; 52.6072 ; 53.2339 ; 54.175 ; 55.5925 ; 55.9381 ; 56.2676 ; 56.7688 ; 57.4233 ; 58.2932 ; 59.6375 ; 61.173 ; 61.5208 ; 61.9981 ; 62.2493 ; 62.6895 ; 63.2763 ; 64.003 ; 64.7658]

Bolt 3 - Shear Force (kips): [0.041162 ; 0.028715 ; 0.021231 ; 0.013594 ; 0.012551 ; 0.023682 ; 0.049206 ; 0.09402 ; 0.16035 ; 0.2299 ; 0.27299 ; 0.31783 ; 0.38307 ; 0.47506 ; 0.49978 ; 0.51138 ; 0.52714 ; 0.54861 ; 0.59665 ; 0.65167 ; 0.8259 ; 1.5332 ; 1.8514 ; 1.9064 ; 1.8317 ; 1.7419 ; 1.3893 ; 0.96541 ; 0.77526 ; 0.87299 ; 1.0064 ; 1.2164 ; 1.5489 ; 2.2129 ; 2.3629 ; 2.5225 ; 2.7202 ; 2.963 ; 3.2405 ; 3.4862 ; 3.8154 ; 3.8453 ; 3.8929 ; 3.8282 ; 3.6736 ; 3.455 ; 3.2386 ; 3.136]

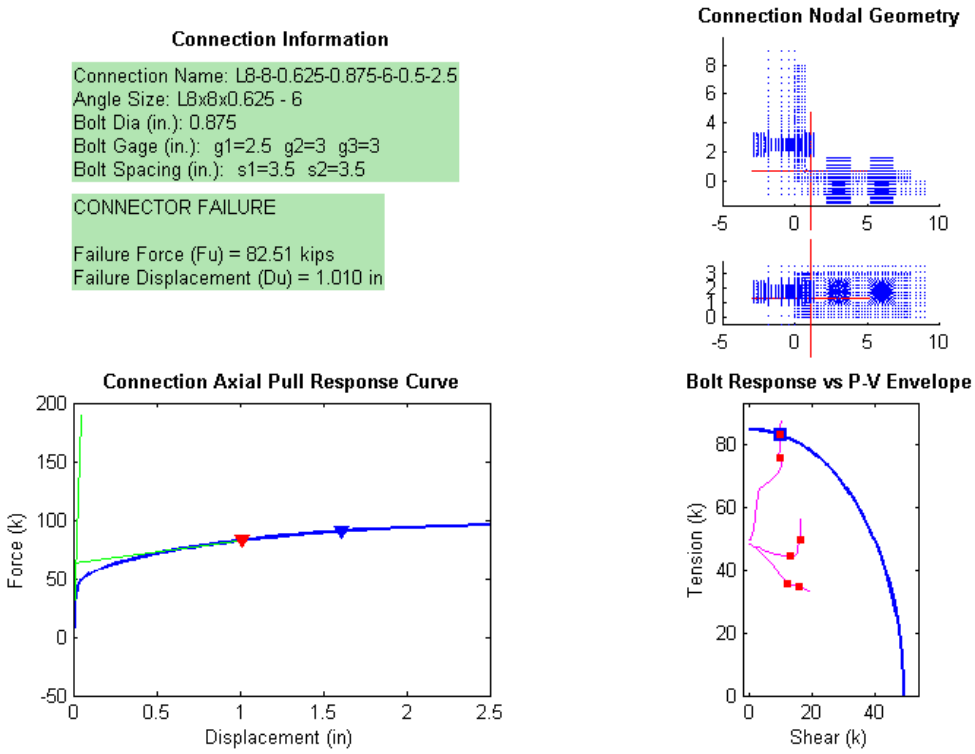


Figure B.334 Connection L8_8_0.625_0.875_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.875_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.7885e+003

Plastic Stiffness (k/in): 19.5643

Displacement (in): [4.2786e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.20294 ; 0.22669 ; 0.26233 ; 0.31578 ; 0.39596 ; 0.40348 ; 0.41476 ; 0.43167 ; 0.45704 ; 0.49509 ; 0.55218 ; 0.6378 ; 0.66991 ; 0.71807 ; 0.79031 ; 0.89868 ; 0.93932 ; 0.95456 ; 0.97742 ; 1.0117 ; 1.0631 ; 1.0824 ; 1.1114 ; 1.1222 ; 1.1385 ; 1.1629 ; 1.1995 ; 1.2544 ; 1.3368 ; 1.3677 ; 1.414 ; 1.4256 ; 1.4372 ; 1.4546 ; 1.4807 ; 1.5197 ; 1.5344 ; 1.5564 ; 1.5894 ; 1.6389 ; 1.7131 ; 1.8245 ; 1.9915 ; 2.2415 ; 2.4915 ; 2.5]

Force (kips): [-1.42676 ; 2.91973 ; 5.97274 ; 9.67364 ; 14.0793 ; 18.5043 ; 19.6181 ; 20.8752 ; 22.1994 ; 23.3376 ; 24.4301 ; 25.6182 ; 26.9873 ; 28.4235 ; 30.0886 ; 30.6248 ; 31.3734 ; 32.4026 ; 33.8143 ; 33.9523 ; 34.1576 ; 34.4476 ; 34.8933 ; 35.5258 ; 36.3903 ; 37.5087 ; 37.885 ; 38.428 ; 39.1962 ; 40.2296 ; 40.597 ; 40.7389 ; 40.9625 ; 41.2665 ; 41.7139 ; 41.8697 ; 42.0989 ; 42.1847 ; 42.3156 ; 42.5085 ; 42.772 ; 43.1423 ; 43.6891 ; 43.8868 ; 44.169 ; 44.2408 ; 44.312 ; 44.4143 ; 44.5633 ; 44.7808 ; 44.8617 ; 44.981 ; 45.1522 ; 45.3931 ; 45.7255 ; 46.1645 ; 46.7243 ; 47.3965 ; 47.9529 ; 47.9712]

Bolt 1 - Tensile Force (kips): [48.527 ; 48.3852 ; 48.2818 ; 48.1497 ; 47.9782 ; 47.7908 ; 47.7397 ; 47.6789 ; 47.6043 ; 47.5187 ; 47.41 ; 47.2549 ; 46.9289 ; 45.8129 ; 44.2808 ; 43.7323 ; 42.9301 ; 41.7581 ; 39.9718 ; 39.7929 ; 39.5225 ; 39.1215 ; 38.5096 ; 37.6126 ; 36.3811 ; 35.8235 ; 35.8169 ; 35.8128 ; 35.8128 ; 35.8189 ; 35.8219 ; 35.823 ; 35.6989 ; 35.6785 ; 35.6712 ; 35.6695 ; 35.6689 ; 35.6689 ; 35.6697 ; 35.673 ; 35.6793 ; 35.6899 ; 35.615 ; 35.5428 ; 35.3657 ; 35.2951 ; 35.2256 ; 35.1348 ; 35.0294 ; 34.9383 ; 34.881 ; 34.7692 ; 34.6175 ; 34.4689 ; 34.299 ; 34.0974 ; 33.8797 ; 33.5769 ; 33.2572 ; 33.2495]

Bolt 1 - Shear Force (kips): [0.0891252 ; 0.149123 ; 0.297754 ; 0.487568 ; 0.72352 ; 0.975318 ; 1.04258 ; 1.12177 ; 1.2184 ; 1.32949 ; 1.47054 ; 1.66747 ; 2.06131 ; 3.33731 ; 4.88526 ; 5.41071 ; 6.15541 ; 7.1975 ; 8.6959 ; 8.84061 ; 9.05758 ; 9.37617 ; 9.85641 ; 10.5381 ; 11.4216 ; 11.8141 ; 11.8163 ; 11.8171 ; 11.8179 ; 11.8202 ; 11.8212 ; 11.8215 ; 12.0092 ; 12.0322 ; 12.0295 ; 12.0272 ; 12.0231 ; 12.0215 ; 12.0191 ; 12.016 ; 12.0116 ; 12.0051 ; 12.4339 ; 12.733 ; 13.2816 ; 13.4854 ; 13.6791 ; 13.9161 ; 14.2389 ; 14.6966 ; 14.8988 ; 15.2288 ; 15.6394 ; 16.0189 ; 16.4452 ; 16.9848 ; 17.6244 ; 18.4341 ; 19.1133 ; 19.13]

Bolt 2 - Tensile Force (kips): [48.5258 ; 48.316 ; 48.1588 ; 47.9688 ; 47.7585 ; 47.559 ; 47.5152 ; 47.4653 ; 47.4048 ; 47.3544 ; 47.2822 ; 47.1928 ; 47.1326 ; 46.6351 ; 45.9675 ; 45.8124 ; 45.6238 ; 45.4174 ; 45.218 ; 45.1932 ; 45.1572 ; 45.1122 ; 45.0446 ; 44.9602 ; 44.8555 ; 44.6216 ; 44.5242 ; 44.4545 ; 44.4639 ; 44.5794 ; 44.6409 ; 44.6496 ; 44.6758 ; 44.6745 ; 44.6112 ; 44.6211 ; 44.6627 ; 44.71 ; 44.8265 ; 45.1683 ; 45.6712 ; 46.4025 ; 47.3251 ; 47.6288 ; 48.0492 ; 48.1403 ; 48.2323 ; 48.3768 ; 48.5893 ; 48.8847 ; 48.9859 ; 49.1332 ; 49.3484 ; 49.7049 ; 50.2889 ; 51.2208 ; 52.5762 ; 54.5033 ; 56.3012 ; 56.3663]

Bolt 2 - Shear Force (kips): [0.0755714 ; 0.237603 ; 0.448228 ; 0.715556 ; 1.05045 ; 1.41144 ; 1.51108 ; 1.63358 ; 1.79287 ; 1.99069 ; 2.24893 ; 2.59028 ; 3.09812 ; 4.25264 ; 5.54957 ; 5.89315 ; 6.33942 ; 6.92697 ; 7.7115 ; 7.78863 ; 7.90313 ; 8.0664 ; 8.31113 ; 8.66304 ; 9.16645 ; 9.99941 ; 10.3141 ; 10.7307 ; 11.2671 ; 11.9539 ; 12.1908 ; 12.3264 ; 12.5821 ; 12.9885 ; 13.8054 ; 14.0666 ; 14.457 ; 14.609 ; 14.801 ; 14.9011 ; 15.0315 ; 15.1964 ; 15.3875 ; 15.4508 ; 15.5398 ; 15.5594 ; 15.5792 ; 15.6105 ; 15.6606 ; 15.7289 ; 15.7519 ; 15.7863 ; 15.8832 ; 16.0654 ; 16.2562 ; 16.354 ; 16.3724 ; 16.2712 ; 16.0381 ; 16.0222]

Bolt 3 - Tensile Force (kips): [50 ; 49.8932 ; 49.8816 ; 49.9524 ; 50.1477 ; 50.5955 ; 50.7944 ; 51.1416 ; 51.6269 ; 52.1318 ; 52.6924 ; 53.4727 ; 54.518 ; 55.9323 ; 58.0283 ; 58.7933 ; 59.9371 ; 61.5897 ; 63.8852 ; 64.0836 ; 64.3521 ; 64.728 ; 65.2122 ; 65.9765 ; 67.1867 ; 68.9554 ; 69.5781 ; 70.497 ; 71.8868 ; 73.9986 ; 74.7868 ; 75.0722 ; 75.4857 ; 76.058 ; 76.8786 ; 77.1615 ; 77.5412 ; 77.6788 ; 77.8768 ; 78.2147 ; 78.7066 ; 79.4557 ; 80.611 ; 81.0032 ; 81.4902 ; 81.6032 ; 81.7088 ; 81.8678 ; 82.1041 ; 82.4606 ; 82.597 ; 82.7918 ; 83.0611 ; 83.4435 ; 84.0166 ; 84.6992 ; 85.5312 ; 86.4983 ; 87.39 ; 87.4273]

Bolt 3 - Shear Force (kips): [0.0392149 ; 0.0478494 ; 0.113261 ; 0.209056 ; 0.346694 ; 0.542944 ; 0.610064 ; 0.700992 ; 0.811417 ; 0.937338 ; 1.077 ; 1.18277 ; 1.32472 ; 1.52827 ; 1.83626 ; 1.93563 ; 2.06393 ; 2.23154 ; 2.45993 ; 2.48914 ; 2.53542 ; 2.59993 ; 2.70603 ; 2.90854 ; 4.50339 ; 7.05102 ; 7.7538 ; 8.82037 ; 9.71015 ; 10.141 ; 10.0118 ; 9.90602 ; 9.75341 ; 9.58132 ; 9.43822 ; 9.41524 ; 9.50629 ; 9.53148 ; 9.6146 ; 9.62335 ; 9.68788 ; 9.68253 ; 9.64124 ; 9.65914 ; 9.64761 ; 9.63624 ; 9.63747 ; 9.6371 ; 9.62924 ; 9.60303 ; 9.58968 ; 9.57407 ; 9.55845 ; 9.559 ; 9.59252 ; 9.58023 ; 9.59922 ; 9.68664 ; 9.96419 ; 10.0081]

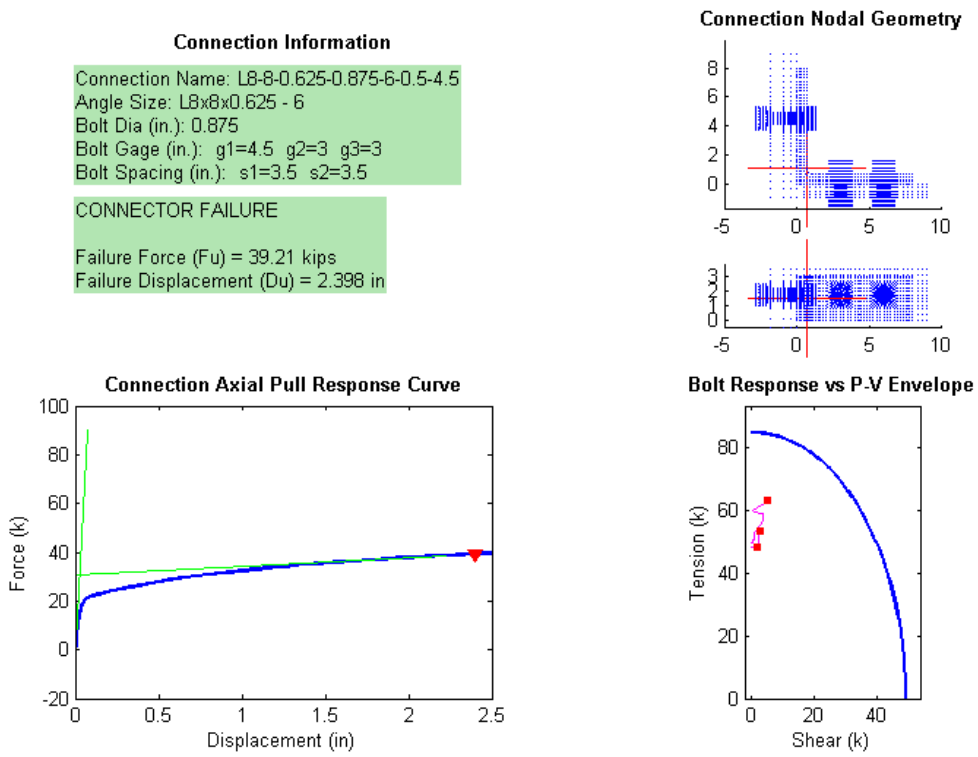


Figure B.335 Connection L8_8_0.625_0.875_6_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.875_6_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 1.1946e+003

Plastic Stiffness (k/in): 3.6720

Displacement (in): [5.3848e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.56737 ; 0.66112 ; 0.80174 ; 1.0127 ; 1.0752 ; 1.1689 ; 1.2041 ; 1.2173 ; 1.2371 ; 1.2667 ; 1.3112 ; 1.378 ; 1.4781 ; 1.5156 ; 1.5719 ; 1.6564 ; 1.7831 ; 1.9732 ; 2.2232 ; 2.4732 ; 2.5]

Force (kips): [-1.29653 ; 0.317368 ; 1.0367 ; 2.01182 ; 3.32167 ; 5.05243 ; 7.21993 ; 9.23857 ; 10.5336 ; 11.0437 ; 11.4387 ; 12.0679 ; 12.9047 ; 13.9563 ; 14.3061 ; 14.791 ; 15.4295 ; 16.2164 ; 16.4268 ; 16.7492 ; 16.8706 ; 16.9199 ; 16.9946 ; 17.0982 ; 17.2453 ; 17.451 ; 17.7358 ; 17.8382 ; 17.9845 ; 18.1948 ; 18.4786 ; 18.8688 ; 19.3278 ; 19.7264 ; 19.768]

Bolt 1 - Tensile Force (kips): [48.5265 ; 48.4752 ; 48.4526 ; 48.4211 ; 48.3774 ; 48.3174 ; 48.237 ; 48.153 ; 48.0921 ; 48.0698 ; 48.0546 ; 48.0163 ; 47.9589 ; 47.9251 ; 47.9154 ; 47.9069 ; 47.9067 ; 47.9217 ; 47.927 ; 47.9328 ; 47.9343 ; 47.9345 ; 47.9345 ; 47.9353 ; 47.9374 ; 47.9418 ; 47.9503 ; 47.9536 ; 47.959 ; 47.9673 ; 47.9823 ; 48.0068 ; 48.0412 ; 48.0805 ; 48.0847]

Bolt 1 - Shear Force (kips): [0.082649 ; 0.053792 ; 0.072312 ; 0.11178 ; 0.17418 ; 0.2642 ; 0.38691 ; 0.51432 ; 0.61073 ; 0.65741 ; 0.70173 ; 0.79088 ; 0.92243 ; 1.0429 ; 1.082 ; 1.1318 ; 1.1888 ; 1.2516 ; 1.2685 ; 1.2964 ; 1.3076 ; 1.3124 ; 1.3198 ; 1.3297 ; 1.3436 ; 1.3626 ; 1.3886 ; 1.3981 ; 1.4119 ; 1.4321 ; 1.459 ; 1.4965 ; 1.5423 ; 1.5816 ; 1.5858]

Bolt 2 - Tensile Force (kips): [48.5213 ; 48.4471 ; 48.4047 ; 48.3484 ; 48.2745 ; 48.1928 ; 48.1195 ; 48.0944 ; 48.1311 ; 48.1626 ; 48.2118 ; 48.3104 ; 48.4769 ; 48.9387 ; 49.1153 ; 49.4309 ; 49.9282 ; 50.5732 ; 50.7438 ; 50.9739 ; 51.057 ; 51.0875 ; 51.1332 ; 51.2019 ; 51.3044 ; 51.4602 ; 51.6863 ; 51.7692 ; 51.8927 ; 52.0756 ; 52.3693 ; 52.8011 ; 53.3185 ; 53.8111 ; 53.8637]

Bolt 2 - Shear Force (kips): [0.067883 ; 0.077927 ; 0.12763 ; 0.20033 ; 0.30419 ; 0.44964 ; 0.64387 ; 0.84708 ; 1.0055 ; 1.0835 ; 1.1656 ; 1.3343 ; 1.5989 ; 1.8671 ; 1.9367 ; 2.0145 ; 2.0919 ; 2.1668 ; 2.1871 ; 2.2233 ; 2.2388 ; 2.2453 ; 2.2553 ; 2.2698 ; 2.292 ; 2.3217 ; 2.3626 ; 2.3775 ; 2.3978 ; 2.4289 ; 2.4574 ; 2.5008 ; 2.5736 ; 2.6527 ; 2.6618]

Bolt 3 - Tensile Force (kips): [50 ; 49.9268 ; 49.8673 ; 49.8035 ; 49.7596 ; 49.7558 ; 49.7877 ; 49.8686 ; 50.0597 ; 50.234 ; 50.4502 ; 50.816 ; 51.3931 ; 52.6144 ; 53.1403 ; 54.0904 ; 55.4624 ; 57.2761 ; 57.7919 ; 58.5764 ; 58.826 ; 58.9337 ; 59.0692 ; 59.2272 ; 59.4378 ; 59.721 ; 60.1023 ; 60.2225 ; 60.3941 ; 60.7131 ; 61.1477 ; 61.776 ; 62.6879 ; 63.5173 ; 63.6257]

Bolt 3 - Shear Force (kips): [0.047643 ; 0.018866 ; 0.022331 ; 0.046912 ; 0.090746 ; 0.15748 ; 0.2454 ; 0.31606 ; 0.34658 ; 0.38027 ; 0.44176 ; 0.56088 ; 0.7756 ; 0.77911 ; 1.0047 ; 1.7267 ; 2.6175 ; 3.3865 ; 3.6946 ; 3.5964 ; 3.4105 ; 3.2415 ; 2.88 ; 2.3827 ; 1.7159 ; 0.87588 ; 0.5207 ; 0.7409 ; 1.206 ; 1.7261 ; 2.4352 ; 3.3661 ; 4.2535 ; 5.0014 ; 5.0926]

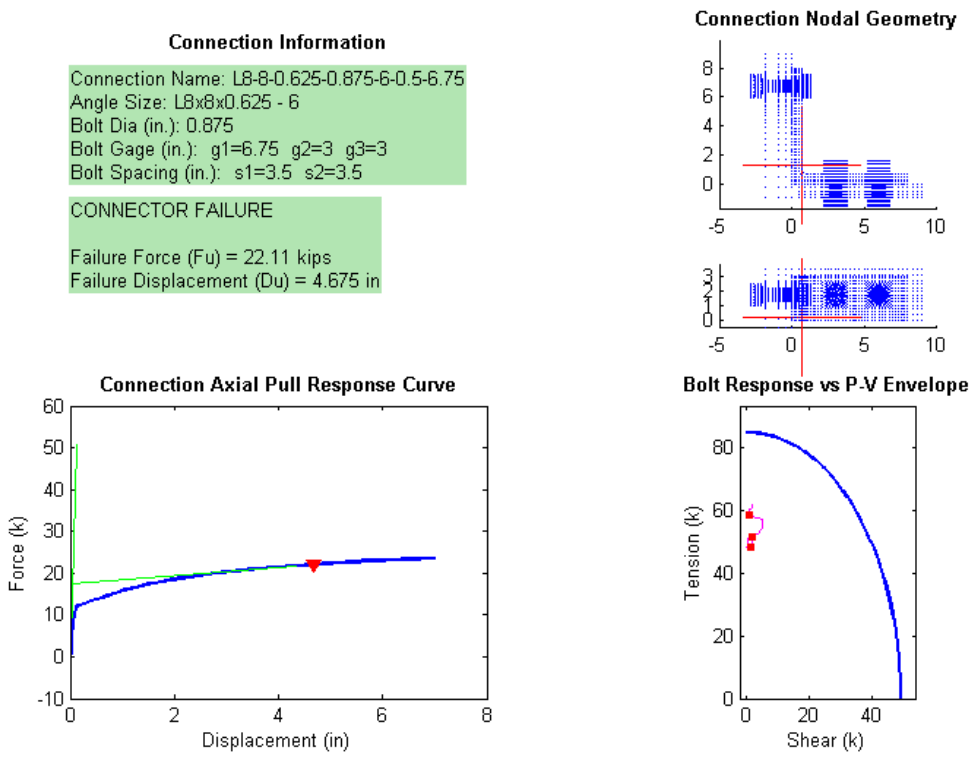


Figure B.336 Connection L8_8_0.625_0.875_6_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.875_6_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 399.0621

Plastic Stiffness (k/in): 1.0388

Displacement (in): [5.0853e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.9406 ; 1.0589 ; 1.2362 ; 1.5023 ; 1.6021 ; 1.7518 ; 1.9763 ; 2.313 ; 2.8182 ; 2.9932 ; 3.0588 ; 3.1572 ; 3.1942 ; 3.2495 ; 3.3326 ; 3.4572 ; 3.6441 ; 3.9244 ; 4.3448 ; 4.9756 ; 5.1506 ; 5.4131 ; 5.8068 ; 5.9545 ; 6.1759 ; 6.5082 ; 7]

Force (kips): [-1.25777 ; 0.390767 ; 0.924601 ; 1.66521 ; 2.67897 ; 4.0175 ; 5.2575 ; 5.88781 ; 6.11371 ; 6.32628 ; 6.68275 ; 7.15641 ; 7.76956 ; 7.99083 ; 8.29161 ; 8.67254 ; 8.80506 ; 8.98551 ; 9.23316 ; 9.55632 ; 9.96581 ; 10.0913 ; 10.1385 ; 10.213 ; 10.2392 ; 10.2793 ; 10.3373 ; 10.4194 ; 10.5368 ; 10.6966 ; 10.915 ; 11.1836 ; 11.257 ; 11.3526 ; 11.4747 ; 11.5157 ; 11.573 ; 11.6499 ; 11.746]

Bolt 1 - Tensile Force (kips): [48.527 ; 48.4748 ; 48.4581 ; 48.434 ; 48.3994 ; 48.3499 ; 48.2991 ; 48.2715 ; 48.2645 ; 48.2607 ; 48.2527 ; 48.2366 ; 48.1943 ; 48.1754 ; 48.1587 ; 48.1509 ; 48.1493 ; 48.1487 ; 48.15 ; 48.1595 ; 48.1855 ; 48.1955 ; 48.1991 ; 48.204 ; 48.2061 ; 48.209 ; 48.2135 ; 48.2205 ; 48.2313 ; 48.2481 ; 48.2741 ; 48.3149 ; 48.3246 ; 48.3412 ; 48.3683 ; 48.3786 ; 48.3942 ; 48.4184 ; 48.4558]

Bolt 1 - Shear Force (kips): [0.081788 ; 0.055787 ; 0.070733 ; 0.10049 ; 0.14975 ; 0.22456 ; 0.30525 ; 0.35442 ; 0.37555 ; 0.39711 ; 0.43243 ; 0.49145 ; 0.60698 ; 0.65368 ; 0.70676 ; 0.76258 ; 0.78163 ; 0.80719 ; 0.84189 ; 0.88188 ; 0.92312 ; 0.93572 ; 0.94068 ; 0.94863 ; 0.95142 ; 0.95575 ; 0.96192 ; 0.9709 ; 0.98403 ; 1.0024 ; 1.0282 ; 1.0636 ; 1.0754 ; 1.0901 ; 1.1089 ; 1.1157 ; 1.1256 ; 1.1393 ; 1.1567]

Bolt 2 - Tensile Force (kips): [48.524 ; 48.4468 ; 48.4098 ; 48.3613 ; 48.3042 ; 48.2571 ; 48.2541 ; 48.2664 ; 48.2782 ; 48.2975 ; 48.34 ; 48.4078 ; 48.5704 ; 48.6348 ; 48.7634 ; 48.9993 ; 49.0894 ; 49.2225 ; 49.4069 ; 49.7138 ; 50.2554 ; 50.4408 ; 50.5071 ; 50.6045 ; 50.6395 ; 50.6913 ; 50.7683 ; 50.8794 ; 51.0378 ; 51.2546 ; 51.5412 ; 51.8807 ; 51.9645 ; 52.0798 ; 52.2333 ; 52.2862 ; 52.3611 ; 52.4659 ; 52.604]

Bolt 2 - Shear Force (kips): [0.067039 ; 0.087521 ; 0.1304 ; 0.19446 ; 0.28856 ; 0.42281 ; 0.56052 ; 0.63677 ; 0.665 ; 0.69429 ; 0.75119 ; 0.84638 ; 1.0538 ; 1.1406 ; 1.2537 ; 1.3889 ; 1.4338 ; 1.4934 ; 1.5664 ; 1.6444 ; 1.7221 ; 1.7434 ; 1.7515 ; 1.7642 ; 1.7688 ; 1.7758 ; 1.7855 ; 1.7994 ; 1.8187 ; 1.8433 ; 1.8784 ; 1.9279 ; 1.9432 ; 1.964 ; 1.9921 ; 2.0015 ; 2.0144 ; 2.0306 ; 2.0521]

Bolt 3 - Tensile Force (kips): [50 ; 49.9098 ; 49.8366 ; 49.759 ; 49.6991 ; 49.6398 ; 49.574 ; 49.5074 ; 49.4266 ; 49.4414 ; 49.6542 ; 50.1677 ; 50.9577 ; 51.2806 ; 51.815 ; 52.6428 ; 52.9821 ; 53.4611 ; 54.1203 ; 55.0483 ; 56.3658 ; 56.8039 ; 56.9767 ; 57.1726 ; 57.2343 ; 57.3254 ; 57.4266 ; 57.5483 ; 57.6977 ; 57.9592 ; 58.419 ; 59.1221 ; 59.4909 ; 59.9207 ; 60.453 ; 60.6334 ; 60.8846 ; 61.2193 ; 61.6227]

Bolt 3 - Shear Force (kips): [0.044401 ; 0.020259 ; 0.028054 ; 0.054094 ; 0.099537 ; 0.16242 ; 0.18518 ; 0.13908 ; 0.11962 ; 0.11997 ; 0.16161 ; 0.237 ; 0.39718 ; 1.3367 ; 2.7508 ; 3.4567 ; 3.8525 ; 4.1285 ; 4.4686 ; 4.7948 ; 4.9446 ; 4.9772 ; 4.889 ; 4.6306 ; 4.5343 ; 4.2917 ; 3.8974 ; 3.3914 ; 2.6382 ; 1.8331 ; 0.925 ; 0.4672 ; 0.69536 ; 0.64522 ; 1.0197 ; 1.2258 ; 1.5257 ; 1.55 ; 1.6498]

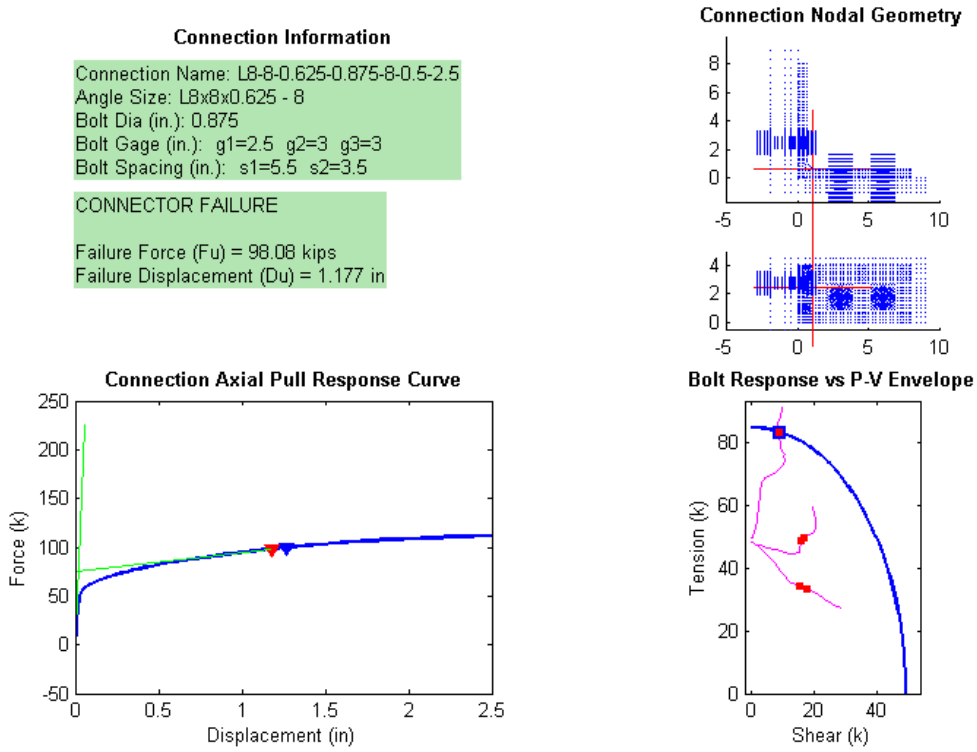


Figure B.337 Connection L8_8_0.625_0.875_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.875_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.7912e+003

Plastic Stiffness (k/in): 19.2442

Displacement (in): [4.0262e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.015625 ; 0.018555 ; 0.022949 ; 0.029541 ; 0.039429 ; 0.05426 ; 0.076508 ; 0.098755 ; 0.121 ; 0.15437 ; 0.20443 ; 0.27951 ; 0.30767 ; 0.34991 ; 0.36574 ; 0.3895 ; 0.42514 ; 0.46077 ; 0.49641 ; 0.53204 ; 0.5855 ; 0.66568 ; 0.69575 ; 0.74085 ; 0.75776 ; 0.78313 ; 0.79265 ; 0.80692 ; 0.82832 ; 0.86043 ; 0.90859 ; 0.92665 ; 0.95375 ; 0.99438 ; 1.0096 ; 1.0325 ; 1.0411 ; 1.0539 ; 1.0732 ; 1.1021 ; 1.1311 ; 1.16 ; 1.1708 ; 1.1871 ; 1.2115 ; 1.2481 ; 1.3031 ; 1.3237 ; 1.3545 ; 1.4009 ; 1.4704 ; 1.5747 ; 1.6138 ; 1.6724 ; 1.7604 ; 1.8924 ; 1.9418 ; 2.0161 ; 2.1274 ; 2.2944 ; 2.5]

Force (kips): [-1.27964 ; 2.98952 ; 6.12502 ; 9.9741 ; 13.2422 ; 16.0204 ; 18.3327 ; 20.2552 ; 22.4855 ; 24.8263 ; 26.976 ; 28.6776 ; 30.1625 ; 31.2992 ; 32.2407 ; 33.4261 ; 34.8915 ; 36.6698 ; 37.2648 ; 38.1049 ; 38.4241 ; 38.913 ; 39.606 ; 40.2464 ; 40.8291 ; 41.3858 ; 42.1695 ; 43.2505 ; 43.6312 ; 44.2001 ; 44.4317 ; 44.7553 ; 44.875 ; 45.0485 ; 45.3034 ; 45.7267 ; 46.3092 ; 46.5209 ; 46.8153 ; 47.2292 ; 47.3989 ; 47.6392 ; 47.7297 ; 47.8684 ; 48.0569 ; 48.3401 ; 48.6145 ; 48.8804 ; 48.9848 ; 49.1398 ; 49.3597 ; 49.6806 ; 50.1257 ; 50.2908 ; 50.5291 ; 50.8694 ; 51.3578 ; 52.0361 ; 52.2805 ; 52.6374 ; 53.1197 ; 53.7758 ; 54.006 ; 54.3337 ; 54.7808 ; 55.3679 ; 55.9949]

Bolt 1 - Tensile Force (kips): [48.5247 ; 48.3754 ; 48.2609 ; 48.1098 ; 47.9715 ; 47.8468 ; 47.7371 ; 47.6402 ; 47.5198 ; 47.3807 ; 47.214 ; 47.007 ; 46.278 ; 45.3615 ; 44.4926 ; 43.3002 ; 41.5818 ; 39.1323 ; 38.2519 ; 37.0262 ; 36.5974 ; 36.0218 ; 35.764 ; 35.7421 ; 35.7273 ; 35.7164 ; 35.7052 ; 35.6938 ; 35.6902 ; 35.5396 ; 35.5269 ; 35.5152 ; 35.511 ; 35.5054 ; 35.4996 ; 35.4907 ; 35.4839 ; 35.4845 ; 35.4858 ; 35.4902 ; 35.4467 ; 35.3908 ; 35.3504 ; 35.2502 ; 35.156 ; 34.9325 ; 34.7548 ; 34.5971 ; 34.4698 ; 34.2685 ; 33.9901 ; 33.6544 ; 33.1877 ; 32.9587 ; 32.5986 ; 32.0506 ; 31.4791 ; 30.3955 ; 30.0868 ; 29.6573 ; 29.1775 ; 28.5161 ; 28.3159 ; 28.0764 ; 27.8097 ; 27.5442 ; 27.1397]

Bolt 1 - Shear Force (kips): [0.0822118 ; 0.170775 ; 0.342344 ; 0.561655 ; 0.754116 ; 0.923002 ; 1.06781 ; 1.19165 ; 1.34093 ; 1.5106 ; 1.71153 ; 1.95928 ; 2.81153 ; 3.78324 ; 4.65013 ; 5.78204 ; 7.30917 ; 9.3195 ; 10.0038 ; 10.9104 ; 11.2126 ; 11.6124 ; 11.7886 ; 11.79 ; 11.7881 ; 11.7856 ; 11.7823 ; 11.7788 ; 11.7776 ; 12.0182 ; 12.0251 ; 12.0253 ; 12.0241 ; 12.0214 ; 12.0168 ; 12.0087 ; 11.998 ; 11.9948 ; 11.9902 ; 11.9841 ; 12.2247 ; 12.487 ; 12.6376 ; 12.9574 ; 13.2144 ; 13.7923 ; 14.3835 ; 14.9711 ; 15.3137 ; 15.8016 ; 16.4234 ; 17.2221 ; 18.3086 ; 18.726 ; 19.3432 ; 20.2214 ; 21.1054 ; 22.7674 ; 23.2446 ; 23.8733 ; 24.5797 ; 25.5406 ; 25.8422 ; 26.249 ; 26.7865 ; 27.6086 ; 28.5463]

Bolt 2 - Tensile Force (kips): [48.5222 ; 48.3238 ; 48.1642 ; 47.9611 ; 47.7985 ; 47.6674 ; 47.5623 ; 47.4794 ; 47.3837 ; 47.2945 ; 47.2278 ; 47.1612 ; 46.8108 ; 46.461 ; 46.2012 ; 46.1667 ; 46.1217 ; 45.8102 ; 45.6725 ; 45.4887 ; 45.4208 ; 45.3233 ; 45.1424 ; 44.9596 ; 44.8139 ; 44.6865 ; 44.5815 ; 44.6008 ; 44.6137 ; 44.6997 ; 44.7051 ; 44.7029 ; 44.7033 ; 44.7177 ; 44.7283 ; 44.8294 ; 45.2566 ; 45.5307 ; 45.9373 ; 46.5513 ; 46.7663 ; 47.0893 ; 47.2049 ; 47.3675 ; 47.6208 ; 47.9683 ; 48.2946 ; 48.6028 ; 48.7078 ; 48.8651 ; 49.1043 ; 49.3808 ; 49.8329 ; 49.963 ; 50.1638 ; 50.4932 ; 50.8174 ; 51.3085 ; 51.524 ; 51.9325 ; 52.5991 ; 53.8045 ; 54.2712 ; 54.9691 ; 55.9889 ; 57.5481 ; 59.3882]

Bolt 2 - Shear Force (kips): [0.0667082 ; 0.235915 ; 0.454056 ; 0.732264 ; 0.977476 ; 1.19132 ; 1.37459 ; 1.53175 ; 1.72506 ; 1.95317 ; 2.24203 ; 2.61411 ; 3.52748 ; 4.48083 ; 5.28252 ; 6.2655 ; 7.29353 ; 8.42365 ; 8.78561 ; 9.27765 ; 9.45913 ; 9.72778 ; 10.1616 ; 10.5866 ; 10.977 ; 11.3448 ; 11.8326 ; 12.4526 ; 12.6736 ; 12.9447 ; 13.065 ; 13.3666 ; 13.4949 ; 13.6746 ; 13.981 ; 14.5208 ; 15.0323 ; 15.1183 ; 15.2321 ; 15.3934 ; 15.4499 ; 15.5338 ; 15.5635 ; 15.6042 ; 15.6669 ; 15.749 ; 15.8225 ; 15.8895 ; 15.9143 ; 15.951 ; 16.0032 ; 16.3397 ; 16.6613 ; 16.8844 ; 17.1453 ; 17.4531 ; 18.4202 ; 19.4938 ; 19.7948 ; 20.0741 ; 20.3577 ; 20.4701 ; 20.4979 ; 20.507 ; 20.4375 ; 20.0925 ; 19.596]

Bolt 3 - Tensile Force (kips): [50 ; 49.8918 ; 49.8822 ; 49.9528 ; 50.0765 ; 50.2381 ; 50.4628 ; 50.7115 ; 51.2313 ; 51.9917 ; 52.8788 ; 53.8899 ; 55.041 ; 56.0595 ; 57.0364 ; 58.4633 ; 60.45 ; 63.124 ; 64.0551 ; 65.3935 ; 65.8522 ; 66.4521 ; 67.2181 ; 67.9764 ; 68.687 ; 69.412 ; 70.6234 ; 72.5541 ; 73.2657 ; 74.2353 ; 74.6947 ; 75.2634 ; 75.4633 ; 75.7182 ; 76.0913 ; 76.7898 ; 77.9097 ; 78.3369 ; 78.9256 ; 79.6796 ; 79.9527 ; 80.3651 ; 80.5162 ; 80.7384 ; 81.0489 ; 81.4875 ; 81.8813 ; 82.2423 ; 82.3764 ; 82.5809 ; 82.88 ; 83.3042 ; 83.884 ; 84.0873 ; 84.3844 ; 84.8039 ; 85.3841 ; 86.1409 ; 86.4541 ; 86.9845 ; 87.6481 ; 88.5092 ; 88.8011 ; 89.2613 ; 89.828 ; 90.4932 ; 91.1489]

Bolt 3 - Shear Force (kips): [0.0443062 ; 0.0473983 ; 0.110845 ; 0.206407 ; 0.30073 ; 0.395676 ; 0.491375 ; 0.584042 ; 0.717986 ; 0.8895 ; 1.10159 ; 1.3132 ; 1.52004 ; 1.70516 ; 1.87942 ; 2.10363 ; 2.35531 ; 2.64439 ; 2.74182 ; 2.88341 ; 2.9469 ; 3.05333 ; 3.19472 ; 3.36649 ; 4.16808 ; 5.59731 ; 7.60054 ; 9.52809 ; 9.95911 ; 10.5512 ; 10.3664 ; 10.2509 ; 10.2117 ; 10.2963 ; 10.4346 ; 10.1438 ; 9.65449 ; 9.40831 ; 9.11798 ; 8.98075 ; 8.99033 ; 8.97306 ; 8.96676 ; 8.95429 ; 8.93662 ; 8.89213 ; 8.84788 ; 8.82153 ; 8.80976 ; 8.79833 ; 8.77749 ; 8.73433 ; 8.65914 ; 8.62778 ; 8.6059 ; 8.58555 ; 8.49803 ; 8.35786 ; 8.41596 ; 8.66377 ; 8.80831 ; 8.96642 ; 9.13402 ; 9.33545 ; 9.54605 ; 9.69721 ; 9.87811]

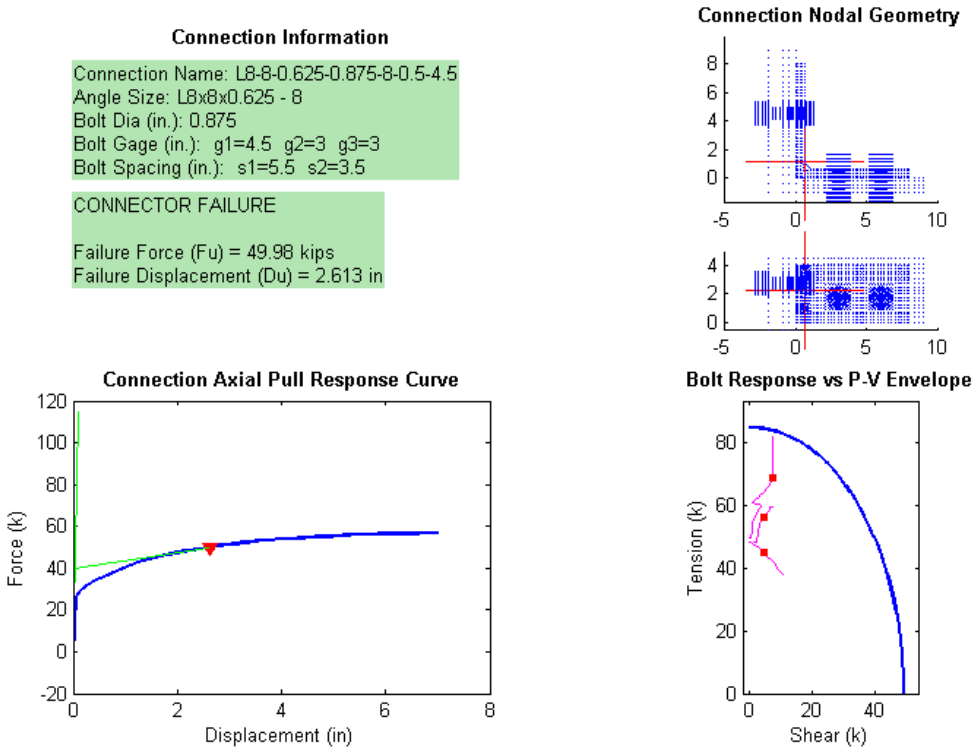


Figure B.338 Connection L8_8_0.625_0.875_8_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.875_8_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 1328

Plastic Stiffness (k/in): 3.9538

Displacement (in): [4.5059e-036 ; 0.0013672 ; 0.0027344 ; 0.0047852 ; 0.0078613 ; 0.012476 ; 0.019397 ; 0.029779 ; 0.045352 ; 0.068712 ; 0.10375 ; 0.15631 ; 0.23515 ; 0.35341 ; 0.5308 ; 0.79688 ; 0.89666 ; 0.93407 ; 0.94811 ; 0.96915 ; 1.0007 ; 1.0481 ; 1.1191 ; 1.1458 ; 1.1857 ; 1.2456 ; 1.3356 ; 1.4704 ; 1.6727 ; 1.9761 ; 2.4313 ; 2.6019 ; 2.858 ; 2.9539 ; 3.098 ; 3.314 ; 3.638 ; 4.124 ; 4.824 ; 5.524 ; 5.699 ; 5.9615 ; 6.3553 ; 6.9459 ; 7]

Force (kips): [-1.10803 ; 0.120707 ; 0.70756 ; 1.53933 ; 2.66325 ; 4.17687 ; 6.19577 ; 8.76027 ; 11.3462 ; 13.2245 ; 14.0949 ; 14.6823 ; 15.4547 ; 16.4387 ; 17.6786 ; 19.2074 ; 19.7113 ; 19.8902 ; 19.971 ; 20.0727 ; 20.2338 ; 20.4771 ; 20.8046 ; 20.9215 ; 21.096 ; 21.35 ; 21.6961 ; 22.1742 ; 22.8077 ; 23.6185 ; 24.6343 ; 24.9717 ; 25.4513 ; 25.6226 ; 25.8532 ; 26.166 ; 26.5756 ; 27.0744 ; 27.6099 ; 27.9892 ; 28.0705 ; 28.1775 ; 28.3141 ; 28.4807 ; 28.4944]

Bolt 1 - Tensile Force (kips): [48.5231 ; 48.4812 ; 48.461 ; 48.4312 ; 48.39 ; 48.3325 ; 48.2518 ; 48.1375 ; 48.0048 ; 47.8906 ; 47.8259 ; 47.7769 ; 47.686 ; 47.5472 ; 47.4293 ; 47.3108 ; 47.2722 ; 47.2581 ; 47.2514 ; 47.2434 ; 47.2305 ; 47.2104 ; 47.1808 ; 47.1693 ; 47.1508 ; 47.1197 ; 47.07 ; 46.9822 ; 46.748 ; 46.199 ; 45.2953 ; 44.9262 ; 44.2912 ; 44.0333 ; 43.69 ; 43.2288 ; 42.575 ; 41.64 ; 40.5394 ; 39.6221 ; 39.3913 ; 39.0686 ; 38.6412 ; 38.09 ; 38.0421]

Bolt 1 - Shear Force (kips): [0.0725829 ; 0.0475468 ; 0.0636113 ; 0.100919 ; 0.160025 ; 0.245991 ; 0.367868 ; 0.534089 ; 0.720596 ; 0.880218 ; 0.973255 ; 1.04768 ; 1.18277 ; 1.38125 ; 1.54957 ; 1.71527 ; 1.76947 ; 1.78909 ; 1.79816 ; 1.80927 ; 1.82703 ; 1.85455 ; 1.89502 ; 1.9107 ; 1.93567 ; 1.97721 ; 2.04296 ; 2.15758 ; 2.45219 ; 3.09486 ; 4.06815 ; 4.45018 ; 5.08783 ; 5.34068 ; 5.67358 ; 6.1141 ; 6.72386 ; 7.5698 ; 8.53631 ; 9.32368 ; 9.51821 ; 9.7885 ; 10.1434 ; 10.5942 ; 10.6327]

Bolt 2 - Tensile Force (kips): [48.5151 ; 48.463 ; 48.4318 ; 48.3801 ; 48.3122 ; 48.2236 ; 48.1228 ; 48.0317 ; 47.9924 ; 48.033 ; 48.0904 ; 48.1382 ; 48.2356 ; 48.508 ; 49.2587 ; 50.8886 ; 51.4045 ; 51.5842 ; 51.6518 ; 51.7486 ; 51.8918 ; 52.0977 ; 52.3789 ; 52.4807 ; 52.631 ; 52.8555 ; 53.1818 ; 53.647 ; 54.2232 ; 54.9196 ; 55.8779 ; 56.1892 ; 56.6065 ; 56.7451 ; 56.9665 ; 57.2935 ; 57.7267 ; 58.2478 ; 58.8725 ; 59.2701 ; 59.3389 ; 59.4226 ; 59.5209 ; 59.6162 ; 59.6235]

Bolt 2 - Shear Force (kips): [0.055362 ; 0.052074 ; 0.093424 ; 0.15437 ; 0.24112 ; 0.36351 ; 0.53454 ; 0.76545 ; 1.0217 ; 1.2464 ; 1.3844 ; 1.5007 ; 1.7199 ; 2.0543 ; 2.3468 ; 2.6094 ; 2.6925 ; 2.7226 ; 2.7354 ; 2.7521 ; 2.7782 ; 2.816 ; 2.8685 ; 2.8867 ; 2.9126 ; 2.9424 ; 2.9811 ; 3.0545 ; 3.2408 ; 3.6174 ; 4.1421 ; 4.3453 ; 4.677 ; 4.8087 ; 4.9722 ; 5.1772 ; 5.4527 ; 5.8304 ; 6.2346 ; 6.5703 ; 6.6583 ; 6.7821 ; 6.9502 ; 7.1786 ; 7.1989]

Bolt 3 - Tensile Force (kips): [50 ; 49.9472 ; 49.8994 ; 49.8434 ; 49.7921 ; 49.7713 ; 49.7929 ; 49.8683 ; 50.0996 ; 50.5026 ; 50.8853 ; 51.3189 ; 51.8566 ; 52.9717 ; 54.8262 ; 57.8275 ; 59.0315 ; 59.472 ; 59.6667 ; 59.8822 ; 60.2241 ; 60.6397 ; 61.1243 ; 61.3043 ; 61.5623 ; 61.9066 ; 62.3517 ; 63.0932 ; 64.184 ; 65.7298 ; 67.889 ; 68.8264 ; 70.4277 ; 71.1057 ; 71.8926 ; 72.9186 ; 74.2983 ; 76.0595 ; 77.8606 ; 79.3325 ; 79.7384 ; 80.2456 ; 80.8919 ; 81.709 ; 81.7869]

Bolt 3 - Shear Force (kips): [0.051104 ; 0.027237 ; 0.021643 ; 0.034494 ; 0.065042 ; 0.11601 ; 0.19348 ; 0.29847 ; 0.4068 ; 0.50086 ; 0.59188 ; 0.70751 ; 0.87609 ; 0.87947 ; 0.86819 ; 2.0716 ; 3.2275 ; 3.6483 ; 3.5325 ; 3.4778 ; 3.0082 ; 1.751 ; 0.87938 ; 1.0521 ; 1.4417 ; 1.7102 ; 2.4677 ; 3.3431 ; 4.4358 ; 5.6031 ; 7.0979 ; 7.3538 ; 7.2546 ; 7.1797 ; 7.2023 ; 7.4236 ; 7.5251 ; 7.4808 ; 7.5075 ; 7.4686 ; 7.4246 ; 7.379 ; 7.3084 ; 7.2235 ; 7.212]

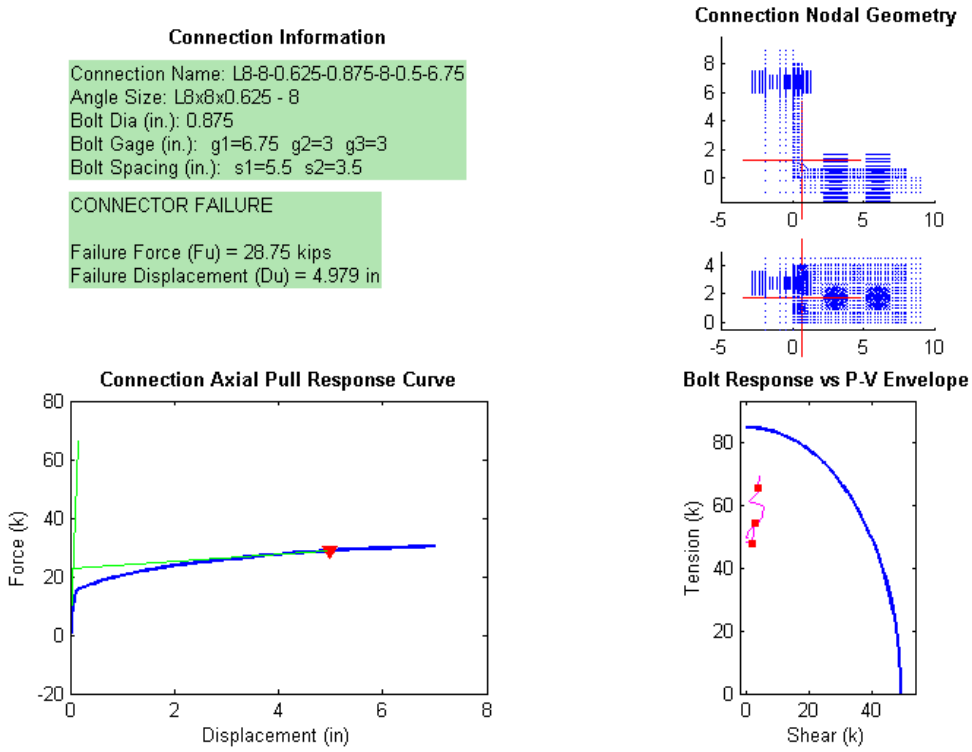


Figure B.339 Connection L8_8_0.625_0.875_8_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.875_8_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 400.1938

Plastic Stiffness (k/in): 1.1746

Displacement (in): [4.3772e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.46757 ; 0.5464 ; 0.66466 ; 0.84205 ; 0.90857 ; 1.0084 ; 1.158 ; 1.3825 ; 1.4667 ; 1.593 ; 1.7824 ; 2.0666 ; 2.1731 ; 2.3329 ; 2.3929 ; 2.4828 ; 2.6176 ; 2.8199 ; 2.8958 ; 3.0096 ; 3.1803 ; 3.4363 ; 3.8203 ; 3.9643 ; 4.1803 ; 4.3963 ; 4.6123 ; 4.9364 ; 5.0579 ; 5.2401 ; 5.5135 ; 5.9236 ; 6.0774 ; 6.3081 ; 6.6541 ; 7]

Force (kips): [-1.07668 ; 0.473275 ; 1.11188 ; 1.99856 ; 3.21166 ; 4.82157 ; 6.49008 ; 7.52016 ; 7.91857 ; 8.23026 ; 8.68609 ; 8.84687 ; 9.06821 ; 9.3738 ; 9.79709 ; 9.95375 ; 10.1742 ; 10.4778 ; 10.8905 ; 11.0328 ; 11.2333 ; 11.5148 ; 11.8958 ; 12.0274 ; 12.2142 ; 12.2901 ; 12.4014 ; 12.5599 ; 12.7752 ; 12.8538 ; 12.9644 ; 13.1227 ; 13.3429 ; 13.6435 ; 13.7475 ; 13.896 ; 14.0339 ; 14.1633 ; 14.3536 ; 14.4184 ; 14.5091 ; 14.6365 ; 14.8062 ; 14.8654 ; 14.9456 ; 15.0533 ; 15.1523]

Bolt 1 - Tensile Force (kips): [48.5237 ; 48.4711 ; 48.4485 ; 48.4157 ; 48.3685 ; 48.3003 ; 48.2187 ; 48.1604 ; 48.1402 ; 48.1271 ; 48.1048 ; 48.0955 ; 48.0802 ; 48.0541 ; 48.007 ; 47.987 ; 47.9575 ; 47.9232 ; 47.886 ; 47.8755 ; 47.8621 ; 47.8475 ; 47.8344 ; 47.8309 ; 47.8268 ; 47.8248 ; 47.822 ; 47.8184 ; 47.8149 ; 47.8135 ; 47.8123 ; 47.8115 ; 47.8124 ; 47.8169 ; 47.8195 ; 47.824 ; 47.8291 ; 47.8351 ; 47.8399 ; 47.8422 ; 47.8466 ; 47.8553 ; 47.8691 ; 47.8747 ; 47.8846 ; 47.9011 ; 47.9183]

Bolt 1 - Shear Force (kips): [0.071792 ; 0.056801 ; 0.083331 ; 0.12942 ; 0.20053 ; 0.30561 ; 0.43021 ; 0.5201 ; 0.55791 ; 0.59045 ; 0.64355 ; 0.66473 ; 0.69874 ; 0.7553 ; 0.85326 ; 0.89314 ; 0.95158 ; 1.024 ; 1.1102 ; 1.137 ; 1.1736 ; 1.2192 ; 1.2733 ; 1.2911 ; 1.3159 ; 1.3257 ; 1.3399 ; 1.3606 ; 1.3893 ; 1.4001 ; 1.4154 ; 1.4371 ; 1.467 ; 1.5078 ; 1.522 ; 1.5423 ; 1.5618 ; 1.5803 ; 1.613 ; 1.6247 ; 1.641 ; 1.6631 ; 1.6955 ; 1.7072 ; 1.7229 ; 1.7444 ; 1.7648]

Bolt 2 - Tensile Force (kips): [48.5174 ; 48.4469 ; 48.3999 ; 48.3375 ; 48.2639 ; 48.1964 ; 48.1909 ; 48.2116 ; 48.2307 ; 48.2554 ; 48.3101 ; 48.3324 ; 48.3745 ; 48.4508 ; 48.5531 ; 48.5917 ; 48.6671 ; 48.8201 ; 49.1202 ; 49.2301 ; 49.4006 ; 49.7146 ; 50.2766 ; 50.4902 ; 50.7982 ; 50.9143 ; 51.0888 ; 51.3444 ; 51.7003 ; 51.8277 ; 52.0136 ; 52.2778 ; 52.6434 ; 53.1313 ; 53.2978 ; 53.527 ; 53.7413 ; 53.9427 ; 54.2267 ; 54.3257 ; 54.4679 ; 54.6732 ; 54.9431 ; 55.0364 ; 55.1653 ; 55.3411 ; 55.5037]

Bolt 2 - Shear Force (kips): [0.054548 ; 0.082029 ; 0.13458 ; 0.21196 ; 0.32452 ; 0.4851 ; 0.66727 ; 0.79115 ; 0.83695 ; 0.87536 ; 0.94831 ; 0.97633 ; 1.0234 ; 1.1092 ; 1.2592 ; 1.3208 ; 1.4142 ; 1.5399 ; 1.6952 ; 1.7422 ; 1.8043 ; 1.8841 ; 1.9775 ; 2.0065 ; 2.047 ; 2.0627 ; 2.0855 ; 2.1179 ; 2.163 ; 2.1797 ; 2.2042 ; 2.2405 ; 2.2936 ; 2.3692 ; 2.3965 ; 2.434 ; 2.4671 ; 2.4943 ; 2.5249 ; 2.5345 ; 2.5472 ; 2.5651 ; 2.5919 ; 2.6017 ; 2.6149 ; 2.6326 ; 2.6488]

Bolt 3 - Tensile Force (kips): [50 ; 49.9055 ; 49.8331 ; 49.7613 ; 49.7134 ; 49.6935 ; 49.7517 ; 49.9286 ; 50.125 ; 50.3999 ; 50.8256 ; 50.9893 ; 51.2448 ; 51.6368 ; 52.2192 ; 52.498 ; 52.9729 ; 53.7689 ; 54.9534 ; 55.3696 ; 55.9562 ; 56.8519 ; 58.1354 ; 58.5975 ; 59.2797 ; 59.5442 ; 59.8711 ; 60.2119 ; 60.6915 ; 60.8516 ; 61.0515 ; 61.3671 ; 61.8734 ; 62.6256 ; 62.9073 ; 63.3644 ; 63.7695 ; 64.2018 ; 65.239 ; 65.5856 ; 66.0518 ; 66.639 ; 67.4952 ; 67.8075 ; 68.1877 ; 68.6646 ; 69.179]

Bolt 3 - Shear Force (kips): [0.047699 ; 0.021373 ; 0.033243 ; 0.066617 ; 0.12318 ; 0.20287 ; 0.26077 ; 0.2613 ; 0.27204 ; 0.29535 ; 0.36844 ; 0.39875 ; 0.44544 ; 0.54275 ; 0.70329 ; 1.1814 ; 1.929 ; 2.8709 ; 3.9611 ; 4.2855 ; 4.5033 ; 4.8274 ; 5.1967 ; 5.297 ; 5.4333 ; 5.2249 ; 4.5986 ; 3.4181 ; 2.3365 ; 1.8583 ; 1.3357 ; 1.0119 ; 1.1153 ; 2.0007 ; 2.3276 ; 2.6923 ; 3.2004 ; 3.6276 ; 3.4864 ; 3.4062 ; 3.4288 ; 3.5805 ; 3.7289 ; 3.8236 ; 3.9915 ; 4.2029 ; 4.2574]

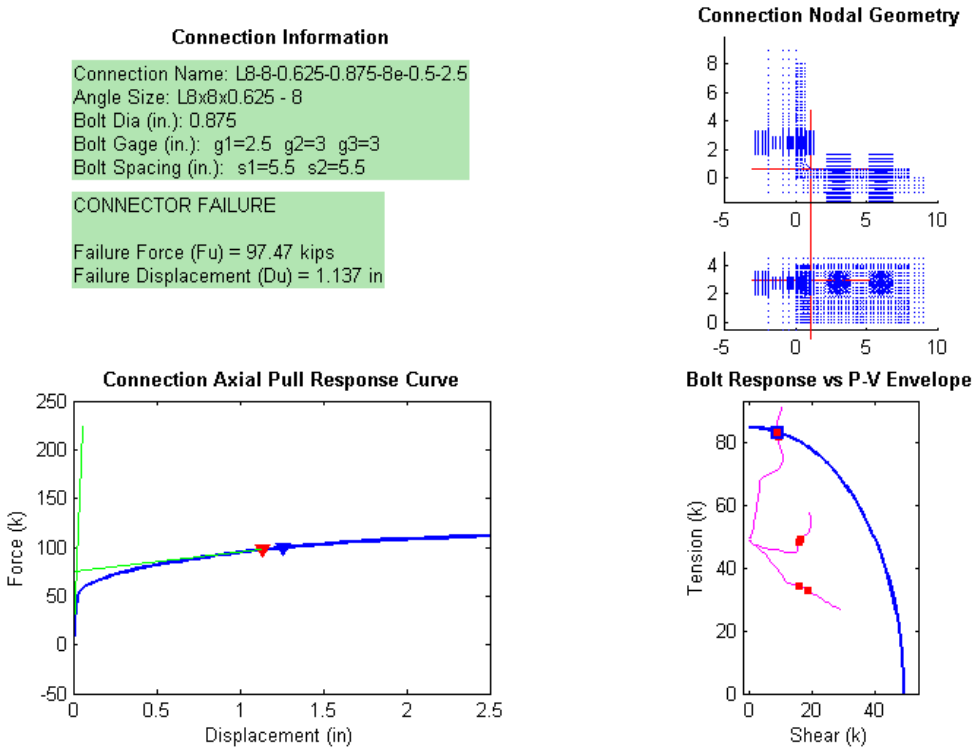


Figure B.340 Connection L8_8_0.625_0.875_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.875_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.8182e+003

Plastic Stiffness (k/in): 20.2039

Displacement (in): [4.4175e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.018738 ; 0.02121 ; 0.024918 ; 0.030479 ; 0.038822 ; 0.051336 ; 0.070108 ; 0.098264 ; 0.12642 ; 0.15458 ; 0.19681 ; 0.26017 ; 0.35519 ; 0.39083 ; 0.40419 ; 0.42424 ; 0.45431 ; 0.49941 ; 0.56706 ; 0.59243 ; 0.63048 ; 0.68757 ; 0.70897 ; 0.74108 ; 0.78924 ; 0.80731 ; 0.8344 ; 0.87503 ; 0.93599 ; 0.95885 ; 0.99314 ; 1.006 ; 1.0253 ; 1.0542 ; 1.0651 ; 1.0813 ; 1.1057 ; 1.1149 ; 1.1286 ; 1.1492 ; 1.1801 ; 1.2265 ; 1.2438 ; 1.2699 ; 1.309 ; 1.3677 ; 1.3897 ; 1.4226 ; 1.4721 ; 1.5463 ; 1.5742 ; 1.6159 ; 1.6786 ; 1.7725 ; 1.9134 ; 1.9663 ; 2.0456 ; 2.1645 ; 2.3428 ; 2.5]

Force (kips): [-1.53337 ; 2.78926 ; 5.92413 ; 9.76689 ; 13.024 ; 15.7881 ; 19.1026 ; 20.1288 ; 21.4592 ; 23.0861 ; 24.9417 ; 26.7828 ; 28.3212 ; 29.6827 ; 31.1188 ; 32.2698 ; 33.2544 ; 34.5441 ; 36.1696 ; 38.2078 ; 38.9574 ; 39.2452 ; 39.626 ; 40.1831 ; 40.9246 ; 41.9612 ; 42.3314 ; 42.8467 ; 43.5838 ; 43.8548 ; 44.2466 ; 44.8735 ; 45.0964 ; 45.4156 ; 45.9323 ; 46.6195 ; 46.8674 ; 47.2533 ; 47.3926 ; 47.6053 ; 47.9027 ; 48.0168 ; 48.1813 ; 48.421 ; 48.5111 ; 48.6498 ; 48.8504 ; 49.1327 ; 49.5386 ; 49.6879 ; 49.9068 ; 50.2242 ; 50.6614 ; 50.8194 ; 51.05 ; 51.3849 ; 51.8509 ; 52.0174 ; 52.279 ; 52.6436 ; 53.142 ; 53.812 ; 54.0436 ; 54.3698 ; 54.8142 ; 55.3934 ; 55.8438]

Bolt 1 - Tensile Force (kips): [48.5929 ; 48.4286 ; 48.3042 ; 48.139 ; 47.989 ; 47.855 ; 47.682 ; 47.625 ; 47.5487 ; 47.4518 ; 47.3327 ; 47.1928 ; 47.0241 ; 46.5347 ; 45.4212 ; 44.3634 ; 43.3542 ; 41.8755 ; 39.6936 ; 36.7092 ; 35.8198 ; 35.7673 ; 35.7485 ; 35.7268 ; 35.7036 ; 35.6772 ; 35.6681 ; 35.6561 ; 35.6404 ; 35.5824 ; 35.5059 ; 35.4747 ; 35.4645 ; 35.4507 ; 35.4294 ; 35.4091 ; 35.4027 ; 35.3044 ; 35.2599 ; 35.1238 ; 34.9505 ; 34.8448 ; 34.7188 ; 34.5921 ; 34.5212 ; 34.3633 ; 34.1264 ; 33.7803 ; 33.2838 ; 33.0608 ; 32.7864 ; 32.3104 ; 31.7145 ; 31.452 ; 31.0351 ; 30.5061 ; 29.8818 ; 29.6437 ; 29.3281 ; 28.936 ; 28.5006 ; 28.1087 ; 28.0014 ; 27.8266 ; 27.5515 ; 27.2232 ; 26.9726]

Bolt 1 - Shear Force (kips): [0.0767005 ; 0.189167 ; 0.368192 ; 0.596645 ; 0.797268 ; 0.972709 ; 1.19036 ; 1.25975 ; 1.3515 ; 1.46678 ; 1.60619 ; 1.76899 ; 1.96586 ; 2.54393 ; 3.74623 ; 4.79868 ; 5.75298 ; 7.07342 ; 8.88438 ; 11.1396 ; 11.7517 ; 11.7854 ; 11.7881 ; 11.7863 ; 11.781 ; 11.7731 ; 11.7703 ; 11.7664 ; 11.7612 ; 11.9031 ; 12.0029 ; 12.0004 ; 11.9963 ; 11.9884 ; 11.9749 ; 11.9575 ; 11.9513 ; 12.4069 ; 12.5678 ; 12.9945 ; 13.4299 ; 13.6958 ; 14.0443 ; 14.5589 ; 14.7891 ; 15.2381 ; 15.8662 ; 16.6557 ; 17.7892 ; 18.2571 ; 18.7949 ; 19.5966 ; 20.5336 ; 20.9295 ; 21.5567 ; 22.3797 ; 23.3328 ; 23.6739 ; 24.1206 ; 24.683 ; 25.3706 ; 26.0793 ; 26.2931 ; 26.6465 ; 27.2516 ; 28.0149 ; 28.6424]

Bolt 2 - Tensile Force (kips): [48.6016 ; 48.3957 ; 48.2349 ; 48.0335 ; 47.8757 ; 47.7502 ; 47.6059 ; 47.5652 ; 47.5154 ; 47.4614 ; 47.4014 ; 47.3466 ; 47.2672 ; 47.0013 ; 46.4852 ; 46.246 ; 46.1473 ; 46.099 ; 45.9965 ; 45.7668 ; 45.6367 ; 45.5626 ; 45.4593 ; 45.3216 ; 45.1546 ; 44.9905 ; 44.9493 ; 44.946 ; 44.9742 ; 45.0129 ; 45.0494 ; 45.03 ; 45.0443 ; 45.0611 ; 45.0877 ; 45.7394 ; 46.0496 ; 46.492 ; 46.6575 ; 46.8878 ; 47.2343 ; 47.3528 ; 47.5299 ; 47.7867 ; 47.8767 ; 47.9994 ; 48.1836 ; 48.464 ; 48.873 ; 49.0221 ; 49.1968 ; 49.4305 ; 49.8328 ; 49.9814 ; 50.2007 ; 50.475 ; 50.8397 ; 50.9749 ; 51.2238 ; 51.6333 ; 52.2643 ; 53.2984 ; 53.6862 ; 54.2767 ; 55.182 ; 56.4701 ; 57.5875]

Bolt 2 - Shear Force (kips): [0.104582 ; 0.204597 ; 0.412425 ; 0.678674 ; 0.912056 ; 1.11461 ; 1.36507 ; 1.44484 ; 1.55111 ; 1.68763 ; 1.85977 ; 2.08297 ; 2.38399 ; 3.04902 ; 4.2317 ; 5.18475 ; 5.98723 ; 6.95877 ; 7.99585 ; 9.2006 ; 9.63757 ; 9.82446 ; 10.0937 ; 10.4768 ; 10.9991 ; 11.6825 ; 11.9172 ; 12.2178 ; 12.6277 ; 12.7517 ; 12.9519 ; 13.4752 ; 13.689 ; 14.066 ; 14.7358 ; 15.095 ; 15.1858 ; 15.303 ; 15.3446 ; 15.3989 ; 15.4813 ; 15.5086 ; 15.5495 ; 15.6073 ; 15.6275 ; 15.6543 ; 15.6939 ; 15.754 ; 15.8398 ; 15.8702 ; 16.1116 ; 16.5157 ; 16.9935 ; 17.1188 ; 17.2783 ; 17.6435 ; 18.1652 ; 18.3422 ; 18.5244 ; 18.7708 ; 19.0587 ; 19.3726 ; 19.457 ; 19.5175 ; 19.4534 ; 19.3327 ; 19.1539]

Bolt 3 - Tensile Force (kips): [50 ; 49.8914 ; 49.88 ; 49.9537 ; 50.0782 ; 50.236 ; 50.5792 ; 50.7246 ; 51.0046 ; 51.4645 ; 52.083 ; 52.8494 ; 53.7282 ; 54.7459 ; 56.0397 ; 57.2671 ; 58.4667 ; 60.1586 ; 62.4639 ; 65.5775 ; 66.5427 ; 66.8444 ; 67.2503 ; 67.889 ; 68.7847 ; 70.2568 ; 70.9016 ; 71.8006 ; 73.086 ; 73.5439 ; 74.1591 ; 75.2629 ; 75.6355 ; 76.129 ; 77.0306 ; 78.4072 ; 78.9335 ; 79.6204 ; 79.8697 ; 80.2339 ; 80.7672 ; 80.9588 ; 81.2213 ; 81.5792 ; 81.7055 ; 81.8908 ; 82.1568 ; 82.5323 ; 83.0714 ; 83.2692 ; 83.5613 ; 83.9872 ; 84.5447 ; 84.7372 ; 85.0142 ; 85.4089 ; 85.9479 ; 86.1327 ; 86.5226 ; 87.0362 ; 87.7036 ; 88.6372 ; 88.9566 ; 89.3826 ; 89.943 ; 90.5889 ; 91.088]

Bolt 3 - Shear Force (kips): [0.0552941 ; 0.0372774 ; 0.0992516 ; 0.193031 ; 0.285604 ; 0.378217 ; 0.516993 ; 0.567771 ; 0.643535 ; 0.746286 ; 0.883587 ; 1.05735 ; 1.24908 ; 1.43284 ; 1.66448 ; 1.87383 ; 2.06225 ; 2.2881 ; 2.5572 ; 2.9028 ; 3.05576 ; 3.12364 ; 3.19166 ; 3.35226 ; 4.21217 ; 6.85495 ; 7.90201 ; 9.04385 ; 9.98134 ; 10.2396 ; 10.7151 ; 10.5508 ; 10.5305 ; 10.655 ; 10.2326 ; 9.71017 ; 9.42887 ; 9.28299 ; 9.27586 ; 9.25713 ; 9.18013 ; 9.15279 ; 9.1213 ; 9.08466 ; 9.06957 ; 9.04317 ; 9.00455 ; 8.96994 ; 8.92047 ; 8.90041 ; 8.91098 ; 8.89967 ; 8.84578 ; 8.81796 ; 8.76645 ; 8.6753 ; 8.53636 ; 8.50404 ; 8.72638 ; 8.91106 ; 9.0293 ; 9.279 ; 9.43511 ; 9.58703 ; 9.76752 ; 9.93636 ; 10.0649]

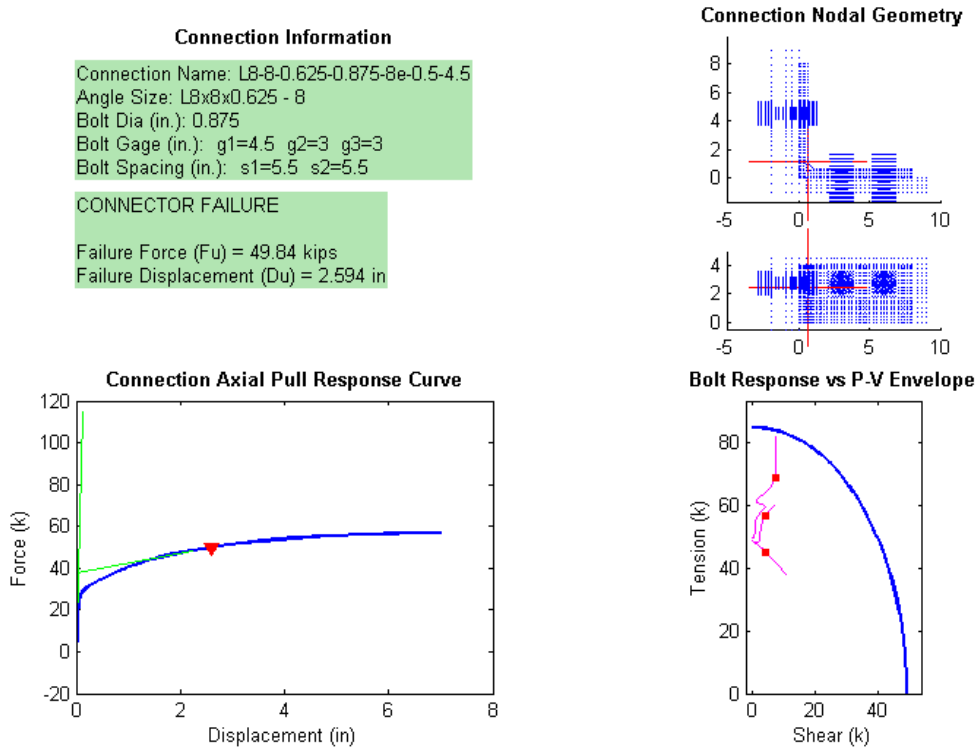


Figure B.341 Connection L8_8_0.625_0.875_8e_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.875_8e_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 890.9458

Plastic Stiffness (k/in): 4.8629

Displacement (in): [5.1821e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.46757 ; 0.5464 ; 0.66466 ; 0.84205 ; 0.90857 ; 0.93351 ; 0.97093 ; 1.0271 ; 1.1113 ; 1.2375 ; 1.2849 ; 1.3559 ; 1.4625 ; 1.6223 ; 1.8621 ; 2.2217 ; 2.7611 ; 2.9361 ; 3.1986 ; 3.5923 ; 4.183 ; 4.883 ; 5.583 ; 5.758 ; 6.0205 ; 6.4142 ; 7]

Force (kips): [-1.29512 ; 1.7068 ; 3.57724 ; 5.98196 ; 8.9278 ; 11.7251 ; 13.5013 ; 14.2814 ; 14.9189 ; 15.7751 ; 16.8555 ; 17.2259 ; 17.7356 ; 18.4509 ; 19.4115 ; 19.7411 ; 19.8588 ; 20.0499 ; 20.3351 ; 20.7444 ; 21.287 ; 21.4838 ; 21.7512 ; 22.1272 ; 22.6371 ; 23.31 ; 24.1844 ; 25.2497 ; 25.5707 ; 25.9825 ; 26.5049 ; 27.1161 ; 27.6374 ; 28.0114 ; 28.0905 ; 28.1948 ; 28.3292 ; 28.4919]

Bolt 1 - Tensile Force (kips): [48.5906 ; 48.4736 ; 48.3954 ; 48.2871 ; 48.1375 ; 47.9742 ; 47.8509 ; 47.7842 ; 47.7211 ; 47.6054 ; 47.5037 ; 47.4722 ; 47.4293 ; 47.3675 ; 47.2831 ; 47.2528 ; 47.2418 ; 47.2235 ; 47.1957 ; 47.1522 ; 47.0866 ; 47.0588 ; 47.0173 ; 46.946 ; 46.7964 ; 46.4319 ; 45.8224 ; 44.7271 ; 44.2717 ; 43.674 ; 42.8778 ; 41.7594 ; 40.6551 ; 39.7125 ; 39.4779 ; 39.1515 ; 38.7154 ; 38.1501]

Bolt 1 - Shear Force (kips): [0.0644202 ; 0.138901 ; 0.252168 ; 0.409153 ; 0.617374 ; 0.839439 ; 1.00657 ; 1.10076 ; 1.19224 ; 1.35325 ; 1.49473 ; 1.53799 ; 1.59625 ; 1.67592 ; 1.78316 ; 1.82107 ; 1.83474 ; 1.85722 ; 1.89146 ; 1.94471 ; 2.02522 ; 2.05897 ; 2.10967 ; 2.19712 ; 2.37917 ; 2.80988 ; 3.48136 ; 4.61565 ; 5.06694 ; 5.64735 ; 6.39865 ; 7.41512 ; 8.38363 ; 9.18872 ; 9.38462 ; 9.65659 ; 10.0173 ; 10.4782]

Bolt 2 - Tensile Force (kips): [48.5902 ; 48.4332 ; 48.3262 ; 48.2134 ; 48.1316 ; 48.1402 ; 48.2277 ; 48.2936 ; 48.3585 ; 48.5308 ; 49.0418 ; 49.3115 ; 49.7843 ; 50.5471 ; 51.5867 ; 51.9284 ; 52.0517 ; 52.2323 ; 52.4882 ; 52.8329 ; 53.2936 ; 53.4526 ; 53.6849 ; 54.0255 ; 54.4934 ; 55.0911 ; 55.8895 ; 56.8632 ; 57.0986 ; 57.466 ; 57.985 ; 58.5874 ; 59.1453 ; 59.4903 ; 59.5445 ; 59.6087 ; 59.6865 ; 59.7629]

Bolt 2 - Shear Force (kips): [0.089867 ; 0.15031 ; 0.2816 ; 0.46394 ; 0.70196 ; 0.95254 ; 1.1572 ; 1.2943 ; 1.4351 ; 1.7044 ; 1.9713 ; 2.0472 ; 2.1404 ; 2.2532 ; 2.3959 ; 2.4488 ; 2.4685 ; 2.5003 ; 2.5479 ; 2.6212 ; 2.7255 ; 2.7637 ; 2.8102 ; 2.8684 ; 2.9862 ; 3.246 ; 3.6366 ; 4.2565 ; 4.5024 ; 4.797 ; 5.1533 ; 5.6159 ; 6.0281 ; 6.3744 ; 6.4641 ; 6.5903 ; 6.7601 ; 6.9842]

Bolt 3 - Tensile Force (kips): [50 ; 49.8287 ; 49.7716 ; 49.7949 ; 49.8921 ; 50.2038 ; 50.6292 ; 51.0298 ; 51.4916 ; 52.1841 ; 53.5692 ; 54.0885 ; 54.8915 ; 56.2169 ; 58.3268 ; 59.1197 ; 59.4171 ; 59.8616 ; 60.4471 ; 61.1107 ; 61.9605 ; 62.2586 ; 62.6037 ; 63.1607 ; 64.0016 ; 65.2375 ; 67.0226 ; 69.6342 ; 70.8841 ; 72.3434 ; 74.094 ; 76.2143 ; 77.9592 ; 79.4027 ; 79.7961 ; 80.3023 ; 80.9328 ; 81.7448]

Bolt 3 - Shear Force (kips): [0.062774 ; 0.032245 ; 0.085507 ; 0.17305 ; 0.28909 ; 0.39951 ; 0.50457 ; 0.60741 ; 0.74692 ; 0.89152 ; 0.86576 ; 0.86815 ; 0.8779 ; 1.4177 ; 2.8629 ; 3.6149 ; 3.8323 ; 3.6195 ; 2.6747 ; 1.0895 ; 1.3701 ; 1.6776 ; 2.3839 ; 3.096 ; 4.0564 ; 5.0852 ; 6.4045 ; 7.4078 ; 7.2321 ; 7.2887 ; 7.4833 ; 7.4435 ; 7.4738 ; 7.4547 ; 7.4193 ; 7.3704 ; 7.2978 ; 7.2012]

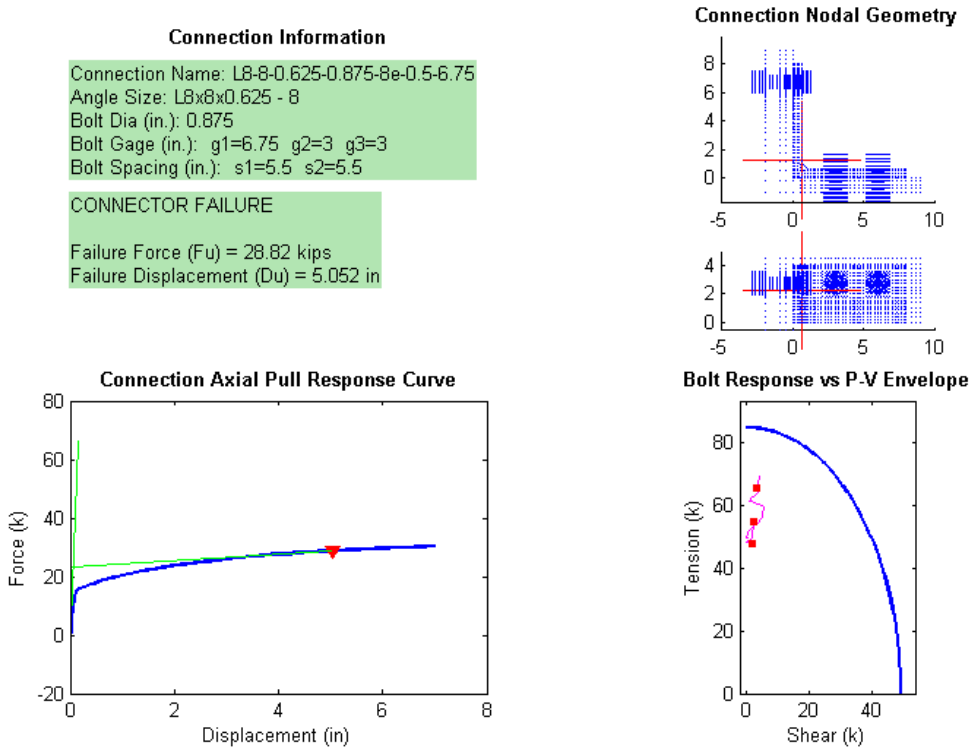


Figure B.342 Connection L8_8_0.625_0.875_8e_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_0.875_8e_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 423.0418

Plastic Stiffness (k/in): 1.0795

Displacement (in): [4.9659e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.46757 ; 0.5464 ; 0.66466 ; 0.84205 ; 0.90857 ; 1.0084 ; 1.158 ; 1.3825 ; 1.4667 ; 1.593 ; 1.7824 ; 2.0666 ; 2.1731 ; 2.3329 ; 2.3929 ; 2.4828 ; 2.6176 ; 2.8199 ; 3.0222 ; 3.2245 ; 3.5279 ; 3.9831 ; 4.1537 ; 4.4097 ; 4.6018 ; 4.8898 ; 4.9978 ; 5.1598 ; 5.4028 ; 5.7673 ; 5.904 ; 6.1091 ; 6.186 ; 6.3013 ; 6.4743 ; 6.7338 ; 7]

Force (kips): [-1.24174 ; 0.442743 ; 1.07177 ; 1.94618 ; 3.14375 ; 4.7352 ; 6.4231 ; 7.51344 ; 7.92443 ; 8.23314 ; 8.68756 ; 8.84827 ; 9.06878 ; 9.37276 ; 9.79453 ; 9.94985 ; 10.1676 ; 10.4679 ; 10.8792 ; 11.0219 ; 11.2227 ; 11.5061 ; 11.8899 ; 12.0228 ; 12.2113 ; 12.2872 ; 12.3979 ; 12.5573 ; 12.772 ; 12.9716 ; 13.1557 ; 13.4106 ; 13.7525 ; 13.8709 ; 14.0339 ; 14.1513 ; 14.3239 ; 14.3822 ; 14.4649 ; 14.5802 ; 14.7404 ; 14.7961 ; 14.8735 ; 14.9011 ; 14.9403 ; 14.9959 ; 15.0735 ; 15.1498]

Bolt 1 - Tensile Force (kips): [48.5921 ; 48.5275 ; 48.5009 ; 48.4628 ; 48.4075 ; 48.3274 ; 48.229 ; 48.1564 ; 48.1321 ; 48.1172 ; 48.0909 ; 48.0801 ; 48.0622 ; 48.0323 ; 47.9787 ; 47.9576 ; 47.9367 ; 47.9159 ; 47.8865 ; 47.8751 ; 47.8612 ; 47.845 ; 47.8269 ; 47.8214 ; 47.8144 ; 47.8114 ; 47.8074 ; 47.8019 ; 47.7964 ; 47.7914 ; 47.7879 ; 47.7842 ; 47.7827 ; 47.783 ; 47.7849 ; 47.7865 ; 47.7851 ; 47.7851 ; 47.7861 ; 47.7898 ; 47.7956 ; 47.7977 ; 47.8023 ; 47.8042 ; 47.8074 ; 47.8127 ; 47.8214 ; 47.8297]

Bolt 1 - Shear Force (kips): [0.062818 ; 0.073004 ; 0.10845 ; 0.16357 ; 0.24581 ; 0.36561 ; 0.50901 ; 0.6161 ; 0.6589 ; 0.69308 ; 0.75048 ; 0.77321 ; 0.81041 ; 0.8708 ; 0.9734 ; 1.0125 ; 1.0547 ; 1.1034 ; 1.1728 ; 1.1989 ; 1.2333 ; 1.2775 ; 1.3334 ; 1.3524 ; 1.3791 ; 1.3895 ; 1.4045 ; 1.4262 ; 1.4553 ; 1.4834 ; 1.5094 ; 1.5462 ; 1.5963 ; 1.6142 ; 1.6396 ; 1.6586 ; 1.6914 ; 1.7031 ; 1.7196 ; 1.7418 ; 1.7746 ; 1.7872 ; 1.8044 ; 1.8107 ; 1.8197 ; 1.8326 ; 1.851 ; 1.8703]

Bolt 2 - Tensile Force (kips): [48.5957 ; 48.5131 ; 48.4696 ; 48.4125 ; 48.3465 ; 48.303 ; 48.3176 ; 48.37 ; 48.3956 ; 48.4263 ; 48.4896 ; 48.5138 ; 48.5545 ; 48.6298 ; 48.7414 ; 48.7907 ; 48.9116 ; 49.1123 ; 49.4454 ; 49.5641 ; 49.7758 ; 50.1536 ; 50.7665 ; 50.987 ; 51.2988 ; 51.4162 ; 51.5884 ; 51.8343 ; 52.1818 ; 52.4988 ; 52.79 ; 53.1918 ; 53.7252 ; 53.9038 ; 54.1519 ; 54.329 ; 54.5734 ; 54.6577 ; 54.7803 ; 54.9615 ; 55.2091 ; 55.2931 ; 55.4133 ; 55.4561 ; 55.5175 ; 55.6051 ; 55.7298 ; 55.8493]

Bolt 2 - Shear Force (kips): [0.088055 ; 0.079902 ; 0.11819 ; 0.1811 ; 0.27569 ; 0.41154 ; 0.56791 ; 0.68076 ; 0.72374 ; 0.75832 ; 0.82547 ; 0.85164 ; 0.89936 ; 0.9854 ; 1.1354 ; 1.1944 ; 1.2682 ; 1.3675 ; 1.5006 ; 1.5459 ; 1.6065 ; 1.684 ; 1.7779 ; 1.8085 ; 1.8511 ; 1.8668 ; 1.8889 ; 1.9212 ; 1.966 ; 2.0105 ; 2.0531 ; 2.1162 ; 2.2092 ; 2.2429 ; 2.2894 ; 2.3217 ; 2.363 ; 2.3763 ; 2.3949 ; 2.4158 ; 2.4446 ; 2.4553 ; 2.4702 ; 2.4758 ; 2.4837 ; 2.495 ; 2.511 ; 2.5273]

Bolt 3 - Tensile Force (kips): [50 ; 49.9058 ; 49.8328 ; 49.7612 ; 49.7148 ; 49.701 ; 49.7676 ; 49.9512 ; 50.1475 ; 50.4175 ; 50.8416 ; 51.0016 ; 51.2518 ; 51.641 ; 52.2188 ; 52.4924 ; 52.9598 ; 53.7511 ; 54.936 ; 55.3554 ; 55.9457 ; 56.8534 ; 58.1588 ; 58.6285 ; 59.3246 ; 59.5989 ; 59.9323 ; 60.2793 ; 60.7574 ; 61.1465 ; 61.5165 ; 62.1148 ; 62.995 ; 63.3442 ; 63.8319 ; 64.2536 ; 65.1982 ; 65.5008 ; 65.9281 ; 66.446 ; 67.2516 ; 67.5375 ; 67.9116 ; 68.0441 ; 68.2212 ; 68.4625 ; 68.7995 ; 69.2273]

Bolt 3 - Shear Force (kips): [0.059241 ; 0.022572 ; 0.02714 ; 0.056029 ; 0.10879 ; 0.18489 ; 0.23939 ; 0.24295 ; 0.25558 ; 0.28189 ; 0.35529 ; 0.38725 ; 0.43551 ; 0.53295 ; 0.69503 ; 1.1787 ; 1.9259 ; 2.87 ; 3.954 ; 4.2821 ; 4.5023 ; 4.8342 ; 5.2079 ; 5.3064 ; 5.4425 ; 5.2488 ; 4.6739 ; 3.4744 ; 2.4006 ; 1.3866 ; 0.9937 ; 1.2271 ; 2.258 ; 2.5387 ; 3.1313 ; 3.481 ; 3.3586 ; 3.3081 ; 3.2944 ; 3.4726 ; 3.5704 ; 3.6294 ; 3.7914 ; 3.8622 ; 3.9512 ; 4.0634 ; 4.2306 ; 4.2066]

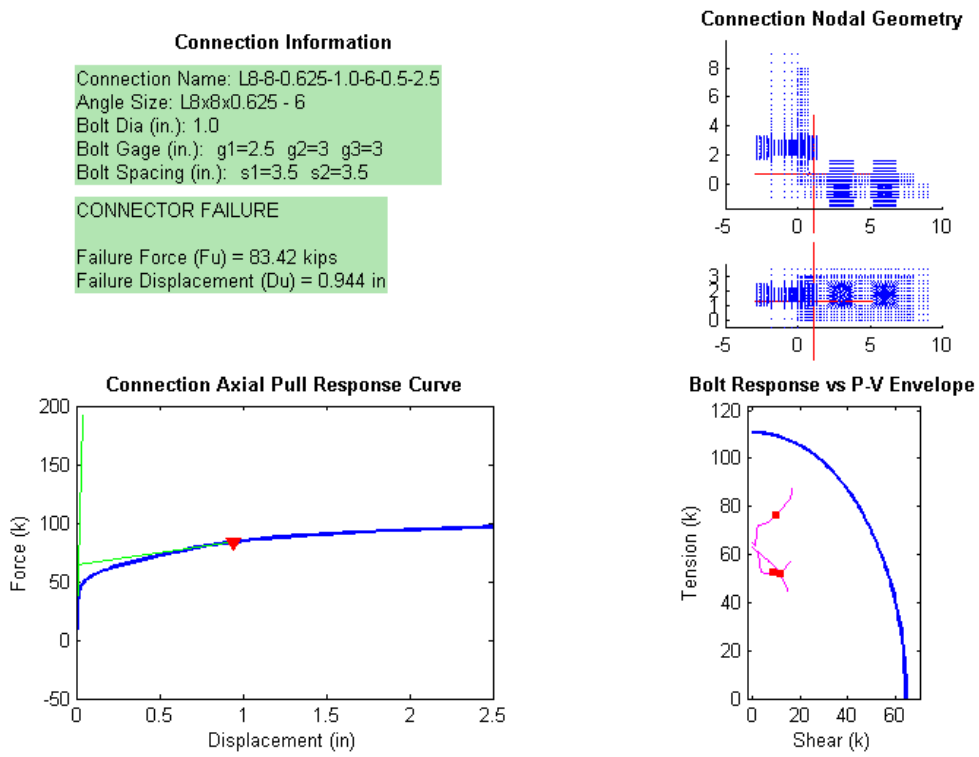


Figure B.343 Connection L8_8_0.625_1.0_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_1.0_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4.4913e+003

Plastic Stiffness (k/in): 20.5470

Displacement (in): [1.1374e-035 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.44793 ; 0.50138 ; 0.52142 ; 0.55149 ; 0.56277 ; 0.57968 ; 0.60505 ; 0.61456 ; 0.62883 ; 0.65024 ; 0.68235 ; 0.73051 ; 0.80276 ; 0.91112 ; 1.0737 ; 1.1346 ; 1.2261 ; 1.3632 ; 1.4146 ; 1.4918 ; 1.5207 ; 1.5641 ; 1.6292 ; 1.7269 ; 1.8733 ; 1.9282 ; 2.0106 ; 2.1342 ; 2.2578 ; 2.3813 ; 2.5]

Force (kips): [-2.26933 ; 2.97882 ; 6.50274 ; 10.7312 ; 15.5403 ; 20.0006 ; 22.854 ; 23.3552 ; 23.9012 ; 24.5555 ; 25.3872 ; 26.4326 ; 27.6531 ; 29.0687 ; 30.6951 ; 32.6947 ; 35.1826 ; 36.0217 ; 36.3757 ; 36.842 ; 37.0168 ; 37.2763 ; 37.6566 ; 37.7935 ; 38.0131 ; 38.3591 ; 38.8269 ; 39.4703 ; 40.3178 ; 41.4311 ; 42.8229 ; 43.2645 ; 43.842 ; 44.5691 ; 44.82 ; 45.1593 ; 45.2767 ; 45.4592 ; 45.7787 ; 46.1796 ; 46.6856 ; 46.8532 ; 47.0798 ; 47.3837 ; 47.6682 ; 47.9362 ; 48.1591]

Bolt 1 - Tensile Force (kips): [63.2848 ; 63.0829 ; 62.9393 ; 62.7562 ; 62.5324 ; 62.3062 ; 62.139 ; 62.099 ; 62.0452 ; 61.9682 ; 61.8567 ; 61.699 ; 61.5094 ; 61.3432 ; 61.1583 ; 60.8219 ; 59.6444 ; 59.0476 ; 58.7557 ; 58.3527 ; 58.1937 ; 57.953 ; 57.5867 ; 57.4498 ; 57.2243 ; 56.8487 ; 56.3053 ; 55.4953 ; 54.2933 ; 52.4929 ; 49.578 ; 48.3397 ; 46.2727 ; 44.9721 ; 44.8816 ; 44.8249 ; 44.8114 ; 44.8027 ; 44.8008 ; 44.7998 ; 44.7954 ; 44.7927 ; 44.7853 ; 44.7722 ; 44.7635 ; 44.7581 ; 44.768]

Bolt 1 - Shear Force (kips): [0.145672 ; 0.166521 ; 0.335822 ; 0.555631 ; 0.819074 ; 1.07911 ; 1.27156 ; 1.32003 ; 1.38711 ; 1.48444 ; 1.62504 ; 1.82035 ; 2.04757 ; 2.24627 ; 2.46639 ; 2.85968 ; 4.39191 ; 5.10243 ; 5.43116 ; 5.87031 ; 6.03913 ; 6.29063 ; 6.66399 ; 6.8008 ; 7.02337 ; 7.38779 ; 7.89952 ; 8.63331 ; 9.66469 ; 11.0954 ; 13.0477 ; 13.7038 ; 14.5133 ; 14.8045 ; 14.7982 ; 14.789 ; 14.786 ; 14.784 ; 14.7837 ; 14.7836 ; 14.7822 ; 14.7813 ; 14.7788 ; 14.7745 ; 14.768 ; 14.7591 ; 14.7478]

Bolt 2 - Tensile Force (kips): [63.281 ; 62.9477 ; 62.6995 ; 62.3733 ; 61.9762 ; 61.5481 ; 61.0959 ; 60.9229 ; 60.6461 ; 60.18 ; 59.4302 ; 58.1562 ; 56.4826 ; 55.0342 ; 53.7747 ; 52.8715 ; 52.2666 ; 52.1739 ; 52.1041 ; 52.057 ; 52.0376 ; 52.0149 ; 51.9955 ; 51.9909 ; 51.9724 ; 51.9262 ; 51.9021 ; 51.9167 ; 52.0401 ; 52.4017 ; 53.0192 ; 53.1908 ; 53.2948 ; 53.114 ; 53.0497 ; 53.0174 ; 53.0152 ; 53.1041 ; 53.5577 ; 54.0689 ; 54.7108 ; 54.9179 ; 55.2148 ; 55.6477 ; 56.0373 ; 56.3543 ; 56.7277]

Bolt 2 - Shear Force (kips): [0.119712 ; 0.308695 ; 0.58133 ; 0.928474 ; 1.34615 ; 1.76805 ; 2.11203 ; 2.20391 ; 2.33064 ; 2.5024 ; 2.72584 ; 2.97137 ; 3.19276 ; 3.3607 ; 3.60846 ; 4.07368 ; 5.47404 ; 5.94824 ; 6.15576 ; 6.41337 ; 6.51115 ; 6.65262 ; 6.85453 ; 6.92683 ; 7.04669 ; 7.24537 ; 7.50576 ; 7.85087 ; 8.27229 ; 8.75011 ; 9.3504 ; 9.6131 ; 10.1591 ; 11.1671 ; 11.4996 ; 11.9159 ; 12.056 ; 12.2928 ; 12.8149 ; 13.3091 ; 13.8745 ; 14.0834 ; 14.3565 ; 14.7832 ; 15.2023 ; 15.6012 ; 15.9282]

Bolt 3 - Tensile Force (kips): [65 ; 64.8295 ; 64.732 ; 64.6872 ; 64.7124 ; 64.615 ; 64.474 ; 64.3684 ; 64.2242 ; 64.041 ; 63.8571 ; 63.7552 ; 63.9083 ; 64.3587 ; 65.4186 ; 67.3163 ; 70.1829 ; 71.1712 ; 71.4958 ; 71.9206 ; 72.0546 ; 72.2675 ; 72.5846 ; 72.6985 ; 72.9136 ; 73.2908 ; 73.7303 ; 74.3541 ; 75.1256 ; 76.1788 ; 77.8066 ; 78.3972 ; 79.1907 ; 80.2728 ; 80.697 ; 81.227 ; 81.419 ; 81.7013 ; 82.1447 ; 82.7725 ; 83.6006 ; 83.8869 ; 84.2819 ; 84.8282 ; 85.4785 ; 86.415 ; 87.2125]

Bolt 3 - Shear Force (kips): [0.0642871 ; 0.0621101 ; 0.146134 ; 0.274427 ; 0.453689 ; 0.64215 ; 0.79524 ; 0.828841 ; 0.868079 ; 0.932172 ; 1.0466 ; 1.21397 ; 1.37159 ; 1.46928 ; 1.60446 ; 1.84971 ; 2.04992 ; 2.14856 ; 2.3057 ; 2.48233 ; 2.74248 ; 3.71907 ; 4.78282 ; 5.29146 ; 5.8198 ; 6.28703 ; 7.11902 ; 7.66138 ; 8.57375 ; 9.79303 ; 11.1719 ; 11.7193 ; 12.5464 ; 13.424 ; 13.7357 ; 14.1907 ; 14.3533 ; 14.5757 ; 14.7887 ; 15.1435 ; 15.6663 ; 15.7888 ; 16.1006 ; 16.5502 ; 16.7546 ; 16.5075 ; 16.4452]

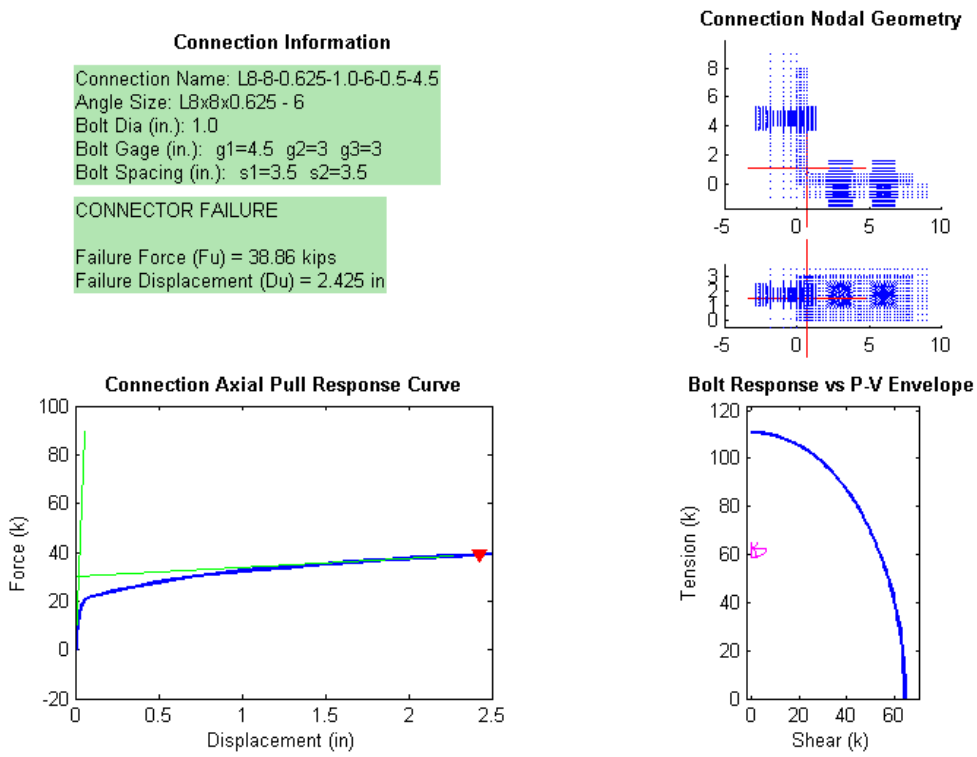


Figure B.344 Connection L8_8_0.625_1.0_6_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_1.0_6_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 1.5887e+003

Plastic Stiffness (k/in): 3.7695

Displacement (in): [8.7442e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.53655 ; 0.67909 ; 0.73254 ; 0.81272 ; 0.93299 ; 1.1134 ; 1.3634 ; 1.3673 ; 1.3732 ; 1.382 ; 1.3951 ; 1.4149 ; 1.4446 ; 1.4891 ; 1.5558 ; 1.6559 ; 1.8061 ; 1.8624 ; 1.9469 ; 2.0736 ; 2.2636 ; 2.5]

Force (kips): [-2.13171 ; 0.192173 ; 0.97128 ; 2.03449 ; 3.43145 ; 5.25229 ; 7.43887 ; 9.36913 ; 10.4669 ; 10.9009 ; 11.2971 ; 11.9181 ; 12.7384 ; 13.0238 ; 13.4554 ; 14.0675 ; 14.8025 ; 15.0516 ; 15.3857 ; 15.8341 ; 16.4175 ; 17.1271 ; 17.1426 ; 17.1655 ; 17.198 ; 17.2435 ; 17.3066 ; 17.3936 ; 17.5207 ; 17.6937 ; 17.9426 ; 18.2759 ; 18.3984 ; 18.5682 ; 18.8027 ; 19.1609 ; 19.559]

Bolt 1 - Tensile Force (kips): [63.2842 ; 63.1962 ; 63.1669 ; 63.1246 ; 63.0672 ; 62.9879 ; 62.8849 ; 62.7843 ; 62.7209 ; 62.6984 ; 62.6814 ; 62.6433 ; 62.5917 ; 62.577 ; 62.5564 ; 62.519 ; 62.4824 ; 62.4729 ; 62.4658 ; 62.4636 ; 62.4718 ; 62.4913 ; 62.4911 ; 62.4906 ; 62.4901 ; 62.4897 ; 62.4897 ; 62.4905 ; 62.4919 ; 62.4962 ; 62.5034 ; 62.518 ; 62.5232 ; 62.533 ; 62.5495 ; 62.5649 ; 62.5872]

Bolt 1 - Shear Force (kips): [0.13867 ; 0.083116 ; 0.09613 ; 0.13215 ; 0.19423 ; 0.28735 ; 0.41173 ; 0.53648 ; 0.62316 ; 0.66721 ; 0.71199 ; 0.79595 ; 0.91082 ; 0.94809 ; 1.0037 ; 1.0951 ; 1.2049 ; 1.2401 ; 1.2834 ; 1.3367 ; 1.401 ; 1.4776 ; 1.4796 ; 1.4824 ; 1.4864 ; 1.4921 ; 1.4999 ; 1.5107 ; 1.5266 ; 1.5477 ; 1.5783 ; 1.6196 ; 1.6353 ; 1.6564 ; 1.686 ; 1.7408 ; 1.8046]

Bolt 2 - Tensile Force (kips): [63.2759 ; 63.1339 ; 63.0754 ; 62.9906 ; 62.8855 ; 62.7442 ; 62.5834 ; 62.4456 ; 62.3558 ; 62.3103 ; 62.251 ; 62.1228 ; 61.8788 ; 61.7329 ; 61.4435 ; 60.9376 ; 60.2655 ; 60.0388 ; 59.7673 ; 59.4937 ; 59.2005 ; 58.9658 ; 58.9603 ; 58.9521 ; 58.9404 ; 58.924 ; 58.9029 ; 58.8784 ; 58.8455 ; 58.8128 ; 58.7752 ; 58.746 ; 58.7419 ; 58.7463 ; 58.7662 ; 58.788 ; 58.8879]

Bolt 2 - Shear Force (kips): [0.11137 ; 0.11366 ; 0.17925 ; 0.27216 ; 0.40187 ; 0.58071 ; 0.81173 ; 1.0409 ; 1.1976 ; 1.2687 ; 1.3533 ; 1.5277 ; 1.7799 ; 1.8575 ; 1.9499 ; 2.0509 ; 2.1151 ; 2.1277 ; 2.1405 ; 2.1626 ; 2.1999 ; 2.2748 ; 2.2767 ; 2.2797 ; 2.2838 ; 2.2894 ; 2.2974 ; 2.3088 ; 2.3263 ; 2.3535 ; 2.3978 ; 2.4621 ; 2.4859 ; 2.5217 ; 2.5723 ; 2.6549 ; 2.7292]

Bolt 3 - Tensile Force (kips): [65 ; 64.9015 ; 64.8061 ; 64.6741 ; 64.4958 ; 64.2281 ; 63.751 ; 63.0043 ; 62.0133 ; 60.8539 ; 59.8869 ; 59.3071 ; 59.0726 ; 59.017 ; 59.1024 ; 59.3674 ; 60.1893 ; 60.4551 ; 60.7324 ; 61.1049 ; 61.6209 ; 62.5764 ; 62.5986 ; 62.6249 ; 62.6525 ; 62.6743 ; 62.6866 ; 62.6911 ; 62.6935 ; 62.7149 ; 62.733 ; 62.8033 ; 62.8877 ; 62.9776 ; 63.1157 ; 63.9817 ; 65.0941]

Bolt 3 - Shear Force (kips): [0.074004 ; 0.037328 ; 0.031621 ; 0.048853 ; 0.085854 ; 0.13564 ; 0.17853 ; 0.14936 ; 0.060671 ; 0.051155 ; 0.090486 ; 0.10652 ; 0.33057 ; 0.4235 ; 1.3623 ; 3.6561 ; 4.9007 ; 5.4334 ; 5.776 ; 6.04 ; 6.0386 ; 5.9364 ; 5.8837 ; 5.7866 ; 5.6331 ; 5.3959 ; 5.062 ; 4.6439 ; 3.9727 ; 3.2738 ; 2.0502 ; 0.92953 ; 0.74806 ; 0.54084 ; 1.1516 ; 1.9532 ; 2.7716]

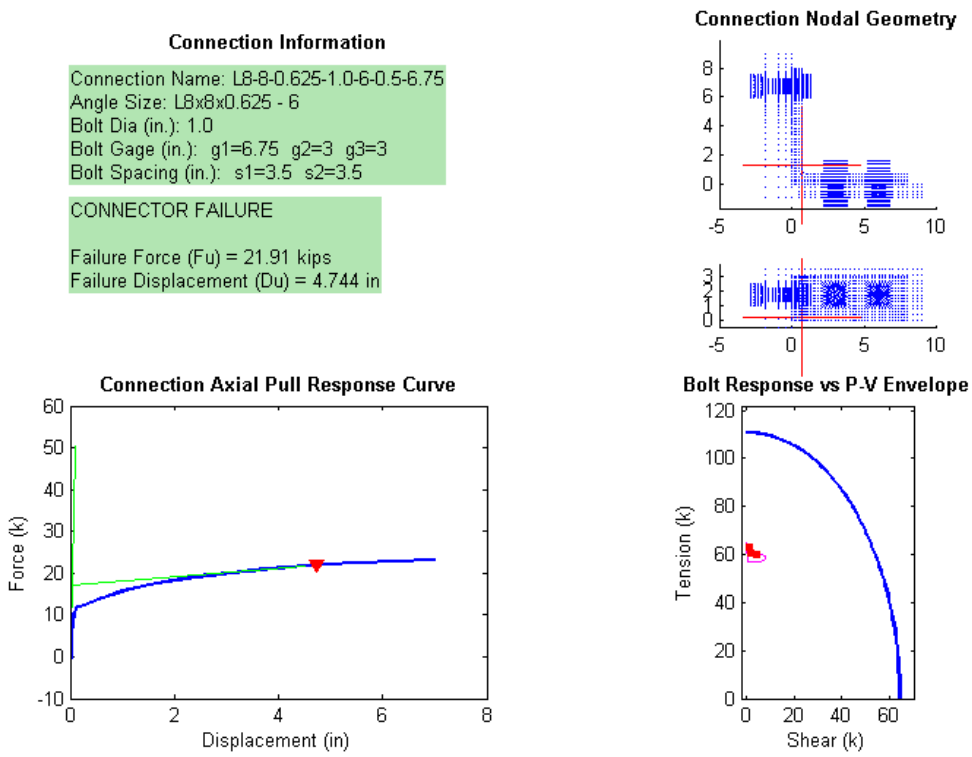


Figure B.345 Connection L8_8_0.625_1.0_6_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_1.0_6_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 546.5969

Plastic Stiffness (k/in): 0.9811

Displacement (in): [8.4607e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.70408 ; 0.82234 ; 0.99973 ; 1.2658 ; 1.6649 ; 2.2636 ; 2.4386 ; 2.7011 ; 3.0949 ; 3.6855 ; 3.6964 ; 3.7128 ; 3.7374 ; 3.7744 ; 3.8297 ; 3.9128 ; 4.0374 ; 4.2242 ; 4.5046 ; 4.925 ; 5.5557 ; 6.2557 ; 6.9558 ; 7]

Force (kips): [-2.07769 ; 0.36173 ; 0.911512 ; 1.6829 ; 2.72991 ; 4.06441 ; 5.24152 ; 5.80045 ; 6.0121 ; 6.22949 ; 6.5839 ; 7.04411 ; 7.20768 ; 7.45613 ; 7.81323 ; 8.26287 ; 8.79999 ; 9.40467 ; 9.5556 ; 9.76108 ; 10.0309 ; 10.396 ; 10.4044 ; 10.4166 ; 10.4337 ; 10.4587 ; 10.4943 ; 10.5449 ; 10.6144 ; 10.7146 ; 10.8521 ; 11.0346 ; 11.259 ; 11.4463 ; 11.5915 ; 11.6]

Bolt 1 - Tensile Force (kips): [63.2849 ; 63.1926 ; 63.1707 ; 63.1382 ; 63.0915 ; 63.026 ; 62.9611 ; 62.9274 ; 62.9175 ; 62.9112 ; 62.9002 ; 62.885 ; 62.8774 ; 62.8603 ; 62.8293 ; 62.8054 ; 62.8026 ; 62.8081 ; 62.8106 ; 62.8176 ; 62.8318 ; 62.8556 ; 62.8559 ; 62.8561 ; 62.8565 ; 62.8572 ; 62.8585 ; 62.8607 ; 62.8652 ; 62.8719 ; 62.8838 ; 62.9035 ; 62.9396 ; 62.9865 ; 63.0369 ; 63.0401]

Bolt 1 - Shear Force (kips): [0.13776 ; 0.0855 ; 0.097661 ; 0.1241 ; 0.17114 ; 0.24455 ; 0.32358 ; 0.37181 ; 0.39522 ; 0.41886 ; 0.45568 ; 0.51105 ; 0.53448 ; 0.57795 ; 0.65024 ; 0.72532 ; 0.79759 ; 0.89133 ; 0.9168 ; 0.95031 ; 0.99506 ; 1.0572 ; 1.0588 ; 1.061 ; 1.0642 ; 1.0689 ; 1.0758 ; 1.0858 ; 1.0993 ; 1.1193 ; 1.1466 ; 1.1845 ; 1.2322 ; 1.2753 ; 1.3128 ; 1.3153]

Bolt 2 - Tensile Force (kips): [63.2797 ; 63.1293 ; 63.0784 ; 63.0089 ; 62.9171 ; 62.8093 ; 62.7281 ; 62.6952 ; 62.6859 ; 62.6796 ; 62.6658 ; 62.6355 ; 62.6164 ; 62.5722 ; 62.5077 ; 62.4441 ; 62.2763 ; 61.8269 ; 61.6693 ; 61.4796 ; 61.216 ; 60.9521 ; 60.9459 ; 60.9369 ; 60.9237 ; 60.9049 ; 60.8787 ; 60.8406 ; 60.7929 ; 60.7288 ; 60.6469 ; 60.5495 ; 60.4489 ; 60.3765 ; 60.3292 ; 60.3258]

Bolt 2 - Shear Force (kips): [0.11034 ; 0.13253 ; 0.18938 ; 0.27143 ; 0.38918 ; 0.55052 ; 0.70894 ; 0.78942 ; 0.81929 ; 0.85196 ; 0.91538 ; 1.0113 ; 1.0566 ; 1.1392 ; 1.2758 ; 1.4442 ; 1.5988 ; 1.6958 ; 1.7076 ; 1.7194 ; 1.7316 ; 1.7448 ; 1.7454 ; 1.7461 ; 1.7472 ; 1.7487 ; 1.751 ; 1.7544 ; 1.7593 ; 1.7686 ; 1.7844 ; 1.8107 ; 1.851 ; 1.8957 ; 1.9371 ; 1.9396]

Bolt 3 - Tensile Force (kips): [65 ; 64.8707 ; 64.7495 ; 64.5674 ; 64.2634 ; 63.64 ; 62.586 ; 61.2269 ; 59.8377 ; 58.5723 ; 57.7003 ; 57.2589 ; 57.1536 ; 57.1648 ; 57.1271 ; 57.0345 ; 57.6098 ; 58.1895 ; 58.3073 ; 58.4919 ; 58.8003 ; 59.6506 ; 59.666 ; 59.6831 ; 59.698 ; 59.7161 ; 59.7155 ; 59.7258 ; 59.7546 ; 59.8161 ; 59.9444 ; 60.1371 ; 60.5495 ; 60.9041 ; 61.2334 ; 61.266]

Bolt 3 - Shear Force (kips): [0.06762 ; 0.037637 ; 0.038385 ; 0.051207 ; 0.070527 ; 0.060436 ; 0.073961 ; 0.2783 ; 0.44363 ; 0.55477 ; 0.56674 ; 0.50069 ; 0.45829 ; 0.73417 ; 3.3907 ; 5.9827 ; 7.2438 ; 7.5277 ; 7.7146 ; 7.7709 ; 7.7832 ; 8.2238 ; 8.1861 ; 8.1233 ; 8.0212 ; 7.8432 ; 7.5898 ; 7.2432 ; 6.8389 ; 6.1103 ; 5.2262 ; 4.132 ; 2.8515 ; 2.5997 ; 2.6563 ; 2.6898]

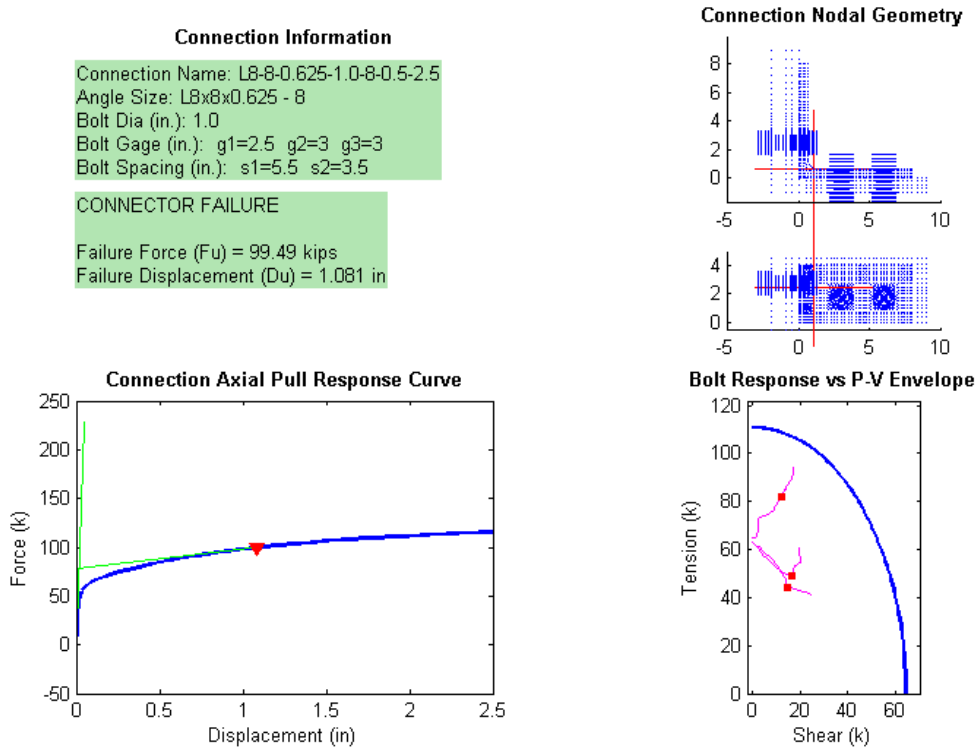


Figure B.346 Connection L8_8_0.625_1.0_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_1.0_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4439

Plastic Stiffness (k/in): 20.4376

Displacement (in): [8.2697e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.024414 ; 0.031006 ; 0.040894 ; 0.055725 ; 0.077972 ; 0.11134 ; 0.14471 ; 0.17808 ; 0.22814 ; 0.30323 ; 0.41585 ; 0.42641 ; 0.44225 ; 0.46601 ; 0.50164 ; 0.5551 ; 0.57514 ; 0.60521 ; 0.65031 ; 0.66722 ; 0.69259 ; 0.73065 ; 0.78773 ; 0.87335 ; 0.90546 ; 0.95362 ; 0.97169 ; 0.99878 ; 1.0089 ; 1.0242 ; 1.047 ; 1.0813 ; 1.1327 ; 1.2099 ; 1.3256 ; 1.369 ; 1.4341 ; 1.4585 ; 1.4951 ; 1.5501 ; 1.6324 ; 1.756 ; 1.9414 ; 2.1914 ; 2.2539 ; 2.3476 ; 2.4883 ; 2.5]

Force (kips): [-1.98737 ; 3.06639 ; 6.68253 ; 11.0495 ; 16.2846 ; 20.1823 ; 22.9405 ; 24.8731 ; 26.7791 ; 28.3412 ; 29.7773 ; 31.3316 ; 33.0286 ; 34.2751 ; 35.289 ; 36.5879 ; 38.2479 ; 40.4357 ; 40.6943 ; 41.0436 ; 41.5039 ; 42.1595 ; 43.0945 ; 43.4632 ; 43.9783 ; 44.6893 ; 44.9616 ; 45.3331 ; 45.8531 ; 46.5806 ; 47.5776 ; 47.9246 ; 48.422 ; 48.6189 ; 48.9101 ; 49.0223 ; 49.186 ; 49.4195 ; 49.752 ; 50.2155 ; 50.8527 ; 51.7351 ; 52.0763 ; 52.5668 ; 52.753 ; 53.0246 ; 53.4187 ; 53.9591 ; 54.6758 ; 55.5964 ; 56.5797 ; 56.814 ; 57.129 ; 57.5381 ; 57.5711]

Bolt 1 - Tensile Force (kips): [63.2847 ; 63.0829 ; 62.9286 ; 62.731 ; 62.4742 ; 62.267 ; 62.1093 ; 61.9919 ; 61.8636 ; 61.7274 ; 61.5534 ; 61.322 ; 60.9883 ; 60.4684 ; 59.6768 ; 58.4709 ; 56.5164 ; 53.3338 ; 52.9783 ; 52.4557 ; 51.6769 ; 50.4645 ; 48.4875 ; 47.7236 ; 46.6399 ; 45.2743 ; 45.0741 ; 44.9374 ; 44.8221 ; 44.7338 ; 44.6671 ; 44.6475 ; 44.6242 ; 44.613 ; 44.5882 ; 44.4479 ; 44.3528 ; 44.2639 ; 44.1788 ; 44.1216 ; 44.0972 ; 44.0457 ; 43.9417 ; 43.7089 ; 43.6052 ; 43.4836 ; 43.1942 ; 42.9134 ; 42.657 ; 42.2234 ; 41.8131 ; 41.6718 ; 41.4944 ; 41.2832 ; 41.2614]

Bolt 1 - Shear Force (kips): [0.133297 ; 0.194188 ; 0.395671 ; 0.653505 ; 0.978359 ; 1.23219 ; 1.42187 ; 1.56214 ; 1.71544 ; 1.88432 ; 2.10616 ; 2.4013 ; 2.81447 ; 3.47364 ; 4.48586 ; 5.86012 ; 7.80694 ; 10.5412 ; 10.819 ; 11.218 ; 11.7816 ; 12.5734 ; 13.6499 ; 13.9893 ; 14.3832 ; 14.7557 ; 14.7827 ; 14.7839 ; 14.7742 ; 14.7574 ; 14.739 ; 14.7331 ; 14.7257 ; 14.722 ; 14.7304 ; 14.8349 ; 14.8612 ; 14.8667 ; 14.8599 ; 14.8438 ; 14.8233 ; 15.1274 ; 15.8214 ; 16.8892 ; 17.4722 ; 18.111 ; 19.2103 ; 20.126 ; 20.9652 ; 22.1908 ; 23.3297 ; 23.6421 ; 24.0225 ; 24.466 ; 24.5097]

Bolt 2 - Tensile Force (kips): [63.2793 ; 62.9883 ; 62.7531 ; 62.4511 ; 62.0587 ; 61.7614 ; 61.5297 ; 61.3542 ; 61.1508 ; 60.8572 ; 60.4345 ; 59.779 ; 58.8674 ; 58.0263 ; 57.1584 ; 56.0858 ; 54.9483 ; 53.7745 ; 53.6426 ; 53.4657 ; 53.2347 ; 52.918 ; 52.4303 ; 52.2197 ; 51.9025 ; 51.4402 ; 51.2657 ; 51.0411 ; 50.7692 ; 50.4732 ; 50.194 ; 50.1063 ; 49.9583 ; 49.8238 ; 49.6163 ; 49.552 ; 49.3982 ; 49.2311 ; 49.2212 ; 49.7315 ; 50.6568 ; 51.9865 ; 52.362 ; 52.871 ; 53.0198 ; 53.1997 ; 53.4642 ; 53.8677 ; 54.6304 ; 56.1684 ; 58.2801 ; 58.7795 ; 59.5356 ; 60.5504 ; 60.6326]

Bolt 2 - Shear Force (kips): [0.102322 ; 0.300418 ; 0.580768 ; 0.93632 ; 1.38249 ; 1.73058 ; 1.9936 ; 2.19562 ; 2.42642 ; 2.69554 ; 3.04237 ; 3.4454 ; 3.88351 ; 4.45995 ; 5.28362 ; 6.29128 ; 7.34842 ; 8.62607 ; 8.76441 ; 8.95746 ; 9.22778 ; 9.62937 ; 10.2736 ; 10.543 ; 10.9524 ; 11.5584 ; 11.7834 ; 12.0906 ; 12.5021 ; 13.029 ; 13.6738 ; 13.8925 ; 14.3362 ; 14.6441 ; 15.1179 ; 15.2721 ; 15.5652 ; 15.9662 ; 16.3691 ; 16.6218 ; 16.9068 ; 17.2596 ; 17.366 ; 17.5319 ; 17.5819 ; 17.8908 ; 18.2433 ; 19.0154 ; 19.9425 ; 20.0195 ; 19.7507 ; 19.6428 ; 19.5073 ; 19.4196 ; 19.4082]

Bolt 3 - Tensile Force (kips): [65 ; 64.8223 ; 64.7234 ; 64.6881 ; 64.7146 ; 64.7069 ; 64.6957 ; 64.7307 ; 64.7582 ; 64.7346 ; 64.715 ; 64.9318 ; 65.5344 ; 66.157 ; 66.8127 ; 67.9267 ; 69.7861 ; 72.5506 ; 72.7685 ; 73.0616 ; 73.4678 ; 74.0335 ; 74.8791 ; 75.2006 ; 75.6292 ; 76.3834 ; 76.766 ; 77.2578 ; 77.8374 ; 78.5777 ; 79.6666 ; 80.0856 ; 80.6267 ; 80.8245 ; 81.1244 ; 81.2385 ; 81.4109 ; 81.6746 ; 82.0582 ; 82.6595 ; 83.5802 ; 84.8433 ; 85.3029 ; 85.9614 ; 86.203 ; 86.5643 ; 87.0974 ; 87.8164 ; 88.8529 ; 90.1606 ; 91.6336 ; 92.2305 ; 92.9671 ; 93.8564 ; 93.9404]

Bolt 3 - Shear Force (kips): [0.0733737 ; 0.0632311 ; 0.144524 ; 0.272629 ; 0.463086 ; 0.62271 ; 0.751706 ; 0.858353 ; 0.978319 ; 1.11477 ; 1.32312 ; 1.54353 ; 1.73924 ; 1.89852 ; 2.04541 ; 2.25766 ; 2.52163 ; 2.82516 ; 2.93507 ; 3.10046 ; 3.26836 ; 4.86647 ; 6.81361 ; 7.40566 ; 8.52657 ; 9.34684 ; 9.18961 ; 9.11517 ; 9.29983 ; 9.85821 ; 10.5903 ; 10.8629 ; 11.2332 ; 11.3556 ; 11.5849 ; 11.6919 ; 11.8349 ; 12.0146 ; 12.3108 ; 12.6777 ; 13.1719 ; 13.8039 ; 14.01 ; 14.3585 ; 14.4906 ; 14.7093 ; 15.0385 ; 15.2607 ; 15.8838 ; 16.6237 ; 17.4393 ; 17.2005 ; 17.0405 ; 17.1308 ; 17.114]

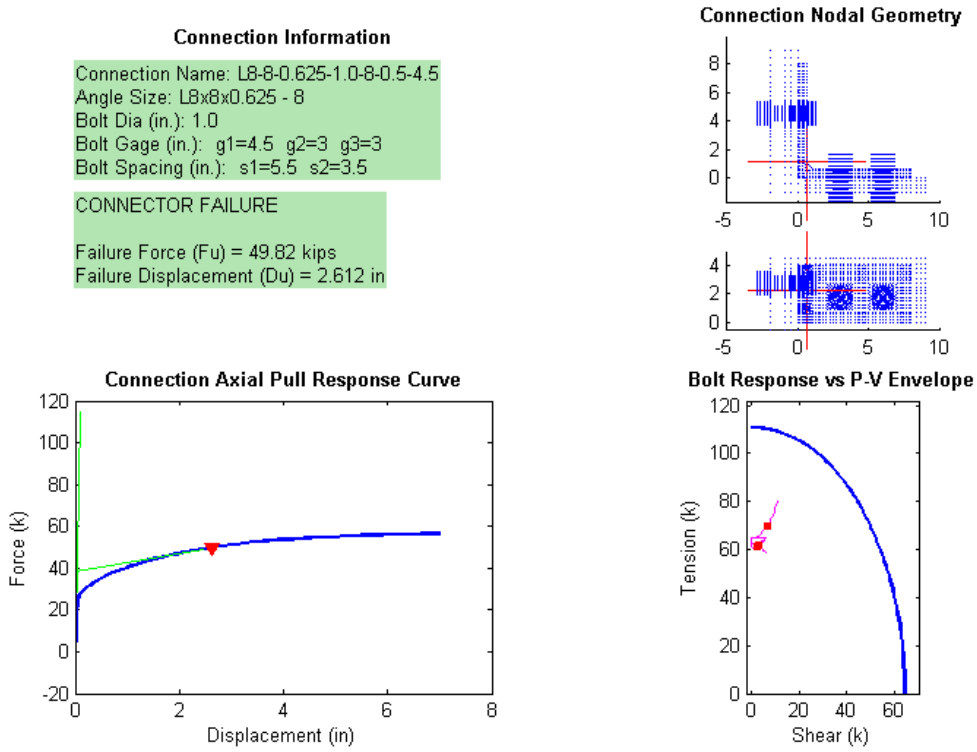


Figure B.347 Connection L8_8_0.625_1.0_8_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_1.0_8_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 1.0344e+003

Plastic Stiffness (k/in): 4.3391

Displacement (in): [7.5396e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.30989 ; 0.36245 ; 0.44128 ; 0.55954 ; 0.73693 ; 1.003 ; 1.1028 ; 1.1122 ; 1.1262 ; 1.1472 ; 1.1788 ; 1.1906 ; 1.2084 ; 1.235 ; 1.275 ; 1.3349 ; 1.4248 ; 1.5597 ; 1.762 ; 1.8378 ; 1.9516 ; 2.1223 ; 2.293 ; 2.4636 ; 2.6343 ; 2.805 ; 3.061 ; 3.445 ; 4.0211 ; 4.7211 ; 5.4211 ; 5.4648 ; 5.5086 ; 5.5742 ; 5.6726 ; 5.8203 ; 6.0418 ; 6.374 ; 6.8723 ; 7]

Force (kips): [-1.84019 ; 1.77992 ; 3.81682 ; 6.38365 ; 9.42584 ; 12.086 ; 13.5393 ; 14.203 ; 14.8433 ; 15.7198 ; 16.0188 ; 16.4426 ; 17.0558 ; 17.8944 ; 18.9159 ; 20.136 ; 20.5326 ; 20.5787 ; 20.6537 ; 20.756 ; 20.8886 ; 20.9396 ; 21.0158 ; 21.1312 ; 21.3017 ; 21.5362 ; 21.87 ; 22.3152 ; 22.904 ; 23.1104 ; 23.4183 ; 23.8526 ; 24.2473 ; 24.6176 ; 24.954 ; 25.2614 ; 25.6943 ; 26.2266 ; 26.838 ; 27.3807 ; 27.7609 ; 27.7813 ; 27.8012 ; 27.8302 ; 27.8716 ; 27.9303 ; 28.0105 ; 28.1174 ; 28.2504 ; 28.2801]

Bolt 1 - Tensile Force (kips): [63.2827 ; 63.1382 ; 63.0486 ; 62.927 ; 62.7669 ; 62.6057 ; 62.5008 ; 62.4464 ; 62.385 ; 62.2795 ; 62.2414 ; 62.1889 ; 62.1193 ; 62.0264 ; 61.9222 ; 61.8176 ; 61.7863 ; 61.7827 ; 61.7766 ; 61.7684 ; 61.7579 ; 61.7538 ; 61.7475 ; 61.7378 ; 61.7232 ; 61.703 ; 61.6745 ; 61.6352 ; 61.5815 ; 61.5615 ; 61.5282 ; 61.4773 ; 61.4262 ; 61.3722 ; 61.3223 ; 61.2744 ; 61.1921 ; 61.073 ; 60.8771 ; 60.4535 ; 59.9825 ; 59.952 ; 59.9215 ; 59.8766 ; 59.8111 ; 59.716 ; 59.5792 ; 59.3801 ; 59.1153 ; 59.0528]

Bolt 1 - Shear Force (kips): [0.12418 ; 0.13539 ; 0.24466 ; 0.40026 ; 0.60463 ; 0.80957 ; 0.9455 ; 1.0222 ; 1.1134 ; 1.2697 ; 1.3249 ; 1.4015 ; 1.5036 ; 1.6401 ; 1.7955 ; 1.9537 ; 2.0029 ; 2.0086 ; 2.0178 ; 2.0304 ; 2.0469 ; 2.0533 ; 2.0631 ; 2.0781 ; 2.1005 ; 2.1317 ; 2.1761 ; 2.238 ; 2.3237 ; 2.3556 ; 2.4078 ; 2.4866 ; 2.5653 ; 2.6474 ; 2.7252 ; 2.8007 ; 2.9277 ; 3.1168 ; 3.4363 ; 4.088 ; 4.763 ; 4.8048 ; 4.8465 ; 4.9078 ; 4.9969 ; 5.1258 ; 5.3094 ; 5.5721 ; 5.9195 ; 6.0012]

Bolt 2 - Tensile Force (kips): [63.271 ; 63.0441 ; 62.8895 ; 62.6927 ; 62.4739 ; 62.3024 ; 62.1929 ; 62.132 ; 62.0528 ; 61.9274 ; 61.8813 ; 61.7776 ; 61.6343 ; 61.5105 ; 61.4793 ; 61.4876 ; 61.4668 ; 61.4622 ; 61.4544 ; 61.4446 ; 61.4331 ; 61.4283 ; 61.4212 ; 61.4104 ; 61.3934 ; 61.3752 ; 61.3518 ; 61.3413 ; 61.3635 ; 61.3744 ; 61.394 ; 61.451 ; 61.5166 ; 61.5932 ; 61.6891 ; 61.7972 ; 61.9837 ; 62.2994 ; 62.7709 ; 63.153 ; 63.4087 ; 63.4211 ; 63.4326 ; 63.4494 ; 63.4729 ; 63.5046 ; 63.5446 ; 63.5853 ; 63.6239 ; 63.631]

Bolt 2 - Shear Force (kips): [0.091975 ; 0.22943 ; 0.41568 ; 0.6652 ; 0.98227 ; 1.2938 ; 1.5023 ; 1.6191 ; 1.7733 ; 2.0484 ; 2.1446 ; 2.2689 ; 2.4094 ; 2.5426 ; 2.6346 ; 2.6954 ; 2.7057 ; 2.7076 ; 2.7111 ; 2.7155 ; 2.72 ; 2.7218 ; 2.7249 ; 2.7298 ; 2.7383 ; 2.7516 ; 2.7736 ; 2.7805 ; 2.7754 ; 2.7778 ; 2.7882 ; 2.8127 ; 2.8443 ; 2.8869 ; 2.9322 ; 2.9797 ; 3.0715 ; 3.2136 ; 3.442 ; 3.8301 ; 4.1987 ; 4.2215 ; 4.2442 ; 4.2773 ; 4.3248 ; 4.3927 ; 4.4882 ; 4.6245 ; 4.7997 ; 4.8403]

Bolt 3 - Tensile Force (kips): [65 ; 64.7298 ; 64.5061 ; 64.1982 ; 63.6889 ; 63.0654 ; 62.1435 ; 61.2634 ; 60.6216 ; 60.453 ; 60.4299 ; 60.4713 ; 60.825 ; 61.8109 ; 62.9149 ; 64.2538 ; 64.7556 ; 64.8072 ; 64.8479 ; 64.865 ; 64.8697 ; 64.8693 ; 64.8575 ; 64.8734 ; 64.8813 ; 64.877 ; 64.9284 ; 65.096 ; 65.5166 ; 65.7045 ; 66.2197 ; 67.1693 ; 68.0846 ; 68.9456 ; 69.6797 ; 70.2897 ; 71.3764 ; 72.699 ; 74.2152 ; 75.9002 ; 77.3884 ; 77.4891 ; 77.5828 ; 77.7133 ; 77.8921 ; 78.1358 ; 78.4658 ; 78.9676 ; 79.7589 ; 79.9431]

Bolt 3 - Shear Force (kips): [0.0794619 ; 0.0482125 ; 0.0994621 ; 0.176045 ; 0.259066 ; 0.297752 ; 0.303285 ; 0.319611 ; 0.432527 ; 0.680859 ; 0.780025 ; 0.921773 ; 1.6648 ; 3.74231 ; 5.22499 ; 5.85159 ; 6.2726 ; 6.12444 ; 5.68967 ; 5.09149 ; 4.56662 ; 4.33718 ; 4.0678 ; 3.62845 ; 2.7797 ; 1.81037 ; 0.324332 ; 1.42623 ; 3.04283 ; 3.53152 ; 4.05924 ; 4.52426 ; 5.15574 ; 5.95158 ; 6.72868 ; 7.35824 ; 7.79197 ; 8.3187 ; 9.00758 ; 9.62241 ; 10.1236 ; 10.1643 ; 10.211 ; 10.2773 ; 10.368 ; 10.4704 ; 10.5966 ; 10.7701 ; 11.1762 ; 11.2783]

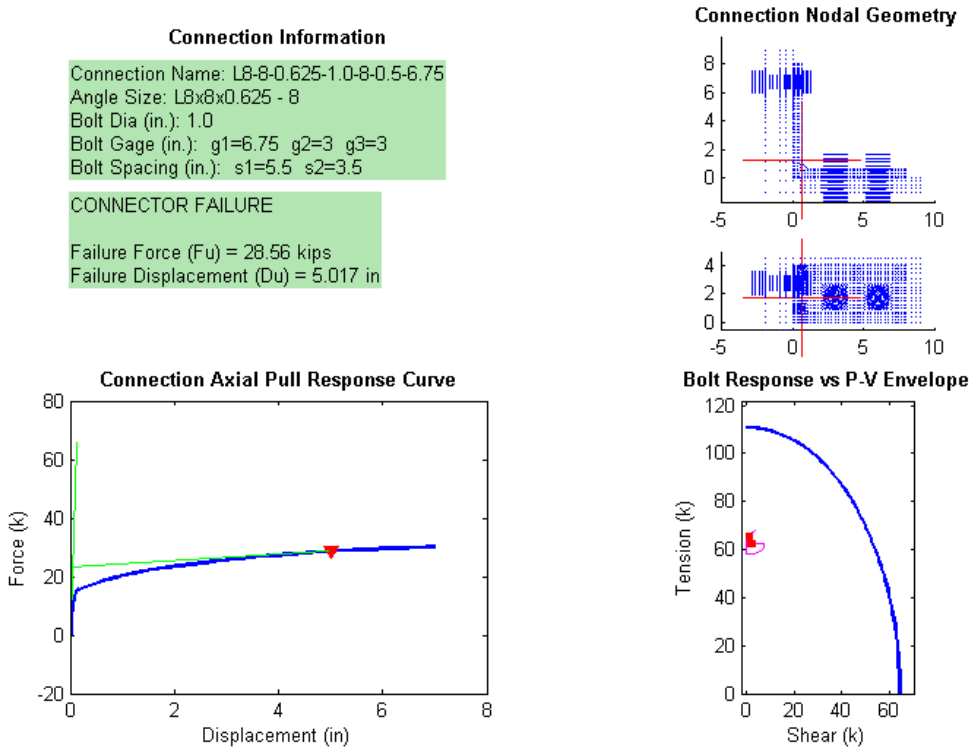


Figure B.348 Connection L8_8_0.625_1.0_8_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_1.0_8_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 529.1520

Plastic Stiffness (k/in): 1.0983

Displacement (in): [7.381e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.46757 ; 0.5464 ; 0.66466 ; 0.70901 ; 0.77553 ; 0.87531 ; 1.025 ; 1.2495 ; 1.5862 ; 2.0914 ; 2.7914 ; 2.8023 ; 2.8187 ; 2.8433 ; 2.8803 ; 2.9356 ; 3.0187 ; 3.1433 ; 3.3301 ; 3.4002 ; 3.5053 ; 3.663 ; 3.8995 ; 4.2543 ; 4.7865 ; 4.9615 ; 5.224 ; 5.6177 ; 6.2084 ; 6.3834 ; 6.6459 ; 7]

Force (kips): [-1.7968 ; 0.434535 ; 1.097 ; 2.02046 ; 3.27544 ; 4.90146 ; 6.52937 ; 7.46406 ; 7.83261 ; 8.13758 ; 8.58558 ; 8.74341 ; 8.96144 ; 9.2642 ; 9.37924 ; 9.56078 ; 9.82369 ; 10.1688 ; 10.6027 ; 11.166 ; 11.8469 ; 12.5926 ; 12.6066 ; 12.6266 ; 12.6546 ; 12.694 ; 12.7494 ; 12.8298 ; 12.9461 ; 13.1086 ; 13.1698 ; 13.2648 ; 13.3951 ; 13.5806 ; 13.8268 ; 14.154 ; 14.2501 ; 14.3829 ; 14.5615 ; 14.789 ; 14.8478 ; 14.9286 ; 15.0283]

Bolt 1 - Tensile Force (kips): [63.2835 ; 63.1969 ; 63.1678 ; 63.1256 ; 63.0649 ; 62.9787 ; 62.8791 ; 62.8143 ; 62.7913 ; 62.7755 ; 62.7509 ; 62.7415 ; 62.7271 ; 62.7036 ; 62.693 ; 62.6732 ; 62.6419 ; 62.6009 ; 62.5632 ; 62.5246 ; 62.4891 ; 62.4642 ; 62.4635 ; 62.4623 ; 62.4609 ; 62.459 ; 62.4567 ; 62.4538 ; 62.4501 ; 62.4468 ; 62.4449 ; 62.4404 ; 62.436 ; 62.4305 ; 62.4285 ; 62.4322 ; 62.4341 ; 62.4393 ; 62.4508 ; 62.4694 ; 62.4758 ; 62.4867 ; 62.5029]

Bolt 1 - Shear Force (kips): [0.12327 ; 0.084897 ; 0.10934 ; 0.15495 ; 0.22838 ; 0.33729 ; 0.4661 ; 0.55545 ; 0.59645 ; 0.63322 ; 0.68921 ; 0.71105 ; 0.74448 ; 0.798 ; 0.82078 ; 0.86083 ; 0.92304 ; 1.0067 ; 1.0988 ; 1.2118 ; 1.3445 ; 1.4871 ; 1.4898 ; 1.4938 ; 1.4994 ; 1.5074 ; 1.5188 ; 1.5354 ; 1.5592 ; 1.5918 ; 1.6047 ; 1.626 ; 1.6549 ; 1.6964 ; 1.7501 ; 1.8211 ; 1.8433 ; 1.8737 ; 1.9142 ; 1.9716 ; 1.9874 ; 2.0092 ; 2.0364]

Bolt 2 - Tensile Force (kips): [63.2741 ; 63.1508 ; 63.0875 ; 63.0024 ; 62.888 ; 62.757 ; 62.6408 ; 62.5899 ; 62.5718 ; 62.5608 ; 62.5424 ; 62.5383 ; 62.529 ; 62.5112 ; 62.5024 ; 62.489 ; 62.4639 ; 62.4448 ; 62.4849 ; 62.4997 ; 62.544 ; 62.6935 ; 62.6933 ; 62.6928 ; 62.6927 ; 62.6923 ; 62.6918 ; 62.6902 ; 62.6862 ; 62.6803 ; 62.6757 ; 62.6664 ; 62.6535 ; 62.638 ; 62.6223 ; 62.5963 ; 62.5834 ; 62.5689 ; 62.5502 ; 62.5227 ; 62.5146 ; 62.504 ; 62.4934]

Bolt 2 - Shear Force (kips): [0.090867 ; 0.11981 ; 0.18785 ; 0.28586 ; 0.42564 ; 0.61849 ; 0.82912 ; 0.95946 ; 1.0058 ; 1.046 ; 1.1262 ; 1.1558 ; 1.2017 ; 1.287 ; 1.3249 ; 1.3881 ; 1.4868 ; 1.6246 ; 1.7879 ; 1.9425 ; 2.0523 ; 2.1138 ; 2.115 ; 2.1166 ; 2.1189 ; 2.122 ; 2.1263 ; 2.1321 ; 2.1406 ; 2.1513 ; 2.1559 ; 2.1644 ; 2.1761 ; 2.1948 ; 2.2224 ; 2.2617 ; 2.2756 ; 2.2963 ; 2.3287 ; 2.3773 ; 2.3906 ; 2.4077 ; 2.4278]

Bolt 3 - Tensile Force (kips): [65 ; 64.8629 ; 64.7368 ; 64.5467 ; 64.2263 ; 63.6251 ; 62.6526 ; 61.5024 ; 60.3175 ; 59.238 ; 58.5358 ; 58.3683 ; 58.2636 ; 58.248 ; 58.2605 ; 58.31 ; 58.3223 ; 58.6057 ; 59.1665 ; 59.9493 ; 60.9741 ; 62.4948 ; 62.5041 ; 62.5075 ; 62.498 ; 62.4715 ; 62.4265 ; 62.3734 ; 62.3299 ; 62.3239 ; 62.369 ; 62.6315 ; 62.9291 ; 63.3565 ; 63.9362 ; 64.9711 ; 65.2501 ; 65.6328 ; 66.1733 ; 67.0472 ; 67.2816 ; 67.5842 ; 67.9693]

Bolt 3 - Shear Force (kips): [0.071511 ; 0.037668 ; 0.041707 ; 0.063372 ; 0.097166 ; 0.11701 ; 0.045811 ; 0.088088 ; 0.21746 ; 0.30027 ; 0.27855 ; 0.25591 ; 0.21753 ; 0.16309 ; 0.24231 ; 1.3207 ; 3.3598 ; 5.2109 ; 6.2094 ; 6.9455 ; 7.4232 ; 7.3671 ; 7.2685 ; 7.1107 ; 6.868 ; 6.5188 ; 6.0651 ; 5.5165 ; 4.7513 ; 3.8353 ; 3.7121 ; 3.7237 ; 3.2781 ; 2.4839 ; 1.6432 ; 1.4957 ; 1.5291 ; 1.5991 ; 2.0157 ; 2.3948 ; 2.7815 ; 3.2183 ; 3.489]

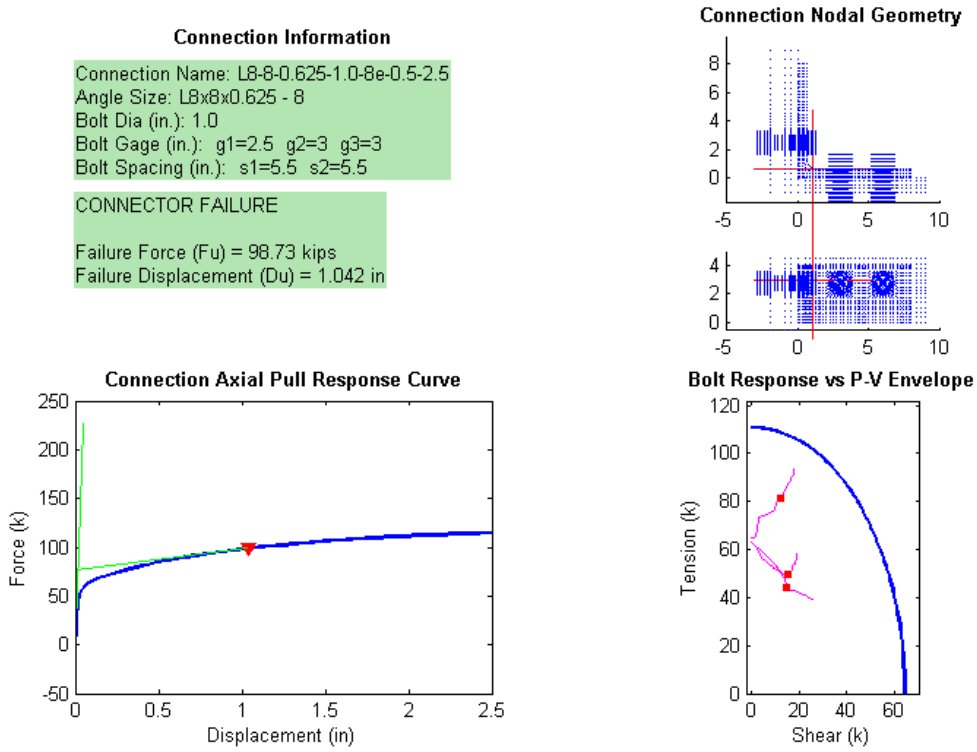


Figure B.349 Connection L8_8_0.625_1.0_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_1.0_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4.4963e+003

Plastic Stiffness (k/in): 20.5463

Displacement (in): [9.5691e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.026611 ; 0.036499 ; 0.051331 ; 0.073578 ; 0.10695 ; 0.14032 ; 0.17369 ; 0.22375 ; 0.29883 ; 0.41146 ; 0.42202 ; 0.43786 ; 0.46161 ; 0.49725 ; 0.5507 ; 0.57075 ; 0.57827 ; 0.58954 ; 0.60645 ; 0.63182 ; 0.66988 ; 0.72696 ; 0.81258 ; 0.94102 ; 0.98918 ; 1.0072 ; 1.0343 ; 1.0445 ; 1.0597 ; 1.0826 ; 1.1169 ; 1.1683 ; 1.2455 ; 1.3226 ; 1.3274 ; 1.3347 ; 1.3455 ; 1.3618 ; 1.3862 ; 1.3953 ; 1.4091 ; 1.4297 ; 1.4606 ; 1.5069 ; 1.5764 ; 1.6025 ; 1.6416 ; 1.7002 ; 1.7882 ; 1.9202 ; 2.1181 ; 2.3681 ; 2.5]

Force (kips): [-2.38226 ; 2.78629 ; 6.39955 ; 10.7655 ; 15.9711 ; 19.8625 ; 22.6457 ; 25.3848 ; 27.6185 ; 29.2595 ; 30.8544 ; 32.5941 ; 33.9097 ; 34.9869 ; 36.3748 ; 38.1201 ; 40.379 ; 40.636 ; 40.9918 ; 41.4604 ; 42.1214 ; 43.0643 ; 43.4174 ; 43.5616 ; 43.7703 ; 44.0512 ; 44.4569 ; 45.047 ; 45.854 ; 46.9311 ; 48.313 ; 48.8103 ; 49.0092 ; 49.2875 ; 49.389 ; 49.5396 ; 49.7588 ; 50.0676 ; 50.5067 ; 51.1091 ; 51.6892 ; 51.7294 ; 51.7898 ; 51.8769 ; 51.9999 ; 52.1768 ; 52.2491 ; 52.3579 ; 52.5173 ; 52.7462 ; 53.0768 ; 53.5374 ; 53.7029 ; 53.943 ; 54.2773 ; 54.7352 ; 55.351 ; 56.1263 ; 56.936 ; 57.3098]

Bolt 1 - Tensile Force (kips): [63.3555 ; 63.1245 ; 62.9506 ; 62.7274 ; 62.4386 ; 62.2042 ; 62.0246 ; 61.8345 ; 61.6577 ; 61.4741 ; 61.2353 ; 60.8638 ; 60.4427 ; 59.6882 ; 58.4408 ; 56.4614 ; 53.2968 ; 52.9576 ; 52.4514 ; 51.7051 ; 50.5627 ; 48.737 ; 48.0266 ; 47.7527 ; 47.3425 ; 46.7492 ; 45.9054 ; 44.9872 ; 44.7286 ; 44.5572 ; 44.4081 ; 44.3226 ; 44.1808 ; 44.0518 ; 44.0081 ; 43.9507 ; 43.8825 ; 43.8085 ; 43.7287 ; 43.6221 ; 43.4207 ; 43.3952 ; 43.3548 ; 43.2991 ; 43.2274 ; 43.1236 ; 43.0623 ; 42.9709 ; 42.8516 ; 42.6787 ; 42.394 ; 41.9732 ; 41.8135 ; 41.6115 ; 41.3602 ; 41.0558 ; 40.5762 ; 40.0399 ; 39.4385 ; 39.1622]

Bolt 1 - Shear Force (kips): [0.122123 ; 0.218386 ; 0.432829 ; 0.706045 ; 1.04774 ; 1.3154 ; 1.51733 ; 1.72914 ; 1.9275 ; 2.14469 ; 2.42799 ; 2.84976 ; 3.33826 ; 4.29674 ; 5.72166 ; 7.68975 ; 10.398 ; 10.6611 ; 11.0414 ; 11.5769 ; 12.3277 ; 13.3618 ; 13.7064 ; 13.8311 ; 14.0083 ; 14.2419 ; 14.5176 ; 14.7377 ; 14.7324 ; 14.6989 ; 14.654 ; 14.6787 ; 14.7589 ; 14.7731 ; 14.7723 ; 14.7665 ; 14.7532 ; 14.7315 ; 14.6991 ; 14.6493 ; 15.1483 ; 15.2556 ; 15.4231 ; 15.6352 ; 15.8661 ; 16.1448 ; 16.3621 ; 16.6899 ; 17.1729 ; 17.833 ; 18.7987 ; 19.9702 ; 20.3995 ; 20.9239 ; 21.5365 ; 22.2029 ; 23.1309 ; 24.0065 ; 24.9909 ; 25.4154]

Bolt 2 - Tensile Force (kips): [63.3582 ; 63.0408 ; 62.7934 ; 62.4703 ; 62.0526 ; 61.7313 ; 61.483 ; 61.2009 ; 60.8369 ; 60.2015 ; 59.179 ; 57.8614 ; 56.9271 ; 56.0689 ; 54.975 ; 53.9394 ; 53.0304 ; 52.9229 ; 52.7776 ; 52.5902 ; 52.3514 ; 52.0019 ; 51.8653 ; 51.8066 ; 51.7207 ; 51.5996 ; 51.407 ; 51.0929 ; 50.688 ; 50.2767 ; 49.9578 ; 49.7705 ; 49.6514 ; 49.4866 ; 49.4411 ; 49.3644 ; 49.2744 ; 49.4137 ; 49.9691 ; 50.8196 ; 51.5465 ; 51.5835 ; 51.6375 ; 51.7202 ; 51.8498 ; 52.0474 ; 52.1077 ; 52.1978 ; 52.3275 ; 52.5203 ; 52.7823 ; 53.1745 ; 53.3176 ; 53.4933 ; 53.7656 ; 54.1879 ; 54.8859 ; 55.9674 ; 57.3549 ; 58.0412]

Bolt 2 - Shear Force (kips): [0.160542 ; 0.255601 ; 0.520527 ; 0.860281 ; 1.28449 ; 1.61457 ; 1.86315 ; 2.13523 ; 2.41899 ; 2.76942 ; 3.18819 ; 3.64984 ; 4.08595 ; 4.87709 ; 5.96504 ; 7.14111 ; 8.40586 ; 8.5348 ; 8.71742 ; 8.97112 ; 9.33838 ; 9.91243 ; 10.1425 ; 10.2345 ; 10.3731 ; 10.5784 ; 10.8995 ; 11.3941 ; 12.0617 ; 12.8667 ; 13.7859 ; 14.3588 ; 14.6888 ; 15.1641 ; 15.3393 ; 15.5992 ; 15.9598 ; 16.259 ; 16.4829 ; 16.7314 ; 16.9104 ; 16.9189 ; 16.9314 ; 16.9509 ; 16.9813 ; 17.0261 ; 17.039 ; 17.0585 ; 17.0859 ; 17.1248 ; 17.178 ; 17.2597 ; 17.2879 ; 17.4843 ; 17.7522 ; 18.0969 ; 18.3678 ; 18.7676 ; 18.947 ; 19.0249]

Bolt 3 - Tensile Force (kips): [65 ; 64.8254 ; 64.725 ; 64.6846 ; 64.7168 ; 64.7083 ; 64.6911 ; 64.7532 ; 64.7761 ; 64.7578 ; 64.8889 ; 65.4517 ; 66.0591 ; 66.698 ; 67.8092 ; 69.6716 ; 72.4741 ; 72.6802 ; 72.9727 ; 73.3765 ; 73.9206 ; 74.7619 ; 75.061 ; 75.1964 ; 75.3892 ; 75.6203 ; 76.0234 ; 76.7261 ; 77.7367 ; 78.9199 ; 80.4676 ; 81.0302 ; 81.2476 ; 81.5617 ; 81.6819 ; 81.8631 ; 82.1346 ; 82.5468 ; 83.1524 ; 84.0029 ; 84.7982 ; 84.8469 ; 84.921 ; 85.0295 ; 85.1888 ; 85.4265 ; 85.5205 ; 85.6603 ; 85.8722 ; 86.1834 ; 86.6326 ; 87.2454 ; 87.4656 ; 87.8166 ; 88.3186 ; 89.0061 ; 89.9224 ; 91.1238 ; 92.6079 ; 93.5877]

Bolt 3 - Shear Force (kips): [0.0846903 ; 0.0500607 ; 0.130099 ; 0.254631 ; 0.441444 ; 0.597022 ; 0.721202 ; 0.867481 ; 1.01417 ; 1.2148 ; 1.47137 ; 1.6837 ; 1.85837 ; 2.01847 ; 2.25831 ; 2.555 ; 2.86594 ; 2.97641 ; 3.15675 ; 3.35421 ; 4.93062 ; 7.09868 ; 7.77464 ; 7.98331 ; 8.2324 ; 8.8715 ; 9.50159 ; 9.60458 ; 9.58945 ; 10.2906 ; 11.3167 ; 11.8176 ; 12.0134 ; 12.2863 ; 12.391 ; 12.5309 ; 12.7067 ; 12.9381 ; 13.2388 ; 13.7159 ; 14.0761 ; 14.105 ; 14.1493 ; 14.2189 ; 14.3239 ; 14.4758 ; 14.5284 ; 14.6194 ; 14.7439 ; 14.9096 ; 15.1347 ; 15.4336 ; 15.497 ; 15.6931 ; 15.97 ; 16.3062 ; 16.8135 ; 17.5169 ; 17.8141 ; 17.5724]

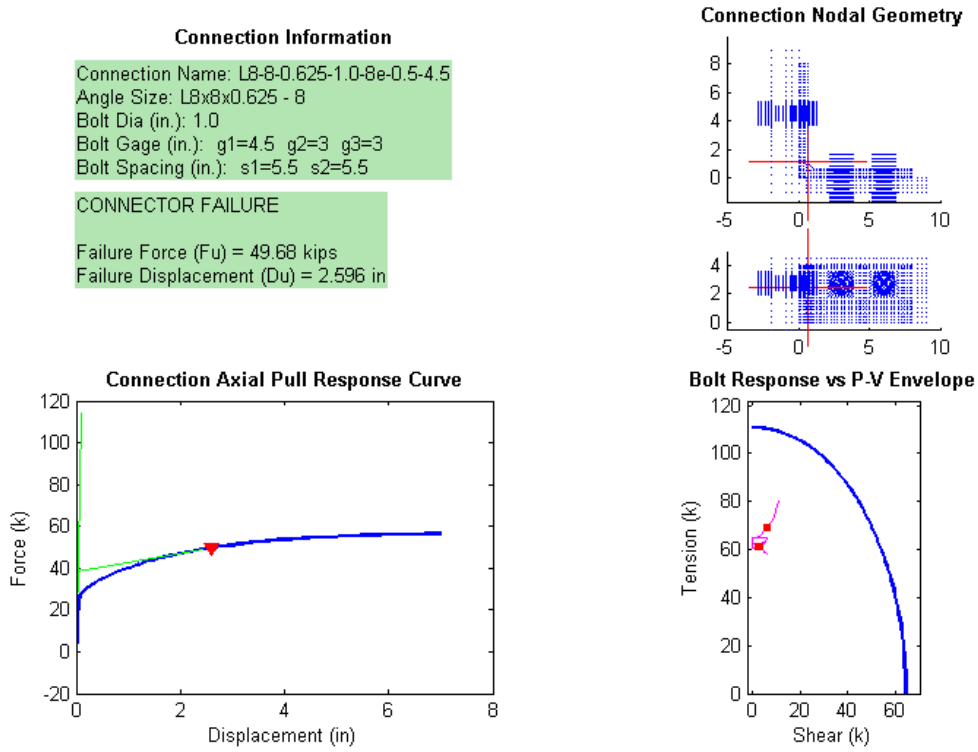


Figure B.350 Connection L8_8_0.625_1.0_8e_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_1.0_8e_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 1.0595e+003

Plastic Stiffness (k/in): 4.4567

Displacement (in): [1.0655e-035 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.46757 ; 0.5464 ; 0.66466 ; 0.84205 ; 1.1081 ; 1.1144 ; 1.1237 ; 1.1378 ; 1.1588 ; 1.1904 ; 1.2377 ; 1.2555 ; 1.2821 ; 1.3221 ; 1.382 ; 1.4719 ; 1.6068 ; 1.8091 ; 1.8849 ; 1.9987 ; 2.1694 ; 2.4254 ; 2.8094 ; 2.9534 ; 3.1694 ; 3.4935 ; 3.9795 ; 4.6795 ; 5.3795 ; 5.5545 ; 5.7295 ; 5.992 ; 6.3857 ; 6.9764 ; 7]

Force (kips): [-2.1098 ; 1.67093 ; 3.68414 ; 6.2196 ; 9.23352 ; 11.947 ; 13.5088 ; 14.202 ; 14.8298 ; 15.6929 ; 16.7927 ; 17.2053 ; 17.7609 ; 18.4901 ; 19.404 ; 20.5301 ; 20.5605 ; 20.6137 ; 20.6869 ; 20.7856 ; 20.9161 ; 21.1171 ; 21.1968 ; 21.3082 ; 21.4648 ; 21.69 ; 22.0078 ; 22.4352 ; 23.0092 ; 23.2141 ; 23.5236 ; 23.9465 ; 24.517 ; 25.2458 ; 25.4979 ; 25.8352 ; 26.2687 ; 26.7893 ; 27.3435 ; 27.7377 ; 27.8177 ; 27.8907 ; 27.9891 ; 28.1184 ; 28.273 ; 28.2784]

Bolt 1 - Tensile Force (kips): [63.3533 ; 63.1794 ; 63.0754 ; 62.9352 ; 62.7507 ; 62.5601 ; 62.4319 ; 62.3674 ; 62.3003 ; 62.1891 ; 62.0855 ; 62.0385 ; 61.971 ; 61.8827 ; 61.7794 ; 61.6615 ; 61.6583 ; 61.6525 ; 61.6446 ; 61.6339 ; 61.6196 ; 61.5972 ; 61.5881 ; 61.5753 ; 61.5571 ; 61.5304 ; 61.492 ; 61.4373 ; 61.3545 ; 61.3207 ; 61.2626 ; 61.1774 ; 61.0502 ; 60.8746 ; 60.803 ; 60.6982 ; 60.5492 ; 60.3056 ; 59.8021 ; 59.2589 ; 59.1222 ; 58.9889 ; 58.8006 ; 58.5312 ; 58.1747 ; 58.1609]

Bolt 1 - Shear Force (kips): [0.10688 ; 0.16596 ; 0.29257 ; 0.4664 ; 0.69322 ; 0.92405 ; 1.0818 ; 1.1664 ; 1.2582 ; 1.4076 ; 1.5426 ; 1.605 ; 1.6951 ; 1.8119 ; 1.9439 ; 2.086 ; 2.0898 ; 2.0963 ; 2.1054 ; 2.1175 ; 2.1334 ; 2.1583 ; 2.1683 ; 2.1824 ; 2.2023 ; 2.2312 ; 2.2729 ; 2.3316 ; 2.4177 ; 2.4522 ; 2.5118 ; 2.5986 ; 2.7289 ; 2.9134 ; 2.9902 ; 3.106 ; 3.2764 ; 3.5845 ; 4.2667 ; 4.9775 ; 5.1507 ; 5.3186 ; 5.5535 ; 5.884 ; 6.3185 ; 6.3351]

Bolt 2 - Tensile Force (kips): [63.3461 ; 63.0938 ; 62.943 ; 62.7533 ; 62.5474 ; 62.3821 ; 62.2892 ; 62.2193 ; 62.1369 ; 61.9711 ; 61.7475 ; 61.6092 ; 61.4134 ; 61.1947 ; 61.0806 ; 60.9716 ; 60.9662 ; 60.9563 ; 60.9441 ; 60.9296 ; 60.9139 ; 60.8926 ; 60.8846 ; 60.8742 ; 60.8621 ; 60.851 ; 60.8475 ; 60.8729 ; 60.9537 ; 60.9838 ; 61.024 ; 61.0884 ; 61.1923 ; 61.4349 ; 61.5219 ; 61.6629 ; 61.8819 ; 62.1991 ; 62.5397 ; 62.7765 ; 62.8207 ; 62.8611 ; 62.9143 ; 62.9772 ; 63.0494 ; 63.0518]

Bolt 2 - Shear Force (kips): [0.14407 ; 0.19862 ; 0.35981 ; 0.58048 ; 0.86169 ; 1.1427 ; 1.348 ; 1.4735 ; 1.6232 ; 1.8906 ; 2.1293 ; 2.2022 ; 2.2826 ; 2.3588 ; 2.4254 ; 2.5014 ; 2.5034 ; 2.5072 ; 2.5118 ; 2.518 ; 2.5261 ; 2.541 ; 2.5467 ; 2.5546 ; 2.5659 ; 2.5823 ; 2.6118 ; 2.6517 ; 2.6759 ; 2.6837 ; 2.7044 ; 2.7418 ; 2.8135 ; 2.9442 ; 3.0017 ; 3.088 ; 3.208 ; 3.3967 ; 3.7471 ; 4.0833 ; 4.1653 ; 4.2439 ; 4.3514 ; 4.5012 ; 4.6964 ; 4.7038]

Bolt 3 - Tensile Force (kips): [65 ; 64.732 ; 64.5096 ; 64.2018 ; 63.7036 ; 63.0957 ; 62.1943 ; 61.3116 ; 60.6645 ; 60.4716 ; 60.7142 ; 61.0848 ; 61.6675 ; 62.4357 ; 63.3499 ; 64.7815 ; 64.8233 ; 64.8671 ; 64.9002 ; 64.9121 ; 64.9209 ; 64.9314 ; 64.9406 ; 64.9353 ; 64.9197 ; 64.9185 ; 64.9993 ; 65.171 ; 65.6027 ; 65.84 ; 66.5022 ; 67.4378 ; 68.7264 ; 70.2614 ; 70.9099 ; 71.8146 ; 72.8822 ; 74.0783 ; 75.7597 ; 77.2762 ; 77.6434 ; 77.9609 ; 78.3737 ; 78.923 ; 79.8417 ; 79.877]

Bolt 3 - Shear Force (kips): [0.0926947 ; 0.0410704 ; 0.0842676 ; 0.153405 ; 0.228693 ; 0.260261 ; 0.273254 ; 0.295775 ; 0.409811 ; 0.660951 ; 1.13027 ; 2.30582 ; 3.7477 ; 5.22252 ; 5.7171 ; 6.26199 ; 6.21395 ; 5.94597 ; 5.53386 ; 5.00999 ; 4.53067 ; 3.8018 ; 3.38374 ; 2.83148 ; 2.14701 ; 1.07299 ; 0.472914 ; 1.84635 ; 3.25605 ; 3.7193 ; 4.12042 ; 4.52664 ; 5.72308 ; 7.24768 ; 7.54946 ; 7.89903 ; 8.38482 ; 8.97524 ; 9.60376 ; 10.0731 ; 10.2256 ; 10.3572 ; 10.5179 ; 10.7704 ; 11.2462 ; 11.2647]

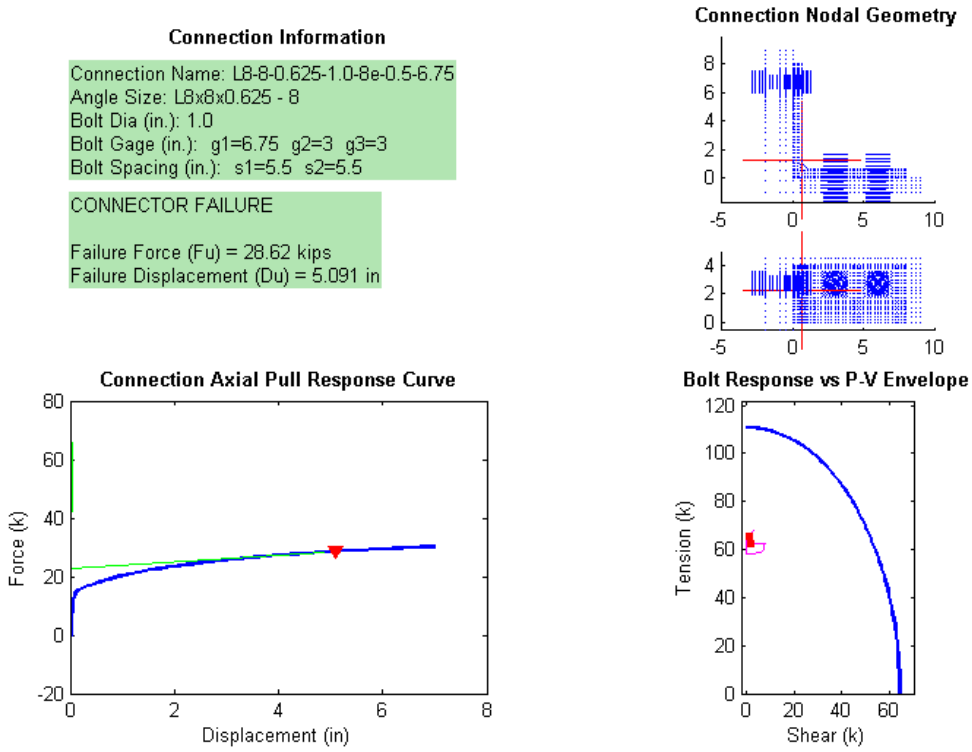


Figure B.351 Connection L8_8_0.625_1.0_8e_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.625_1.0_8e_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.5425e+003

Plastic Stiffness (k/in): 1.1572

Displacement (in): [8.3221e-036 ; 0.0013672 ; 0.0027344 ; 0.0047852 ; 0.0078613 ; 0.012476 ; 0.019397 ; 0.029779 ; 0.045352 ; 0.068712 ; 0.10375 ; 0.15631 ; 0.23515 ; 0.35341 ; 0.39776 ; 0.46427 ; 0.56406 ; 0.71373 ; 0.76985 ; 0.85404 ; 0.98033 ; 1.1698 ; 1.4539 ; 1.5604 ; 1.7203 ; 1.96 ; 2.3196 ; 2.4545 ; 2.6568 ; 2.7326 ; 2.8464 ; 3.0171 ; 3.0811 ; 3.1771 ; 3.3211 ; 3.3751 ; 3.4561 ; 3.5776 ; 3.7599 ; 4.0333 ; 4.1358 ; 4.2896 ; 4.5203 ; 4.8663 ; 5.3853 ; 6.0853 ; 6.2603 ; 6.5228 ; 6.9165 ; 7]

Force (kips): [-2.05439 ; -0.121954 ; 0.0545217 ; 0.313916 ; 0.691174 ; 1.23214 ; 1.99208 ; 3.04357 ; 4.44677 ; 6.04874 ; 7.24884 ; 7.73604 ; 8.01174 ; 8.39833 ; 8.53961 ; 8.74069 ; 9.01321 ; 9.39175 ; 9.54761 ; 9.77244 ; 10.0689 ; 10.45 ; 10.9519 ; 11.1235 ; 11.36 ; 11.686 ; 12.1109 ; 12.2558 ; 12.459 ; 12.5363 ; 12.662 ; 12.8264 ; 12.8878 ; 12.9743 ; 13.0974 ; 13.1465 ; 13.2208 ; 13.3236 ; 13.4695 ; 13.6736 ; 13.7438 ; 13.8493 ; 13.9972 ; 14.1974 ; 14.4553 ; 14.743 ; 14.8051 ; 14.8895 ; 15.003 ; 15.0272]

Bolt 1 - Tensile Force (kips): [63.3552 ; 63.2703 ; 63.262 ; 63.2492 ; 63.2292 ; 63.1999 ; 63.1574 ; 63.0963 ; 63.0084 ; 62.8956 ; 62.7988 ; 62.7598 ; 62.7421 ; 62.7156 ; 62.7054 ; 62.6903 ; 62.6672 ; 62.6277 ; 62.6075 ; 62.5753 ; 62.5394 ; 62.5108 ; 62.4808 ; 62.4689 ; 62.4521 ; 62.4299 ; 62.4076 ; 62.4012 ; 62.3939 ; 62.3908 ; 62.3841 ; 62.3767 ; 62.3734 ; 62.3694 ; 62.3643 ; 62.3609 ; 62.3552 ; 62.3487 ; 62.3398 ; 62.3288 ; 62.3259 ; 62.3209 ; 62.3156 ; 62.311 ; 62.3111 ; 62.3182 ; 62.3203 ; 62.3252 ; 62.335 ; 62.3368]

Bolt 1 - Shear Force (kips): [0.10561 ; 0.07616 ; 0.083078 ; 0.094688 ; 0.11509 ; 0.14827 ; 0.1992 ; 0.2752 ; 0.38617 ; 0.52958 ; 0.65632 ; 0.71494 ; 0.75011 ; 0.80243 ; 0.82236 ; 0.85206 ; 0.89785 ; 0.97371 ; 1.0096 ; 1.0654 ; 1.1301 ; 1.193 ; 1.2729 ; 1.3042 ; 1.35 ; 1.4143 ; 1.4951 ; 1.5225 ; 1.5601 ; 1.5745 ; 1.5984 ; 1.6305 ; 1.643 ; 1.6606 ; 1.6854 ; 1.6964 ; 1.7136 ; 1.737 ; 1.7706 ; 1.8173 ; 1.8331 ; 1.8574 ; 1.8911 ; 1.9373 ; 1.998 ; 2.0703 ; 2.088 ; 2.1125 ; 2.1464 ; 2.154]

Bolt 2 - Tensile Force (kips): [63.3536 ; 63.2358 ; 63.2243 ; 63.2056 ; 63.1718 ; 63.1221 ; 63.0555 ; 62.9682 ; 62.8558 ; 62.7568 ; 62.6921 ; 62.6745 ; 62.668 ; 62.6603 ; 62.6572 ; 62.6509 ; 62.6364 ; 62.6159 ; 62.6048 ; 62.584 ; 62.5747 ; 62.6011 ; 62.5993 ; 62.5805 ; 62.5454 ; 62.4706 ; 62.4366 ; 62.4166 ; 62.3981 ; 62.3874 ; 62.3724 ; 62.3504 ; 62.3407 ; 62.331 ; 62.3204 ; 62.3117 ; 62.2993 ; 62.2841 ; 62.263 ; 62.2428 ; 62.2364 ; 62.2236 ; 62.2055 ; 62.2048 ; 62.2187 ; 62.2406 ; 62.242 ; 62.2458 ; 62.2544 ; 62.255]

Bolt 2 - Shear Force (kips): [0.14262 ; 0.083976 ; 0.095434 ; 0.11347 ; 0.13841 ; 0.18087 ; 0.24668 ; 0.34425 ; 0.48375 ; 0.65454 ; 0.79675 ; 0.85447 ; 0.88357 ; 0.94073 ; 0.9647 ; 0.99967 ; 1.0571 ; 1.1757 ; 1.2284 ; 1.3112 ; 1.4158 ; 1.5396 ; 1.6681 ; 1.7056 ; 1.7517 ; 1.7982 ; 1.8409 ; 1.8532 ; 1.8668 ; 1.8718 ; 1.8807 ; 1.8922 ; 1.8967 ; 1.903 ; 1.9114 ; 1.9159 ; 1.9236 ; 1.9351 ; 1.9525 ; 1.9803 ; 1.991 ; 2.0088 ; 2.0358 ; 2.0756 ; 2.1284 ; 2.1911 ; 2.2052 ; 2.2234 ; 2.2448 ; 2.2493]

Bolt 3 - Tensile Force (kips): [65 ; 64.9668 ; 64.9325 ; 64.8807 ; 64.8086 ; 64.7025 ; 64.5456 ; 64.2819 ; 63.7932 ; 62.9793 ; 61.9209 ; 60.7866 ; 59.6479 ; 58.8065 ; 58.5844 ; 58.3802 ; 58.278 ; 58.3297 ; 58.403 ; 58.4184 ; 58.5255 ; 59.038 ; 59.7114 ; 59.922 ; 60.2004 ; 60.6809 ; 61.4571 ; 61.7628 ; 62.2021 ; 62.3336 ; 62.3224 ; 62.2739 ; 62.2606 ; 62.238 ; 62.2409 ; 62.3032 ; 62.531 ; 62.7651 ; 63.0824 ; 63.5741 ; 63.7169 ; 64.0155 ; 64.5169 ; 65.0683 ; 65.8277 ; 66.8543 ; 67.1342 ; 67.4671 ; 67.8976 ; 68.0076]

Bolt 3 - Shear Force (kips): [0.084879 ; 0.064339 ; 0.054379 ; 0.043201 ; 0.037578 ; 0.040188 ; 0.053962 ; 0.077846 ; 0.094967 ; 0.052039 ; 0.073519 ; 0.19387 ; 0.2952 ; 0.31757 ; 0.30656 ; 0.27493 ; 0.21998 ; 0.21713 ; 1.187 ; 2.9766 ; 4.703 ; 5.9563 ; 6.7243 ; 7.0461 ; 7.235 ; 7.5372 ; 7.6207 ; 7.7564 ; 7.8015 ; 7.5945 ; 6.5989 ; 5.4962 ; 5.0573 ; 4.4638 ; 3.7848 ; 3.7933 ; 3.802 ; 3.5578 ; 2.9801 ; 2.1347 ; 1.9133 ; 1.5231 ; 1.4949 ; 1.4354 ; 1.7199 ; 2.1566 ; 2.4945 ; 2.9905 ; 3.449 ; 3.3667]

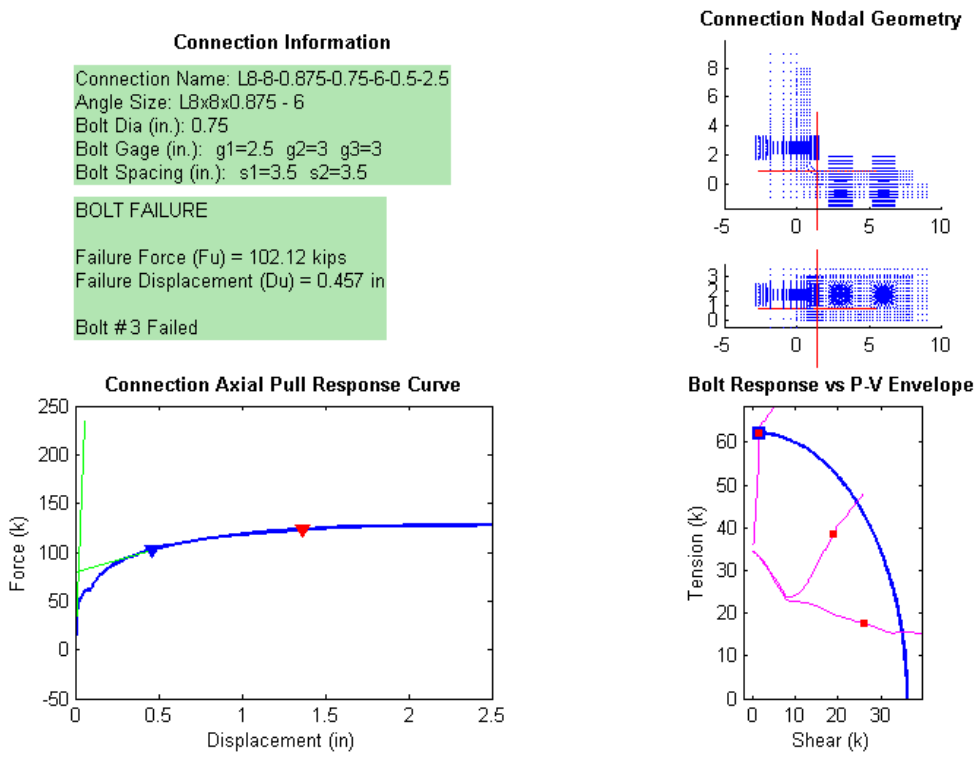


Figure B.352 Connection L8_8_0.875_0.75_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.75_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.8542e+003

Plastic Stiffness (k/in): 51.0520

Displacement (in): [3.5584e-036 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.013672 ; 0.016602 ; 0.019531 ; 0.022461 ; 0.026856 ; 0.033447 ; 0.043335 ; 0.058167 ; 0.063728 ; 0.072071 ; 0.0752 ; 0.076373 ; 0.078133 ; 0.080772 ; 0.084732 ; 0.090671 ; 0.092898 ; 0.093734 ; 0.094986 ; 0.096866 ; 0.099684 ; 0.10074 ; 0.10233 ; 0.10471 ; 0.10827 ; 0.11363 ; 0.12165 ; 0.13369 ; 0.15175 ; 0.15853 ; 0.16869 ; 0.1725 ; 0.17821 ; 0.18678 ; 0.19964 ; 0.21893 ; 0.24786 ; 0.29125 ; 0.30753 ; 0.33194 ; 0.36855 ; 0.38228 ; 0.40288 ; 0.43377 ; 0.48011 ; 0.54962 ; 0.57569 ; 0.61479 ; 0.67344 ; 0.76141 ; 0.89338 ; 1.0913 ; 1.3413 ; 1.4038 ; 1.4663 ; 1.5601 ; 1.5952 ; 1.648 ; 1.6677 ; 1.6974 ; 1.7419 ; 1.8086 ; 1.8337 ; 1.8712 ; 1.9275 ; 2.012 ; 2.1387 ; 2.3287 ; 2.5]

Force (kips): [-0.868141 ; 15.5258 ; 17.9513 ; 20.0223 ; 21.7894 ; 23.5656 ; 24.2997 ; 24.9001 ; 25.7417 ; 26.8881 ; 28.3983 ; 30.0759 ; 30.2803 ; 30.2728 ; 30.2687 ; 30.2672 ; 30.3695 ; 30.8021 ; 30.8225 ; 30.8184 ; 30.8165 ; 30.8159 ; 31.1175 ; 31.5914 ; 32.1191 ; 32.3303 ; 32.6522 ; 33.0536 ; 33.5291 ; 34.3225 ; 35.3422 ; 36.7072 ; 38.275 ; 38.8127 ; 39.5378 ; 39.7954 ; 40.1763 ; 40.7306 ; 41.5428 ; 42.666 ; 44.254 ; 46.1944 ; 46.8248 ; 47.6551 ; 48.7626 ; 49.1564 ; 49.7125 ; 50.5011 ; 51.6226 ; 53.0619 ; 53.5549 ; 54.2602 ; 55.22 ; 56.5029 ; 58.1399 ; 59.9843 ; 61.6137 ; 61.9551 ; 62.2706 ; 62.6985 ; 62.837 ; 63.0021 ; 63.047 ; 63.1073 ; 63.1859 ; 63.2855 ; 63.3093 ; 63.346 ; 63.415 ; 63.5142 ; 63.6517 ; 63.8418 ; 64.0018]

Bolt 1 - Tensile Force (kips): [34.5907 ; 34.0875 ; 33.9916 ; 33.9029 ; 33.8154 ; 33.5471 ; 32.9456 ; 32.2609 ; 31.1913 ; 29.5443 ; 27.0716 ; 23.6734 ; 23.3097 ; 23.2959 ; 23.292 ; 23.2907 ; 23.2089 ; 23.0356 ; 23.0277 ; 23.0233 ; 23.0222 ; 23.0219 ; 23.0055 ; 22.9838 ; 22.964 ; 22.95 ; 22.9345 ; 22.9211 ; 22.9251 ; 22.8827 ; 22.7752 ; 22.5808 ; 22.322 ; 22.1784 ; 22.0068 ; 21.9484 ; 21.8522 ; 21.7434 ; 21.3882 ; 20.8212 ; 19.8554 ; 19.1026 ; 18.8479 ; 18.5836 ; 18.3134 ; 18.1469 ; 17.9377 ; 17.712 ; 17.4412 ; 16.9609 ; 16.7343 ; 16.4151 ; 16.0601 ; 15.6869 ; 15.4197 ; 15.4728 ; 15.547 ; 15.5249 ; 15.5093 ; 15.4471 ; 15.4212 ; 15.3992 ; 15.3939 ; 15.3893 ; 15.3907 ; 15.3991 ; 15.396 ; 15.3935 ; 15.3874 ; 15.3808 ; 15.3896 ; 15.4402 ; 15.503]

Bolt 1 - Shear Force (kips): [0.0515365 ; 0.615561 ; 0.719178 ; 0.810178 ; 0.895836 ; 1.15564 ; 1.6619 ; 2.18364 ; 2.95115 ; 4.05407 ; 5.59568 ; 7.49943 ; 7.68995 ; 7.68747 ; 7.68631 ; 7.6859 ; 7.80496 ; 8.01599 ; 8.01955 ; 8.01864 ; 8.01802 ; 8.01779 ; 8.17768 ; 8.39982 ; 8.64162 ; 8.77762 ; 8.93086 ; 9.1195 ; 9.33555 ; 9.8138 ; 10.3829 ; 11.6087 ; 12.8117 ; 13.3178 ; 13.9057 ; 14.1033 ; 14.4405 ; 14.8328 ; 15.6601 ; 16.776 ; 18.893 ; 21.1708 ; 21.8957 ; 22.7131 ; 23.6987 ; 24.1331 ; 24.7162 ; 25.5189 ; 26.6591 ; 28.3198 ; 28.9005 ; 29.6685 ; 30.5462 ; 31.5461 ; 32.7631 ; 34.4258 ; 36.3995 ; 36.8362 ; 37.2327 ; 37.776 ; 37.9568 ; 38.1843 ; 38.2565 ; 38.3557 ; 38.4885 ; 38.6653 ; 38.7268 ; 38.815 ; 38.9435 ; 39.1283 ; 39.3856 ; 39.7406 ; 40.0563]

Bolt 2 - Tensile Force (kips): [34.5931 ; 34.0405 ; 33.9582 ; 33.8922 ; 33.8285 ; 33.589 ; 32.9897 ; 32.3188 ; 31.279 ; 29.7088 ; 27.4042 ; 24.3558 ; 23.8557 ; 23.8368 ; 23.8328 ; 23.8315 ; 23.8471 ; 23.6469 ; 23.6299 ; 23.6247 ; 23.6233 ; 23.623 ; 23.6666 ; 23.736 ; 23.8294 ; 23.8664 ; 23.9204 ; 23.9966 ; 24.1164 ; 24.34 ; 24.6499 ; 25.3413 ; 26.5138 ; 26.9798 ; 27.6558 ; 27.9021 ; 28.2595 ; 28.729 ; 29.5518 ; 30.7306 ; 32.3544 ; 34.2899 ; 34.9132 ; 35.7551 ; 36.8261 ; 37.1733 ; 37.6446 ; 38.2716 ; 39.0676 ; 39.9162 ; 40.1862 ; 40.5752 ; 41.0495 ; 41.7614 ; 42.8224 ; 44.049 ; 45.2214 ; 45.5002 ; 45.7655 ; 46.1248 ; 46.2443 ; 46.3888 ; 46.4284 ; 46.4843 ; 46.5632 ; 46.6773 ; 46.711 ; 46.765 ; 46.8653 ; 47.0224 ; 47.2585 ; 47.6008 ; 47.8884]

Bolt 2 - Shear Force (kips): [0.0402339 ; 0.733693 ; 0.853628 ; 0.958076 ; 1.05629 ; 1.32087 ; 1.81872 ; 2.33643 ; 3.09762 ; 4.1884 ; 5.7065 ; 7.56692 ; 7.86011 ; 7.86517 ; 7.86457 ; 7.86426 ; 7.86947 ; 8.21288 ; 8.23704 ; 8.23667 ; 8.23612 ; 8.23597 ; 8.37013 ; 8.61893 ; 8.90134 ; 8.97925 ; 9.15507 ; 9.37609 ; 9.64474 ; 9.99049 ; 10.5052 ; 11.1733 ; 12.2009 ; 12.5285 ; 12.9397 ; 13.0622 ; 13.2378 ; 13.6217 ; 14.017 ; 14.5435 ; 15.379 ; 16.5391 ; 16.9635 ; 17.4731 ; 18.0676 ; 18.2419 ; 18.4732 ; 18.7524 ; 19.0601 ; 19.4426 ; 19.5857 ; 19.7973 ; 20.2349 ; 20.861 ; 21.7741 ; 22.7274 ; 23.6783 ; 23.8837 ; 24.0828 ; 24.3605 ; 24.4598 ; 24.5964 ; 24.6451 ; 24.7134 ; 24.8063 ; 24.9281 ; 24.9712 ; 25.0307 ; 25.1052 ; 25.2085 ; 25.3542 ; 25.5661 ; 25.7436]

Bolt 3 - Tensile Force (kips): [36 ; 36.6974 ; 37.0861 ; 37.5133 ; 37.9167 ; 38.3369 ; 38.5161 ; 38.6649 ; 38.8842 ; 39.2233 ; 39.7558 ; 40.5343 ; 40.648 ; 40.6409 ; 40.6366 ; 40.6351 ; 40.6931 ; 40.9332 ; 40.9441 ; 40.9394 ; 40.9372 ; 40.9366 ; 41.1147 ; 41.4109 ; 41.7634 ; 41.9114 ; 42.1448 ; 42.4508 ; 42.8406 ; 43.5587 ; 44.6032 ; 46.1111 ; 47.9514 ; 48.5783 ; 49.4376 ; 49.744 ; 50.1931 ; 50.841 ; 51.7749 ; 53.0453 ; 54.6856 ; 56.6762 ; 57.3445 ; 58.2717 ; 59.5521 ; 60.0067 ; 60.6583 ; 61.6009 ; 62.9935 ; 64.5723 ; 65.0982 ; 65.7732 ; 66.6468 ; 67.9564 ; 69.5782 ; 71.0066 ; 71.8166 ; 71.9252 ; 72.0295 ; 72.1341 ; 72.1604 ; 72.2086 ; 72.2238 ; 72.2657 ; 72.3473 ; 72.4548 ; 72.4987 ; 72.5577 ; 72.592 ; 72.6422 ; 72.7068 ; 72.7888 ; 72.8522]

Bolt 3 - Shear Force (kips): [0.011445 ; 0.19431 ; 0.22834 ; 0.25625 ; 0.2819 ; 0.31043 ; 0.32149 ; 0.33035 ; 0.3428 ; 0.36021 ; 0.38726 ; 0.42815 ; 0.43399 ; 0.43369 ; 0.43348 ; 0.43341 ; 0.4365 ; 0.44882 ; 0.44945 ; 0.44932 ; 0.44924 ; 0.44921 ; 0.458 ; 0.47226 ; 0.49 ; 0.49771 ; 0.51062 ; 0.52843 ; 0.55175 ; 0.5975 ; 0.67229 ; 0.79052 ; 0.92443 ; 0.96419 ; 1.0183 ; 1.0372 ; 1.0645 ; 1.1021 ; 1.1512 ; 1.2115 ; 1.2704 ; 1.3167 ; 1.3255 ; 1.3337 ; 1.337 ; 1.3358 ; 1.332 ; 1.3209 ; 1.283 ; 2.0634 ; 2.7263 ; 3.2171 ; 3.6084 ; 4.896 ; 5.8514 ; 5.9907 ; 5.9971 ; 6.1094 ; 6.2115 ; 6.3125 ; 6.3086 ; 6.2356 ; 6.1742 ; 6.0839 ; 5.9505 ; 5.7697 ; 5.6429 ; 5.4832 ; 5.4162 ; 5.3209 ; 5.175 ; 4.9376 ; 4.7119]

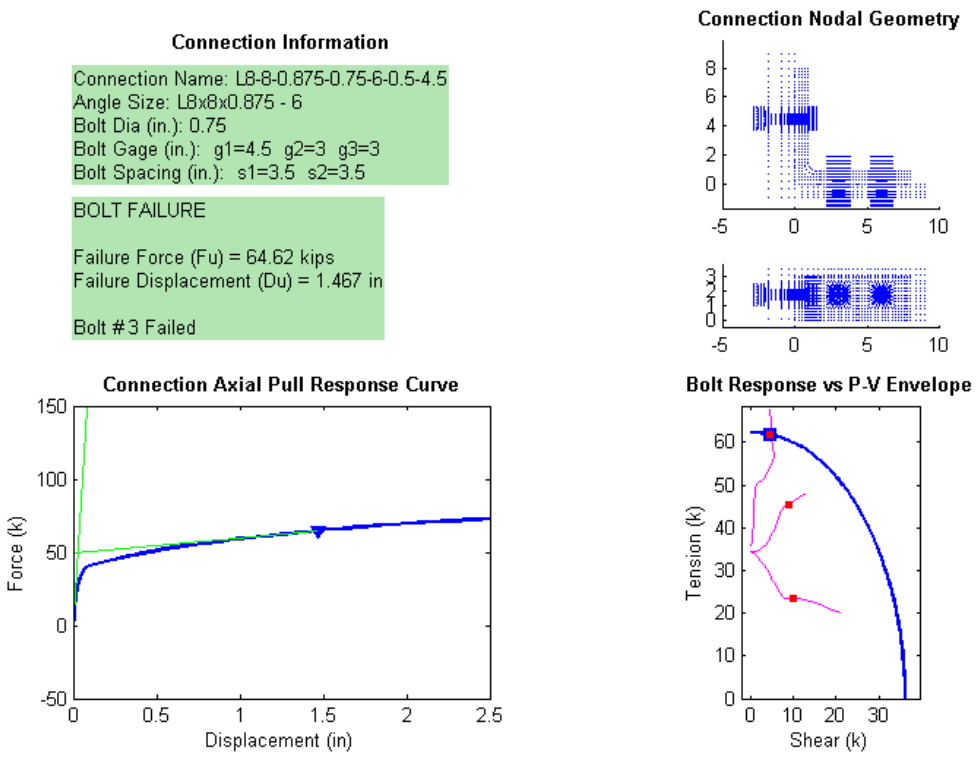


Figure B.353 Connection L8_8_0.875_0.75_6_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.75_6_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 1.7787e+003

Plastic Stiffness (k/in): 10.4462

Displacement (in): [2.5114e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.073132 ; 0.085646 ; 0.10442 ; 0.13257 ; 0.17481 ; 0.23816 ; 0.33319 ; 0.35695 ; 0.38071 ; 0.41634 ; 0.4698 ; 0.54998 ; 0.67025 ; 0.71535 ; 0.783 ; 0.88448 ; 0.92253 ; 0.96059 ; 0.99864 ; 1.0557 ; 1.1414 ; 1.2698 ; 1.3179 ; 1.336 ; 1.3631 ; 1.4037 ; 1.4647 ; 1.5561 ; 1.5904 ; 1.6418 ; 1.719 ; 1.7479 ; 1.7913 ; 1.8076 ; 1.832 ; 1.8686 ; 1.9235 ; 2.0059 ; 2.0368 ; 2.0832 ; 2.1527 ; 2.2569 ; 2.4133 ; 2.5]

Force (kips): [-0.835613 ; 1.20594 ; 2.63843 ; 4.47203 ; 6.83145 ; 9.8161 ; 13.1916 ; 16.4788 ; 18.9705 ; 19.3884 ; 19.8423 ; 20.3128 ; 20.8333 ; 21.443 ; 22.3006 ; 23.5317 ; 23.8228 ; 24.1543 ; 24.618 ; 25.2368 ; 26.031 ; 27.0689 ; 27.429 ; 27.942 ; 28.6691 ; 28.9734 ; 29.2495 ; 29.5297 ; 29.9135 ; 30.4446 ; 31.194 ; 31.4905 ; 31.5962 ; 31.7529 ; 31.9773 ; 32.2957 ; 32.7743 ; 32.9598 ; 33.2314 ; 33.6059 ; 33.7404 ; 33.9311 ; 34.0024 ; 34.1068 ; 34.2576 ; 34.4767 ; 34.7921 ; 34.9078 ; 35.0783 ; 35.3236 ; 35.6681 ; 36.1388 ; 36.3826]

Bolt 1 - Tensile Force (kips): [34.5885 ; 34.5388 ; 34.5014 ; 34.4502 ; 34.378 ; 34.2703 ; 34.1255 ; 33.9509 ; 33.6163 ; 33.3891 ; 33.0619 ; 32.6155 ; 32.0107 ; 31.3102 ; 30.3013 ; 28.6312 ; 28.2067 ; 27.759 ; 27.1102 ; 26.1797 ; 24.9053 ; 23.4316 ; 23.4239 ; 23.4412 ; 23.4801 ; 23.4954 ; 23.511 ; 23.4046 ; 23.408 ; 23.4786 ; 23.5722 ; 23.5041 ; 23.5093 ; 23.5074 ; 23.5295 ; 23.5688 ; 23.4624 ; 23.3239 ; 23.1489 ; 22.9792 ; 22.8943 ; 22.8062 ; 22.7465 ; 22.6571 ; 22.5389 ; 22.4164 ; 22.1285 ; 21.996 ; 21.7607 ; 21.3756 ; 20.9074 ; 20.3549 ; 20.112]

Bolt 1 - Shear Force (kips): [0.0497232 ; 0.0526471 ; 0.105965 ; 0.181206 ; 0.283648 ; 0.42017 ; 0.590028 ; 0.782005 ; 1.11432 ; 1.31955 ; 1.59064 ; 1.9381 ; 2.38951 ; 2.8929 ; 3.5852 ; 4.67051 ; 4.93597 ; 5.21216 ; 5.60889 ; 6.16321 ; 6.89248 ; 7.70866 ; 7.72458 ; 7.73436 ; 7.7482 ; 7.75338 ; 7.75857 ; 7.91529 ; 7.97569 ; 7.98485 ; 8.12054 ; 8.7554 ; 8.86165 ; 9.10189 ; 9.36609 ; 9.78571 ; 10.7518 ; 11.3878 ; 12.1633 ; 12.9995 ; 13.3455 ; 13.7754 ; 13.9933 ; 14.2973 ; 14.6825 ; 15.1327 ; 15.9269 ; 16.2527 ; 16.819 ; 17.6902 ; 18.8586 ; 20.3656 ; 21.0323]

Bolt 2 - Tensile Force (kips): [34.5842 ; 34.5343 ; 34.49 ; 34.439 ; 34.3773 ; 34.3277 ; 34.3319 ; 34.4334 ; 34.6036 ; 34.6251 ; 34.707 ; 34.868 ; 35.093 ; 35.3297 ; 35.7387 ; 36.7364 ; 37.0155 ; 37.3111 ; 37.7562 ; 38.4022 ; 39.2762 ; 40.497 ; 40.9098 ; 41.5065 ; 42.3488 ; 42.6465 ; 42.9284 ; 43.1947 ; 43.5697 ; 44.079 ; 44.713 ; 44.9592 ; 45.0319 ; 45.1411 ; 45.2913 ; 45.5679 ; 45.8602 ; 45.9569 ; 46.1059 ; 46.3324 ; 46.4133 ; 46.5503 ; 46.5977 ; 46.6661 ; 46.7566 ; 46.8897 ; 47.1018 ; 47.1723 ; 47.2539 ; 47.3891 ; 47.576 ; 47.8723 ; 47.9856]

Bolt 2 - Shear Force (kips): [0.0381588 ; 0.0756293 ; 0.144262 ; 0.237193 ; 0.360973 ; 0.524762 ; 0.72396 ; 0.934997 ; 1.26089 ; 1.44386 ; 1.68137 ; 1.97778 ; 2.35318 ; 2.76164 ; 3.29536 ; 4.02992 ; 4.19486 ; 4.36097 ; 4.59333 ; 4.90498 ; 5.30683 ; 5.80139 ; 5.97254 ; 6.20381 ; 6.50196 ; 6.61062 ; 6.71175 ; 6.80144 ; 6.93879 ; 7.13996 ; 7.60826 ; 7.81571 ; 7.99456 ; 8.22443 ; 8.57658 ; 8.92261 ; 9.51284 ; 9.64363 ; 9.89004 ; 10.2644 ; 10.4054 ; 10.5935 ; 10.6453 ; 10.7212 ; 10.8333 ; 11.0025 ; 11.2038 ; 11.2798 ; 11.4027 ; 11.5607 ; 11.8844 ; 12.2479 ; 12.5353]

Bolt 3 - Tensile Force (kips): [36 ; 35.9328 ; 35.9061 ; 35.9457 ; 36.1633 ; 36.6195 ; 37.4796 ; 38.6002 ; 39.7413 ; 40.0674 ; 40.5314 ; 41.2177 ; 42.208 ; 43.6952 ; 45.7974 ; 48.4814 ; 49.092 ; 49.6754 ; 50.4181 ; 51.4145 ; 52.704 ; 54.3659 ; 54.9873 ; 55.8215 ; 57.0139 ; 57.5031 ; 57.9144 ; 58.3208 ; 58.8241 ; 59.5377 ; 60.6367 ; 60.9865 ; 61.1002 ; 61.2651 ; 61.5185 ; 61.8769 ; 62.5329 ; 62.8349 ; 63.2917 ; 63.9374 ; 64.1647 ; 64.4821 ; 64.5947 ; 64.7549 ; 64.9817 ; 65.3256 ; 65.7911 ; 65.9671 ; 66.2179 ; 66.5411 ; 66.9701 ; 67.5009 ; 67.7899]

Bolt 3 - Shear Force (kips): [0.02752 ; 0.0087466 ; 0.030874 ; 0.067775 ; 0.12662 ; 0.19658 ; 0.27269 ; 0.36325 ; 0.48132 ; 0.51115 ; 0.54551 ; 0.58393 ; 0.63319 ; 0.6952 ; 0.77159 ; 0.83476 ; 0.8473 ; 0.87836 ; 1.5245 ; 2.7377 ; 3.5988 ; 4.4483 ; 4.7209 ; 5.0311 ; 5.3861 ; 5.3357 ; 5.2999 ; 5.2015 ; 5.0695 ; 4.9699 ; 4.684 ; 4.5713 ; 4.5344 ; 4.4743 ; 4.3766 ; 4.2795 ; 4.3134 ; 4.48 ; 4.577 ; 4.6693 ; 4.7394 ; 4.8336 ; 4.8592 ; 4.8865 ; 4.9049 ; 4.7684 ; 4.6614 ; 4.6334 ; 4.5772 ; 4.4633 ; 4.4101 ; 4.3553 ; 4.3417]

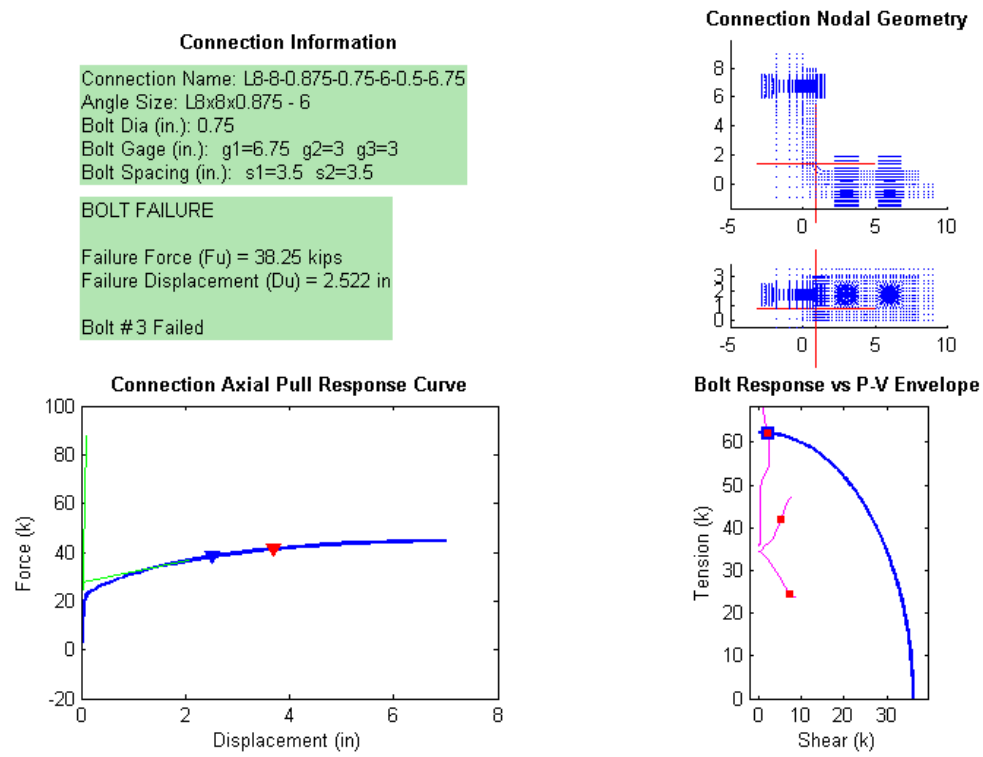


Figure B.354 Connection L8_8_0.875_0.75_6_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.75_6_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 953.5449

Plastic Stiffness (k/in): 4.2949

Displacement (in): [3.2059e-036 ; 0.0013672 ; 0.0027344 ; 0.0047852 ; 0.0078613 ; 0.012476 ; 0.019397 ; 0.029779 ; 0.045352 ; 0.068712 ; 0.10375 ; 0.15631 ; 0.17602 ; 0.20558 ; 0.24993 ; 0.31645 ; 0.41623 ; 0.45365 ; 0.50978 ; 0.59397 ; 0.72025 ; 0.76761 ; 0.83864 ; 0.9452 ; 1.105 ; 1.3448 ; 1.4347 ; 1.5695 ; 1.7718 ; 2.0752 ; 2.5304 ; 3.2131 ; 3.3881 ; 3.6506 ; 4.0443 ; 4.192 ; 4.4135 ; 4.7457 ; 5.244 ; 5.419 ; 5.6815 ; 6.0753 ; 6.6659 ; 7]

Force (kips): [-0.801449 ; 0.155594 ; 0.502228 ; 0.995616 ; 1.68978 ; 2.64163 ; 3.94282 ; 5.6851 ; 7.81576 ; 9.79146 ; 11.1641 ; 11.7703 ; 11.8939 ; 12.0601 ; 12.3256 ; 12.7219 ; 13.2658 ; 13.4549 ; 13.725 ; 14.0946 ; 14.5719 ; 14.7445 ; 15.0032 ; 15.381 ; 15.903 ; 16.5884 ; 16.8461 ; 17.187 ; 17.6699 ; 18.3215 ; 19.1404 ; 20.104 ; 20.3134 ; 20.5981 ; 20.9719 ; 21.0982 ; 21.2761 ; 21.5138 ; 21.8056 ; 21.8916 ; 22.0048 ; 22.1437 ; 22.2906 ; 22.3553]

Bolt 1 - Tensile Force (kips): [34.5888 ; 34.5659 ; 34.5574 ; 34.5448 ; 34.5266 ; 34.4998 ; 34.4607 ; 34.4026 ; 34.3155 ; 34.2169 ; 34.1372 ; 34.1044 ; 34.0988 ; 34.0907 ; 34.0746 ; 34.0456 ; 33.9848 ; 33.9564 ; 33.8954 ; 33.6792 ; 32.9948 ; 32.7181 ; 32.3066 ; 31.6991 ; 30.8251 ; 29.6617 ; 29.2274 ; 28.584 ; 27.6228 ; 26.2445 ; 24.4899 ; 23.5329 ; 23.5495 ; 23.5772 ; 23.6207 ; 23.6362 ; 23.559 ; 23.6155 ; 23.7014 ; 23.7293 ; 23.77 ; 23.8287 ; 23.8228 ; 23.7969]

Bolt 1 - Shear Force (kips): [0.0487 ; 0.030273 ; 0.034646 ; 0.048227 ; 0.073815 ; 0.11348 ; 0.17235 ; 0.25793 ; 0.37285 ; 0.49478 ; 0.59028 ; 0.63349 ; 0.64209 ; 0.65459 ; 0.67743 ; 0.71626 ; 0.78981 ; 0.82215 ; 0.88766 ; 1.1033 ; 1.6864 ; 1.9017 ; 2.2127 ; 2.6558 ; 3.2662 ; 4.044 ; 4.3267 ; 4.7375 ; 5.339 ; 6.1768 ; 7.1893 ; 7.7621 ; 7.7698 ; 7.78 ; 7.7947 ; 7.7999 ; 7.9323 ; 7.9341 ; 7.9314 ; 7.9294 ; 7.926 ; 7.9203 ; 8.3294 ; 8.6452]

Bolt 2 - Tensile Force (kips): [34.5856 ; 34.5634 ; 34.5576 ; 34.5432 ; 34.5225 ; 34.499 ; 34.475 ; 34.463 ; 34.4996 ; 34.6187 ; 34.7607 ; 34.8306 ; 34.8452 ; 34.8679 ; 34.9173 ; 35.0217 ; 35.2741 ; 35.39 ; 35.5668 ; 35.8088 ; 36.0768 ; 36.1745 ; 36.3365 ; 36.6178 ; 37.1316 ; 37.9931 ; 38.3334 ; 38.8298 ; 39.5633 ; 40.6265 ; 42.0391 ; 43.6764 ; 44.0118 ; 44.4629 ; 45.0473 ; 45.2435 ; 45.5134 ; 45.8729 ; 46.3098 ; 46.4394 ; 46.6114 ; 46.782 ; 46.9791 ; 47.0818]

Bolt 2 - Shear Force (kips): [0.037407 ; 0.032689 ; 0.047526 ; 0.071573 ; 0.10772 ; 0.16006 ; 0.23577 ; 0.34145 ; 0.47969 ; 0.6228 ; 0.72782 ; 0.77331 ; 0.78241 ; 0.7956 ; 0.81937 ; 0.85821 ; 0.92862 ; 0.95831 ; 1.0203 ; 1.2067 ; 1.6945 ; 1.8736 ; 2.1263 ; 2.4746 ; 2.9249 ; 3.4387 ; 3.6128 ; 3.8568 ; 4.193 ; 4.6328 ; 5.1457 ; 5.7397 ; 5.8734 ; 6.0561 ; 6.2931 ; 6.373 ; 6.4755 ; 6.6229 ; 6.8039 ; 6.8586 ; 6.9296 ; 7.1208 ; 7.3629 ; 7.4638]

Bolt 3 - Tensile Force (kips): [36 ; 35.972 ; 35.9455 ; 35.9167 ; 35.8909 ; 35.8997 ; 36.0142 ; 36.335 ; 36.9405 ; 38.0378 ; 39.1456 ; 40.1315 ; 40.4589 ; 40.9277 ; 41.6155 ; 42.6401 ; 44.1633 ; 44.7296 ; 45.5557 ; 46.7188 ; 48.2974 ; 48.867 ; 49.7029 ; 50.87 ; 52.4637 ; 54.5153 ; 55.453 ; 56.3257 ; 57.6755 ; 59.7586 ; 62.2736 ; 65.2299 ; 65.9732 ; 66.9353 ; 68.1364 ; 68.5261 ; 69.0402 ; 69.7419 ; 70.6278 ; 70.863 ; 71.1557 ; 71.5219 ; 71.8055 ; 71.8917]

Bolt 3 - Shear Force (kips): [0.026547 ; 0.014186 ; 0.0081102 ; 0.011838 ; 0.026581 ; 0.052013 ; 0.094373 ; 0.15373 ; 0.21703 ; 0.26974 ; 0.32658 ; 0.40901 ; 0.40503 ; 0.39085 ; 0.37091 ; 0.3494 ; 0.34321 ; 0.34585 ; 0.35324 ; 0.36742 ; 0.38985 ; 0.39738 ; 0.43437 ; 0.60808 ; 1.4961 ; 2.4237 ; 2.4874 ; 2.5386 ; 2.4225 ; 2.276 ; 2.0982 ; 1.48 ; 1.1925 ; 1.0567 ; 0.85023 ; 0.77756 ; 0.68548 ; 0.73075 ; 1.0027 ; 1.1168 ; 1.2138 ; 1.2559 ; 1.4633 ; 1.585]

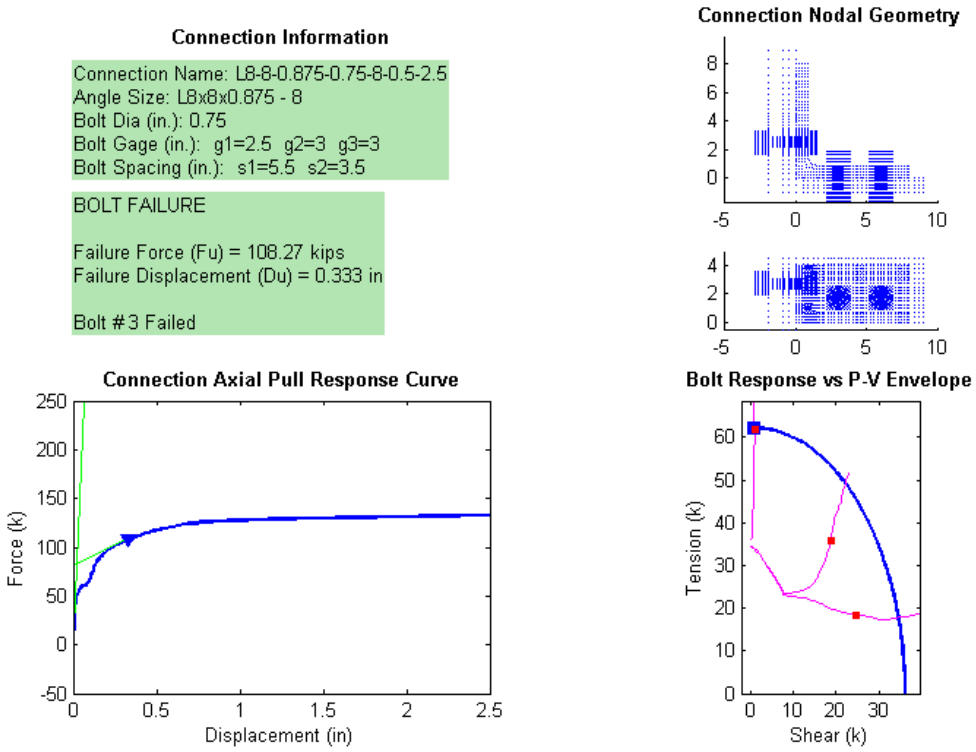


Figure B.355 Connection L8_8_0.875_0.75_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.75_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.9327e+003

Plastic Stiffness (k/in): 84.7478

Displacement (in): [2.3205e-036 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.055916 ; 0.058001 ; 0.06113 ; 0.065823 ; 0.072862 ; 0.075502 ; 0.079461 ; 0.085401 ; 0.087628 ; 0.088463 ; 0.089716 ; 0.091595 ; 0.094414 ; 0.098642 ; 0.10023 ; 0.10261 ; 0.10617 ; 0.11153 ; 0.11955 ; 0.12256 ; 0.12708 ; 0.13385 ; 0.13639 ; 0.1402 ; 0.14591 ; 0.15449 ; 0.16734 ; 0.17217 ; 0.1794 ; 0.19025 ; 0.20652 ; 0.23093 ; 0.24008 ; 0.25382 ; 0.27441 ; 0.3053 ; 0.35165 ; 0.42116 ; 0.44722 ; 0.48632 ; 0.54497 ; 0.63295 ; 0.66594 ; 0.71542 ; 0.78965 ; 0.901 ; 0.94275 ; 1.0054 ; 1.0993 ; 1.2403 ; 1.4516 ; 1.7016 ; 1.9516 ; 2.2016 ; 2.4516 ; 2.5]

Force (kips): [-0.731917 ; 15.8904 ; 18.4708 ; 20.6971 ; 23.2583 ; 24.5766 ; 25.913 ; 27.6586 ; 29.6945 ; 30.1862 ; 30.1901 ; 30.1882 ; 30.1813 ; 30.2149 ; 30.7051 ; 30.7101 ; 30.7046 ; 30.7022 ; 30.7015 ; 31.1383 ; 31.7607 ; 32.4862 ; 33.3979 ; 33.7553 ; 34.3555 ; 35.1921 ; 36.7416 ; 38.6951 ; 39.3198 ; 40.184 ; 41.2708 ; 41.6394 ; 42.1843 ; 42.9129 ; 43.8972 ; 45.117 ; 45.5316 ; 46.1316 ; 46.962 ; 48.0697 ; 49.5809 ; 50.1087 ; 50.8434 ; 51.834 ; 53.1431 ; 54.8228 ; 56.8518 ; 57.5194 ; 58.4326 ; 59.6508 ; 61.1956 ; 61.7113 ; 62.3619 ; 62.942 ; 63.4537 ; 63.6063 ; 63.7997 ; 64.0461 ; 64.3659 ; 64.7867 ; 65.2302 ; 65.6348 ; 66.0041 ; 66.3423 ; 66.4057]

Bolt 1 - Tensile Force (kips): [34.5901 ; 34.0329 ; 33.9191 ; 33.8115 ; 33.5897 ; 32.6665 ; 30.9868 ; 28.3341 ; 24.4223 ; 23.3125 ; 23.3035 ; 23.2953 ; 23.2872 ; 23.2527 ; 23.027 ; 23.0186 ; 23.014 ; 23.0129 ; 23.0127 ; 22.9847 ; 22.9593 ; 22.9282 ; 22.911 ; 22.9008 ; 22.8447 ; 22.7503 ; 22.6024 ; 22.3993 ; 22.3232 ; 22.1737 ; 21.9897 ; 21.9267 ; 21.8439 ; 21.7444 ; 21.4772 ; 21.0832 ; 20.9148 ; 20.5912 ; 20.1648 ; 19.7124 ; 19.2486 ; 19.0764 ; 18.8897 ; 18.7302 ; 18.6209 ; 18.3527 ; 17.9808 ; 17.7124 ; 17.4725 ; 17.3518 ; 17.4062 ; 17.4478 ; 17.5354 ; 17.6598 ; 17.803 ; 17.8498 ; 17.9238 ; 17.9868 ; 18.0531 ; 18.1679 ; 18.3145 ; 18.4333 ; 18.5751 ; 18.8266 ; 18.874]

Bolt 1 - Shear Force (kips): [0.0458713 ; 0.684893 ; 0.802793 ; 0.906836 ; 1.11565 ; 1.87742 ; 3.09089 ; 4.82146 ; 7.09657 ; 7.68575 ; 7.68742 ; 7.68674 ; 7.68466 ; 7.73018 ; 8.01048 ; 8.01417 ; 8.01347 ; 8.01288 ; 8.01267 ; 8.27663 ; 8.54583 ; 8.91106 ; 9.32058 ; 9.53906 ; 9.89967 ; 10.4107 ; 11.3944 ; 12.4138 ; 12.7284 ; 13.2554 ; 13.8874 ; 14.1027 ; 14.3889 ; 14.7528 ; 15.4162 ; 16.2225 ; 16.5552 ; 17.1868 ; 18.1211 ; 19.2128 ; 20.6567 ; 21.2178 ; 21.9121 ; 22.7393 ; 23.7822 ; 25.5201 ; 28.1112 ; 29.0159 ; 30.0175 ; 31.0468 ; 32.1596 ; 32.5439 ; 33.0408 ; 33.5946 ; 34.3936 ; 34.6353 ; 34.941 ; 35.4176 ; 36.0603 ; 36.8552 ; 37.6357 ; 38.3558 ; 39.0139 ; 39.6069 ; 39.7412]

Bolt 2 - Tensile Force (kips): [34.5911 ; 34.0137 ; 33.9119 ; 33.825 ; 33.6356 ; 32.722 ; 31.076 ; 28.5089 ; 24.7766 ; 23.6366 ; 23.6105 ; 23.5968 ; 23.5882 ; 23.5837 ; 23.3458 ; 23.3349 ; 23.3275 ; 23.3255 ; 23.3249 ; 23.3581 ; 23.405 ; 23.4677 ; 23.5746 ; 23.6299 ; 23.7075 ; 23.8041 ; 23.9635 ; 24.1271 ; 24.2077 ; 24.3657 ; 24.6237 ; 24.7297 ; 24.8597 ; 25.0425 ; 25.4291 ; 26.1188 ; 26.4008 ; 26.8176 ; 27.4703 ; 28.5427 ; 30.0697 ; 30.6315 ; 31.481 ; 32.7384 ; 34.4715 ; 36.6371 ; 39.0619 ; 39.7999 ; 40.8013 ; 42.0192 ; 43.4966 ; 43.947 ; 44.5395 ; 45.1364 ; 45.8291 ; 46.0606 ; 46.3902 ; 46.8595 ; 47.498 ; 48.3576 ; 49.267 ; 50.1173 ; 50.9139 ; 51.5903 ; 51.7046]

Bolt 2 - Shear Force (kips): [0.0347173 ; 0.761358 ; 0.889371 ; 1.00178 ; 1.21769 ; 1.96943 ; 3.17458 ; 4.89093 ; 7.13212 ; 7.76427 ; 7.77764 ; 7.78329 ; 7.78347 ; 7.78255 ; 8.13296 ; 8.14002 ; 8.13934 ; 8.13849 ; 8.13818 ; 8.29723 ; 8.62739 ; 8.96003 ; 9.45171 ; 9.59319 ; 9.84417 ; 10.2196 ; 10.8394 ; 11.9283 ; 12.2932 ; 12.704 ; 13.2301 ; 13.4028 ; 13.7059 ; 14.1247 ; 14.4966 ; 15.0064 ; 15.1507 ; 15.3547 ; 15.6932 ; 16.1635 ; 16.9147 ; 17.1644 ; 17.5418 ; 17.9592 ; 18.4423 ; 18.903 ; 19.2607 ; 19.3645 ; 19.5047 ; 19.8357 ; 20.3813 ; 20.5971 ; 20.8321 ; 21.0857 ; 21.2503 ; 21.304 ; 21.3769 ; 21.4702 ; 21.6096 ; 21.8271 ; 22.1226 ; 22.3854 ; 22.6188 ; 22.8068 ; 22.8298]

Bolt 3 - Tensile Force (kips): [36 ; 36.6753 ; 37.0562 ; 37.4888 ; 38.0478 ; 38.3435 ; 38.6508 ; 39.0971 ; 39.7595 ; 39.953 ; 39.9547 ; 39.9535 ; 39.9473 ; 39.962 ; 40.1639 ; 40.1654 ; 40.1598 ; 40.1573 ; 40.1565 ; 40.3492 ; 40.642 ; 41.0164 ; 41.5385 ; 41.7552 ; 42.1373 ; 42.7186 ; 43.8985 ; 45.6008 ; 46.2057 ; 47.0928 ; 48.2809 ; 48.6963 ; 49.3176 ; 50.1677 ; 51.327 ; 52.7626 ; 53.2374 ; 53.9033 ; 54.7743 ; 55.9051 ; 57.4269 ; 57.9519 ; 58.6849 ; 59.6845 ; 61.0084 ; 62.6975 ; 64.6312 ; 65.2593 ; 66.1554 ; 67.4005 ; 69.0126 ; 69.5684 ; 70.2843 ; 70.869 ; 71.2564 ; 71.3568 ; 71.4789 ; 71.6247 ; 71.7819 ; 71.9302 ; 72.0744 ; 72.2005 ; 72.3228 ; 72.4617 ; 72.488]

Bolt 3 - Shear Force (kips): [0.014995 ; 0.18944 ; 0.22307 ; 0.25003 ; 0.28252 ; 0.30007 ; 0.31578 ; 0.3367 ; 0.36216 ; 0.36942 ; 0.3695 ; 0.36949 ; 0.36917 ; 0.36992 ; 0.37791 ; 0.37803 ; 0.37782 ; 0.37773 ; 0.3777 ; 0.385 ; 0.39512 ; 0.40653 ; 0.42175 ; 0.42844 ; 0.44099 ; 0.45963 ; 0.49861 ; 0.55866 ; 0.58004 ; 0.6101 ; 0.64271 ; 0.65136 ; 0.66269 ; 0.67471 ; 0.68805 ; 0.7052 ; 0.71058 ; 0.71944 ; 0.73772 ; 0.77471 ; 0.81399 ; 0.82163 ; 0.83003 ; 0.83577 ; 0.83682 ; 0.82502 ; 0.80413 ; 0.79232 ; 0.76156 ; 0.6857 ; 0.56606 ; 0.5913 ; 0.75199 ; 1.1068 ; 1.1696 ; 1.1569 ; 1.1065 ; 1.0144 ; 0.86642 ; 0.65157 ; 0.4004 ; 0.15418 ; 0.026602 ; 0.026699 ; 0.0267]

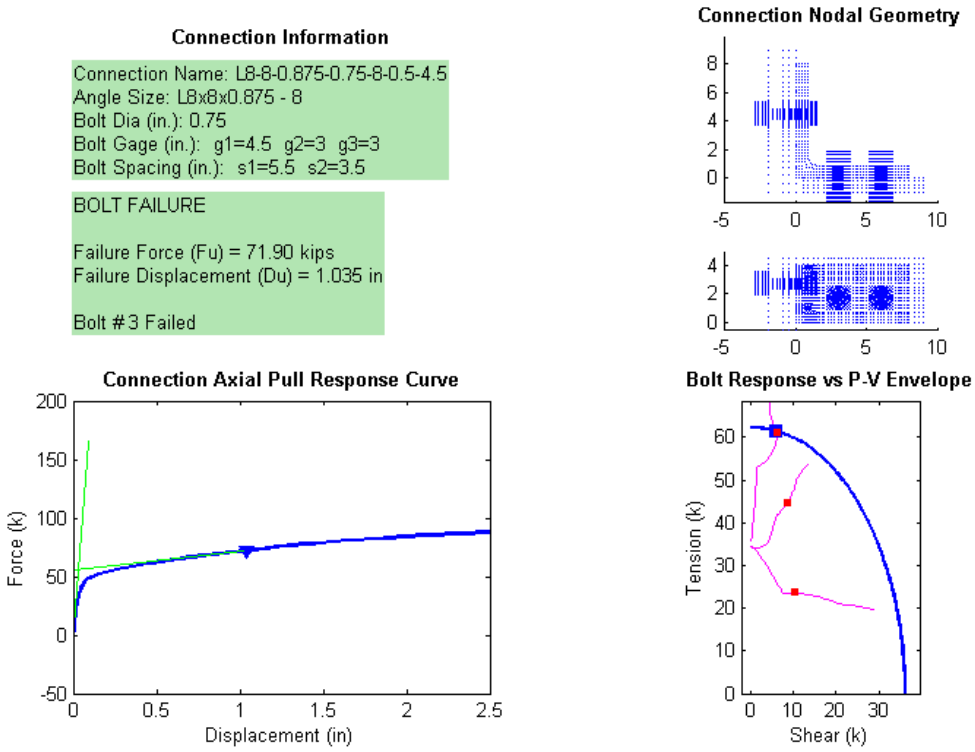


Figure B.356 Connection L8_8_0.875_0.75_8_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.75_8_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 1.8621e+003

Plastic Stiffness (k/in): 16.3508

Displacement (in): [2.728e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.072601 ; 0.10597 ; 0.15603 ; 0.23111 ; 0.25927 ; 0.30151 ; 0.36486 ; 0.38861 ; 0.40643 ; 0.43316 ; 0.47325 ; 0.53339 ; 0.62359 ; 0.65742 ; 0.70815 ; 0.78426 ; 0.81281 ; 0.85562 ; 0.87167 ; 0.88772 ; 0.90378 ; 0.92786 ; 0.96398 ; 1.0182 ; 1.0994 ; 1.1299 ; 1.1756 ; 1.1928 ; 1.2185 ; 1.2571 ; 1.3149 ; 1.4017 ; 1.4343 ; 1.4831 ; 1.5563 ; 1.6662 ; 1.8309 ; 1.8927 ; 1.9854 ; 2.1244 ; 2.3329 ; 2.5]

Force (kips): [-0.684175 ; 1.36709 ; 2.9528 ; 4.34097 ; 6.21035 ; 7.89738 ; 9.4421 ; 11.5316 ; 14.1758 ; 17.2579 ; 20.475 ; 23.015 ; 24.6435 ; 26.0109 ; 27.5117 ; 27.9342 ; 28.5203 ; 29.3798 ; 29.7128 ; 29.9819 ; 30.3513 ; 30.8715 ; 31.5486 ; 32.434 ; 32.7482 ; 33.2132 ; 33.8501 ; 34.0767 ; 34.4077 ; 34.5511 ; 34.6998 ; 34.8385 ; 35.0488 ; 35.3553 ; 35.7983 ; 36.5145 ; 36.79 ; 37.1714 ; 37.3137 ; 37.5216 ; 37.8147 ; 38.2391 ; 38.8154 ; 39.0287 ; 39.339 ; 39.778 ; 40.3914 ; 41.2298 ; 41.5276 ; 41.9409 ; 42.5273 ; 43.3334 ; 43.8993]

Bolt 1 - Tensile Force (kips): [34.5865 ; 34.5326 ; 34.487 ; 34.4448 ; 34.3837 ; 34.3216 ; 34.2603 ; 34.1694 ; 34.0414 ; 33.8652 ; 33.4513 ; 32.5544 ; 31.395 ; 29.7288 ; 27.7656 ; 27.2446 ; 26.5013 ; 25.3524 ; 24.9175 ; 24.5956 ; 24.151 ; 23.5578 ; 23.3693 ; 23.4278 ; 23.4566 ; 23.3644 ; 23.4405 ; 23.4998 ; 23.5981 ; 23.5714 ; 23.5264 ; 23.5478 ; 23.5774 ; 23.6327 ; 23.7121 ; 23.5616 ; 23.4198 ; 23.2968 ; 23.257 ; 23.1791 ; 23.0973 ; 22.9115 ; 22.697 ; 22.4669 ; 22.1259 ; 21.7529 ; 21.247 ; 20.9038 ; 20.8574 ; 20.7154 ; 20.5216 ; 20.1856 ; 19.8241]

Bolt 1 - Shear Force (kips): [0.0427875 ; 0.0640232 ; 0.131205 ; 0.193506 ; 0.280219 ; 0.360155 ; 0.435595 ; 0.541527 ; 0.684262 ; 0.865422 ; 1.25126 ; 1.9669 ; 2.80575 ; 3.92322 ; 5.14892 ; 5.46435 ; 5.9093 ; 6.57403 ; 6.8201 ; 7.0016 ; 7.24945 ; 7.57778 ; 7.70285 ; 7.72983 ; 7.74013 ; 7.9255 ; 8.03319 ; 8.047 ; 8.06957 ; 8.31186 ; 8.62566 ; 8.77269 ; 9.04446 ; 9.34539 ; 9.81825 ; 11.2824 ; 11.9844 ; 12.739 ; 12.9893 ; 13.4281 ; 14.0117 ; 14.8579 ; 15.9393 ; 16.5692 ; 17.5666 ; 18.8365 ; 20.5945 ; 22.4229 ; 23.0064 ; 23.8588 ; 25.142 ; 27.1969 ; 28.6458]

Bolt 2 - Tensile Force (kips): [34.5804 ; 34.5323 ; 34.4811 ; 34.4383 ; 34.3809 ; 34.3303 ; 34.2903 ; 34.2476 ; 34.219 ; 34.2218 ; 34.1372 ; 33.9924 ; 34.3035 ; 34.9239 ; 36.3165 ; 36.7529 ; 37.4086 ; 38.4648 ; 38.8587 ; 39.1568 ; 39.5978 ; 40.2224 ; 41.0308 ; 41.8739 ; 42.0719 ; 42.5221 ; 42.9054 ; 42.9717 ; 43.0331 ; 43.2242 ; 43.4043 ; 43.5659 ; 43.8032 ; 44.1534 ; 44.6632 ; 45.4897 ; 45.7803 ; 46.2247 ; 46.3766 ; 46.6257 ; 47.0064 ; 47.5152 ; 48.2267 ; 48.4853 ; 48.864 ; 49.3678 ; 50.0653 ; 50.9769 ; 51.2961 ; 51.7429 ; 52.3701 ; 53.1065 ; 53.5155]

Bolt 2 - Shear Force (kips): [0.0302156 ; 0.0799871 ; 0.158161 ; 0.229088 ; 0.326431 ; 0.416241 ; 0.500436 ; 0.617892 ; 0.77292 ; 0.960842 ; 1.3272 ; 1.96072 ; 2.65127 ; 3.50647 ; 4.263 ; 4.43436 ; 4.6663 ; 4.99189 ; 5.11351 ; 5.20447 ; 5.32845 ; 5.507 ; 5.77997 ; 6.30489 ; 6.53227 ; 6.73023 ; 7.12789 ; 7.30317 ; 7.56926 ; 7.57418 ; 7.62717 ; 7.69449 ; 7.84148 ; 8.14356 ; 8.56594 ; 8.9262 ; 9.08466 ; 9.29054 ; 9.42857 ; 9.56424 ; 9.71361 ; 9.97164 ; 10.2405 ; 10.2907 ; 10.3413 ; 10.5014 ; 10.7334 ; 11.1893 ; 11.4098 ; 11.6832 ; 12.0096 ; 12.6423 ; 13.2934]

Bolt 3 - Tensile Force (kips): [36 ; 35.9334 ; 35.9123 ; 35.9394 ; 36.0573 ; 36.2429 ; 36.4521 ; 36.808 ; 37.4894 ; 38.4343 ; 39.5486 ; 40.9562 ; 42.6155 ; 44.6574 ; 47.3388 ; 48.2609 ; 49.5458 ; 51.2759 ; 51.8783 ; 52.3011 ; 52.8479 ; 53.5362 ; 54.4738 ; 55.7506 ; 56.2661 ; 56.9867 ; 57.9382 ; 58.2868 ; 58.8328 ; 59.06 ; 59.291 ; 59.504 ; 59.8158 ; 60.2674 ; 60.9105 ; 61.8805 ; 62.2448 ; 62.7014 ; 62.8577 ; 63.091 ; 63.4493 ; 63.9873 ; 64.6893 ; 64.9062 ; 65.1556 ; 65.5236 ; 66.0886 ; 67.0283 ; 67.4646 ; 67.9047 ; 68.5024 ; 69.298 ; 69.7189]

Bolt 3 - Shear Force (kips): [0.028158 ; 0.011171 ; 0.034464 ; 0.060342 ; 0.10192 ; 0.14161 ; 0.17541 ; 0.219 ; 0.27101 ; 0.33822 ; 0.42966 ; 0.55997 ; 0.71451 ; 0.91878 ; 1.0948 ; 1.131 ; 1.1756 ; 1.2349 ; 1.2607 ; 1.296 ; 1.4054 ; 2.5106 ; 3.5374 ; 4.539 ; 4.8628 ; 5.2576 ; 5.6155 ; 5.7389 ; 5.893 ; 5.9425 ; 5.9844 ; 6.0257 ; 6.0784 ; 6.1395 ; 6.1918 ; 5.7844 ; 5.5181 ; 5.3076 ; 5.2707 ; 5.2329 ; 5.1203 ; 4.9596 ; 4.7475 ; 4.6633 ; 4.5698 ; 4.5004 ; 4.3609 ; 4.3062 ; 4.3041 ; 4.2964 ; 3.9961 ; 3.7174 ; 3.5797]

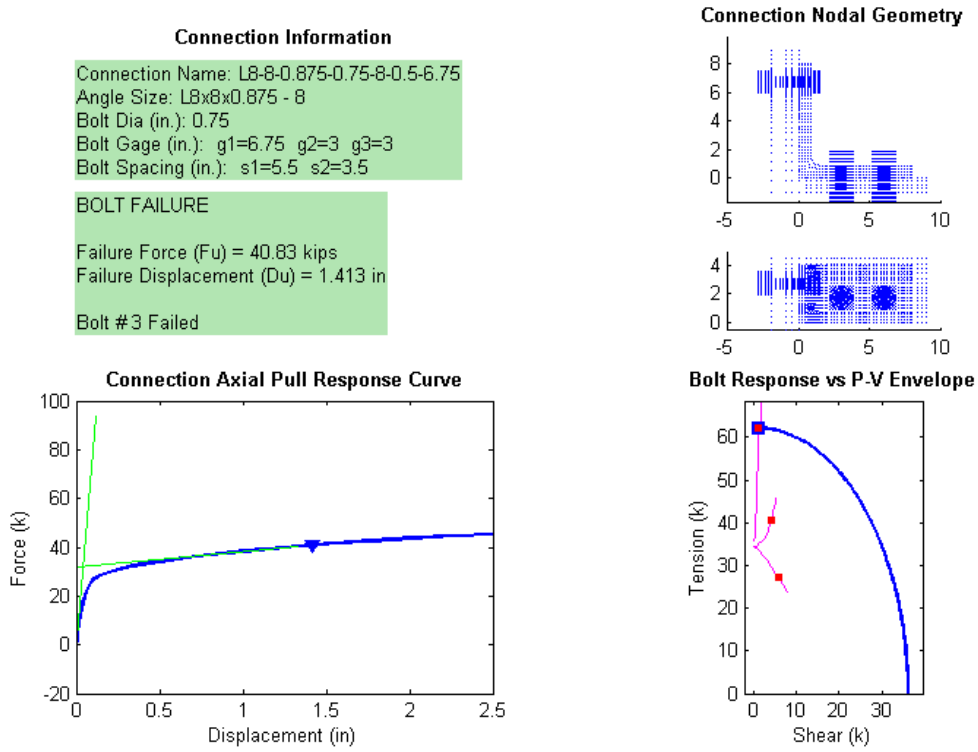


Figure B.357 Connection L8_8_0.875_0.75_8_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.75_8_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 820.3950

Plastic Stiffness (k/in): 6.1600

Displacement (in): [2.1794e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.56737 ; 0.66112 ; 0.80174 ; 1.0127 ; 1.2627 ; 1.3252 ; 1.4189 ; 1.5596 ; 1.7705 ; 2.0205 ; 2.2705 ; 2.5]

Force (kips): [-0.662363 ; 0.370121 ; 0.939971 ; 1.73774 ; 2.82671 ; 4.29629 ; 6.23513 ; 8.61492 ; 11.0603 ; 13.1525 ; 14.3215 ; 15.2009 ; 16.1475 ; 17.1296 ; 17.4244 ; 17.8207 ; 18.3745 ; 19.1455 ; 19.9629 ; 20.1554 ; 20.4326 ; 20.8082 ; 21.303 ; 21.8116 ; 22.2752 ; 22.6519]

Bolt 1 - Tensile Force (kips): [34.5868 ; 34.5604 ; 34.5453 ; 34.5229 ; 34.4901 ; 34.4426 ; 34.3713 ; 34.2647 ; 34.1296 ; 33.9893 ; 33.9137 ; 33.87 ; 33.7602 ; 32.9617 ; 32.5472 ; 31.8698 ; 30.9228 ; 29.5658 ; 28.045 ; 27.6848 ; 27.1668 ; 26.434 ; 25.4477 ; 24.494 ; 23.8149 ; 23.8058]

Bolt 1 - Shear Force (kips): [0.042145 ; 0.031741 ; 0.049985 ; 0.083378 ; 0.13353 ; 0.20595 ; 0.30799 ; 0.44459 ; 0.60565 ; 0.7657 ; 0.85553 ; 0.91851 ; 1.0516 ; 1.7562 ; 2.0796 ; 2.5854 ; 3.2584 ; 4.1696 ; 5.1559 ; 5.3864 ; 5.7147 ; 6.1727 ; 6.7737 ; 7.3473 ; 7.7765 ; 7.8435]

Bolt 2 - Tensile Force (kips): [34.5816 ; 34.5627 ; 34.5472 ; 34.5212 ; 34.4898 ; 34.4543 ; 34.4243 ; 34.4356 ; 34.5378 ; 34.723 ; 34.8531 ; 34.9524 ; 35.181 ; 35.6215 ; 35.8298 ; 36.1894 ; 36.8454 ; 38.1848 ; 39.8294 ; 40.2192 ; 40.7729 ; 41.5451 ; 42.6 ; 43.7372 ; 44.8126 ; 45.6708]

Bolt 2 - Shear Force (kips): [0.029977 ; 0.035772 ; 0.064075 ; 0.10586 ; 0.16556 ; 0.25037 ; 0.36689 ; 0.52073 ; 0.69545 ; 0.85535 ; 0.94364 ; 1.004 ; 1.1177 ; 1.6919 ; 1.9506 ; 2.3438 ; 2.8257 ; 3.3677 ; 3.8652 ; 3.9714 ; 4.1188 ; 4.3169 ; 4.5719 ; 4.8143 ; 5.0095 ; 5.1767]

Bolt 3 - Tensile Force (kips): [36 ; 35.9584 ; 35.9273 ; 35.8994 ; 35.9089 ; 36.0438 ; 36.4266 ; 37.2448 ; 38.6771 ; 40.6605 ; 43.7231 ; 47.1963 ; 50.47 ; 53.4933 ; 54.3254 ; 55.4074 ; 56.9006 ; 58.9391 ; 61.106 ; 61.6075 ; 62.3588 ; 63.309 ; 64.4869 ; 65.8009 ; 67.0071 ; 67.9087]

Bolt 3 - Shear Force (kips): [0.027616 ; 0.010168 ; 0.010969 ; 0.026494 ; 0.05429 ; 0.10042 ; 0.16182 ; 0.22572 ; 0.29357 ; 0.39971 ; 0.55513 ; 0.70011 ; 0.76546 ; 0.84503 ; 0.87978 ; 0.91813 ; 0.94952 ; 0.97352 ; 0.99398 ; 1.0052 ; 1.0603 ; 1.2323 ; 1.5582 ; 1.8286 ; 1.5551 ; 1.6002]

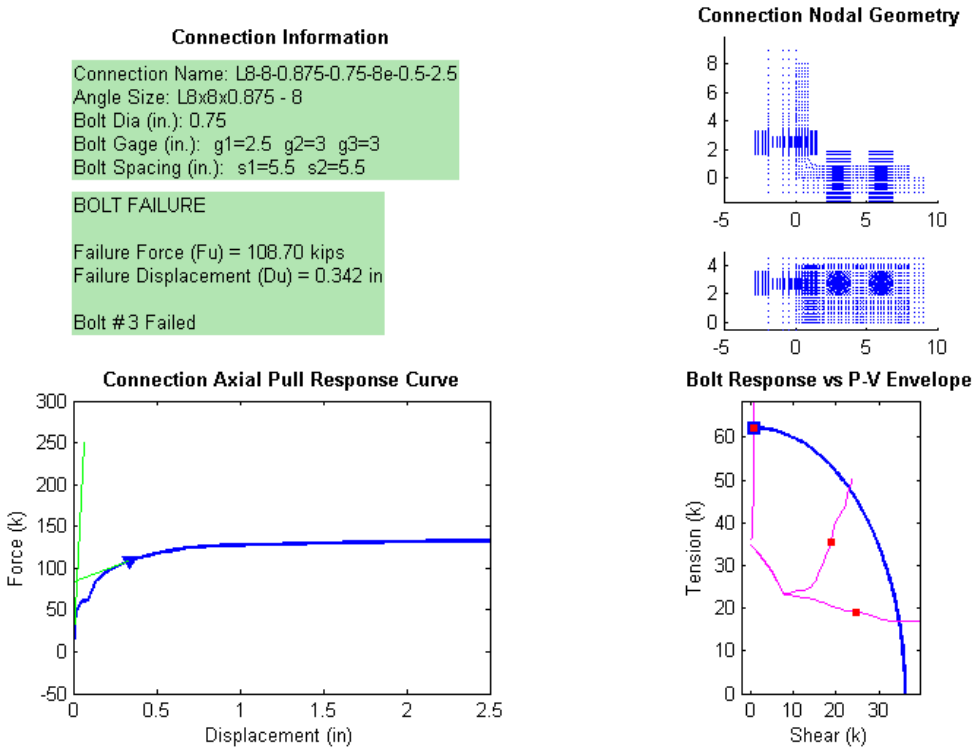


Figure B.358 Connection L8_8_0.875_0.75_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.75_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.8846e+003

Plastic Stiffness (k/in): 76.1466

Displacement (in): [2.7708e-036 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.055916 ; 0.058001 ; 0.06113 ; 0.065823 ; 0.072862 ; 0.073522 ; 0.074512 ; 0.075997 ; 0.078224 ; 0.081565 ; 0.086576 ; 0.088455 ; 0.08916 ; 0.090217 ; 0.091803 ; 0.094181 ; 0.097749 ; 0.099087 ; 0.10109 ; 0.1041 ; 0.10862 ; 0.11539 ; 0.11793 ; 0.12174 ; 0.12746 ; 0.13603 ; 0.14889 ; 0.16817 ; 0.17541 ; 0.18625 ; 0.20253 ; 0.22694 ; 0.23609 ; 0.24982 ; 0.27042 ; 0.30131 ; 0.3129 ; 0.33027 ; 0.35634 ; 0.39544 ; 0.45409 ; 0.54207 ; 0.57506 ; 0.62454 ; 0.69877 ; 0.72661 ; 0.76836 ; 0.83099 ; 0.92494 ; 0.96017 ; 1.013 ; 1.0659 ; 1.1187 ; 1.198 ; 1.3169 ; 1.4952 ; 1.7452 ; 1.9952 ; 2.2452 ; 2.4952 ; 2.5]

Force (kips): [-0.910739 ; 15.4818 ; 18.057 ; 20.2752 ; 22.9737 ; 24.4856 ; 25.8316 ; 27.5894 ; 29.6629 ; 30.2056 ; 30.275 ; 30.2767 ; 30.2711 ; 30.2619 ; 30.3005 ; 30.4472 ; 30.6724 ; 30.7669 ; 30.7682 ; 30.7641 ; 30.7624 ; 30.7619 ; 31.0564 ; 31.5426 ; 32.2109 ; 33.0621 ; 33.347 ; 33.8165 ; 34.4932 ; 35.6849 ; 37.5357 ; 38.1422 ; 39.0028 ; 40.1715 ; 41.5467 ; 43.2183 ; 45.1387 ; 45.7483 ; 46.5878 ; 47.7156 ; 49.223 ; 49.7433 ; 50.4901 ; 51.4994 ; 52.8281 ; 53.2872 ; 53.9488 ; 54.8652 ; 56.0839 ; 57.6602 ; 59.5906 ; 60.2175 ; 61.0657 ; 62.1332 ; 62.4537 ; 62.8056 ; 63.1491 ; 63.5227 ; 63.6411 ; 63.7921 ; 63.9314 ; 64.0607 ; 64.2408 ; 64.4869 ; 64.8266 ; 65.2591 ; 65.6541 ; 66.0153 ; 66.3504 ; 66.3569]

Bolt 1 - Tensile Force (kips): [34.6555 ; 34.0651 ; 33.9448 ; 33.8326 ; 33.6331 ; 32.7733 ; 31.1094 ; 28.477 ; 24.5893 ; 23.3744 ; 23.3387 ; 23.3298 ; 23.3215 ; 23.3131 ; 23.2889 ; 23.1456 ; 23.078 ; 23.0706 ; 23.0651 ; 23.0613 ; 23.0603 ; 23.06 ; 23.034 ; 23.0144 ; 22.9996 ; 22.9832 ; 22.9926 ; 22.9951 ; 22.9423 ; 22.827 ; 22.6124 ; 22.5537 ; 22.49 ; 22.3354 ; 22.1679 ; 21.963 ; 21.5404 ; 21.3185 ; 20.944 ; 20.5302 ; 20.1529 ; 20.0301 ; 19.7804 ; 19.5188 ; 19.3356 ; 19.2918 ; 19.0966 ; 18.87 ; 18.5519 ; 18.0051 ; 17.4013 ; 17.257 ; 17.1197 ; 17.0169 ; 16.9933 ; 16.9658 ; 16.9478 ; 16.9423 ; 16.9417 ; 16.9419 ; 16.9625 ; 16.9867 ; 17.0039 ; 17.0027 ; 17.0337 ; 17.0292 ; 17.0965 ; 17.1372 ; 17.2106 ; 17.2094]

Bolt 1 - Shear Force (kips): [0.0436556 ; 0.69819 ; 0.819418 ; 0.926266 ; 1.11049 ; 1.82332 ; 3.03201 ; 4.75775 ; 7.03193 ; 7.67913 ; 7.69768 ; 7.69777 ; 7.6959 ; 7.69332 ; 7.73876 ; 7.92388 ; 8.00715 ; 8.01195 ; 8.0138 ; 8.01266 ; 8.01209 ; 8.01189 ; 8.28975 ; 8.55267 ; 8.80765 ; 9.19307 ; 9.34654 ; 9.60658 ; 10.011 ; 10.8752 ; 12.0967 ; 12.4051 ; 12.757 ; 13.4131 ; 14.1583 ; 15.0614 ; 16.1967 ; 16.7168 ; 17.6428 ; 18.7853 ; 20.1604 ; 20.6134 ; 21.3775 ; 22.3039 ; 23.3321 ; 23.6845 ; 24.3638 ; 25.3598 ; 26.885 ; 28.9478 ; 30.9338 ; 31.4436 ; 32.1053 ; 32.9793 ; 33.2492 ; 33.6202 ; 34.1254 ; 34.6889 ; 34.8947 ; 35.1833 ; 35.4462 ; 35.689 ; 36.0459 ; 36.5731 ; 37.2591 ; 38.0992 ; 38.807 ; 39.4788 ; 40.1507 ; 40.1689]

Bolt 2 - Tensile Force (kips): [34.6674 ; 34.0994 ; 34.0058 ; 33.9262 ; 33.7926 ; 32.9854 ; 31.378 ; 28.8567 ; 25.186 ; 23.9648 ; 23.6885 ; 23.6598 ; 23.6471 ; 23.6385 ; 23.6407 ; 23.6503 ; 23.4977 ; 23.4076 ; 23.4011 ; 23.3967 ; 23.3955 ; 23.3952 ; 23.4223 ; 23.4501 ; 23.5086 ; 23.6005 ; 23.6344 ; 23.7026 ; 23.8113 ; 23.9614 ; 24.1511 ; 24.1895 ; 24.213 ; 24.3164 ; 24.5455 ; 24.982 ; 25.9367 ; 26.3556 ; 27.0307 ; 28.0187 ; 29.5603 ; 30.0895 ; 30.8961 ; 32.073 ; 33.7414 ; 34.3256 ; 35.1354 ; 36.2132 ; 37.6034 ; 39.2494 ; 40.9971 ; 41.4786 ; 42.135 ; 42.9189 ; 43.1487 ; 43.4428 ; 43.8281 ; 44.3391 ; 44.5213 ; 44.7857 ; 45.0454 ; 45.3004 ; 45.6711 ; 46.2091 ; 46.9505 ; 47.9068 ; 48.7897 ; 49.6182 ; 50.3467 ; 50.359]

Bolt 2 - Shear Force (kips): [0.0546068 ; 0.702976 ; 0.823723 ; 0.928996 ; 1.10077 ; 1.79582 ; 2.99215 ; 4.70042 ; 6.94867 ; 7.63368 ; 7.78572 ; 7.7993 ; 7.80212 ; 7.80055 ; 7.80132 ; 7.80451 ; 8.0159 ; 8.13596 ; 8.13947 ; 8.13908 ; 8.13854 ; 8.13836 ; 8.14684 ; 8.3576 ; 8.75138 ; 9.1975 ; 9.32195 ; 9.52219 ; 9.7993 ; 10.1589 ; 10.8819 ; 11.2255 ; 11.8172 ; 12.4696 ; 13.2122 ; 14.0736 ; 14.8658 ; 15.0702 ; 15.2993 ; 15.7304 ; 16.4492 ; 16.7033 ; 17.102 ; 17.6049 ; 18.1627 ; 18.3497 ; 18.5889 ; 18.8772 ; 19.1749 ; 19.5235 ; 20.1431 ; 20.44 ; 20.8802 ; 21.4666 ; 21.6486 ; 21.8336 ; 21.9843 ; 22.1476 ; 22.1978 ; 22.2678 ; 22.3282 ; 22.376 ; 22.4366 ; 22.5212 ; 22.6888 ; 22.9851 ; 23.2558 ; 23.4782 ; 23.6421 ; 23.6454]

Bolt 3 - Tensile Force (kips): [36 ; 36.6545 ; 37.0253 ; 37.4531 ; 38.0412 ; 38.3884 ; 38.7005 ; 39.1576 ; 39.8451 ; 40.0634 ; 40.0929 ; 40.0937 ; 40.0891 ; 40.0799 ; 40.1007 ; 40.1615 ; 40.2572 ; 40.2981 ; 40.2981 ; 40.2937 ; 40.2919 ; 40.2913 ; 40.4225 ; 40.6532 ; 40.9899 ; 41.4614 ; 41.627 ; 41.9141 ; 42.3522 ; 43.1865 ; 44.6471 ; 45.1721 ; 45.9581 ; 47.1004 ; 48.6009 ; 50.5466 ; 52.818 ; 53.5191 ; 54.4362 ; 55.6039 ; 57.1432 ; 57.6715 ; 58.4213 ; 59.4392 ; 60.791 ; 61.2574 ; 61.9217 ; 62.8254 ; 63.9757 ; 65.4251 ; 67.3561 ; 68.0003 ; 68.8902 ; 70.0555 ; 70.4148 ; 70.777 ; 71.066 ; 71.3307 ; 71.4058 ; 71.5015 ; 71.5842 ; 71.6554 ; 71.739 ; 71.8303 ; 71.9474 ; 72.086 ; 72.2077 ; 72.3456 ; 72.4845 ; 72.4871]

Bolt 3 - Shear Force (kips): [0.02758 ; 0.17722 ; 0.21091 ; 0.23764 ; 0.27193 ; 0.29205 ; 0.30805 ; 0.32917 ; 0.35615 ; 0.3649 ; 0.36624 ; 0.36633 ; 0.36612 ; 0.36572 ; 0.36683 ; 0.36909 ; 0.37295 ; 0.37465 ; 0.37474 ; 0.3746 ; 0.37454 ; 0.37452 ; 0.37928 ; 0.3868 ; 0.39724 ; 0.4103 ; 0.41522 ; 0.42404 ; 0.4374 ; 0.46319 ; 0.51073 ; 0.52855 ; 0.55473 ; 0.59088 ; 0.62735 ; 0.65466 ; 0.68026 ; 0.68823 ; 0.70383 ; 0.73743 ; 0.78126 ; 0.79104 ; 0.7999 ; 0.8065 ; 0.80799 ; 0.80667 ; 0.80261 ; 0.79202 ; 0.77668 ; 0.75356 ; 0.66056 ; 0.61025 ; 0.52716 ; 0.49602 ; 0.79333 ; 1.0238 ; 1.1168 ; 1.1193 ; 1.1006 ; 1.0518 ; 1.0001 ; 0.94556 ; 0.86346 ; 0.73946 ; 0.55532 ; 0.2968 ; 0.043316 ; 0.025311 ; 0.026182 ; 0.026179]

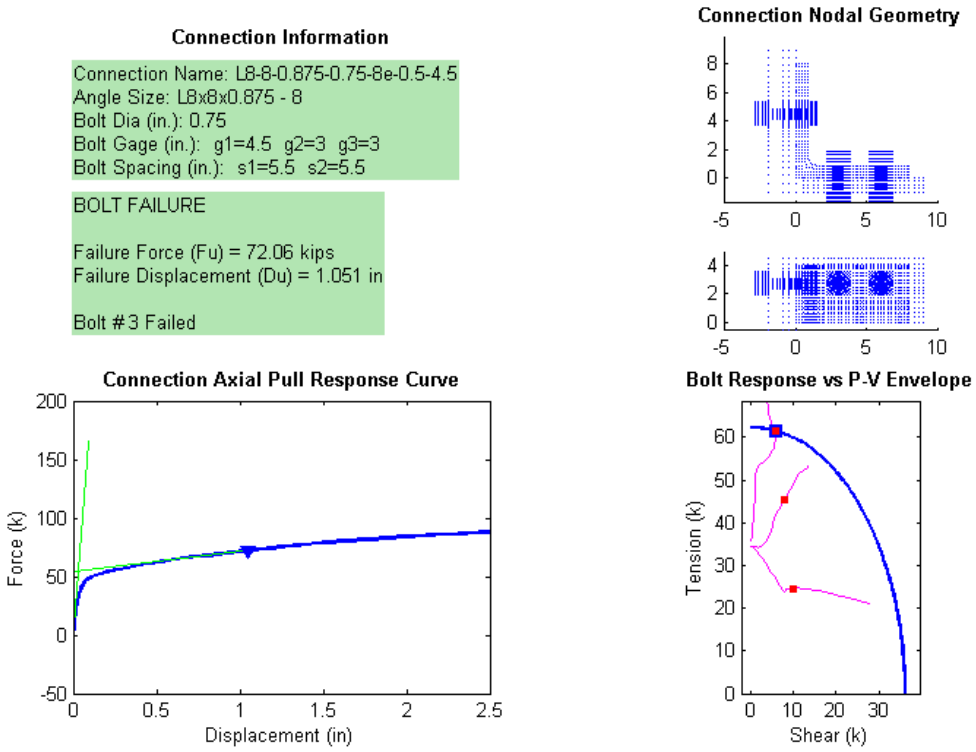


Figure B.359 Connection L8_8_0.875_0.75_8e_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.75_8e_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 1.8522e+003

Plastic Stiffness (k/in): 16.4522

Displacement (in): [2.4704e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.026611 ; 0.036499 ; 0.051331 ; 0.073578 ; 0.10695 ; 0.11946 ; 0.13823 ; 0.16639 ; 0.20863 ; 0.27198 ; 0.36701 ; 0.40264 ; 0.4561 ; 0.53628 ; 0.56635 ; 0.61145 ; 0.6791 ; 0.70447 ; 0.74252 ; 0.79961 ; 0.88523 ; 0.91734 ; 0.92938 ; 0.94744 ; 0.97453 ; 1.0152 ; 1.0761 ; 1.099 ; 1.1333 ; 1.1847 ; 1.2618 ; 1.2908 ; 1.3342 ; 1.3993 ; 1.4644 ; 1.5295 ; 1.6271 ; 1.7736 ; 1.9932 ; 2.2432 ; 2.4932 ; 2.5]

Force (kips): [-0.847023 ; 1.21536 ; 2.77051 ; 4.77461 ; 7.3637 ; 9.63042 ; 11.6387 ; 14.182 ; 17.2008 ; 20.3834 ; 22.9678 ; 24.5893 ; 24.9857 ; 25.4894 ; 26.1691 ; 27.068 ; 28.0616 ; 29.3443 ; 29.8613 ; 30.6004 ; 31.5315 ; 31.8539 ; 32.3076 ; 32.9464 ; 33.1759 ; 33.5153 ; 34.0035 ; 34.6777 ; 34.9208 ; 35.0244 ; 35.1753 ; 35.3974 ; 35.7317 ; 36.241 ; 36.4412 ; 36.7314 ; 37.1506 ; 37.7501 ; 37.972 ; 38.2823 ; 38.7155 ; 39.1224 ; 39.5157 ; 40.0802 ; 40.8467 ; 41.8783 ; 42.9019 ; 43.7932 ; 43.8151]

Bolt 1 - Tensile Force (kips): [34.6487 ; 34.5871 ; 34.5368 ; 34.4681 ; 34.3659 ; 34.2663 ; 34.1697 ; 34.0353 ; 33.8491 ; 33.3924 ; 32.4713 ; 31.3423 ; 30.9421 ; 30.3507 ; 29.4958 ; 28.3671 ; 27.1679 ; 25.6226 ; 25.0335 ; 24.2496 ; 23.7162 ; 23.7475 ; 23.8102 ; 23.9212 ; 23.9674 ; 23.9653 ; 24.0228 ; 24.3091 ; 24.4254 ; 24.4016 ; 24.3712 ; 24.3913 ; 24.49 ; 24.6827 ; 24.7304 ; 24.7587 ; 24.59 ; 24.472 ; 24.3936 ; 24.3262 ; 24.1894 ; 24.0164 ; 23.7552 ; 23.3687 ; 22.834 ; 22.3144 ; 21.8474 ; 21.1661 ; 21.1465]

Bolt 1 - Shear Force (kips): [0.0407543 ; 0.071729 ; 0.142659 ; 0.239525 ; 0.368733 ; 0.486924 ; 0.596456 ; 0.743352 ; 0.930378 ; 1.35197 ; 2.08159 ; 2.90203 ; 3.18114 ; 3.58502 ; 4.15367 ; 4.8857 ; 5.64921 ; 6.60353 ; 6.95781 ; 7.42954 ; 7.80614 ; 7.82703 ; 7.8544 ; 7.89332 ; 7.9089 ; 8.02671 ; 8.19964 ; 8.28447 ; 8.3161 ; 8.52838 ; 8.81538 ; 9.10658 ; 9.53744 ; 10.084 ; 10.3783 ; 10.8384 ; 12.0109 ; 13.205 ; 13.6872 ; 14.3189 ; 15.1781 ; 16.1026 ; 17.1441 ; 18.7335 ; 20.7946 ; 23.1104 ; 25.3745 ; 27.767 ; 27.825]

Bolt 2 - Tensile Force (kips): [34.6499 ; 34.6014 ; 34.5517 ; 34.4905 ; 34.4207 ; 34.3712 ; 34.3452 ; 34.34 ; 34.3821 ; 34.3277 ; 34.1886 ; 34.5582 ; 34.7427 ; 35.0155 ; 35.4617 ; 36.2227 ; 37.1828 ; 38.6144 ; 39.1829 ; 40.0112 ; 41.1875 ; 41.5934 ; 42.0921 ; 42.6376 ; 42.8165 ; 43.1686 ; 43.6752 ; 44.1105 ; 44.2436 ; 44.3753 ; 44.5701 ; 44.8104 ; 45.1612 ; 45.7088 ; 45.885 ; 46.182 ; 46.6696 ; 47.3222 ; 47.5488 ; 47.8992 ; 48.3679 ; 48.8048 ; 49.233 ; 49.7855 ; 50.5582 ; 51.54 ; 52.4262 ; 53.1369 ; 53.1498]

Bolt 2 - Shear Force (kips): [0.0504435 ; 0.0635082 ; 0.131389 ; 0.225306 ; 0.350193 ; 0.462532 ; 0.564777 ; 0.699661 ; 0.863423 ; 1.21746 ; 1.83733 ; 2.49884 ; 2.71277 ; 3.01807 ; 3.42631 ; 3.89717 ; 4.33874 ; 4.83768 ; 5.01606 ; 5.25685 ; 5.56954 ; 5.68483 ; 5.89736 ; 6.26536 ; 6.40167 ; 6.5312 ; 6.69302 ; 7.06231 ; 7.19928 ; 7.19945 ; 7.20081 ; 7.32027 ; 7.50087 ; 7.83922 ; 8.09096 ; 8.33689 ; 8.5084 ; 8.93037 ; 9.0842 ; 9.27592 ; 9.6428 ; 9.90443 ; 10.0657 ; 10.338 ; 10.6956 ; 11.3949 ; 12.3075 ; 13.2095 ; 13.2425]

Bolt 3 - Tensile Force (kips): [36 ; 35.9315 ; 35.9086 ; 35.9579 ; 36.1944 ; 36.5085 ; 36.867 ; 37.5497 ; 38.4814 ; 39.5799 ; 40.997 ; 42.6576 ; 43.2065 ; 43.9809 ; 45.0782 ; 46.6081 ; 48.68 ; 51.3689 ; 52.2751 ; 53.3702 ; 54.6457 ; 55.1323 ; 55.7835 ; 56.7329 ; 57.0925 ; 57.6063 ; 58.3321 ; 59.3695 ; 59.7699 ; 59.9256 ; 60.1501 ; 60.4787 ; 60.9834 ; 61.7036 ; 61.9529 ; 62.3407 ; 62.7523 ; 63.4501 ; 63.7121 ; 64.0839 ; 64.5472 ; 64.9113 ; 65.244 ; 65.789 ; 66.5668 ; 67.7658 ; 68.8875 ; 69.6581 ; 69.6725]

Bolt 3 - Shear Force (kips): [0.041447 ; 0.0072504 ; 0.023859 ; 0.060792 ; 0.1203 ; 0.16919 ; 0.21009 ; 0.25858 ; 0.32297 ; 0.41273 ; 0.53508 ; 0.67425 ; 0.72391 ; 0.79542 ; 0.89202 ; 0.99608 ; 1.0816 ; 1.1653 ; 1.2073 ; 1.8393 ; 3.3774 ; 3.8307 ; 4.3326 ; 4.8793 ; 5.0747 ; 5.2937 ; 5.5259 ; 5.7874 ; 5.8724 ; 5.8998 ; 5.9376 ; 5.9853 ; 5.9908 ; 5.7116 ; 5.5574 ; 5.2773 ; 4.951 ; 4.731 ; 4.6987 ; 4.6076 ; 4.4547 ; 4.288 ; 4.1621 ; 4.1099 ; 4.054 ; 4.0544 ; 3.7197 ; 3.4982 ; 3.4919]

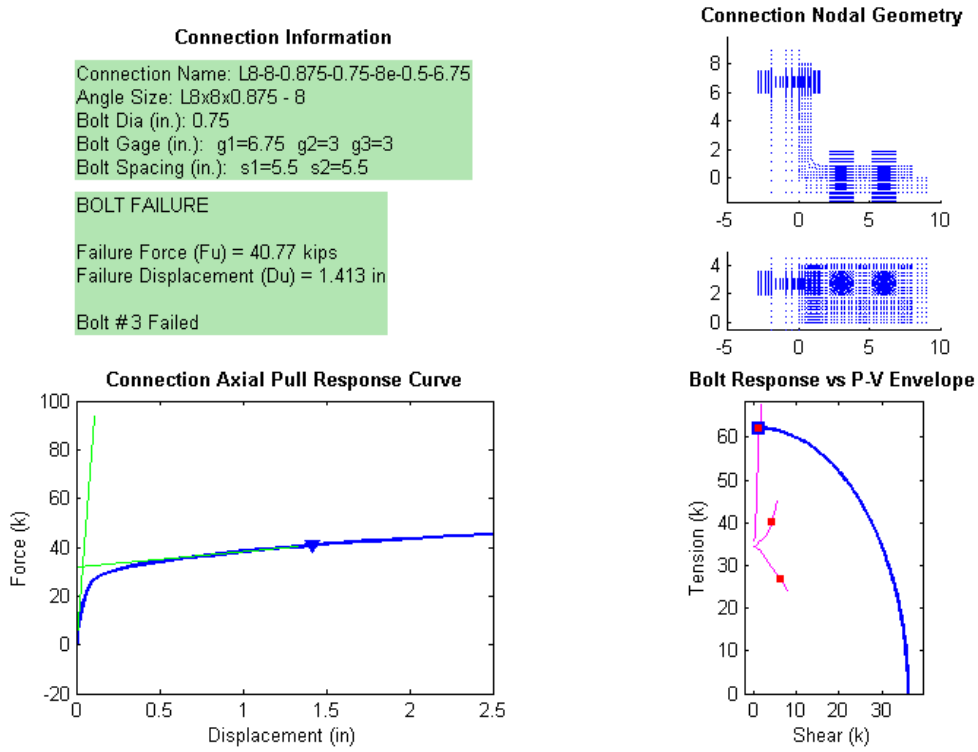


Figure B.360 Connection L8_8_0.875_0.75_8e_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.75_8e_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 840.6139

Plastic Stiffness (k/in): 6.1888

Displacement (in): [3.1415e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.50487 ; 0.56737 ; 0.66112 ; 0.80174 ; 1.0127 ; 1.2627 ; 1.3252 ; 1.4189 ; 1.5596 ; 1.7705 ; 2.0205 ; 2.2705 ; 2.5]

Force (kips): [-0.77747 ; 0.312112 ; 0.864354 ; 1.64631 ; 2.71582 ; 4.15803 ; 6.06564 ; 8.42128 ; 10.885 ; 13.054 ; 14.3038 ; 15.1964 ; 16.1302 ; 17.0998 ; 17.389 ; 17.783 ; 18.3373 ; 19.1078 ; 19.931 ; 20.1244 ; 20.4061 ; 20.7853 ; 21.2836 ; 21.7928 ; 22.2541 ; 22.6309]

Bolt 1 - Tensile Force (kips): [34.6497 ; 34.6176 ; 34.5997 ; 34.5735 ; 34.5363 ; 34.4824 ; 34.3999 ; 34.2814 ; 34.1343 ; 33.9835 ; 33.8958 ; 33.8489 ; 33.6421 ; 32.7305 ; 32.2777 ; 31.5728 ; 30.6131 ; 29.3038 ; 27.8402 ; 27.4978 ; 26.9968 ; 26.3028 ; 25.3994 ; 24.6067 ; 24.191 ; 24.2927]

Bolt 1 - Shear Force (kips): [0.038313 ; 0.037772 ; 0.060531 ; 0.098013 ; 0.1531 ; 0.23194 ; 0.34184 ; 0.49006 ; 0.66602 ; 0.84208 ; 0.94457 ; 1.0105 ; 1.2308 ; 1.9966 ; 2.3457 ; 2.8696 ; 3.5575 ; 4.4685 ; 5.4631 ; 5.6933 ; 6.0249 ; 6.4786 ; 7.0682 ; 7.6061 ; 7.9473 ; 7.9988]

Bolt 2 - Tensile Force (kips): [34.6531 ; 34.6311 ; 34.617 ; 34.5928 ; 34.5622 ; 34.5331 ; 34.5166 ; 34.5514 ; 34.6872 ; 34.9242 ; 35.0857 ; 35.1889 ; 35.3721 ; 35.8101 ; 36.0232 ; 36.372 ; 36.9661 ; 38.1117 ; 39.5672 ; 39.9228 ; 40.4338 ; 41.1614 ; 42.178 ; 43.256 ; 44.2563 ; 45.0784]

Bolt 2 - Shear Force (kips): [0.047928 ; 0.036372 ; 0.053004 ; 0.085963 ; 0.13603 ; 0.20805 ; 0.30831 ; 0.43915 ; 0.58848 ; 0.7282 ; 0.81261 ; 0.87016 ; 1.0437 ; 1.663 ; 1.9393 ; 2.3444 ; 2.8434 ; 3.4168 ; 3.9585 ; 4.0747 ; 4.2385 ; 4.4553 ; 4.7302 ; 4.9882 ; 5.1979 ; 5.37]

Bolt 3 - Tensile Force (kips): [36 ; 35.9589 ; 35.9258 ; 35.8971 ; 35.9035 ; 36.0307 ; 36.4073 ; 37.203 ; 38.6408 ; 40.6305 ; 43.7203 ; 47.2024 ; 50.4641 ; 53.4604 ; 54.2886 ; 55.3687 ; 56.8729 ; 58.9194 ; 61.1087 ; 61.6134 ; 62.3597 ; 63.3208 ; 64.5097 ; 65.8065 ; 66.9863 ; 67.8826]

Bolt 3 - Shear Force (kips): [0.040403 ; 0.01897 ; 0.0083754 ; 0.017512 ; 0.043047 ; 0.086458 ; 0.14617 ; 0.20855 ; 0.27549 ; 0.3814 ; 0.5406 ; 0.68893 ; 0.75553 ; 0.83569 ; 0.87039 ; 0.9089 ; 0.93944 ; 0.96145 ; 0.9781 ; 0.98701 ; 1.041 ; 1.2214 ; 1.5458 ; 1.8356 ; 1.577 ; 1.6564]

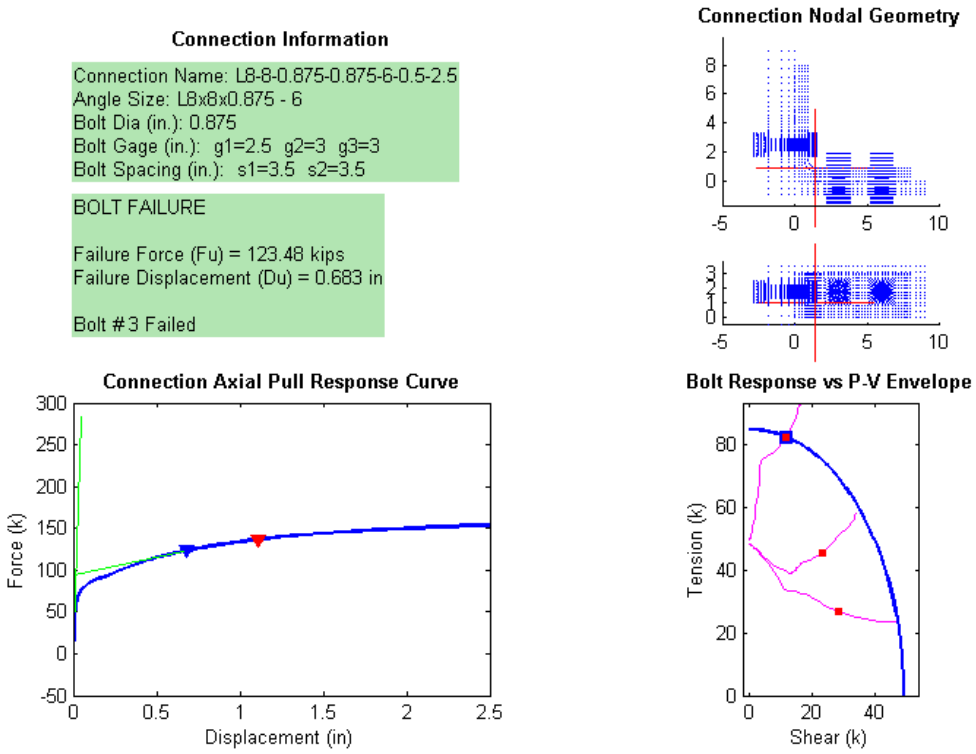


Figure B.361 Connection L8_8_0.875_0.875_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.875_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 6.2819e+003

Plastic Stiffness (k/in): 44.0966

Displacement (in): [4.5977e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.014526 ; 0.016174 ; 0.018646 ; 0.022354 ; 0.027916 ; 0.036259 ; 0.048773 ; 0.067544 ; 0.095701 ; 0.13794 ; 0.15377 ; 0.15971 ; 0.16194 ; 0.16528 ; 0.16653 ; 0.16841 ; 0.17123 ; 0.17546 ; 0.17705 ; 0.17943 ; 0.18299 ; 0.18834 ; 0.19637 ; 0.19712 ; 0.19825 ; 0.19995 ; 0.20249 ; 0.2063 ; 0.21201 ; 0.22058 ; 0.23344 ; 0.25273 ; 0.25996 ; 0.27081 ; 0.28708 ; 0.31149 ; 0.32065 ; 0.33437 ; 0.35497 ; 0.38587 ; 0.43221 ; 0.44958 ; 0.47565 ; 0.51475 ; 0.5734 ; 0.66138 ; 0.69437 ; 0.74385 ; 0.76241 ; 0.79024 ; 0.832 ; 0.89463 ; 0.98857 ; 1.0238 ; 1.0767 ; 1.1559 ; 1.2748 ; 1.3194 ; 1.3863 ; 1.4866 ; 1.6371 ; 1.6935 ; 1.7782 ; 1.8099 ; 1.8575 ; 1.9289 ; 2.0361 ; 2.1968 ; 2.4378 ; 2.5]

Force (kips): [-1.50214 ; 5.63773 ; 10.7671 ; 16.7833 ; 23.3832 ; 25.2114 ; 26.8443 ; 28.3029 ; 30.1893 ; 32.2519 ; 34.075 ; 35.8923 ; 37.9038 ; 39.8218 ; 41.9727 ; 44.4263 ; 45.057 ; 45.1629 ; 45.1705 ; 45.164 ; 45.16 ; 45.2703 ; 45.4229 ; 45.6006 ; 45.6031 ; 45.6767 ; 45.8471 ; 46.0284 ; 46.0358 ; 46.0346 ; 46.0717 ; 46.1721 ; 46.3188 ; 46.5359 ; 46.8351 ; 47.2674 ; 47.8833 ; 48.7501 ; 49.0556 ; 49.5431 ; 50.2415 ; 51.1971 ; 51.5424 ; 52.0776 ; 52.8437 ; 53.9601 ; 55.4517 ; 55.9993 ; 56.7795 ; 57.8583 ; 59.3588 ; 61.2985 ; 61.9597 ; 62.8827 ; 63.2152 ; 63.7356 ; 64.4676 ; 65.4805 ; 66.8163 ; 67.2753 ; 67.9309 ; 68.8318 ; 70.0331 ; 70.4544 ; 71.0687 ; 71.8962 ; 72.9277 ; 73.2816 ; 73.7692 ; 73.9427 ; 74.1971 ; 74.5568 ; 75.0526 ; 75.7162 ; 76.5582 ; 76.7553]

Bolt 1 - Tensile Force (kips): [48.4029 ; 48.1791 ; 47.9973 ; 47.7677 ; 47.4862 ; 47.3999 ; 47.3178 ; 47.2374 ; 47.1188 ; 46.8114 ; 45.928 ; 44.2013 ; 42.0079 ; 39.5937 ; 36.8527 ; 34.0305 ; 33.9882 ; 33.9724 ; 33.9666 ; 33.9593 ; 33.9568 ; 33.9192 ; 33.8352 ; 33.7186 ; 33.7062 ; 33.6978 ; 33.69 ; 33.6803 ; 33.6728 ; 33.6723 ; 33.6694 ; 33.6523 ; 33.6282 ; 33.6039 ; 33.5807 ; 33.5401 ; 33.4841 ; 33.341 ; 33.2723 ; 33.1381 ; 32.9132 ; 32.6344 ; 32.4776 ; 32.2798 ; 32.0445 ; 31.4958 ; 30.6105 ; 30.2051 ; 29.6209 ; 28.9079 ; 27.881 ; 26.9298 ; 26.6753 ; 26.3211 ; 26.1871 ; 26.0229 ; 25.8179 ; 25.6171 ; 25.1802 ; 25.0022 ; 24.7301 ; 24.4212 ; 24.065 ; 23.9612 ; 23.8517 ; 23.7602 ; 23.7087 ; 23.6857 ; 23.6736 ; 23.6698 ; 23.6671 ; 23.6505 ; 23.6276 ; 23.5866 ; 23.5703 ; 23.6151]

Bolt 1 - Shear Force (kips): [0.0819752 ; 0.237888 ; 0.455428 ; 0.722461 ; 1.03206 ; 1.12213 ; 1.20606 ; 1.28665 ; 1.40498 ; 1.71903 ; 2.56913 ; 4.06606 ; 5.81148 ; 7.58707 ; 9.46086 ; 11.2184 ; 11.2144 ; 11.2105 ; 11.2088 ; 11.2065 ; 11.2057 ; 11.2856 ; 11.4145 ; 11.5665 ; 11.5733 ; 11.5746 ; 11.5732 ; 11.5712 ; 11.5681 ; 11.5678 ; 11.5855 ; 11.7089 ; 11.8798 ; 12.0526 ; 12.2071 ; 12.4757 ; 12.8215 ; 13.5824 ; 13.8011 ; 14.4162 ; 15.4305 ; 16.7305 ; 17.2362 ; 17.7965 ; 18.4275 ; 19.5097 ; 20.9751 ; 21.6605 ; 22.6283 ; 23.8294 ; 25.782 ; 28.0366 ; 28.6971 ; 29.6529 ; 30.0248 ; 30.5517 ; 31.3166 ; 32.3017 ; 34.0256 ; 34.6941 ; 35.7155 ; 37.0199 ; 38.448 ; 38.856 ; 39.4878 ; 40.3384 ; 41.5051 ; 41.9391 ; 42.5779 ; 42.8022 ; 43.1262 ; 43.6196 ; 44.3147 ; 45.2108 ; 46.1442 ; 46.3404]

Bolt 2 - Tensile Force (kips): [48.4044 ; 48.128 ; 47.8988 ; 47.6273 ; 47.3192 ; 47.2372 ; 47.1621 ; 47.0918 ; 46.9922 ; 46.7222 ; 45.9111 ; 44.3229 ; 42.484 ; 41.0789 ; 40.5668 ; 39.9565 ; 38.9993 ; 38.7756 ; 38.7328 ; 38.6953 ; 38.6854 ; 38.7651 ; 38.8641 ; 38.9754 ; 38.9714 ; 38.9691 ; 38.9731 ; 39.0001 ; 38.984 ; 38.9818 ; 39.0161 ; 39.094 ; 39.2077 ; 39.3229 ; 39.487 ; 39.7498 ; 40.1112 ; 40.7099 ; 40.9122 ; 41.1735 ; 41.5428 ; 41.9912 ; 42.1602 ; 42.3719 ; 42.5747 ; 42.7975 ; 43.2777 ; 43.3861 ; 43.565 ; 43.9006 ; 44.445 ; 45.2526 ; 45.5747 ; 46.0633 ; 46.2568 ; 46.5871 ; 47.0857 ; 47.7246 ; 48.5954 ; 48.9176 ; 49.432 ; 50.1914 ; 51.1508 ; 51.4603 ; 51.9154 ; 52.5635 ; 53.5464 ; 53.8914 ; 54.3777 ; 54.5616 ; 54.8321 ; 55.2034 ; 55.7806 ; 56.6273 ; 57.8234 ; 58.1138]

Bolt 2 - Shear Force (kips): [0.0621497 ; 0.325003 ; 0.598281 ; 0.933843 ; 1.3199 ; 1.43225 ; 1.53723 ; 1.63858 ; 1.78674 ; 2.13084 ; 2.97182 ; 4.46081 ; 6.18026 ; 7.87064 ; 9.49097 ; 11.5154 ; 12.5283 ; 12.7247 ; 12.7507 ; 12.7606 ; 12.7612 ; 12.7868 ; 12.8186 ; 12.8567 ; 12.8579 ; 12.9401 ; 13.1281 ; 13.3192 ; 13.3379 ; 13.3378 ; 13.3486 ; 13.372 ; 13.4062 ; 13.5858 ; 13.8343 ; 14.1383 ; 14.5854 ; 15.0172 ; 15.2106 ; 15.5205 ; 15.838 ; 16.268 ; 16.4189 ; 16.6793 ; 17.2776 ; 18.1565 ; 19.0652 ; 19.4644 ; 19.9905 ; 20.6559 ; 21.5128 ; 22.7961 ; 23.2566 ; 23.8811 ; 24.0868 ; 24.3695 ; 24.7508 ; 25.4205 ; 26.251 ; 26.5437 ; 26.8964 ; 27.3717 ; 28.2311 ; 28.614 ; 29.1662 ; 29.9838 ; 31.0173 ; 31.3758 ; 31.8529 ; 32.0181 ; 32.2566 ; 32.571 ; 32.8694 ; 33.2551 ; 33.6815 ; 33.7866]

Bolt 3 - Tensile Force (kips): [50 ; 49.9263 ; 49.9752 ; 50.2032 ; 50.8689 ; 51.2045 ; 51.5385 ; 51.8623 ; 52.3127 ; 52.8732 ; 53.4828 ; 54.2096 ; 55.3737 ; 57.1176 ; 59.6209 ; 62.5666 ; 63.3462 ; 63.4829 ; 63.4949 ; 63.493 ; 63.4902 ; 63.6122 ; 63.7888 ; 63.995 ; 63.9982 ; 64.0843 ; 64.2835 ; 64.4942 ; 64.5016 ; 64.5005 ; 64.5424 ; 64.6499 ; 64.809 ; 65.0459 ; 65.386 ; 65.882 ; 66.5969 ; 67.6234 ; 67.9915 ; 68.5494 ; 69.3572 ; 70.4926 ; 70.8935 ; 71.4575 ; 72.2386 ; 73.2614 ; 74.7145 ; 75.2643 ; 76.0679 ; 77.2722 ; 79.3009 ; 81.8707 ; 82.7014 ; 83.9046 ; 84.338 ; 85.0378 ; 85.9972 ; 87.2859 ; 88.827 ; 89.347 ; 90.0918 ; 91.096 ; 92.4001 ; 92.8503 ; 93.4732 ; 94.1837 ; 94.8517 ; 94.9766 ; 95.1993 ; 95.2811 ; 95.4376 ; 95.5781 ; 95.6852 ; 95.9525 ; 96.2875 ; 96.3718]

Bolt 3 - Shear Force (kips): [0.0183144 ; 0.0714425 ; 0.1515 ; 0.263596 ; 0.421232 ; 0.475658 ; 0.526893 ; 0.574523 ; 0.642742 ; 0.733891 ; 0.837726 ; 0.964522 ; 1.17649 ; 1.49228 ; 1.91899 ; 2.35573 ; 2.45901 ; 2.47652 ; 2.47799 ; 2.47708 ; 2.47757 ; 2.49351 ; 2.51684 ; 2.54409 ; 2.54458 ; 2.55609 ; 2.58247 ; 2.61039 ; 2.61219 ; 2.61214 ; 2.61762 ; 2.63024 ; 2.64881 ; 2.67589 ; 2.71594 ; 2.77322 ; 2.85445 ; 2.9594 ; 2.99411 ; 3.03783 ; 3.09246 ; 3.15735 ; 3.17848 ; 3.21958 ; 3.27676 ; 3.35263 ; 3.42382 ; 4.13468 ; 5.4178 ; 7.13347 ; 9.41188 ; 11.2195 ; 11.832 ; 12.4165 ; 12.601 ; 12.997 ; 13.5504 ; 14.2093 ; 14.7814 ; 14.953 ; 15.1792 ; 15.465 ; 15.8553 ; 15.9839 ; 15.8576 ; 15.8919 ; 15.9142 ; 15.6889 ; 15.5412 ; 15.5154 ; 15.4512 ; 15.3449 ; 15.1879 ; 15.0941 ; 15.0881 ; 15.0756]

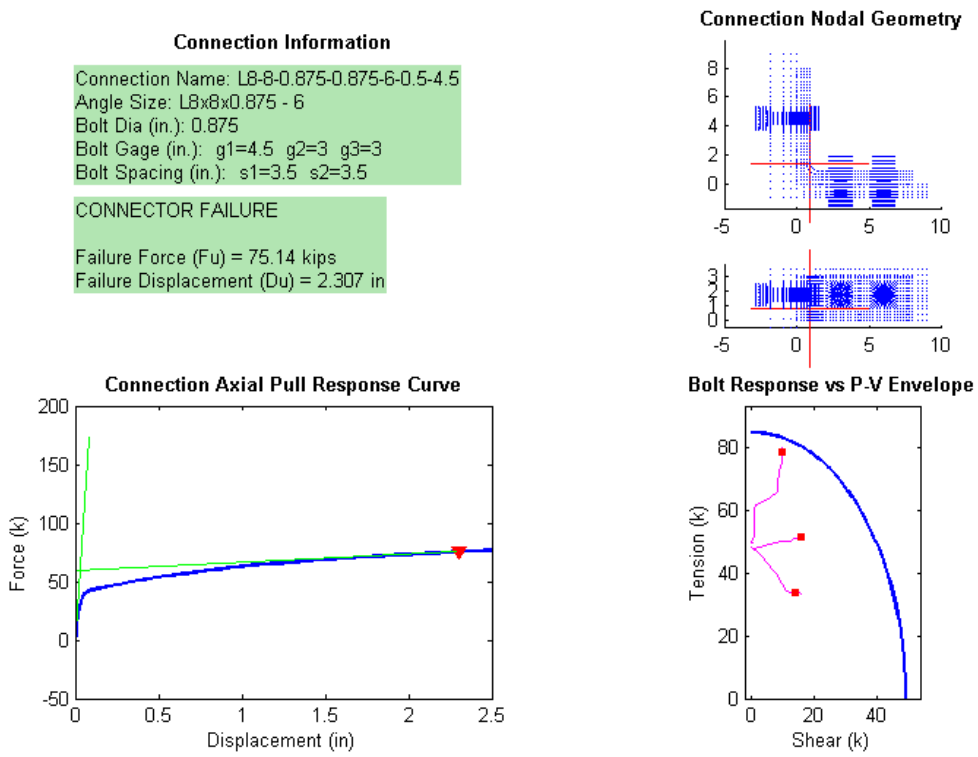


Figure B.362 Connection L8_8_0.875_0.875_6_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.875_6_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.1441e+003

Plastic Stiffness (k/in): 6.6005

Displacement (in): [4.5799e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.34102 ; 0.39447 ; 0.41452 ; 0.44458 ; 0.48969 ; 0.55734 ; 0.65882 ; 0.81103 ; 0.86812 ; 0.95374 ; 1.0822 ; 1.1303 ; 1.2026 ; 1.311 ; 1.4735 ; 1.5345 ; 1.5573 ; 1.5916 ; 1.643 ; 1.7202 ; 1.8359 ; 1.8793 ; 1.9444 ; 1.9688 ; 2.0054 ; 2.0603 ; 2.1427 ; 2.1736 ; 2.2199 ; 2.2895 ; 2.3937 ; 2.5]

Force (kips): [-1.4801 ; 1.11001 ; 2.70758 ; 4.78736 ; 7.44708 ; 10.8072 ; 14.4766 ; 15.5196 ; 16.8274 ; 18.2819 ; 19.7322 ; 20.7339 ; 21.3942 ; 22.0722 ; 23.0403 ; 24.3574 ; 24.8243 ; 25.482 ; 25.7168 ; 26.102 ; 26.6228 ; 27.361 ; 28.3754 ; 29.7479 ; 30.2683 ; 30.9876 ; 31.9215 ; 32.238 ; 32.6801 ; 33.3015 ; 34.1571 ; 34.4617 ; 34.5793 ; 34.7512 ; 34.9936 ; 35.3392 ; 35.8272 ; 36.0085 ; 36.2683 ; 36.3604 ; 36.5104 ; 36.7252 ; 37.0177 ; 37.1258 ; 37.2851 ; 37.5145 ; 37.8515 ; 38.1767]

Bolt 1 - Tensile Force (kips): [48.3998 ; 48.3227 ; 48.2717 ; 48.2013 ; 48.1031 ; 47.9659 ; 47.797 ; 47.744 ; 47.6723 ; 47.5827 ; 47.4779 ; 47.3792 ; 47.2919 ; 47.1586 ; 46.4228 ; 44.9341 ; 44.372 ; 43.5541 ; 43.2551 ; 42.7895 ; 42.1374 ; 41.1743 ; 39.7095 ; 37.4327 ; 36.5596 ; 35.3613 ; 34.2163 ; 34.2002 ; 34.1874 ; 34.1787 ; 34.1749 ; 34.1744 ; 34.1116 ; 34.1029 ; 34.0965 ; 34.0946 ; 34.0957 ; 34.1007 ; 34.108 ; 34.1104 ; 34.0483 ; 33.9938 ; 33.9499 ; 33.918 ; 33.8792 ; 33.8116 ; 33.6113 ; 33.4086]

Bolt 1 - Shear Force (kips): [0.0799499 ; 0.0665044 ; 0.125481 ; 0.214981 ; 0.337567 ; 0.504119 ; 0.705957 ; 0.768763 ; 0.85178 ; 0.953314 ; 1.07032 ; 1.18025 ; 1.2789 ; 1.42837 ; 2.18365 ; 3.5293 ; 4.01013 ; 4.68827 ; 4.93024 ; 5.30093 ; 5.81131 ; 6.54651 ; 7.62193 ; 9.21449 ; 9.78886 ; 10.5549 ; 11.2692 ; 11.2764 ; 11.2786 ; 11.2781 ; 11.2775 ; 11.2774 ; 11.4201 ; 11.424 ; 11.4202 ; 11.4081 ; 11.3861 ; 11.379 ; 11.3682 ; 11.364 ; 11.8189 ; 12.2778 ; 12.6452 ; 12.8995 ; 13.2534 ; 13.6066 ; 14.7252 ; 15.7677]

Bolt 2 - Tensile Force (kips): [48.391 ; 48.3076 ; 48.2426 ; 48.1546 ; 48.0493 ; 47.9318 ; 47.8473 ; 47.8326 ; 47.8232 ; 47.838 ; 47.8832 ; 47.977 ; 48.076 ; 48.2136 ; 48.3648 ; 48.6803 ; 48.8021 ; 48.9928 ; 49.0577 ; 49.1392 ; 49.2531 ; 49.417 ; 49.6451 ; 49.904 ; 49.9477 ; 49.9661 ; 49.9783 ; 49.9817 ; 49.9927 ; 50.0533 ; 50.2417 ; 50.3335 ; 50.3653 ; 50.4206 ; 50.5085 ; 50.6459 ; 50.8704 ; 50.9034 ; 51.0233 ; 51.0794 ; 51.1592 ; 51.2575 ; 51.4723 ; 51.5491 ; 51.6316 ; 51.7164 ; 51.8709 ; 52.0516]

Bolt 2 - Shear Force (kips): [0.0605617 ; 0.102055 ; 0.193029 ; 0.317207 ; 0.483334 ; 0.707025 ; 0.969881 ; 1.04984 ; 1.15556 ; 1.28531 ; 1.43802 ; 1.58853 ; 1.72578 ; 1.92529 ; 2.66718 ; 3.88355 ; 4.30528 ; 4.88644 ; 5.09185 ; 5.40419 ; 5.82706 ; 6.42516 ; 7.2637 ; 8.40138 ; 8.81272 ; 9.38847 ; 10.1858 ; 10.4854 ; 10.9092 ; 11.4885 ; 12.2359 ; 12.4902 ; 12.5669 ; 12.7023 ; 12.8966 ; 13.1712 ; 13.5575 ; 13.8864 ; 14.2686 ; 14.3868 ; 14.4746 ; 14.7116 ; 15.022 ; 15.1056 ; 15.2717 ; 15.7102 ; 16.0165 ; 16.3381]

Bolt 3 - Tensile Force (kips): [50 ; 49.898 ; 49.8335 ; 49.807 ; 49.8776 ; 50.0817 ; 50.5171 ; 50.7243 ; 51.104 ; 51.6178 ; 52.2006 ; 52.8243 ; 53.6567 ; 54.7352 ; 56.2158 ; 58.333 ; 59.1107 ; 60.2529 ; 60.6663 ; 61.1629 ; 61.8059 ; 62.6214 ; 63.9372 ; 66.0612 ; 66.8567 ; 67.8837 ; 69.3329 ; 69.7703 ; 70.3295 ; 71.1379 ; 72.4626 ; 72.9575 ; 73.1531 ; 73.4452 ; 73.8631 ; 74.4593 ; 75.3455 ; 75.6908 ; 76.2317 ; 76.4281 ; 76.7149 ; 77.1235 ; 77.7009 ; 77.9068 ; 78.2017 ; 78.6373 ; 79.252 ; 79.8822]

Bolt 3 - Shear Force (kips): [0.043772 ; 0.013137 ; 0.043189 ; 0.093275 ; 0.16587 ; 0.26624 ; 0.39973 ; 0.44212 ; 0.502 ; 0.57787 ; 0.67801 ; 0.76864 ; 0.75113 ; 0.71662 ; 0.72402 ; 0.84236 ; 0.89741 ; 0.98254 ; 1.0143 ; 1.1353 ; 1.3467 ; 3.4226 ; 6.0002 ; 8.0647 ; 8.3241 ; 8.3358 ; 8.3599 ; 8.3744 ; 8.4514 ; 8.5767 ; 8.7018 ; 8.8963 ; 8.9937 ; 9.0169 ; 9.0879 ; 9.209 ; 9.4376 ; 9.4922 ; 9.459 ; 9.4522 ; 9.4439 ; 9.4583 ; 9.4894 ; 9.4997 ; 9.505 ; 9.5018 ; 9.478 ; 9.523]

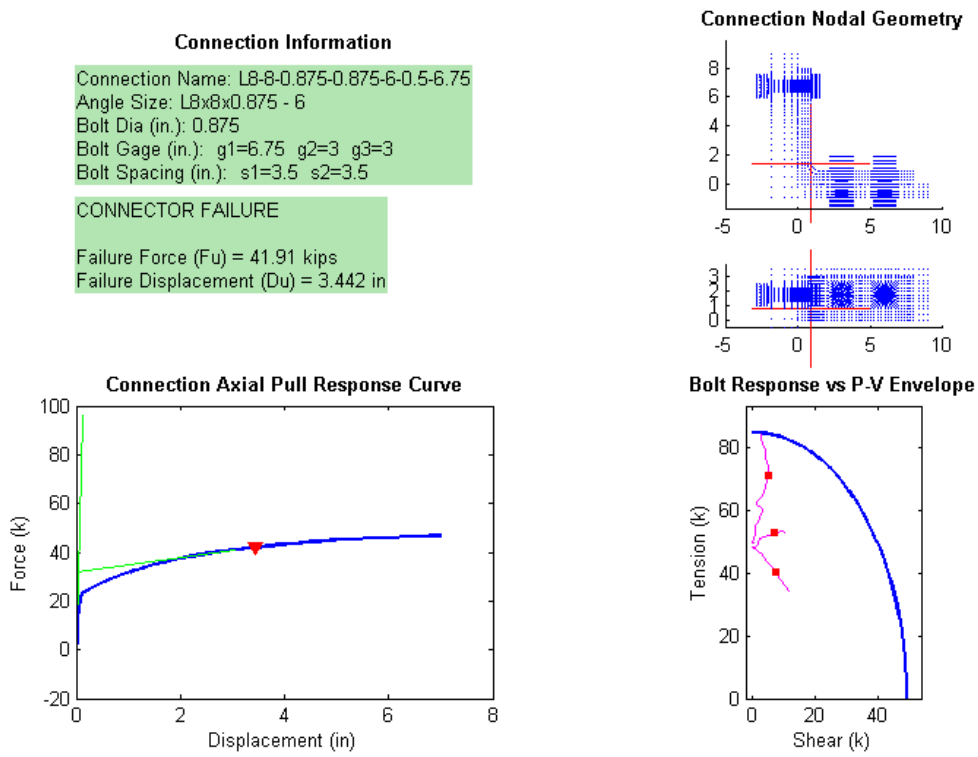


Figure B.363 Connection L8_8_0.875_0.875_6_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.875_6_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 697.3367

Plastic Stiffness (k/in): 3.0689

Displacement (in): [5.7139e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.41501 ; 0.62524 ; 0.63017 ; 0.63756 ; 0.64865 ; 0.66528 ; 0.69022 ; 0.72764 ; 0.78377 ; 0.86796 ; 0.99424 ; 1.0416 ; 1.1126 ; 1.1393 ; 1.1792 ; 1.2392 ; 1.2616 ; 1.2954 ; 1.3459 ; 1.4218 ; 1.5356 ; 1.7062 ; 1.7703 ; 1.8663 ; 2.0103 ; 2.2263 ; 2.5503 ; 3.0363 ; 3.7363 ; 3.9113 ; 4.1738 ; 4.5676 ; 5.1582 ; 5.8582 ; 6.5582 ; 7]

Force (kips): [-1.42425 ; 1.11962 ; 2.38931 ; 4.08023 ; 6.2816 ; 8.73392 ; 10.6829 ; 11.5151 ; 11.9288 ; 12.5153 ; 13.3449 ; 14.3575 ; 14.3793 ; 14.412 ; 14.4642 ; 14.5413 ; 14.6526 ; 14.811 ; 15.0355 ; 15.3529 ; 15.7886 ; 15.9435 ; 16.1657 ; 16.2609 ; 16.3973 ; 16.5976 ; 16.6789 ; 16.7977 ; 16.9647 ; 17.2009 ; 17.5246 ; 17.9659 ; 18.1224 ; 18.3488 ; 18.6724 ; 19.1153 ; 19.7095 ; 20.4553 ; 21.3148 ; 21.5201 ; 21.7924 ; 22.1411 ; 22.5638 ; 22.945 ; 23.236 ; 23.3815]

Bolt 1 - Tensile Force (kips): [48.4003 ; 48.3242 ; 48.2821 ; 48.2215 ; 48.133 ; 48.016 ; 47.9055 ; 47.8539 ; 47.8333 ; 47.8006 ; 47.7316 ; 47.5865 ; 47.5829 ; 47.5774 ; 47.5685 ; 47.5554 ; 47.5364 ; 47.509 ; 47.4699 ; 47.4176 ; 47.3477 ; 47.3214 ; 47.2877 ; 47.2723 ; 47.247 ; 47.2008 ; 47.1774 ; 47.1358 ; 47.0367 ; 46.7871 ; 46.4062 ; 45.7695 ; 45.5237 ; 45.1625 ; 44.6306 ; 43.859 ; 42.7408 ; 41.2271 ; 39.3569 ; 38.8705 ; 38.2009 ; 37.2928 ; 36.1179 ; 35.0615 ; 34.5014 ; 34.5144]

Bolt 1 - Shear Force (kips): [0.0785678 ; 0.0693283 ; 0.118842 ; 0.196595 ; 0.309632 ; 0.454117 ; 0.590856 ; 0.658204 ; 0.691596 ; 0.743528 ; 0.843299 ; 1.03257 ; 1.03714 ; 1.04404 ; 1.05496 ; 1.071 ; 1.0941 ; 1.12729 ; 1.17396 ; 1.23566 ; 1.31857 ; 1.34949 ; 1.38976 ; 1.4075 ; 1.43633 ; 1.48797 ; 1.51348 ; 1.55855 ; 1.66452 ; 1.92424 ; 2.3004 ; 2.8898 ; 3.11045 ; 3.43036 ; 3.89273 ; 4.54399 ; 5.45163 ; 6.63279 ; 8.02519 ; 8.37596 ; 8.8522 ; 9.48392 ; 10.2727 ; 10.9706 ; 11.358 ; 11.3704]

Bolt 2 - Tensile Force (kips): [48.3934 ; 48.3129 ; 48.2587 ; 48.1961 ; 48.1295 ; 48.1058 ; 48.1403 ; 48.1783 ; 48.1969 ; 48.2339 ; 48.335 ; 48.6087 ; 48.6165 ; 48.6282 ; 48.6469 ; 48.6777 ; 48.7283 ; 48.8093 ; 48.9512 ; 49.2052 ; 49.6212 ; 49.783 ; 50.0367 ; 50.1374 ; 50.2837 ; 50.4938 ; 50.5691 ; 50.6768 ; 50.8096 ; 50.938 ; 51.1125 ; 51.3458 ; 51.4278 ; 51.5448 ; 51.7119 ; 51.9442 ; 52.2482 ; 52.6145 ; 52.9981 ; 53.0401 ; 53.0927 ; 53.1675 ; 53.2112 ; 53.2134 ; 53.2018 ; 53.167]

Bolt 2 - Shear Force (kips): [0.0592946 ; 0.111783 ; 0.19407 ; 0.310302 ; 0.471938 ; 0.66999 ; 0.847859 ; 0.932271 ; 0.971984 ; 1.03756 ; 1.16678 ; 1.42453 ; 1.43064 ; 1.43988 ; 1.45424 ; 1.47522 ; 1.50541 ; 1.54877 ; 1.60951 ; 1.68761 ; 1.78728 ; 1.82227 ; 1.86716 ; 1.88623 ; 1.91672 ; 1.96923 ; 1.99426 ; 2.03717 ; 2.13289 ; 2.35994 ; 2.69016 ; 3.205 ; 3.39639 ; 3.6721 ; 4.06647 ; 4.61277 ; 5.35491 ; 6.2611 ; 7.21777 ; 7.45479 ; 7.77651 ; 8.19524 ; 8.74531 ; 9.28412 ; 9.74044 ; 10.0053]

Bolt 3 - Tensile Force (kips): [50 ; 49.863 ; 49.7875 ; 49.7903 ; 49.9021 ; 50.1326 ; 50.6501 ; 51.1876 ; 51.7112 ; 52.3295 ; 53.4128 ; 55.1708 ; 55.2108 ; 55.2721 ; 55.3746 ; 55.5387 ; 55.8118 ; 56.2136 ; 56.7928 ; 57.6462 ; 58.9411 ; 59.4355 ; 60.1513 ; 60.4083 ; 60.7181 ; 61.108 ; 61.2493 ; 61.4395 ; 61.7128 ; 62.1093 ; 62.5865 ; 63.2741 ; 63.5254 ; 63.9443 ; 64.6763 ; 65.7987 ; 67.4284 ; 69.6598 ; 72.5622 ; 73.7546 ; 75.2604 ; 77.1048 ; 79.2417 ; 81.3353 ; 83.0958 ; 84.1701]

Bolt 3 - Shear Force (kips): [0.040946 ; 0.020882 ; 0.056191 ; 0.11531 ; 0.19834 ; 0.29506 ; 0.35802 ; 0.43243 ; 0.51636 ; 0.63892 ; 0.64676 ; 0.59186 ; 0.59132 ; 0.59916 ; 0.79036 ; 1.0952 ; 1.4065 ; 1.6829 ; 1.9127 ; 2.2722 ; 2.8476 ; 3.0685 ; 3.2814 ; 3.1398 ; 2.8346 ; 2.3527 ; 2.0945 ; 1.7247 ; 1.2717 ; 1.1679 ; 1.1776 ; 1.8921 ; 2.2799 ; 2.6678 ; 3.0366 ; 3.5742 ; 4.232 ; 4.6792 ; 5.1792 ; 4.8584 ; 4.5482 ; 4.2219 ; 3.8736 ; 3.3026 ; 2.7443 ; 2.4873]

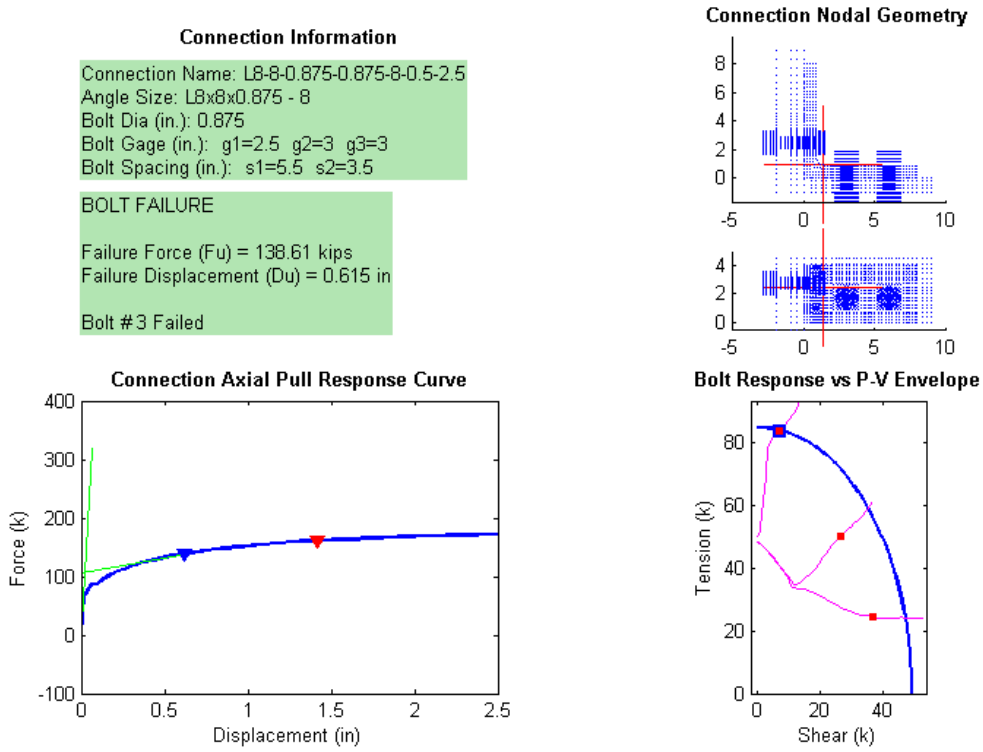


Figure B.364 Connection L8_8_0.875_0.875_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.875_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 4.7994e+003

Plastic Stiffness (k/in): 51.6821

Displacement (in): [3.8445e-036 ; 0.0078125 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.021484 ; 0.025879 ; 0.032471 ; 0.042358 ; 0.05719 ; 0.062752 ; 0.071095 ; 0.074223 ; 0.078916 ; 0.085955 ; 0.088595 ; 0.089585 ; 0.091069 ; 0.093297 ; 0.096638 ; 0.10165 ; 0.10917 ; 0.11199 ; 0.11621 ; 0.1178 ; 0.12018 ; 0.12374 ; 0.1291 ; 0.13712 ; 0.14916 ; 0.16723 ; 0.174 ; 0.17654 ; 0.18035 ; 0.18606 ; 0.19463 ; 0.20749 ; 0.22678 ; 0.25571 ; 0.2991 ; 0.31538 ; 0.33979 ; 0.3764 ; 0.43133 ; 0.51371 ; 0.5446 ; 0.59094 ; 0.66045 ; 0.76472 ; 0.80382 ; 0.86247 ; 0.95045 ; 1.0824 ; 1.2804 ; 1.3429 ; 1.4366 ; 1.5772 ; 1.7882 ; 1.8507 ; 1.9444 ; 2.085 ; 2.296 ; 2.347 ; 2.4235 ; 2.5]

Force (kips): [-1.27877 ; 18.9255 ; 22.1558 ; 26.0803 ; 30.5977 ; 33.3707 ; 34.8036 ; 36.657 ; 39.0526 ; 41.9449 ; 42.7851 ; 43.6884 ; 43.7095 ; 43.7032 ; 43.6826 ; 43.6749 ; 43.739 ; 43.9666 ; 44.2661 ; 44.2962 ; 44.2885 ; 44.3803 ; 44.8932 ; 45.5331 ; 45.7482 ; 46.0764 ; 46.54 ; 47.109 ; 48.0015 ; 49.1577 ; 50.8241 ; 51.4083 ; 51.6227 ; 51.9311 ; 52.3679 ; 52.9701 ; 53.8146 ; 55.0089 ; 56.6272 ; 58.7637 ; 59.532 ; 60.5757 ; 62.014 ; 64.061 ; 66.6716 ; 67.543 ; 68.7405 ; 70.3505 ; 72.449 ; 73.1685 ; 74.1604 ; 75.5101 ; 77.285 ; 79.4379 ; 80.0097 ; 80.7605 ; 81.732 ; 82.988 ; 83.3287 ; 83.8041 ; 84.4637 ; 85.3286 ; 85.5191 ; 85.7867 ; 86.02]

Bolt 1 - Tensile Force (kips): [48.4043 ; 47.6291 ; 47.4768 ; 47.275 ; 47.0081 ; 46.4444 ; 45.3342 ; 43.518 ; 40.7851 ; 36.8889 ; 35.5211 ; 34.0362 ; 34.0082 ; 33.9849 ; 33.964 ; 33.9574 ; 33.9196 ; 33.787 ; 33.7088 ; 33.6864 ; 33.6718 ; 33.6534 ; 33.6105 ; 33.5762 ; 33.558 ; 33.5233 ; 33.497 ; 33.473 ; 33.3365 ; 33.135 ; 32.7788 ; 32.6539 ; 32.5832 ; 32.4776 ; 32.3344 ; 32.1586 ; 31.8495 ; 31.0508 ; 29.872 ; 28.1437 ; 27.5466 ; 26.9443 ; 26.3057 ; 25.6261 ; 25.0853 ; 24.8469 ; 24.5637 ; 24.2532 ; 24.0478 ; 24.0025 ; 23.9806 ; 24.049 ; 24.0879 ; 24.2498 ; 24.2893 ; 24.2555 ; 24.1936 ; 24.1805 ; 24.178 ; 24.1761 ; 24.1435 ; 24.1364 ; 24.1448 ; 24.1527 ; 24.1689]

Bolt 1 - Shear Force (kips): [0.0746644 ; 0.90066 ; 1.06463 ; 1.27037 ; 1.53075 ; 2.09009 ; 3.10001 ; 4.62568 ; 6.7245 ; 9.43383 ; 10.3019 ; 11.2129 ; 11.2174 ; 11.2141 ; 11.208 ; 11.2059 ; 11.2798 ; 11.4769 ; 11.5773 ; 11.5886 ; 11.5884 ; 11.6792 ; 11.9928 ; 12.2335 ; 12.3625 ; 12.596 ; 12.7732 ; 13.0034 ; 13.6392 ; 14.4272 ; 16.0386 ; 16.5627 ; 16.8032 ; 17.1336 ; 17.5387 ; 17.9774 ; 18.7278 ; 20.0689 ; 21.9726 ; 24.8477 ; 26.1052 ; 27.5556 ; 29.0851 ; 30.9904 ; 33.4967 ; 34.5742 ; 36.0681 ; 37.7186 ; 39.3412 ; 39.8744 ; 40.6343 ; 41.6491 ; 43.1803 ; 45.2888 ; 45.895 ; 46.6708 ; 47.6568 ; 48.9044 ; 49.2683 ; 49.7775 ; 50.6112 ; 51.5506 ; 51.754 ; 52.0924 ; 52.3946]

Bolt 2 - Tensile Force (kips): [48.4033 ; 47.5458 ; 47.3872 ; 47.192 ; 46.9628 ; 46.4466 ; 45.3644 ; 43.6172 ; 41.0523 ; 37.5648 ; 36.3695 ; 34.9357 ; 34.8341 ; 34.788 ; 34.7621 ; 34.7546 ; 34.7663 ; 34.7627 ; 34.6102 ; 34.583 ; 34.5651 ; 34.5853 ; 34.6926 ; 34.8438 ; 34.9023 ; 34.9993 ; 35.1419 ; 35.3452 ; 35.7442 ; 36.3252 ; 37.1835 ; 37.4501 ; 37.5568 ; 37.7179 ; 37.9556 ; 38.3235 ; 38.9288 ; 39.8424 ; 41.2451 ; 43.1701 ; 43.8254 ; 44.7383 ; 45.864 ; 47.2659 ; 48.7613 ; 49.1648 ; 49.6936 ; 50.4133 ; 51.4504 ; 51.8403 ; 52.3829 ; 53.1937 ; 54.2223 ; 55.4425 ; 55.7504 ; 56.2093 ; 56.9 ; 57.9144 ; 58.2049 ; 58.6445 ; 59.2769 ; 60.191 ; 60.403 ; 60.694 ; 60.9607]

Bolt 2 - Shear Force (kips): [0.0543761 ; 1.05593 ; 1.24289 ; 1.4776 ; 1.7734 ; 2.33731 ; 3.33741 ; 4.84897 ; 6.91982 ; 9.5331 ; 10.3818 ; 11.3934 ; 11.4537 ; 11.4724 ; 11.4706 ; 11.4687 ; 11.4726 ; 11.5661 ; 11.8652 ; 11.9018 ; 11.9048 ; 11.9113 ; 12.1347 ; 12.5458 ; 12.6326 ; 12.7332 ; 13.0176 ; 13.3466 ; 13.6675 ; 14.1946 ; 15.3529 ; 15.8962 ; 16.0669 ; 16.3071 ; 16.6735 ; 17.1912 ; 17.7371 ; 18.4416 ; 19.3214 ; 20.5373 ; 20.9994 ; 21.6668 ; 22.6254 ; 23.7827 ; 25.0442 ; 25.4807 ; 26.0367 ; 26.7641 ; 27.7967 ; 28.2104 ; 28.8363 ; 29.6503 ; 30.7318 ; 31.9908 ; 32.3541 ; 32.8736 ; 33.5663 ; 34.4659 ; 34.6856 ; 34.9895 ; 35.4027 ; 35.938 ; 36.0661 ; 36.2187 ; 36.349]

Bolt 3 - Tensile Force (kips): [50 ; 50.3133 ; 50.5891 ; 51.1694 ; 52.0956 ; 52.7593 ; 53.1422 ; 53.681 ; 54.5347 ; 55.9526 ; 56.4672 ; 57.1105 ; 57.1298 ; 57.1276 ; 57.1084 ; 57.1009 ; 57.1528 ; 57.3246 ; 57.5603 ; 57.5844 ; 57.5773 ; 57.6501 ; 58.0782 ; 58.6473 ; 58.8497 ; 59.17 ; 59.6432 ; 60.2482 ; 61.2262 ; 62.5403 ; 64.3593 ; 64.9989 ; 65.2344 ; 65.5774 ; 66.0696 ; 66.7633 ; 67.7508 ; 69.1386 ; 70.9669 ; 73.2296 ; 73.9925 ; 75.0491 ; 76.5485 ; 78.6336 ; 81.3382 ; 82.1588 ; 83.3489 ; 85.0931 ; 87.491 ; 88.2823 ; 89.3941 ; 90.8903 ; 92.764 ; 94.6397 ; 95.0143 ; 95.4386 ; 95.9566 ; 96.4489 ; 96.559 ; 96.7388 ; 96.9581 ; 97.1966 ; 97.2521 ; 97.3753 ; 97.5205]

Bolt 3 - Shear Force (kips): [0.0251708 ; 0.292518 ; 0.363192 ; 0.462596 ; 0.589945 ; 0.686751 ; 0.73907 ; 0.81259 ; 0.925342 ; 1.09272 ; 1.14906 ; 1.21832 ; 1.22067 ; 1.22095 ; 1.2195 ; 1.21894 ; 1.22371 ; 1.24203 ; 1.26808 ; 1.27099 ; 1.27063 ; 1.2786 ; 1.32544 ; 1.39298 ; 1.41763 ; 1.457 ; 1.51857 ; 1.5988 ; 1.72457 ; 1.88802 ; 2.09096 ; 2.15654 ; 2.17964 ; 2.21315 ; 2.2617 ; 2.33035 ; 2.42293 ; 2.54436 ; 2.68265 ; 2.83254 ; 2.87938 ; 2.9459 ; 3.03848 ; 3.15974 ; 4.35355 ; 5.22202 ; 6.44149 ; 8.22214 ; 9.99078 ; 10.7825 ; 11.4899 ; 12.3976 ; 13.0526 ; 13.4649 ; 13.3414 ; 13.2782 ; 13.1997 ; 12.559 ; 12.4063 ; 12.2247 ; 11.8975 ; 11.6857 ; 11.6263 ; 11.4604 ; 11.2653]

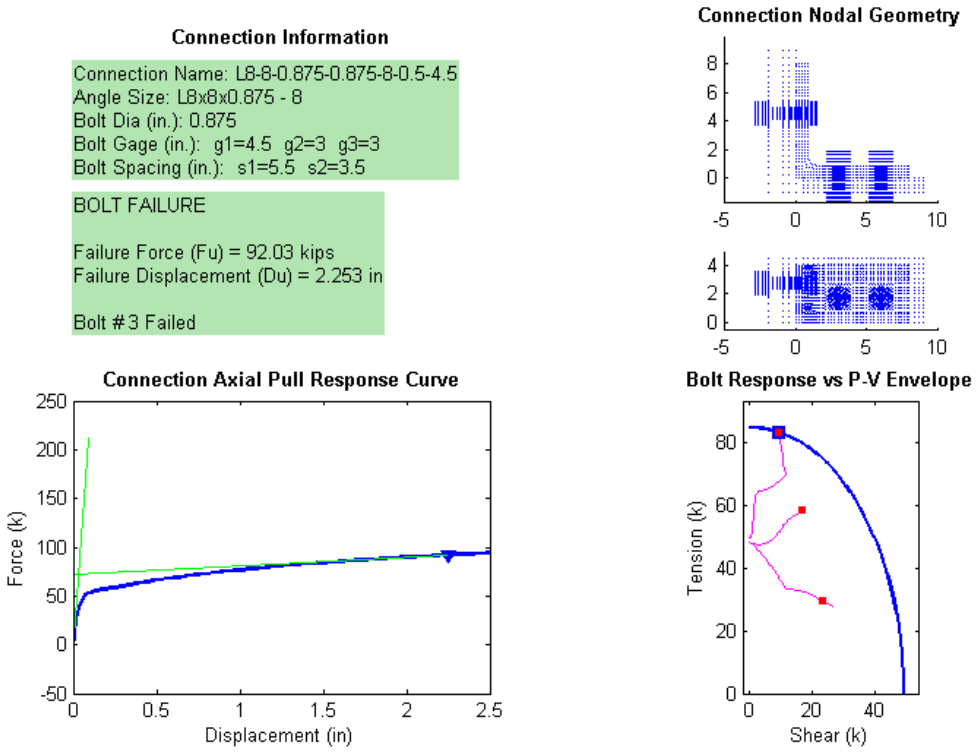


Figure B.365 Connection L8_8_0.875_0.875_8_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.875_8_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.1997e+003

Plastic Stiffness (k/in): 9.0978

Displacement (in): [4.9669e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.026611 ; 0.036499 ; 0.051331 ; 0.073578 ; 0.081921 ; 0.094435 ; 0.11321 ; 0.14136 ; 0.1836 ; 0.24695 ; 0.34198 ; 0.37761 ; 0.39098 ; 0.41102 ; 0.44109 ; 0.48619 ; 0.50311 ; 0.52848 ; 0.56653 ; 0.62361 ; 0.70923 ; 0.74134 ; 0.78951 ; 0.86175 ; 0.88884 ; 0.92948 ; 0.99044 ; 1.0819 ; 1.219 ; 1.4248 ; 1.4873 ; 1.5107 ; 1.5458 ; 1.559 ; 1.5788 ; 1.6085 ; 1.653 ; 1.7197 ; 1.8198 ; 1.8574 ; 1.9137 ; 1.9981 ; 2.1248 ; 2.1724 ; 2.2436 ; 2.3505 ; 2.3879 ; 2.444 ; 2.5]

Force (kips): [-1.24029 ; 1.28058 ; 3.05599 ; 5.37273 ; 8.34449 ; 10.9511 ; 13.2681 ; 16.1729 ; 19.4351 ; 22.7886 ; 25.3832 ; 25.8551 ; 26.3915 ; 26.9749 ; 27.5983 ; 28.2944 ; 29.2997 ; 30.7552 ; 31.2715 ; 31.4932 ; 31.8 ; 32.2602 ; 32.8921 ; 33.127 ; 33.4746 ; 33.9533 ; 34.6038 ; 35.501 ; 35.8209 ; 36.2853 ; 37.0106 ; 37.2921 ; 37.6949 ; 38.2487 ; 39.0273 ; 40.0553 ; 41.4131 ; 41.848 ; 42.0056 ; 42.2285 ; 42.3145 ; 42.4385 ; 42.6176 ; 42.9001 ; 43.306 ; 43.8939 ; 44.0998 ; 44.4022 ; 44.831 ; 45.4328 ; 45.6516 ; 45.9758 ; 46.4328 ; 46.5865 ; 46.8138 ; 47.0349]

Bolt 1 - Tensile Force (kips): [48.3992 ; 48.3183 ; 48.256 ; 48.169 ; 48.0457 ; 47.9292 ; 47.8185 ; 47.6655 ; 47.4679 ; 47.2205 ; 46.8531 ; 46.5809 ; 46.1919 ; 45.6567 ; 44.9988 ; 44.2189 ; 42.9711 ; 40.9725 ; 40.2187 ; 39.9178 ; 39.4765 ; 38.8089 ; 37.8393 ; 37.4803 ; 36.9489 ; 36.1875 ; 35.1552 ; 34.0359 ; 33.9806 ; 33.9119 ; 33.8266 ; 33.7975 ; 33.7588 ; 33.7103 ; 33.6309 ; 33.5244 ; 33.423 ; 33.322 ; 33.2877 ; 33.2502 ; 33.218 ; 33.182 ; 33.1436 ; 33.0102 ; 32.8065 ; 32.5159 ; 32.387 ; 32.1244 ; 31.665 ; 30.7474 ; 30.2561 ; 29.6333 ; 28.9009 ; 28.6251 ; 28.2683 ; 27.9561]

Bolt 1 - Shear Force (kips): [0.0710166 ; 0.0790237 ; 0.156768 ; 0.268752 ; 0.420362 ; 0.560931 ; 0.69261 ; 0.868765 ; 1.08409 ; 1.33776 ; 1.70298 ; 1.97688 ; 2.34853 ; 2.83376 ; 3.40902 ; 4.0722 ; 5.08397 ; 6.60702 ; 7.15456 ; 7.36943 ; 7.6812 ; 8.14588 ; 8.80649 ; 9.04633 ; 9.39465 ; 9.87835 ; 10.5165 ; 11.1824 ; 11.1883 ; 11.1805 ; 11.1592 ; 11.1508 ; 11.139 ; 11.1235 ; 11.2776 ; 11.3158 ; 11.5087 ; 12.2352 ; 12.4639 ; 12.7906 ; 13.0154 ; 13.2677 ; 13.5048 ; 14.3736 ; 15.5279 ; 17.0876 ; 17.583 ; 18.4085 ; 19.447 ; 21.1233 ; 21.9559 ; 23.0036 ; 24.2471 ; 24.7205 ; 25.4914 ; 26.2255]

Bolt 2 - Tensile Force (kips): [48.3876 ; 48.3139 ; 48.2401 ; 48.1375 ; 48.0116 ; 47.9076 ; 47.8242 ; 47.737 ; 47.6624 ; 47.6432 ; 47.6584 ; 47.5565 ; 47.4494 ; 47.4268 ; 47.5136 ; 47.6709 ; 47.9803 ; 48.5414 ; 48.7579 ; 48.8353 ; 48.9602 ; 49.1705 ; 49.5284 ; 49.6834 ; 49.9282 ; 50.3069 ; 50.8829 ; 51.778 ; 52.0858 ; 52.5305 ; 53.1573 ; 53.3729 ; 53.672 ; 54.0693 ; 54.5891 ; 55.2043 ; 55.8954 ; 56.1138 ; 56.1931 ; 56.3217 ; 56.3755 ; 56.4494 ; 56.5407 ; 56.6797 ; 56.8927 ; 57.2012 ; 57.3407 ; 57.509 ; 57.7517 ; 58.1318 ; 58.2587 ; 58.4647 ; 58.733 ; 58.8283 ; 58.9554 ; 59.0767]

Bolt 2 - Shear Force (kips): [0.0490711 ; 0.103787 ; 0.206075 ; 0.344434 ; 0.529305 ; 0.699189 ; 0.856077 ; 1.05983 ; 1.30454 ; 1.5897 ; 1.9963 ; 2.26255 ; 2.62017 ; 3.07487 ; 3.59277 ; 4.16711 ; 5.00587 ; 6.19823 ; 6.60743 ; 6.7666 ; 6.99261 ; 7.31993 ; 7.7662 ; 7.92306 ; 8.14601 ; 8.45417 ; 8.87499 ; 9.439 ; 9.6561 ; 9.96496 ; 10.4036 ; 10.5656 ; 10.7995 ; 11.1282 ; 11.565 ; 12.1843 ; 13.0633 ; 13.4027 ; 13.5234 ; 13.6759 ; 13.7133 ; 13.7955 ; 14.0058 ; 14.2333 ; 14.5512 ; 15.105 ; 15.2662 ; 15.5001 ; 15.9503 ; 16.4905 ; 16.6187 ; 16.7906 ; 17.1221 ; 17.2279 ; 17.402 ; 17.5727]

Bolt 3 - Tensile Force (kips): [50 ; 49.8975 ; 49.8382 ; 49.8244 ; 49.9152 ; 50.0653 ; 50.2615 ; 50.6498 ; 51.5091 ; 52.6277 ; 53.9019 ; 54.2581 ; 54.7591 ; 55.447 ; 56.4054 ; 57.6961 ; 59.464 ; 61.896 ; 62.7453 ; 63.0142 ; 63.3966 ; 63.9082 ; 64.5523 ; 64.7915 ; 65.1824 ; 65.778 ; 66.6327 ; 67.9046 ; 68.3946 ; 69.1117 ; 70.2315 ; 70.643 ; 71.2187 ; 71.9203 ; 72.9009 ; 73.9857 ; 75.8443 ; 76.5957 ; 76.9006 ; 77.3033 ; 77.4477 ; 77.6541 ; 77.9414 ; 78.3693 ; 78.9767 ; 79.9529 ; 80.2997 ; 80.7848 ; 81.4516 ; 82.3594 ; 82.6747 ; 83.2542 ; 84.033 ; 84.2831 ; 84.6406 ; 85.016]

Bolt 3 - Shear Force (kips): [0.0452946 ; 0.0176859 ; 0.049557 ; 0.102892 ; 0.179998 ; 0.253498 ; 0.325386 ; 0.430852 ; 0.567976 ; 0.745062 ; 0.928153 ; 0.968808 ; 1.01964 ; 1.08072 ; 1.15015 ; 1.24293 ; 1.3941 ; 1.61026 ; 1.67859 ; 1.73212 ; 1.80923 ; 1.95616 ; 2.85189 ; 3.668 ; 4.98742 ; 6.47771 ; 7.90716 ; 9.59561 ; 10.2366 ; 11.0585 ; 11.509 ; 11.346 ; 11.1094 ; 10.8629 ; 10.4815 ; 10.4154 ; 10.4342 ; 10.3851 ; 10.3383 ; 10.3076 ; 10.2947 ; 10.2766 ; 10.2451 ; 10.1601 ; 9.98079 ; 9.62649 ; 9.55761 ; 9.4606 ; 9.28975 ; 9.16689 ; 9.1167 ; 9.24479 ; 9.33589 ; 9.35831 ; 9.38306 ; 9.41949]

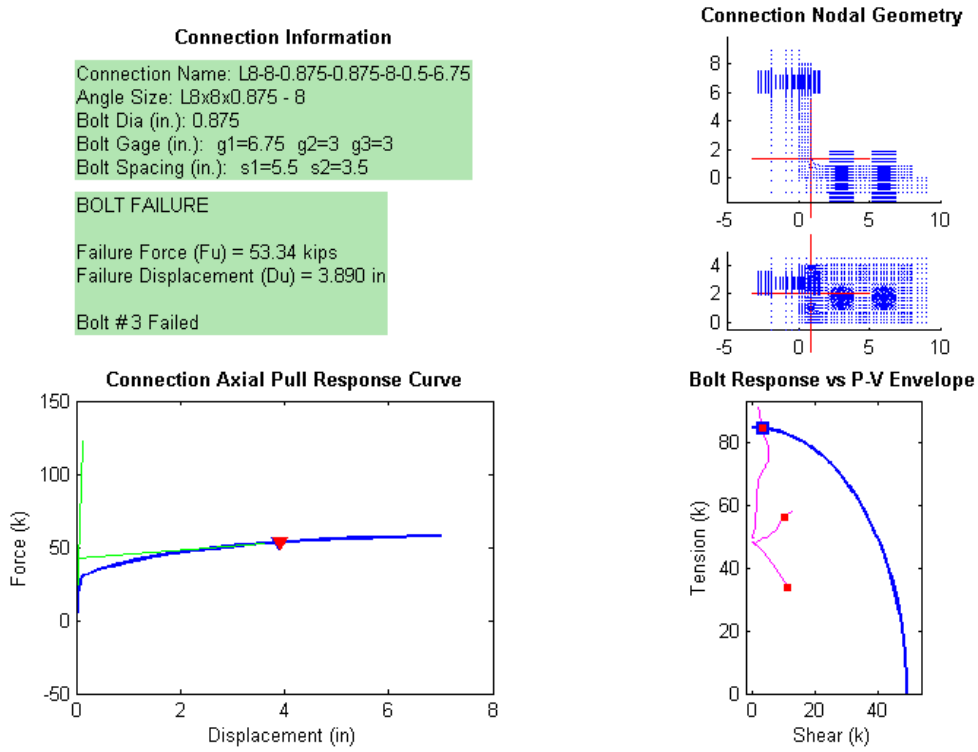


Figure B.366 Connection L8_8_0.875_0.875_8_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.875_8_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 930.9842

Plastic Stiffness (k/in): 2.8891

Displacement (in): [3.628e-036 ; 0.0027344 ; 0.0054687 ; 0.0095703 ; 0.015723 ; 0.024951 ; 0.038794 ; 0.059558 ; 0.067345 ; 0.079024 ; 0.096544 ; 0.12282 ; 0.16224 ; 0.22137 ; 0.31007 ; 0.44311 ; 0.64267 ; 0.7175 ; 0.82976 ; 0.99814 ; 1.0613 ; 1.156 ; 1.2981 ; 1.5112 ; 1.5911 ; 1.711 ; 1.7559 ; 1.8233 ; 1.9245 ; 2.0762 ; 2.3038 ; 2.6451 ; 3.1571 ; 3.3321 ; 3.5946 ; 3.9884 ; 4.579 ; 4.754 ; 5.0165 ; 5.4103 ; 6.0009 ; 6.7009 ; 7]

Force (kips): [-1.20096 ; 0.530124 ; 1.3447 ; 2.48191 ; 4.02915 ; 6.08678 ; 8.70961 ; 11.494 ; 12.2576 ; 13.1787 ; 14.0909 ; 14.7455 ; 15.2625 ; 15.7302 ; 16.4034 ; 17.2755 ; 18.3675 ; 18.7207 ; 19.2073 ; 19.9014 ; 20.164 ; 20.5485 ; 21.0738 ; 21.8122 ; 22.0794 ; 22.4452 ; 22.5762 ; 22.7658 ; 23.0385 ; 23.4266 ; 23.9692 ; 24.7039 ; 25.6347 ; 25.9128 ; 26.292 ; 26.7946 ; 27.4246 ; 27.5879 ; 27.8129 ; 28.1101 ; 28.4819 ; 28.836 ; 28.9684]

Bolt 1 - Tensile Force (kips): [48.3998 ; 48.3444 ; 48.3164 ; 48.2741 ; 48.2126 ; 48.1221 ; 47.9911 ; 47.8266 ; 47.7769 ; 47.7131 ; 47.6435 ; 47.595 ; 47.5573 ; 47.5239 ; 47.4613 ; 47.3318 ; 47.0382 ; 46.6916 ; 45.9371 ; 44.8374 ; 44.4313 ; 43.8401 ; 43.0238 ; 41.8139 ; 41.3392 ; 40.6384 ; 40.3756 ; 39.981 ; 39.3904 ; 38.5166 ; 37.2558 ; 35.5484 ; 34.0767 ; 34.0283 ; 33.9725 ; 33.9146 ; 33.8671 ; 33.831 ; 33.8087 ; 33.7957 ; 33.8053 ; 33.8363 ; 33.8574]

Bolt 1 - Shear Force (kips): [0.0700107 ; 0.0550428 ; 0.0855357 ; 0.1383 ; 0.217671 ; 0.331599 ; 0.491405 ; 0.687267 ; 0.745615 ; 0.819628 ; 0.898369 ; 0.954319 ; 0.99953 ; 1.042 ; 1.11801 ; 1.26473 ; 1.57506 ; 1.92645 ; 2.6381 ; 3.60098 ; 3.94457 ; 4.43319 ; 5.08682 ; 6.02056 ; 6.37694 ; 6.89271 ; 7.08279 ; 7.36522 ; 7.78176 ; 8.38661 ; 9.2347 ; 10.3179 ; 11.207 ; 11.2128 ; 11.2048 ; 11.1897 ; 11.1753 ; 11.3072 ; 11.2949 ; 11.2674 ; 11.2286 ; 11.1879 ; 11.1733]

Bolt 2 - Tensile Force (kips): [48.3895 ; 48.3425 ; 48.3126 ; 48.2602 ; 48.1936 ; 48.1132 ; 48.038 ; 48.0192 ; 48.0244 ; 48.038 ; 48.0622 ; 48.0792 ; 48.0945 ; 48.1158 ; 48.1737 ; 48.3437 ; 48.7974 ; 48.937 ; 49.1181 ; 49.4732 ; 49.6214 ; 49.8508 ; 50.192 ; 50.6585 ; 50.8348 ; 51.1201 ; 51.2309 ; 51.4047 ; 51.6869 ; 52.1369 ; 52.8361 ; 53.8471 ; 55.1011 ; 55.426 ; 55.8369 ; 56.3452 ; 56.9353 ; 57.0685 ; 57.2508 ; 57.4751 ; 57.7463 ; 58.0083 ; 58.0766]

Bolt 2 - Shear Force (kips): [0.0484254 ; 0.0651755 ; 0.117254 ; 0.19081 ; 0.295073 ; 0.440603 ; 0.640573 ; 0.87285 ; 0.941079 ; 1.0258 ; 1.11452 ; 1.17617 ; 1.22297 ; 1.2681 ; 1.35236 ; 1.52071 ; 1.8675 ; 2.19299 ; 2.82149 ; 3.63416 ; 3.91467 ; 4.30243 ; 4.80703 ; 5.50694 ; 5.76786 ; 6.1337 ; 6.26594 ; 6.4579 ; 6.73185 ; 7.11258 ; 7.61849 ; 8.2754 ; 9.13985 ; 9.42973 ; 9.82579 ; 10.3664 ; 11.0502 ; 11.2068 ; 11.443 ; 11.7507 ; 12.1188 ; 12.4499 ; 12.6605]

Bolt 3 - Tensile Force (kips): [50 ; 49.9215 ; 49.8612 ; 49.8051 ; 49.7999 ; 49.8966 ; 50.1769 ; 50.912 ; 51.3146 ; 51.8926 ; 52.5826 ; 53.3611 ; 54.305 ; 55.444 ; 57.0212 ; 59.1948 ; 62.1758 ; 63.1672 ; 64.5339 ; 66.4167 ; 67.0389 ; 67.9733 ; 69.2667 ; 71.1823 ; 71.9346 ; 72.9293 ; 73.2592 ; 73.7207 ; 74.371 ; 75.2906 ; 76.6102 ; 78.6442 ; 81.4267 ; 82.2912 ; 83.4984 ; 85.093 ; 86.8455 ; 87.2865 ; 87.8979 ; 88.7374 ; 89.885 ; 91.0171 ; 91.4456]

Bolt 3 - Shear Force (kips): [0.042826 ; 0.015089 ; 0.026589 ; 0.058195 ; 0.10988 ; 0.18404 ; 0.28781 ; 0.41331 ; 0.45165 ; 0.50166 ; 0.57592 ; 0.68071 ; 0.78562 ; 0.88422 ; 1.0089 ; 1.156 ; 1.3322 ; 1.3859 ; 1.4637 ; 1.5886 ; 1.6574 ; 1.8493 ; 2.3961 ; 3.2768 ; 3.8428 ; 4.2386 ; 4.4393 ; 4.7412 ; 4.8869 ; 4.8224 ; 4.8423 ; 4.825 ; 4.15 ; 3.7373 ; 3.128 ; 2.8399 ; 2.5455 ; 2.4423 ; 2.3186 ; 2.164 ; 2.0093 ; 1.9051 ; 1.8722]

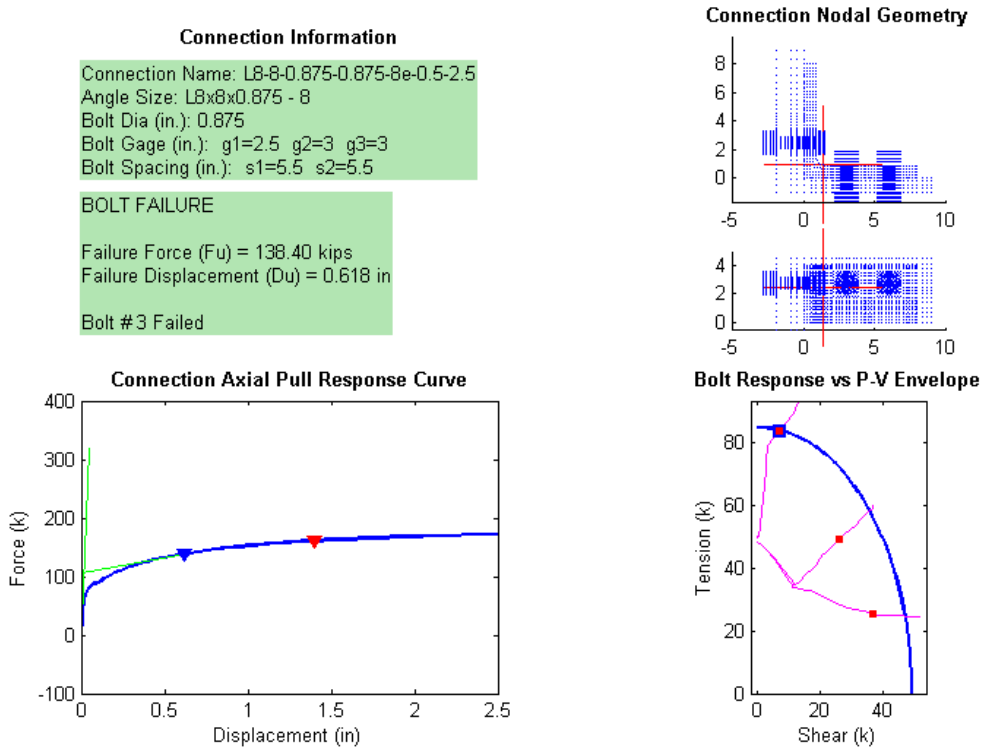


Figure B.367 Connection L8_8_0.875_0.875_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.875_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 6.1301e+003

Plastic Stiffness (k/in): 54.0590

Displacement (in): [4.7289e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.015625 ; 0.020019 ; 0.026611 ; 0.036499 ; 0.051331 ; 0.073578 ; 0.081921 ; 0.085049 ; 0.089742 ; 0.091502 ; 0.094141 ; 0.098101 ; 0.10404 ; 0.10627 ; 0.10961 ; 0.11462 ; 0.12214 ; 0.12496 ; 0.12918 ; 0.13553 ; 0.14504 ; 0.15931 ; 0.18072 ; 0.18874 ; 0.20078 ; 0.2053 ; 0.21207 ; 0.22223 ; 0.23747 ; 0.26033 ; 0.29462 ; 0.30747 ; 0.32676 ; 0.35569 ; 0.36654 ; 0.38281 ; 0.40722 ; 0.44384 ; 0.49876 ; 0.58115 ; 0.70472 ; 0.75106 ; 0.82057 ; 0.84664 ; 0.88574 ; 0.94439 ; 1.0324 ; 1.1643 ; 1.3623 ; 1.5602 ; 1.7582 ; 1.9561 ; 2.154 ; 2.404 ; 2.5]

Force (kips): [-1.5676 ; 5.26034 ; 10.4053 ; 16.5545 ; 21.5333 ; 25.4589 ; 28.6238 ; 32.2053 ; 34.8239 ; 37.5194 ; 40.8026 ; 43.8754 ; 43.8891 ; 43.8801 ; 43.8672 ; 44.061 ; 44.3006 ; 44.4512 ; 44.4477 ; 44.4436 ; 44.4547 ; 45.2265 ; 46.2745 ; 46.6036 ; 47.0795 ; 47.7905 ; 48.6928 ; 49.9791 ; 51.685 ; 52.2919 ; 53.1214 ; 53.4219 ; 53.8508 ; 54.4768 ; 55.3517 ; 56.6089 ; 58.3165 ; 58.9386 ; 59.8133 ; 61.0207 ; 61.471 ; 62.1328 ; 63.093 ; 64.3966 ; 66.1573 ; 68.3841 ; 71.1366 ; 72.0736 ; 73.3366 ; 73.7977 ; 74.4463 ; 75.3484 ; 76.5926 ; 78.2297 ; 80.1384 ; 81.5947 ; 82.7946 ; 83.831 ; 84.7164 ; 85.6662 ; 85.966]

Bolt 1 - Tensile Force (kips): [48.4778 ; 48.2267 ; 48.012 ; 47.7369 ; 47.4883 ; 47.2715 ; 47.0834 ; 46.7009 ; 45.2673 ; 42.5434 ; 38.5146 ; 34.0778 ; 34.0402 ; 34.0303 ; 34.0193 ; 33.8772 ; 33.7838 ; 33.7599 ; 33.7436 ; 33.7396 ; 33.7346 ; 33.6568 ; 33.5989 ; 33.5819 ; 33.568 ; 33.4784 ; 33.3591 ; 33.0581 ; 32.6935 ; 32.522 ; 32.3053 ; 32.205 ; 32.0765 ; 31.7288 ; 31.2151 ; 30.3745 ; 29.1477 ; 28.7076 ; 28.2004 ; 27.6855 ; 27.4975 ; 27.2703 ; 26.9809 ; 26.7436 ; 26.282 ; 25.7284 ; 25.1077 ; 24.9617 ; 24.835 ; 24.8134 ; 24.7804 ; 24.7701 ; 24.7791 ; 24.8493 ; 24.7337 ; 24.5908 ; 24.4386 ; 24.3144 ; 24.3152 ; 24.3685 ; 24.3629]

Bolt 1 - Shear Force (kips): [0.0671757 ; 0.274882 ; 0.524644 ; 0.836588 ; 1.09886 ; 1.31374 ; 1.49505 ; 1.86964 ; 3.1868 ; 5.42506 ; 8.37245 ; 11.2343 ; 11.2323 ; 11.2297 ; 11.2263 ; 11.4563 ; 11.5736 ; 11.5869 ; 11.5868 ; 11.5857 ; 11.5984 ; 12.2234 ; 12.6885 ; 12.8196 ; 12.9836 ; 13.4825 ; 13.934 ; 15.3075 ; 16.9964 ; 17.5353 ; 18.1434 ; 18.4099 ; 18.7518 ; 19.4223 ; 20.3385 ; 21.877 ; 24.2042 ; 25.1426 ; 26.4196 ; 27.9892 ; 28.5326 ; 29.2327 ; 30.1674 ; 31.2402 ; 33.1182 ; 35.6901 ; 38.5134 ; 39.2845 ; 40.3025 ; 40.6285 ; 41.11 ; 41.8524 ; 42.8978 ; 44.2993 ; 46.2378 ; 47.5912 ; 48.6977 ; 49.7487 ; 50.5164 ; 51.5086 ; 51.8475]

Bolt 2 - Tensile Force (kips): [48.4856 ; 48.2289 ; 48.0001 ; 47.7197 ; 47.4855 ; 47.3021 ; 47.1594 ; 46.8836 ; 45.5735 ; 43.0307 ; 39.4147 ; 35.0488 ; 34.9088 ; 34.8893 ; 34.8743 ; 34.9155 ; 34.8258 ; 34.7148 ; 34.6973 ; 34.6929 ; 34.6934 ; 34.8928 ; 35.1719 ; 35.2843 ; 35.4607 ; 35.7979 ; 36.2726 ; 37.0633 ; 38.1337 ; 38.4389 ; 38.8937 ; 39.0719 ; 39.3321 ; 39.7549 ; 40.4118 ; 41.3217 ; 42.7105 ; 43.197 ; 43.8757 ; 44.7896 ; 45.0733 ; 45.4652 ; 46.0381 ; 46.8465 ; 47.8358 ; 48.9742 ; 50.2553 ; 50.7346 ; 51.3354 ; 51.5433 ; 51.8125 ; 52.275 ; 53.0218 ; 54.0788 ; 55.2618 ; 56.2056 ; 57.0373 ; 57.8766 ; 58.6798 ; 59.6056 ; 59.9115]

Bolt 2 - Shear Force (kips): [0.0837872 ; 0.279015 ; 0.54205 ; 0.867334 ; 1.13689 ; 1.35407 ; 1.5351 ; 1.88201 ; 3.1578 ; 5.35753 ; 8.22348 ; 11.4331 ; 11.5076 ; 11.51 ; 11.5079 ; 11.5216 ; 11.7246 ; 11.9175 ; 11.9242 ; 11.924 ; 11.9241 ; 12.097 ; 12.7337 ; 12.9386 ; 13.2437 ; 13.4601 ; 13.8547 ; 14.327 ; 15.2718 ; 15.8574 ; 16.6825 ; 16.9359 ; 17.2816 ; 17.6675 ; 18.1189 ; 18.8558 ; 19.6794 ; 20.0332 ; 20.5395 ; 21.2473 ; 21.5737 ; 22.0756 ; 22.7741 ; 23.6442 ; 24.5373 ; 25.5517 ; 27.0117 ; 27.5028 ; 28.2758 ; 28.594 ; 29.1074 ; 29.7298 ; 30.4725 ; 31.3877 ; 32.6228 ; 33.6386 ; 34.5272 ; 35.3383 ; 36.0246 ; 36.6316 ; 36.805]

Bolt 3 - Tensile Force (kips): [50 ; 49.9217 ; 49.9677 ; 50.186 ; 50.5572 ; 51.1169 ; 51.737 ; 52.5462 ; 53.2466 ; 54.0716 ; 55.4401 ; 57.3373 ; 57.3509 ; 57.3433 ; 57.3306 ; 57.4759 ; 57.6609 ; 57.7821 ; 57.7793 ; 57.7751 ; 57.7827 ; 58.4401 ; 59.4449 ; 59.7816 ; 60.2893 ; 61.0765 ; 62.129 ; 63.6066 ; 65.5551 ; 66.2452 ; 67.208 ; 67.5569 ; 68.0601 ; 68.7984 ; 69.8281 ; 71.2397 ; 73.0458 ; 73.6612 ; 74.5311 ; 75.7404 ; 76.1878 ; 76.8371 ; 77.7828 ; 79.0828 ; 80.8845 ; 83.1043 ; 86.1223 ; 87.2046 ; 88.5194 ; 89.0588 ; 89.7468 ; 90.666 ; 92.0328 ; 93.6731 ; 95.1284 ; 95.9092 ; 96.4641 ; 96.8223 ; 97.1505 ; 97.5 ; 97.6435]

Bolt 3 - Shear Force (kips): [0.0397757 ; 0.0568199 ; 0.132778 ; 0.240681 ; 0.34488 ; 0.44279 ; 0.529838 ; 0.641355 ; 0.737826 ; 0.847119 ; 1.00808 ; 1.20201 ; 1.20416 ; 1.20368 ; 1.20281 ; 1.21716 ; 1.23624 ; 1.24894 ; 1.24888 ; 1.24863 ; 1.24963 ; 1.31978 ; 1.43586 ; 1.47642 ; 1.5388 ; 1.6354 ; 1.76363 ; 1.9255 ; 2.12418 ; 2.18752 ; 2.27504 ; 2.30572 ; 2.35054 ; 2.41197 ; 2.49419 ; 2.59102 ; 2.70152 ; 2.73725 ; 2.7869 ; 2.85524 ; 2.87863 ; 2.91572 ; 2.98398 ; 3.04585 ; 4.30967 ; 6.13935 ; 8.78336 ; 9.73492 ; 10.5914 ; 11.0301 ; 11.4803 ; 12.0133 ; 12.6284 ; 13.1154 ; 13.361 ; 13.1377 ; 12.8691 ; 12.286 ; 11.9178 ; 11.5243 ; 11.2503]

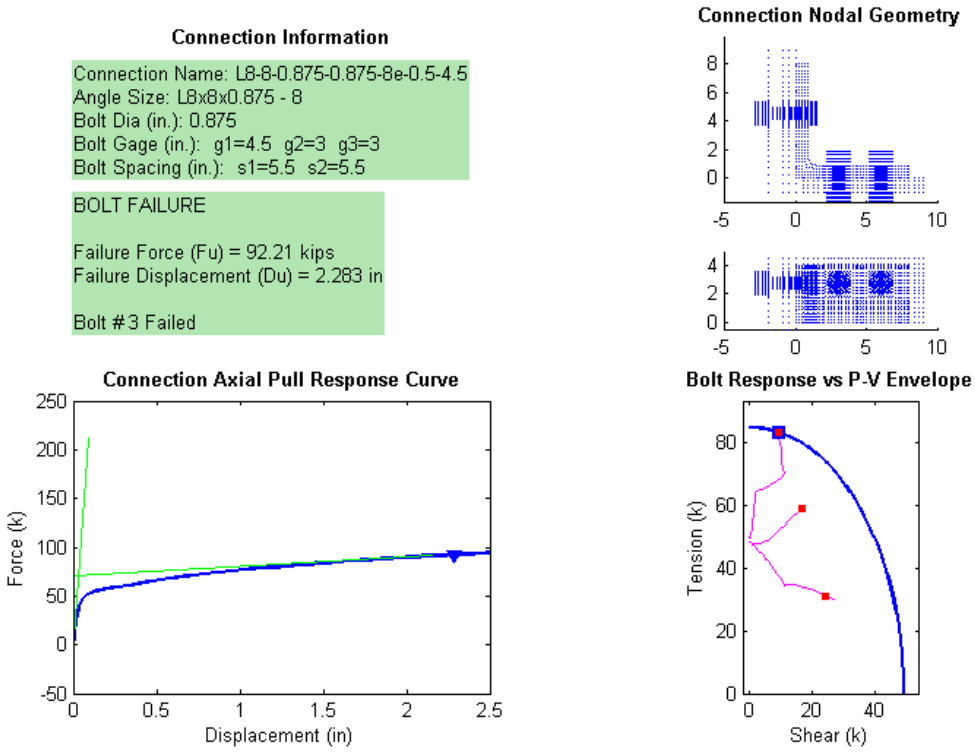


Figure B.368 Connection L8_8_0.875_0.875_8e_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.875_8e_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.2079e+003

Plastic Stiffness (k/in): 9.5072

Displacement (in): [4.4646e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.026611 ; 0.029083 ; 0.032791 ; 0.038353 ; 0.046696 ; 0.05921 ; 0.077981 ; 0.10614 ; 0.14837 ; 0.21173 ; 0.23548 ; 0.27112 ; 0.32457 ; 0.40475 ; 0.4248 ; 0.44484 ; 0.47491 ; 0.52001 ; 0.58767 ; 0.68914 ; 0.7272 ; 0.78428 ; 0.8699 ; 0.95553 ; 1.0412 ; 1.0733 ; 1.1214 ; 1.1937 ; 1.302 ; 1.3427 ; 1.4036 ; 1.4951 ; 1.5294 ; 1.5808 ; 1.6579 ; 1.7736 ; 1.817 ; 1.8333 ; 1.8577 ; 1.8943 ; 1.9493 ; 2.0317 ; 2.1552 ; 2.3406 ; 2.3804 ; 2.4402 ; 2.5]

Force (kips): [-1.48433 ; 1.08475 ; 2.82802 ; 5.09978 ; 8.01827 ; 10.5793 ; 12.8637 ; 15.7599 ; 16.6723 ; 17.9148 ; 19.5837 ; 21.6166 ; 23.8 ; 25.5088 ; 26.6509 ; 27.6537 ; 28.658 ; 29.0357 ; 29.6031 ; 30.4249 ; 31.6145 ; 31.9265 ; 32.236 ; 32.6756 ; 33.2909 ; 34.1504 ; 35.2491 ; 35.6328 ; 36.1779 ; 37.0271 ; 37.8698 ; 38.619 ; 38.8942 ; 39.2703 ; 39.8059 ; 40.5579 ; 40.831 ; 41.2359 ; 41.8523 ; 42.0803 ; 42.4019 ; 42.8885 ; 43.5786 ; 43.8289 ; 43.9216 ; 44.0567 ; 44.2538 ; 44.5404 ; 44.9523 ; 45.5397 ; 46.3549 ; 46.5244 ; 46.7695 ; 47.006]

Bolt 1 - Tensile Force (kips): [48.4685 ; 48.3754 ; 48.3049 ; 48.2069 ; 48.0706 ; 47.9427 ; 47.8207 ; 47.652 ; 47.5944 ; 47.5125 ; 47.3951 ; 47.2389 ; 47.0445 ; 46.6054 ; 45.682 ; 44.5715 ; 43.38 ; 42.9072 ; 42.1692 ; 41.0536 ; 39.3672 ; 38.9299 ; 38.4867 ; 37.8346 ; 36.8883 ; 35.5728 ; 34.2961 ; 34.2767 ; 34.2823 ; 34.3181 ; 34.362 ; 34.4191 ; 34.3195 ; 34.3373 ; 34.4066 ; 34.5438 ; 34.6001 ; 34.572 ; 34.5858 ; 34.5981 ; 34.5397 ; 34.1649 ; 33.8579 ; 33.7372 ; 33.6472 ; 33.5211 ; 33.3849 ; 33.1691 ; 32.7291 ; 31.7764 ; 30.7697 ; 30.5796 ; 30.3302 ; 30.105]

Bolt 1 - Shear Force (kips): [0.0631364 ; 0.088961 ; 0.175773 ; 0.296819 ; 0.46015 ; 0.611466 ; 0.753472 ; 0.94371 ; 1.00642 ; 1.0941 ; 1.2165 ; 1.37542 ; 1.56806 ; 2.00747 ; 2.8654 ; 3.83015 ; 4.81903 ; 5.19717 ; 5.77573 ; 6.6265 ; 7.86166 ; 8.17297 ; 8.48542 ; 8.93854 ; 9.57934 ; 10.4362 ; 11.2625 ; 11.2856 ; 11.3038 ; 11.3221 ; 11.3383 ; 11.3576 ; 11.5336 ; 11.5731 ; 11.5988 ; 11.6257 ; 11.6363 ; 12.0737 ; 12.9077 ; 13.3177 ; 13.9451 ; 15.5102 ; 17.2223 ; 17.7682 ; 18.0398 ; 18.4136 ; 18.8676 ; 19.5094 ; 20.5938 ; 22.6158 ; 25.0481 ; 25.5247 ; 26.2313 ; 26.9281]

Bolt 2 - Tensile Force (kips): [48.4598 ; 48.3824 ; 48.311 ; 48.2159 ; 48.0956 ; 48.005 ; 47.9339 ; 47.8727 ; 47.8592 ; 47.8455 ; 47.835 ; 47.8494 ; 47.902 ; 47.8907 ; 47.7466 ; 47.9154 ; 48.2075 ; 48.3534 ; 48.6154 ; 48.9952 ; 49.5837 ; 49.732 ; 49.876 ; 50.0977 ; 50.4555 ; 51.0261 ; 51.8518 ; 52.1182 ; 52.5139 ; 53.0773 ; 53.5821 ; 54.0354 ; 54.2081 ; 54.4405 ; 54.7563 ; 55.1609 ; 55.2928 ; 55.5367 ; 55.8399 ; 55.968 ; 56.1853 ; 56.5376 ; 57.0016 ; 57.1552 ; 57.2221 ; 57.3238 ; 57.4461 ; 57.6429 ; 57.9591 ; 58.4244 ; 58.9964 ; 59.1027 ; 59.2669 ; 59.4503]

Bolt 2 - Shear Force (kips): [0.0792065 ; 0.0812137 ; 0.167221 ; 0.289122 ; 0.452521 ; 0.601362 ; 0.739064 ; 0.918171 ; 0.976258 ; 1.05727 ; 1.16949 ; 1.31394 ; 1.49526 ; 1.90362 ; 2.70887 ; 3.56124 ; 4.38927 ; 4.69449 ; 5.14883 ; 5.79737 ; 6.68746 ; 6.9051 ; 7.12245 ; 7.43522 ; 7.87408 ; 8.46071 ; 9.21438 ; 9.4929 ; 9.87198 ; 10.3956 ; 10.8758 ; 11.3066 ; 11.4414 ; 11.6537 ; 11.9605 ; 12.3909 ; 12.5458 ; 12.7188 ; 13.1843 ; 13.3393 ; 13.5184 ; 13.7119 ; 14.4224 ; 14.7423 ; 14.827 ; 14.9384 ; 15.1436 ; 15.4672 ; 15.8453 ; 16.1783 ; 16.9206 ; 17.086 ; 17.299 ; 17.472]

Bolt 3 - Tensile Force (kips): [50 ; 49.8972 ; 49.8356 ; 49.8186 ; 49.9092 ; 50.0559 ; 50.2462 ; 50.6256 ; 50.8166 ; 51.1423 ; 51.6295 ; 52.2863 ; 53.114 ; 54.0891 ; 55.177 ; 56.589 ; 58.4697 ; 59.1343 ; 60.0945 ; 61.4702 ; 63.3608 ; 63.741 ; 64.0851 ; 64.5262 ; 65.2009 ; 66.3188 ; 67.8538 ; 68.4242 ; 69.2563 ; 70.4904 ; 71.6722 ; 72.6236 ; 72.9721 ; 73.3758 ; 73.842 ; 74.6687 ; 75.1044 ; 75.6499 ; 76.6434 ; 77.0752 ; 77.6448 ; 78.423 ; 79.5058 ; 79.9319 ; 80.0861 ; 80.3064 ; 80.6177 ; 81.0676 ; 81.7011 ; 82.5524 ; 83.7877 ; 84.093 ; 84.5121 ; 84.8996]

Bolt 3 - Shear Force (kips): [0.0614412 ; 0.0133651 ; 0.0368054 ; 0.0862542 ; 0.159544 ; 0.229376 ; 0.297713 ; 0.397219 ; 0.431788 ; 0.481736 ; 0.552559 ; 0.649226 ; 0.784252 ; 0.903898 ; 1.00738 ; 1.11441 ; 1.24484 ; 1.30111 ; 1.38476 ; 1.49929 ; 1.67927 ; 1.77556 ; 1.86823 ; 2.38044 ; 3.94055 ; 6.5649 ; 8.70678 ; 9.47759 ; 10.434 ; 11.0942 ; 10.7012 ; 10.3743 ; 10.1868 ; 10.0472 ; 10.0889 ; 10.2418 ; 10.2158 ; 10.238 ; 10.1933 ; 10.1611 ; 10.1123 ; 9.97134 ; 9.60892 ; 9.49613 ; 9.4622 ; 9.43486 ; 9.36818 ; 9.2737 ; 9.14884 ; 9.03457 ; 8.9909 ; 9.05231 ; 9.09643 ; 9.20001]

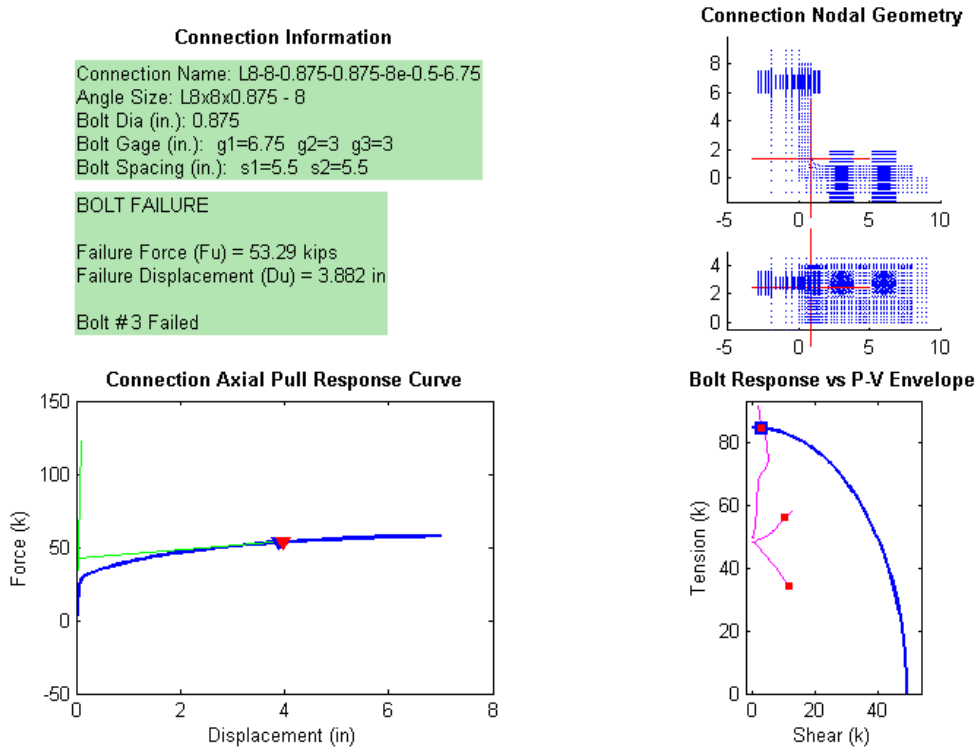


Figure B.369 Connection L8_8_0.875_0.875_8e_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_0.875_8e_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.3424e+003

Plastic Stiffness (k/in): 2.6872

Displacement (in): [4.1356e-036 ; 0.0013672 ; 0.0027344 ; 0.0047852 ; 0.0078613 ; 0.012476 ; 0.019397 ; 0.029779 ; 0.045352 ; 0.068712 ; 0.10375 ; 0.15631 ; 0.23515 ; 0.35341 ; 0.39776 ; 0.46427 ; 0.56406 ; 0.71373 ; 0.93823 ; 1.0224 ; 1.054 ; 1.1014 ; 1.1724 ; 1.2789 ; 1.4388 ; 1.4987 ; 1.5886 ; 1.7235 ; 1.774 ; 1.8499 ; 1.9637 ; 2.1344 ; 2.3904 ; 2.7744 ; 3.3504 ; 3.5254 ; 3.7879 ; 4.1817 ; 4.3293 ; 4.5508 ; 4.883 ; 5.3814 ; 6.0814 ; 6.2564 ; 6.5189 ; 6.9126 ; 7]

Force (kips): [-1.38191 ; 0.0446221 ; 0.453442 ; 1.05307 ; 1.90635 ; 3.09871 ; 4.71518 ; 6.85426 ; 9.51344 ; 12.1911 ; 14.2652 ; 15.1997 ; 15.8278 ; 16.7001 ; 16.9952 ; 17.3997 ; 17.9608 ; 18.6828 ; 19.636 ; 19.986 ; 20.1172 ; 20.3201 ; 20.6081 ; 21.0096 ; 21.5759 ; 21.7795 ; 22.0736 ; 22.4758 ; 22.6198 ; 22.8282 ; 23.1292 ; 23.5557 ; 24.1521 ; 24.9422 ; 25.9223 ; 26.1795 ; 26.5322 ; 27.0003 ; 27.1605 ; 27.3862 ; 27.6904 ; 28.0804 ; 28.5211 ; 28.6146 ; 28.7482 ; 28.9321 ; 28.9702]

Bolt 1 - Tensile Force (kips): [48.4703 ; 48.4199 ; 48.4036 ; 48.3783 ; 48.3408 ; 48.2863 ; 48.207 ; 48.0915 ; 47.931 ; 47.7436 ; 47.5749 ; 47.499 ; 47.4501 ; 47.3526 ; 47.3055 ; 47.2292 ; 47.0951 ; 46.36 ; 44.7333 ; 44.1391 ; 43.9182 ; 43.5843 ; 43.0978 ; 42.4131 ; 41.4695 ; 41.1277 ; 40.621 ; 39.8572 ; 39.5649 ; 39.1226 ; 38.4614 ; 37.4975 ; 36.1529 ; 34.5859 ; 34.4345 ; 34.4518 ; 34.4901 ; 34.5596 ; 34.5853 ; 34.5435 ; 34.6102 ; 34.7372 ; 34.918 ; 34.9591 ; 34.9003 ; 34.8629 ; 34.8718]

Bolt 1 - Shear Force (kips): [0.0596928 ; 0.047399 ; 0.0633916 ; 0.0924074 ; 0.138814 ; 0.207963 ; 0.306754 ; 0.446881 ; 0.640168 ; 0.861658 ; 1.05339 ; 1.14071 ; 1.20091 ; 1.31464 ; 1.36686 ; 1.44968 ; 1.5895 ; 2.31728 ; 3.76182 ; 4.26347 ; 4.44647 ; 4.72041 ; 5.11299 ; 5.65423 ; 6.38349 ; 6.64345 ; 7.02283 ; 7.58298 ; 7.79461 ; 8.11183 ; 8.5816 ; 9.25269 ; 10.1464 ; 11.1715 ; 11.3498 ; 11.3626 ; 11.379 ; 11.4034 ; 11.4122 ; 11.5266 ; 11.5569 ; 11.5739 ; 11.5847 ; 11.586 ; 12.0212 ; 12.5064 ; 12.5614]

Bolt 2 - Tensile Force (kips): [48.4652 ; 48.4162 ; 48.4089 ; 48.3911 ; 48.3549 ; 48.3058 ; 48.2454 ; 48.186 ; 48.1569 ; 48.2078 ; 48.3049 ; 48.3493 ; 48.3867 ; 48.5196 ; 48.5879 ; 48.6971 ; 48.9318 ; 49.2356 ; 49.6952 ; 49.9147 ; 50.0002 ; 50.1211 ; 50.2914 ; 50.5385 ; 50.9216 ; 51.0618 ; 51.2766 ; 51.6036 ; 51.7297 ; 51.9143 ; 52.2147 ; 52.6776 ; 53.3356 ; 54.2522 ; 55.296 ; 55.5493 ; 55.8987 ; 56.3489 ; 56.5031 ; 56.7193 ; 56.9968 ; 57.3362 ; 57.7128 ; 57.7907 ; 57.9355 ; 58.1019 ; 58.1305]

Bolt 2 - Shear Force (kips): [0.0755444 ; 0.0450784 ; 0.0581273 ; 0.0845308 ; 0.127733 ; 0.193288 ; 0.287613 ; 0.418583 ; 0.59319 ; 0.78602 ; 0.95193 ; 1.02939 ; 1.08401 ; 1.19217 ; 1.24687 ; 1.3366 ; 1.48378 ; 2.13697 ; 3.36861 ; 3.77507 ; 3.92092 ; 4.13803 ; 4.4466 ; 4.8635 ; 5.39814 ; 5.5834 ; 5.85006 ; 6.23488 ; 6.37706 ; 6.5885 ; 6.89304 ; 7.32039 ; 7.89127 ; 8.61523 ; 9.60268 ; 9.8691 ; 10.235 ; 10.7268 ; 10.8927 ; 11.1101 ; 11.4065 ; 11.7764 ; 12.1709 ; 12.2541 ; 12.3098 ; 12.4906 ; 12.542]

Bolt 3 - Tensile Force (kips): [50 ; 49.9615 ; 49.9226 ; 49.872 ; 49.8221 ; 49.786 ; 49.8242 ; 49.9758 ; 50.3578 ; 51.377 ; 52.8316 ; 54.1914 ; 55.6923 ; 57.7457 ; 58.4703 ; 59.5328 ; 61.0587 ; 63.11 ; 65.8045 ; 66.7142 ; 67.0263 ; 67.5145 ; 68.2133 ; 69.1733 ; 70.6191 ; 71.1546 ; 71.9458 ; 73.0082 ; 73.3644 ; 73.8689 ; 74.591 ; 75.6194 ; 77.1723 ; 79.4111 ; 82.3794 ; 83.2304 ; 84.3625 ; 85.7935 ; 86.2399 ; 86.84 ; 87.6641 ; 88.7548 ; 90.0954 ; 90.3875 ; 90.8155 ; 91.4077 ; 91.53]

Bolt 3 - Shear Force (kips): [0.05803 ; 0.037679 ; 0.021659 ; 0.016417 ; 0.033614 ; 0.06829 ; 0.1227 ; 0.19931 ; 0.30553 ; 0.42689 ; 0.57909 ; 0.75225 ; 0.88692 ; 1.043 ; 1.0978 ; 1.1697 ; 1.2648 ; 1.3755 ; 1.5168 ; 1.6134 ; 1.652 ; 1.7568 ; 1.9151 ; 2.3783 ; 2.9016 ; 3.4503 ; 4.033 ; 4.4101 ; 4.6509 ; 4.937 ; 5.0117 ; 4.8284 ; 4.7304 ; 4.7165 ; 3.875 ; 3.3107 ; 2.8926 ; 2.6509 ; 2.5885 ; 2.4873 ; 2.3329 ; 2.1499 ; 1.9833 ; 1.953 ; 1.9111 ; 1.8716 ; 1.8659]

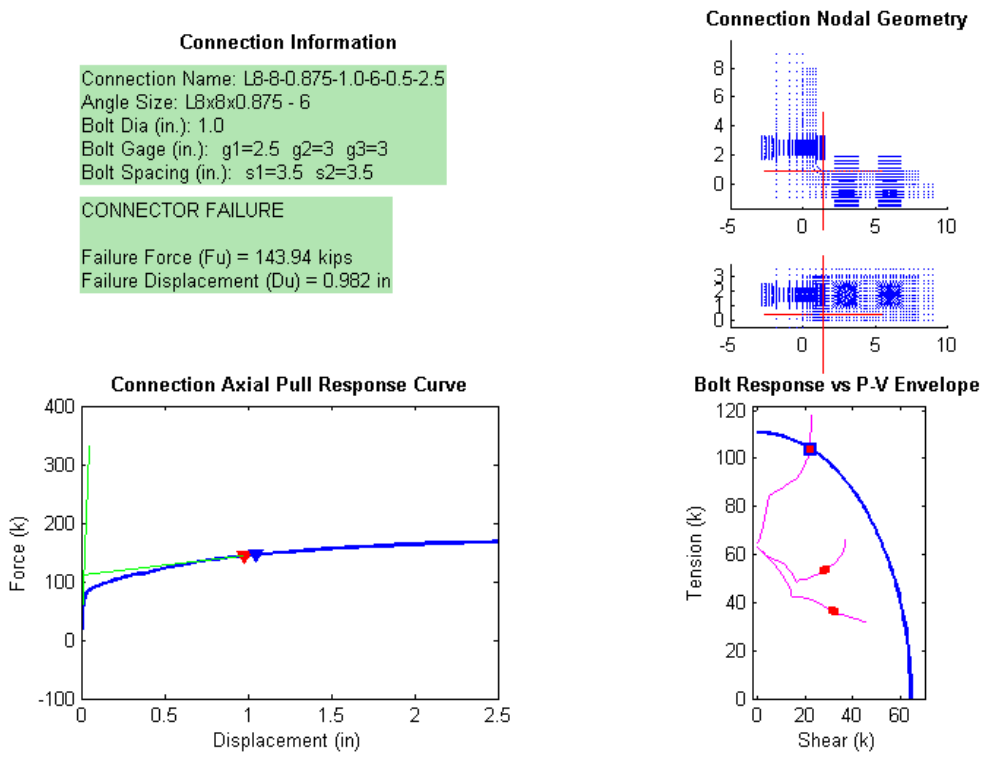


Figure B.370 Connection L8_8_0.875_1.0_6_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_1.0_6_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 7.4409e+003

Plastic Stiffness (k/in): 33.0524

Displacement (in): [9.3532e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.019058 ; 0.022766 ; 0.026474 ; 0.032036 ; 0.040379 ; 0.052893 ; 0.071664 ; 0.099821 ; 0.14206 ; 0.20541 ; 0.22917 ; 0.2648 ; 0.27817 ; 0.28318 ; 0.29069 ; 0.30197 ; 0.31888 ; 0.34425 ; 0.35377 ; 0.36804 ; 0.36937 ; 0.37138 ; 0.37439 ; 0.37891 ; 0.38568 ; 0.39584 ; 0.41108 ; 0.41679 ; 0.42536 ; 0.43822 ; 0.45751 ; 0.48644 ; 0.52983 ; 0.54611 ; 0.57052 ; 0.60713 ; 0.62086 ; 0.64146 ; 0.67235 ; 0.71869 ; 0.7882 ; 0.81427 ; 0.85337 ; 0.91202 ; 0.93402 ; 0.96701 ; 1.0165 ; 1.0907 ; 1.2021 ; 1.3691 ; 1.4316 ; 1.455 ; 1.4902 ; 1.5429 ; 1.5627 ; 1.5923 ; 1.6368 ; 1.7036 ; 1.8037 ; 1.9539 ; 2.1791 ; 2.4291 ; 2.5]

Force (kips): [-2.3666 ; 6.12228 ; 12.1665 ; 19.2275 ; 26.8908 ; 29.0563 ; 31.6845 ; 34.727 ; 36.952 ; 38.6227 ; 40.3195 ; 41.6098 ; 42.9077 ; 44.4446 ; 46.3601 ; 48.715 ; 51.5366 ; 52.4736 ; 53.7922 ; 54.2611 ; 54.4669 ; 54.7583 ; 55.1811 ; 55.8106 ; 56.3296 ; 56.3732 ; 56.5053 ; 56.4734 ; 56.4349 ; 56.4832 ; 56.7131 ; 57.0177 ; 57.4358 ; 58.0235 ; 58.2351 ; 58.5422 ; 59.0135 ; 59.6808 ; 60.6759 ; 62.06 ; 62.5621 ; 63.2785 ; 64.2778 ; 64.6426 ; 65.1714 ; 65.9256 ; 66.989 ; 68.4849 ; 69.0136 ; 69.768 ; 70.8046 ; 71.1871 ; 71.7323 ; 72.4892 ; 73.5237 ; 74.9395 ; 76.7666 ; 77.4109 ; 77.6428 ; 77.9762 ; 78.4554 ; 78.6306 ; 78.8832 ; 79.2456 ; 79.7511 ; 80.4487 ; 81.3666 ; 82.5138 ; 83.5362 ; 83.7928]

Bolt 1 - Tensile Force (kips): [63.1813 ; 62.8647 ; 62.6252 ; 62.325 ; 61.9671 ; 61.8581 ; 61.7187 ; 61.5369 ; 61.3829 ; 61.2361 ; 60.9636 ; 60.3565 ; 59.4816 ; 58.1894 ; 56.317 ; 53.6345 ; 49.8431 ; 48.3954 ; 46.2942 ; 45.5346 ; 45.2524 ; 44.8488 ; 44.2966 ; 43.6901 ; 43.3796 ; 43.2011 ; 42.72 ; 42.6919 ; 42.6658 ; 42.6384 ; 42.6019 ; 42.5645 ; 42.5336 ; 42.4672 ; 42.441 ; 42.4191 ; 42.3491 ; 42.2326 ; 42.0664 ; 41.8696 ; 41.7459 ; 41.579 ; 41.2892 ; 41.1537 ; 40.9242 ; 40.5674 ; 40.1061 ; 39.3114 ; 38.9365 ; 38.3879 ; 37.6159 ; 37.3468 ; 36.9666 ; 36.4984 ; 35.9132 ; 35.154 ; 34.5199 ; 34.3011 ; 34.2145 ; 34.082 ; 33.8827 ; 33.8025 ; 33.6878 ; 33.5214 ; 33.3029 ; 33.0058 ; 32.641 ; 32.2788 ; 32.1028 ; 32.0807]

Bolt 1 - Shear Force (kips): [0.126157 ; 0.280528 ; 0.55264 ; 0.887482 ; 1.27341 ; 1.38859 ; 1.53466 ; 1.72333 ; 1.8822 ; 2.03602 ; 2.34073 ; 3.05622 ; 3.99557 ; 5.24831 ; 6.90278 ; 9.03116 ; 11.6236 ; 12.4559 ; 13.4716 ; 13.7754 ; 13.8772 ; 14.014 ; 14.1811 ; 14.3211 ; 14.3092 ; 14.4046 ; 14.5554 ; 14.5516 ; 14.5462 ; 14.6215 ; 14.844 ; 15.0783 ; 15.2532 ; 15.6452 ; 15.7939 ; 15.8953 ; 16.3242 ; 16.986 ; 18.2633 ; 19.4034 ; 20.0182 ; 20.8487 ; 21.9601 ; 22.4042 ; 23.0544 ; 23.9353 ; 24.9363 ; 26.5517 ; 27.2687 ; 28.279 ; 29.6453 ; 30.1432 ; 30.8723 ; 31.8241 ; 33.1007 ; 34.9793 ; 37.1866 ; 37.8993 ; 38.1659 ; 38.5799 ; 39.1703 ; 39.3864 ; 39.6962 ; 40.1322 ; 40.7035 ; 41.5399 ; 42.6322 ; 43.9806 ; 45.0243 ; 45.295]

Bolt 2 - Tensile Force (kips): [63.1814 ; 62.7377 ; 62.3724 ; 61.907 ; 61.3679 ; 61.2029 ; 61.0088 ; 60.7595 ; 60.5785 ; 60.4175 ; 60.1603 ; 59.6572 ; 58.9929 ; 58.2695 ; 57.7733 ; 56.9288 ; 55.5214 ; 54.9715 ; 54.204 ; 53.9338 ; 53.8223 ; 53.6605 ; 53.4182 ; 52.9396 ; 49.8809 ; 49.0757 ; 48.4279 ; 48.3576 ; 48.2888 ; 48.2541 ; 48.3925 ; 48.4957 ; 48.6254 ; 48.8281 ; 48.8989 ; 49.0055 ; 49.1669 ; 49.4001 ; 49.6229 ; 49.7293 ; 49.7819 ; 49.894 ; 50.1563 ; 50.2382 ; 50.3898 ; 50.6721 ; 51.0696 ; 51.539 ; 51.7315 ; 52.0479 ; 52.5591 ; 52.7188 ; 52.9757 ; 53.4052 ; 54.1344 ; 55.1347 ; 56.524 ; 57.1019 ; 57.3182 ; 57.6389 ; 58.1139 ; 58.2938 ; 58.5645 ; 58.9602 ; 59.5265 ; 60.3792 ; 61.6917 ; 63.7155 ; 65.8476 ; 66.4266]

Bolt 2 - Shear Force (kips): [0.0917915 ; 0.42716 ; 0.796838 ; 1.25133 ; 1.77601 ; 1.93338 ; 2.13463 ; 2.40255 ; 2.6364 ; 2.86611 ; 3.26532 ; 4.02422 ; 5.0031 ; 6.24701 ; 7.74123 ; 9.51065 ; 11.4316 ; 12.0564 ; 12.9268 ; 13.2313 ; 13.3498 ; 13.523 ; 13.7803 ; 14.2123 ; 15.7896 ; 16.0633 ; 16.4268 ; 16.4281 ; 16.4226 ; 16.4196 ; 16.4593 ; 16.6082 ; 16.8702 ; 17.0727 ; 17.1695 ; 17.4414 ; 17.6636 ; 17.917 ; 18.3725 ; 19.7254 ; 20.1039 ; 20.6513 ; 21.3367 ; 21.599 ; 21.9411 ; 22.3727 ; 23.1839 ; 24.6316 ; 25.0987 ; 25.773 ; 26.6931 ; 27.059 ; 27.5534 ; 28.246 ; 29.2118 ; 30.4713 ; 32.1617 ; 32.8089 ; 33.0315 ; 33.3417 ; 33.7855 ; 33.9464 ; 34.1755 ; 34.4902 ; 34.9405 ; 35.509 ; 36.0315 ; 36.4719 ; 36.7566 ; 36.7874]

Bolt 3 - Tensile Force (kips): [65 ; 64.8762 ; 64.903 ; 65.1082 ; 65.6104 ; 65.8796 ; 66.371 ; 67.0898 ; 67.6982 ; 68.2175 ; 68.8547 ; 69.5416 ; 70.4213 ; 71.569 ; 73.1195 ; 75.3405 ; 78.4142 ; 79.4852 ; 81.0445 ; 81.6089 ; 81.8069 ; 82.0931 ; 82.492 ; 83.0303 ; 83.4867 ; 83.5456 ; 83.6502 ; 83.6229 ; 83.589 ; 83.6356 ; 83.8051 ; 84.0514 ; 84.4239 ; 84.9886 ; 85.1994 ; 85.5091 ; 85.9825 ; 86.7189 ; 87.8764 ; 89.6472 ; 90.294 ; 91.2447 ; 92.6206 ; 93.1132 ; 93.8224 ; 94.8306 ; 96.2236 ; 98.1043 ; 98.7536 ; 99.6971 ; 101.036 ; 101.566 ; 102.325 ; 103.353 ; 104.738 ; 106.5 ; 108.803 ; 109.672 ; 109.994 ; 110.46 ; 111.157 ; 111.434 ; 111.817 ; 112.35 ; 112.963 ; 113.838 ; 114.909 ; 116.392 ; 117.571 ; 117.854]

Bolt 3 - Shear Force (kips): [0.0272665 ; 0.106053 ; 0.231987 ; 0.410048 ; 0.659723 ; 0.751923 ; 0.880988 ; 1.0492 ; 1.19723 ; 1.33114 ; 1.50802 ; 1.71495 ; 1.95361 ; 2.28132 ; 2.7085 ; 3.23455 ; 3.81592 ; 4.00013 ; 4.25508 ; 4.34509 ; 4.3911 ; 4.45285 ; 4.54856 ; 4.69045 ; 4.80598 ; 4.81901 ; 4.84384 ; 4.8406 ; 4.83663 ; 4.84279 ; 4.89305 ; 4.9649 ; 5.07759 ; 5.64261 ; 6.13183 ; 6.69622 ; 7.8621 ; 9.34099 ; 11.1657 ; 13.6886 ; 14.6068 ; 15.7017 ; 16.8933 ; 17.2752 ; 17.7701 ; 18.3745 ; 19.1336 ; 19.9887 ; 20.2924 ; 20.7527 ; 21.4444 ; 21.6232 ; 21.6845 ; 21.9949 ; 22.2982 ; 22.2014 ; 21.8894 ; 22.0162 ; 22.0975 ; 22.1885 ; 22.3724 ; 22.4749 ; 22.602 ; 22.6305 ; 22.5776 ; 22.6 ; 22.5355 ; 22.7017 ; 22.9 ; 22.9631]

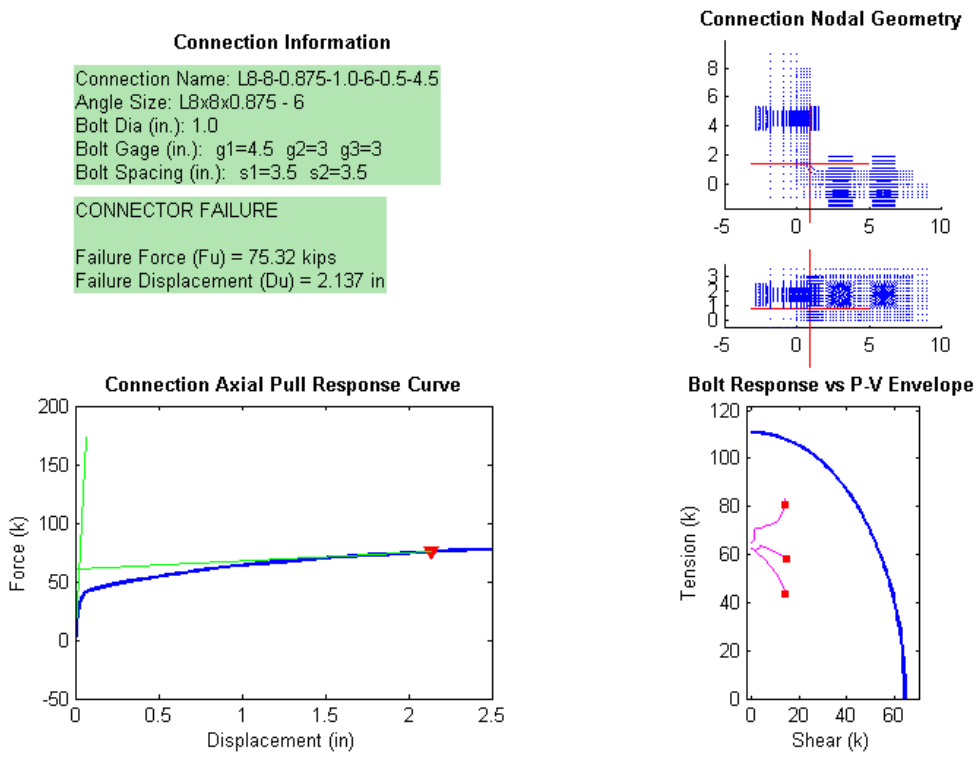


Figure B.371 Connection L8_8_0.875_1.0_6_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_1.0_6_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.6159e+003

Plastic Stiffness (k/in): 6.9248

Displacement (in): [9.4665e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.073132 ; 0.085646 ; 0.10442 ; 0.13257 ; 0.17481 ; 0.23816 ; 0.33319 ; 0.47573 ; 0.52919 ; 0.54923 ; 0.5793 ; 0.59058 ; 0.60749 ; 0.61383 ; 0.62335 ; 0.63762 ; 0.65902 ; 0.69113 ; 0.73929 ; 0.75735 ; 0.78445 ; 0.82508 ; 0.88604 ; 0.97747 ; 1.1146 ; 1.3203 ; 1.5703 ; 1.8203 ; 2.0703 ; 2.1328 ; 2.1953 ; 2.2891 ; 2.4297 ; 2.5]

Force (kips): [-2.38426 ; 0.964592 ; 2.72487 ; 5.01827 ; 7.95243 ; 11.5758 ; 15.3558 ; 18.6361 ; 20.5155 ; 20.8154 ; 21.1123 ; 21.445 ; 21.9356 ; 22.7173 ; 23.7935 ; 25.1344 ; 26.771 ; 27.322 ; 27.5218 ; 27.8239 ; 27.9478 ; 28.1405 ; 28.2182 ; 28.3447 ; 28.5132 ; 28.7486 ; 29.1066 ; 29.6222 ; 29.8068 ; 30.0745 ; 30.4594 ; 31.0182 ; 31.7563 ; 32.7471 ; 34.0352 ; 35.376 ; 36.4904 ; 37.4261 ; 37.6425 ; 37.8506 ; 38.1403 ; 38.5398 ; 38.7286]

Bolt 1 - Tensile Force (kips): [63.1773 ; 63.0545 ; 62.9873 ; 62.8943 ; 62.7693 ; 62.6019 ; 62.4044 ; 62.2002 ; 62.0535 ; 62.0245 ; 61.9951 ; 61.9624 ; 61.9062 ; 61.8013 ; 61.6446 ; 61.4771 ; 61.199 ; 60.9178 ; 60.7851 ; 60.5707 ; 60.4736 ; 60.3102 ; 60.2401 ; 60.1237 ; 59.9565 ; 59.713 ; 59.3273 ; 58.7425 ; 58.5233 ; 58.1986 ; 57.7171 ; 56.9854 ; 55.9275 ; 54.3525 ; 51.9681 ; 48.7737 ; 45.3053 ; 43.8668 ; 43.7779 ; 43.7126 ; 43.6442 ; 43.5614 ; 43.5241]

Bolt 1 - Shear Force (kips): [0.124753 ; 0.0856924 ; 0.146785 ; 0.24789 ; 0.390053 ; 0.581502 ; 0.804826 ; 1.0341 ; 1.20448 ; 1.24052 ; 1.27898 ; 1.32366 ; 1.39888 ; 1.53603 ; 1.7384 ; 1.95941 ; 2.32532 ; 2.68186 ; 2.84343 ; 3.09743 ; 3.20949 ; 3.39445 ; 3.47221 ; 3.59908 ; 3.77882 ; 4.03552 ; 4.42841 ; 5.00312 ; 5.21285 ; 5.51907 ; 5.96454 ; 6.62077 ; 7.53102 ; 8.80351 ; 10.5631 ; 12.5595 ; 14.0806 ; 14.4278 ; 14.4212 ; 14.4117 ; 14.3969 ; 14.3727 ; 14.356]

Bolt 2 - Tensile Force (kips): [63.1639 ; 63.0004 ; 62.9006 ; 62.7578 ; 62.5762 ; 62.3659 ; 62.1559 ; 62.0413 ; 62.0587 ; 62.0687 ; 62.0837 ; 62.104 ; 62.1381 ; 62.1865 ; 62.2697 ; 62.651 ; 63.472 ; 63.5949 ; 63.6204 ; 63.6336 ; 63.6219 ; 63.5877 ; 63.5661 ; 63.5251 ; 63.4661 ; 63.3814 ; 63.2415 ; 63.0142 ; 62.9255 ; 62.7904 ; 62.5887 ; 62.2837 ; 61.8742 ; 61.3743 ; 60.8482 ; 60.253 ; 59.4477 ; 58.6729 ; 58.4794 ; 58.2945 ; 58.0538 ; 57.7824 ; 57.6798]

Bolt 2 - Shear Force (kips): [0.0923419 ; 0.137278 ; 0.256623 ; 0.419225 ; 0.638951 ; 0.926348 ; 1.25421 ; 1.59131 ; 1.85471 ; 1.9115 ; 1.97155 ; 2.04401 ; 2.17132 ; 2.40514 ; 2.75063 ; 3.11425 ; 3.55556 ; 3.88291 ; 4.02605 ; 4.24944 ; 4.3473 ; 4.50834 ; 4.57608 ; 4.68644 ; 4.84294 ; 5.06586 ; 5.40695 ; 5.90595 ; 6.08754 ; 6.3516 ; 6.73241 ; 7.28746 ; 8.03623 ; 9.0134 ; 10.2574 ; 11.6576 ; 13.0909 ; 14.3976 ; 14.6958 ; 14.9806 ; 15.3757 ; 15.9039 ; 16.1474]

Bolt 3 - Tensile Force (kips): [65 ; 64.8623 ; 64.7522 ; 64.6582 ; 64.6352 ; 64.6742 ; 64.6567 ; 64.7425 ; 64.8111 ; 64.8202 ; 64.8716 ; 64.9887 ; 65.2278 ; 65.6818 ; 66.3591 ; 67.3255 ; 68.9437 ; 69.576 ; 69.8153 ; 70.173 ; 70.2716 ; 70.4063 ; 70.4586 ; 70.5525 ; 70.6684 ; 70.8041 ; 70.9685 ; 71.2424 ; 71.3018 ; 71.394 ; 71.5672 ; 71.9384 ; 72.3125 ; 72.9395 ; 74.2812 ; 76.2527 ; 78.0956 ; 80.0189 ; 80.5607 ; 81.0945 ; 81.8342 ; 82.8278 ; 83.315]

Bolt 3 - Shear Force (kips): [0.0646072 ; 0.016461 ; 0.0519018 ; 0.116207 ; 0.214576 ; 0.350602 ; 0.505498 ; 0.64686 ; 0.771021 ; 0.805195 ; 0.845549 ; 0.906259 ; 0.984784 ; 1.02813 ; 1.03351 ; 1.05539 ; 1.11732 ; 1.13536 ; 1.13976 ; 1.16944 ; 1.21777 ; 1.27838 ; 1.29398 ; 1.36364 ; 1.50782 ; 2.01709 ; 2.89929 ; 3.74866 ; 4.19183 ; 4.79659 ; 5.48278 ; 6.16457 ; 7.53084 ; 9.1994 ; 10.9774 ; 12.5925 ; 13.7003 ; 13.8935 ; 13.8859 ; 13.9545 ; 14.0628 ; 14.2116 ; 14.2474]

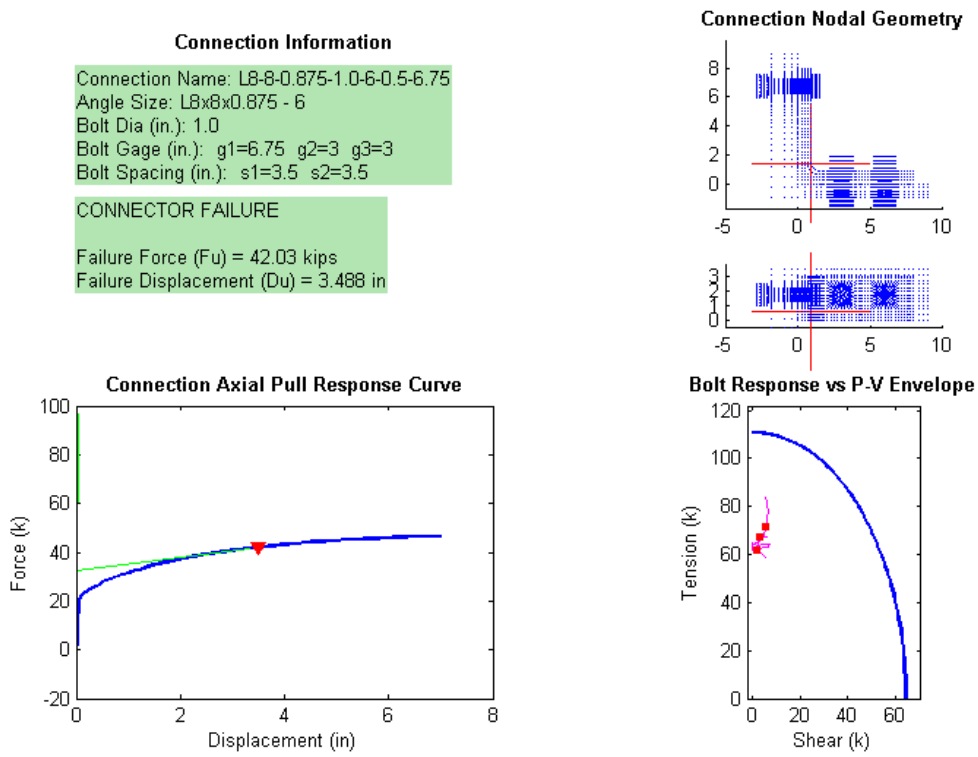


Figure B.372 Connection L8_8_0.875_1.0_6_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_1.0_6_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.9403e+003

Plastic Stiffness (k/in): 2.8443

Displacement (in): [9.2673e-036 ; 0.0013672 ; 0.0027344 ; 0.0047852 ; 0.0078613 ; 0.012476 ; 0.019397 ; 0.029779 ; 0.045352 ; 0.068712 ; 0.10375 ; 0.15631 ; 0.23515 ; 0.35341 ; 0.39776 ; 0.46427 ; 0.48922 ; 0.52664 ; 0.58276 ; 0.66695 ; 0.79324 ; 0.98267 ; 1.0537 ; 1.1603 ; 1.2002 ; 1.2152 ; 1.2377 ; 1.2714 ; 1.322 ; 1.3978 ; 1.5116 ; 1.5543 ; 1.6183 ; 1.7143 ; 1.8583 ; 2.0743 ; 2.2903 ; 2.5063 ; 2.8303 ; 3.3164 ; 4.0164 ; 4.1914 ; 4.4539 ; 4.5523 ; 4.7 ; 4.9215 ; 5.2537 ; 5.752 ; 5.927 ; 6.1895 ; 6.5833 ; 7]

Force (kips): [-2.29856 ; -0.0181498 ; 0.354264 ; 0.904272 ; 1.68251 ; 2.77913 ; 4.27231 ; 6.2261 ; 8.47954 ; 10.3799 ; 11.2991 ; 11.6641 ; 12.1062 ; 12.8503 ; 13.1109 ; 13.4799 ; 13.6556 ; 13.8652 ; 14.163 ; 14.5533 ; 15.0495 ; 15.7114 ; 15.9428 ; 16.2675 ; 16.3861 ; 16.441 ; 16.528 ; 16.6516 ; 16.8165 ; 17.0535 ; 17.3793 ; 17.5006 ; 17.6761 ; 17.9307 ; 18.2738 ; 18.7478 ; 19.1834 ; 19.5752 ; 20.1268 ; 20.818 ; 21.6151 ; 21.7899 ; 22.0212 ; 22.1015 ; 22.2125 ; 22.3624 ; 22.5598 ; 22.8276 ; 22.9104 ; 23.0215 ; 23.1647 ; 23.2889]

Bolt 1 - Tensile Force (kips): [63.1781 ; 63.0941 ; 63.0797 ; 63.0588 ; 63.0276 ; 62.9809 ; 62.9139 ; 62.8195 ; 62.6969 ; 62.5741 ; 62.5064 ; 62.481 ; 62.4556 ; 62.4038 ; 62.3828 ; 62.3473 ; 62.3288 ; 62.3038 ; 62.2658 ; 62.2123 ; 62.1478 ; 62.0775 ; 62.0559 ; 62.0271 ; 62.0181 ; 62.0136 ; 62.0069 ; 61.9975 ; 61.9855 ; 61.9682 ; 61.9454 ; 61.9365 ; 61.9241 ; 61.9059 ; 61.8839 ; 61.8572 ; 61.8313 ; 61.8073 ; 61.7626 ; 61.683 ; 61.4839 ; 61.3485 ; 61.1206 ; 61.0336 ; 60.9052 ; 60.7115 ; 60.4224 ; 59.9823 ; 59.8349 ; 59.626 ; 59.3408 ; 59.0487]

Bolt 1 - Shear Force (kips): [0.12289 ; 0.068876 ; 0.07358 ; 0.086255 ; 0.11247 ; 0.15903 ; 0.23135 ; 0.33723 ; 0.47741 ; 0.62053 ; 0.70392 ; 0.74241 ; 0.7841 ; 0.86275 ; 0.89419 ; 0.94631 ; 0.97217 ; 1.0078 ; 1.0616 ; 1.1375 ; 1.2311 ; 1.3376 ; 1.3721 ; 1.4195 ; 1.4352 ; 1.4424 ; 1.453 ; 1.4683 ; 1.4885 ; 1.5177 ; 1.5574 ; 1.5726 ; 1.5946 ; 1.6269 ; 1.6698 ; 1.7262 ; 1.783 ; 1.8383 ; 1.9326 ; 2.0906 ; 2.4188 ; 2.607 ; 2.9122 ; 3.0254 ; 3.1904 ; 3.433 ; 3.7835 ; 4.2926 ; 4.4592 ; 4.6933 ; 5.0118 ; 5.3334]

Bolt 2 - Tensile Force (kips): [63.1676 ; 63.054 ; 63.0387 ; 63.0108 ; 62.963 ; 62.889 ; 62.7902 ; 62.6759 ; 62.5568 ; 62.4828 ; 62.4639 ; 62.4651 ; 62.476 ; 62.5047 ; 62.5225 ; 62.5509 ; 62.5631 ; 62.5873 ; 62.6354 ; 62.7142 ; 62.8505 ; 63.106 ; 63.2104 ; 63.3874 ; 63.4638 ; 63.4944 ; 63.5458 ; 63.6236 ; 63.7463 ; 63.9393 ; 64.2392 ; 64.351 ; 64.5199 ; 64.7673 ; 65.1045 ; 65.5864 ; 65.9796 ; 66.3031 ; 66.6929 ; 67.1446 ; 67.6284 ; 67.6664 ; 67.6904 ; 67.6958 ; 67.6991 ; 67.6905 ; 67.6521 ; 67.5357 ; 67.4866 ; 67.4063 ; 67.2767 ; 67.0785]

Bolt 2 - Shear Force (kips): [0.090277 ; 0.072794 ; 0.099511 ; 0.14278 ; 0.20592 ; 0.29595 ; 0.42444 ; 0.60223 ; 0.82447 ; 1.0355 ; 1.1511 ; 1.1969 ; 1.2541 ; 1.3679 ; 1.4144 ; 1.4954 ; 1.5337 ; 1.5884 ; 1.6726 ; 1.7926 ; 1.9475 ; 2.1388 ; 2.2028 ; 2.2919 ; 2.3223 ; 2.335 ; 2.3535 ; 2.3801 ; 2.4155 ; 2.465 ; 2.5297 ; 2.5527 ; 2.5858 ; 2.6336 ; 2.6979 ; 2.7788 ; 2.8573 ; 2.9333 ; 3.0543 ; 3.2589 ; 3.6232 ; 3.7908 ; 4.0529 ; 4.1486 ; 4.2869 ; 4.4878 ; 4.7704 ; 5.1686 ; 5.2972 ; 5.475 ; 5.7088 ; 5.9309]

Bolt 3 - Tensile Force (kips): [65 ; 64.9524 ; 64.9007 ; 64.8294 ; 64.7428 ; 64.6381 ; 64.542 ; 64.4353 ; 64.149 ; 63.5691 ; 62.7931 ; 62.1982 ; 61.9115 ; 62.0253 ; 62.1086 ; 62.3289 ; 62.4588 ; 62.59 ; 62.7051 ; 62.7906 ; 62.7804 ; 63.3255 ; 63.6381 ; 64.0555 ; 64.2209 ; 64.246 ; 64.2608 ; 64.2109 ; 64.132 ; 64.0518 ; 63.9655 ; 63.9343 ; 63.9556 ; 64.1059 ; 64.3294 ; 64.8806 ; 65.4601 ; 66.1993 ; 68.2969 ; 70.9441 ; 74.1907 ; 75.0659 ; 76.1952 ; 76.5904 ; 77.131 ; 77.8643 ; 78.8634 ; 80.3511 ; 80.8638 ; 81.5638 ; 82.5908 ; 83.5118]

Bolt 3 - Shear Force (kips): [0.057459 ; 0.039478 ; 0.024751 ; 0.023662 ; 0.041981 ; 0.076917 ; 0.13352 ; 0.21311 ; 0.29338 ; 0.30078 ; 0.28599 ; 0.26527 ; 0.31551 ; 0.47407 ; 0.53941 ; 0.73424 ; 2.0132 ; 2.7737 ; 3.8937 ; 5.144 ; 5.8705 ; 6.6443 ; 6.914 ; 7.0992 ; 7.1362 ; 7.0161 ; 6.7068 ; 6.1241 ; 5.4054 ; 4.2524 ; 2.8972 ; 2.3917 ; 1.7038 ; 0.84623 ; 0.77908 ; 1.8242 ; 3.0985 ; 4.1106 ; 4.7862 ; 5.6247 ; 6.2186 ; 6.3037 ; 6.5155 ; 6.5653 ; 6.6312 ; 6.696 ; 6.7077 ; 6.5131 ; 6.4317 ; 6.312 ; 6.0881 ; 5.3102]

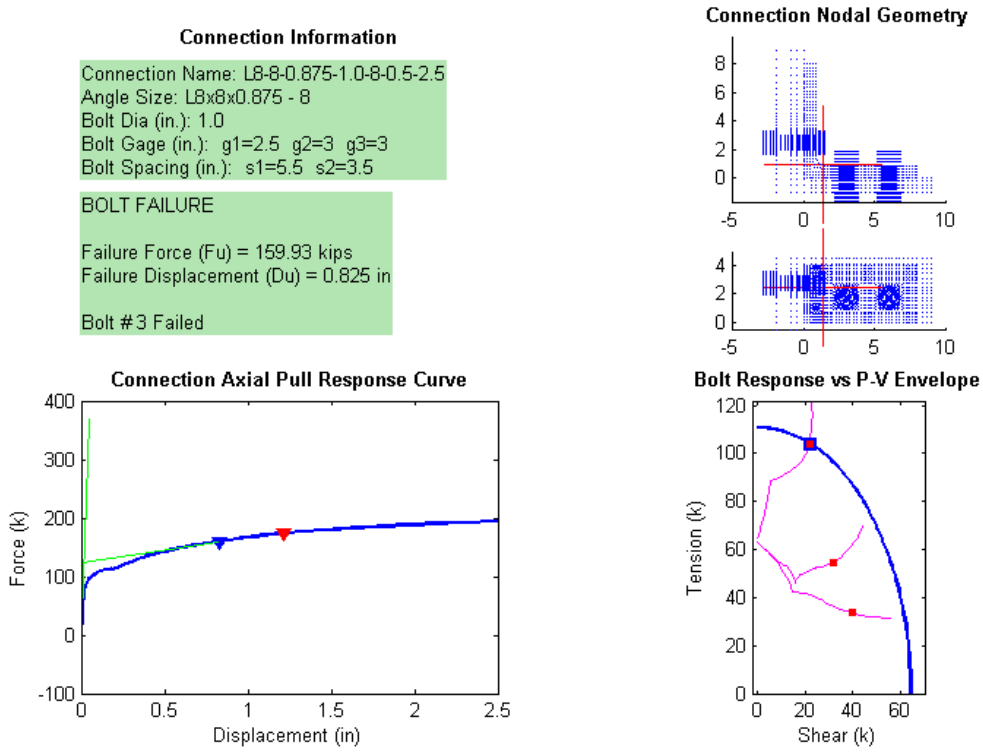


Figure B.373 Connection L8_8_0.875_1.0_8_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_1.0_8_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 7.3734e+003

Plastic Stiffness (k/in): 43.3606

Displacement (in): [8.4293e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012329 ; 0.013428 ; 0.015076 ; 0.017548 ; 0.021256 ; 0.026817 ; 0.03516 ; 0.047674 ; 0.066445 ; 0.094602 ; 0.10516 ; 0.121 ; 0.14476 ; 0.15367 ; 0.16703 ; 0.17204 ; 0.17392 ; 0.17674 ; 0.1778 ; 0.17938 ; 0.18176 ; 0.18533 ; 0.19068 ; 0.19269 ; 0.19344 ; 0.19457 ; 0.19626 ; 0.1988 ; 0.20261 ; 0.20832 ; 0.2169 ; 0.22975 ; 0.23096 ; 0.23277 ; 0.23548 ; 0.23955 ; 0.24565 ; 0.2548 ; 0.26854 ; 0.27368 ; 0.28141 ; 0.29299 ; 0.31037 ; 0.31689 ; 0.32666 ; 0.34132 ; 0.36332 ; 0.37157 ; 0.38394 ; 0.40249 ; 0.43033 ; 0.47208 ; 0.48774 ; 0.51123 ; 0.54646 ; 0.5993 ; 0.67857 ; 0.70829 ; 0.75288 ; 0.81976 ; 0.84484 ; 0.88247 ; 0.9389 ; 0.96006 ; 0.9918 ; 1.0394 ; 1.1108 ; 1.1376 ; 1.1778 ; 1.2381 ; 1.3284 ; 1.464 ; 1.6674 ; 1.7299 ; 1.8237 ; 1.9643 ; 2.1752 ; 2.2377 ; 2.3315 ; 2.4721 ; 2.5]

Force (kips): [-2.01402 ; 6.25079 ; 12.3871 ; 19.6653 ; 27.9823 ; 29.6561 ; 31.1637 ; 33.1831 ; 35.739 ; 38.9591 ; 42.2281 ; 45.2235 ; 47.8757 ; 50.3078 ; 52.7808 ; 53.5784 ; 54.6452 ; 55.9263 ; 56.1703 ; 56.0561 ; 55.9624 ; 56.0846 ; 56.0678 ; 56.121 ; 56.2021 ; 56.3153 ; 56.2872 ; 56.2211 ; 56.1987 ; 56.1909 ; 56.3536 ; 56.4759 ; 56.6498 ; 56.8958 ; 57.2449 ; 57.7669 ; 58.5037 ; 58.5813 ; 58.6969 ; 58.8689 ; 59.114 ; 59.4541 ; 60.0064 ; 60.7451 ; 61.0223 ; 61.4508 ; 62.0934 ; 62.9969 ; 63.3678 ; 63.8668 ; 64.6596 ; 65.7592 ; 66.1382 ; 66.7286 ; 67.6026 ; 68.7701 ; 70.3692 ; 70.9545 ; 71.7927 ; 72.9542 ; 74.5336 ; 76.6335 ; 77.3637 ; 78.4009 ; 79.8509 ; 80.3943 ; 81.1547 ; 82.2248 ; 82.6119 ; 83.2225 ; 84.0772 ; 85.2745 ; 85.6959 ; 86.287 ; 87.1266 ; 88.2737 ; 89.7987 ; 91.7695 ; 92.3174 ; 93.0832 ; 94.113 ; 95.4126 ; 95.7565 ; 96.2358 ; 96.8823 ; 97.0029]

Bolt 1 - Tensile Force (kips): [63.1858 ; 62.8632 ; 62.6065 ; 62.2754 ; 61.8573 ; 61.7676 ; 61.6846 ; 61.5693 ; 61.415 ; 61.1928 ; 60.6448 ; 59.3556 ; 57.0803 ; 54.5478 ; 51.5022 ; 50.401 ; 48.6148 ; 45.2603 ; 43.733 ; 43.4206 ; 43.3748 ; 43.1395 ; 42.858 ; 42.8226 ; 42.7899 ; 42.7497 ; 42.6765 ; 42.6351 ; 42.6256 ; 42.6227 ; 42.6031 ; 42.5821 ; 42.5551 ; 42.5216 ; 42.4888 ; 42.4145 ; 42.3138 ; 42.2976 ; 42.2725 ; 42.2321 ; 42.1755 ; 42.1014 ; 41.9807 ; 41.8385 ; 41.7814 ; 41.673 ; 41.4961 ; 41.2683 ; 41.1585 ; 40.9619 ; 40.6061 ; 40.1391 ; 39.9765 ; 39.617 ; 39.0543 ; 38.2154 ; 37.1441 ; 36.8181 ; 36.4217 ; 35.9258 ; 35.331 ; 34.7132 ; 34.5076 ; 34.1918 ; 33.69 ; 33.4782 ; 33.1927 ; 32.8551 ; 32.7358 ; 32.566 ; 32.3595 ; 32.2382 ; 32.2084 ; 32.1782 ; 32.1383 ; 32.0735 ; 31.9804 ; 31.9335 ; 31.8596 ; 31.7261 ; 31.6179 ; 31.4516 ; 31.4018 ; 31.3544 ; 31.3204 ; 31.3148]

Bolt 1 - Shear Force (kips): [0.116412 ; 0.323415 ; 0.631374 ; 1.01446 ; 1.47746 ; 1.57447 ; 1.66343 ; 1.78542 ; 1.94559 ; 2.17523 ; 2.79582 ; 4.17077 ; 6.29208 ; 8.38628 ; 10.5979 ; 11.3216 ; 12.3763 ; 13.8982 ; 14.3316 ; 14.3233 ; 14.3126 ; 14.5023 ; 14.6076 ; 14.6096 ; 14.6094 ; 14.6072 ; 14.5988 ; 14.5886 ; 14.5856 ; 14.5845 ; 14.6972 ; 14.8162 ; 14.9667 ; 15.1411 ; 15.2609 ; 15.5942 ; 15.9593 ; 16.0487 ; 16.1909 ; 16.4138 ; 16.6918 ; 16.9748 ; 17.8567 ; 18.7051 ; 19.0175 ; 19.5479 ; 20.4347 ; 21.4213 ; 21.837 ; 22.5005 ; 23.4702 ; 24.5057 ; 24.8449 ; 25.5702 ; 26.6463 ; 28.2118 ; 30.1295 ; 30.7487 ; 31.6138 ; 32.75 ; 34.4296 ; 36.5169 ; 37.2597 ; 38.2512 ; 39.6916 ; 40.2889 ; 41.1026 ; 42.32 ; 42.7504 ; 43.3167 ; 44.0431 ; 45.0971 ; 45.4562 ; 45.9414 ; 46.5608 ; 47.4884 ; 48.6963 ; 50.2113 ; 50.6036 ; 51.1728 ; 52.1138 ; 53.4906 ; 53.8871 ; 54.4323 ; 55.1826 ; 55.3187]

Bolt 2 - Tensile Force (kips): [63.1827 ; 62.794 ; 62.4524 ; 62.0115 ; 61.4825 ; 61.373 ; 61.2713 ; 61.1324 ; 60.9576 ; 60.7176 ; 60.1964 ; 59.0379 ; 57.0084 ; 55.1415 ; 53.8367 ; 53.5799 ; 53.1087 ; 51.5129 ; 49.8094 ; 47.1445 ; 46.8051 ; 46.8187 ; 46.743 ; 46.7173 ; 46.721 ; 46.7238 ; 46.465 ; 46.3109 ; 46.2739 ; 46.2623 ; 46.3651 ; 46.5029 ; 46.6834 ; 46.9255 ; 47.2104 ; 47.5569 ; 47.9984 ; 48.0412 ; 48.1062 ; 48.2053 ; 48.3506 ; 48.5597 ; 48.8796 ; 49.3203 ; 49.4624 ; 49.6316 ; 49.8327 ; 50.0819 ; 50.191 ; 50.3834 ; 50.6882 ; 51.103 ; 51.207 ; 51.365 ; 51.6098 ; 51.9949 ; 52.3871 ; 52.4603 ; 52.5234 ; 52.6379 ; 52.9845 ; 53.6992 ; 53.899 ; 54.2504 ; 54.8014 ; 54.9924 ; 55.2574 ; 55.7003 ; 55.8704 ; 56.1887 ; 56.6823 ; 57.4332 ; 57.7157 ; 58.1603 ; 58.872 ; 59.8436 ; 61.1728 ; 63.1343 ; 63.7065 ; 64.5455 ; 65.7225 ; 67.3647 ; 67.8505 ; 68.5486 ; 69.5513 ; 69.7442]

Bolt 2 - Shear Force (kips): [0.0795001 ; 0.426145 ; 0.801901 ; 1.2668 ; 1.82414 ; 1.94022 ; 2.04739 ; 2.19465 ; 2.39012 ; 2.67386 ; 3.34195 ; 4.70216 ; 6.79992 ; 8.80472 ; 10.731 ; 11.3139 ; 12.1497 ; 13.6123 ; 14.4925 ; 15.3666 ; 15.4029 ; 15.42 ; 15.4146 ; 15.4911 ; 15.5888 ; 15.7231 ; 15.8146 ; 15.8192 ; 15.8131 ; 15.8115 ; 15.8435 ; 15.8851 ; 15.9393 ; 16.0107 ; 16.2222 ; 16.5096 ; 16.9717 ; 17.0236 ; 17.0914 ; 17.1834 ; 17.3122 ; 17.486 ; 17.6493 ; 17.9021 ; 18.0581 ; 18.4236 ; 19.0272 ; 19.9665 ; 20.2677 ; 20.6286 ; 21.044 ; 21.6722 ; 21.949 ; 22.251 ; 22.6793 ; 23.2967 ; 24.3176 ; 24.7972 ; 25.5152 ; 26.5623 ; 27.7168 ; 29.1321 ; 29.727 ; 30.5995 ; 31.7291 ; 32.1283 ; 32.7221 ; 33.5245 ; 33.8167 ; 34.2191 ; 34.7979 ; 35.6238 ; 35.9109 ; 36.3198 ; 36.953 ; 37.8196 ; 39.0041 ; 40.4985 ; 40.9319 ; 41.5118 ; 42.2359 ; 43.0249 ; 43.1949 ; 43.4622 ; 43.8297 ; 43.8989]

Bolt 3 - Tensile Force (kips): [65 ; 64.8709 ; 64.9015 ; 65.1199 ; 65.6429 ; 65.8135 ; 66.0278 ; 66.3866 ; 66.9544 ; 67.724 ; 68.6559 ; 69.7015 ; 70.9203 ; 72.5396 ; 74.5873 ; 75.3034 ; 76.2982 ; 77.5546 ; 77.8335 ; 77.8353 ; 77.7697 ; 77.8719 ; 77.861 ; 77.9068 ; 77.9791 ; 78.0829 ; 78.0667 ; 78.0117 ; 77.9921 ; 77.9853 ; 78.1239 ; 78.2279 ; 78.3799 ; 78.6018 ; 78.9263 ; 79.411 ; 80.1121 ; 80.1808 ; 80.2842 ; 80.4391 ; 80.6665 ; 80.9955 ; 81.5098 ; 82.2409 ; 82.5127 ; 82.9281 ; 83.5586 ; 84.4826 ; 84.8215 ; 85.291 ; 85.9674 ; 86.8646 ; 87.1571 ; 87.6232 ; 88.4144 ; 89.5929 ; 91.3133 ; 91.9864 ; 93.0107 ; 94.5526 ; 96.7759 ; 99.8201 ; 100.796 ; 102.127 ; 103.931 ; 104.556 ; 105.449 ; 106.676 ; 107.116 ; 107.903 ; 108.93 ; 110.37 ; 110.917 ; 111.625 ; 112.571 ; 113.802 ; 115.461 ; 117.442 ; 117.929 ; 118.642 ; 119.585 ; 120.556 ; 120.774 ; 121.08 ; 121.403 ; 121.457]

Bolt 3 - Shear Force (kips): [0.039367 ; 0.105117 ; 0.228878 ; 0.404784 ; 0.660584 ; 0.724601 ; 0.787146 ; 0.877994 ; 0.998665 ; 1.1644 ; 1.36923 ; 1.61426 ; 1.90967 ; 2.3259 ; 2.89657 ; 3.09115 ; 3.34236 ; 3.63762 ; 3.70476 ; 3.71203 ; 3.70407 ; 3.71925 ; 3.71802 ; 3.72609 ; 3.74002 ; 3.76248 ; 3.762 ; 3.75632 ; 3.75425 ; 3.75352 ; 3.77428 ; 3.79546 ; 3.82697 ; 3.87351 ; 3.94226 ; 4.04198 ; 4.18775 ; 4.20098 ; 4.22056 ; 4.24946 ; 4.29248 ; 4.35643 ; 4.44599 ; 4.57825 ; 4.62712 ; 4.69778 ; 4.79726 ; 4.93944 ; 5.002 ; 5.07973 ; 5.20721 ; 5.36218 ; 5.40398 ; 5.49127 ; 5.66708 ; 7.94838 ; 10.9596 ; 12.4435 ; 14.394 ;

16.5077 ; 18.5563 ; 20.4651 ; 20.9618 ; 21.4854 ; 22.0525 ; 21.9965 ; 21.9817 ; 22.1037 ; 22.178 ; 22.3057 ; 22.4197 ; 22.7313 ; 22.7874 ; 22.7732 ; 22.8473 ; 22.8905 ; 23.1051 ; 23.1043 ; 22.9379 ; 22.8658 ; 22.9173 ; 23.0763 ; 23.0947 ; 22.8962 ; 22.569 ; 22.5017]

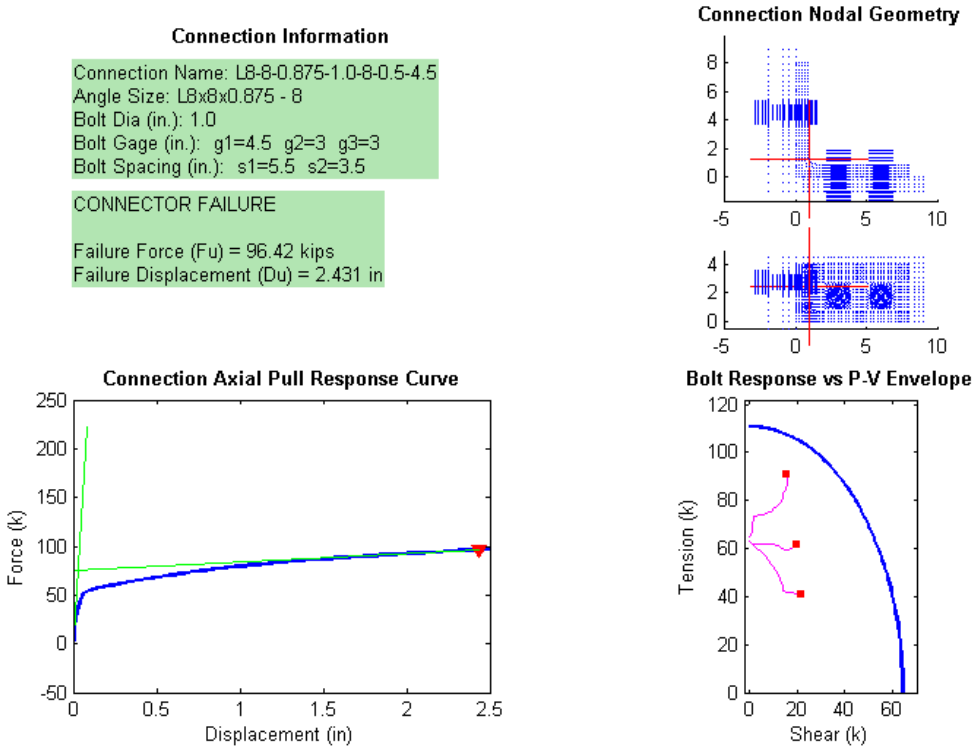


Figure B.374 Connection L8_8_0.875_1.0_8_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_1.0_8_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.6256e+003

Plastic Stiffness (k/in): 8.5318

Displacement (in): [1.0159e-035 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.024414 ; 0.031006 ; 0.040894 ; 0.055725 ; 0.077972 ; 0.11134 ; 0.1614 ; 0.23649 ; 0.34911 ; 0.39135 ; 0.4547 ; 0.47846 ; 0.48737 ; 0.50073 ; 0.52077 ; 0.55084 ; 0.59594 ; 0.6636 ; 0.68897 ; 0.72702 ; 0.7841 ; 0.86972 ; 0.99816 ; 1.0945 ; 1.239 ; 1.4557 ; 1.5182 ; 1.612 ; 1.6471 ; 1.6999 ; 1.779 ; 1.8976 ; 1.9421 ; 1.9588 ; 1.9838 ; 2.0214 ; 2.0777 ; 2.1621 ; 2.2888 ; 2.3363 ; 2.4076 ; 2.4307 ; 2.4654 ; 2.5]

Force (kips): [-2.02149 ; 1.1497 ; 3.10673 ; 5.66284 ; 8.95307 ; 13.082 ; 16.456 ; 19.0627 ; 22.0419 ; 24.7523 ; 26.541 ; 27.6333 ; 28.6573 ; 30.0166 ; 31.804 ; 32.4206 ; 33.2726 ; 33.6112 ; 33.743 ; 33.9533 ; 34.2477 ; 34.6496 ; 35.2157 ; 36.0338 ; 36.3739 ; 36.8949 ; 37.6016 ; 38.5123 ; 39.7428 ; 40.5562 ; 41.6636 ; 43.1086 ; 43.5073 ; 44.0624 ; 44.261 ; 44.5527 ; 44.9865 ; 45.628 ; 45.8608 ; 45.9487 ; 46.0772 ; 46.2715 ; 46.5665 ; 46.9967 ; 47.5896 ; 47.8072 ; 48.1128 ; 48.2113 ; 48.355 ; 48.4946]

Bolt 1 - Tensile Force (kips): [63.1792 ; 63.0568 ; 62.9762 ; 62.8657 ; 62.7152 ; 62.5081 ; 62.3203 ; 62.1605 ; 61.957 ; 61.7393 ; 61.5471 ; 61.3945 ; 61.1874 ; 60.1323 ; 58.0952 ; 57.316 ; 56.1864 ; 55.7538 ; 55.5879 ; 55.3325 ; 54.9583 ; 54.4034 ; 53.5594 ; 52.1945 ; 51.619 ; 50.7028 ; 49.3093 ; 47.284 ; 44.5782 ; 43.7164 ; 43.3999 ; 43.0483 ; 42.8206 ; 42.6212 ; 42.5609 ; 42.4824 ; 42.3795 ; 42.1429 ; 42.048 ; 42.0081 ; 41.9561 ; 41.8612 ; 41.7028 ; 41.5209 ; 41.2899 ; 41.1798 ; 41.0277 ; 40.9736 ; 40.888 ; 40.7932]

Bolt 1 - Shear Force (kips): [0.113156 ; 0.100346 ; 0.185951 ; 0.316398 ; 0.497031 ; 0.740988 ; 0.957319 ; 1.13871 ; 1.36602 ; 1.60733 ; 1.8215 ; 1.99711 ; 2.24377 ; 3.46633 ; 5.47642 ; 6.18125 ; 7.159 ; 7.52063 ; 7.65676 ; 7.86419 ; 8.16382 ; 8.59827 ; 9.23884 ; 10.2246 ; 10.6221 ; 11.2274 ; 12.0731 ; 13.1274 ; 14.1554 ; 14.3378 ; 14.3067 ; 14.2034 ; 14.2997 ; 14.2584 ; 14.2362 ; 14.2012 ; 14.1501 ; 14.8354 ; 15.112 ; 15.2545 ; 15.4061 ; 15.8187 ; 16.5865 ; 18.0241 ; 19.592 ; 20.2875 ; 21.1741 ; 21.5223 ; 22.0161 ; 22.482]

Bolt 2 - Tensile Force (kips): [63.1621 ; 63.025 ; 62.9181 ; 62.7633 ; 62.564 ; 62.323 ; 62.1356 ; 62.0033 ; 61.8805 ; 61.8416 ; 61.8838 ; 61.9369 ; 62.0167 ; 61.8007 ; 61.9541 ; 62.0296 ; 62.1054 ; 62.1184 ; 62.1199 ; 62.1191 ; 62.1149 ; 62.1039 ; 62.0673 ; 61.9366 ; 61.8546 ; 61.7189 ; 61.4796 ; 61.0652 ; 60.3795 ; 59.8976 ; 59.3257 ; 59.3122 ; 59.3883 ; 59.5298 ; 59.6007 ; 59.7123 ; 59.8366 ; 60.1583 ; 60.2857 ; 60.3345 ; 60.3977 ; 60.5119 ; 60.7071 ; 60.9592 ; 61.2876 ; 61.3776 ; 61.5409 ; 61.5839 ; 61.6549 ; 61.7335]

Bolt 2 - Shear Force (kips): [0.0748647 ; 0.135391 ; 0.267939 ; 0.447466 ; 0.68969 ; 1.00919 ; 1.28464 ; 1.51063 ; 1.79354 ; 2.10161 ; 2.39541 ; 2.6399 ; 2.97522 ; 4.19877 ; 5.98021 ; 6.5648 ; 7.33378 ; 7.61143 ; 7.71528 ; 7.87355 ; 8.10048 ; 8.42408 ; 8.88429 ; 9.56434 ; 9.83559 ; 10.248 ; 10.8469 ; 11.6852 ; 12.8457 ; 13.6357 ; 14.6547 ; 15.8173 ; 16.0983 ; 16.5052 ; 16.6467 ; 16.8502 ; 17.3767 ; 17.9209 ; 18.1641 ; 18.2439 ; 18.3894 ; 18.5426 ; 18.699 ; 18.8379 ; 19.2386 ; 19.4319 ; 19.6685 ; 19.7266 ; 19.8072 ; 19.8823]

Bolt 3 - Tensile Force (kips): [65 ; 64.8591 ; 64.7517 ; 64.6725 ; 64.6845 ; 64.7783 ; 64.8552 ; 64.9951 ; 65.3402 ; 66.0511 ; 66.6765 ; 67.3475 ; 68.1268 ; 69.1709 ; 70.9581 ; 71.6582 ; 72.7447 ; 73.0596 ; 73.175 ; 73.3485 ; 73.5868 ; 73.913 ; 74.3189 ; 74.978 ; 75.2142 ; 75.5481 ; 76.0097 ; 76.692 ; 77.6699 ; 78.3499 ; 79.7 ; 82.1182 ; 82.9159 ; 83.8814 ; 84.2078 ; 84.6837 ; 85.3705 ; 86.4385 ; 86.8311 ; 86.9804 ; 87.1998 ; 87.5252 ; 88.0483 ; 88.8479 ; 89.9742 ; 90.396 ; 90.9999 ; 91.1938 ; 91.4772 ; 91.7415]

Bolt 3 - Shear Force (kips): [0.0676417 ; 0.0231822 ; 0.0623744 ; 0.132294 ; 0.240774 ; 0.39389 ; 0.535312 ; 0.65967 ; 0.819472 ; 1.01979 ; 1.20303 ; 1.27286 ; 1.3077 ; 1.41467 ; 1.61996 ; 1.71437 ; 1.86723 ; 1.99172 ; 2.04715 ; 2.17672 ; 2.60977 ; 4.27685 ; 6.44254 ; 8.44575 ; 9.09845 ; 9.57438 ; 9.81825 ; 10.1685 ; 11.4406 ; 12.4429 ; 13.3721 ; 14.1359 ; 14.3531 ; 14.7955 ; 14.9502 ; 15.173 ; 15.5302 ; 15.8802 ; 15.9934 ; 16.0366 ; 16.1015 ; 16.1988 ; 16.1161 ; 15.933 ; 15.7323 ; 15.6216 ; 15.4972 ; 15.4536 ; 15.3973 ; 15.3564]

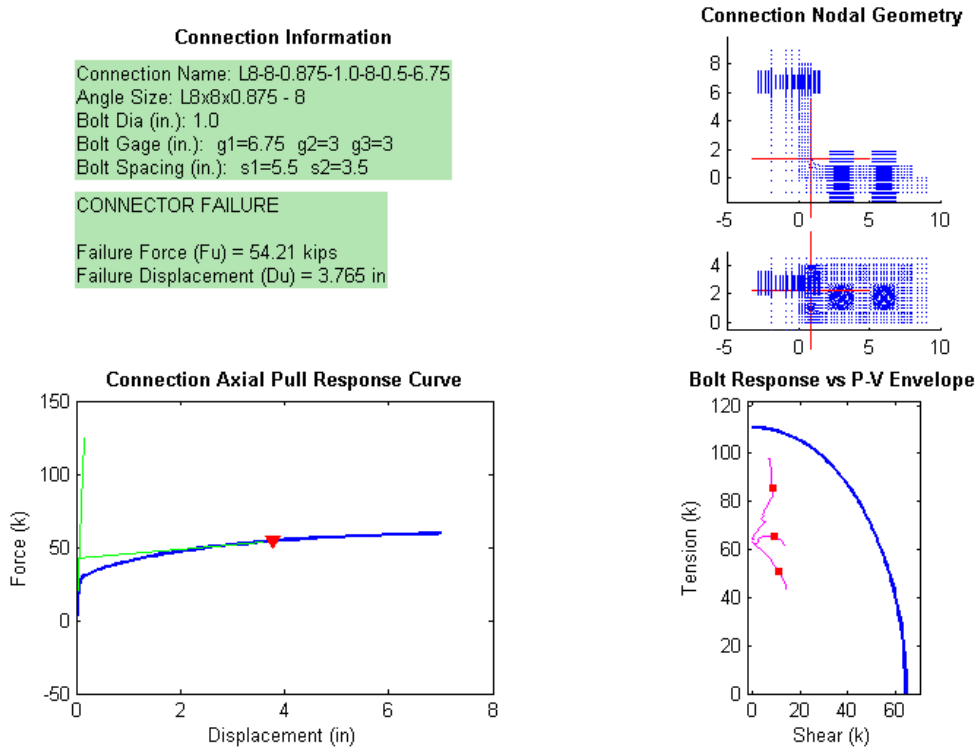


Figure B.375 Connection L8_8_0.875_1.0_8_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_1.0_8_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 887.0107

Plastic Stiffness (k/in): 3.2322

Displacement (in): [7.9398e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.056824 ; 0.067206 ; 0.082779 ; 0.10614 ; 0.14118 ; 0.19374 ; 0.27258 ; 0.39083 ; 0.43518 ; 0.5017 ; 0.60148 ; 0.75115 ; 0.97566 ; 1.0599 ; 1.0914 ; 1.1151 ; 1.1506 ; 1.2039 ; 1.2838 ; 1.4037 ; 1.4486 ; 1.5161 ; 1.6172 ; 1.7689 ; 1.9965 ; 2.0818 ; 2.2098 ; 2.4018 ; 2.6899 ; 2.7979 ; 2.9599 ; 3.2029 ; 3.5674 ; 4.1142 ; 4.8142 ; 5.5142 ; 6.2142 ; 6.9142 ; 7]

Force (kips): [-1.95924 ; 1.30783 ; 2.8916 ; 5.01341 ; 7.71432 ; 10.8281 ; 11.6897 ; 12.7418 ; 13.8263 ; 14.6143 ; 15.1243 ; 15.5347 ; 16.1395 ; 16.9845 ; 17.2739 ; 17.6769 ; 18.2547 ; 19.0146 ; 19.9952 ; 20.3428 ; 20.4857 ; 20.5971 ; 20.766 ; 21.0052 ; 21.3322 ; 21.7959 ; 21.956 ; 22.1869 ; 22.517 ; 22.9941 ; 23.6442 ; 23.8812 ; 24.2129 ; 24.6652 ; 25.2816 ; 25.5025 ; 25.8124 ; 26.2394 ; 26.8285 ; 27.5885 ; 28.3445 ; 28.9326 ; 29.3776 ; 29.7384 ; 29.7789]

Bolt 1 - Tensile Force (kips): [63.18 ; 63.0517 ; 62.9804 ; 62.8785 ; 62.7359 ; 62.5456 ; 62.4857 ; 62.4081 ; 62.3214 ; 62.2542 ; 62.2118 ; 62.1817 ; 62.1294 ; 62.0342 ; 61.9936 ; 61.9306 ; 61.8279 ; 61.6806 ; 61.4981 ; 61.4368 ; 61.4114 ; 61.3915 ; 61.359 ; 61.3068 ; 61.2078 ; 60.9659 ; 60.8031 ; 60.5521 ; 60.1721 ; 59.5449 ; 58.5574 ; 58.1854 ; 57.6382 ; 56.8311 ; 55.6211 ; 55.1671 ; 54.4928 ; 53.4842 ; 51.975 ; 49.7139 ; 46.8873 ; 44.5513 ; 43.8532 ; 43.6617 ; 43.6425]

Bolt 1 - Shear Force (kips): [0.111695 ; 0.110352 ; 0.186998 ; 0.304873 ; 0.472335 ; 0.694375 ; 0.763535 ; 0.852744 ; 0.952607 ; 1.03151 ; 1.08455 ; 1.12643 ; 1.19733 ; 1.32311 ; 1.37619 ; 1.45841 ; 1.58937 ; 1.77182 ; 1.9916 ; 2.06318 ; 2.09262 ; 2.11554 ; 2.15289 ; 2.21347 ; 2.32948 ; 2.61435 ; 2.80914 ; 3.10073 ; 3.5242 ; 4.1794 ; 5.14534 ; 5.49437 ; 5.9983 ; 6.71822 ; 7.75059 ; 8.12271 ; 8.66122 ; 9.43565 ; 10.531 ; 11.9959 ; 13.448 ; 14.2734 ; 14.3938 ; 14.3687 ; 14.3642]

Bolt 2 - Tensile Force (kips): [63.165 ; 63.0206 ; 62.9147 ; 62.7713 ; 62.6136 ; 62.4504 ; 62.4142 ; 62.3778 ; 62.3518 ; 62.3436 ; 62.3426 ; 62.3445 ; 62.3646 ; 62.4316 ; 62.4642 ; 62.5258 ; 62.6417 ; 62.9066 ; 63.4517 ; 63.7236 ; 63.8297 ; 63.9128 ; 64.0391 ; 64.2276 ; 64.4985 ; 64.8585 ; 64.9332 ; 65.036 ; 65.1804 ; 65.358 ; 65.5396 ; 65.5954 ; 65.6607 ; 65.7306 ; 65.7567 ; 65.7408 ; 65.7011 ; 65.6047 ; 65.3928 ; 65.0572 ; 64.4549 ; 63.6132 ; 62.7823 ; 62.1041 ; 62.0264]

Bolt 2 - Shear Force (kips): [0.0736481 ; 0.159477 ; 0.28488 ; 0.460742 ; 0.698997 ; 0.996028 ; 1.08402 ; 1.19689 ; 1.3203 ; 1.41523 ; 1.47292 ; 1.51623 ; 1.59994 ; 1.75741 ; 1.82691 ; 1.93693 ; 2.11526 ; 2.3608 ; 2.63734 ; 2.71284 ; 2.74146 ; 2.76286 ; 2.79656 ; 2.85006 ; 2.95006 ; 3.18672 ; 3.34888 ; 3.59081 ; 3.93925 ; 4.4706 ; 5.22745 ; 5.49415 ; 5.87435 ; 6.40236 ; 7.13727 ; 7.3981 ; 7.76608 ; 8.27658 ; 8.98173 ; 9.92931 ; 11.0499 ; 12.1095 ; 12.9609 ; 13.6238 ; 13.6963]

Bolt 3 - Tensile Force (kips): [65 ; 64.8012 ; 64.6708 ; 64.5675 ; 64.5149 ; 64.3895 ; 64.3396 ; 64.2911 ; 64.2825 ; 64.3186 ; 64.5272 ; 64.7851 ; 65.2099 ; 65.9887 ; 66.3089 ; 66.8102 ; 67.6503 ; 68.9466 ; 70.8329 ; 71.5332 ; 71.7583 ; 71.8824 ; 72.0823 ; 72.3661 ; 72.7068 ; 73.1361 ; 73.2982 ; 73.586 ; 74.0645 ; 74.8836 ; 76.0616 ; 76.5856 ; 77.34 ; 78.3781 ; 79.863 ; 80.4569 ; 81.2734 ; 82.4193 ; 84.5171 ; 87.7381 ; 90.9749 ; 93.7209 ; 96.003 ; 97.7852 ; 98.0207]

Bolt 3 - Shear Force (kips): [0.060349 ; 0.03448 ; 0.083946 ; 0.16807 ; 0.28964 ; 0.43434 ; 0.47397 ; 0.52101 ; 0.57533 ; 0.63352 ; 0.67267 ; 0.74008 ; 0.85905 ; 0.9797 ; 1.0225 ; 1.0907 ; 1.7049 ; 3.3462 ; 5.0189 ; 5.3779 ; 5.2889 ; 4.9326 ; 4.4752 ; 3.9895 ; 3.6303 ; 4.3636 ; 4.647 ; 4.805 ; 4.9153 ; 4.4505 ; 5.1637 ; 5.0071 ; 5.3656 ; 6.0826 ; 7.209 ; 7.3961 ; 7.7499 ; 8.4177 ; 8.6336 ; 8.2122 ; 8.1535 ; 7.8382 ; 7.5537 ; 7.1592 ; 7.0536]

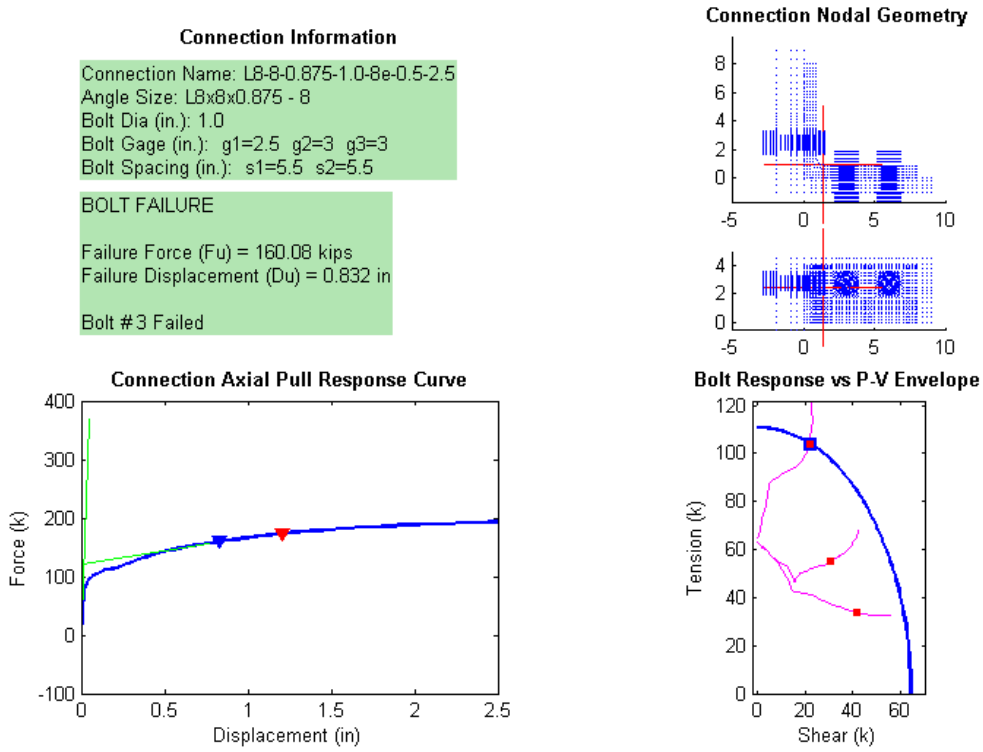


Figure B.376 Connection L8_8_0.875_1.0_8e_0.5_2.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_1.0_8e_0.5_2.5 Analysis Response Variables.
Initial Stiffness (k/in): 7.2297e+003

Plastic Stiffness (k/in): 46.4613

Displacement (in): [9.9139e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012329 ; 0.013428 ; 0.015076 ; 0.017548 ; 0.021256 ; 0.026817 ; 0.03516 ; 0.047674 ; 0.066445 ; 0.094602 ; 0.13684 ; 0.15268 ; 0.17643 ; 0.17866 ; 0.17949 ; 0.18075 ; 0.18263 ; 0.18545 ; 0.1865 ; 0.18809 ; 0.19047 ; 0.19404 ; 0.19939 ; 0.20741 ; 0.21945 ; 0.22397 ; 0.23074 ; 0.2409 ; 0.25614 ; 0.279 ; 0.28757 ; 0.29079 ; 0.29561 ; 0.30284 ; 0.31369 ; 0.31776 ; 0.32386 ; 0.33301 ; 0.34674 ; 0.35189 ; 0.35962 ; 0.3712 ; 0.38858 ; 0.41465 ; 0.42442 ; 0.43908 ; 0.46108 ; 0.49407 ; 0.50644 ; 0.525 ; 0.55283 ; 0.59459 ; 0.65722 ; 0.6807 ; 0.71593 ; 0.76878 ; 0.84804 ; 0.87777 ; 0.92236 ; 0.98924 ; 1.0896 ; 1.1272 ; 1.1836 ; 1.2048 ; 1.2365 ; 1.2841 ; 1.3556 ; 1.3823 ; 1.4225 ; 1.4828 ; 1.5732 ; 1.7088 ; 1.7596 ; 1.8359 ; 1.9503 ; 2.1219 ; 2.3719 ; 2.5]

Force (kips): [-2.45146 ; 5.63523 ; 11.669 ; 18.8586 ; 27.1189 ; 28.7974 ; 30.3238 ; 32.3735 ; 34.9807 ; 38.267 ; 41.7835 ; 44.9436 ; 47.7773 ; 50.2045 ; 52.6132 ; 55.3131 ; 56.0337 ; 56.2452 ; 56.1909 ; 56.2494 ; 56.3063 ; 56.289 ; 56.2206 ; 56.2531 ; 56.3239 ; 56.3336 ; 56.2867 ; 56.3721 ; 56.9101 ; 57.6111 ; 57.8805 ; 58.2574 ; 58.854 ; 59.7546 ; 61.0202 ; 61.4686 ; 61.6415 ; 61.8995 ; 62.2761 ; 62.8492 ; 63.0968 ; 63.4334 ; 63.9132 ; 64.6687 ; 64.9472 ; 65.3446 ; 65.9031 ; 66.6987 ; 67.8923 ; 68.3115 ; 68.9005 ; 69.7386 ; 70.9749 ; 71.4248 ; 72.0701 ; 72.9809 ; 74.2443 ; 75.9801 ; 76.5889 ; 77.4608 ; 78.6884 ; 80.369 ; 80.9803 ; 81.8479 ; 83.0445 ; 84.7912 ; 85.3975 ; 86.2382 ; 86.5403 ; 86.9807 ; 87.6036 ; 88.4717 ; 88.7802 ; 89.2277 ; 89.8677 ; 90.7616 ; 91.9785 ; 92.4025 ; 93.0005 ; 93.8292 ; 94.9099 ; 96.2017 ; 96.77]

Bolt 1 - Tensile Force (kips): [63.2648 ; 62.9145 ; 62.6341 ; 62.2717 ; 61.8186 ; 61.7208 ; 61.6291 ; 61.5006 ; 61.3294 ; 61.0862 ; 60.5513 ; 59.2795 ; 56.9069 ; 54.361 ; 51.2997 ; 46.6637 ; 44.2419 ; 43.476 ; 43.4477 ; 43.329 ; 43.2181 ; 43.0122 ; 42.8586 ; 42.818 ; 42.7869 ; 42.7468 ; 42.7146 ; 42.6868 ; 42.6044 ; 42.5329 ; 42.4865 ; 42.4437 ; 42.3402 ; 42.1725 ; 41.8918 ; 41.7872 ; 41.7301 ; 41.6455 ; 41.5277 ; 41.3685 ; 41.283 ; 41.1583 ; 40.9796 ; 40.6991 ; 40.5962 ; 40.4447 ; 40.085 ; 39.6148 ; 38.921 ; 38.6079 ; 38.1644 ; 37.5907 ; 36.9257 ; 36.6854 ; 36.3929 ; 35.9816 ; 35.5729 ; 35.1467 ; 34.9946 ; 34.7353 ; 34.3479 ; 33.9079 ; 33.7695 ; 33.5147 ; 33.1683 ; 32.9187 ; 32.8854 ; 32.8614 ; 32.8568 ; 32.8359 ; 32.8277 ; 32.8531 ; 32.8455 ; 32.8374 ; 32.8415 ; 32.8683 ; 32.7248 ; 32.659 ; 32.6033 ; 32.4772 ; 32.3887 ; 32.3534 ; 32.3395]

Bolt 1 - Shear Force (kips): [0.101125 ; 0.334 ; 0.653528 ; 1.05335 ; 1.53914 ; 1.64167 ; 1.7367 ; 1.86754 ; 2.03909 ; 2.28182 ; 2.87157 ; 4.21895 ; 6.41592 ; 8.50461 ; 10.7148 ; 13.339 ; 14.2341 ; 14.341 ; 14.3353 ; 14.4303 ; 14.5044 ; 14.5904 ; 14.6074 ; 14.6063 ; 14.6033 ; 14.5972 ; 14.5895 ; 14.6725 ; 15.1394 ; 15.4947 ; 15.7355 ; 15.9148 ; 16.4604 ; 17.4213 ; 19.0339 ; 19.5698 ; 19.8402 ; 20.257 ; 20.8246 ; 21.4899 ; 21.805 ; 22.2371 ; 22.8228 ; 23.6168 ; 23.8777 ; 24.2413 ; 25.0278 ; 26.0151 ; 27.4321 ; 28.0466 ; 28.9148 ; 30.0507 ; 31.5681 ; 32.1434 ; 32.8782 ; 33.9479 ; 35.2564 ; 36.922 ; 37.5716 ; 38.5255 ; 39.9348 ; 41.698 ; 42.2803 ; 43.1822 ; 44.505 ; 45.9792 ; 46.4023 ; 47.0281 ; 47.2393 ; 47.5636 ; 48.0069 ; 48.5883 ; 48.8032 ; 49.1613 ; 49.6729 ; 50.3455 ; 51.4021 ; 51.7762 ; 52.2986 ; 53.1301 ; 54.0988 ; 55.1883 ; 55.7259]

Bolt 2 - Tensile Force (kips): [63.2686 ; 62.8627 ; 62.5068 ; 62.0429 ; 61.4651 ; 61.3437 ; 61.2295 ; 61.0759 ; 60.8943 ; 60.6463 ; 60.223 ; 59.2058 ; 57.2035 ; 55.383 ; 54.2303 ; 53.1405 ; 51.5749 ; 47.4356 ; 47.1937 ; 47.1885 ; 47.2154 ; 47.1004 ; 46.9944 ; 46.866 ; 46.7695 ; 46.604 ; 46.435 ; 46.4255 ; 46.9601 ; 47.5588 ; 47.7623 ; 48.0121 ; 48.3652 ; 48.8589 ; 49.5694 ; 49.7977 ; 49.8873 ; 50.0216 ; 50.2112 ; 50.4024 ; 50.4549 ; 50.5327 ; 50.6496 ; 50.8248 ; 50.8904 ; 50.9948 ; 51.1722 ; 51.4362 ; 51.7112 ; 51.8085 ; 51.9657 ; 52.2167 ; 52.5267 ; 52.5936 ; 52.6844 ; 52.8231 ; 53.0393 ; 53.4411 ; 53.6174 ; 53.911 ; 54.3788 ; 55.1235 ; 55.3363 ; 55.6922 ; 56.3228 ; 57.1919 ; 57.4357 ; 57.8497 ; 58.0184 ; 58.299 ; 58.7334 ; 59.3886 ; 59.6368 ; 60.0197 ; 60.5936 ; 61.3803 ; 62.5064 ; 62.938 ; 63.5642 ; 64.4725 ; 65.7171 ; 67.3561 ; 68.21]

Bolt 2 - Shear Force (kips): [0.123787 ; 0.353114 ; 0.703282 ; 1.13534 ; 1.65139 ; 1.75915 ; 1.85915 ; 1.99605 ; 2.17516 ; 2.42929 ; 2.99076 ; 4.2829 ; 6.43389 ; 8.42121 ; 10.3137 ; 12.4866 ; 13.6742 ; 15.4263 ; 15.4641 ; 15.4759 ; 15.4916 ; 15.4976 ; 15.4917 ; 15.5887 ; 15.7145 ; 15.797 ; 15.8201 ; 15.8383 ; 15.9934 ; 16.162 ; 16.218 ; 16.3738 ; 16.6772 ; 17.2322 ; 17.7112 ; 17.9029 ; 17.9566 ; 18.0295 ; 18.1516 ; 18.6346 ; 18.8469 ; 19.1601 ; 19.6011 ; 20.1886 ; 20.3877 ; 20.6531 ; 20.9339 ; 21.3421 ; 22.0537 ; 22.3063 ; 22.625 ; 23.0445 ; 23.7602 ; 24.0499 ; 24.5375 ; 25.2338 ; 26.2191 ; 27.6498 ; 28.1105 ; 28.7353 ; 29.6095 ; 30.7743 ; 31.3159 ; 31.9895 ; 32.7824 ; 34.0135 ; 34.533 ; 35.3153 ; 35.5904 ; 35.9648 ; 36.4715 ; 37.1708 ; 37.4194 ; 37.7691 ; 38.2489 ; 38.9 ; 39.696 ; 39.9591 ; 40.3289 ; 40.7615 ; 41.3923 ; 42.1729 ; 42.476]

Bolt 3 - Tensile Force (kips): [65 ; 64.8665 ; 64.8889 ; 65.097 ; 65.5955 ; 65.7544 ; 65.9544 ; 66.3029 ; 66.8679 ; 67.6408 ; 68.6135 ; 69.695 ; 70.9375 ; 72.5866 ; 74.6608 ; 77.3176 ; 78.0652 ; 78.4195 ; 78.3843 ; 78.4371 ; 78.4907 ; 78.4832 ; 78.4242 ; 78.4623 ; 78.5241 ; 78.5374 ; 78.5017 ; 78.5766 ; 79.0564 ; 79.7305 ; 79.9853 ; 80.3545 ; 80.923 ; 81.7739 ; 83.014 ; 83.4617 ; 83.6319 ; 83.8872 ; 84.2648 ; 84.8282 ; 85.038 ; 85.3319 ; 85.7562 ; 86.3704 ; 86.5885 ; 86.8948 ; 87.3217 ; 87.9489 ; 89.0665 ; 89.4757 ; 90.0547 ; 90.8981 ; 92.2942 ; 92.826 ; 93.6175 ; 94.8075 ; 96.5128 ; 98.8573 ; 99.6936 ; 100.87 ; 102.464 ; 104.55 ; 105.288 ; 106.309 ; 107.655 ; 109.839 ; 110.537 ; 111.568 ; 111.957 ; 112.506 ; 113.208 ; 114.101 ; 114.416 ; 114.886 ; 115.573 ; 116.533 ; 117.684 ; 118.082 ; 118.669 ; 119.455 ; 120.357 ; 121.154 ; 121.425]

Bolt 3 - Shear Force (kips): [0.0557745 ; 0.0876565 ; 0.206792 ; 0.37781 ; 0.626234 ; 0.688406 ; 0.749753 ; 0.839125 ; 0.958256 ; 1.12253 ; 1.32819 ; 1.56535 ; 1.83614 ; 2.22141 ; 2.73222 ; 3.33832 ; 3.50015 ; 3.5759 ; 3.57186 ; 3.57979 ; 3.59 ; 3.58921 ; 3.58257 ; 3.58753 ; 3.59807 ; 3.60115 ; 3.59717 ; 3.60984 ; 3.70544 ; 3.84329 ; 3.89292 ; 3.96724 ; 4.07287 ; 4.2228 ; 4.43113 ; 4.50781 ; 4.53531 ; 4.57576 ; 4.6358 ; 4.72655 ; 4.76817 ; 4.82328 ; 4.89939 ; 5.02396 ; 5.0675 ; 5.13033 ; 5.19518 ; 5.30049 ; 6.57817 ; 7.48775 ; 8.42907 ; 9.72276 ; 12.5308 ; 13.6019 ; 15.0007 ; 16.532 ; 18.1127 ; 19.8739 ; 20.383 ; 20.9365 ; 21.4756 ; 22.0219 ; 22.0593 ; 22.096 ; 22.2267 ; 22.6379 ; 22.7883 ; 22.9639 ; 22.9957 ; 23.0616 ; 23.0862 ; 23.0727 ; 23.0724 ; 23.0911 ; 23.1473 ; 22.963 ; 22.7932 ; 22.751 ; 22.7274 ; 22.7904 ; 22.9263 ; 22.5944 ; 22.3052]

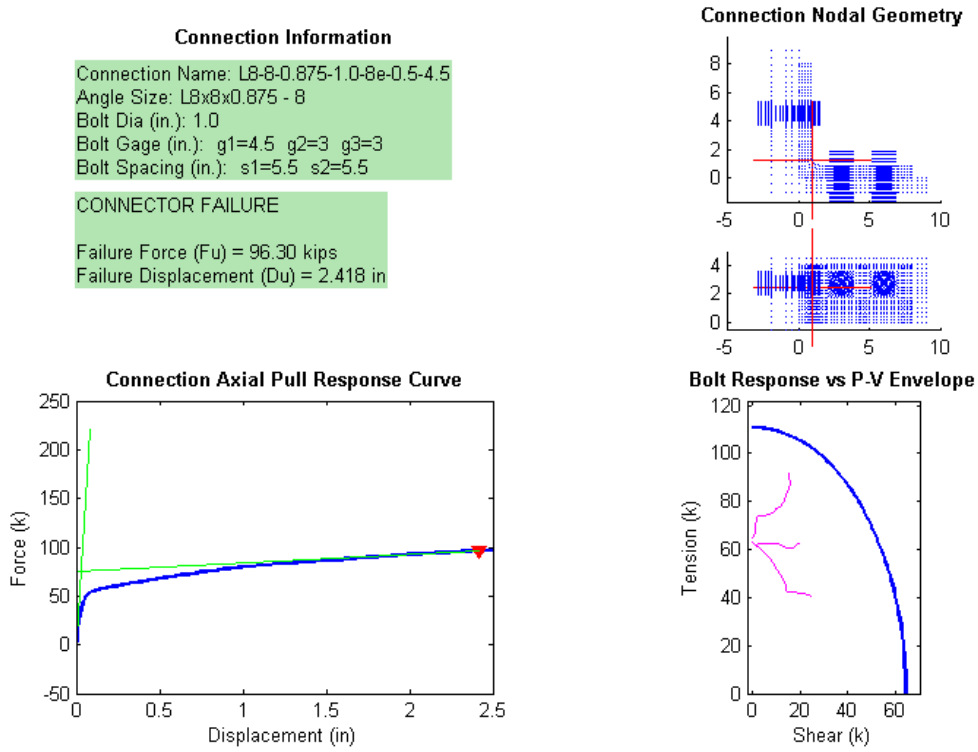


Figure B.377 Connection L8_8_0.875_1.0_8e_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_1.0_8e_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.6647e+003

Plastic Stiffness (k/in): 8.5613

Displacement (in): [9.5099e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.024414 ; 0.031006 ; 0.040894 ; 0.055725 ; 0.077972 ; 0.11134 ; 0.1614 ; 0.23649 ; 0.34911 ; 0.39135 ; 0.4547 ; 0.46064 ; 0.46955 ; 0.48291 ; 0.50296 ; 0.53302 ; 0.57813 ; 0.64578 ; 0.67115 ; 0.69652 ; 0.72189 ; 0.75994 ; 0.81702 ; 0.90265 ; 1.0311 ; 1.2237 ; 1.2862 ; 1.38 ; 1.4151 ; 1.4679 ; 1.547 ; 1.6656 ; 1.7101 ; 1.7769 ; 1.8019 ; 1.8394 ; 1.8535 ; 1.8746 ; 1.9063 ; 1.9538 ; 2.0251 ; 2.132 ; 2.1721 ; 2.2322 ; 2.2548 ; 2.2886 ; 2.3393 ; 2.4154 ; 2.5]

Force (kips): [-2.37079 ; 0.926851 ; 2.8337 ; 5.33556 ; 8.55576 ; 12.6146 ; 15.9705 ; 18.6013 ; 21.6647 ; 24.495 ; 26.4359 ; 27.6111 ; 28.6192 ; 29.941 ; 31.7275 ; 32.3534 ; 33.2267 ; 33.3171 ; 33.4537 ; 33.6395 ; 33.9383 ; 34.3771 ; 34.9592 ; 35.7609 ; 36.1076 ; 36.4318 ; 36.7802 ; 37.2686 ; 37.9052 ; 38.7857 ; 39.9648 ; 41.4788 ; 41.9342 ; 42.5593 ; 42.7855 ; 43.1205 ; 43.6037 ; 44.2809 ; 44.5246 ; 44.9047 ; 45.0536 ; 45.2636 ; 45.3418 ; 45.4564 ; 45.6287 ; 45.889 ; 46.2793 ; 46.8309 ; 47.0286 ; 47.3199 ; 47.4276 ; 47.5869 ; 47.8153 ; 48.1411 ; 48.4853]

Bolt 1 - Tensile Force (kips): [63.253 ; 63.1086 ; 63.0173 ; 62.8922 ; 62.7216 ; 62.4884 ; 62.2784 ; 62.0993 ; 61.8706 ; 61.6271 ; 61.4094 ; 61.2327 ; 61.0027 ; 59.7541 ; 57.5626 ; 56.7197 ; 55.4678 ; 55.3424 ; 55.154 ; 54.8838 ; 54.4673 ; 53.8473 ; 52.9624 ; 51.6448 ; 51.0834 ; 50.5133 ; 49.8971 ; 48.9517 ; 47.5598 ; 45.5559 ; 43.8885 ; 43.4674 ; 43.3713 ; 43.2528 ; 43.1487 ; 42.9835 ; 42.8515 ; 42.7634 ; 42.7356 ; 42.6184 ; 42.551 ; 42.4893 ; 42.4652 ; 42.4319 ; 42.3713 ; 42.2768 ; 42.0751 ; 41.8599 ; 41.7609 ; 41.6373 ; 41.5747 ; 41.4674 ; 41.3087 ; 41.1116 ; 40.8004]

Bolt 1 - Shear Force (kips): [0.0967638 ; 0.109393 ; 0.210216 ; 0.355803 ; 0.554607 ; 0.822593 ; 1.06189 ; 1.26357 ; 1.51812 ; 1.78401 ; 2.01837 ; 2.21304 ; 2.47326 ; 3.87562 ; 5.97739 ; 6.722 ; 7.77402 ; 7.87578 ; 8.02785 ; 8.244 ; 8.57161 ; 9.04759 ; 9.70468 ; 10.6313 ; 11.004 ; 11.368 ; 11.7459 ; 12.2912 ; 13.0163 ; 13.8767 ; 14.3645 ; 14.3283 ; 14.3053 ; 14.2702 ; 14.3138 ; 14.3493 ; 14.3343 ; 14.2923 ; 14.2748 ; 14.6371 ; 14.9849 ; 15.2441 ; 15.3656 ; 15.5365 ; 15.8921 ; 16.5682 ; 17.8501 ; 19.3877 ; 20.0055 ; 20.8468 ; 21.2199 ; 21.7846 ; 22.5277 ; 23.3588 ; 24.3256]

Bolt 2 - Tensile Force (kips): [63.2348 ; 63.079 ; 62.9747 ; 62.8209 ; 62.6247 ; 62.3793 ; 62.1874 ; 62.0567 ; 61.9464 ; 61.9458 ; 62.0738 ; 62.2262 ; 62.3269 ; 62.1709 ; 62.3839 ; 62.4817 ; 62.5639 ; 62.5662 ; 62.5691 ; 62.5755 ; 62.5796 ; 62.5956 ; 62.6199 ; 62.6178 ; 62.586 ; 62.5451 ; 62.4878 ; 62.4056 ; 62.2595 ; 61.9644 ; 61.4918 ; 60.8962 ; 60.7534 ; 60.6262 ; 60.6068 ; 60.5933 ; 60.5916 ; 60.6209 ; 60.6461 ; 60.6869 ; 60.7256 ; 60.7809 ; 60.8068 ; 60.8474 ; 60.9208 ; 61.0277 ; 61.211 ; 61.5104 ; 61.6175 ; 61.7461 ; 61.7983 ; 61.8847 ; 62.0204 ; 62.1924 ; 62.407]

Bolt 2 - Shear Force (kips): [0.120831 ; 0.104059 ; 0.212364 ; 0.367027 ; 0.576475 ; 0.853464 ; 1.09215 ; 1.28823 ; 1.53562 ; 1.81286 ; 2.09758 ; 2.35305 ; 2.67339 ; 4.02392 ; 5.83673 ; 6.42753 ; 7.22993 ; 7.30609 ; 7.41927 ; 7.57868 ; 7.81862 ; 8.16069 ; 8.62131 ; 9.25801 ; 9.51274 ; 9.76395 ; 10.029 ; 10.4186 ; 10.9761 ; 11.7974 ; 12.9071 ; 14.2833 ; 14.6792 ; 15.2112 ; 15.3875 ; 15.6427 ; 16.0089 ; 16.512 ; 16.6884 ; 17.0932 ; 17.2141 ; 17.4029 ; 17.4637 ; 17.5505 ; 17.6573 ; 17.8338 ; 18.0252 ; 18.2848 ; 18.3804 ; 18.5812 ; 18.6362 ; 18.7049 ; 18.814 ; 19.2072 ; 19.5163]

Bolt 3 - Tensile Force (kips): [65 ; 64.8616 ; 64.75 ; 64.6681 ; 64.6769 ; 64.7754 ; 64.8591 ; 65.0003 ; 65.344 ; 66.071 ; 66.7241 ; 67.3891 ; 68.1539 ; 69.1742 ; 70.9604 ; 71.6576 ; 72.7555 ; 72.855 ; 72.9833 ; 73.155 ; 73.4379 ; 73.8288 ; 74.3188 ; 74.942 ; 75.1789 ; 75.3649 ; 75.5684 ; 75.8624 ; 76.2417 ; 76.9417 ; 77.8407 ; 79.516 ; 80.3095 ; 81.3222 ; 81.679 ; 82.2317 ; 83.0946 ; 84.238 ; 84.6468 ; 85.2626 ; 85.4876 ; 85.8251 ; 85.9521 ; 86.1386 ; 86.4189 ; 86.8456 ; 87.5122 ; 88.5733 ; 88.9392 ; 89.475 ; 89.6689 ; 89.9571 ; 90.3772 ; 91.0039 ; 91.6793]

Bolt 3 - Shear Force (kips): [0.0872681 ; 0.0239986 ; 0.0469812 ; 0.110177 ; 0.210747 ; 0.356103 ; 0.488831 ; 0.605878 ; 0.758058 ; 0.951008 ; 1.14267 ; 1.23081 ; 1.27692 ; 1.38243 ; 1.57802 ; 1.65769 ; 1.76427 ; 1.79234 ; 1.84404 ; 1.89951 ; 2.02537 ; 2.85975 ; 5.12032 ; 7.52568 ; 8.0406 ; 8.68478 ; 8.99997 ; 9.22593 ; 9.62502 ; 10.075 ; 11.479 ; 13.0699 ; 13.3416 ; 13.7443 ; 13.8804 ; 14.0468 ; 14.3647 ; 14.8974 ; 15.0925 ; 15.3491 ; 15.4553 ; 15.5723 ; 15.6116 ; 15.6728 ; 15.7624 ; 15.8876 ; 16.031 ; 15.7778 ; 15.7269 ; 15.5998 ; 15.5454 ; 15.4741 ; 15.4188 ; 15.3382 ; 15.2623]

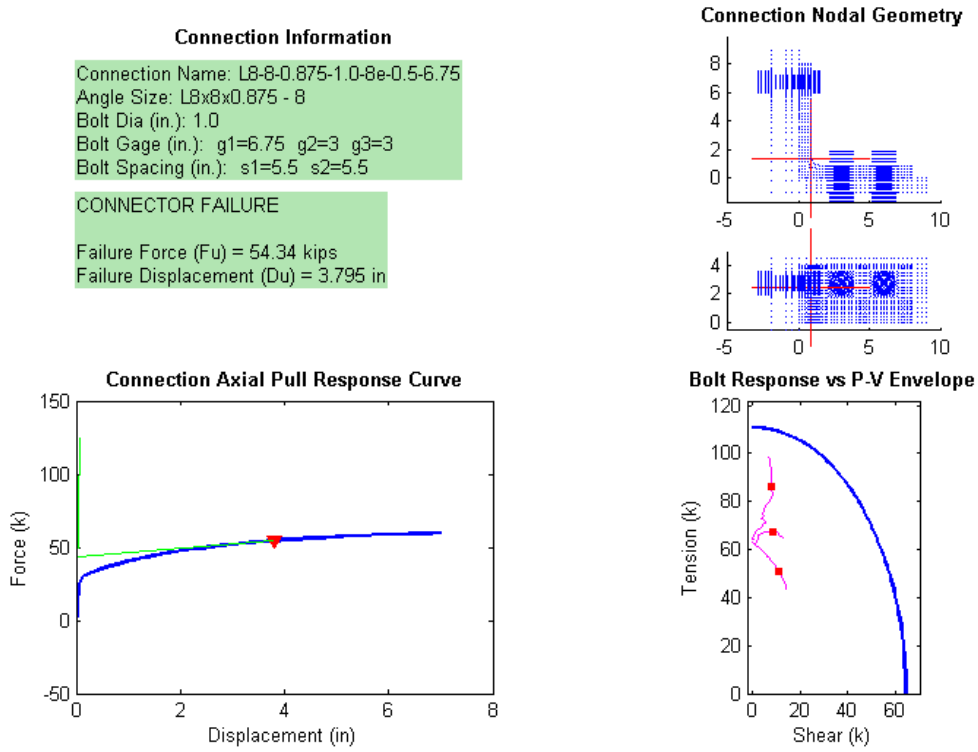


Figure B.378 Connection L8_8_0.875_1.0_8e_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_0.875_1.0_8e_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.8979e+003

Plastic Stiffness (k/in): 2.9497

Displacement (in): [8.9485e-036 ; 0.0013672 ; 0.0027344 ; 0.0047852 ; 0.0078613 ; 0.012476 ; 0.019397 ; 0.029779 ; 0.045352 ; 0.068712 ; 0.10375 ; 0.15631 ; 0.17602 ; 0.20558 ; 0.24993 ; 0.31645 ; 0.41623 ; 0.5659 ; 0.79041 ; 0.8746 ; 1.0009 ; 1.0482 ; 1.1193 ; 1.137 ; 1.1548 ; 1.1814 ; 1.2214 ; 1.2813 ; 1.3712 ; 1.5061 ; 1.7084 ; 1.7842 ; 1.898 ; 2.0687 ; 2.1327 ; 2.2287 ; 2.3247 ; 2.4207 ; 2.5647 ; 2.6187 ; 2.6997 ; 2.8212 ; 3.0035 ; 3.2769 ; 3.3794 ; 3.5332 ; 3.7639 ; 4.1099 ; 4.6289 ; 5.3289 ; 6.0289 ; 6.7289 ; 7]

Force (kips): [-2.22979 ; -0.0725156 ; 0.36495 ; 0.984762 ; 1.89346 ; 3.15864 ; 4.88525 ; 7.15022 ; 9.94329 ; 12.6793 ; 14.5247 ; 15.2558 ; 15.4116 ; 15.6278 ; 15.9687 ; 16.4712 ; 17.1526 ; 18.0409 ; 19.1957 ; 19.5841 ; 20.1121 ; 20.3091 ; 20.634 ; 20.7239 ; 20.8115 ; 20.9322 ; 21.0955 ; 21.339 ; 21.6838 ; 22.1526 ; 22.8022 ; 23.0379 ; 23.368 ; 23.8392 ; 24.0121 ; 24.2529 ; 24.4816 ; 24.7008 ; 25.0165 ; 25.1312 ; 25.2972 ; 25.5426 ; 25.888 ; 26.3614 ; 26.5405 ; 26.7876 ; 27.1278 ; 27.5885 ; 28.1709 ; 28.8072 ; 29.2813 ; 29.6627 ; 29.7934]

Bolt 1 - Tensile Force (kips): [63.2555 ; 63.163 ; 63.1412 ; 63.1098 ; 63.0615 ; 62.992 ; 62.8921 ; 62.7521 ; 62.5595 ; 62.3401 ; 62.1693 ; 62.103 ; 62.0908 ; 62.0732 ; 62.0417 ; 61.9882 ; 61.8965 ; 61.7384 ; 61.5213 ; 61.4611 ; 61.3878 ; 61.3592 ; 61.3075 ; 61.2922 ; 61.2763 ; 61.2535 ; 61.2205 ; 61.1636 ; 61.0564 ; 60.6502 ; 59.9236 ; 59.6185 ; 59.1321 ; 58.382 ; 58.1016 ; 57.6932 ; 57.2905 ; 56.8882 ; 56.2749 ; 56.0442 ; 55.7052 ; 55.2036 ; 54.4597 ; 53.3516 ; 52.9096 ; 52.2619 ; 51.3051 ; 49.865 ; 47.6864 ; 44.9878 ; 44.0445 ; 43.823 ; 43.7682]

Bolt 1 - Shear Force (kips): [0.0920083 ; 0.0651547 ; 0.0841313 ; 0.11635 ; 0.16995 ; 0.250583 ; 0.367824 ; 0.533374 ; 0.760406 ; 1.01884 ; 1.22031 ; 1.30403 ; 1.32085 ; 1.34529 ; 1.38794 ; 1.45855 ; 1.57614 ; 1.77086 ; 2.02241 ; 2.09133 ; 2.17515 ; 2.20803 ; 2.26719 ; 2.28465 ; 2.30265 ; 2.32859 ; 2.36653 ; 2.43217 ; 2.55749 ; 3.03723 ; 3.83762 ; 4.15427 ; 4.64023 ; 5.36091 ; 5.6227 ; 5.99819 ; 6.36118 ; 6.71799 ; 7.24854 ; 7.44422 ; 7.72808 ; 8.13898 ; 8.73081 ; 9.57601 ; 9.90023 ; 10.3613 ; 11.0128 ; 11.9203 ; 13.1089 ; 14.2002 ; 14.4233 ; 14.4115 ; 14.4015]

Bolt 2 - Tensile Force (kips): [63.2427 ; 63.1337 ; 63.1162 ; 63.0897 ; 63.0309 ; 62.9462 ; 62.835 ; 62.6967 ; 62.5568 ; 62.4656 ; 62.4744 ; 62.4928 ; 62.4958 ; 62.5023 ; 62.5218 ; 62.5676 ; 62.6686 ; 62.8982 ; 63.4429 ; 63.7719 ; 64.3469 ; 64.5596 ; 64.8809 ; 64.9578 ; 65.0323 ; 65.1432 ; 65.3029 ; 65.5279 ; 65.8471 ; 66.1537 ; 66.5131 ; 66.6243 ; 66.7786 ; 66.9646 ; 67.0301 ; 67.1283 ; 67.2227 ; 67.3031 ; 67.3867 ; 67.4103 ; 67.4443 ; 67.4895 ; 67.5275 ; 67.5442 ; 67.5385 ; 67.5236 ; 67.4872 ; 67.413 ; 67.15 ; 66.4457 ; 65.7287 ; 65.1015 ; 64.8814]

Bolt 2 - Shear Force (kips): [0.115423 ; 0.0605391 ; 0.0795484 ; 0.113649 ; 0.168986 ; 0.251082 ; 0.369591 ; 0.534923 ; 0.751342 ; 0.985071 ; 1.16639 ; 1.23994 ; 1.25465 ; 1.27731 ; 1.31912 ; 1.39168 ; 1.52914 ; 1.77693 ; 2.1004 ; 2.18128 ; 2.26268 ; 2.29059 ; 2.33669 ; 2.3505 ; 2.36476 ; 2.38463 ; 2.41351 ; 2.4648 ; 2.56348 ; 2.94841 ; 3.57903 ; 3.82444 ; 4.19166 ; 4.7208 ; 4.90947 ; 5.17393 ; 5.42479 ; 5.66834 ; 6.02913 ; 6.16197 ; 6.35331 ; 6.62836 ; 7.01717 ; 7.55874 ; 7.76066 ; 8.04703 ; 8.45022 ; 9.01048 ; 9.82551 ; 10.9685 ; 11.8991 ; 12.6163 ; 12.8487]

Bolt 3 - Tensile Force (kips): [65 ; 64.9501 ; 64.8976 ; 64.8229 ; 64.7376 ; 64.6428 ; 64.5656 ; 64.5345 ; 64.4461 ; 64.4029 ; 64.4709 ; 64.7542 ; 64.83 ; 64.9475 ; 65.1648 ; 65.5481 ; 66.246 ; 67.4363 ; 69.4798 ; 70.2567 ; 71.3115 ; 71.7269 ; 72.2055 ; 72.3224 ; 72.4233 ; 72.5476 ; 72.7097 ; 72.9104 ; 73.1953 ; 73.7602 ; 74.8216 ; 75.2039 ; 75.7101 ; 76.6685 ; 77.092 ; 77.6425 ; 78.1497 ; 78.6479 ; 79.3749 ; 79.6535 ; 80.0631 ; 80.7247 ; 81.6515 ; 82.9739 ; 83.7734 ; 84.7576 ; 86.1072 ; 88.0272 ; 90.4287 ; 93.2955 ; 95.7032 ; 97.5798 ; 98.2875]

Bolt 3 - Shear Force (kips): [0.07858 ; 0.053722 ; 0.035092 ; 0.02494 ; 0.042903 ; 0.08186 ; 0.14699 ; 0.24401 ; 0.36822 ; 0.48258 ; 0.58973 ; 0.65308 ; 0.68041 ; 0.72549 ; 0.79444 ; 0.8859 ; 0.98219 ; 1.168 ; 3.5949 ; 4.6439 ; 5.3879 ; 5.6608 ; 5.0812 ; 4.8589 ; 4.6325 ; 4.3503 ; 4.0711 ; 3.7427 ; 4.2042 ; 4.8271 ; 4.6545 ; 4.4185 ; 4.7715 ; 5.0473 ; 5.1081 ; 5.3973 ; 5.7393 ; 6.0501 ; 6.6452 ; 6.9185 ; 7.2371 ; 7.3995 ; 7.8177 ; 8.4589 ; 8.3687 ; 8.1652 ; 7.9213 ; 7.8747 ; 7.9325 ; 7.7903 ; 7.4979 ; 7.1469 ; 6.8437]

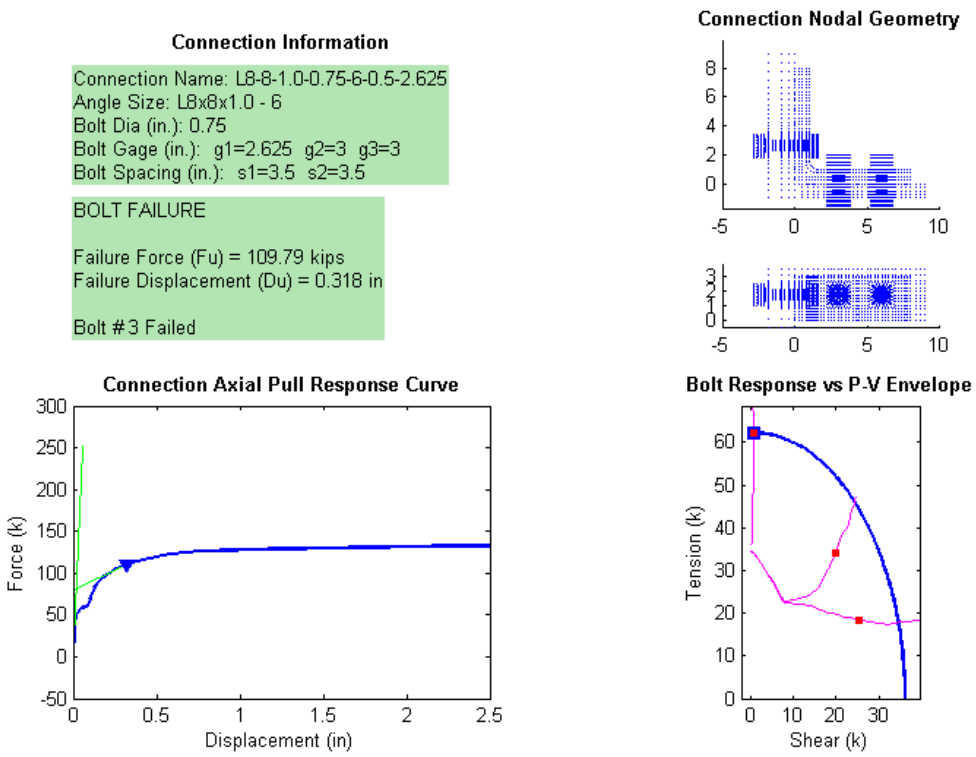


Figure B.379 Connection L8_8_1.0_0.75_6_0.5_2.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.75_6_0.5_2.625 Analysis Response Variables.
Initial Stiffness (k/in): 4303

Plastic Stiffness (k/in): 92.2655

Displacement (in): [2.6833e-036 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.013672 ; 0.016602 ; 0.020996 ; 0.027588 ; 0.037476 ; 0.052307 ; 0.057869 ; 0.059955 ; 0.063083 ; 0.067776 ; 0.069536 ; 0.072176 ; 0.076135 ; 0.082074 ; 0.084302 ; 0.085137 ; 0.08639 ; 0.088269 ; 0.091088 ; 0.095316 ; 0.10166 ; 0.10404 ; 0.1076 ; 0.11296 ; 0.12098 ; 0.12399 ; 0.12851 ; 0.13528 ; 0.14544 ; 0.16068 ; 0.16639 ; 0.17497 ; 0.18782 ; 0.20711 ; 0.23604 ; 0.24689 ; 0.26316 ; 0.28757 ; 0.32419 ; 0.37911 ; 0.46149 ; 0.58507 ; 0.77043 ; 0.83293 ; 0.92668 ; 1.0673 ; 1.2782 ; 1.5282 ; 1.7782 ; 2.0282 ; 2.2782 ; 2.5]

Force (kips): [-0.86141 ; 17.4889 ; 20.1492 ; 22.4217 ; 23.5946 ; 24.2193 ; 25.0282 ; 26.1186 ; 27.5593 ; 29.1426 ; 29.4905 ; 29.4913 ; 29.4883 ; 29.4826 ; 29.4806 ; 29.9318 ; 30.0797 ; 30.0754 ; 30.0732 ; 30.1529 ; 30.7037 ; 31.3775 ; 32.1113 ; 33.137 ; 34.6072 ; 35.3528 ; 36.3983 ; 37.8642 ; 39.7585 ; 40.3635 ; 41.1932 ; 42.3178 ; 43.6794 ; 45.4028 ; 46.0039 ; 46.7916 ; 47.8262 ; 49.2159 ; 51.0861 ; 51.7113 ; 52.5592 ; 53.6853 ; 55.1335 ; 56.8358 ; 58.8597 ; 61.283 ; 62.9594 ; 63.198 ; 63.4922 ; 63.8649 ; 64.3386 ; 64.8358 ; 65.2898 ; 65.7084 ; 66.0938 ; 66.4141]

Bolt 1 - Tensile Force (kips): [34.5279 ; 33.9772 ; 33.8704 ; 33.7604 ; 33.5022 ; 32.8354 ; 31.7372 ; 30.0058 ; 27.3372 ; 23.5622 ; 22.6821 ; 22.676 ; 22.6697 ; 22.6636 ; 22.6617 ; 22.4369 ; 22.4061 ; 22.4004 ; 22.399 ; 22.3933 ; 22.3709 ; 22.349 ; 22.3255 ; 22.3083 ; 22.2666 ; 22.2409 ; 22.1821 ; 21.9942 ; 21.7918 ; 21.7301 ; 21.6119 ; 21.3575 ; 21.0936 ; 20.8041 ; 20.547 ; 20.2011 ; 19.8965 ; 19.6241 ; 19.1645 ; 19.0166 ; 18.872 ; 18.7281 ; 18.4381 ; 17.9715 ; 17.4961 ; 17.3516 ; 17.6422 ; 17.6912 ; 17.7913 ; 17.9283 ; 18.0516 ; 18.1197 ; 18.1597 ; 18.1941 ; 18.2758 ; 18.3961]

Bolt 1 - Shear Force (kips): [0.0481715 ; 0.625551 ; 0.72864 ; 0.830617 ; 1.06537 ; 1.58152 ; 2.34425 ; 3.45433 ; 5.03702 ; 7.03911 ; 7.48031 ; 7.4813 ; 7.48054 ; 7.47892 ; 7.47832 ; 7.79458 ; 7.83438 ; 7.83375 ; 7.83308 ; 7.89973 ; 8.16376 ; 8.47232 ; 8.83442 ; 9.3142 ; 10.0279 ; 10.423 ; 11.1531 ; 12.233 ; 13.1089 ; 13.3785 ; 13.8627 ; 14.7117 ; 15.5607 ; 16.471 ; 17.1029 ; 18.0042 ; 18.9855 ; 20.2334 ; 21.9963 ; 22.5622 ; 23.2611 ; 24.2467 ; 25.7426 ; 27.8541 ; 30.0269 ; 32.0652 ; 33.4502 ; 33.8985 ; 34.3952 ; 35.0113 ; 35.857 ; 36.7631 ; 37.6056 ; 38.4241 ; 39.1781 ; 39.8082]

Bolt 2 - Tensile Force (kips): [34.5289 ; 33.9452 ; 33.8552 ; 33.7652 ; 33.5156 ; 32.843 ; 31.7539 ; 30.055 ; 27.4672 ; 23.8777 ; 22.9833 ; 22.9701 ; 22.9626 ; 22.9571 ; 22.9555 ; 22.8125 ; 22.7324 ; 22.7263 ; 22.7246 ; 22.7328 ; 22.7612 ; 22.8135 ; 22.8783 ; 22.9968 ; 23.21 ; 23.3018 ; 23.4533 ; 23.6071 ; 23.7711 ; 23.8579 ; 24.0143 ; 24.3343 ; 24.7747 ; 25.5149 ; 25.8341 ; 26.3983 ; 27.3122 ; 28.6764 ; 30.4516 ; 31.0523 ; 31.9047 ; 33.0899 ; 34.5138 ; 36.0379 ; 37.6931 ; 39.3822 ; 40.7231 ; 41.0792 ; 41.5761 ; 42.2334 ; 43.1446 ; 44.1562 ; 45.0582 ; 45.8957 ; 46.6753 ; 47.3087]

Bolt 2 - Shear Force (kips): [0.0356379 ; 0.724839 ; 0.8399 ; 0.952262 ; 1.18337 ; 1.69331 ; 2.45184 ; 3.55406 ; 5.12302 ; 7.08875 ; 7.56806 ; 7.57396 ; 7.57606 ; 7.57559 ; 7.5752 ; 7.81962 ; 7.96041 ; 7.96037 ; 7.95969 ; 7.96925 ; 8.2357 ; 8.57093 ; 8.91516 ; 9.44676 ; 10.1569 ; 10.4855 ; 10.7923 ; 11.2776 ; 12.4761 ; 12.8666 ; 13.3095 ; 13.7052 ; 14.3175 ; 15.3269 ; 15.6288 ; 15.9311 ; 16.4111 ; 17.0129 ; 18.0984 ; 18.4478 ; 18.9027 ; 19.4254 ; 19.9664 ; 20.3993 ; 20.9403 ; 22.0548 ; 22.8174 ; 22.9066 ; 23.0147 ; 23.1721 ; 23.3358 ; 23.601 ; 23.8845 ; 24.1741 ; 24.4395 ; 24.6229]

Bolt 3 - Tensile Force (kips): [36 ; 36.8382 ; 37.2826 ; 37.7194 ; 37.9623 ; 38.0878 ; 38.2547 ; 38.4954 ; 38.8513 ; 39.3171 ; 39.4329 ; 39.4329 ; 39.4306 ; 39.4254 ; 39.4235 ; 39.5838 ; 39.6378 ; 39.6333 ; 39.631 ; 39.662 ; 39.8702 ; 40.1527 ; 40.4927 ; 41.028 ; 41.9072 ; 42.4021 ; 43.1485 ; 44.3084 ; 46.0111 ; 46.6037 ; 47.4582 ; 48.6974 ; 50.2782 ; 52.2674 ; 52.9267 ; 53.7787 ; 54.8594 ; 56.289 ; 58.2334 ; 58.8951 ; 59.7974 ; 61.0133 ; 62.5874 ; 64.4436 ; 66.6444 ; 69.2951 ; 71.0353 ; 71.1833 ; 71.3407 ; 71.5147 ; 71.7021 ; 71.885 ; 72.0431 ; 72.1869 ; 72.3173 ; 72.4256]

Bolt 3 - Shear Force (kips): [0.0084713 ; 0.1619 ; 0.18493 ; 0.20339 ; 0.21509 ; 0.2208 ; 0.22782 ; 0.23714 ; 0.24775 ; 0.25972 ; 0.26273 ; 0.26276 ; 0.26268 ; 0.26247 ; 0.26239 ; 0.26693 ; 0.26848 ; 0.26837 ; 0.26829 ; 0.26931 ; 0.27582 ; 0.28368 ; 0.29248 ; 0.30581 ; 0.32899 ; 0.34192 ; 0.36233 ; 0.39539 ; 0.4445 ; 0.4612 ; 0.48457 ; 0.5119 ; 0.53274 ; 0.54513 ; 0.54632 ; 0.54893 ; 0.55728 ; 0.58113 ; 0.61213 ; 0.61494 ; 0.61573 ; 0.60905 ; 0.58936 ; 0.54475 ; 0.50837 ; 0.37134 ; 0.12828 ; 0.087755 ; 0.057487 ; 0.035598 ; 0.028803 ; 0.024759 ; 0.023629 ; 0.023055 ; 0.022201 ; 0.022519]

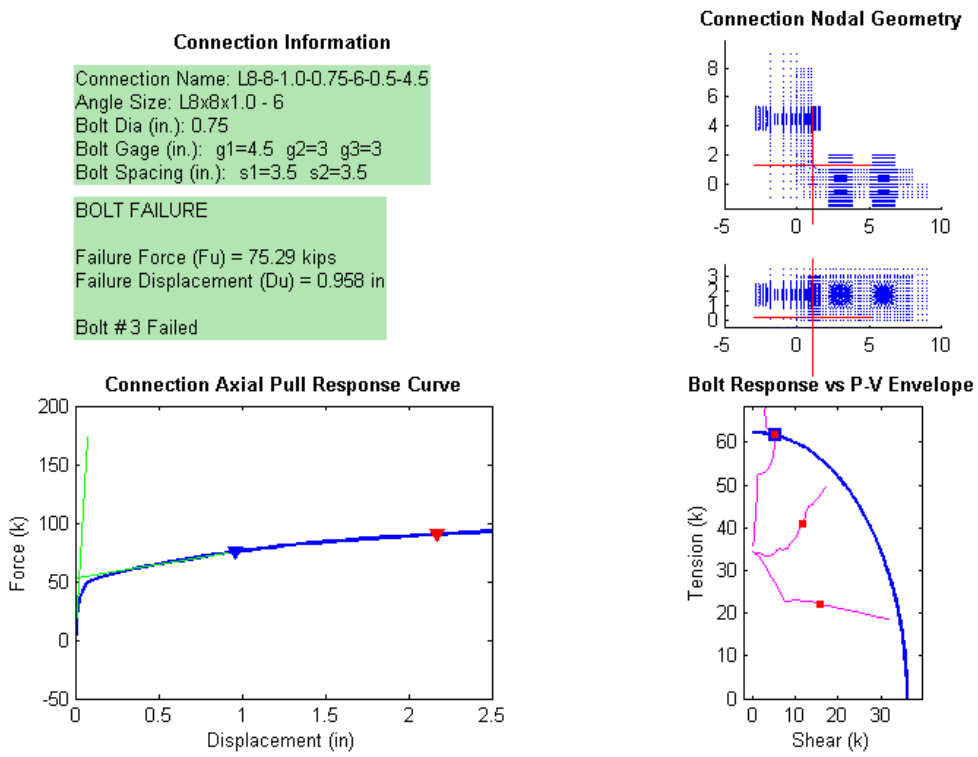


Figure B.380 Connection L8_8_1.0_0.75_6_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.75_6_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.3316e+003

Plastic Stiffness (k/in): 22.8977

Displacement (in): [3.373e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.15017 ; 0.22525 ; 0.25341 ; 0.29565 ; 0.359 ; 0.38276 ; 0.39166 ; 0.40503 ; 0.42507 ; 0.45514 ; 0.50024 ; 0.5679 ; 0.59327 ; 0.63132 ; 0.6884 ; 0.77402 ; 0.85965 ; 0.88105 ; 0.91316 ; 0.96132 ; 1.0336 ; 1.1419 ; 1.1826 ; 1.2435 ; 1.2664 ; 1.3007 ; 1.3521 ; 1.4292 ; 1.545 ; 1.5884 ; 1.6535 ; 1.7511 ; 1.8976 ; 2.1172 ; 2.3672 ; 2.5]

Force (kips): [-0.860667 ; 1.77518 ; 3.69333 ; 5.34876 ; 7.53552 ; 10.3702 ; 13.8538 ; 17.7001 ; 21.2363 ; 23.9598 ; 25.5067 ; 26.7588 ; 28.1196 ; 28.6154 ; 29.3213 ; 30.3209 ; 30.6881 ; 30.8214 ; 31.0103 ; 31.3138 ; 31.73 ; 32.2895 ; 33.156 ; 33.4799 ; 33.9556 ; 34.6404 ; 35.6605 ; 36.5924 ; 36.8223 ; 37.1899 ; 37.676 ; 38.3772 ; 39.3417 ; 39.6832 ; 40.1559 ; 40.333 ; 40.5851 ; 40.9478 ; 41.4574 ; 42.175 ; 42.4314 ; 42.8009 ; 43.3238 ; 44.0461 ; 44.9906 ; 45.8891 ; 46.301]

Bolt 1 - Tensile Force (kips): [34.5252 ; 34.4648 ; 34.4158 ; 34.3701 ; 34.3041 ; 34.2055 ; 34.0663 ; 33.882 ; 33.3491 ; 32.3574 ; 30.3163 ; 28.2838 ; 26.1297 ; 25.3131 ; 24.1481 ; 22.7828 ; 22.8 ; 22.8108 ; 22.8271 ; 22.7444 ; 22.6994 ; 22.8144 ; 22.8614 ; 22.9073 ; 22.9826 ; 23.1275 ; 22.9475 ; 22.6976 ; 22.55 ; 22.3709 ; 22.2205 ; 21.8921 ; 21.2928 ; 21.2171 ; 21.112 ; 20.9976 ; 20.8291 ; 20.6094 ; 20.4598 ; 20.2855 ; 20.1906 ; 19.9868 ; 19.6977 ; 19.3677 ; 18.956 ; 18.7561 ; 18.7391]

Bolt 1 - Shear Force (kips): [0.0481922 ; 0.065478 ; 0.133562 ; 0.195751 ; 0.280852 ; 0.395199 ; 0.546709 ; 0.733649 ; 1.20943 ; 1.93846 ; 3.27863 ; 4.50751 ; 5.73682 ; 6.17782 ; 6.79132 ; 7.51082 ; 7.52274 ; 7.52649 ; 7.53278 ; 7.68411 ; 7.85982 ; 7.88943 ; 8.57843 ; 8.92775 ; 9.42014 ; 10.048 ; 12.1098 ; 13.848 ; 14.4162 ; 15.106 ; 15.8589 ; 17.2287 ; 19.4164 ; 20.003 ; 20.7876 ; 21.1602 ; 21.7058 ; 22.4582 ; 23.3259 ; 24.368 ; 24.8376 ; 25.6391 ; 26.7821 ; 28.2005 ; 29.8081 ; 31.1794 ; 31.8309]

Bolt 2 - Tensile Force (kips): [34.5204 ; 34.4635 ; 34.4111 ; 34.3678 ; 34.3112 ; 34.2472 ; 34.2025 ; 34.1989 ; 34.0029 ; 33.8701 ; 33.2877 ; 33.3276 ; 33.9273 ; 34.2188 ; 34.6691 ; 35.128 ; 34.9335 ; 34.8447 ; 34.7243 ; 34.8426 ; 34.9746 ; 35.218 ; 36.1126 ; 36.4609 ; 36.9999 ; 37.7061 ; 38.8942 ; 40.0085 ; 40.276 ; 40.6151 ; 41.1043 ; 41.7902 ; 42.7899 ; 43.1409 ; 43.6341 ; 43.8145 ; 44.0806 ; 44.4638 ; 44.944 ; 45.5178 ; 45.7331 ; 46.0833 ; 46.6022 ; 47.3101 ; 48.2881 ; 49.1434 ; 49.5149]

Bolt 2 - Shear Force (kips): [0.0353235 ; 0.0898619 ; 0.171798 ; 0.245048 ; 0.343232 ; 0.474591 ; 0.644095 ; 0.841292 ; 1.28086 ; 1.90246 ; 3.07248 ; 4.05221 ; 4.91052 ; 5.20674 ; 5.6263 ; 6.32037 ; 6.76179 ; 6.92759 ; 7.16055 ; 7.33141 ; 7.58301 ; 8.05459 ; 8.63881 ; 8.85463 ; 9.31574 ; 10.0643 ; 10.496 ; 10.9003 ; 10.9994 ; 11.2804 ; 11.6013 ; 11.9304 ; 12.154 ; 12.2802 ; 12.4375 ; 12.4931 ; 12.5708 ; 12.7059 ; 13.0862 ; 13.912 ; 14.1774 ; 14.4584 ; 14.7945 ; 15.3169 ; 15.9694 ; 16.705 ; 17.0382]

Bolt 3 - Tensile Force (kips): [36 ; 35.934 ; 35.9254 ; 35.9783 ; 36.1642 ; 36.5577 ; 37.2819 ; 38.3397 ; 39.4784 ; 40.8823 ; 42.3899 ; 44.4804 ; 47.4002 ; 48.3927 ; 49.7654 ; 51.6383 ; 52.2604 ; 52.4595 ; 52.724 ; 53.1306 ; 53.7242 ; 54.4856 ; 55.6144 ; 56.0932 ; 56.7936 ; 57.7964 ; 59.2209 ; 60.5265 ; 60.8351 ; 61.2875 ; 61.7661 ; 62.2797 ; 63.0896 ; 63.4063 ; 63.8239 ; 63.9797 ; 64.1735 ; 64.4351 ; 64.8559 ; 65.5116 ; 65.7744 ; 66.1299 ; 66.6846 ; 67.3952 ; 68.2445 ; 68.9338 ; 69.1318]

Bolt 3 - Shear Force (kips): [0.0244 ; 0.008572 ; 0.031391 ; 0.055788 ; 0.094601 ; 0.14172 ; 0.19015 ; 0.24611 ; 0.32169 ; 0.43597 ; 0.55524 ; 0.70937 ; 0.8438 ; 0.87446 ; 0.91573 ; 0.97235 ; 1.0041 ; 1.2943 ; 1.8658 ; 2.6571 ; 3.4411 ; 3.8998 ; 4.3245 ; 4.4674 ; 4.6547 ; 4.8753 ; 5.0958 ; 5.2623 ; 5.2927 ; 5.1812 ; 4.9845 ; 4.545 ; 3.8392 ; 3.5465 ; 3.2215 ; 3.2172 ; 3.2088 ; 3.184 ; 3.084 ; 2.9323 ; 2.946 ; 2.8933 ; 2.812 ; 2.696 ; 2.8986 ; 2.9251 ; 2.8678]

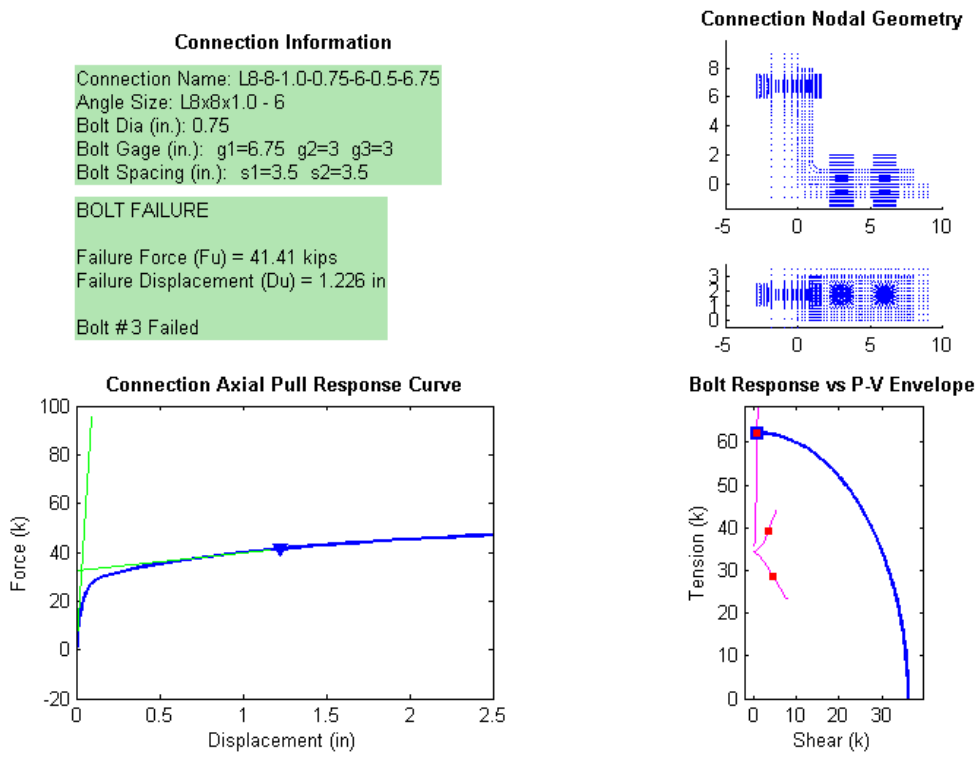


Figure B.381 Connection L8_8_1.0_0.75_6_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.75_6_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.0325e+003

Plastic Stiffness (k/in): 7.4225

Displacement (in): [2.5449e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.033371 ; 0.038933 ; 0.047275 ; 0.05979 ; 0.078561 ; 0.10672 ; 0.14895 ; 0.2123 ; 0.30733 ; 0.44988 ; 0.66369 ; 0.91369 ; 1.1637 ; 1.2262 ; 1.3199 ; 1.4606 ; 1.6715 ; 1.734 ; 1.8278 ; 1.9684 ; 2.1793 ; 2.3903 ; 2.5]

Force (kips): [-0.829993 ; 0.489919 ; 1.18652 ; 1.83582 ; 2.73363 ; 3.95872 ; 5.61617 ; 7.77201 ; 8.47347 ; 9.3997 ; 10.5388 ; 11.8519 ; 13.1003 ; 14.0259 ; 14.7642 ; 15.4765 ; 16.3126 ; 17.3274 ; 18.4837 ; 19.5687 ; 20.4965 ; 20.7071 ; 21.0074 ; 21.4137 ; 21.9474 ; 22.092 ; 22.2979 ; 22.5885 ; 22.9785 ; 23.3155 ; 23.4708]

Bolt 1 - Tensile Force (kips): [34.5253 ; 34.496 ; 34.4801 ; 34.4645 ; 34.4415 ; 34.4077 ; 34.3578 ; 34.2815 ; 34.2533 ; 34.2137 ; 34.1609 ; 34.0939 ; 34.0246 ; 33.975 ; 33.9432 ; 33.9173 ; 33.8449 ; 33.4434 ; 32.31 ; 30.6365 ; 29.0821 ; 28.71 ; 28.1599 ; 27.3632 ; 26.2473 ; 25.9351 ; 25.4881 ; 24.8787 ; 24.0991 ; 23.524 ; 23.3851]

Bolt 1 - Shear Force (kips): [0.047377 ; 0.031546 ; 0.049144 ; 0.071319 ; 0.10504 ; 0.15404 ; 0.22466 ; 0.32324 ; 0.3573 ; 0.4044 ; 0.46607 ; 0.54345 ; 0.62338 ; 0.68205 ; 0.72553 ; 0.76898 ; 0.86459 ; 1.2453 ; 2.1001 ; 3.2294 ; 4.2252 ; 4.4595 ; 4.8022 ; 5.2946 ; 5.9683 ; 6.1522 ; 6.4142 ; 6.7688 ; 7.2309 ; 7.596 ; 7.7061]

Bolt 2 - Tensile Force (kips): [34.5214 ; 34.4977 ; 34.4836 ; 34.4677 ; 34.4474 ; 34.4241 ; 34.4013 ; 34.394 ; 34.4017 ; 34.4229 ; 34.4592 ; 34.5374 ; 34.6612 ; 34.7753 ; 34.8683 ; 34.9699 ; 35.1438 ; 35.3545 ; 36.0581 ; 37.3722 ; 38.8734 ; 39.2351 ; 39.7441 ; 40.4487 ; 41.3668 ; 41.6186 ; 41.9799 ; 42.4903 ; 43.1826 ; 43.7986 ; 44.0864]

Bolt 2 - Shear Force (kips): [0.034842 ; 0.040801 ; 0.070715 ; 0.10017 ; 0.14231 ; 0.20211 ; 0.28612 ; 0.39961 ; 0.43818 ; 0.491 ; 0.55903 ; 0.64044 ; 0.71901 ; 0.77673 ; 0.81791 ; 0.85648 ; 0.93378 ; 1.2325 ; 1.8789 ; 2.632 ; 3.1923 ; 3.3148 ; 3.4898 ; 3.7341 ; 4.0647 ; 4.1558 ; 4.2878 ; 4.4713 ; 4.7247 ; 4.9507 ; 5.0589]

Bolt 3 - Tensile Force (kips): [36 ; 35.9552 ; 35.9222 ; 35.9027 ; 35.9039 ; 35.9766 ; 36.2256 ; 36.7443 ; 36.9885 ; 37.4125 ; 38.0324 ; 38.8743 ; 40.1888 ; 42.0956 ; 44.5683 ; 47.3279 ; 49.9737 ; 53.0633 ; 56.3613 ; 59.289 ; 61.7708 ; 62.3298 ; 63.1068 ; 64.1094 ; 65.4537 ; 65.8071 ; 66.2923 ; 67.0116 ; 67.8984 ; 68.4912 ; 68.6972]

Bolt 3 - Shear Force (kips): [0.02431 ; 0.0086331 ; 0.0082619 ; 0.017027 ; 0.032891 ; 0.058902 ; 0.10011 ; 0.14541 ; 0.15764 ; 0.1712 ; 0.18838 ; 0.21661 ; 0.26279 ; 0.34218 ; 0.46015 ; 0.5811 ; 0.59706 ; 0.58012 ; 0.62986 ; 0.64581 ; 0.65299 ; 0.66139 ; 0.68892 ; 0.71433 ; 0.80525 ; 0.91371 ; 1.1236 ; 1.0725 ; 0.83035 ; 0.84454 ; 0.86092]

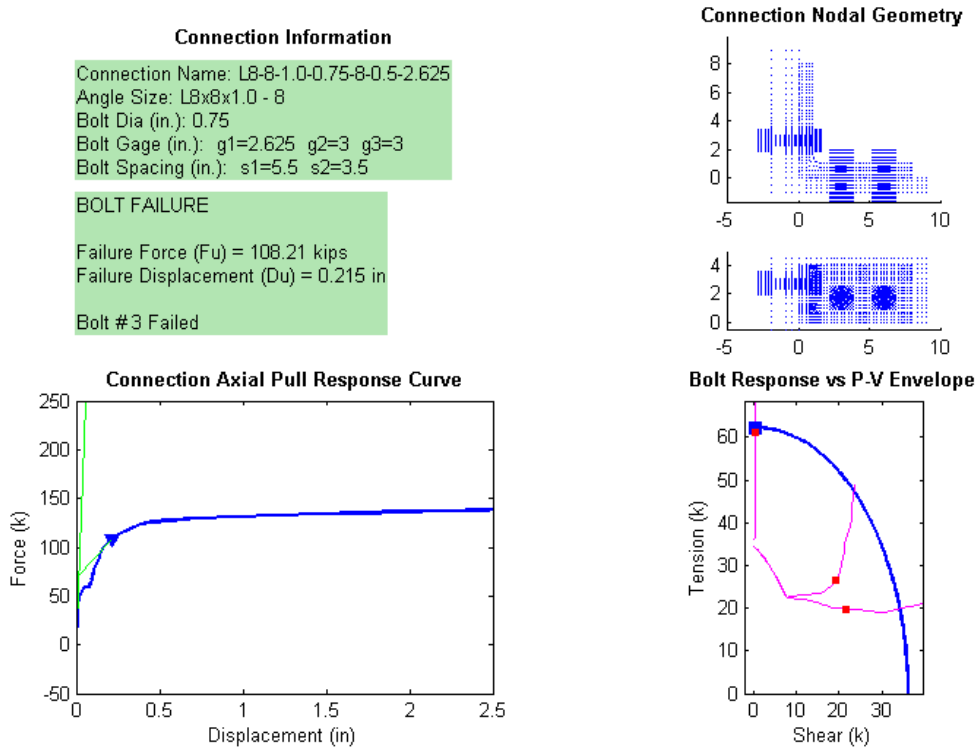


Figure B.382 Connection L8_8_1.0_0.75_8_0.5_2.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.75_8_0.5_2.625 Analysis Response Variables.
Initial Stiffness (k/in): 4.3722e+003

Plastic Stiffness (k/in): 188.3163

Displacement (in): [2.0272e-036 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.055916 ; 0.058001 ; 0.06113 ; 0.065823 ; 0.067583 ; 0.068243 ; 0.069233 ; 0.070717 ; 0.072944 ; 0.076285 ; 0.081297 ; 0.083176 ; 0.085995 ; 0.087052 ; 0.088637 ; 0.091016 ; 0.094584 ; 0.099935 ; 0.10194 ; 0.10495 ; 0.10947 ; 0.11624 ; 0.11878 ; 0.12259 ; 0.1283 ; 0.13688 ; 0.14009 ; 0.14491 ; 0.15215 ; 0.16299 ; 0.17927 ; 0.20368 ; 0.24029 ; 0.29521 ; 0.31581 ; 0.3467 ; 0.39304 ; 0.46256 ; 0.56682 ; 0.72322 ; 0.95782 ; 1.2078 ; 1.4578 ; 1.7078 ; 1.9578 ; 2.2078 ; 2.4578 ; 2.5]

Force (kips): [-0.706217 ; 17.8287 ; 20.6422 ; 22.9477 ; 24.0358 ; 24.8857 ; 26.0205 ; 27.5059 ; 29.1156 ; 29.4401 ; 29.44 ; 29.4368 ; 29.4309 ; 29.4287 ; 29.4579 ; 29.7149 ; 30.0052 ; 30.0103 ; 30.0075 ; 30.0018 ; 30.2735 ; 31.4155 ; 31.683 ; 32.203 ; 32.8262 ; 33.7027 ; 35.3827 ; 36.1142 ; 37.1924 ; 38.7084 ; 40.5718 ; 41.2069 ; 42.1497 ; 43.4298 ; 45.1671 ; 45.8291 ; 46.7673 ; 47.9582 ; 49.3119 ; 51.0318 ; 53.3302 ; 55.9555 ; 58.2409 ; 59.0074 ; 60.1427 ; 61.6426 ; 62.9295 ; 63.7933 ; 64.6609 ; 65.5801 ; 66.3691 ; 67.0355 ; 67.6247 ; 68.1571 ; 68.6502 ; 69.1072 ; 69.1811]

Bolt 1 - Tensile Force (kips): [34.5281 ; 33.9195 ; 33.7947 ; 33.6531 ; 33.0763 ; 31.9665 ; 30.1937 ; 27.4352 ; 23.5352 ; 22.6803 ; 22.6739 ; 22.6677 ; 22.6612 ; 22.6591 ; 22.6423 ; 22.5065 ; 22.4101 ; 22.4034 ; 22.3979 ; 22.3938 ; 22.3755 ; 22.3352 ; 22.3239 ; 22.3011 ; 22.2883 ; 22.2743 ; 22.186 ; 22.1406 ; 22.0385 ; 21.8495 ; 21.6514 ; 21.5591 ; 21.3467 ; 21.1106 ; 20.8831 ; 20.7099 ; 20.462 ; 20.2175 ; 20.0793 ; 20.0298 ; 19.8865 ; 19.67 ; 19.6698 ; 19.6074 ; 19.4354 ; 19.2478 ; 19.0345 ; 19.0333 ; 19.2385 ; 19.595 ; 19.9551 ; 20.2521 ; 20.4595 ; 20.636 ; 20.8264 ; 21.1822 ; 21.2417]

Bolt 1 - Shear Force (kips): [0.0424654 ; 0.691675 ; 0.807614 ; 0.933943 ; 1.40493 ; 2.18996 ; 3.33754 ; 4.97904 ; 7.04962 ; 7.48007 ; 7.48076 ; 7.47991 ; 7.47813 ; 7.47747 ; 7.51189 ; 7.6969 ; 7.83437 ; 7.83817 ; 7.83838 ; 7.83672 ; 8.03872 ; 8.54289 ; 8.69276 ; 8.94122 ; 9.23648 ; 9.68305 ; 10.5469 ; 11.0852 ; 11.8699 ; 12.6573 ; 13.5276 ; 13.9055 ; 14.64 ; 15.4147 ; 16.2567 ; 16.7379 ; 17.4338 ; 18.2575 ; 19.053 ; 19.9173 ; 21.1995 ; 22.8029 ; 24.2714 ; 24.8896 ; 25.9975 ; 27.477 ; 29.0346 ; 30.5136 ; 32.0785 ; 33.7092 ; 35.0065 ; 35.988 ; 36.9341 ; 37.8733 ; 38.7679 ; 39.4763 ; 39.584]

Bolt 2 - Tensile Force (kips): [34.5274 ; 33.9188 ; 33.8081 ; 33.6846 ; 33.1096 ; 32.0047 ; 30.2528 ; 27.5426 ; 23.7433 ; 22.8659 ; 22.8557 ; 22.8496 ; 22.8445 ; 22.8429 ; 22.8436 ; 22.752 ; 22.6074 ; 22.5999 ; 22.5935 ; 22.5889 ; 22.5966 ; 22.6479 ; 22.6656 ; 22.6947 ; 22.7447 ; 22.8497 ; 22.9972 ; 23.0729 ; 23.1334 ; 23.1407 ; 23.2061 ; 23.2472 ; 23.3315 ; 23.4178 ; 23.5027 ; 23.5842 ; 23.7205 ; 23.9637 ; 24.3954 ; 24.9466 ; 26.0496 ; 27.7379 ; 29.9617 ; 30.736 ; 31.8444 ; 33.3321 ; 35.1018 ; 37.0424 ; 39.1438 ; 41.2731 ; 43.083 ; 44.502 ; 45.7172 ; 46.8039 ; 47.815 ; 48.6596 ; 48.7846]

Bolt 2 - Shear Force (kips): [0.0304253 ; 0.751778 ; 0.874198 ; 1.00418 ; 1.46813 ; 2.24949 ; 3.39155 ; 5.0243 ; 7.07512 ; 7.53316 ; 7.53765 ; 7.53912 ; 7.53847 ; 7.53805 ; 7.53833 ; 7.68152 ; 7.91203 ; 7.91794 ; 7.91884 ; 7.91732 ; 7.98542 ; 8.59395 ; 8.70021 ; 8.95942 ; 9.27796 ; 9.68278 ; 10.4709 ; 10.668 ; 11.0243 ; 11.9013 ; 13.0689 ; 13.4022 ; 13.7442 ; 14.4393 ; 15.5484 ; 15.7956 ; 16.1118 ; 16.523 ; 17.0278 ; 17.8652 ; 18.8659 ; 19.7559 ; 20.4669 ; 20.6653 ; 20.888 ; 21.1378 ; 21.3489 ; 21.8661 ; 22.4757 ; 22.8917 ; 22.9454 ; 23.0017 ; 23.1284 ; 23.3559 ; 23.5072 ; 23.5584 ; 23.5592]

Bolt 3 - Tensile Force (kips): [36 ; 36.7881 ; 37.2326 ; 37.6593 ; 37.8764 ; 38.0378 ; 38.2595 ; 38.5763 ; 38.9762 ; 39.0661 ; 39.0657 ; 39.0634 ; 39.0584 ; 39.0565 ; 39.0686 ; 39.1424 ; 39.2293 ; 39.2305 ; 39.2281 ; 39.2229 ; 39.3096 ; 39.7027 ; 39.8067 ; 40.0172 ; 40.2943 ; 40.7263 ; 41.6776 ; 42.1438 ; 42.8855 ; 44.0392 ; 45.6519 ; 46.248 ; 47.1708 ; 48.5011 ; 50.4145 ; 51.1598 ; 52.2405 ; 53.6468 ; 55.2611 ; 57.3344 ; 60.1612 ; 63.3821 ; 65.9426 ; 66.7705 ; 67.9838 ; 69.5711 ; 70.7387 ; 71.1113 ; 71.3884 ; 71.6574 ; 71.8627 ; 72.0333 ; 72.1858 ; 72.3244 ; 72.4513 ; 72.5713 ; 72.591]

Bolt 3 - Shear Force (kips): [0.011923 ; 0.16052 ; 0.183 ; 0.19934 ; 0.20823 ; 0.21466 ; 0.22303 ; 0.23256 ; 0.24094 ; 0.24272 ; 0.24273 ; 0.24263 ; 0.24242 ; 0.24234 ; 0.24274 ; 0.24424 ; 0.24596 ; 0.24599 ; 0.24593 ; 0.24576 ; 0.24747 ; 0.25514 ; 0.25724 ; 0.26169 ; 0.26718 ; 0.27507 ; 0.29452 ; 0.30334 ; 0.31809 ; 0.34147 ; 0.3732 ; 0.38339 ; 0.39799 ; 0.41487 ; 0.41477 ; 0.4066 ; 0.38675 ; 0.35111 ; 0.31431 ; 0.31305 ; 0.33078 ; 0.25335 ; 0.19951 ; 0.20213 ; 0.21266 ; 0.19131 ; 0.11031 ; 0.067465 ; 0.042274 ; 0.02675 ; 0.023769 ; 0.021773 ; 0.021896 ; 0.021486 ; 0.021407 ; 0.021795 ; 0.021755]

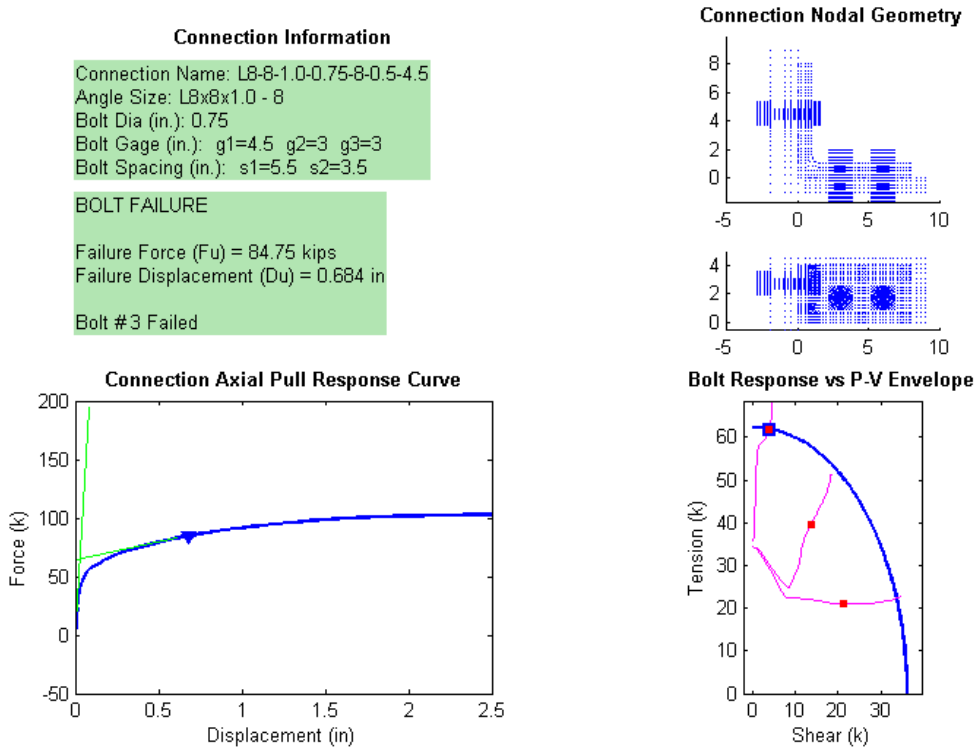


Figure B.383 Connection L8_8_1.0_0.75_8_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.75_8_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.4401e+003

Plastic Stiffness (k/in): 30.6287

Displacement (in): [2.7814e-036 ; 0.0019531 ; 0.0039063 ; 0.0058594 ; 0.0087891 ; 0.013184 ; 0.019775 ; 0.029663 ; 0.044495 ; 0.066742 ; 0.10011 ; 0.11263 ; 0.11732 ; 0.12436 ; 0.127 ; 0.13096 ; 0.1369 ; 0.14581 ; 0.14915 ; 0.1504 ; 0.15228 ; 0.1551 ; 0.15933 ; 0.16567 ; 0.17518 ; 0.18945 ; 0.21086 ; 0.24297 ; 0.29113 ; 0.36337 ; 0.39047 ; 0.4311 ; 0.49206 ; 0.55302 ; 0.61397 ; 0.7054 ; 0.84256 ; 0.89399 ; 0.97113 ; 1.0869 ; 1.1303 ; 1.1953 ; 1.293 ; 1.4394 ; 1.4944 ; 1.5768 ; 1.6076 ; 1.654 ; 1.7235 ; 1.8278 ; 1.9842 ; 2.2188 ; 2.2813 ; 2.375 ; 2.5]

Force (kips): [-0.697062 ; 1.9726 ; 4.06872 ; 5.88569 ; 8.30328 ; 11.4487 ; 15.3006 ; 19.7965 ; 23.7167 ; 26.2601 ; 28.7888 ; 29.3824 ; 29.538 ; 29.6924 ; 29.7321 ; 29.993 ; 30.1103 ; 30.5058 ; 30.5075 ; 30.5406 ; 30.6724 ; 30.8641 ; 31.1286 ; 31.477 ; 31.9559 ; 32.5904 ; 33.3765 ; 34.4264 ; 35.6055 ; 37.0223 ; 37.5531 ; 38.2975 ; 39.4445 ; 40.5019 ; 41.4354 ; 42.6615 ; 44.1952 ; 44.7214 ; 45.4638 ; 46.4918 ; 46.8693 ; 47.3958 ; 48.1063 ; 49.0049 ; 49.2894 ; 49.6233 ; 49.7312 ; 49.8758 ; 50.0662 ; 50.3191 ; 50.6467 ; 51.058 ; 51.1568 ; 51.2968 ; 51.4642]

Bolt 1 - Tensile Force (kips): [34.5241 ; 34.4581 ; 34.3993 ; 34.3438 ; 34.2601 ; 34.1372 ; 33.9644 ; 33.7105 ; 32.7857 ; 29.1371 ; 23.6666 ; 22.698 ; 22.688 ; 22.678 ; 22.6575 ; 22.4658 ; 22.4282 ; 22.4312 ; 22.4278 ; 22.4258 ; 22.4184 ; 22.4063 ; 22.3951 ; 22.3902 ; 22.3869 ; 22.4017 ; 22.4679 ; 22.5477 ; 22.2787 ; 22.0534 ; 21.8489 ; 21.6492 ; 21.4341 ; 21.0803 ; 21.1274 ; 21.0371 ; 21.099 ; 21.1108 ; 21.1665 ; 21.1569 ; 21.1771 ; 21.1706 ; 21.2612 ; 21.5154 ; 21.5693 ; 21.6322 ; 21.6594 ; 21.707 ; 21.7715 ; 21.8739 ; 22.0544 ; 22.3354 ; 22.4061 ; 22.5089 ; 22.6487]

Bolt 1 - Shear Force (kips): [0.0415158 ; 0.0804557 ; 0.162884 ; 0.237426 ; 0.338468 ; 0.475143 ; 0.654892 ; 0.891639 ; 1.62543 ; 3.9898 ; 6.9956 ; 7.48501 ; 7.48554 ; 7.48349 ; 7.51814 ; 7.786 ; 7.83632 ; 7.8372 ; 7.83574 ; 7.85121 ; 7.96044 ; 8.13072 ; 8.33879 ; 8.54386 ; 8.80755 ; 9.10936 ; 9.57106 ; 10.3519 ; 12.1094 ; 13.7017 ; 14.5827 ; 15.525 ; 16.9178 ; 18.7294 ; 19.9232 ; 21.4995 ; 23.4458 ; 24.0803 ; 25.2152 ; 26.9537 ; 27.4804 ; 28.2286 ; 29.1199 ; 30.1685 ; 30.5657 ; 31.1217 ; 31.3148 ; 31.5811 ; 31.9574 ; 32.4624 ; 33.1007 ; 33.9018 ; 34.0795 ; 34.3243 ; 34.6112]

Bolt 2 - Tensile Force (kips): [34.5176 ; 34.462 ; 34.4007 ; 34.348 ; 34.2756 ; 34.1864 ; 34.0979 ; 34.0228 ; 33.4531 ; 30.447 ; 26.3555 ; 25.401 ; 25.0722 ; 24.7386 ; 24.7411 ; 24.8747 ; 24.8863 ; 25.034 ; 25.0264 ; 25.0562 ; 25.1683 ; 25.3372 ; 25.5843 ; 25.9389 ; 26.477 ; 27.2344 ; 28.3274 ; 29.7206 ; 31.1531 ; 33.0566 ; 33.7734 ; 34.7891 ; 36.1341 ; 37.348 ; 38.4331 ; 39.8516 ; 41.7348 ; 42.3164 ; 43.2164 ; 44.4359 ; 44.8072 ; 45.3513 ; 46.146 ; 47.2564 ; 47.6282 ; 48.1151 ; 48.2807 ; 48.5114 ; 48.8252 ; 49.2528 ; 49.8378 ; 50.6321 ; 50.8213 ; 51.0974 ; 51.4046]

Bolt 2 - Shear Force (kips): [0.0278167 ; 0.0965709 ; 0.188218 ; 0.269656 ; 0.378926 ; 0.525921 ; 0.714808 ; 0.950412 ; 1.62346 ; 3.89546 ; 6.76145 ; 7.56279 ; 7.84882 ; 8.13831 ; 8.1546 ; 8.19964 ; 8.2904 ; 8.68744 ; 8.69447 ; 8.70447 ; 8.73639 ; 8.77973 ; 8.84265 ; 8.94094 ; 9.19866 ; 9.67422 ; 10.0363 ; 10.6618 ; 10.9001 ; 11.2673 ; 11.3682 ; 11.5566 ; 11.9559 ; 12.293 ; 12.8837 ; 13.7391 ; 14.6799 ; 15.1133 ; 15.5381 ; 16.0025 ; 16.2574 ; 16.5569 ; 16.9324 ; 17.3778 ; 17.493 ; 17.623 ; 17.6657 ; 17.721 ; 17.7913 ; 17.8845 ; 17.9836 ; 18.1095 ; 18.1631 ; 18.2363 ; 18.3637]

Bolt 3 - Tensile Force (kips): [36 ; 35.9358 ; 35.9339 ; 35.9973 ; 36.199 ; 36.6129 ; 37.4086 ; 38.5804 ; 39.9215 ; 41.2466 ; 43.195 ; 43.7906 ; 43.9632 ; 44.1409 ; 44.1848 ; 44.4763 ; 44.6118 ; 45.0847 ; 45.0869 ; 45.1268 ; 45.2862 ; 45.5232 ; 45.8608 ; 46.3295 ; 46.9901 ; 47.8848 ; 49.0394 ; 50.5788 ; 52.5246 ; 54.7482 ; 55.4786 ; 56.4934 ; 58.0183 ; 59.4097 ; 60.71 ; 62.4042 ; 64.5509 ; 65.2788 ; 66.2915 ; 67.6673 ; 68.1409 ; 68.7112 ; 69.2225 ; 69.7718 ; 69.9079 ; 70.0155 ; 70.0459 ; 70.0888 ; 70.1666 ; 70.2659 ; 70.4408 ; 70.6869 ; 70.7534 ; 70.8547 ; 71.0203]

Bolt 3 - Shear Force (kips): [0.024655 ; 0.0111 ; 0.035545 ; 0.061738 ; 0.10299 ; 0.15121 ; 0.19839 ; 0.25417 ; 0.31883 ; 0.37366 ; 0.45409 ; 0.48099 ; 0.48902 ; 0.4978 ; 0.50001 ; 0.51469 ; 0.52176 ; 0.54628 ; 0.5465 ; 0.54859 ; 0.55663 ; 0.56839 ; 0.58537 ; 0.60911 ; 0.64043 ; 0.67833 ; 0.72321 ; 0.77256 ; 0.8261 ; 0.90412 ; 0.92341 ; 0.94022 ; 1.244 ; 2.6646 ; 3.3235 ; 3.8167 ; 4.2917 ; 4.4474 ; 4.569 ; 4.4951 ; 4.3752 ; 3.9332 ; 3.0625 ; 2.1593 ; 1.8323 ; 1.4612 ; 1.358 ; 1.2335 ; 1.1022 ; 1.0133 ; 1.0048 ; 1.0823 ; 1.1111 ; 1.1644 ; 1.2324]

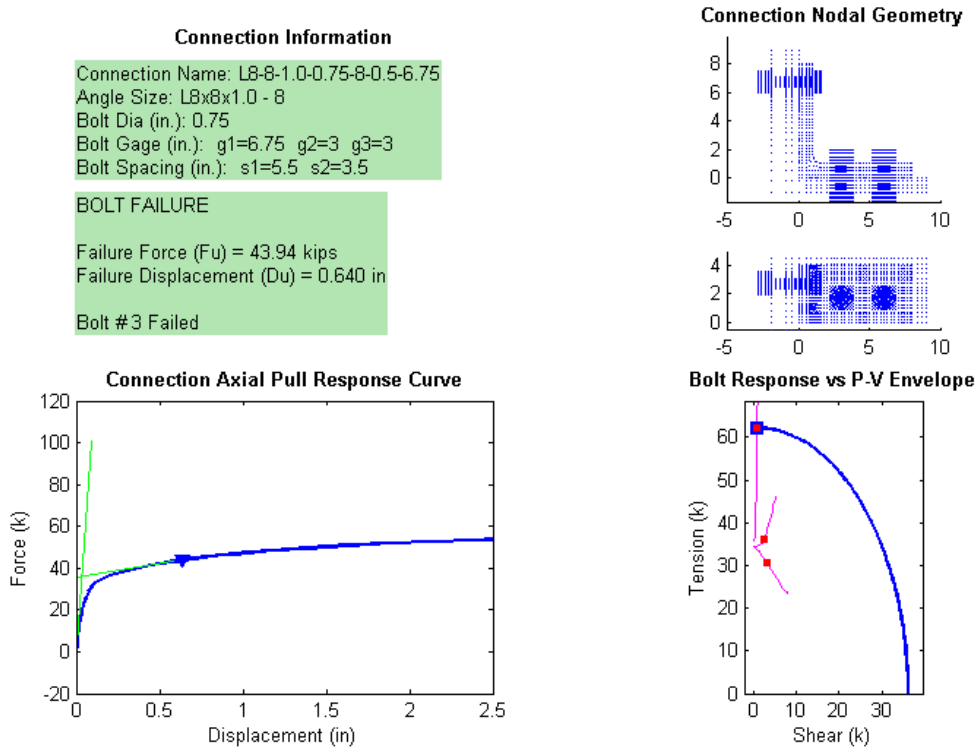


Figure B.384 Connection L8_8_1.0_0.75_8_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.75_8_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.0659e+003

Plastic Stiffness (k/in): 13.0355

Displacement (in): [2.0676e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.44793 ; 0.50138 ; 0.58156 ; 0.70183 ; 0.88224 ; 0.94474 ; 1.0385 ; 1.1791 ; 1.3901 ; 1.6401 ; 1.8901 ; 2.1401 ; 2.3901 ; 2.5]

Force (kips): [-0.680244 ; 0.589578 ; 1.40158 ; 2.51316 ; 3.99593 ; 5.94316 ; 8.39668 ; 9.16408 ; 10.1994 ; 11.5489 ; 13.0834 ; 14.6688 ; 16.1554 ; 17.1873 ; 18.1887 ; 19.4042 ; 20.7372 ; 21.1373 ; 21.6599 ; 22.3007 ; 23.0932 ; 23.3464 ; 23.7053 ; 24.1853 ; 24.7951 ; 25.3874 ; 25.911 ; 26.3093 ; 26.6419 ; 26.7797]

Bolt 1 - Tensile Force (kips): [34.5243 ; 34.494 ; 34.4735 ; 34.4429 ; 34.3982 ; 34.3332 ; 34.2345 ; 34.1999 ; 34.1497 ; 34.0782 ; 33.9854 ; 33.8719 ; 33.7423 ; 33.5158 ; 33.2652 ; 32.8879 ; 32.1773 ; 31.8524 ; 31.2755 ; 30.3022 ; 28.9735 ; 28.5437 ; 27.9226 ; 27.0506 ; 25.8365 ; 24.6095 ; 23.7429 ; 23.4885 ; 23.6578 ; 23.749]

Bolt 1 - Shear Force (kips): [0.04114 ; 0.034776 ; 0.062317 ; 0.10695 ; 0.17074 ; 0.2597 ; 0.37913 ; 0.41914 ; 0.4758 ; 0.55477 ; 0.65406 ; 0.76968 ; 0.89498 ; 1.1025 ; 1.316 ; 1.6142 ; 2.1314 ; 2.3559 ; 2.741 ; 3.3633 ; 4.2016 ; 4.4718 ; 4.862 ; 5.4081 ; 6.1535 ; 6.8958 ; 7.4595 ; 7.7311 ; 7.8018 ; 7.8301]

Bolt 2 - Tensile Force (kips): [34.5184 ; 34.499 ; 34.4799 ; 34.449 ; 34.4118 ; 34.3693 ; 34.334 ; 34.3306 ; 34.3377 ; 34.3621 ; 34.423 ; 34.5499 ; 34.7257 ; 34.7378 ; 34.7126 ; 34.766 ; 35.0863 ; 35.298 ; 35.7109 ; 36.7685 ; 38.3575 ; 38.8624 ; 39.5767 ; 40.5376 ; 41.7785 ; 42.9776 ; 44.069 ; 45.004 ; 45.8075 ; 46.1461]

Bolt 2 - Shear Force (kips): [0.027939 ; 0.040614 ; 0.077042 ; 0.1288 ; 0.20049 ; 0.29849 ; 0.42782 ; 0.47086 ; 0.53093 ; 0.61271 ; 0.711 ; 0.81759 ; 0.92018 ; 1.0926 ; 1.2717 ; 1.5119 ; 1.9006 ; 2.0583 ; 2.3171 ; 2.6645 ; 3.0814 ; 3.2085 ; 3.3867 ; 3.6298 ; 3.9583 ; 4.3128 ; 4.5906 ; 4.8368 ; 5.0588 ; 5.1432]

Bolt 3 - Tensile Force (kips): [36 ; 35.9544 ; 35.9235 ; 35.9087 ; 35.9715 ; 36.2543 ; 36.8923 ; 37.2158 ; 37.72 ; 38.4407 ; 39.4726 ; 41.128 ; 43.4929 ; 46.6225 ; 50.5614 ; 54.8419 ; 58.8213 ; 59.9777 ; 61.4696 ; 63.234 ; 65.0192 ; 65.5351 ; 66.1988 ; 67.0714 ; 68.0972 ; 68.9378 ; 69.3572 ; 69.5338 ; 69.5983 ; 69.5342]

Bolt 3 - Shear Force (kips): [0.024971 ; 0.0080249 ; 0.010969 ; 0.028471 ; 0.058046 ; 0.10476 ; 0.15256 ; 0.16383 ; 0.17775 ; 0.20099 ; 0.23535 ; 0.30482 ; 0.41812 ; 0.56107 ; 0.62671 ; 0.66745 ; 0.68021 ; 0.6695 ; 0.65561 ; 0.64218 ; 0.64616 ; 0.65512 ; 0.73437 ; 0.78709 ; 1.027 ; 1.326 ; 2.2786 ; 3.083 ; 3.8181 ; 4.2579]

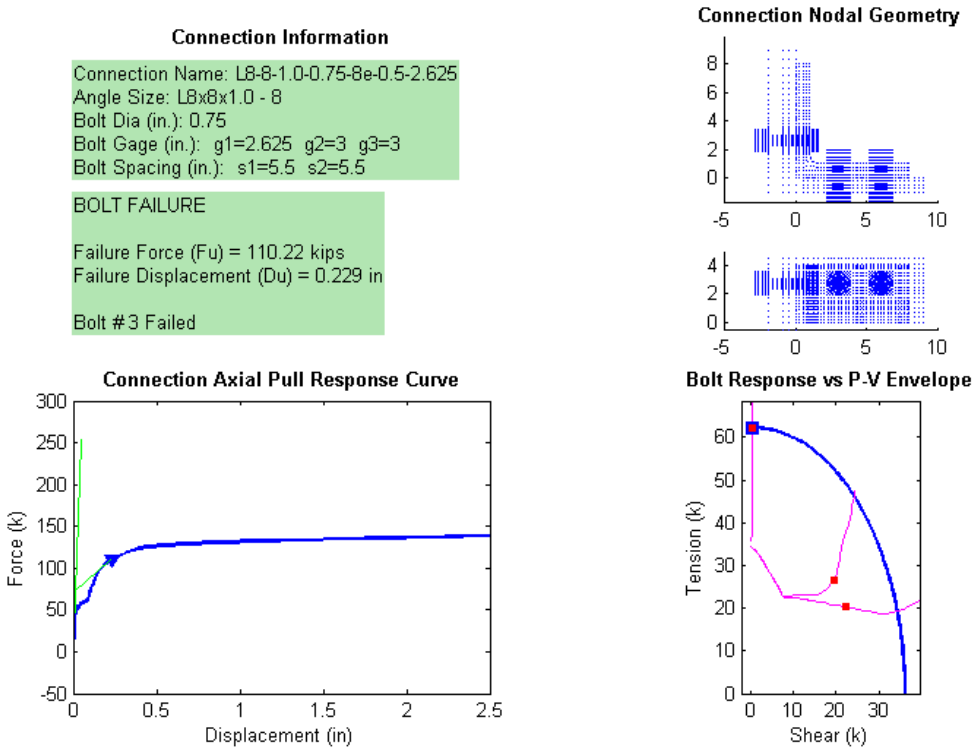


Figure B.385 Connection L8_8_1.0_0.75_8e_0.5_2.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.75_8e_0.5_2.625 Analysis Response Variables.
Initial Stiffness (k/in): 5.5582e+003

Plastic Stiffness (k/in): 174.8682

Displacement (in): [2.6711e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.033569 ; 0.048401 ; 0.053963 ; 0.056048 ; 0.059177 ; 0.06387 ; 0.065629 ; 0.068269 ; 0.069259 ; 0.070744 ; 0.072971 ; 0.076312 ; 0.081323 ; 0.083203 ; 0.083907 ; 0.084964 ; 0.08655 ; 0.088928 ; 0.08982 ; 0.091158 ; 0.093165 ; 0.096175 ; 0.10069 ; 0.10238 ; 0.10492 ; 0.10873 ; 0.11445 ; 0.11659 ; 0.1198 ; 0.12463 ; 0.13186 ; 0.14271 ; 0.15898 ; 0.18339 ; 0.22001 ; 0.27493 ; 0.29552 ; 0.30325 ; 0.31483 ; 0.33221 ; 0.35828 ; 0.39738 ; 0.45603 ; 0.544 ; 0.67597 ; 0.87391 ; 1.1239 ; 1.3739 ; 1.6239 ; 1.8739 ; 2.1239 ; 2.1864 ; 2.2802 ; 2.4208 ; 2.5]

Force (kips): [-0.889446 ; 5.22864 ; 9.96648 ; 15.6567 ; 20.07 ; 23.2231 ; 24.4899 ; 25.6833 ; 27.2303 ; 28.9918 ; 29.4451 ; 29.5671 ; 29.5745 ; 29.5699 ; 29.5674 ; 29.5639 ; 29.6361 ; 29.9276 ; 30.1102 ; 30.1128 ; 30.1081 ; 30.1062 ; 30.3167 ; 30.6899 ; 31.3243 ; 32.006 ; 32.2664 ; 32.6299 ; 33.1695 ; 33.8776 ; 35.2763 ; 35.9106 ; 36.8042 ; 38.0258 ; 39.7406 ; 40.3216 ; 41.1463 ; 42.3381 ; 43.9278 ; 46.1408 ; 48.8066 ; 51.4333 ; 54.6347 ; 57.4619 ; 58.2501 ; 58.5402 ; 58.9667 ; 59.5996 ; 60.5366 ; 61.7407 ; 62.8349 ; 63.6225 ; 64.4364 ; 65.2896 ; 66.1231 ; 66.8258 ; 67.4334 ; 67.9841 ; 68.4946 ; 68.6216 ; 68.8035 ; 69.0648 ; 69.2052]

Bolt 1 - Tensile Force (kips): [34.5948 ; 34.4189 ; 34.2526 ; 34.0252 ; 33.8237 ; 33.5697 ; 32.597 ; 30.875 ; 28.1602 ; 24.1914 ; 22.9508 ; 22.7153 ; 22.7061 ; 22.6981 ; 22.6956 ; 22.6924 ; 22.6393 ; 22.4668 ; 22.4584 ; 22.4517 ; 22.4472 ; 22.4459 ; 22.4305 ; 22.4083 ; 22.3998 ; 22.3846 ; 22.3815 ; 22.3779 ; 22.3973 ; 22.3997 ; 22.3849 ; 22.3655 ; 22.2529 ; 22.0753 ; 21.9777 ; 21.9406 ; 21.8655 ; 21.6912 ; 21.5731 ; 21.3052 ; 20.8674 ; 20.7051 ; 20.3469 ; 20.0318 ; 19.9783 ; 19.9235 ; 19.8457 ; 19.7288 ; 19.4869 ; 19.2134 ; 18.8579 ; 18.6559 ; 18.6633 ; 19.0142 ; 19.4296 ; 19.8329 ; 20.2318 ; 20.7149 ; 21.1871 ; 21.2897 ; 21.4462 ; 21.6527 ; 21.763]

Bolt 1 - Shear Force (kips): [0.0401303 ; 0.215016 ; 0.402598 ; 0.634207 ; 0.820426 ; 1.04232 ; 1.77967 ; 2.93318 ; 4.58654 ; 6.74662 ; 7.36931 ; 7.49015 ; 7.49146 ; 7.4901 ; 7.48942 ; 7.48847 ; 7.57735 ; 7.82048 ; 7.82853 ; 7.8311 ; 7.83015 ; 7.82957 ; 8.03417 ; 8.33537 ; 8.54955 ; 8.88837 ; 8.97719 ; 9.16875 ; 9.4125 ; 9.78883 ; 10.6227 ; 11.0272 ; 11.7119 ; 12.5443 ; 13.236 ; 13.5069 ; 13.985 ; 14.8554 ; 15.6932 ; 17.0313 ; 18.7978 ; 20.0809 ; 21.8461 ; 23.5756 ; 24.1377 ; 24.3799 ; 24.7289 ; 25.283 ; 26.235 ; 27.4534 ; 28.8249 ; 30.2006 ; 31.7393 ; 33.2747 ; 34.7579 ; 35.8099 ; 36.7322 ; 37.5996 ; 38.4052 ; 38.6262 ; 38.8984 ; 39.2869 ; 39.4736]

Bolt 2 - Tensile Force (kips): [34.6031 ; 34.4364 ; 34.275 ; 34.0678 ; 33.9065 ; 33.7125 ; 32.777 ; 31.0914 ; 28.4408 ; 24.5829 ; 23.3401 ; 22.9476 ; 22.8951 ; 22.8836 ; 22.8809 ; 22.8777 ; 22.8799 ; 22.7963 ; 22.6466 ; 22.6395 ; 22.6342 ; 22.6329 ; 22.6443 ; 22.6532 ; 22.6749 ; 22.7153 ; 22.7297 ; 22.7522 ; 22.7995 ; 22.8946 ; 23.0154 ; 23.0697 ; 23.158 ; 23.2073 ; 23.1109 ; 23.0823 ; 23.0653 ; 23.1162 ; 23.138 ; 23.2615 ; 23.6913 ; 24.5488 ; 26.1036 ; 28.4429 ; 29.2529 ; 29.5422 ; 29.9647 ; 30.5896 ; 31.4976 ; 32.7089 ; 34.1512 ; 35.8382 ; 37.7448 ; 39.6327 ; 41.4252 ; 42.7757 ; 43.9369 ; 45.0191 ; 46.0434 ; 46.2961 ; 46.6701 ; 47.2111 ; 47.4909]

Bolt 2 - Shear Force (kips): [0.0481979 ; 0.209377 ; 0.39673 ; 0.624346 ; 0.803883 ; 1.00615 ; 1.73254 ; 2.87834 ; 4.52186 ; 6.67559 ; 7.3156 ; 7.52147 ; 7.54748 ; 7.55028 ; 7.55013 ; 7.54948 ; 7.55025 ; 7.68044 ; 7.90488 ; 7.90919 ; 7.90849 ; 7.9079 ; 7.91147 ; 7.98118 ; 8.39387 ; 8.7206 ; 8.88563 ; 9.0526 ; 9.33952 ; 9.65358 ; 10.1968 ; 10.4277 ; 10.677 ; 11.1695 ; 12.3717 ; 12.7546 ; 13.2177 ; 13.6987 ; 14.6521 ; 15.7609 ; 16.7512 ; 17.9652 ; 19.2583 ; 20.1097 ; 20.3218 ; 20.3939 ; 20.4987 ; 20.6363 ; 20.791 ; 20.9907 ; 21.2421 ; 21.7271 ; 22.3231 ; 22.9707 ; 23.2873 ; 23.5469 ; 23.755 ; 23.9897 ; 24.218 ; 24.2516 ; 24.3001 ; 24.3358 ; 24.3478]

Bolt 3 - Tensile Force (kips): [36 ; 35.9811 ; 36.1213 ; 36.5743 ; 37.1906 ; 37.7832 ; 38.036 ; 38.2712 ; 38.6022 ; 39.0474 ; 39.177 ; 39.2155 ; 39.2178 ; 39.2143 ; 39.2122 ; 39.2091 ; 39.234 ; 39.3223 ; 39.3807 ; 39.3809 ; 39.3766 ; 39.3747 ; 39.4444 ; 39.5688 ; 39.8014 ; 40.0729 ; 40.185 ; 40.3467 ; 40.6037 ; 40.9656 ; 41.7726 ; 42.1729 ; 42.7777 ; 43.6793 ; 45.0798 ; 45.5907 ; 46.3492 ; 47.5081 ; 49.1636 ; 51.6038 ; 54.6611 ; 57.812 ; 61.7726 ; 65.1027 ; 65.9664 ; 66.2812 ; 66.7437 ; 67.4274 ; 68.431 ; 69.7027 ; 70.7022 ; 71.056 ; 71.3173 ; 71.5738 ; 71.7963 ; 71.9771 ; 72.1342 ; 72.2776 ; 72.4081 ; 72.4394 ; 72.4854 ; 72.5529 ; 72.5899]

Bolt 3 - Shear Force (kips): [0.025401 ; 0.025083 ; 0.070131 ; 0.13187 ; 0.16986 ; 0.19303 ; 0.20332 ; 0.21249 ; 0.22309 ; 0.23338 ; 0.23626 ; 0.23696 ; 0.23699 ; 0.23688 ; 0.23679 ; 0.23666 ; 0.23734 ; 0.23923 ; 0.2405 ; 0.24052 ; 0.24039 ; 0.24034 ; 0.24181 ; 0.24436 ; 0.2495 ; 0.25516 ; 0.25738 ; 0.26046 ; 0.26521 ; 0.27236 ; 0.2888 ; 0.29655 ; 0.30856 ; 0.32657 ; 0.35455 ; 0.36376 ; 0.37623 ; 0.39344 ; 0.40781 ; 0.3872 ; 0.3099 ; 0.30079 ; 0.28869 ; 0.19136 ; 0.18384 ; 0.1841 ; 0.18671 ; 0.19238 ; 0.20029 ; 0.17164 ; 0.10129 ; 0.066139 ; 0.041616 ; 0.0258 ; 0.021278 ; 0.018812 ; 0.019318 ; 0.020041 ; 0.02009 ; 0.020334 ; 0.020758 ; 0.021322 ; 0.021514]

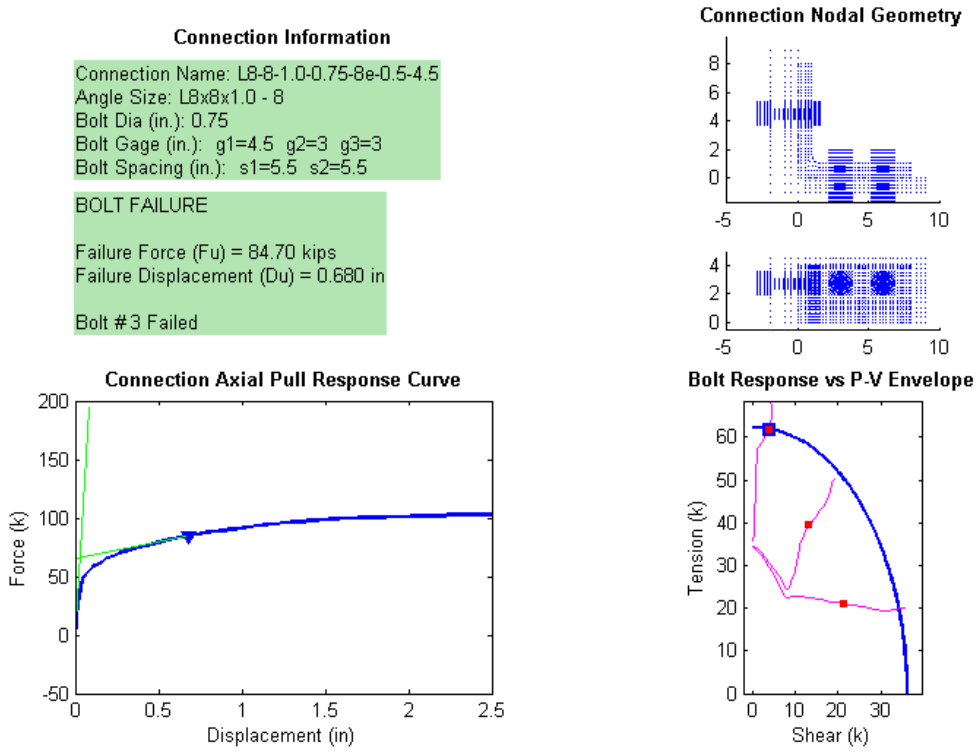


Figure B.386 Connection L8_8_1.0_0.75_8e_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.75_8e_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.3978e+003

Plastic Stiffness (k/in): 28.2133

Displacement (in): [2.6363e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.0097656 ; 0.012695 ; 0.01709 ; 0.023682 ; 0.033569 ; 0.048401 ; 0.070648 ; 0.10402 ; 0.11653 ; 0.12123 ; 0.12826 ; 0.1309 ; 0.13487 ; 0.13635 ; 0.13858 ; 0.14192 ; 0.14693 ; 0.14881 ; 0.14951 ; 0.15057 ; 0.15216 ; 0.15453 ; 0.1581 ; 0.16345 ; 0.17148 ; 0.18352 ; 0.20158 ; 0.22867 ; 0.26931 ; 0.33027 ; 0.35313 ; 0.3617 ; 0.37456 ; 0.39384 ; 0.42277 ; 0.46617 ; 0.53126 ; 0.6289 ; 0.66551 ; 0.72044 ; 0.80282 ; 0.83371 ; 0.88006 ; 0.94957 ; 1.0538 ; 1.0929 ; 1.1516 ; 1.1736 ; 1.2066 ; 1.2561 ; 1.3303 ; 1.4416 ; 1.4834 ; 1.546 ; 1.64 ; 1.6752 ; 1.728 ; 1.8073 ; 1.9262 ; 2.1046 ; 2.3546 ; 2.3909 ; 2.4455 ; 2.5]

Force (kips): [-0.878654 ; 1.7587 ; 3.80449 ; 6.40764 ; 8.68679 ; 10.726 ; 13.4126 ; 16.7877 ; 20.5984 ; 24.1357 ; 26.543 ; 28.9978 ; 29.5219 ; 29.6568 ; 29.7706 ; 29.9429 ; 30.0158 ; 30.0184 ; 30.1513 ; 30.3466 ; 30.4161 ; 30.415 ; 30.4495 ; 30.5267 ; 30.6391 ; 30.805 ; 31.0373 ; 31.3523 ; 31.7567 ; 32.3024 ; 33.0353 ; 33.9466 ; 35.1042 ; 36.3668 ; 36.8075 ; 36.9708 ; 37.2219 ; 37.5978 ; 38.1361 ; 38.9619 ; 40.1418 ; 41.6456 ; 42.1621 ; 42.8741 ; 43.8123 ; 44.1387 ; 44.6079 ; 45.2873 ; 46.2217 ; 46.5684 ; 47.0484 ; 47.2273 ; 47.4828 ; 47.8424 ; 48.3428 ; 49.0072 ; 49.2266 ; 49.4998 ; 49.8235 ; 49.9281 ; 50.0701 ; 50.2638 ; 50.5207 ; 50.8549 ; 51.2519 ; 51.3048 ; 51.3818 ; 51.4496]

Bolt 1 - Tensile Force (kips): [34.5873 ; 34.5131 ; 34.4483 ; 34.3577 ; 34.2672 ; 34.1798 ; 34.0557 ; 33.8786 ; 33.5196 ; 32.4558 ; 28.771 ; 23.5077 ; 22.8125 ; 22.8114 ; 22.7664 ; 22.6315 ; 22.5758 ; 22.5717 ; 22.5767 ; 22.5842 ; 22.584 ; 22.5823 ; 22.5812 ; 22.577 ; 22.5753 ; 22.5727 ; 22.5726 ; 22.5809 ; 22.6019 ; 22.6301 ; 22.7028 ; 22.8092 ; 22.8027 ; 22.5174 ; 22.4802 ; 22.4708 ; 22.4079 ; 22.2706 ; 22.1193 ; 22.0188 ; 21.5115 ; 21.2758 ; 21.1664 ; 20.902 ; 20.7119 ; 20.6542 ; 20.5105 ; 20.2637 ; 19.9475 ; 19.8193 ; 19.6641 ; 19.6118 ; 19.5497 ; 19.4875 ; 19.4205 ; 19.4221 ; 19.4313 ; 19.4691 ; 19.5435 ; 19.5688 ; 19.5971 ; 19.6592 ; 19.7578 ; 19.8997 ; 20.0991 ; 20.1289 ; 20.1718 ; 20.2122]

Bolt 1 - Shear Force (kips): [0.0401372 ; 0.0855667 ; 0.171419 ; 0.285096 ; 0.387043 ; 0.48136 ; 0.611315 ; 0.78485 ; 1.10681 ; 1.90694 ; 4.26636 ; 7.15483 ; 7.52415 ; 7.52672 ; 7.58837 ; 7.77673 ; 7.85429 ; 7.85631 ; 7.85848 ; 7.86112 ; 7.86117 ; 7.86042 ; 7.882 ; 7.93696 ; 8.01548 ; 8.14716 ; 8.32174 ; 8.52038 ; 8.70422 ; 9.03328 ; 9.43929 ; 9.92587 ; 11.2196 ; 13.0284 ; 13.4857 ; 13.6513 ; 14.022 ; 14.6343 ; 15.3675 ; 16.2315 ; 18.2185 ; 20.3558 ; 21.049 ; 22.1697 ; 23.4569 ; 23.8768 ; 24.542 ; 25.7688 ; 27.468 ; 28.036 ; 28.774 ; 29.0276 ; 29.3794 ; 29.8567 ; 30.5343 ; 31.4184 ; 31.7333 ; 32.1527 ; 32.707 ; 32.9123 ; 33.2242 ; 33.5859 ; 34.0585 ; 34.6698 ; 35.3476 ; 35.4331 ; 35.5583 ; 35.6766]

Bolt 2 - Tensile Force (kips): [34.5875 ; 34.5326 ; 34.475 ; 34.4009 ; 34.3389 ; 34.2879 ; 34.235 ; 34.1921 ; 34.0865 ; 33.4433 ; 30.4334 ; 26.4746 ; 25.1429 ; 24.6735 ; 24.4764 ; 24.5453 ; 24.5672 ; 24.5642 ; 24.5638 ; 24.5983 ; 24.6079 ; 24.6028 ; 24.6307 ; 24.6911 ; 24.7809 ; 24.9218 ; 25.1356 ; 25.4581 ; 25.9217 ; 26.6393 ; 27.6979 ; 29.0957 ; 30.6906 ; 32.3404 ; 32.9539 ; 33.1831 ; 33.5251 ; 34.0273 ; 34.7635 ; 35.7277 ; 37.0431 ; 38.7822 ; 39.3143 ; 40.0994 ; 41.1081 ; 41.4277 ; 41.8964 ; 42.5949 ; 43.5405 ; 43.8378 ; 44.2802 ; 44.4418 ; 44.6899 ; 45.0702 ; 45.6491 ; 46.4666 ; 46.7493 ; 47.1296 ; 47.6226 ; 47.7907 ; 48.0232 ; 48.3479 ; 48.7991 ; 49.4136 ; 50.0368 ; 50.0995 ; 50.1983 ; 50.2999]

Bolt 2 - Shear Force (kips): [0.0469874 ; 0.0752447 ; 0.156046 ; 0.263327 ; 0.358095 ; 0.444737 ; 0.561958 ; 0.714675 ; 0.980768 ; 1.68442 ; 3.94484 ; 6.73835 ; 7.61574 ; 7.91929 ; 8.06414 ; 8.08922 ; 8.10405 ; 8.10732 ; 8.25609 ; 8.46739 ; 8.54012 ; 8.54186 ; 8.55071 ; 8.56985 ; 8.59637 ; 8.63185 ; 8.68361 ; 8.75765 ; 8.85576 ; 8.98044 ; 9.43291 ; 9.98364 ; 10.3951 ; 10.6374 ; 10.7276 ; 10.7584 ; 10.8058 ; 10.9125 ; 11.0779 ; 11.4345 ; 11.893 ; 12.5793 ; 13.012 ; 13.5412 ; 14.3183 ; 14.6442 ; 15.0351 ; 15.5227 ; 16.1223 ; 16.3516 ; 16.67 ; 16.7964 ; 16.9641 ; 17.2079 ; 17.4906 ; 17.8055 ; 17.903 ; 18.0284 ; 18.1777 ; 18.2202 ; 18.2755 ; 18.3594 ; 18.4651 ; 18.6083 ; 18.9389 ; 19.004 ; 19.0884 ; 19.1571]

Bolt 3 - Tensile Force (kips): [36 ; 35.9335 ; 35.9289 ; 36.038 ; 36.2617 ; 36.5396 ; 37.0234 ; 37.8554 ; 38.8926 ; 40.2002 ; 41.5318 ; 43.4827 ; 44.0145 ; 44.164 ; 44.2906 ; 44.4776 ; 44.5583 ; 44.5613 ; 44.7138 ; 44.9416 ; 45.0235 ; 45.022 ; 45.0624 ; 45.1543 ; 45.2909 ; 45.4936 ; 45.7854 ; 46.1962 ; 46.7534 ; 47.524 ; 48.5764 ; 49.9265 ; 51.7032 ; 53.8147 ; 54.4837 ; 54.7207 ; 55.0723 ; 55.5882 ; 56.3203 ; 57.4493 ; 58.9511 ; 61.064 ; 61.768 ; 62.7381 ; 64.0288 ; 64.4723 ; 65.1118 ; 66.0297 ; 67.2865 ; 67.7518 ; 68.3139 ; 68.5108 ; 68.7385 ; 68.9818 ; 69.2804 ; 69.6833 ; 69.7898 ; 69.904 ; 70.0213 ; 70.0564 ; 70.1168 ; 70.193 ; 70.3169 ; 70.506 ; 70.7729 ; 70.8146 ; 70.8768 ; 70.9639]

Bolt 3 - Shear Force (kips): [0.03925 ; 0.005499 ; 0.022321 ; 0.059294 ; 0.097363 ; 0.12737 ; 0.16167 ; 0.19887 ; 0.249 ; 0.31335 ; 0.36698 ; 0.445 ; 0.46672 ; 0.47333 ; 0.47917 ; 0.4877 ; 0.49147 ; 0.49163 ; 0.49871 ; 0.50925 ; 0.51315 ; 0.51313 ; 0.515 ; 0.51918 ; 0.52526 ; 0.53429 ; 0.54746 ; 0.56599 ; 0.5904 ; 0.62104 ; 0.65676 ; 0.69902 ; 0.74768 ; 0.81713 ; 0.84142 ; 0.84952 ; 0.86013 ; 0.87235 ; 0.88458 ; 0.91976 ; 2.1823 ; 3.2963 ; 3.5473 ; 3.7941 ; 4.1167 ; 4.2639 ; 4.4109 ; 4.5429 ; 4.5767 ; 4.358 ; 4.0118 ; 3.7894 ; 3.4447 ; 3.0284 ; 2.5517 ; 1.9258 ; 1.7148 ; 1.4807 ; 1.2329 ; 1.1605 ; 1.0824 ; 1.0271 ; 1.0165 ; 1.0792 ; 1.1999 ; 1.221 ; 1.2524 ; 1.2854]

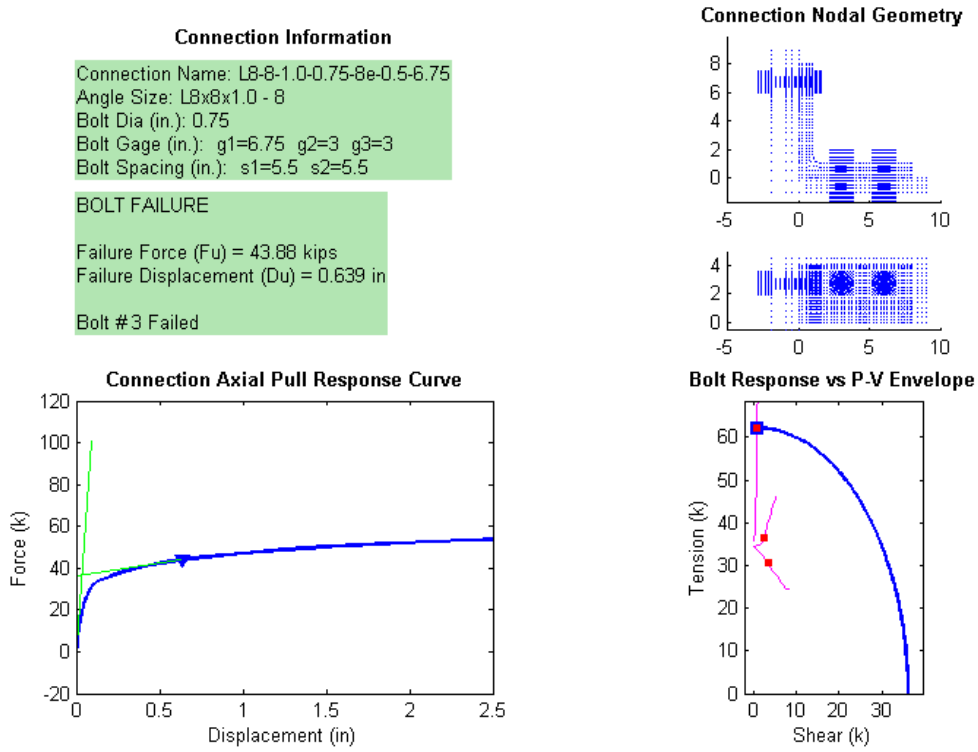


Figure B.387 Connection L8_8_1.0_0.75_8e_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.75_8e_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 1070

Plastic Stiffness (k/in): 12.0795

Displacement (in): [2.1913e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.062529 ; 0.069569 ; 0.080127 ; 0.095965 ; 0.11972 ; 0.15536 ; 0.20881 ; 0.28899 ; 0.40926 ; 0.45437 ; 0.52202 ; 0.6235 ; 0.77572 ; 1.004 ; 1.254 ; 1.504 ; 1.5665 ; 1.6603 ; 1.6954 ; 1.7482 ; 1.8273 ; 1.9459 ; 2.1239 ; 2.3739 ; 2.5]

Force (kips): [-0.803503 ; 0.492896 ; 1.28634 ; 2.37145 ; 3.82402 ; 5.73183 ; 8.15041 ; 8.90952 ; 9.9355 ; 11.276 ; 12.8362 ; 13.296 ; 13.9107 ; 14.7096 ; 15.6626 ; 16.5391 ; 17.3261 ; 18.1572 ; 19.1961 ; 20.4026 ; 20.7659 ; 21.2504 ; 21.8633 ; 22.6097 ; 23.5538 ; 24.4013 ; 25.0777 ; 25.2256 ; 25.4303 ; 25.5033 ; 25.6129 ; 25.7765 ; 25.994 ; 26.272 ; 26.6073 ; 26.7624]

Bolt 1 - Tensile Force (kips): [34.588 ; 34.5517 ; 34.5277 ; 34.4923 ; 34.4418 ; 34.3676 ; 34.2583 ; 34.2204 ; 34.1671 ; 34.0915 ; 33.994 ; 33.9627 ; 33.9184 ; 33.8574 ; 33.7676 ; 33.5684 ; 33.3475 ; 33.1204 ; 32.7936 ; 32.215 ; 31.9591 ; 31.5394 ; 30.8214 ; 29.7819 ; 28.4376 ; 27.1214 ; 25.934 ; 25.6732 ; 25.3061 ; 25.1816 ; 25.0244 ; 24.832 ; 24.5897 ; 24.3538 ; 24.4929 ; 24.6288]

Bolt 1 - Shear Force (kips): [0.037622 ; 0.03998 ; 0.071793 ; 0.12058 ; 0.18966 ; 0.28514 ; 0.41368 ; 0.45683 ; 0.51781 ; 0.60265 ; 0.71026 ; 0.74462 ; 0.79236 ; 0.85667 ; 0.94694 ; 1.1296 ; 1.3179 ; 1.5039 ; 1.7639 ; 2.2004 ; 2.3864 ; 2.6846 ; 3.1814 ; 3.8905 ; 4.8179 ; 5.7272 ; 6.5406 ; 6.7247 ; 6.9886 ; 7.0821 ; 7.2113 ; 7.3864 ; 7.6237 ; 7.9148 ; 8.0701 ; 8.1117]

Bolt 2 - Tensile Force (kips): [34.5899 ; 34.5693 ; 34.5509 ; 34.523 ; 34.4878 ; 34.4555 ; 34.4362 ; 34.4403 ; 34.4525 ; 34.493 ; 34.5771 ; 34.6131 ; 34.6695 ; 34.7615 ; 34.8698 ; 34.9164 ; 34.9029 ; 34.8781 ; 34.905 ; 35.1783 ; 35.3668 ; 35.7228 ; 36.4081 ; 37.6971 ; 39.5396 ; 41.2456 ; 42.5623 ; 42.8406 ; 43.206 ; 43.3342 ; 43.5505 ; 43.8985 ; 44.3769 ; 45.0422 ; 45.8415 ; 46.2076]

Bolt 2 - Shear Force (kips): [0.044438 ; 0.035029 ; 0.060864 ; 0.10341 ; 0.16441 ; 0.24857 ; 0.35917 ; 0.39557 ; 0.44635 ; 0.51528 ; 0.59908 ; 0.62542 ; 0.66073 ; 0.70527 ; 0.76676 ; 0.90082 ; 1.053 ; 1.2066 ; 1.4137 ; 1.7332 ; 1.8626 ; 2.0608 ; 2.3733 ; 2.7621 ; 3.1987 ; 3.5976 ; 3.9733 ; 4.067 ; 4.2112 ; 4.2646 ; 4.3337 ; 4.4211 ; 4.5483 ; 4.7222 ; 4.952 ; 5.0565]

Bolt 3 - Tensile Force (kips): [36 ; 35.9538 ; 35.9223 ; 35.9058 ; 35.9624 ; 36.2353 ; 36.8591 ; 37.1757 ; 37.6731 ; 38.3914 ; 39.4229 ; 39.8366 ; 40.4606 ; 41.3886 ; 42.738 ; 44.5928 ; 47.1609 ; 50.4531 ; 54.2348 ; 57.8699 ; 58.9484 ; 60.3673 ; 62.1319 ; 64.0418 ; 66.0054 ; 67.538 ; 68.5775 ; 68.7713 ; 69.0372 ; 69.1253 ; 69.2378 ; 69.3374 ; 69.4378 ; 69.5365 ; 69.6569 ; 69.6623]

Bolt 3 - Shear Force (kips): [0.038965 ; 0.015648 ; 0.0066625 ; 0.016294 ; 0.042968 ; 0.086798 ; 0.13224 ; 0.14314 ; 0.15638 ; 0.17954 ; 0.21494 ; 0.22979 ; 0.25441 ; 0.29638 ; 0.35813 ; 0.45004 ; 0.55651 ; 0.60554 ; 0.63832 ; 0.66951 ; 0.66296 ; 0.64731 ; 0.62778 ; 0.61949 ; 0.64502 ; 0.73891 ; 1.0614 ; 1.1535 ; 1.2453 ; 1.2748 ; 1.3741 ; 1.7557 ; 2.2295 ; 2.8356 ; 3.5032 ; 3.8839]

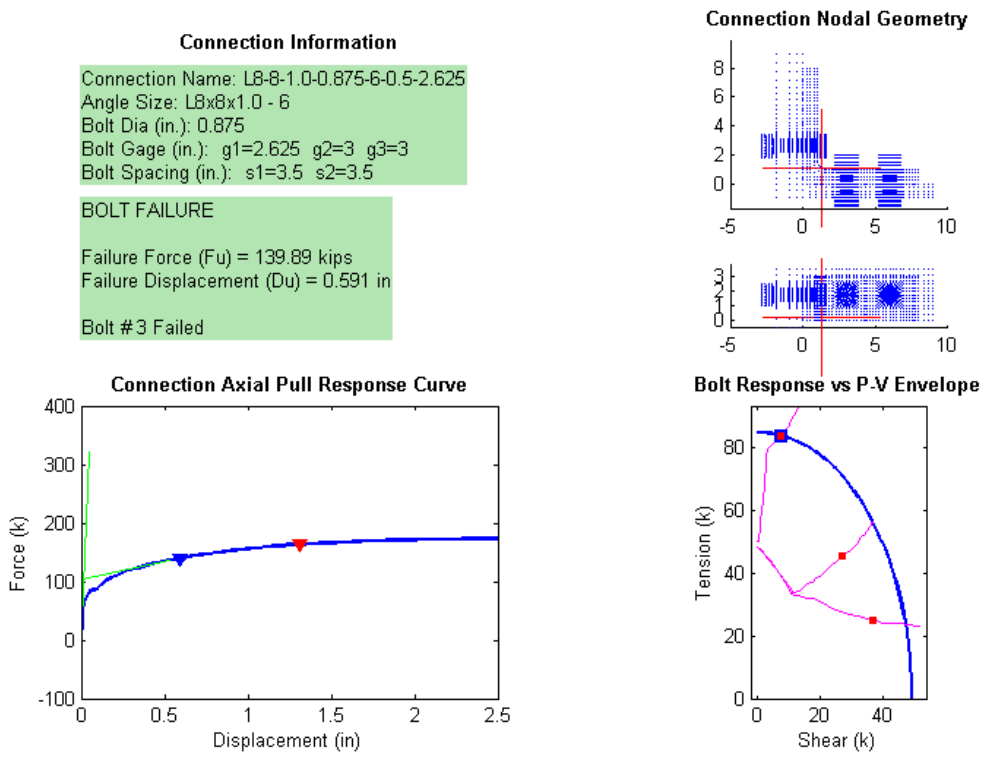


Figure B.388 Connection L8_8_1.0_0.875_6_0.5_2.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.875_6_0.5_2.625 Analysis Response Variables.
Initial Stiffness (k/in): 7.0668e+003

Plastic Stiffness (k/in): 63.3699

Displacement (in): [4.7717e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.026611 ; 0.036499 ; 0.051331 ; 0.056892 ; 0.065235 ; 0.068364 ; 0.073056 ; 0.080096 ; 0.082735 ; 0.086695 ; 0.092634 ; 0.10154 ; 0.10488 ; 0.1099 ; 0.11178 ; 0.11459 ; 0.11882 ; 0.12516 ; 0.13468 ; 0.14895 ; 0.17035 ; 0.17838 ; 0.19042 ; 0.20848 ; 0.23557 ; 0.26267 ; 0.28976 ; 0.33039 ; 0.34563 ; 0.36849 ; 0.40278 ; 0.45421 ; 0.53136 ; 0.60851 ; 0.68565 ; 0.71458 ; 0.75798 ; 0.82307 ; 0.92071 ; 0.95733 ; 1.0123 ; 1.0329 ; 1.0637 ; 1.1101 ; 1.1796 ; 1.2839 ; 1.323 ; 1.3816 ; 1.4696 ; 1.6016 ; 1.651 ; 1.7253 ; 1.7531 ; 1.7949 ; 1.8575 ; 1.9514 ; 2.0924 ; 2.1452 ; 2.2245 ; 2.3434 ; 2.3825 ; 2.4413 ; 2.5]

Force (kips): [-1.50044 ; 6.46694 ; 12.302 ; 19.1025 ; 26.4197 ; 31.3261 ; 33.6228 ; 35.4667 ; 37.8808 ; 40.8364 ; 41.7175 ; 42.7994 ; 42.9855 ; 42.9911 ; 42.9752 ; 42.9795 ; 43.6315 ; 43.6446 ; 43.8607 ; 44.6647 ; 45.5114 ; 45.8243 ; 46.1993 ; 46.7694 ; 47.538 ; 48.5818 ; 50.2335 ; 52.2568 ; 52.9603 ; 53.874 ; 55.0692 ; 56.7715 ; 58.2135 ; 59.4995 ; 61.2148 ; 61.8183 ; 62.7229 ; 64.0416 ; 65.8631 ; 68.3075 ; 70.429 ; 72.1934 ; 72.8039 ; 73.7148 ; 74.9704 ; 76.6433 ; 77.2191 ; 78.0326 ; 78.3266 ; 78.7554 ; 79.379 ; 80.2343 ; 81.3076 ; 81.6635 ; 82.1594 ; 82.8397 ; 83.7507 ; 84.07 ; 84.5256 ; 84.6857 ; 84.9062 ; 85.1968 ; 85.54 ; 85.9162 ; 86.0325 ; 86.1836 ; 86.379 ; 86.4394 ; 86.529 ; 86.6161]

Bolt 1 - Tensile Force (kips): [48.3385 ; 48.0949 ; 47.8898 ; 47.631 ; 47.3116 ; 47.0183 ; 46.1837 ; 44.3061 ; 41.3782 ; 37.0349 ; 35.4951 ; 33.5123 ; 33.2528 ; 33.2271 ; 33.2072 ; 33.1969 ; 32.9533 ; 32.9272 ; 32.8987 ; 32.8537 ; 32.8091 ; 32.7869 ; 32.7687 ; 32.7415 ; 32.7014 ; 32.5746 ; 32.1808 ; 31.7688 ; 31.4173 ; 30.9989 ; 30.4827 ; 29.2835 ; 28.3156 ; 27.6656 ; 27.1526 ; 26.9905 ; 26.7254 ; 26.4216 ; 26.1585 ; 25.4472 ; 24.7349 ; 24.2796 ; 24.1693 ; 24.0601 ; 24.0189 ; 24.0656 ; 24.0917 ; 24.1419 ; 24.1556 ; 24.1582 ; 24.1089 ; 24.0001 ; 23.863 ; 23.7834 ; 23.671 ; 23.521 ; 23.4226 ; 23.3903 ; 23.3517 ; 23.3386 ; 23.3215 ; 23.3018 ; 23.2841 ; 23.2778 ; 23.272 ; 23.2514 ; 23.2275 ; 23.2199 ; 23.2102 ; 23.1881]

Bolt 1 - Shear Force (kips): [0.0758305 ; 0.24908 ; 0.47539 ; 0.752163 ; 1.07016 ; 1.34411 ; 2.11548 ; 3.65073 ; 5.81627 ; 8.70976 ; 9.64687 ; 10.8094 ; 10.9613 ; 10.9628 ; 10.9581 ; 10.9684 ; 11.3469 ; 11.3569 ; 11.5268 ; 11.9241 ; 12.3441 ; 12.5193 ; 12.6545 ; 12.9852 ; 13.3701 ; 14.0634 ; 16.1903 ; 17.7791 ; 18.6463 ; 19.5756 ; 20.6208 ; 22.8116 ; 24.7559 ; 26.3488 ; 28.0803 ; 28.6732 ; 29.5245 ; 30.6321 ; 32.1079 ; 34.8175 ; 37.3415 ; 39.0612 ; 39.5549 ; 40.1908 ; 41.107 ; 42.2896 ; 42.6925 ; 43.2634 ; 43.4726 ; 43.8007 ; 44.4432 ; 45.3481 ; 46.4791 ; 46.8841 ; 47.4266 ; 48.1197 ; 48.8562 ; 49.0956 ; 49.4205 ; 49.5331 ; 49.6919 ; 49.9051 ; 50.1749 ; 50.5019 ; 50.6197 ; 50.813 ; 51.0789 ; 51.165 ; 51.2859 ; 51.4279]

Bolt 2 - Tensile Force (kips): [48.3388 ; 48.0512 ; 47.8069 ; 47.5118 ; 47.1702 ; 46.8854 ; 46.0718 ; 44.2237 ; 41.405 ; 37.4311 ; 36.1171 ; 34.4129 ; 34.0551 ; 33.9895 ; 33.963 ; 33.9579 ; 33.7946 ; 33.7732 ; 33.8093 ; 33.9492 ; 34.1382 ; 34.2157 ; 34.3151 ; 34.5044 ; 34.8295 ; 35.3149 ; 36.0596 ; 36.9002 ; 37.2774 ; 37.8101 ; 38.5379 ; 39.4522 ; 40.2397 ; 41.0042 ; 41.9454 ; 42.2524 ; 42.6456 ; 43.1847 ; 43.9519 ; 44.805 ; 45.5976 ; 46.2321 ; 46.3881 ; 46.7097 ; 47.3122 ; 48.3553 ; 48.7558 ; 49.3342 ; 49.5537 ; 49.8715 ; 50.3167 ; 50.89 ; 51.6009 ; 51.849 ; 52.2233 ; 52.7687 ; 53.4661 ; 53.7063 ; 54.0598 ; 54.1876 ; 54.365 ; 54.6039 ; 54.9017 ; 55.2835 ; 55.4244 ; 55.6322 ; 55.9367 ; 56.0373 ; 56.1876 ; 56.3373]

Bolt 2 - Shear Force (kips): [0.0537169 ; 0.328604 ; 0.603805 ; 0.937869 ; 1.31671 ; 1.63821 ; 2.40147 ; 3.92605 ; 6.06877 ; 8.87375 ; 9.7655 ; 10.9257 ; 11.1701 ; 11.2039 ; 11.2064 ; 11.2057 ; 11.6464 ; 11.6652 ; 11.7171 ; 12.1359 ; 12.5946 ; 12.7549 ; 13.0185 ; 13.2769 ; 13.6764 ; 14.1567 ; 15.103 ; 17.1292 ; 17.6051 ; 18.1955 ; 18.9783 ; 20.2238 ; 21.1178 ; 21.7848 ; 22.8242 ; 23.1975 ; 23.7466 ; 24.4629 ; 25.3973 ; 26.3907 ; 27.1148 ; 28.0114 ; 28.4694 ; 29.0863 ; 29.8145 ; 30.6722 ; 30.9862 ; 31.4375 ; 31.5967 ; 31.826 ; 32.1175 ; 32.5446 ; 33.1582 ; 33.4078 ; 33.7419 ; 34.1759 ; 34.7785 ; 34.9812 ; 35.2561 ; 35.3518 ; 35.4877 ; 35.6753 ; 35.913 ; 36.1669 ; 36.2458 ; 36.3334 ; 36.4395 ; 36.4715 ; 36.5198 ; 36.5618]

Bolt 3 - Tensile Force (kips): [50 ; 49.9446 ; 50.017 ; 50.3188 ; 51.1782 ; 52.1126 ; 52.6181 ; 53.0595 ; 53.7583 ; 54.9164 ; 55.3495 ; 55.9691 ; 56.0857 ; 56.0909 ; 56.0768 ; 56.0817 ; 56.4928 ; 56.5004 ; 56.6414 ; 57.2153 ; 57.8888 ; 58.1544 ; 58.4937 ; 59.0412 ; 59.8235 ; 60.9458 ; 62.6148 ; 64.7262 ; 65.4604 ; 66.459 ; 67.8113 ; 69.7081 ; 71.3602 ; 72.7856 ; 74.6318 ; 75.2704 ; 76.2395 ; 77.6464 ; 79.5417 ; 82.1098 ; 84.4632 ; 86.2005 ; 86.7483 ; 87.5439 ; 88.7157 ; 90.4937 ; 91.0924 ; 91.9034 ; 92.1889 ; 92.6003 ; 93.1822 ; 93.9394 ; 94.7087 ; 94.9269 ; 95.2147 ; 95.5948 ; 96.1442 ; 96.3502 ; 96.6324 ; 96.7201 ; 96.8718 ; 97.0784 ; 97.3092 ; 97.5791 ; 97.6607 ; 97.8419 ; 98.1533 ; 98.2499 ; 98.3921 ; 98.5279]

Bolt 3 - Shear Force (kips): [0.0129003 ; 0.0634114 ; 0.134191 ; 0.230914 ; 0.357237 ; 0.45995 ; 0.519741 ; 0.567463 ; 0.636659 ; 0.742715 ; 0.781672 ; 0.833955 ; 0.844011 ; 0.844654 ; 0.843828 ; 0.844184 ; 0.879405 ; 0.880331 ; 0.892599 ; 0.942343 ; 1.00704 ; 1.03471 ; 1.07266 ; 1.13851 ; 1.24047 ; 1.39546 ; 1.58985 ; 1.81464 ; 1.88396 ; 1.98054 ; 2.10855 ; 2.2565 ; 2.36069 ; 2.43534 ; 2.53215 ; 2.56253 ; 2.60005 ; 2.64988 ; 2.95734 ; 5.28464 ; 7.75271 ; 9.168 ; 9.55977 ; 9.96432 ; 10.5655 ; 11.7011 ; 12.0599 ; 12.4535 ; 12.58 ; 12.7332 ; 12.9032 ; 13.0066 ; 13.093 ; 13.1132 ; 13.1347 ; 13.1103 ; 13.1266 ; 13.1114 ; 12.808 ; 12.6737 ; 12.4818 ; 12.1919 ; 11.7876 ; 11.2739 ; 11.0477 ; 10.752 ; 10.2813 ; 10.1202 ; 9.88223 ; 9.64361]

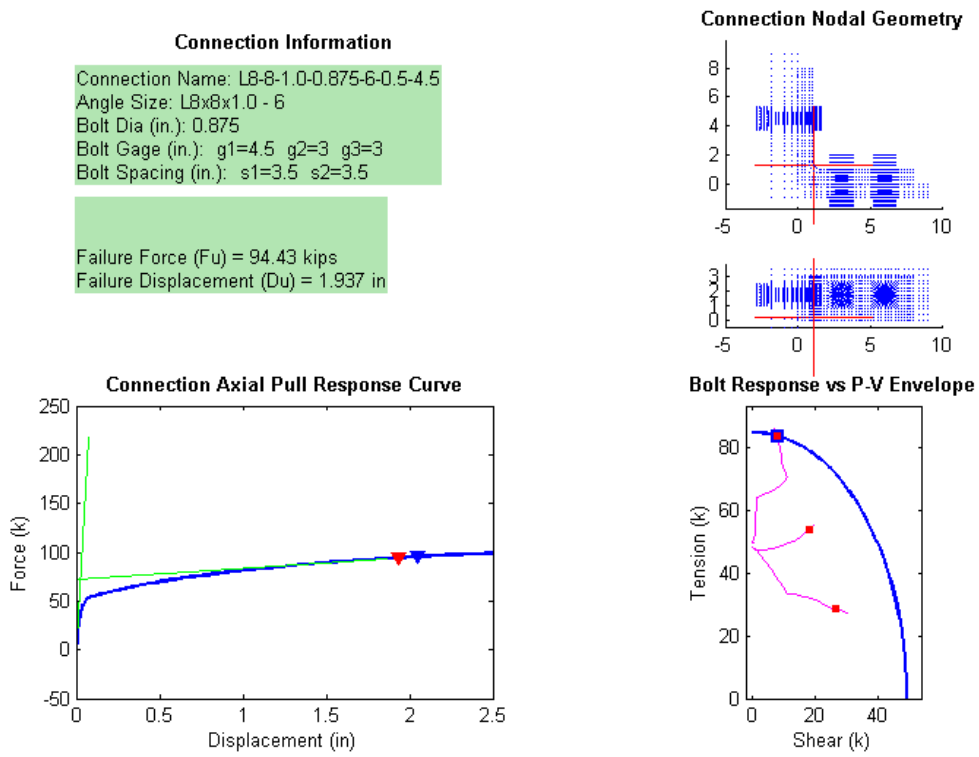


Figure B.389 Connection L8_8_1.0_0.875_6_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.875_6_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.7815e+003

Plastic Stiffness (k/in): 11.3338

Displacement (in): [4.9483e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.16699 ; 0.19514 ; 0.23738 ; 0.30073 ; 0.32449 ; 0.3334 ; 0.34676 ; 0.36681 ; 0.39687 ; 0.44198 ; 0.45889 ; 0.48426 ; 0.52231 ; 0.5794 ; 0.66502 ; 0.69713 ; 0.74529 ; 0.76335 ; 0.79044 ; 0.83108 ; 0.84632 ; 0.86918 ; 0.90346 ; 0.9549 ; 1.032 ; 1.061 ; 1.1044 ; 1.1695 ; 1.1939 ; 1.2305 ; 1.2854 ; 1.3678 ; 1.4914 ; 1.5377 ; 1.6072 ; 1.7115 ; 1.8679 ; 2.1025 ; 2.165 ; 2.2587 ; 2.3994 ; 2.5]

Force (kips): [-1.53403 ; 1.7269 ; 3.89857 ; 6.66706 ; 10.1653 ; 14.4765 ; 18.9624 ; 23.226 ; 26.1344 ; 27.4074 ; 28.5023 ; 28.8981 ; 29.4697 ; 30.3 ; 31.4557 ; 31.8676 ; 32.0524 ; 32.325 ; 32.6782 ; 33.2075 ; 33.94 ; 34.1969 ; 34.5748 ; 35.1209 ; 35.8951 ; 36.9422 ; 37.3045 ; 37.8227 ; 38.0432 ; 38.3413 ; 38.7743 ; 38.9497 ; 39.1992 ; 39.5352 ; 40.0055 ; 40.7152 ; 40.9834 ; 41.3998 ; 41.9713 ; 42.1844 ; 42.4908 ; 42.9678 ; 43.651 ; 44.552 ; 44.8764 ; 45.3296 ; 45.9918 ; 46.8781 ; 48.0192 ; 48.2948 ; 48.6859 ; 49.2363 ; 49.612]

Bolt 1 - Tensile Force (kips): [48.3348 ; 48.2392 ; 48.1712 ; 48.0752 ; 47.9416 ; 47.7591 ; 47.5366 ; 47.2694 ; 46.8623 ; 46.1744 ; 45.2461 ; 44.836 ; 44.1675 ; 43.1172 ; 41.5256 ; 40.9207 ; 40.6728 ; 40.2985 ; 39.7578 ; 38.9288 ; 37.7084 ; 37.2573 ; 36.5835 ; 35.6064 ; 34.2565 ; 33.3319 ; 33.3235 ; 33.3217 ; 33.3223 ; 33.3249 ; 33.3308 ; 33.2535 ; 33.1765 ; 33.1802 ; 33.1988 ; 33.246 ; 33.2685 ; 33.1746 ; 33.1548 ; 33.1371 ; 33.1394 ; 32.9595 ; 32.5373 ; 32.0309 ; 31.6925 ; 31.3909 ; 30.616 ; 29.3595 ; 28.246 ; 28.0926 ; 27.7538 ; 27.3386 ; 27.1335]

Bolt 1 - Shear Force (kips): [0.0767512 ; 0.079766 ; 0.160526 ; 0.2729 ; 0.42389 ; 0.626457 ; 0.863952 ; 1.13145 ; 1.52485 ; 2.15578 ; 2.93678 ; 3.2685 ; 3.79643 ; 4.59553 ; 5.75001 ; 6.17583 ; 6.34801 ; 6.60529 ; 6.97277 ; 7.5266 ; 8.32483 ; 8.61353 ; 9.03396 ; 9.6289 ; 10.4299 ; 10.986 ; 10.9917 ; 10.9948 ; 10.9956 ; 10.9963 ; 10.999 ; 11.1516 ; 11.2703 ; 11.2756 ; 11.2745 ; 11.274 ; 11.2751 ; 12.0333 ; 12.6834 ; 13.037 ; 13.4104 ; 14.536 ; 16.4799 ; 18.4299 ; 19.2621 ; 20.0865 ; 21.7462 ; 24.3198 ; 27.1093 ; 27.6524 ; 28.576 ; 29.7475 ; 30.3899]

Bolt 2 - Tensile Force (kips): [48.3258 ; 48.2299 ; 48.1498 ; 48.0407 ; 47.9122 ; 47.7648 ; 47.6407 ; 47.571 ; 47.4833 ; 47.2507 ; 47.25 ; 47.3007 ; 47.4045 ; 47.579 ; 47.8086 ; 47.8809 ; 47.899 ; 47.9224 ; 47.959 ; 47.9998 ; 48.0735 ; 48.1086 ; 48.1732 ; 48.2927 ; 48.5373 ; 48.9444 ; 49.0799 ; 49.2585 ; 49.3195 ; 49.4118 ; 49.547 ; 49.6057 ; 49.6786 ; 49.7719 ; 49.9033 ; 50.0543 ; 50.1293 ; 50.3376 ; 50.6035 ; 50.7292 ; 50.8814 ; 51.0663 ; 51.3827 ; 51.9299 ; 52.1175 ; 52.4142 ; 52.7648 ; 53.2262 ; 54.0107 ; 54.2263 ; 54.5499 ; 54.9528 ; 55.1915]

Bolt 2 - Shear Force (kips): [0.0552097 ; 0.120278 ; 0.230252 ; 0.375661 ; 0.56847 ; 0.819982 ; 1.10194 ; 1.40493 ; 1.81423 ; 2.40274 ; 3.1021 ; 3.38738 ; 3.83134 ; 4.48578 ; 5.40449 ; 5.73445 ; 5.86735 ; 6.06524 ; 6.34443 ; 6.76107 ; 7.34784 ; 7.55807 ; 7.8653 ; 8.30278 ; 8.91491 ; 9.76959 ; 10.0783 ; 10.516 ; 10.6786 ; 10.9071 ; 11.2306 ; 11.3288 ; 11.4844 ; 11.7246 ; 12.0625 ; 12.8601 ; 13.1841 ; 13.4052 ; 13.9221 ; 14.0565 ; 14.3467 ; 14.8175 ; 15.2872 ; 15.8295 ; 16.0486 ; 16.4206 ; 16.8833 ; 17.4095 ; 17.9625 ; 18.1238 ; 18.3207 ; 18.8082 ; 19.2877]

Bolt 3 - Tensile Force (kips): [50 ; 49.8949 ; 49.8436 ; 49.8673 ; 50.0328 ; 50.4404 ; 51.3463 ; 52.5881 ; 53.9572 ; 55.5359 ; 57.5328 ; 58.2166 ; 59.1859 ; 60.5721 ; 62.5058 ; 63.1874 ; 63.4228 ; 63.7356 ; 64.1666 ; 64.7248 ; 65.5185 ; 65.7903 ; 66.2019 ; 66.88 ; 67.9277 ; 69.5042 ; 70.0632 ; 70.8226 ; 71.1506 ; 71.5318 ; 72.0062 ; 72.1869 ; 72.4687 ; 72.82 ; 73.2882 ; 74.1137 ; 74.4685 ; 74.9667 ; 75.67 ; 75.9376 ; 76.2596 ; 76.8024 ; 77.6469 ; 79.0042 ; 79.5206 ; 80.2439 ; 81.3417 ; 82.6056 ; 84.177 ; 84.5729 ; 85.0289 ; 85.6015 ; 86.0601]

Bolt 3 - Shear Force (kips): [0.0385698 ; 0.0130895 ; 0.0459202 ; 0.0973274 ; 0.167453 ; 0.266206 ; 0.392525 ; 0.559222 ; 0.733022 ; 0.824459 ; 0.919489 ; 0.958418 ; 1.02032 ; 1.11426 ; 1.23748 ; 1.27662 ; 1.30571 ; 1.36158 ; 1.44401 ; 2.64908 ; 4.47235 ; 5.01225 ; 5.91311 ; 7.12031 ; 8.54725 ; 9.9748 ; 10.3724 ; 10.822 ; 10.7581 ; 10.7055 ; 10.603 ; 10.4955 ; 10.3195 ; 10.0612 ; 9.81727 ; 9.59557 ; 9.46928 ; 9.29722 ; 9.18563 ; 9.18188 ; 9.17858 ; 9.13742 ; 9.0161 ; 8.78234 ; 8.76514 ; 8.73819 ; 8.42295 ; 8.02843 ; 7.49871 ; 7.35775 ; 7.18719 ; 6.96177 ; 6.95719]

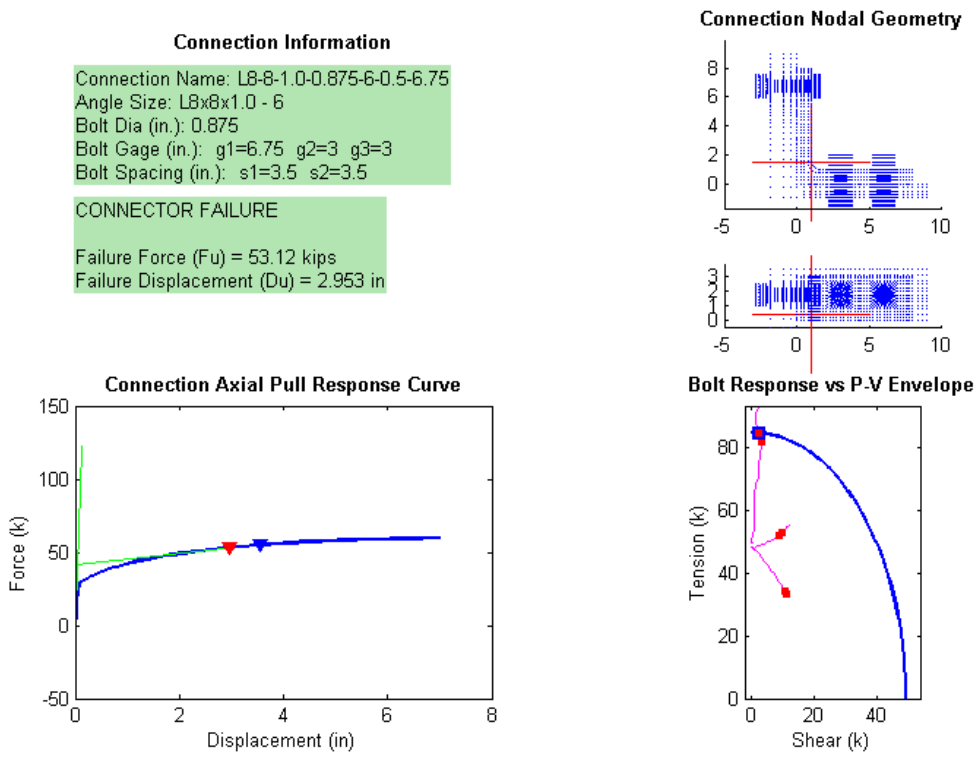


Figure B.390 Connection L8_8_1.0_0.875_6_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.875_6_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 908.0594

Plastic Stiffness (k/in): 4.1486

Displacement (in): [4.4388e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.18141 ; 0.27485 ; 0.30989 ; 0.36245 ; 0.44128 ; 0.55954 ; 0.60389 ; 0.67041 ; 0.77019 ; 0.91986 ; 0.97599 ; 0.99704 ; 1.0286 ; 1.076 ; 1.147 ; 1.2535 ; 1.4134 ; 1.6531 ; 1.743 ; 1.8779 ; 2.0802 ; 2.3836 ; 2.8387 ; 3.5214 ; 3.6921 ; 3.8628 ; 4.1188 ; 4.5028 ; 4.6468 ; 4.8628 ; 5.1869 ; 5.6729 ; 6.3729 ; 7]

Force (kips): [-1.48221 ; 1.69762 ; 3.48374 ; 5.80753 ; 8.74836 ; 11.7557 ; 14.0928 ; 15.0732 ; 15.6208 ; 16.4448 ; 16.7542 ; 17.1902 ; 17.7886 ; 18.5891 ; 18.8654 ; 19.2587 ; 19.7968 ; 20.5044 ; 20.7831 ; 20.8892 ; 21.038 ; 21.252 ; 21.578 ; 22.0296 ; 22.6374 ; 23.4675 ; 23.751 ; 24.1484 ; 24.6944 ; 25.4321 ; 26.3762 ; 27.4632 ; 27.6907 ; 27.9003 ; 28.1832 ; 28.5485 ; 28.6728 ; 28.8443 ; 29.073 ; 29.366 ; 29.6926 ; 29.8885]

Bolt 1 - Tensile Force (kips): [48.3351 ; 48.2409 ; 48.1822 ; 48.0954 ; 47.9689 ; 47.8155 ; 47.6748 ; 47.6145 ; 47.5855 ; 47.5334 ; 47.5121 ; 47.4792 ; 47.426 ; 47.3256 ; 47.2803 ; 47.188 ; 46.8292 ; 45.9449 ; 45.5797 ; 45.4384 ; 45.2278 ; 44.9106 ; 44.4285 ; 43.7131 ; 42.6598 ; 41.1078 ; 40.5277 ; 39.6769 ; 38.4501 ; 36.7253 ; 34.5191 ; 33.4707 ; 33.471 ; 33.4748 ; 33.4862 ; 33.507 ; 33.4482 ; 33.4576 ; 33.4802 ; 33.522 ; 33.5959 ; 33.6635]

Bolt 1 - Shear Force (kips): [0.0756109 ; 0.0825131 ; 0.153518 ; 0.256959 ; 0.40254 ; 0.576858 ; 0.734423 ; 0.803737 ; 0.841998 ; 0.90796 ; 0.934078 ; 0.973963 ; 1.03609 ; 1.14537 ; 1.19273 ; 1.28589 ; 1.63715 ; 2.42277 ; 2.72783 ; 2.84417 ; 3.01625 ; 3.27234 ; 3.65541 ; 4.20896 ; 4.99647 ; 6.11158 ; 6.51643 ; 7.09767 ; 7.91686 ; 9.02669 ; 10.3686 ; 11.0362 ; 11.0415 ; 11.0447 ; 11.0497 ; 11.057 ; 11.1881 ; 11.1904 ; 11.1814 ; 11.1614 ; 11.134 ; 11.1096]

Bolt 2 - Tensile Force (kips): [48.3275 ; 48.2378 ; 48.1715 ; 48.094 ; 48.0187 ; 47.985 ; 48.0071 ; 48.0252 ; 48.0386 ; 48.0862 ; 48.1121 ; 48.1522 ; 48.2238 ; 48.3793 ; 48.4604 ; 48.5869 ; 48.7137 ; 48.8923 ; 48.9834 ; 49.0171 ; 49.0684 ; 49.1527 ; 49.2701 ; 49.432 ; 49.6637 ; 49.9673 ; 50.0981 ; 50.3133 ; 50.6578 ; 51.2101 ; 52.018 ; 52.9497 ; 53.1417 ; 53.3202 ; 53.5636 ; 53.8797 ; 53.9898 ; 54.142 ; 54.3459 ; 54.6189 ; 54.8857 ; 55.0655]

Bolt 2 - Shear Force (kips): [0.0543947 ; 0.129841 ; 0.2323 ; 0.372547 ; 0.563296 ; 0.77762 ; 0.959096 ; 1.03479 ; 1.07714 ; 1.14951 ; 1.17744 ; 1.22016 ; 1.28771 ; 1.40678 ; 1.45629 ; 1.55364 ; 1.87141 ; 2.5428 ; 2.79786 ; 2.89467 ; 3.03699 ; 3.24576 ; 3.55485 ; 3.99641 ; 4.61167 ; 5.45263 ; 5.74415 ; 6.15283 ; 6.7054 ; 7.43337 ; 8.33563 ; 9.43157 ; 9.66751 ; 9.88441 ; 10.1727 ; 10.5328 ; 10.6361 ; 10.7957 ; 11.0018 ; 11.2544 ; 11.7133 ; 12.0756]

Bolt 3 - Tensile Force (kips): [50 ; 49.8509 ; 49.8024 ; 49.9008 ; 50.2026 ; 50.8983 ; 52.1551 ; 53.0739 ; 53.9701 ; 55.4455 ; 56.0449 ; 56.9998 ; 58.5241 ; 60.7854 ; 61.6131 ; 62.8 ; 64.4209 ; 66.5652 ; 67.3868 ; 67.6869 ; 68.082 ; 68.6307 ; 69.4533 ; 70.517 ; 71.8199 ; 73.9214 ; 74.539 ; 75.3604 ; 76.5525 ; 78.3911 ; 81.1449 ; 84.5897 ; 85.4196 ; 86.1028 ; 86.9726 ; 88.1397 ; 88.5484 ; 89.1248 ; 89.9436 ; 91.0134 ; 92.2721 ; 93.1489]

Bolt 3 - Shear Force (kips): [0.037146 ; 0.021163 ; 0.060068 ; 0.12075 ; 0.20366 ; 0.2939 ; 0.3808 ; 0.51009 ; 0.61921 ; 0.64319 ; 0.65297 ; 0.66433 ; 0.69207 ; 0.76585 ; 0.79486 ; 0.83504 ; 0.89091 ; 0.98264 ; 1.1013 ; 1.1795 ; 1.1892 ; 1.2316 ; 1.7122 ; 2.1257 ; 2.3073 ; 2.3455 ; 2.3208 ; 2.3907 ; 2.422 ; 2.7916 ; 3.0639 ; 2.1003 ; 1.8948 ; 1.7696 ; 1.6291 ; 1.4387 ; 1.3621 ; 1.2687 ; 1.2054 ; 1.3037 ; 1.8541 ; 2.3032]

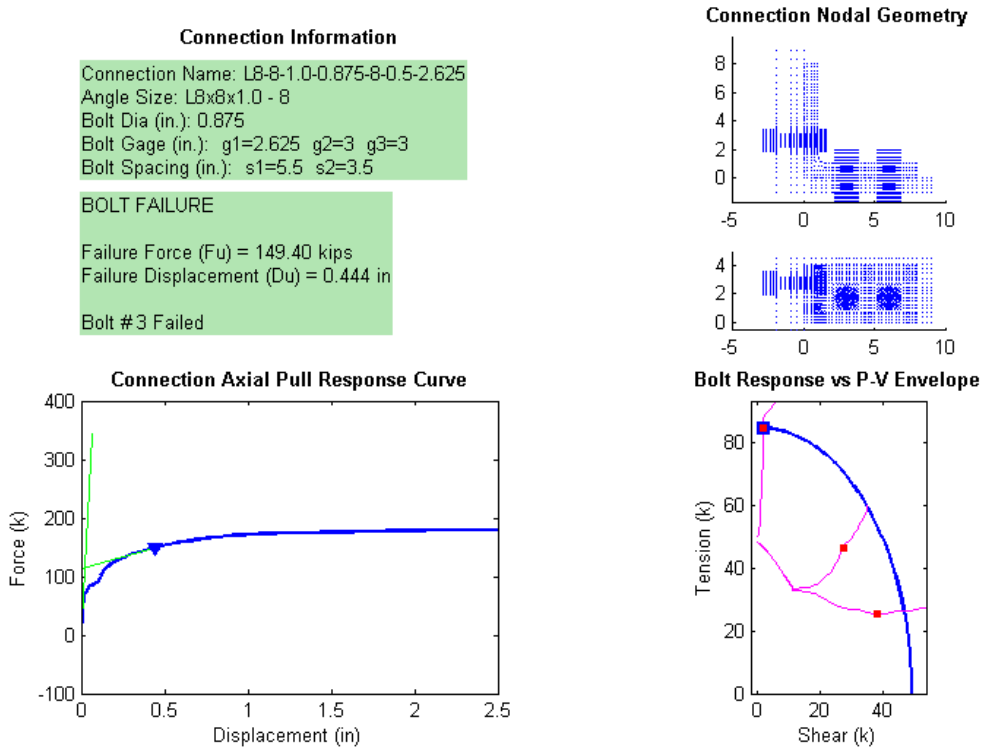


Figure B.391 Connection L8_8_1.0_0.875_8_0.5_2.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.875_8_0.5_2.625 Analysis Response Variables.
Initial Stiffness (k/in): 5.3682e+003

Plastic Stiffness (k/in): 83.0341

Displacement (in): [4.9946e-036 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.055916 ; 0.064259 ; 0.067387 ; 0.07208 ; 0.07384 ; 0.076479 ; 0.080439 ; 0.086378 ; 0.088606 ; 0.091946 ; 0.093199 ; 0.095078 ; 0.097897 ; 0.098954 ; 0.10054 ; 0.10292 ; 0.10649 ; 0.11184 ; 0.11987 ; 0.1319 ; 0.13642 ; 0.14319 ; 0.14997 ; 0.15674 ; 0.1669 ; 0.18214 ; 0.205 ; 0.23928 ; 0.25214 ; 0.25696 ; 0.2642 ; 0.27504 ; 0.29132 ; 0.31573 ; 0.35234 ; 0.40726 ; 0.48965 ; 0.52054 ; 0.56688 ; 0.58426 ; 0.61033 ; 0.64943 ; 0.70808 ; 0.73007 ; 0.76306 ; 0.81255 ; 0.88678 ; 0.91461 ; 0.95637 ; 1.019 ; 1.1129 ; 1.2539 ; 1.3067 ; 1.3265 ; 1.3563 ; 1.4008 ; 1.4677 ; 1.568 ; 1.7185 ; 1.9443 ; 2.1942 ; 2.4442 ; 2.5]

Force (kips): [-1.24704 ; 21.421 ; 24.9649 ; 27.9528 ; 31.6219 ; 33.9159 ; 35.8574 ; 38.4213 ; 41.5402 ; 42.4361 ; 42.9572 ; 42.9521 ; 42.939 ; 42.934 ; 43.1129 ; 43.6091 ; 43.6041 ; 43.5983 ; 43.591 ; 43.7283 ; 44.4718 ; 45.2709 ; 45.563 ; 45.9825 ; 46.5535 ; 47.4419 ; 49.0141 ; 51.6028 ; 54.3607 ; 55.1768 ; 56.2884 ; 57.2223 ; 58.0863 ; 59.2235 ; 60.7433 ; 62.7156 ; 65.2252 ; 66.0471 ; 66.3477 ; 66.7848 ; 67.4054 ; 68.2751 ; 69.4745 ; 71.1425 ; 73.4227 ; 76.2451 ; 77.1949 ; 78.5012 ; 78.9806 ; 79.6446 ; 80.5641 ; 81.8105 ; 82.2434 ; 82.8623 ; 83.721 ; 84.7858 ; 85.0856 ; 85.4518 ; 85.8778 ; 86.3752 ; 86.9761 ; 87.1749 ; 87.2446 ; 87.3424 ; 87.4828 ; 87.6804 ; 87.9572 ; 88.3418 ; 88.868 ; 89.4014 ; 89.884 ; 89.985]

Bolt 1 - Tensile Force (kips): [48.3411 ; 47.478 ; 47.3078 ; 47.1528 ; 46.914 ; 45.9157 ; 43.8866 ; 40.6731 ; 35.8205 ; 34.1679 ; 33.2444 ; 33.2287 ; 33.2133 ; 33.2084 ; 33.1106 ; 32.9451 ; 32.9225 ; 32.9168 ; 32.9114 ; 32.8957 ; 32.8504 ; 32.8157 ; 32.7878 ; 32.7664 ; 32.7372 ; 32.7009 ; 32.5186 ; 32.2205 ; 31.9107 ; 31.7367 ; 31.3511 ; 31.0582 ; 30.8729 ; 30.492 ; 29.5569 ; 28.3322 ; 27.3773 ; 27.1552 ; 27.0516 ; 26.9251 ; 26.7798 ; 26.655 ; 26.6366 ; 26.3547 ; 25.6375 ; 25.3368 ; 25.3651 ; 25.5229 ; 25.5928 ; 25.71 ; 25.855 ; 26.0603 ; 26.1444 ; 26.2517 ; 26.3878 ; 26.4579 ; 26.4375 ; 26.4246 ; 26.41 ; 26.417 ; 26.4844 ; 26.5206 ; 26.5338 ; 26.5557 ; 26.5918 ; 26.6523 ; 26.7464 ; 26.9033 ; 27.1076 ; 27.2213 ; 27.2335 ; 27.2342]

Bolt 1 - Shear Force (kips): [0.0686251 ; 0.929559 ; 1.09441 ; 1.23816 ; 1.45551 ; 2.35092 ; 3.97842 ; 6.30897 ; 9.45061 ; 10.4259 ; 10.9649 ; 10.964 ; 10.9601 ; 10.9587 ; 11.1269 ; 11.358 ; 11.361 ; 11.3601 ; 11.358 ; 11.489 ; 11.8846 ; 12.2137 ; 12.4388 ; 12.6037 ; 12.9144 ; 13.3811 ; 14.5798 ; 16.086 ; 17.3948 ; 17.8678 ; 18.7894 ; 19.4457 ; 19.8709 ; 20.5932 ; 22.3364 ; 24.8026 ; 27.4978 ; 28.3079 ; 28.6403 ; 29.0944 ; 29.6951 ; 30.4735 ; 31.5325 ; 33.4541 ; 36.6854 ; 39.4072 ; 40.0882 ; 40.9423 ; 41.2461 ; 41.7168 ; 42.389 ; 43.3064 ; 43.622 ; 44.1176 ; 44.8599 ; 45.8855 ; 46.2698 ; 46.7516 ; 47.3452 ; 48.0527 ; 48.9113 ; 49.1937 ; 49.2968 ; 49.4455 ; 49.6589 ; 49.9607 ; 50.3839 ; 50.9572 ; 51.7569 ; 52.6762 ; 53.43 ; 53.5584]

Bolt 2 - Tensile Force (kips): [48.3384 ; 47.4241 ; 47.2527 ; 47.1029 ; 46.8809 ; 45.9035 ; 43.9008 ; 40.7631 ; 36.1383 ; 34.5626 ; 33.6117 ; 33.591 ; 33.5763 ; 33.572 ; 33.5581 ; 33.328 ; 33.3045 ; 33.2984 ; 33.2926 ; 33.305 ; 33.3496 ; 33.4081 ; 33.4319 ; 33.4652 ; 33.5151 ; 33.6242 ; 33.7971 ; 33.8583 ; 34.0621 ; 34.1646 ; 34.4033 ; 34.6556 ; 34.8268 ; 35.2078 ; 35.9931 ; 37.1781 ; 38.6329 ; 39.3097 ; 39.5505 ; 39.9152 ; 40.4586 ; 41.2605 ; 42.4483 ; 43.9412 ; 45.7399 ; 47.6334 ; 48.1025 ; 48.7637 ; 49.0259 ; 49.4324 ; 50.0269 ; 50.8829 ; 51.1818 ; 51.6249 ; 52.2339 ; 52.9483 ; 53.1567 ; 53.4234 ; 53.7769 ; 54.2502 ; 54.9166 ; 55.1532 ; 55.245 ; 55.3808 ; 55.5794 ; 55.8707 ; 56.2966 ; 56.9099 ; 57.7821 ; 58.7591 ; 59.7035 ; 59.9075]

Bolt 2 - Shear Force (kips): [0.0467168 ; 1.05762 ; 1.2389 ; 1.39666 ; 1.63169 ; 2.5139 ; 4.13191 ; 6.44411 ; 9.51444 ; 10.486 ; 11.0727 ; 11.0797 ; 11.0792 ; 11.0783 ; 11.1227 ; 11.5048 ; 11.511 ; 11.5101 ; 11.508 ; 11.5117 ; 11.8488 ; 12.3137 ; 12.383 ; 12.6491 ; 12.9262 ; 13.3599 ; 13.8141 ; 15.1532 ; 16.8319 ; 17.2654 ; 17.6535 ; 18.065 ; 18.7659 ; 19.5556 ; 20.2341 ; 21.2315 ; 23.0057 ; 23.5097 ; 23.6838 ; 23.9466 ; 24.319 ; 24.8046 ; 25.4174 ; 26.1057 ; 26.8384 ; 28.0758 ; 28.6523 ; 29.351 ; 29.5706 ; 29.8542 ; 30.2134 ; 30.6778 ; 30.845 ; 31.0743 ; 31.3957 ; 31.8323 ; 31.9834 ; 32.1885 ; 32.4292 ; 32.7294 ; 33.0821 ; 33.2173 ; 33.2649 ; 33.3328 ; 33.4297 ; 33.5665 ; 33.754 ; 34.0087 ; 34.3475 ; 34.6609 ; 34.9476 ; 35.0105]

Bolt 3 - Tensile Force (kips): [50 ; 50.4405 ; 50.7989 ; 51.2583 ; 51.914 ; 52.3748 ; 52.7863 ; 53.4097 ; 54.4162 ; 54.7765 ; 55.0062 ; 55.0035 ; 54.9923 ; 54.9879 ; 55.0721 ; 55.3041 ; 55.3 ; 55.2946 ; 55.2876 ; 55.3574 ; 55.7311 ; 56.1708 ; 56.3389 ; 56.5918 ; 56.9492 ; 57.5343 ; 58.6762 ; 60.8243 ; 63.5565 ; 64.4251 ; 65.641 ; 66.6932 ; 67.6654 ; 68.9525 ; 70.6285 ; 72.7083 ; 75.1738 ; 75.9791 ; 76.272 ; 76.699 ; 77.3114 ; 78.1797 ; 79.3945 ; 81.0953 ; 83.4382 ; 86.414 ; 87.4041 ; 88.7224 ; 89.1853 ; 89.8208 ; 90.7395 ; 92.0146 ; 92.4746 ; 93.1141 ; 94.0018 ; 95.1033 ; 95.4113 ; 95.7832 ; 96.2201 ; 96.6898 ; 97.2209 ; 97.3894 ; 97.4485 ; 97.5333 ; 97.6527 ; 97.8139 ; 98.0279 ; 98.3038 ; 98.6029 ; 98.7692 ; 98.8683 ; 98.8888]

Bolt 3 - Shear Force (kips): [0.019328 ; 0.25883 ; 0.31531 ; 0.36608 ; 0.43223 ; 0.47955 ; 0.5184 ; 0.57343 ; 0.64502 ; 0.66684 ; 0.67989 ; 0.67974 ; 0.67898 ; 0.67869 ; 0.68394 ; 0.69647 ; 0.69643 ; 0.69615 ; 0.69577 ; 0.69958 ; 0.7175 ; 0.73748 ; 0.74488 ; 0.75583 ; 0.77122 ; 0.79741 ; 0.8449 ; 0.93855 ; 1.0755 ; 1.1156 ; 1.1666 ; 1.2114 ; 1.2516 ; 1.308 ; 1.3863 ; 1.4898 ; 1.6349 ; 1.6788 ; 1.6929 ; 1.713 ; 1.7399 ; 1.7745 ; 1.8185 ; 1.8648 ; 1.8985 ; 1.8859 ; 1.8898 ; 2.2551 ; 2.615 ; 3.0618 ; 3.982 ; 4.9555 ; 5.3712 ; 5.8445 ; 6.3545 ; 6.8762 ; 7.0134 ; 7.1736 ; 7.2665 ; 7.1348 ; 6.7019 ; 6.5112 ; 6.431 ; 6.3043 ; 6.1152 ; 5.8331 ; 5.4162 ; 4.8258 ; 4.0373 ; 3.3512 ; 2.7443 ; 2.6138]

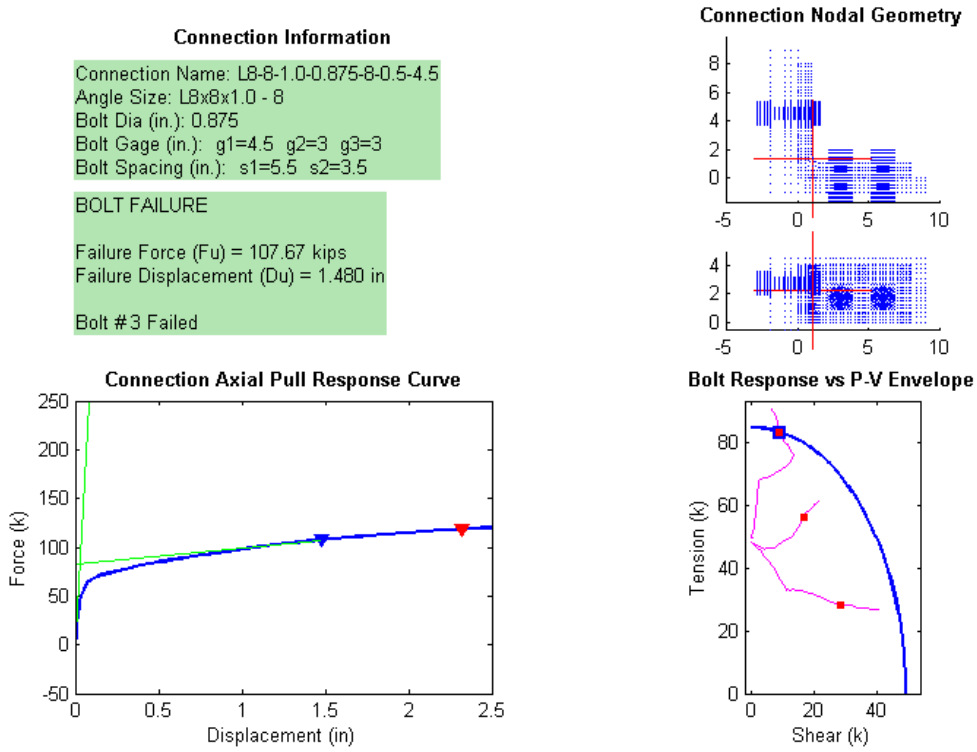


Figure B.392 Connection L8_8_1.0_0.875_8_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.875_8_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 2.8684e+003

Plastic Stiffness (k/in): 17.3449

Displacement (in): [3.8404e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.20294 ; 0.29797 ; 0.3336 ; 0.34697 ; 0.36701 ; 0.39708 ; 0.44218 ; 0.45909 ; 0.48446 ; 0.52252 ; 0.5796 ; 0.601 ; 0.60903 ; 0.62107 ; 0.63913 ; 0.66622 ; 0.70686 ; 0.76782 ; 0.79068 ; 0.79925 ; 0.81211 ; 0.83139 ; 0.86032 ; 0.86756 ; 0.87479 ; 0.88564 ; 0.90191 ; 0.92632 ; 0.96294 ; 1.0179 ; 1.0385 ; 1.0462 ; 1.0578 ; 1.0751 ; 1.1012 ; 1.1403 ; 1.199 ; 1.2869 ; 1.4189 ; 1.4684 ; 1.5426 ; 1.654 ; 1.6957 ; 1.7583 ; 1.8523 ; 1.9932 ; 2.2046 ; 2.2671 ; 2.3608 ; 2.5]

Force (kips): [-1.26875 ; 1.95158 ; 4.33356 ; 7.38114 ; 11.2628 ; 16.091 ; 17.654 ; 19.7023 ; 22.2554 ; 25.4922 ; 28.6966 ; 31.539 ; 33.5204 ; 35.1172 ; 36.6075 ; 38.5649 ; 39.2637 ; 39.562 ; 39.9823 ; 40.6167 ; 41.4454 ; 41.7443 ; 42.1591 ; 42.7551 ; 43.559 ; 43.8419 ; 43.9538 ; 44.123 ; 44.3533 ; 44.6882 ; 45.1748 ; 45.8846 ; 46.1617 ; 46.28 ; 46.4591 ; 46.7016 ; 47.0692 ; 47.173 ; 47.2713 ; 47.4205 ; 47.6294 ; 47.9481 ; 48.4837 ; 49.1956 ; 49.438 ; 49.5362 ; 49.6796 ; 49.8913 ; 50.1952 ; 50.6131 ; 51.2255 ; 52.1056 ; 53.3096 ; 53.7388 ; 54.3483 ; 55.1934 ; 55.5077 ; 55.9569 ; 56.5973 ; 57.4833 ; 58.6276 ; 58.9388 ; 59.3782 ; 59.9862]

Bolt 1 - Tensile Force (kips): [48.3355 ; 48.2342 ; 48.1514 ; 48.0337 ; 47.8694 ; 47.6421 ; 47.5602 ; 47.4455 ; 47.2875 ; 47.0586 ; 46.3971 ; 45.2683 ; 43.8541 ; 42.0718 ; 40.135 ; 37.1697 ; 36.0452 ; 35.6075 ; 34.9888 ; 34.1243 ; 33.2428 ; 33.2116 ; 33.1882 ; 33.1736 ; 33.1749 ; 33.1772 ; 33.1311 ; 33.0075 ; 33.0083 ; 33.0246 ; 33.0643 ; 33.1449 ; 33.1822 ; 33.1521 ; 33.1091 ; 33.1128 ; 33.1319 ; 33.1318 ; 33.1355 ; 33.1497 ; 33.1626 ; 33.0971 ; 32.7549 ; 32.4646 ; 32.4171 ; 32.3303 ; 32.1935 ; 31.9974 ; 31.7667 ; 31.5767 ; 30.9459 ; 29.7033 ; 28.7935 ; 28.5054 ; 28.195 ; 28.1083 ; 28.0016 ; 27.8221 ; 27.5306 ; 27.0777 ; 26.689 ; 26.6423 ; 26.6456 ; 26.7258]

Bolt 1 - Shear Force (kips): [0.0680478 ; 0.0983952 ; 0.198691 ; 0.335259 ; 0.519327 ; 0.766579 ; 0.851641 ; 0.968198 ; 1.12215 ; 1.33483 ; 1.94424 ; 2.8907 ; 3.99729 ; 5.30552 ; 6.65086 ; 8.58111 ; 9.26883 ; 9.52825 ; 9.89285 ; 10.3992 ; 10.9206 ; 10.9346 ; 10.942 ; 10.9441 ; 10.9468 ; 10.9478 ; 11.0499 ; 11.2559 ; 11.2687 ; 11.2772 ; 11.2846 ; 11.2983 ; 11.3056 ; 11.5273 ; 11.9145 ; 12.2011 ; 12.6015 ; 12.7613 ; 12.9016 ; 13.0677 ; 13.2976 ; 13.8343 ; 15.4279 ; 17.0485 ; 17.4038 ; 17.6718 ; 18.0639 ; 18.5864 ; 19.2112 ; 19.8842 ; 21.4165 ; 24.034 ; 27.1301 ; 28.0691 ; 29.4241 ; 30.8815 ; 31.4607 ; 32.371 ; 33.8495 ; 36.0328 ; 38.3171 ; 38.8004 ; 39.4394 ; 40.2329]

Bolt 2 - Tensile Force (kips): [48.3237 ; 48.237 ; 48.1455 ; 48.0191 ; 47.8671 ; 47.6779 ; 47.6202 ; 47.5451 ; 47.4586 ; 47.3611 ; 46.9425 ; 46.3664 ; 46.1514 ; 46.224 ; 46.304 ; 46.5945 ; 46.931 ; 47.0683 ; 47.2817 ; 47.6243 ; 48.0632 ; 48.1988 ; 48.3833 ; 48.6117 ; 48.8859 ; 48.9942 ; 49.0522 ; 49.1458 ; 49.2482 ; 49.387 ; 49.5814 ; 49.8722 ; 49.9827 ; 50.0728 ; 50.2185 ; 50.3994 ; 50.67 ; 50.7382 ; 50.806 ; 50.9065 ; 51.0669 ; 51.3377 ; 51.7455 ; 52.3008 ; 52.4986 ; 52.5801 ; 52.7023 ; 52.8844 ; 53.1471 ; 53.5283 ; 54.0974 ; 54.8821 ; 55.9036 ; 56.2785 ; 56.8557 ; 57.6876 ; 57.9619 ; 58.2895 ; 58.7002 ; 59.3431 ; 60.3137 ; 60.5478 ; 60.9214 ; 61.4877]

Bolt 2 - Shear Force (kips): [0.0440737 ; 0.125731 ; 0.246865 ; 0.407037 ; 0.619661 ; 0.898493 ; 0.991982 ; 1.11824 ; 1.28196 ; 1.50267 ; 2.08311 ; 2.95513 ; 3.9195 ; 4.99004 ; 6.04997 ; 7.46208 ; 7.92869 ; 8.10618 ; 8.36145 ; 8.73297 ; 9.26522 ; 9.47429 ; 9.77623 ; 10.2173 ; 10.8248 ; 11.0295 ; 11.0875 ; 11.1654 ; 11.3151 ; 11.5372 ; 11.8542 ; 12.3815 ; 12.733 ; 12.8019 ; 12.8802 ; 13.0217 ; 13.2295 ; 13.295 ; 13.3591 ; 13.4539 ; 13.5779 ; 13.709 ; 13.8577 ; 14.2387 ; 14.4308 ; 14.4708 ; 14.5248 ; 14.6281 ; 14.8291 ; 15.0897 ; 15.3067 ; 15.7203 ; 16.357 ; 16.5612 ; 16.8127 ; 17.3265 ; 17.5621 ; 18.02 ; 18.6729 ; 19.3569 ; 20.1359 ; 20.5007 ; 20.9219 ; 21.4435]

Bolt 3 - Tensile Force (kips): [50 ; 49.8952 ; 49.8515 ; 49.8889 ; 50.0712 ; 50.5273 ; 50.7569 ; 51.1914 ; 51.8256 ; 52.6872 ; 53.7651 ; 55.1565 ; 56.8526 ; 58.9861 ; 61.7074 ; 65.0376 ; 66.1602 ; 66.5467 ; 67.0821 ; 67.7778 ; 68.6474 ; 68.9861 ; 69.4325 ; 70.1437 ; 71.1669 ; 71.542 ; 71.6862 ; 71.9023 ; 72.2014 ; 72.6354 ; 73.2817 ; 74.23 ; 74.5963 ; 74.7403 ; 74.9642 ; 75.2753 ; 75.7696 ; 75.9056 ; 76.0336 ; 76.2421 ; 76.5293 ; 76.9642 ; 77.663 ; 78.5698 ; 78.8556 ; 78.976 ; 79.1481 ; 79.4049 ; 79.7626 ; 80.2349 ; 80.8779 ; 81.7393 ; 82.9175 ; 83.402 ; 84.1584 ; 85.383 ; 85.8699 ; 86.4428 ; 87.1008 ; 88.0937 ; 89.2614 ; 89.5692 ; 89.9746 ; 90.5365]

Bolt 3 - Shear Force (kips): [0.0393968 ; 0.0178898 ; 0.0535663 ; 0.108759 ; 0.184661 ; 0.290825 ; 0.329395 ; 0.382917 ; 0.456545 ; 0.563625 ; 0.711235 ; 0.894697 ; 1.11816 ; 1.38918 ; 1.64503 ; 1.90081 ; 1.98889 ; 2.03781 ; 2.12018 ; 2.32895 ; 4.02132 ; 4.90396 ; 5.87704 ; 7.5285 ; 9.19407 ; 9.75982 ; 9.95282 ; 10.2097 ; 10.601 ; 11.1146 ; 11.8048 ; 12.4904 ; 12.7207 ; 12.8161 ; 12.9465 ; 13.1384 ; 13.3091 ; 13.2851 ; 13.2777 ; 13.2173 ; 13.1812 ; 13.0817 ; 12.642 ; 12.0541 ; 11.844 ; 11.7498 ; 11.6211 ; 11.4151 ; 11.1189 ; 10.7028 ; 10.1172 ; 9.3751 ; 8.66789 ; 8.64698 ; 8.59242 ; 8.54298 ; 8.45144 ; 8.31912 ; 8.09347 ; 7.70759 ; 7.15382 ; 6.99814 ; 6.80871 ; 6.53996]

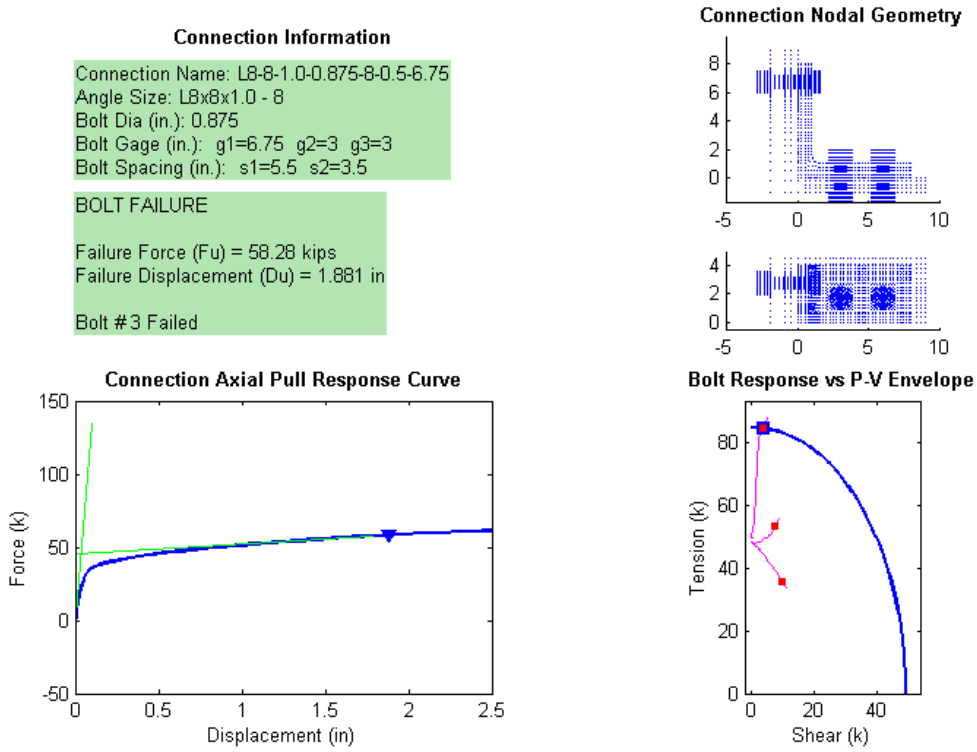


Figure B.393 Connection L8_8_1.0_0.875_8_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.875_8_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.3345e+003

Plastic Stiffness (k/in): 6.6773

Displacement (in): [3.7288e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.53655 ; 0.57218 ; 0.62564 ; 0.70581 ; 0.82609 ; 1.0065 ; 1.069 ; 1.1627 ; 1.1979 ; 1.2506 ; 1.3297 ; 1.4484 ; 1.6264 ; 1.6889 ; 1.7826 ; 1.9232 ; 2.1342 ; 2.3842 ; 2.5]

Force (kips): [-1.24117 ; 0.505588 ; 1.3652 ; 2.5647 ; 4.20272 ; 6.36839 ; 9.16598 ; 12.4307 ; 15.5624 ; 17.9626 ; 19.1785 ; 20.1793 ; 21.425 ; 21.8267 ; 22.3755 ; 23.0857 ; 23.33 ; 23.6732 ; 24.1474 ; 24.8083 ; 25.7175 ; 26.0111 ; 26.4438 ; 26.5997 ; 26.8306 ; 27.1626 ; 27.6332 ; 28.2992 ; 28.5206 ; 28.8336 ; 29.2691 ; 29.8564 ; 30.4639 ; 30.7161]

Bolt 1 - Tensile Force (kips): [48.3358 ; 48.2814 ; 48.2537 ; 48.2125 ; 48.1509 ; 48.06 ; 47.9292 ; 47.7538 ; 47.5495 ; 47.3696 ; 47.2932 ; 47.2404 ; 47.142 ; 47.0884 ; 46.9097 ; 46.3596 ; 46.1291 ; 45.7488 ; 45.1078 ; 44.0398 ; 42.5025 ; 41.9894 ; 41.2136 ; 40.9246 ; 40.4906 ; 39.8487 ; 38.9062 ; 37.5365 ; 37.0728 ; 36.4018 ; 35.4845 ; 34.341 ; 33.6636 ; 33.6525]

Bolt 1 - Shear Force (kips): [0.0675712 ; 0.0509483 ; 0.0797153 ; 0.130841 ; 0.206877 ; 0.314288 ; 0.464882 ; 0.663728 ; 0.885417 ; 1.07466 ; 1.16238 ; 1.23454 ; 1.35839 ; 1.41976 ; 1.60483 ; 2.12034 ; 2.3237 ; 2.64896 ; 3.18038 ; 4.02949 ; 5.19043 ; 5.56389 ; 6.11762 ; 6.32067 ; 6.62149 ; 7.06003 ; 7.69479 ; 8.60013 ; 8.8988 ; 9.31922 ; 9.88788 ; 10.6022 ; 11.0562 ; 11.0793]

Bolt 2 - Tensile Force (kips): [48.325 ; 48.2824 ; 48.261 ; 48.2157 ; 48.1487 ; 48.0681 ; 47.9766 ; 47.9013 ; 47.8801 ; 47.9095 ; 47.9424 ; 47.9919 ; 48.1061 ; 48.1536 ; 48.1968 ; 48.2774 ; 48.3391 ; 48.4527 ; 48.6563 ; 49.0229 ; 49.5745 ; 49.7633 ; 50.0913 ; 50.2376 ; 50.4706 ; 50.85 ; 51.4311 ; 52.2896 ; 52.5796 ; 52.9984 ; 53.6207 ; 54.5216 ; 55.4567 ; 55.8269]

Bolt 2 - Shear Force (kips): [0.044314 ; 0.0564 ; 0.10401 ; 0.17132 ; 0.26565 ; 0.39545 ; 0.57374 ; 0.79933 ; 1.0391 ; 1.2339 ; 1.3282 ; 1.403 ; 1.5229 ; 1.58 ; 1.7433 ; 2.184 ; 2.3535 ; 2.62 ; 3.0476 ; 3.711 ; 4.5802 ; 4.8514 ; 5.234 ; 5.3668 ; 5.5584 ; 5.8259 ; 6.1984 ; 6.7149 ; 6.8861 ; 7.1308 ; 7.4672 ; 7.9198 ; 8.4118 ; 8.6341]

Bolt 3 - Tensile Force (kips): [50 ; 49.9347 ; 49.88 ; 49.83 ; 49.819 ; 49.9313 ; 50.2487 ; 51.1063 ; 52.7378 ; 55.0314 ; 58.2832 ; 61.7358 ; 65.3572 ; 66.5248 ; 68.068 ; 70.0122 ; 70.6813 ; 71.5986 ; 72.8335 ; 74.4631 ; 76.6502 ; 77.344 ; 78.3686 ; 78.7312 ; 79.2815 ; 80.0981 ; 81.2657 ; 82.8927 ; 83.3753 ; 84.0182 ; 84.9027 ; 86.0956 ; 87.3575 ; 87.8736]

Bolt 3 - Shear Force (kips): [0.038367 ; 0.013946 ; 0.017075 ; 0.040019 ; 0.079157 ; 0.13559 ; 0.21375 ; 0.31788 ; 0.44966 ; 0.64663 ; 0.87172 ; 1.1349 ; 1.3229 ; 1.3689 ; 1.4337 ; 1.5335 ; 1.5709 ; 1.6277 ; 1.7029 ; 1.7905 ; 1.8667 ; 1.8877 ; 2.0045 ; 2.0345 ; 2.0736 ; 2.1394 ; 2.3121 ; 2.8397 ; 3.015 ; 3.2331 ; 3.5284 ; 4.0127 ; 4.8097 ; 4.8773]

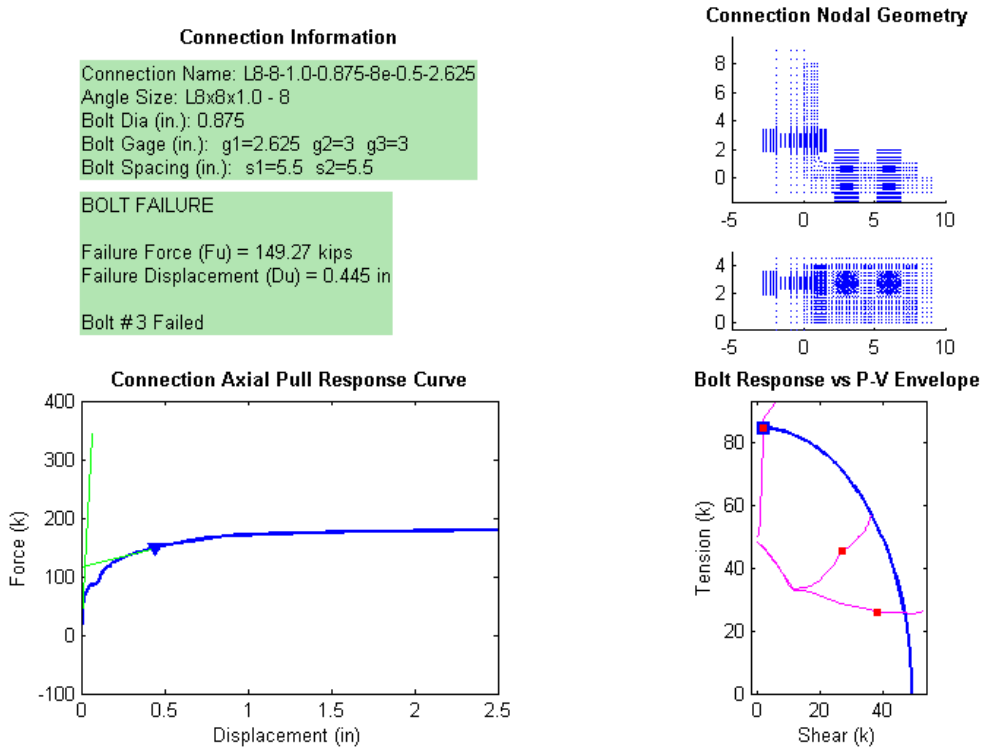


Figure B.394 Connection L8_8_1.0_0.875_8e_0.5_2.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.875_8e_0.5_2.625 Analysis Response Variables.
Initial Stiffness (k/in): 5.2658e+003

Plastic Stiffness (k/in): 77.6624

Displacement (in): [4.713e-036 ; 0.0078125 ; 0.0097656 ; 0.011719 ; 0.014648 ; 0.019043 ; 0.025635 ; 0.035522 ; 0.050354 ; 0.055916 ; 0.064259 ; 0.067387 ; 0.07208 ; 0.07384 ; 0.076479 ; 0.077469 ; 0.078954 ; 0.081181 ; 0.084522 ; 0.089534 ; 0.091413 ; 0.094232 ; 0.09846 ; 0.098856 ; 0.099451 ; 0.10034 ; 0.10168 ; 0.10369 ; 0.1067 ; 0.11121 ; 0.11799 ; 0.12815 ; 0.13195 ; 0.13767 ; 0.14624 ; 0.1591 ; 0.16392 ; 0.17115 ; 0.182 ; 0.19828 ; 0.22269 ; 0.2593 ; 0.27303 ; 0.29363 ; 0.32452 ; 0.33611 ; 0.35348 ; 0.37955 ; 0.41865 ; 0.4773 ; 0.49929 ; 0.53229 ; 0.58177 ; 0.656 ; 0.76734 ; 0.8091 ; 0.87173 ; 0.89521 ; 0.93044 ; 0.98329 ; 1.0626 ; 1.1815 ; 1.3598 ; 1.4223 ; 1.5161 ; 1.6567 ; 1.8676 ; 2.1176 ; 2.3676 ; 2.5]

Force (kips): [-1.55687 ; 20.6233 ; 24.1549 ; 27.143 ; 30.8394 ; 33.6885 ; 35.6445 ; 38.2258 ; 41.3852 ; 42.3059 ; 43.0282 ; 43.0277 ; 43.0155 ; 43.0103 ; 43.0035 ; 43.1769 ; 43.4063 ; 43.6341 ; 43.6434 ; 43.6354 ; 43.6316 ; 43.8052 ; 45.1184 ; 45.2512 ; 45.4386 ; 45.6716 ; 45.9508 ; 46.5051 ; 47.256 ; 48.5236 ; 50.7266 ; 53.4751 ; 54.313 ; 55.4068 ; 56.751 ; 58.3261 ; 58.8745 ; 59.6343 ; 60.6738 ; 62.0546 ; 63.9046 ; 66.2762 ; 67.0942 ; 68.216 ; 69.7382 ; 70.2863 ; 71.0894 ; 72.2191 ; 73.7374 ; 75.7373 ; 76.4431 ; 77.4122 ; 78.7429 ; 80.5121 ; 82.7688 ; 83.5093 ; 84.468 ; 84.7716 ; 85.1421 ; 85.5718 ; 86.049 ; 86.6139 ; 87.2844 ; 87.4802 ; 87.7497 ; 88.1254 ; 88.6465 ; 89.2085 ; 89.709 ; 89.9507]

Bolt 1 - Tensile Force (kips): [48.4171 ; 47.5032 ; 47.3222 ; 47.1573 ; 46.9124 ; 46.0615 ; 44.051 ; 40.8641 ; 36.0494 ; 34.3898 ; 33.2946 ; 33.2787 ; 33.2632 ; 33.2584 ; 33.2523 ; 33.1372 ; 33.031 ; 33.0119 ; 32.9948 ; 32.9829 ; 32.9797 ; 32.9622 ; 32.9104 ; 32.9032 ; 32.8926 ; 32.8795 ; 32.8711 ; 32.8612 ; 32.8575 ; 32.7361 ; 32.3917 ; 32.1999 ; 32.0974 ; 31.8735 ; 31.5107 ; 31.1856 ; 31.0619 ; 30.8168 ; 30.246 ; 29.4555 ; 28.6821 ; 28.2396 ; 28.0164 ; 27.8087 ; 27.5989 ; 27.458 ; 27.1747 ; 26.7387 ; 26.2481 ; 25.8889 ; 25.819 ; 25.7704 ; 25.8137 ; 25.9823 ; 26.0779 ; 25.9767 ; 25.8902 ; 25.858 ; 25.7956 ; 25.6818 ; 25.557 ; 25.4349 ; 25.3826 ; 25.4187 ; 25.5094 ; 25.7062 ; 25.9376 ; 26.1204 ; 26.2678 ; 26.3441]

Bolt 1 - Shear Force (kips): [0.0609922 ; 0.95119 ; 1.1224 ; 1.27252 ; 1.49349 ; 2.25681 ; 3.88136 ; 6.20753 ; 9.34982 ; 10.3365 ; 10.98 ; 10.98 ; 10.9765 ; 10.9751 ; 10.9732 ; 11.1796 ; 11.3351 ; 11.3524 ; 11.3591 ; 11.3575 ; 11.3567 ; 11.5252 ; 12.2182 ; 12.2979 ; 12.4116 ; 12.552 ; 12.6623 ; 12.9844 ; 13.3552 ; 14.3088 ; 16.1144 ; 17.1911 ; 17.5663 ; 18.2355 ; 19.1921 ; 20.1277 ; 20.4263 ; 20.989 ; 22.1814 ; 23.9855 ; 26.3226 ; 28.5306 ; 29.3971 ; 30.4342 ; 31.9103 ; 32.5531 ; 33.6865 ; 35.3273 ; 37.3091 ; 39.2584 ; 39.8152 ; 40.5509 ; 41.4706 ; 42.7757 ; 44.603 ; 45.3626 ; 46.1922 ; 46.4498 ; 46.8109 ; 47.3151 ; 47.945 ; 48.6989 ; 49.5642 ; 49.8122 ; 50.1521 ; 50.6074 ; 51.3329 ; 52.0641 ; 52.5708 ; 52.7703]

Bolt 2 - Tensile Force (kips): [48.4213 ; 47.5246 ; 47.3617 ; 47.2219 ; 47.0205 ; 46.2677 ; 44.3245 ; 41.258 ; 36.7157 ; 35.1302 ; 33.6479 ; 33.6097 ; 33.5888 ; 33.5831 ; 33.5771 ; 33.5858 ; 33.5223 ; 33.3461 ; 33.3275 ; 33.315 ; 33.3117 ; 33.3233 ; 33.3933 ; 33.4024 ; 33.4163 ; 33.4352 ; 33.4608 ; 33.5059 ; 33.5865 ; 33.7506 ; 33.9593 ; 34.0431 ; 34.1273 ; 34.2963 ; 34.6066 ; 35.0703 ; 35.2319 ; 35.5279 ; 36.0624 ; 36.9024 ; 38.0285 ; 39.5206 ; 40.0969 ; 40.9947 ; 42.3393 ; 42.7841 ; 43.4073 ; 44.2065 ; 45.1793 ; 46.0471 ; 46.3027 ; 46.637 ; 47.0385 ; 47.7864 ; 48.9684 ; 49.3977 ; 49.9747 ; 50.1465 ; 50.3514 ; 50.6184 ; 50.973 ; 51.4942 ; 52.2557 ; 52.5452 ; 52.9746 ; 53.6278 ; 54.5458 ; 55.5331 ; 56.4572 ; 56.8966]

Bolt 2 - Shear Force (kips): [0.0737112 ; 0.954952 ; 1.1233 ; 1.26841 ; 1.47361 ; 2.18622 ; 3.78959 ; 6.08747 ; 9.15926 ; 10.15 ; 11.0634 ; 11.08 ; 11.0823 ; 11.0816 ; 11.0802 ; 11.0831 ; 11.2094 ; 11.4795 ; 11.4933 ; 11.4939 ; 11.4931 ; 11.4965 ; 12.1095 ; 12.1644 ; 12.24 ; 12.3322 ; 12.4948 ; 12.7408 ; 13.1317 ; 13.4842 ; 14.0373 ; 15.8912 ; 16.4069 ; 16.9474 ; 17.5178 ; 18.3184 ; 18.7298 ; 19.2252 ; 19.7388 ; 20.2571 ; 21.1057 ; 22.7989 ; 23.3352 ; 24.0343 ; 24.8683 ; 25.1347 ; 25.4602 ; 25.8607 ; 26.3897 ; 27.547 ; 27.9717 ; 28.5766 ; 29.4116 ; 30.3357 ; 31.3157 ; 31.6174 ; 32.0658 ; 32.2704 ; 32.5718 ; 32.904 ; 33.2731 ; 33.731 ; 34.2597 ; 34.4052 ; 34.6017 ; 34.8517 ; 35.1921 ; 35.6079 ; 36.0042 ; 36.2337]

Bolt 3 - Tensile Force (kips): [50 ; 50.411 ; 50.7513 ; 51.1974 ; 51.8568 ; 52.4277 ; 52.8455 ; 53.4759 ; 54.5003 ; 54.874 ; 55.197 ; 55.1975 ; 55.1875 ; 55.1829 ; 55.1766 ; 55.2627 ; 55.3692 ; 55.479 ; 55.4832 ; 55.4758 ; 55.4721 ; 55.5585 ; 56.2429 ; 56.3182 ; 56.4251 ; 56.5597 ; 56.7264 ; 57.0666 ; 57.5543 ; 58.4399 ; 60.147 ; 62.6395 ; 63.4854 ; 64.6393 ; 66.1297 ; 67.9369 ; 68.5637 ; 69.43 ; 70.5957 ; 72.1028 ; 73.9972 ; 76.3408 ; 77.1419 ; 78.2517 ; 79.7807 ; 80.3303 ; 81.1347 ; 82.28 ; 83.8477 ; 85.9371 ; 86.6652 ; 87.6203 ; 88.9625 ; 90.7353 ; 93.0913 ; 93.8614 ; 94.8597 ; 95.1697 ; 95.5448 ; 95.9723 ; 96.4354 ; 96.9469 ; 97.5201 ; 97.683 ; 97.8963 ; 98.173 ; 98.4824 ; 98.6876 ; 98.7975 ; 98.8456]

Bolt 3 - Shear Force (kips): [0.035578 ; 0.23655 ; 0.29114 ; 0.34053 ; 0.40728 ; 0.46666 ; 0.50653 ; 0.56248 ; 0.63673 ; 0.65915 ; 0.67771 ; 0.67788 ; 0.67728 ; 0.677 ; 0.67662 ; 0.68141 ; 0.68707 ; 0.69293 ; 0.6932 ; 0.69281 ; 0.69262 ; 0.697 ; 0.72823 ; 0.73127 ; 0.73564 ; 0.7412 ; 0.74823 ; 0.76297 ; 0.78371 ; 0.8184 ; 0.88434 ; 0.9929 ; 1.0297 ; 1.0768 ; 1.1334 ; 1.205 ; 1.2291 ; 1.2643 ; 1.3148 ; 1.3852 ; 1.4864 ; 1.6135 ; 1.646 ; 1.6865 ; 1.7363 ; 1.7499 ; 1.7667 ; 1.7891 ; 1.8135 ; 1.8183 ; 1.8308 ; 1.8798 ; 2.6716 ; 4.0753 ; 5.7651 ; 6.2688 ; 6.7801 ; 6.9287 ; 7.0692 ; 7.1528 ; 7.0693 ; 6.7765 ; 6.1049 ; 5.8438 ; 5.4677 ; 4.9247 ; 4.173 ; 3.4077 ; 2.7633 ; 2.4466]

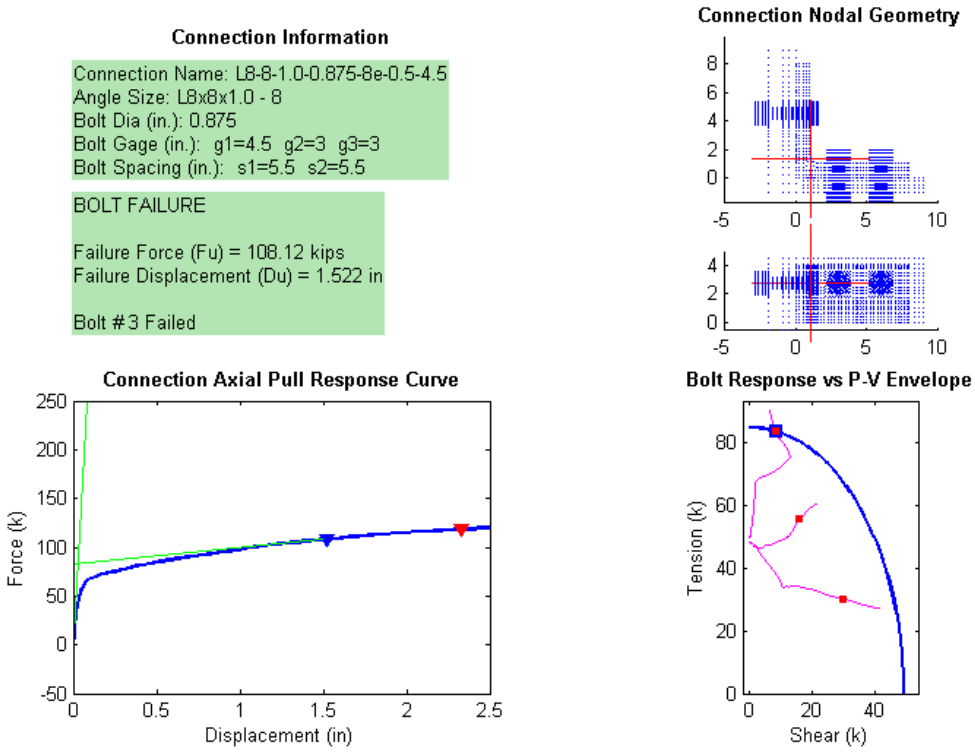


Figure B.395 Connection L8_8_1.0_0.875_8e_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.875_8e_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 2838

Plastic Stiffness (k/in): 16.2638

Displacement (in): [6.1943e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.026611 ; 0.036499 ; 0.051331 ; 0.073578 ; 0.081921 ; 0.094435 ; 0.11321 ; 0.14136 ; 0.1836 ; 0.24695 ; 0.34198 ; 0.35089 ; 0.36425 ; 0.3843 ; 0.41436 ; 0.45947 ; 0.52712 ; 0.6286 ; 0.78082 ; 0.80936 ; 0.85217 ; 0.86822 ; 0.8923 ; 0.92843 ; 0.98261 ; 1.0639 ; 1.0944 ; 1.1401 ; 1.2087 ; 1.2344 ; 1.2729 ; 1.3308 ; 1.4176 ; 1.4501 ; 1.499 ; 1.5722 ; 1.682 ; 1.8468 ; 2.094 ; 2.344 ; 2.5]

Force (kips): [-1.54476 ; 1.66624 ; 3.99813 ; 6.97656 ; 10.7788 ; 14.0518 ; 16.9136 ; 20.4009 ; 24.4766 ; 28.536 ; 31.8321 ; 32.5535 ; 33.3463 ; 34.2223 ; 35.1974 ; 36.2165 ; 37.5227 ; 39.3972 ; 39.5984 ; 39.8812 ; 40.2982 ; 40.9023 ; 41.7044 ; 42.7722 ; 44.1599 ; 45.9428 ; 46.3317 ; 46.8715 ; 47.0972 ; 47.4094 ; 47.9108 ; 48.6641 ; 49.6501 ; 50.0146 ; 50.5209 ; 51.2523 ; 51.5201 ; 51.9047 ; 52.4479 ; 53.2028 ; 53.4738 ; 53.8708 ; 54.4572 ; 55.2956 ; 56.4465 ; 57.9462 ; 59.2106 ; 59.9094]

Bolt 1 - Tensile Force (kips): [48.4065 ; 48.2922 ; 48.1989 ; 48.068 ; 47.8899 ; 47.7237 ; 47.564 ; 47.3465 ; 47.053 ; 46.2627 ; 44.8956 ; 44.4613 ; 43.8636 ; 43.0592 ; 41.9523 ; 40.7006 ; 38.869 ; 35.9506 ; 35.6727 ; 35.273 ; 34.7115 ; 33.9889 ; 33.6236 ; 33.694 ; 33.6862 ; 34.0841 ; 34.0466 ; 34.1785 ; 34.2255 ; 34.3306 ; 34.2757 ; 33.8969 ; 33.5622 ; 33.3174 ; 33.0886 ; 32.4832 ; 32.174 ; 31.7131 ; 31.146 ; 30.7182 ; 30.5809 ; 30.2938 ; 29.9812 ; 29.5863 ; 28.7506 ; 27.8404 ; 27.4644 ; 27.407]

Bolt 1 - Shear Force (kips): [0.061121 ; 0.1061 ; 0.214631 ; 0.360697 ; 0.557409 ; 0.736705 ; 0.902109 ; 1.11743 ; 1.39288 ; 2.11932 ; 3.2604 ; 3.60634 ; 4.07098 ; 4.67924 ; 5.49132 ; 6.38438 ; 7.644 ; 9.5465 ; 9.72034 ; 9.96979 ; 10.3215 ; 10.7853 ; 11.0641 ; 11.1136 ; 11.4174 ; 11.6319 ; 12.3226 ; 12.902 ; 13.2401 ; 13.5571 ; 14.5798 ; 16.6172 ; 18.6279 ; 19.47 ; 20.4835 ; 22.3825 ; 23.198 ; 24.3731 ; 25.9731 ; 27.7811 ; 28.338 ; 29.3018 ; 30.5417 ; 32.2417 ; 34.9868 ; 38.1934 ; 40.2788 ; 41.2124]

Bolt 2 - Tensile Force (kips): [48.3971 ; 48.3088 ; 48.2232 ; 48.1069 ; 47.9609 ; 47.8511 ; 47.756 ; 47.6613 ; 47.5745 ; 47.1838 ; 46.5431 ; 46.4855 ; 46.5071 ; 46.6577 ; 46.9277 ; 47.1825 ; 47.4233 ; 47.876 ; 47.9264 ; 48.0103 ; 48.1319 ; 48.33 ; 48.5767 ; 48.8992 ; 49.2916 ; 49.7635 ; 49.9936 ; 50.2674 ; 50.4058 ; 50.6002 ; 50.9485 ; 51.5514 ; 52.302 ; 52.5788 ; 53.0126 ; 53.6651 ; 53.9027 ; 54.2462 ; 54.7509 ; 55.4059 ; 55.5676 ; 55.8149 ; 56.2372 ; 56.889 ; 57.8212 ; 58.8175 ; 59.7663 ; 60.2656]

Bolt 2 - Shear Force (kips): [0.0730038 ; 0.0935951 ; 0.199416 ; 0.340182 ; 0.527061 ; 0.693594 ; 0.844307 ; 1.03396 ; 1.2694 ; 1.87452 ; 2.86759 ; 3.15948 ; 3.54338 ; 4.02736 ; 4.6533 ; 5.32406 ; 6.2417 ; 7.59104 ; 7.71764 ; 7.89916 ; 8.16725 ; 8.55578 ; 9.12005 ; 9.89261 ; 10.8405 ; 11.9209 ; 12.1649 ; 12.5951 ; 12.6955 ; 12.8431 ; 13.0661 ; 13.2322 ; 13.671 ; 13.8299 ; 14.1639 ; 14.5437 ; 14.6349 ; 14.7466 ; 14.881 ; 15.2454 ; 15.4728 ; 15.7637 ; 16.2492 ; 16.9153 ; 17.7227 ; 19.1465 ; 20.3299 ; 21.2191]

Bolt 3 - Tensile Force (kips): [50 ; 49.8948 ; 49.8482 ; 49.8813 ; 50.0602 ; 50.3394 ; 50.6965 ; 51.4497 ; 52.506 ; 53.8154 ; 55.461 ; 56.0001 ; 56.7472 ; 57.7697 ; 59.173 ; 61.0675 ; 63.4869 ; 66.5941 ; 66.8788 ; 67.2504 ; 67.7542 ; 68.3839 ; 69.2518 ; 70.4626 ; 72.2669 ; 74.6186 ; 75.1034 ; 75.7847 ; 76.0479 ; 76.4294 ; 77.0474 ; 77.9558 ; 79.1958 ; 79.6677 ; 80.2646 ; 81.0254 ; 81.2924 ; 81.65 ; 82.142 ; 82.8188 ; 83.073 ; 83.4592 ; 84.22 ; 85.3777 ; 86.7702 ; 88.4432 ; 89.7318 ; 90.4129]

Bolt 3 - Shear Force (kips): [0.0578129 ; 0.00965604 ; 0.0362025 ; 0.0867965 ; 0.157505 ; 0.224008 ; 0.288452 ; 0.377005 ; 0.498733 ; 0.669362 ; 0.871471 ; 0.93239 ; 1.0143 ; 1.13181 ; 1.28476 ; 1.4588 ; 1.63259 ; 1.85202 ; 1.88648 ; 1.94134 ; 2.05177 ; 2.69616 ; 4.55884 ; 6.93539 ; 9.66148 ; 11.9813 ; 12.2963 ; 12.6898 ; 12.6655 ; 12.6236 ; 12.5061 ; 12.0091 ; 11.2596 ; 10.9104 ; 10.4354 ; 9.76712 ; 9.52868 ; 9.22636 ; 8.82935 ; 8.33817 ; 8.19401 ; 8.01314 ; 8.07328 ; 7.96227 ; 7.55121 ; 6.97756 ; 6.48265 ; 6.23614]

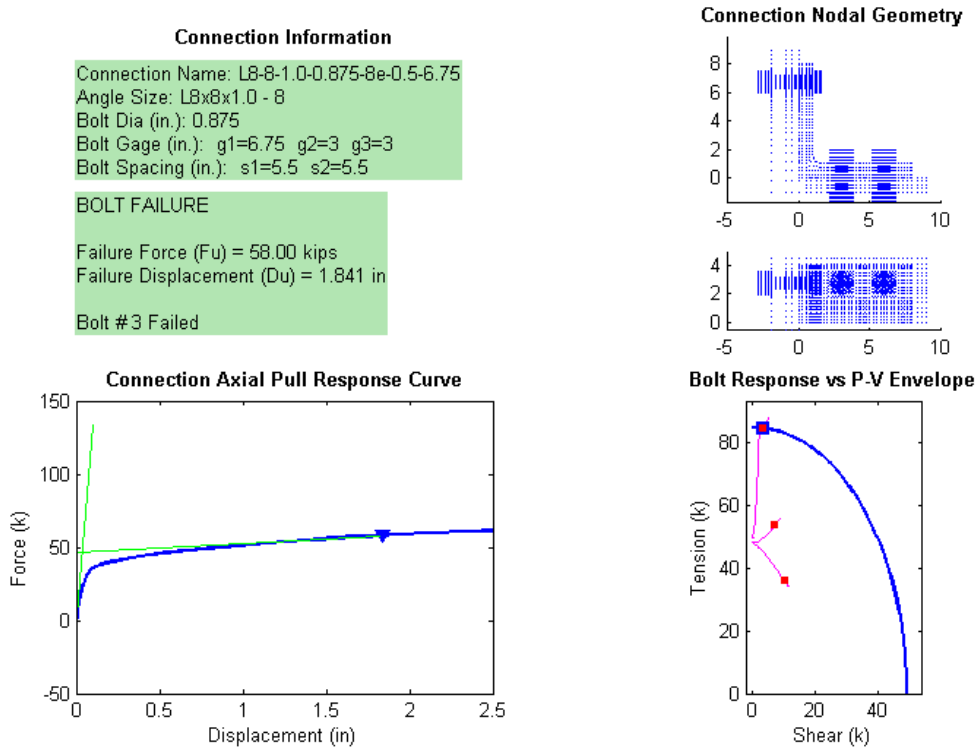


Figure B.396 Connection L8_8_1.0_0.875_8e_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_0.875_8e_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.3612e+003

Plastic Stiffness (k/in): 6.4248

Displacement (in): [5.7804e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.042542 ; 0.064789 ; 0.09816 ; 0.14822 ; 0.2233 ; 0.33593 ; 0.37816 ; 0.44152 ; 0.53655 ; 0.67909 ; 0.8929 ; 1.1429 ; 1.3929 ; 1.4554 ; 1.5492 ; 1.6898 ; 1.7425 ; 1.8216 ; 1.9403 ; 2.1183 ; 2.3683 ; 2.5]

Force (kips): [-1.4343 ; 0.399179 ; 1.22429 ; 2.39859 ; 3.99652 ; 6.11721 ; 8.8655 ; 12.1183 ; 15.3039 ; 17.8795 ; 19.1707 ; 20.1703 ; 21.4152 ; 21.8173 ; 22.3604 ; 23.0682 ; 23.9677 ; 25.1344 ; 26.3342 ; 27.4012 ; 27.6545 ; 28.0123 ; 28.5135 ; 28.6895 ; 28.9436 ; 29.3029 ; 29.7941 ; 30.4019 ; 30.6873]

Bolt 1 - Tensile Force (kips): [48.4077 ; 48.3426 ; 48.3107 ; 48.2615 ; 48.1887 ; 48.0845 ; 47.9379 ; 47.7414 ; 47.5127 ; 47.301 ; 47.2133 ; 47.1589 ; 47.0248 ; 46.91 ; 46.6517 ; 46.0385 ; 44.9625 ; 43.1234 ; 41.1463 ; 39.2228 ; 38.7555 ; 38.068 ; 37.064 ; 36.7038 ; 36.1938 ; 35.514 ; 34.7228 ; 34.2891 ; 34.3542]

Bolt 1 - Shear Force (kips): [0.057665 ; 0.0552092 ; 0.0920604 ; 0.151537 ; 0.237224 ; 0.357331 ; 0.525292 ; 0.747639 ; 0.996578 ; 1.2187 ; 1.31924 ; 1.39392 ; 1.55599 ; 1.67845 ; 1.93353 ; 2.48545 ; 3.39759 ; 4.8606 ; 6.35481 ; 7.74534 ; 8.07667 ; 8.55791 ; 9.23847 ; 9.47862 ; 9.82087 ; 10.2869 ; 10.8613 ; 11.2632 ; 11.2976]

Bolt 2 - Tensile Force (kips): [48.4014 ; 48.3506 ; 48.3332 ; 48.292 ; 48.2353 ; 48.1627 ; 48.0925 ; 48.0506 ; 48.0806 ; 48.1659 ; 48.2278 ; 48.283 ; 48.4043 ; 48.4186 ; 48.4481 ; 48.5924 ; 49.048 ; 49.9507 ; 50.9815 ; 52.0236 ; 52.274 ; 52.6399 ; 53.159 ; 53.351 ; 53.6408 ; 54.0709 ; 54.7153 ; 55.4799 ; 55.801]

Bolt 2 - Shear Force (kips): [0.069415 ; 0.047416 ; 0.079798 ; 0.1337 ; 0.21156 ; 0.3199 ; 0.46747 ; 0.6553 ; 0.8576 ; 1.0318 ; 1.1199 ; 1.1868 ; 1.3136 ; 1.4086 ; 1.6159 ; 2.0741 ; 2.7936 ; 3.8854 ; 4.9063 ; 5.7659 ; 5.963 ; 6.2477 ; 6.6577 ; 6.8025 ; 7.01 ; 7.3014 ; 7.7016 ; 8.234 ; 8.5023]

Bolt 3 - Tensile Force (kips): [50 ; 49.9352 ; 49.8799 ; 49.8291 ; 49.8162 ; 49.928 ; 50.2432 ; 51.0718 ; 52.7178 ; 55.0666 ; 58.3866 ; 61.8487 ; 65.4693 ; 66.6267 ; 68.1627 ; 70.1271 ; 72.5883 ; 75.5493 ; 78.4874 ; 81.1345 ; 81.7746 ; 82.633 ; 83.7433 ; 84.0756 ; 84.539 ; 85.2257 ; 86.1783 ; 87.3932 ; 87.9568]

Bolt 3 - Shear Force (kips): [0.055603 ; 0.024439 ; 0.011669 ; 0.02523 ; 0.059631 ; 0.11151 ; 0.18293 ; 0.2809 ; 0.40969 ; 0.6061 ; 0.83694 ; 1.1048 ; 1.2938 ; 1.3408 ; 1.4053 ; 1.5013 ; 1.637 ; 1.7645 ; 1.8436 ; 1.9438 ; 2.0695 ; 2.3805 ; 2.8494 ; 3.0303 ; 3.2466 ; 3.6938 ; 4.0149 ; 4.8449 ; 5.0907]

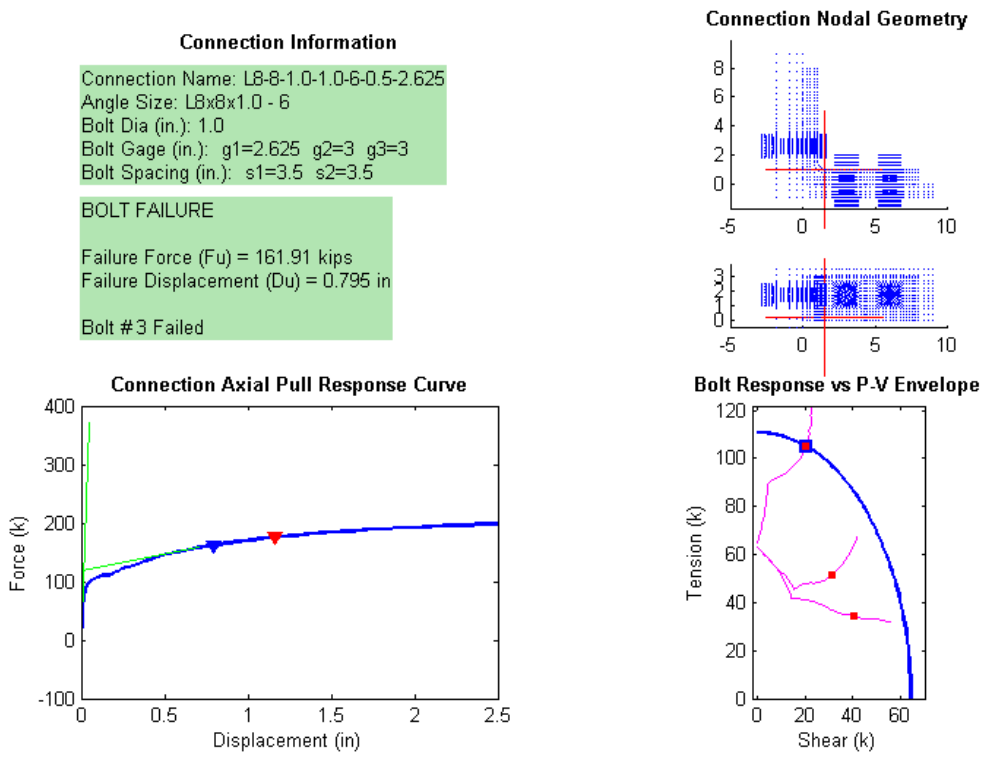


Figure B.397 Connection L8_8_1.0_1.0_6_0.5_2.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_1.0_6_0.5_2.625 Analysis Response Variables.
Initial Stiffness (k/in): 8356

Plastic Stiffness (k/in): 54.0222

Displacement (in): [9.6289e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012878 ; 0.01535 ; 0.017822 ; 0.020294 ; 0.024002 ; 0.029564 ; 0.037907 ; 0.050421 ; 0.069192 ; 0.097349 ; 0.13958 ; 0.14354 ; 0.14948 ; 0.15839 ; 0.16173 ; 0.16674 ; 0.16862 ; 0.17144 ; 0.17567 ; 0.18201 ; 0.18439 ; 0.18796 ; 0.19331 ; 0.20134 ; 0.21338 ; 0.21789 ; 0.22467 ; 0.23483 ; 0.25006 ; 0.27292 ; 0.2815 ; 0.29435 ; 0.30721 ; 0.32007 ; 0.33936 ; 0.36829 ; 0.37914 ; 0.39541 ; 0.41982 ; 0.45643 ; 0.47016 ; 0.49076 ; 0.52165 ; 0.56799 ; 0.58537 ; 0.61144 ; 0.65054 ; 0.70919 ; 0.79716 ; 0.83015 ; 0.87964 ; 0.95387 ; 0.98171 ; 1.0235 ; 1.0861 ; 1.1096 ; 1.1448 ; 1.1977 ; 1.2769 ; 1.3958 ; 1.4404 ; 1.5073 ; 1.6076 ; 1.7581 ; 1.9838 ; 2.2338 ; 2.4838 ; 2.5]

Force (kips): [-2.36769 ; 7.09551 ; 13.9526 ; 21.9708 ; 30.5841 ; 32.9559 ; 35.9717 ; 38.4843 ; 40.4999 ; 42.5442 ; 44.6682 ; 46.8877 ; 49.2095 ; 51.316 ; 53.5217 ; 55.3037 ; 55.2569 ; 55.2698 ; 55.5371 ; 55.495 ; 55.4243 ; 55.5397 ; 55.7622 ; 56.0907 ; 56.5157 ; 56.6685 ; 56.9063 ; 57.2231 ; 57.7131 ; 58.4339 ; 58.7198 ; 59.1555 ; 59.7708 ; 60.6482 ; 61.9214 ; 62.3823 ; 63.0554 ; 63.6931 ; 64.3272 ; 65.2858 ; 66.722 ; 67.2423 ; 68.0106 ; 69.1293 ; 70.6904 ; 71.247 ; 72.0385 ; 73.1699 ; 74.737 ; 75.2977 ; 76.1008 ; 77.2475 ; 78.8317 ; 81.0016 ; 81.7505 ; 82.8112 ; 84.2799 ; 84.7968 ; 85.5295 ; 86.5692 ; 86.9504 ; 87.5088 ; 88.2869 ; 89.3665 ; 90.8206 ; 91.332 ; 92.0649 ; 93.0857 ; 94.432 ; 96.1473 ; 97.6534 ; 98.8703 ; 98.9431]

Bolt 1 - Tensile Force (kips): [63.1232 ; 62.7852 ; 62.5219 ; 62.1867 ; 61.7871 ; 61.6656 ; 61.4935 ; 61.3307 ; 61.1365 ; 60.5899 ; 59.4676 ; 57.4213 ; 54.8582 ; 51.9882 ; 48.2892 ; 42.9055 ; 42.8266 ; 42.6429 ; 42.1965 ; 42.1079 ; 42.0551 ; 42.0324 ; 41.9898 ; 41.9458 ; 41.9066 ; 41.894 ; 41.8515 ; 41.8088 ; 41.7553 ; 41.6435 ; 41.6083 ; 41.5453 ; 41.4133 ; 41.2421 ; 41.05 ; 40.9626 ; 40.7893 ; 40.5961 ; 40.4136 ; 40.0196 ; 39.3419 ; 39.0338 ; 38.5879 ; 37.977 ; 37.2327 ; 36.9659 ; 36.6033 ; 36.205 ; 35.7228 ; 35.5487 ; 35.3409 ; 35.1457 ; 34.8885 ; 34.2216 ; 33.9987 ; 33.6506 ; 33.3211 ; 33.2329 ; 33.1297 ; 33.0698 ; 33.0498 ; 33.0246 ; 33.034 ; 33.0748 ; 33.0856 ; 33.0327 ; 32.9723 ; 32.8301 ; 32.6229 ; 32.2818 ; 32.0454 ; 31.9423 ; 31.937]

Bolt 1 - Shear Force (kips): [0.117189 ; 0.300408 ; 0.588919 ; 0.94353 ; 1.3546 ; 1.47686 ; 1.64753 ; 1.80722 ; 2.00762 ; 2.61521 ; 3.7374 ; 5.55947 ; 7.61548 ; 9.66043 ; 11.9323 ; 14.133 ; 14.1264 ; 14.2431 ; 14.4255 ; 14.4215 ; 14.4109 ; 14.5229 ; 14.7874 ; 15.0524 ; 15.251 ; 15.3087 ; 15.5416 ; 15.7375 ; 16.0244 ; 16.7362 ; 17.0968 ; 17.7901 ; 18.6126 ; 19.6575 ; 20.8861 ; 21.3101 ; 22.109 ; 22.8473 ; 23.4527 ; 24.3905 ; 25.8115 ; 26.4365 ; 27.3243 ; 28.5041 ; 29.9997 ; 30.5923 ; 31.4409 ; 32.5873 ; 34.2188 ; 34.8076 ; 35.6094 ; 36.6032 ; 37.9922 ; 40.2954 ; 41.0938 ; 42.2948 ; 44.0097 ; 44.5643 ; 45.3488 ; 46.3039 ; 46.611 ; 47.0192 ; 47.5678 ; 48.2888 ; 49.3977 ; 49.8201 ; 50.3731 ; 51.2201 ; 52.4133 ; 53.8252 ; 54.9356 ; 55.8137 ; 55.8773]

Bolt 2 - Tensile Force (kips): [63.1228 ; 62.6723 ; 62.2875 ; 61.7825 ; 61.1852 ; 60.9982 ; 60.7378 ; 60.5093 ; 60.2551 ; 59.7032 ; 58.6171 ; 56.6796 ; 54.4829 ; 52.787 ; 51.2969 ; 46.6682 ; 46.1796 ; 45.894 ; 45.6334 ; 45.4182 ; 45.2764 ; 45.2966 ; 45.464 ; 45.6366 ; 45.8477 ; 45.9171 ; 46.0328 ; 46.1813 ; 46.3849 ; 46.6935 ; 46.8051 ; 46.9744 ; 47.1829 ; 47.4745 ; 47.6764 ; 47.7069 ; 47.7629 ; 47.8144 ; 47.8685 ; 47.9834 ; 48.1631 ; 48.153 ; 48.1438 ; 48.1477 ; 48.3047 ; 48.3464 ; 48.4102 ; 48.5546 ; 48.8376 ; 48.967 ; 49.213 ; 49.695 ; 50.4697 ; 51.5865 ; 51.9381 ; 52.4653 ; 53.234 ; 53.5357 ; 53.9895 ; 54.6105 ; 54.8287 ; 55.2045 ; 55.798 ; 56.7094 ; 58.1052 ; 58.6297 ; 59.3666 ; 60.3926 ; 61.7471 ; 63.6136 ; 65.4212 ; 66.958 ; 67.0527]

Bolt 2 - Shear Force (kips): [0.0796988 ; 0.436479 ; 0.811005 ; 1.27222 ; 1.80047 ; 1.95789 ; 2.17984 ; 2.3838 ; 2.63012 ; 3.24589 ; 4.35555 ; 6.15391 ; 8.13693 ; 9.97573 ; 11.8861 ; 14.9037 ; 15.0482 ; 15.1036 ; 15.4429 ; 15.5013 ; 15.5008 ; 15.5114 ; 15.5604 ; 15.8336 ; 16.1912 ; 16.3303 ; 16.4448 ; 16.6007 ; 16.9612 ; 17.2701 ; 17.4168 ; 17.5589 ; 17.8611 ; 18.3457 ; 19.444 ; 19.8821 ; 20.364 ; 20.7693 ; 21.1467 ; 21.577 ; 22.3132 ; 22.6615 ; 23.1607 ; 23.9527 ; 24.9348 ; 25.3022 ; 25.8429 ; 26.5608 ; 27.5066 ; 27.8393 ; 28.2962 ; 28.9909 ; 29.9749 ; 31.1822 ; 31.6371 ; 32.227 ; 32.9988 ; 33.2777 ; 33.6821 ; 34.3314 ; 34.6001 ; 34.9825 ; 35.5062 ; 36.2165 ; 37.0833 ; 37.3738 ; 37.8198 ; 38.4409 ; 39.2705 ; 40.1713 ; 40.9926 ; 41.6256 ; 41.6626]

Bolt 3 - Tensile Force (kips): [65 ; 64.8976 ; 64.9608 ; 65.2545 ; 66.0409 ; 66.441 ; 67.0573 ; 67.6107 ; 68.0936 ; 68.6286 ; 69.2732 ; 70.0623 ; 71.2037 ; 72.8078 ; 74.9167 ; 76.8761 ; 76.8737 ; 76.8982 ; 77.1596 ; 77.1324 ; 77.0757 ; 77.1701 ; 77.3665 ; 77.661 ; 78.0713 ; 78.2217 ; 78.4508 ; 78.7734 ; 79.2617 ; 79.9874 ; 80.2685 ; 80.6967 ; 81.327 ; 82.2562 ; 83.6305 ; 84.1326 ; 84.8789 ; 85.606 ; 86.3139 ; 87.2791 ; 88.5982 ; 89.0314 ; 89.7125 ; 90.7567 ; 92.3789 ; 92.9777 ; 93.8316 ; 95.137 ; 97.0552 ; 97.768 ; 98.7976 ; 100.27 ; 102.337 ; 105.157 ; 106.074 ; 107.341 ; 109.021 ; 109.604 ; 110.4 ; 111.457 ; 111.867 ; 112.507 ; 113.354 ; 114.52 ; 116.054 ; 116.53 ; 117.282 ; 118.197 ; 119.448 ; 121.086 ; 122.201 ; 122.85 ; 122.896]

Bolt 3 - Shear Force (kips): [0.0177873 ; 0.0974648 ; 0.21352 ; 0.373134 ; 0.59672 ; 0.675243 ; 0.783743 ; 0.884001 ; 0.975204 ; 1.08777 ; 1.22136 ; 1.38618 ; 1.64984 ; 2.02021 ; 2.538 ; 2.95597 ; 2.95634 ; 2.96024 ; 3.01219 ; 3.00942 ; 3.00391 ; 3.01499 ; 3.05052 ; 3.10158 ; 3.17717 ; 3.20474 ; 3.24396 ; 3.30382 ; 3.38862 ; 3.50456 ; 3.5433 ; 3.59725 ; 3.67712 ; 3.79464 ; 3.96537 ; 4.02841 ; 4.11936 ; 4.20764 ; 4.29726 ; 4.43566 ; 4.60911 ; 4.65823 ; 4.73155 ; 5.56232 ; 9.09892 ; 10.1363 ; 11.3945 ; 13.2971 ; 15.4377 ; 16.2234 ; 17.1105 ; 18.1535 ; 19.2625 ; 20.351 ; 20.6602 ; 21.0099 ; 21.4035 ; 21.576 ; 21.8136 ; 21.654 ; 21.7132 ; 21.8946 ; 22.0988 ; 22.3893 ; 22.5492 ; 22.4551 ; 22.406 ; 22.3343 ; 22.373 ; 22.5322 ; 22.4584 ; 22.2807 ; 22.2858]

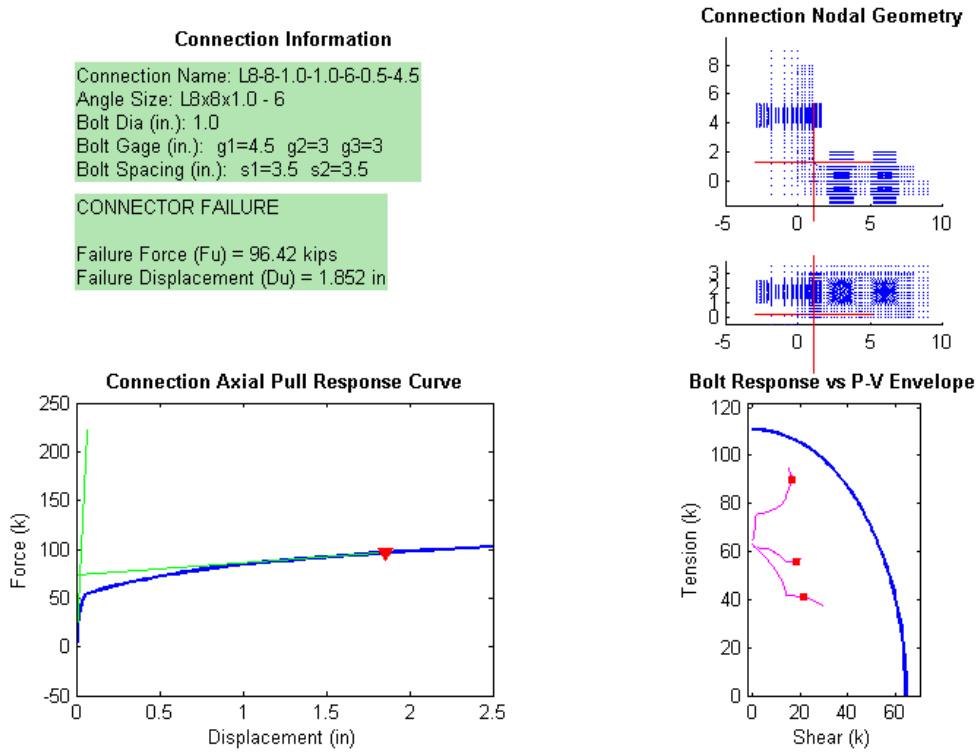


Figure B.398 Connection L8_8_1.0_1.0_6_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_1.0_6_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.3158e+003

Plastic Stiffness (k/in): 12.2167

Displacement (in): [1.0133e-035 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.34102 ; 0.39447 ; 0.40784 ; 0.4212 ; 0.44124 ; 0.47131 ; 0.51641 ; 0.58406 ; 0.60943 ; 0.64749 ; 0.66176 ; 0.68317 ; 0.71527 ; 0.76344 ; 0.83568 ; 0.94405 ; 1.0253 ; 1.1472 ; 1.193 ; 1.2615 ; 1.3644 ; 1.403 ; 1.4608 ; 1.5476 ; 1.5802 ; 1.629 ; 1.7022 ; 1.8121 ; 1.8533 ; 1.8687 ; 1.8919 ; 1.9266 ; 1.9397 ; 1.9592 ; 1.9885 ; 2.0325 ; 2.0985 ; 2.1975 ; 2.3459 ; 2.5]

Force (kips): [-2.46582 ; 1.60111 ; 4.01028 ; 7.09513 ; 10.9857 ; 15.6942 ; 20.4695 ; 21.8293 ; 23.4482 ; 25.2154 ; 26.6757 ; 27.5249 ; 28.2412 ; 29.3294 ; 30.808 ; 32.6115 ; 33.2281 ; 34.1534 ; 34.3926 ; 34.6168 ; 34.9784 ; 35.4887 ; 36.1916 ; 37.1607 ; 37.5284 ; 38.0835 ; 38.2956 ; 38.6003 ; 39.04 ; 39.6378 ; 40.4885 ; 41.5905 ; 42.3311 ; 43.335 ; 43.691 ; 44.2039 ; 44.9323 ; 45.1903 ; 45.6261 ; 46.2343 ; 46.4629 ; 46.8094 ; 47.3083 ; 47.9793 ; 48.2165 ; 48.3046 ; 48.4344 ; 48.624 ; 48.6979 ; 48.809 ; 48.9665 ; 49.1941 ; 49.5203 ; 49.9991 ; 50.6535 ; 51.2641]

Bolt 1 - Tensile Force (kips): [63.1183 ; 62.9754 ; 62.8852 ; 62.7631 ; 62.5987 ; 62.3771 ; 62.1166 ; 62.033 ; 61.9273 ; 61.8001 ; 61.6846 ; 61.61 ; 61.5456 ; 61.4072 ; 60.6969 ; 58.7552 ; 57.998 ; 56.8232 ; 56.5109 ; 56.2021 ; 55.7058 ; 54.9469 ; 53.7948 ; 52.0298 ; 51.3385 ; 50.2591 ; 49.8377 ; 49.2057 ; 48.2565 ; 46.8461 ; 44.838 ; 43.138 ; 42.9044 ; 42.7054 ; 42.5646 ; 42.2899 ; 42.1025 ; 42.0374 ; 41.8957 ; 41.7084 ; 41.6137 ; 41.4795 ; 41.2732 ; 41.0104 ; 40.9024 ; 40.8505 ; 40.7729 ; 40.6546 ; 40.606 ; 40.5322 ; 40.4363 ; 40.2666 ; 40.0474 ; 39.4183 ; 38.5064 ; 37.735]

Bolt 1 - Shear Force (kips): [0.120055 ; 0.0977617 ; 0.187397 ; 0.321073 ; 0.502996 ; 0.743667 ; 1.02168 ; 1.11015 ; 1.22161 ; 1.35591 ; 1.47944 ; 1.56361 ; 1.64035 ; 1.79804 ; 2.60989 ; 4.50793 ; 5.1809 ; 6.18179 ; 6.43897 ; 6.68988 ; 7.08575 ; 7.67336 ; 8.52766 ; 9.76396 ; 10.2241 ; 10.9118 ; 11.169 ; 11.5426 ; 12.0736 ; 12.7874 ; 13.6251 ; 14.1478 ; 14.1396 ; 14.0898 ; 14.1571 ; 14.2113 ; 14.1544 ; 14.126 ; 14.7799 ; 15.6279 ; 16.2073 ; 17.143 ; 18.7762 ; 20.5959 ; 21.2567 ; 21.5546 ; 21.9795 ; 22.5659 ; 22.7759 ; 23.0695 ; 23.4408 ; 23.9679 ; 24.5826 ; 25.9982 ; 27.8407 ; 29.3743]

Bolt 2 - Tensile Force (kips): [63.1051 ; 62.929 ; 62.8052 ; 62.6301 ; 62.4002 ; 62.1202 ; 61.8253 ; 61.741 ; 61.6521 ; 61.5724 ; 61.537 ; 61.5304 ; 61.5448 ; 61.6074 ; 61.464 ; 61.2719 ; 61.2259 ; 61.1129 ; 61.0644 ; 61.0116 ; 60.9038 ; 60.7161 ; 60.425 ; 59.9144 ; 59.6835 ; 59.3079 ; 59.1605 ; 58.9361 ; 58.5879 ; 58.0756 ; 57.3171 ; 56.3587 ; 55.8739 ; 55.51 ; 55.4722 ; 55.4666 ; 55.548 ; 55.5958 ; 55.5533 ; 55.5857 ; 55.632 ; 55.708 ; 55.7461 ; 55.9167 ; 55.9522 ; 55.9621 ; 55.9855 ; 56.033 ; 56.0536 ; 56.0877 ; 56.1523 ; 56.2448 ; 56.3556 ; 56.4762 ; 56.8001 ; 57.2053]

Bolt 2 - Shear Force (kips): [0.0848561 ; 0.159158 ; 0.304152 ; 0.498715 ; 0.756513 ; 1.0877 ; 1.45704 ; 1.57212 ; 1.71474 ; 1.8871 ; 2.04295 ; 2.14776 ; 2.24533 ; 2.45631 ; 3.31318 ; 5.02137 ; 5.59506 ; 6.41465 ; 6.622 ; 6.82263 ; 7.13744 ; 7.60144 ; 8.2609 ; 9.20457 ; 9.55533 ; 10.0784 ; 10.2748 ; 10.5633 ; 10.9862 ; 11.5812 ; 12.4364 ; 13.5465 ; 14.239 ; 15.0917 ; 15.3582 ; 15.7312 ; 16.2325 ; 16.4066 ; 16.8041 ; 17.3379 ; 17.443 ; 17.5626 ; 17.7531 ; 18.0936 ; 18.2724 ; 18.3198 ; 18.3812 ; 18.464 ; 18.4937 ; 18.5382 ; 18.6054 ; 18.794 ; 19.2107 ; 19.5802 ; 19.8456 ; 20.0064]

Bolt 3 - Tensile Force (kips): [65 ; 64.8551 ; 64.7556 ; 64.7143 ; 64.8333 ; 65.0714 ; 65.4825 ; 65.7237 ; 66.1485 ; 66.7228 ; 67.2907 ; 67.8537 ; 68.5349 ; 69.5426 ; 70.9882 ; 73.0778 ; 73.849 ; 74.9454 ; 75.1417 ; 75.3229 ; 75.5904 ; 75.981 ; 76.5437 ; 77.4133 ; 77.7371 ; 78.1507 ; 78.2681 ; 78.438 ; 78.7232 ; 79.0752 ; 79.7271 ; 80.7036 ; 81.4243 ; 82.5093 ; 82.9433 ; 83.5846 ; 84.6887 ; 85.0773 ; 85.7507 ; 86.7253 ; 87.0779 ; 87.6405 ; 88.4206 ; 89.4532 ; 89.8233 ; 89.9603 ; 90.161 ; 90.46 ; 90.6049 ; 90.8236 ; 91.1117 ; 91.4976 ; 92.0201 ; 92.7242 ; 93.8708 ; 94.8471]

Bolt 3 - Shear Force (kips): [0.0570715 ; 0.0139167 ; 0.0581539 ; 0.129057 ; 0.236603 ; 0.379729 ; 0.558739 ; 0.617914 ; 0.697154 ; 0.796456 ; 0.911077 ; 0.966708 ; 0.99223 ; 1.06187 ; 1.18112 ; 1.36958 ; 1.44143 ; 1.62828 ; 1.70435 ; 1.76631 ; 2.52662 ; 4.56169 ; 6.79034 ; 9.46172 ; 10.1125 ; 10.5188 ; 10.6972 ; 10.9599 ; 11.2518 ; 11.8789 ; 12.4287 ; 12.8752 ; 13.3589 ; 13.9055 ; 14.089 ; 14.4258 ; 14.7979 ; 14.9425 ; 15.1259 ; 15.4617 ; 15.6062 ; 15.8208 ; 16.0961 ; 16.4415 ; 16.5406 ; 16.5737 ; 16.6309 ; 16.7275 ; 16.719 ; 16.6549 ; 16.5647 ; 16.4315 ; 16.2528 ; 15.9089 ; 15.5 ; 15.2012]

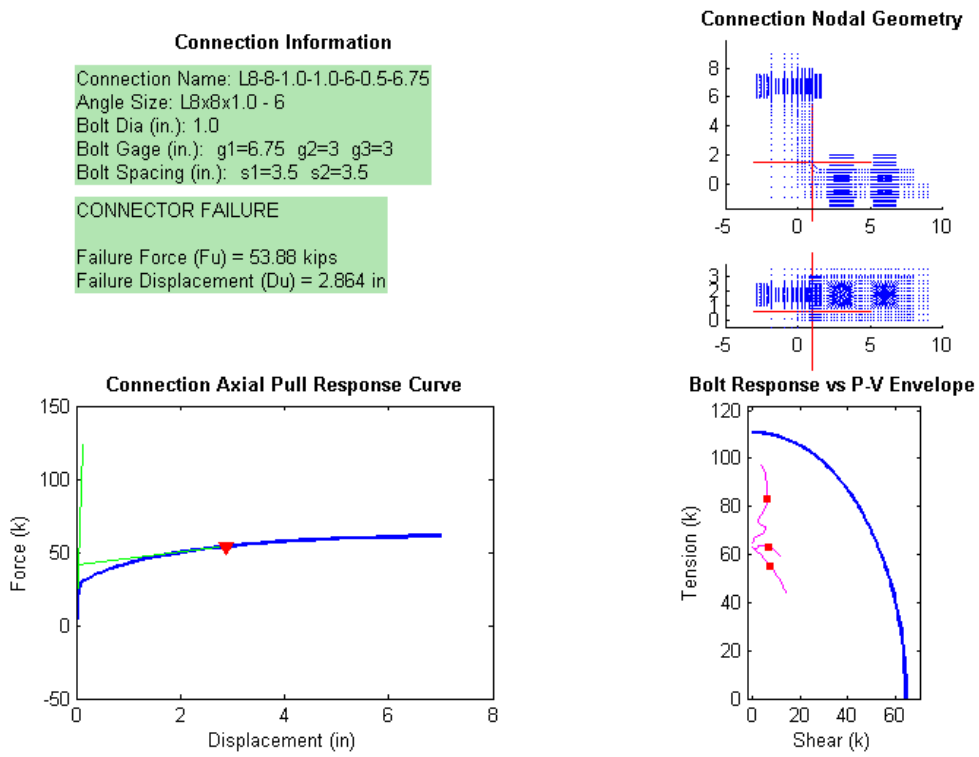


Figure B.399 Connection L8_8_1.0_1.0_6_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_1.0_6_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.0892e+003

Plastic Stiffness (k/in): 4.2754

Displacement (in): [9.5919e-036 ; 0.0054687 ; 0.010937 ; 0.019141 ; 0.031445 ; 0.049902 ; 0.077588 ; 0.11912 ; 0.13469 ; 0.15805 ; 0.19309 ; 0.24565 ; 0.32449 ; 0.44275 ; 0.48709 ; 0.55361 ; 0.65339 ; 0.80306 ; 0.85919 ; 0.88024 ; 0.91181 ; 0.92365 ; 0.94141 ; 0.94807 ; 0.95806 ; 0.97304 ; 0.99552 ; 1.0292 ; 1.0798 ; 1.1557 ; 1.1841 ; 1.2268 ; 1.2908 ; 1.3868 ; 1.5308 ; 1.7468 ; 2.0708 ; 2.5568 ; 2.7319 ; 2.9943 ; 3.3881 ; 3.9787 ; 4.1537 ; 4.4162 ; 4.81 ; 4.9576 ; 5.1791 ; 5.5113 ; 6.0097 ; 6.7097 ; 7]

Force (kips): [-2.38683 ; 1.66988 ; 3.56999 ; 6.063 ; 9.1564 ; 12.2044 ; 14.3351 ; 15.0444 ; 15.1731 ; 15.338 ; 15.6221 ; 16.1035 ; 16.8159 ; 17.7783 ; 18.1505 ; 18.6297 ; 19.2607 ; 20.0948 ; 20.3807 ; 20.4856 ; 20.6428 ; 20.7141 ; 20.8146 ; 20.8603 ; 20.9257 ; 21.0183 ; 21.1505 ; 21.3426 ; 21.608 ; 21.9751 ; 22.1068 ; 22.299 ; 22.5694 ; 22.9466 ; 23.4666 ; 24.1915 ; 25.1386 ; 26.3095 ; 26.6836 ; 27.1906 ; 27.854 ; 28.6612 ; 28.8635 ; 29.1338 ; 29.4784 ; 29.5956 ; 29.757 ; 29.9711 ; 30.2254 ; 30.5006 ; 30.5978]

Bolt 1 - Tensile Force (kips): [63.1188 ; 62.9744 ; 62.8975 ; 62.7888 ; 62.6382 ; 62.4615 ; 62.3142 ; 62.2639 ; 62.2561 ; 62.2466 ; 62.2288 ; 62.1964 ; 62.1461 ; 62.0693 ; 62.0349 ; 61.9854 ; 61.9088 ; 61.8007 ; 61.7621 ; 61.7475 ; 61.7258 ; 61.7165 ; 61.7033 ; 61.6976 ; 61.6892 ; 61.6774 ; 61.6604 ; 61.6365 ; 61.6004 ; 61.5429 ; 61.5187 ; 61.4781 ; 61.4046 ; 61.2215 ; 60.6934 ; 59.8066 ; 58.4175 ; 56.4176 ; 55.7121 ; 54.6762 ; 53.1695 ; 51.0644 ; 50.4752 ; 49.6344 ; 48.4839 ; 48.0698 ; 47.4713 ; 46.6498 ; 45.6553 ; 44.6518 ; 44.3292]

Bolt 1 - Shear Force (kips): [0.118527 ; 0.103612 ; 0.180723 ; 0.298812 ; 0.465483 ; 0.660738 ; 0.825359 ; 0.887503 ; 0.898793 ; 0.912872 ; 0.937818 ; 0.981255 ; 1.04799 ; 1.14963 ; 1.19379 ; 1.25768 ; 1.35573 ; 1.49304 ; 1.54128 ; 1.55933 ; 1.58596 ; 1.59706 ; 1.61296 ; 1.6197 ; 1.62958 ; 1.64359 ; 1.66378 ; 1.69232 ; 1.73543 ; 1.80425 ; 1.83309 ; 1.8812 ; 1.96796 ; 2.18333 ; 2.77917 ; 3.68141 ; 4.96611 ; 6.68376 ; 7.2541 ; 8.05969 ; 9.17196 ; 10.6141 ; 10.992 ; 11.5088 ; 12.1714 ; 12.3955 ; 12.7056 ; 13.1 ; 13.5297 ; 13.9144 ; 14.0265]

Bolt 2 - Tensile Force (kips): [63.108 ; 62.9329 ; 62.8229 ; 62.6746 ; 62.502 ; 62.3298 ; 62.2266 ; 62.1966 ; 62.1929 ; 62.1883 ; 62.1818 ; 62.1739 ; 62.1695 ; 62.189 ; 62.1998 ; 62.2279 ; 62.2953 ; 62.4394 ; 62.5039 ; 62.532 ; 62.5751 ; 62.5916 ; 62.6179 ; 62.628 ; 62.6439 ; 62.6702 ; 62.7123 ; 62.7915 ; 62.914 ; 63.0975 ; 63.1682 ; 63.2705 ; 63.4132 ; 63.5906 ; 63.6765 ; 63.7633 ; 63.7321 ; 63.479 ; 63.3391 ; 63.0842 ; 62.6556 ; 62.0574 ; 61.8749 ; 61.612 ; 61.2308 ; 61.0872 ; 60.8774 ; 60.5736 ; 60.1642 ; 59.5689 ; 59.3117]

Bolt 2 - Shear Force (kips): [0.0835186 ; 0.178301 ; 0.313277 ; 0.500562 ; 0.748098 ; 1.01841 ; 1.22791 ; 1.29758 ; 1.30936 ; 1.32475 ; 1.35418 ; 1.40689 ; 1.4884 ; 1.61218 ; 1.66603 ; 1.74569 ; 1.86864 ; 2.03992 ; 2.09927 ; 2.12113 ; 2.15378 ; 2.16734 ; 2.18677 ; 2.19485 ; 2.20664 ; 2.22323 ; 2.2471 ; 2.27981 ; 2.32868 ; 2.40561 ; 2.43655 ; 2.48729 ; 2.57568 ; 2.77126 ; 3.2807 ; 4.03198 ; 5.06032 ; 6.35661 ; 6.77745 ; 7.36417 ; 8.1406 ; 9.10342 ; 9.35715 ; 9.70192 ; 10.1476 ; 10.3029 ; 10.5214 ; 10.8228 ; 11.1992 ; 11.6349 ; 11.7991]

Bolt 3 - Tensile Force (kips): [65 ; 64.7865 ; 64.6677 ; 64.6499 ; 64.7292 ; 64.7219 ; 64.8294 ; 64.8883 ; 64.8934 ; 64.9125 ; 65.0015 ; 65.2318 ; 65.7264 ; 66.7639 ; 67.2408 ; 67.8268 ; 68.6814 ; 70.1023 ; 70.5977 ; 70.7831 ; 71.0663 ; 71.154 ; 71.2779 ; 71.3362 ; 71.4145 ; 71.5187 ; 71.6653 ; 71.9233 ; 72.284 ; 72.7345 ; 72.8774 ; 73.1031 ; 73.4661 ; 74.0481 ; 74.9399 ; 76.3105 ; 78.3378 ; 81.1919 ; 82.2917 ; 83.868 ; 85.9896 ; 88.6696 ; 89.3839 ; 90.4138 ; 91.8598 ; 92.418 ; 93.2053 ; 94.2366 ; 95.4477 ; 96.8885 ; 97.4527]

Bolt 3 - Shear Force (kips): [0.051641 ; 0.025573 ; 0.071308 ; 0.1494 ; 0.25873 ; 0.35523 ; 0.41638 ; 0.45481 ; 0.46758 ; 0.4889 ; 0.53245 ; 0.61291 ; 0.73997 ; 0.97072 ; 2.1829 ; 3.1611 ; 4.1874 ; 5.3633 ; 5.6857 ; 5.7951 ; 5.8947 ; 5.7505 ; 5.6042 ; 5.4845 ; 5.3022 ; 5.018 ; 4.5872 ; 4.1434 ; 3.6575 ; 2.9357 ; 2.7105 ; 2.5219 ; 2.4332 ; 2.4123 ; 2.6041 ; 3.5836 ; 4.9776 ; 6.4198 ; 6.3744 ; 6.2919 ; 6.1653 ; 6.0826 ; 6.0234 ; 5.9894 ; 5.8696 ; 5.7721 ; 5.6602 ; 5.4092 ; 5.0147 ; 4.1529 ; 3.6386]

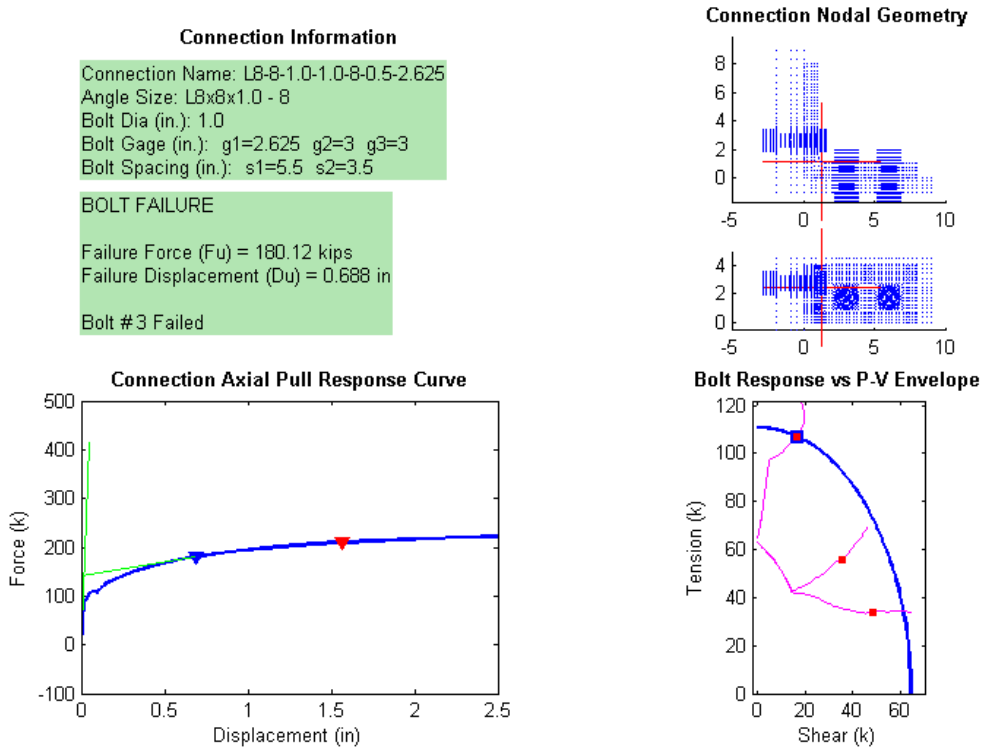


Figure B.400 Connection L8_8_1.0_1.0_8_0.5_2.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_1.0_8_0.5_2.625 Analysis Response Variables.
Initial Stiffness (k/in): 8.2592e+003

Plastic Stiffness (k/in): 57.3375

Displacement (in): [8.0054e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012329 ; 0.013428 ; 0.015076 ; 0.017548 ; 0.021256 ; 0.026817 ; 0.03516 ; 0.047674 ; 0.066445 ; 0.073484 ; 0.084043 ; 0.088003 ; 0.089488 ; 0.091715 ; 0.095056 ; 0.10007 ; 0.10195 ; 0.10477 ; 0.10899 ; 0.11058 ; 0.11296 ; 0.11653 ; 0.12188 ; 0.1299 ; 0.14194 ; 0.16001 ; 0.16678 ; 0.16932 ; 0.17313 ; 0.17884 ; 0.18741 ; 0.20027 ; 0.20509 ; 0.21233 ; 0.22318 ; 0.23945 ; 0.26386 ; 0.27301 ; 0.28674 ; 0.30734 ; 0.31506 ; 0.32665 ; 0.34403 ; 0.35054 ; 0.36032 ; 0.37498 ; 0.39697 ; 0.42996 ; 0.44233 ; 0.46089 ; 0.48873 ; 0.53048 ; 0.54614 ; 0.56963 ; 0.60486 ; 0.6577 ; 0.67752 ; 0.70724 ; 0.75183 ; 0.76855 ; 0.79363 ; 0.83125 ; 0.88768 ; 0.97233 ; 1.0993 ; 1.2898 ; 1.5398 ; 1.7898 ; 1.8523 ; 1.946 ; 2.0866 ; 2.2976 ; 2.5]

Force (kips): [-1.99031 ; 7.21246 ; 14.141 ; 22.3895 ; 31.7211 ; 33.5316 ; 35.197 ; 37.4271 ; 40.327 ; 43.056 ; 45.5557 ; 48.437 ; 51.8997 ; 54.87 ; 54.8779 ; 54.7498 ; 54.7816 ; 54.9907 ; 55.0498 ; 54.9812 ; 54.9032 ; 54.8796 ; 55.1013 ; 56.1803 ; 56.4816 ; 56.9311 ; 57.5202 ; 58.4563 ; 59.7288 ; 61.45 ; 63.5304 ; 64.2118 ; 64.4581 ; 64.8264 ; 65.3482 ; 66.0709 ; 67.1166 ; 67.4998 ; 68.0576 ; 68.9109 ; 70.1099 ; 71.7548 ; 72.3791 ; 73.2563 ; 74.4786 ; 74.9156 ; 75.5429 ; 76.4595 ; 76.8139 ; 77.2981 ; 78.0707 ; 79.2027 ; 80.7501 ; 81.3088 ; 82.1341 ; 83.3391 ; 84.9623 ; 85.5385 ; 86.3716 ; 87.5634 ; 89.1931 ; 89.7612 ; 90.5696 ; 91.6932 ; 92.1173 ; 92.7552 ; 93.6723 ; 94.9474 ; 96.6557 ; 98.8923 ; 101.735 ; 104.602 ; 106.683 ; 107.149 ; 107.799 ; 108.687 ; 109.858 ; 110.829]

Bolt 1 - Tensile Force (kips): [63.1292 ; 62.7842 ; 62.5004 ; 62.1313 ; 61.666 ; 61.5669 ; 61.4729 ; 61.34 ; 61.13 ; 60.5054 ; 58.946 ; 56.1539 ; 51.7453 ; 44.6298 ; 43.0858 ; 42.8958 ; 42.765 ; 42.5203 ; 42.3504 ; 42.2184 ; 42.1389 ; 42.1198 ; 42.0807 ; 42.0029 ; 41.9874 ; 41.9368 ; 41.8909 ; 41.8104 ; 41.724 ; 41.5105 ; 41.2565 ; 41.1252 ; 41.0682 ; 40.9633 ; 40.7999 ; 40.5837 ; 40.1504 ; 39.9855 ; 39.711 ; 39.0641 ; 38.1618 ; 37.2602 ; 36.9471 ; 36.5623 ; 36.0399 ; 35.871 ; 35.6613 ; 35.4165 ; 35.3461 ; 35.2571 ; 35.1278 ; 34.857 ; 34.4041 ; 34.2412 ; 34.0391 ; 33.7924 ; 33.5406 ; 33.5154 ; 33.5239 ; 33.594 ; 33.7848 ; 33.8268 ; 33.9028 ; 34.0506 ; 34.1011 ; 34.1754 ; 34.2692 ; 34.2947 ; 34.1607 ; 34.0335 ; 34.1328 ; 34.346 ; 34.4654 ; 34.4201 ; 34.3328 ; 34.1545 ; 34.0071 ; 33.9786]

Bolt 1 - Shear Force (kips): [0.108624 ; 0.343555 ; 0.666502 ; 1.06974 ; 1.55664 ; 1.65599 ; 1.74929 ; 1.88008 ; 2.08956 ; 2.76535 ; 4.27053 ; 6.6584 ; 9.88968 ; 13.688 ; 14.1587 ; 14.1516 ; 14.2476 ; 14.4112 ; 14.4632 ; 14.4699 ; 14.4584 ; 14.4536 ; 14.687 ; 15.2079 ; 15.2975 ; 15.6152 ; 15.8621 ; 16.5208 ; 17.4422 ; 18.9228 ; 20.6195 ; 21.2786 ; 21.5423 ; 22.0176 ; 22.6483 ; 23.362 ; 24.3567 ; 24.6855 ; 25.2263 ; 26.5261 ; 28.2904 ; 30.1876 ; 30.9873 ; 31.9979 ; 33.4778 ; 34.0324 ; 34.759 ; 35.7121 ; 36.0352 ; 36.4743 ; 37.1092 ; 38.173 ; 39.8767 ; 40.5241 ; 41.4408 ; 42.7059 ; 44.5347 ; 45.1108 ; 45.8289 ; 46.685 ; 47.687 ; 48.0491 ; 48.5664 ; 49.2626 ; 49.5034 ; 49.8848 ; 50.4619 ; 51.4037 ; 52.8124 ; 54.613 ; 56.5581 ; 58.435 ; 60.0034 ; 60.47 ; 61.1308 ; 61.9778 ; 63.0293 ; 63.9301]

Bolt 2 - Tensile Force (kips): [63.1247 ; 62.7303 ; 62.3703 ; 61.8933 ; 61.3103 ; 61.1896 ; 61.0771 ; 60.9167 ; 60.6593 ; 60.0289 ; 58.4765 ; 55.7105 ; 51.4902 ; 45.1663 ; 43.6816 ; 43.3623 ; 43.3207 ; 43.1321 ; 42.88 ; 42.718 ; 42.6167 ; 42.5921 ; 42.6055 ; 42.7723 ; 42.8167 ; 42.8925 ; 42.9829 ; 43.1735 ; 43.5359 ; 44.0035 ; 44.7278 ; 45.0269 ; 45.1379 ; 45.3056 ; 45.5428 ; 45.857 ; 46.2851 ; 46.415 ; 46.6259 ; 46.9851 ; 47.5566 ; 48.3401 ; 48.543 ; 48.8529 ; 49.3763 ; 49.5853 ; 49.9343 ; 50.4838 ; 50.6853 ; 51.0006 ; 51.4417 ; 51.9207 ; 52.637 ; 52.889 ; 53.2771 ; 53.8236 ; 54.5358 ; 54.7269 ; 54.9863 ; 55.3598 ; 55.8102 ; 55.9667 ; 56.2354 ; 56.6592 ; 56.8413 ; 57.1384 ; 57.62 ; 58.323 ; 59.3055 ; 60.4843 ; 62.1863 ; 64.1764 ; 65.7802 ; 66.1325 ; 66.6452 ; 67.3002 ; 68.2371 ; 69.0553]

Bolt 2 - Shear Force (kips): [0.0700112 ; 0.436133 ; 0.815601 ; 1.28727 ; 1.84702 ; 1.96089 ; 2.06734 ; 2.21758 ; 2.45702 ; 3.13187 ; 4.61786 ; 6.97482 ; 10.0899 ; 13.7239 ; 14.2613 ; 14.2986 ; 14.2932 ; 14.4897 ; 14.6399 ; 14.66 ; 14.6495 ; 14.6439 ; 14.6487 ; 15.2184 ; 15.4387 ; 15.5896 ; 15.96 ; 16.2732 ; 16.7596 ; 17.9119 ; 19.7416 ; 20.2157 ; 20.3609 ; 20.5395 ; 20.8018 ; 21.2283 ; 22.0355 ; 22.4009 ; 22.8671 ; 23.3909 ; 24.088 ; 25.1971 ; 25.7097 ; 26.415 ; 27.2263 ; 27.4761 ; 27.8295 ; 28.3242 ; 28.4953 ; 28.7453 ; 29.1712 ; 29.9023 ; 30.7831 ; 31.0599 ; 31.4321 ; 31.928 ; 32.5419 ; 32.8479 ; 33.3247 ; 34.0696 ; 35.2078 ; 35.5827 ; 36.0681 ; 36.6771 ; 36.8936 ; 37.204 ; 37.5991 ; 38.1065 ; 38.7891 ; 39.8243 ; 41.0564 ; 42.5565 ; 43.7215 ; 43.9313 ; 44.2095 ; 44.6129 ; 45.1321 ; 45.5572]

Bolt 3 - Tensile Force (kips): [65 ; 64.89 ; 64.954 ; 65.2505 ; 66.0209 ; 66.296 ; 66.5836 ; 67.0303 ; 67.6354 ; 68.27 ; 68.9045 ; 69.7039 ; 70.888 ; 72.2609 ; 72.2879 ; 72.1865 ; 72.2195 ; 72.3567 ; 72.3905 ; 72.3301 ; 72.2591 ; 72.2373 ; 72.4173 ; 73.0354 ; 73.2213 ; 73.515 ; 73.9291 ; 74.6392 ; 75.7261 ; 77.3036 ; 79.399 ; 80.1213 ; 80.3865 ; 80.7784 ; 81.3389 ; 82.1262 ; 83.2467 ; 83.6537 ; 84.2467 ; 85.1294 ; 86.3793 ; 88.1126 ; 88.7527 ; 89.6615 ; 90.933 ; 91.3828 ; 92.0271 ; 92.9644 ; 93.3074 ; 93.7587 ; 94.4641 ; 95.4471 ; 96.7166 ; 97.1689 ; 97.9035 ; 99.1698 ; 100.959 ; 101.604 ; 102.552 ; 103.983 ; 106.01 ; 106.705 ; 107.696 ; 109.096 ; 109.626 ; 110.463 ; 111.687 ; 113.303 ; 115.173 ; 117.326 ; 119.938 ; 121.991 ; 123.009 ; 123.27 ; 123.603 ; 124.024 ; 124.627 ; 125.197]

Bolt 3 - Shear Force (kips): [0.0286955 ; 0.099556 ; 0.215578 ; 0.374861 ; 0.602746 ; 0.656607 ; 0.708723 ; 0.77976 ; 0.878997 ; 0.990788 ; 1.09868 ; 1.22879 ; 1.41849 ; 1.62345 ; 1.62916 ; 1.61969 ; 1.62256 ; 1.63941 ; 1.64459 ; 1.63978 ; 1.63394 ; 1.63214 ; 1.64939 ; 1.73448 ; 1.7609 ; 1.80079 ; 1.85801 ; 1.95995 ; 2.12226 ; 2.35665 ; 2.65764 ; 2.75521 ; 2.78967 ; 2.83905 ; 2.91231 ; 3.02015 ; 3.17555 ; 3.23247 ; 3.31573 ; 3.43514 ; 3.60853 ; 3.85738 ; 3.94403 ; 4.06797 ; 4.23525 ; 4.29112 ; 4.36909 ; 4.476 ; 4.51803 ; 4.57871 ; 4.66055 ; 4.76195 ; 4.87644 ; 4.93783 ; 6.08775 ; 8.75295 ; 10.7882 ; 11.3465 ; 12.087 ; 13.6266 ; 15.6392 ; 16.2685 ; 16.9838 ; 17.7169 ; 18.0312 ; 18.4892 ; 18.9731 ; 19.4185 ; 19.7694 ; 19.4467 ; 19.1409 ; 18.2653 ; 17.966 ; 17.9293 ; 17.7794 ; 17.5748 ; 17.2811 ; 16.808]

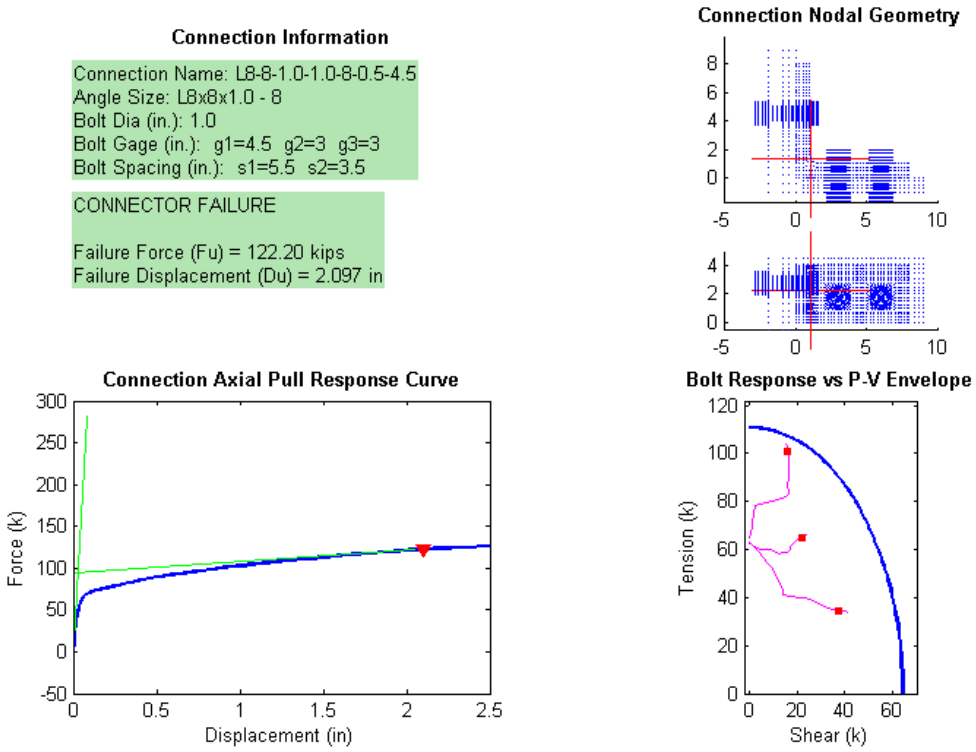


Figure B.401 Connection L8_8_1.0_1.0_8_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_1.0_8_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.3633e+003

Plastic Stiffness (k/in): 13.1338

Displacement (in): [8.3168e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.017822 ; 0.02771 ; 0.031418 ; 0.03698 ; 0.045322 ; 0.057836 ; 0.076608 ; 0.10476 ; 0.147 ; 0.21035 ; 0.30538 ; 0.34102 ; 0.35438 ; 0.35939 ; 0.36691 ; 0.37818 ; 0.3951 ; 0.42047 ; 0.45852 ; 0.5156 ; 0.60123 ; 0.63333 ; 0.6815 ; 0.69956 ; 0.72665 ; 0.76729 ; 0.82824 ; 0.91968 ; 0.95396 ; 1.0054 ; 1.0825 ; 1.1115 ; 1.1549 ; 1.1711 ; 1.1955 ; 1.2322 ; 1.2459 ; 1.2665 ; 1.2742 ; 1.2858 ; 1.3032 ; 1.3293 ; 1.3684 ; 1.427 ; 1.515 ; 1.6469 ; 1.6964 ; 1.7707 ; 1.882 ; 2.049 ; 2.1115 ; 2.2053 ; 2.3459 ; 2.5]

Force (kips): [-2.06983 ; 1.85489 ; 4.49921 ; 7.90249 ; 12.2303 ; 17.5788 ; 23.4849 ; 25.2011 ; 27.4587 ; 30.0296 ; 32.6783 ; 34.4775 ; 35.718 ; 36.8548 ; 38.3656 ; 40.4529 ; 41.2023 ; 41.5012 ; 41.6148 ; 41.7826 ; 42.0436 ; 42.4129 ; 42.9569 ; 43.7019 ; 44.6863 ; 46.0073 ; 46.4691 ; 47.1621 ; 47.4431 ; 47.8382 ; 48.4124 ; 49.2142 ; 50.3068 ; 50.6945 ; 51.246 ; 52.1689 ; 52.5156 ; 53.0356 ; 53.2291 ; 53.5086 ; 53.9193 ; 54.0708 ; 54.294 ; 54.3796 ; 54.5059 ; 54.697 ; 54.9707 ; 55.3628 ; 55.9296 ; 56.7652 ; 57.9175 ; 58.3245 ; 58.9045 ; 59.7112 ; 60.808 ; 61.1883 ; 61.7303 ; 62.4852 ; 63.2507]

Bolt 1 - Tensile Force (kips): [63.1217 ; 62.9755 ; 62.8694 ; 62.7252 ; 62.5268 ; 62.2526 ; 61.9043 ; 61.7904 ; 61.6289 ; 61.4244 ; 61.1591 ; 60.5875 ; 59.8461 ; 58.8794 ; 57.0909 ; 54.1373 ; 52.9419 ; 52.4652 ; 52.2827 ; 52.0068 ; 51.5788 ; 50.9371 ; 49.9625 ; 48.4897 ; 46.3027 ; 43.5459 ; 43.0496 ; 42.7409 ; 42.6429 ; 42.519 ; 42.3515 ; 41.9832 ; 41.5959 ; 41.483 ; 41.3398 ; 40.9851 ; 40.8312 ; 40.5933 ; 40.5059 ; 40.3912 ; 40.219 ; 40.1599 ; 40.0708 ; 40.0305 ; 39.974 ; 39.895 ; 39.7953 ; 39.6381 ; 39.2116 ; 38.1065 ; 36.7706 ; 36.34 ; 35.7062 ; 35.2119 ; 34.8705 ; 34.6986 ; 34.5335 ; 34.2709 ; 34.002]

Bolt 1 - Shear Force (kips): [0.109069 ; 0.120748 ; 0.23692 ; 0.403534 ; 0.62914 ; 0.93145 ; 1.30717 ; 1.42708 ; 1.5936 ; 1.80088 ; 2.06771 ; 2.68733 ; 3.44202 ; 4.3452 ; 5.89242 ; 8.20167 ; 9.05768 ; 9.38811 ; 9.51268 ; 9.69864 ; 9.98298 ; 10.4005 ; 11.0085 ; 11.8575 ; 12.9498 ; 13.9714 ; 14.0814 ; 14.0685 ; 14.0518 ; 14.0216 ; 13.972 ; 14.1174 ; 14.0808 ; 14.0427 ; 13.9979 ; 15.323 ; 16.0733 ; 17.4984 ; 18.0535 ; 18.7532 ; 19.8273 ; 20.2157 ; 20.8017 ; 21.0745 ; 21.4643 ; 22.0022 ; 22.6819 ; 23.5055 ; 24.8575 ; 27.4402 ; 30.3567 ; 31.4212 ; 33.0081 ; 34.7879 ; 36.7604 ; 37.5083 ; 38.4055 ; 39.7794 ; 41.1282]

Bolt 2 - Tensile Force (kips): [63.1048 ; 62.9541 ; 62.8237 ; 62.6358 ; 62.3829 ; 62.0734 ; 61.7191 ; 61.6182 ; 61.4833 ; 61.3414 ; 61.22 ; 60.903 ; 60.5336 ; 60.2354 ; 60.1475 ; 60.1978 ; 60.1334 ; 60.0893 ; 60.0685 ; 60.0356 ; 59.978 ; 59.8794 ; 59.7179 ; 59.4396 ; 58.9375 ; 58.3712 ; 58.3776 ; 58.422 ; 58.4603 ; 58.5361 ; 58.6416 ; 58.7873 ; 58.9353 ; 58.9613 ; 58.9796 ; 59.2859 ; 59.4745 ; 59.8156 ; 59.9249 ; 60.0836 ; 60.3547 ; 60.4635 ; 60.6426 ; 60.7103 ; 60.8107 ; 60.9412 ; 61.126 ; 61.4181 ; 61.8159 ; 62.4044 ; 63.2843 ; 63.5869 ; 63.9694 ; 64.4041 ; 64.9143 ; 65.069 ; 65.3581 ; 65.8281 ; 66.3724]

Bolt 2 - Shear Force (kips): [0.0680161 ; 0.162299 ; 0.320453 ; 0.53223 ; 0.813753 ; 1.17971 ; 1.61659 ; 1.75303 ; 1.94132 ; 2.17307 ; 2.47053 ; 3.07888 ; 3.79308 ; 4.62807 ; 5.96332 ; 7.74556 ; 8.3762 ; 8.61523 ; 8.70494 ; 8.83861 ; 9.04198 ; 9.33964 ; 9.77562 ; 10.3997 ; 11.2791 ; 12.4474 ; 12.8111 ; 13.324 ; 13.5054 ; 13.757 ; 14.1061 ; 14.568 ; 15.2243 ; 15.4599 ; 15.8465 ; 16.5043 ; 16.6501 ; 16.769 ; 16.8427 ; 16.9654 ; 17.1027 ; 17.1498 ; 17.2108 ; 17.2256 ; 17.2484 ; 17.3118 ; 17.4495 ; 17.7386 ; 18.0891 ; 18.5004 ; 19.1635 ; 19.441 ; 19.7905 ; 20.5317 ; 21.6664 ; 21.9973 ; 22.5507 ; 23.1234 ; 23.5908]

Bolt 3 - Tensile Force (kips): [65 ; 64.8529 ; 64.7601 ; 64.7401 ; 64.8932 ; 65.1849 ; 65.865 ; 66.267 ; 66.8825 ; 67.6727 ; 68.628 ; 69.6059 ; 70.7288 ; 72.1025 ; 73.9367 ; 76.64 ; 77.579 ; 77.8579 ; 77.9551 ; 78.0948 ; 78.2979 ; 78.5607 ; 78.9306 ; 79.4942 ; 80.3495 ; 81.6109 ; 82.106 ; 82.9052 ; 83.2024 ; 83.6143 ; 84.2262 ; 85.0426 ; 86.1244 ; 86.5155 ; 87.0639 ; 88.0125 ; 88.3727 ; 89.0102 ; 89.2536 ; 89.6531 ; 90.2868 ; 90.5259 ; 90.8825 ; 91.0166 ; 91.2107 ; 91.5307 ; 91.9837 ; 92.6041 ; 93.4667 ; 94.7365 ; 96.525 ; 97.1199 ; 97.9268 ; 99.025 ; 100.657 ; 101.241 ; 102.023 ; 103.069 ; 104.107]

Bolt 3 - Shear Force (kips): [0.0586871 ; 0.0219474 ; 0.0706561 ; 0.149432 ; 0.267931 ; 0.429626 ; 0.660481 ; 0.739974 ; 0.85311 ; 1.00192 ; 1.16253 ; 1.30339 ; 1.43646 ; 1.60293 ; 1.84582 ; 2.19502 ; 2.32667 ; 2.40595 ; 2.44092 ; 2.50255 ; 2.58 ; 2.7138 ; 4.43588 ; 7.23477 ; 9.87918 ; 13.7345 ; 15.1309 ; 16.5287 ; 16.6303 ; 16.7743 ; 16.6105 ; 16.3436 ; 16.0257 ; 15.9898 ; 15.9852 ; 16.152 ; 16.2178 ; 16.2802 ; 16.295 ; 16.391 ; 16.5148 ; 16.5627 ; 16.6243 ; 16.6442 ; 16.6757 ; 16.6517 ; 16.6287 ; 16.6194 ; 16.6274 ; 16.6599 ; 16.6316 ; 16.5516 ; 16.4434 ; 16.3216 ; 16.1964 ; 16.1593 ; 16.04 ; 15.8271 ; 15.6309]

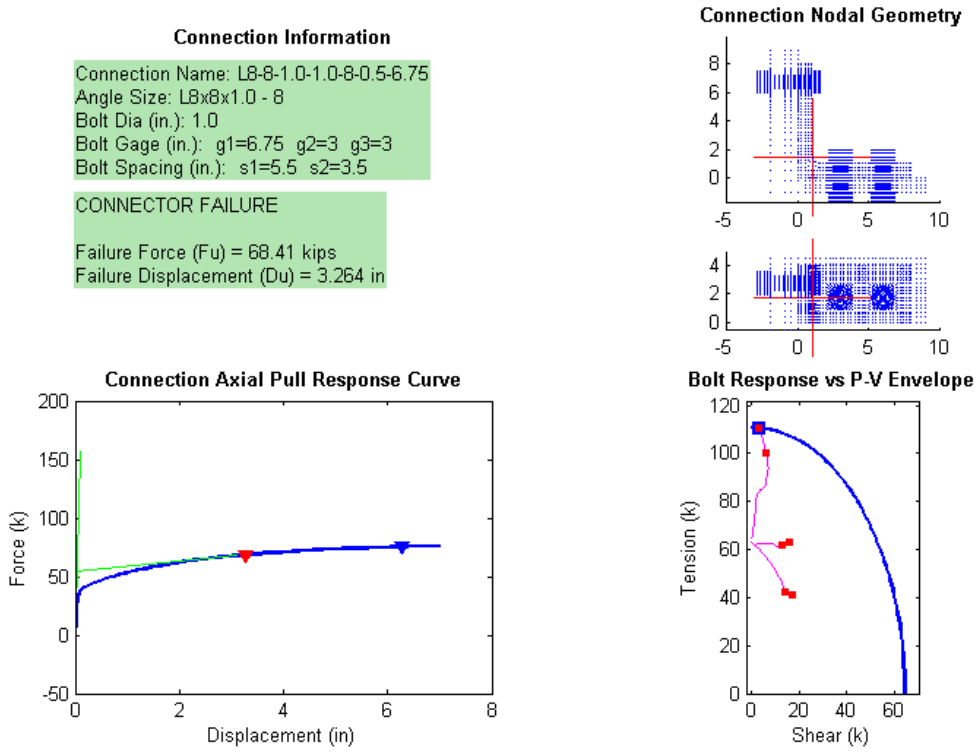


Figure B.402 Connection L8_8_1.0_1.0_8_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_1.0_8_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 1.4692e+003

Plastic Stiffness (k/in): 4.2357

Displacement (in): [8.1392e-036 ; 0.0027344 ; 0.0054687 ; 0.0095703 ; 0.015723 ; 0.024951 ; 0.038794 ; 0.043985 ; 0.051771 ; 0.054691 ; 0.059071 ; 0.065641 ; 0.075496 ; 0.090278 ; 0.11245 ; 0.14571 ; 0.1956 ; 0.27044 ; 0.38269 ; 0.55107 ; 0.61421 ; 0.70893 ; 0.851 ; 0.90427 ; 0.91426 ; 0.92925 ; 0.95172 ; 0.98544 ; 1.036 ; 1.1119 ; 1.1403 ; 1.183 ; 1.247 ; 1.343 ; 1.487 ; 1.541 ; 1.622 ; 1.7435 ; 1.9258 ; 2.1992 ; 2.3017 ; 2.4555 ; 2.6861 ; 2.7727 ; 2.9024 ; 3.097 ; 3.389 ; 3.8269 ; 4.4838 ; 4.6588 ; 4.9213 ; 5.315 ; 5.4627 ; 5.518 ; 5.6011 ; 5.7257 ; 5.9126 ; 6.1929 ; 6.6134 ; 7]

Force (kips): [-2.02133 ; 0.769541 ; 1.99607 ; 3.69251 ; 5.97441 ; 8.91711 ; 12.4909 ; 13.554 ; 14.9165 ; 15.3632 ; 15.9743 ; 16.7759 ; 17.7069 ; 18.6035 ; 19.2546 ; 19.7987 ; 20.3358 ; 21.1509 ; 22.2503 ; 23.6599 ; 24.1282 ; 24.7796 ; 25.6767 ; 26.004 ; 26.0687 ; 26.1614 ; 26.2922 ; 26.494 ; 26.8024 ; 27.2242 ; 27.3834 ; 27.6104 ; 27.9339 ; 28.4049 ; 29.0507 ; 29.2805 ; 29.6134 ; 30.0852 ; 30.7419 ; 31.6255 ; 31.9327 ; 32.3665 ; 32.9667 ; 33.1779 ; 33.4738 ; 33.886 ; 34.4479 ; 35.1921 ; 36.0902 ; 36.2915 ; 36.5713 ; 36.943 ; 37.0661 ; 37.1116 ; 37.178 ; 37.2744 ; 37.4129 ; 37.6056 ; 37.8483 ; 38.0307]

Bolt 1 - Tensile Force (kips): [63.1222 ; 63.0187 ; 62.9681 ; 62.8937 ; 62.7875 ; 62.6381 ; 62.4286 ; 62.3586 ; 62.2634 ; 62.2309 ; 62.185 ; 62.1228 ; 62.0485 ; 61.9746 ; 61.9226 ; 61.881 ; 61.8416 ; 61.7702 ; 61.6563 ; 61.454 ; 61.3655 ; 61.1975 ; 60.401 ; 60.0096 ; 59.9315 ; 59.8145 ; 59.6396 ; 59.3664 ; 58.934 ; 58.289 ; 58.0423 ; 57.672 ; 57.1234 ; 56.3084 ; 55.0799 ; 54.6157 ; 53.9147 ; 52.8507 ; 51.1921 ; 48.6374 ; 47.6752 ; 46.2341 ; 44.3183 ; 43.7637 ; 43.1803 ; 42.8392 ; 42.5235 ; 42.1138 ; 41.671 ; 41.5834 ; 41.4279 ; 41.2061 ; 41.1554 ; 41.1267 ; 41.0902 ; 41.0443 ; 40.9812 ; 40.8967 ; 40.81 ; 40.7598]

Bolt 1 - Shear Force (kips): [0.108249 ; 0.0851456 ; 0.13293 ; 0.214283 ; 0.335031 ; 0.505365 ; 0.738086 ; 0.814972 ; 0.919317 ; 0.95481 ; 1.00455 ; 1.07178 ; 1.15206 ; 1.2324 ; 1.29017 ; 1.33812 ; 1.38598 ; 1.47046 ; 1.60355 ; 1.83029 ; 1.92615 ; 2.10784 ; 2.97104 ; 3.36449 ; 3.44071 ; 3.55375 ; 3.72031 ; 3.97537 ; 4.36887 ; 4.94017 ; 5.15445 ; 5.47223 ; 5.9356 ; 6.60549 ; 7.56993 ; 7.92114 ; 8.43885 ; 9.1987 ; 10.3154 ; 11.8483 ; 12.3561 ; 13.032 ; 13.7556 ; 13.9302 ; 14.0804 ; 14.0817 ; 14.0195 ; 14.0364 ; 13.9518 ; 13.9127 ; 14.2095 ; 15.0529 ; 15.2122 ; 15.3647 ; 15.5549 ; 15.8118 ; 16.1476 ; 16.9538 ; 17.868 ; 18.4302]

Bolt 2 - Tensile Force (kips): [63.1069 ; 63.0048 ; 62.9482 ; 62.8475 ; 62.7076 ; 62.5321 ; 62.3266 ; 62.2663 ; 62.1914 ; 62.1702 ; 62.141 ; 62.1034 ; 62.0615 ; 62.0286 ; 62.0058 ; 61.9884 ; 61.9774 ; 61.9761 ; 62.0021 ; 62.1315 ; 62.2105 ; 62.3347 ; 62.3436 ; 62.3522 ; 62.3538 ; 62.3551 ; 62.3623 ; 62.3726 ; 62.3919 ; 62.4265 ; 62.4364 ; 62.453 ; 62.4706 ; 62.4935 ; 62.4919 ; 62.4781 ; 62.4456 ; 62.3817 ; 62.1913 ; 61.8391 ; 61.7015 ; 61.5133 ; 61.4598 ; 61.5033 ; 61.5843 ; 61.6641 ; 61.7642 ; 61.977 ; 62.3081 ; 62.3837 ; 62.5417 ; 62.7373 ; 62.7861 ; 62.8165 ; 62.8628 ; 62.938 ; 63.0602 ; 63.2481 ; 63.4927 ; 63.6743]

Bolt 2 - Shear Force (kips): [0.0681111 ; 0.104113 ; 0.187275 ; 0.304794 ; 0.469395 ; 0.69293 ; 0.982983 ; 1.07422 ; 1.196 ; 1.23726 ; 1.29506 ; 1.37267 ; 1.46381 ; 1.55313 ; 1.61536 ; 1.6639 ; 1.71359 ; 1.80284 ; 1.93989 ; 2.18432 ; 2.28761 ; 2.47646 ; 3.25212 ; 3.58802 ; 3.65286 ; 3.74896 ; 3.88952 ; 4.10355 ; 4.42869 ; 4.88606 ; 5.05353 ; 5.29861 ; 5.65188 ; 6.15097 ; 6.8489 ; 7.09947 ; 7.4611 ; 7.97775 ; 8.72599 ; 9.76038 ; 10.129 ; 10.661 ; 11.3768 ; 11.6134 ; 11.9458 ; 12.4105 ; 13.0384 ; 13.7954 ; 14.6849 ; 14.888 ; 15.1043 ; 15.4928 ; 15.6683 ; 15.7064 ; 15.7634 ; 15.8399 ; 15.9417 ; 15.9891 ; 16.0328 ; 16.0743]

Bolt 3 - Tensile Force (kips): [65 ; 64.8814 ; 64.7832 ; 64.6951 ; 64.6764 ; 64.8122 ; 65.0376 ; 65.1434 ; 65.3645 ; 65.4889 ; 65.6991 ; 66.0783 ; 66.6508 ; 67.3492 ; 68.1216 ; 68.9841 ; 70.0009 ; 71.4287 ; 73.4524 ; 76.406 ; 77.4815 ; 79.0265 ; 81.1751 ; 81.9664 ; 82.1175 ; 82.3299 ; 82.6251 ; 83.0733 ; 83.6995 ; 84.4801 ; 84.7776 ; 85.1819 ; 85.7588 ; 86.6834 ; 87.9462 ; 88.3572 ; 88.9719 ; 89.8408 ; 91.0645 ; 93.1992 ; 94.0497 ; 95.1982 ; 96.7938 ; 97.4121 ; 98.2301 ; 99.36 ; 100.973 ; 102.9 ; 105.493 ; 106.073 ; 106.906 ; 108.125 ; 108.544 ; 108.7 ; 108.93 ; 109.268 ; 109.755 ; 110.455 ; 111.415 ; 112.231]

Bolt 3 - Shear Force (kips): [0.053519 ; 0.017944 ; 0.036389 ; 0.080694 ; 0.15369 ; 0.26126 ; 0.40728 ; 0.45598 ; 0.51926 ; 0.54227 ; 0.57525 ; 0.62042 ; 0.68194 ; 0.78285 ; 0.89574 ; 1.0181 ; 1.1673 ; 1.3637 ; 1.5814 ; 1.8249 ; 1.8994 ; 1.9885 ; 2.1808 ; 2.4922 ; 2.534 ; 2.5804 ; 2.6342 ; 2.7651 ; 3.0963 ; 3.6987 ; 3.9893 ; 4.4071 ; 5.0873 ; 6.1238 ; 6.4603 ; 6.3937 ; 6.0433 ; 6.2101 ; 6.8155 ; 7.0113 ; 7.1638 ; 6.9574 ; 7.0452 ; 6.8876 ; 6.6477 ; 6.4749 ; 6.2298 ; 5.6977 ; 5.0353 ; 4.8745 ; 4.6068 ; 4.1724 ; 4.0358 ; 3.982 ; 3.9057 ; 3.7983 ; 3.6547 ; 3.4479 ; 3.1921 ; 3.0197]

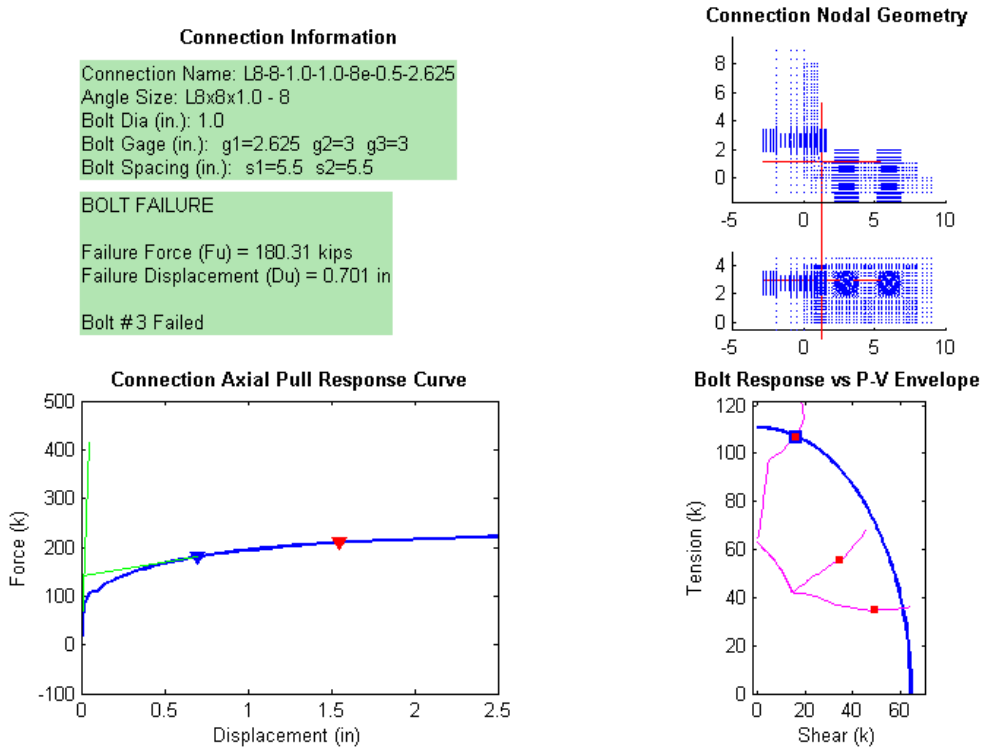


Figure B.403 Connection L8_8_1.0_1.0_8e_0.5_2.625 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_1.0_8e_0.5_2.625 Analysis Response Variables.
Initial Stiffness (k/in): 8.0103e+003

Plastic Stiffness (k/in): 56.0630

Displacement (in): [9.8926e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.012329 ; 0.013428 ; 0.015076 ; 0.017548 ; 0.021256 ; 0.026817 ; 0.03516 ; 0.047674 ; 0.066445 ; 0.073484 ; 0.084043 ; 0.088003 ; 0.089488 ; 0.091715 ; 0.095056 ; 0.10007 ; 0.10195 ; 0.10477 ; 0.10582 ; 0.10741 ; 0.10979 ; 0.11335 ; 0.11871 ; 0.12071 ; 0.12372 ; 0.12824 ; 0.13501 ; 0.14517 ; 0.16041 ; 0.16612 ; 0.17469 ; 0.18755 ; 0.20684 ; 0.21407 ; 0.22492 ; 0.24119 ; 0.2656 ; 0.27476 ; 0.28849 ; 0.29364 ; 0.30136 ; 0.31295 ; 0.33032 ; 0.35639 ; 0.38246 ; 0.40852 ; 0.44763 ; 0.46229 ; 0.48428 ; 0.51727 ; 0.52964 ; 0.5482 ; 0.57604 ; 0.58647 ; 0.60213 ; 0.62562 ; 0.66085 ; 0.67406 ; 0.69388 ; 0.7236 ; 0.76819 ; 0.83507 ; 0.93539 ; 0.97301 ; 1.0294 ; 1.1141 ; 1.2411 ; 1.2887 ; 1.3601 ; 1.4672 ; 1.6279 ; 1.869 ; 2.119 ; 2.369 ; 2.5]

Force (kips): [-2.44586 ; 6.42261 ; 13.1992 ; 21.307 ; 30.587 ; 32.4085 ; 34.079 ; 36.3366 ; 39.2962 ; 42.3773 ; 45.1032 ; 48.0299 ; 51.5643 ; 54.7095 ; 54.8285 ; 54.6986 ; 54.6627 ; 54.7717 ; 54.9321 ; 54.8935 ; 54.8087 ; 54.7807 ; 54.7732 ; 55.1203 ; 55.4809 ; 56.0051 ; 56.8235 ; 57.7543 ; 58.1426 ; 58.6468 ; 59.4322 ; 60.437 ; 61.7062 ; 63.3496 ; 63.9052 ; 64.7219 ; 65.8193 ; 67.3026 ; 67.8755 ; 68.7189 ; 69.9235 ; 71.5691 ; 72.1626 ; 73.0191 ; 73.3374 ; 73.8016 ; 74.4729 ; 75.421 ; 76.8027 ; 78.1474 ; 79.4756 ; 81.2515 ; 81.8933 ; 82.8349 ; 84.1618 ; 84.6369 ; 85.3242 ; 86.2982 ; 86.658 ; 87.1836 ; 87.9437 ; 89.0118 ; 89.3946 ; 89.9501 ; 90.745 ; 91.8668 ; 93.4223 ; 95.6183 ; 96.3904 ; 97.4614 ; 98.9343 ; 100.862 ; 101.529 ; 102.472 ; 103.749 ; 105.31 ; 107.18 ; 108.793 ; 110.14 ; 110.759]

Bolt 1 - Tensile Force (kips): [63.2114 ; 62.8415 ; 62.534 ; 62.1337 ; 61.6335 ; 61.5271 ; 61.4263 ; 61.2832 ; 61.0532 ; 60.4921 ; 59.0373 ; 56.258 ; 51.7794 ; 44.7285 ; 43.1571 ; 42.954 ; 42.9175 ; 42.6296 ; 42.4532 ; 42.3008 ; 42.2073 ; 42.1847 ; 42.165 ; 42.121 ; 42.0779 ; 42.0557 ; 42.0065 ; 41.9443 ; 41.9173 ; 41.882 ; 41.8422 ; 41.707 ; 41.5401 ; 41.3743 ; 41.2809 ; 41.0726 ; 40.7885 ; 40.2547 ; 39.8695 ; 39.3295 ; 38.5863 ; 37.8015 ; 37.5536 ; 37.2744 ; 37.1462 ; 36.9736 ; 36.7596 ; 36.5285 ; 36.3256 ; 36.0979 ; 35.8116 ; 35.3772 ; 35.2397 ; 35.0269 ; 34.8413 ; 34.8069 ; 34.7575 ; 34.7265 ; 34.7249 ; 34.7383 ; 34.789 ; 34.8855 ; 34.9007 ; 34.9279 ; 34.9956 ; 35.0297 ; 35.0727 ; 35.1068 ; 35.0778 ; 35.0496 ; 34.9904 ; 35.0577 ; 35.0743 ; 35.1357 ; 35.2498 ; 35.3707 ; 35.4732 ; 35.5537 ; 35.8224 ; 35.9692]

Bolt 1 - Shear Force (kips): [0.0916378 ; 0.347625 ; 0.680282 ; 1.09868 ; 1.60884 ; 1.7141 ; 1.81271 ; 1.95104 ; 2.17637 ; 2.76688 ; 4.17914 ; 6.5697 ; 9.8683 ; 13.6753 ; 14.1728 ; 14.17 ; 14.168 ; 14.3825 ; 14.4438 ; 14.4596 ; 14.4496 ; 14.4444 ; 14.4576 ; 14.7925 ; 15.1334 ; 15.3168 ; 15.6813 ; 16.1893 ; 16.4703 ; 16.8461 ; 17.5992 ; 18.5231 ; 19.6061 ; 20.8739 ; 21.3668 ; 22.3451 ; 23.4251 ; 24.8139 ; 25.6615 ; 26.8374 ; 28.5256 ; 30.4617 ; 31.2104 ; 32.2578 ; 32.6995 ; 33.3115 ; 34.1433 ; 35.2227 ; 36.5257 ; 37.8548 ; 39.1854 ; 41.1981 ; 41.9151 ; 42.9269 ; 44.2058 ; 44.6775 ; 45.3348 ; 46.2008 ; 46.5003 ; 46.9137 ; 47.4679 ; 48.2351 ; 48.516 ; 48.9283 ; 49.4881 ; 50.2994 ; 51.4677 ; 52.989 ; 53.5781 ; 54.3759 ; 55.5417 ; 56.8708 ; 57.3264 ; 57.8508 ; 58.5086 ; 59.4188 ; 60.707 ; 61.9436 ; 63.0629 ; 63.5754]

Bolt 2 - Tensile Force (kips): [63.2115 ; 62.8083 ; 62.4376 ; 61.9406 ; 61.2999 ; 61.1678 ; 61.0444 ; 60.8719 ; 60.6074 ; 60.0969 ; 58.7483 ; 56.0836 ; 51.8732 ; 45.4985 ; 43.6053 ; 43.1443 ; 43.085 ; 43.079 ; 42.7756 ; 42.5344 ; 42.3958 ; 42.3622 ; 42.3363 ; 42.3893 ; 42.4505 ; 42.5084 ; 42.6341 ; 42.7939 ; 42.8797 ; 43.0016 ; 43.2414 ; 43.6031 ; 44.1794 ; 44.9286 ; 45.2049 ; 45.6255 ; 46.1864 ; 46.9636 ; 47.2724 ; 47.6351 ; 48.1596 ; 48.8618 ; 49.113 ; 49.4034 ; 49.5089 ; 49.6511 ; 49.8591 ; 50.1447 ; 50.6423 ; 51.212 ; 51.7994 ; 52.6326 ; 52.8707 ; 53.2024 ; 53.617 ; 53.7417 ; 53.9427 ; 54.253 ; 54.3743 ; 54.5431 ; 54.7821 ; 55.1556 ; 55.2683 ; 55.4388 ; 55.6587 ; 56.006 ; 56.663 ; 57.7853 ; 58.2206 ; 58.843 ; 59.6824 ; 60.7166 ; 61.0578 ; 61.6138 ; 62.3877 ; 63.434 ; 64.8861 ; 66.2363 ; 67.3853 ; 67.9753]

Bolt 2 - Shear Force (kips): [0.108984 ; 0.355818 ; 0.706251 ; 1.13797 ; 1.65169 ; 1.75608 ; 1.85315 ; 1.98807 ; 2.20088 ; 2.72644 ; 4.08871 ; 6.42522 ; 9.58073 ; 13.3617 ; 14.1331 ; 14.2182 ; 14.2135 ; 14.2135 ; 14.4804 ; 14.5537 ; 14.5513 ; 14.5452 ; 14.5389 ; 14.5556 ; 14.5745 ; 14.9165 ; 15.3782 ; 15.8363 ; 15.9523 ; 16.0943 ; 16.2887 ; 16.6351 ; 17.2286 ; 18.6307 ; 19.0511 ; 19.5333 ; 20.2592 ; 21.143 ; 21.4025 ; 21.9754 ; 22.7433 ; 23.7573 ; 24.068 ; 24.5836 ; 24.7509 ; 25.002 ; 25.4186 ; 26.0207 ; 26.9364 ; 27.7047 ; 28.3651 ; 29.1915 ; 29.5495 ; 30.0264 ; 30.6978 ; 30.9708 ; 31.3734 ; 31.9226 ; 32.1164 ; 32.424 ; 32.8737 ; 33.4681 ; 33.6861 ; 33.9816 ; 34.4363 ; 35.0839 ; 35.9452 ; 37.0248 ; 37.3715 ; 37.858 ; 38.4993 ; 39.5315 ; 39.9229 ; 40.4603 ; 41.1814 ; 42.1059 ; 43.1815 ; 43.9883 ; 44.665 ; 45.0102]

Bolt 3 - Tensile Force (kips): [65 ; 64.884 ; 64.9363 ; 65.217 ; 65.9445 ; 66.206 ; 66.4846 ; 66.9272 ; 67.5306 ; 68.2271 ; 68.9178 ; 69.7258 ; 70.8809 ; 72.2839 ; 72.3717 ; 72.2773 ; 72.2473 ; 72.3517 ; 72.4378 ; 72.4101 ; 72.3338 ; 72.3084 ; 72.3017 ; 72.5359 ; 72.7257 ; 73.0171 ; 73.5141 ; 74.1433 ; 74.4238 ; 74.8173 ; 75.4675 ; 76.3826 ; 77.639 ; 79.3653 ; 79.9729 ; 80.8594 ; 82.0754 ; 83.7189 ; 84.3272 ; 85.2138 ; 86.4761 ; 88.2197 ; 88.846 ; 89.7483 ; 90.0793 ; 90.5625 ; 91.261 ; 92.2393 ; 93.6272 ; 94.865 ; 96.0247 ; 97.4813 ; 98.0329 ; 98.9115 ; 100.326 ; 100.842 ; 101.604 ; 102.697 ; 103.107 ; 103.712 ; 104.613 ; 105.918 ; 106.374 ; 107.022 ; 107.962 ; 109.301 ; 111.138 ; 113.835 ; 114.728 ; 115.891 ; 117.331 ; 119.122 ; 119.706 ; 120.567 ; 121.598 ; 122.543 ; 123.456 ; 124.235 ; 124.883 ; 125.212]

Bolt 3 - Shear Force (kips): [0.0479273 ; 0.0780746 ; 0.18866 ; 0.341545 ; 0.559452 ; 0.611714 ; 0.663265 ; 0.733874 ; 0.833909 ; 0.956244 ; 1.0734 ; 1.19943 ; 1.38011 ; 1.57868 ; 1.59328 ; 1.58493 ; 1.58222 ; 1.59298 ; 1.60379 ; 1.60142 ; 1.59491 ; 1.59274 ; 1.59218 ; 1.61602 ; 1.63823 ; 1.67459 ; 1.73531 ; 1.8126 ; 1.84837 ; 1.8987 ; 1.98224 ; 2.10572 ; 2.28536 ; 2.52357 ; 2.60055 ; 2.70513 ; 2.85329 ; 3.06611 ; 3.14033 ; 3.24948 ; 3.40921 ; 3.64154 ; 3.7245 ; 3.84271 ; 3.88419 ; 3.94421 ; 4.02908 ; 4.14622 ; 4.29997 ; 4.4384 ; 4.54529 ; 4.73195 ; 5.51119 ; 7.25631 ; 9.69104 ; 10.3288 ; 11.044 ; 11.7794 ; 12.1353 ; 12.6797 ; 13.6734 ; 14.9391 ; 15.3385 ; 15.9238 ; 16.6396 ; 17.4213 ; 18.1939 ; 19.0926 ; 19.3864 ; 19.5749 ; 19.2502 ; 19.0838 ; 19.0397 ; 18.9816 ; 18.5014 ; 17.9743 ; 17.454 ; 17.1561 ; 16.7326 ; 16.471]

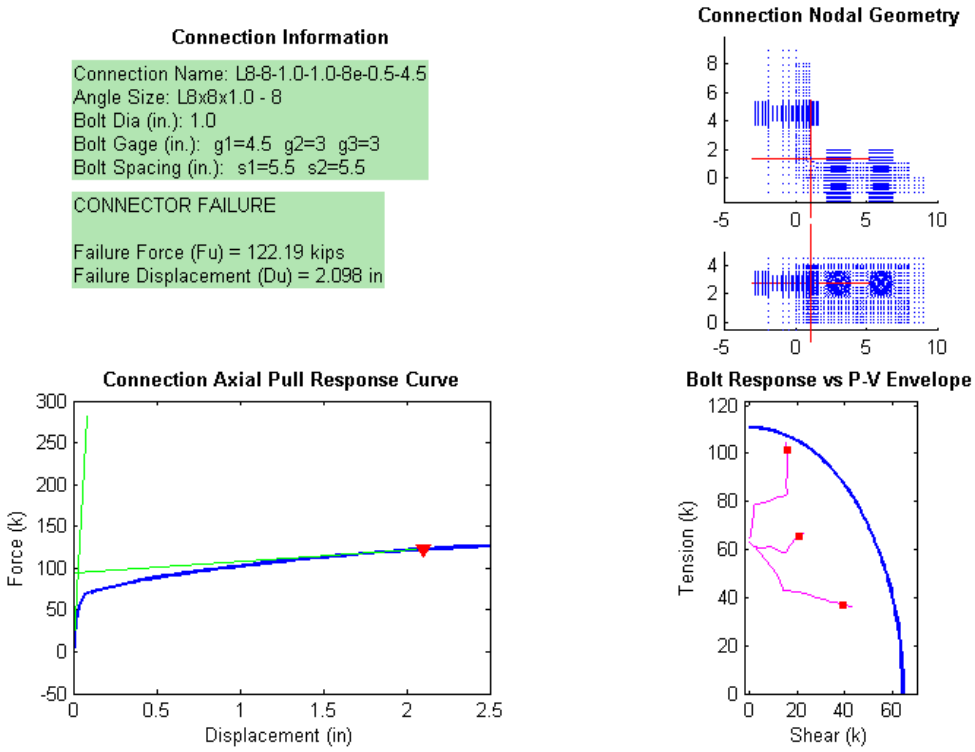


Figure B.404 Connection L8_8_1.0_1.0_8e_0.5_4.5 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_1.0_8e_0.5_4.5 Analysis Response Variables.
Initial Stiffness (k/in): 3.3549e+003

Plastic Stiffness (k/in): 13.6275

Displacement (in): [9.8539e-036 ; 0.0019531 ; 0.0039063 ; 0.0068359 ; 0.01123 ; 0.015625 ; 0.020019 ; 0.026611 ; 0.036499 ; 0.051331 ; 0.073578 ; 0.10695 ; 0.15701 ; 0.23209 ; 0.34472 ; 0.35528 ; 0.37111 ; 0.37705 ; 0.38596 ; 0.39933 ; 0.41937 ; 0.44944 ; 0.49454 ; 0.56219 ; 0.58756 ; 0.62562 ; 0.6827 ; 0.76832 ; 0.78973 ; 0.81113 ; 0.84324 ; 0.8914 ; 0.96365 ; 0.99074 ; 1.0314 ; 1.0466 ; 1.0695 ; 1.1038 ; 1.1552 ; 1.2323 ; 1.2613 ; 1.3047 ; 1.3698 ; 1.4674 ; 1.6139 ; 1.6688 ; 1.7512 ; 1.8747 ; 2.0601 ; 2.1226 ; 2.2163 ; 2.357 ; 2.5]

Force (kips): [-2.45735 ; 1.51669 ; 4.09523 ; 7.40831 ; 11.6307 ; 15.2545 ; 18.4257 ; 22.2934 ; 26.681 ; 31.0928 ; 34.1434 ; 35.7682 ; 37.0802 ; 38.8244 ; 41.2222 ; 41.4687 ; 41.8214 ; 41.958 ; 42.161 ; 42.4525 ; 42.8793 ; 43.4828 ; 44.2891 ; 45.3523 ; 45.7256 ; 46.2594 ; 47.062 ; 48.2788 ; 48.5724 ; 48.8649 ; 49.2715 ; 49.8535 ; 50.6719 ; 51.0178 ; 51.4914 ; 51.6692 ; 51.9441 ; 52.3766 ; 53.003 ; 53.8494 ; 54.1722 ; 54.6284 ; 55.2844 ; 56.2374 ; 57.5537 ; 58.0205 ; 58.6845 ; 59.5943 ; 60.8573 ; 61.2477 ; 61.7999 ; 62.5632 ; 63.2749]

Bolt 1 - Tensile Force (kips): [63.1976 ; 63.0276 ; 62.9086 ; 62.7467 ; 62.5241 ; 62.3177 ; 62.1259 ; 61.8728 ; 61.5463 ; 61.1516 ; 60.4045 ; 59.4194 ; 58.2425 ; 56.0175 ; 52.3694 ; 51.9819 ; 51.401 ; 51.1756 ; 50.8337 ; 50.3199 ; 49.531 ; 48.3442 ; 46.6241 ; 44.4446 ; 43.8365 ; 43.4172 ; 43.2319 ; 43.1571 ; 43.148 ; 42.9749 ; 42.8319 ; 42.7711 ; 42.8062 ; 42.73 ; 42.7268 ; 42.7298 ; 42.7377 ; 42.621 ; 42.3768 ; 42.1856 ; 42.0086 ; 41.8001 ; 41.3109 ; 40.1846 ; 39.1085 ; 38.7464 ; 38.236 ; 37.8311 ; 37.1494 ; 36.9561 ; 36.7191 ; 36.3801 ; 36.1208]

Bolt 1 - Shear Force (kips): [0.0934264 ; 0.12881 ; 0.259959 ; 0.442212 ; 0.68764 ; 0.91109 ; 1.11912 ; 1.39193 ; 1.73081 ; 2.1288 ; 2.91991 ; 3.89049 ; 4.96101 ; 6.83928 ; 9.56884 ; 9.83541 ; 10.2275 ; 10.3762 ; 10.5985 ; 10.9238 ; 11.4046 ; 12.0868 ; 12.9713 ; 13.8899 ; 14.1028 ; 14.2173 ; 14.2373 ; 14.2355 ; 14.2347 ; 14.3685 ; 14.4344 ; 14.4554 ; 14.4625 ; 15.0941 ; 15.7151 ; 15.9656 ; 16.4358 ; 17.5388 ; 19.3494 ; 21.3468 ; 22.29 ; 23.4112 ; 25.1369 ; 28.0716 ; 31.28 ; 32.4063 ; 34.0078 ; 35.8792 ; 38.4083 ; 39.1321 ; 40.069 ; 41.3959 ; 42.5901]

Bolt 2 - Tensile Force (kips): [63.1789 ; 63.0154 ; 62.8852 ; 62.699 ; 62.4516 ; 62.2245 ; 62.0279 ; 61.7906 ; 61.5255 ; 61.3276 ; 61.0932 ; 60.7383 ; 60.6418 ; 60.8786 ; 61.2203 ; 61.2196 ; 61.2059 ; 61.1944 ; 61.1724 ; 61.1299 ; 61.0401 ; 60.8837 ; 60.6359 ; 60.1388 ; 59.9514 ; 59.6869 ; 59.3341 ; 58.9885 ; 58.9369 ; 58.9077 ; 58.8557 ; 58.779 ; 58.6986 ; 58.8245 ; 58.9663 ; 59.0056 ; 59.0625 ; 59.2387 ; 59.5797 ; 60.0923 ; 60.2757 ; 60.551 ; 61.0263 ; 61.6453 ; 62.587 ; 62.94 ; 63.5027 ; 64.2961 ; 65.0985 ; 65.3623 ; 65.6882 ; 66.2481 ; 66.8752]

Bolt 2 - Shear Force (kips): [0.111314 ; 0.117109 ; 0.251718 ; 0.434758 ; 0.677616 ; 0.893773 ; 1.08862 ; 1.33636 ; 1.64439 ; 2.00271 ; 2.67727 ; 3.57155 ; 4.51383 ; 6.00301 ; 7.91722 ; 8.09674 ; 8.35967 ; 8.45973 ; 8.60893 ; 8.82712 ; 9.15347 ; 9.62986 ; 10.2965 ; 11.2449 ; 11.5838 ; 12.0658 ; 12.7208 ; 13.556 ; 13.7389 ; 13.9013 ; 14.1428 ; 14.4837 ; 14.9505 ; 15.0386 ; 15.1912 ; 15.2921 ; 15.4856 ; 15.683 ; 15.8584 ; 16.0886 ; 16.1979 ; 16.3771 ; 16.5684 ; 16.8862 ; 17.7321 ; 18.1678 ; 18.6828 ; 19.3442 ; 20.5648 ; 20.9183 ; 21.5362 ; 22.1592 ; 22.5914]

Bolt 3 - Tensile Force (kips): [65 ; 64.8534 ; 64.7569 ; 64.7315 ; 64.8809 ; 65.0741 ; 65.2877 ; 65.7225 ; 66.8092 ; 68.1782 ; 69.5242 ; 70.8872 ; 72.5085 ; 74.6935 ; 77.8467 ; 78.0842 ; 78.4033 ; 78.5179 ; 78.6802 ; 78.8973 ; 79.2013 ; 79.6616 ; 80.3569 ; 81.3437 ; 81.7108 ; 82.2684 ; 83.1465 ; 84.3903 ; 84.6665 ; 84.9431 ; 85.3271 ; 85.8998 ; 86.6896 ; 87.0271 ; 87.5212 ; 87.7057 ; 87.9809 ; 88.4 ; 89.1233 ; 90.3588 ; 90.8692 ; 91.6308 ; 92.6884 ; 94.1808 ; 96.2558 ; 96.9286 ; 97.8333 ; 99.0601 ; 100.894 ; 101.466 ; 102.232 ; 103.273 ; 104.229]

Bolt 3 - Shear Force (kips): [0.0816655 ; 0.0148239 ; 0.0475375 ; 0.11781 ; 0.226701 ; 0.32722 ; 0.426209 ; 0.568949 ; 0.763996 ; 1.0022 ; 1.20269 ; 1.36405 ; 1.55887 ; 1.82403 ; 2.16295 ; 2.22636 ; 2.33247 ; 2.37295 ; 2.42844 ; 2.54322 ; 3.72945 ; 6.09409 ; 8.50481 ; 11.3001 ; 12.4332 ; 14.0798 ; 15.7462 ; 16.1492 ; 15.9633 ; 15.8174 ; 15.6326 ; 15.3337 ; 15.2891 ; 15.2708 ; 15.2712 ; 15.2632 ; 15.2851 ; 15.4062 ; 15.5526 ; 15.8904 ; 16.0101 ; 16.0532 ; 16.0705 ; 16.1224 ; 16.132 ; 16.1079 ; 15.998 ; 15.8848 ; 15.757 ; 15.7168 ; 15.6225 ; 15.4468 ; 15.2799]

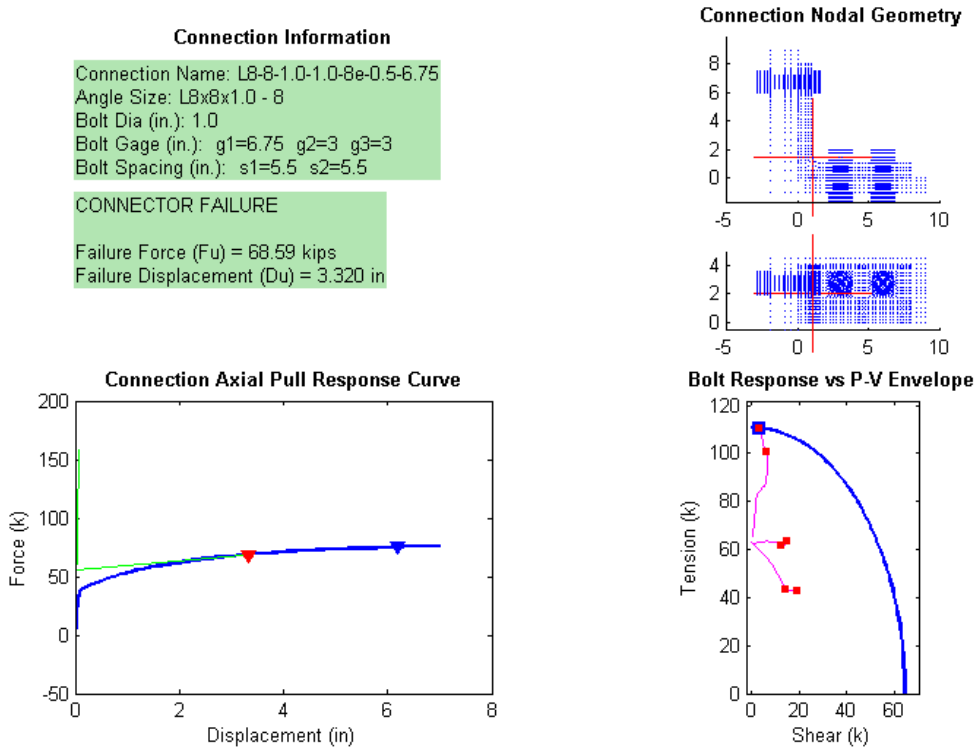


Figure B.405 Connection L8_8_1.0_1.0_8e_0.5_6.75 analysis response and failure criteria evaluation.

Numerical Data of Connection L8_8_1.0_1.0_8e_0.5_6.75 Analysis Response Variables.
Initial Stiffness (k/in): 2.1471e+003

Plastic Stiffness (k/in): 4.1051

Displacement (in): [9.2177e-036 ; 0.0013672 ; 0.0027344 ; 0.0047852 ; 0.0078613 ; 0.012476 ; 0.019397 ; 0.029779 ; 0.045352 ; 0.051192 ; 0.059952 ; 0.073092 ; 0.092801 ; 0.12237 ; 0.16671 ; 0.23323 ; 0.33301 ; 0.37043 ; 0.42656 ; 0.51075 ; 0.63703 ; 0.82646 ; 0.8975 ; 0.91525 ; 0.93301 ; 0.95965 ; 0.96964 ; 0.98462 ; 1.0071 ; 1.0408 ; 1.0914 ; 1.1672 ; 1.281 ; 1.4517 ; 1.5157 ; 1.6117 ; 1.7557 ; 1.9717 ; 2.2958 ; 2.7818 ; 2.9568 ; 3.2193 ; 3.613 ; 4.2037 ; 4.3787 ; 4.4443 ; 4.5427 ; 4.6904 ; 4.9119 ; 4.9949 ; 5.1195 ; 5.3064 ; 5.5867 ; 6.0072 ; 6.6379 ; 7]

Force (kips): [-2.30603 ; 0.00912084 ; 0.629427 ; 1.52119 ; 2.80383 ; 4.55887 ; 6.90975 ; 9.92277 ; 13.4755 ; 14.5112 ; 15.8088 ; 17.303 ; 18.6305 ; 19.4453 ; 20.0333 ; 20.741 ; 21.7837 ; 22.1442 ; 22.6514 ; 23.3664 ; 24.315 ; 25.5391 ; 25.9936 ; 26.1049 ; 26.2139 ; 26.3721 ; 26.4331 ; 26.527 ; 26.6693 ; 26.8681 ; 27.1498 ; 27.5623 ; 28.1338 ; 28.9221 ; 29.1958 ; 29.5928 ; 30.1476 ; 30.9061 ; 31.9079 ; 33.1756 ; 33.5727 ; 34.1115 ; 34.825 ; 35.7215 ; 35.9509 ; 36.0354 ; 36.1591 ; 36.3331 ; 36.5702 ; 36.6555 ; 36.7763 ; 36.9463 ; 37.1777 ; 37.4912 ; 37.8677 ; 38.036]

Bolt 1 - Tensile Force (kips): [63.1996 ; 63.1031 ; 63.0724 ; 63.0288 ; 62.9626 ; 62.8676 ; 62.7333 ; 62.5445 ; 62.2939 ; 62.2131 ; 62.1068 ; 61.9785 ; 61.8591 ; 61.7881 ; 61.7422 ; 61.6821 ; 61.5759 ; 61.5347 ; 61.4726 ; 61.3693 ; 61.159 ; 60.1192 ; 59.5331 ; 59.3797 ; 59.2241 ; 58.9914 ; 58.903 ; 58.7679 ; 58.5626 ; 58.2599 ; 57.8146 ; 57.1409 ; 56.1515 ; 54.6604 ; 54.0911 ; 53.2264 ; 51.8974 ; 49.8222 ; 46.6399 ; 43.6514 ; 43.4531 ; 43.3542 ; 43.2593 ; 43.1371 ; 43.1529 ; 43.1305 ; 43.0819 ; 43.0639 ; 43.0876 ; 43.0807 ; 43.0972 ; 43.0917 ; 43.0022 ; 42.86 ; 42.7681 ; 42.7644]

Bolt 1 - Shear Force (kips): [0.0886957 ; 0.0625774 ; 0.0900818 ; 0.136014 ; 0.209652 ; 0.317309 ; 0.470606 ; 0.682678 ; 0.964811 ; 1.05541 ; 1.17448 ; 1.31848 ; 1.45174 ; 1.53151 ; 1.58553 ; 1.65727 ; 1.78094 ; 1.82839 ; 1.89938 ; 2.01433 ; 2.24089 ; 3.34235 ; 3.90795 ; 4.05117 ; 4.1952 ; 4.40843 ; 4.48884 ; 4.6107 ; 4.79434 ; 5.06282 ; 5.4527 ; 6.03078 ; 6.85346 ; 8.02556 ; 8.4543 ; 9.08843 ; 10.0186 ; 11.3519 ; 13.0714 ; 14.2431 ; 14.2791 ; 14.2899 ; 14.3384 ; 14.4346 ; 14.4356 ; 14.6112 ; 14.9841 ; 15.4485 ; 15.7823 ; 16.0638 ; 16.3477 ; 16.8098 ; 17.6709 ; 18.817 ; 19.9193 ; 20.2696]

Bolt 2 - Tensile Force (kips): [63.1855 ; 63.0845 ; 63.0641 ; 63.0267 ; 62.952 ; 62.847 ; 62.7067 ; 62.5226 ; 62.3264 ; 62.2719 ; 62.2117 ; 62.1528 ; 62.1235 ; 62.1154 ; 62.1087 ; 62.1152 ; 62.1503 ; 62.1769 ; 62.2312 ; 62.3622 ; 62.5824 ; 62.8094 ; 62.8957 ; 62.9202 ; 62.9461 ; 62.9911 ; 63.0068 ; 63.0306 ; 63.0616 ; 63.1069 ; 63.169 ; 63.2472 ; 63.3237 ; 63.4206 ; 63.4396 ; 63.4401 ; 63.3829 ; 63.2521 ; 62.9993 ; 62.4565 ; 62.2855 ; 62.1065 ; 61.9672 ; 62.1057 ; 62.1921 ; 62.2473 ; 62.3469 ; 62.4822 ; 62.6449 ; 62.7232 ; 62.8079 ; 62.9085 ; 63.0992 ; 63.4017 ; 63.8078 ; 64.0006]

Bolt 2 - Shear Force (kips): [0.10608 ; 0.0554171 ; 0.0795254 ; 0.125467 ; 0.1965 ; 0.298703 ; 0.44287 ; 0.638208 ; 0.880781 ; 0.956409 ; 1.05703 ; 1.17801 ; 1.28962 ; 1.35805 ; 1.40452 ; 1.46747 ; 1.57327 ; 1.61383 ; 1.6756 ; 1.783 ; 2.00085 ; 2.94278 ; 3.41541 ; 3.53293 ; 3.65023 ; 3.82133 ; 3.88546 ; 3.98153 ; 4.12522 ; 4.33184 ; 4.62548 ; 5.05096 ; 5.63868 ; 6.434 ; 6.71646 ; 7.12732 ; 7.71229 ; 8.53033 ; 9.66863 ; 11.2193 ; 11.689 ; 12.2938 ; 13.0421 ; 13.8706 ; 14.0708 ; 14.1182 ; 14.1665 ; 14.2344 ; 14.3641 ; 14.3857 ; 14.4735 ; 14.6314 ; 14.7501 ; 14.8535 ; 14.9663 ; 15.0099]

Bolt 3 - Tensile Force (kips): [65 ; 64.9427 ; 64.8815 ; 64.8068 ; 64.7265 ; 64.6701 ; 64.7187 ; 64.904 ; 65.2345 ; 65.3921 ; 65.8 ; 66.587 ; 67.5534 ; 68.5236 ; 69.5339 ; 70.8192 ; 72.6664 ; 73.3403 ; 74.3506 ; 75.8476 ; 78.0648 ; 81.0759 ; 82.2027 ; 82.4693 ; 82.7183 ; 83.0916 ; 83.2288 ; 83.4322 ; 83.726 ; 84.0991 ; 84.6064 ; 85.3839 ; 86.4592 ; 88.0035 ; 88.4932 ; 89.2237 ; 90.2348 ; 91.7262 ; 94.3074 ; 97.7216 ; 98.8505 ; 100.34 ; 102.287 ; 104.686 ; 105.364 ; 105.614 ; 105.976 ; 106.483 ; 107.185 ; 107.446 ; 107.825 ; 108.38 ; 109.17 ; 110.261 ; 111.68 ; 112.421]

Bolt 3 - Shear Force (kips): [0.07473 ; 0.046647 ; 0.024724 ; 0.018938 ; 0.041363 ; 0.087006 ; 0.1618 ; 0.26736 ; 0.41087 ; 0.45598 ; 0.51849 ; 0.60248 ; 0.73925 ; 0.88639 ; 1.0413 ; 1.237 ; 1.4592 ; 1.5345 ; 1.6339 ; 1.7612 ; 1.9006 ; 2.067 ; 2.5476 ; 2.6196 ; 2.6419 ; 2.7805 ; 2.809 ; 2.9358 ; 3.1024 ; 3.2892 ; 3.5987 ; 4.2861 ; 5.608 ; 6.3236 ; 6.4494 ; 6.1056 ; 6.1748 ; 6.8162 ; 7.0518 ; 6.8004 ; 6.5167 ; 6.2573 ; 5.8773 ; 5.1069 ; 4.9232 ; 4.8469 ; 4.7279 ; 4.5467 ; 4.3138 ; 4.2128 ; 4.0764 ; 3.8823 ; 3.6331 ; 3.3437 ; 3.0316 ; 2.8962]

APPENDIX C

PARAMETRIC BOLTED ANGLE CONNECTION DATA, ANALYSIS OUTPUT AND PREDICTED CAPACITY

The connection geometry and topography information as defined in Figure C.1, is tabulated along with response and failure data for all the bolted angle connections in the data-set analyzed. The force and displacement of the connection at failure determined by the analytical failure criteria defined in Chapter 5, the connection initial stiffness and plastic stiffness and failure mode are included in the table. Also, the zone of angle failure or the bolt which failure is detected as defined in Figure C.2, is listed in the table.

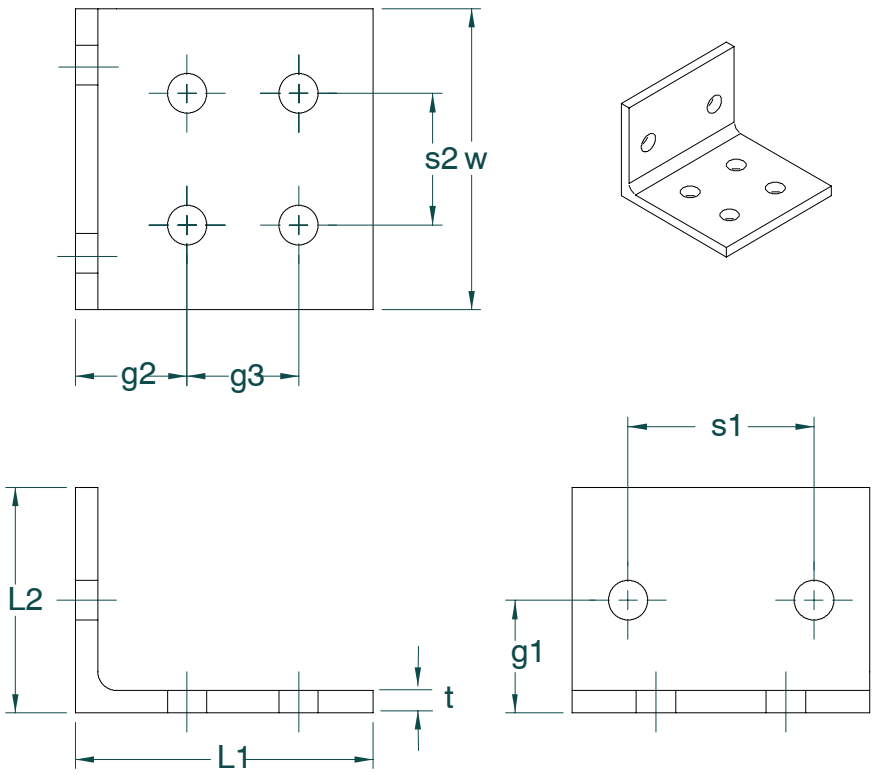


Figure C.1 Bolted Angle Connection Topography and Parameters.

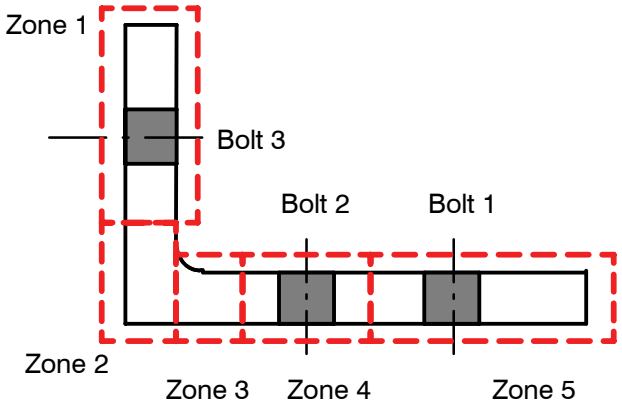


Figure C.2 Bolted angle connection model bolt and angle failure zone identification.

Table C.1 Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
6	4	0.3125	0.5	6	2.25	2.5	2.25	3.5	3.5	24.08	0.734	928.5	8.9	Bolt	3
6	4	0.3125	0.5	6	2.5625	2.5	2.25	3.5	3.5	21.19	1.054	682.4	6.0	Bolt	3
6	4	0.3125	0.5	6	2.875	2.5	2.25	3.5	3.5	18.77	1.569	525.1	2.9	Bolt	3
6	4	0.3125	0.5	8	2.25	3	3	5.5	3.5	25.63	0.695	895.4	7.7	Bolt	3
6	4	0.3125	0.5	8	2.5625	3	3	5.5	3.5	22.62	0.951	855.1	5.6	Bolt	3
6	4	0.3125	0.5	8	2.875	3	3	5.5	3.5	20.12	1.31	504.8	3.6	Bolt	3
6	4	0.3125	0.5	8	2.25	3	3	5.5	5.5	25.65	0.684	950.7	8.0	Bolt	3
6	4	0.3125	0.5	8	2.5625	3	3	5.5	5.5	22.66	0.942	707.0	5.4	Bolt	3
6	4	0.3125	0.5	8	2.875	3	3	5.5	5.5	20.09	1.289	548.0	3.7	Bolt	3
6	4	0.3125	0.75	6	2.25	2.5	2.25	3.5	3.5	28.40	0.96	1473.8	7.5	Angle	3
6	4	0.3125	0.75	6	2.5625	2.5	2.25	3.5	3.5	23.34	1.217	1165.3	5.2	Angle	1
6	4	0.3125	0.75	6	2.875	2.5	2.25	3.5	3.5	19.26	1.427	988.0	3.3	Angle	1
6	4	0.3125	0.75	8	2.25	3	3	5.5	3.5	32.40	1.115	1378.8	7.0	Angle	1
6	4	0.3125	0.75	8	2.5625	3	3	5.5	3.5	26.42	1.231	1084.6	5.7	Angle	1
6	4	0.3125	0.75	8	2.875	3	3	5.5	3.5	21.96	1.388	915.2	3.8	Angle	1
6	4	0.3125	0.75	8	2.25	3	3	5.5	5.5	32.44	1.063	1448.3	7.7	Angle	3
6	4	0.3125	0.75	8	2.5625	3	3	5.5	5.5	26.46	1.202	1138.0	5.0	Angle	1
6	4	0.3125	0.75	8	2.875	3	3	5.5	5.5	22.04	1.392	963.2	3.8	Angle	1
6	4	0.3125	0.875	6	2.25	2.5	2.25	3.5	3.5	28.70	0.984	1968.5	8.8	Angle	1
6	4	0.3125	0.875	6	2.5625	2.5	2.25	3.5	3.5	23.18	1.174	1641.5	5.2	Angle	1

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
6	4	0.3125	0.875	6	2.875	2.5	2.25	3.5	3.5	19.02	1.357	1459.8	3.2	Angle	1
6	4	0.3125	0.875	8	2.25	3	3	5.5	3.5	32.07	1.017	1832.9	6.9	Angle	1
6	4	0.3125	0.875	8	2.5625	3	3	5.5	3.5	26.20	1.176	1527.7	5.7	Angle	1
6	4	0.3125	0.875	8	2.875	3	3	5.5	3.5	21.80	1.356	1357.9	3.7	Angle	1
6	4	0.3125	0.875	8	2.25	3	3	5.5	5.5	32.29	0.992	1916.8	9.5	Angle	1
6	4	0.3125	0.875	8	2.5625	3	3	5.5	5.5	26.36	1.174	1606.7	5.7	Angle	1
6	4	0.3125	0.875	8	2.875	3	3	5.5	5.5	21.90	1.365	1439.6	3.7	Angle	1
6	4	0.375	0.875	6	2.25	2.5	2.25	3.5	3.5	39.69	0.974	2555.6	8.3	Angle	3
6	4	0.375	0.875	6	2.5625	2.5	2.25	3.5	3.5	33.74	1.392	2055.8	4.3	Angle	3
6	4	0.375	0.875	6	2.875	2.5	2.25	3.5	3.5	27.91	1.604	1757.8	3.6	Angle	3
6	4	0.375	0.875	8	2.25	3	3	5.5	3.5	44.82	1.071	2389.3	9.2	Angle	3
6	4	0.375	0.875	8	2.5625	3	3	5.5	3.5	38.21	1.435	1921.0	5.2	Angle	1
6	4	0.375	0.875	8	2.875	3	3	5.5	3.5	32.14	1.665	1639.3	3.7	Angle	1
6	4	0.375	0.875	8	2.25	3	3	5.5	5.5	45.25	1.068	2498.0	9.3	Angle	3
6	4	0.375	0.875	8	2.5625	3	3	5.5	5.5	38.33	1.413	2004.6	5.8	Angle	1
6	4	0.375	0.875	8	2.875	3	3	5.5	5.5	32.07	1.639	1714.8	4.0	Angle	1
6	4	0.5	0.5	6	2.25	2.5	2.25	3.5	3.5	36.06	0.328	2095.1	29.7	Bolt	3
6	4	0.5	0.5	6	2.5625	2.5	2.25	3.5	3.5	31.43	0.335	1624.5	24.8	Bolt	3
6	4	0.5	0.5	6	2.875	2.5	2.25	3.5	3.5	26.24	0.313	1271.5	22.9	Bolt	3
6	4	0.5	0.5	8	2.25	3	3	5.5	3.5	36.79	0.249	1512.9	41.7	Bolt	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
6	4	0.5	0.5	8	2.5625	3	3	5.5	3.5	32.70	0.281	1225.0	39.9	Bolt	3
6	4	0.5	0.5	8	2.875	3	3	5.5	3.5	28.15	0.303	987.2	22.4	Bolt	3
6	4	0.5	0.5	8	2.25	3	3	5.5	5.5	36.41	0.241	2098.3	52.1	Bolt	3
6	4	0.5	0.5	8	2.5625	3	3	5.5	5.5	32.61	0.278	1651.8	35.5	Bolt	3
6	4	0.5	0.5	8	2.875	3	3	5.5	5.5	28.08	0.306	1308.5	24.3	Bolt	3
6	4	0.5	0.75	6	2.25	2.5	2.25	3.5	3.5	60.87	0.93	3270.4	12.7	Angle	3
6	4	0.5	0.75	6	2.5625	2.5	2.25	3.5	3.5	53.05	1.126	2498.4	11.1	Angle	3
6	4	0.5	0.75	6	2.875	2.5	2.25	3.5	3.5	46.46	1.423	1977.0	7.8	Angle	3
6	4	0.5	0.75	8	2.25	3	3	5.5	3.5	66.66	0.915	3904.1	15.6	Bolt	3
6	4	0.5	0.75	8	2.5625	3	3	5.5	3.5	59.29	1.159	2394.5	11.6	Bolt	3
6	4	0.5	0.75	8	2.875	3	3	5.5	3.5	53.39	1.585	1897.2	6.5	Bolt	3
6	4	0.5	0.75	8	2.25	3	3	5.5	5.5	66.78	0.91	3252.6	15.1	Bolt	3
6	4	0.5	0.75	8	2.5625	3	3	5.5	5.5	59.39	1.157	2504.8	10.8	Bolt	3
6	4	0.5	0.75	8	2.875	3	3	5.5	5.5	52.82	1.487	1984.5	7.9	Bolt	3
6	4	0.5	0.875	6	2.25	2.5	2.25	3.5	3.5	63.48	0.846	4041.7	18.1	Angle	3
6	4	0.5	0.875	6	2.5625	2.5	2.25	3.5	3.5	54.41	1.077	3159.8	11.1	Angle	3
6	4	0.5	0.875	6	2.875	2.5	2.25	3.5	3.5	47.21	1.402	2581.1	7.7	Angle	3
6	4	0.5	0.875	8	2.25	3	3	5.5	3.5	72.48	0.946	3852.6	18.3	Angle	3
6	4	0.5	0.875	8	2.5625	3	3	5.5	3.5	63.03	1.201	2998.0	11.5	Angle	3
6	4	0.5	0.875	8	2.875	3	3	5.5	3.5	55.15	1.539	2437.9	8.1	Angle	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
6	4	0.5	0.875	8	2.25	3	3	5.5	5.5	72.16	0.905	3982.4	19.3	Angle	3
6	4	0.5	0.875	8	2.5625	3	3	5.5	5.5	62.81	1.166	3118.9	12.4	Angle	3
6	4	0.5	0.875	8	2.875	3	3	5.5	5.5	54.90	1.502	2539.0	8.3	Angle	3
6	4	0.75	0.5	6	2.25	2.5	2.25	3.5	3.5	43.25	0.198	2405.2	70.1	Bolt	3
6	4	0.75	0.5	6	2.5625	2.5	2.25	3.5	3.5	40.97	0.249	2067.9	50.7	Bolt	3
6	4	0.75	0.5	6	2.875	2.5	2.25	3.5	3.5	37.33	0.297	1752.7	31.8	Bolt	3
6	4	0.75	0.5	8	2.25	3	3	5.5	3.5	45.38	0.172	2399.1	110.6	Bolt	3
6	4	0.75	0.5	8	2.5625	3	3	5.5	3.5	44.14	0.228	2080.1	60.6	Bolt	3
6	4	0.75	0.5	8	2.875	3	3	5.5	3.5	42.03	0.299	1777.1	40.3	Bolt	3
6	4	0.75	0.5	8	2.25	3	3	5.5	5.5	48.26	0.213	2395.7	70.1	Bolt	3
6	4	0.75	0.5	8	2.5625	3	3	5.5	5.5	44.25	0.23	2074.0	58.9	Bolt	3
6	4	0.75	0.5	8	2.875	3	3	5.5	5.5	41.93	0.299	1769.5	42.3	Bolt	3
6	4	0.75	0.75	6	2.25	2.5	2.25	3.5	3.5	87.14	0.382	5982.0	53.6	Bolt	3
6	4	0.75	0.75	6	2.5625	2.5	2.25	3.5	3.5	76.82	0.427	4878.5	39.8	Bolt	3
6	4	0.75	0.75	6	2.875	2.5	2.25	3.5	3.5	65.91	0.452	3978.4	25.1	Bolt	3
6	4	0.75	0.75	8	2.25	3	3	5.5	3.5	89.96	0.295	5767.2	77.3	Bolt	3
6	4	0.75	0.75	8	2.5625	3	3	5.5	3.5	80.80	0.345	4756.6	50.7	Bolt	3
6	4	0.75	0.75	8	2.875	3	3	5.5	3.5	70.67	0.405	3892.0	35.8	Bolt	3
6	4	0.75	0.75	8	2.25	3	3	5.5	5.5	89.59	0.292	5742.0	76.0	Bolt	3
6	4	0.75	0.75	8	2.5625	3	3	5.5	5.5	80.63	0.341	4749.7	54.4	Bolt	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
6	4	0.75	0.75	8	2.875	3	3	5.5	5.5	70.54	0.4	3906.1	35.2	Bolt	3
6	6	0.3125	0.5	6	2.25	2.5	2.25	3.5	3.5	24.10	0.736	923.9	9.2	Bolt	3
6	6	0.3125	0.5	6	3.5625	2.5	2.25	3.5	3.5	13.36	2.16	342.1	1.5	Angle	1
6	6	0.3125	0.5	6	4.875	2.5	2.25	3.5	3.5	8.18	3.613	1108.4	0.6	Angle	1
6	6	0.3125	0.5	8	2.25	3	3	5.5	3.5	26.11	0.718	893.8	7.8	Bolt	3
6	6	0.3125	0.5	8	3.5625	3	3	5.5	3.5	16.19	2.223	615.9	1.8	Angle	1
6	6	0.3125	0.5	8	4.875	3	3	5.5	3.5	10.12	3.397	302.4	0.8	Angle	1
6	6	0.3125	0.5	8	2.25	3	3	5.5	5.5	26.15	0.713	948.5	8.0	Bolt	3
6	6	0.3125	0.5	8	3.5625	3	3	5.5	5.5	16.18	2.217	364.0	1.9	Angle	1
6	6	0.3125	0.5	8	4.875	3	3	5.5	5.5	10.11	3.398	152.7	0.8	Angle	1
6	6	0.3125	0.75	6	2.25	2.5	2.25	3.5	3.5	28.38	0.96	1469.4	8.7	Angle	3
6	6	0.3125	0.75	6	3.5625	2.5	2.25	3.5	3.5	13.30	1.863	808.4	1.7	Angle	1
6	6	0.3125	0.75	6	4.875	2.5	2.25	3.5	3.5	8.11	3.304	1137.1	0.7	Angle	1
6	6	0.3125	0.75	8	2.25	3	3	5.5	3.5	32.54	1.1	1375.2	8.0	Angle	1
6	6	0.3125	0.75	8	3.5625	3	3	5.5	3.5	16.14	1.851	744.0	2.0	Angle	1
6	6	0.3125	0.75	8	4.875	3	3	5.5	3.5	10.07	3.041	1021.3	0.8	Angle	1
6	6	0.3125	0.75	8	2.25	3	3	5.5	5.5	32.51	1.051	1446.1	8.0	Angle	3
6	6	0.3125	0.75	8	3.5625	3	3	5.5	5.5	16.13	1.85	793.3	2.0	Angle	1
6	6	0.3125	0.75	8	4.875	3	3	5.5	5.5	10.07	3.037	1122.7	0.8	Angle	1
6	6	0.3125	0.875	6	2.25	2.5	2.25	3.5	3.5	28.07	0.961	1895.5	8.0	Angle	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
6	6	0.3125	0.875	6	3.5625	2.5	2.25	3.5	3.5	13.24	1.923	1239.0	1.4	Angle	1
6	6	0.3125	0.875	6	4.875	2.5	2.25	3.5	3.5	8.06	3.307	1894.8	0.6	Angle	1
6	6	0.3125	0.875	8	2.25	3	3	5.5	3.5	32.11	1.031	1759.9	7.0	Angle	1
6	6	0.3125	0.875	8	3.5625	3	3	5.5	3.5	16.11	1.915	1141.2	1.9	Angle	1
6	6	0.3125	0.875	8	4.875	3	3	5.5	3.5	10.03	3.082	6340.4	0.9	Angle	1
6	6	0.3125	0.875	8	2.25	3	3	5.5	5.5	32.23	1.008	1845.7	9.5	Angle	1
6	6	0.3125	0.875	8	3.5625	3	3	5.5	5.5	16.09	1.912	1228.1	1.9	Angle	1
6	6	0.3125	0.875	8	4.875	3	3	5.5	5.5	10.03	3.088	1895.9	0.9	Angle	1
6	6	0.375	0.875	6	2.25	2.5	2.25	3.5	3.5	38.91	0.926	2468.4	11.6	Angle	3
6	6	0.375	0.875	6	3.5625	2.5	2.25	3.5	3.5	19.58	2.066	1405.2	1.9	Angle	1
6	6	0.375	0.875	6	4.875	2.5	2.25	3.5	3.5	11.94	3.335	613.5	1.0	Angle	1
6	6	0.375	0.875	8	2.25	3	3	5.5	3.5	45.02	1.046	2304.0	9.5	Angle	3
6	6	0.375	0.875	8	3.5625	3	3	5.5	3.5	23.87	2.096	1298.0	2.3	Angle	1
6	6	0.375	0.875	8	4.875	3	3	5.5	3.5	14.96	3.285	581.6	1.0	Angle	1
6	6	0.375	0.875	8	2.25	3	3	5.5	5.5	44.90	1	2423.5	9.3	Angle	3
6	6	0.375	0.875	8	3.5625	3	3	5.5	5.5	23.83	2.084	1379.1	2.3	Angle	1
6	6	0.375	0.875	8	4.875	3	3	5.5	5.5	14.94	3.283	622.4	1.0	Angle	1
6	6	0.5	0.5	6	2.25	2.5	2.25	3.5	3.5	36.85	0.352	2088.4	30.8	Bolt	3
6	6	0.5	0.5	6	3.5625	2.5	2.25	3.5	3.5	24.88	0.8	781.3	6.3	Bolt	3
6	6	0.5	0.5	6	4.875	2.5	2.25	3.5	3.5	17.85	1.655	794.5	2.5	Bolt	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
6	6	0.5	0.5	8	2.25	3	3	5.5	3.5	40.81	0.325	1517.0	35.1	Bolt	3
6	6	0.5	0.5	8	3.5625	3	3	5.5	3.5	27.78	0.619	796.7	9.3	Bolt	3
6	6	0.5	0.5	8	4.875	3	3	5.5	3.5	18.94	0.949	407.8	4.1	Bolt	3
6	6	0.5	0.5	8	2.25	3	3	5.5	5.5	40.72	0.324	2094.4	36.3	Bolt	3
6	6	0.5	0.5	8	3.5625	3	3	5.5	5.5	28.00	0.651	825.0	8.8	Bolt	3
6	6	0.5	0.5	8	4.875	3	3	5.5	5.5	18.94	0.96	435.2	4.0	Bolt	3
6	6	0.5	0.75	6	2.25	2.5	2.25	3.5	3.5	60.92	0.927	3256.2	14.1	Angle	3
6	6	0.5	0.75	6	3.5625	2.5	2.25	3.5	3.5	34.96	1.927	1355.1	4.8	Angle	3
6	6	0.5	0.75	6	4.875	2.5	2.25	3.5	3.5	21.64	2.938	570.9	1.6	Angle	3
6	6	0.5	0.75	8	2.25	3	3	5.5	3.5	68.42	0.95	3890.3	16.4	Bolt	3
6	6	0.5	0.75	8	3.5625	3	3	5.5	3.5	43.29	2.227	1296.6	4.0	Angle	3
6	6	0.5	0.75	8	4.875	3	3	5.5	3.5	27.51	3.283	567.2	1.8	Angle	3
6	6	0.5	0.75	8	2.25	3	3	5.5	5.5	68.57	0.948	3243.1	16.7	Bolt	3
6	6	0.5	0.75	8	3.5625	3	3	5.5	5.5	42.91	2.145	1352.5	4.6	Angle	3
6	6	0.5	0.75	8	4.875	3	3	5.5	5.5	27.38	3.232	587.1	2.0	Angle	3
6	6	0.5	0.875	6	2.25	2.5	2.25	3.5	3.5	62.97	0.847	3948.0	17.0	Angle	3
6	6	0.5	0.875	6	3.5625	2.5	2.25	3.5	3.5	34.46	1.856	1855.2	3.9	Angle	3
6	6	0.5	0.875	6	4.875	2.5	2.25	3.5	3.5	21.45	2.944	800.7	2.0	Angle	3
6	6	0.5	0.875	8	2.25	3	3	5.5	3.5	72.73	0.931	3760.1	21.7	Angle	3
6	6	0.5	0.875	8	3.5625	3	3	5.5	3.5	42.85	2.087	1741.0	4.5	Angle	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
6	6	0.5	0.875	8	4.875	3	3	5.5	3.5	27.35	3.27	776.7	1.7	Angle	3
6	6	0.5	0.875	8	2.25	3	3	5.5	5.5	72.34	0.887	3916.4	21.9	Angle	3
6	6	0.5	0.875	8	3.5625	3	3	5.5	5.5	42.49	2.01	1823.9	4.8	Angle	3
6	6	0.5	0.875	8	4.875	3	3	5.5	5.5	27.22	3.21	814.1	1.9	Angle	3
6	6	0.75	0.5	6	2.25	2.5	2.25	3.5	3.5	44.90	0.165	2410.3	129.7	Bolt	3
6	6	0.75	0.5	6	3.5625	2.5	2.25	3.5	3.5	35.61	0.258	1693.5	40.5	Bolt	3
6	6	0.75	0.5	6	4.875	2.5	2.25	3.5	3.5	22.97	0.407	865.8	8.5	Bolt	3
6	6	0.75	0.5	8	2.25	3	3	5.5	3.5	48.40	0.174	2430.9	133.4	Bolt	3
6	6	0.75	0.5	8	3.5625	3	3	5.5	3.5	37.36	0.224	1341.1	48.9	Bolt	3
6	6	0.75	0.5	8	4.875	3	3	5.5	3.5	25.96	0.398	914.2	11.2	Bolt	3
6	6	0.75	0.5	8	2.25	3	3	5.5	5.5	46.36	0.157	2424.4	166.3	Bolt	3
6	6	0.75	0.5	8	3.5625	3	3	5.5	5.5	38.43	0.25	1854.3	42.6	Bolt	3
6	6	0.75	0.5	8	4.875	3	3	5.5	5.5	25.94	0.4	898.8	11.4	Bolt	3
6	6	0.75	0.75	6	2.25	2.5	2.25	3.5	3.5	92.10	0.468	5966.1	53.1	Bolt	3
6	6	0.75	0.75	6	3.5625	2.5	2.25	3.5	3.5	64.13	1.129	2648.2	15.4	Bolt	3
6	6	0.75	0.75	6	4.875	2.5	2.25	3.5	3.5	43.53	1.803	1543.4	5.7	Bolt	3
6	6	0.75	0.75	8	2.25	3	3	5.5	3.5	100.84	0.411	5762.8	55.6	Bolt	3
6	6	0.75	0.75	8	3.5625	3	3	5.5	3.5	70.89	0.888	2626.0	18.2	Bolt	3
6	6	0.75	0.75	8	4.875	3	3	5.5	3.5	46.93	1.238	1506.5	9.2	Bolt	3
6	6	0.75	0.75	8	2.25	3	3	5.5	5.5	101.37	0.417	5734.9	59.1	Bolt	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
6	6	0.75	0.75	8	3.5625	3	3	5.5	5.5	70.86	0.884	2640.0	16.6	Bolt	3
6	6	0.75	0.75	8	4.875	3	3	5.5	5.5	46.83	1.231	1530.8	8.6	Bolt	3
8	4	0.5	0.75	6	2.5	2.5	2.25	3.5	3.5	52.66	1.073	2377.4	10.7	Angle	3
8	4	0.5	0.75	6	2.75	2.5	2.25	3.5	3.5	46.90	1.247	1932.1	8.4	Angle	3
8	4	0.5	0.75	8	2.5	3	3	5.5	3.5	59.71	1.146	2345.7	10.7	Bolt	3
8	4	0.5	0.75	8	2.75	3	3	5.5	3.5	54.96	1.458	2295.3	7.6	Bolt	3
8	4	0.5	0.75	8	2.5	3	3	5.5	5.5	59.81	1.144	2424.2	10.8	Bolt	3
8	4	0.5	0.75	8	2.75	3	3	5.5	5.5	54.70	1.409	1978.8	7.9	Angle	3
8	4	0.5	0.875	6	2.5	2.5	2.25	3.5	3.5	53.29	1.017	2856.6	12.0	Angle	3
8	4	0.5	0.875	6	2.75	2.5	2.25	3.5	3.5	47.14	1.211	2354.1	9.0	Angle	3
8	4	0.5	0.875	8	2.5	3	3	5.5	3.5	62.60	1.163	3098.5	11.6	Angle	3
8	4	0.5	0.875	8	2.75	3	3	5.5	3.5	55.97	1.388	2220.1	8.3	Angle	3
8	4	0.5	0.875	8	2.5	3	3	5.5	5.5	61.96	1.097	2886.1	13.7	Angle	3
8	4	0.5	0.875	8	2.75	3	3	5.5	5.5	55.43	1.315	2375.3	9.6	Angle	3
8	4	0.5	1	6	2.5	2.5	2.25	3.5	3.5	52.59	1.006	3587.7	11.3	Angle	3
8	4	0.5	1	6	2.75	2.5	2.25	3.5	3.5	46.31	1.195	3059.6	9.1	Angle	3
8	4	0.5	1	8	2.5	3	3	5.5	3.5	61.95	1.137	3369.4	11.9	Angle	3
8	4	0.5	1	8	2.75	3	3	5.5	3.5	55.16	1.363	2832.8	8.4	Angle	3
8	4	0.5	1	8	2.5	3	3	5.5	5.5	61.33	1.071	3577.0	12.4	Angle	3
8	4	0.5	1	8	2.75	3	3	5.5	5.5	54.61	1.294	3037.0	9.5	Angle	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
8	4	0.75	0.75	6	2.5	2.5	2.25	3.5	3.5	78.60	0.443	4784.3	37.1	Bolt	3
8	4	0.75	0.75	6	2.75	2.5	2.25	3.5	3.5	69.35	0.456	4048.8	29.0	Bolt	3
8	4	0.75	0.75	8	2.5	3	3	5.5	3.5	82.13	0.34	4734.1	60.4	Bolt	3
8	4	0.75	0.75	8	2.75	3	3	5.5	3.5	74.20	0.378	2934.8	43.0	Bolt	3
8	4	0.75	0.75	8	2.5	3	3	5.5	5.5	81.79	0.338	4699.6	60.5	Bolt	3
8	4	0.75	0.75	8	2.75	3	3	5.5	5.5	74.01	0.377	4025.6	50.8	Bolt	3
8	4	0.75	0.875	6	2.5	2.5	2.25	3.5	3.5	101.16	0.925	5791.0	24.3	Bolt	3
8	4	0.75	0.875	6	2.75	2.5	2.25	3.5	3.5	91.68	1.08	4871.1	17.8	Angle	3
8	4	0.75	0.875	8	2.5	3	3	5.5	3.5	109.08	0.809	5690.2	28.9	Bolt	3
8	4	0.75	0.875	8	2.75	3	3	5.5	3.5	98.37	0.93	4790.8	21.2	Bolt	3
8	4	0.75	0.875	8	2.5	3	3	5.5	5.5	109.11	0.805	5659.3	29.0	Bolt	3
8	4	0.75	0.875	8	2.75	3	3	5.5	5.5	98.23	0.917	4805.2	20.9	Bolt	3
8	4	0.75	1	6	2.5	2.5	2.25	3.5	3.5	105.11	0.854	6904.8	24.6	Angle	3
8	4	0.75	1	6	2.75	2.5	2.25	3.5	3.5	94.87	0.973	5854.7	19.8	Angle	3
8	4	0.75	1	8	2.5	3	3	5.5	3.5	123.13	1.025	8228.9	29.7	Angle	3
8	4	0.75	1	8	2.75	3	3	5.5	3.5	110.78	1.147	5659.8	22.8	Angle	3
8	4	0.75	1	8	2.5	3	3	5.5	5.5	122.17	0.988	6712.9	28.5	Angle	3
8	4	0.75	1	8	2.75	3	3	5.5	5.5	110.22	1.118	5736.3	24.0	Angle	3
8	4	1	0.75	6	2.5	2.5	2.25	3.5	3.5	95.66	0.288	4854.9	107.4	Bolt	3
8	4	1	0.75	6	2.75	2.5	2.25	3.5	3.5	87.88	0.322	6180.4	67.7	Bolt	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
8	4	1	0.75	8	2.5	3	3	5.5	3.5	104.33	0.288	4833.9	133.5	Bolt	3
8	4	1	0.75	8	2.75	3	3	5.5	3.5	97.47	0.323	4313.5	73.5	Bolt	3
8	4	1	0.75	8	2.5	3	3	5.5	5.5	104.23	0.286	5538.4	120.7	Bolt	3
8	4	1	0.75	8	2.75	3	3	5.5	5.5	97.39	0.322	4240.8	82.7	Bolt	3
8	4	1	0.875	6	2.5	2.5	2.25	3.5	3.5	118.29	0.324	8543.6	90.1	Bolt	3
8	4	1	0.875	6	2.75	2.5	2.25	3.5	3.5	108.40	0.375	7562.8	62.7	Bolt	3
8	4	1	0.875	8	2.5	3	3	5.5	3.5	128.47	0.316	5979.4	102.1	Bolt	3
8	4	1	0.875	8	2.75	3	3	5.5	3.5	119.00	0.367	5293.5	86.3	Bolt	3
8	4	1	0.875	8	2.5	3	3	5.5	5.5	128.23	0.315	8023.4	98.2	Bolt	3
8	4	1	0.875	8	2.75	3	3	5.5	5.5	118.77	0.364	7166.1	89.7	Bolt	3
8	4	1	1	6	2.5	2.5	2.25	3.5	3.5	151.92	0.637	10140.5	53.1	Bolt	3
8	4	1	1	6	2.75	2.5	2.25	3.5	3.5	138.96	0.75	8973.1	40.7	Bolt	3
8	4	1	1	8	2.5	3	3	5.5	3.5	162.47	0.542	9853.5	65.6	Bolt	3
8	4	1	1	8	2.75	3	3	5.5	3.5	149.14	0.626	8701.5	56.1	Bolt	3
8	4	1	1	8	2.5	3	3	5.5	5.5	161.63	0.536	9482.7	74.5	Bolt	3
8	4	1	1	8	2.75	3	3	5.5	5.5	150.51	0.662	8462.0	48.3	Bolt	3
8	6	0.5	0.75	6	2.5	2.5	2.25	3.5	3.5	52.83	1.066	2367.0	12.3	Angle	3
8	6	0.5	0.75	6	3.625	2.5	2.25	3.5	3.5	34.29	2.311	1143.9	3.3	Angle	3
8	6	0.5	0.75	6	4.75	2.5	2.25	3.5	3.5	22.57	3.057	491.4	1.6	Angle	3
8	6	0.5	0.75	8	2.5	3	3	5.5	3.5	62.36	1.257	2343.0	10.5	Angle	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
8	6	0.5	0.75	8	3.625	3	3	5.5	3.5	42.21	2.507	935.2	3.7	Angle	3
8	6	0.5	0.75	8	4.75	3	3	5.5	3.5	28.71	3.422	492.5	1.7	Angle	3
8	6	0.5	0.75	8	2.5	3	3	5.5	5.5	61.62	1.18	2420.6	11.8	Angle	3
8	6	0.5	0.75	8	3.625	3	3	5.5	5.5	41.77	2.396	1165.6	3.7	Angle	3
8	6	0.5	0.75	8	4.75	3	3	5.5	5.5	28.60	3.379	1044.2	2.1	Angle	3
8	6	0.5	0.875	6	2.5	2.5	2.25	3.5	3.5	53.55	1.013	2843.0	12.6	Angle	3
8	6	0.5	0.875	6	3.625	2.5	2.25	3.5	3.5	33.88	2.253	894.4	3.0	Angle	3
8	6	0.5	0.875	6	4.75	2.5	2.25	3.5	3.5	22.35	3.069	655.8	1.9	Angle	3
8	6	0.5	0.875	8	2.5	3	3	5.5	3.5	63.59	1.134	3470.4	11.8	Angle	3
8	6	0.5	0.875	8	3.625	3	3	5.5	3.5	42.18	2.493	914.5	3.3	Angle	3
8	6	0.5	0.875	8	4.75	3	3	5.5	3.5	28.52	3.412	635.6	1.9	Angle	3
8	6	0.5	0.875	8	2.5	3	3	5.5	5.5	62.85	1.064	2881.7	13.3	Angle	3
8	6	0.5	0.875	8	3.625	3	3	5.5	5.5	41.90	2.417	1527.1	3.3	Angle	3
8	6	0.5	0.875	8	4.75	3	3	5.5	5.5	28.43	3.365	679.5	1.8	Angle	3
8	6	0.5	1	6	2.5	2.5	2.25	3.5	3.5	52.89	1.006	3571.9	11.6	Angle	3
8	6	0.5	1	6	3.625	2.5	2.25	3.5	3.5	33.25	2.3	2242.3	2.8	Angle	3
8	6	0.5	1	6	4.75	2.5	2.25	3.5	3.5	22.07	3.151	930.2	1.4	Angle	3
8	6	0.5	1	8	2.5	3	3	5.5	3.5	63.15	1.111	3362.0	12.9	Angle	3
8	6	0.5	1	8	3.625	3	3	5.5	3.5	41.47	2.478	1105.9	3.5	Angle	3
8	6	0.5	1	8	4.75	3	3	5.5	3.5	28.15	3.481	874.1	1.7	Angle	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
8	6	0.5	1	8	2.5	3	3	5.5	5.5	62.45	1.046	3571.7	13.8	Angle	3
8	6	0.5	1	8	3.625	3	3	5.5	5.5	41.23	2.415	2188.7	3.3	Angle	3
8	6	0.5	1	8	4.75	3	3	5.5	5.5	28.06	3.432	2615.8	1.8	Angle	3
8	6	0.75	0.75	6	2.5	2.5	2.25	3.5	3.5	85.52	0.594	4772.1	36.6	Bolt	3
8	6	0.75	0.75	6	3.625	2.5	2.25	3.5	3.5	62.31	1.177	2341.1	12.8	Bolt	3
8	6	0.75	0.75	6	4.75	2.5	2.25	3.5	3.5	46.00	1.917	1423.3	5.7	Bolt	3
8	6	0.75	0.75	8	2.5	3	3	5.5	3.5	94.58	0.504	4737.0	45.3	Bolt	3
8	6	0.75	0.75	8	3.625	3	3	5.5	3.5	69.27	0.928	2333.0	17.8	Bolt	3
8	6	0.75	0.75	8	4.75	3	3	5.5	3.5	49.50	1.278	1384.1	8.0	Bolt	3
8	6	0.75	0.75	8	2.5	3	3	5.5	5.5	94.70	0.504	4700.3	42.2	Bolt	3
8	6	0.75	0.75	8	3.625	3	3	5.5	5.5	69.20	0.921	2379.4	16.3	Bolt	3
8	6	0.75	0.75	8	4.75	3	3	5.5	5.5	49.43	1.278	1440.0	8.3	Bolt	3
8	6	0.75	0.875	6	2.5	2.5	2.25	3.5	3.5	103.27	0.959	5773.5	24.8	Bolt	3
8	6	0.75	0.875	6	3.625	2.5	2.25	3.5	3.5	70.36	1.578	2871.7	9.9	Angle	3
8	6	0.75	0.875	6	4.75	2.5	2.25	3.5	3.5	48.84	2.223	1922.7	4.8	Angle	3
8	6	0.75	0.875	8	2.5	3	3	5.5	3.5	114.41	0.804	5690.0	33.7	Bolt	3
8	6	0.75	0.875	8	3.625	3	3	5.5	3.5	86.68	1.836	2793.5	10.5	Angle	3
8	6	0.75	0.875	8	4.75	3	3	5.5	3.5	61.31	2.642	2086.5	4.6	Angle	3
8	6	0.75	0.875	8	2.5	3	3	5.5	5.5	114.50	0.804	5657.0	32.1	Bolt	3
8	6	0.75	0.875	8	3.625	3	3	5.5	5.5	85.85	1.752	2889.4	11.0	Angle	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
8	6	0.75	0.875	8	4.75	3	3	5.5	5.5	61.22	2.625	2238.9	4.8	Angle	3
8	6	0.75	1	6	2.5	2.5	2.25	3.5	3.5	105.50	0.845	6882.1	28.2	Angle	3
8	6	0.75	1	6	3.625	2.5	2.25	3.5	3.5	70.36	1.48	3640.1	11.9	Angle	3
8	6	0.75	1	6	4.75	2.5	2.25	3.5	3.5	48.55	2.208	2662.9	4.8	Angle	3
8	6	0.75	1	8	2.5	3	3	5.5	3.5	128.65	1.021	8212.7	30.7	Angle	3
8	6	0.75	1	8	3.625	3	3	5.5	3.5	87.43	1.691	3446.7	10.7	Angle	3
8	6	0.75	1	8	4.75	3	3	5.5	3.5	61.61	2.49	2425.8	5.4	Angle	3
8	6	0.75	1	8	2.5	3	3	5.5	5.5	127.56	0.987	6706.4	32.7	Angle	3
8	6	0.75	1	8	3.625	3	3	5.5	5.5	86.57	1.617	3596.2	10.8	Angle	3
8	6	0.75	1	8	4.75	3	3	5.5	5.5	61.45	2.464	2609.1	5.7	Angle	3
8	6	1	0.75	6	2.5	2.5	2.25	3.5	3.5	103.09	0.245	4878.7	141.9	Bolt	3
8	6	1	0.75	6	3.625	2.5	2.25	3.5	3.5	82.80	0.475	3967.6	41.7	Bolt	3
8	6	1	0.75	6	4.75	2.5	2.25	3.5	3.5	54.51	0.474	2383.4	21.3	Bolt	3
8	6	1	0.75	8	2.5	3	3	5.5	3.5	107.04	0.227	4916.4	161.6	Bolt	3
8	6	1	0.75	8	3.625	3	3	5.5	3.5	85.39	0.301	4544.6	81.0	Bolt	3
8	6	1	0.75	8	4.75	3	3	5.5	3.5	60.13	0.445	2397.9	23.9	Bolt	3
8	6	1	0.75	8	2.5	3	3	5.5	5.5	104.22	0.207	4829.4	195.5	Bolt	3
8	6	1	0.75	8	3.625	3	3	5.5	5.5	85.29	0.302	3924.2	85.0	Bolt	3
8	6	1	0.75	8	4.75	3	3	5.5	5.5	60.05	0.44	2383.4	26.3	Bolt	3
8	6	1	0.875	6	2.5	2.5	2.25	3.5	3.5	140.49	0.542	8532.7	64.5	Bolt	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
8	6	1	0.875	6	3.625	2.5	2.25	3.5	3.5	106.47	1.023	4799.5	26.6	Bolt	3
8	6	1	0.875	6	4.75	2.5	2.25	3.5	3.5	72.70	1.24	2983.9	12.0	Bolt	3
8	6	1	0.875	8	2.5	3	3	5.5	3.5	139.83	0.31	6038.8	107.5	Bolt	3
8	6	1	0.875	8	3.625	3	3	5.5	3.5	113.01	0.676	4751.8	39.6	Bolt	3
8	6	1	0.875	8	4.75	3	3	5.5	3.5	77.52	0.824	2918.7	17.2	Bolt	3
8	6	1	0.875	8	2.5	3	3	5.5	5.5	141.82	0.333	8036.0	98.5	Bolt	3
8	6	1	0.875	8	3.625	3	3	5.5	5.5	112.84	0.674	4717.1	40.5	Bolt	3
8	6	1	0.875	8	4.75	3	3	5.5	5.5	77.33	0.822	2936.4	21.5	Bolt	3
8	6	1	1	6	2.5	2.5	2.25	3.5	3.5	164.72	0.765	10122.5	51.2	Bolt	3
8	6	1	1	6	3.625	2.5	2.25	3.5	3.5	118.99	1.302	5746.1	22.9	Angle	3
8	6	1	1	6	4.75	2.5	2.25	3.5	3.5	82.74	1.751	3796.3	10.4	Angle	3
8	6	1	1	8	2.5	3	3	5.5	3.5	180.41	0.645	9866.9	60.9	Bolt	3
8	6	1	1	8	3.625	3	3	5.5	3.5	141.49	1.385	5596.0	23.8	Bolt	3
8	6	1	1	8	4.75	3	3	5.5	3.5	100.21	2.093	3618.1	9.5	Angle	3
8	6	1	1	8	2.5	3	3	5.5	5.5	180.23	0.651	9494.4	60.7	Bolt	3
8	6	1	1	8	3.625	3	3	5.5	5.5	141.72	1.402	5594.1	24.4	Bolt	3
8	6	1	1	8	4.75	3	3	5.5	5.5	100.12	2.092	3704.7	9.5	Angle	3
8	8	0.5	0.75	6	2.5	2.5	2.25	3.5	3.5	56.10	1.129	2481.2	11.4	Angle	3
8	8	0.5	0.75	6	4.5	2.5	2.25	3.5	3.5	25.84	2.924	559.7	1.9	Angle	3
8	8	0.5	0.75	6	6.75	2.5	2.25	3.5	3.5	14.22	5.496	325.5	0.6	Angle	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
8	8	0.5	0.75	8	2.5	3	3	5.5	3.5	64.02	1.156	2448.0	12.8	Bolt	3
8	8	0.5	0.75	8	4.5	3	3	5.5	3.5	32.96	3.257	566.2	2.2	Angle	3
8	8	0.5	0.75	8	6.75	3	3	5.5	3.5	18.54	5.881	837.0	0.6	Angle	3
8	8	0.5	0.75	8	2.5	3	3	5.5	5.5	64.33	1.174	2525.6	12.8	Bolt	3
8	8	0.5	0.75	8	4.5	3	3	5.5	5.5	32.83	3.199	1096.1	2.2	Angle	3
8	8	0.5	0.75	8	6.75	3	3	5.5	5.5	18.56	5.931	3491.2	0.6	Angle	3
8	8	0.5	0.875	6	2.5	2.5	2.25	3.5	3.5	56.92	1.062	2976.4	12.2	Angle	3
8	8	0.5	0.875	6	4.5	2.5	2.25	3.5	3.5	25.58	2.941	726.3	1.6	Angle	3
8	8	0.5	0.875	6	6.75	2.5	2.25	3.5	3.5	14.16	5.533	493.5	0.5	Angle	3
8	8	0.5	0.875	8	2.5	3	3	5.5	3.5	67.61	1.206	3605.3	11.2	Angle	3
8	8	0.5	0.875	8	4.5	3	3	5.5	3.5	32.61	3.17	712.7	2.0	Angle	3
8	8	0.5	0.875	8	6.75	3	3	5.5	3.5	18.41	5.893	450.5	0.6	Angle	3
8	8	0.5	0.875	8	2.5	3	3	5.5	5.5	66.92	1.138	3008.4	12.1	Angle	3
8	8	0.5	0.875	8	4.5	3	3	5.5	5.5	32.51	3.125	1654.3	2.1	Angle	3
8	8	0.5	0.875	8	6.75	3	3	5.5	5.5	18.44	5.953	504.6	0.7	Angle	3
8	8	0.5	1	6	2.5	2.5	2.25	3.5	3.5	56.31	1.05	3724.0	10.9	Angle	3
8	8	0.5	1	6	4.5	2.5	2.25	3.5	3.5	25.18	3	1004.1	1.7	Angle	3
8	8	0.5	1	6	6.75	2.5	2.25	3.5	3.5	14.03	5.647	773.9	0.5	Angle	3
8	8	0.5	1	8	2.5	3	3	5.5	3.5	67.28	1.178	3504.7	13.9	Angle	3
8	8	0.5	1	8	4.5	3	3	5.5	3.5	32.17	3.217	954.0	2.1	Angle	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
8	8	0.5	1	8	6.75	3	3	5.5	3.5	18.26	5.995	694.9	0.6	Angle	3
8	8	0.5	1	8	2.5	3	3	5.5	5.5	66.59	1.112	3714.2	13.6	Angle	3
8	8	0.5	1	8	4.5	3	3	5.5	5.5	32.07	3.174	2629.6	2.0	Angle	3
8	8	0.5	1	8	6.75	3	3	5.5	5.5	18.27	6.048	780.8	0.6	Angle	3
8	8	0.625	0.75	6	2.5	2.5	2.25	3.5	3.5	71.92	0.773	3710.5	21.2	Bolt	3
8	8	0.625	0.75	6	4.5	2.5	2.25	3.5	3.5	39.39	2.467	1197.5	3.3	Angle	3
8	8	0.625	0.75	6	6.75	2.5	2.25	3.5	3.5	22.28	4.683	422.0	1.1	Angle	3
8	8	0.625	0.75	8	2.5	3	3	5.5	3.5	80.41	0.688	3693.8	27.0	Bolt	3
8	8	0.625	0.75	8	4.5	3	3	5.5	3.5	48.17	2.355	1143.0	4.8	Bolt	3
8	8	0.625	0.75	8	6.75	3	3	5.5	3.5	28.79	5.066	411.2	1.3	Angle	3
8	8	0.625	0.75	8	2.5	3	3	5.5	5.5	80.48	0.685	3715.4	27.0	Bolt	3
8	8	0.625	0.75	8	4.5	3	3	5.5	5.5	48.17	2.367	1601.1	4.6	Bolt	3
8	8	0.625	0.75	8	6.75	3	3	5.5	5.5	28.85	5.137	1050.5	1.3	Angle	3
8	8	0.625	0.875	6	2.5	2.5	2.25	3.5	3.5	82.51	1.01	4450.8	19.6	Angle	3
8	8	0.625	0.875	6	4.5	2.5	2.25	3.5	3.5	39.21	2.398	1652.6	3.7	Angle	3
8	8	0.625	0.875	6	6.75	2.5	2.25	3.5	3.5	22.11	4.675	602.9	1.0	Angle	3
8	8	0.625	0.875	8	2.5	3	3	5.5	3.5	98.08	1.177	4371.6	19.2	Angle	3
8	8	0.625	0.875	8	4.5	3	3	5.5	3.5	49.98	2.613	1797.5	4.0	Angle	3
8	8	0.625	0.875	8	6.75	3	3	5.5	3.5	28.75	4.979	566.8	1.2	Angle	3
8	8	0.625	0.875	8	2.5	3	3	5.5	5.5	97.47	1.137	4426.4	20.2	Angle	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
8	8	0.625	0.875	8	4.5	3	3	5.5	5.5	49.84	2.594	1097.8	4.9	Angle	3
8	8	0.625	0.875	8	6.75	3	3	5.5	5.5	28.82	5.052	616.0	1.1	Angle	3
8	8	0.625	1	6	2.5	2.5	2.25	3.5	3.5	83.42	0.944	5374.1	20.5	Angle	3
8	8	0.625	1	6	4.5	2.5	2.25	3.5	3.5	38.86	2.425	2379.7	3.8	Angle	3
8	8	0.625	1	6	6.75	2.5	2.25	3.5	3.5	21.91	4.744	892.1	1.0	Angle	3
8	8	0.625	1	8	2.5	3	3	5.5	3.5	99.49	1.081	5175.0	20.4	Angle	3
8	8	0.625	1	8	4.5	3	3	5.5	3.5	49.82	2.612	1323.9	4.3	Angle	3
8	8	0.625	1	8	6.75	3	3	5.5	3.5	28.56	5.017	816.0	1.1	Angle	3
8	8	0.625	1	8	2.5	3	3	5.5	5.5	98.73	1.042	5292.6	20.5	Angle	3
8	8	0.625	1	8	4.5	3	3	5.5	5.5	49.68	2.596	1382.7	4.5	Angle	3
8	8	0.625	1	8	6.75	3	3	5.5	5.5	28.62	5.091	2826.9	1.2	Angle	3
8	8	0.875	0.75	6	2.5	2.5	2.25	3.5	3.5	102.12	0.457	4196.8	51.1	Bolt	3
8	8	0.875	0.75	6	4.5	2.5	2.25	3.5	3.5	64.62	1.467	2090.5	10.4	Bolt	3
8	8	0.875	0.75	6	6.75	2.5	2.25	3.5	3.5	38.25	2.522	1400.0	4.3	Bolt	3
8	8	0.875	0.75	8	2.5	3	3	5.5	3.5	108.27	0.333	4255.3	84.7	Bolt	3
8	8	0.875	0.75	8	4.5	3	3	5.5	3.5	71.90	1.035	2100.5	16.4	Bolt	3
8	8	0.875	0.75	8	6.75	3	3	5.5	3.5	40.83	1.413	1057.3	6.2	Bolt	3
8	8	0.875	0.75	8	2.5	3	3	5.5	5.5	108.70	0.342	4196.5	76.1	Bolt	3
8	8	0.875	0.75	8	4.5	3	3	5.5	5.5	72.06	1.051	2111.9	16.5	Bolt	3
8	8	0.875	0.75	8	6.75	3	3	5.5	5.5	40.77	1.413	1115.7	6.2	Bolt	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
8	8	0.875	0.875	6	2.5	2.5	2.25	3.5	3.5	123.48	0.683	7311.2	44.1	Bolt	3
8	8	0.875	0.875	6	4.5	2.5	2.25	3.5	3.5	75.14	2.307	2652.3	6.6	Angle	3
8	8	0.875	0.875	6	6.75	2.5	2.25	3.5	3.5	41.91	3.442	930.3	3.1	Angle	3
8	8	0.875	0.875	8	2.5	3	3	5.5	3.5	138.61	0.615	5172.3	51.7	Bolt	3
8	8	0.875	0.875	8	4.5	3	3	5.5	3.5	92.03	2.253	2581.4	9.1	Bolt	3
8	8	0.875	0.875	8	6.75	3	3	5.5	3.5	53.34	3.89	1266.2	2.9	Bolt	3
8	8	0.875	0.875	8	2.5	3	3	5.5	5.5	138.40	0.618	6991.8	54.1	Bolt	3
8	8	0.875	0.875	8	4.5	3	3	5.5	5.5	92.21	2.283	2630.7	9.5	Bolt	3
8	8	0.875	0.875	8	6.75	3	3	5.5	5.5	53.29	3.882	2086.8	2.7	Bolt	3
8	8	0.875	1	6	2.5	2.5	2.25	3.5	3.5	143.94	0.982	8692.6	33.1	Angle	4
8	8	0.875	1	6	4.5	2.5	2.25	3.5	3.5	75.32	2.137	3429.2	6.9	Angle	3
8	8	0.875	1	6	6.75	2.5	2.25	3.5	3.5	42.03	3.488	3335.9	2.8	Angle	3
8	8	0.875	1	8	2.5	3	3	5.5	3.5	159.93	0.825	8463.1	43.4	Bolt	3
8	8	0.875	1	8	4.5	3	3	5.5	3.5	96.42	2.431	3247.3	8.5	Angle	3
8	8	0.875	1	8	6.75	3	3	5.5	3.5	54.21	3.765	1194.8	3.2	Angle	3
8	8	0.875	1	8	2.5	3	3	5.5	5.5	160.08	0.832	8280.7	46.5	Bolt	3
8	8	0.875	1	8	4.5	3	3	5.5	5.5	96.30	2.418	3376.8	8.6	Angle	3
8	8	0.875	1	8	6.75	3	3	5.5	5.5	54.34	3.795	3155.8	3.0	Angle	3
8	8	1	0.75	6	2.625	2.5	2.25	3.5	3.5	109.79	0.318	4697.7	92.3	Bolt	3
8	8	1	0.75	6	4.5	2.5	2.25	3.5	3.5	75.29	0.958	2699.1	22.9	Bolt	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
8	8	1	0.75	6	6.75	2.5	2.25	3.5	3.5	41.41	1.226	1351.6	7.4	Bolt	3
8	8	1	0.75	8	2.625	3	3	5.5	3.5	108.21	0.215	4744.9	188.3	Bolt	3
8	8	1	0.75	8	4.5	3	3	5.5	3.5	84.75	0.684	2733.7	30.6	Bolt	3
8	8	1	0.75	8	6.75	3	3	5.5	3.5	43.94	0.64	1300.3	13.0	Bolt	3
8	8	1	0.75	8	2.625	3	3	5.5	5.5	110.22	0.229	6264.9	174.9	Bolt	3
8	8	1	0.75	8	4.5	3	3	5.5	5.5	84.70	0.68	2700.6	28.2	Bolt	3
8	8	1	0.75	8	6.75	3	3	5.5	5.5	43.88	0.639	1327.5	12.1	Bolt	3
8	8	1	0.875	6	2.625	2.5	2.25	3.5	3.5	139.89	0.591	8158.6	63.4	Bolt	3
8	8	1	0.875	6	4.5	2.5	2.25	3.5	3.5	94.43	1.937	3339.2	11.3	Angle	3
8	8	1	0.875	6	6.75	2.5	2.25	3.5	3.5	53.12	2.953	1162.9	4.1	Angle	3
8	8	1	0.875	8	2.625	3	3	5.5	3.5	149.40	0.444	5803.0	83.0	Bolt	3
8	8	1	0.875	8	4.5	3	3	5.5	3.5	107.67	1.48	3297.6	17.3	Bolt	3
8	8	1	0.875	8	6.75	3	3	5.5	3.5	58.28	1.881	1788.7	6.7	Bolt	3
8	8	1	0.875	8	2.625	3	3	5.5	5.5	149.27	0.445	5678.1	77.7	Bolt	3
8	8	1	0.875	8	4.5	3	3	5.5	5.5	108.12	1.522	3288.1	16.3	Bolt	3
8	8	1	0.875	8	6.75	3	3	5.5	5.5	58.00	1.841	1877.5	6.4	Bolt	3
8	8	1	1	6	2.625	2.5	2.25	3.5	3.5	161.91	0.795	9690.3	54.0	Bolt	3
8	8	1	1	6	4.5	2.5	2.25	3.5	3.5	96.42	1.852	4164.5	12.2	Angle	3
8	8	1	1	6	6.75	2.5	2.25	3.5	3.5	53.88	2.864	1483.6	4.3	Angle	3
8	8	1	1	8	2.625	3	3	5.5	3.5	180.12	0.688	9423.6	57.3	Bolt	3

Table C.1 (cont.) Parametric Bolted Angle Connection Data Set Definition and Predicted Analytical Response

Connection Geometry and Topology (in)										Connection Analytical Response and Failure					
L1	L2	Thick-ness	Bolt Dia.	width	g1	g2	g3	s1	s2	Force (kips)	Disp. (in)	Ki (kip/in)	Kp (kip/in)	Fail Mode	Failed Bolt/Angle Zone
8	8	1	1	8	4.5	3	3	5.5	3.5	122.20	2.097	4018.9	13.1	Angle	3
8	8	1	1	8	6.75	3	3	5.5	3.5	68.41	3.264	2041.3	4.2	Angle	3
8	8	1	1	8	2.625	3	3	5.5	5.5	180.31	0.701	9081.3	56.1	Bolt	3
8	8	1	1	8	4.5	3	3	5.5	5.5	122.19	2.098	4069.4	13.6	Angle	3
8	8	1	1	8	6.75	3	3	5.5	5.5	68.59	3.32	3386.7	4.1	Angle	3

APPENDIX D

ASSESSMENT OF PRYING STRENGTH MODELS USING ANALYTICAL BOLTED ANGLE PULL TEST DATA

The bolt angle connection capacities of all the cases in the analysis database determined by the analytical failure criteria defined in Chapter 5 are compare to the various prying strength models presented in Chapter 7. The common features used in these models to calculate the prying strength are the angle leg size connected to the tension bolt, bolt diameter, tension bolt size, and the angle width. The angle capacity vs. angle thickness envelope can be plotted cases with these common parameters for varying angle thickness. Thus all the 405 analysis cases can be compared to the capacities determined using the different prying models with only 90 figures.

All the models comprise of three limit states which form an envelope with the upper limit being the full bolt tensile capacity. The two other limit state which represent different modes of mechanisms leading to failure are plotted in these figures with red and green dashed lines which are referred to Equation 1 and 2 for each prying model. This is consistent with the equations presented for each prying model in Chapter 7.

In each figure two groups of cases with common parameters are presented and compared to six different prying strength models. The plots on the left in each figure compare the capacity of the group of angles with common parameters, determined by analyses, to the previous and current AISC prying strength models. The middle plots compare the data to Eurocode model and proposed modified Eurocode model. Finally, the plots on the right compare the data to the Hybrid model and the proposed modified Hybrid model. Note that the shape of data points note the mode of failure for each analysis case. Data points with failure in the angle leg is plotted using a circle while those with bolt failure is plotted with a diamond.

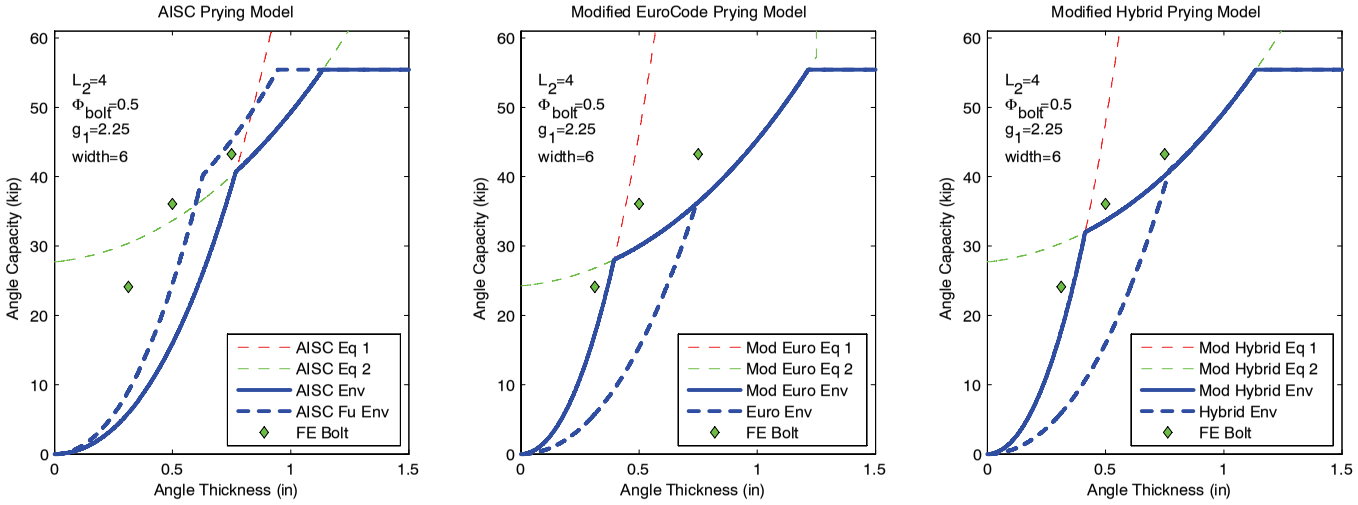
The envelopes of the prying strength limit states presented in Chapter 7 which are graphically presented in Figures D.1 through D.45 are calculated using the following referred equations:

- AISC Prying strength model using steel yield strength, Fy – see Equations 7.1 through 7.3
- AISC prying strength model using steel ultimate strength, Fu – same equations as above substituting Fu instead of Fy
- Eurocode prying strength model – see Equations 7.4 through 7.6
- Hybrid prying strength model – see Section 7.1.3
- Modified hybrid prying strength model – see Equations 7.10 through 7.12
- Modified Eurocode prying strength model – see Equations 7.7 through 7.9

The following material strengths are used while calculating the prying strengths:

- Angle steel yield strength, F_y=41 ksi
- Angle steel ultimate strength, F_u=63 ksi
- Bolt steel ultimate strength, F_t=141.1 ksi
- Bolt steel shear strength, F_v=81.6 ksi

(a)



(b)

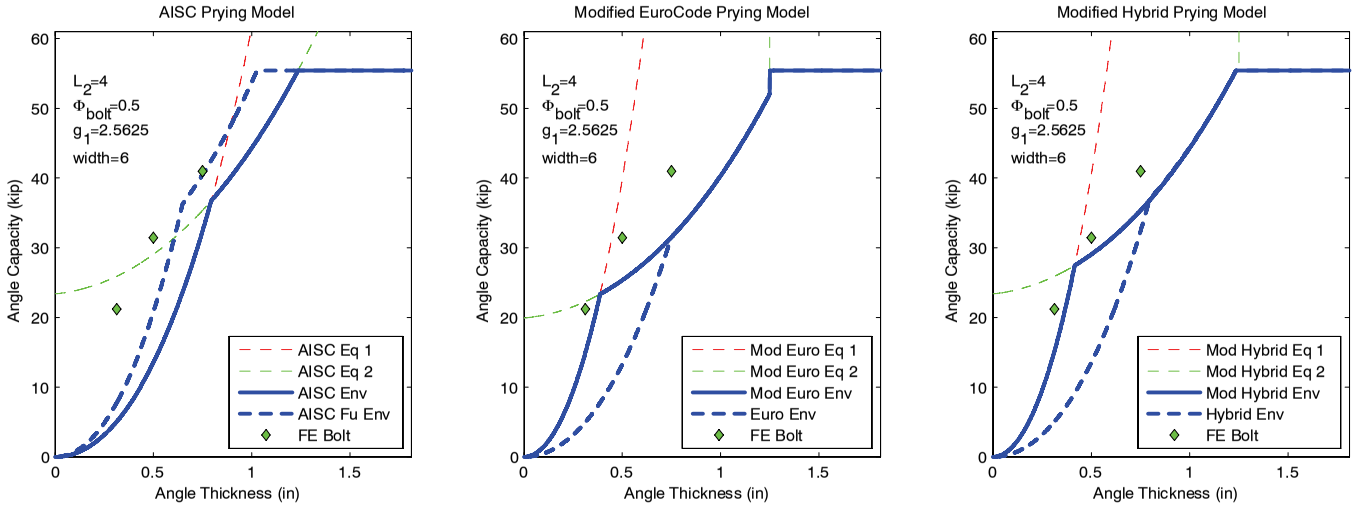


Figure D.1 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 4 in. leg, 0.5 in. bolt diameter, 2.25 in. gage, and 6 in. width; and (b) 4 in. leg, 0.5 in. bolt diameter, 2.5625 in. gage, and 6 in. width.

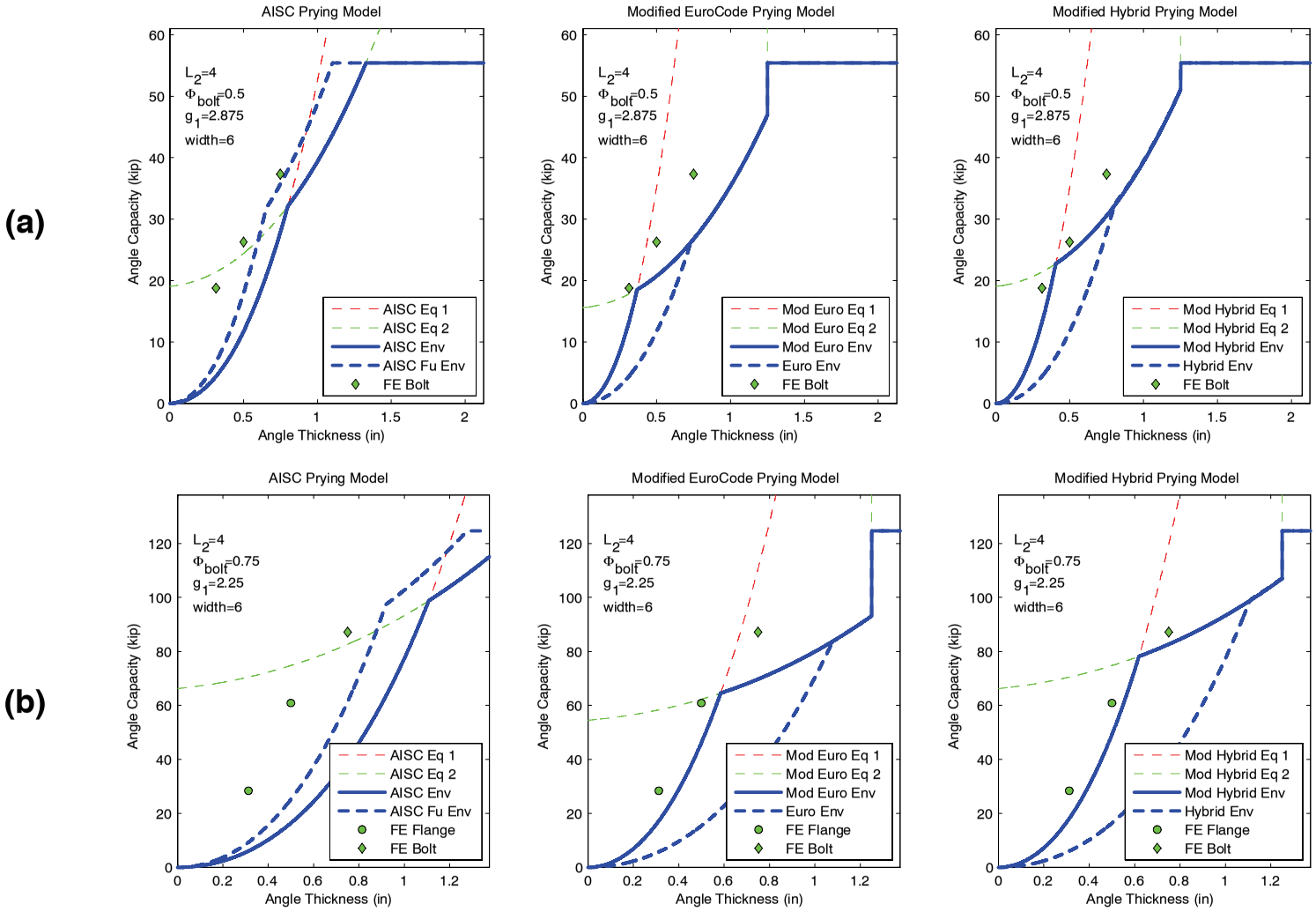


Figure D.2 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 4 in. leg, 0.5 in. bolt diameter, 2.875 in. gage, and 6 in. width; and (b) 4 in. leg, 0.75 in. bolt diameter, 2.25 in. gage, and 6 in. width.

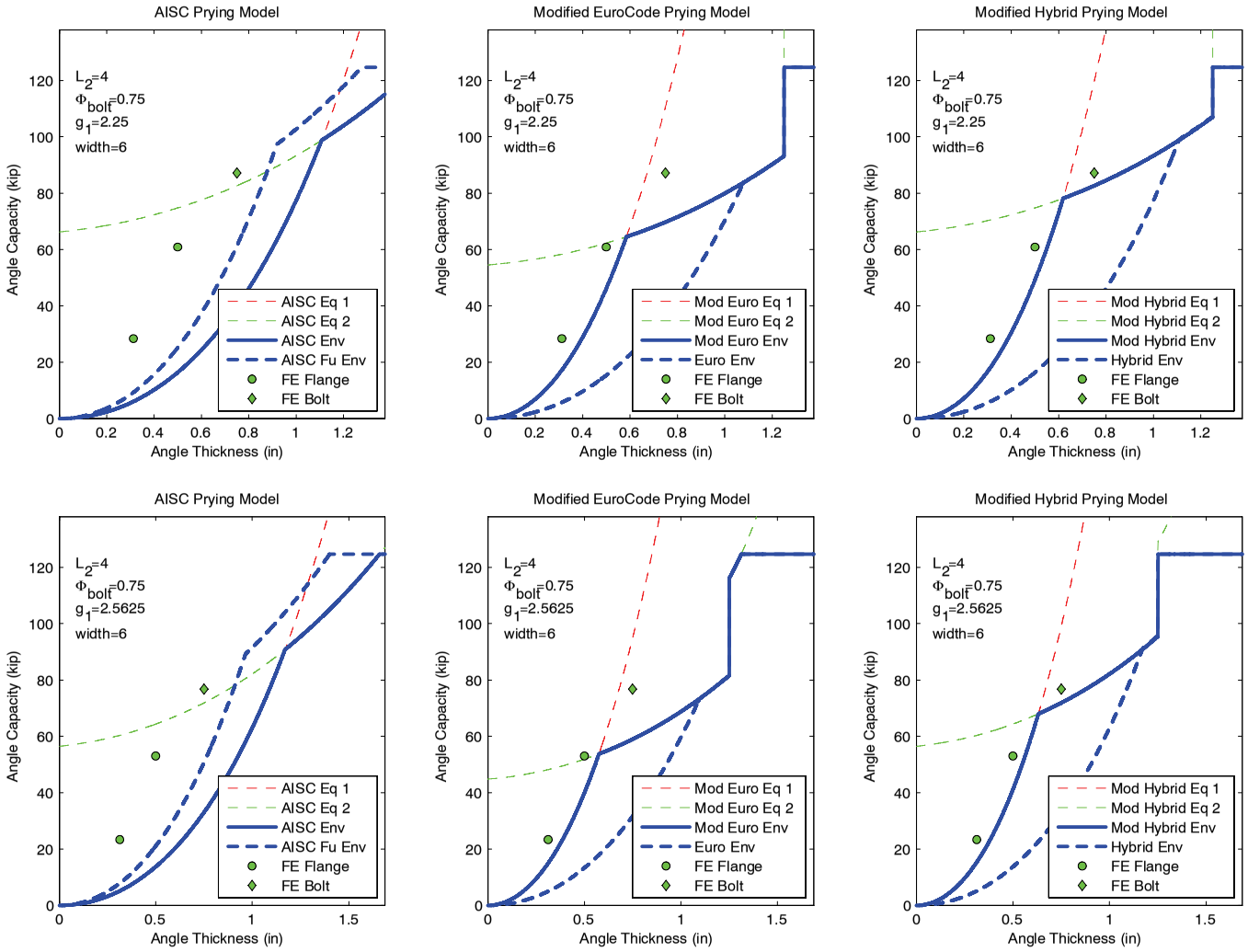


Figure D.3 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 4 in. leg, 0.75 in. bolt diameter, 2.5 in. gage, and 6 in. width; and (b) 4 in. leg, 0.75 in. bolt diameter, 2.5825 in. gage, and 6 in. width.

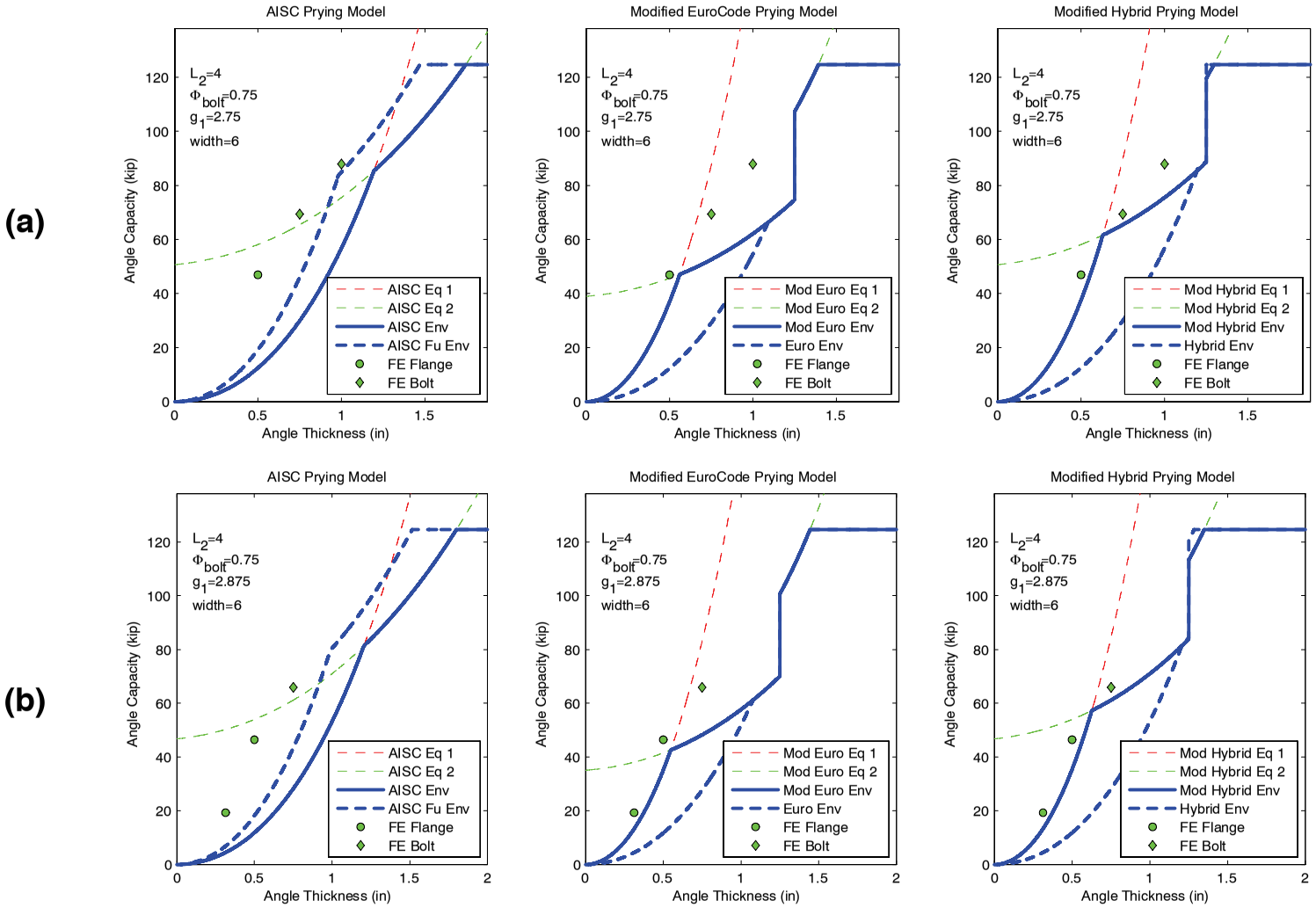


Figure D.4 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 4 in. leg, 0.75 in. bolt diameter, 2.75 in. gage, and 6 in. width; and (b) 4 in. leg, 0.75 in. bolt diameter, 2.875 in. gage, and 6 in. width.

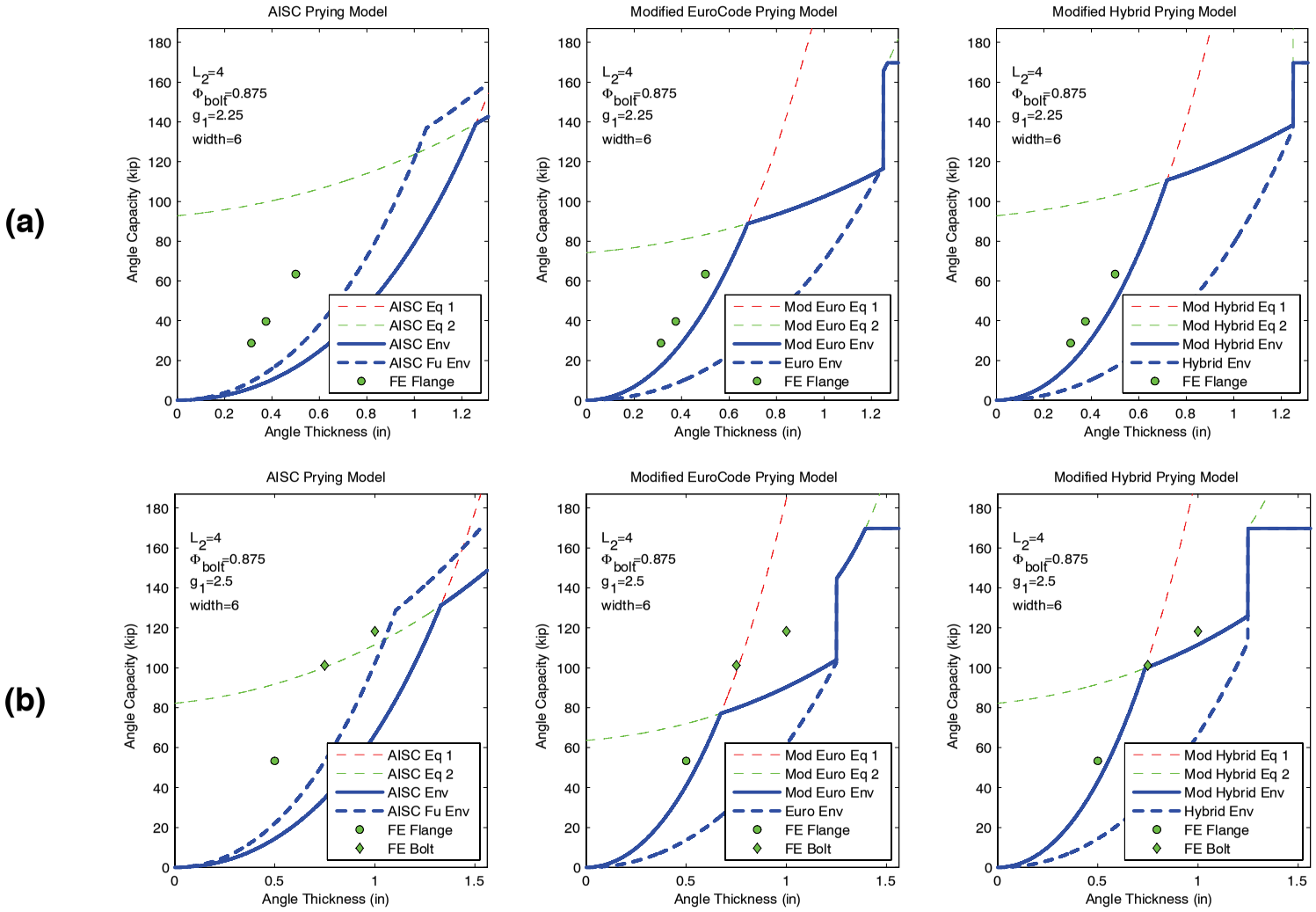


Figure D.5 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 4 in. leg, 0.875 in. bolt diameter, 2.25 in. gage, and 6 in. width; and (b) 4 in. leg, 0.875 in. bolt diameter, 2.5 in. gage, and 6 in. width.

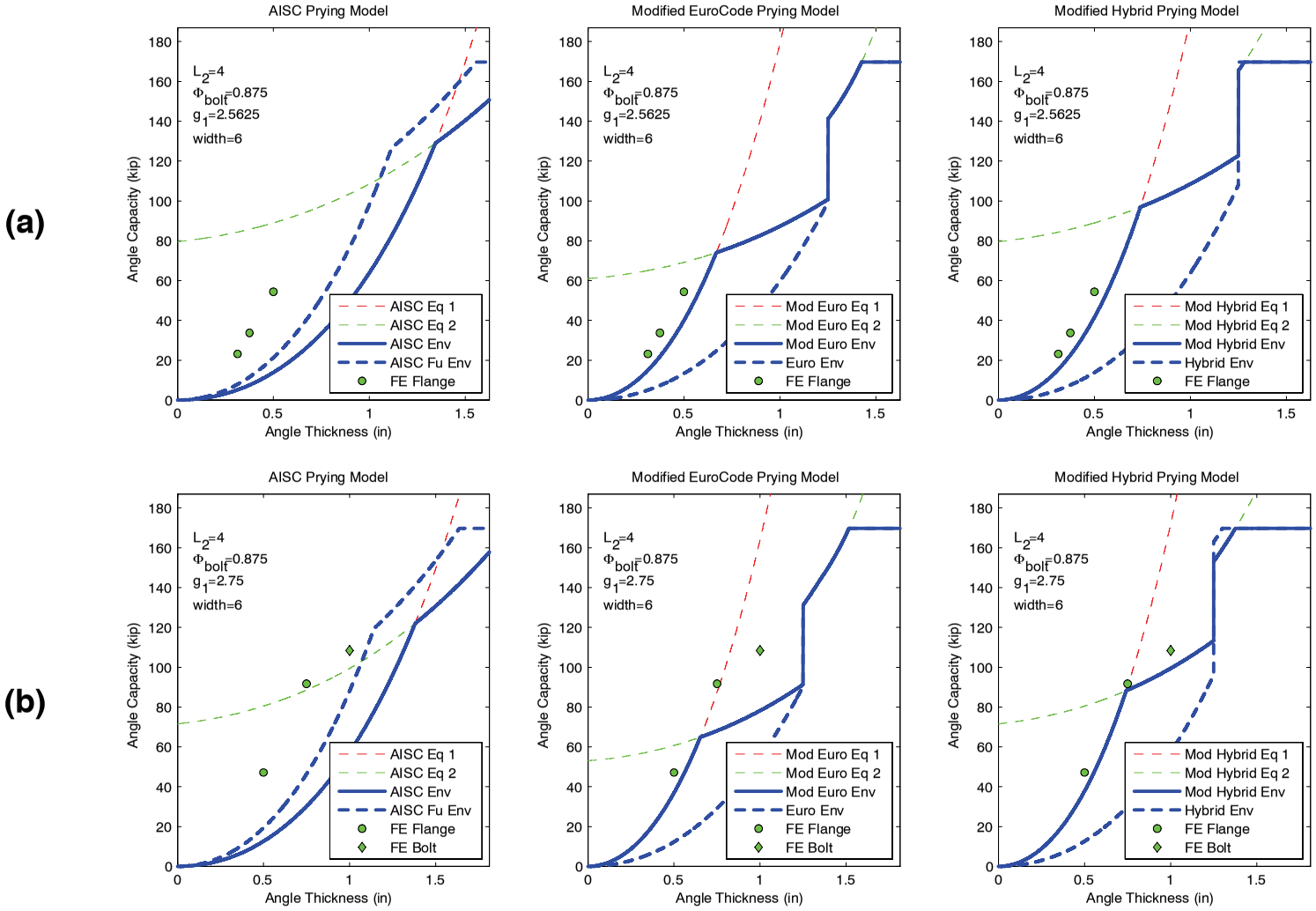


Figure D.6 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 4 in. leg, 0.875 in. bolt diameter, 2.5625 in. gage, and 6 in. width; and (b) 4 in. leg, 0.875 in. bolt diameter, 2.75 in. gage, and 6 in. width.

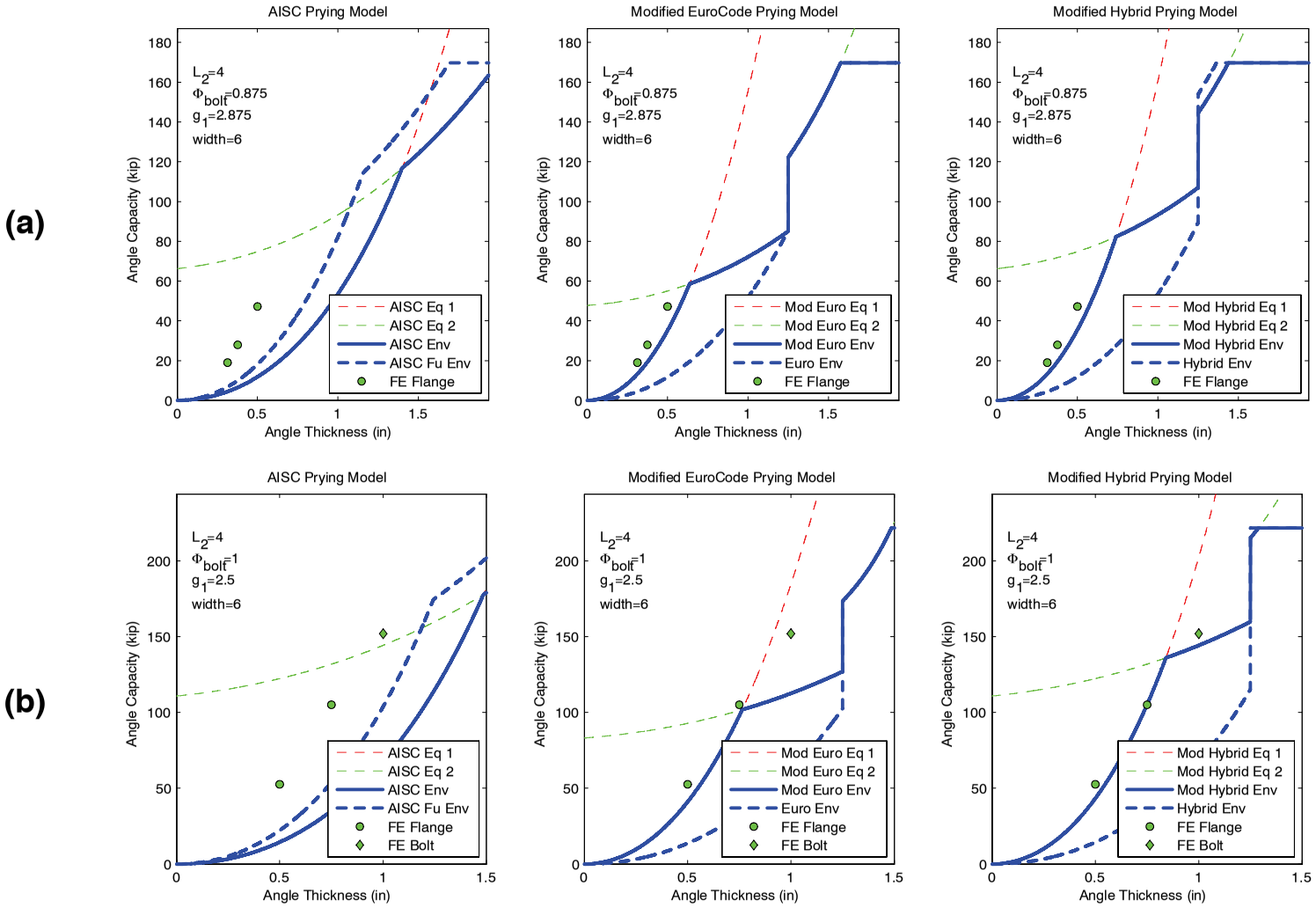


Figure D.7 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 4 in. leg, 0.875 in. bolt diameter, 2.875 in. gage, and 6 in. width; and (b) 4 in. leg, 1.0 in. bolt diameter, 2.5 in. gage, and 6 in. width.

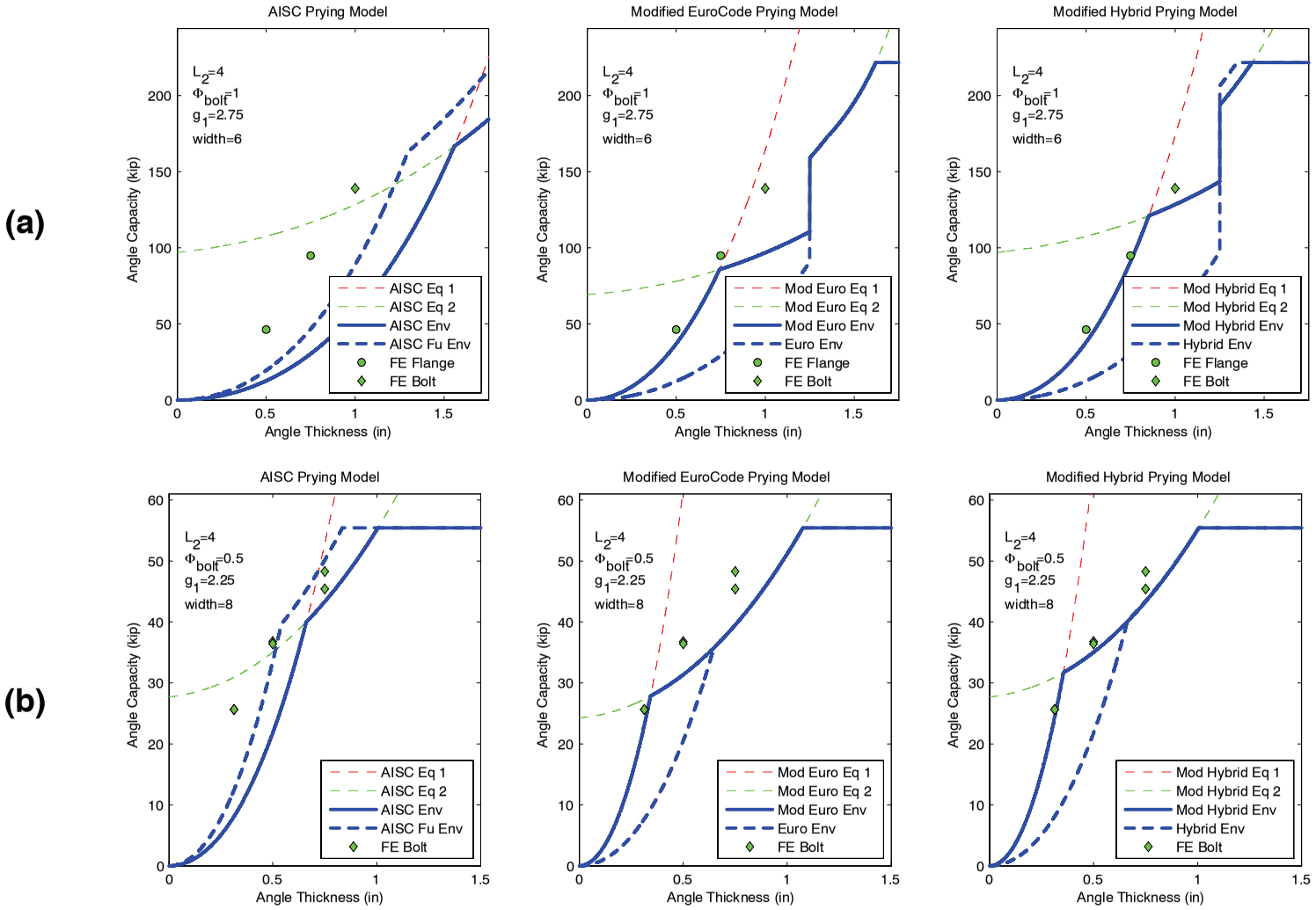


Figure D.8 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 4 in. leg, 1.0 in. bolt diameter, 2.75 in. gage, and 6 in. width; and (b) 4 in. leg, 0.5 in. bolt diameter, 2.25 in. gage, and 8 in. width.

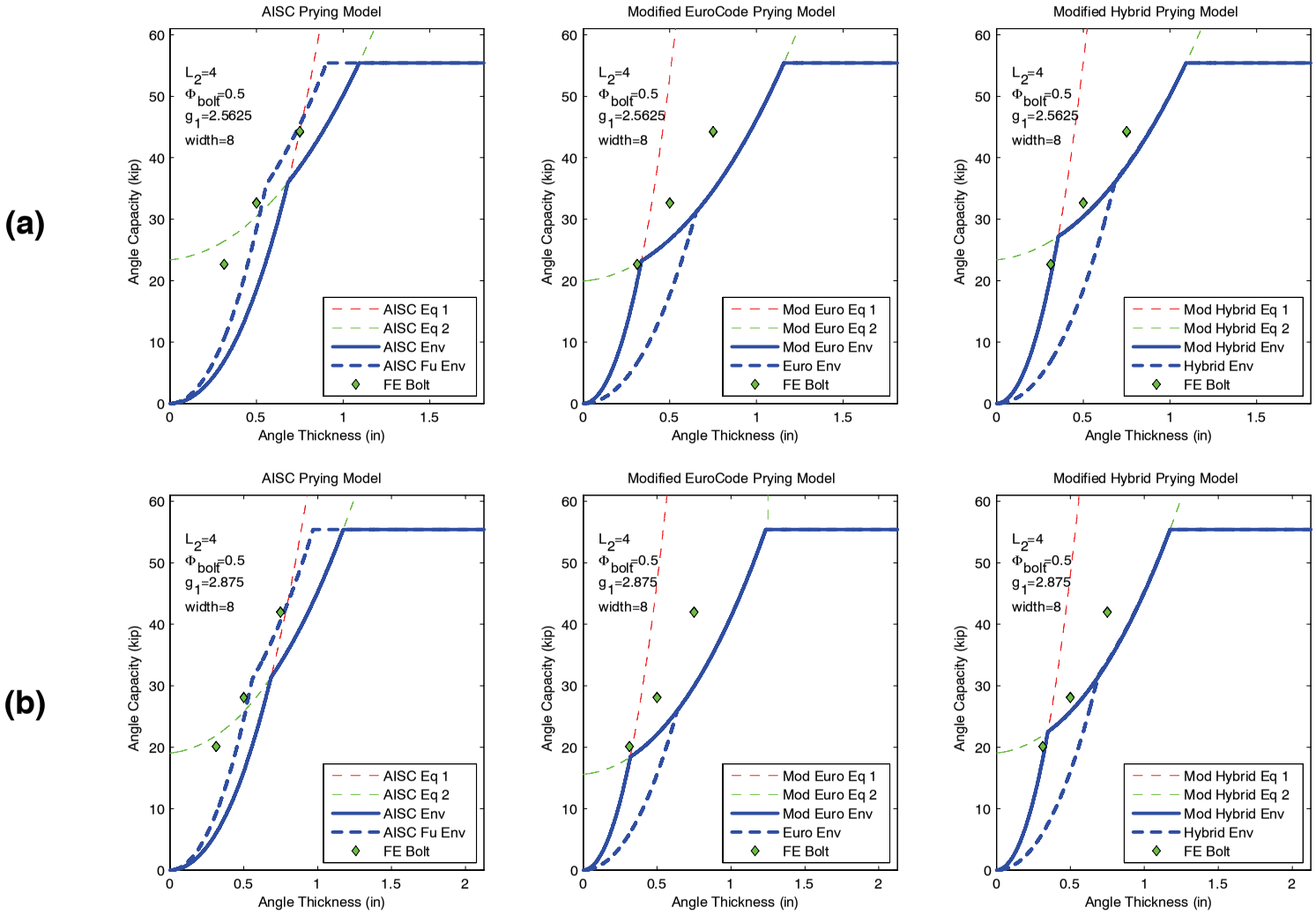


Figure D.9 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 4 in. leg, 0.5 in. bolt diameter, 2.5625 in. gage, and 8 in. width; and (b) 4 in. leg, 0.5 in. bolt diameter, 2.875 in. gage, and 8 in. width.

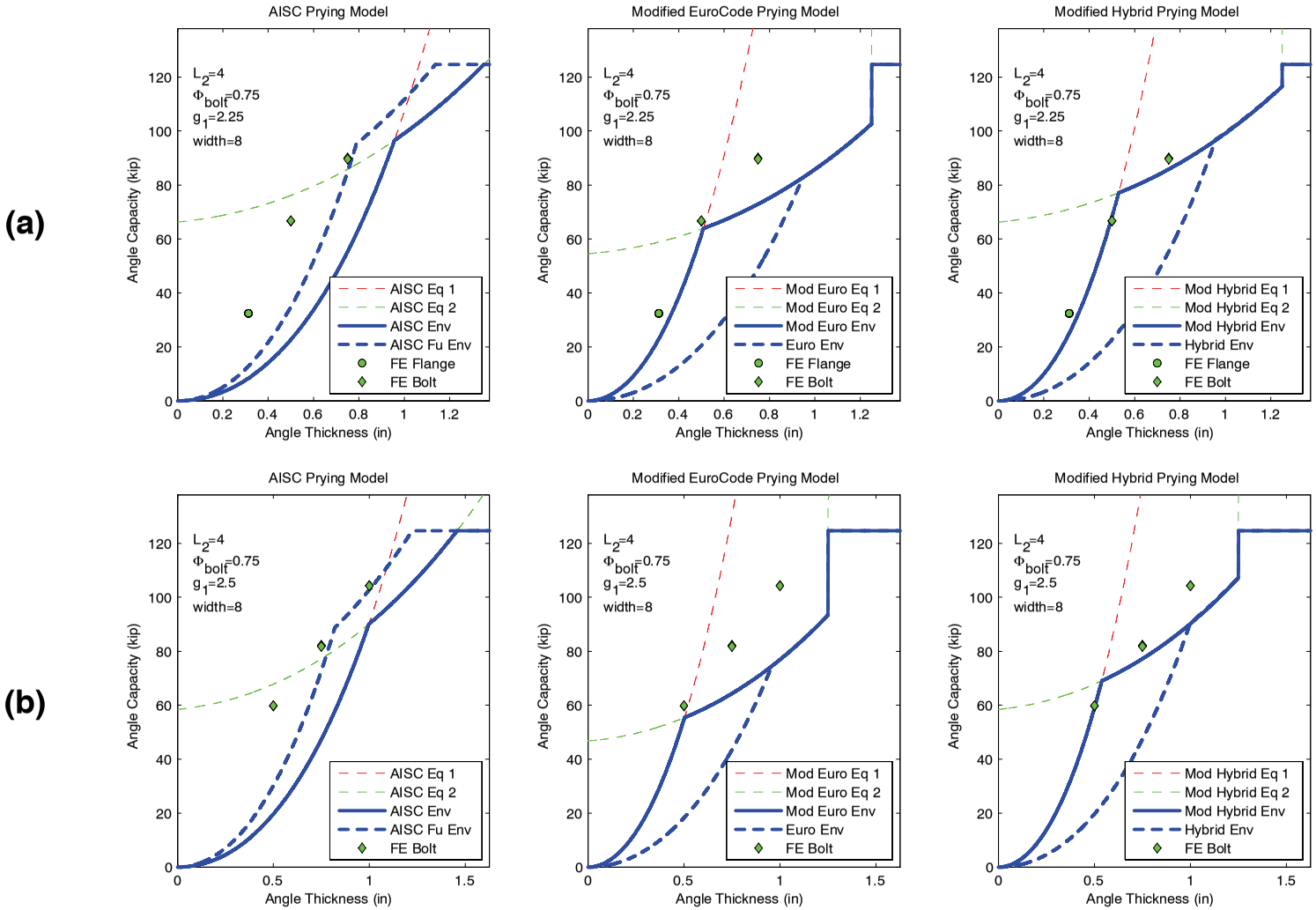


Figure D.10 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 4 in. leg, 0.75 in. bolt diameter, 2.25 in. gage, and 8 in. width; and (b) 4 in. leg, 0.75 in. bolt diameter, 2.5 in. gage, and 8 in. width.

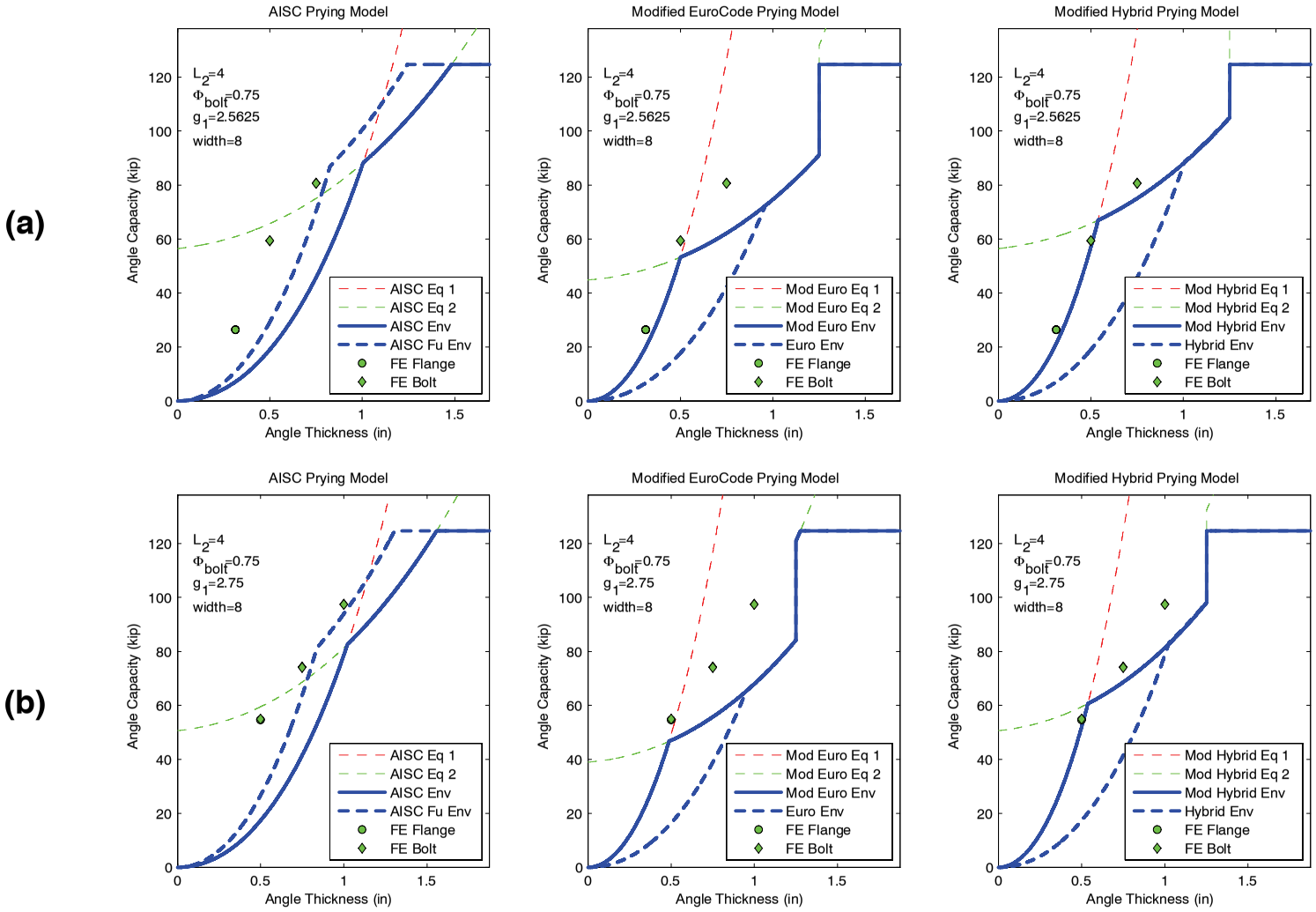
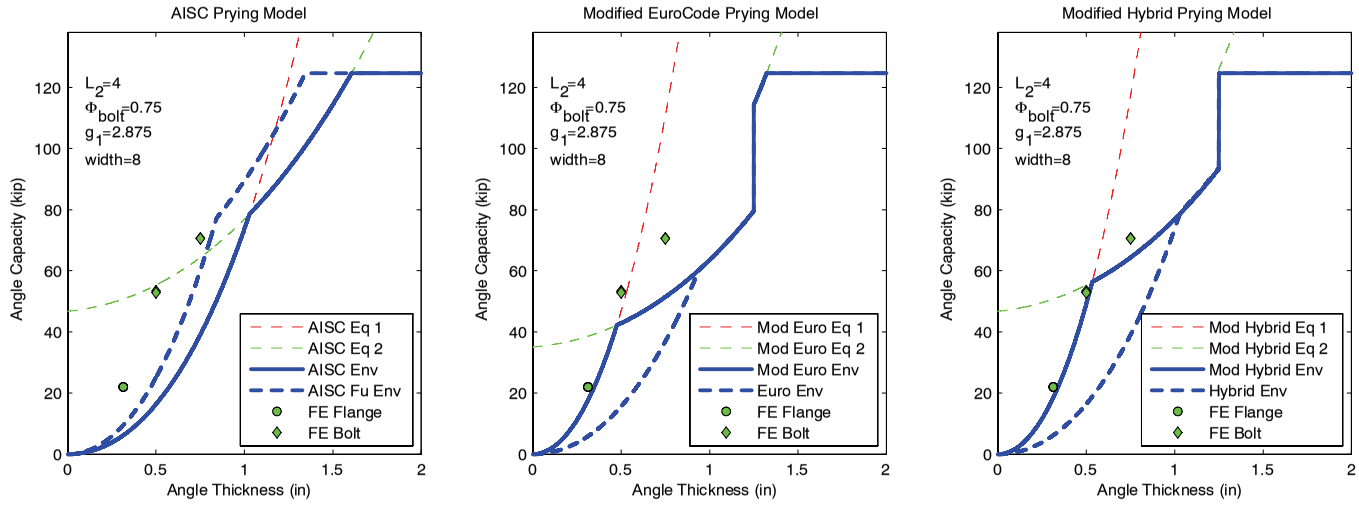


Figure D.11 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 4 in. leg, 0.75 in. bolt diameter, 2.5625 in. gage, and 8 in. width; and (b) 4 in. leg, 0.75 in. bolt diameter, 2.75 in. gage, and 8 in. width.

(a)



(b)

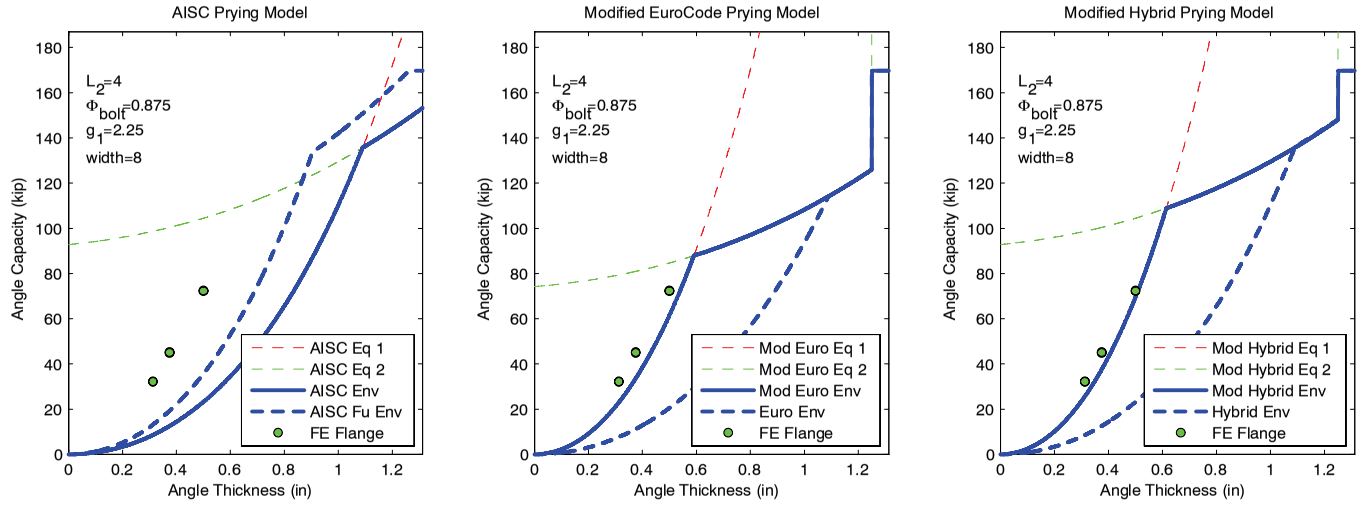


Figure D.12 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 4 in. leg, 0.75 in. bolt diameter, 2.875 in. gage, and 8 in. width; and (b) 4 in. leg, 0.875 in. bolt diameter, 2.25 in. gage, and 8 in. width.

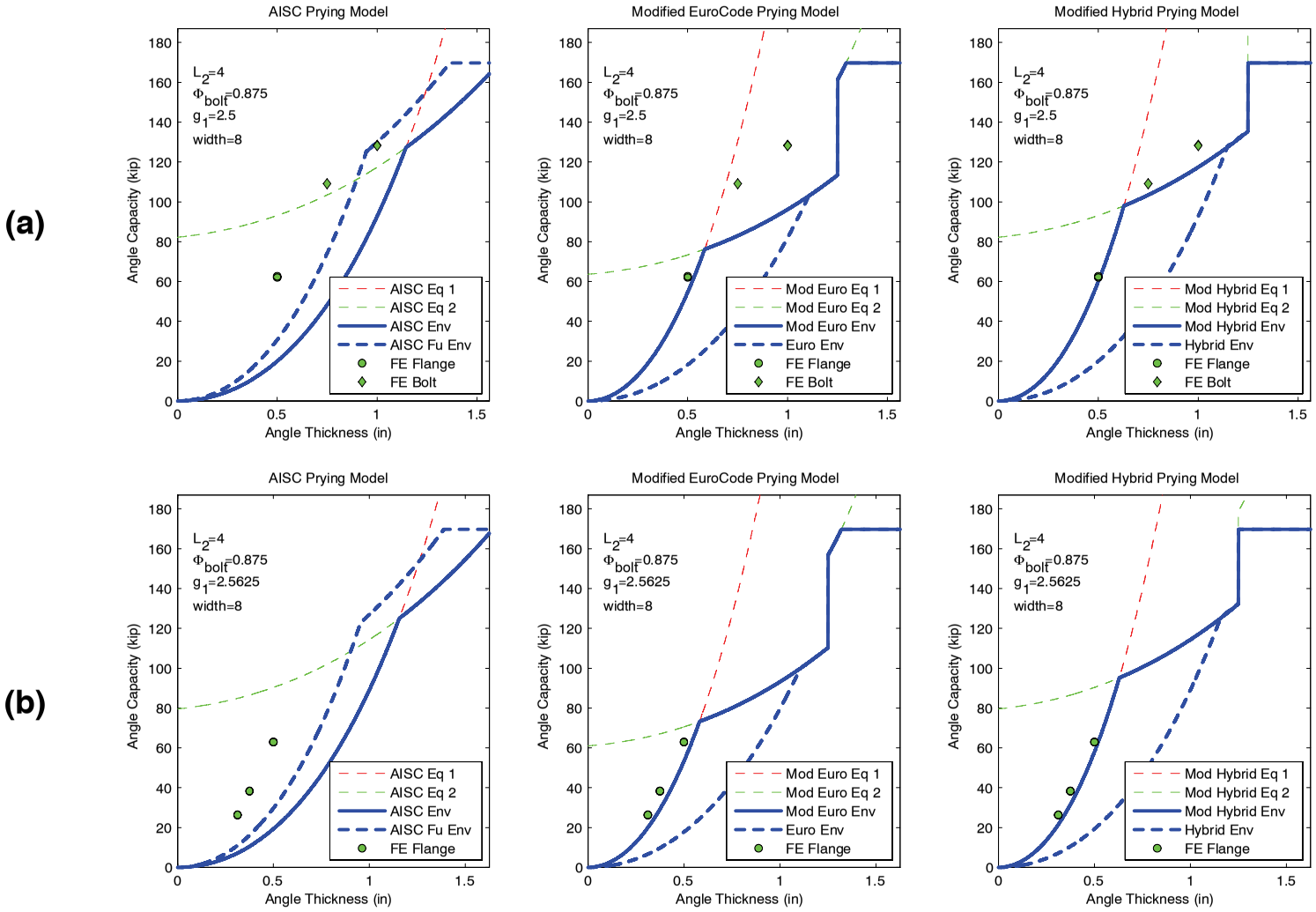


Figure D.13 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 4 in. leg, 0.875 in. bolt diameter, 2.5 in. gage, and 8 in. width; and (b) 4 in. leg, 0.875 in. bolt diameter, 2.5625 in. gage, and 8 in. width.

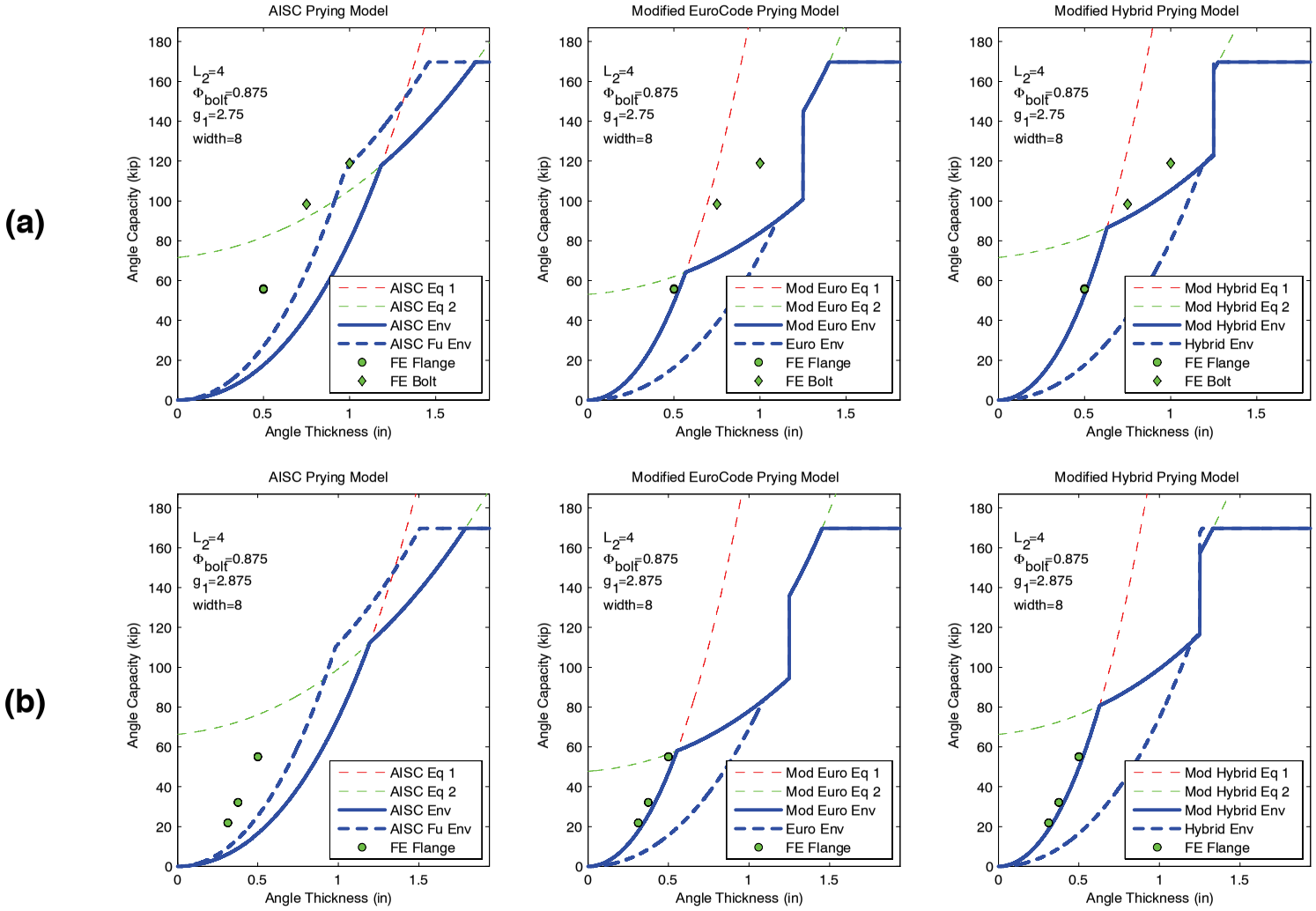


Figure D.14 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 4 in. leg, 0.875 in. bolt diameter, 2.75 in. gage, and 8 in. width; and (b) 4 in. leg, 0.875 in. bolt diameter, 2.875 in. gage, and 8 in. width.

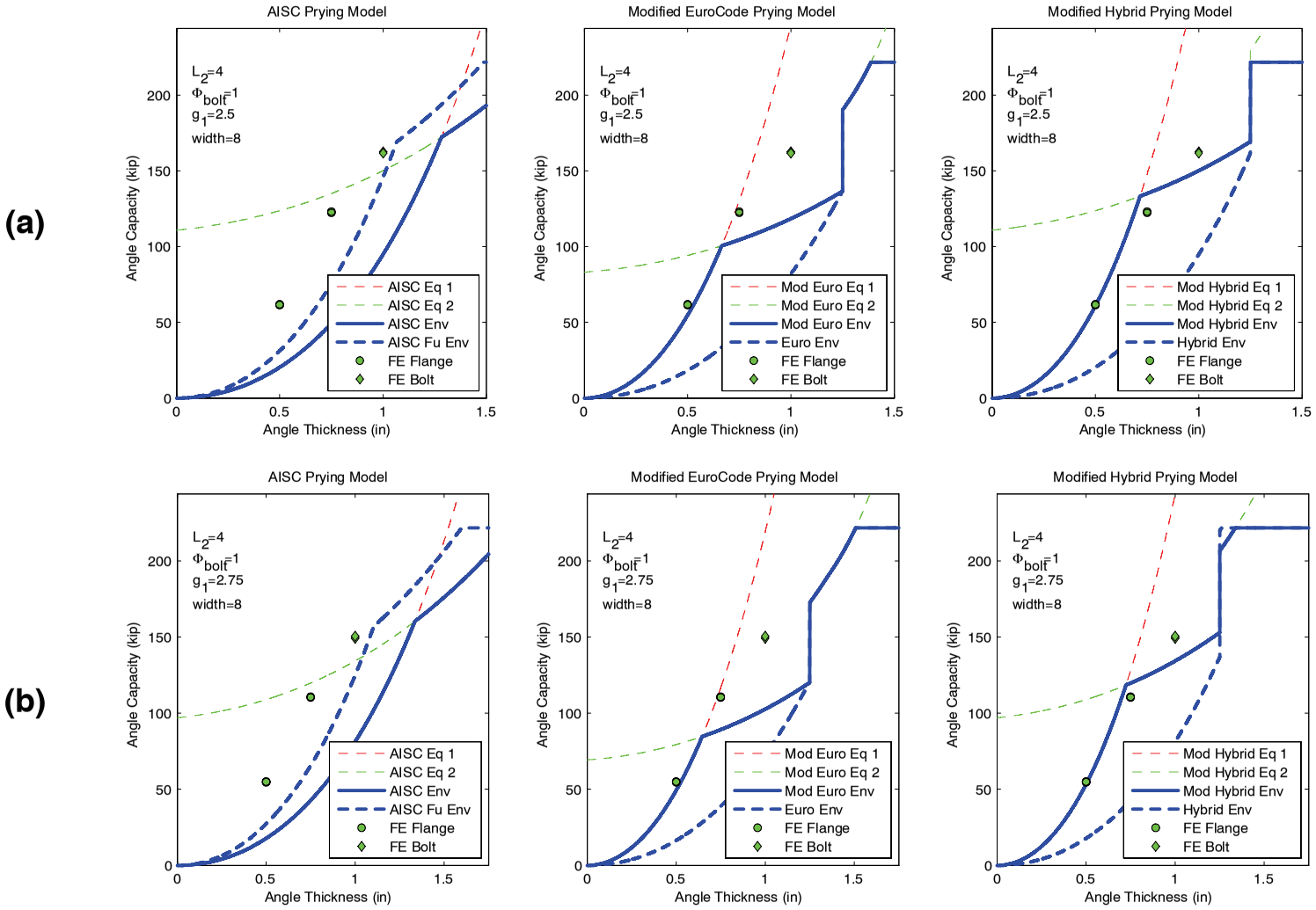


Figure D.15 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 4 in. leg, 1.0 in. bolt diameter, 2.5 in. gage, and 8 in. width; and (b) 4 in. leg, 1.0 in. bolt diameter, 2.75 in. gage, and 8 in. width.

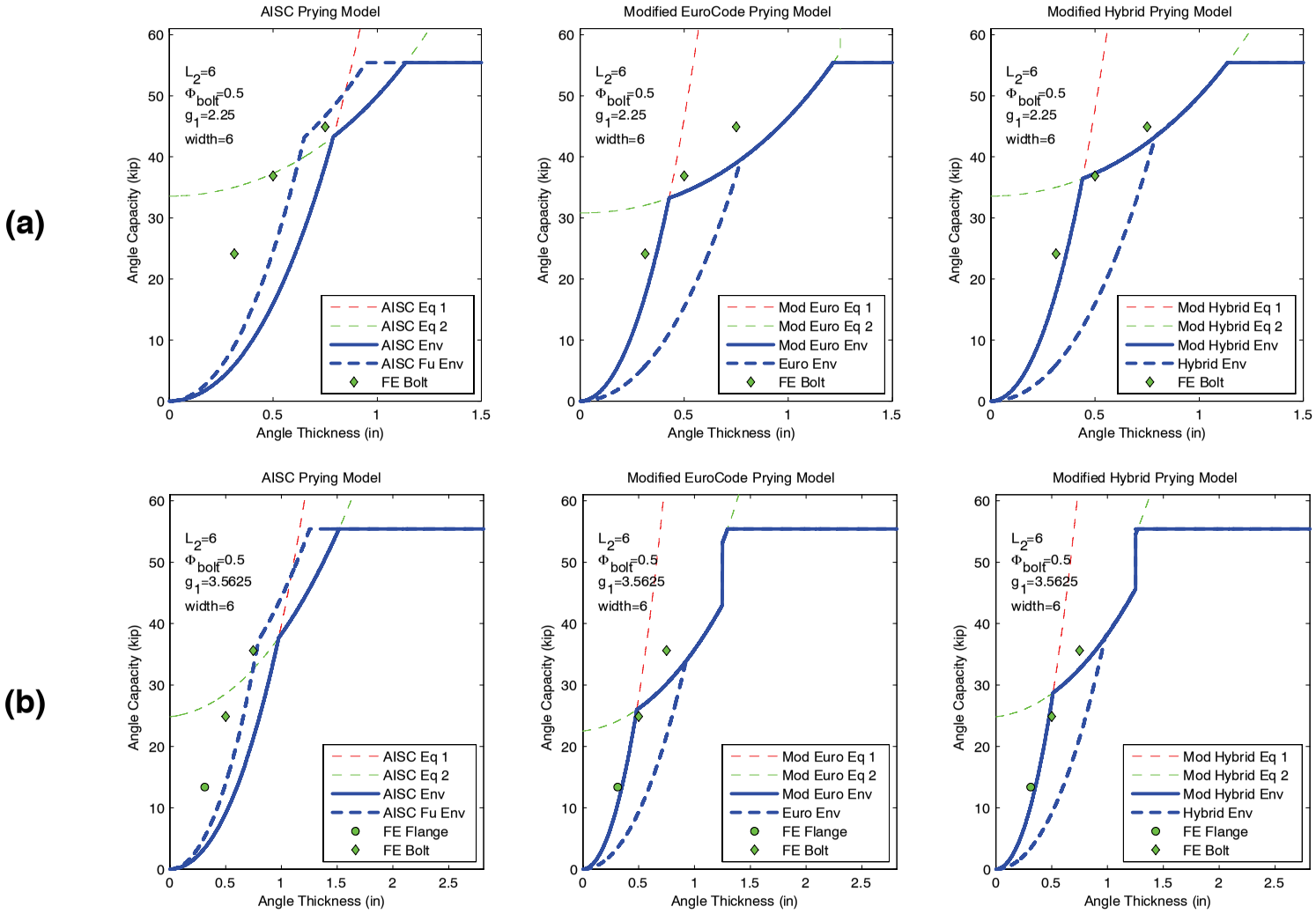


Figure D.16 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 0.5 in. bolt diameter, 2.25 in. gage, and 6 in. width; and (b) 6 in. leg, 0.5 in. bolt diameter, 3.5625 in. gage, and 6 in. width.

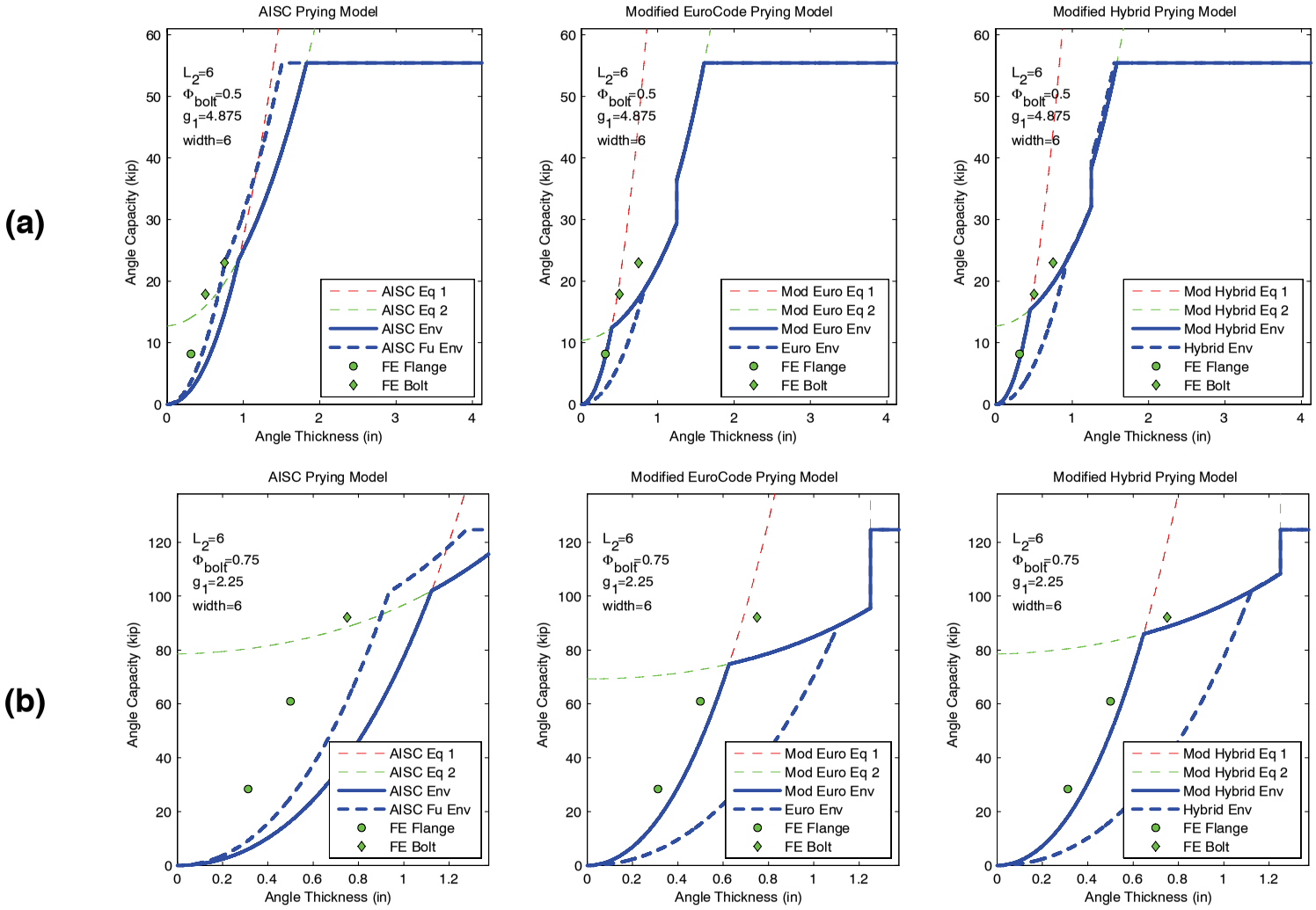


Figure D.17 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 0.5 in. bolt diameter, 4.875 in. gage, and 6 in. width; and (b) 6 in. leg, 0.75 in. bolt diameter, 2.25 in. gage, and 6 in. width.

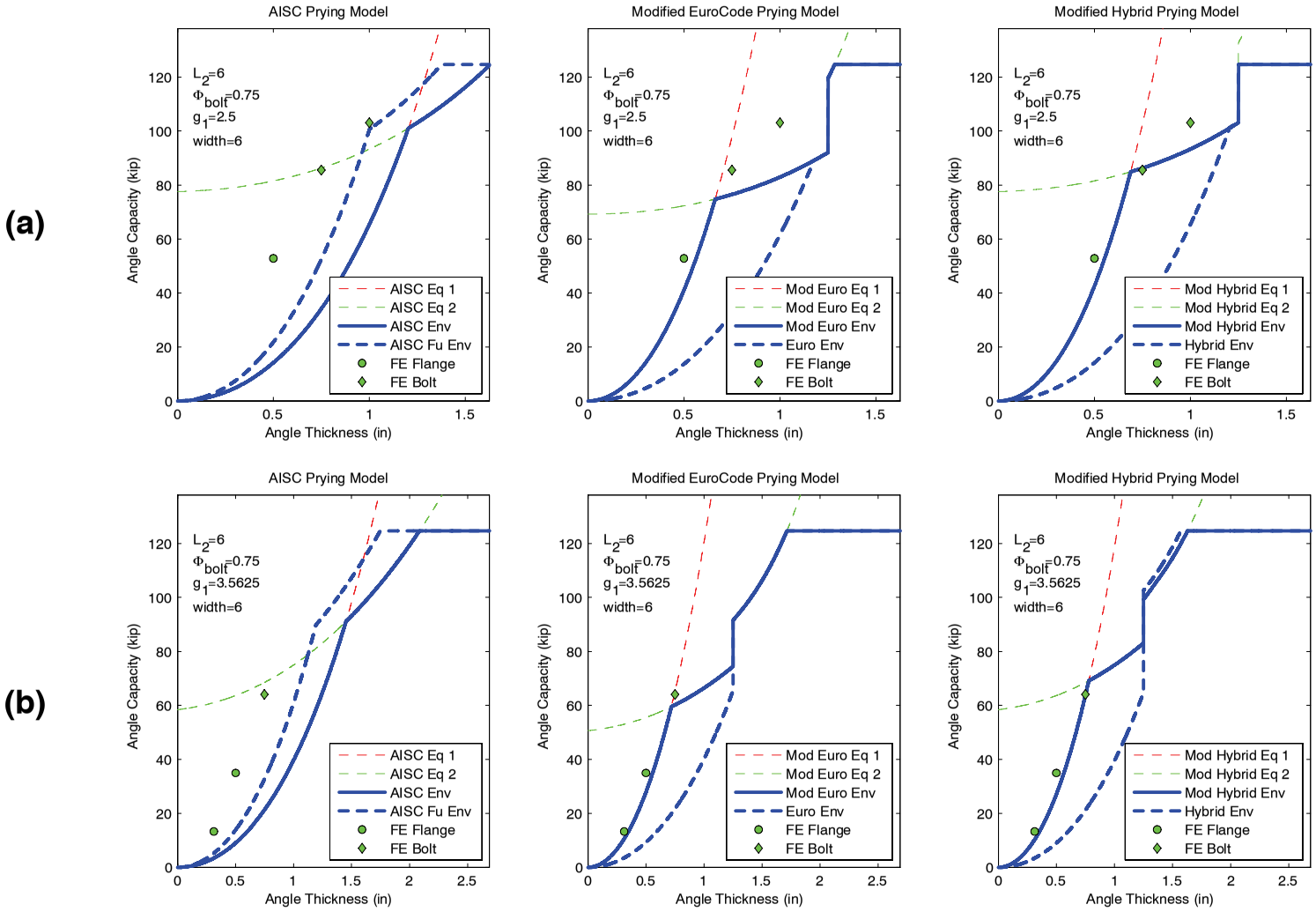


Figure D.18 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 0.75 in. bolt diameter, 2.5 in. gage, and 6 in. width; and (b) 6 in. leg, 0.875 in. bolt diameter, 3.5625 in. gage, and 6 in. width.

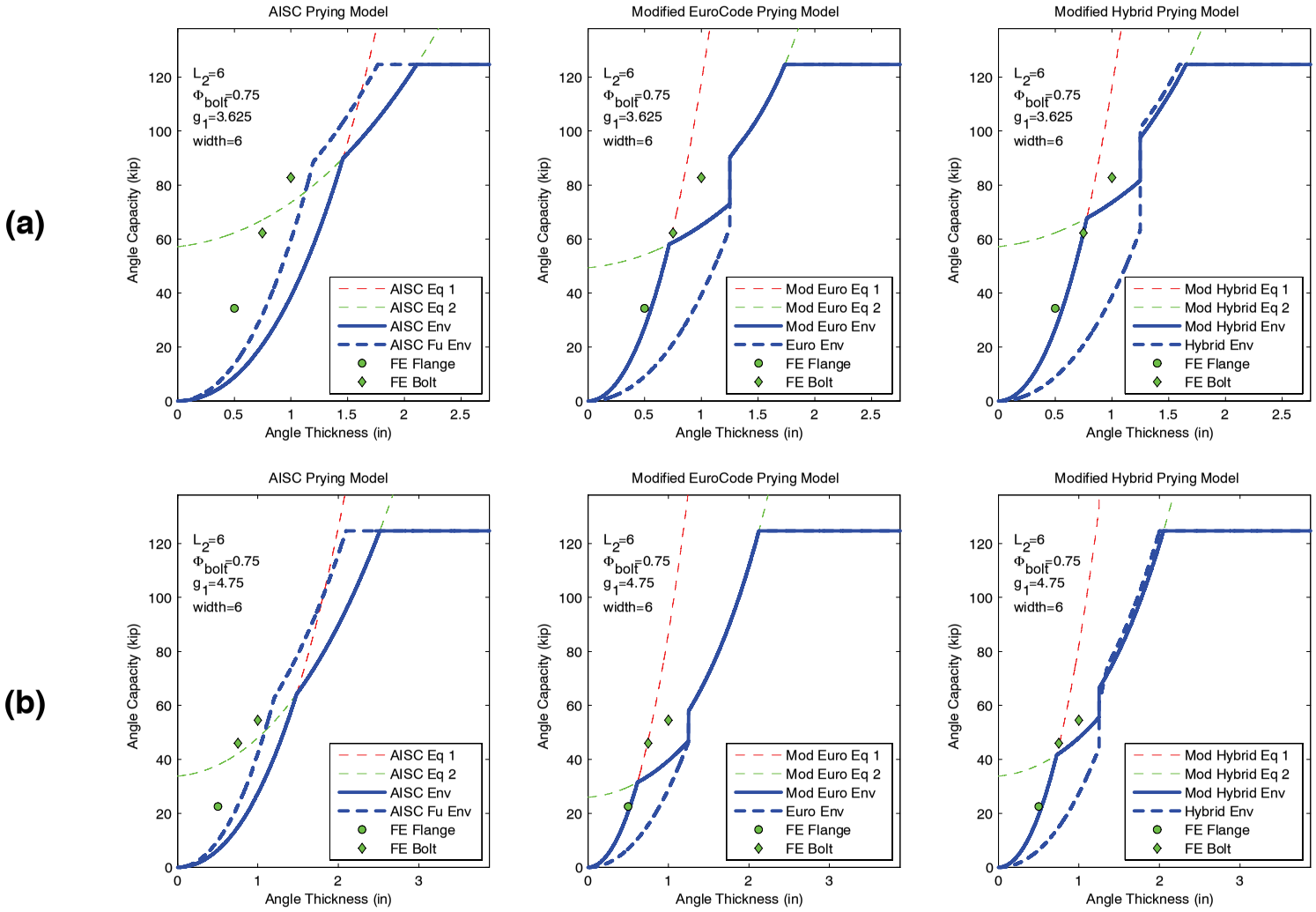


Figure D.19 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 0.75 in. bolt diameter, 3.625 in. gage, and 6 in. width; and (b) 6 in. leg, 0.75 in. bolt diameter, 4.75 in. gage, and 6 in. width.

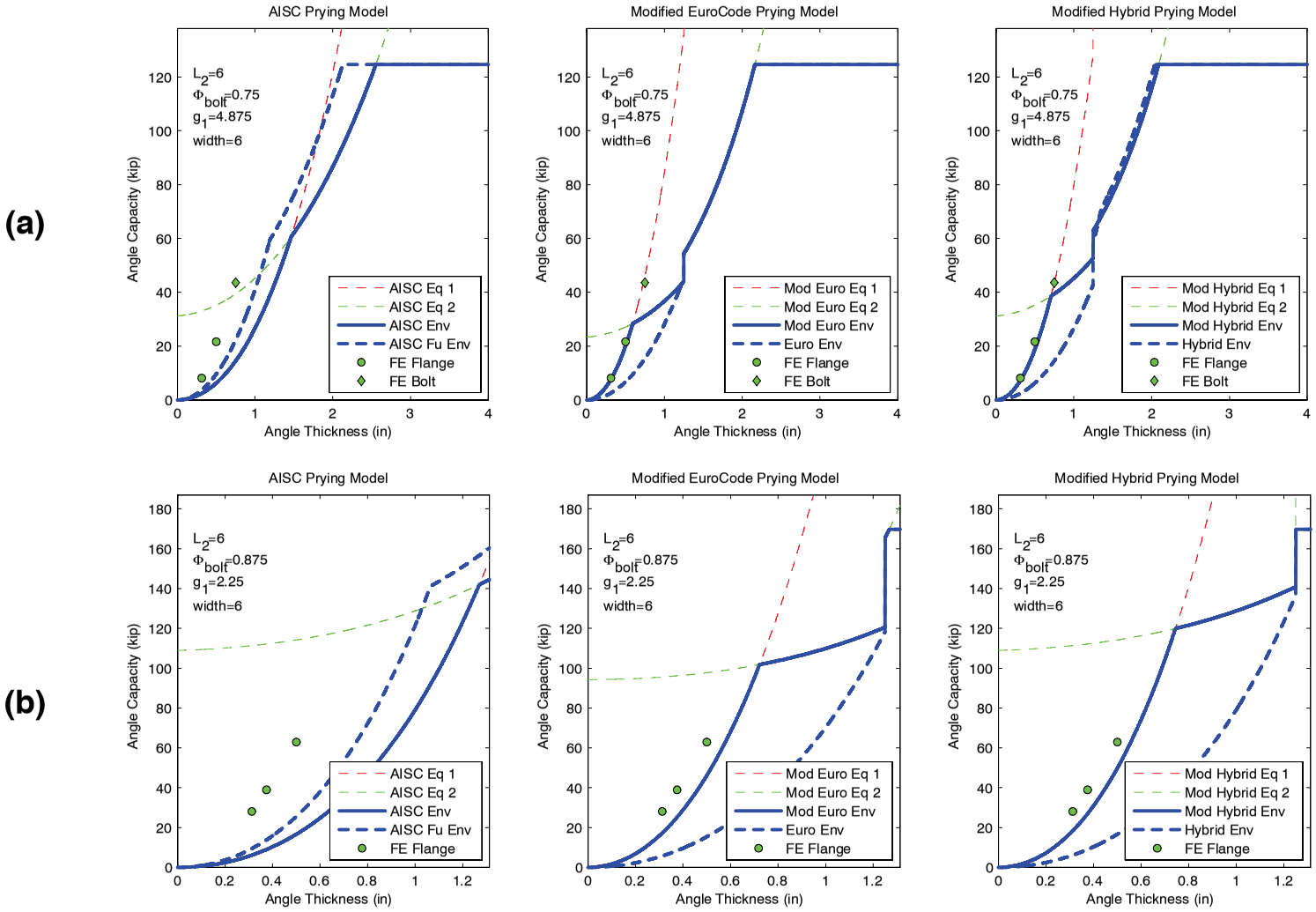


Figure D.20 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 0.75 in. bolt diameter, 4.875 in. gage, and 6 in. width; and (b) 6 in. leg, 0.875 in. bolt diameter, 2.25 in. gage, and 6 in. width.

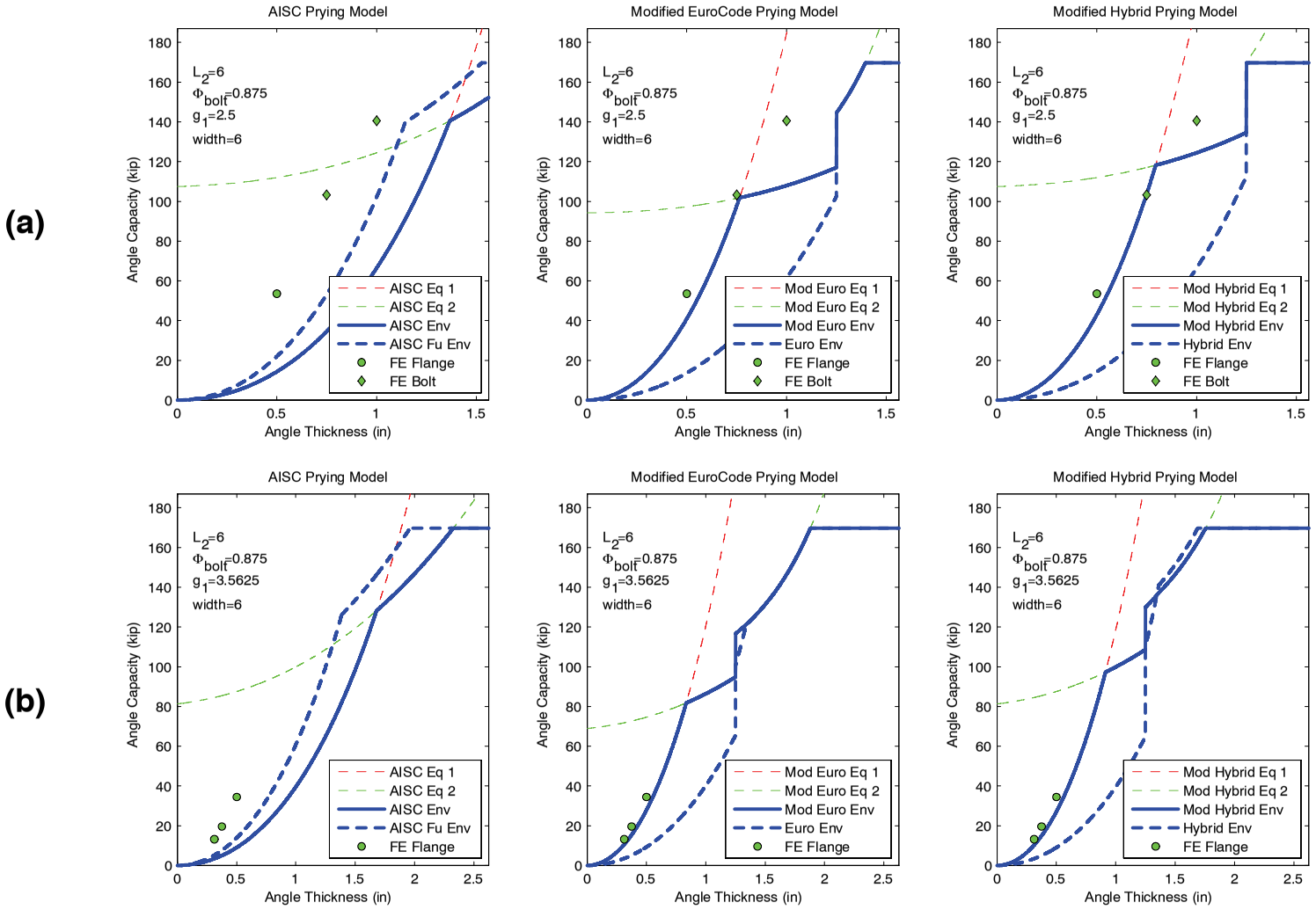


Figure D.21 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 0.875 in. bolt diameter, 2.5 in. gage, and 6 in. width; and (b) 6 in. leg, 0.875 in. bolt diameter, 3.5625 in. gage, and 6 in. width.

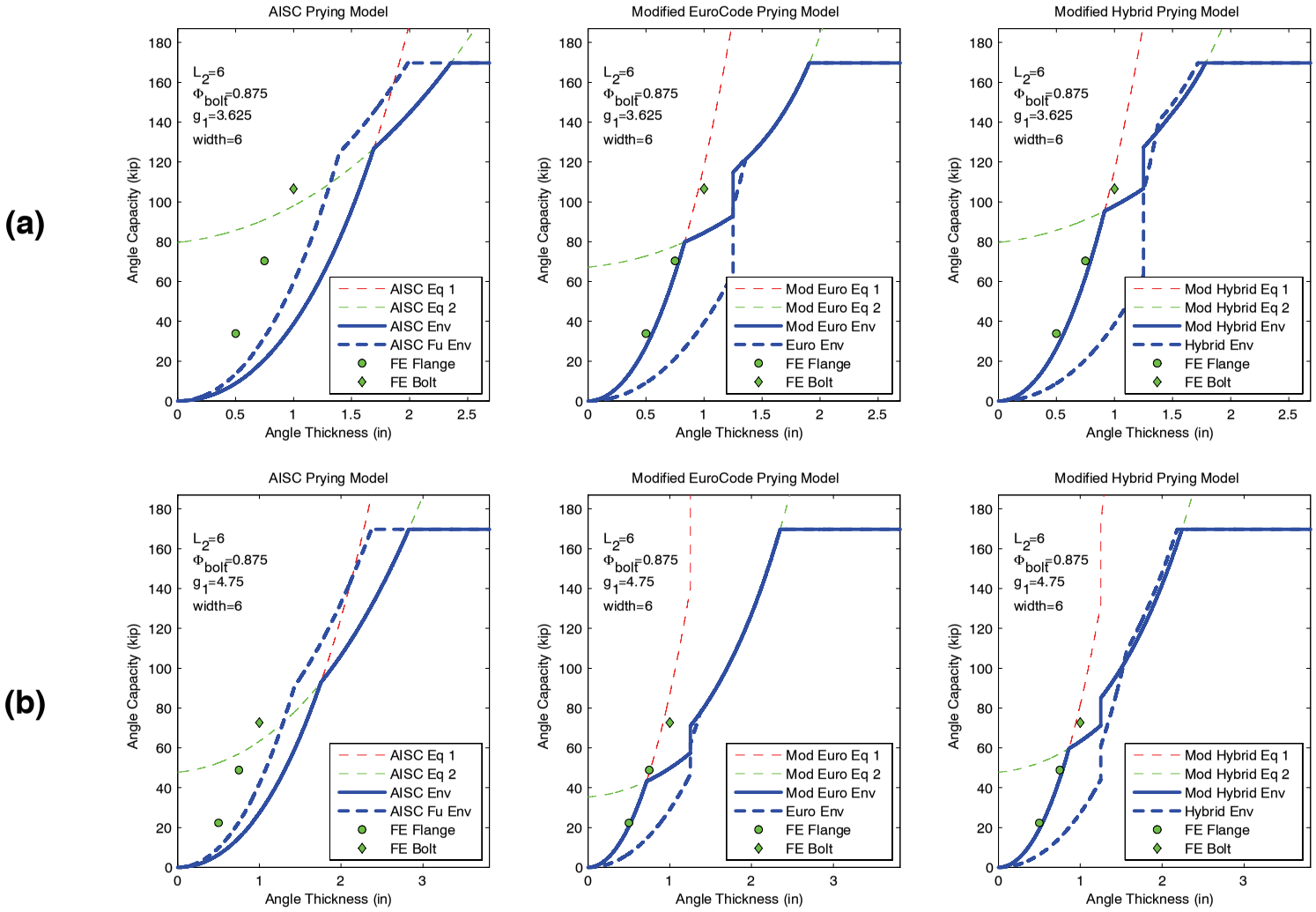


Figure D.22 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 0.875 in. bolt diameter, 3.625 in. gage, and 6 in. width; and (b) 6 in. leg, 0.875 in. bolt diameter, 4.75 in. gage, and 6 in. width.

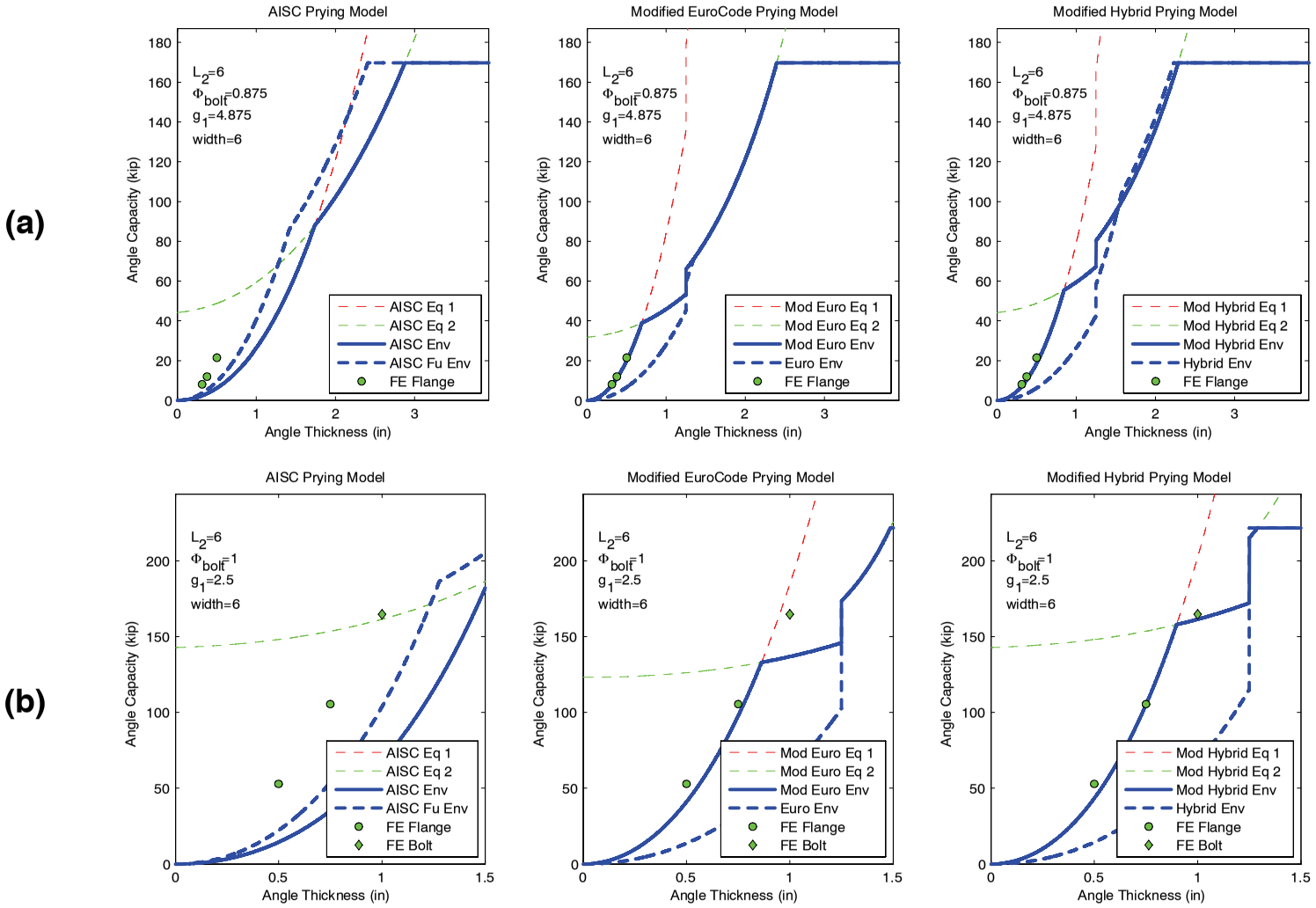


Figure D.23 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 0.875 in. bolt diameter, 4.875 in. gage, and 6 in. width; and (b) 6 in. leg, 1.0 in. bolt diameter, 2.5 in. gage, and 6 in. width.

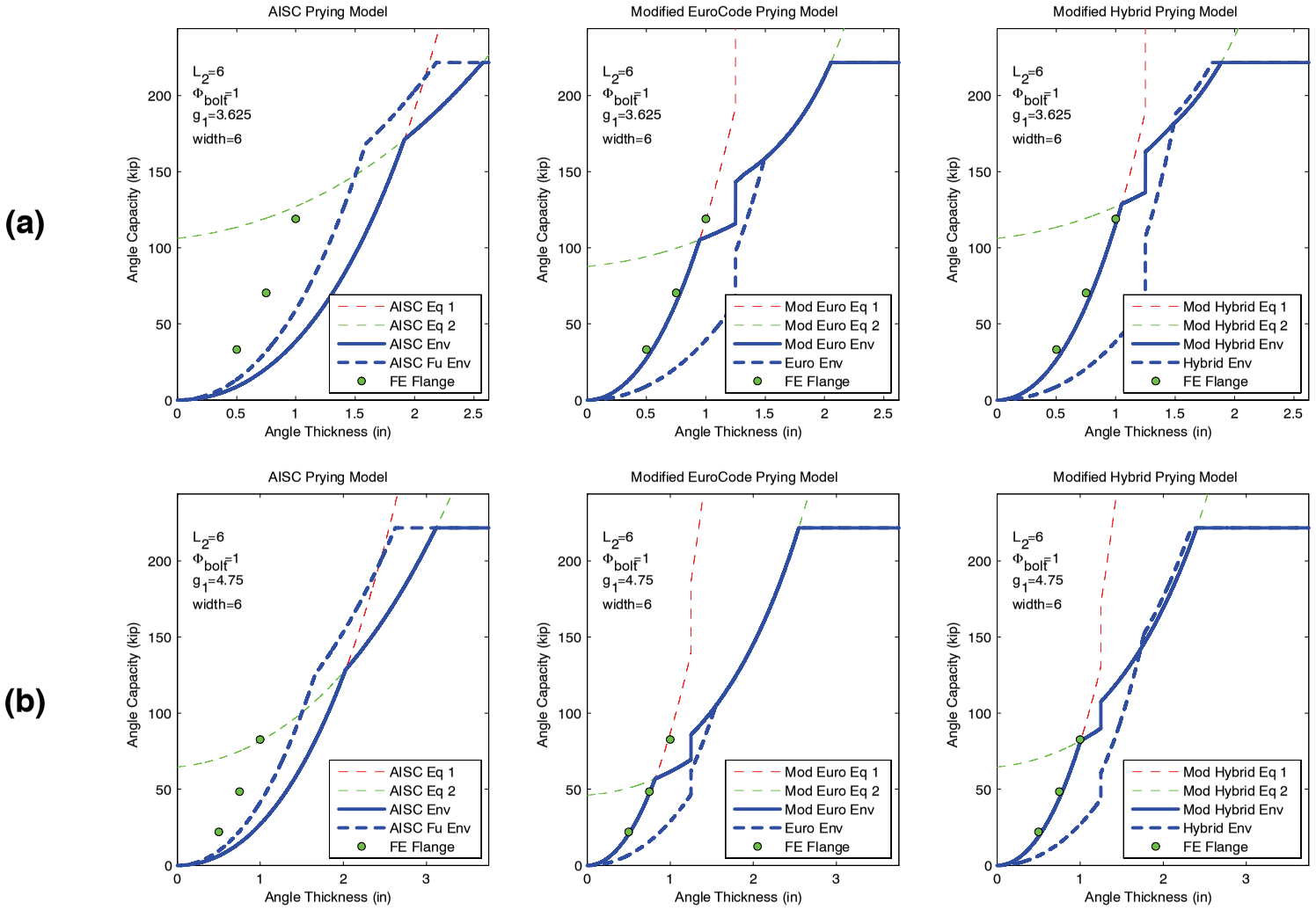


Figure D.24 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 1.0 in. bolt diameter, 3.625 in. gage, and 6 in. width; and (b) 6 in. leg, 1.0 in. bolt diameter, 4.75 in. gage, and 6 in. width.

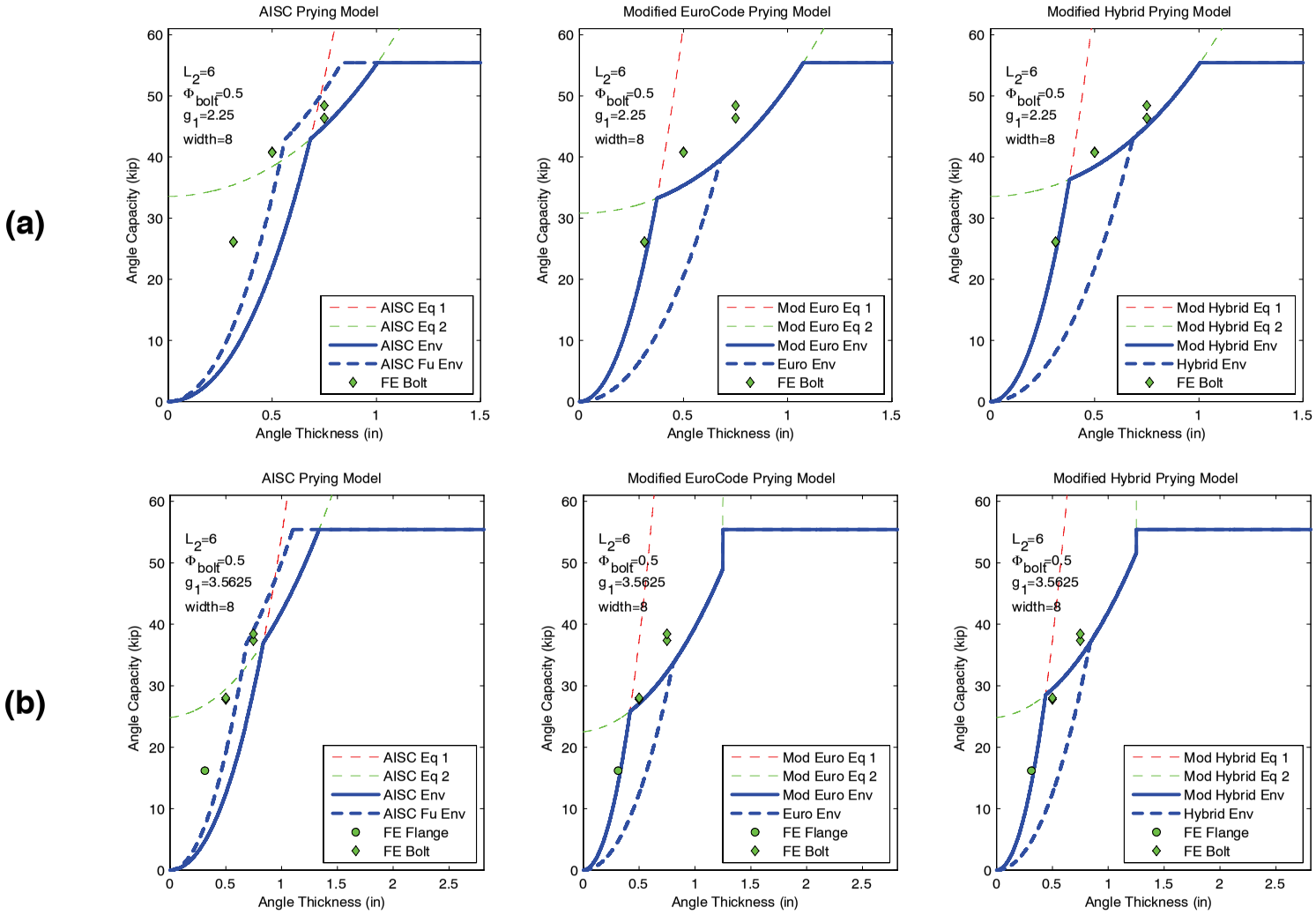


Figure D.25 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 0.5 in. bolt diameter, 2.25 in. gage, and 8 in. width; and (b) 6 in. leg, 0.5 in. bolt diameter, 3.5625 in. gage, and 8 in. width.

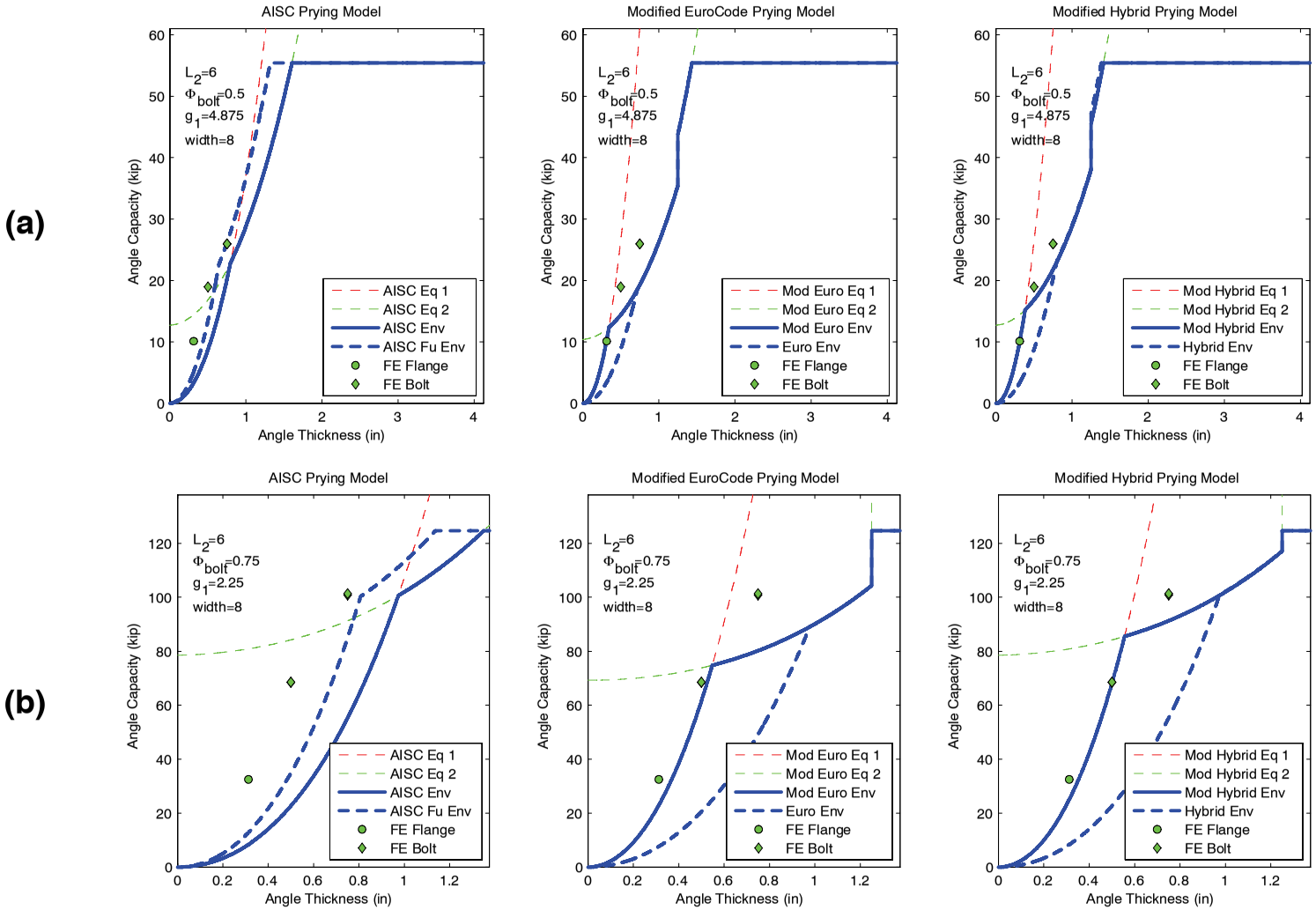


Figure D.26 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 0.5 in. bolt diameter, 4.875 in. gage, and 8 in. width; and (b) 6 in. leg, 0.75 in. bolt diameter, 2.25 in. gage, and 8 in. width.

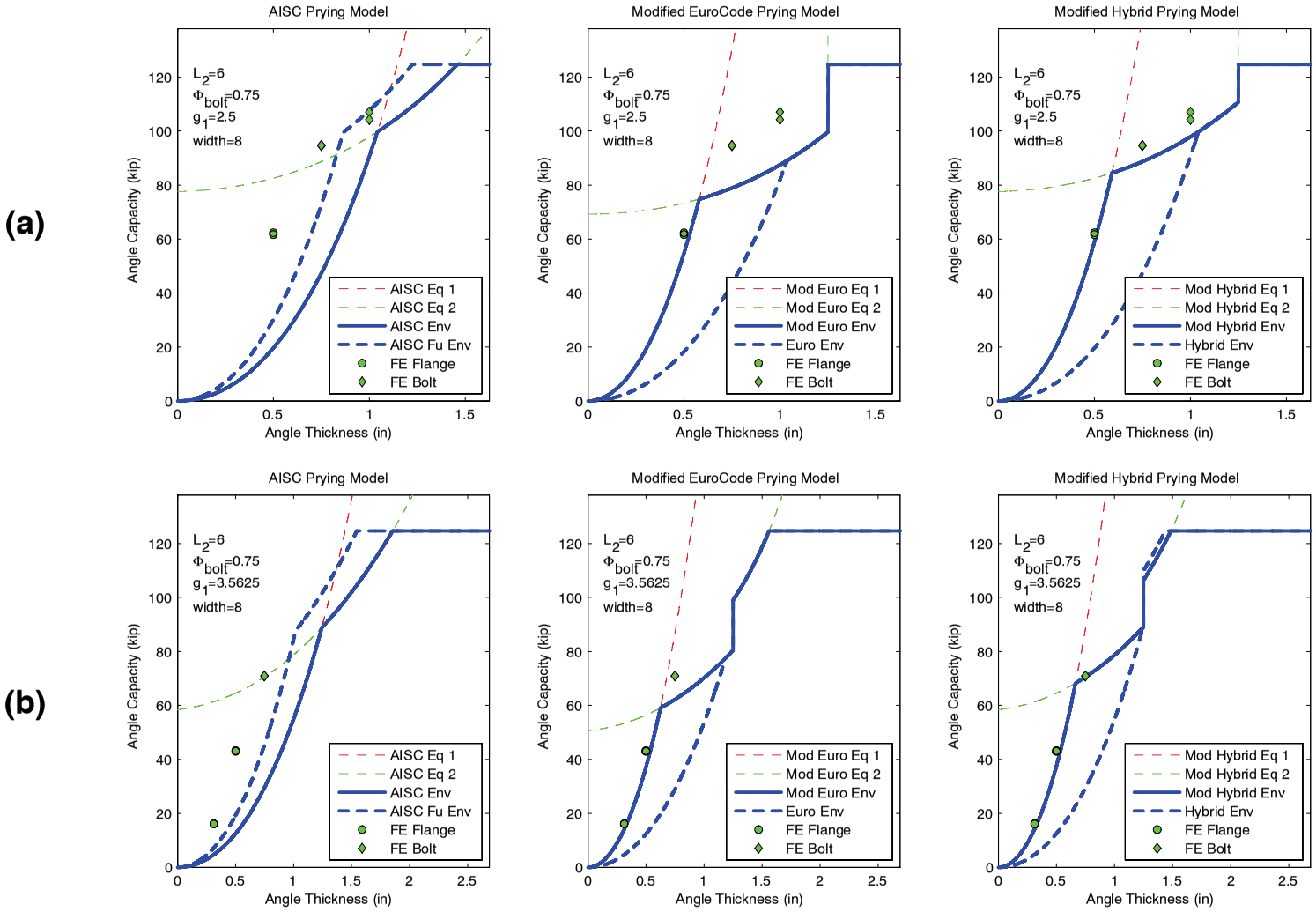


Figure D.27 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 0.75 in. bolt diameter, 2.5 in. gage, and 8 in. width; and (b) 6 in. leg, 0.75 in. bolt diameter, 3.5625 in. gage, and 8 in. width.

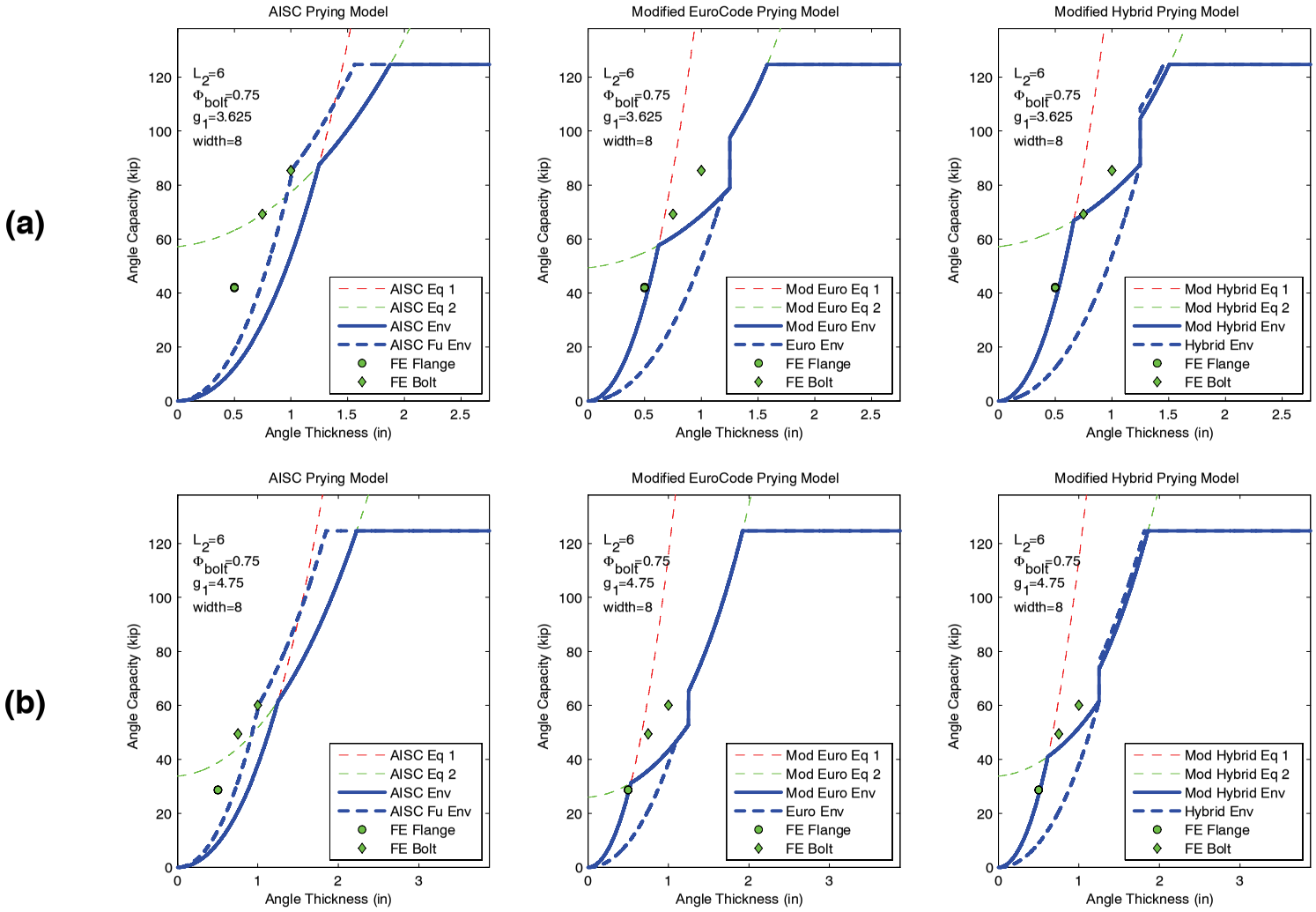


Figure D.28 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 0.75 in. bolt diameter, 3.625 in. gage, and 8 in. width; and (b) 6 in. leg, 0.75 in. bolt diameter, 4.75 in. gage, and 8 in. width.

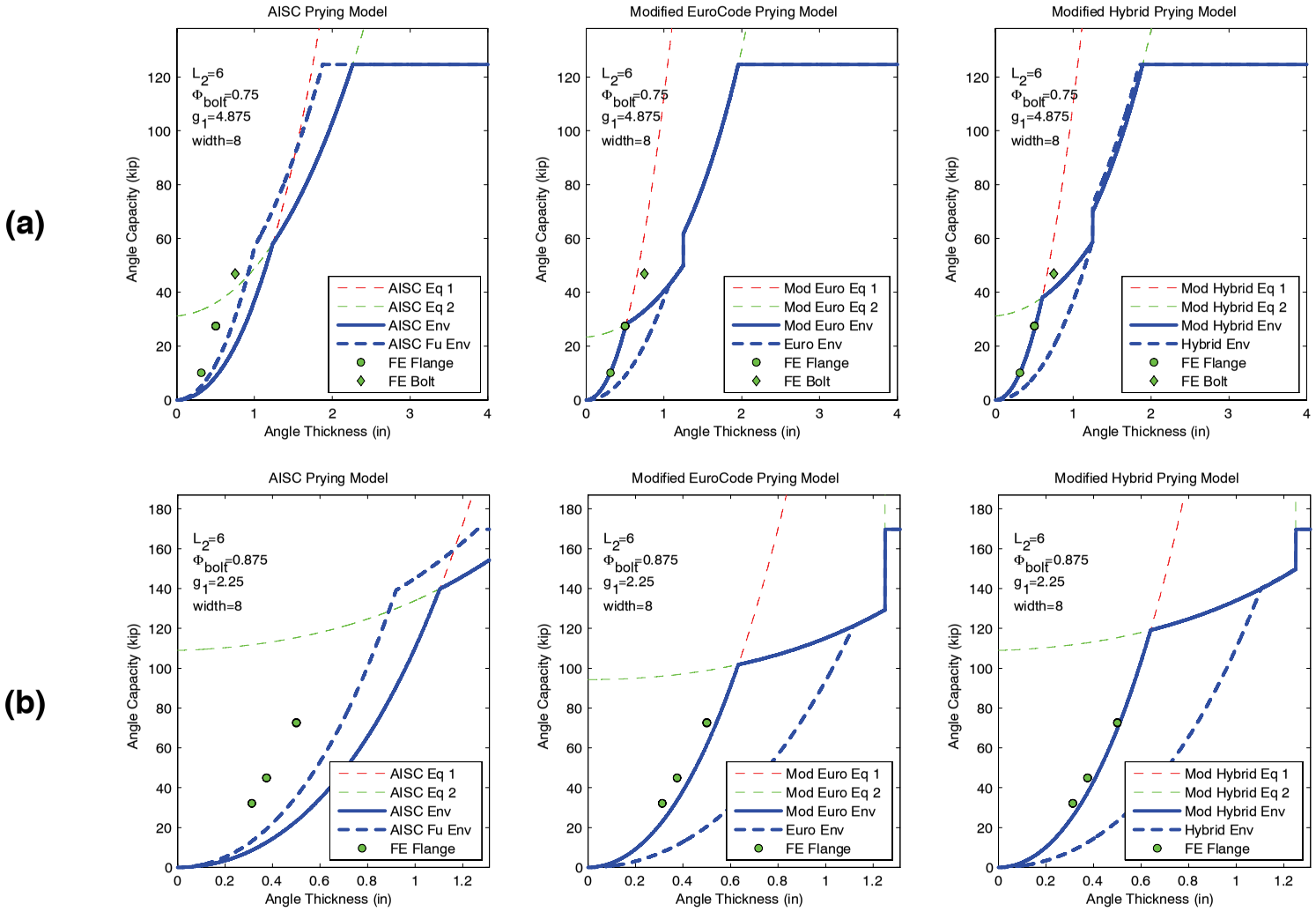


Figure D.29 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 0.75 in. bolt diameter, 4.875 in. gage, and 8 in. width; and (b) 6 in. leg, 0.875 in. bolt diameter, 2.25 in. gage, and 8 in. width.

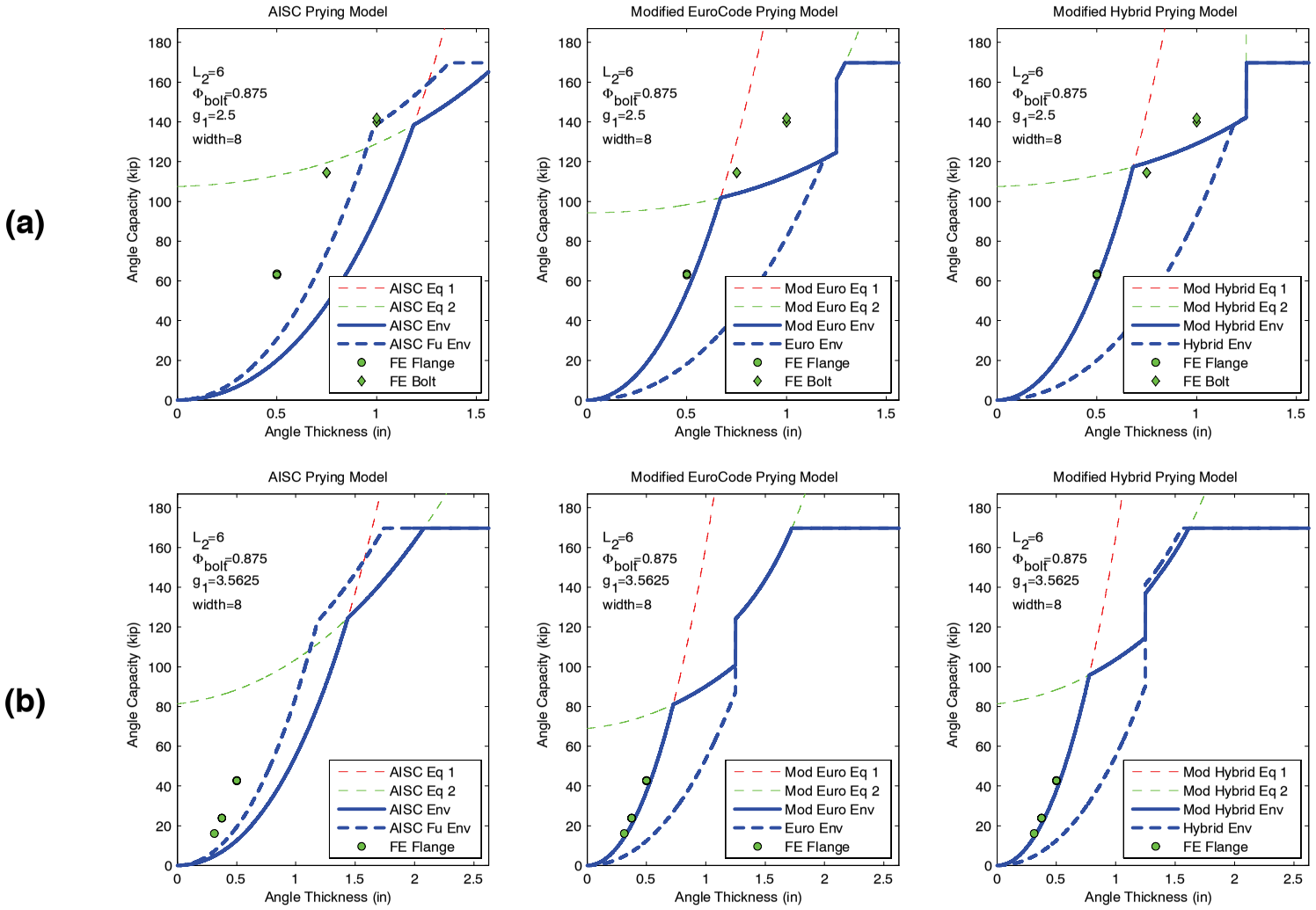


Figure D.30 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 0.875 in. bolt diameter, 2.5 in. gage, and 8 in. width; and (b) 6 in. leg, 0.875 in. bolt diameter, 3.5625 in. gage, and 8 in. width.

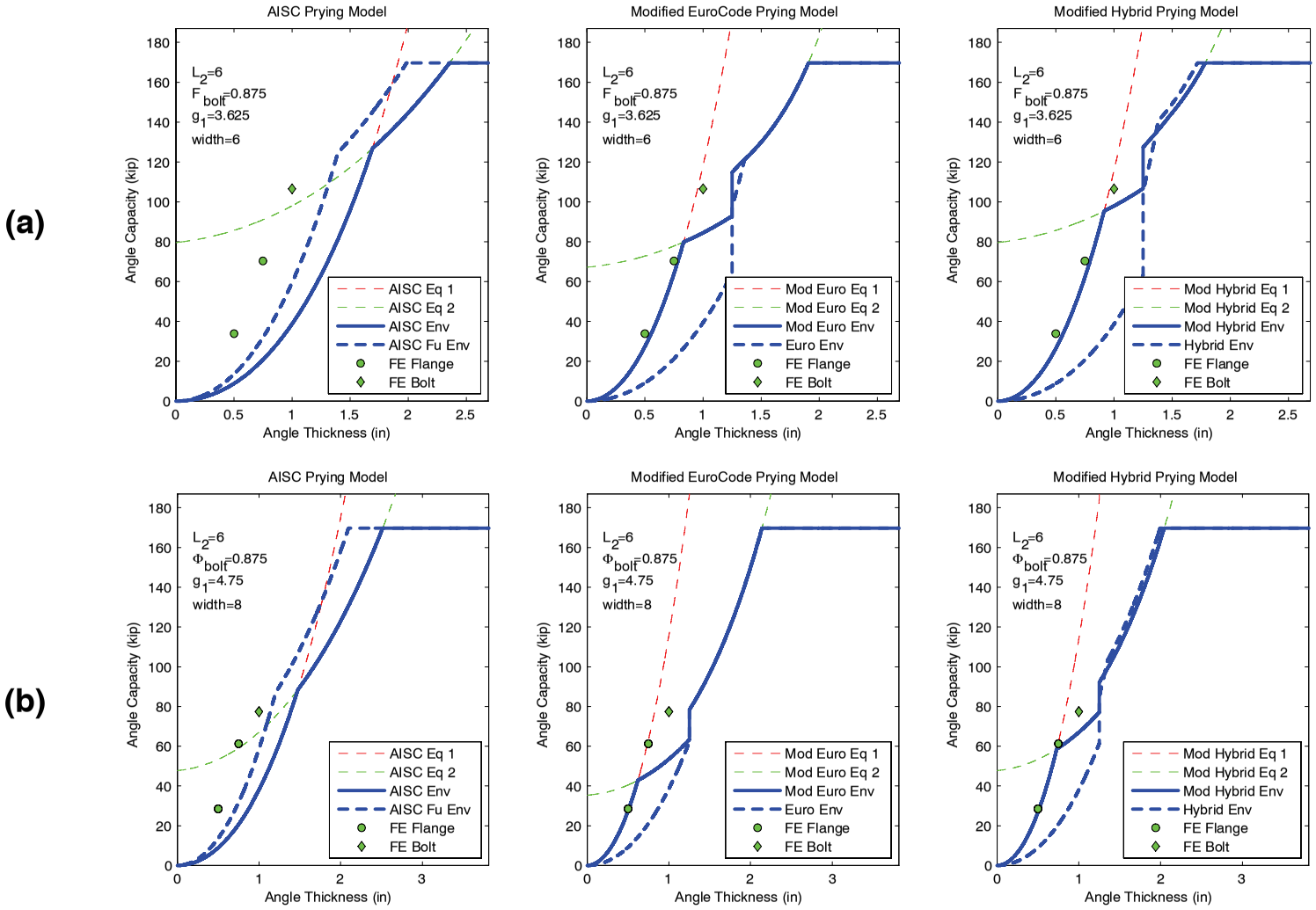
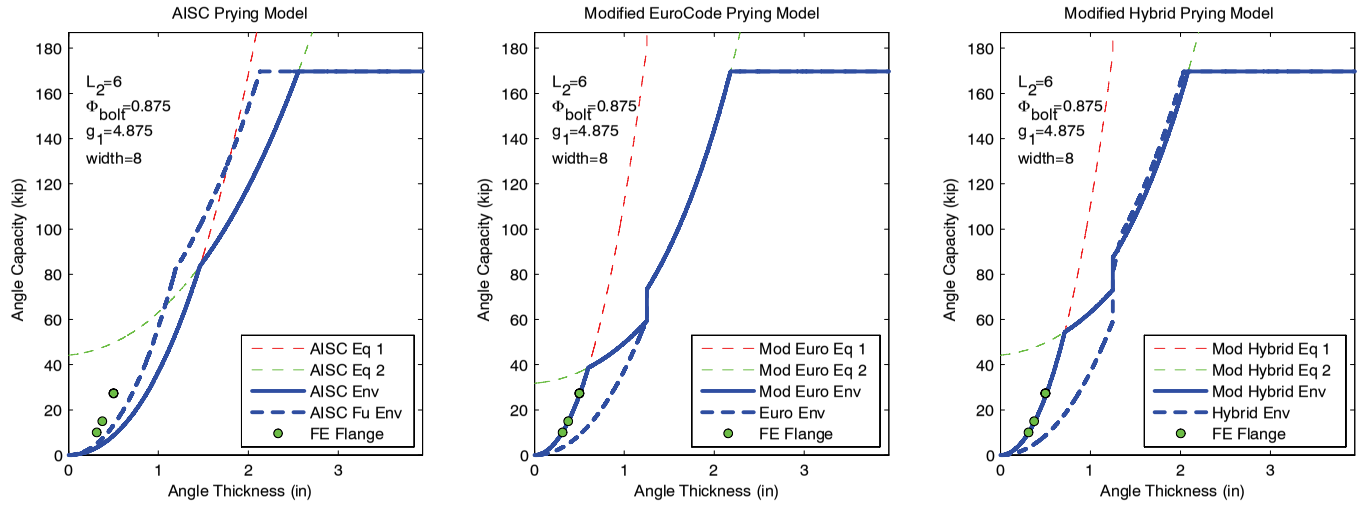


Figure D.31 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 0.875 in. bolt diameter, 3.625 in. gage, and 8 in. width; and (b) 6 in. leg, 0.875 in. bolt diameter, 4.75 in. gage, and 8 in. width.

(a)



(b)

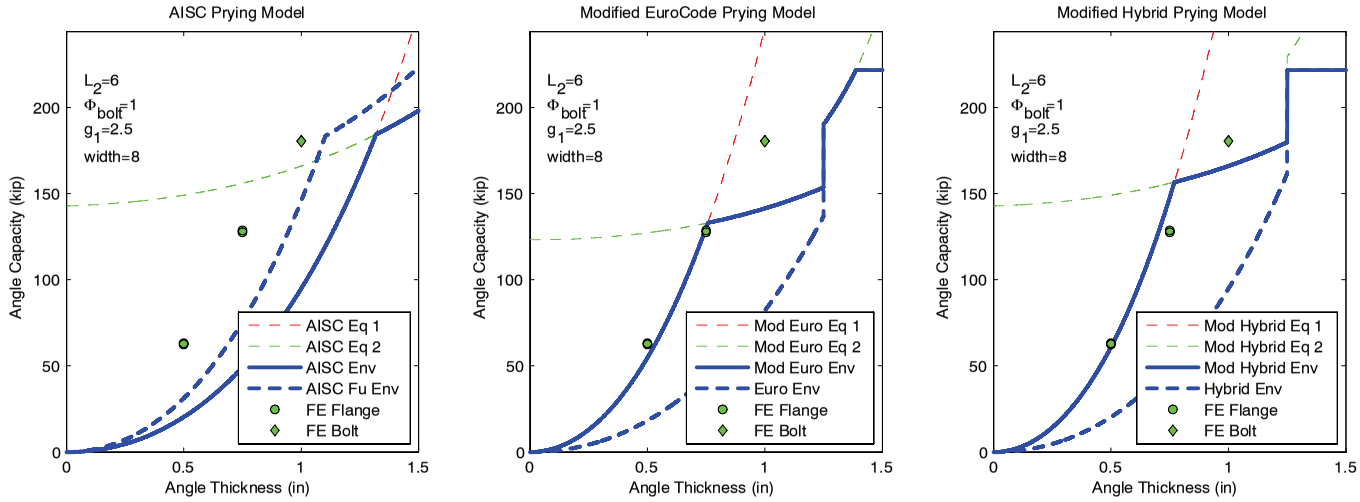


Figure D.32 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 0.875 in. bolt diameter, 4.875 in. gage, and 8 in. width; and (b) 6 in. leg, 1.0 in. bolt diameter, 2.5 in. gage, and 8 in. width.

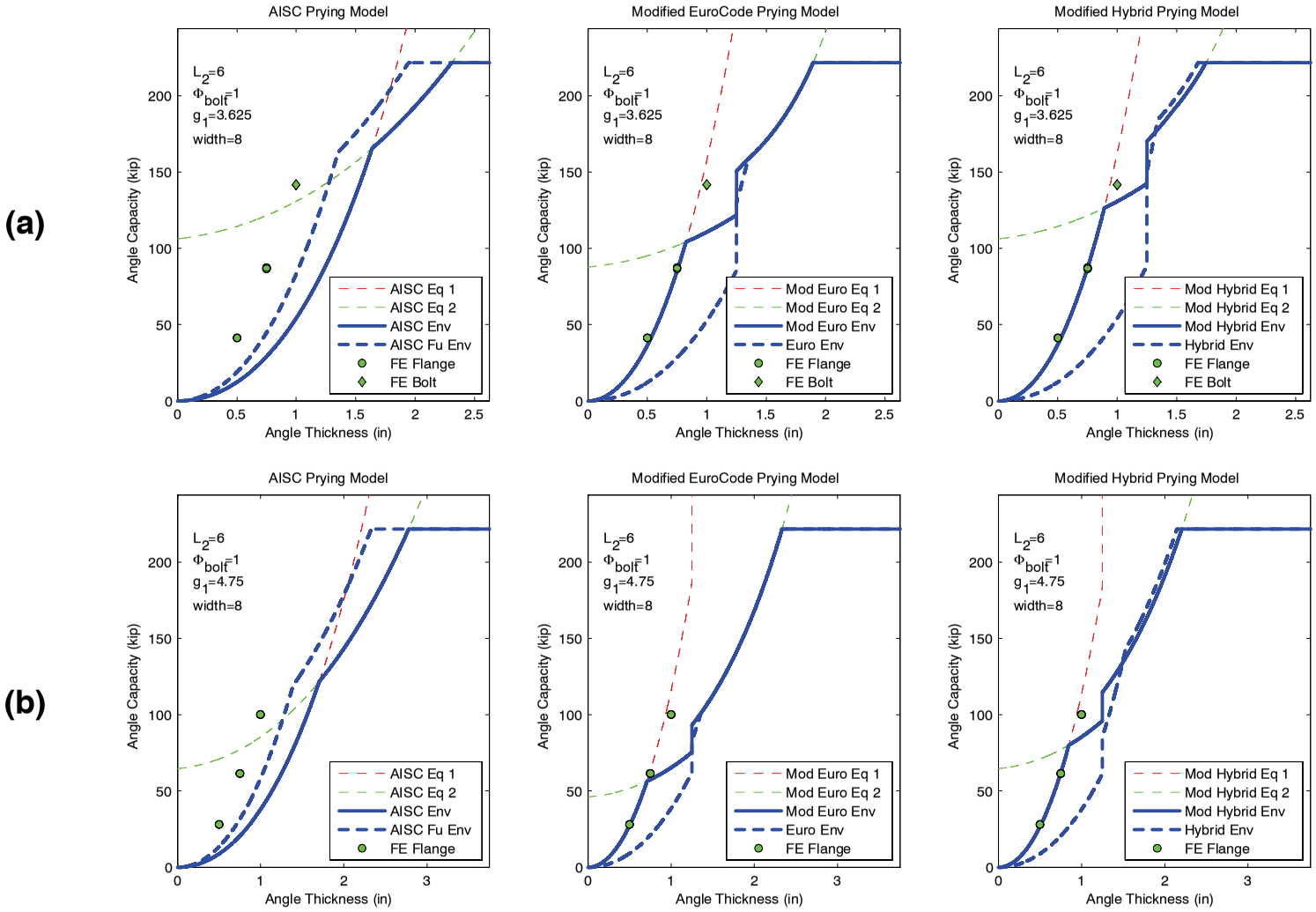
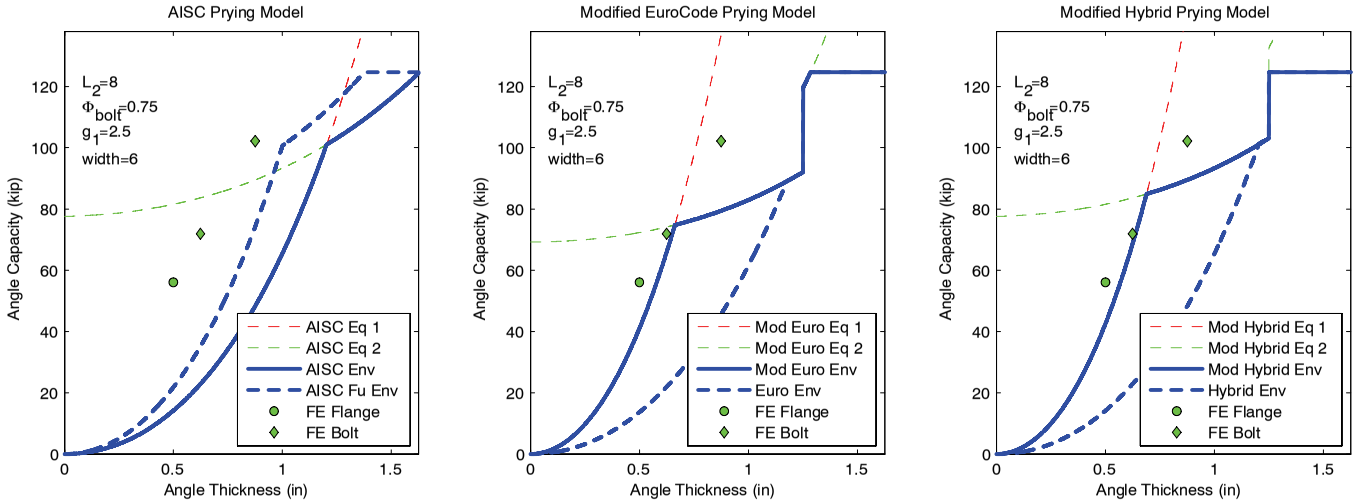


Figure D.33 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 6 in. leg, 1.0 in. bolt diameter, 3.625 in. gage, and 8 in. width; and (b) 6 in. leg, 1.0 in. bolt diameter, 4.75 in. gage, and 8 in. width.

(a)



(b)

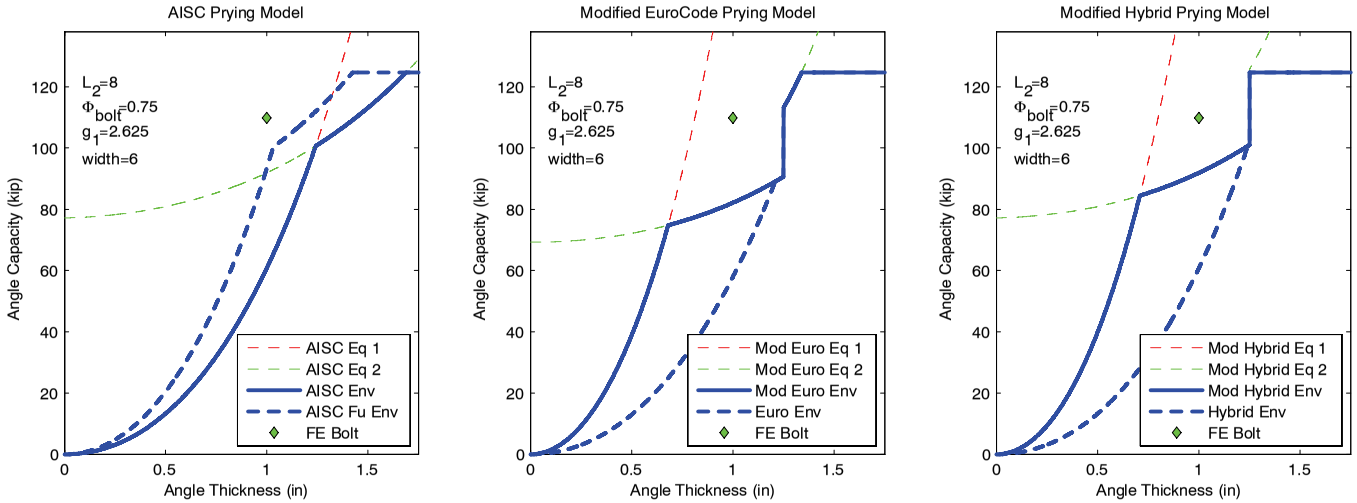


Figure D.34 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 8 in. leg, 0.75 in. bolt diameter, 2.5 in. gage, and 6 in. width; and (b) 8 in. leg, 0.75 in. bolt diameter, 2.625 in. gage, and 6 in. width.

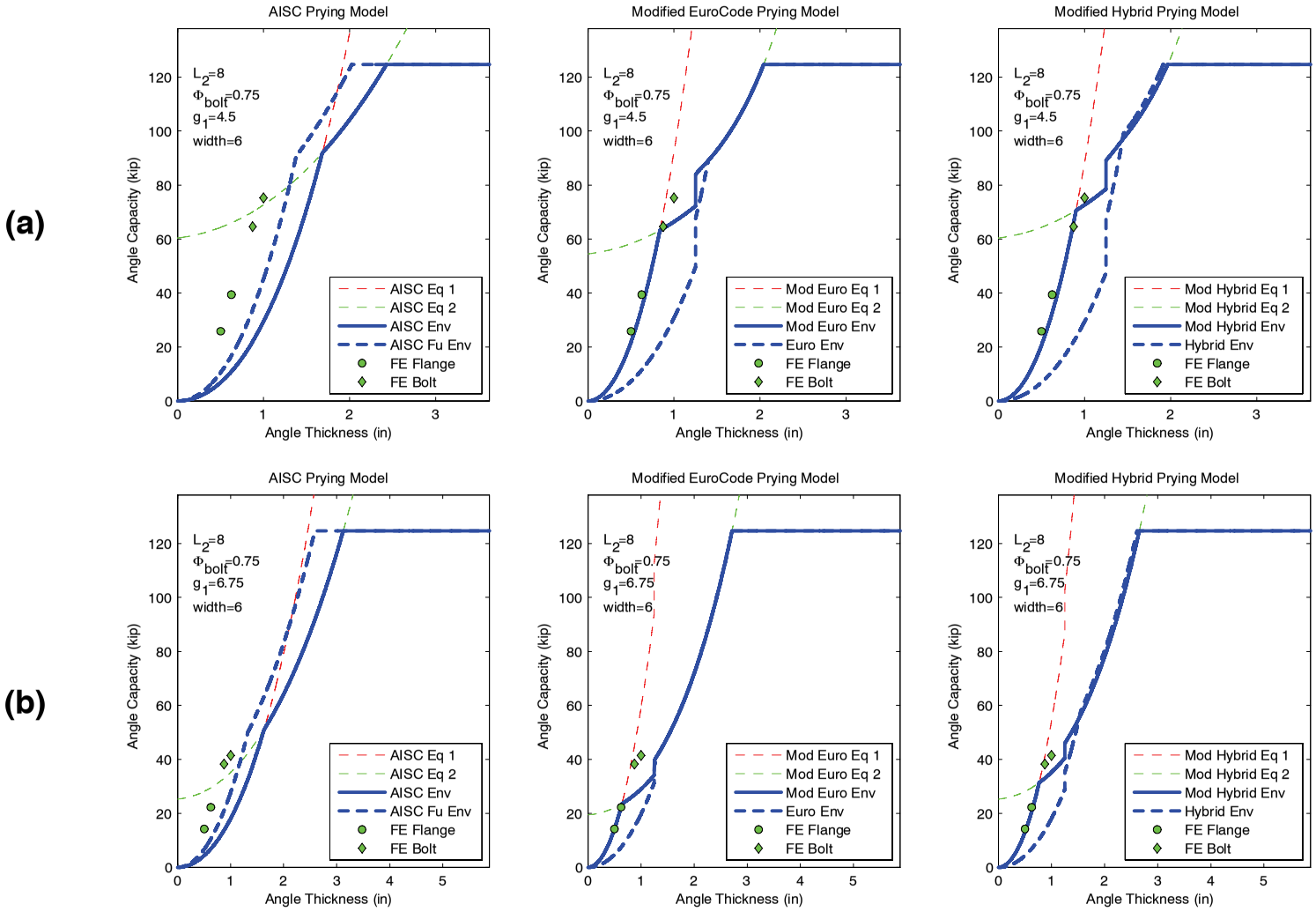


Figure D.35 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 8 in. leg, 0.75 in. bolt diameter, 4.5 in. gage, and 6 in. width; and (b) 8 in. leg, 0.75 in. bolt diameter, 6.75 in. gage, and 6 in. width.

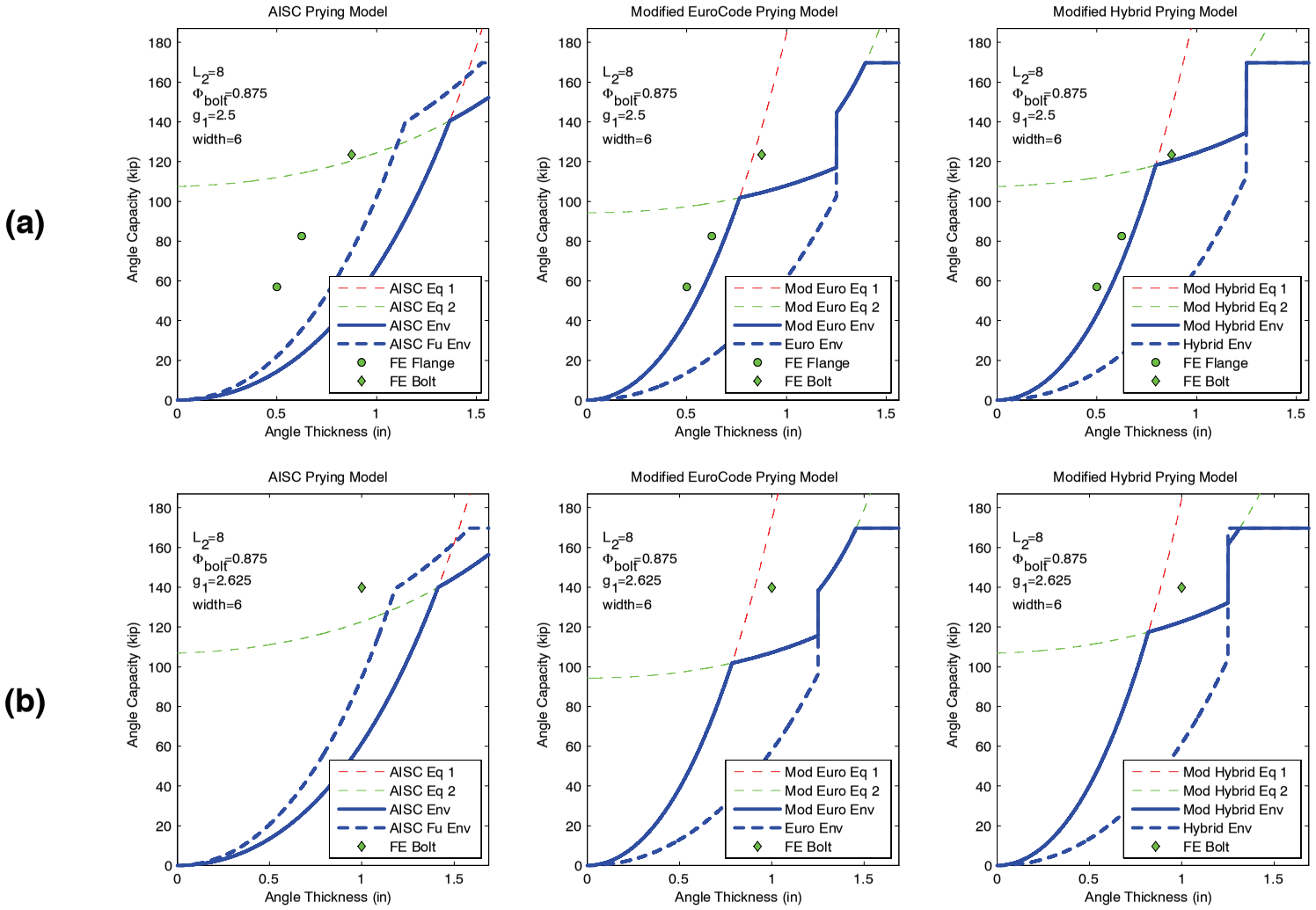


Figure D.36 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 8 in. leg, 0.875 in. bolt diameter, 2.5 in. gage, and 6 in. width; and (b) 8 in. leg, 0.875 in. bolt diameter, 2.625 in. gage, and 6 in. width.

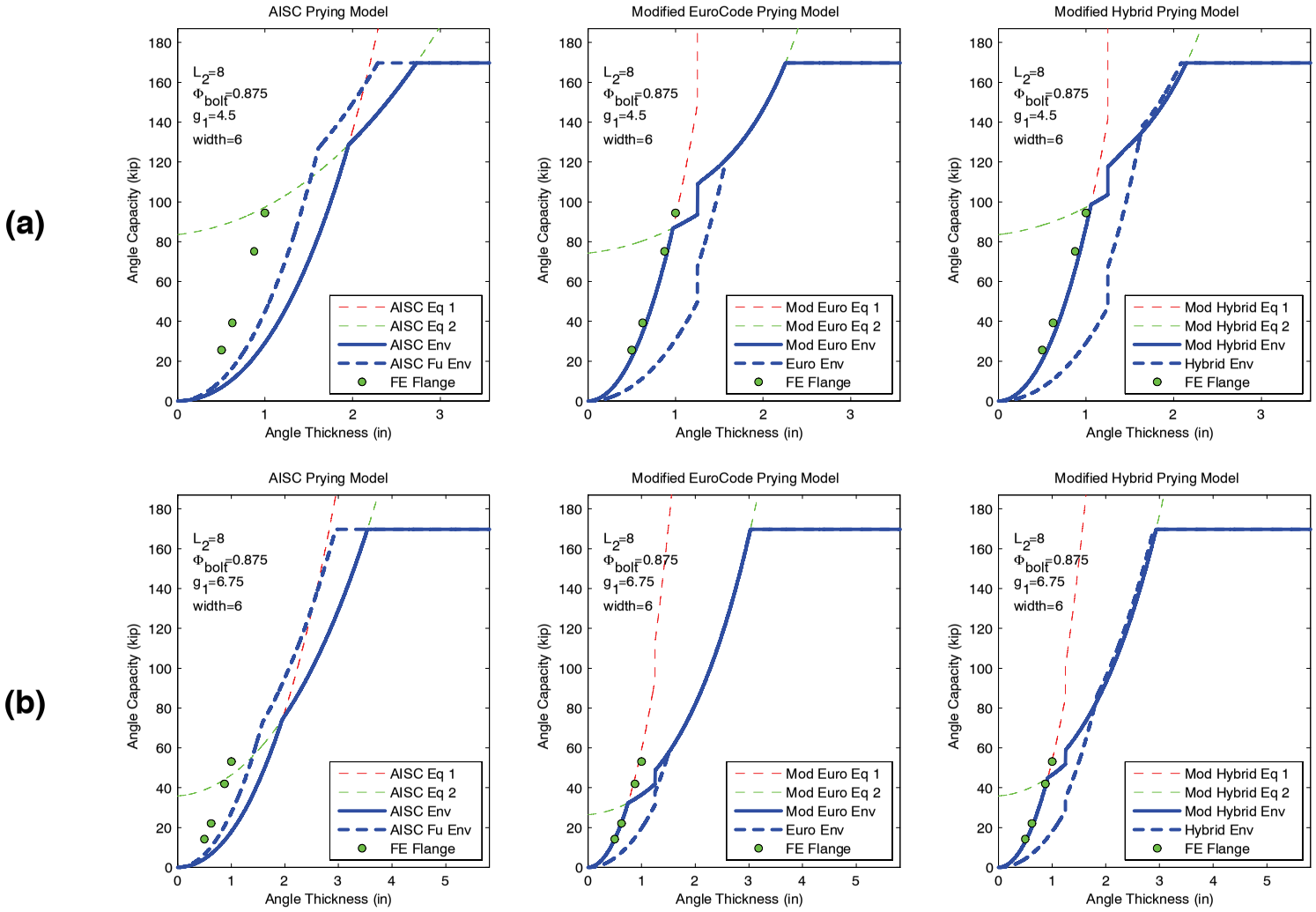


Figure D.37 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 8 in. leg, 0.875 in. bolt diameter, 4.5 in. gage, and 6 in. width; and (b) 8 in. leg, 0.875 in. bolt diameter, 6.75 in. gage, and 6 in. width.

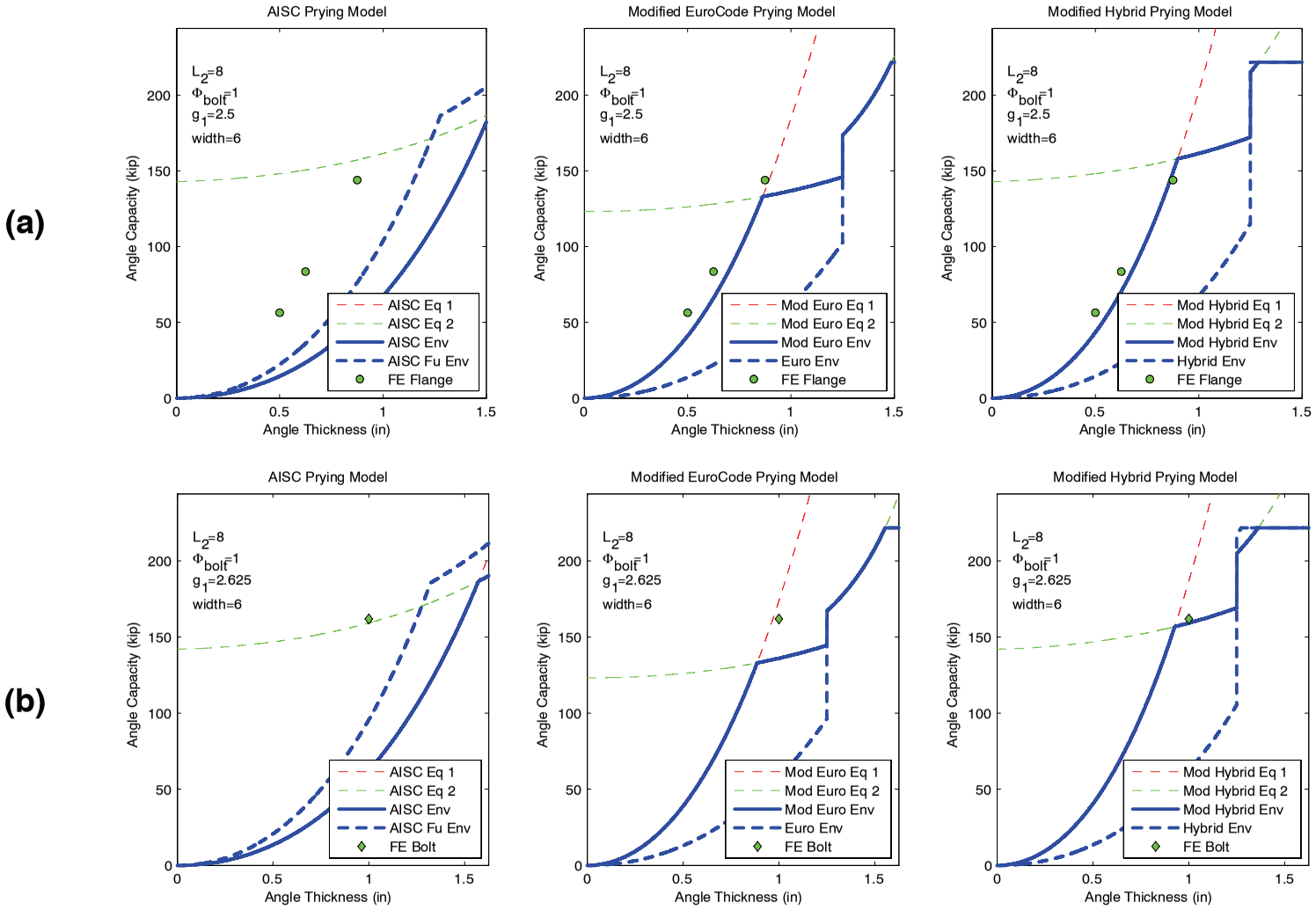


Figure D.38 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 8 in. leg, 1.0 in. bolt diameter, 2.5 in. gage, and 6 in. width; and (b) 8 in. leg, 1.0 in. bolt diameter, 2.625 in. gage, and 6 in. width.

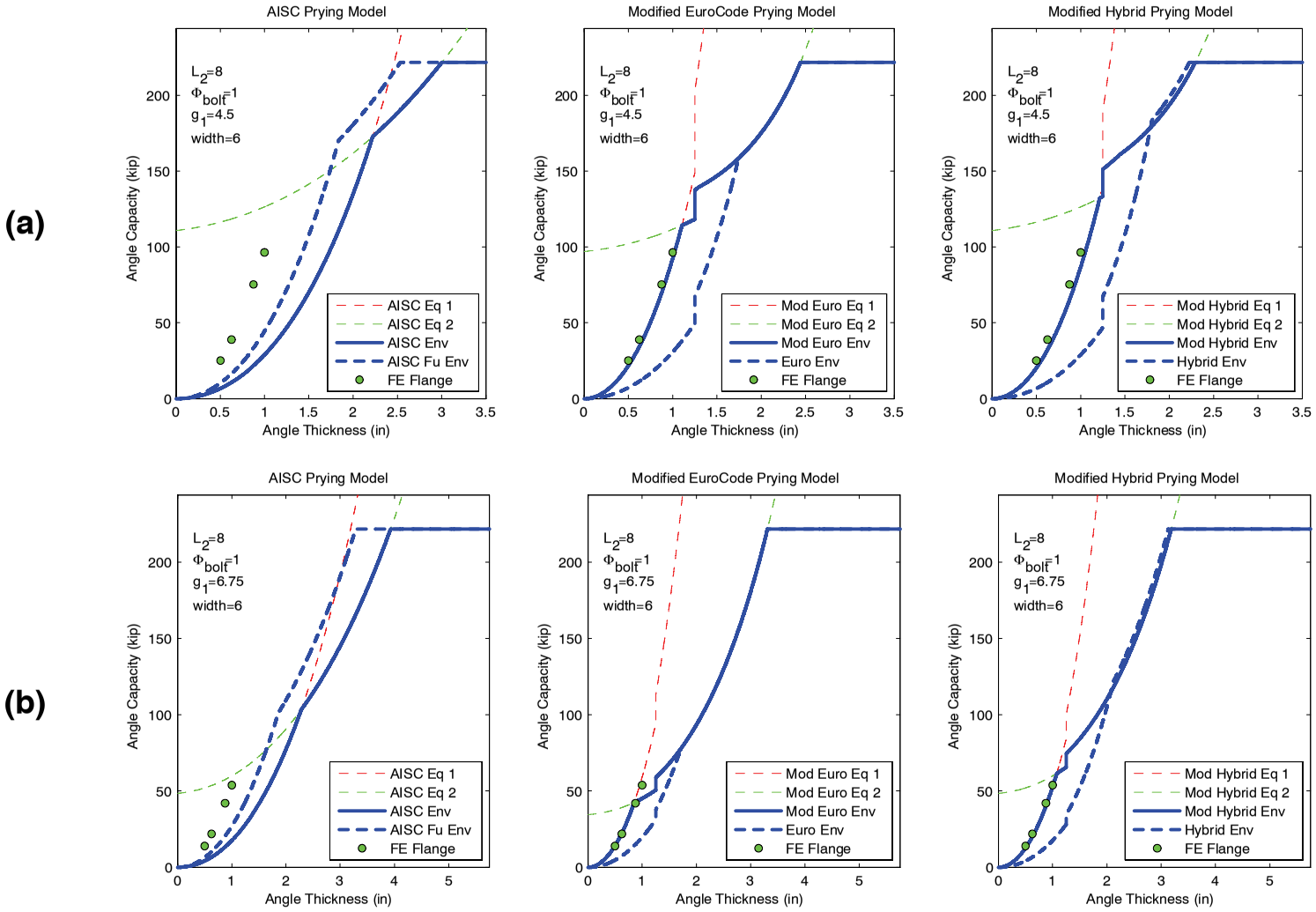
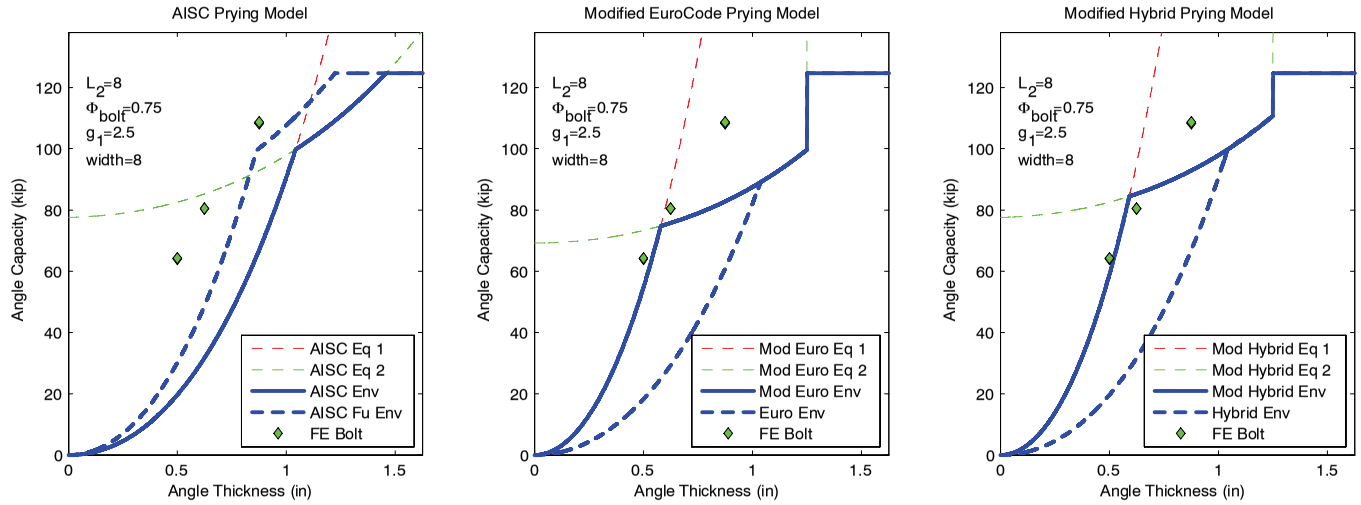


Figure D.39 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 8 in. leg, 1.0 in. bolt diameter, 4.5 in. gage, and 6 in. width; and (b) 8 in. leg, 1.0 in. bolt diameter, 6.75 in. gage, and 6 in. width.

(a)



(b)

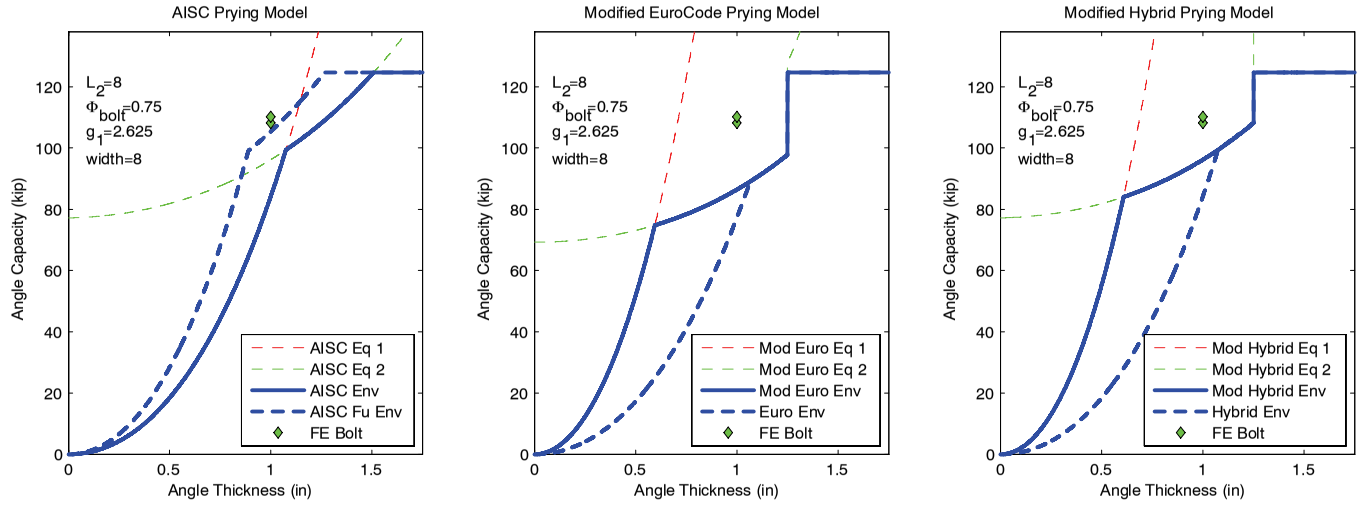


Figure D.40 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 8 in. leg, 0.75 in. bolt diameter, 2.5 in. gage, and 8 in. width; and (b) 8 in. leg, 0.75 in. bolt diameter, 2.625 in. gage, and 8 in. width.

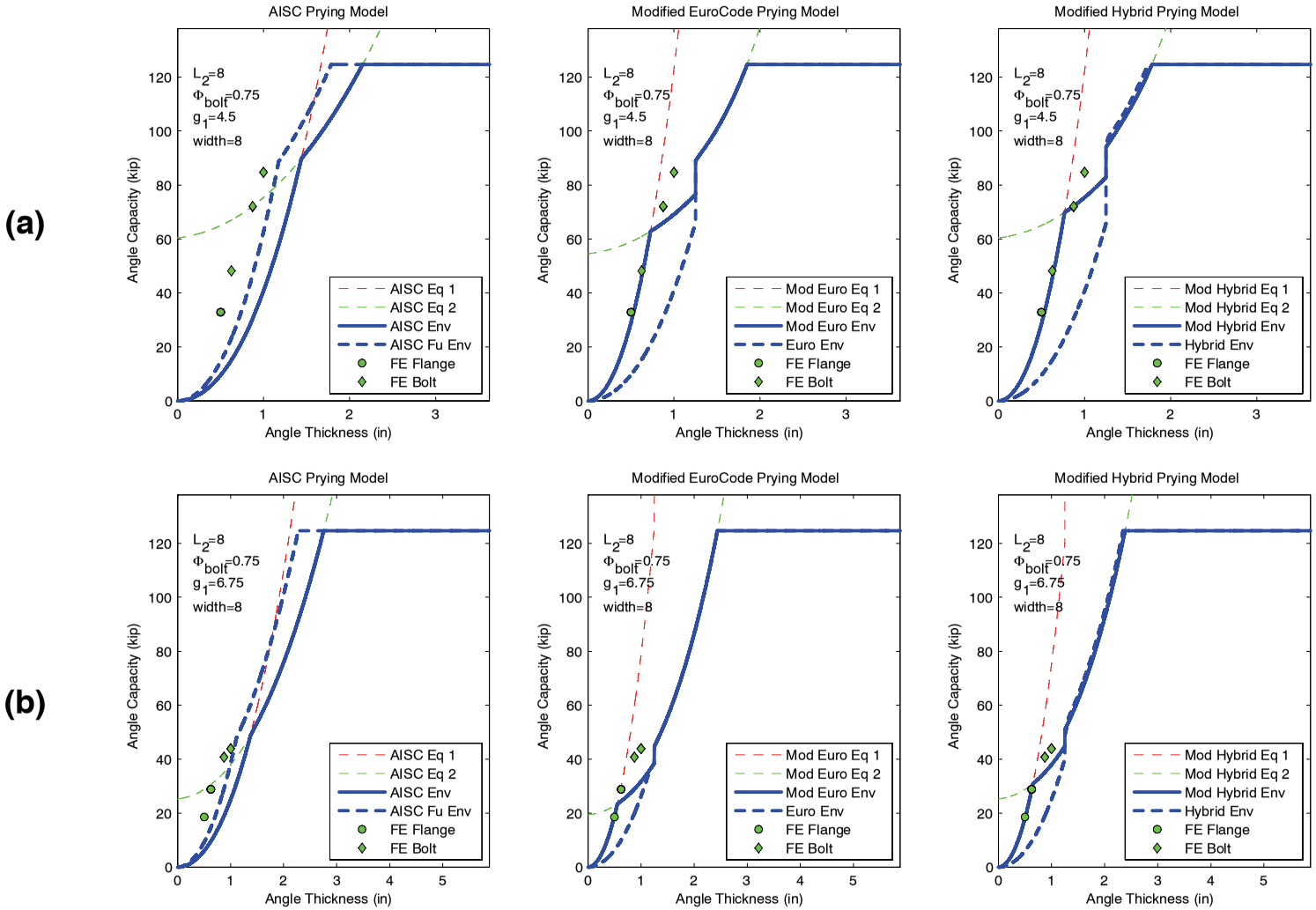


Figure D.41 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 8 in. leg, 0.75 in. bolt diameter, 4.5 in. gage, and 8 in. width; and (b) 8 in. leg, 0.75 in. bolt diameter, 6.75 in. gage, and 8 in. width.

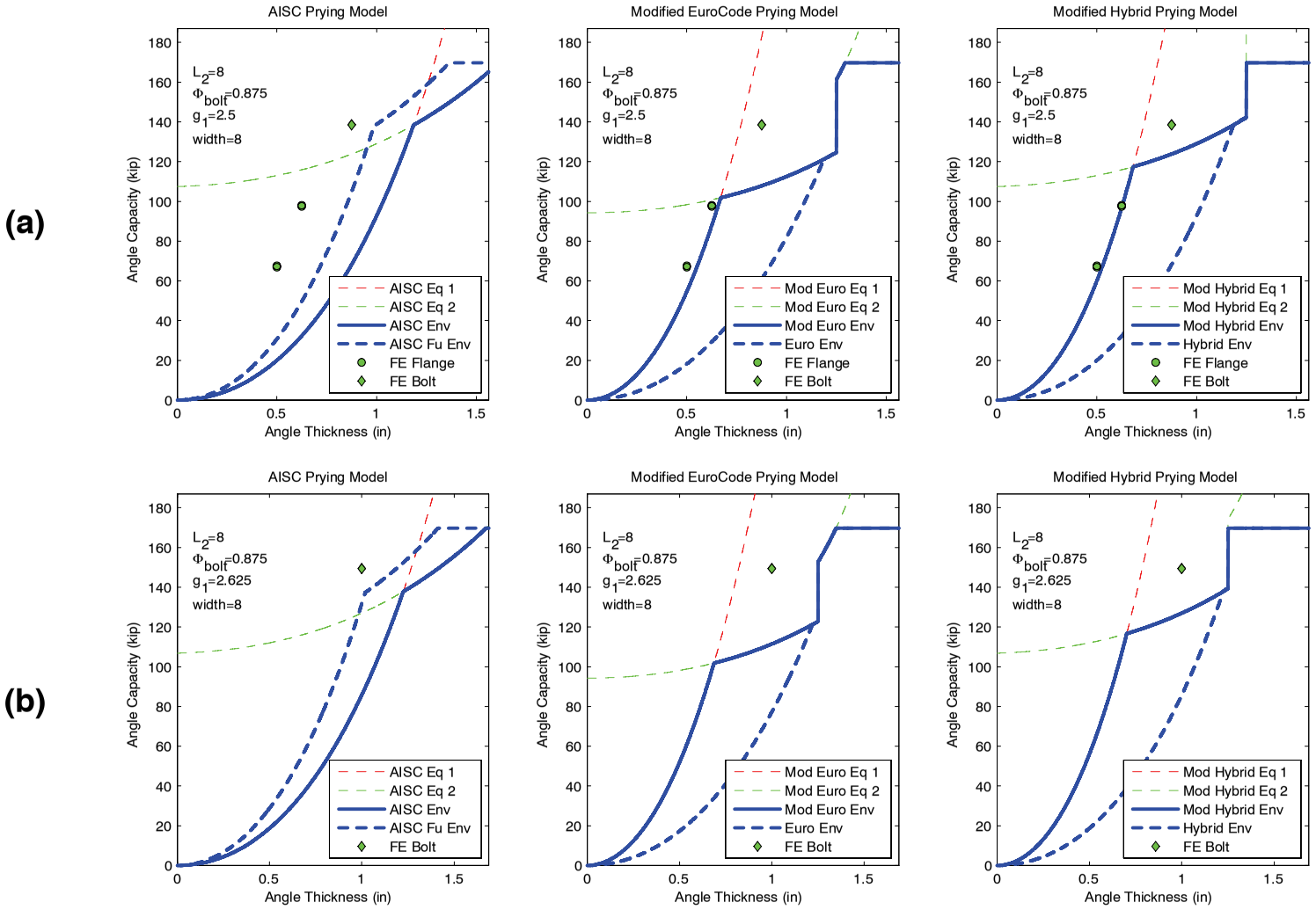


Figure D.42 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 8 in. leg, 0.875 in. bolt diameter, 2.5 in. gage, and 8 in. width; and (b) 8 in. leg, 0.875 in. bolt diameter, 2.625 in. gage, and 8 in. width.

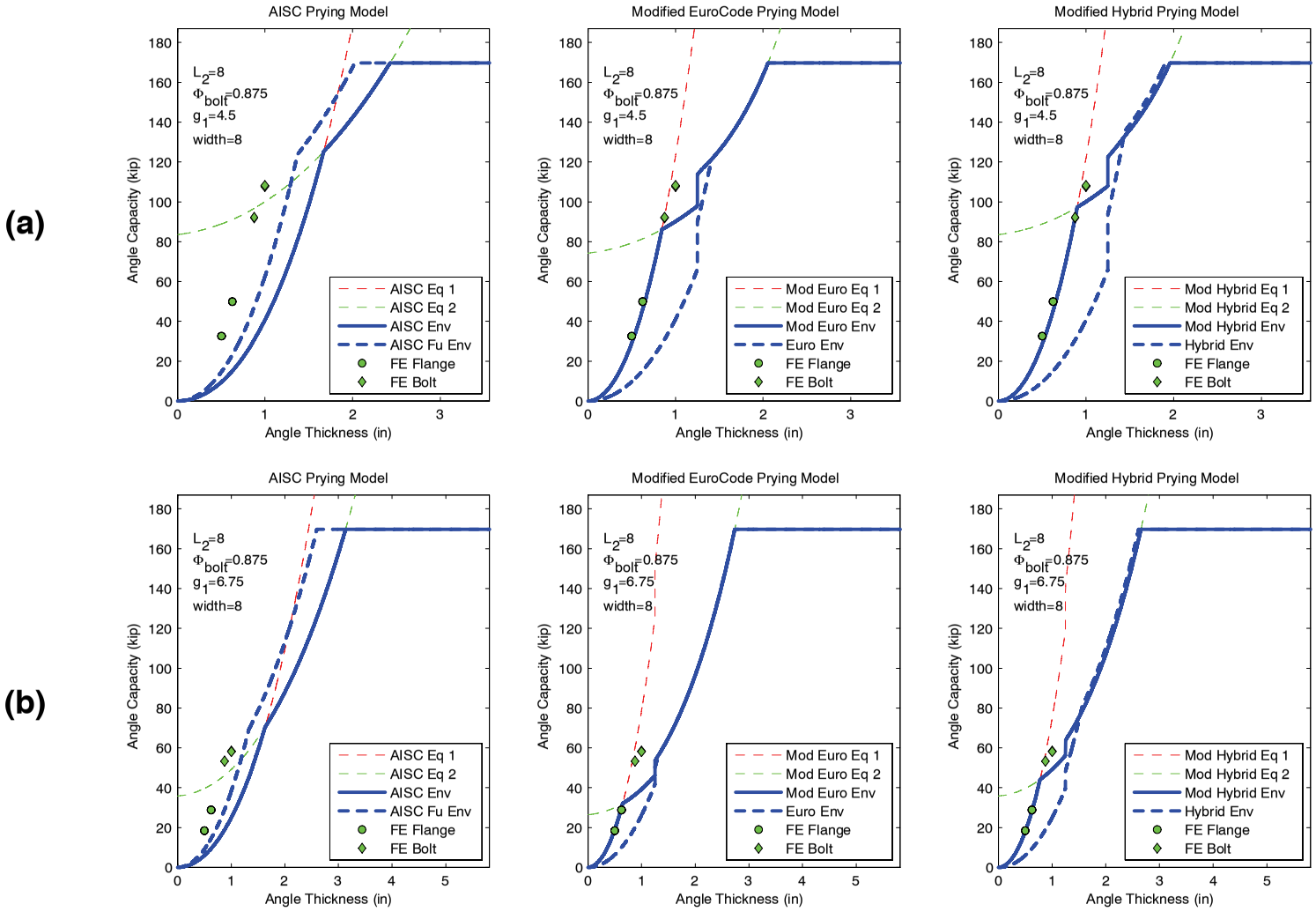


Figure D.43 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 8 in. leg, 0.875 in. bolt diameter, 4.5 in. gage, and 8 in. width; and (b) 8 in. leg, 0.875 in. bolt diameter, 6.75 in. gage, and 8 in. width.

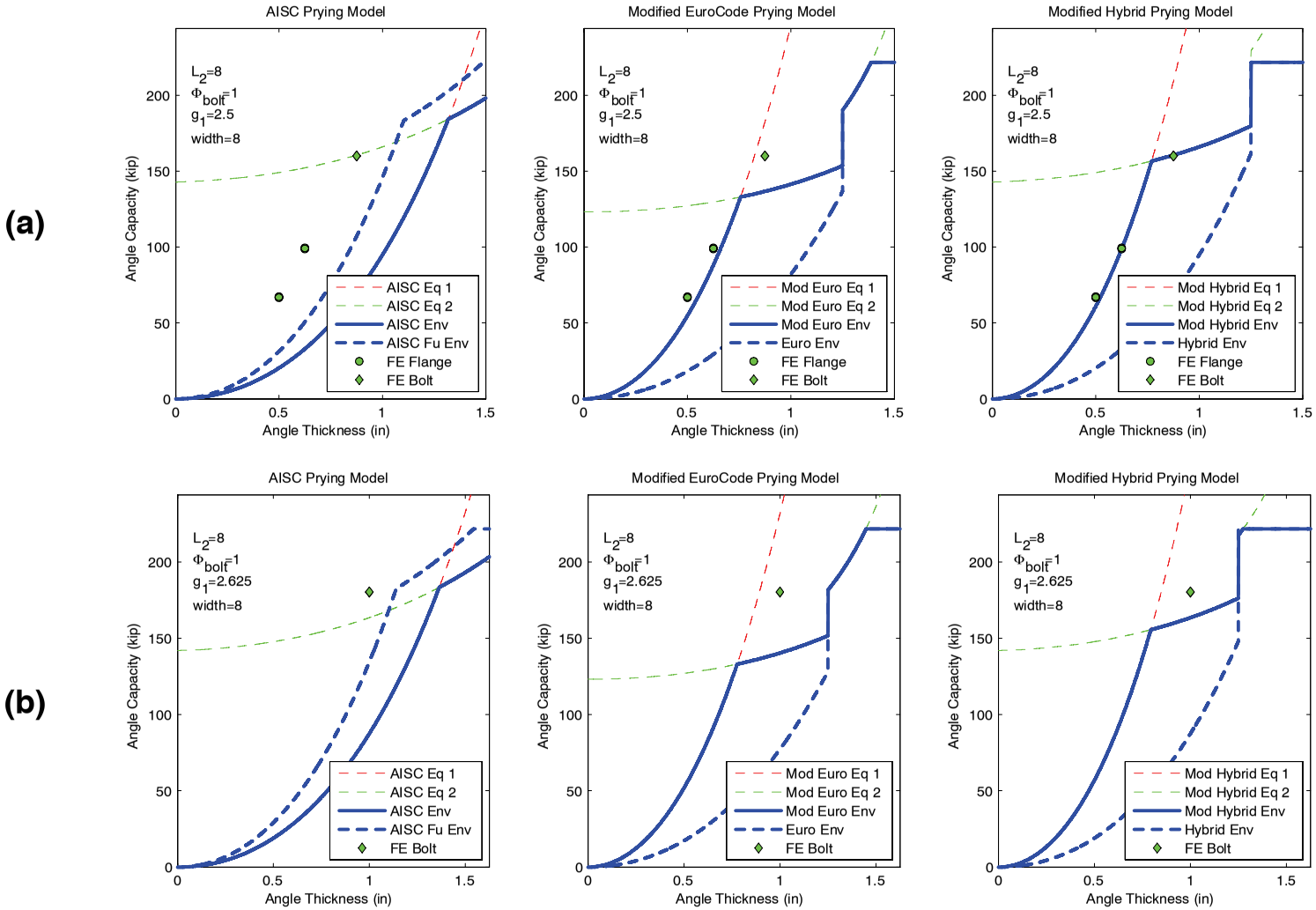


Figure D.44 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 8 in. leg, 1.0 in. bolt diameter, 2.5 in. gage, and 8 in. width; and (b) 8 in. leg, 1.0 in. bolt diameter, 2.625 in. gage, and 8 in. width.

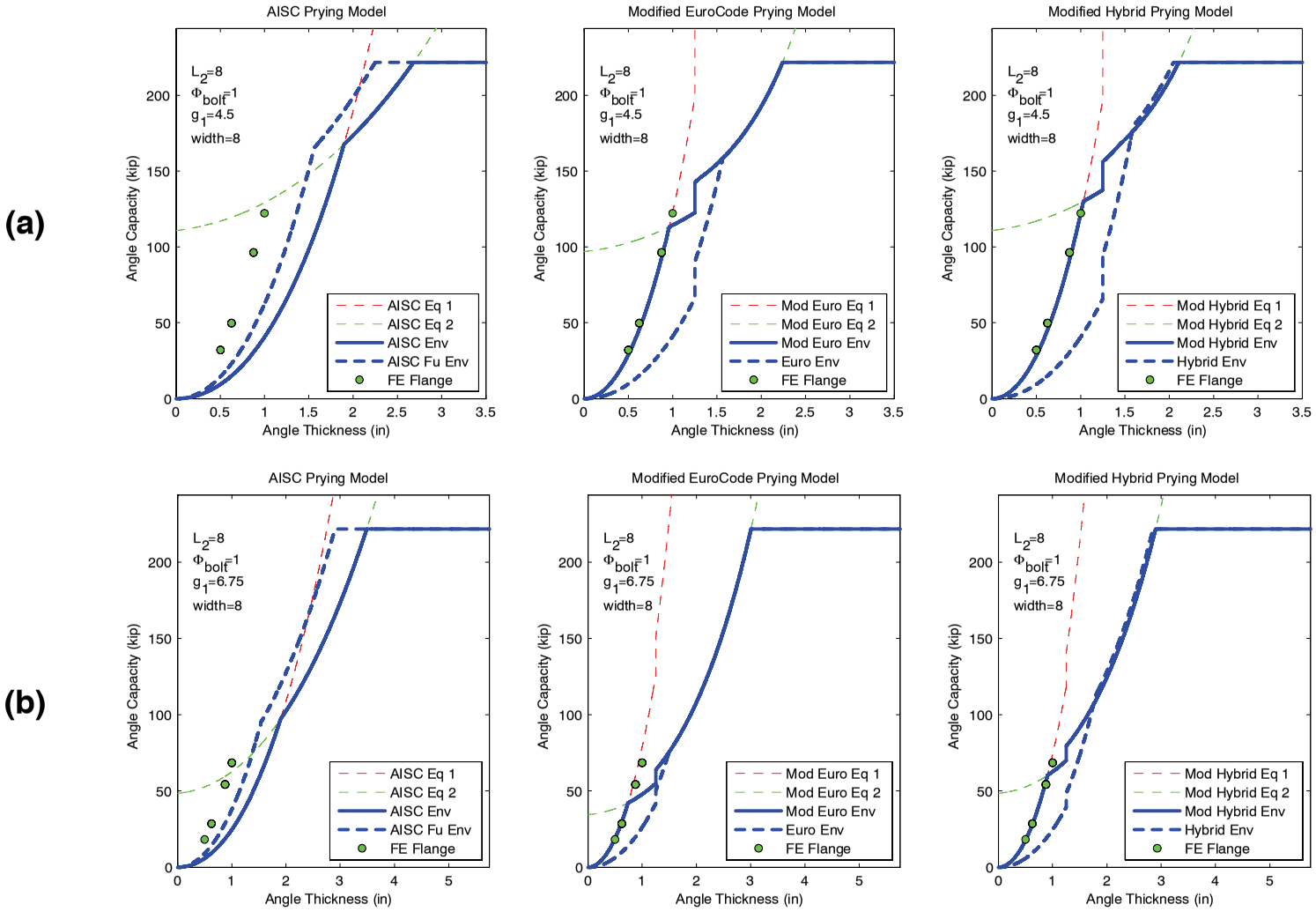


Figure D.45 Bolted angle connection prying strength models versus angle thickness capacity envelope plotted against analytically predicted failure capacities for cases with (a) 8 in. leg, 1.0 in. bolt diameter, 4.5 in. gage, and 8 in. width; and (b) 8 in. leg, 1.0 in. bolt diameter, 6.75 in. gage, and 8 in. width.

APPENDIX E

PARAMETRIC BOLTED ANGLE CONNECTION PREDICTED CAPACITY COMPARISON TO CALCULATED LIMIT STATES AND PRYING STRENGTH MODELS

The connection geometry and topography information is tabulated with the analytically determined capacity, failure mode and connection efficiency; along with the various mechanics based calculated connection capacities for all the bolted angle connections in the dataset analyzed.

For each connection case the numerical values of all the mechanics based limit state strength models presented in Chapter section 5.2 listed below are calculated using unfactored nominal strength values are included in Table E.1:

- Bolt tension failure – using Equation 5.1 with F_t=141.1 ksi
- Bolt shear failure – using Equation 5.2 with F_v=81.6 ksi
- Angle gross section yielding – using Equation 5.4 with F_y=41 ksi
- Angle net section fracture – using Equation 5.5 with F_u=63 ksi
- Whitmore section yielding – see Section 5.2.2.1
- Modified Whitmore section yielding – see Section 5.2.2.1
- Angle block shear failure – using Equation 5.6 with F_y=41 ksi and F_u=63 ksi

Also, the prying strength limit states presented in Chapter 7 and graphically presented in Appendix D listed below are tabulated for each connection case:

- AISC Prying strength model using steel yield strength, Fy – see Equations 7.1 through 7.3

- AISC prying strength model using steel ultimate strength, Fu – same equations as above substituting Fu instead of Fy
- Eurocode prying strength model – see Equations 7.4 through 7.6
- Hybrid prying strength model – see Section 7.1.3
- Modified hybrid prying strength model – see Equations 7.10 through 7.12
- Modified Eurocode prying strength model – see Equations 7.7 through 7.9

The following material strengths are used while calculating the limit states:

- Angle steel yield strength, F_y=41 ksi
- Angle steel ultimate strength, F_u=63 ksi
- Bolt steel ultimate strength, F_t=141.1 ksi
- Bolt steel shear strength, F_v=81.6 ksi

Table E.1 Parametric Bolted Angle Connection Data Set Predicted Analytical and Calculated Limit State Capacities

Connection Geometry (in)								Analytically Predicted			Calculated Connection Capacity (kips)												
L1	L2	t	Bolt Dia.	g1	w	s1	s2	Force (kips)	Fail Mode	Eff	R_{BOLT} Tension	R_{BOLT} Shear	R_{GY} Gross Section Yield	R_{NF} Net Section Fracture	R_{WS} Whitemore Section	R_{MWS} Modified Whitemore Section	R_{BS} Block Shear	R_{PRY} AISC	R_{PRY} AISC w/ Fu	R_{PRY} Eurocode	R_{PRY} Hybrid	R_{PRY} Modified Hybrid	R_{PRY} Modified Eurocode
6	4	0.3125	0.5	2.25	6	3.5	3.5	24.08	Bolt	0.43	55.41	51.27	76.88	95.98	76.88	64.42	111.64	5.90	9.07	5.74	5.90	17.71	17.21
6	4	0.3125	0.5	2.5625	6	3.5	3.5	21.19	Bolt	0.38	55.41	51.27	76.88	95.98	76.88	64.42	111.64	5.05	7.76	4.99	5.05	15.15	14.98
6	4	0.3125	0.5	2.875	6	3.5	3.5	18.77	Bolt	0.34	55.41	51.27	76.88	95.98	76.88	64.42	111.64	4.41	6.78	4.42	4.41	13.23	13.25
6	4	0.3125	0.5	2.25	8	5.5	3.5	25.63	Bolt	0.46	55.41	51.27	102.50	135.35	89.23	70.94	103.96	8.08	12.41	7.65	8.08	24.23	22.95
6	4	0.3125	0.5	2.5625	8	5.5	3.5	22.62	Bolt	0.41	55.41	51.27	102.50	135.35	89.23	70.94	103.96	6.91	10.61	6.66	6.91	20.72	19.97
6	4	0.3125	0.5	2.875	8	5.5	3.5	20.12	Bolt	0.36	55.41	51.27	102.50	135.35	89.23	70.94	103.96	6.03	9.27	5.89	6.03	18.09	17.67
6	4	0.3125	0.5	2.25	8	5.5	5.5	25.65	Bolt	0.46	55.41	51.27	102.50	135.35	102.50	96.56	143.33	8.08	12.41	7.65	8.08	24.23	22.95
6	4	0.3125	0.5	2.5625	8	5.5	5.5	22.66	Bolt	0.41	55.41	51.27	102.50	135.35	102.50	96.56	143.33	6.91	10.61	6.66	6.91	20.72	19.97
6	4	0.3125	0.5	2.875	8	5.5	5.5	20.09	Bolt	0.36	55.41	51.27	102.50	135.35	102.50	96.56	143.33	6.03	9.27	5.89	6.03	18.09	17.67
6	4	0.3125	0.75	2.25	6	3.5	3.5	28.4	Angle	0.23	124.67	115.36	76.88	86.13	76.88	64.42	106.72	6.04	9.28	5.74	6.04	18.13	17.21
6	4	0.3125	0.75	2.5625	6	3.5	3.5	23.34	Angle	0.19	124.67	115.36	76.88	86.13	76.88	64.42	106.72	5.11	7.86	4.99	5.11	15.34	14.98
6	4	0.3125	0.75	2.875	6	3.5	3.5	19.26	Angle	0.15	124.67	115.36	76.88	86.13	76.88	64.42	106.72	4.43	6.81	4.42	4.43	13.29	13.25
6	4	0.3125	0.75	2.25	8	5.5	3.5	32.4	Angle	0.26	124.67	115.36	102.50	125.51	89.23	70.94	94.99	8.37	12.86	7.65	8.37	25.12	22.95
6	4	0.3125	0.75	2.5625	8	5.5	3.5	26.42	Angle	0.21	124.67	115.36	102.50	125.51	89.23	70.94	94.99	7.08	10.88	6.66	7.08	21.25	19.97
6	4	0.3125	0.75	2.875	8	5.5	3.5	21.96	Angle	0.18	124.67	115.36	102.50	125.51	89.23	70.94	94.99	6.14	9.43	5.89	6.14	18.42	17.67
6	4	0.3125	0.75	2.25	8	5.5	5.5	32.44	Angle	0.26	124.67	115.36	102.50	125.51	102.50	96.56	134.37	8.37	12.86	7.65	8.37	25.12	22.95
6	4	0.3125	0.75	2.5625	8	5.5	5.5	26.46	Angle	0.21	124.67	115.36	102.50	125.51	102.50	96.56	134.37	7.08	10.88	6.66	7.08	21.25	19.97
6	4	0.3125	0.75	2.875	8	5.5	5.5	22.04	Angle	0.18	124.67	115.36	102.50	125.51	102.50	96.56	134.37	6.14	9.43	5.89	6.14	18.42	17.67
6	4	0.3125	0.875	2.25	6	3.5	3.5	28.7	Angle	0.17	169.69	157.02	76.88	81.21	76.88	64.42	99.91	6.12	9.40	5.74	6.12	18.36	17.21
6	4	0.3125	0.875	2.5625	6	3.5	3.5	23.18	Angle	0.14	169.69	157.02	76.88	81.21	76.88	64.42	99.91	5.15	7.91	4.99	5.15	15.44	14.98
6	4	0.3125	0.875	2.875	6	3.5	3.5	19.02	Angle	0.11	169.69	157.02	76.88	81.21	76.88	64.42	99.91	4.44	6.83	4.42	4.44	13.33	13.25
6	4	0.3125	0.875	2.25	8	5.5	3.5	32.07	Angle	0.19	169.69	157.02	102.50	120.59	89.23	70.94	88.10	8.54	13.12	7.65	8.54	25.61	22.95
6	4	0.3125	0.875	2.5625	8	5.5	3.5	26.2	Angle	0.15	169.69	157.02	102.50	120.59	89.23	70.94	88.10	7.18	11.04	6.66	7.18	21.54	19.97
6	4	0.3125	0.875	2.875	8	5.5	3.5	21.8	Angle	0.13	169.69	157.02	102.50	120.59	89.23	70.94	88.10	6.20	9.52	5.89	6.20	18.59	17.67
6	4	0.3125	0.875	2.25	8	5.5	5.5	32.29	Angle	0.19	169.69	157.02	102.50	120.59	102.50	96.56	127.48	8.54	13.12	7.65	8.54	25.61	22.95
6	4	0.3125	0.875	2.5625	8	5.5	5.5	26.36	Angle	0.16	169.69	157.02	102.50	120.59	102.50	96.56	127.48	7.18	11.04	6.66	7.18	21.54	19.97

Table E.1 (cont.) Parametric Bolted Angle Connection Data Set Predicted Analytical and Calculated Limit State Capacities

Connection Geometry (in)								Analytically Predicted			Calculated Connection Capacity (kips)												
L1	L2	t	Bolt Dia.	g1	w	s1	s2	Force (kips)	Fail Mode	Eff	R_{BOLT} Tension	R_{BOLT} Shear	R_{GY} Gross Section Yield	R_{NF} Net Section Fracture	R_{WS} Whitemore Section	R_{MWS} Modified Whitemore Section	R_{BS} Block Shear	R_{PRY} AISC	R_{PRY} AISC w/ Fu	R_{PRY} Eurocode	R_{PRY} Hybrid	R_{PRY} Modified Hybrid	R_{PRY} Modified Eurocode
6	4	0.3125	0.875	2.875	8	5.5	5.5	21.9	Angle	0.13	169.69	157.02	102.50	120.59	102.50	96.56	127.48	6.20	9.52	5.89	6.20	18.59	17.67
6	4	0.375	0.875	2.25	6	3.5	3.5	39.69	Angle	0.23	169.69	157.02	92.25	97.45	92.25	82.47	119.90	8.98	13.80	8.39	8.98	26.94	25.16
6	4	0.375	0.875	2.5625	6	3.5	3.5	33.74	Angle	0.20	169.69	157.02	92.25	97.45	92.25	82.47	119.90	7.53	11.57	7.28	7.53	22.60	21.85
6	4	0.375	0.875	2.875	6	3.5	3.5	27.91	Angle	0.16	169.69	157.02	92.25	97.45	92.25	82.47	119.90	6.49	9.97	6.44	6.49	19.46	19.31
6	4	0.375	0.875	2.25	8	5.5	3.5	44.82	Angle	0.26	169.69	157.02	123.00	144.70	107.07	92.02	105.72	12.53	19.25	11.18	12.53	37.59	33.55
6	4	0.375	0.875	2.5625	8	5.5	3.5	38.21	Angle	0.23	169.69	157.02	123.00	144.70	107.07	92.02	105.72	10.51	16.15	9.71	10.51	31.52	29.13
6	4	0.375	0.875	2.875	8	5.5	3.5	32.14	Angle	0.19	169.69	157.02	123.00	144.70	107.07	92.02	105.72	9.05	13.90	8.58	9.05	27.15	25.74
6	4	0.375	0.875	2.25	8	5.5	5.5	45.25	Angle	0.27	169.69	157.02	123.00	144.70	123.00	122.77	152.97	12.53	19.25	11.18	12.53	37.59	33.55
6	4	0.375	0.875	2.5625	8	5.5	5.5	38.33	Angle	0.23	169.69	157.02	123.00	144.70	123.00	122.77	152.97	10.51	16.15	9.71	10.51	31.52	29.13
6	4	0.375	0.875	2.875	8	5.5	5.5	32.07	Angle	0.19	169.69	157.02	123.00	144.70	123.00	122.77	152.97	9.05	13.90	8.58	9.05	27.15	25.74
6	4	0.5	0.5	2.25	6	3.5	3.5	36.06	Bolt	0.65	55.41	51.27	123.00	153.56	123.00	123.00	178.63	15.92	24.47	15.38	15.92	33.65	29.96
6	4	0.5	0.5	2.5625	6	3.5	3.5	31.43	Bolt	0.57	55.41	51.27	123.00	153.56	123.00	123.00	178.63	13.51	20.76	13.30	13.51	29.03	25.34
6	4	0.5	0.5	2.875	6	3.5	3.5	26.24	Bolt	0.47	55.41	51.27	123.00	153.56	123.00	123.00	178.63	11.73	18.03	11.71	11.73	24.42	20.72
6	4	0.5	0.5	2.25	8	5.5	3.5	36.79	Bolt	0.66	55.41	51.27	164.00	216.56	142.76	142.76	166.33	21.78	33.47	20.50	21.78	35.02	31.32
6	4	0.5	0.5	2.5625	8	5.5	3.5	32.7	Bolt	0.59	55.41	51.27	164.00	216.56	142.76	142.76	166.33	18.48	28.40	17.73	18.48	30.40	26.71
6	4	0.5	0.5	2.875	8	5.5	3.5	28.15	Bolt	0.51	55.41	51.27	164.00	216.56	142.76	142.76	166.33	16.05	24.66	15.62	16.05	25.78	22.09
6	4	0.5	0.5	2.25	8	5.5	5.5	36.41	Bolt	0.66	55.41	51.27	164.00	216.56	164.00	164.00	229.33	21.78	33.47	20.50	21.78	35.02	31.32
6	4	0.5	0.5	2.5625	8	5.5	5.5	32.61	Bolt	0.59	55.41	51.27	164.00	216.56	164.00	164.00	229.33	18.48	28.40	17.73	18.48	30.40	26.71
6	4	0.5	0.5	2.875	8	5.5	5.5	28.08	Bolt	0.51	55.41	51.27	164.00	216.56	164.00	164.00	229.33	16.05	24.66	15.62	16.05	25.78	22.09
6	4	0.5	0.75	2.25	6	3.5	3.5	60.87	Angle	0.49	124.67	115.36	123.00	137.81	123.00	123.00	170.76	16.36	25.14	15.38	16.36	49.08	46.13
6	4	0.5	0.75	2.5625	6	3.5	3.5	53.05	Angle	0.43	124.67	115.36	123.00	137.81	123.00	123.00	170.76	13.72	21.08	13.30	13.72	41.17	39.89
6	4	0.5	0.75	2.875	6	3.5	3.5	46.46	Angle	0.37	124.67	115.36	123.00	137.81	123.00	123.00	170.76	11.82	18.16	11.71	11.82	35.45	35.14
6	4	0.5	0.75	2.25	8	5.5	3.5	66.66	Bolt	0.53	124.67	115.36	164.00	200.81	142.76	142.76	151.99	22.67	34.83	20.50	22.67	68.00	61.50
6	4	0.5	0.75	2.5625	8	5.5	3.5	59.29	Bolt	0.48	124.67	115.36	164.00	200.81	142.76	142.76	151.99	19.01	29.21	17.73	19.01	57.04	53.19
6	4	0.5	0.75	2.875	8	5.5	3.5	53.39	Bolt	0.43	124.67	115.36	164.00	200.81	142.76	142.76	151.99	16.37	25.16	15.62	16.37	49.11	42.87
6	4	0.5	0.75	2.25	8	5.5	5.5	66.78	Bolt	0.54	124.67	115.36	164.00	200.81	164.00	164.00	214.99	22.67	34.83	20.50	22.67	68.00	61.50
6	4	0.5	0.75	2.5625	8	5.5	5.5	59.39	Bolt	0.48	124.67	115.36	164.00	200.81	164.00	164.00	214.99	19.01	29.21	17.73	19.01	57.04	53.19
6	4	0.5	0.75	2.875	8	5.5	5.5	52.82	Bolt	0.42	124.67	115.36	164.00	200.81	164.00	164.00	214.99	16.37	25.16	15.62	16.37	49.11	42.87
6	4	0.5	0.875	2.25	6	3.5	3.5	63.48	Angle	0.37	169.69	157.02	123.00	129.94	123.00	123.00	159.86	16.61	25.52	15.38	16.61	49.82	46.13
6	4	0.5	0.875	2.5625	6	3.5	3.5	54.41	Angle	0.32	169.69	157.02	123.00	129.94	123.00	123.00	159.86	13.84	21.26	13.30	13.84	41.51	39.89
6	4	0.5	0.875	2.875	6	3.5	3.5	47.21	Angle	0.28	169.69	157.02	123.00	129.94	123.00	123.00	159.86	11.86	18.23	11.71	11.86	35.58	35.14
6	4	0.5	0.875	2.25	8	5.5	3.5	72.48	Angle	0.43	169.69	157.02	164.00	192.94	142.76	142.76	140.96	23.17	35.60	20.50	23.17	69.50	61.50

Table E.1 (cont.) Parametric Bolted Angle Connection Data Set Predicted Analytical and Calculated Limit State Capacities

Connection Geometry (in)								Analytically Predicted			Calculated Connection Capacity (kips)												
L1	L2	t	Bolt Dia.	g1	w	s1	s2	Force (kips)	Fail Mode	Eff	R_{BOLT} Tension	R_{BOLT} Shear	R_{GY} Gross Section Yield	R_{NF} Net Section Fracture	R_{WS} Whitemore Section	R_{MWS} Modified Whitemore Section	R_{BS} Block Shear	R_{PRY} AISC	R_{PRY} AISC w/ Fu	R_{PRY} Eurocode	R_{PRY} Hybrid	R_{PRY} Modified Hybrid	R_{PRY} Modified Eurocode
6	4	0.5	0.875	2.5625	8	5.5	3.5	63.03	Angle	0.37	169.69	157.02	164.00	192.94	142.76	142.76	140.96	19.30	29.66	17.73	19.30	57.91	53.19
6	4	0.5	0.875	2.875	8	5.5	3.5	55.15	Angle	0.32	169.69	157.02	164.00	192.94	142.76	142.76	140.96	16.55	25.43	15.62	16.55	49.64	46.86
6	4	0.5	0.875	2.25	8	5.5	5.5	72.16	Angle	0.43	169.69	157.02	164.00	192.94	164.00	164.00	203.96	23.17	35.60	20.50	23.17	69.50	61.50
6	4	0.5	0.875	2.5625	8	5.5	5.5	62.81	Angle	0.37	169.69	157.02	164.00	192.94	164.00	164.00	203.96	19.30	29.66	17.73	19.30	57.91	53.19
6	4	0.5	0.875	2.875	8	5.5	5.5	54.9	Angle	0.32	169.69	157.02	164.00	192.94	164.00	164.00	203.96	16.55	25.43	15.62	16.55	49.64	46.86
6	4	0.75	0.5	2.25	6	3.5	3.5	43.25	Bolt	0.78	55.41	51.27	184.50	230.34	184.50	184.50	267.95	38.59	45.23	36.29	38.59	40.11	36.29
6	4	0.75	0.5	2.5625	6	3.5	3.5	40.97	Bolt	0.74	55.41	51.27	184.50	230.34	184.50	184.50	267.95	32.36	40.46	31.52	32.36	35.34	31.52
6	4	0.75	0.5	2.875	6	3.5	3.5	37.33	Bolt	0.67	55.41	51.27	184.50	230.34	184.50	184.50	267.95	27.87	35.68	26.74	27.87	30.56	26.74
6	4	0.75	0.5	2.25	8	5.5	3.5	45.38	Bolt	0.82	55.41	51.27	246.00	324.84	214.15	214.15	249.50	43.30	50.12	39.47	43.40	43.30	39.47
6	4	0.75	0.5	2.5625	8	5.5	3.5	44.14	Bolt	0.80	55.41	51.27	246.00	324.84	214.15	214.15	249.50	38.52	45.35	34.70	38.66	38.52	34.70
6	4	0.75	0.5	2.875	8	5.5	3.5	42.03	Bolt	0.76	55.41	51.27	246.00	324.84	214.15	214.15	249.50	33.74	40.57	29.92	33.93	33.74	29.92
6	4	0.75	0.5	2.25	8	5.5	5.5	48.26	Bolt	0.87	55.41	51.27	246.00	324.84	246.00	246.00	344.00	43.30	50.12	39.47	43.40	43.30	39.47
6	4	0.75	0.5	2.5625	8	5.5	5.5	44.25	Bolt	0.80	55.41	51.27	246.00	324.84	246.00	246.00	344.00	38.52	45.35	34.70	38.66	38.52	34.70
6	4	0.75	0.5	2.875	8	5.5	5.5	41.93	Bolt	0.76	55.41	51.27	246.00	324.84	246.00	246.00	344.00	33.74	40.57	29.92	33.93	33.74	29.92
6	4	0.75	0.75	2.25	6	3.5	3.5	87.14	Bolt	0.70	124.67	115.36	184.50	206.72	184.50	184.50	256.13	39.88	61.28	36.90	39.88	82.63	69.73
6	4	0.75	0.75	2.5625	6	3.5	3.5	76.82	Bolt	0.62	124.67	115.36	184.50	206.72	184.50	184.50	256.13	33.00	50.71	31.63	33.00	71.88	58.98
6	4	0.75	0.75	2.875	6	3.5	3.5	65.91	Bolt	0.53	124.67	115.36	184.50	206.72	184.50	184.50	256.13	28.15	43.25	27.68	28.15	61.13	48.23
6	4	0.75	0.75	2.25	8	5.5	3.5	89.96	Bolt	0.72	124.67	115.36	246.00	301.22	214.15	214.15	227.98	55.25	84.90	49.20	55.25	85.81	72.91
6	4	0.75	0.75	2.5625	8	5.5	3.5	80.8	Bolt	0.65	124.67	115.36	246.00	301.22	214.15	214.15	227.98	45.73	70.26	42.17	45.73	75.06	62.16
6	4	0.75	0.75	2.875	8	5.5	3.5	70.67	Bolt	0.57	124.67	115.36	246.00	301.22	214.15	214.15	227.98	39.00	59.93	36.90	39.00	64.31	51.42
6	4	0.75	0.75	2.25	8	5.5	5.5	89.59	Bolt	0.72	124.67	115.36	246.00	301.22	246.00	246.00	322.48	55.25	84.90	49.20	55.25	85.81	72.91
6	4	0.75	0.75	2.5625	8	5.5	5.5	80.63	Bolt	0.65	124.67	115.36	246.00	301.22	246.00	246.00	322.48	45.73	70.26	42.17	45.73	75.06	62.16
6	4	0.75	0.75	2.875	8	5.5	5.5	70.54	Bolt	0.57	124.67	115.36	246.00	301.22	246.00	246.00	322.48	39.00	59.93	36.90	39.00	64.31	51.42
6	6	0.3125	0.5	2.25	6	3.5	3.5	24.1	Bolt	0.43	55.41	51.27	76.88	95.98	76.88	64.42	111.64	5.90	9.07	5.74	5.90	17.71	17.21
6	6	0.3125	0.5	3.5625	6	3.5	3.5	13.36	Angle	0.24	55.41	51.27	76.88	95.98	76.88	64.42	111.64	3.45	5.30	3.53	3.45	10.35	10.58
6	6	0.3125	0.5	4.875	6	3.5	3.5	8.18	Angle	0.15	55.41	51.27	76.88	95.98	76.88	64.42	111.64	2.44	3.74	2.55	2.44	7.31	7.64
6	6	0.3125	0.5	2.25	8	5.5	3.5	26.11	Bolt	0.47	55.41	51.27	102.50	135.35	89.23	70.94	103.96	8.08	12.41	7.65	8.08	24.23	22.95
6	6	0.3125	0.5	3.5625	8	5.5	3.5	16.19	Angle	0.29	55.41	51.27	102.50	135.35	89.23	70.94	103.96	4.72	7.25	4.70	4.72	14.15	14.11
6	6	0.3125	0.5	4.875	8	5.5	3.5	10.12	Angle	0.18	55.41	51.27	102.50	135.35	89.23	70.94	103.96	3.33	5.12	3.39	3.33	10.00	10.18
6	6	0.3125	0.5	2.25	8	5.5	5.5	26.15	Bolt	0.47	55.41	51.27	102.50	135.35	102.50	96.56	143.33	8.08	12.41	7.65	8.08	24.23	22.95
6	6	0.3125	0.5	3.5625	8	5.5	5.5	16.18	Angle	0.29	55.41	51.27	102.50	135.35	102.50	96.56	143.33	4.72	7.25	4.70	4.72	14.15	14.11
6	6	0.3125	0.5	4.875	8	5.5	5.5	10.11	Angle	0.18	55.41	51.27	102.50	135.35	102.50	96.56	143.33	3.33	5.12	3.39	3.33	10.00	10.18

Table E.1 (cont.) Parametric Bolted Angle Connection Data Set Predicted Analytical and Calculated Limit State Capacities

Connection Geometry (in)								Analytically Predicted			Calculated Connection Capacity (kips)												
L1	L2	t	Bolt Dia.	g1	w	s1	s2	Force (kips)	Fail Mode	Eff	R_{BOLT} Tension	R_{BOLT} Shear	R_{GY} Gross Section Yield	R_{NF} Net Section Fracture	R_{WS} Whitemore Section	R_{MWS} Modified Whitemore Section	R_{BS} Block Shear	R_{PRY} AISC	R_{PRY} AISC w/ Fu	R_{PRY} Eurocode	R_{PRY} Hybrid	R_{PRY} Modified Hybrid	R_{PRY} Modified Eurocode
6	6	0.3125	0.75	2.25	6	3.5	3.5	28.38	Angle	0.23	124.67	115.36	76.88	86.13	76.88	64.42	106.72	6.04	9.28	5.74	6.04	18.13	17.21
6	6	0.3125	0.75	3.5625	6	3.5	3.5	13.3	Angle	0.11	124.67	115.36	76.88	86.13	76.88	64.42	106.72	3.43	5.26	3.53	3.43	10.28	10.58
6	6	0.3125	0.75	4.875	6	3.5	3.5	8.11	Angle	0.07	124.67	115.36	76.88	86.13	76.88	64.42	106.72	2.39	3.67	2.55	2.39	7.17	7.64
6	6	0.3125	0.75	2.25	8	5.5	3.5	32.54	Angle	0.26	124.67	115.36	102.50	125.51	89.23	70.94	94.99	8.37	12.86	7.65	8.37	25.12	22.95
6	6	0.3125	0.75	3.5625	8	5.5	3.5	16.14	Angle	0.13	124.67	115.36	102.50	125.51	89.23	70.94	94.99	4.75	7.29	4.70	4.75	14.24	14.11
6	6	0.3125	0.75	4.875	8	5.5	3.5	10.07	Angle	0.08	124.67	115.36	102.50	125.51	89.23	70.94	94.99	3.31	5.09	3.39	3.31	9.94	10.18
6	6	0.3125	0.75	2.25	8	5.5	5.5	32.51	Angle	0.26	124.67	115.36	102.50	125.51	102.50	96.56	134.37	8.37	12.86	7.65	8.37	25.12	22.95
6	6	0.3125	0.75	3.5625	8	5.5	5.5	16.13	Angle	0.13	124.67	115.36	102.50	125.51	102.50	96.56	134.37	4.75	7.29	4.70	4.75	14.24	14.11
6	6	0.3125	0.75	4.875	8	5.5	5.5	10.07	Angle	0.08	124.67	115.36	102.50	125.51	102.50	96.56	134.37	3.31	5.09	3.39	3.31	9.94	10.18
6	6	0.3125	0.875	2.25	6	3.5	3.5	28.07	Angle	0.17	169.69	157.02	76.88	81.21	76.88	64.42	99.91	6.12	9.40	5.74	6.12	18.36	17.21
6	6	0.3125	0.875	3.5625	6	3.5	3.5	13.24	Angle	0.08	169.69	157.02	76.88	81.21	76.88	64.42	99.91	3.41	5.25	3.53	3.41	10.24	10.58
6	6	0.3125	0.875	4.875	6	3.5	3.5	8.06	Angle	0.05	169.69	157.02	76.88	81.21	76.88	64.42	99.91	2.37	3.64	2.55	2.37	7.10	7.64
6	6	0.3125	0.875	2.25	8	5.5	3.5	32.11	Angle	0.19	169.69	157.02	102.50	120.59	89.23	70.94	88.10	8.54	13.12	7.65	8.54	25.61	22.95
6	6	0.3125	0.875	3.5625	8	5.5	3.5	16.11	Angle	0.09	169.69	157.02	102.50	120.59	89.23	70.94	88.10	4.76	7.32	4.70	4.76	14.29	14.11
6	6	0.3125	0.875	4.875	8	5.5	3.5	10.03	Angle	0.06	169.69	157.02	102.50	120.59	89.23	70.94	88.10	3.30	5.07	3.39	3.30	9.91	10.18
6	6	0.3125	0.875	2.25	8	5.5	5.5	32.23	Angle	0.19	169.69	157.02	102.50	120.59	102.50	96.56	127.48	8.54	13.12	7.65	8.54	25.61	22.95
6	6	0.3125	0.875	3.5625	8	5.5	5.5	16.09	Angle	0.09	169.69	157.02	102.50	120.59	102.50	96.56	127.48	4.76	7.32	4.70	4.76	14.29	14.11
6	6	0.3125	0.875	4.875	8	5.5	5.5	10.03	Angle	0.06	169.69	157.02	102.50	120.59	102.50	96.56	127.48	3.30	5.07	3.39	3.30	9.91	10.18
6	6	0.375	0.875	2.25	6	3.5	3.5	38.91	Angle	0.23	169.69	157.02	92.25	97.45	92.25	82.47	119.90	8.98	13.80	8.39	8.98	26.94	25.16
6	6	0.375	0.875	3.5625	6	3.5	3.5	19.58	Angle	0.12	169.69	157.02	92.25	97.45	92.25	82.47	119.90	4.97	7.63	5.13	4.97	14.90	15.38
6	6	0.375	0.875	4.875	6	3.5	3.5	11.94	Angle	0.07	169.69	157.02	92.25	97.45	92.25	82.47	119.90	3.43	5.28	3.69	3.43	10.30	11.07
6	6	0.375	0.875	2.25	8	5.5	3.5	45.02	Angle	0.27	169.69	157.02	123.00	144.70	107.07	92.02	105.72	12.53	19.25	11.18	12.53	37.59	33.55
6	6	0.375	0.875	3.5625	8	5.5	3.5	23.87	Angle	0.14	169.69	157.02	123.00	144.70	107.07	92.02	105.72	6.93	10.65	6.83	6.93	20.79	20.50
6	6	0.375	0.875	4.875	8	5.5	3.5	14.96	Angle	0.09	169.69	157.02	123.00	144.70	107.07	92.02	105.72	4.79	7.36	4.92	4.79	14.37	14.76
6	6	0.375	0.875	2.25	8	5.5	5.5	44.9	Angle	0.26	169.69	157.02	123.00	144.70	123.00	122.77	152.97	12.53	19.25	11.18	12.53	37.59	33.55
6	6	0.375	0.875	3.5625	8	5.5	5.5	23.83	Angle	0.14	169.69	157.02	123.00	144.70	123.00	122.77	152.97	6.93	10.65	6.83	6.93	20.79	20.50
6	6	0.375	0.875	4.875	8	5.5	5.5	14.94	Angle	0.09	169.69	157.02	123.00	144.70	123.00	122.77	152.97	4.79	7.36	4.92	4.79	14.37	14.76
6	6	0.5	0.5	2.25	6	3.5	3.5	36.85	Bolt	0.67	55.41	51.27	123.00	153.56	123.00	123.00	178.63	15.92	24.47	15.38	15.92	37.28	34.20
6	6	0.5	0.5	3.5625	6	3.5	3.5	24.88	Bolt	0.45	55.41	51.27	123.00	153.56	123.00	123.00	178.63	9.10	13.98	9.28	9.10	27.30	26.16
6	6	0.5	0.5	4.875	6	3.5	3.5	17.85	Bolt	0.32	55.41	51.27	123.00	153.56	123.00	123.00	178.63	6.37	9.79	6.65	6.37	15.92	13.51
6	6	0.5	0.5	2.25	8	5.5	3.5	40.81	Bolt	0.74	55.41	51.27	164.00	216.56	142.76	142.76	166.33	21.78	33.47	20.50	21.78	38.42	35.34
6	6	0.5	0.5	3.5625	8	5.5	3.5	27.78	Bolt	0.50	55.41	51.27	164.00	216.56	142.76	142.76	166.33	12.45	19.13	12.38	12.45	29.46	27.05

Table E.1 (cont.) Parametric Bolted Angle Connection Data Set Predicted Analytical and Calculated Limit State Capacities

Connection Geometry (in)								Analytically Predicted			Calculated Connection Capacity (kips)												
L1	L2	t	Bolt Dia.	g1	w	s1	s2	Force (kips)	Fail Mode	Eff	R_{BOLT} Tension	R_{BOLT} Shear	R_{GY} Gross Section Yield	R_{NF} Net Section Fracture	R_{WS} Whitemore Section	R_{MWS} Modified Whitemore Section	R_{BS} Block Shear	R_{PRY} AISC	R_{PRY} AISC w/ Fu	R_{PRY} Eurocode	R_{PRY} Hybrid	R_{PRY} Modified Hybrid	R_{PRY} Modified Eurocode
6	6	0.5	0.5	4.875	8	5.5	3.5	18.94	Bolt	0.34	55.41	51.27	164.00	216.56	142.76	142.76	166.33	8.71	13.39	8.86	8.71	16.82	14.41
6	6	0.5	0.5	2.25	8	5.5	5.5	40.72	Bolt	0.73	55.41	51.27	164.00	216.56	164.00	164.00	229.33	21.78	33.47	20.50	21.78	38.42	35.34
6	6	0.5	0.5	3.5625	8	5.5	5.5	28	Bolt	0.51	55.41	51.27	164.00	216.56	164.00	164.00	229.33	12.45	19.13	12.38	12.45	29.46	27.05
6	6	0.5	0.5	4.875	8	5.5	5.5	18.94	Bolt	0.34	55.41	51.27	164.00	216.56	164.00	164.00	229.33	8.71	13.39	8.86	8.71	16.82	14.41
6	6	0.5	0.75	2.25	6	3.5	3.5	60.92	Angle	0.49	124.67	115.36	123.00	137.81	123.00	123.00	170.76	16.36	25.14	15.38	16.36	49.08	46.13
6	6	0.5	0.75	3.5625	6	3.5	3.5	34.96	Angle	0.28	124.67	115.36	123.00	137.81	123.00	123.00	170.76	9.05	13.91	9.28	9.05	27.15	27.85
6	6	0.5	0.75	4.875	6	3.5	3.5	21.64	Angle	0.17	124.67	115.36	123.00	137.81	123.00	123.00	170.76	6.26	9.61	6.65	6.26	18.77	19.95
6	6	0.5	0.75	2.25	8	5.5	3.5	68.42	Bolt	0.55	124.67	115.36	164.00	200.81	142.76	142.76	151.99	22.67	34.83	20.50	22.67	68.00	61.50
6	6	0.5	0.75	3.5625	8	5.5	3.5	43.29	Angle	0.35	124.67	115.36	164.00	200.81	142.76	142.76	151.99	12.54	19.27	12.38	12.54	37.62	37.13
6	6	0.5	0.75	4.875	8	5.5	3.5	27.51	Angle	0.22	124.67	115.36	164.00	200.81	142.76	142.76	151.99	8.67	13.32	8.86	8.67	26.00	26.59
6	6	0.5	0.75	2.25	8	5.5	5.5	68.57	Bolt	0.55	124.67	115.36	164.00	200.81	164.00	164.00	214.99	22.67	34.83	20.50	22.67	68.00	61.50
6	6	0.5	0.75	3.5625	8	5.5	5.5	42.91	Angle	0.34	124.67	115.36	164.00	200.81	164.00	164.00	214.99	12.54	19.27	12.38	12.54	37.62	37.13
6	6	0.5	0.75	4.875	8	5.5	5.5	27.38	Angle	0.22	124.67	115.36	164.00	200.81	164.00	164.00	214.99	8.67	13.32	8.86	8.67	26.00	26.59
6	6	0.5	0.875	2.25	6	3.5	3.5	62.97	Angle	0.37	169.69	157.02	123.00	129.94	123.00	123.00	159.86	16.61	25.52	15.38	16.61	49.82	46.13
6	6	0.5	0.875	3.5625	6	3.5	3.5	34.46	Angle	0.20	169.69	157.02	123.00	129.94	123.00	123.00	159.86	9.02	13.87	9.28	9.02	27.07	27.85
6	6	0.5	0.875	4.875	6	3.5	3.5	21.45	Angle	0.13	169.69	157.02	123.00	129.94	123.00	123.00	159.86	6.20	9.52	6.65	6.20	18.59	19.95
6	6	0.5	0.875	2.25	8	5.5	3.5	72.73	Angle	0.43	169.69	157.02	164.00	192.94	142.76	142.76	140.96	23.17	35.60	20.50	23.17	69.50	61.50
6	6	0.5	0.875	3.5625	8	5.5	3.5	42.85	Angle	0.25	169.69	157.02	164.00	192.94	142.76	142.76	140.96	12.59	19.35	12.38	12.59	37.77	37.13
6	6	0.5	0.875	4.875	8	5.5	3.5	27.35	Angle	0.16	169.69	157.02	164.00	192.94	142.76	142.76	140.96	8.64	13.28	8.86	8.64	25.93	26.59
6	6	0.5	0.875	2.25	8	5.5	5.5	72.34	Angle	0.43	169.69	157.02	164.00	192.94	164.00	164.00	203.96	23.17	35.60	20.50	23.17	69.50	61.50
6	6	0.5	0.875	3.5625	8	5.5	5.5	42.49	Angle	0.25	169.69	157.02	164.00	192.94	164.00	164.00	203.96	12.59	19.35	12.38	12.59	37.77	37.13
6	6	0.5	0.875	4.875	8	5.5	5.5	27.22	Angle	0.16	169.69	157.02	164.00	192.94	164.00	164.00	203.96	8.64	13.28	8.86	8.64	25.93	26.59
6	6	0.75	0.5	2.25	6	3.5	3.5	44.9	Bolt	0.81	55.41	51.27	184.50	230.34	184.50	184.50	267.95	38.59	46.67	36.90	38.59	42.27	38.98
6	6	0.75	0.5	3.5625	6	3.5	3.5	35.61	Bolt	0.64	55.41	51.27	184.50	230.34	184.50	184.50	267.95	21.35	32.80	21.71	21.35	32.62	30.16
6	6	0.75	0.5	4.875	6	3.5	3.5	22.97	Bolt	0.41	55.41	51.27	184.50	230.34	184.50	184.50	267.95	14.75	22.67	15.38	14.75	19.69	17.23
6	6	0.75	0.5	2.25	8	5.5	3.5	48.4	Bolt	0.87	55.41	51.27	246.00	324.84	214.15	214.15	249.50	45.00	50.87	41.72	45.08	45.00	41.72
6	6	0.75	0.5	3.5625	8	5.5	3.5	37.36	Bolt	0.67	55.41	51.27	246.00	324.84	214.15	214.15	249.50	29.20	39.07	28.94	29.20	34.67	32.21
6	6	0.75	0.5	4.875	8	5.5	3.5	25.96	Bolt	0.47	55.41	51.27	246.00	324.84	214.15	214.15	249.50	20.18	26.14	19.28	20.18	21.74	19.28
6	6	0.75	0.5	2.25	8	5.5	5.5	46.36	Bolt	0.84	55.41	51.27	246.00	324.84	246.00	246.00	344.00	45.00	50.87	41.72	45.08	45.00	41.72
6	6	0.75	0.5	3.5625	8	5.5	5.5	38.43	Bolt	0.69	55.41	51.27	246.00	324.84	246.00	246.00	344.00	29.20	39.07	28.94	29.20	34.67	32.21
6	6	0.75	0.5	4.875	8	5.5	5.5	25.94	Bolt	0.47	55.41	51.27	246.00	324.84	246.00	246.00	344.00	20.18	26.14	19.28	20.18	21.74	19.28
6	6	0.75	0.75	2.25	6	3.5	3.5	92.1	Bolt	0.74	124.67	115.36	184.50	206.72	184.50	184.50	256.13	39.88	61.28	36.90	39.88	88.54	77.46

Table E.1 (cont.) Parametric Bolted Angle Connection Data Set Predicted Analytical and Calculated Limit State Capacities

Connection Geometry (in)								Analytically Predicted			Calculated Connection Capacity (kips)												
L1	L2	t	Bolt Dia.	g1	w	s1	s2	Force (kips)	Fail Mode	Eff	R_{BOLT} Tension	R_{BOLT} Shear	R_{GY} Gross Section Yield	R_{NF} Net Section Fracture	R_{WS} Whitemore Section	R_{MWS} Modified Whitemore Section	R_{BS} Block Shear	R_{PRY} AISC	R_{PRY} AISC w/ Fu	R_{PRY} Eurocode	R_{PRY} Hybrid	R_{PRY} Modified Hybrid	R_{PRY} Modified Eurocode
6	6	0.75	0.75	3.5625	6	3.5	3.5	64.13	Bolt	0.51	124.67	115.36	184.50	206.72	184.50	184.50	256.13	21.27	32.68	21.71	21.27	63.81	60.17
6	6	0.75	0.75	4.875	6	3.5	3.5	43.53	Bolt	0.35	124.67	115.36	184.50	206.72	184.50	184.50	256.13	14.50	22.28	15.38	14.50	39.40	31.08
6	6	0.75	0.75	2.25	8	5.5	3.5	100.84	Bolt	0.81	124.67	115.36	246.00	301.22	214.15	214.15	227.98	55.25	84.90	49.20	55.25	91.28	80.20
6	6	0.75	0.75	3.5625	8	5.5	3.5	70.89	Bolt	0.57	124.67	115.36	246.00	301.22	214.15	214.15	227.98	29.47	45.28	28.94	29.47	70.54	62.22
6	6	0.75	0.75	4.875	8	5.5	3.5	46.93	Bolt	0.38	124.67	115.36	246.00	301.22	214.15	214.15	227.98	20.09	30.87	20.50	20.09	41.45	33.13
6	6	0.75	0.75	2.25	8	5.5	5.5	101.37	Bolt	0.81	124.67	115.36	246.00	301.22	246.00	246.00	322.48	55.25	84.90	49.20	55.25	91.28	80.20
6	6	0.75	0.75	3.5625	8	5.5	5.5	70.86	Bolt	0.57	124.67	115.36	246.00	301.22	246.00	246.00	322.48	29.47	45.28	28.94	29.47	70.54	62.22
6	6	0.75	0.75	4.875	8	5.5	5.5	46.83	Bolt	0.38	124.67	115.36	246.00	301.22	246.00	246.00	322.48	20.09	30.87	20.50	20.09	41.45	33.13
8	4	0.5	0.75	2.5	6	3.5	3.5	52.66	Angle	0.42	124.67	115.36	123.00	137.81	123.00	123.00	219.96	14.18	21.79	13.67	14.18	42.54	41.00
8	4	0.5	0.75	2.75	6	3.5	3.5	46.9	Angle	0.38	124.67	115.36	123.00	137.81	123.00	123.00	219.96	12.51	19.22	12.30	12.51	37.53	36.90
8	4	0.5	0.75	2.5	8	5.5	3.5	59.71	Bolt	0.48	124.67	115.36	164.00	200.81	142.76	142.76	207.66	19.65	30.19	18.22	19.65	58.94	54.67
8	4	0.5	0.75	2.75	8	5.5	3.5	54.96	Bolt	0.44	124.67	115.36	164.00	200.81	142.76	142.76	207.66	17.33	26.64	16.40	17.33	52.00	47.02
8	4	0.5	0.75	2.5	8	5.5	5.5	59.81	Bolt	0.48	124.67	115.36	164.00	200.81	164.00	164.00	270.66	19.65	30.19	18.22	19.65	58.94	54.67
8	4	0.5	0.75	2.75	8	5.5	5.5	54.7	Angle	0.44	124.67	115.36	164.00	200.81	164.00	164.00	270.66	17.33	26.64	16.40	17.33	52.00	47.02
8	4	0.5	0.875	2.5	6	3.5	3.5	53.29	Angle	0.31	169.69	157.02	123.00	129.94	123.00	123.00	216.02	14.31	22.00	13.67	14.31	42.94	41.00
8	4	0.5	0.875	2.75	6	3.5	3.5	47.14	Angle	0.28	169.69	157.02	123.00	129.94	123.00	123.00	216.02	12.58	19.33	12.30	12.58	37.74	36.90
8	4	0.5	0.875	2.5	8	5.5	3.5	62.6	Angle	0.37	169.69	157.02	164.00	192.94	142.76	142.76	203.72	19.97	30.69	18.22	19.97	59.91	54.67
8	4	0.5	0.875	2.75	8	5.5	3.5	55.97	Angle	0.33	169.69	157.02	164.00	192.94	142.76	142.76	203.72	17.55	26.97	16.40	17.55	52.65	49.20
8	4	0.5	0.875	2.5	8	5.5	5.5	61.96	Angle	0.37	169.69	157.02	164.00	192.94	164.00	164.00	266.72	19.97	30.69	18.22	19.97	59.91	54.67
8	4	0.5	0.875	2.75	8	5.5	5.5	55.43	Angle	0.33	169.69	157.02	164.00	192.94	164.00	164.00	266.72	17.55	26.97	16.40	17.55	52.65	49.20
8	4	0.5	1	2.5	6	3.5	3.5	52.59	Angle	0.24	221.64	205.08	123.00	122.06	123.00	123.00	212.08	14.46	22.22	13.67	14.46	43.38	41.00
8	4	0.5	1	2.75	6	3.5	3.5	46.31	Angle	0.21	221.64	205.08	123.00	122.06	123.00	123.00	212.08	12.65	19.44	12.30	12.65	37.96	36.90
8	4	0.5	1	2.5	8	5.5	3.5	61.95	Angle	0.28	221.64	205.08	164.00	185.06	142.76	142.76	199.78	20.32	31.22	18.22	20.32	60.95	54.67
8	4	0.5	1	2.75	8	5.5	3.5	55.16	Angle	0.25	221.64	205.08	164.00	185.06	142.76	142.76	199.78	17.78	27.32	16.40	17.78	53.33	49.20
8	4	0.5	1	2.5	8	5.5	5.5	61.33	Angle	0.28	221.64	205.08	164.00	185.06	164.00	164.00	262.78	20.32	31.22	18.22	20.32	60.95	54.67
8	4	0.5	1	2.75	8	5.5	5.5	54.61	Angle	0.25	221.64	205.08	164.00	185.06	164.00	164.00	262.78	17.78	27.32	16.40	17.78	53.33	49.20
8	4	0.75	0.75	2.5	6	3.5	3.5	78.6	Bolt	0.63	124.67	115.36	184.50	206.72	184.50	184.50	329.93	34.18	52.52	32.56	34.18	74.03	61.13
8	4	0.75	0.75	2.75	6	3.5	3.5	69.35	Bolt	0.56	124.67	115.36	184.50	206.72	184.50	184.50	329.93	29.91	45.96	29.13	29.91	65.43	52.53
8	4	0.75	0.75	2.5	8	5.5	3.5	82.13	Bolt	0.66	124.67	115.36	246.00	301.22	214.15	214.15	311.48	47.36	72.77	43.41	47.36	77.21	64.31
8	4	0.75	0.75	2.75	8	5.5	3.5	74.2	Bolt	0.60	124.67	115.36	246.00	301.22	214.15	214.15	311.48	41.44	63.68	38.84	41.44	68.61	55.71
8	4	0.75	0.75	2.5	8	5.5	5.5	81.79	Bolt	0.66	124.67	115.36	246.00	301.22	246.00	246.00	405.98	47.36	72.77	43.41	47.36	77.21	64.31
8	4	0.75	0.75	2.75	8	5.5	5.5	74.01	Bolt	0.59	124.67	115.36	246.00	301.22	246.00	246.00	405.98	41.44	63.68	38.84	41.44	68.61	55.71

Table E.1 (cont.) Parametric Bolted Angle Connection Data Set Predicted Analytical and Calculated Limit State Capacities

Connection Geometry (in)								Analytically Predicted			Calculated Connection Capacity (kips)												
L1	L2	t	Bolt Dia.	g1	w	s1	s2	Force (kips)	Fail Mode	Eff	R_{BOLT} Tension	R_{BOLT} Shear	R_{GY} Gross Section Yield	R_{NF} Net Section Fracture	R_{WS} Whitemore Section	R_{MWS} Modified Whitemore Section	R_{BS} Block Shear	R_{PRY} AISC	R_{PRY} AISC w/ Fu	R_{PRY} Eurocode	R_{PRY} Hybrid	R_{PRY} Modified Hybrid	R_{PRY} Modified Eurocode
8	4	0.75	0.875	2.5	6	3.5	3.5	101.16	Bolt	0.60	169.69	157.02	184.50	194.91	184.50	184.50	324.03	34.59	53.16	32.56	34.59	100.24	79.76
8	4	0.75	0.875	2.75	6	3.5	3.5	91.68	Angle	0.54	169.69	157.02	184.50	194.91	184.50	184.50	324.03	30.13	46.30	29.13	30.13	88.54	68.06
8	4	0.75	0.875	2.5	8	5.5	3.5	109.08	Bolt	0.64	169.69	157.02	246.00	289.41	214.15	214.15	305.58	48.26	74.16	43.41	48.26	103.42	82.94
8	4	0.75	0.875	2.75	8	5.5	3.5	98.37	Bolt	0.58	169.69	157.02	246.00	289.41	214.15	214.15	305.58	42.03	64.59	38.84	42.03	91.72	71.24
8	4	0.75	0.875	2.5	8	5.5	5.5	109.11	Bolt	0.64	169.69	157.02	246.00	289.41	246.00	246.00	400.08	48.26	74.16	43.41	48.26	103.42	82.94
8	4	0.75	0.875	2.75	8	5.5	5.5	98.23	Bolt	0.58	169.69	157.02	246.00	289.41	246.00	246.00	400.08	42.03	64.59	38.84	42.03	91.72	71.24
8	4	0.75	1	2.5	6	3.5	3.5	105.11	Angle	0.47	221.64	205.08	184.50	183.09	184.50	184.50	318.12	35.04	53.84	32.56	35.04	105.11	97.68
8	4	0.75	1	2.75	6	3.5	3.5	94.87	Angle	0.43	221.64	205.08	184.50	183.09	184.50	184.50	318.12	30.37	46.66	29.13	30.37	91.10	85.97
8	4	0.75	1	2.5	8	5.5	3.5	123.13	Angle	0.56	221.64	205.08	246.00	277.59	214.15	214.15	299.67	49.23	75.65	43.41	49.23	135.01	104.44
8	4	0.75	1	2.75	8	5.5	3.5	110.78	Angle	0.50	221.64	205.08	246.00	277.59	214.15	214.15	299.67	42.67	65.56	38.84	42.67	119.72	89.15
8	4	0.75	1	2.5	8	5.5	5.5	122.17	Angle	0.55	221.64	205.08	246.00	277.59	246.00	246.00	394.17	49.23	75.65	43.41	49.23	135.01	104.44
8	4	0.75	1	2.75	8	5.5	5.5	110.22	Angle	0.50	221.64	205.08	246.00	277.59	246.00	246.00	394.17	42.67	65.56	38.84	42.67	119.72	89.15
8	4	1	0.75	2.5	6	3.5	3.5	95.66	Bolt	0.77	124.67	115.36	246.00	275.63	246.00	246.00	439.91	65.44	93.79	61.50	65.44	84.36	71.00
8	4	1	0.75	2.75	6	3.5	3.5	87.88	Bolt	0.70	124.67	115.36	246.00	275.63	246.00	246.00	439.91	56.72	84.88	54.67	56.72	75.45	62.10
8	4	1	0.75	2.5	8	5.5	3.5	104.33	Bolt	0.84	124.67	115.36	328.00	401.63	285.53	285.53	415.31	90.22	102.79	76.86	90.52	90.22	76.86
8	4	1	0.75	2.75	8	5.5	3.5	97.47	Bolt	0.78	124.67	115.36	328.00	401.63	285.53	285.53	415.31	78.58	93.88	67.95	78.58	81.31	67.95
8	4	1	0.75	2.5	8	5.5	5.5	104.23	Bolt	0.84	124.67	115.36	328.00	401.63	328.00	328.00	541.31	90.22	102.79	76.86	90.52	90.22	76.86
8	4	1	0.75	2.75	8	5.5	5.5	97.39	Bolt	0.78	124.67	115.36	328.00	401.63	328.00	328.00	541.31	78.58	93.88	67.95	78.58	81.31	67.95
8	4	1	0.875	2.5	6	3.5	3.5	118.29	Bolt	0.70	169.69	157.02	246.00	259.88	246.00	246.00	432.04	66.42	102.06	61.50	66.42	111.51	90.30
8	4	1	0.875	2.75	6	3.5	3.5	108.4	Bolt	0.64	169.69	157.02	246.00	259.88	246.00	246.00	432.04	57.26	87.98	54.67	57.26	99.39	78.18
8	4	1	0.875	2.5	8	5.5	3.5	128.47	Bolt	0.76	169.69	157.02	328.00	385.88	285.53	285.53	407.44	92.66	129.94	82.00	92.66	117.37	96.15
8	4	1	0.875	2.75	8	5.5	3.5	119	Bolt	0.70	169.69	157.02	328.00	385.88	285.53	285.53	407.44	79.88	117.82	72.89	79.88	105.24	84.03
8	4	1	0.875	2.5	8	5.5	5.5	128.23	Bolt	0.76	169.69	157.02	328.00	385.88	328.00	328.00	533.44	92.66	129.94	82.00	92.66	117.37	96.15
8	4	1	0.875	2.75	8	5.5	5.5	118.77	Bolt	0.70	169.69	157.02	328.00	385.88	328.00	328.00	533.44	79.88	117.82	72.89	79.88	105.24	84.03
8	4	1	1	2.5	6	3.5	3.5	151.92	Bolt	0.69	221.64	205.08	246.00	244.13	246.00	246.00	424.16	67.48	103.69	61.50	67.48	144.22	112.56
8	4	1	1	2.75	6	3.5	3.5	138.96	Bolt	0.63	221.64	205.08	246.00	244.13	246.00	246.00	424.16	57.84	88.88	54.67	57.84	128.39	96.73
8	4	1	1	2.5	8	5.5	3.5	162.47	Bolt	0.73	221.64	205.08	328.00	370.13	285.53	285.53	399.56	94.81	145.69	82.00	94.81	150.08	118.42
8	4	1	1	2.75	8	5.5	3.5	149.14	Bolt	0.67	221.64	205.08	328.00	370.13	285.53	285.53	399.56	81.27	124.88	72.89	81.27	134.25	102.59
8	4	1	1	2.5	8	5.5	5.5	161.63	Bolt	0.73	221.64	205.08	328.00	370.13	328.00	328.00	525.56	94.81	145.69	82.00	94.81	150.08	118.42
8	4	1	1	2.75	8	5.5	5.5	150.51	Bolt	0.68	221.64	205.08	328.00	370.13	328.00	328.00	525.56	81.27	124.88	72.89	81.27	134.25	102.59
8	6	0.5	0.75	2.5	6	3.5	3.5	52.83	Angle	0.42	124.67	115.36	123.00	137.81	123.00	123.00	219.96	14.18	21.79	13.67	14.18	42.54	41.00
8	6	0.5	0.75	3.625	6	3.5	3.5	34.29	Angle	0.28	124.67	115.36	123.00	137.81	123.00	123.00	219.96	8.86	13.62	9.11	8.86	26.59	27.33

Table E.1 (cont.) Parametric Bolted Angle Connection Data Set Predicted Analytical and Calculated Limit State Capacities

Connection Geometry (in)								Analytically Predicted			Calculated Connection Capacity (kips)												
L1	L2	t	Bolt Dia.	g1	w	s1	s2	Force (kips)	Fail Mode	Eff	R_{BOLT} Tension	R_{BOLT} Shear	R_{GY} Gross Section Yield	R_{NF} Net Section Fracture	R_{WS} Whitemore Section	R_{MWS} Modified Whitemore Section	R_{BS} Block Shear	R_{PRY} AISC	R_{PRY} AISC w/ Fu	R_{PRY} Eurocode	R_{PRY} Hybrid	R_{PRY} Modified Hybrid	R_{PRY} Modified Eurocode
8	6	0.5	0.75	4.75	6	3.5	3.5	22.57	Angle	0.18	124.67	115.36	123.00	137.81	123.00	123.00	219.96	6.45	9.90	6.83	6.45	19.34	20.50
8	6	0.5	0.75	2.5	8	5.5	3.5	62.36	Angle	0.50	124.67	115.36	164.00	200.81	142.76	142.76	207.66	19.65	30.19	18.22	19.65	58.94	54.67
8	6	0.5	0.75	3.625	8	5.5	3.5	42.21	Angle	0.34	124.67	115.36	164.00	200.81	142.76	142.76	207.66	12.28	18.87	12.15	12.28	36.84	36.44
8	6	0.5	0.75	4.75	8	5.5	3.5	28.71	Angle	0.23	124.67	115.36	164.00	200.81	142.76	142.76	207.66	8.93	13.72	9.11	8.93	26.79	27.33
8	6	0.5	0.75	2.5	8	5.5	5.5	61.62	Angle	0.49	124.67	115.36	164.00	200.81	164.00	164.00	270.66	19.65	30.19	18.22	19.65	58.94	54.67
8	6	0.5	0.75	3.625	8	5.5	5.5	41.77	Angle	0.34	124.67	115.36	164.00	200.81	164.00	164.00	270.66	12.28	18.87	12.15	12.28	36.84	36.44
8	6	0.5	0.75	4.75	8	5.5	5.5	28.6	Angle	0.23	124.67	115.36	164.00	200.81	164.00	164.00	270.66	8.93	13.72	9.11	8.93	26.79	27.33
8	6	0.5	0.875	2.5	6	3.5	3.5	53.55	Angle	0.32	169.69	157.02	123.00	129.94	123.00	123.00	216.02	14.31	22.00	13.67	14.31	42.94	41.00
8	6	0.5	0.875	3.625	6	3.5	3.5	33.88	Angle	0.20	169.69	157.02	123.00	129.94	123.00	123.00	216.02	8.83	13.57	9.11	8.83	26.50	27.33
8	6	0.5	0.875	4.75	6	3.5	3.5	22.35	Angle	0.13	169.69	157.02	123.00	129.94	123.00	123.00	216.02	6.39	9.81	6.83	6.39	19.16	20.50
8	6	0.5	0.875	2.5	8	5.5	3.5	63.59	Angle	0.37	169.69	157.02	164.00	192.94	142.76	142.76	203.72	19.97	30.69	18.22	19.97	59.91	54.67
8	6	0.5	0.875	3.625	8	5.5	3.5	42.18	Angle	0.25	169.69	157.02	164.00	192.94	142.76	142.76	203.72	12.32	18.93	12.15	12.32	36.97	36.44
8	6	0.5	0.875	4.75	8	5.5	3.5	28.52	Angle	0.17	169.69	157.02	164.00	192.94	142.76	142.76	203.72	8.91	13.69	9.11	8.91	26.73	27.33
8	6	0.5	0.875	2.5	8	5.5	5.5	62.85	Angle	0.37	169.69	157.02	164.00	192.94	164.00	164.00	266.72	19.97	30.69	18.22	19.97	59.91	54.67
8	6	0.5	0.875	3.625	8	5.5	5.5	41.9	Angle	0.25	169.69	157.02	164.00	192.94	164.00	164.00	266.72	12.32	18.93	12.15	12.32	36.97	36.44
8	6	0.5	0.875	4.75	8	5.5	5.5	28.43	Angle	0.17	169.69	157.02	164.00	192.94	164.00	164.00	266.72	8.91	13.69	9.11	8.91	26.73	27.33
8	6	0.5	1	2.5	6	3.5	3.5	52.89	Angle	0.24	221.64	205.08	123.00	122.06	123.00	123.00	212.08	14.46	22.22	13.67	14.46	43.38	41.00
8	6	0.5	1	3.625	6	3.5	3.5	33.25	Angle	0.15	221.64	205.08	123.00	122.06	123.00	123.00	212.08	8.80	13.52	9.11	8.80	26.40	27.33
8	6	0.5	1	4.75	6	3.5	3.5	22.07	Angle	0.10	221.64	205.08	123.00	122.06	123.00	123.00	212.08	6.33	9.72	6.83	6.33	18.98	20.50
8	6	0.5	1	2.5	8	5.5	3.5	63.15	Angle	0.28	221.64	205.08	164.00	185.06	142.76	142.76	199.78	20.32	31.22	18.22	20.32	60.95	54.67
8	6	0.5	1	3.625	8	5.5	3.5	41.47	Angle	0.19	221.64	205.08	164.00	185.06	142.76	142.76	199.78	12.37	19.00	12.15	12.37	37.10	36.44
8	6	0.5	1	4.75	8	5.5	3.5	28.15	Angle	0.13	221.64	205.08	164.00	185.06	142.76	142.76	199.78	8.89	13.66	9.11	8.89	26.67	27.33
8	6	0.5	1	2.5	8	5.5	5.5	62.45	Angle	0.28	221.64	205.08	164.00	185.06	164.00	164.00	262.78	20.32	31.22	18.22	20.32	60.95	54.67
8	6	0.5	1	3.625	8	5.5	5.5	41.23	Angle	0.19	221.64	205.08	164.00	185.06	164.00	164.00	262.78	12.37	19.00	12.15	12.37	37.10	36.44
8	6	0.5	1	4.75	8	5.5	5.5	28.06	Angle	0.13	221.64	205.08	164.00	185.06	164.00	164.00	262.78	8.89	13.66	9.11	8.89	26.67	27.33
8	6	0.75	0.75	2.5	6	3.5	3.5	85.52	Bolt	0.69	124.67	115.36	184.50	206.72	184.50	184.50	329.93	34.18	52.52	32.56	34.18	86.28	76.50
8	6	0.75	0.75	3.625	6	3.5	3.5	62.31	Bolt	0.50	124.67	115.36	184.50	206.72	184.50	184.50	329.93	20.81	31.97	21.29	20.81	62.42	58.79
8	6	0.75	0.75	4.75	6	3.5	3.5	46	Bolt	0.37	124.67	115.36	184.50	206.72	184.50	184.50	329.93	14.95	22.98	15.81	14.95	42.17	33.85
8	6	0.75	0.75	2.5	8	5.5	3.5	94.58	Bolt	0.76	124.67	115.36	246.00	301.22	214.15	214.15	311.48	47.36	72.77	43.41	47.36	88.69	78.91
8	6	0.75	0.75	3.625	8	5.5	3.5	69.27	Bolt	0.56	124.67	115.36	246.00	301.22	214.15	214.15	311.48	28.83	44.30	28.38	28.83	69.15	60.84
8	6	0.75	0.75	4.75	8	5.5	3.5	49.5	Bolt	0.40	124.67	115.36	246.00	301.22	214.15	214.15	311.48	20.72	31.84	21.09	20.72	44.22	35.90
8	6	0.75	0.75	2.5	8	5.5	5.5	94.7	Bolt	0.76	124.67	115.36	246.00	301.22	246.00	246.00	405.98	47.36	72.77	43.41	47.36	88.69	78.91

Table E.1 (cont.) Parametric Bolted Angle Connection Data Set Predicted Analytical and Calculated Limit State Capacities

Connection Geometry (in)								Analytically Predicted			Calculated Connection Capacity (kips)												
L1	L2	t	Bolt Dia.	g1	w	s1	s2	Force (kips)	Fail Mode	Eff	R_{BOLT} Tension	R_{BOLT} Shear	R_{GY} Gross Section Yield	R_{NF} Net Section Fracture	R_{WS} Whitemore Section	R_{MWS} Modified Whitemore Section	R_{BS} Block Shear	R_{PRY} AISC	R_{PRY} AISC w/ Fu	R_{PRY} Eurocode	R_{PRY} Hybrid	R_{PRY} Modified Hybrid	R_{PRY} Modified Eurocode
8	6	0.75	0.75	3.625	8	5.5	5.5	69.2	Bolt	0.56	124.67	115.36	246.00	301.22	246.00	246.00	405.98	28.83	44.30	28.38	28.83	69.15	60.84
8	6	0.75	0.75	4.75	8	5.5	5.5	49.43	Bolt	0.40	124.67	115.36	246.00	301.22	246.00	246.00	405.98	20.72	31.84	21.09	20.72	44.22	35.90
8	6	0.75	0.875	2.5	6	3.5	3.5	103.27	Bolt	0.61	169.69	157.02	184.50	194.91	184.50	184.50	324.03	34.59	53.16	32.56	34.59	103.78	97.68
8	6	0.75	0.875	3.625	6	3.5	3.5	70.36	Angle	0.41	169.69	157.02	184.50	194.91	184.50	184.50	324.03	20.76	31.89	21.29	20.76	62.27	63.87
8	6	0.75	0.875	4.75	6	3.5	3.5	48.84	Angle	0.29	169.69	157.02	184.50	194.91	184.50	184.50	324.03	14.83	22.78	15.81	14.83	44.48	43.86
8	6	0.75	0.875	2.5	8	5.5	3.5	114.41	Bolt	0.67	169.69	157.02	246.00	289.41	214.15	214.15	305.58	48.26	74.16	43.41	48.26	119.45	103.92
8	6	0.75	0.875	3.625	8	5.5	3.5	86.68	Angle	0.51	169.69	157.02	246.00	289.41	214.15	214.15	305.58	28.96	44.49	28.38	28.96	86.87	79.85
8	6	0.75	0.875	4.75	8	5.5	3.5	61.31	Angle	0.36	169.69	157.02	246.00	289.41	214.15	214.15	305.58	20.68	31.78	21.09	20.68	59.11	45.91
8	6	0.75	0.875	2.5	8	5.5	5.5	114.5	Bolt	0.67	169.69	157.02	246.00	289.41	246.00	246.00	400.08	48.26	74.16	43.41	48.26	119.45	103.92
8	6	0.75	0.875	3.625	8	5.5	5.5	85.85	Angle	0.51	169.69	157.02	246.00	289.41	246.00	246.00	400.08	28.96	44.49	28.38	28.96	86.87	79.85
8	6	0.75	0.875	4.75	8	5.5	5.5	61.22	Angle	0.36	169.69	157.02	246.00	289.41	246.00	246.00	400.08	20.68	31.78	21.09	20.68	59.11	45.91
8	6	0.75	1	2.5	6	3.5	3.5	105.5	Angle	0.48	221.64	205.08	184.50	183.09	184.50	184.50	318.12	35.04	53.84	32.56	35.04	105.11	97.68
8	6	0.75	1	3.625	6	3.5	3.5	70.36	Angle	0.32	221.64	205.08	184.50	183.09	184.50	184.50	318.12	20.70	31.81	21.29	20.70	62.11	63.87
8	6	0.75	1	4.75	6	3.5	3.5	48.55	Angle	0.22	221.64	205.08	184.50	183.09	184.50	184.50	318.12	14.69	22.58	15.81	14.69	44.08	47.44
8	6	0.75	1	2.5	8	5.5	3.5	128.65	Angle	0.58	221.64	205.08	246.00	277.59	214.15	214.15	299.67	49.23	75.65	43.41	49.23	147.69	130.24
8	6	0.75	1	3.625	8	5.5	3.5	87.43	Angle	0.39	221.64	205.08	246.00	277.59	214.15	214.15	299.67	29.09	44.70	28.38	29.09	87.27	85.15
8	6	0.75	1	4.75	8	5.5	3.5	61.61	Angle	0.28	221.64	205.08	246.00	277.59	214.15	214.15	299.67	20.64	31.72	21.09	20.64	61.93	57.45
8	6	0.75	1	2.5	8	5.5	5.5	127.56	Angle	0.58	221.64	205.08	246.00	277.59	246.00	246.00	394.17	49.23	75.65	43.41	49.23	147.69	130.24
8	6	0.75	1	3.625	8	5.5	5.5	86.57	Angle	0.39	221.64	205.08	246.00	277.59	246.00	246.00	394.17	29.09	44.70	28.38	29.09	87.27	85.15
8	6	0.75	1	4.75	8	5.5	5.5	61.45	Angle	0.28	221.64	205.08	246.00	277.59	246.00	246.00	394.17	20.64	31.72	21.09	20.64	61.93	57.45
8	6	1	0.75	2.5	6	3.5	3.5	103.09	Bolt	0.83	124.67	115.36	246.00	275.63	246.00	246.00	439.91	65.44	100.56	61.50	65.44	93.32	82.93
8	6	1	0.75	3.625	6	3.5	3.5	82.8	Bolt	0.66	124.67	115.36	246.00	275.63	246.00	246.00	439.91	38.67	59.42	39.36	38.67	73.52	65.02
8	6	1	0.75	4.75	6	3.5	3.5	54.51	Bolt	0.44	124.67	115.36	246.00	275.63	246.00	246.00	439.91	27.44	42.17	28.94	27.44	48.02	39.52
8	6	1	0.75	2.5	8	5.5	3.5	107.04	Bolt	0.86	124.67	115.36	328.00	401.63	285.53	285.53	415.31	90.67	107.65	82.00	90.67	97.87	87.48
8	6	1	0.75	3.625	8	5.5	3.5	85.39	Bolt	0.68	124.67	115.36	328.00	401.63	285.53	285.53	415.31	53.58	82.33	52.48	53.58	77.25	68.74
8	6	1	0.75	4.75	8	5.5	3.5	60.13	Bolt	0.48	124.67	115.36	328.00	401.63	285.53	285.53	415.31	38.02	58.43	38.59	38.02	51.74	43.24
8	6	1	0.75	2.5	8	5.5	5.5	104.22	Bolt	0.84	124.67	115.36	328.00	401.63	328.00	328.00	541.31	90.67	107.65	82.00	90.67	97.87	87.48
8	6	1	0.75	3.625	8	5.5	5.5	85.29	Bolt	0.68	124.67	115.36	328.00	401.63	328.00	328.00	541.31	53.58	82.33	52.48	53.58	77.25	68.74
8	6	1	0.75	4.75	8	5.5	5.5	60.05	Bolt	0.48	124.67	115.36	328.00	401.63	328.00	328.00	541.31	38.02	58.43	38.59	38.02	51.74	43.24
8	6	1	0.875	2.5	6	3.5	3.5	140.49	Bolt	0.83	169.69	157.02	246.00	259.88	246.00	246.00	432.04	66.42	102.06	61.50	66.42	124.44	107.94
8	6	1	0.875	3.625	6	3.5	3.5	106.47	Bolt	0.63	169.69	157.02	246.00	259.88	246.00	246.00	432.04	38.62	59.34	39.36	38.62	97.96	84.46
8	6	1	0.875	4.75	6	3.5	3.5	72.7	Bolt	0.43	169.69	157.02	246.00	259.88	246.00	246.00	432.04	27.22	41.83	28.94	27.22	63.25	49.75

Table E.1 (cont.) Parametric Bolted Angle Connection Data Set Predicted Analytical and Calculated Limit State Capacities

Connection Geometry (in)								Analytically Predicted			Calculated Connection Capacity (kips)												
L1	L2	t	Bolt Dia.	g1	w	s1	s2	Force (kips)	Fail Mode	Eff	R_{BOLT} Tension	R_{BOLT} Shear	R_{GY} Gross Section Yield	R_{NF} Net Section Fracture	R_{WS} Whitemore Section	R_{MWS} Modified Whitemore Section	R_{BS} Block Shear	R_{PRY} AISC	R_{PRY} AISC w/ Fu	R_{PRY} Eurocode	R_{PRY} Hybrid	R_{PRY} Modified Hybrid	R_{PRY} Modified Eurocode
8	6	1	0.875	2.5	8	5.5	3.5	139.83	Bolt	0.82	169.69	157.02	328.00	385.88	285.53	285.53	407.44	92.66	138.77	82.00	92.66	128.99	112.50
8	6	1	0.875	3.625	8	5.5	3.5	113.01	Bolt	0.67	169.69	157.02	328.00	385.88	285.53	285.53	407.44	53.87	82.78	52.48	53.87	101.68	88.19
8	6	1	0.875	4.75	8	5.5	3.5	77.52	Bolt	0.46	169.69	157.02	328.00	385.88	285.53	285.53	407.44	37.98	58.35	38.59	37.98	66.97	53.48
8	6	1	0.875	2.5	8	5.5	5.5	141.82	Bolt	0.84	169.69	157.02	328.00	385.88	328.00	328.00	533.44	92.66	138.77	82.00	92.66	128.99	112.50
8	6	1	0.875	3.625	8	5.5	5.5	112.84	Bolt	0.66	169.69	157.02	328.00	385.88	328.00	328.00	533.44	53.87	82.78	52.48	53.87	101.68	88.19
8	6	1	0.875	4.75	8	5.5	5.5	77.33	Bolt	0.46	169.69	157.02	328.00	385.88	328.00	328.00	533.44	37.98	58.35	38.59	37.98	66.97	53.48
8	6	1	1	2.5	6	3.5	3.5	164.72	Bolt	0.74	221.64	205.08	246.00	244.13	246.00	246.00	424.16	67.48	103.69	61.50	67.48	161.43	136.80
8	6	1	1	3.625	6	3.5	3.5	118.99	Angle	0.54	221.64	205.08	246.00	244.13	246.00	246.00	424.16	38.56	59.25	39.36	38.56	115.68	106.89
8	6	1	1	4.75	6	3.5	3.5	82.74	Angle	0.37	221.64	205.08	246.00	244.13	246.00	246.00	424.16	26.99	41.48	28.94	26.99	80.98	61.55
8	6	1	1	2.5	8	5.5	3.5	180.41	Bolt	0.81	221.64	205.08	328.00	370.13	285.53	285.53	399.56	94.81	145.69	82.00	94.81	165.98	141.36
8	6	1	1	3.625	8	5.5	3.5	141.49	Bolt	0.64	221.64	205.08	328.00	370.13	285.53	285.53	399.56	54.18	83.25	52.48	54.18	130.77	110.62
8	6	1	1	4.75	8	5.5	3.5	100.21	Angle	0.45	221.64	205.08	328.00	370.13	285.53	285.53	399.56	37.93	58.28	38.59	37.93	85.43	65.28
8	6	1	1	2.5	8	5.5	5.5	180.23	Bolt	0.81	221.64	205.08	328.00	370.13	328.00	328.00	525.56	94.81	145.69	82.00	94.81	165.98	141.36
8	6	1	1	3.625	8	5.5	5.5	141.72	Bolt	0.64	221.64	205.08	328.00	370.13	328.00	328.00	525.56	54.18	83.25	52.48	54.18	130.77	110.62
8	6	1	1	4.75	8	5.5	5.5	100.12	Angle	0.45	221.64	205.08	328.00	370.13	328.00	328.00	525.56	37.93	58.28	38.59	37.93	85.43	65.28
8	8	0.5	0.75	2.5	6	3.5	3.5	56.1	Angle	0.45	124.67	115.36	123.00	137.81	123.00	123.00	219.96	14.18	21.79	13.67	14.18	42.54	41.00
8	8	0.5	0.75	4.5	6	3.5	3.5	25.84	Angle	0.21	124.67	115.36	123.00	137.81	123.00	123.00	219.96	6.86	10.54	7.24	6.86	20.58	21.71
8	8	0.5	0.75	6.75	6	3.5	3.5	14.22	Angle	0.11	124.67	115.36	123.00	137.81	123.00	123.00	219.96	4.34	6.67	4.73	4.34	13.02	14.19
8	8	0.5	0.75	2.5	8	5.5	3.5	64.02	Bolt	0.51	124.67	115.36	164.00	200.81	142.76	142.76	207.66	19.65	30.19	18.22	19.65	58.94	54.67
8	8	0.5	0.75	4.5	8	5.5	3.5	32.96	Angle	0.26	124.67	115.36	164.00	200.81	142.76	142.76	207.66	9.51	14.61	9.65	9.51	28.52	28.94
8	8	0.5	0.75	6.75	8	5.5	3.5	18.54	Angle	0.15	124.67	115.36	164.00	200.81	142.76	142.76	207.66	6.01	9.24	6.31	6.01	18.04	18.92
8	8	0.5	0.75	2.5	8	5.5	5.5	64.33	Bolt	0.52	124.67	115.36	164.00	200.81	164.00	164.00	270.66	19.65	30.19	18.22	19.65	58.94	54.67
8	8	0.5	0.75	4.5	8	5.5	5.5	32.83	Angle	0.26	124.67	115.36	164.00	200.81	164.00	164.00	270.66	9.51	14.61	9.65	9.51	28.52	28.94
8	8	0.5	0.75	6.75	8	5.5	5.5	18.56	Angle	0.15	124.67	115.36	164.00	200.81	164.00	164.00	270.66	6.01	9.24	6.31	6.01	18.04	18.92
8	8	0.5	0.875	2.5	6	3.5	3.5	56.92	Angle	0.34	169.69	157.02	123.00	129.94	123.00	123.00	216.02	14.31	22.00	13.67	14.31	42.94	41.00
8	8	0.5	0.875	4.5	6	3.5	3.5	25.58	Angle	0.15	169.69	157.02	123.00	129.94	123.00	123.00	216.02	6.81	10.46	7.24	6.81	20.42	21.71
8	8	0.5	0.875	6.75	6	3.5	3.5	14.16	Angle	0.08	169.69	157.02	123.00	129.94	123.00	123.00	216.02	4.28	6.58	4.73	4.28	12.84	14.19
8	8	0.5	0.875	2.5	8	5.5	3.5	67.61	Angle	0.40	169.69	157.02	164.00	192.94	142.76	142.76	203.72	19.97	30.69	18.22	19.97	59.91	54.67
8	8	0.5	0.875	4.5	8	5.5	3.5	32.61	Angle	0.19	169.69	157.02	164.00	192.94	142.76	142.76	203.72	9.49	14.59	9.65	9.49	28.48	28.94
8	8	0.5	0.875	6.75	8	5.5	3.5	18.41	Angle	0.11	169.69	157.02	164.00	192.94	142.76	142.76	203.72	5.97	9.17	6.31	5.97	17.91	18.92
8	8	0.5	0.875	2.5	8	5.5	5.5	66.92	Angle	0.39	169.69	157.02	164.00	192.94	164.00	164.00	266.72	19.97	30.69	18.22	19.97	59.91	54.67
8	8	0.5	0.875	4.5	8	5.5	5.5	32.51	Angle	0.19	169.69	157.02	164.00	192.94	164.00	164.00	266.72	9.49	14.59	9.65	9.49	28.48	28.94

Table E.1 (cont.) Parametric Bolted Angle Connection Data Set Predicted Analytical and Calculated Limit State Capacities

Connection Geometry (in)								Analytically Predicted			Calculated Connection Capacity (kips)												
L1	L2	t	Bolt Dia.	g1	w	s1	s2	Force (kips)	Fail Mode	Eff	R_{BOLT} Tension	R_{BOLT} Shear	R_{GY} Gross Section Yield	R_{NF} Net Section Fracture	R_{WS} Whitemore Section	R_{MWS} Modified Whitemore Section	R_{BS} Block Shear	R_{PRY} AISC	R_{PRY} AISC w/ Fu	R_{PRY} Eurocode	R_{PRY} Hybrid	R_{PRY} Modified Hybrid	R_{PRY} Modified Eurocode
8	8	0.5	0.875	6.75	8	5.5	5.5	18.44	Angle	0.11	169.69	157.02	164.00	192.94	164.00	164.00	266.72	5.97	9.17	6.31	5.97	17.91	18.92
8	8	0.5	1	2.5	6	3.5	3.5	56.31	Angle	0.25	221.64	205.08	123.00	122.06	123.00	123.00	212.08	14.46	22.22	13.67	14.46	43.38	41.00
8	8	0.5	1	4.5	6	3.5	3.5	25.18	Angle	0.11	221.64	205.08	123.00	122.06	123.00	123.00	212.08	6.75	10.37	7.24	6.75	20.24	21.71
8	8	0.5	1	6.75	6	3.5	3.5	14.03	Angle	0.06	221.64	205.08	123.00	122.06	123.00	123.00	212.08	4.22	6.48	4.73	4.22	12.65	14.19
8	8	0.5	1	2.5	8	5.5	3.5	67.28	Angle	0.30	221.64	205.08	164.00	185.06	142.76	142.76	199.78	20.32	31.22	18.22	20.32	60.95	54.67
8	8	0.5	1	4.5	8	5.5	3.5	32.17	Angle	0.15	221.64	205.08	164.00	185.06	142.76	142.76	199.78	9.48	14.57	9.65	9.48	28.44	28.94
8	8	0.5	1	6.75	8	5.5	3.5	18.26	Angle	0.08	221.64	205.08	164.00	185.06	142.76	142.76	199.78	5.93	9.11	6.31	5.93	17.78	18.92
8	8	0.5	1	2.5	8	5.5	5.5	66.59	Angle	0.30	221.64	205.08	164.00	185.06	164.00	164.00	262.78	20.32	31.22	18.22	20.32	60.95	54.67
8	8	0.5	1	4.5	8	5.5	5.5	32.07	Angle	0.14	221.64	205.08	164.00	185.06	164.00	164.00	262.78	9.48	14.57	9.65	9.48	28.44	28.94
8	8	0.5	1	6.75	8	5.5	5.5	18.27	Angle	0.08	221.64	205.08	164.00	185.06	164.00	164.00	262.78	5.93	9.11	6.31	5.93	17.78	18.92
8	8	0.625	0.75	2.5	6	3.5	3.5	71.92	Bolt	0.58	124.67	115.36	153.75	172.27	153.75	153.75	274.95	22.92	35.22	21.96	22.92	68.76	65.89
8	8	0.625	0.75	4.5	6	3.5	3.5	39.39	Angle	0.32	124.67	115.36	153.75	172.27	153.75	153.75	274.95	10.90	16.74	11.47	10.90	32.69	34.42
8	8	0.625	0.75	6.75	6	3.5	3.5	22.28	Angle	0.18	124.67	115.36	153.75	172.27	153.75	153.75	274.95	6.85	10.53	7.46	6.85	20.56	22.39
8	8	0.625	0.75	2.5	8	5.5	3.5	80.41	Bolt	0.64	124.67	115.36	205.00	251.02	178.46	178.46	259.57	31.76	48.79	29.29	31.76	85.27	75.77
8	8	0.625	0.75	4.5	8	5.5	3.5	48.17	Bolt	0.39	124.67	115.36	205.00	251.02	178.46	178.46	259.57	15.10	23.20	15.30	15.10	45.29	45.90
8	8	0.625	0.75	6.75	8	5.5	3.5	28.79	Angle	0.23	124.67	115.36	205.00	251.02	178.46	178.46	259.57	9.49	14.59	9.95	9.49	28.48	24.44
8	8	0.625	0.75	2.5	8	5.5	5.5	80.48	Bolt	0.65	124.67	115.36	205.00	251.02	205.00	205.00	338.32	31.76	48.79	29.29	31.76	85.27	75.77
8	8	0.625	0.75	4.5	8	5.5	5.5	48.17	Bolt	0.39	124.67	115.36	205.00	251.02	205.00	205.00	338.32	15.10	23.20	15.30	15.10	45.29	45.90
8	8	0.625	0.75	6.75	8	5.5	5.5	28.85	Angle	0.23	124.67	115.36	205.00	251.02	205.00	205.00	338.32	9.49	14.59	9.95	9.49	28.48	24.44
8	8	0.625	0.875	2.5	6	3.5	3.5	82.51	Angle	0.49	169.69	157.02	153.75	162.42	153.75	153.75	270.02	23.17	35.60	21.96	23.17	69.50	65.89
8	8	0.625	0.875	4.5	6	3.5	3.5	39.21	Angle	0.23	169.69	157.02	153.75	162.42	153.75	153.75	270.02	10.81	16.61	11.47	10.81	32.43	34.42
8	8	0.625	0.875	6.75	6	3.5	3.5	22.11	Angle	0.13	169.69	157.02	153.75	162.42	153.75	153.75	270.02	6.76	10.38	7.46	6.76	20.27	22.39
8	8	0.625	0.875	2.5	8	5.5	3.5	98.08	Angle	0.58	169.69	157.02	205.00	241.17	178.46	178.46	254.65	32.32	49.66	29.29	32.32	96.95	87.86
8	8	0.625	0.875	4.5	8	5.5	3.5	49.98	Angle	0.29	169.69	157.02	205.00	241.17	178.46	178.46	254.65	15.08	23.17	15.30	15.08	45.24	45.90
8	8	0.625	0.875	6.75	8	5.5	3.5	28.75	Angle	0.17	169.69	157.02	205.00	241.17	178.46	178.46	254.65	9.43	14.48	9.95	9.43	28.28	29.85
8	8	0.625	0.875	2.5	8	5.5	5.5	97.47	Angle	0.57	169.69	157.02	205.00	241.17	205.00	205.00	333.40	32.32	49.66	29.29	32.32	96.95	87.86
8	8	0.625	0.875	4.5	8	5.5	5.5	49.84	Angle	0.29	169.69	157.02	205.00	241.17	205.00	205.00	333.40	15.08	23.17	15.30	15.08	45.24	45.90
8	8	0.625	0.875	6.75	8	5.5	5.5	28.82	Angle	0.17	169.69	157.02	205.00	241.17	205.00	205.00	333.40	9.43	14.48	9.95	9.43	28.28	29.85
8	8	0.625	1	2.5	6	3.5	3.5	83.42	Angle	0.38	221.64	205.08	153.75	152.58	153.75	153.75	265.10	23.43	36.00	21.96	23.43	70.29	65.89
8	8	0.625	1	4.5	6	3.5	3.5	38.86	Angle	0.18	221.64	205.08	153.75	152.58	153.75	153.75	265.10	10.72	16.48	11.47	10.72	32.17	34.42
8	8	0.625	1	6.75	6	3.5	3.5	21.91	Angle	0.10	221.64	205.08	153.75	152.58	153.75	153.75	265.10	6.66	10.23	7.46	6.66	19.98	22.39
8	8	0.625	1	2.5	8	5.5	3.5	99.49	Angle	0.45	221.64	205.08	205.00	231.33	178.46	178.46	249.73	32.92	50.59	29.29	32.92	98.76	87.86

Table E.1 (cont.) Parametric Bolted Angle Connection Data Set Predicted Analytical and Calculated Limit State Capacities

Connection Geometry (in)								Analytically Predicted			Calculated Connection Capacity (kips)												
L1	L2	t	Bolt Dia.	g1	w	s1	s2	Force (kips)	Fail Mode	Eff	R_{BOLT} Tension	R_{BOLT} Shear	R_{GY} Gross Section Yield	R_{NF} Net Section Fracture	R_{WS} Whitemore Section	R_{MWS} Modified Whitemore Section	R_{BS} Block Shear	R_{PRY} AISC	R_{PRY} AISC w/ Fu	R_{PRY} Eurocode	R_{PRY} Hybrid	R_{PRY} Modified Hybrid	R_{PRY} Modified Eurocode
8	8	0.625	1	4.5	8	5.5	3.5	49.82	Angle	0.22	221.64	205.08	205.00	231.33	178.46	178.46	249.73	15.07	23.15	15.30	15.07	45.20	45.90
8	8	0.625	1	6.75	8	5.5	3.5	28.56	Angle	0.13	221.64	205.08	205.00	231.33	178.46	178.46	249.73	9.36	14.38	9.95	9.36	28.07	29.85
8	8	0.625	1	2.5	8	5.5	5.5	98.73	Angle	0.45	221.64	205.08	205.00	231.33	205.00	205.00	328.48	32.92	50.59	29.29	32.92	98.76	87.86
8	8	0.625	1	4.5	8	5.5	5.5	49.68	Angle	0.22	221.64	205.08	205.00	231.33	205.00	205.00	328.48	15.07	23.15	15.30	15.07	45.20	45.90
8	8	0.625	1	6.75	8	5.5	5.5	28.62	Angle	0.13	221.64	205.08	205.00	231.33	205.00	205.00	328.48	9.36	14.38	9.95	9.36	28.07	29.85
8	8	0.875	0.75	2.5	6	3.5	3.5	102.12	Bolt	0.82	124.67	115.36	215.25	241.17	215.25	215.25	384.92	48.25	74.14	45.66	48.25	89.48	79.41
8	8	0.875	0.75	4.5	6	3.5	3.5	64.62	Bolt	0.52	124.67	115.36	215.25	241.17	215.25	215.25	384.92	22.08	33.93	23.18	22.08	66.24	63.93
8	8	0.875	0.75	6.75	6	3.5	3.5	38.25	Bolt	0.31	124.67	115.36	215.25	241.17	215.25	215.25	384.92	13.71	21.07	14.92	13.71	33.02	26.83
8	8	0.875	0.75	2.5	8	5.5	3.5	108.27	Bolt	0.87	124.67	115.36	287.00	351.42	249.84	249.84	363.40	66.85	100.12	60.88	66.85	92.87	82.79
8	8	0.875	0.75	4.5	8	5.5	3.5	71.9	Bolt	0.58	124.67	115.36	287.00	351.42	249.84	249.84	363.40	30.59	47.01	30.91	30.59	72.18	66.00
8	8	0.875	0.75	6.75	8	5.5	3.5	40.83	Bolt	0.33	124.67	115.36	287.00	351.42	249.84	249.84	363.40	19.00	29.19	19.89	19.00	35.09	28.91
8	8	0.875	0.75	2.5	8	5.5	5.5	108.7	Bolt	0.87	124.67	115.36	287.00	351.42	287.00	287.00	473.65	66.85	100.12	60.88	66.85	92.87	82.79
8	8	0.875	0.75	4.5	8	5.5	5.5	72.06	Bolt	0.58	124.67	115.36	287.00	351.42	287.00	287.00	473.65	30.59	47.01	30.91	30.59	72.18	66.00
8	8	0.875	0.75	6.75	8	5.5	5.5	40.77	Bolt	0.33	124.67	115.36	287.00	351.42	287.00	287.00	473.65	19.00	29.19	19.89	19.00	35.09	28.91
8	8	0.875	0.875	2.5	6	3.5	3.5	123.48	Bolt	0.73	169.69	157.02	215.25	227.39	215.25	215.25	378.03	48.90	75.13	45.66	48.90	120.42	104.42
8	8	0.875	0.875	4.5	6	3.5	3.5	75.14	Angle	0.44	169.69	157.02	215.25	227.39	215.25	215.25	378.03	21.92	33.68	23.18	21.92	65.76	69.54
8	8	0.875	0.875	6.75	6	3.5	3.5	41.91	Angle	0.25	169.69	157.02	215.25	227.39	215.25	215.25	378.03	13.52	20.78	14.92	13.52	40.57	34.27
8	8	0.875	0.875	2.5	8	5.5	3.5	138.61	Bolt	0.82	169.69	157.02	287.00	337.64	249.84	249.84	356.51	68.21	104.82	60.88	68.21	123.80	107.80
8	8	0.875	0.875	4.5	8	5.5	3.5	92.03	Bolt	0.54	169.69	157.02	287.00	337.64	249.84	249.84	356.51	30.58	46.99	30.91	30.58	91.74	86.84
8	8	0.875	0.875	6.75	8	5.5	3.5	53.34	Bolt	0.31	169.69	157.02	287.00	337.64	249.84	249.84	356.51	18.87	28.99	19.89	18.87	46.17	36.35
8	8	0.875	0.875	2.5	8	5.5	5.5	138.4	Bolt	0.82	169.69	157.02	287.00	337.64	287.00	287.00	466.76	68.21	104.82	60.88	68.21	123.80	107.80
8	8	0.875	0.875	4.5	8	5.5	5.5	92.21	Bolt	0.54	169.69	157.02	287.00	337.64	287.00	287.00	466.76	30.58	46.99	30.91	30.58	91.74	86.84
8	8	0.875	0.875	6.75	8	5.5	5.5	53.29	Bolt	0.31	169.69	157.02	287.00	337.64	287.00	287.00	466.76	18.87	28.99	19.89	18.87	46.17	36.35
8	8	0.875	1	2.5	6	3.5	3.5	143.94	Angle	0.65	221.64	205.08	215.25	213.61	215.25	215.25	371.14	49.60	76.21	45.66	49.60	148.79	133.28
8	8	0.875	1	4.5	6	3.5	3.5	75.32	Angle	0.34	221.64	205.08	215.25	213.61	215.25	215.25	371.14	21.75	33.43	23.18	21.75	65.26	69.54
8	8	0.875	1	6.75	6	3.5	3.5	42.03	Angle	0.19	221.64	205.08	215.25	213.61	215.25	215.25	371.14	13.33	20.49	14.92	13.33	40.00	42.86
8	8	0.875	1	2.5	8	5.5	3.5	159.93	Bolt	0.72	221.64	205.08	287.00	323.86	249.84	249.84	349.62	69.69	107.08	60.88	69.69	160.54	136.66
8	8	0.875	1	4.5	8	5.5	3.5	96.42	Angle	0.44	221.64	205.08	287.00	323.86	249.84	249.84	349.62	30.56	46.97	30.91	30.56	91.69	92.72
8	8	0.875	1	6.75	8	5.5	3.5	54.21	Angle	0.24	221.64	205.08	287.00	323.86	249.84	249.84	349.62	18.73	28.79	19.89	18.73	56.20	44.94
8	8	0.875	1	2.5	8	5.5	5.5	160.08	Bolt	0.72	221.64	205.08	287.00	323.86	287.00	287.00	459.87	69.69	107.08	60.88	69.69	160.54	136.66
8	8	0.875	1	4.5	8	5.5	5.5	96.3	Angle	0.43	221.64	205.08	287.00	323.86	287.00	287.00	459.87	30.56	46.97	30.91	30.56	91.69	92.72
8	8	0.875	1	6.75	8	5.5	5.5	54.34	Angle	0.25	221.64	205.08	287.00	323.86	287.00	287.00	459.87	18.73	28.79	19.89	18.73	56.20	44.94

Table E.1 (cont.) Parametric Bolted Angle Connection Data Set Predicted Analytical and Calculated Limit State Capacities

Connection Geometry (in)								Analytically Predicted			Calculated Connection Capacity (kips)												
L1	L2	t	Bolt Dia.	g1	w	s1	s2	Force (kips)	Fail Mode	Eff	R_{BOLT} Tension	R_{BOLT} Shear	R_{GY} Gross Section Yield	R_{NF} Net Section Fracture	R_{WS} Whitemore Section	R_{MWS} Modified Whitemore Section	R_{BS} Block Shear	R_{PRY} AISC	R_{PRY} AISC w/ Fu	R_{PRY} Eurocode	R_{PRY} Hybrid	R_{PRY} Modified Hybrid	R_{PRY} Modified Eurocode
8	8	1	0.75	2.625	6	3.5	3.5	109.79	Bolt	0.88	124.67	115.36	246.00	275.63	246.00	246.00	439.91	60.77	93.38	57.88	60.77	91.90	82.13
8	8	1	0.75	4.5	6	3.5	3.5	75.29	Bolt	0.60	124.67	115.36	246.00	275.63	246.00	246.00	439.91	29.34	45.08	30.75	29.34	72.61	66.38
8	8	1	0.75	6.75	6	3.5	3.5	41.41	Bolt	0.33	124.67	115.36	246.00	275.63	246.00	246.00	439.91	18.10	27.81	19.68	18.10	35.21	28.98
8	8	1	0.75	2.625	8	5.5	3.5	108.21	Bolt	0.87	124.67	115.36	328.00	401.63	285.53	285.53	415.31	84.20	105.39	77.18	84.20	96.19	86.41
8	8	1	0.75	4.5	8	5.5	3.5	84.75	Bolt	0.68	124.67	115.36	328.00	401.63	285.53	285.53	415.31	40.65	62.46	41.00	40.65	75.35	69.11
8	8	1	0.75	6.75	8	5.5	3.5	43.94	Bolt	0.35	124.67	115.36	328.00	401.63	285.53	285.53	415.31	25.08	38.54	26.24	25.08	37.95	31.71
8	8	1	0.75	2.625	8	5.5	5.5	110.22	Bolt	0.88	124.67	115.36	328.00	401.63	328.00	328.00	541.31	84.20	105.39	77.18	84.20	96.19	86.41
8	8	1	0.75	4.5	8	5.5	5.5	84.7	Bolt	0.68	124.67	115.36	328.00	401.63	328.00	328.00	541.31	40.65	62.46	41.00	40.65	75.35	69.11
8	8	1	0.75	6.75	8	5.5	5.5	43.88	Bolt	0.35	124.67	115.36	328.00	401.63	328.00	328.00	541.31	25.08	38.54	26.24	25.08	37.95	31.71
8	8	1	0.875	2.625	6	3.5	3.5	139.89	Bolt	0.82	169.69	157.02	246.00	259.88	246.00	246.00	432.04	61.50	94.50	57.88	61.50	122.66	107.14
8	8	1	0.875	4.5	6	3.5	3.5	94.43	Angle	0.56	169.69	157.02	246.00	259.88	246.00	246.00	432.04	29.13	44.76	30.75	29.13	87.39	87.39
8	8	1	0.875	6.75	6	3.5	3.5	53.12	Angle	0.31	169.69	157.02	246.00	259.88	246.00	246.00	432.04	17.85	27.44	19.68	17.85	46.38	36.48
8	8	1	0.875	2.625	8	5.5	3.5	149.4	Bolt	0.88	169.69	157.02	328.00	385.88	285.53	285.53	407.44	85.80	131.83	77.18	85.80	126.95	111.42
8	8	1	0.875	4.5	8	5.5	3.5	107.67	Bolt	0.63	169.69	157.02	328.00	385.88	285.53	285.53	407.44	40.64	62.45	41.00	40.64	100.02	90.12
8	8	1	0.875	6.75	8	5.5	3.5	58.28	Bolt	0.34	169.69	157.02	328.00	385.88	285.53	285.53	407.44	24.91	38.27	26.24	24.91	49.11	39.22
8	8	1	0.875	2.625	8	5.5	5.5	149.27	Bolt	0.88	169.69	157.02	328.00	385.88	328.00	328.00	533.44	85.80	131.83	77.18	85.80	126.95	111.42
8	8	1	0.875	4.5	8	5.5	5.5	108.12	Bolt	0.64	169.69	157.02	328.00	385.88	328.00	328.00	533.44	40.64	62.45	41.00	40.64	100.02	90.12
8	8	1	0.875	6.75	8	5.5	5.5	58	Bolt	0.34	169.69	157.02	328.00	385.88	328.00	328.00	533.44	24.91	38.27	26.24	24.91	49.11	39.22
8	8	1	1	2.625	6	3.5	3.5	161.91	Bolt	0.73	221.64	205.08	246.00	244.13	246.00	246.00	424.16	62.29	95.71	57.88	62.29	159.17	136.00
8	8	1	1	4.5	6	3.5	3.5	96.42	Angle	0.44	221.64	205.08	246.00	244.13	246.00	246.00	424.16	28.92	44.44	30.75	28.92	86.76	92.25
8	8	1	1	6.75	6	3.5	3.5	53.88	Angle	0.24	221.64	205.08	246.00	244.13	246.00	246.00	424.16	17.60	27.05	19.68	17.60	52.81	45.14
8	8	1	1	2.625	8	5.5	3.5	180.12	Bolt	0.81	221.64	205.08	328.00	370.13	285.53	285.53	399.56	87.52	134.48	77.18	87.52	163.46	140.28
8	8	1	1	4.5	8	5.5	3.5	122.2	Angle	0.55	221.64	205.08	328.00	370.13	285.53	285.53	399.56	40.63	62.44	41.00	40.63	121.90	114.37
8	8	1	1	6.75	8	5.5	3.5	68.41	Angle	0.31	221.64	205.08	328.00	370.13	285.53	285.53	399.56	24.73	38.01	26.24	24.73	62.65	47.87
8	8	1	1	2.625	8	5.5	5.5	180.31	Bolt	0.81	221.64	205.08	328.00	370.13	328.00	328.00	525.56	87.52	134.48	77.18	87.52	163.46	140.28
8	8	1	1	4.5	8	5.5	5.5	122.19	Angle	0.55	221.64	205.08	328.00	370.13	328.00	328.00	525.56	40.63	62.44	41.00	40.63	121.90	114.37
8	8	1	1	6.75	8	5.5	5.5	68.59	Angle	0.31	221.64	205.08	328.00	370.13	328.00	328.00	525.56	24.73	38.01	26.24	24.73	62.65	47.87

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