1-1-1967

Linear and nonlinear analyses of skewed plates.

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LINEAR AND NONLINEAR ANALYSES OF SKEWED PLATES

A THESIS

Submitted to the Faculty of Graduate Studies through the

Department of Civil Engineering in Partial Fullfilment

of the Requirements for the Degree of

Doctor of Philosophy at The

University of Windsor.

by

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1967

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ABSTRACT

The perturbation method is used to analyze the problem of small and large deflections of clamped skewed plates under uniform pressure. The results are improved by successive approximations to the three displacement components in the middle plane of the plate. Numerical and graphical results are presented. Comparisons are made with existing results for skewed plates with small deflections as well as with results for rectangular plates with small and large deflection behaviour; good agreement is shown. The effects of skew and aspect ratio on plates with large deflections are investigated. It is shown that the centre deflection decreases with increase in skew and aspect ratio, and that the maximum resultant stress occurs along the longer edges of the plates and is displaced towards the obtuse corners.

Four aluminum skewed panels of different skew angles and aspect ratios were tested to verify the theoretical predictions. Experimental results for deflections as well as maximum edge and centre stresses are compared with those obtained analytically. Close agreement is found. It was also revealed from these experiments that, at large lateral loads producing plastic permanent deformations in the plate models, the obtuse corners are not only regions of stress concentration but also of instability, exhibited by sudden reversal of stresses.

ACKNOWLEDGMENTS

The writer wishes to express his gratitude to Dr. J.B. Kennedy for his guidance and suggestions in the preparation of this work and for his generous aid and constructive criticism throughout its development.

The writer is also indebted to Mr. William James and Mr. David Wongsing who have helped in the checking of the theoretical analysis. Thanks are also due to Mr. George Michalczuk who has helped generously in the setting up of the experiments.

The financial assistance given by the Defence Research Board is greatly appreciated.

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CHAPTER I

INTRODUCTION

Skewed plates and slabs are often required as component parts of large scale structures such as triangular dams and building floor systems. In the field of reinforced concrete, such plates are also of considerable interest and practical importance, especially in the case of skewed slabs for highway bridges that cross rivers, railways or other highways at an oblique angle. In general, the deflections of skewed plates or slabs used in the aforementioned structures are usually rather small in comparison with the thickness of the plate so that for a proper design of such plates, only a linear (small deflection) analysis is required. In contrast, the requirements of skewed plates or panels for the aircraft industry are quite different. In the case of the design of swept wings and skin panels of aircrafts, for example, the weight is of primary importance; for this reason, when skewed plates are used as their component parts, they must be thin and, as a result, their deflections are usually quite large in comparison with plate thickness. Hence, in order to obtain design charts and formulas for stressing skewed plates used for swept wings, skin panels and other related components of the aircraft, the nonlinear (large deflection) analysis must be used.

Many diverse and indirect methods are now available for the linear analysis of clamped square and rectangular plates subjected to uniform normal loadings. Some of these methods are cited by Timoshenko and Woinowsky-Krieger (1). For the solution of a clamped uniformly loaded rectangular plate, Timoshenko and Woinowsky-Krieger employ a double series which operates with two independent systems of infinite linear simultaneous equations. Approximate solutions for the nonlinear (large deflection) analysis of uniformly loaded rectangular plates under similar boundary conditions have also been examined by Way (2) using the Rayleigh-Ritz technique and by Levy (3) who substituted a double Fourier series solution into the differential equations and evaluated the coefficients. Invariably, all the methods employed are extremely laborious and require considerable computations.

In contrast to the square and rectangular plates, skewed plates have not received as much attention. This may perhaps be due to its relatively difficult mathematical model and its absence of orthogonal relationships. For the clamped skewed plate under consideration, Morley (4) has presented results for a very limited number of skew angles and aspect ratios. Recently, due to the work of Kennedy (5) (6), deflections as well as principal stresses for such plates have been determined for various skews and aspect ratios both analytically and experimentally. However, with regard to large deflection behaviour of uniformly loaded skewed plates, no general solutions are as yet available.

The work embodied in this thesis comprises:

(i) a theoretical linear (small deflection) analysis on the bending of clamped skewed plates subjected to a uniformly distributed load and a comparison of the results so obtained with those obtained earlier by the author and other investigators (4) (5) (6) and (7)

(ii) an extension of the theoretical analysis to include the investigation into the large deflection behaviour of uniformly loaded skewed plates under the same boundary conditions.

(iii) an experimental investigation into the effect of varying the skew angle, aspect ratio and plate thickness on the small as well as the large deflection behaviour of uniformly loaded clamped skewed plates and thereby verify the theoretical predictions. The experiments performed consisted of the following aluminum plate models:

a) Test Panel 1 --- a skewed plate with aspect ratio 1/2, skew angle 50° and plate thickness 1/8 in.

b) Test Panel 2 --- a skewed plate with aspect ratio 1/2, skew angle 50° and plate thickness 1/16 in.

c) Test Panel 3 --- a skewed plate with aspect ratio 2/3, skew angle 30° and plate thickness 1/16 in.

and d) Test Panel 4 --- a skewed plate with aspect ratio 2/3, skew angle 30° and plate thickness 1/8 in.

With reference to the theoretical work, the perturbation method (8) (9), based on the smallness of the central deflection was used to determine the lateral deflection, the in-plane displacements and hence the moments and stresses of clamped skewed plates. Throughout the theoretical analysis, the dimensionless ratio of the central deflection to the thickness of the plate is used as the perturbation parameter. Essentially, the perturbation technique is based on the principle that, if a well constructed asymptotic power series should satisfy the differential equation, then each parameter should also satisfy the governing differential equation independently. Following the perturbation procedure, asymptotic power series containing a number of undetermined coefficients are assumed relating first the dimensionless load to the central deflection perturbation parameter W_o. Power series containing unknown functions of the oblique co-ordinate axes are also assumed relating each of the displacement components u, v, and w in the middle plane of the plate with the same perturbation parameter W_o. In assuming these functions for displacements, care was taken to ensure that these assumed functions satisfy not only the boundary conditions of the plate but also the condition of polar symmetry ---- a necessary condition for a uniformly loaded skewed plate. The assumed displacement functions are next substituted in turn into the governing partial differential equations derived in each step in the successive approximation sequence. By equating equal powers of the oblique co-ordinates ξ and η, and by solving the set of simultaneous linear equations thus obtained, all the unknown coefficients in the displacement functions are evaluated. Finally, these displacement functions with their determined parameters are differentiated to yield the required bending and membrane stresses anywhere within the plate boundary.

Also included in the theoretical analysis is a brief discussion of the initiation of yield along the edge of the plate if the plate material reaches its yield in a region where the Von Karman equations are valid ($w/h \leq 2$). In this connection, the Huber-von Mises yield theory is used.

The experimental investigation consisted of the testing of four plate models of different skew angles, aspect ratios and plate thicknesses. All test plates were made of 6061-T6 aluminum alloy. Metal foil strain rosette gauges were installed at selected points on the plate models and principal stresses were calculated from the strain measurements recorded for the different intensities of loadings. Dial indicators were also installed at the bottom of the plate to measure the lateral deflections. In order to verify the results of the nonlinear (large deflection) analysis, all four test panels were loaded so that the centre deflection of the plate approaches twice the plate thickness.

In order to study the behaviour and stress distribution of skewed plates loaded beyond the validity of the Von Karman equations, two of the above-mentioned test panels were subjected to large loads resulting in plastic permanent deformation of the plate models.

To facilitate the computation of deflections, principal bending and membrane stresses at specified points on the skewed plate, all computational work for both the theoretical and experimental investigations was programmed in Fortran for the IBM 1620 II. The programmes are included in Appendix A.

CHAPTER II

Review of Literature

(a) Linear Analysis of Skewed Plates

The linear small deflection behaviour of skewed plates and slabs has been investigated mainly by the method of finite difference. The first publication on skewed plates was probably due to Brigatti (10) who obtained limited results, by means of finite difference equations, for uniformly loaded rhombic plates simply supported and clamped.

In 1939, Anzelius (11) investigated into the small deflection behaviour of uniformly loaded skewed plates, simply supported on two opposite sides and free on the other two. His solution is in the form of a series involving hyperbolic and trigonometric functions which yield an infinite system of linear equations. Results were given qualitatively only for twisting moments for a 45° skewed slab.

Studies of skewed plates by means of finite difference techniques were also made by Jensen (12) in 1941. Uniformly loaded skewed plates simply supported on four sides and similarly loaded skewed plates simply supported on two opposite edges and free on the other two sides were anslysed by use of difference equations developed in a form readily applicable to networks made up of lines parallel to the sides. Throughout his work, the aspect ratio of the plate was taken as 1/2 and Poisson's ratio was taken to be 0.2.

Since the work of Jensen in 1941, a great deal of work has been done on skewed plates and skewed structures. In 1953, Dorman (13) used the energy approach to investigate into the bending behaviour of a clamped skewed plate but the function he assumed for the lateral deflection has the restrictive character of satisfying not only the polar symmetry but also quadrant symmetry ----- a condition which is non-existent in a skewed plate. The outstanding researchers in skewed plates and related structures in the past decade include Morley (4), Mirsky (14) and Jones (15).

More recently, Kennedy and the author (5) (6) have solved the small deflection problem of uniformly loaded skewed plates by means of variational techniques and the results were verified by experiments.

In 1964, Kennedy and Huggins (16) presented an analytical solution for skewed stiffened plates under a uniformly distributed load. Stresses near the corners of skewed stiffened plates were also examined by Kennedy and Martens (17) who have observed experimentally that critical stresses often occur in obtuse corners of such skewed plates.

(b) Nonlinear Analysis of Skewed Plates

No general solution for the nonlinear (large deflection) analysis of skewed plates is as yet available in the literature. However, nonlinear analyses of rectangular, circular and elliptical plates are quite well known. Results for the nonlinear analyses of such plates are largely due to the work of Way (2), Levy (3), Chien (18), Wang (19) and Weil and Newmark (20). Large deflections of simply supported rectangular plates on elastic foundations were examined by Sinha (21) in 1963 and more recently, approximate solutions for the small and large deflection behaviour of rectangular plates resting on elastic supports have also been obtained by Kennedy and the author (22).

CHAPTER III

THEORETICAL ANALYSIS

(a) Assumptions

Based on the small deflection theory of elastic thin plates, the problem of the clamped skewed plate subjected to uniform normal loading has recently been solved (4) (5) (6) by various theoretical methods. However, in all these theoretical analyses considered, the deflections are considered to be of such magnitude that the effect of the stretching of the middle plane of the plate on its curvature can be neglected. When the lateral deflection of the plate is moderately large, that is, in the neighbourhood of one half the plate thickness or more, the linear theory of thin plates is no longer applicable and the effect of the forces acting in the middle surface must be taken into account.

Throughout this theoretical work of linear and nonlinear analyses of skewed plates, the following assumptions are made:

i) points which lie on a normal to the midplane of the undeflected plate lie on a normal to the mid-plane of the deflected plate.

ii) the stresses normal to the mid-plane of the plate, arising from the applied loading, are negligible in comparison with the stresses in the plane of the plate.

iii) the slope of the deflected plate in any direction is small so that its square may be neglected in comparison with unity.

Also, for the linear (small deflection) analysis, the forces in the middle plane of the plate is neglected and this entails one additional assumption, viz.,

iv) the mid-plane of the plate is a neutral plane, i.e., any mid-plane stresses arising from the deflection of the plate into a non-developable surface is ignored.

(b) Formulation of the Governing Partial Differential Equations

The nonlinear large deflection behaviour of thin elastic plates is governed by three coupled nonlinear partial differential equations. When the boundary conditions of the plate are known, it is often convenient to express these equations in terms of the displacement components u, v, and w (parallel to the rectangular co-ordinate axes x, y, and z respectively) of a point in the middle plane of the plate.

i) Equilibrium of the Plate Element in the x and y directions

Consider the equilibrium of a small element cut out from the middle plane of the plate with sides dx and dy as shown in Fig. 1. Let N_x , N_y and N_{xy} be the in-plane forces per unit length of the plate.

Neglecting body forces, the equilibrium of the plate element in the x and y directions yields respectively,

$$N_{x,x} + N_{xy,y} = 0 \qquad \text{(3-1)}$$

$$N_{xy,x} + N_{y,y} = 0 \qquad \text{(3-2)}$$

where the comma notation signifies differentiation.

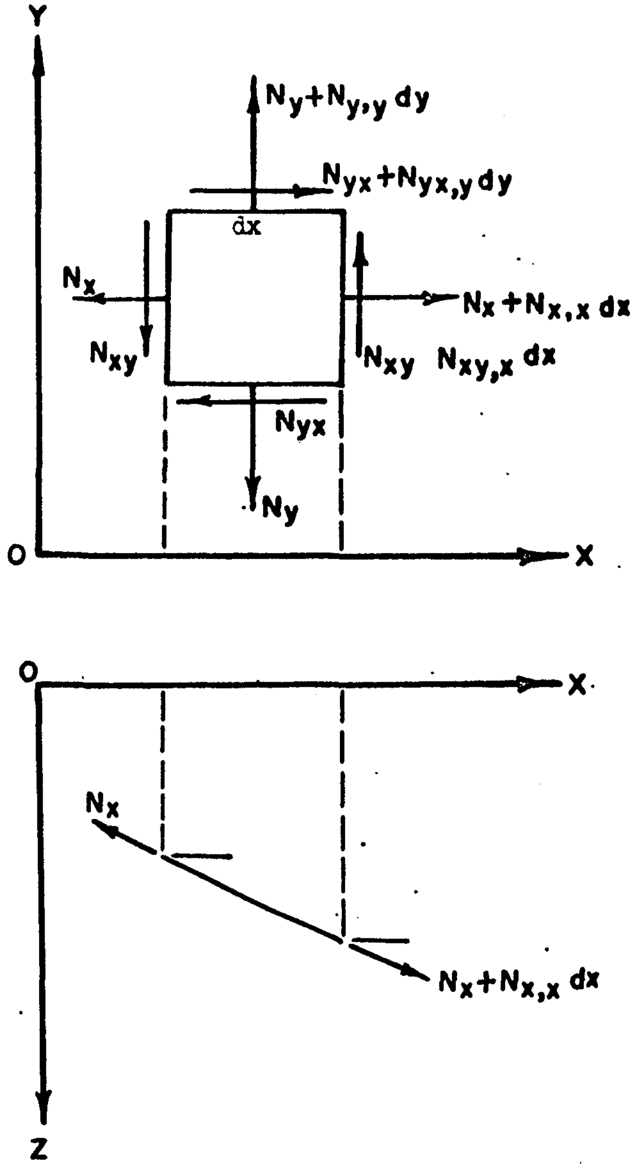


Fig. 1. In-plane Forces on Plate Element

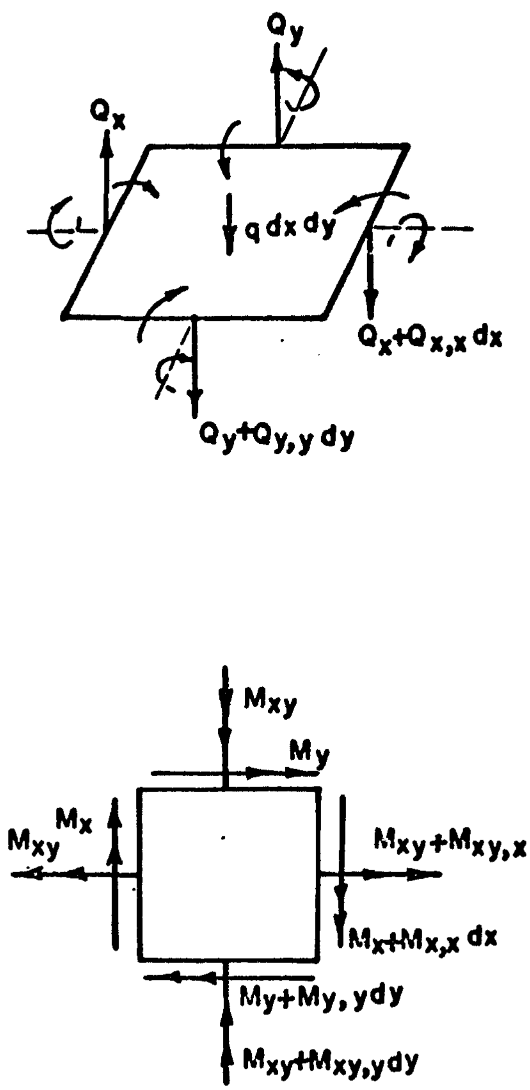


Fig. 2. Moments and Shear Forces on Plate Element

ii) Equilibrium of the plate element in the z direction

<u>Forces in the z direction due to the in-plane forces:</u>

From Figure 1, it is easily seen that the net contribution of the downward force by N_x in the plate element is

$$-N_x w,_x dy + (N_x w,_x dy),_x dx$$

or $(N_x w,_{xx} + N_{x,x} w,_x)$ dx dy ....(3-3)

Similarly, the net downward contribution of N_y on the plate element is

$$(N_y w,_{yy} + N_{y,y} w,_y) \, dx \, dy \quad ....(3\text{-}4)$$

The net downward contribution of N_{xy} on the plate element is

$$-N_{xy} w,_y dy + N_{xy} w,_y dy + (N_{xy} w,_y dy),_x dx$$

or $(N_{xy} w,_{xy} + N_{xy,x} w,_y)$ dx dy ,...........(3-5)

Similarly, the net downward contribution of N_{yx} is

$$(N_{xy} w,_{xy} + N_{xy,y} w,_x) \, dx \, dy \quad ....(3\text{-}6)$$

Hence, the net downward contribution of all the in-plane forces can be obtained by adding Eqs. (3-3) through (3-6), viz.,

$$(N_x w,_{xx} + 2 N_{xy} w,_{xy} + N_y w,_{yy}) \, dx \, dy ......(3\text{-}7)$$

<u>Forces in the z direction due to lateral loads:</u>

Let Q_x, Q_y be the shear forces per unit length (Fig. 2). Also shown on the same figure are the direction of the bending and twisting moments acting per unit length.

Equilibrium in the downward direction (along the z axis) gives:

$$Q_{x,x} + Q_{y,y} + q = 0 \quad \text{.....................(3-8)}$$

Also, by taking moments about an axis parallel to the x axis and ignoring terms of lower order of magnitude gives:

$$Q_y \, dx \, dy - M_{y,y} \, dy \, dx + M_{xy,x} \, dx \, dy = 0$$

or $$M_{y,y} - M_{xy,x} - Q_y = 0 \quad \text{.....................(3-9)}$$

Similarly, by taking moments about an axis parallel to the y axis, we have,

$$M_{x,x} - M_{xy,y} - Q_x = 0 \quad \text{.....................(3-10)}$$

Putting the well -known expressions for moments and curvature relationships (1), viz.,

$$M_x = -D \, (w,_{xx} + \nu \, w,_{yy})$$

$$M_y = -D \, (w,_{yy} + \nu \, w,_{xx})$$

$$M_{xy} = D \, (1 - \nu) \, w,_{xy}$$

into expression (3-9) and (3-10), we get

$$Q_x = -D \, (w,_{xxx} + w,_{xyy}) \quad \text{..................(3-11)}$$

$$Q_y = -D \, (w,_{yyy} + w,_{yxx}) \quad \text{..................(3-12)}$$

Substituting Eqs. (3-11) and (3-12) into Eq. (3-8) gives,

$$w,_{xxxx} + 2 \, w,_{xxyy} + w,_{yyyy} = q/D \quad \text{...........(3-13)}$$

If we now add to this equilibrium equation in the vertical direction due to the lateral loads the effect due to the in-plane forces Eq. (3-7), we finally arrive at the equilibrium equation in the vertical direction due to the combined action of the lateral and membrane forces,

$$D\,(w,_{xxxx} + 2\, w,_{xxyy} + w,_{yyyy}) = q + N_x\, w,_{xx} + 2\, N_{xy}\, w,_{xy} + N_y\, w,_{yy} \qquad \text{.............(3-14)}$$

In terms of stresses, Eqs. (3-1), (3-2) and (3-14) can be written as

$$\sigma_{x,x} + \tau_{xy,y} = 0 \qquad \text{.........................(3-15)}$$

$$\sigma_{y,y} + \tau_{xy,x} = 0 \qquad \text{..........................(3-16)}$$

and

$$D\nabla^2\nabla^2 w = q + h\,(\sigma_x\, w,_{xx} + \sigma_y\, w,_{yy} + 2\,\tau_{xy}\, w,_{xy}) \qquad \text{....(3-17)}$$

But, from the elementary theory of elasticity (23), the equations of plane strain are:

$$\sigma_x = E/(1-\nu^2)\quad(\epsilon_x + \nu\epsilon_y)$$

$$\sigma_y = E/(1-\nu^2)\quad(\epsilon_y + \nu\epsilon_x) \qquad \text{.....(3-18)}$$

$$\tau_{xy} = E/2(1+\nu)\,\gamma_{xy}$$

and, the equations of compatibility are:

$$\epsilon_x = u,_x + 1/2\,(w,_x)^2$$

$$\epsilon_y = v,_y + 1/2\,(w,_y)^2 \qquad \text{.................(3-19)}$$

$$\gamma_{xy} = u,_y + v,_x + w,_x\, w,_y$$

Substituting equations (3-18) and (3-19) into Eqs. (3-15), (3-16) and (3-17), the three general differential equations in

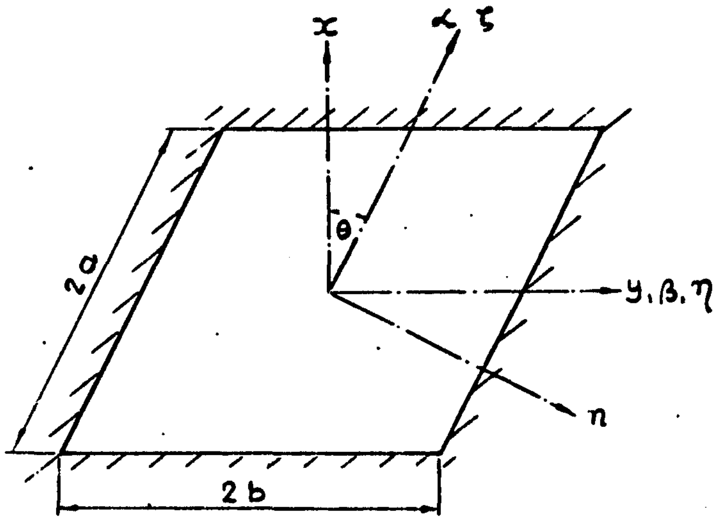


Fig. 3. The Rectangular and Skewed Co-ordinate Systems.

rectangular cartesian co-ordinates governing the large deflection of thin elastic plates are obtained:

$$u_{,xx} + w_{,x}w_{,xx} + \nu(v_{,xy} + w_{,y}w_{,xy}) + \frac{1}{2}(1-\nu)(u_{,yy} + v_{,xy} + w_{,x}w_{,yy} + w_{,y}w_{,xy}) = 0 \quad \text{.................... (3-20)}$$

$$v_{,yy} + w_{,y}w_{,yy} + \nu(u_{,xy} + w_{,x}w_{,xy}) + \frac{1}{2}(1-\nu)(v_{,xx} + u_{,xy} + w_{,y}w_{,xx} + w_{,x}w_{,xy}) = 0 \quad \text{.................... (3-21)}$$

$$D\,\nabla^2\nabla^2 w = q + h\Big(\frac{E}{(1-\nu^2)}\{u_{,x} + \frac{1}{2}(w_{,x})^2 + \nu[v_{,y} + \frac{1}{2}(w_{,y})^2]\}w_{,xx} + \frac{E}{(1-\nu^2)}\{v_{,y} + \frac{1}{2}(w_{,y})^2 + \nu[u_{,x} + \frac{1}{2}(w_{,x})^2]\}w_{,yy} + \frac{E}{(1+\nu)}\cdot(u_{,y} + v_{,x} + w_{,x}w_{,y})\,w_{,xy}\Big) \quad \text{...... (3-22)}$$

where ∇ is the Laplacian operator, ν being Poisson's ratio, D, the flexural rigidity, E, the modulus of elasticity of the plate material, q, the intensity of uniformly distributed load, and h is the thickness of the plate. The comma notation signifies differentiation.

(c) The Oblique Co-ordinate System

In investigating the small and large deflection problem of skewed plates, it is often advantageous to adopt a co-ordinate system parallel to the edges of the plate, namely the oblique co-ordinate system α and β as shown in Fig. 3.

By the transformation

$$\left.\begin{aligned} x &= \alpha \cos \theta \\ y &= \beta + \alpha \sin \theta \end{aligned}\right\} . \qquad \ldots\ldots\ldots\ldots\ldots (3\text{-}23)$$

in which θ is the skew angle, the following relationships between the rectangular and oblique co-ordinate systems hold:

$$u_{,x} = u_{,\alpha} \sec \theta - u_{,\beta} \tan \theta$$

$$u_{,xx} = u_{,\alpha\alpha} \sec^2 \theta - 2\, u_{,\alpha\beta} \sec \theta \tan \theta + u_{,\beta\beta} \tan^2 \theta$$

$$u_{,xy} = u_{,\alpha\beta} \sec \theta - u_{,\beta\beta} \tan \theta$$

$$u_{,y} = u_{,\beta}$$

$$u_{,yy} = u_{,\beta\beta}$$

$$v_{,x} = v_{,\alpha} \sec \theta - v_{,\beta} \tan \theta$$

$$v_{,xy} = v_{,\alpha\beta} \sec \theta - v_{,\beta\beta} \tan \theta$$

$$v_{,xx} = v_{,\alpha\alpha} \sec^2 \theta - 2\, v_{,\alpha\beta} \sec \theta \tan \theta + v_{,\beta\beta} \tan^2 \theta$$

$$v_{,y} = v_{,\beta}$$

$$v_{,yy} = v_{,\beta\beta}$$

$$w_{,x} = w_{,\alpha} \sec \theta - w_{,\beta} \tan \theta$$

$$w_{,xy} = w_{,\alpha\beta} \sec \theta - w_{,\beta\beta} \tan \theta$$

$$w_{,xx} = w_{,\alpha\alpha} \sec^2 \theta - 2\, w_{,\alpha\beta} \sec \theta \tan \theta + w_{,\beta\beta} \tan^2 \theta$$

$$\begin{aligned} w_{,xxxx} = {} & w_{,\alpha\alpha\alpha\alpha} \sec^4 \theta - 4\, w_{,\alpha\alpha\alpha\beta} \sec^3 \theta \tan \theta \\ & + 6\, w_{,\alpha\alpha\beta\beta} \sec^2 \theta \tan^2 \theta - 4\, w_{,\alpha\beta\beta\beta} \sec \theta \tan^3 \theta \\ & + w_{,\alpha\beta\beta\beta} \sec \theta \tan^3 \theta + w_{,\beta\beta\beta\beta} \tan^4 \theta \end{aligned}$$

$$\begin{aligned} w_{,xxyy} = {} & w_{,\alpha\alpha\beta\beta} \sec^2 \theta - 2\, w_{,\alpha\beta\beta\beta} \sec \theta \tan \theta \\ & + w_{,\beta\beta\beta\beta} \tan^2 \theta \end{aligned}$$

$$w_{,yyyy} = w_{,\beta\beta\beta\beta}$$

Using these transformation relationships and, by defining further the dimensionless quantities

$$R = \frac{b}{a} \quad ; \quad \zeta = \frac{\alpha}{a} \quad ; \quad \eta = \frac{\beta}{b} \quad ; \quad U = \frac{ua}{h^2} \quad ;$$

$$V = \frac{va}{h^2} \quad ; \quad W = \frac{w}{h} \quad ; \quad Q = \frac{qb^4}{Dh}$$

Eqs. (3-20), (3-21) and (3-22) can be re-written into the oblique dimensionless form as:

$$2 R^3 c \; U_{,\zeta\zeta} - 4R^2 sc \; U_{,\zeta\eta} + R(2s^2c+(1-\nu)c^3)U_{,\eta\eta} + R(1+\nu) \; c \; (RV_{,\zeta\eta} - sV_{,\eta\eta})$$
$$+2R^2 W_{,\zeta\zeta} (RW_{,\zeta} - sW_{,\eta}) + RW_{,\zeta\eta} \{ - 4Rs \, W_{,\zeta} + W_{,\eta} [4s^2 + (1+\nu) \; c^2] \}$$
$$+ W_{,\eta\eta} [RW_{,\zeta} (1 + s^2 - \nu c^2) - 2 \; s \; W_{,\eta}] = 0 \quad \ldots\ldots\ldots \; (3\text{-}24)$$

$$R(1 + c^2 - \nu s^2) \; V_{,\eta\eta} - 2 \; R^2(1-\nu)s \; V_{,\zeta\eta} + R^3(1-\nu)V_{,\zeta\zeta} + (1+\nu)(R^2c \; U_{,\zeta\eta} - Rsc \; U_{,\eta\eta})$$
$$+ W_{,\eta\eta} [2 \, W_{,\eta} - R(1+\nu)s \; W_{,\zeta}] + RW_{,\zeta\eta} [(-3+\nu)s \; W_{,\eta} + R(1+\nu)W_{,\zeta}] + R^2 \; W_{,\zeta\zeta} [(1-\nu)W_{,\eta}]$$
$$= 0 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \; (3\text{-}25)$$

$$R^4 \; W_{,\zeta\zeta\zeta\zeta} - 4s(R^3 \; W_{\zeta\zeta\zeta\eta} + R \; W_{,\zeta\eta\eta\eta}) + 2R^2 \; (1+2s^2) \; W_{,\zeta\zeta\eta\eta} + W_{,\eta\eta\eta\eta} =$$
$$Qc^4 + 12\{ (R^2c \; U_{,\zeta} - Rsc \; U_{,\eta}) + \frac{1}{2} (R \; W_{,\zeta} - s \; W_{,\eta})^2 + \nu[Rc^2 \; V_{,\eta} + \frac{1}{2}(cW_{,\eta})^2] \}$$
$$(R^2 \; W_{,\zeta\zeta} - 2Rs \; W_{,\zeta\eta} + s^2 \; W_{,\eta\eta}) + 12c^2 \; \{Rc^2 \; V_{,\eta} + \frac{1}{2} \; c^2(W_{,\eta})^2 + \nu[(R^2cU_{,\zeta} - RscU_{,\eta})$$
$$+ \frac{1}{2} (RW_{,\zeta} - sW_{,\eta})^2] \} \; W_{,\eta\eta} + 12(1-\nu)[(R^2cV_{,\zeta} - RscV_{,\eta}) + (RcW_{,\zeta} - sc \; W_{,\eta}) \; W_{,\eta}$$
$$+ R \; c^2 \; U_{,\eta}] \; (Rc \; W_{,\zeta\eta} - sc \; W_{,\eta\eta}) \quad \ldots\ldots\ldots\ldots\ldots\ldots \; (3\text{-}26)$$

where, for brevity, $s = \sin\theta$ and $c = \cos\theta$, θ being the skew angle, 2a and 2b are the oblique dimensions ofthe plate.

Hence, the problem of large deflections of skewed plates is reduced to finding a solution to Eqs. (3-24), (3-25) and (3-26).

(d) Method of Solution

The small parameter perturbation method is now used to obtain approximate solutions to Eqs. (3-24), (3-25) and (3-26) for clamped skewed plates subjected to lateral uniform pressure. This method requires the expansion of the displacement components and the dimensionless load quantity in a power series of ascending powers of the dimensionless centre deflection parameter W_o. Thus we let,

$$Q = \gamma_1 W_o + \gamma_3 W_o^3 + \gamma_5 W_o^5 + \ldots \qquad (3\text{-}27)$$

$$W = w_1(\zeta, \eta) W_o + w_3(\zeta, \eta) W_o^3 + w_5(\zeta, \eta) W_o^5 + \ldots \qquad (3\text{-}28)$$

$$U = s_2(\zeta, \eta) W_o^2 + s_4(\zeta, \eta) W_o^4 + \ldots \qquad (3\text{-}29)$$

$$V = t_2(\zeta, \eta) W_o^2 + t_4(\zeta, \eta) W_o^4 + \ldots \qquad (3\text{-}30)$$

where $\gamma_1, \gamma_3, \gamma_5$ ..... are the undetermined parameters relating the dimensionless centre deflection W_o to the dimensionless load Q, s_2, s_4,...., t_2, t_4,..., and w_1, w_3, w_5,...., are functions of the dimensionless oblique co-ordinates ζ and η, relating the in-plane and lateral displacements to the same perturbation parameter W_o.

From the series for W, Eq. (3-27) , it is evident that, in order that the centre deflection be W_o as defined, it is necessary to require

$$w_1\ (0,0) = 1 \quad \text{and } w_3\ (0,0) = w_5\ (0,0) = 0 \quad \ldots (3\text{-}31)$$

The prescribed boundary conditions for the clamped edges are:

$$\left.\begin{array}{lll} & w,_{n} = v\cos\theta = w = 0 & \text{at } \eta = \pm\ 1 \\ \text{and} & w,_{x} = u = w = 0 & \text{at } \zeta = \pm\ 1 \end{array}\right. \quad \ldots\ldots\ldots (3\text{-}32)$$

Solution to the Linear Small Deflection Problem

(First Order Approximation)

Substituting Eqs. (3-27) and (3-28) into Eq. (3-26) and equating coefficients of the terms containing W_o , yield the following differential equation governing the linear (small deflection) behaviour of skewed plates:

$$R^4\ w_{1,\zeta\zeta\zeta\zeta} - 4\ R^3\ s\ w_{1,\zeta\zeta\zeta\eta} - 4\ Rs\ w_{1,\zeta\eta\eta\eta} + 2R^2\ (1+2s^2)\ w_{1,\zeta\zeta\eta\eta}$$

$$+\ w_{1,\eta\eta\eta\eta} = \gamma_1\ c^4 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3\text{-}33)$$

The associated boundary conditions for this first order approximation are:

$$\left.\begin{array}{lll} & w_{1,n} = w_1 = 0 & \text{at } \eta = \pm\ 1 \\ \text{and} & & \\ & w_{1,x} = w_1 = 0 & \text{at } \zeta = \pm\ 1 \end{array}\right\} \ldots\ldots\ldots\ldots (3\text{-}34)$$

It can be readily verified that conditions (3-34) are identically satisfied when

$$w_1 = (1-\eta^2)^2(1-\zeta^2)^2(1-\zeta\eta)(1+C_1\eta^2+C_2\zeta^2+C_3\eta^4+C_4\zeta^4+C_5\zeta^2\eta^2) \quad .. (3\text{-}35)$$

where $C_1 \ldots C_5$ are undetermined coefficients. It is perhaps worth noting that the deflection function assumed, Eq. (3-35) not only meets the conditions set out in (3-31) but also satisfies the inherent condition of polar symmetry, i.e.,

$$w_1(\zeta, \eta) = w_1(-\zeta, -\eta), \text{ and } w_1(-\zeta, \eta) = w_1(\zeta, -\eta)$$

------- a necessary condition for a uniformly loaded skewed plate.

Substituting expression (3-35) into Eq. (3-33) and equating corresponding powers of η and ζ we obtain six linear algebraic equations for the six undetermined coefficients, $\gamma_1, \ldots C_1, \ldots, C_5$. The solution of this matrix equation defines uniquely the value of the small lateral displacement (deflection) of the plate anywhere within the plate boundary.

Solution to the Nonlinear Large Deflection Problem (Higher Order Approximations)

Making use of Eqs. (3-28) through (3-30) in Eqs. (3-24) and (3-25) and collecting coefficients of W_o^2 terms, result in two differential equations governing the in-plane displacement components of the plate:

$$2R^3c\, s_{2,\zeta\zeta} - 4R^2 sc\, s_{2,\zeta\eta} + R(2s^2c+(1-\nu)c^3)s_{2,\eta\eta} + (1+\nu)R^2c^2 t_{2,\zeta\eta}$$

$$-R(1+\nu)sc^2 t_{2,\eta\eta} + 2R^3 w_{1,\zeta\zeta} w_{1,\zeta} - 2R^2 s\, w_{1,\zeta\zeta} w_{1,\eta} - 4R^2 s\, w_{1,\zeta\eta} w_{1,\zeta}$$

$$+R[4s^2+(1+\nu)c^2] w_{1,\zeta\eta} w_{1,\eta} + R(1+s^2-\nu c^2) w_{1,\eta\eta} w_{1,\zeta} - 2s\, w_{1,\eta\eta} w_{1,\eta} = 0 \ldots \text{(3-36)}$$

$$R(1+c^2-\nu s^2)t_{2,\eta\eta} - 2R^2(1-\nu)s\, t_{2,\zeta\eta} + R^3(1-\nu)t_{2,\zeta\zeta} + R(1+\nu)c\, s_{2,\zeta\eta}$$

$$-R(1+\nu)sc\, s_{2,\eta\eta} + 2w_{1,\eta\eta} w_{1,\eta} - R(1+\nu)s\, w_{1,\eta\eta} w_{1,\zeta} + R(\nu-3)s\, w_{1,\zeta\eta} w_{1,\eta}$$

$$+ R^2(1+\nu) w_{1,\zeta\eta} w_{1,\zeta} + R^2(1-\nu) w_{1,\zeta\zeta} w_{1,\eta} = 0 \quad \ldots\ldots \text{(3-37)}$$

The boundary conditions for the in-plane displacements require

$$s_2 = t_2 \cos\theta = 0$$

at $\eta = \pm 1$ and $\zeta = \pm 1$ .... (3-38)

which are satisfied if we take,

$$s_2 = (1-\zeta^2)(1-\eta^2)(D_2\zeta + D_3\eta + D_4\zeta^3 + D_5\eta^3 + D_6\zeta\eta^2 + D_7\zeta^2\eta$$
$$+ D_8\zeta^3\eta^2 + D_9\zeta^2\eta^3) \quad \ldots\ldots\ldots\ldots \text{(3-39)}$$

$$t_2 = (1-\zeta^2)(1-\eta^2)(E_2\eta + E_3\zeta + E_4\eta^3 + E_5\zeta^3 + E_6\zeta^2\eta + E_7\zeta\eta^2$$
$$+ E_8\zeta^2\eta^3 + E_9\zeta^3\eta^2) \quad \ldots\ldots\ldots\ldots \text{(3-40)}$$

Employing expression (3-35) , (3-39) and (3-40) as dictated by Eqs. (3-36) and (3-37) and equating powers of x and y, yield sufficient linear equations to determine the twelve undetermined coefficients $D_2, \ldots, D_9$, $E_2, \ldots, E_9$, and hence the in-plane displacement components.

Collecting the coefficients of W_o^3 terms in equation (3-26), the differential equation governing the first nonlinear term of the lateral displacement expression is obtained, namely,

$$R^4 w_{3,\zeta\zeta\zeta\zeta} - 4\,Rs(R^2 w_{3,\zeta\zeta\zeta\eta} + w_{3,\zeta\eta\eta\eta}) + 2R^2(1+2s^2)w_{3,\zeta\zeta\eta\eta} + w_{3,\eta\eta\eta\eta}$$

$$= \gamma_3 c^4 + 12\Big\{[R^4 c\; s_{2,\zeta} w_{1,\zeta\zeta} - 2R^3 sc\; s_{2,\zeta} w_{1,\zeta\eta} + R^2 s^2 c s_{2,\zeta} w_{1,\eta\eta} - R^3 sc s_{2,\eta} w_{1,\zeta\zeta}$$

$$+ 2R^2 s^2 c\; s_{2,\eta} w_{1,\zeta\eta} - Rs^3 c\; s_{2,\eta} w_{1,\eta\eta}] + \frac{1}{2}[R^4 w_{1,\zeta\zeta}(w_{1,\zeta})^2$$

$$- 2R^3 s\; w_{1,\zeta\eta}(w_{1,\zeta})^2 + R^2 s^2\; w_{1,\eta\eta}(w_{1,\zeta})^2 - 2\,R^3 s\; w_{1,\zeta\zeta} w_{1,\zeta}\, w_{1,\eta}$$

$$+ 4R^2 s^2\; w_{1,\zeta\eta} w_{1,\zeta} w_{1,\eta} - 2Rs^3\; w_{1,\eta\eta} w_{1,\zeta} w_{1,\eta} + R^2 s^2\; w_{1,\zeta\zeta}(w_{1,\eta})^2$$

$$- 2Rs^3\; w_{1,\zeta\eta}(w_{1,\eta})^2 + s^4\; w_{1,\eta\eta}(w_{1,\eta})^2] + \nu[R^3 c^2\; w_{1,\zeta\zeta} t_{2,\eta}$$

$$- 2R^2 sc^2\; w_{1,\zeta\eta} t_{2,\eta} + Rs^2 c^2\; w_{1,\eta\eta} t_{2,\eta} + \frac{1}{2} R^2 c^2\; w_{1,\zeta\zeta}(w_{1,\eta})^2$$

$$- Rsc^2\; w_{1,\zeta\eta}(w_{1,\eta})^2 + \frac{1}{2} s^2 c^2\; w_{1,\eta\eta}(w_{1,\eta})^2]\Big\} + 12\Big\{(Rc^4\; w_{1,\eta\eta} t_{2,\eta}$$

$$+ \frac{1}{2} c^4\; w_{1,\eta\eta}(w_{1,\eta})^2 + \nu\,(R^2 c^3\; w_{1,\eta\eta} s_{2,\zeta} - Rsc^3\; w_{1,\eta\eta}\; s_{2,\eta}$$

$$+ \frac{1}{2} c^2 [R^2\,(w_{1,\zeta})^2 (w_{1,\eta\eta}) - 2\,Rs\; w_{1,\eta\eta} w_{1,\zeta}\; w_{1,\eta} + s^2\; w_{1,\eta\eta}(w_{1,\eta})^2\,]\,)\,\Big\}$$

$$+ 12\,(1-\nu)[R^2 c^3\; w_{1,\zeta\eta}\; s_{2,\eta} - Rsc^3\; w_{1,\eta\eta}\; s_{2,\eta} + R^3 c^2\; w_{1,\zeta\eta} t_{2,\zeta}$$

$$- R^2 sc^2\; w_{1,\eta\eta} t_{2,\zeta} - R^2 sc^2\; w_{1,\zeta\eta} t_{2,\eta} + Rs^2 c^2\; w_{1,\eta\eta} t_{2,\eta} + R^2 c^2 w_{1,\eta} w_{1,\zeta} w_{1,\zeta\eta}$$

$$- Rsc^2\; w_{1,\eta\eta} w_{1,\eta} w_{1,\zeta} - Rsc^2\; w_{1,\zeta\eta}(w_{1,\eta})^2 + s^2 c^2\; w_{1,\eta\eta}(w_{1,\eta})^2\,] \qquad (3\text{-}41)$$

The boundary conditions to be met here are:

$$w_{3,\eta} = w_3 = 0 \qquad \text{at } \eta = \pm 1$$
and
$$w_{3,x} = w_3 = 0 \qquad \text{at } \xi = \pm 1 \qquad \ldots\ldots\ldots\ldots\ldots\ldots (3\text{-}42)$$

which are identically satisfied by the following expression:

$$w_3 = (1-\eta^2)^2 (1-\xi^2)^2 (1-\xi\eta)(F_1\eta^2+F_2\xi^2+F_3\eta^4+F_4\xi^4+F_5\xi^2\eta^2) \qquad (3\text{-}43)$$

Substituting Eq. (3-43) into expression (3-41) and again equating powers of η and ξ, the undetermined coefficients γ_3, F_1, ... F_5 are evaluated by solving the resulting set of simultaneous equations.

Repeating the same procedure, i.e., now collecting coefficients of W_o^4, equations governing the next approximation for the in-plane displacements can be written as:

$$\begin{aligned}
&2R^3c\, s_{4,\xi\xi} - 4R^2 sc\, s_{4,\xi\eta} + R(2s^2c + (1-\nu)c^3)\, s_{4,\eta\eta} \\
&+ (1+\nu)R^2c^2\, t_{4,\xi\eta} - (1+\nu)Rc^2s\, t_{4,\eta\eta} + 2R^3(w_{1,\xi}w_{3,\xi\xi} + w_{3,\xi}w_{1,\xi\xi}) \\
&- 2R^2 s(w_{1,\eta}w_{3,\xi\xi} + w_{3,\eta}w_{1,\xi\xi}) - 4R^2s(w_{3,\xi}w_{1,\xi\eta} + w_{1,\xi}w_{3,\xi\eta}) \\
&+R(4s^2 + (1+\nu)c^2)(w_{1,\eta}w_{3,\xi\eta} + w_{3,\eta}w_{1,\xi\eta}) + R(1+s^2-\nu c^2) \\
&(w_{1,\xi}w_{3,\eta\eta} + w_{3,\xi}w_{1,\eta\eta}) - 2s(w_{1,\eta}w_{3,\eta\eta} + w_{3,\eta}w_{1,\eta\eta}) = 0
\end{aligned}$$

$$\ldots\ldots\ldots\ldots\ldots\ldots (3\text{-}44)$$

$$R(1+c^2-s^2)t_{4,\eta\eta}-2(1-\nu)R^2 st_{4,\xi\eta}+(1-\nu)R^3 t_{4,\xi\xi}+(1+\nu)R^2 c\, s_{4,\xi\eta}$$
$$-(1+\nu)R c s\, s_{4,\eta\eta}+2(w_{1,\eta}w_{3,\eta\eta}+w_{3,\eta}w_{1,\eta\eta})-R(1+\nu)s(w_{1,\xi}w_{3,\eta\eta}+w_{3,\xi}w_{1,\eta\eta})$$
$$+R(-3+\nu)s(w_{1,\eta}w_{3,\xi\eta}+w_{3,\eta}w_{1,\xi\eta})+R^2(1+\nu)(w_{3,\xi}w_{1,\xi\eta}+w_{1,\xi}w_{3,\xi\eta})$$
$$+R^2(1-\nu)(w_{1,\eta}w_{3,\xi\xi}+w_{3,\eta}w_{1,\xi\xi})=0 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(3-45)}$$

The associated boundary conditions for this approximation are:

$$s_4 = t_4 \cos\theta = 0$$

at $\eta = \pm 1$ and $\xi = \pm 1$ ....(3-46)

Eq.(3-46) are satisfied by assuming the following forms for the in-plane displacements:

$$s_4=(1-\xi^2)(1-\eta^2)(1-\xi\eta)(G_2\xi+G_3\eta+G_4\xi^3+G_5\eta^3+G_6\xi\eta^2+G_7\xi^2\eta+G_8\xi^3\eta^2+G_9\xi^2\eta^3)$$
....(3-47)

$$t_4=(1-\xi^2)(1-\eta^2)(1-\xi\eta)(H_2\xi+H_3\eta+H_4\xi^3+H_5\eta^3+H_6\xi\eta^2+H_7\xi^2\eta+H_8\xi^3\eta^2+H_9\xi^2\eta^3)$$
....(3-48)

The undetermind coefficients $G_2,\ldots,G_6,\ldots,H_6$ are again evaluated by substituting Eqs (3-47) and (3-48) into Eqs. (3-44) and (3-45).

As a last appoximation in this analysis, we put Eqs.(3-27) through (3-30) into Eq. (3-26) and collect coefficients W_0^5. This yields the differential equation:

$$R^4 w_{5,\xi\xi\xi\xi}-4Rs(R^2 w_{5,\xi\xi\xi\eta}+w_{5,\xi\eta\eta\eta})+2R^2(1+2s^2)w_{5,\xi\xi\eta\eta}+w_{5,\eta\eta\eta\eta}=\gamma_5 c^4+12$$
$$\{[R^4 c(w_{1,\xi\xi}S_{4,\xi}+w_{3,\xi\xi}S_{2,\xi})-2R^3 sc(w_{1,\xi\eta}S_{4,\xi}+w_{3,\xi\eta}S_{2,\xi})+R^2 cs^2(w_{1,\eta\eta}$$
$$S_{4,\xi}+w_{3,\eta\eta}S_{2,\xi})-R^3 cs(w_{3,\xi\xi}S_{2,\eta}+w_{1,\xi\xi}S_{4,\eta})+2R^2 cs^2(w_{1,\xi\eta}S_{4,\eta}+w_{3,\xi\eta}$$
$$S_{2,\eta})-Rcs^3(w_{1,\eta\eta}S_{4,\eta}+w_{3,\eta\eta}S_{2,\eta})]+1/2[R^4(2w_{1,\xi\xi}w_{1,\xi}w_{3,\xi}+w_{3,\xi\xi}\cdots$$

$$(w_{1,\xi})^2) - 2R^3 s(2w_{1,\xi\eta}\, w_{1,\xi}\, w_{3,\xi} + w_{3,\xi\eta}\, (w_{1,\xi})^2) + R^2 s^2 (2w_{1,\eta\eta}\, w_{1,\xi}\, w_{3,\xi} + w_{3,\eta\eta}$$

$$(w_{1,\xi})^2) - 2R^3 s(w_{1,\xi\xi}\, w_{1,\xi}\, w_{3,\eta} + w_{1,\xi\xi}\, w_{3,\xi}\, w_{1,\eta} + w_{3,\xi\xi}\, w_{1,\xi}\, w_{1,\eta})$$

$$+4R^2 s^2 (w_{1,\xi\eta}\, w_{1,\xi}\, w_{3,\eta} + w_{1,\xi\eta}\, w_{3,\xi}\, w_{1,\eta} + w_{3,\xi\eta}\, w_{1,\xi}\, w_{1,\eta}) - 2Rs^3 (w_{1,\eta\eta}$$

$$w_{1,\xi}\, w_{3,\eta} + w_{1,\eta\eta}\, w_{3,\xi}\, w_{1,\eta} + w_{3,\eta\eta}\, w_{1,\xi}\, w_{1,\eta}) + R^2 s^2 (2w_{1,\xi\xi}\, w_{1,\eta}\, w_{3,\eta}$$

$$+ w_{3,\xi\xi}\, w_{1,\eta}\, w_{1,\eta}) - 2Rs^3 (2w_{1,\xi\eta}\, w_{1,\eta}\, w_{3,\eta} + w_{3,\xi\eta}\, (w_{1,\eta})^2) + s^4 (2w_{1,\eta\eta}$$

$$w_{1,\eta}\, w_{3,\eta} + w_{3,\eta\eta}\, (w_{1,\eta})^2] + \nu[R^3 c^2 (w_{1,\xi\xi}\, t_{4,\eta} + w_{3,\xi\xi}\, t_{2,\eta}) - 2R^2 sc^2$$

$$(w_{1,\xi\eta}\, t_{4,\eta} + w_{3,\xi\eta}\, t_{2,\eta}) + Rs^2 c^2 (w_{1,\eta\eta}\, t_{4,\eta} + w_{3,\eta\eta}\, t_{2,\eta})$$

$$+1/2c^2 (R^2 (2w_{1,\xi\xi}\, w_{1,\eta}\, w_{3,\eta} + w_{3,\xi\xi}\, (w_{1,\eta})^2)$$

$$-2Rs(2w_{1,\xi\eta}\, w_{1,\eta}\, w_{3,\eta} + w_{3,\xi\eta}\, (w_{1,\eta})^2) + s^2 (2w_{1,\eta\eta}\, w_{1,\eta}\, w_{3,\eta} + w_{3,\eta\eta}$$

$$(w_{1,\eta})^2))] + 12\{Rc^4 (w_{1,\eta\eta}\, t_{4,\eta} + w_{3,\eta\eta}\, t_{2,\eta}) + 1/2c^4 (2w_{1,\eta\eta}\, w_{1,\eta}\, w_{3,\eta}$$

$$+ w_{3,\eta\eta} (w_{1,\eta})^2) + \nu[R^2 c^3 (w_{1,\eta\eta}\, S_{4,\xi} + w_{3,\eta\eta}\, S_{2,\xi}) - Rsc^3 (w_{1,\eta\eta}\, S_{4,\eta}$$

$$+ w_{3,\eta\eta}\, S_{2,\eta}) + 1/2[R^2 c^2 (2w_{1,\eta\eta}\, w_{1,\xi}\, w_{3,\xi} + w_{3,\eta\eta}\, (w_{1,\xi})^2) - 2Rsc^2 (w_{1,\eta\eta}$$

$$w_{1,\xi}\, w_{3,\eta} + w_{1,\eta\eta}\, w_{3,\xi}\, w_{1,\eta} + w_{3,\eta\eta}\, w_{1,\xi}\, w_{1,\eta}) + c^2 s^2 (2w_{1,\eta\eta}\, w_{1,\eta}\, w_{3,\eta}$$

$$+ w_{3,\eta\eta}\, w_{1,\eta}\, w_{1,\eta})]]\} + 12(1-\nu)\{R^2 c^3 (w_{1,\xi\eta}\, S_{4,\eta} + w_{3,\xi\eta}\, S_{2,\eta}) - Rsc^3$$

$$(w_{1,\eta\eta}\, S_{4,\eta} + w_{3,\eta\eta}\, S_{2,\eta}) + R^3 c^2 (w_{1,\xi\eta}\, t_{4,\xi} + w_{3,\xi\eta}\, t_{2,\xi}) - R^2 sc^2 (w_{1,\eta\eta}$$

$$t_{4,\xi} + w_{3,\eta\eta}\, t_{2,\xi}) - R^2 sc^2 (w_{1,\xi\eta}\, t_{4,\eta} + w_{3,\xi\eta}\, t_{2,\eta})$$

$$+ Rs^2 c^2 (w_{1,\eta\eta}\, t_{4,\eta} + w_{3,\eta\eta}\, t_{2,\eta}) + R^2 c^2 (w_{1,\xi\eta}\, w_{1,\eta}$$

$$w_{3,\xi} + w_{1,\xi\eta}\, w_{3,\eta}\, w_{1,\xi} + w_{3,\xi\eta}\, w_{1,\eta}\, w_{1,\xi}) - Rsc^2 (w_{1,\eta\eta}\, w_{1,\eta}\, w_{3,\xi} + w_{1,\eta\eta}$$

$$w_{3,\eta}\, w_{1,\xi} + w_{3,\eta\eta}\, w_{1,\eta}\, w_{1,\xi}) - Rsc^2 (2w_{1,\xi\eta}\, w_{3,\eta}\, w_{1,\eta} + w_{3,\xi\eta}\, (w_{1,\eta})^2)$$

$$+ s^2 c^2 (w_{1,\eta\eta}\, w_{1,\eta}\, w_{3,\eta} + w_{1,\eta\eta}\, w_{3,\eta}\, w_{1,\eta} + w_{3\eta\eta} (w_{1,\eta})^2) \quad \ldots\ldots\ldots (3\text{-}49)$$

The boundary conditions for this last approximation are:

$$w_{5,n} = w_5 = 0 \qquad \text{at } \eta = \pm 1$$

and

$$w_{5,x} = w_5 = 0 \qquad \text{at } \xi = \pm 1 \qquad \ldots\ldots\ldots\ldots (3\text{-}50)$$

which are met if we choose:

$$w_5 = (1-\xi^2)^2 \cdot (1-\eta^2)^2 \; (1-\xi\eta) \; (T_1\eta^2 + T_2\xi^2 + T_3\eta^4 + T_4\xi^4 + T_5\xi^2\eta^2) \qquad \text{..............(3-51)}$$

Using this expression in Eq. (3-49) and equating powers of ξ and η, provide six linear simultaneous equations from which the undetermined coefficients, γ_5, $T_1, \ldots, T_5$ are found.

The above perturbation procedure has provided a means of determining uniquely the coefficients in all the dimensionless load and displacement functions represented by Eqs. (3-27) through Eq. (3-30). From these displacement functions, the principal bending and membrane stresses at any point within the plate boundary can be obtained.

(e) Displacement and Stress Relationships

It is well known that, in the theory of thin flat plates, the bending and membrane stresses can be expressed in terms of the displacements.[1] In terms of rectangular coordinates x and y, these displacements and stress relationships are given by:

$$\sigma_x'' = \frac{-6D}{h^2} \left(w_{,xx} + \nu \, w_{,yy} \right)$$

$$\sigma_y'' = \frac{-6D}{h^2} \left(w_{,yy} + \nu \, w_{,xx} \right) \qquad \text{............... (3-52)}$$

$$\tau_{xy}'' = \frac{6D}{h^2} (1-\nu) \, w_{,xy}$$

$$\sigma'_x = \frac{E}{(1-\nu^2)} \{ u_{,x} + \frac{1}{2}(w_{,x})^2 + \nu [v_{,y} + \frac{1}{2}(w_{,y})^2] \}$$

$$\sigma'_y = \frac{E}{(1-\nu^2)} \{ v_{,y} + \frac{1}{2}(w_{,y})^2 + \nu [u_{,x} + \frac{1}{2}(w_{,x})^2] \} \qquad \ldots\ldots (3\text{-}53)$$

$$\tau'_{xy} = G(u_{,y} + v_{,x} + w_{,x}w_{,y})$$

where σ''_x, σ''_y and τ''_{xy} are the extreme-fibre bending and shearing stresses, σ'_x, σ'_y and τ'_{xy} are the membrance stresses in the middle surface of the plate, and G is the shear modulus.

By means of the transformation Eqs. (4) and, by adding further the following dimensionless ratios for stress, viz.,

the nondimensional bending stresses:

$$S''_x = \frac{\sigma''_x b^2(1-\nu^2)}{Eh^2} \; ; \; S''_y = \frac{\sigma''_y b^2}{Eh^2}(1-\nu^2) \; ; \; S''_{xy} = \frac{\tau''_{xy} b^2}{Gh^2}$$

and, the nondimensional membrane stresses:

$$S'_x = \frac{\sigma'_x b^2}{Eh^2}(1-\nu^2) \; ; \; S'_y = \frac{\sigma'_y b^2}{Eh^2}(1-\nu^2) \; ; \; S'_{xy} = \frac{\tau'_{xy} b^2}{Gh^2} \qquad \ldots (3\text{-}54)$$

Eqs. (25) can be readily expressed in terms of the dimensionless oblique co-ordinates as follows:

$$S''_x = -\frac{1}{2}[R^2\sec^2\theta W_{,\zeta\zeta} - 2R\sec\theta\tan\theta\, W_{,\zeta\eta} + (\tan^2\theta + \nu)\, W_{,\eta\eta}]$$

$$S''_y = -\frac{1}{2}[(1+\nu\tan^2\theta) W_{,\eta\eta} + \nu(R^2\sec^2\theta\, W_{,\zeta\zeta} - 2R\sec\theta\tan\theta\, W_{,\zeta\eta})] \qquad \ldots\ldots (3\text{-}55)$$

$$S''_{xy} = R\sec\theta\, W_{,\zeta\eta} - \tan\theta\, W_{,\eta\eta}$$

$$S_x' = R^2 \sec\theta \, U_{,\zeta} - R \tan\theta \, U_{,\eta} + \nu R \, V_{,\eta} + \frac{1}{2} [R^2 \sec^2\theta (W_{,\zeta})^2$$

$$+ (\nu + \tan^2\theta)(W_{,\eta})^2 - 2 R \sec\theta \tan\theta \, W_{,\zeta} W_{,\eta}]$$

$$S_y' = R \, V_{,\eta} + \frac{1}{2}(1+\nu \tan^2\theta)(W_{,\eta})^2 + \nu \{ R^2 \sec\theta \, U_{,\zeta} - R \tan\theta U_{,\eta} \qquad (3\text{-}56)$$

$$+ \frac{1}{2} [(R W_{,\zeta})^2 \sec^2\theta - 2 R W_{,\zeta} W_{,\eta} \sec\theta \tan\theta] \}$$

$$S_{xy}'' = R \, U_{,\eta} + R^2 \sec\theta \, V_{,\zeta} - R \tan\theta \, V_{,\eta} + W_{,\eta} (R \sec\theta \, W_{,\zeta} - \tan\theta \, W_{,\eta})$$

From these dimensionless bending and membrane stresses, the dimensionless principal stresses can be calculated in the usual manner:

$$S''_{\substack{max \\ min}} = 1/2 \, (S_x'' + S_y'') \pm 1/2 \sqrt{(S_x''-S_y'')^2 + 4(S_{xy}'')^2}$$

$$S'_{\substack{max \\ min}} = 1/2 \, (S_x' + S_y') \pm 1/2 \sqrt{(S_x' - S_y')^2 + 4(S_{xy}')^2} \qquad (3\text{-}57)$$

The solution to the problem was programmed in Fortran for an IBM 1620 . To guard against round-off errors, all computations were carried to 16 significant figures.

(f) Observation and Discussion of Theoretical Results

Deflections (Lateral Displacements):

Results for the small deflection problem, obtained from the first order approximation, are shown in Table 1 for various skew angles and aspect ratios. It can be observed that the results are in close agreement with those obtained by Morley (4) and Kennedy (5). The results were also compared with experimental values obtained recently by the authors (6); the agreement was found to be good with the theoretical results being on the conservative side.

Results for the large deflection problem are shown graphically in Figures 4, 5, and 6, for aspect ratio R = 1/2, 2/3, and 1 respectively. To exhibit the difference between the linear and non-linear behaviour, results based on the small deflection theory are shown plotted in the above-mentioned figures.

For a given aspect ratio R, each of the Figures 4, 5, or 6 shows that the maximum deflection at the centre of the plate decreases with an increase in the skew angle. A similar observation can be made regarding deflections governed by the small deflection theory. (See also Table 1). This is due mainly to the increased rigidity of the obtuse corners with increase in skew, thus reducing the central deflection.

Furthermore, comparison of results for different aspect ratios R, indicates that the effect of skew on the central deflection decreases with decreasing R; this is expected since the influence of the plate corners on the central deflection diminish with decreasing R.

TABLE I. COEFFICIENTS w FOR MAXIMUM SMALL DEFLECTION AT CENTER FOR VARIOUS SKEW ANGLES AND RATIOS OF SIDES

$R = b/a$ $$W_{max.} = w \frac{b^4 q}{D} (10)^{-2}$$

Skew Angle θ	R = 1		R = 0.8		R = 0.667		R = 0.5	
	Present Method	Reference [5]	Present Method	Reference [5]	Present Method	Reference [5]	Present Method	Reference [5]
15°	1.797	1.793 1.792*	2.583	2.576 2.581*	3.123	3.093 3.098*	3.616	3.536 3.552*
30°	1.219	1.181	1.760	1.699 1.792*	2.096	2.050 2.081*	2.400	2.352 2.320*
45°	0.549	0.508	.791	.735	0.951	0.896 0.997*	1.088	1.056 1.040*
60°	0.128	.120	.186	.175	.230	0.216	.275	.259
75°	.00864	.00826	.0127	.0121	.0160	.0150	.0195	.0182

* Values obtained by Morley (4)

Results from the present method of solution are compared to those obtained by Way (2) for rectangular plates with small and large deflections, Figures 4, 5, and 6. Excellent agreement is shown for the small deflection results for all the aspect ratios considered, and for the large deflection results for aspect ratio R = 1/2; whereas for R = 2/3 and R = 1, the agreement is not as close, the difference not exceeding 5% for R = 1 and a dimensionless uniformly distributed load of 200. This discrepancy can be explained by the fact that the expressions assumed here for the displacement components, u, v, and w provide polar symmetry only in contrast to the rectangular plate where quadrant symmetry is required. The effect of this difference in symmetry on the behaviour of the plate under load seems to increase with increase in the aspect ratio R.

Figures 4, 5, and 6 also indicate that results obtained from small deflection and large deflection theories are sensibly the same when the central deflection is small compared to the thickness of the plate. However, the ratio, w_{max}/h at which the results from the two theories begin to deviate significantly is influenced by the aspect ratio, R = b/a. For example, Figure 4 (R = 1/2) shows that a distinct deviation between the small and large deflection results occurs when w_{max}/h exceeds a value of approximately 0.4; whereas Figure 5 (R = 2/3) and Figure 6 (R = 1) show such deviations occurring at ratios w_{max}/h approximately equal to 0.35 and 0.22 respectively. Thus we may conclude that the ratio w_{max}/h , at which

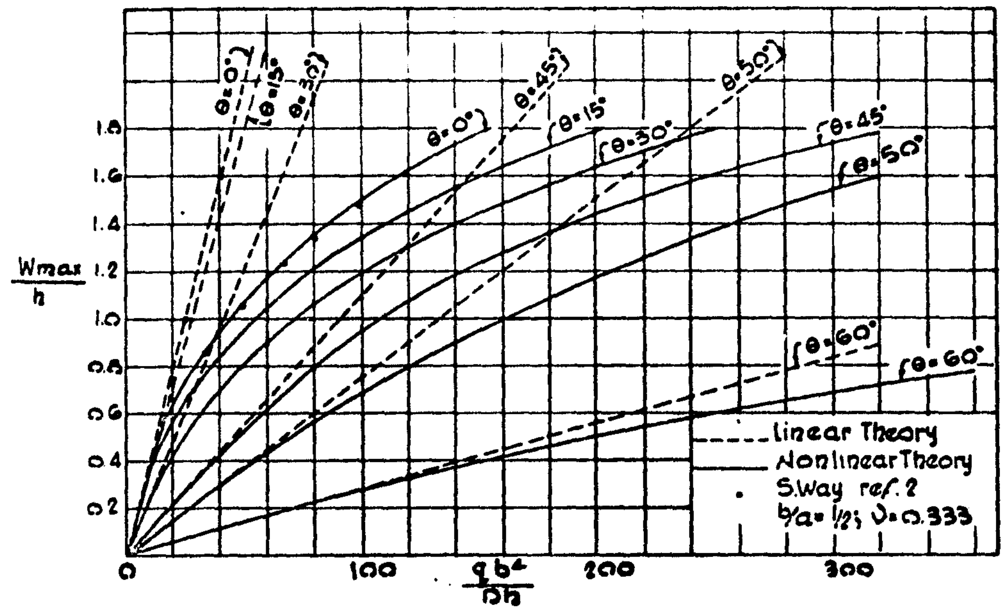


Fig. 4. Variation of Centre Deflections with Skew for Aspect Ratio = 1/2

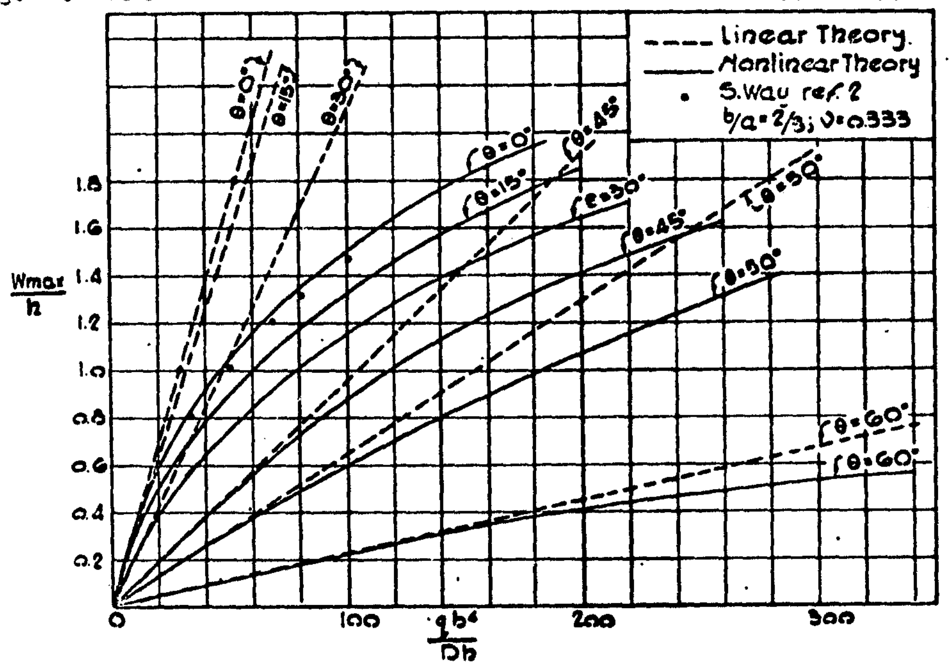


Fig. 5. Variations of Centre Deflections with Skew for Aspect Ratio =2/3.

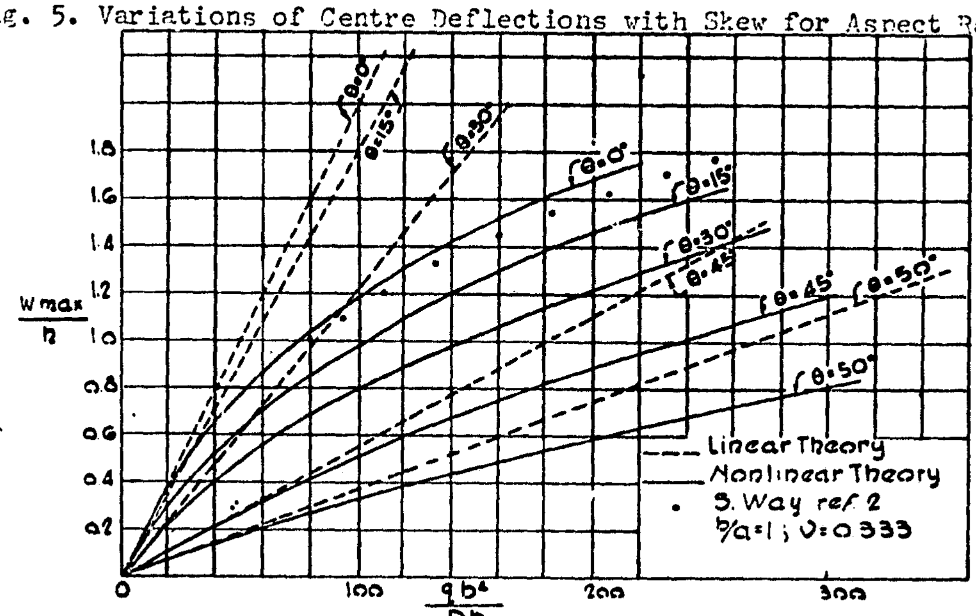


Fig. 6. Variation of Centre Deflection with Skew for Aspect Ratio = 1.

marked deviations of results from the two theories occur, decreases with increasing aspect ratio, R. It may be added also that the above w_{max} /h ratios do not appear to be sensitive to changes in the skew angle. In general, as the load on the plate is increased, the effect of the membrane forces on the deflection of the plate also increases, thus substantially reducing the lateral deflection as observed from Figures 4, 5, and 6.

The influence of the nonlinear terms on the deflection appears to diminish with increase in skew. Thus, for any given aspect ratio, the large deflection curves tend to become increasingly linear for large angles of skew.

Bending and Membrane Stresses:

Variations of the maximum principal bending and membrane stresses, at the edge and centre of the plate, with maximum centre deflection are shown in Figures 7 through 12 for several aspect ratios and skew angles. For the limiting case of zero skew ($\theta = 0^\circ$) and all the aspect ratios considered, the edge bending stresses are in close agreement with those obtained by Way (2). However, the corresponding membrane edge stresses reported by Way are approximately 30% higher. This discrepancy is probably due partly to the approximations in Way's energy solution, noted also by Timoshenko (1), and partly to the difference in symmetry existing between the skew and rectangular plate problems.

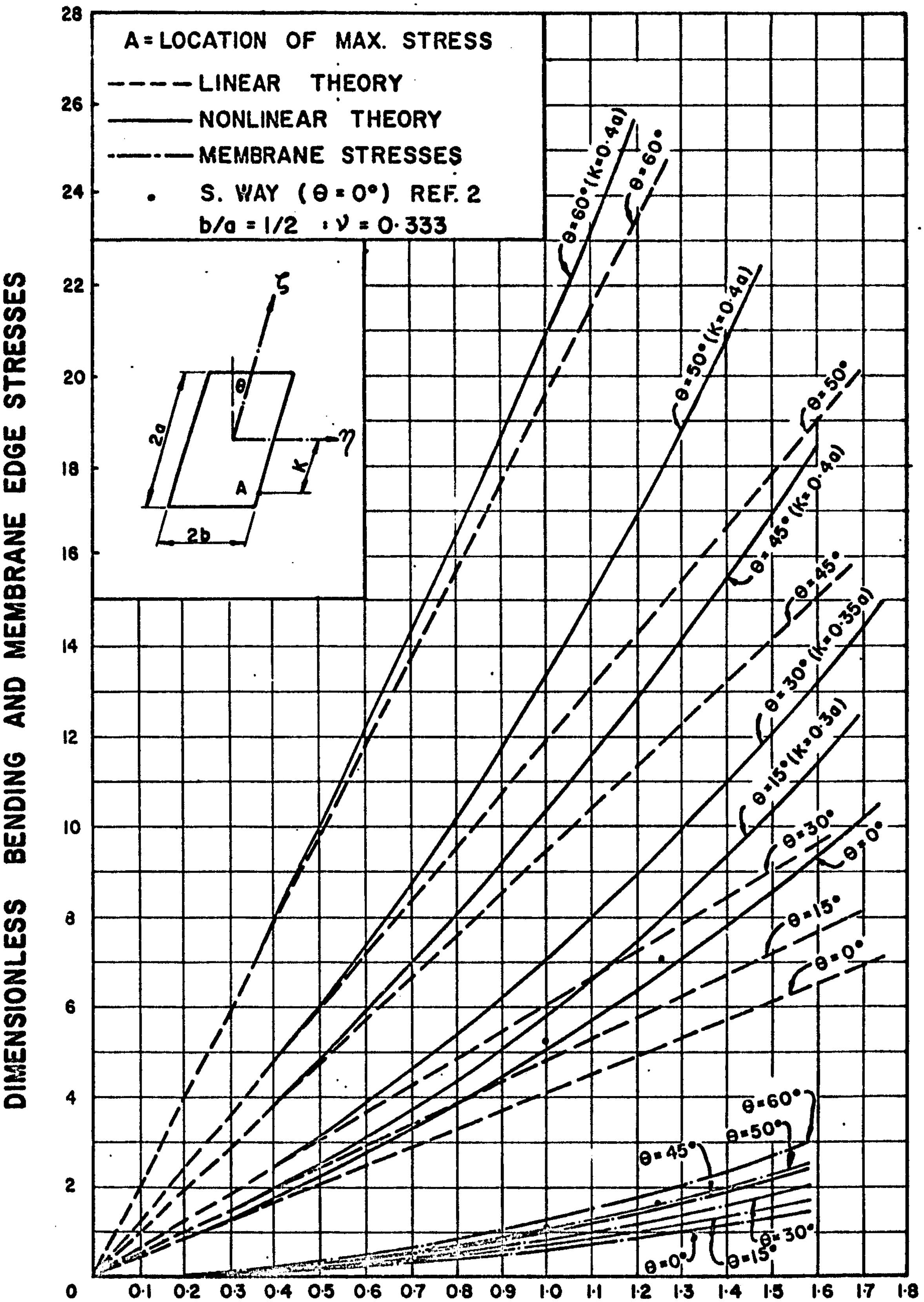


Fig. 7. Variations of Bending and Membrane Edge Stresses with Centre Deflections for Aspect Ratio b/a = 1/2

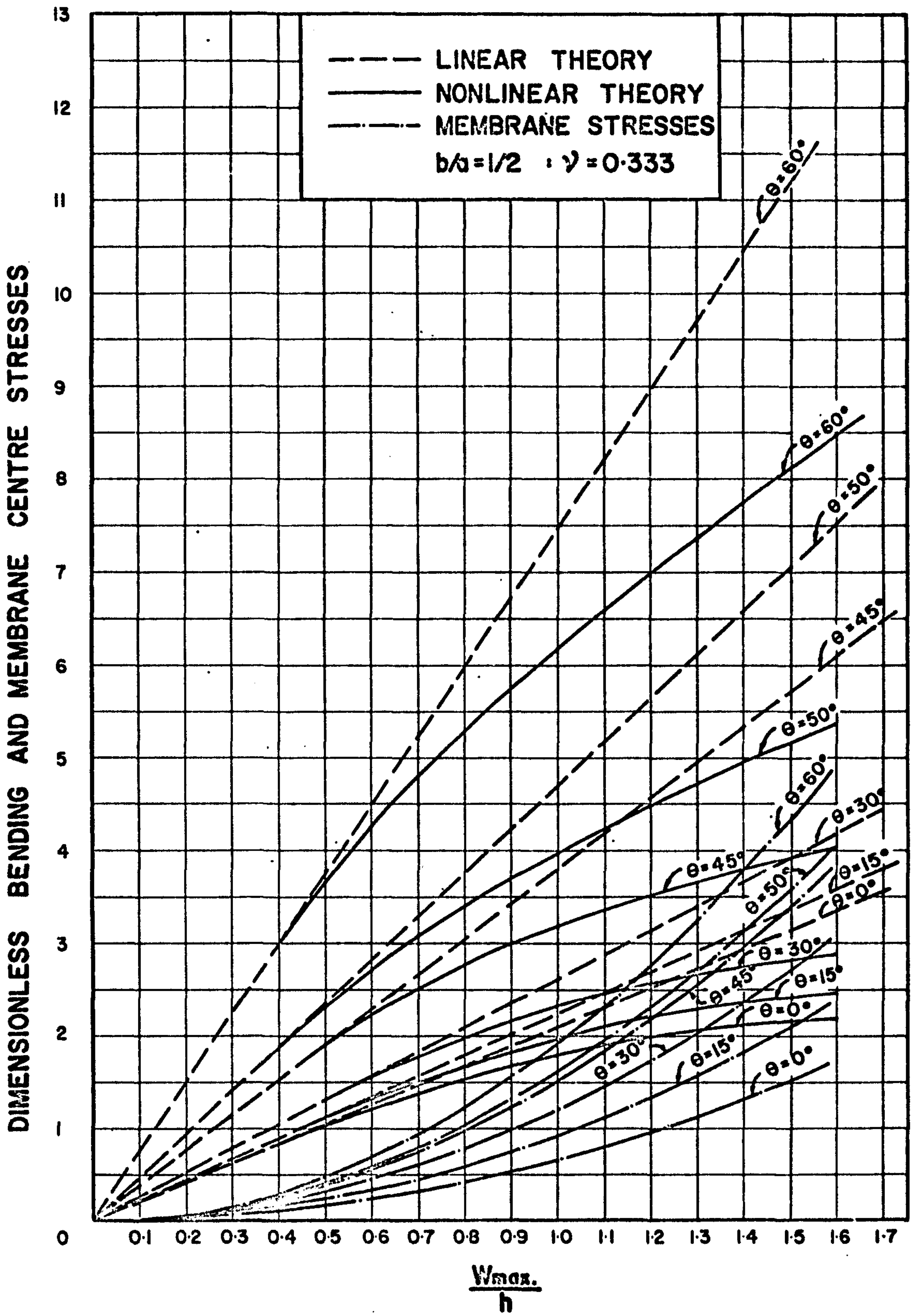


Fig. 8. Variations of Bending and Membrane Stresses at Centre of Plate with Centre Deflections for Aspect Ratio b/a = 1/2

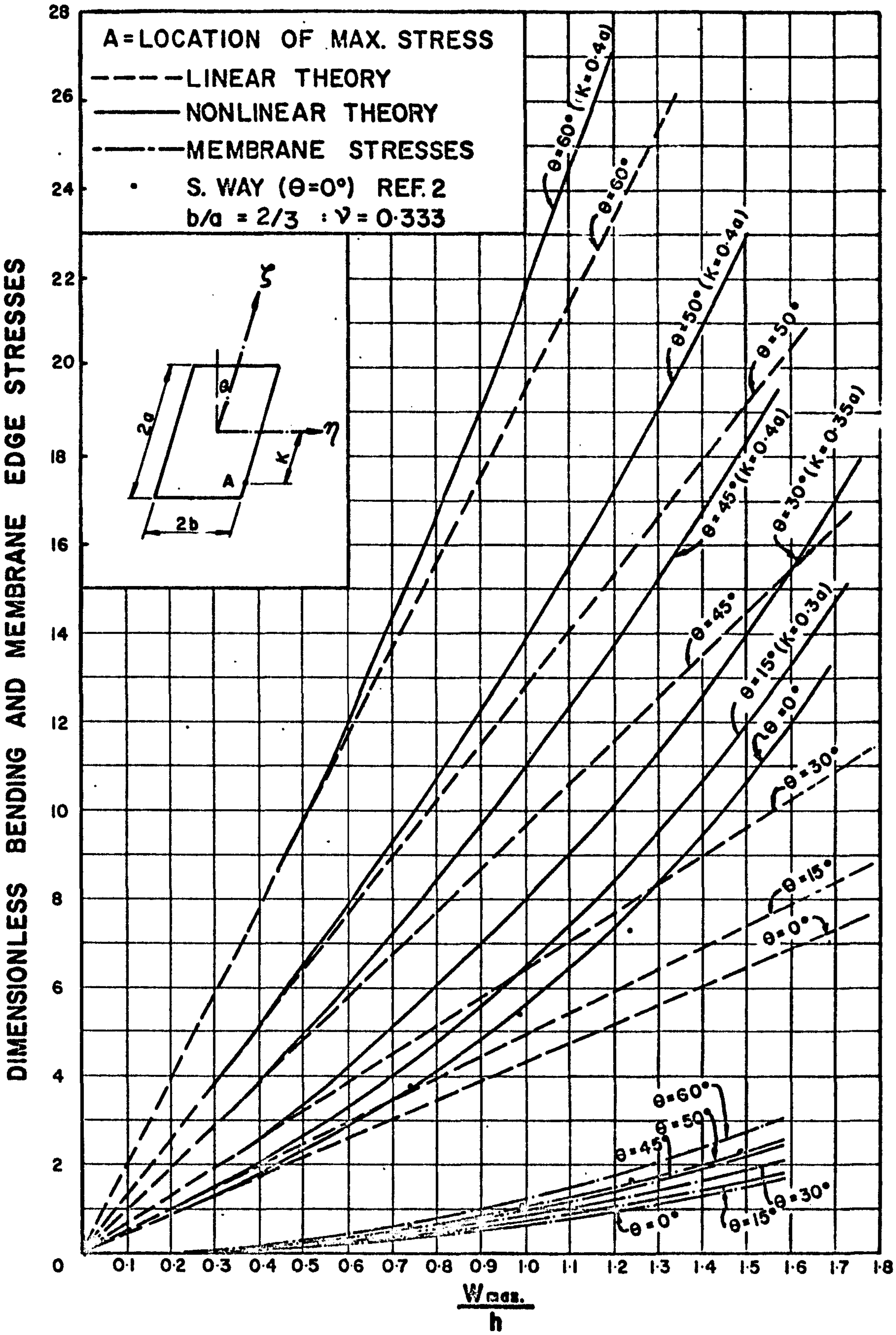


Fig. 9. Variations of Bending and Membrane Edge Stresses with Centre Deflections for Aspect Ratio b/a = 2/3

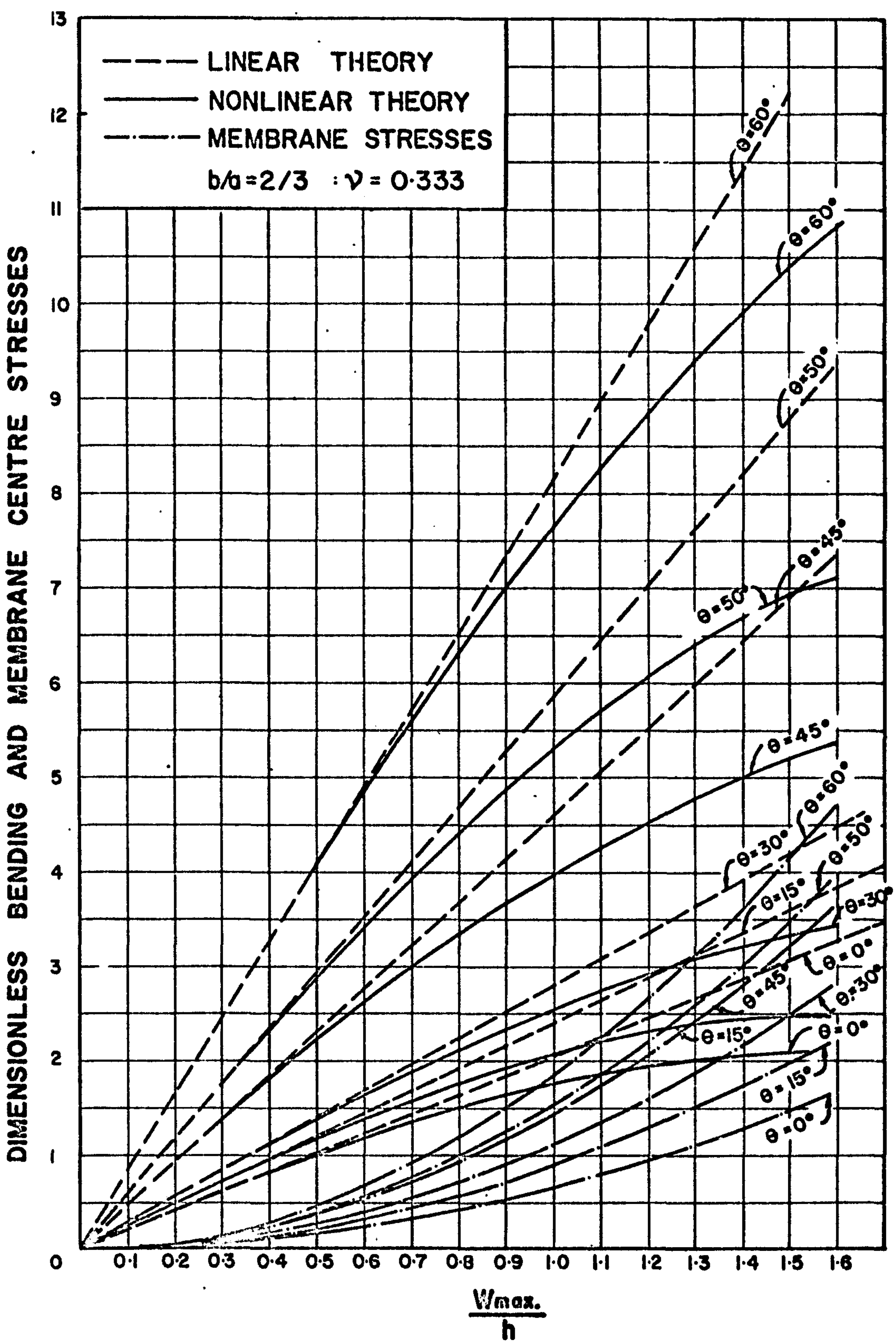


Fig. 10. Variation of Bending and Membrane Stresses at Centre of Plate with Centre Deflections for Aspect Ratio b/a = 2/3

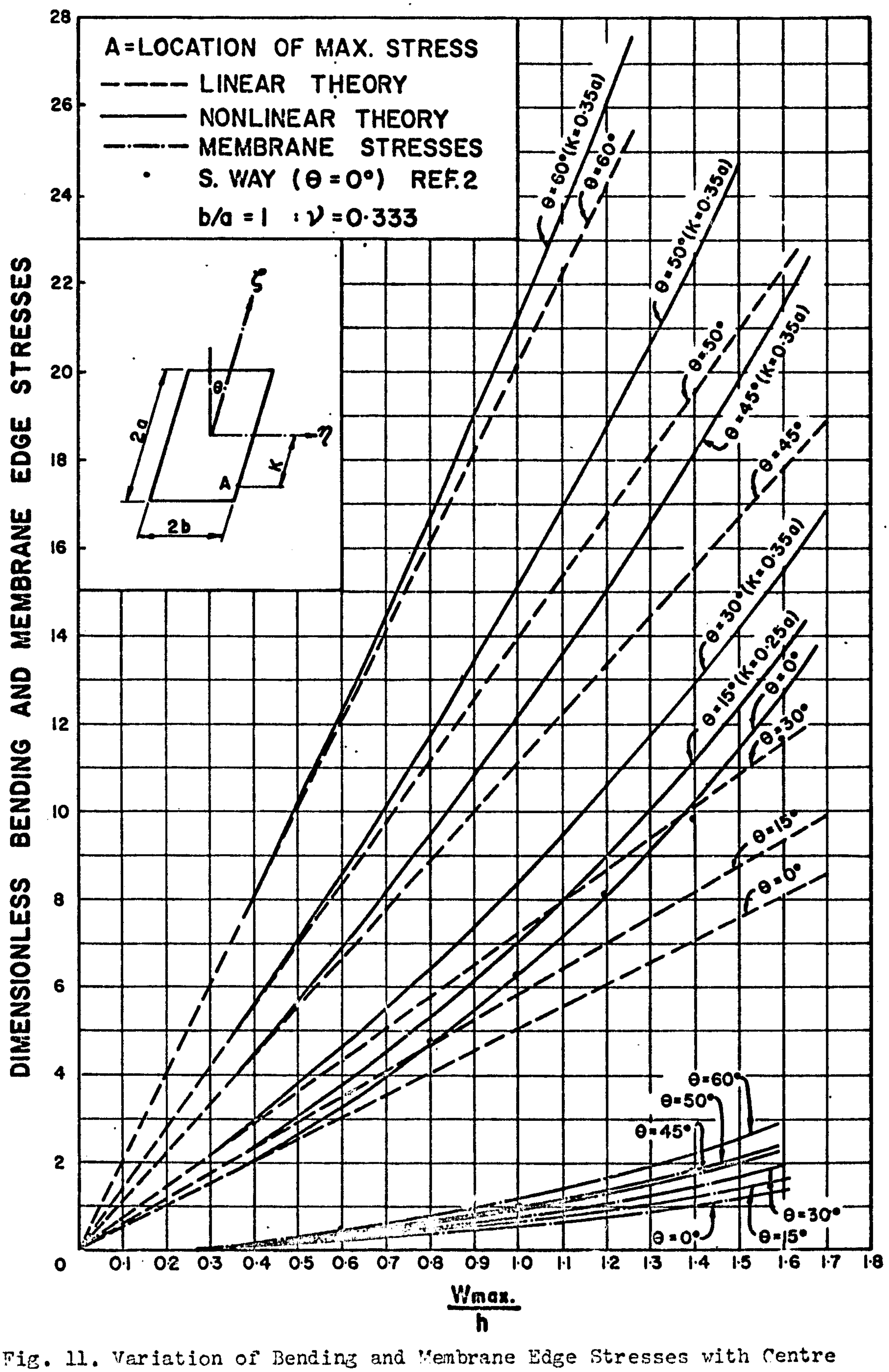


Fig. 11. Variation of Bending and Membrane Edge Stresses with Centre Deflection for Aspect Ratio b/a = 1

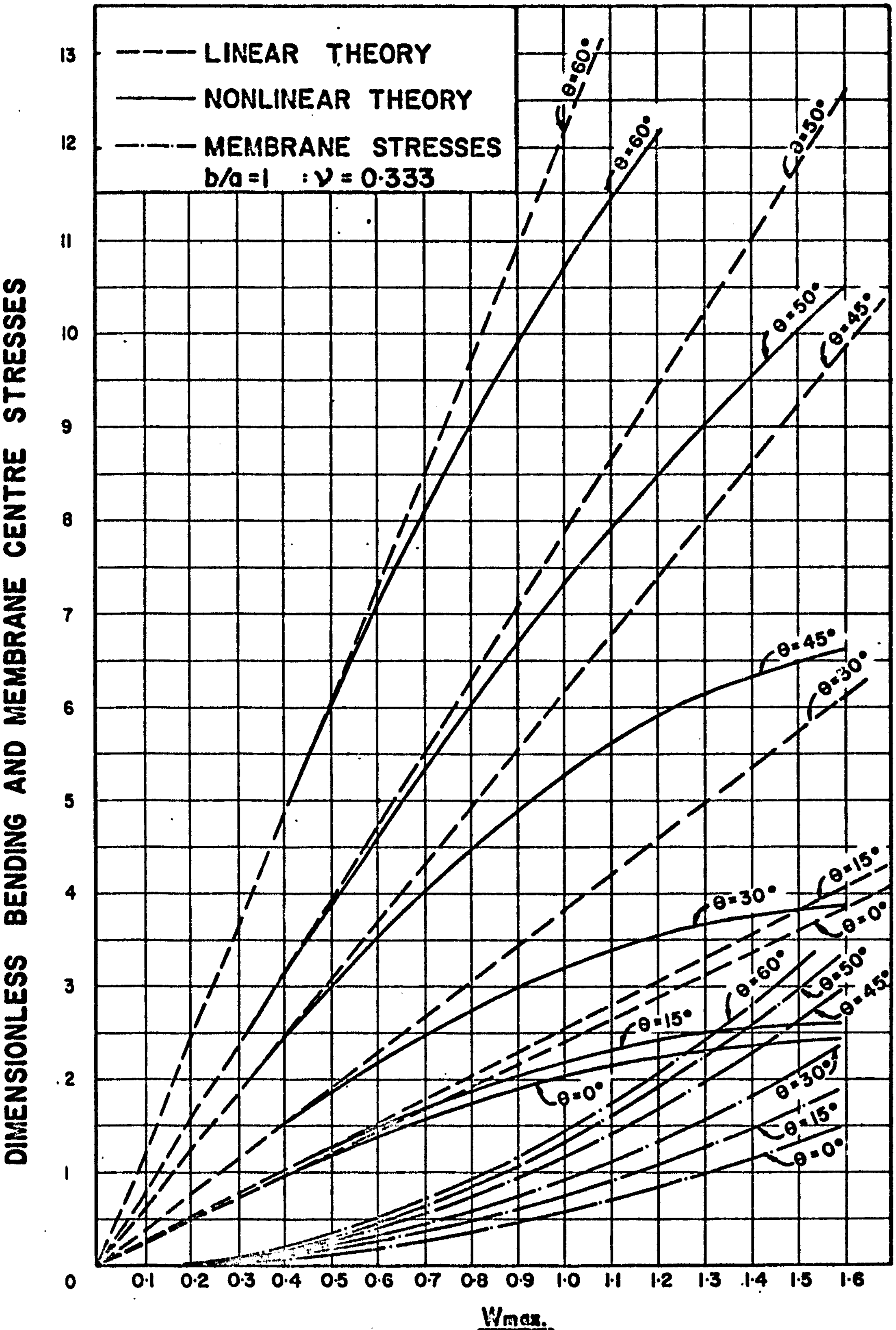


Fig. 12. Variation of Bending and Membrane Stresses at Centre of Plate with Centre Deflection for Aspect Ratio b/a = 1

Inspection of Figures 7 through 12 indicates that the maximum resultant or total stress occurs along the longer edge of the plate. The location of this resultant stress is invariably displaced towards the obtuse corners, and increasingly so with higher skew. It can also be observed from the above figures that, for a particular lateral displacement at centre, both the maximum edge and centre stresses increase with increasing skew; this is to be expected since more load is required to produce the same lateral centre displacement in a plate with a large skew than one with a small skew.

For different values of skew and aspect ratio considered, the curves representing the bending and membrane stresses are sensibly linear up to a point where the ratio w_{max} /h is between 0.35 and 0.40. This observation confirms the generally accepted criterion as to the limit of applicability of the small deflection theory.

Although the maximum membrane stresses along the edge and at the centre do increase with skew, they are relatively insensitive to changes in the aspect ratio, R. For any particular plate geometry the membrane stresses at the centre are invariably larger than those along the edge. However, for the entire combinations of independent variables considered, the magnitude of the membrane stresses is quite small when compared with the maximum resultant stresses along the longer edge of the plate.

(g) Convergence of the Results:

Although the convergence of the perturbation method has not been fully and rigorously clarified (25) (26), the method has been used successfully in solving many practical problems. Invariably, when the method was employed in solving plate problems, approximations beyond the third were not considered, mainly because of the formidable computational labour entailed. However, due to the restrictive symmetry of the problem treated herein, approximations up to and including the 5th were considered to obtain the results reported. It should be mentioned that in some cases with skew angles as high as 60°, the 5th order approximations were discarded, since with their inclusion the results began to diverge. The convergence and divergence of series solutions used in perturbation methods are fully discussed by Van Dyke (26). To illustrate the convergence, typical values for γ, in Equation (3-27), are given below:

For

$R = 1/2$, $\theta = 15^{\circ}$: $\gamma_1 = 27.654$, $\gamma_3 = 25.274$, $\gamma_5 = 0.792$

$R = 1$, $\theta = 45^{\circ}$: $\gamma_1 = 181.149$, $\gamma_3 = 38.745$, $\gamma_5 = 15.253$

(h) Plastic Analysis

As a result of foregoing theoretical analysis, it has been found that the maximum principal stress of a clamped skewed plate occurs along the longer edge of the plate and is displaced towards the obtuse corners (Figures 7, 9, and 11.) This maximum principal stress acts perpendicular to the edge of the plate and increases with increasing lateral centre deflection. When the yielding stress of the plate material is reached, the bending strength at the edge would break gradually.

The condition of yielding along the edge can be computed most simply by following the assumptions of the von-mises-Hencky theory of plastic failure. If σ_1, σ_2, and σ_3 are the principal stresses in the three perpendicular directions, the yielding condition is (23):

$$(\sigma_1 - \sigma_2)^2 + (\sigma_2 - \sigma_3)^2 + (\sigma_3 - \sigma_1)^2 = \ldots\ldots\ldots\ldots\ldots \quad (3\text{-}58)$$

Where E_o is the yielding stress in simple tension.

At the edge of the plate, we may identify σ_1, the maximum principal stress perpendicular to the edge of the plate as σ_x, and σ_2, the principal stress paralled to the edge of the plate as σ_y; and, due to the assumption of plane stress (assumption 2), σ_3 in the von Mises equation is neglected and Equation (3-58) is reduced to :

$$\sigma_x^{2} - \sigma_x \sigma_y + \sigma_y^{2} = E_o^{2} \quad \text{...............(3-59)}$$

Using equations (3-18) and (3-19) and recalling that the boundary conditions at the longer edge of the plate are:

$$w_{,x} = w_{,n} = w_{,y} = v_{,y} = 0 \text{ at } \quad = \pm \ 1 \quad \text{......(3-60)}$$

we have,

$$\sigma_x = \frac{E}{(1 - \nu^{2})} u_{,x}$$

$$\sigma_y = \frac{E}{(1 - \nu^{2})} \nu \, u_{,x}$$

or

$$\sigma_y = \nu \sigma_x \quad \text{.................................(3-61)}$$

Putting Equation (3-61) into Equation (3-59) and, after simplification, the yield condition at the edge of the plate on the convex side is obtained:

$$\frac{E_o \, b^2 \, (1 - \nu^{2})}{E \, h^2} = \sqrt{(1 - \nu + \nu^{2})} \quad (S''_{max} + S'_{max}) \text{...(3-62)}$$

This equation for the yield condition is plotted for aspect ratios R = 1/2, R = 2/3, and R = 1 respectively for various skew angles in Figures 13, 14, and 15.

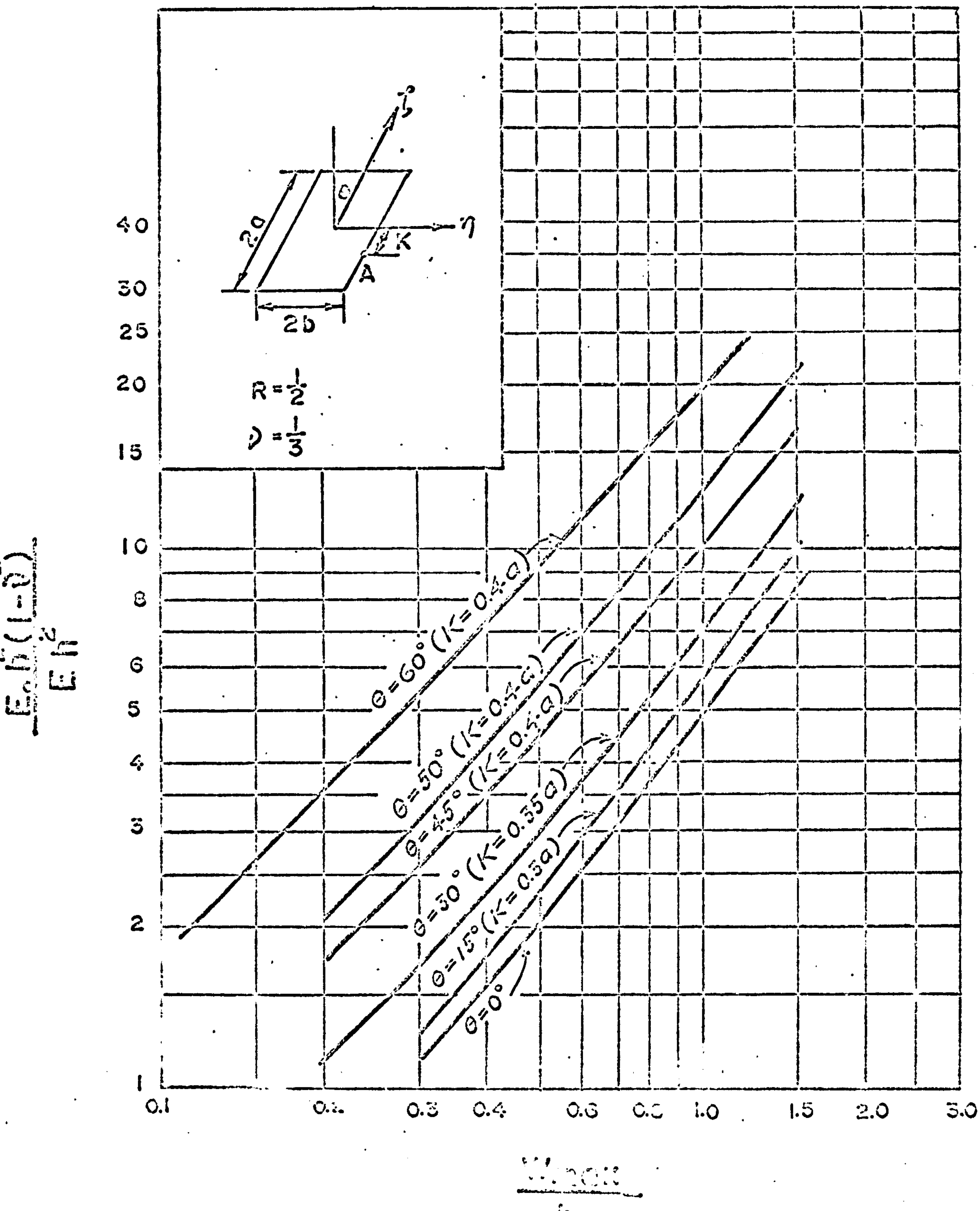


Fig. 13. Initiation of Yield at A for Various Skew Angles for Aspect Ratio b/a = 1/2

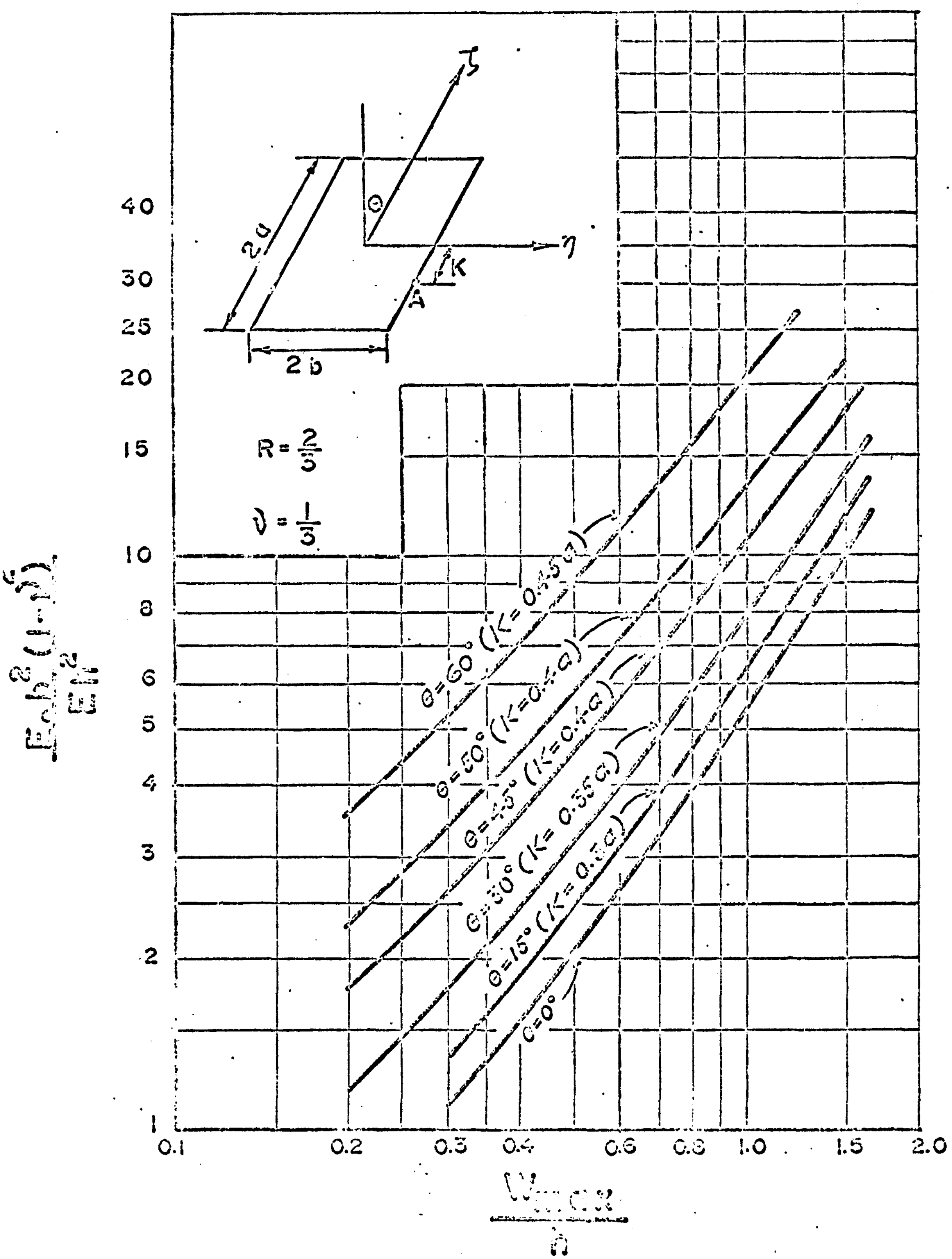


Fig. 14. Initiation of Yield at A for Various Skew Angles for Aspect Ratio b/a = 2/3

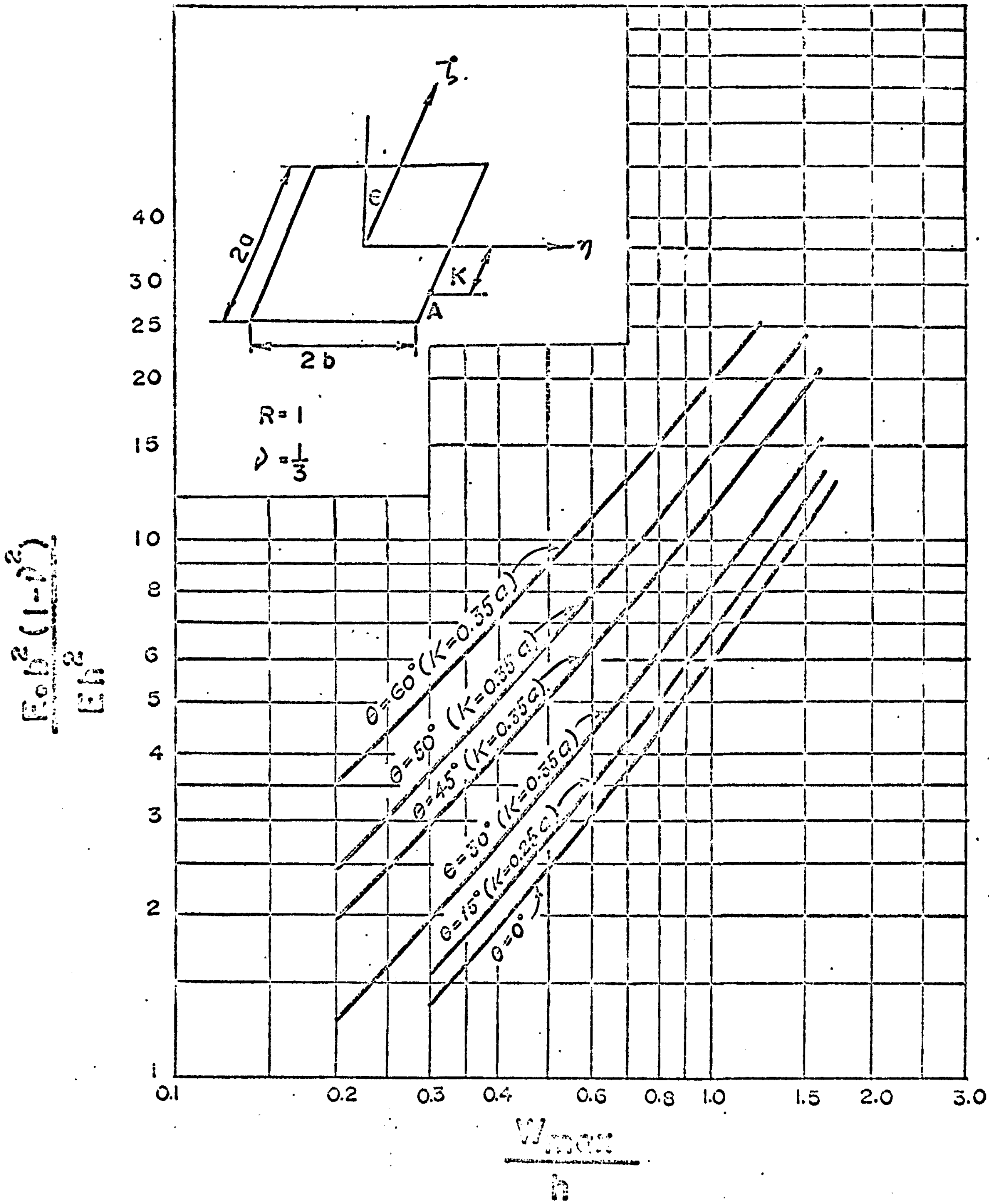


Fig. 15. Initiation of Yield at A for Various Skew Angles for Aspect Ratio b/a = 1

From these figures, it can be seen that, apart from the elastic and plastic properties of the plate material, the initiation of the yield condition in a clamped skewed plate depends largely on the angle of skew and is rather insensitive to changes in the aspect ratio R of the plate. For skewed plates with a given plate material, aspect ratio and oblique dimensions, the yielding occurs at a much lower dimensionless centre deflection ratio w_{max} / h for large skew angles than it is with small skews. This is to be expected since, for a given aspect ratio R, the maximum stress of the plate increases with the angle of skew for a particular dimensionless centre deflection w/h (Figures 7, 9, and 11). Due to the assumptions on which the large deflection equations (3-20),(3-21),(3-22) are based, the results from this analysis are applicable only to those skewed panels where the plate material has a very low yield strength so that yielding occurs in a region where the von Karman equations are still valid ($w_{max} / h \leq 2$).

CHAPTER IV

EXPERIMENTAL ANALYSIS

(a) Materials and Apparatus

Four aluminum alloy (24) 6061-T6 skewed panels were tested. The aspect ratio, skew angle, thickness and dimensions of these test panels are given in Table 2. A total of 18 metal-foil strain rosette gauges were installed on each panel, equally divided between the top and bottom surfaces of each test plate. All these rosette gauges are of the 3-gauge 45° rectangular type, having a gauge factor of 2.05 and a resistance of 120 ohms. Since the stress gradient near the edges of the plate is expected to be high, all the rosette gauges installed near the edge of the plate have a gauge length of 1/16 in. For gauges installed near the centre portion of the plate, gauges of gauge length 1/8 in were used. Terminal strips (type T-50) were used to connect the lead wires to the gauge tabs. All the lead wires are sixteen feet long, made of No. 26 stranded copper wire and with vinyl insulation. To provide mechanical protection and water-proofing, all gauges after installation were covered with gauge coat No. 1 (synthetic resin compound), gauge coat No. 2 (nitrite rubber) and gauge coat No. 5 (a two-component rubber epoxy resin)

A skewed frame left over from a previous experiment (7) on skewed plates was re-used as the supporting structure. The

Table 2. Geometries of test plates

	Panel 1	Panel 2	Penel 3	Panel 4
2b, in.	26	26	20	20
2a, in.	52	52	30	30
θ, degree	50	50	30	30
h, in.	0.125	0.0625	0.0625	0.125

Table 3. Location of rosette gauges in inches

Point	Panels 1 and 2		Panels 3 and 4	
	α	β	α	β
A	-11.0	12.6	-5.25	9.6
B	0.0	12.6	0.0	9.6
C	0.0	0.0	0.0	0.0
D	-25.0	12.6	-14.0	9.6
E	-13.0	0.0	-7.5	0.0
F	-25.0	11.5	-14.0	8.5
G	-25.0	-12.6	-14.0	-9.6
H	-24.0	12.6	-13.0	9.6
I	11.0	-12.6	5.25	-9.6

frame was made from four standard steel channels twelve inches deep and weighing 20.7 pounds per foot. To increase the rigidity of the skew frame, 1/4 in. thick vertical stiffeners were welded to the channels and were spaced approximately six inches apart. The plate and channel assembly was then seated on steel angles which were in turn bolted to heavy structural posts.

To assimulate the built-in condition, the aluminum test plate was sandwiched between the flange of the channels and a 1 in. thick cold-rolled steel cover plate, 3 inches wide. The test panels were all cut in such a way so as to provide a clamping edge of three inches while the flange width of the channel was also three inches. Heavy structural erection clamps were used to clamp down the edges of the plate. These clamps are spaced approximately three inches apart centre to centre.

For tests within the elastic limit, the 1/16 in. thick plate models 2 and 3 required relatively low pressures and hence, for these two models, the uniformly distributed load was provided hydrostatically. In this connection, for each plate model, a one-foot tall wooden tank having the same dimensions and skew as the plate model was made and a waterproof sheet of polyethylene material lined the inside of the wooden tank and test plate.

Plate models 1 and 4 are relatively thick and hence to exhibit large deflection behaviour, a high intensity of lateral uniform pressure was required. For each of these plate models, a 1/4 in. thick plate was used together with leather gaskets to form an airtight connection. Air presser was used to provide the uniformly distributed load, this presser being regulated and recorded by means of two pressure gauges, one placed at the entrance to the test plate, the other in the vicinity of the centre of the plate. Similar experimental set-ups using air as a loading medium were also used for yield tests on plate models 3 and 4.

During the test , the strains were measured by means of three switch and balancing units(model C-10T and C-10 LTC, Budd Instrument Division), a digital strain indicator and an automatic print out unit (photograph A) which can print out strains in micro-inches per inch at all gauge locations for the different intensities of loadings. Dial indicators which permitted the measurement of lateral deflections in one-thousandth of an inch were installed at the bottom of the plate to measure the deflection of the centre and quarter points of each test plate. To clarify the description of the aforementioned apparatus and the general set-up of the experiments, photographs were taken and are included on pages 57 and 59 .

(b) Procedures and Results

For each of the four plate models, the plate was first cut to the required dimensions and skew, leaving three inches all around for clamping purposes. The plate was then cleaned with acetone and the locations for both the top and bottom surface gauges laid with reference to the oblique co-ordinates α and β (Fig. 3). In order to ascertain the magnitude of the membrane stresses, care was taken to ensure that all the top gauges are in proper alignment with the corresponding gauges at the bottom of the test plate. The co-ordinates of the gauge locations are given in Table 3. The installation of these rosette gauges followed a set procedure. The spot where the rosette was to be placed was first wiped clean with acetone and then sanded with a metal conditioner using silicon carbide paper. The exact location of the gauge was then marked and then cleaned in turn first with a metal conditioner and then with a neutralizer. With the rosette and the terminal strip properly lined Eastman 910 cement was applied to cement the assembly onto the plate. The gauge and terminal were then left to dry for approximately one minute during which time pressure was applied to the gauge by means of the thumb. The installation of both ends of the lead wires was next stripped and the bare copper strands twisted. Each lead wire consisted of three copper strands, one strand was soldered to one tab of the terminal strip while the other two strands were twisted together and soldered to the other tab of the terminal. The tabs of the terminal strip were then connected in turn with the tabs of the gauges by means of thin copper jumper wires. After the lead wires were soldered into position, the gauge is then covered with gauge coats for waterproof and mechanical protection. Photographs B and D show a clear picture of some of the gauges completely installed on the plate models.

The skewed supporting structure was next prepared by first cutting the standard steel channels to the required dimensions and skew as the test plate and then welded and seated onto four heavy structural posts (photograph C). Each test plate with all the rosette gauges installed on both the top and bottom surfaces was then placed on top of the skewed supporting frame with the edges of the plate sandwiched between the flanges of the steel channels and a one inch thick cold rolled steel cover plate. A 1/4 in. thick plate cut into the same skew and dimensions as the plate model was in turn laid on top of the cold-rolled steel cover plate and the entire edge assembly was then clamped by closely spaced special structural clamps; allowance was made here to have clamps placed closer together near the corners of the plate. All four edges of the plate model were made airtight by inserting thin leather gaskets both immediately above and below the edges of the test plate. Compressed air, regulated and measured by means of two Bourdon type gauges was used to provide the uniform lateral pressure (photograph C).For plate models 1 and 4 with plate thickness equal to 1/16 in., a relatively low pressure was required to produce the desired centre deflection and hence for these two models, hydrostatic pressure was used to provide the uniformly distributed load

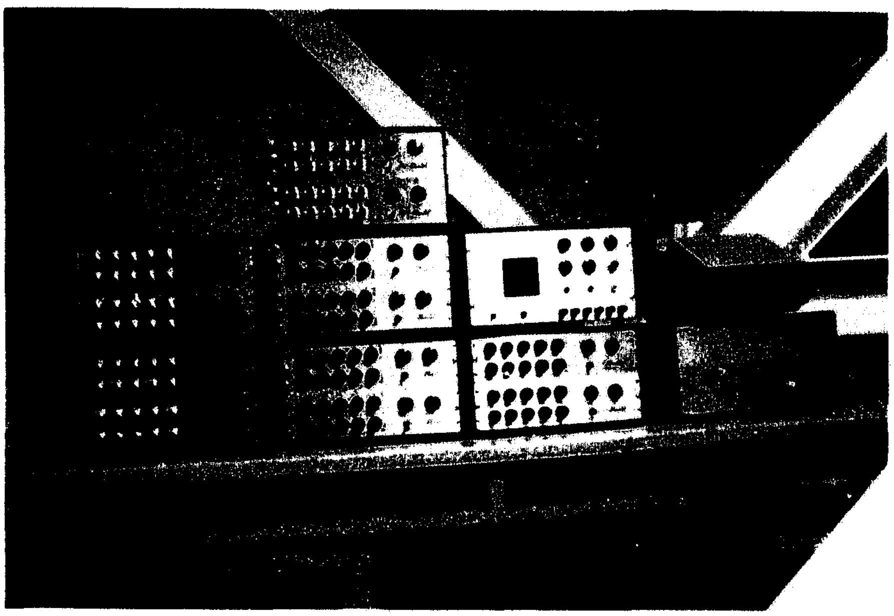
Next, gauge lead wires from the rosette gauges were soldered to ten 5-channel receptacles especially provided for the three switch and balance units. Unit strains for different intensities of loadings were automatically recorded by a precise digital strain indicator and printer.

To allow a direct measurement of the lateral deflections, four dial indicators graduated in one thousandth of an inch were installed for each plate model in locations previously marked on the bottom of the plate. The locations of these dial indicators in terms of the oblique co-ordinate axes α and β are tabulated in Table 4.

Three independent tests were performed on each of the four plate models loaded within the elastic limit with test data obtained for both loading and unloading. All experimental results for deflection and principal stresses reported herein represent an average value of these tests. To avoid the tedious task of copying the experimental results , strain readings from the digital indicators were photographically reduced and are included in Appendix B. Test data for experimental lateral deflections of each plate model recorded by means of the dial indicators are also reported in the same Appendix.

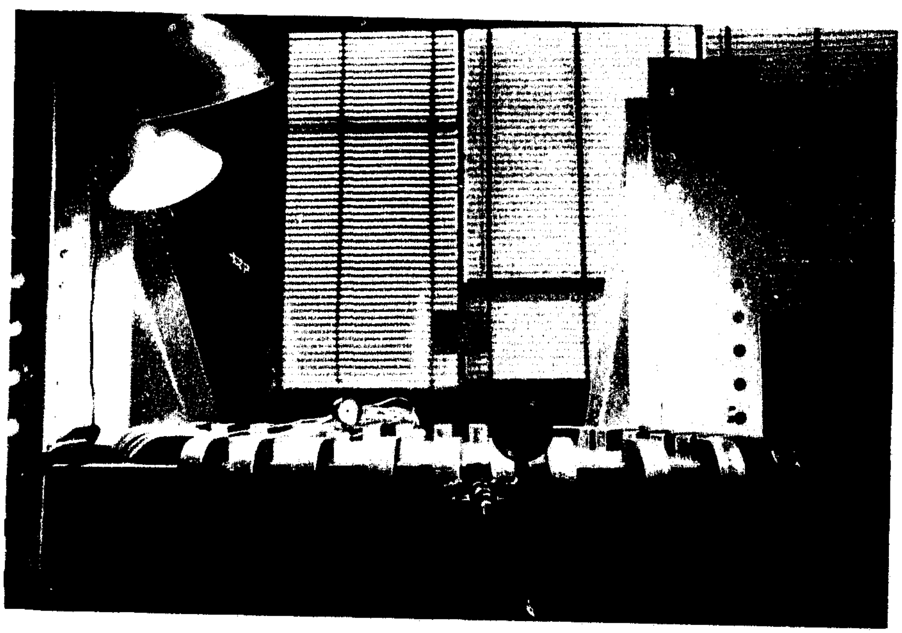
Table 4. Location of Dial Indicators (in.)

Dial Gauge	Panels 1 and 2		Panels 3 and 4	
	α	β	α	β
1	0.0	0.0	0.0	0.0
2	13.0	-6.5	5.0	-7.5
3	-13.0	6.5	-5.0	7.5
4	13.0	6.5	5.0	7.5

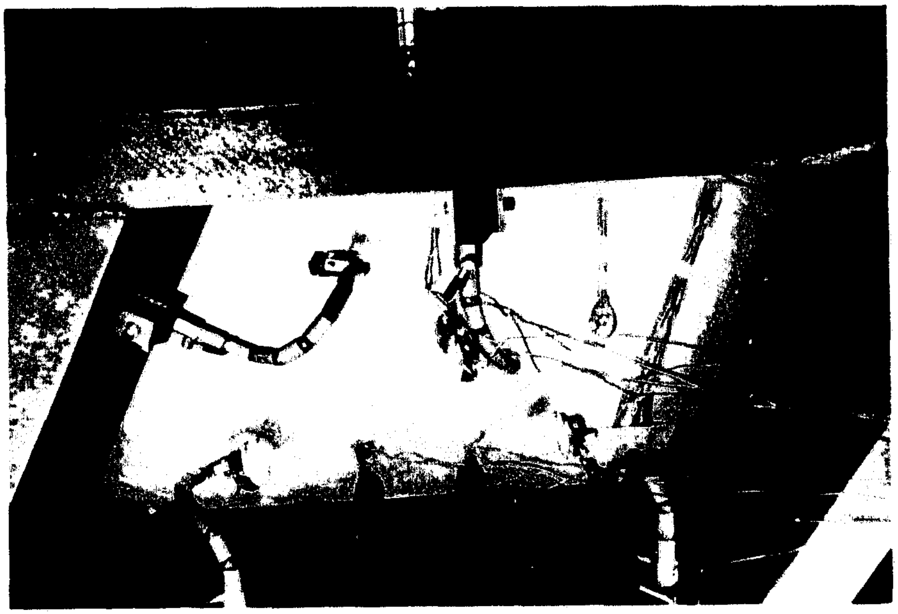


Photograph A. Digital Strain Indicator and Automatic Print-out Device

Photograph B. Test Plate Permanently Deformed after Yield Test.



Photograph C. Photograph showing air-tight Chamber and Supporting Structure.



Photograph D. Bottom View of Test Plate showing Dial Indicators in position

From the values of unit strains e_a, e_b, and e_c obtained from each rosette gauge, the principal stresses can be obtained in the usual manner:

$$\sigma_{max} = \frac{E}{2}\left(\frac{e_a + e_c}{(1-\nu)} + \frac{1}{1+\nu}\sqrt{2(e_a - e_b)^2 + 2\,(e_b - e_c)^2}\right) \quad \ldots\ldots (4\text{-}1)$$

$$\sigma_{min} = \frac{E}{2}\left(\frac{e_a + e_c}{(1-\nu)} - \frac{1}{1+\nu}\sqrt{2(e_a - e_b)^2 + 2\,(e_b - e_c)^2}\right) \quad \ldots. (4\text{-}2)$$

To facilitate the computation of principal stresses from the unit strains, a small programme in Fortran was written and is included in Appexdix A.

(c) Comparison and Discussion of Experimental and Theoretical Results

Deflections (Lateral displacements)

Experimental and theoretical results for the centre deflections of the four test panels are plotted in Figure 16. From this figure, it is noted that, for low intensities of the uniformly distributed lateral pressure, the agreement between the theoretical and experimental values is excellent. However, as the lateral pressure increases and the centre deflection exceeds the thickness of the test plate, the measured experimental centre deflection starts to deviate from the theoretical values. This deviation may be due to a slight slippage of the test plate taking place at the edges of the test model, with the result that the experimental deflections range from 4-8 % higher than those predicted analytically. Since the ideal theoretical clamping conditions assumed in the analytical solution can never be realized in practice, this discrepancy between the experimental and theoretical values in the lateral displacement of clamped plates will always exist and must be taken into account in the design of such plates.

The variation of the plate thickness does not seem to affect appreciably the deflection pattern of the plate models as deflection measurements from test plates 1 and 2 (or test plates 3 and 4) do not differ significantly.

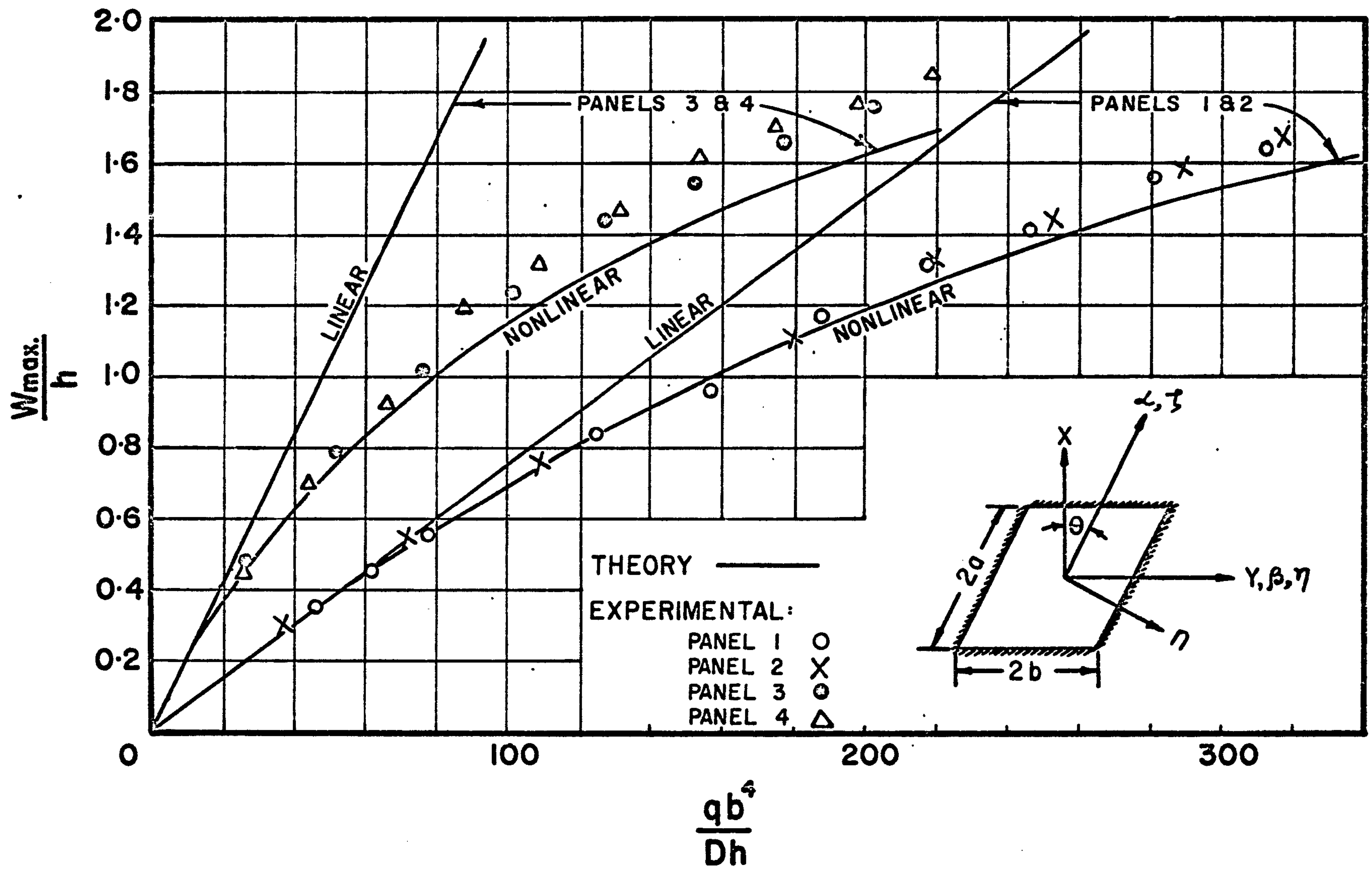


Fig. 16. Comparison of Experimental Centre Deflections with Theory.

Total Principal Stresses

Figures 17 and 18 show comparisons between the theoretical and experimental maximum total principal edge and centre stresses for panels 1 and 2 and 3 and 4, respectively. The agreement is quite good, with the theoretical predictions invariably on the conservative side. Here the degree of skew does affect the closeness of the results since with a high skew of 50° (Figure 17) the results from the 1/16 inch plate is shown to be closer to theory than those from a panel with the same thickness but with a moderate skew of 30° (Figure 18). Analytical results based on the linear theory are shown for comparison.

Typical experimental and the corresponding theoretical variations of the bending and membrane edge and centre stresses with the centre deflection are given in Figure 19. It can be observed that the results compare quite well generally, with the exception of the theoretical and experimental membrane stresses for test plate 3. This discrepancy may be due to a slight relaxation of the test panel along the clamped edges, resulting in an appreciable relief in the membrane stresses. Such discrepancies are of no great significance since, within the range of the centre deflections considered in the analytical solution ($w/h \leq 2$), the membrane stress accounted for a relatively small percentage of the total stress; hence, despite the apparent discrepancy between the theoretical and experimental membrane stresses, the agreement between the total stresses remains close (Figures 17 and 18).

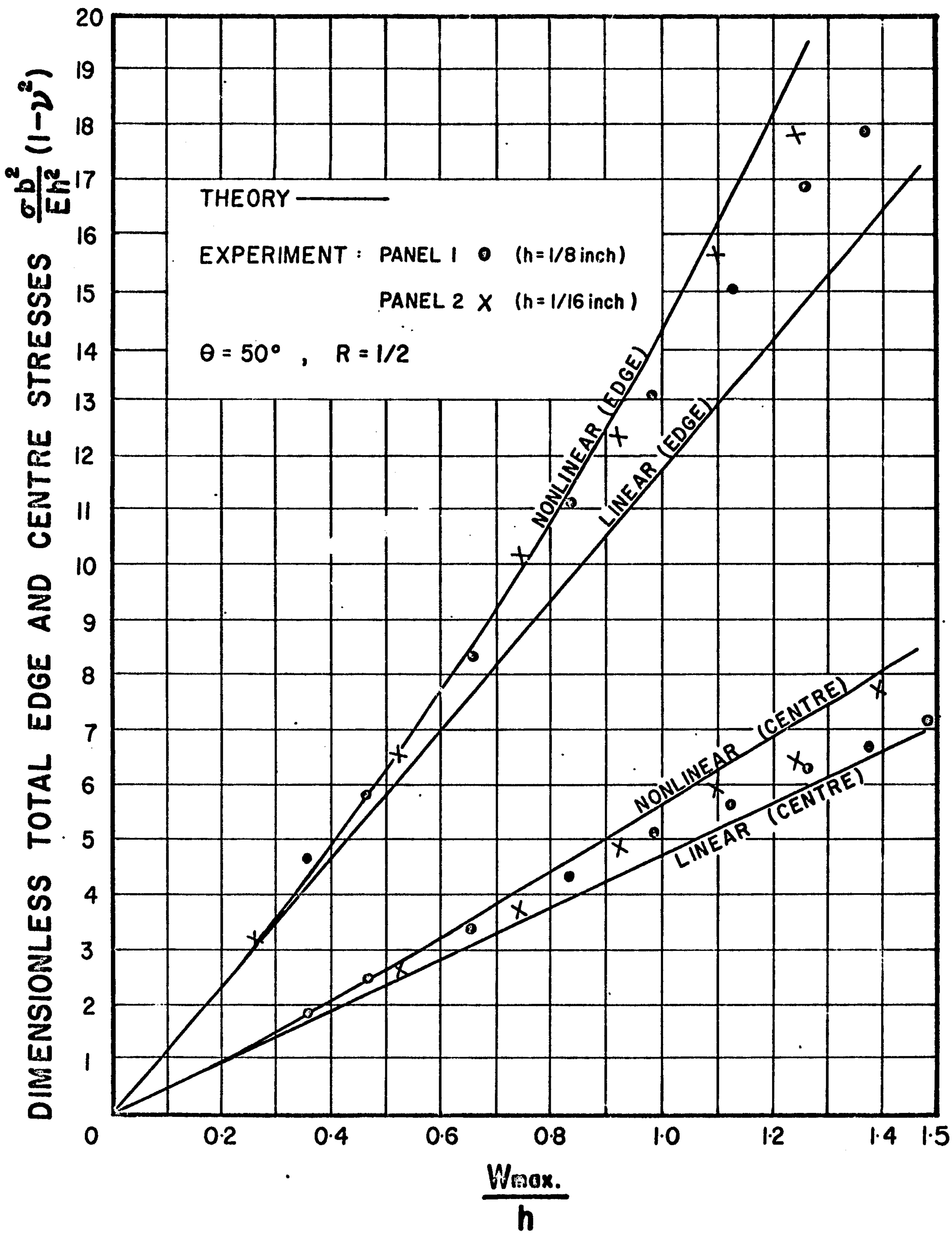


Fig. 17. Comparison of Experimental Edge and Centre Stresses with Theory for Test Plates 1 and 2

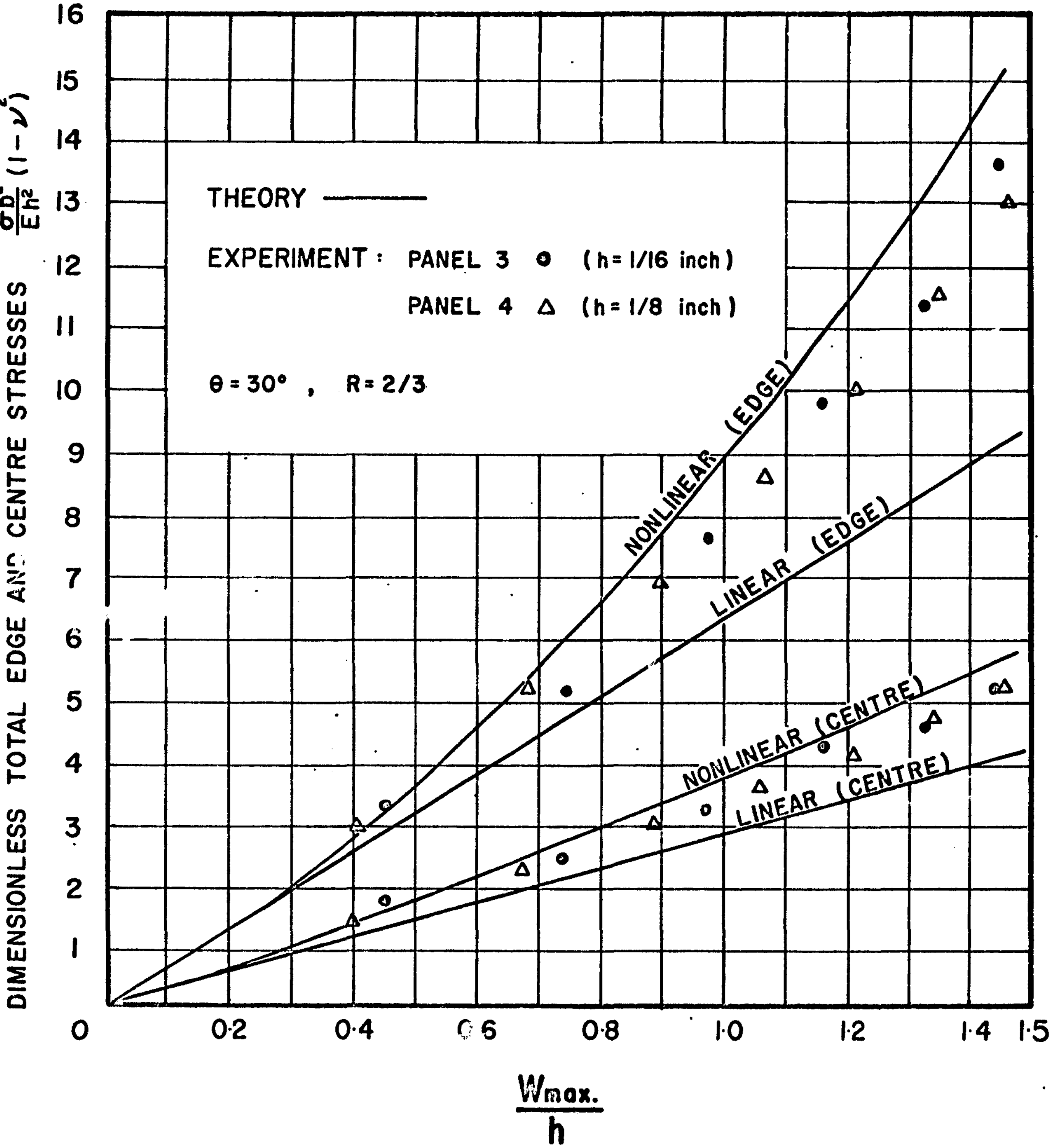


Fig. 18. Comparison of Experimental Edge and Centre Stresses with Theory for Test Plates 3 and 4.

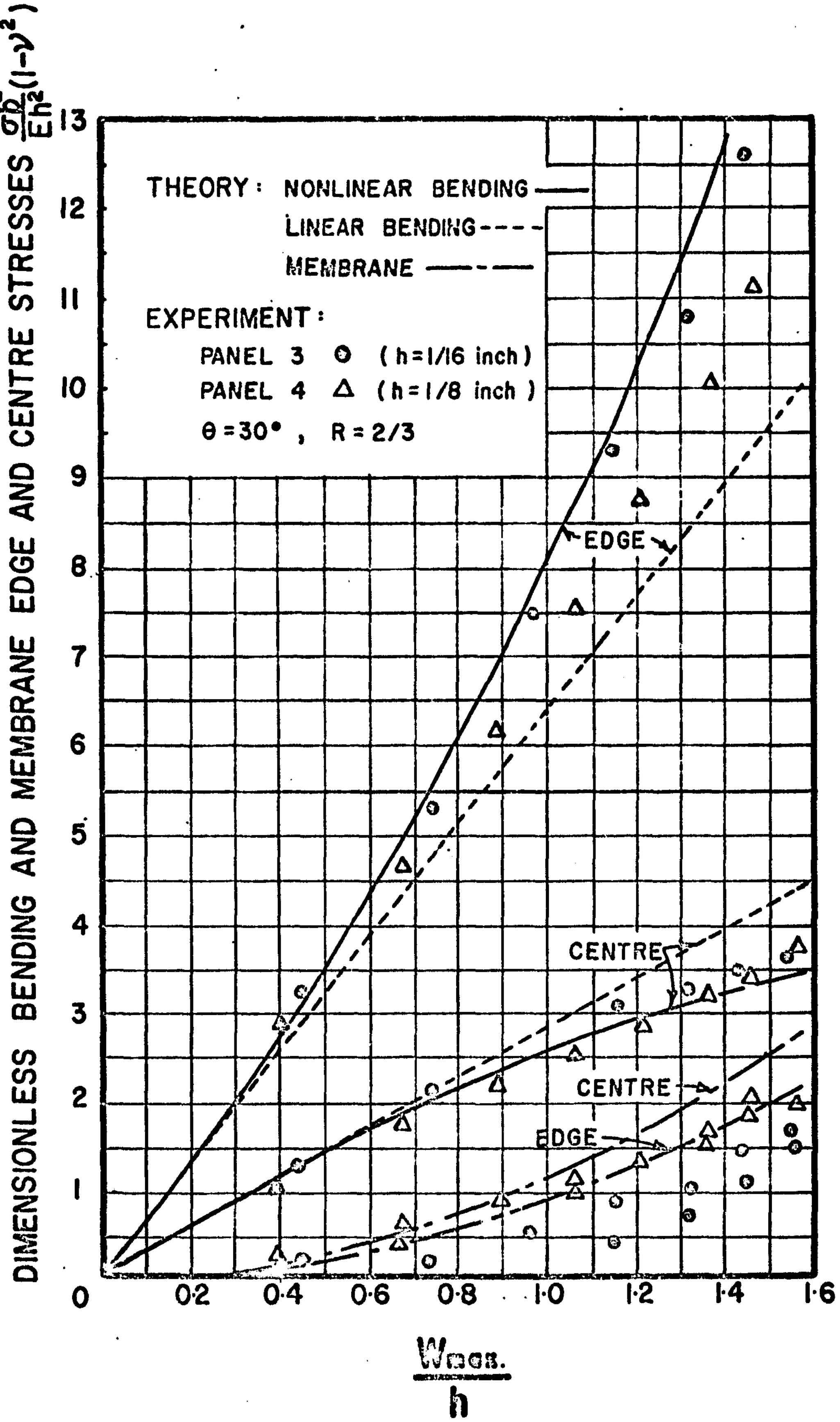


Fig. 19. Experimental and Theoretical Results for Bending and Membrane Stresses.

To exhibit the relative magnitude of the maximum total principal stresses at critical locations on the test panels, such stresses are shown plotted versus the applied pressure in Figures 20-23. Examination of these figures shows that for low intensities of pressure, the principal stress increases linearly with the applied pressure, producing a centre deflection not exceeding half the plate thickness and with insignificant membrane forces. However, with higher intensities of load (producing large deflections), the membrane forces become more pronounced, effecting a decrease in the slope of the stress-pressure curves shown. The total principal stresses at different locations will now be discussed:

As predicted by the analytical solution the experimental maximum total stress occurs along the longer edge of the plate and is displaced towards the obtuse corners, point A. [Compare with theoretical investigations of clamped rectangular plates (2) (3) where such stress occurs at the middle of the longer edge]. The total stress at the middle of the longer edge, point B, is about 85% of that at point A for test panels 1 and 2 with a skew of 50°. This percentage increases to approximately 90% for test panels 3 and 4 where the skew is 30°. Variations in the thickness of the plates do not seem to affect this percentage.

The variations of the experimental total stress at the panel centre (point C) with load are shown in Figures 20-23. It can be observed that for the entire range of loading considered, the total stresses at the centre of the test panels are approximately 35 to

45% of the corresponding maximum total edge stresses. This observation seems to indicate that the ratio of total stress at centre to maximum total edge stress is sensibly unaffected by changes in skew, aspect ratio, or plate thickness.

Results from the experimental study have revealed, as expected, severe concentration of stress in the vicinity of the obtuse corners. [Theoretically, stresses at the corners are zero, due to the nature of the mathematical model of the problem.] Figures 20-23 show that for low intensities of loading the total stress at the obtuse corners is of the same order of magnitude as the stress at centre of panel. With increased loading, the magnitude of the total stress at the obtuse corners can exceed that at the centre by approximately 10% for plates 1 and 4 (with 1/8 inch thickness) and by as much as 20% for plates 2 and 3 (with 1/16 inch thickness). Therefore, it may be surmised that the stress concentration at the obtuse corners, relative to the stress at the centre of the plate, is more affected by the plate thickness than by changes in skew or aspect ratio.

In contrast to the high level of stress in the vicinity of the obtuse corners, only nominal stresses were recorded in the vicinity of the acute corners. The experimental results obtained indicate that the total stress at such corners remains insignificant until parts of the edges yield due to excessive lateral loading. This will be expounded on in the next section.

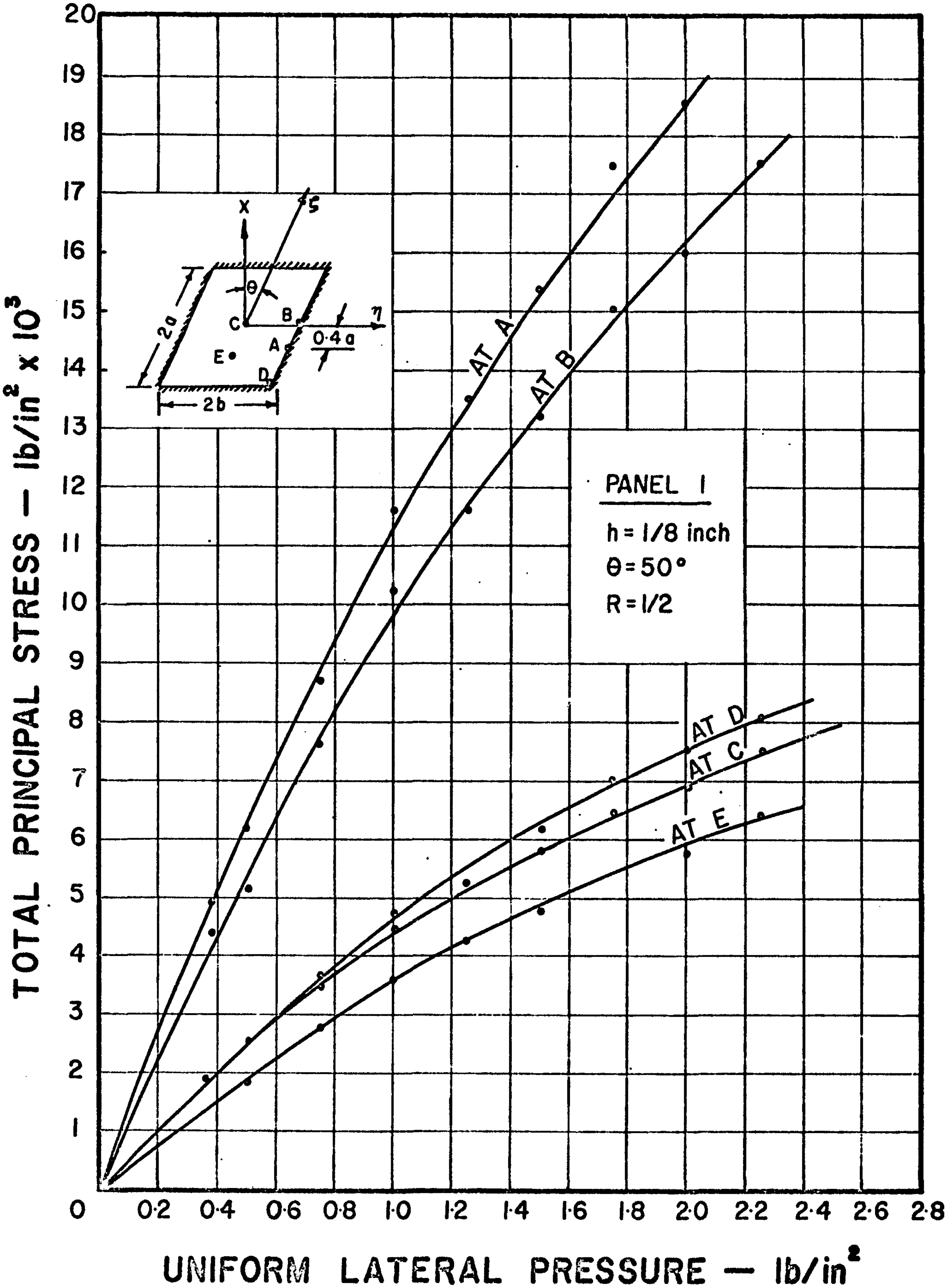


Fig. 20. Experimental Stresses at various Locations on Test Plate 1

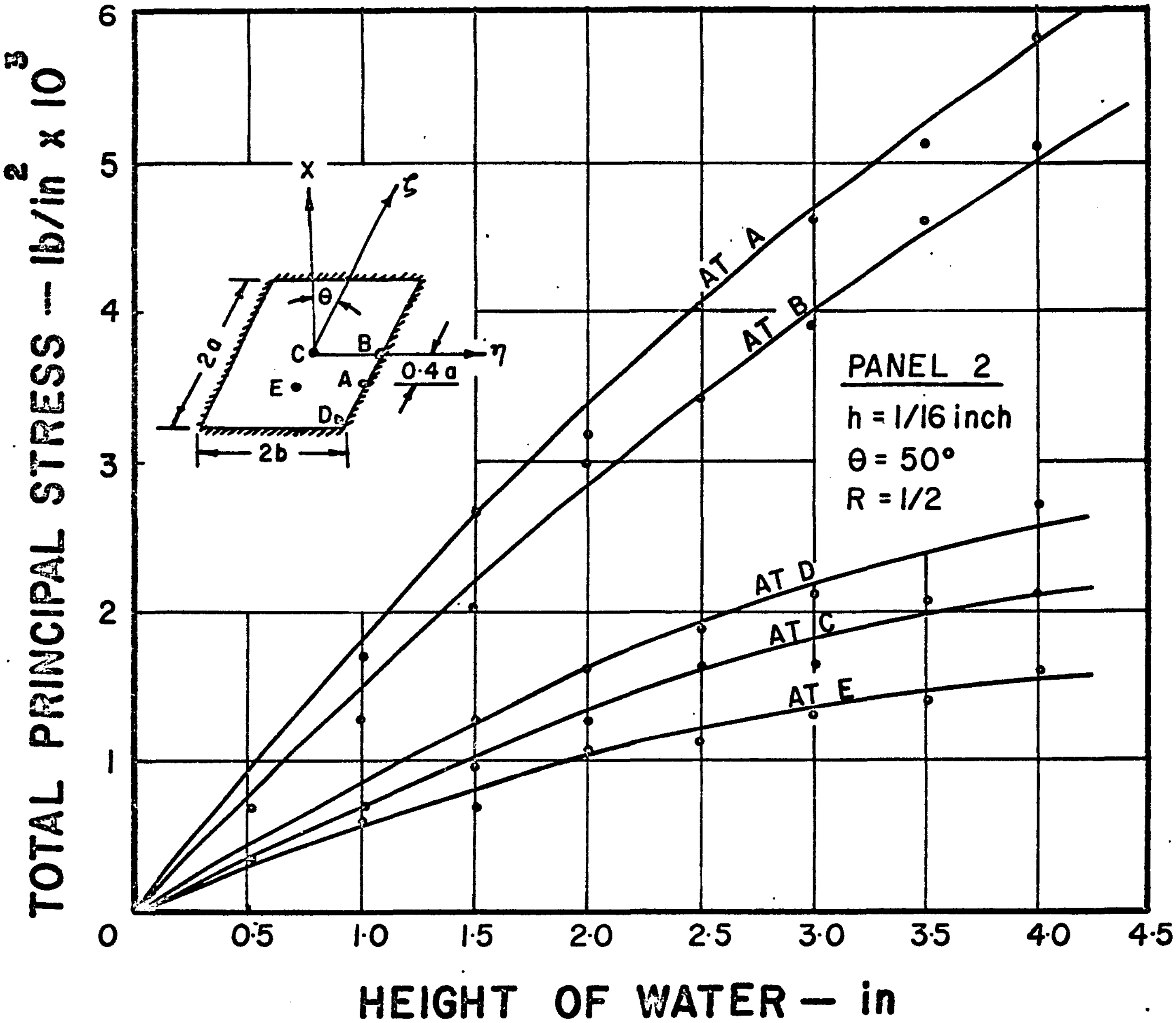


Fig. 21. Experimental Stresses at Various Locations on Test Plate 2

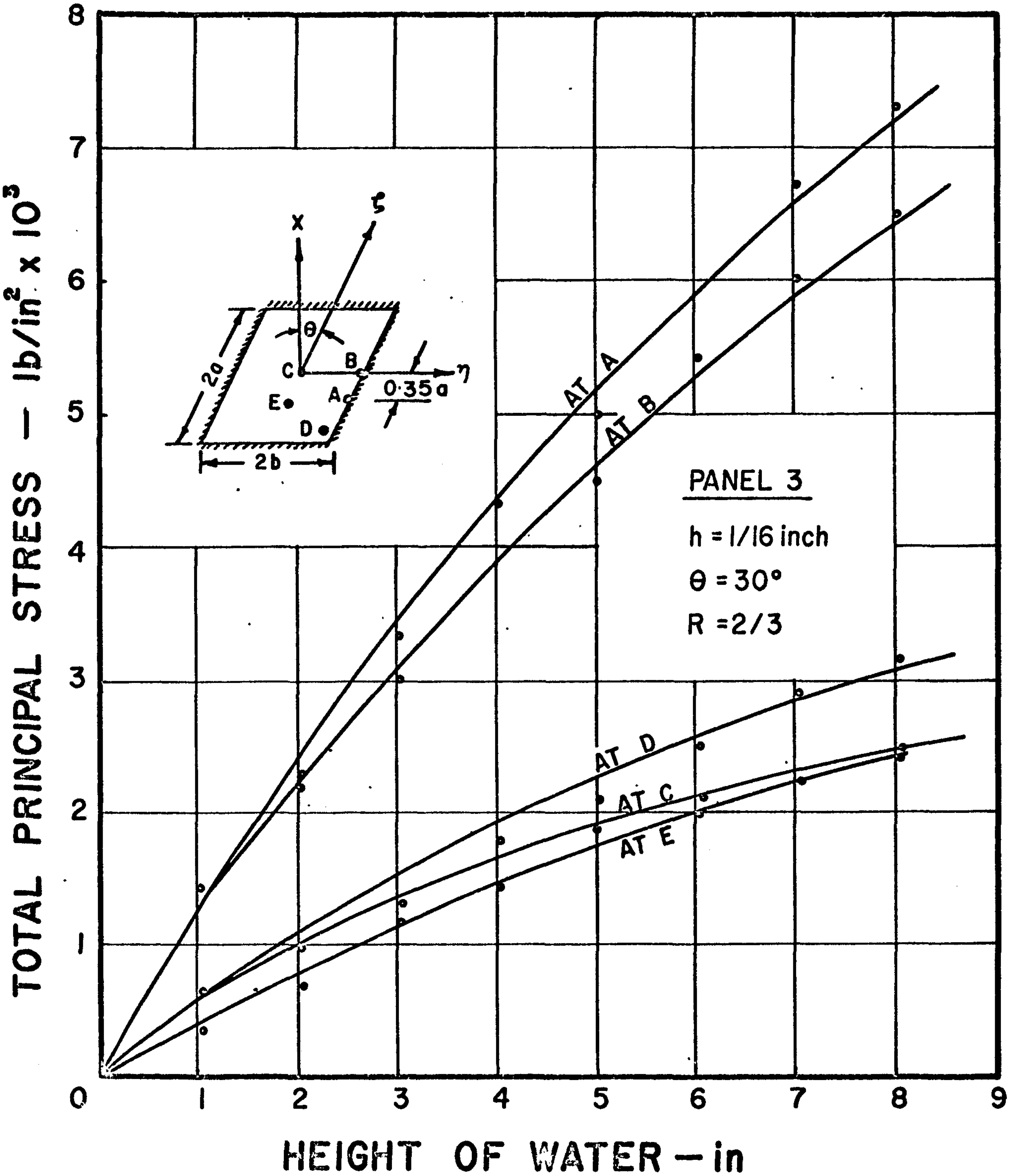


Fig. 22. Experimental Stresses at Various Locations on Test Plate 3.

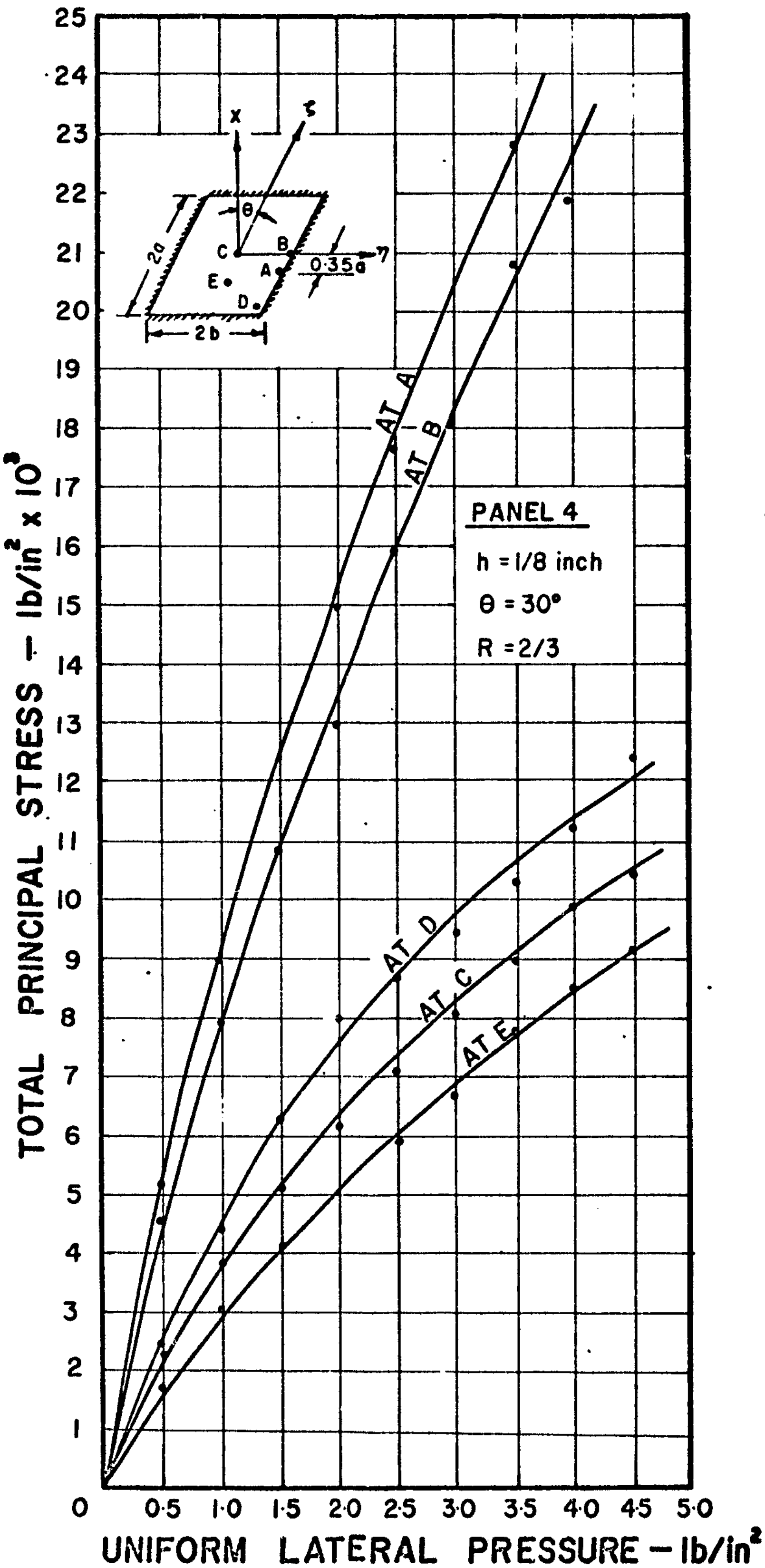


Fig. 23. Experimental Stresses at Various Locations on Test Plate 4.

Yield Tests:

In order to study the behaviour of clamped skewed plates beyond the validity of the Von Karman equations (9), where the centre deflection should not exceed 2 to 2.5 times the panel thickness, plates 3 and 4 were loaded until plastic regions were formed. The results of such tests are shown in Figures 24-26.

The variation of the total principal strain at the plate centre with applied pressure is shown in Figure 24. It is interesting to observe that when these plates were loaded excessively the strain in the middle plan of the plate increased to such a level that it nullified the compressive strain at the top of the panel at centre. This is not surprising since it was shown in Figure 15 that the magnitude of the membrane stress at centre increases rapidly with increase in centre deflection.

Figure 25 exhibits the behaviour and the distribution of principal strain in the vicinity of the obtuse corner when the panels are loaded beyond the elastic region. A sudden reversal in strain at these corners is noted when a certain critical load on the plate is reached. Such instability is preceded by progressive yielding of the panel edges towards the obtuse corners. (The variation of the maximum principal strain along the longer edge with lateral load is given in Figure 26) Ideally, one would have expected the curves from the top and bottom gauges to cross the horizontal axis at the same load. However, this was not the case and the discrepancy seems to be more pronounced for plate 4 (1/8 inch thick) than plate 3 (1/16 inch thick). This can be attributed mainly to experimental errors such as those incurred in gauge alignment, support conditions, etc. It may be mentioned that results from a bottom gauge located less than 1 inch away, at point F, do indicate the expected reversal in strain.

Variation of the total principal strain at the maximum point along the longer edges of plates 3 and 4 with load are shown in Figure 12. It can be observed that after the yield stress of the material is reached the total strain decreases with further increase in strain in the vicinity of the acute corners after the edges have yeilded; reversal of strain is also possible at such corners as evidenced from the results obtained, although the observed instability here is not as proncunced as was found for the obtuse corners.

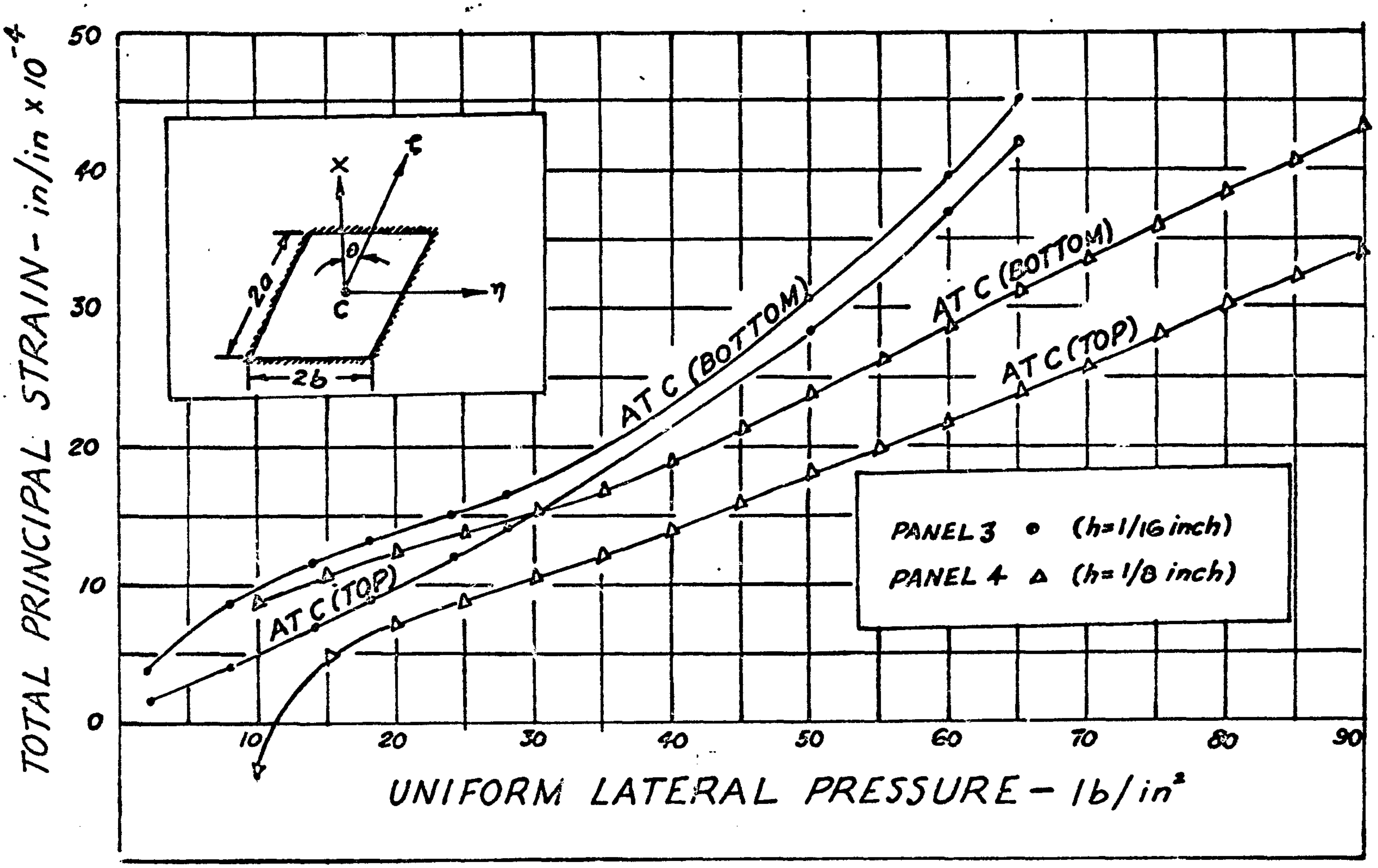


Fig. 24. Centre Stresses at Large Lateral Pressures

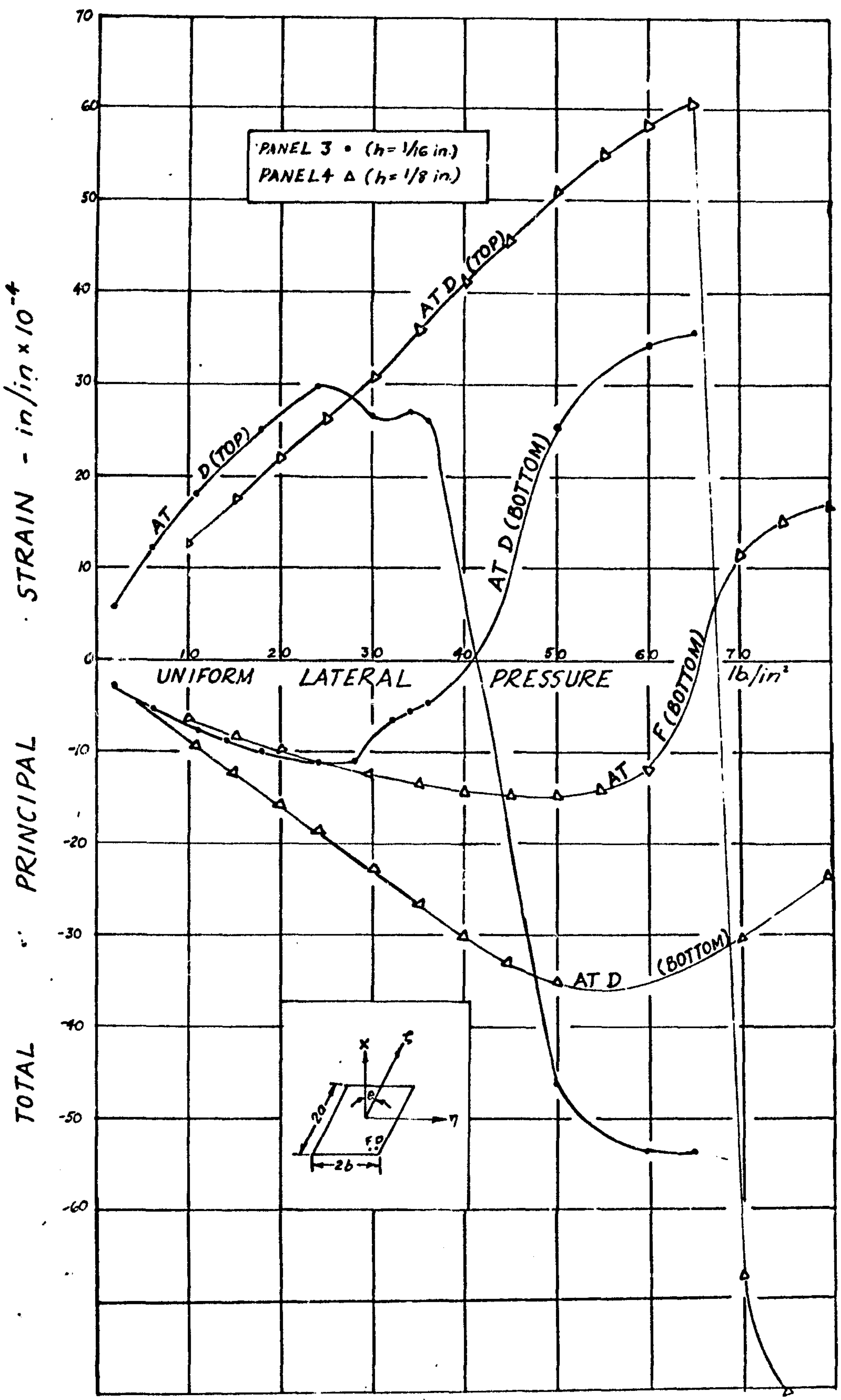


Fig. 25. Obtuse Corner Stresses at Large Lateral Pressures

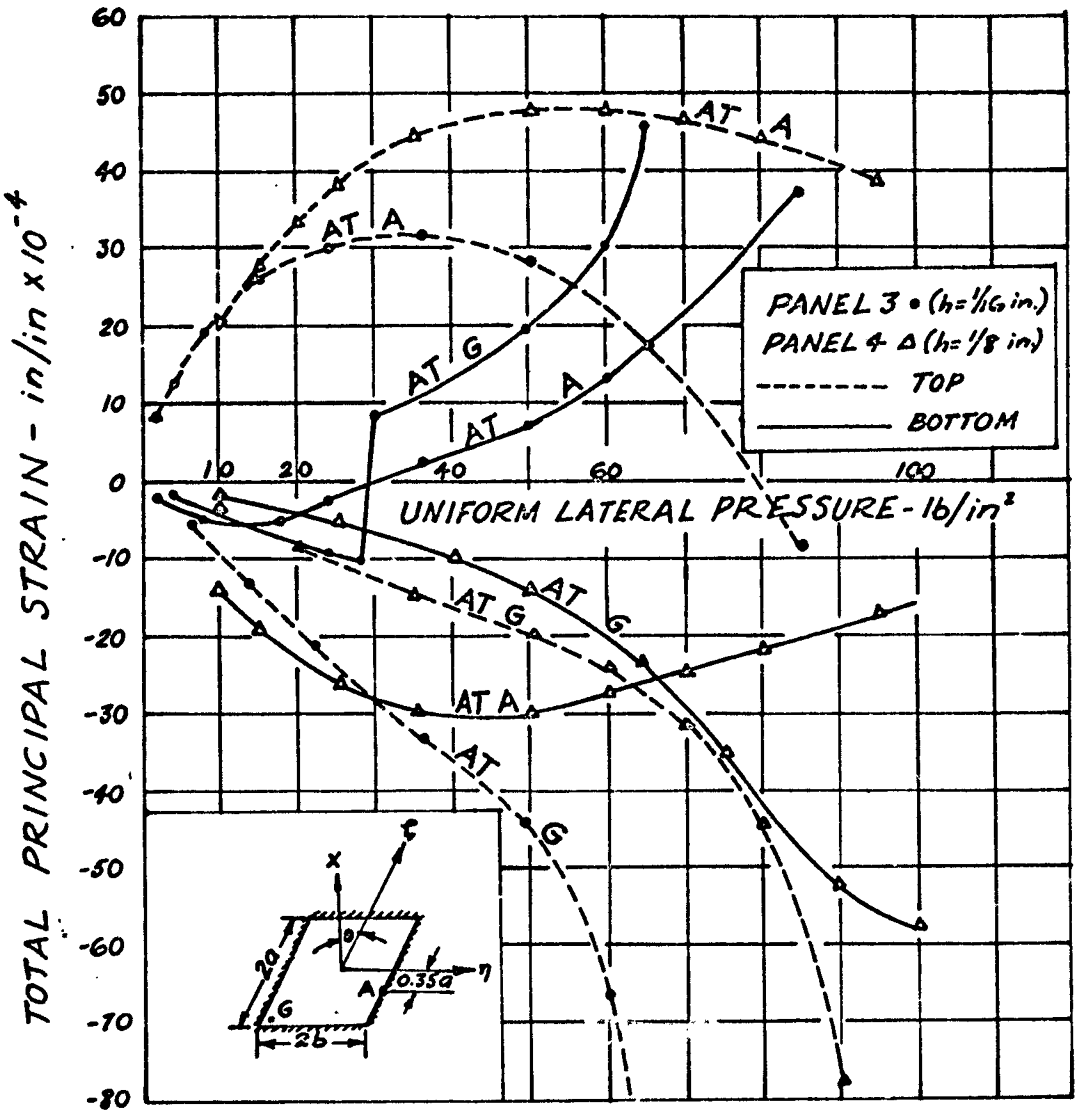


Fig. 26. Acute Corner and Maximum Edge Stresses at Large Lateral Pressures

CHAPTER V

CONCLUSIONS

As a result of this theoretical and experimental investigation on the small and large deflection behaviour of clamped skewed plates, the following conclusions may be drawn:

1. For the limiting case where the skew angle is reduced to zero, the perturbation method yields results which are in good agreement with those obtained for rectangular plates, analysed by more laborious methods.
2. The small deflection results for clamped skewed plates are in close agreement with those obtained by experiments and by other analytical methods.
3. For a given aspect ratio and a given uniformly distributed load, the maximum deflection at the centre of skewed plates decreases with increase in skew.
4. The effect of skew on the centre deflection decreases with decreasing aspect ratio R, where $R < 1$.
5. The ratios w_{max}/h, at which results from the linear and nonlinear theories begin to deviate significantly from each other are influenced by the aspect ratio, R; the ratio w_{max}/h decreasing with increasing R. Thus the deflection value, at which the influence of the in-plane forces begins to be effective, can be assessed.

6. Analytical nonlinear (large deflection) results have been substantiated by model tests. Notwithstanding the experimental errors inherent in such tests, the agreement between theory and experiment is found to be quite close.

7. Nonlinear deflection of clamped skewed plates tend to become increasingly linear with increase in skew.

8. The maximum resultant stress occurs along the longer edge of the plate and is displaced towards the obtuse corners. Such stress increases with skew for any specified aspect ratio and centre deflection.

9. Invariably membrane stresses are relatively insignificant in magnitude when compared to the maximum resultant edge stresses.

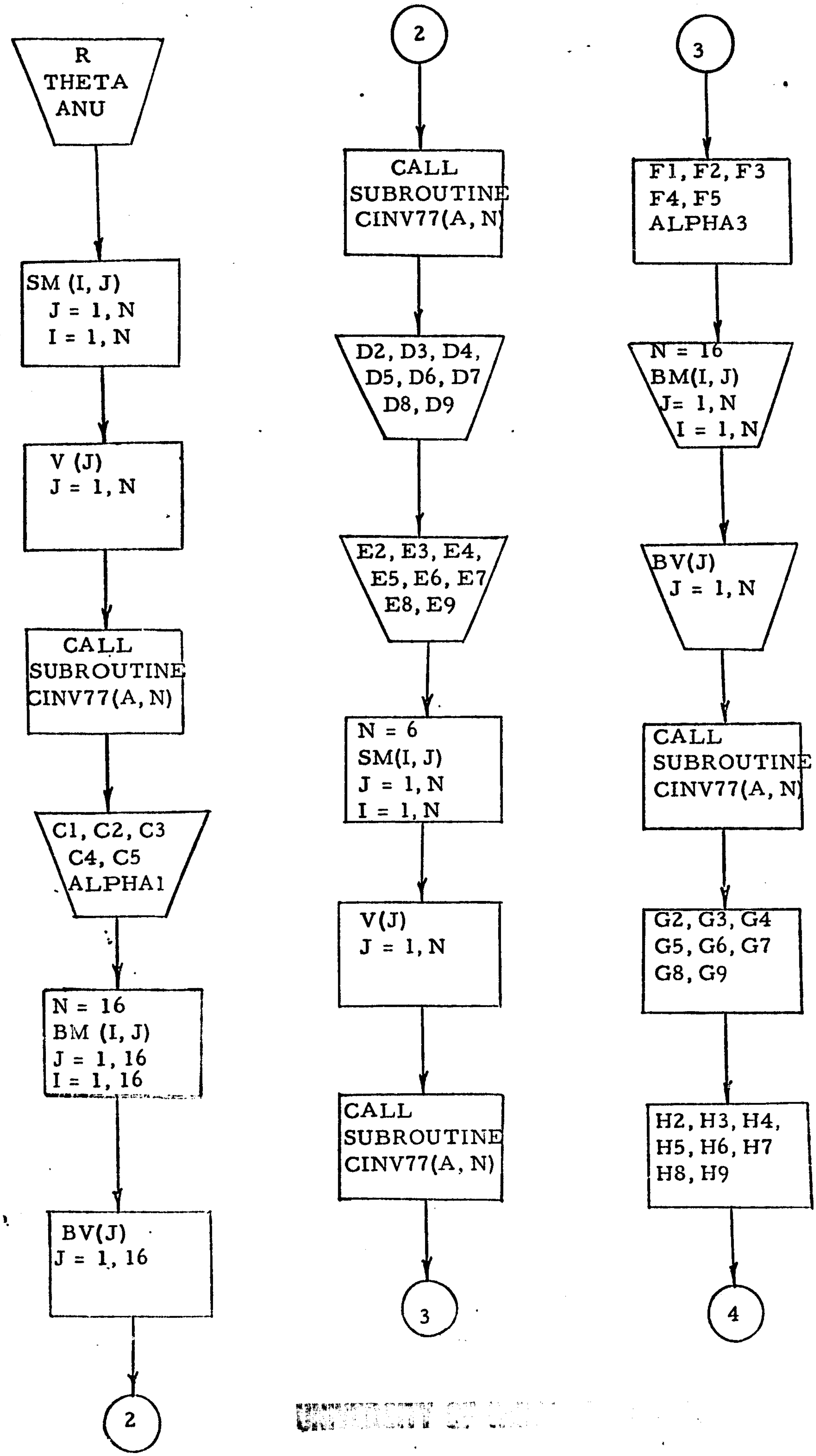
10. Experimental results obtained for very large loads, producing plastic regions, and outside the range of applicability of the analytical solution of the Von Karman equations have indicated that:

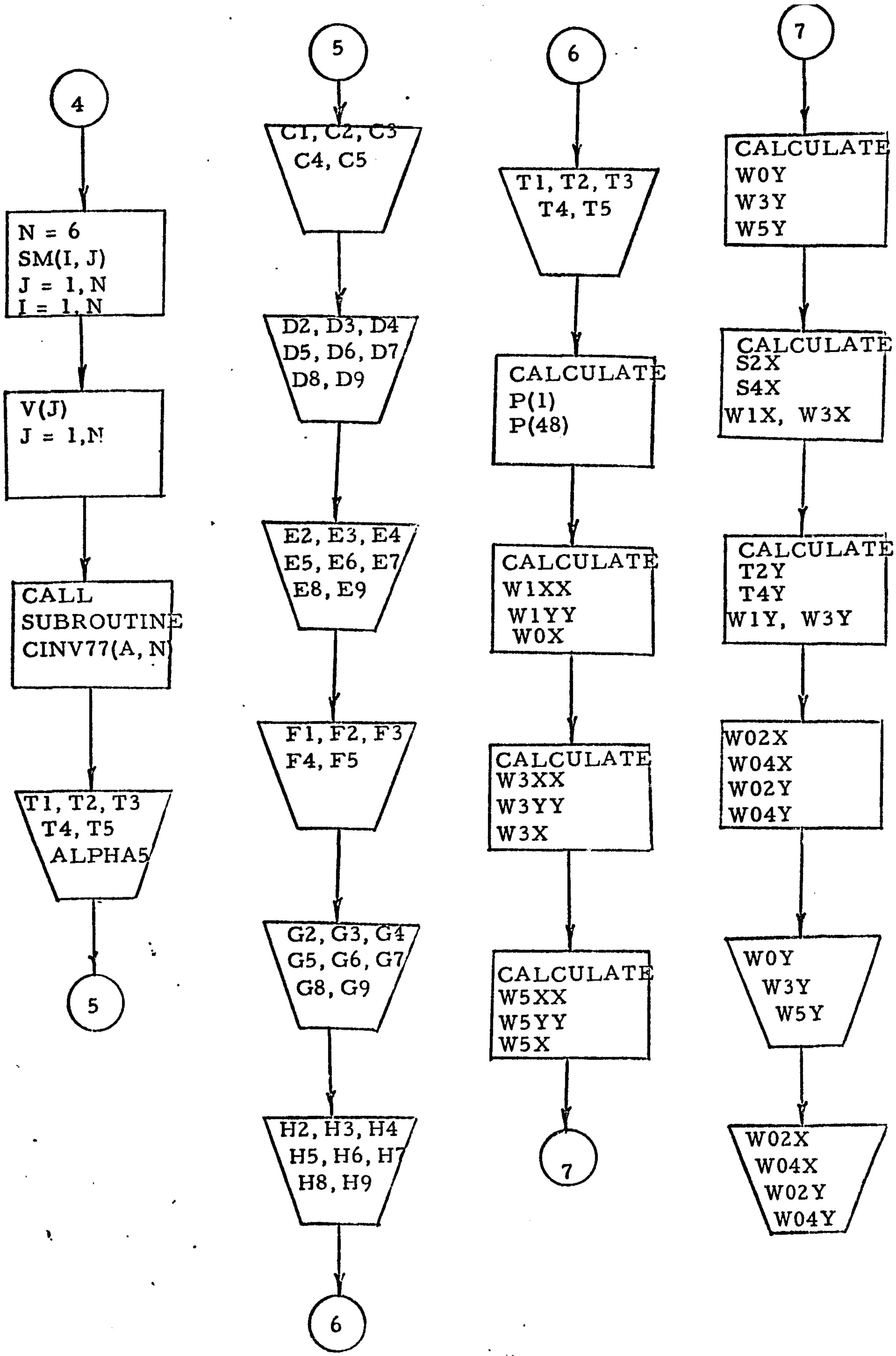
(a) The obtuse corners of clamped skewed plates are not only regions of severe stress concentrations, but also of instability, giving rise to sudden reversal of stresses.

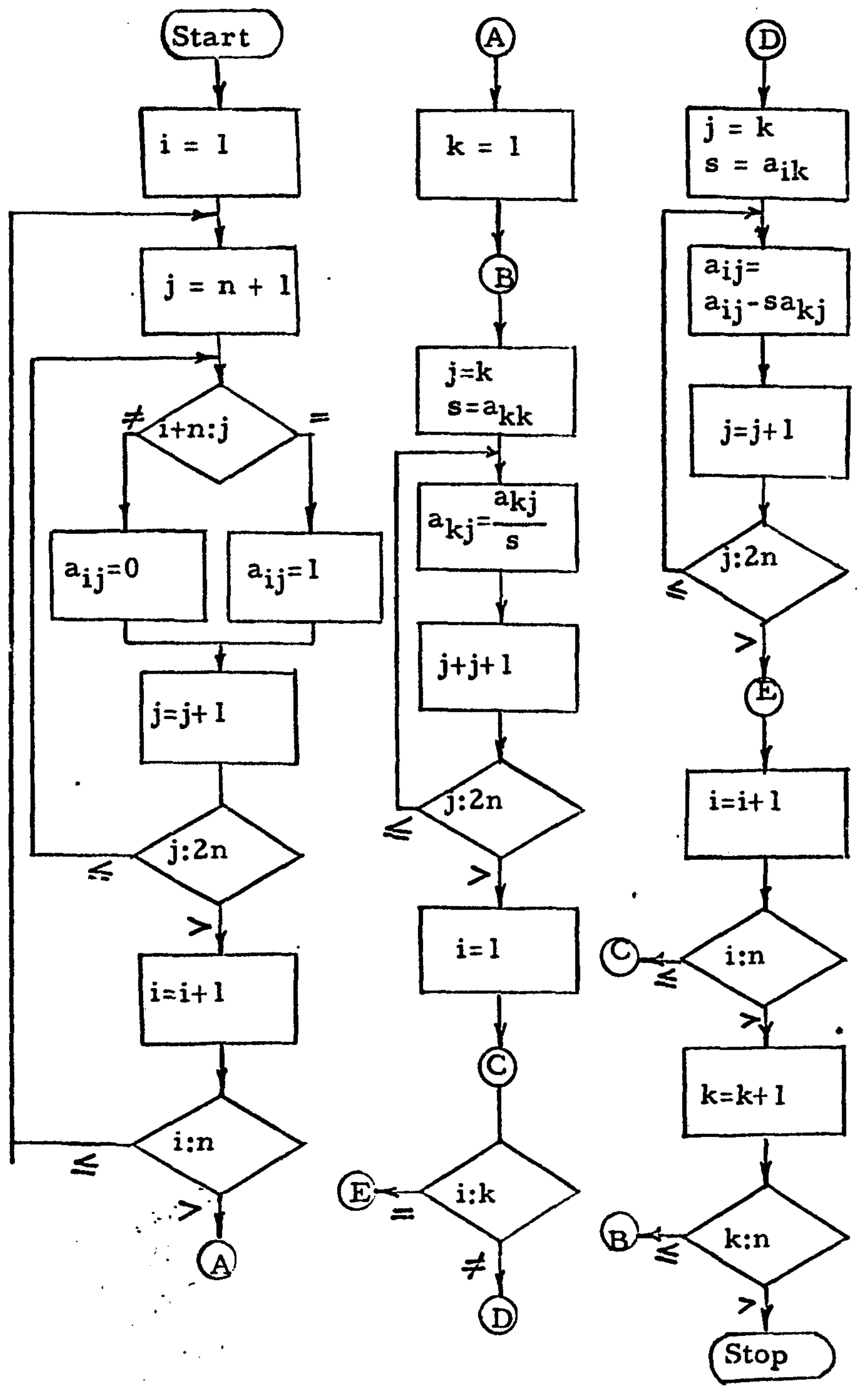
(b) The stress in the vicinity of the acute corners are relatively insignificant; however, when the edges have yielded, the stresses in such corners increase sharply with possible stress reversal at very large loads.

APPENDIX A

FORTRAN PROGRAMS FOR THEORETICAL AND EXPERIMENTAL ANALYSIS


R
THETA
ANU
SM (I, J)
J = 1, N
I = 1, N
V (J)
J = 1, N
CALL
SUBROUTINE
CINV77(A, N)
C1, C2, C3
C4, C5
ALPHA1
N = 16
BM (I, J)
J = 1, 16
I = 1, 16
BV(J)
J = 1, 16
2
2
CALL
SUBROUTINE
CINV77(A, N)
D2, D3, D4,
D5, D6, D7
D8, D9
E2, E3, E4,
E5, E6, E7
E8, E9
N = 6
SM(I, J)
J = 1, N
I = 1, N
V(J)
J = 1, N
CALL
SUBROUTINE
CINV77(A, N)
3
3
F1, F2, F3
F4, F5
ALPHA3
N = 16
BM(I, J)
J= 1, N
I = 1, N
BV(J)
J = 1, N
CALL
SUBROUTINE
CINV77(A, N)
G2, G3, G4
G5, G6, G7
G8, G9
H2, H3, H4,
H5, H6, H7
H8, H9
4


4
N = 6
SM(I, J)
J = 1, N
I = 1, N
V(J)
J = 1,N
CALL SUBROUTINE CINV77(A, N)
T1, T2, T3
T4, T5
ALPHA5
5
5
C1, C2, C3
C4, C5
D2, D3, D4
D5, D6, D7
D8, D9
E2, E3, E4
E5, E6, E7
E8, E9
F1, F2, F3
F4, F5
G2, G3, G4
G5, G6, G7
G8, G9
H2, H3, H4
H5, H6, H7
H8, H9
6
6
T1, T2, T3
T4, T5
CALCULATE
P(1)
P(48)
CALCULATE
W1XX
W1YY
W0X
CALCULATE
W3XX
W3YY
W3X
CALCULATE
W5XX
W5YY
W5X
7
7
CALCULATE
W0Y
W3Y
W5Y
CALCULATE
S2X
S4X
W1X, W3X
CALCULATE
T2Y
T4Y
W1Y, W3Y
W02X
W04X
W02Y
W04Y
W0Y
W3Y
W5Y
W02X
W04X
W02Y
W04Y



Start
i = 1
j = n + 1
i+n:j
≠
=
aij=0
aij=1
j=j+1
j:2n
≤
>
i=i+1
i:n
≤
>
A
A
k = 1
B
j=k
s=akk
akj=akj/s
j+j+1
j:2n
≤
>
i=1
C
i:k
E
=
≠
D
D
j = k
s = aik
aij=
aij-sakj
j=j+1
j:2n
≤
>
E
i=i+1
i:n
C
≤
>
k=k+1
k:n
B
≤
>
Stop

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[illegible]
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      PUNCH 1[illegible],[illegible],THETA,ANU
   1[illegible] FORMAT([illegible]=F10.5,7H THETA=F10.5,5H ANU=F10.5)
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      S=SIN(TH1)
      C=COS(TH1)
      A2=[illegible]
      A1=[illegible]
      A2=-[illegible].*([illegible]*S)
      A3=-4.*([illegible]*S)
      A4=[illegible]2*([illegible].*[illegible].*S*S)*2.
      [illegible]=[illegible]
      S[illegible](1,1)=-[illegible].*A3-6.*A4-48.
      S[illegible](1,2)=(-[illegible].*A1-6.*A2-8.*A4)
      S[illegible](1,3)=24.
      S[illegible](1,4)=24.*A1
      S[illegible](1,5)=4.*A4
    1 S[illegible](1,[illegible])=-[illegible]
      S[illegible]([illegible],1)=([illegible].*A1)+(36.*A2)+120.*A3+(96.*A4)+360.
      S[illegible]([illegible],[illegible])=([illegible].*A1+36.*A2+24.*A4)
```

```
      S[illegible](2,3)=(-[illegible].*A3-48.*A4-720.)
      S[illegible](2,4)=(-[illegible].*A1)
      S[illegible](2,5)=(-[illegible].*A1-16.*A2-48.*A4)
      S[illegible](2,6)=[illegible].
      S[illegible](3,1)=([illegible].*A3+24.*A4+[illegible].)
      S[illegible](3,2)=([illegible].*A1+120.*A2+36.*A3+96.*A4+24.)
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      S[illegible](3,4)=(-7[illegible].*A1-60.*A2-48.*A4)
      S[illegible](3,5)=(-[illegible].*A3-48.*A4-48.)
      S[illegible](3,6)=[illegible].
      S[illegible](4,1)=(-[illegible].*A1-120.*A2-210.*A3-120.*A4)
      S[illegible](4,2)=(-[illegible].*A1-30.*A2)
      S[illegible](4,3)=(24.*A1+60.*A2+420.*A3+1680.+240.*A4)
      S[illegible](4,4)=(24.*A1)
      S[illegible](4,5)=([illegible].*A1+60.*A2+60.*A4)
      S[illegible](4,6)=[illegible]
      S[illegible](5,1)=(-30.*A3-48.)
      S[illegible](5,2)=(-210.*A2-120.*A3-120.*A4-48.)
      S[illegible](5,3)=24.
      S[illegible](5,4)=(1680.*A1+420.*A2+60.*A3+240.*A4+24.)
      S[illegible](5,5)=(60.*A3+60.*A4+96.)
      S[illegible](5,6)=0.0
      S[illegible](6,1)=(-[illegible].*A2-720.*A3-288.*A4-720.)
      S[illegible](6,2)=(-720.*A1-720.*A2-180.*A3-288.*A4)
      S[illegible](6,3)=(360.*A3+144.*A4+1440.)
      S[illegible](6,4)=(1440.*A1+360.*A2+144.*A4)
      S[illegible](6,5)=(360.*A1+360.*A2+360.*A3+576.*A4+360.)
      S[illegible](6,6)=[illegible]
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      V(2)=-(-[illegible].*A1-72.*A2-60.*A3-48.*A4)
      V(3)=-(-[illegible].*[illegible]-72.*A3-48.*A4-48.)
      V(4)=-([illegible].*[illegible]1+60.*A2)
      V(5)=-([illegible].*[illegible]+24.)
      V(6)=-([illegible].*[illegible]2+360.*A3+144.*A4)
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      [illegible],((S[illegible](I,J),J=1,[illegible]),I=1,[illegible])
      [illegible],(V(J),J=1,[illegible])
   3[illegible] F[illegible](7(6[illegible],[illegible]16.[illegible]))
      [illegible]777(7,[illegible])
      [illegible],((A(I,J),J=1,[illegible]),I=1,[illegible])
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   1[illegible] [illegible](I)=[illegible]S(I)+A(I,J)*V(J)
   [illegible] F[illegible](7(3[illegible],4E16.8))
      C1=[illegible]
      C2=[illegible]
      C3=[illegible]
      C4=[illegible]
      C5=[illegible]
      [illegible]
      [illegible],C1,C2,C3,C4,C5,ALPH1
   37 F[illegible] C1=E16.8,4H C2=E16.8,4H C3=E16.8/4H C4=E16.8,
     14[illegible] C5=E16.8,7H ALPH1=E16.8)
```

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          [illegible]
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[illegible]
[illegible]
      [illegible]=1[illegible]
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      [illegible] J=[illegible],13
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       [illegible]([illegible],1)=-[illegible].*[illegible]2*[illegible]*C-2.*A44
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       [illegible](1,[illegible])=[illegible]2.*[illegible]2*[illegible]*C
       [illegible](1,[illegible])=[illegible].*[illegible]44
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      [illegible](1,[illegible])=[illegible].*A11
       [illegible](1,1[illegible])=-2.*A10
      [illegible](1,1[illegible])=-2.*A11
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      [illegible](2,2)=-4.*[illegible]2*[illegible]*C-6.*A44
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       [illegible](3,1)=2.*A44
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      [illegible](5,[illegible])=1[illegible].*[illegible]2*R*C
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      [illegible](5,[illegible])=-1[illegible].*[illegible]2*[illegible]*C
      [illegible]([illegible],[illegible])=[illegible].[illegible]
      [illegible]([illegible],[illegible])=-1[illegible].*[illegible]2*[illegible]*C-12.*A44
      [illegible]([illegible],[illegible])=[illegible].[illegible]
      [illegible]([illegible],[illegible])=[illegible]2.*[illegible]2*[illegible]*C
      [illegible](5,[illegible])=-6.*A[illegible]
      [illegible](5,1[illegible])=[illegible].*A10
```

```
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[illegible](7,[illegible])=-1[illegible].*A10
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[illegible]([illegible],[illegible])=-2.*A[illegible]*R*C*S
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[illegible]([illegible],1[illegible])=-[illegible].*A7*R2*S
[illegible]([illegible],[illegible])=-[illegible].*[illegible]*R2*C
[illegible]([illegible],[illegible])=[illegible].*[illegible]*R*C*S
[illegible]([illegible],[illegible])=-[illegible].*[illegible]*R*C*S
[illegible]([illegible],[illegible])=[illegible].*[illegible]*R2*C
[illegible]([illegible],[illegible])=[illegible].*[illegible]7*R2*S
[illegible]([illegible],[illegible])=-[illegible].*A14-2.*A7*R2*R
CALL [illegible]R([illegible]S)
```

```
      END
$DATA
*ELDISKKUSAKE
      [illegible]=13
      [illegible](10,12)=6.*A14
      [illegible](10,13)=-4.*A7*R2*S
      [illegible](10,14)=[illegible].*A7*R2*R
      [illegible](11,1)=-[illegible].*A6*R*C*S
      [illegible](11,3)=[illegible].*[illegible]*R*C*S
      [illegible](11,5)=[illegible].*A6*R*C*S
      [illegible](11,6)=-[illegible].*A6*R2*C
      [illegible](11,7)=-[illegible].*A6*R*C*S
      [illegible](11,[illegible])=2.*A14
      [illegible](11,11)=-[illegible].*A14-20.*A7*R2*R
      [illegible](11,13)=-[illegible].*A14
      [illegible](11,[illegible])=[illegible].*A7*R2*S
      [illegible](11,[illegible])=[illegible].*A14
      [illegible](12,[illegible])=20.*A6*R*C*S
      [illegible](12,[illegible])=-[illegible].*A6*R2*C
      [illegible](12,1[illegible])=[illegible].*A7*R2*R
      [illegible](12,12)=-[illegible].*A7*R2*R-20.*A14
      [illegible](12,13)=[illegible].*A7*R2*S
      [illegible](12,[illegible])=-2.*A7*R2*R
      [illegible](12,1[illegible])=[illegible].*A7*R2*R
      [illegible](13,[illegible])=6.*A6*R2*C
      [illegible](13,[illegible])=-[illegible].*A6*R2*C
      [illegible](13,[illegible])=12.*A6*R*C*S
      [illegible](13,[illegible])=-[illegible].*A6*R2*C
      [illegible](13,[illegible])=[illegible].*A6*R2*C
      [illegible](13,[illegible])=[illegible].*A7*R2*R
      [illegible](13,[illegible])=-12.*A7*R2*S
      [illegible](13,[illegible])=-[illegible].*A7*R2*R
      [illegible](13,12)=12.*A7*R2*S
      [illegible](13,13)=-[illegible].*A7*R2*R-12.*A14
      [illegible](13,[illegible])=12.*A7*R2*S
      [illegible](13,[illegible])=[illegible].*A7*R2*R
      [illegible]([illegible],[illegible])=-12.*A7*R2*S
      [illegible](14,1)=[illegible].*A6*R2*C
      [illegible](14,2)=-6.*A6*R*C*S
      [illegible](14,[illegible])=-6.*A6*R2*C
      [illegible](14,[illegible])=[illegible].*A6*R*C*S
      [illegible](14,[illegible])=-6.*A6*R2*C
      [illegible](14,[illegible])=6.*A6*R*C*S
      [illegible](14,7)=[illegible].*A6*R2*C
      [illegible](14,[illegible])=-[illegible].*A6*R*C*S
      [illegible](14,[illegible])=-1[illegible].*A7*R2*S
      [illegible](14,[illegible])=[illegible].*A14
      [illegible](14,[illegible])=12.*A7*R2*S
      [illegible]([illegible],[illegible])=-[illegible].*A14
      [illegible]([illegible],[illegible])=[illegible].*A7*R2*S
      [illegible]([illegible],[illegible])=-[illegible].*A14-12.*A7*R2*R
      [illegible]([illegible],[illegible])=-[illegible].*A7*R2*S
      [illegible](14,[illegible])=[illegible].*A14
      [illegible](15,[illegible])=-12.*A6*R*C*S
```

[illegible] 12

```
      [illegible](1[illegible],[illegible])=[illegible].*[illegible]2*C
      [illegible](1[illegible],[illegible])=[illegible].*[illegible]*C*S
      [illegible]([illegible],[illegible])=-[illegible].*[illegible]2*C
      [illegible]([illegible],[illegible])=[illegible].*[illegible]7*[illegible]2*R
      [illegible]([illegible],[illegible])=1.*[illegible]
      [illegible](1[illegible],1[illegible])=-[illegible].*[illegible]7*[illegible]*S
      [illegible]([illegible],[illegible])=[illegible].*[illegible]-[illegible].*A7*R2*R
      [illegible]([illegible],[illegible])=[illegible].*[illegible]7*R2*S
      [illegible]([illegible],[illegible])=-[illegible].*[illegible]*C*S
      [illegible]([illegible],[illegible])=[illegible].*[illegible]2*C
      [illegible]([illegible],[illegible])=-[illegible].*[illegible]2*C
      [illegible]([illegible],[illegible])=[illegible].*[illegible]*C*S
      [illegible](1[illegible],[illegible])=[illegible].*[illegible]14
      [illegible](1[illegible],[illegible])=-24.*[illegible]7*R2*S
      [illegible](1[illegible],2[illegible])=1[illegible].*A7*R2*R
      [illegible](1[illegible],[illegible])=[illegible].*A7*[illegible]2*S
      [illegible](1[illegible],[illegible])=-[illegible].*A14-12.*A7*R2*R
      CALL L[illegible](KUSARA)
      EN[illegible]
[illegible]
*[illegible]IS[illegible]S[illegible]
      [illegible]Y(1)=-([illegible].*[illegible]2*R*A1[illegible]*A16+2.*R2*S*A13+4.*[illegible]2*S*A1[illegible]+A12+A13[illegible]
     1+[illegible].*S*A17)
      [illegible]Y(2)=-([illegible].*[illegible]2*R*(-A16)-2.*R2*S*(A16*A17)-4.*[illegible]2*S+A12*(-A17)+[illegible]
     1*(-A1[illegible])-[illegible].*S*(A17*A17))
      [illegible]Y(3)=-([illegible].*[illegible]2*R*(A16*A24+A1[illegible]*A23)-2.*[illegible]2*S*(A16*A25-A23)-4.*[illegible]2*S*
     1(A1[illegible]*A[illegible]-A24)+A12*(-A25-A26)+A13*(A16*A1[illegible]+A17*A24)-2.*S*(-[illegible]+A17
     2*A23))
      [illegible]Y(4)=-([illegible].*[illegible]2*R*(A16*A2[illegible]-A18)-2.*R2*S*(A16*A31+A17*A1[illegible])-4.*[illegible]2*S*
     1 (-A[illegible]-[illegible])+A12*(-A31+A17*A30)+A13*(-A21+A17*A28)-2.*S*([illegible]+A17
     2*A17*A31))
      [illegible]Y(5)=-([illegible].*[illegible]2*R*(A16*A18-A19+A16*A1[illegible])-2.*R2*S*(A16*A20+A17*A1[illegible]-
     1[illegible])-4.*[illegible]2*S*(A16*A30-A33-A18)+A12*(-A20+A17*A33-A30)+A13*(A16*
     2A21-A22*A17*A1[illegible])-2.*S*(-A21+A17*A22+A17*A20))
      CALL L[illegible](KUSARA)
      [illegible]
[illegible]
*[illegible]
      [illegible]Y(6)=-([illegible].*[illegible]*(A16*A36-A23+A19*A16)-2.*R2*S*(A16*A1[illegible]+A[illegible]*A17-A19
     1)-4.*[illegible]*(A16*A33-A26-A23)+A12*(-A1[illegible]+A26*A17-A33)+A13*(A1[illegible]*A2[illegible]-
     2[illegible]1+[illegible]17)-2.*S*(-A22+A17*A1[illegible]+A17*A1[illegible]))
      [illegible]Y(7)=-([illegible].*[illegible]*(2.*A16*A39+A23*A1[illegible]+A19*A26-A40+A24*A1[illegible]+[illegible]
     1)-[illegible].*[illegible]*A16+A23*A20+A1[illegible]*A19+A17*A40+A1[illegible]*A[illegible]-[illegible].*[illegible])
     2-[illegible].*[illegible]*([illegible].*[illegible]*A16+A24*A30-4.*A39+[illegible]*A2[illegible]+A26*A1[illegible]-2.*[illegible])+A12
     3*(-[illegible].*[illegible]*A33*A1[illegible]+4.*A39*A17+A2[illegible]*A2[illegible]-1.[illegible]*A29)+A1[illegible]
     4([illegible].*[illegible]-[illegible]24*A21+3.*A1[illegible]+A26*A22+A1[illegible]*A1[illegible]+2.*A39*A17))
      [illegible]Y(8)-[illegible])-(-2.*S*(-6.*A27+A25*A21-3.*A18+A17+A1[illegible]*A2[illegible]+A2[illegible]
     1[illegible]17))
      [illegible](-[illegible].*[illegible]2*R*(3.[illegible]*A29*A16+A1[illegible]*A26+A19*A1[illegible]+A16*A2[illegible]-[illegible]
     1[illegible])-[illegible].*[illegible]*(2.*A16*A27+A1[illegible]*A1[illegible]+A19*A20-A2[illegible]+A23*A1[illegible].*[illegible]17
     2-[illegible].*[illegible](-[illegible].*A[illegible]*A26*A2[illegible]+4.*A1[illegible]*A27+A1[illegible]*A[illegible]+A24*A30-6.*[illegible])
     3[illegible](-[illegible].*[illegible]7+A[illegible]*A1[illegible]+A23*A20-4.*A27*A26*A1[illegible]+1.5*A29*[illegible])*[illegible]
     4(-[illegible].*[illegible]*A15+7.*A1[illegible]*A32+A1[illegible]*A22+A26*A21+6.*A29*A17))
      [illegible]Y([illegible])=-[illegible])-(-2.*S*(6.*A27*A17+A31*A18-4.*A32+A20*A22+A1[illegible]
```

[illegible] 1[illegible]

```
      1[illegible].[illegible]17))
       [illegible](
[illegible]0[illegible]0750[illegible]0070[illegible]40[illegible]11[illegible]361130[illegible]
[illegible]
[illegible]
[illegible]
       [illegible]
       [illegible]=-[illegible].*([illegible]*S)
       A[illegible]=-[illegible].*([illegible]*S)
       [illegible]*([illegible].*[illegible].*S*S)*2.
       [illegible]=C*C
       [illegible]=1.*[illegible]
       A7=[illegible].-
       [illegible]
       A[illegible]=([illegible]*C)*[illegible]
       [illegible]=([illegible]*C*C)
       [illegible]*S
       A1[illegible]=[illegible].*[illegible]*A3*C*C)
       A1[illegible]=[illegible]((1.*[illegible])-([illegible]U*C*C))
       [illegible]((1.*[illegible]C)-(A[illegible]U*S*S))
       [illegible]=[illegible](-[illegible].*[illegible])*S
       [illegible]=-[illegible].[illegible]
       A17=-[illegible].*[illegible].*C1
       [illegible]-([illegible].-[illegible].*C1-4.*C2+2.*C5)
       [illegible]=1[illegible].-[illegible].*C2
       [illegible]=[illegible].-1.*C[illegible]
       [illegible]=1[illegible].-24.*C1+12.*C3
       [illegible]=[illegible].-[illegible].*C1
       [illegible]=[illegible].-[illegible].*C[illegible]+12.*C4
       [illegible]=[illegible].-[illegible].*C[illegible]+4.*C4
       [illegible]=[illegible].-[illegible]
       A2[illegible]=[illegible].-[illegible].*C[illegible]
       A27=-[illegible].*C1+2.*C2-4.*C3-4.*C5
       [illegible]=[illegible].-[illegible]
       [illegible]=-[illegible].*C1+12.*C2-6.*C5
       [illegible]=[illegible].-[illegible].*C[illegible]
       [illegible]=[illegible].-[illegible].*C[illegible]+4.*C3
       [illegible]=-[illegible].*C1-5.*C3
       [illegible]=[illegible].-[illegible].*C1-[illegible].*C2+4.*C5
       [illegible]-[illegible].*C3
       [illegible]-[illegible].*C4
       [illegible]-[illegible].*C4
       [illegible]=-[illegible].*C2-C4
       [illegible]=-[illegible].*C2-5.*C4
       [illegible]=-[illegible].*C1+[illegible].*C2-4.*C4-4.*C5
       [illegible]=-[illegible].*C2-[illegible].*C4
       [illegible].-[illegible].*C1-20.*C2+10.*C4+10.*C[illegible]
       [illegible].-[illegible].*C1-[illegible].*C2+4.*C3+4.*C4+16.*C[illegible]
       [illegible].-[illegible].*C1-[illegible].*C2+10.*C3+10.*C5
       [illegible]([illegible].*[illegible]*A7*C**3)
       [illegible]
       [illegible](-[illegible]-A17)-[illegible]*A6*S*A17*A16+A15*1.+[illegible]*A6*(-A16)+[illegible]*A7*(
     1-A1[illegible]))
       [illegible](1[illegible])=-(2.*[illegible]17*A17-[illegible]*A6*S*(-A17)+A15*(-A17)+[illegible]*A6*1.+[illegible]
```

```
1 [illegible], 17)
  [illegible](1[illegible])=-([illegible].*(A17*[illegible]-A1[illegible])-R*A5*S*(A17*[illegible]24+A16*[illegible])*[illegible](-[illegible]
 1-[illegible])*[illegible](-[illegible]A16*A2[illegible])*[illegible]A7*(A1[illegible]*A2[illegible]-A[illegible]))
  [illegible]([illegible])=-([illegible].*([illegible]+A17*A21)-[illegible]*(A17[illegible]-[illegible])*[illegible](-[illegible]
 1[illegible])*[illegible](-[illegible]-A[illegible])*[illegible]A7*(A[illegible]*A17*A[illegible]))
  [illegible]V([illegible])=-([illegible].*(A17*A20-A[illegible]+A[illegible]2*A17)-R*[illegible]*S*(A17[illegible]-A2[illegible] [illegible]
 1*[illegible](-[illegible]-A20)+[illegible]*A[illegible]*(A16*A50-A25-A1[illegible]) +[illegible](-[illegible]
 [illegible]))
  [illegible](1[illegible])=-([illegible].*(A17*A1[illegible]-A22+A1[illegible]*A17)-[illegible]*A6*S*([illegible]7*A24+A2[illegible] [illegible]-[illegible])
 [illegible]*(A17*[illegible]-A[illegible]-A1[illegible])+R2*A6*(-A2[illegible]*A1[illegible]*A53-A[illegible])+[illegible]2*[illegible](A17[illegible]
 [illegible]-[illegible]*A1[illegible]))
  [illegible](1[illegible])=-([illegible].*(A17*[illegible].5*A19*A1[illegible]*A2[illegible]*A22*A1[illegible]-3.*A1[illegible] A17*A1[illegible] - .[illegible]
 1[illegible])-R*[illegible]*S*(A17*[illegible].*A59*A16*A1[illegible]*A22*A26+3.*A1[illegible]*A21*A24*6.*[illegible]7*A1[illegible])
 [illegible]* 15*(-[illegible].*[illegible]-A25*A30+A17*4.*[illegible]*A1[illegible]*A53*[illegible]A26*A25-[illegible])
 [illegible]*([illegible].5*A2[illegible]*A24*A30-[illegible]*A2[illegible]*A33*A1[illegible]*A21-2.*[illegible])*[illegible]
 [illegible](-[illegible].*[illegible]*A16*A17*A40*A1[illegible] * A1[illegible]*A20*A25*0.5*A2[illegible]*A1[illegible]))
  [illegible]V(1[illegible])=-([illegible].*(A17*2.*A27*A21*A1[illegible]*A22*A2[illegible]0-4.*A32*A16*A21*[illegible].*A27*A17
 1)-[illegible]*([illegible]17*0.5*A29*A21*A2[illegible]6 +A22*A18*A16*4.*A32*A16*A2[illegible]-[illegible].*A27)
 2*A15*(A17*1.5*A25*A31*A26-4.*A27*A20*A35*A18*A26-2.*A27)*[illegible]
 3(-1.[illegible]*A2[illegible]*A2[illegible]*A2[illegible] +A16*4.*A27*A18*A35*A26*A30-0.5*A25)*[illegible]2*[illegible]7*
 4(A17*6.*[illegible]*A31*A23-A29*A20*A19*A18*A16+2.*A27*A16))
  EQUIVALENCE ([illegible],[illegible])
30 FORMAT(/[illegible],4E16.[illegible]))
   CALL GI[illegible]77(A,[illegible])
   DO 15 I=1,[illegible]
   [illegible]S(I)=0.0
   DO 15 J=1,[illegible]
15 [illegible]S(I)=[illegible]S(I)+A(I,J)*[illegible]V(J)
   [illegible]2=[illegible]S([illegible])
   D3=[illegible]S([illegible])
   D4=[illegible]S([illegible])
   D5=[illegible]S([illegible])
   D[illegible]=[illegible]S([illegible])
   D7=[illegible]S([illegible])
   [illegible]=[illegible]S([illegible])
   D9=[illegible]S([illegible])
   [illegible]=[illegible]S([illegible])
   E3=[illegible]S([illegible])
   E4=[illegible]S([illegible])
   E5=[illegible]S([illegible])
   E[illegible]=[illegible]S([illegible])
   E7=[illegible]S([illegible])
   [illegible]=[illegible]S([illegible])
   [illegible]=[illegible]S([illegible])
   [illegible] D2,D3,D4,D5,[illegible],D7,D[illegible],D9,E2,E3,E4,E5,E6,E7,[illegible],[illegible]
5[illegible] FORMAT([illegible]=E16.8,4H D3=E16.[illegible],4H D4=E16.8/4H D5=E16.[illegible],4H D6=E16.
 1,4H D7=E[illegible]/4H D8=E16.8,4H D9=E16.8,4H E2=E16.8/4H E3=E16.[illegible],[illegible]
 2[illegible] E4=E[illegible],4H E5=E16.8/4H E6=E16.8, 4H E7=E16.8,4H E[illegible]=E16.[illegible]/
 3[illegible]=E[illegible])
   CALL [illegible]([illegible])
   END
[illegible]
[illegible]
   D(2)=[illegible]*C*(D2*A23+A16*(-3.*D2+7.*D4))-2.*R2*R*S*C*(D2*A26
```

```
 [illegible]*C**3*S*(D2*A1[illegible]+A17*(-3.*D2+3.*D4))-[illegible]
 [illegible](-D5*D7))*2.*R2*C*S*S*([illegible]-D7)-[illegible]
 [illegible](-[illegible])))
  U(1)=U(1)+[illegible](R2*R2*(A16*A16*A16)-2.*R2*R*S*(-A17*A16)+[illegible]
 1(A17*A16*A16)-[illegible]*S*(-A16*A16)+4.*R2*S*S*(A16)-2.*[illegible]
 2(-A17*A16)+R2*S*S*(A16)-2.*R*S*[illegible](-1.)+S**4*(A17))
  U(1)=U(1)+[illegible]*C*C*(E3*A22+A16*(-E3*E7))-2.*[illegible]
 1*[illegible]-A17)+[illegible]*C*S*[illegible](E3*A1[illegible]+A17*(-E3*E7))+0.5*C*C*R2*(A16)-[illegible]
 2(-1.)+0.[illegible]*C*S*S*(A17))
  U(1)=U(1)+[illegible]*C**4*(E3*A16+A17*(-E3*E7))+0.5*C**4*(A17)+[illegible]
 1*(D2*A1[illegible]+A17*(-3.*D2+3.*D4))-R*S*C**3*(D3*A21+A17*(-D3+D7))+[illegible]
 2*C*C*(R2*(A17*A16*A16)-2.*R*S*(-A17*A16)+S*S*(A17)))
  U(2)=U(2)+(1.-A16)*(R2*C**3*(D3*A25+D3-D7)-R*S*C**2*(D3*A[illegible]-A17*
 1(-D3+D7))+R2*R*C*C*(E2*A26+3.*E2-3.*E4)-R2*S*C*C*(E2*A1[illegible]
 2A17*(-3.*E2+3.*E4))-R2*S*C*C*(E3*A26+E3-E7)+R*S*S*C*C*([illegible]
 3A17*(-E3+E7))+R2*C*C*(A16)-R*S*C*C*(-A17*A16)-R*S*C*C*(-1.)
 4+S*S*C*C*(A17))
  U(2)=U(2)*12.
  CALL LIN(KJS,K6)
*LDISKKUS[illegible]
  U(3)=[illegible]*C*(D2*A16+A16*(-D2+D6))-2.*R2*[illegible]*S*C*([illegible]-[illegible])
 1+R2*C*S*S*(D2*A21+A17*(-D2+D6))-R2*R*C*S*(D3*A16+A16*(-3.*D3+3.*D5
 2))+2.*R2*C*S*S*(D3*A30+3.*D3-3.*D5)-R*C*S**3*(D3*A21+A17*(-3.*D3
 3+3.*D5)))
  U(3)=U(3)+0.5*(R2*R2*(A16)-2.*R2*R*S*(-1.)+R2*S*S*(A17)-2.*[illegible]
 1(-A16*A17)+[illegible]*R2*S*S*(A17)-2.*R*S**3*(-A17*A17)+R2*S*S*(A16*A17
 2*A17)-2.*R*S**3*(-A17*A17)+S**4*(A17*A17*A17))
  U(3)=U(3)+[illegible]*(R2*R*C*C*(E3*A16+A16*(-3.*E3+3.*E5))-2.*R2*C*C*[illegible]
 1(E3*A30+3.*E3-3.*E5)+R*C*C*S*S*(E3*A21+A17*(-3.*E3+3.*E5))+[illegible]
 2*C*C*[illegible]([illegible]*A17*A17)-R*S*C*C*(-A17*A17)+0.5*C*C*S*S*(A17*A17*A17))
  U(3)=U(3)+[illegible]*C**4*(E3*A21+A17*(-3.*E3+3.*E5))+0.5*C**4*([illegible]*A17*A17
 1)+[illegible]*(R*C**3*(D2*A21+A17*(-D2+D6))-R*S*C**3*(D3*A21+A17*(-3.*D
 2+3.*D5))+0.5*C*C*(R2*(A17)-2.*R*S*(-A17*A17)+S*S*(A17*A17*A17)))
  U(3)=U(3)+(1.-A16)*(R2*C**3*(D3*A30+3.*D3-3.*D5)-R*S*C**2*(D3*A21
 1+A17*(-3.*D3+3.*D5))+R2*R*C*C*(E2*A30+E2-E6)-R2*S*C*C*(A21*[illegible]17
 2*(-E2+[illegible]))-R2*S*C*C*(E3*A30+3.*E3-3.*E5)+R*S*S*C*C*(E3*A21+A17*(
 3-3.*E3+3.*E5))+R2*C*C*(A17)-R*S*C*C*(-A17*A17)-R*S*C*C*(-A17*A17)
 4+S*S*C*C*(A17*A17*A17))
  U(3)=U(3)*12.
  CALL LIN(KJS,K5)
*LDISKKUS[illegible]
  U(4)=[illegible]*C*(D2*A35+A16*(-5.*D4)+A23*(-3.*D2+3.*D4))-2.*R2*R*S*C
 1*(D2*[illegible]+5.*D4+A26*(-3.*D2+3.*D4))+R2*C*S*S*(D2*A39-5.*D4*A17+[illegible]
 2(-3.*D2+3.*D4))-R2*R*C*S*(D3*A35-D7*A16+A23*(-D3+D7))+2.*R2*C*S*S*
 3(D3*[illegible]-D7*[illegible]*(-D3+D7))-R*C*S**3*(D3*A39-D7*A17+A16*(-D3+D7)))
  U(4)=U(4)+[illegible]*(R2*R2*(A16*2.*A16*A24+A23*A16*A16)-2.*R2*R*S*(-1.*
 1*A16*[illegible]*A16)+R2*S*S*(2.*A16*A24*A17+A16*A16*A16)-2.*R2*[illegible]
 2*([illegible]-A24+A25*A16)-A16*A23)+4.*R2*S*S*(A24-A25*A16-A1[illegible])-2.*
 3*S*[illegible]*A17*(-A24+A25*A16)-A16*A1[illegible])+R2*S*S*(-2.*A25*A16+A23)-2.*[illegible]
 4S**3*([illegible]*A26)+S**4*(-2.*A25*A17+A16))
  U(4)=U(4)+[illegible]*(R2*R*C*C*(-E7*A16+E3*A35+A23*(-E3+E7))-2.*R2*C*C*S*
 1(E3*[illegible]+A26*(-E3+E7))+R*C*C*S*S*(-E7*A17+E3*A39+A16*(-E3+E7))
 2*[illegible](-2.*A25*A16+A23)-R*S*C*C*(2.*A25+A26)+0.5*C*C*S*S*
 3(-2.*[illegible]*A17+A16))
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[illegible] 18

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      CALL LI[illegible]( [illegible]SA10)
*[illegible]
      U([illegible])=[illegible]C*[illegible](-[illegible]7*A17*[illegible]*A1[illegible](-[illegible]*[illegible]7))+[illegible]
     1*A17*[illegible]*(A[illegible]C*[illegible](D2*A3[illegible]-[illegible].*D4*A17*A1[illegible]*(-2.*[illegible]))-
     [illegible]C*[illegible]-[illegible]7*A17*A1[illegible]*(-D[illegible]*D7))+0.5*C*C*(D2*(2.*A16[illegible]
     [illegible])-[illegible]*S*(A17*(-A24+A25*A16)-A16*A1[illegible])+[illegible]*S*(-2.*[illegible]17
     [illegible]))
      U([illegible])=U([illegible])+(1.-A[illegible])*(R2*C**3*([illegible]*A3[illegible]*D7*A26*(-D3+[illegible]7))-[illegible]
     1(D3*A3[illegible]-[illegible]7*A17*(-D5+D7))+[illegible]C*C*([illegible]-
     2*2.*[illegible])-[illegible]*S*C*C*(-[illegible]*A16*(-3.*E2+3.*E4))-A2*[illegible]
     3(E7*A[illegible]*A26*(-E5+E7))+R*S*S*C*C*(-E7*A17+A39*E3+A1[illegible]*(-[illegible]))
     4+R2*C*C*([illegible]-A25*A16-A16*A26))
      U(4)=U(4)+(1.-A[illegible]U)*(-R*S*C*C*(A17*(-A24+A25*A16)-A16*A1[illegible])-[illegible]
     1(2.*A2[illegible])+S*S*C*C*(-2.*A25*A17+A1[illegible]))
      U(4)=U(4)*12.
      CALL LI[illegible]S(R[illegible]SA11)
*LDISKR[illegible]S11
      U(5)=([illegible]*C*(D2*A27-D6*A16+A18*(-D2+D6))-2.*R2*R*S*C*([illegible]
     1+[illegible](-[illegible]))+R2*C*S*S*(D2*A34-D6*A17+A21*(-D2+D6))-R2*[illegible]27
     2*D3-5.*[illegible]*(-3.*D3+3.*D5))+2.*R2*C*S*S*(D3*A32+5.*[illegible]
     3(-3.*[illegible]))-R*C*S**3*(D3*A34-5.*D5*A17+A21*(-3.*D3+3.*[illegible]))
      U(5)=U(5)+[illegible]*(R2*R2*(-2.*A28*A16+A1[illegible])-2.*R2*R*S*(2.*A2[illegible]+A[illegible])+R2*
     15*S*(-[illegible]*A17+A21)-2.*R2*R*S*(A16*(A17*A28-A31)-A17*A1[illegible])+4.*R2*
     2S*S*(-A17*A28+A31-A17*A30)-2.*R*S**3*(A17*(A17*A28-A31)-A17*A21)
     3+[illegible](A16*2.*A17*A31+A16*A17*A17)-2.*R*S**3*(-2.*A17*A31+A30
     4*A17*A17)+S**4*(2.*A17*A31*A17+A21*A17*A17))
      U(5)=U(5)+[illegible]*(R2*R*C*C*(-5.*E5*A16+A27*E3+A1[illegible]*(-3.*E3+3.*E5))-2.*
     1[illegible](3.*[illegible]*A32+A30*(-3.*E3+3.*E5))+R*C*C*S*S*(-5.*[illegible]*A17
     2[illegible]21*(-3.*E3+3.*E5))+0.5*C*C*R2*(2.*A17*A31*A16+A1[illegible]*A17
     3*A17)-[illegible](-2.*A17*A31+A30*A17*A17)+0.5*C*C*S*S*(2.*A17*A31
     4*A17+[illegible]*A17*A17))
      CALL LI[illegible](R[illegible]SA12)
*LDISKR[illegible]S12
      U(5)=U(5)+[illegible]**4*(-5.*E5*A17+A34*E3+A21*(-3.*E3+3.*E5))+0.5*[illegible]
     1(2.*A17[illegible]A17*A21*A17*A17)+ANU*(R2*C**3*(D2*A34-D6*A17+A21*(-D2
     2+D6))-[illegible](D3*A34-5.*D5*A17+A21*(-3.*D3+3.*D5))+0.5*C*C*([illegible]
     3[illegible]-[illegible])-2.*R*S*(-A17*A21+A17*(A17*A28-A31))+S*S*([illegible]*A17
     4[illegible]*A17*A17)))
      U(5)=U(5)+(1.-ANU)*(R2*C**3*(D3*A32+5.*D5+A30*(-3.*D3+5.*[illegible]))
     1-[illegible](D3*A34-5.*D5*A17+A21*(-3.*D3+3.*D5))+R2*R*C*C*([illegible]
     2*A2[illegible](-[illegible]))-R2*S*C*C*(-E6*A17+A34*E2+A21*(-E2+E6))-[illegible]
     3*(5.*[illegible]*A30*(-3.*E3+3.*E5))+R*S*S*C*C*(-5.*E5*A17+[illegible]
     4+A21*(-[illegible]3+3.*E5))+R2*C*C*(-A17[illegible]A28+A31-A17*A30))
      U(5)=U(5)+(1.-ANU)*(-R*S*C*C*(A17*(A17*A28-A31)-A17*A21)-[illegible]*S*C*C*
     1(-2.*A17[illegible]+A30*A17*A17)+S*S*C*C*(2.*A17*A31*A17+A21*A17*A17))
      U(5)=U(5)*1[illegible].
      CALL LI[illegible](R[illegible]SA13)
*LDISKRJS 13
      U(6)=([illegible]C*(D2*6.*A39+(-3.*D2+3.*D4)*A1[illegible]+(-2.*D3+2.*D7)*[illegible]+
     1(-D2+D6)[illegible](3.*D2-3.*D4-3.*D6+3.*D8)*A16)-2.*R2*R*S*C*(1.*[illegible]
     2*[illegible]+(-[illegible])*A30+(-2.*D3+2.*D7)*A33+(-D2+D6)*A26-3.*[illegible]+3.*[illegible]
     3+3.*[illegible]-3.*[illegible])+R2*C*S*S*(6.*A27*D2+(-3.*D2+3.*D4)*A21+(-2.*[illegible]+2.*[illegible]
     4)*A22+(-[illegible])*A16+(3.*D2-3.*D4-3.*D6+3.*D8)*A17))
      U(6)=U(6)+(-R2*R*C*S*(A16*(3.*D3-3.*D5-3.*D7+3.*D9)+A23*(-3.*[illegible]
```

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[illegible] 17

      [illegible])*[illegible](-[illegible]*[illegible].*[illegible])+[illegible](-[illegible]+D7)+[illegible]*[illegible])*2.*[illegible]
     1(1.[illegible]*[illegible](-[illegible]+D7)+(-2.*[illegible]+2.*[illegible])*A23+(-3.*[illegible]+3.*[illegible]
     2-3.*[illegible]-3.*D9)-[illegible]*C*S**[illegible](D[illegible].*A27+(-[illegible]+D7)[illegible](-2.[illegible]
     3*1.*[illegible])+[illegible](-[illegible]*D[illegible]+2.*D[illegible])*A1[illegible]+(3.*D[illegible]-3.*D[illegible]-3.*[illegible]7+3.*[illegible])[illegible]))
      U(6)=U(6)+[illegible]*(A1[illegible]*(A1[illegible](2.*A16*A1[illegible]-[illegible].*A22)+[illegible]-2.*[illegible]
     1*A16*A[illegible])-2.*A2*A*S*(-2.*A16*A1[illegible]+2.*[illegible]*A26-2.*A16*A[illegible]
     2*A16*A1[illegible]+[illegible]*S*S*(A16*A16*A21-2.*A16*A22+A[illegible]+A17*(2.*A[illegible]-2.
     3*A[illegible]))-[illegible]*S*(A16*(-A16+A20*A16-A16+A17*A26)-A17*A2[illegible]*A[illegible]
     4*(1.+A17*A16)-A16*A16))
      CALL L[illegible](KJS,14)
*L[illegible](JSA14
      U(6)=U(6)+[illegible]*( 4.*A2*S*S*(A16-A20*A[illegible]+A1[illegible]-A17*A26-A17*A2[illegible]
     1(1.+A17*A16)-A16*A30)-2.*A*S**3*(A17*(-A1[illegible]+A20*A16-A1[illegible]+A17*A[illegible]
     2-A16*A17*A2[illegible]*(1.+A17*A16)-A21*A16)+A2*S*S*(A16*(-2.*A20+2.*A17
     3*A1[illegible])+A[illegible]*A17*A17-2.*A17*A19+A18))
  112 U(6)=U(6)+[illegible]*(-2.*A*S**3*(2.*A20-2.*A17*A1[illegible]+A26*A17*A17*A[illegible]
     1(-2.*A17)+A[illegible])+S**4*(A17*(-2.*A20+2.*A17*A16)+A18*A17*A17
     2-2.*A17*A22+A21))
      U(6)=U(6)+[illegible]*(A2*A*C*C*(A16*(3.*D3-3.*D5-3.*D7+3.*D9)+A21*
     1(-[illegible].*[illegible]+[illegible].*[illegible])+A1[illegible]*(-2.*D2+2.*D6)+A1[illegible]*(-D3+D7)+[illegible].*[illegible])
     2-[illegible].*A2*A*C*[illegible](-3.*D3+3.*D5+3.*D7-3.*D9)+A2[illegible]*(-3.*[illegible]+3.*[illegible])+[illegible]
     3(-2.*[illegible]+2.*[illegible])+A2[illegible]*(-D3+D7)+1.5*A2[illegible]*D[illegible]))
      U(6)=U(6)+[illegible]*(A*C*C*A*S*S*(A17*(3.*D3-3.*D5-3.*D7+3.*D9)+[illegible]
     1(-3.*[illegible]+[illegible].*[illegible])+A22*(-2.*D2+2.*D[illegible])+A21*(-D3+D7)+[illegible].*A27*D3)
     2[illegible].5*C*C[illegible]*(-2.*A20+2.*A17*A1[illegible])+A23*A17*A17-2.*A17*A[illegible])
     3-[illegible]*S*C*C*([illegible].*A[illegible]-2.*A17*A16+A26*A17*A17-2.*A17*A3[illegible]+A[illegible])+[illegible].[illegible]
     4*S*(A17*(-2.*A[illegible]+2.*A17*A16)+A18*A17*A17-2.*A17*A22+A21))
      CALL L[illegible](KJS,15)
*L[illegible]
      U(6)=U([illegible])+[illegible]*C**4*(A17*(3.*D3-3.*D5-3.*D7+3.*D9)+A16*(-[illegible].*[illegible]+[illegible].*[illegible])
     1*A[illegible]*(-[illegible].*[illegible]+2.*D[illegible])+A21*(-D3+D7)+[illegible].*A27*D3)+[illegible].5*C**4*(A17*(-2.*[illegible]
     2+2.*A17*A1[illegible])+A1[illegible]*A17*A17-A22*2.*A17+A21)
      U(6)=U(6)+[illegible]*A2*C**3*(D2*[illegible].*A27+(-3.*D2+3.*D4)*A21+(-2.*[illegible]
     1+2.*[illegible]7)*A22+(-D2+D6)*A1[illegible]+(3.*D2-3.*D4-3.*D6+3.*D8)*A1[illegible])-[illegible]*C**[illegible]*
     2([illegible].*[illegible]-D3+(-D3+D7)*A21+(-2.*D2+2.*D6)*A22+(-3.*D3+3.*D5)*A[illegible]+
     3(3.*[illegible]-[illegible]-3.*D7+3.*D9)*A17)+[illegible].5*C*C*(A2*(A16*A16*A21-2.*A16
     4*A22+[illegible](2.*A16*[illegible]-2.*A23)*A17)))
      U(6)=U(6)+[illegible]*([illegible].5*C*C*(-2.*A*S*(A17*(-[illegible]+A20*A16-A1[illegible]+A17*A26)
     1-A16*A17*[illegible](1.+A17*A16)-A21*A16)+S*S*(A17*(-2.*A20
     2+2.*A17*A1[illegible])+A18*A17*A17-2.*A17*A22+A21)))
      U(6)=U(6)+[illegible].-[illegible])*(A2*C**3*(1.5*A29*D3+(-D3+D7)*A30+(-2.*D2
     1+2.*D6)*A31+(-3.*D3+3.*D5)*A26-3.*D3+3.*D5+3.*D7-3.*D9)-A*S*C**3*
     2([illegible].*[illegible]-D3+(-D3+D7)*A21+(-2.*D2+2.*D6)*A22+(-3.*D3+3.*D5)*A16
     3+(3.*[illegible]-[illegible].*[illegible]-3.*D7+3.*D9)*A17))
      CALL L[illegible](KJS,16)
[illegible]7[illegible]249[illegible]2402511963611300[illegible]0200
[illegible]
[illegible]
[illegible]
[illegible]
      U(6)=U(6)+([illegible].-[illegible])*(A2*A*C*C*(-3.*E2+3.*E4+3.*E6-3.*E8)+A2[illegible]*(-[illegible]
     1*[illegible]*(-2.*E3+2.*E7)+A30*(-3.*E2+3.*E4)+1.5*A29*E2)-[illegible]
     2*A17*(3.*E2-3.*E4-3.*E6+3.*E8)+A1[illegible]*(-E2+E6)+A22*(-2.*E3+2.*E7)+[illegible]
     3*(-3.*[illegible]+3.*E4)+3.*A27*E2))
```

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[illegible]75 15[illegible]20[illegible]70 24[illegible]24[illegible]2 119 635[illegible]1500[illegible]
[illegible]
      [illegible]FLECTI[illegible]
      [illegible]S[illegible] ([illegible]),[illegible](6)
      [illegible],C2,C3,C4,C[illegible]
     1 [illegible]
      [illegible],C1,C2,C3,C4,C[illegible],[illegible]7,[illegible]
     1 [illegible]
      [illegible]
      [illegible]
      [illegible](5)[illegible]
      [illegible]*S*C*C*([illegible]17*[illegible](2[illegible])+[illegible](16)-2.*[illegible]
     1[illegible](22)+[illegible](1[illegible])*[illegible](1)+[illegible]2.*F1*[illegible]2+[illegible](2)*[illegible](14)+[illegible]
     [illegible]))
      [illegible]((1./2.)*C*C*([illegible]2*(2.*([illegible]
     1[illegible]17-[illegible]*F1*A1[illegible])+2.*[illegible]2*(2.*[illegible]17-[illegible]20)+[illegible]
     [illegible](1))-2.*[illegible]5*(2.*(-(5.*F1*[illegible]17*[illegible](1)+2.*F1*[illegible]
     [illegible]17*[illegible]1*A1[illegible])-2.*F2*[illegible]17*A17-4.*[illegible](1)*A17-3.*F1)))
      [illegible]((1./2.)*C*C*(S*S*(2.*([illegible]17*(2.*F1*A1[illegible]+A17*[illegible](1)+5.
     1*F1)+2.[illegible]-2.*F1*A22)+2.*F1*(2.*[illegible]17-2.*[illegible])+[illegible](1)
     [illegible]17*[illegible]17*F1+[illegible](2)))))
      [illegible]17*[illegible](24)+[illegible](1[illegible])-2.*[illegible]22*[illegible]21*[illegible](13)+[illegible]27
     1[illegible]+2.*[illegible](1)*[illegible](1[illegible])+12.*[illegible]2*F1+[illegible](2)*[illegible](14)+[illegible](4)*[illegible]
     2*(1./2.)*[illegible]17*(2.*F1*[illegible]17*[illegible](1)+5.*F1)+2.*F1*A17*[illegible]
     [illegible]-[illegible]*F1*(2.*A1[illegible]*A17-2.*A20)+[illegible](1)*A17*A17+12.*F1
     [illegible]17*[illegible]))
      [illegible]*S*(F2*[illegible]27*[illegible](11)*[illegible]21-2.*[illegible]2*A22+[illegible]
     1[illegible](4)+[illegible](12)*[illegible](2)+[illegible]2.*F1*[illegible](1)*[illegible](17)+2.*[illegible]))
     [illegible]17*[illegible].*([illegible]2-[illegible]23)*[illegible]2.*([illegible]-[illegible])-[illegible]21+2.*F1*[illegible]
     [illegible]-1[illegible](2))+(1./2.)*[illegible]2*C*C*(2.*(A17*(2.[illegible]
     [illegible])-[illegible]2*[illegible]22+2.*[illegible]21)))))
      [illegible]*C*C*(2.*F1*(2.*[illegible]A16-2.*[illegible]26)+[illegible](1)+[illegible]
     [illegible](2))-2.*[illegible]*S*C*C*(A17*(2.*F1*[illegible](1)-3.*[illegible]
     [illegible]1*A16*[illegible]22*A17*(2.*F1*[illegible]-5.*F2*A17-[illegible](1))+2.*[illegible]
     [illegible]17*[illegible]-2.*[illegible]21+2.*F1*([illegible]25*A17-2.*A1[illegible]+A16*[illegible]20)-[illegible]17*[illegible](1)
     [illegible]16*[illegible](2)))))
      [illegible]((1./2.)*(C*C*S*S*(2.*([illegible]17*(2.*F1*[illegible]+A17*[illegible](1)
     1+5.*F1)+2.*F1*[illegible]17*A1[illegible]-2.*F1*A22)+2.*F1*(2.*A18*[illegible]17-2.*A20)
     2+[illegible]17*[illegible](1)+12.*A17*F1+B(2))))))
```

```
[illegible]
[illegible](1)=[illegible](-[illegible])[illegible](1)*([illegible])
[illegible](-[illegible](1)-[illegible](1))[illegible]
[illegible]
[illegible]
[illegible]
7[illegible]
[illegible]
[illegible](1)+12.*[illegible](2)[illegible]
[illegible](1)-[illegible]
[illegible](1)*(1.+[illegible]17)[illegible]16))
[illegible]*(-[illegible]*S*C*C*(A17*(2.[illegible]A17-[illegible]
[illegible](1)-[illegible]
[illegible](1)*[illegible]
[illegible](2)))
[illegible]*(-[illegible]*S*C*C*(2.*(-(3.*F1*A17*[illegible](1)*[illegible]
[illegible]*F1*A33)-3.*F2*A17*A17-4.*A17*[illegible](1)-3.*F[illegible]
[illegible](1)+2.*F1*A1[illegible])+2.*F1*A17*A1[illegible]-2.[illegible]F1*A22)
[illegible]*A17-2.*A33))+A17*A17*[illegible](1)+12.*A17*F1*[illegible](2)))
[illegible]
[illegible](V(I),I=1,6)
[illegible]
[illegible]
1.          [illegible]          0.33333   0.24566474[illegible].24566474[illegible].01011561[illegible].01[illegible].167[illegible]
[illegible]-2.3297676[illegible]2.7710021[illegible]7-0.5056[illegible]0.4[illegible]-2.32[illegible]
[illegible]-0.[illegible]2.7710021710.4[illegible]0.7576425[illegible]0.757642[illegible]-0.075[illegible]-0.075[illegible]
[illegible]17
-1.7[illegible]-[illegible]0.7720067[illegible]-7.3094955-4.2148797-7.2560167-1.7[illegible]0.772[illegible]
-2.[illegible]-4.[illegible]797-7.3094954-7.2560161
[illegible]
[illegible]
[illegible]
[illegible]
      [illegible](12,12),V(6),A(12,12),ANS(12),[illegible](12,12),[illegible]V(12),
     [illegible]
      [illegible],C1,C2,C3,C4,C5,D1,D2,D3,D4,D5,D6,E1,E2,E3,E4,[illegible]
     [illegible]4,F5,G1,G2,G3,G4,G5,G6,H1,H2,H3,H4,H5,H6,Y1,Y2,Y3,
     [illegible],U,LV
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
  1[illegible]10.5,5H ANU=F10.5,4H AK=F10.5)
[illegible]
[illegible]
      [illegible]-14.[illegible]
      [illegible]-4.
[illegible]
      [illegible]3.
[illegible]
      [illegible]=-3.
```

```
      SM(2,1)=360.*R4+[illegible].+192.*R2+24.
      SM(2,2)=4[illegible].*R2+96.
      SM(2,3)=-7[illegible].*R4-96.*R2
      SM(2,4)=-4[illegible].
      SM(2,5)=-[illegible].*R2-4[illegible].
      SM(2,6)=0.
      SM(3,1)=9[illegible].*R4+4[illegible].*R2
      SM(3,2)=[illegible].*R[illegible]+192.*R2+360.+AK
      SM(3,3)=-4[illegible].*R4
      SM(3,4)=-96.*R2-720.
      SM(3,5)=-[illegible].*R2-48.*R4
      SM(3,6)=0.
      SM(4,1)=-2[illegible].*R2-4[illegible].-2.*AK
      SM(4,2)=-4[illegible].
      SM(4,3)=1[illegible].*R4+24.+4[illegible]0.*R2+AK
      SM(4,4)=[illegible]4.
      SM(4,5)=1[illegible].*R2+96.
      SM(4,6)=0.
      SM(5,1)=-[illegible].*R4
      SM(5,2)=-4[illegible].*R4-240.*R2-2.*AK
      SM(5,3)=[illegible].*R4
      SM(5,4)=24.*R4+[illegible]0.*R2+16[illegible].+AK
      SM(5,5)=120.*R2+9[illegible].*R4
      SM(5,6)=0.
      SM(6,1)=-720.*R4-57[illegible].*R2-2.*AK
      SM(6,2)=-576.*R2-720.-2.*AK
      SM(6,3)=1440.*R4+2[illegible].*R2
      SM(6,4)=[illegible].*R2+1440.
      SM(6,5)=3[illegible]0.*R4+1152.*R2+360.+AK
      SM(6,6)=0.
      V(1)=-(24.*R4+32.*R2+24.+AK)
      V(2)=2.*AK-(-96.*R2-48.)
      V(3)=2.*AK-(-4[illegible].*R4-96.*R2)
      V(4)=-AK-2[illegible].
      V(5)=-AK-24.*R4
      V(6)=-2[illegible].*R2-4.*AK
      DO [illegible] [illegible]=1,6
      DO 15 [illegible]=1,6
   15 [illegible]([illegible],[illegible])=S[illegible]([illegible],[illegible])
      [illegible]=6
      EQUIVALENCE(S[illegible],A)
      PUNCH [illegible],((A(I,J),J=1,N),I=1,N)
      PUNCH [illegible],(V(J),J=1,N)
   36 FORMAT(/(6X,5E16.8))
      CALL A[illegible]V77(A,N)
      DO 13 I=1,N
      ANS(I)=0.
      DO 13 J=1,N
   13 ANS(I)=ANS(I)+A(I,J)*V(J)
    6 FORMAT(/(5X,4E16.8))
      C1=ANS(1)
      C2=ANS(2)
      C3=ANS(3)
      C4=ANS(4)
```

```
      C5=A.S(5)
      ALPH1=A.S(6)
      W[illegible] 37,C1,C2,C3,C4,C5,ALPH1
      DO 14 I=1,[illegible]
      V(I)=0.
      DO 14 J=1,[illegible]
   14 V(I)=V(I)+[illegible](I,J)*[illegible]S(J)
      [illegible] 36,(V(I),I=1,6)
   37 FORMAT(4H C1=F16.[illegible],4H C2=F16.[illegible],4H C3=F16.[illegible]/4H C4=F16.[illegible],
     14H C5=F1[illegible].[illegible],7H ALPH1=F16.[illegible])
      CALL LINK(RJ[illegible]2)
      END
          3
  0.[illegible]       0.[illegible]          0.
[illegible]
*L[illegible]IS[illegible]
      [illegible]=12
      DO 21 I=1,12
      D[illegible] 21 J=1,12
   21 [illegible](I,J)=[illegible].
      [illegible](1,1)=-1[illegible].[illegible]2*[illegible]-2.*[illegible]*(1.-ANU)
      [illegible](1,2)=[illegible]2.[illegible]2*[illegible]
      [illegible](1,[illegible])=[illegible].*[illegible]*(1.-[illegible])
      [illegible](1,7)=-[illegible].*(1.-[illegible])*R2
      [illegible](1,[illegible])=2.*(1.+[illegible])*R2
      [illegible](2,[illegible])=[illegible].*[illegible](1.-ANU)
      [illegible](2,[illegible])=-[illegible].[illegible]*(1.-[illegible])-4).*R2*R
      [illegible](2,[illegible])=-[illegible].[illegible]*(1.-ANU)
      [illegible](2,[illegible])=[illegible].*[illegible]2*[illegible]
      [illegible](2,[illegible])=[illegible].*[illegible]*(1.-ANU)
      [illegible](2,[illegible])=-[illegible].*(1.+ANU)*R2
      [illegible](2,[illegible])=[illegible].*(1.+ANU)*R2
      [illegible](3,[illegible])=[illegible].[illegible]2*R
      [illegible](3,2)=-[illegible].[illegible]2*[illegible]
      [illegible](3,[illegible])=-12.*[illegible]2*R-12.*R*(1.-ANU)
      [illegible](3,[illegible])=12.*[illegible]*(1.-ANU)
      [illegible](3,[illegible])=12.*[illegible]2*[illegible]
      [illegible](3,[illegible])=[illegible].*(1.+[illegible])*R2
      [illegible](3,[illegible])=-[illegible].*(1.+[illegible])*R2
      [illegible](3,[illegible])=-[illegible].*(1.+ANU)*R2
      [illegible](3,12)=3.*(1.+ANU)*R2
      [illegible](4,[illegible])=[illegible].*[illegible](1.-[illegible]U)
      [illegible](4,[illegible])=-[illegible].*[illegible]2*R-2.*R*(1.-ANU)
      [illegible](4,[illegible])=-[illegible].*[illegible]*(1.-ANU)
      [illegible](4,11)=-[illegible].*(1.+ANU)*R2
      [illegible](5,[illegible])=12.*[illegible]2*R
      [illegible](5,[illegible])=-12.*[illegible]2*R-30.*R*(1.-ANU)
      [illegible](5,[illegible])=-12.*R2*R
      [illegible](5,[illegible])=[illegible].*(1.+[illegible])*R2
      [illegible](5,[illegible])=-1[illegible].*[illegible]2*(1.+A[illegible]U)
      [illegible](5,12)=-[illegible].*(1.+ANU)*R2
      [illegible](6,[illegible])=[illegible].*[illegible]2*[illegible]
      [illegible](6,5)=12.*[illegible]*(1.-ANU)
      [illegible](6,[illegible])=-[illegible].*R2*R
```

```
      [illegible](6,[illegible])=-[illegible].*[illegible]*(1.-[illegible])
      [illegible]([illegible],[illegible])=-[illegible].*[illegible]-12.*[illegible]*(1.-ANU)
      [illegible]([illegible],[illegible])=[illegible].*(1.+[illegible])*[illegible]2
      [illegible]([illegible],11)=-[illegible].*(1.+[illegible])*[illegible]2
      [illegible]([illegible],1[illegible])=-[illegible].*(1.+[illegible])*[illegible]2
      [illegible](7,1)=-[illegible].*(1.+[illegible])*[illegible]2
      [illegible](7,[illegible])=[illegible].*(1.+[illegible])*[illegible]2
      [illegible](7,7)=-[illegible].*[illegible]-2.*(1.-[illegible]U)*[illegible]2*[illegible]
      [illegible](7,[illegible])=[illegible].*[illegible]
      [illegible](7,[illegible])=[illegible].*(1.-[illegible])*[illegible]2*[illegible]
      [illegible]([illegible],2)=-[illegible].*(1.+[illegible])*[illegible]2
      [illegible]([illegible],[illegible])=[illegible].*(1.+[illegible])*[illegible]2
      [illegible]([illegible],7)=[illegible].*(1.-[illegible])*[illegible]2*[illegible]
      [illegible]([illegible],[illegible])=-[illegible].*[illegible]-[illegible].*(1.-A[illegible]U)*[illegible]2*R
      [illegible]([illegible],[illegible])=-[illegible].*(1.-A[illegible]U)*[illegible]2*[illegible]
      [illegible]([illegible],1[illegible])=[illegible].*[illegible]
      [illegible]([illegible],12)=[illegible].*(1.-[illegible]U)*[illegible]2*[illegible]
      [illegible](9,1)=[illegible].*(1.+[illegible])*[illegible]2
      [illegible]([illegible],[illegible])=-[illegible].*(1.+[illegible]U)*[illegible]2
      [illegible]([illegible],[illegible])=-[illegible].*(1.+[illegible]U)*[illegible]2
      [illegible]([illegible],[illegible])=[illegible].*(1.+[illegible]U)*[illegible]2
      [illegible]([illegible],[illegible])=[illegible].*[illegible]
      [illegible]([illegible],[illegible])=-1[illegible].*[illegible]
      [illegible]([illegible],[illegible])=-1[illegible].*[illegible]-12.*(1.-A[illegible]U)*[illegible]2*[illegible]
      [illegible]([illegible],1[illegible])=1[illegible].*(1.-A[illegible]U)*[illegible]2*R
      [illegible]([illegible],[illegible])=1[illegible].*[illegible]
      [illegible]([illegible],[illegible])=-[illegible].*(1.+[illegible])*[illegible]2
      [illegible]([illegible],[illegible])=[illegible].*(1.-[illegible]U)*[illegible]2*[illegible]
      [illegible](1[illegible],[illegible])=-[illegible].*[illegible]-[illegible].*(1.-[illegible]U)*[illegible]2*[illegible]
      [illegible](1[illegible],1[illegible])=-[illegible].*(1.-[illegible]U)*[illegible]2*[illegible]
      [illegible](1[illegible],[illegible])=1[illegible].*(1.+[illegible]U)*[illegible]2
      [illegible](1[illegible],[illegible])=-[illegible].*(1.+[illegible]U)*[illegible]2
      [illegible](1[illegible],[illegible])=-[illegible].*(1.+[illegible]U)*[illegible]2
      [illegible](1[illegible],[illegible])=1[illegible].*[illegible]
      [illegible](1[illegible],1[illegible])=-[illegible]2.*[illegible]-50.*(1.-ANU)*[illegible]2*[illegible]
      [illegible](1[illegible],[illegible])=-[illegible].*[illegible]
      [illegible]([illegible],[illegible])=[illegible].*(1.+[illegible]U)*[illegible]2
      [illegible](1[illegible],[illegible])=-1[illegible].*(1.+A[illegible]U)*[illegible]2
      [illegible](1[illegible],[illegible])=-12.*(1.+A[illegible]U)*[illegible]2
      [illegible](1[illegible],[illegible])=[illegible].*[illegible]
      [illegible](1[illegible],[illegible])=12.*(1.-[illegible]U)*[illegible]2*[illegible]
      [illegible](1[illegible],1[illegible])=-[illegible].*[illegible]
      [illegible](1[illegible],11)=-[illegible].*(1.-A[illegible]U)*[illegible]2*R
      [illegible](1[illegible],[illegible])=-[illegible].*[illegible]-12.*(1.-ANU)*[illegible]2*[illegible]
      CALL [illegible]([illegible]S)
      END
[illegible]
[illegible]
      [illegible]V(1)=-[illegible].*[illegible]2*[illegible]*(2.*C1-4.)*(2.*C1-4.)*(1.-A[illegible])
     1*[illegible]*(2.*[illegible]-4.)*(2.*C2-4.))
      [illegible]V(2)=-([illegible].*[illegible]*[illegible]*((2.*C1-4.)*(-24.*C1+12.*C3+12.)+(-[illegible].*C1+[illegible].*C3+[illegible].)
     1*(2.*C[illegible]-[illegible].))+(1.-A[illegible])*[illegible]*((2.*C1-4.)*(-4.*C1-4.*C2+2.*C3+[illegible].)+
     2(-[illegible].*C1-[illegible].*C3+4.)*(2.*C2-4.)))
      [illegible]V(3)=-[illegible].*[illegible]*[illegible]*((2.*C1-4.)*(-4.*C1-4.*C2+2.*C[illegible]+[illegible].)+(-4.*C1-[illegible].*C[illegible]
```

```
[illegible]
12    [illegible] S[illegible]) * A(I,J) * U(J)
[illegible]
      [illegible], F3, F4, F5, ALPHA
[illegible]
14    [illegible](I,J)*[illegible](J)
      [illegible], I=1,[illegible])
```

```
      BV(7)=-(2.*(2.*F2*(2.*C2-4.)+2.*F2*(2.*C2-4.))+R2*(1.-ANU)
     1*(2.*F1*(2.*C2-4.)+(2.*C1-4.)*2.*F2))
      BV(8)=-(2.*((2.*C2-4.)*(-24.*F2+12.*F4)+(-8.*C2+4.*C4+4.)*2.*F2
     1+2.*F2*(-24.*C2+12.*C4+12.)+(-8.*F2+4.*F4)*(2.*C2-4.))+R2*(1.
     2-ANU)*((2.*C2-4.)*(-4.*F1-4.*F2+2.*F5)+2.*F1*(-8.*C2+4.*C4+4.)
     3+(2.*C1-4.)*(-8.*F2+4.*F4)+(-4.*C1-4.*C2+2.*C5+8.)*2.*F2))
      BV(9)=-(2.*((2.*C2-4.)*(-4.*F1-4.*F2+2.*F5)+(-4.*C1-4.*C2+2.*C5
     1+8.)*2.*F2+2.*F2*(-4.*C1-4.*C2+2.*C5+8.)+(-4.*F1-4.*F2+2.*F5)
     2*(2.*C2-4.))+R2*(1.+ANU)*((-8.*C1-8.*C2+4.*C5+16.)*2.*F1+(2.*C1
     3-4.)*(-8.*F1-8.*F2+4.*F5))+R2*(1.-ANU)*((2.*C2-4.)*(-24.*F1
     4+12.*F3)+(-4.*C1-4.*C2+2.*C5+8.)*2.*F1))
      BV(9)=BV(9)-(+R2*(1.-ANU)*(+2.*F2*(-24.*C1+12.*C3+12.)+(-4.*F1
     1-4.*F2+2.*F5)*(2.*C1-4.)))
      CALL LINK(KJEAR7)
*LDISKKJEAR7
      BV(10)=-(2.*((2.*C2-4.)*(30.*F2-60.*F4)+(-8.*C2+4.*C4+4.)*(-24.
     1*F2+12.*F4)+(6.*C2-12.*C4)*2.*F2+2.*F2*(30.*C2-60.*C4)+(-8.*F2
     2+4.*F4)*(-24.*C2+12.*C4+12.)+(6.*F2-12.*F4)*(2.*C2-4.))+R2*(1.
     3-ANU)*((2.*C2-4.)*(2.*F1+8.*F2-4.*F4-4.*F5)+(-8.*C2+4.*C4+4.)
     4*(-4.*F1-4.*F2+2.*F5)+(6.*C2-12.*C4)*2.*F1))
      BV(10)=BV(10)-(+R2*(1.-ANU)*(+2.*F2*(2.*C1+8.*C2-4.*C4-4.*C5
     1-4.)+(-8.*F2+4.*F4)*(-4.*C1-4.*C2+2.*C5+8.)+(6.*F2-12.*F4)
     2*(2.*C1-4.)))
      BV(11)=-(2.*((2.*C2-4.)*(8.*F1+2.*F2-4.*F3-4.*F5)+(-4.*C1-4.*C2
     1+2.*C5+8.)*(-4.*F1-4.*F2+2.*F5)+(8.*C1+2.*C2-4.*C3-4.*C5-4.)
     2*2.*F2+2.*F2*(8.*C1+2.*C2-4.*C3-4.*C5-4.)+(-4.*F1-4.*F2+2.*F5)*
     3(-4.*C1-4.*C2+2.*C5+8.)+(8.*F1+2.*F2-4.*F3-4.*F5)*(2.*C2-4.))
     4+R2*(1.+ANU)*((32.*C1+8.*C2-16.*C3-16.*C5-16.)*2.*F1))
      BV(11)=BV(11)-(+R2*(1.+ANU)*(+(-8.*F1+4.*F3)*(-8.*C1-8.*C2+4.*C5
     1+16.)+(2.*C1-4.)*(32.*F1+8.*F2-16.*F3-16.*F5)+(-8.*C1+4.*C3+4.)
     2*(-8.*F1-8.*F2+4.*F5))+R2*(1.-ANU)*((2.*C2-4.)*(30.*F1-60.*F3)+
     3(-4.*C1-4.*C2+2.*C5+8.)*(-24.*F1+12.*F3)+2.*F1*(8.*C1+2.*C2-4.*C3
     4-4.*C5-4.)+2.*F2*(30.*C1-60.*C3)))
      BV(11)=BV(11)-(+R2*(1.-ANU)*(+(-4.*F1-4.*F2+2.*F5)*(-24.*C1
     1+12.*C3+12.)+(8.*F1+2.*F2-4.*F3-4.*F5)*(2.*C1-4.)))
      BV(12)=-(2.*((2.*C2-4.)*(12.*F1+48.*F2-24.*F4-24.*F5)+(-8.*C2+
     14.*C4+4.)*(-4.*F1-4.*F2+2.*F5)+(-4.*C1-4.*C2+2.*C5+8.)*(-24.*F2
     2+12.*F4)+(4.*C1+16.*C2-8.*C4-8.*C5-8.)*2.*F2+2.*F2*(12.*C1+48.*C2
     3-24.*C4-24.*C5-24.)+(-8.*F2+4.*F4)*(-4.*C1-4.*C2+2.*C5+8.)+(-4.*
     4F1-4.*F2+2.*F5)*(-24.*C2+12.*C4+12.)))
      BV(12)=BV(12)-(2.*(+(4.*F1+16.*F2-8.*F4-8.*F5)*(2.*C2-4.))+R2*
     1(1.+ANU)*(2.*F1*(8.*C1+32.*C2-16.*C4-16.*C5-16.)+(-4.*F1-4.*F2
     2+2.*F5)*(-8.*C1-8.*C2+4.*C5+16.)+(2.*C1-4.)*(8.*F1+32.*F2-16.*F4
     3-16.*F5)+(-4.*C1-4.*C2+2.*C5+8.)*(-8.*F1-8.*F2+4.*F5))+R2*(1.-
     4ANU)*((2.*C2-4.)*(48.*F1+12.*F2-24.*F3-24.*F5)))
      BV(12)=BV(12)-(+R2*(1.-ANU)*(+(-8.*C2+4.*C4+4.)*(-24.*F1+12.*F3)
     1+(-4.*C1-4.*C2+2.*C5+8.)*(-4.*F1-4.*F2+2.*F5)+(4.*C1+16.*C2-8.*C4
     2-8.*C5-8.)*2.*F1+2.*F2*(48.*C1+12.*C2-24.*C3-24.*C5-24.)+(-8.*F2
     3+4.*F4)*(-24.*C1+12.*C3+12.)+(-4.*F1-4.*F2+2.*F5)*(-4.*C1-4.*C2
     4+2.*C5+8.)+(4.*F1+16.*F2-8.*F4-8.*F5)*(2.*C1-4.)))
      DO 15 M=1,12
      DO 15 N=1,12
   15 SM(M,N)=BM(M,N)
      EQUIVALENCE(SM,A)
```

```
      N=12
      PUNCH 36,((A(I,J),J=1,N),I=1,N)
      PUNCH 36,(BV(J),J=1,N)
   36 FORMAT(/(6X,4E16.8))
      CALL AINV77(A,N)
      DO 13 I=1,N
      ANS(I)=0.
      DO 13 J=1,N
   13 ANS(I)=ANS(I)+A(I,J)*BV(J)
      G1=ANS(1)
      G2=ANS(2)
      G3=ANS(3)
      G4=ANS(4)
      G5=ANS(5)
      G6=ANS(6)
      H1=ANS(7)
      H2=ANS(8)
      H3=ANS(9)
      H4=ANS(10)
      H5=ANS(11)
      H6=ANS(12)
      PUNCH 38,G1,G2,G3,G4,G5,G6,H1,H2,H3,H4,H5,H6
      DO 14 I=1,12
      BV(I)=0.
      DO 14 J=1,12
   14 BV(I)=BV(I)+BM(I,J)*ANS(J)
      PUNCH 36,(BV(I),I=1,12)
   38 FORMAT(4H G1=E16.8,4H G2=E16.8,4H G3=E16.8/4H G4=E16.8,4H G5=E16.8
     1,4H G6=E16.8/4H H1=E16.8,4H H2=E16.8,4H H3=E16.8/4H H4=E16.8,
     24H H5=E16.8,4H H6=E16.8)
      CALL LINK(KJEAR8)
      END
##FOR 5
*LDISKKJEAR8
      U(1)=R2*R2*((2.*C1-4.)*G1+2.*F1*D1)+ANU*(R2*R*((2.*C1-4.)*H1
     1+2.*F1*E1))+R*(H1*(2.*C2-4.)+2.*F2*E1)+ANU*(R2*(G1*(2.*C2-4.)
     2+2.*F2*D1))
      U(1)=U(1)*12.
      U(2)=R2*R2*((2.*C1-4.)*(-3.*G1+3.*G2)+(-24.*C1+12.*C3+12.)*G1
     1+2.*F1*(-3.*D1+3.*D2)+D1*(-24.*F1+12.*F3))+0.5*(R2*R2*(2.*(2.*C1
     2-4.)*2.*F1*(2.*C1-4.)+2.*F1*(2.*C1-4.)*(2.*C1-4.)))+ANU*(R2*R*((
     32.*C1-4.)*(-H1+H3)+H1*(-24.*C1+12.*C3+12.)+2.*F1*(-E1+E3)+E1*
     4(-24.*F1+12.*F3)))
      U(2)=U(2)+R*((2.*C2-4.)*(-H1+H3)+(-4.*C1-4.*C2+2.*C5+8.)*H1
     1+2.*F2*(-E1+E3)+(-4.*F1-4.*F2+2.*F5)*E1)+ANU*(R2*(G1*(-4.*C1
     2-4.*C2+2.*C5+8.)+(2.*C2-4.)*(-3.*G1+3.*G2)+2.*F2*(-3.*D1+3.*D2)
     3+(-4.*F1-4.*F2+2.*F5)*D1)+0.5*(R2*(2.*(2.*C2-4.)*2.*F1*(2.*C1
     4-4.)+2.*F2*(2.*C1-4.)*(2.*C1-4.))))
      U(2)=U(2)*12.
      U(3)=R2*R2*((2.*C1-4.)*(-G1+G3)+(-4.*C1-4.*C2+2.*C5+8.)*G1
     1+2.*F1*(-D1+D3)+D1*(-4.*F1-4.*F2+2.*F5))+ANU*(R2*R*((2.*C1-4.)
     2*(-3.*H1+3.*H2)+(-4.*C1-4.*C2+2.*C5+8.)*H1+2.*F1*(-3.*E1+3.*E2)
     3+(-4.*F1-4.*F2+2.*F5)*E1)+0.5*(R2*(2.*(2.*C1-4.)*(2.*C2-4.)*2.*F2
     4+2.*F1*(2.*C2-4.)*(2.*C2-4.))))
```

```
      U(3)=U(3)+R*((2.*C2-4.)*(-3.*H1+3.*H2)+(-24.*C2+12.*C4+12.)*G1
     1+2.*F2*(-3.*E1+3.*E2)+(-24.*F2+12.*F4)*E1)+0.5*(2.*(2.*C2-4.)*2.
     2*F2*(2.*C2-4.)+2.*F2*(2.*C2-4.)*(2.*C2-4.))+ANU*(R2*((2.*C2-4.)
     3*(-G1+G3)+(-24.*C2+12.*C4+12.)*G1+2.*F2*(-D1+D3)+(-24.*F2+12.*F4)
     4*D1))
      U(3)=U(3)*12.
      U(4)=R2*R2*((2.*C1-4.)*(-5.*G2+5.*G4)+(-24.*C1+12.*C3+12.)*(-3.
     1*G1+3.*G2)+(30.*C1-60.*C3)*G1+2.*F1*(-5.*D2+5.*D4)+(-24.*F1
     2+12.*F3)*(-3.*D1+3.*D2)+(30.*F1-60.*F3)*D1)+0.5*(R2*R2*(2.*(2.*
     3C1-4.)*((2.*C1-4.)*(-8.*F1+4.*F3)+(-8.*C1+4.*C3+4.)*2.*F1)+(
     4-24.*C1+12.*C3+12.)*(2.*C1-4.)*2.*F1))
      U(4)=U(4)+0.5*(R2*R2*(+2.*F1*2.*(2.*C1-4.)*(-8.*C1+4.*C3+4.)
     1+(-24.*F1+12.*F3)*(2.*C1-4.)*(2.*C1-4.)))+ANU*(R2*R*((2.*C1-4.)
     2*(-H3+H5)+(-24.*C1+12.*C3+12.)*(-H1+H3)+(30.*C1-60.*C3)*H1
     3+2.*F1*(-E3+E5)+(-24.*F1+12.*F3)*(-E1+E3)+(30.*F1-60.*F3)*E1))
      U(4)=U(4)+R*((2.*C2-4.)*(-H3+H5)+(-4.*C1-4.*C2+2.*C5+8.)*(-H1+H3)
     1+(8.*C1+2.*C2-4.*C3-4.*C5-4.)*H1+2.*F2*(-E3+E5)+(-4.*F1-4.*F2
     2+2.*F5)*(-E1+E3)+(8.*F1+2.*F2-4.*F3-4.*F5)*E1)+ANU*(R2*((2.*C2-4.)
     3*(-5.*G2+5.*G4)+(-4.*C1-4.*C2+2.*C5+8.)*(-3.*G1+3.*G2)+(8.*C1
     4+2.*C2-4.*C3-4.*C5-4.)*G1+2.*F2*(-5.*D2+5.*D4)))
      U(4)=U(4)+ANU*(R2*(+(-4.*F1-4.*F2+2.*F5)*(-3.*D1+3.*D2)+(8.*F1
     1+2.*F2-4.*F3-4.*F5)*D1)+0.5*(R2*(2.*(2.*C2-4.)*((2.*C1-4.)*(-8.*
     2F1+4.*F3)+(-8.*C1+4.*C3+4.)*2.*F1)+(-4.*C1-4.*C2+2.*C5+8.)
     3*2.*F1*(2.*C1-4.)+2.*F2*2.*(2.*C1-4.)*(-8.*C1+4.*C3+4.)+(-4.*F1
     4-4.*F2+2.*F5)*(2.*C1-4.)*(2.*C1-4.))))
      U(4)=U(4)*12.
      U(5)=R2*R2*((2.*C1-4.)*(-G3+G5)+(-4.*C1-4.*C2+2.*C5+8.)*(-G1
     1+G3)+(2.*C1+8.*C2-4.*C4-4.*C5-4.)*G1+2.*F1*(-D3+D5)+(-4.*F1-4.*F2
     2+2.*F5)*(-D1+D3)+(2.*F1+8.*F2-4.*F4-4.*F5)*D1)+ANU*(R2*R*((2.*C1
     3-4.)*(-5.*H2+5.*H4)+(-4.*C1-4.*C2+2.*C5+8.)*(-3.*H1+3.*H2)+(2.*C1
     4+8.*C2-4.*C4-4.*C5-4.)*H1+2.*F1*(-5.*E2+5.*E4)))
      U(5)=U(5)+ANU*(R2*R*(+(-4.*F1-4.*F2+2.*F5)*(-3.*E1+3.*E2)+(2.*F1
     1+8.*F2-4.*F4-4.*F5)*E1)+0.5*(R2*(2.*(2.*C1-4.)*(2.*F2*(-8.*C2
     2+4.*C4+4.)+(2.*C2-4.)*(-8.*F2+4.*F4))+(-4.*C1-4.*C2+2.*C5+8.)
     3*2.*F2*(2.*C2-4.)+2.*F1*2.*(2.*C2-4.)*(-8.*C2+4.*C4+4.)+(-4.*F1
     4-4.*F2+2.*F5)*(2.*C2-4.)*(2.*C2-4.))))
      CALL LINK(KJEAR9)
      END
****
*LDISKKJEAR9
      U(5)=U(5)+R*((2.*C2-4.)*(-5.*H2+5.*H4)+(-24.*C2+12.*C4+12.)*
     1(-3.*H1+3.*H2)+(30.*C2-60.*C4)*H1+2.*F2*(-5.*E2+5.*E4)+(-24.*F2
     2+12.*F4)*(-3.*E1+3.*E2)+(30.*F2-60.*F4)*E1)+0.5*(2.*(2.*C2-4.)*
     3(2.*F2*(-8.*C2+4.*C4+4.)+(2.*C2-4.)*(-8.*F2+4.*F4))+(-24.*C2
     4+12.*C4+12.)*(2.*C2-4.)*2.*F2)
      U(5)=U(5)+0.5*(+2.*F2*(2.*C2-4.)*(-8.*C2+4.*C4+4.)*2.+(-24.*F2
     1+12.*F4)*(2.*C2-4.)*(2.*C2-4.))+ANU*(R2*((2.*C2-4.)*(-G3+G5)
     2+(-24.*C2+12.*C4+12.)*(-G1+G3)+(30.*C2-60.*C4)*G1+2.*F2*(-D3
     3+D5)+(-24.*F2+12.*F4)*(-D1+D3)+(30.*F2-60.*F4)*D1))
      U(5)=U(5)*12.
      U(6)=R2*R2*((2.*C1-4.)*(3.*G1-3.*G2-3.*G3+3.*G6)+(-24.*C1+12.*C3
     1+12.)*(-G1+G3)+(-4.*C1-4.*C2+2.*C5+8.)*(-3.*G1+3.*G2)+(48.*C1
     2+12.*C2-24.*C3-24.*C5-24.)*G1+2.*F1*(3.*D1-3.*D2-3.*D3+3.*D6)+
     3(-24.*F1+12.*F3)*(-D1+D3)+(-4.*F1-4.*F2+2.*F5)*(-3.*D1-3.*D2)+
```

```
     4(48.*F1+12.*F2-24.*F3-24.*F5)*D1)
      U(6)=U(6)+0.5*(R2*R2*(2.*(2.*C1-4.)*((2.*C1-4.)*(-4.*F1-4.*F2
     1+2.*F5)+2.*F1*(-4.*C1-4.*C2+2.*C5+8.))+(-4.*C1-4.*C2+2.*C5+8.)
     2*(2.*C1-4.)*2.*F1+2.*F1*2.*(2.*C1-4.)*(-4.*C1-4.*C2+2.*C5+8.)+
     3(-4.*F1-4.*F2+2.*F5)*(2.*C1-4.)*(2.*C1-4.)))+ANU*(R2*R*((2.*C1-4.)
     4*(3.*H1-3.*H2-3.*H3+3.*H6)+(-24.*C1+12.*C3+12.)*(-3.*H1+3.*H2)))
      U(6)=U(6)+ANU*(R2*R*(+(-4.*C1-4.*C2+2.*C5+8.)*(-H1+H3)+(48.*C1+
     112.*C2-24.*C3-24.*C5-24.)*H1+2.*F1*(3.*E1-3.*E2-3.*E3+3.*E6)+
     2(-24.*F1+12.*F3)*(-3.*E1+3.*E2)+(-4.*F1-4.*F2+2.*F5)*(-E1+E3)+
     3(48.*F1+12.*F2-24.*F3-24.*F5)*E1)+0.5*(R2*(2.*(2.*C1-4.)*(2.*F2*
     4(-4.*C1-4.*C2+2.*C5+8.)+(2.*C2-4.)*(-4.*F1-4.*F2+2.*F5)))))
      U(6)=U(6)+ANU*(+0.5*(R2*(+(-24.*C1+12.*C3+12.)*2.*F2*(2.*C2-4.)
     1+2.*F1*2.*(2.*C2-4.)*(-4.*C1-4.*C2+2.*C5+8.)+(-24.*F1+12.*F3)*
     2(2.*C2-4.)*(2.*C2-4.))))+R*((2.*C2-4.)*(3.*H1-3.*H2-3.*H3+3.*H6)
     3+(-4.*C1-4.*C2+2.*C5+8.)*(-3.*H1+3.*H2)+(-24.*C2+12.*C4+12.)*
     4(-H1+H3)+(12.*C1+48.*C2-24.*C4-24.*C5-24.)*H1)
      U(6)=U(6)+R*(+2.*F2*(3.*E1-3.*E2-3.*E3+3.*E6)+(-4.*F1-4.*F2+2.*F5)
     1*(-3.*E1+3.*E2)+(-24.*F2+12.*F4)*(-E1+E3)+(12.*F1+48.*F2-24.*F4
     2-24.*F5)*E1)+0.5*(2.*(2.*C2-4.)*(2.*F2*(-4.*C1-4.*C2+2.*C5+8.)
     3+(2.*C2-4.)*(-4.*F1-4.*F2+2.*F5))+(-4.*C1-4.*C2+2.*C5+8.)*2.*F2*
     4(2.*C2-4.)+2.*F2*2.*(2.*C2-4.)*(-4.*C1-4.*C2+2.*C5+8.))
      U(6)=U(6)+0.5*(+(-4.*F1-4.*F2+2.*F5)*(2.*C2-4.)*(2.*C2-4.))
     1+ANU*(R2*((2.*C2-4.)*(3.*G1-3.*G2-3.*G3+3.*G6)+(-4.*C1-4.*C2+2.*
     2C5+8.)*(-G1+G3)+(-24.*C2+12.*C4+12.)*(-3.*G1+3.*G2)+(12.*C1+48.*
     3C2-24.*C4-24.*C5-24.)*G1+2.*F2*(3.*D1-3.*D2-3.*D3+3.*D6)+(-4.*F1
     4-4.*F2+2.*F5)*(-D1+D3)+(-24.*F2+12.*F4)*(-3.*D1+3.*D2)))
    9 U(6)=U(6)+ANU*(R2*(  (12.*F1+48.*F2-24.*F4-24.*F5)*D1)
     1+0.5*(R2*(2.*(2.*C2-4.)*((2.*C1-4.)*(-4.*F1-4.*F2+2.*F5)+2.*F1*(
     2-4.*C1-4.*C2+2.*C5+8.))+(-24.*C2+12.*C4+12.)*2.*F1*(2.*C1-4.)
     3+2.*F2*2.*(2.*C1-4.)*(-4.*C1-4.*C2+2.*C5+8.)+(-24.*F2+12.*F4)
     4*(2.*C1-4.)*(2.*C1-4.))))
      U(6)=U(6)+(1.-ANU)*(R2*((-8.*C1-8.*C2+4.*C5+16.)*(-2.*G1+2.*G3)
     1+(-8.*F1-8.*F2+4.*F5)*(-2.*D1+2.*D3))+R2*R*((-8.*C1-8.*C2+4.*C5+
     216.)*(-2.*H1+2.*H3)+(-8.*F1-8.*F2+4.*F5)*(-2.*E1+2.*E3))+R2*((-8.
     3*C1-8.*C2+4.*C5+16.)*(2.*F1)*(2.*C2-4.)+(-8.*C1-8.*C2+4.*C5+16.)
     4*(2.*C1-4.)*(2.*F2)+(-8.*F1-8.*F2+4.*F5)*(2.*C1-4.)*(2.*C2-4.)))
      U(6)=U(6)*12.
      DO 15 M=1,6
      DO 15 N=1,6
   15 SM(M,N)=DM(M,N)
      EQUIVALENCE(SM,A)
      N=6
      PUNCH 36,((A(I,J),J=1,N),I=1,N)
      PUNCH 36,(U(J),J=1,N)
   36 FORMAT(/(5X,4E16.8))
      CALL AINV77(A,N)
      DO 13 I=1,N
      ANS(I)=0.
      DO 13 J=1,N
   13 ANS(I)=ANS(I)+A(I,J)*U(J)
      Y1=ANS(1)
      Y2=ANS(2)
      Y3=ANS(3)
      Y4=ANS(4)
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      Y5=ANS(5)
      ALPH5=ANS(6)
      PUNCH 444,Y1,Y2,Y3,Y4,Y5,ALPH5
      DO 14 I=1,6
      U(I)=0.
      DO 14 J=1,6
   14 U(I)=U(I)+OM(I,J)*ANS(J)
      PUNCH 36,(U(I),I=1,6)
  444 FORMAT(4H Y1=E16.8,4H Y2=E16.8,4H Y3=E16.8/4H Y4=E16.8,
     14H Y5=E16.8,7H ALPH5=E16.8)
      CALL LINK(KJEA10)
34000320070136000320070249024025119636113001020O
##JOB 5
##FOR 5
*FANDK1510
*LDISKKJEA10
      DIMENSION P(50)
      COMMON K,AK,K2,K4,C1,C2,C3,C4,C5,D1,D2,D3,D4,D5,D6,E1,E2,E3,E4,E5,
     1E6,F1,F2,F3,F4,F5,G1,G2,G3,G4,G5,G6,H1,H2,H3,H4,H5,H6,Y1,Y2,Y3,
     2Y4,Y5,AMU,P
      AXI=0.
      ETA=1.
   77 P(1)=(2.*AXI-8.*(AXI**3)-4.*AXI*(ETA**2)+16.*(AXI**3)*(ETA**2)
     1-12.*(AXI**5)*(ETA**2)+2.*AXI*(ETA**4)-8.*(AXI**3)*(ETA**4)
     2+6.*(AXI**5)*(ETA**4)+6.*(AXI**5))
      P(2)=(-4.*AXI*(ETA**2)+4.*(AXI**3)*(ETA**2)+8.*AXI*(ETA**4)
     1-8.*(AXI**3)*(ETA**4)-4.*AXI*(ETA**6)+4.*(AXI**3)*(ETA**6))
      P(3)=(4.*(AXI**3)-12.*(AXI**5)+8.*(AXI**7)-8.*(AXI**3)*(ETA**2)
     1+24.*(AXI**5)*(ETA**2)-16.*(AXI**7)*(ETA**2)+4.*(AXI**3)*(ETA
     2**4)-12.*(AXI**5)*(ETA**4)+8.*(AXI**7)*(ETA**4))
      P(4)=(-4.*AXI*(ETA**4)+4.*(AXI**3)*(ETA**4)+8.*AXI*(ETA**6)
     1-8.*(AXI**3)*(ETA**6)-4.*AXI*(ETA**8)+4.*(AXI**3)*(ETA**8))
      P(5)=(2.*AXI*(ETA**2)-8.*(AXI**3)*(ETA**2)+6.*(AXI**5)*(ETA**2)
     1-4.*AXI*(ETA**4)+16.*(AXI**3)*(ETA**4)-12.*(AXI**5)*(ETA**4)
     2+2.*AXI*(ETA**6)-8.*(AXI**3)*(ETA**6)+6.*(AXI**5)*(ETA**6))
      P(6)=(-4.*AXI+4.*(AXI**3)+8.*AXI*(ETA**2)-8.*(AXI**3)*(ETA**2)-4.
     1*AXI*(ETA**4)+4.*(AXI**3)*(ETA**4))
      P(7)=(2.-24.*(AXI**2)+30.*(AXI**4)-4.*(ETA**2)+48.*(AXI**2)
     1*(ETA**2)-60.*(AXI**4)*(ETA**2)+2.*(ETA**4)-24.*(AXI**2)*(ETA**4)
     2+30.*(AXI**4)*(ETA**4))
      P(8)=(-4.*(ETA**2)+12.*(AXI**2)*(ETA**2)+8.*(ETA**4)-24.*(AXI**2)
     1*(ETA**4)-4.*(ETA**6)+12.*(AXI**2)*(ETA**6))
      P(9)=(12.*(AXI**2)-60.*(AXI**4)+56.*(AXI**6)-24.*(AXI**2)*(ETA**2)
     1+120.*(AXI**4)*(ETA**2)-112.*(AXI**6)*(ETA**2)+12.*(AXI**2)
     2*(ETA**4)-60.*(AXI**4)*(ETA**4)+56.*(AXI**6)*(ETA**4))
      P(10)=(-4.*(ETA**4)+12.*(AXI**2)*(ETA**4)+8.*(ETA**6)-24.*(
     1AXI**2)*(ETA**6)-4.*(ETA**8)+12.*(AXI**2)*(ETA**8))
      P(11)=(2.*(ETA**2)-24.*(AXI**2)*(ETA**2)+30.*(AXI**4)*(ETA**2)
     1-4.*(ETA**4)+48.*(AXI**2)*(ETA**4)-60.*(AXI**4)*(ETA**4)+2.*(ETA
     2**6)-24.*(AXI**2)*(ETA**6)+30.*(AXI**4)*(ETA**6))
      P(12)=(-4.+12.*(AXI**2)+8.*(ETA**2)-24.*(AXI**2)*(ETA**2)-4.*
     1(ETA**4)+12.*(AXI**2)*(ETA**4))
      P(13)=(-4.*(AXI**2)*ETA+8.*(AXI**4)*ETA-4.*(AXI**6)*ETA+4.
     1*(AXI**2)*(ETA**3)-8.*(AXI**4)*(ETA**3)+4.*(AXI**6)*(ETA**3))
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 P(14)=(2.*ETA-4.*(AXI**2)*ETA+2.*(AXI**4)*ETA-8.*(ETA**3)+16.*
1(AXI**2)*(ETA**3)-8.*(AXI**4)*(ETA**3)+6.*(ETA**5)-12.*(AXI**2)
2*(ETA**5)+6.*(AXI**4)*(ETA**5))
 P(15)=(-4.*(AXI**4)*ETA+8.*(AXI**6)*ETA-4.*(AXI**8)*ETA+4.*
1(AXI**4)*(ETA**3)-8.*(AXI**6)*(ETA**3)+4.*(AXI**8)*(ETA**3))
 P(16)=(4.*(ETA**3)-8.*(AXI**2)*(ETA**3)+4.*(AXI**4)*(ETA**3)
1-12.*(ETA**5)+24.*(AXI**2)*(ETA**5)-12.*(AXI**4)*(ETA**5)+8.*
2(ETA**7)-16.*(AXI**2)*(ETA**7)+8.*(AXI**4)*(ETA**7))
 P(17)=(2.*(AXI**2)*ETA-4.*(AXI**4)*ETA+2.*(AXI**6)*ETA-8.*
1(AXI**2)*(ETA**3)+16.*(AXI**4)*(ETA**3)-8.*(AXI**6)*(ETA**3)
2+6.*(AXI**2)*(ETA**5)-12.*(AXI**4)*(ETA**5)+6.*(AXI**6)*(ETA**5))
 P(18)=(-4.*ETA+8.*(AXI**2)*ETA-4.*(AXI**4)*ETA+4.*(ETA**3)-8.*
1(AXI**2)*(ETA**3)+4.*(AXI**4)*(ETA**3))
 P(19)=(-4.*(AXI**2)+8.*(AXI**4)-4.*(AXI**6)+12.*(AXI**2)*(ETA**2)
1-24.*(AXI**4)*(ETA**2)+12.*(AXI**6)*(ETA**2))
 P(20)=(2.-4.*(AXI**2)+2.*(AXI**4)-24.*(ETA**2)+48.*(AXI**2)*
1(ETA**2)-24.*(AXI**4)*(ETA**2)+30.*(ETA**4)-60.*(AXI**2)*
2(ETA**4)+30.*(AXI**4)*(ETA**4))
 P(21)=(-4.*(AXI**4)+8.*(AXI**6)-4.*(AXI**8)+12.*(AXI**4)*(ETA**2)
1-24.*(AXI**6)*(ETA**2)+12.*(AXI**8)*(ETA**2))
 P(22)=(12.*(ETA**2)-24.*(AXI**2)*(ETA**2)+12.*(AXI**4)*(ETA**2)
1-60.*(ETA**4)+120.*(AXI**2)*(ETA**4)-60.*(AXI**4)*(ETA**4)+56.*
2(ETA**6)-112.*(AXI**2)*(ETA**6)+56.*(AXI**4)*(ETA**6))
 P(23)=(2.*(AXI**2)-4.*(AXI**4)+2.*(AXI**6)-24.*(AXI**2)*(ETA**2)
1+48.*(AXI**4)*(ETA**2)-24.*(AXI**6)*(ETA**2)+30.*(AXI**2)*
2(ETA**4)-60.*(AXI**4)*(ETA**4)+30.*(AXI**6)*(ETA**4))
 P(24)=(-4.+8.*(AXI**2)-4.*(AXI**4)+12.*(ETA**2)-24.*(AXI**2)
1*(ETA**2)+12.*(AXI**4)*(ETA**2))
 P(25)=(1.-3.*(AXI**2)-(ETA**2)+3.*(AXI**2)*(ETA**2))
 P(26)=(3.*(AXI**2)-5.*(AXI**4)-3.*(AXI**2)*(ETA**2)+5.*(AXI**4)
1*(ETA**2))
 P(27)=((ETA**2)-3.*(AXI**2)*(ETA**2)-(ETA**4)+3.*(AXI**2)*(ETA
1**4))
 P(28)=(5.*(AXI**4)-7.*(AXI**6)-5.*(AXI**4)*(ETA**2)+7.*(AXI**6)
1*(ETA**2))
 P(29)=((ETA**4)-3.*(AXI**2)*(ETA**4)-(ETA**6)+3.*(AXI**2)*
1(ETA**6))
 P(30)=(3.*(AXI**2)*(ETA**2)-5.*(AXI**4)*(ETA**2)-3.*(AXI**2)
1*(ETA**4)+5.*(AXI**4)*(ETA**4))
 P(31)=(-2.*AXI*ETA+2.*(AXI**3)*ETA)
 P(32)=(-2.*(AXI**3)*ETA+2.*(AXI**5)*ETA)
 P(33)=(2.*AXI*ETA-2.*(AXI**3)*ETA-4.*AXI*(ETA**3)+4.*(AXI**3)
1*(ETA**3))
 P(34)=(-2.*(AXI**5)*ETA+2.*(AXI**7)*ETA)
 P(35)=(4.*AXI*(ETA**3)-4.*(AXI**3)*(ETA**3)-6.*AXI*(ETA**5)
1+6.*(AXI**3)*(ETA**5))
 P(36)=(2.*(AXI**3)*ETA-2.*(AXI**5)*ETA-4.*(AXI**3)*(ETA**3)+4.*
1(AXI**5)*(ETA**3))
 P(37)=(-2.*ETA*AXI+2.*AXI*(ETA**3))
 P(38)=(-2.*AXI*(ETA**3)+2.*AXI*(ETA**5))
 P(39)=(2.*AXI*ETA-4.*(AXI**3)*ETA-2.*AXI*(ETA**3)+4.*(AXI**3)
1*(ETA**3))
 P(40)=(-2.*AXI*(ETA**5)+2.*AXI*(ETA**7))
 P(41)=(4.*(AXI**3)*ETA-6.*(AXI**5)*ETA-4.*(AXI**3)*(ETA**3)
```

```
     1+6.*(AXI**5)*(ETA**3))
      P(42)=(2.*AXI*(ETA**3)-4.*(AXI**3)*(ETA**3)-2.*AXI*(ETA**5)+4.*
     1(AXI**3)*(ETA**5))
      P(43)=(1.-(AXI**2)-3.*(ETA**2)+3.*(AXI**2)*(ETA**2))
      P(44)=(3.*(ETA**2)-3.*(AXI**2)*(ETA**2)-5.*(ETA**4)+5.*(AXI**2)
     1*(ETA**4))
      P(45)=((AXI**2)-(AXI**4)-3.*(AXI**2)*(ETA**2)+3.*(AXI**4)*
     1(ETA**2))
      P(46)=(5.*(ETA**4)-5.*(AXI**2)*(ETA**4)-7.*(ETA**6)+7.*(AXI**2)
     1*(ETA**6))
      P(47)=((AXI**4)-(AXI**6)-3.*(AXI**4)*(ETA**2)+3.*(AXI**6)
     1*(ETA**2))
      P(48)=(3.*(AXI**2)*(ETA**2)-3.*(AXI**4)*(ETA**2)-5.*(AXI**2)*
     1(ETA**4)+5.*(AXI**4)*(ETA**4))
      IF (ETA-0.5) 23,24,24
   24 CONTINUE
      PUNCH 445
  445 FORMAT(5X,38H BENDING STRESS AT MIDDLE OF LONG EDGE)
   23 W1XX=C1*P(7)+C2*P(8)+C3*P(9)+C4*P(10)+C5*P(11)+P(12)
      W1YY=C1*P(19)+C2*P(20)+C3*P(21)+C4*P(22)+C5*P(23)+P(24)
      W0X=-0.5*(R2*W1XX+ANU*W1YY)
      W3XX=F1*P(7)+F2*P(8)+F3*P(9)+F4*P(10)+F5*P(11)
      W3YY=F1*P(19)+F2*P(20)+F3*P(21)+F4*P(22)+F5*P(23)
      W3X=-0.5*(R2*W3XX+ANU*W3YY)
      W5XX=Y1*P(7)+Y2*P(8)+Y3*P(9)+Y4*P(10)+Y5*P(11)
      W5YY=Y1*P(19)+Y2*P(20)+Y3*P(21)+Y4*P(22)+Y5*P(23)
      W5X=-0.5*(R2*W5XX+ANU*W5YY)
      PUNCH 446,W0X,W3X,W5X
  446 FORMAT(5H W0X=E16.8,5H W3X=E16.8,5H W5X=E16.8)
      W0Y=-0.5*(W1YY+ANU*R2*W1XX)
      W3Y=-0.5*(W3YY+ANU*R2*W3XX)
      W5Y=-0.5*(W5YY+ANU*R2*W5XX)
      PUNCH 447,W0Y,W3Y,W5Y
  447 FORMAT(5H W0Y=E16.8,5H W3Y=E16.8,5H W5Y=E16.8)
      S2X=D1*P(25)+D2*P(26)+D3*P(27)+D4*P(28)+D5*P(29)+D6*P(30)
      S4X=G1*P(25)+G2*P(26)+G3*P(27)+G4*P(28)+G5*P(29)+G6*P(30)
      W1X=C1*P(1)+C2*P(2)+C3*P(3)+C4*P(4)+C5*P(5)+P(6)
      W3X=F1*P(1)+F2*P(2)+F3*P(3)+F4*P(4)+F5*P(5)
      T2Y=E1*P(43)+E2*P(44)+E3*P(45)+E4*P(46)+E5*P(47)+E6*P(48)
      T4Y=H1*P(43)+H2*P(44)+H3*P(45)+H4*P(46)+H5*P(47)+H6*P(48)
      W1Y=C1*P(13)+C2*P(14)+C3*P(15)+C4*P(16)+C5*P(17)+P(18)
      W3Y=F1*P(13)+F2*P(14)+F3*P(15)+F4*P(16)+F5*P(17)
      IF(ETA-0.5)15,16,16
   16 CONTINUE
      PUNCH 111
  111 FORMAT(5X,39H MEMBRANE STRESS AT MIDDLE OF LONG EDGE)
   15 W02X=(R2*S2X+0.5*R2*(W1X*W1X)+ANU*(R*T2Y+0.5*(W1Y*W1Y)))
      W04X=(R2*S4X+0.5*R2*(2.*W1X*W3X)+ANU*(R*T4Y+0.5*(2.*W1Y*W3Y)))
      W02Y=(R*T2Y+0.5*(W1Y*W1Y)+ANU*(R2*S2X+0.5*R2*(W1X*W1X)))
      W04Y=(R*T4Y+0.5*(2.*W1Y*W3Y)+ANU*(R2*S4X+0.5*R2*(2.*W1X*W3X)))
      PUNCH 113,W02X,W04X,W02Y,W04Y
  113 FORMAT(4X,6H W02X=E16.8,6H W04X=E16.8,6H W02Y=E16.8/6H W04Y=E16.8)
      IF (ETA-0.5) 52,51,51
   51 CONTINUE
```

```
      AXI=0.
      ETA=0.
      PUNCH 446
  446 FORMAT(3X,36H BENDING STRESSES AT CENTRE OF PLATE)
      GO TO 77
   52 PUNCH 112
  112 FORMAT(3X,37H MEMBRANE STRESSES AT CENTRE OF PLATE)
      END
****
3400032007013600032007024902402511963611300102000000000000000000000000
**JOB 5
**FOR 5
*FANDK1510
*LDISKKJPAN2
      DIMENSION SM(12,12),V(7),A(12,12),ANS(12),BM(12,12),BV(12),
     1DM(12,12),U(6)
      COMMON R,THETA,TH1,S,R2,C1,C2,C3,C4,C5,D2,D3,D4,D5,D6,D7,
     1E2,E3,E4,E5,E6,E7,ANU,BM,DM,U,C
      M=12
      DO 21 I=1,12
      DO 21 J=1,12
   21 BM(I,J)=0.
      BM(1,1)=-12.*C*R2*R+2.*A8-2.*A44
      BM(1,2)=2.*A44
      BM(1,3)=12.*C*R2*R
      BM(1,7)=2.*A11-2.*A10
      BM(1,9)=2.*A10
      BM(2,1)=12.*C*R2*R-6.*A8
      BM(2,2)=-12.*C*R2*R+6.*A8-12.*A44
      BM(2,3)=-12.*C*R2*R
      BM(2,4)=12.*A44
      BM(2,6)=12.*C*R2*R
      BM(2,7)=6.*A10-12.*A11
      BM(2,8)=12.*A11-6.*A10
      BM(2,9)=-6.*A10
      BM(2,12)=6.*A10
      BM(3,1)=-4.*A8+2.*A44
      BM(3,2)=-2.*A44
      BM(3,3)=-2.*A44+4.*A8-40.*C*R2*R
      BM(3,5)=40.*C*R2*R
      BM(3,6)=2.*A44
      BM(3,7)=-2.*A11
      BM(3,9)=2.*A11-4.*A10
      BM(3,11)=4.*A10
      BM(4,2)=12.*C*R2*R-10.*A8
      BM(4,4)=10.*A8-12.*C*R2*R-30.*A44
      BM(4,6)=-12.*C*R2*R
      BM(4,8)=10.*A10-30.*A11
      BM(4,10)=30.*A11-10.*A10
      BM(4,12)=-10.*A10
      BM(5,3)=-6.*A8*2.*A44
      BM(5,5)=-24.*C*R2*R+6.*A8-2.*A44
      BM(5,6)=-2.*A44
      BM(5,9)=-2.*A11
```

```
      BM(5,11)=2.*A11-6.*A10
      BM(6,1)=12.*A6
      BM(6,2)=12.*A44-12.*A6
      BM(6,3)=40.*C*R2*R-12.*A8
      BM(6,4)=-12.*A44
      BM(6,5)=-40.*C*R2*R
      BM(6,6)=12.*A8-12.*A44-40.*C*R2*R
      BM(6,7)=12.*A11
      BM(6,8)=-12.*A11
      BM(6,9)=12.*A10-12.*A11
      BM(6,11)=-12.*A10
      BM(6,12)=12.*A11-12.*A10
      BM(7,1)=-2.*A6*R2*C
      BM(7,2)=2.*A6*R2*C
      BM(7,7)=(-6.*A14+4.*A7*R2*S)-(2.*A7*R2*R)
      BM(7,8)=6.*A14
      BM(7,9)=2.*A7*R2*R
      BM(8,2)=-4.*A6*R2*C
      BM(8,4)=4.*A6*R2*C
      BM(8,7)=2.*A7*R2*R-8.*A7*R2*S
      BM(8,8)=8.*A7*R2*S-20.*A14-2.*A7*R2*R
      BM(8,9)=-2.*A7*R2*R
      BM(8,10)=20.*A14
      BM(8,12)=2.*A7*R2*R
      BM(9,1)=6.*A6*R2*C-6.*A6*R*C*S
      BM(9,2)=6.*A6*R*C*S-6.*A6*R2*C
      BM(9,3)=-6.*A6*R2*C
      BM(9,4)=6.*A6*R2*C
      BM(9,7)=6.*A14-12.*A7*R2*S
      BM(9,8)=-6.*A14
      BM(9,9)=12.*A7*R2*S-6.*A14-12.*A7*R2*R
      BM(9,11)=12.*A7*R2*R
      BM(9,12)=6.*A14
      BM(10,4)=-6.*A6*R2*C
      BM(10,8)=2.*A7*R2*R-12.*A7*R2*S
      BM(10,10)=12.*A7*R2*S-42.*A14-2.*A7*R2*R
      BM(10,12)=-2.*A7*R2*R
      BM(11,1)=6.*A6*R*C*S
      BM(11,2)=-6.*A6*R*C*S
      BM(11,3)=-6.*A6*R*C*S+10.*A6*R2*C
      BM(11,5)=-10.*A6*R2*C
      BM(11,6)=6.*A6*R*C*S-10.*A6*R2*C
      BM(11,9)=6.*A14-20.*A7*R2*S
      BM(11,11)=20.*A7*R2*S-30.*A7*R2*R-6.*A14
      BM(11,12)=-6.*A14
      BM(12,2)=12.*A6*R2*C-20.*A6*R*C*S
      BM(12,4)=20.*A6*R*C*S-12.*A6*R2*C
      BM(12,6)=-12.*A6*R2*C
      BM(12,7)=24.*A7*R2*S
      BM(12,8)=20.*A14-24.*A7*R2*S
      BM(12,9)=12.*A7*R2*R-24.*A7*R2*S
      BM(12,10)=-20.*A14
      BM(12,11)=-12.*A7*R2*R
  201 BM(12,12)=24.*A7*R2*S-12.*A7*R2*R-20.*A14
```

```
      CALL LINK(KJPAR3)
      END
// XEQ
*LDISKKJSAR3
      BV(1)= -(2.*R2*R*(A16*A16)-2.*R2*S*(-A16)-4.*R2*S*(-A16)+A12
     1+A13 *A16*A17-2.*S*(-A17))
       BV(2)=-(2.*R2*R*(-A16)-2.*R2*S*(A16*A17)-4.*R2*S+A12*(-A17)
     1+A13*(-A17)-2.*S*(A17*A17))
      BV(3)=0.
      BV(4)=0.
      BV(5)=0.
      BV(6)=-(2.*R2*R*(A16*A26-A23+A16*A19)-2.*R2*S*(A16*A18+A26*A17
     1-A19)-4.*R2*S*(A16*A33-A26-A26)+A12*(-A18+A17*A26-A33)+A13*(A16
     2*A22-A18+A17*A26)-2.*S*(-A22+A17*A18+A17*A18))
      BV(7)=-(2.*R2*R*(A16*A18-A19+A16*A18)-2.*R2*S*(A16*A20+A19*A17
     1-A18)-4.*R2*S*(A16*A30-A33-A18)+A12*(-A20+A17*A33-A30)+A13*(A16
     2*A21-A22+A17*A18)-2.*S*(-A21+A17*A22+A17*A20))
      BV(8)=-(2.*(A17*A17)-R*A6*S*(-A17)+A15*(-A17)+R2*A6+R2*A7*A16
     1*A17)
      BV(9)=-(2.*(-A17)-R*A6*S*(A16*A17)+A15+R2*A6*(-A16)+R2*A7* (-A16))
      BV(10)=0.
      BV(11)=0.
      BV(12)=0.
      BV(13)=-(2.*(-A21+A17*A22+A17*A20)-R*A6*S*(A16*A21 -A22+A16*A17)
     1+A15*(-A20+A33*A17-A30)+R2*A6*(A16*A30-A33-A 18) +R2*A7*(A16*A20
     2+A17*A19-A18))
      BV(14)=-(2.*(-A22+A17*A18+A17*A18)-R*A6*S* (A16*A22-A18+A26*A17)
     1+A15*(-A18+A26*A17-A33)+R2*A6*(A16*A33-A26-A26)+R2*A7*(A16*A18
     2+A26*A17-A19))
      EQUIVALENCE(CN,A)
      PUNCH 36,((A(I,J),J=1,N),I=1,N)
      PUNCH 36,(BV(J),J=1,N)
   36 FORMAT(/(6X,4E16.8))
      CALL MINV77(A,N)
      PUNCH 36,((A(I,J),J=1,N),I=1,N)
      DO 13 I=1,N
      ANS(I)=0.
      DO 13 J=1,N
   13 ANS(I)=ANS(I)+ A(I,J)*BV(J)
      D2=ANS(1)
      D3=ANS(2)
      D4=ANS ( 3)
      D5=ANS(4)
      D6=ANS(5)
      D7=ANS(6)
      D8=ANS(7)
      E2=ANS(8)
      E3=ANS(9)
      E4=ANS(10)
      E5=ANS(11)
      E6=ANS(12)
      E7=ANS(13)
      E8=ANS(14)
      PUNCH 36,D2,D3,D4,D5,D6,D7,D8,E2,E3,E4,E5,E6,E7,E8
```

```
 58 FORMAT(4H D2=E16.8,4H D3=E16.8,4H D4=E16.8/4H D5=E16.8,4H D6=E16.8
   1,4H D7=E16.8/4H D8=E16.8,4H E2=E16.8,4H E3=E16.8/4H E4=E16.8,
   24H E5=E16.8,4H E6=E16.8/4H E7=E16.8,4H E8=E16.8)
    END
****
*LDISKKJPAR6
  444 U(6)=(R2*R2*C*((D2*6.*A39)+(D3-D2)*A23+(3.*D4-3.*D2)*A1
   1+3.*(D7-D3-D4+D2)*A16+(-2.*D2*A19))-2.*R2*R*S*C* (D2*(3./2.)*A29
   2+(D3-D2)*A26+(3.*D4-3.*D2)*A30+3.*(D7-D3-D4+D2)*(-1.)+(-2.*D2*
   3A33))+R2*C*S*S*((D2*6.*A27)+(D3-D2)*A18+3.*(D4-D2)*A21 +3.*(D7-D3
   4-D4+D2)*A17+(-2.*D2*A22)))
    U(6)=U(6)-R2*R*C*S*((-D2*A18)+3.*(D2-D3)*A16+2.*(D3-D2)*A19)
   1+2.*R2*C*S*S*((-D2*A30)+3.*(D2-D3)*(-1.)+2.*(D3-D2)*A33)-R*C*S*S*
   2((-D2*A21)+3.*(D2-D3)*A17+2.*(D3-D2)*A22)+(1./2.)*(R2*R2*(A23+
   3(A16*A16*A1)+(2.*A16*A18-2.*A26)*A16+(-2.*A16*A19))-2.*R2*R*S*(
   4A26+(A16*A16*A30)+(2.*A16*A18-2.*A26)*(-1.)+(-2.*A16*A33)))
    U(6)=U(6)+0.5*(R2*S*S*(A18+(A16*A16*A21)+(2.*A16*A18-2.*A26)*A17
   2+(-2.*A16*A22))-2.*R2*R*S*((-A17*A23)+(-A16*A18)+(-A18+A20*A16+A17
   3*A26-A18)*A16+(1.+A17*A16)*A19)+4.*R2*S*S*((-A17*A26)+(-A16*A30)+
   4(-A18+A20*A16+A17*A26-A18)*(-1.)+(1.+A17*A16)*A33))
    U(6)=U(6)+0.5*(-2.*R*S**3*((-A17*A18)+(-A16*A21)+(-A18+A20*A16+
   1A17*A26-A18)*A17+(1.+A17*A16)*A22)+R2*S*S*(A17*A17*A23+A18+(-2.*
   2A20+2.*A17*A18)*A16+(-2.*A17)*A19)-2.*R*S**3*(A17*A17*A26+A30+(
   3-2.*A20+2.*A17*A18)*(-1.)+(-2.*A17)*A33)+S**4*(A17*A17*A18+A21+
   4(-2.*A20+2.*A17*A18)*A17+(-2.*A17)*A22))
    U(6)=U(6)+AMU*(R2*R*C*C*((E2*6.*A39)+3.*(E3-E2)*A23+(E4-E2)*A1+
   13.*(E7-E3-E4+E2)*A16+(-2.*E2)*A19)-2.*R2*C*C*S*((E2*(3./2.)*A29)+
   23.*(E3-E2)*A26+(E4-E2)*A30+3.*(E7-E3-E4+E2)*(-1.)+(-2.*E2)*A33)
   3+R*C*C*S*S*((E2*6.*A27)+3.*(E3-E2)*A18+(E4-E2)*A21+3.*(E7-E3-E4+
   4E2)*A17+(-2.*E2)*A22))
    U(6)=U(6)+AMU*(0.5*C*C*R2*((A17*A17*A23)+A18+(-2.*A20+2.*A17*A18)*
   1A16-(2.*A17*A19))-R*S*C*C*((A17*A17*A26)+A30+(-2.*A20+2.*A17*A18)*
   2(-1.)-(2.*A17*A33))+0.5*C*C*S*S*((A17*A17*A18)+A21+(-2.*A20+2.*
   3A17*A18)*A17-(2.*A17*A22)))
    U(6)=U(6)*12.
    T1=12.*(R*C**4*((E2*6.*A27)+3.*(E3-E2)*A18+(E4-E2)*A21+3.*(E7-
   1E3-E4+E2)*A17+(-2.*E2)*A22)+0.5*C**4*((A17*A17*A18)+A21+(-2.*A20+
   22.*A17*A18)*A17+(-2.*A17)*A22))
    T2=12.*(AMU*(R2*C**3*((D2*6.*A27)+(D3-D2)*A18+3.*(D4-D2)*A21+3.*(D
   17-D3-D4+D2)*A17+(-2.*D2)*A22)-R*S*C**3*((-D2*A21)+3.*(D2-D3)*A17+
   22.*(D3-D2)*A22)+0.5*C*C*(R2*((A18)+(A16*A16*A21)+(2.*A16*A18
   3-2.*A26)*A17+(-2.*A16*A22))-2.*R*S*((-A17*A18)+(-A16*A21)+(-A18
   4+A20*A16+A17*A26-A18)*A17+(1.+A17*A16)*A22))))
    T2=T2+12.*AMU*0.5*C*C*(S*S*((A17*A17*A18)+A21+(-2.*A20+2.*A17*
   1A18)*A17+(-2.*A17)*A22))
    T3=12.*(1.-AMU)*(R2*C**3*((-D2*A30)+3.*(D2-D3)*(-1.)+2.*(D3-D2)*
   1A33)-R*S*C**3*((-D2*A21)+3.*(D2-D3)*A17+2.*(D3-D2)*A22)+R2*R*C*C
   2*((-E2*A23)+3.*(E2-E4)*(-1.)+2.*(E4-E2)*A33)-R2*S*C*C*((-E2*A18)
   3+3.*(E2-E4)*A17+2.*(E4-E2)*A22)-R2*S*C*C*((E2*(3./2.)*A29)+3.*(E3
   4-E2)*A26+(E4-E2)*A30+3.*(E7-E3-E4+E2)*(-1.)+(-2.*E2)*A33))
    T4=12.*(1.-AMU)*(R*S*S*C*C*((E2*6.*A27)+3.*(E3-E2)*A18+(E4-E2)*
   1A21+3.*(E7-E3-E4+E2)*A17+(-2.*E2)*A22)+R2*C*C*((-A17*A26)+(-A16*
   2A30)+(-A18+A20*A16+A17*A26-A18)*(-1.)+(1.+A17*A16)*A33)
   3-R*S*C*C*((-A17*A18)+(-A16*A21)+(-A18+A20*A16+A17*A26-A18)*A17
```

```
4+(1.+A17*A16)*A22))
 T5=12.*(1.-ANU)*(-R*S*C*C*((A17*A17*A26)+A30+(-2.*A20+2.*A17*A16)
1*(-1.)+(-2.*A17)*A33)+S*S*C*C*((A17*A17*A18)+A21+(-2.*A20+2.*
2A17*A16)*A17+(-2.*A17)*A22))
 U(6)=U(6)+T1+T2+T3+T4+T5
 CALL LINK(KJPAR7)
 END
****
*LDISKKJPAR4
 U(1)=12.*(R2*R2*C*D2*(-4.+2.*C2)+2.*R*R2*S*C*2+R2*C*R*S*2*(-4.+
12.*C1)+ANU*(R2*R*C*C*(-4.+2.*C2)*E2+2.*R2*C*C*S*E2+R*C*C*R*S*(-4.
2+2.*C1)*E2))+12.*(R*C**4*(-4.+2.*C1)*E2+ANU*(R2*C**3*(-4.+2.*C1)
3*D2))+12.*(1.-ANU)*(R2*S*C*C*D2+R*S*S*C*C*(-4.+2.*C1)*E2)
 U(2)=12.*(R2*R2*C*(D2*(12.-24.*C2+12.*C4)+(3.*E4-3.*E2)*(-4.+2.*
1C2))-2.*R2*R*S*C*((D2*A26)+(-1.)*(3.*D4-3.*D2))+R2*C*S*S*(A20+A16
2+(3.*E4-3.*E2)*A17)-R2*R*C*S*(-D2*A16)+2.*R2*C*S*S*(-D2*(-1.))-R
3*C*S**3*(-D2*A17)+1./2.*(R2*R2*(A16**3)-2.*R2*R*S*((A16*A16)*
4(-1.))+R2*S*S*(A17*A16*A16)-2.*R2*R*S*(A16*(-A16))))
 U(2)=U(2)+12.*(1./2.*(4.*R2*S*S*A16-2.*R*S**3*A17*(-A16)+R2*S*S*
1A16-2.*R*S**3*(-1.)+S**4*A17)
2+ANU*(R**3*C*C*((E2*A23)+A16*(E4-E2))-2.*R2*C*C*S*((A24*E2)+(-1.)
3*(E4-E2))+R*C*C*S*S*((A18*E2)+A17*(E4-E2))+(1./2.)*C*R2*A16*C
4-R*S*C*C*(-1.)+(1./2.)*C*C*S*S*A17))
 U(2)=U(2)+12.*(R*C**4*((A16*E2)+A17*(E4-E2))+1./2.*C**4*A17+ANU
1*(R2*C**3*(A16*D2+A17*(3.*D4-3.*D2))-R*S*C**3*(-D2*A17)+1./2.*C*
2C*((R2*A16*A16*A17)-2.*R*S*A17*(-A16)+S*S*A17)))
 U(2)=U(2)+12.*(1.-ANU)*(R2*C**3*D2-R*S*C**3*(-D2*A17)-R2*S*C*C*
1(A26*E2-(E4-E2))+R*S*S*C*C*(A18*E2+A17*(E4-E2))+R2*C*C*A16-R*S*C
2*C*(A17*(-A16))-R*S*C*C*(-1.)+S*S*C*C*A17)
 CALL LINK(KJPAR5)
*LDISKKJPAR5
 N=6
 U(3)=12.*(R2*R2*C*(D2*A16+A16*(D3-D2))-2.*R2*R*S*C*(A30*D2-(D3-
1D2))+R2*C*S*S*(A21*D2+A17*(D3-D2))+0.5*(R2*R2*A16-2.*R2*R*S*(-1.)
2+R2*S*S*A17-2.*R2*R*S*(-A17*A16)+4.*R2*S*S*A17-2.*R*S**3*A17*
3(-A17)+R2*S*S*A16*A17*A17-2.*R*S**3*(-A17)*A17+S**4*A17*A17*A17))
 U(3)=U(3)+12.*(ANU*(R2*R*C*C*((E2*A16)+(3.*E3-3.*E2)*A16)-2.*R2*
1C*C*S*(E2*A30+(3.*E3-3.*E2)*(-1.))+R*C*C*S*S*(E2*A21+(3.*E3-3.*
2E2)*A17)+0.5*C*C*R2*(A16*A17*A17)-R*S*C*C*(-1.)*A17*A17+0.5*C*C*S*
3S*A17*A17*A17))
 U(3)=U(3)+12.*(R*C**4*(E2*A21+(3.*E3-3.*E2)*A17)+0.5*C**4*A17*
1A17*A17+ANU*(R2*C**3*(D2*A21+(D3-D2)*A17)+0.5*C*C*(R2*A17-2.*R*
2S*(-A17)*A17+S*S*A17*A17*A17)))
 U(3)=U(3)+12.*(1.-ANU)*(R2*R*C*C*E2-R2*S*C*C*(-E2)*A17-R2*S*C*C*
1(A30*E2+(3.*E3-3.*E2)*(-1.))+R*S*S*C*C*(E2*A21+(3.*E3-3.*E2)*A17
2)+R2*C*C*A17-R*S*C*C*(-A17)*A17-R*S*C*C*(-1.)*A17*A17+S*S*C*C*
3A17*A17*A17)
 U(4)=12.*(R2*R2*C*(D2*A35+5.*(D4-D2)*A23+5.*(D6-D4)*A16)-2.*R2*R*
1S*C*(D2*A26+5.*(D4-D2)*A26+5.*(D6-D4)*(-1.))+R2*C*S*S*(D2*A36+
25.*(D4-D2)*A18+5.*(D6-D4)*A17)-R2*R*C*S*(-D2*A23+(-D4+D2)*A16)+
32.*R2*C*S*S*(-D2*A26+(-D4+D2)*(-1.))-R*C*S**3*(-D2*A18+(-D4+D2)
4*A17)+0.5*(R2*R2*(A16*A16*A23+(2.*A16*A24)*A16)))
 U(4)=U(4)+12.*(0.5*(-2.*R2*R*S*(A16*A16*A26+(2.*A16*A24)*(-1.))
1+R2*S*S*(A16*A16*A18+2.*A16*A24*A17)-2.*R2*R*S*(-A16*A23+(-A24
```

```
3+A25*A16)*A16)+4.*A2*S*S*(-A16*A26+(-A24+A25*A16)*(-1.))-2.*[illegible]
5**5*(-A16*A1[illegible]+(-A24+A25*A16)*A17)+B2*S*[illegible]*(A25*(-2.*A25*A17))-2.
4*A*S*S*[illegible]*(A26+2.*A25)+S**4*(A15*(-2.*A25*A17))))
 U(4)=U(4)+12.*(A[illegible]*(B2*R*C*C*(B2*A[illegible]+(B4-B2)*A23+(B6-B4)*[illegible])
1-2.*A2*C*C*S*((B2*A38)+(B4-B2)*A15+(B6-B4)*(-1.))+R*C*C*[illegible]*((B2*
2A39)+(B4-B2)*A16+(B6-B4)*A17)*0.5*C*C*R2*(A27*(-2.*A25*A17))
3-R*S*C*C*(A26+2.*A25)*0.5*C*C*S*S*(A18+(-2.*A25*A17))))
 U(4)=U(4)+12.*(R*C**4*(B2*A39+(B4-B2)*A18+(B6-B4)*A17)+0.5*C**4*
1(A18+(-2.*A25*A17))*ARU*(R2*C**3*((D2*A39)+3.*(D4-D2)*A1[illegible]+[illegible](D6
2-D4)*A17)-R*S*C**3*(-D2*A16+(-D4+D2)*A17)+0.5*C*C*(B2*(A1[illegible]*A1[illegible]*
3A16*[illegible]*A[illegible]*A24*A17)-2.*R*S*(-A16*A1[illegible]+(-A24+A25*A16)*A17)
4+S*S*(A18+(-2.*A25*A17)))))
 U(4)=U(4)+12.*(1.-ARU)*(R2*C**3*((-D2*A26)+(-D4+D2)*(-1.))-R*S*
1C**3*((-D2*A16)+(-D4+D2)*A17)-R2*S*C*C*((B2*A38)+(B4-B2)*A26+
2(B6-B4)*(-1.))+R*S*S*C*C*((B2*A39)+(B4-B2)*A18+(B6-B4)*A17)+R2*C
3*C*((-A16*A26)+(-A24+A25*A16)*(-1.))-R*S*C*C*(-A16*A16+(-A24+A25*
4A16)*A17)-R*S*C*C*(A26+2.*A25)+S*S*C*C*(A18+(-2.*A25*A17)))
 CALL LINK(KJPAR6)
 END
****
```

```
34000 3000701300003200702490240251196361130010200
[illegible]
$$FOAXF501
*PA[illegible]X1610
C          SIM[illegible] [illegible]G     STRESSES  IN CLAMPED  SKEWED  PLATES
      DIMENSION TETA(6),TAXI(6),P(50)
      COMMON C1,C2,C3,C4,C5,D2,D3,D4,D5,D6,D7,E2,E3,E4,E5,E6,E7,F1,
     1F2,F3,F4,F[illegible],[illegible],ANU,S,C,TAN,SEC,AXI,ETA,I,J,P
      READ 101,(TETA(I),I=1,2),(TAXI(J),J=1,6)
      PUNCH 101,(TETA(I),I=1,2),(TAXI(J),J=1,6)
  101 FORMAT(8F10.5).
  500 READ 10,C1,C2,C3,C4,C5,D2,D3,D4,D5,D6,D7,E2,E3,E4,E5,E6,E7,F1,F2,
     1F3,F4,F5,THETA,R,ANU
      READ 2,Z1,Z2,Z3,Z4
    2 FORMAT(4F10.5)
      PUNCH 18,R,THETA,ANU
   18 FORMAT(3H R=F10.5,7H THETA=F10.5,5H ANU=F10.5)
      PUNCH 1,C1,C2,C3,C4,C5,D2,D3,D4,D5,D6,D7,E2,E3,E4,E5,E6,E7,F1,F2,
     1F3,F4,F5,THETA,R,ANU
   10 FORMAT(8F10.5)
    1 FORMAT(4E16.8)
      TH1=THETA*0.17453292/10.
      S=SINF(TH1)
      C=COSF(TH1)
      TAN=S/C
      TAN2=SQRTF(TAN)
      SEC=1./C
      DO 99 J=1,6
      AXI=TAXI(J)
      DO 99 I=1,2
      ETA=TETA(I)
```

```
  P(1)=-4.*AXI+ .*AXI*ETA*ETA-4.*AXI*(ETA**4)+4.*(AXI**3)- .*(AXI**3
 1)*(ETA**2)+4.*(AXI**3)*(ETA**4)-ETA+2.*(ETA**3)-(ETA**5)+ .*(A
 2*AXI*ETA-12.*(AXI**2)*(ETA**3)+6.*(AXI**2)*(ETA**5)-5.*(AXI**4)*
 3ETA+10.*(AXI**4)*(ETA**3)-5.*(AXI**4)*(ETA**5)
  CALL KJ1
  CALL KJ4
  CALL KJ2
  CALL KJ
  CALL KJ3
  CALL KJ6
  CALL KJ5
  W1XX=P(7)+C1*P(8)+C2*P(9)+C3*P(10)+C4*P(11)+C5*P(12)
  W1YY=P(19)+C1*P(20)+C2*P(21)+C3*P(22)+C4*P(23)+C5*P(24)
  W1XY=P(25)+C1*P(26)+C2*P(27)+C3*P(28)+C4*P(29)+C5*P(30)
  WOX=-0.5*(R*R*W1XX*SEC*SEC-2.*SEC*TAN*R*W1XY+(TAN*TAN+ANU)*W1YY)
  WOY=-0.5*((1.+ANU*TAN*TAN)*W1YY+ANU*(R*R*SEC*SEC*W1XX-2.*SEC*TAN
 1*R*W1XY))
  W3XX=F1*P(8)+F2*P(9)+F3*P(10)+F4*P(11)+F5*P(12)
  TAU0=R*SEC*W1XY-TAN*W1YY
  WOMAX=(0.5*(WOX+WOY))+(0.5*SQRTF((WOX-WOY)**2+4.*(TAU0)**2))
  WOMIN=(0.5*(WOX+WOY))-(0.5*SQRTF((WOX-WOY)**2+4.*(TAU0)**2))
  W3YY=F1*P(20)+F2*P(21)+F3*P(22)+F4*P(23)+F5*P(24)
  W3XY=F1*P(26)+F2*P(27)+F3*P(28)+F4*P(29)+F5*P(30)
  WO3X=-0.5*(R*R*SEC*SEC*W3XX-2.*SEC*TAN*R*W3XY+(TAN*TAN+ANU)*W3YY)
  WO3Y=-0.5*((1.+ANU*TAN*TAN)*W3YY+ANU*(R*R*SEC*SEC*W3XX-2.*SEC
 1*TAN*R*W3XY))
  TAU3=R*SEC*W3XY-TAN*W3YY
  W3MAX=(0.5*(WO3X+WO3Y))+(0.5*SQRTF((WO3X-WO3Y)**2+4.*(TAU3)**2))
  W3MIN=(0.5*(WO3X+WO3Y))-(0.5*SQRTF((WO3X-WO3Y)**2+4.*(TAU3)**2))
  UX=D2*P(31)+D3*P(32)+D4*P(33)+D5*P(34)+D6*P(35)+D7*P(36)
  UY=D2*P(37)+D3*P(38)+D4*P(39)+D5*P(40)+D6*P(41)+D7*P(42)
  VY=E2*P(43)+E3*P(44)+E4*P(45)+E5*P(46)+E6*P(47)+E7*P(48)
  W1X=P(1)+C1*P(2)+C2*P(3)+C3*P(4)+C4*P(5)+C5*P(6)
  W1Y=P(13)+C1*P(14)+C2*P(15)+C3*P(16)+C4*P(17)+C5*P(18)
  WO2X=R*R*SEC*UX-R*TAN*UY+ANU*R*VY+0.5*(R*R*SEC*SEC*W1X*W1X-2.*R*
 1SEC*TAN*W1X*W1Y+(ANU+TAN*TAN)*W1Y*W1Y)
  WO2Y=R*VY+0.5*W1Y*W1Y*(1.+ANU*TAN*TAN)+ANU*(R*R*SEC*UX-R*TAN*UY
 1+0.5*(R*R*W1X*W1X*SEC*SEC-2.*R*SEC*TAN*W1X*W1Y))
  WO2XY=R*UY-R*TAN*VY+W1Y*(R*SEC*W1X-TAN*W1Y)
  W2MAX=(0.5*(WO2X+WO2Y))+(0.5*SQRTF((WO2X-WO2Y)**2+4.*(WO2XY)**2))
  W2MIN=(0.5*(WO2X+WO2Y))-(0.5*SQRTF((WO2X-WO2Y)**2+4.*(WO2XY)**2))
  IF(AXI-0.005) 25,25,26
25 IF(ETA-0.9) 26,26,27
27 WO3Y=0.1*Z1
  WO3X=WO3X*Z1
  W3MAX=W3MAX*Z1
  W3MIN=W3MIN*0.1*Z1
  WO2X=WO2X*Z2
  WO2Y=WO2Y*Z2
  W2MAX=W2MAX*Z2
  W2MIN=W2MIN*Z2
  GO TO 2
26 CONTINUE
  WO3Y=WO3Y*Z3
```

```
      W03X=[illegible]
      [illegible]
      [illegible]
      [illegible]
      W02Y=[illegible]
      [illegible]
      [illegible]*Z4
  201 PUNCH 100
  100 FORMAT(1[illegible]  BENDING STRESSES)
      PUNCH 102,[illegible]
  102 FORMAT([illegible]X=E16.8,5H [illegible]0Y=E16.8,6H TAU0=E16.8/7H W0MAX=E16.8,
     17[illegible]=E16.8/6H W03X=E16.8,6H W03Y=E16.8,6H TAU3=E16.8/
     27H W3MAX=E16.8,7H W3MIN=F16.8)
      PUNCH 103
  103 FORMAT(1[illegible]  MEMBRANE STRESSES)
   99 PUNCH 104,W02X,W02Y,W02XY,W2MAX,W2MIN,AXI,ETA
  104 FORMAT(6[illegible] W02X=E16.8,6H W02Y=E16.8,7H W02XY=E16.8/7H W2MAX=E16.8,
     17[illegible] W2MIN=E16.8/5H AXI=F6.3,5H ETA=F6.3)
      GO TO [illegible]
      END
*LOCAL,KJ1,KJ[illegible],KJ[illegible],KJ[illegible],KJ3,KJC,KJ4
   0.        -1.         0.         0.25        0.3        0.35        0.4         0.4[illegible]
0.0283566 1.0621717 -0.001553 0.2871597 0.1639461 1.8056127 -0.1055[illegible] -1.95[illegible]
5.9467131 0.4[illegible]474 -4.040757 1.2635980 -4.084084 5.622[illegible]29 1.750[illegible]31 -7.73[illegible]
17.311[illegible]4 0.33[illegible]749 1.1705073 -0.006963 1.7775504 1.2291226     0.          0.5
  0.3333
  0.63       0.85        1.         0.513
-0.041149 0.[illegible] -0.001680 -0.027448 0.3244454 1.8628599 -1.[illegible]21573 -3.327
-3.[illegible]11[illegible] -1.54[illegible]74[illegible] -5.017219 1.5374749 -4.176846 10.840732 2.947[illegible]95 -2.249
25.126276 0.319018[illegible] 1.7693652 -0.086921 3.1558596 1.2253061    15.          0.
  0.3333
   0.4       0.[illegible]7          0.4      -0.6235
-0.076919 0.6404040 -0.005818 -0.398525 0.8643556 0.6454967 -4.594[illegible]01 -5.3[illegible]0
-4.5[illegible]2424 -5.243934 -15.06079 2.0952549 -4.530145 19.005527 3.590571[illegible] 1.967[illegible]
39.569915 0.2736639 2.3966780 -0.057855 4.9104088 0.0219636    30.          0.
  0.3333
  0.4        0.[illegible]        0.38      -1.54
-0.[illegible]4547 0.[illegible]46009 -0.025627 -0.712415 1.5062099 0.1375416 -3.601022 -[illegible].971
-0.372[illegible]49 -3.[illegible]4000 -25.92181 2.9164908 -5.981934 32.506423 3.273[illegible]428 -6.337
56.537413 0.1925[illegible]56 2.6887051 0.1503837 6.4493865 -2.490418    45.          0.
  0.3333
  0.46       0.59        0.5        0.148
-0.0[illegible]3358 0.6[illegible]3961 -0.034446 -0.772948 1.6643584 0.1309978 -2.601147 -10.46
1.5113065 -2.613277 -28.94166 3.2794362 -6.790375 37.990865 3.0[illegible]00532 -13.2[illegible]
65.473959 0.2023443 2.5343719 0.2528271 6.2652200 -3.042813    50.          0.
  0.3333
  0.46       0.5         0.5        0.0915
-0.0[illegible]1819 0.73[illegible]456 -0.051260 -0.824604 1.8684829 -0.288222 0.2920320 -14.2[illegible]
5.496[illegible]9[illegible]0 -[illegible].944[illegible] -36.51766 4.3117554 -8.920696 49.123947 2.6110637 -40.4[illegible]
52.681437 0.31[illegible]07[illegible]8 1.6915845 0.4800764 4.5664996 -3.236667    60.          0.5
  0.3333
  0.4       0.37        0.4         0.5
****
```

```
*+JOB 5
**FOR 5
*FANDK1610
*LDISK
      SUBROUTINE AJI
      P(2)=-4.*AXI*(ETA**2)+8.*AXI*(ETA**4)-4.*AXI*(ETA**6)+4.*(AXI**3)
     1*(ETA**2)-8.*(AXI**3)*(ETA**4)+4.*(AXI**3)*(ETA**6)-(ETA**3)+2.*(
     2ETA**5)-(ETA**7)+6.*(AXI**2)*(ETA**3)-12.*(AXI**2)*(ETA**5)
     3+6.*(AXI**2)*(ETA**7)-5.*(AXI**4)*(ETA**3)+10.*(AXI**4)*(ETA**5)
     4-5.*(AXI**4)*(ETA**7)
      P(3)=2.*AXI-4.*AXI*(ETA**2)+2.*AXI*(ETA**4)-8.*(AXI**3)+16.*(
     1AXI**3)*(ETA**2)-8.*(AXI**3)*(ETA**4)+6.*(AXI**5)-12.*(AXI**5)*
     2(ETA**2)+6.*(AXI**5)*(ETA**4)-3.*(AXI**2)*ETA+6.*(AXI**2)*
     3(ETA**3)-3.*(AXI**2)*(ETA**5)+10.*(AXI**4)*ETA-20.*(AXI**4)*(ETA**
     43)+10.*(AXI**4)*(ETA**5)-7.*(AXI**6)*ETA+14.*(AXI**6)*(ETA**3)
      P(3)=P(3)-7.*(AXI**6)*(ETA**5)
      P(4)=-(ETA**5)+6.*(AXI**2)*(ETA**5)-5.*(AXI**4)*(ETA**5)-4.*
     1AXI*(ETA**4)+4.*(AXI**3)*(ETA**4)+2.*(ETA**7)-12.*(AXI**2)*
     2(ETA**7)+10.*(AXI**4)*(ETA**7)+8.*AXI*(ETA**6)-8.*(AXI**3)*
     3(ETA**6)-(ETA**9)+6.*(AXI**2)*(ETA**9)-5.*(AXI**4)*(ETA**9)
     4-4.*AXI*(ETA**8)+4.*(AXI**3)*(ETA**8)
      P(5)=4.*(AXI**3)-5.*(AXI**4)*ETA-12.*(AXI**5)+14.*(AXI**6)*ETA+8.*
     1(AXI**7)-9.*(AXI**8)*ETA-8.*(AXI**3)*(ETA**2)+10.*(AXI**4)*
     2(ETA**3)+24.*(AXI**5)*(ETA**2)-28.*(AXI**6)*(ETA**3)-16.*
     3(AXI**7)*(ETA**2)+18.*(AXI**8)*(ETA**3)+4.*(AXI**3)*(ETA**4)-5.*
     4(AXI**4)*(ETA**5)-12.*(AXI**5)*(ETA**4)+14.*(AXI**6)*(ETA**5)
      P(5)=P(5)+8.*(AXI**7)*(ETA**4)-9.*(AXI**8)*(ETA**5)
      P(6)=2.*AXI*(ETA**2)-3.*(AXI**2)*(ETA**3)-8.*(AXI**3)*(ETA**2)
     1+10.*(AXI**4)*(ETA**3)+6.*(AXI**5)*(ETA**2)-7.*(AXI**6)*(ETA**3)
     2-4.*AXI*(ETA**4)+6.*(AXI**2)*(ETA**5)+16.*(AXI**3)*(ETA**4)
     3-20.*(AXI**4)*(ETA**5)-12.*(AXI**5)*(ETA**4)+14.*(AXI**6)*(
     4ETA**5)+2.*AXI*(ETA**6)-3.*(AXI**2)*(ETA**7)-8.*(AXI**3)*(ETA**6)
      F(6)=P(6)+10.*(AXI**4)*(ETA**7)+6.*(AXI**5)*(ETA**6)-7.*(AXI**6)
     1*(ETA**7)
      RETURN
      END
****
      SUBROUTINE KJA
      P(7)=-4.+8.*(ETA**2)-4.*(ETA**4)+12.*(AXI**2)-24.*(AXI**2)*(ETA**2
     1)+12.*(AXI**2)*(ETA**4)+12.*AXI*ETA-24.*AXI*(ETA**3)+12.*AXI*
     2(ETA**5)-20.*(AXI**3)*ETA+40.*(AXI**3)*(ETA**3)-20.*(AXI**3)*
     3(ETA**5)
      P(8)=-4.*(ETA**2)+8.*(ETA**4)-4.*(ETA**6)+12.*(AXI**2)*(ETA**2)
     1-24.*(AXI**2)*(ETA**4)+12.*(AXI**2)*(ETA**6)+12.*AXI*(ETA**3)
     2-24.*AXI*(ETA**5)+12.*AXI*(ETA**7)-20.*(AXI**3)*(ETA**3)+40.*
     3(AXI**3)*(ETA**5)-20.*(AXI**3)*(ETA**7)
      P(9)=2.-4.*(ETA**2)+2.*(ETA**4)-24.*(AXI**2)+48.*(AXI**2)*(ETA**2)
     1-24.*(AXI**2)*(ETA**4)+30.*(AXI**4)-60.*(AXI**4)*(ETA**2)+30.*
     2(AXI**4)*(ETA**4)-6.*AXI*ETA+12.*AXI*(ETA**3)-6.*AXI*(ETA**5)
      P(10)=12.*AXI*(ETA**5)-20.*(AXI**3)*(ETA**5)-4.*(ETA**4)+12.*(
      P(11)=12.*(AXI**2)-20.*(AXI**3)*ETA-60.*(AXI**4)+84.*(AXI**5)*ETA+
      P(11)=P(11)+64.*(AXI**5)*(ETA**5)+56.*(AXI**6)*(ETA**4)
      P(12)=2.*(ETA**2)-6.*AXI*(ETA**3)-24.*(AXI**2)*(ETA**2)+40.*
      P(12)=P(12)+40.*(AXI**3)*(ETA**7)+30.*(AXI**4)*(ETA**6)-42.*
```

```
      RETURN
      END
***
      SUBROUTINE XD4
      P(13)=-4.*ETA+4.*(ETA**3)+8.*(AXI**2)*ETA-8.*(AXI**2)*(ETA**3)
     1-4.*(AXI**4)*ETA+4.*(AXI**4)*(ETA**3)-AXI+6.*AXI*(ETA**2)-5.*
     2AXI*(ETA**4)+2.*(AXI**3)-12.*(AXI**3)*(ETA**2)+10.*(AXI**3)*
     3(ETA**4)-(AXI**5)+6.*(AXI**5)*(ETA**2)-5.*(AXI**5)*(ETA**4)
      P(14)=2.*ETA-4.*(ETA**3)+6.*(ETA**5)-4.*(AXI**2)*ETA+16.*(
     1AXI**2)*(ETA**3)-12.*(AXI**2)*(ETA**5)+2.*(AXI**4)*ETA-4.*(AXI
     2**4)*(ETA**3)+6.*(AXI**4)*(ETA**5)-3.*AXI*(ETA**2)+10.*AXI*(
     3ETA**4)-7.*AXI*(ETA**6)+6.*(AXI**3)*(ETA**2)-20.*(AXI**3)*(ETA**4)
     4+14.*(AXI**3)*(ETA**6)-3.*(AXI**5)*(ETA**2)+10.*(AXI**5)*(ETA**4)
      P(14)=P(14)-7.*(AXI**5)*(ETA**6)
      P(15)=-4.*(AXI**2)*ETA+4.*(AXI**2)*(ETA**3)+8.*(AXI**4)*ETA
     1-8.*(AXI**4)*(ETA**3)-4.*(AXI**6)*ETA+4.*(AXI**6)*(ETA**3)-
     2(AXI**3)+6.*(AXI**3)*(ETA**2)-5.*(AXI**3)*(ETA**4)+2.*(AXI**5)
     3-12.*(AXI**5)*(ETA**2)+10.*(AXI**5)*(ETA**4)-(AXI**7)+6.*(AXI**7)
     4*(ETA**2)-5.*(AXI**7)*(ETA**4)
      P(16)=4.*(ETA**3)-5.*AXI*(ETA**4)-12.*(ETA**5)+14.*AXI*(ETA**6)
     1-9.*AXI*(ETA**8)+8.*(ETA**7)-8.*(AXI**2)*(ETA**3)+10.*(AXI**3)*
     2(ETA**4)+24.*(AXI**2)*(ETA**5)-28.*(AXI**3)*(ETA**6)-16.*(AXI**2)
     3*(ETA**7)+18.*(AXI**3)*(ETA**8)+4.*(AXI**4)*(ETA**3)-5.*(AXI**5)*
     4(ETA**4)-12.*(AXI**4)*(ETA**5)+14.*(AXI**5)*(ETA**6)
      P(16)=P(16)+8.*(AXI**4)*(ETA**7)-9.*(AXI**5)*(ETA**8)
      P(17)=-(AXI**5)+6.*(AXI**5)*(ETA**2)-5.*(AXI**5)*(ETA**4)-4.*
     1(AXI**4)*ETA+4.*(AXI**4)*(ETA**3)+2.*(AXI**7)-12.*(AXI**7)*(ETA**2
     2)+10.*(AXI**7)*(ETA**4)+8.*(AXI**6)*ETA-8.*(AXI**6)*(ETA**3)
     3-(AXI**9)+6.*(AXI**9)*(ETA**2)-5.*(AXI**9)*(ETA**4)-4.*(AXI**8)*
     4ETA+4.*(AXI**8)*(ETA**3)
      SUBROUTINE XD5
      P(18)=2.*(AXI**2)*ETA-3.*(AXI**3)*(ETA**2)-8.*(AXI**2)*(ETA**3)
     1+10.*(AXI**3)*(ETA**4)+6.*(AXI**2)*(ETA**5)-7.*(AXI**3)*(ETA**6)
     2-4.*(AXI**4)*ETA+6.*(AXI**5)*(ETA**2)+16.*(AXI**4)*(ETA**3)
     3-20.*(AXI**5)*(ETA**4)-12.*(AXI**4)*(ETA**5)+14.*(AXI**5)*(ETA
     4**6)+2.*(AXI**6)*ETA-3.*(AXI**7)*(ETA**2)-8.*(AXI**6)*(ETA**3)
      P(18)=P(18)+10.*(AXI**7)*(ETA**4)+6.*(AXI**6)*(ETA**5)-7.*(AXI**7)
     1*(ETA**6)
      P(19)=-4.+12.*(ETA**2)+8.*(AXI**2)-24.*(AXI**2)*(ETA**2)-4.*
      P(20)=2.-24.*(ETA**2)+30.*(ETA**4)-4.*(AXI**2)+48.*(AXI**2)*
      P(20)=P(20)-42.*(AXI**5)*(ETA**5)
      P(21)=-4.*(AXI**2)+12.*(AXI**2)*(ETA**2)+8.*(AXI**4)-24.*(AXI**4)
      P(22)=12.*(ETA**2)-20.*AXI*(ETA**3)-60.*(ETA**4)+84.*AXI*(ETA**5)-
      P(22)=P(22)+56.*(AXI**4)*(ETA**6)-72.*(AXI**5)*(ETA**7)
      P(23)=12.*(AXI**3)*ETA-20.*(AXI**5)*(ETA**3)-4.*(AXI**4)+12.*
      P(24)=2.*(AXI**2)-6.*(AXI**3)*ETA-24.*(AXI**2)*(ETA**2)+40.*
      P(24)=P(24)+30.*(AXI**6)*(ETA**4)-42.*(AXI**7)*(ETA**5)
      RETURN
      END
****
34000320070136000320070249024025119636113001020O
**JOB 5
**FOR 5
*FANDK1610
```

```
*LDISK
      SUBROUTINE KJ3
      COMMON C1,C2,C3,C4,C5,D2,D3,D4,D5,D6,D7,E2,E3,E4,E5,E6,E7,F1,
     1F2,F3,F4,F5,A,ANU,S,C,TAN,SEC,AXI,ETA,I,J,P
      P(25)=16.*AXI*ETA-16.*AXI*(ETA**3)-16.*(AXI**3)*ETA+16.*(AXI**3)*
      P(26)=-8.*AXI*ETA+32.*AXI*(ETA**3)-24.*AXI*(ETA**5)+8.*(AXI**3)
      P(27)=-8.*AXI*ETA+8.*AXI*(ETA**3)+32.*(AXI**3)*ETA-32.*(AXI**3)
      P(28)=-5.*(ETA**4)+30.*(AXI**2)*(ETA**4)-25.*(AXI**4)*(ETA**4)
      P(29)=-5.*(AXI**4)+14.*(AXI**6)-9.*(AXI**8)-16.*(AXI**3)*ETA
      P(30)=4.*AXI*ETA-9.*(AXI**2)*(ETA**2)-16.*(AXI**3)*ETA+30.*
      P(30)=P(30)+70.*(AXI**4)*(ETA**6)+36.*(AXI**5)*(ETA**5)
      RETURN
      END
****
      SUBROUTINE KJC
      P(31)=1.-2.*AXI*ETA-3.*(AXI**2)+4.*(AXI**3)*ETA-(ETA**2)+2.*AXI*(
     1ETA**3)+3.*(AXI**2)*(ETA**2)-4.*(AXI**3)*(ETA**3)
      P(32)=(ETA**2)-2.*AXI*(ETA**3)-3.*(AXI**2)*(ETA**2)+4.*(AXI**3)
     1*(ETA**3)-(ETA**4)+2.*AXI*(ETA**5)+3.*(AXI**2)*(ETA**4)
     2-4.*(AXI**3)*(ETA**5)
      P(33)=3.*(AXI**2)-4.*(AXI**3)*ETA-5.*(AXI**4)+6.*(AXI**5)*ETA
     1-3.*(AXI**2)*(ETA**2)+4.*(AXI**3)*(ETA**3)+5.*(AXI**4)*(ETA**2)
     2-6.*(AXI**5)*(ETA**3)
      P(34)=(ETA**4)-2.*AXI*(ETA**5)-3.*(AXI**2)*(ETA**4)+4.*(AXI**3)*
     1(ETA**5)-(ETA**6)+2.*AXI*(ETA**7)+3.*(AXI**2)*(ETA**6)-4.*(AXI**3)
     2*(ETA**7)
      P(35)=5.*(AXI**4)-6.*(AXI**5)*ETA-7.*(AXI**6)+8.*(AXI**7)*ETA-5.
     1*(AXI**4)*(ETA**2)+6.*(AXI**5)*(ETA**3)+7.*(AXI**6)*(ETA**2)
     2-8.*(AXI**7)*(ETA**3)
      P(36)=3.*(AXI**2)*(ETA**2)-4.*(AXI**3)*(ETA**3)-5.*(AXI**4)*
     1(ETA**2)+6.*(AXI**5)*(ETA**3)-3.*(AXI**2)*(ETA**4)+4.*(AXI**3)
     2*(ETA**5)+5.*(AXI**4)*(ETA**4)-6.*(AXI**5)*(ETA**5)
      P(37)=-(AXI**2)+(AXI**4)-2.*AXI*ETA+3.*(AXI**2)*(ETA**2)+2.*(AXI
     1**3)*ETA-3.*(AXI**4)*(ETA**2)
      P(38)=2.*AXI*ETA-3.*(AXI**2)*(ETA**2)-2.*(AXI**3)*ETA+3.*(AXI**4)
     1*(ETA**2)-4.*AXI*(ETA**3)+5.*(AXI**2)*(ETA**4)+4.*(AXI**3)*(ETA**3
     2)-5.*(AXI**4)*(ETA**4)
      P(39)=-(AXI**4)+(AXI**6)-2.*(AXI**3)*ETA+3.*(AXI**4)*(ETA**2)
     1+2.*(AXI**5)*ETA-3.*(AXI**6)*(ETA**2)
      P(40)=4.*AXI*(ETA**3)-5.*(AXI**2)*(ETA**4)-4.*(AXI**3)*(ETA**3)
     1+5.*(AXI**4)*(ETA**4)-6.*AXI*(ETA**5)+7.*(AXI**2)*(ETA**6)+6.
     2*(AXI**3)*(ETA**5)-7.*(AXI**4)*(ETA**6)
      P(41)=-(AXI**6)+(AXI**8)-2.*(AXI**5)*ETA+3.*(AXI**6)*(ETA**2)+
     22.*(AXI**7)*ETA-3.*(AXI**8)*(ETA**2)
      RETURN
      END
340003200701360032007024902402511963611300l0200
**JOB 5
**FOR 5
*PAPOK1610
*LDISK
      SUBROUTINE KJ4
      DIMENSION P(50)
      COMMON C1,C2,C3,C4,C5,D2,D3,D4,D5,D6,D7,E2,E3,E4,E5,E6,E7,F1,
```

```
1F2,F3,F4,F5, ,ANU,S,C,TAN,SEC,AXI,ETA,I,J,P
 P(42)=2.*(AXI**3)*ETA-3.*(AXI**4)*(ETA**2)-2.*(AXI**5)*ETA+3.
1*(AXI**6)*(ETA**2)-4.*(AXI**3)*(ETA**3)+5.*(AXI**4)*(ETA**4)
2+4.*(AXI**5)*(ETA**3)-5.*(AXI**6)*(ETA**4)
 P(43)=1.-1.*AXI*ETA-(AXI**2)+2.*(AXI**3)*ETA-3.*(ETA**2)+4.*AXI
1*(ETA**3)+3.*(AXI**2)*(ETA**2)-4.*(AXI**3)*(ETA**3)
 P(44)=3.*(ETA**2)-4.*AXI*(ETA**3)-3.*(AXI**2)*(ETA**2)+4.*(AXI
1**3)*(ETA**3)-5.*(ETA**4)+6.*AXI*(ETA**5)+5.*(AXI**2)*(ETA**4)-6.
2*(AXI**3)*(ETA**5)
 P(45)=(AXI**2)-2.*(AXI**3)*ETA-(AXI**4)+2.*(AXI**5)*ETA-3.*(AXI
1**2)*(ETA**2)+4.*(AXI**3)*(ETA**3)+3.*(AXI**4)*(ETA**2)-4.*
2(AXI**5)*(ETA**3)
 P(46)=5.*(ETA**4)-6.*AXI*(ETA**5)-5.*(AXI**2)*(ETA**4)+6.*(
1AXI**3)*(ETA**5)-7.*(ETA**6)+8.*AXI*(ETA**7)+7.*(AXI**2)*(ETA**6)
2-8.*(AXI**3)*(ETA**7)
 P(47)=(AXI**4)-2.*(AXI**5)*ETA-(AXI**6)+2.*(AXI**7)*ETA-3.*(
1AXI**4)*(ETA**2)+4.*(AXI**5)*(ETA**3)+3.*(AXI**6)*(ETA**2)
2-4.*(AXI**7)*(ETA**3)
 P(48)=3.*(AXI**2)*(ETA**2)-4.*(AXI**3)*(ETA**3)-3.*(AXI**4)*(ETA**
12)+4.*(AXI**5)*(ETA**3)-5.*(AXI**2)*(ETA**4)+6.*(AXI**3)*(
2ETA**5)+5.*(AXI**4)*(ETA**4)-6.*(AXI**5)*(ETA**5)
 RETURN
 END
****
```

```
540003200701360003200702490240251196361130010200
**JOB 5
**FORX5
*PARAM1,10
C     EXPERIMENTAL   RESULTS   FOR   SKEWED   PLATE
  100 READ 10,SA,SB,SC
   10 FORMAT(3F10.5)
      PUNCH 11,SA,SB,SC
   11 FORMAT(4H SA=E16.8,4H SB=E16.8,4H SC=E16.8)
      E2=30000000.
      ANU=0.3333
      AMAXS=E2*((SA+SC)/(1.-ANU)+(1./(1.+ANU))*SQRTF((SA-SC)**2
     1+(2.*SB-(SA+SC))**2))
      AMINS=E2*((SA+SC)/(1.-ANU)-(1./(1.+ANU))*SQRTF((SA-SC)**2+
     1(2.*SB-(SA+SC))**2))
      TAUM=E2/(1.+ANU)*SQRTF((SA-SC)**2+(2.*SB-(SA+SC))**2)
      ANGLE=0.5*ATANF(2.*SB-(SA+SC)/(SA-SC))
      DEGRE=ANGLE/0.017453292
      PUNCH 13,AMAXS,AMINS,DEGRE
   13 FORMAT(7H AMAXS=E16.8,7H AMINS=E16.8,7H DEGRE=F10.5)
      GO TO 100
      END
****
```

APPENDIX B

EXPERIMENTAL DATA FOR LATERAL DEFLECTIONS AND UNIT STRAINS

Table 5. Lateral Deflection Results for Plate 1, Test 1.

(inches)

	p.s.i.	qb^4/Dh	Loading	Unloading	Average	w/h
Dial Gauge No. 1	0.375	46.79	0.042	0.044	0.043	0.344
	0.5	62.40	0.057	-	0.057	0.456
	0.625	78.00	0.067	0.066	0.066	0.532
	0.750	93.6	0.084	0.090	0.087	0.696
	1.000	124.8	0.102	0.107	0.104	0.836
	1.250	156.0	0.117	0.121	0.119	0.952
	1.500	187.2	0.145	0.145	0.145	1.160
	1.750	218.4	0.159	0.160	0.160	1.276
	2.000	245.0	0.174	0.179	0.177	1.412
	2.250	280.8	0.194	0.191	0.193	1.549
	2.500	312.0	0.205	-	0.205	1.640
Dial Gauges Nos. 2 and 3	0.375	46.79	0.035	0.036	0.035	0.284
	0.500	62.4	0.049	-	0.049	0.392
	0.625	78.0	0.057	0.056	0.056	0.452
	0.750	93.6	0.074	0.076	0.075	0.600
	1.000	124.8	0.090	0.093	0.091	0.732
	1.250	156.0	0.103	0.105	0.104	0.832
	1.500	187.3	0.116	0.120	0.118	0.944
	1.750	218.4	0.130	0.131	0.131	1.044
	2.000	245.0	0.142	0.143	0.142	1.140
	2.250	280.8	0.156	0.154	0.155	1.240
	2.500	312.0	0.169	-	0.169	1.352
Dial Gauge No. 4	0.375	46.79	0.021	0.025	0.023	0.184
	0.500	62.4	0.029	-	0.029	0.232
	0.625	78.0	0.035	0.038	0.036	0.292
	0.750	93.6	0.046	0.051	0.049	0.388
	1.000	124.8	0.056	0.060	0.058	0.464
	1.250	156.0	0.065	0.072	0.068	0.548
	1.500	187.2	0.075	0.078	0.077	0.612
	1.750	218.4	0.083	0.087	0.085	0.680
	2.000	245.0	0.092	0.097	0.095	0.756
	2.250	280.8	0.101	0.101	0.101	0.808
	2.500	312.0	0.111	-	0.111	0.888

Table 6. Lateral Deflection Results for Plate 1, Test 2.

(inches)

	p.s.i.	qb^4/Dh	Loading	Unloading	Average	w/h
Dial Gauge No. 1	0.375	46.79	0.045	0.048	0.047	0.372
	0.500	62.4	- -	-	-	-
	0.625	78.0	0.064	0.071	0.067	0.54
	0.75	93.6	0.084	0.089	0.085	0.69
	1.000	124.8	0.101	0.107	0.104	0.832
	1.250	156.0	0.119	0.121	0.120	0.96
	1.500	187.2	0.141	0.147	0.144	1.152
	1.750	218.4	0.157	0.161	0.159	1.272
	2.000	245.0	0.177	0.177	0.177	1.416
	2.250	280.8	0.193	0.193	0.193	1.544
	2.500	312.0	0.206	-	0.206	1.648
Dial Gauges Nos. 2 and 3	0.375	46.79	0.037	0.039	0.038	0.304
	0.500	62.4	-	-	-	-
	0.625	78.0	0.055	0.059	0.057	0.456
	0.750	93.6	0.073	0.075	0.074	0.592
	1.000	124.8	0.089	0.091	0.090	0.720
	1.250	156.0	0.104	0.106	0.105	0.840
	1.500	187.2	0.116	0.120	0.118	0.944
	1.750	218.4	0.129	0.131	0.130	1.040
	2.000	245.0	0.143	0.143	0.143	1.144
	2.250	280.8	0.155	0.155	0.155	1.240
	2.500	312.0	0.165	-	0.165	1.320
Dial Gauge No. 4	0.375	46.79	0.023	0.026	0.024	0.196
	0.500	62.4	-	-	-	-
	0.625	78.0	0.035	0.036	0.036	0.284
	0.750	93.6	0.046	0.048	0.047	0.376
	1.000	124.8	0.056	0.061	0.059	0.468
	1.250	156.0	0.066	0.072	0.069	0.552
	1.500	187.2	0.076	0.081	0.079	0.628
	1.750	218.4	0.084	0.088	0.086	0.688
	2.000	245.0	0.092	0.096	0.094	0.752
	2.250	280.8	0.102	0.102	0.102	0.816
	2.500	312.0	0.109	-	0.109	0.872

Table 7. Lateral Deflection Results for Plate 1, Test 3.

(inches)

	p.s.i.	qb^4/Dh	Loading	Unloading	Average	w/h
Dial Gauge 1	0.625	78.0	0.065	0.079	0.072	0.576
	1.000	124.8	0.101	0.104	0.102	0.82
	1.500	187.3	0.143	0.145	0.144	1.152
	2.000	245.0	0.169	0.170	0.169	1.352
	2.500	312.0	0.204	-	0.204	1.632
Dial Gauges Nos. 2 and 3	0.625	78.0	0.056	0.057	0.057	0.452
	1.000	124.8	0.089	0.089	0.089	0.712
	1.500	187.2	0.117	0.117	0.117	0.936
	2.000	245.0	0.143	0.140	0.142	1.132
	2.500	312.0	0.164	0.162	0.163	1.304
Dial Gauge 1	0.625	78.0	0.034	0.037	0.036	0.284
	1.000	124.8	0.055	0.059	0.057	0.456
	1.500	187.2	0.075	0.080	0.078	0.620
	2.000	245.0	0.092	0.095	0.094	0.748
	2.500	312.0	0.108	0.107	0.108	0.860

Table 8. Lateral Deflection Results for Plate 2, Test 1.

(inches)

	Height of water (in.)	qb^4/Dh	Loading	Unloading	Average	w/h
Dial Gauge No. 1	0.5	36.05	0.018	0.020	0.019	0.304
	1.0	72.10	0.036	0.039	0.038	0.60
	1.5	108.15	0.050	0.051	0.050	0.808
	2.0	144.20	0.060	0.064	0.062	0.992
	2.5	180.25	0.070	0.073	0.071	1.14
	3.0	216.30	0.078	0.083	0.080	1.28
	3.5	252.35	0.090	0.094	0.092	1.47
	4.0	288.41	0.096	0.099	0.98	1.56
Dial Gauges No.2 and 3	0.5	36.05	0.013	0.013	0.013	0.208
	1.0	72.10	0.021	0.022	0.021	0.344
	1.5	108.15	0.032	0.033	0.032	0.520
	2.0	144.2	0.036	0.039	0.038	0.608
	2.5	180.25	0.042	0.045	0.044	0.696
	3.0	216.3	0.044	0.051	0.048	0.760
	3.5	252.35	0.052	0.058	0.055	0.880
	4.0	288.41	0.055	0.057	0.056	0.896
Dial Gauge No. 4	0.5	36.05	0.006	0.005	0.006	0.088
	1.0	72.10	0.014	0.013	0.014	0.216
	1.5	108.15	0.020	0.021	0.020	0.328
	2.0	144.20	0.025	0.027	0.026	0.416
	2.5	180.25	0.029	0.034	0.032	0.504
	3.0	216.30	0.035	0.035	0.035	0.560
	3.5	252.35	0.042	0.041	0.041	0.664
	4.0	288.41	0.044	-	0.044	0.704

Table 9. Lateral Deflection Results for Plate 2, Test 2.

(inches)

	Height of water (in)	qb^4/Dh	Loading	Unloading	Average	w/h
Dial Gauge No. 1	0.5	36.05	0.019	0.021	0.020	0.320
	1.00	72.10	0.029	0.035	0.032	0.512
	1.5	108.15	0.046	0.046	0.046	0.736
	2.0	144.20	0.061	0.062	0.062	0.984
	2.5	180.24	0.069	0.070	0.070	1.112
	3.0	216.30	0.082	0.084	0.083	1.328
	3.5	252.35	0.086	0.090	0.088	1.408
	4.0	288.41	0.096	0.102	0.099	1.584
Dial Gauges No. 2 and 3	0.5	36.05	0.014	0.010	0.012	0.184
	1.0	72.10	0.025	0.021	0.023	0.368
	1.5	108.15	0.030	0.032	0.031	0.496
	2.0	144.20	0.038	0.038	0.038	0.608
	2.5	180.25	0.043	0.045	0.044	0.704
	3.0	216.30	0.050	0.047	0.049	0.776
	3.5	252.35	0.058	0.056	0.057	0.912
	4.0	288.41	0.058	0.060	0.059	0.944
Dial Gauge No. 4	0.5	36.05	0.005	0.006	0.005	0.088
	1.0	72.10	0.011	0.013	0.012	0.192
	1.5	108.15	0.018	0.019	0.019	0.296
	2.0	144.20	0.023	0.023	0.023	0.368
	2.5	180.24	0.028	0.032	0.030	0.480
	3.0	216.30	0.031	0.033	0.032	0.512
	3.5	252.35	0.038	0.040	0.039	0.624
	4.0	288.41	0.041	0.042	0.042	0.664

Table 10. Lateral Deflection Results for Plate 2, Test 3.

(inches)

	Height of water(in.)	qb^4/Dh	Loading	Unloading	Average	w/h
Dial Gauge No. 1	0.5	36.05	0.018	0.019	0.018	0.296
	1.00	72.10	0.033	0.034	0.034	0.536
	1.50	108.15	0.045	0.046	0.046	0.728
	2.00	144.20	0.061	0.062	0.062	0.984
	2.50	180.25	0.065	0.066	0.066	1.506
	3.0	216.30	0.075	0.076	0.076	1.208
	3.5	252.35	0.087	0.088	0.087	1.400
	4.0	288.41	0.096	0.097	0.097	1.544
Dial Gauges No. 2 and 3	0.5	36.05	0.013	0.014	0.014	0.216
	1.00	72.10	0.022	0.022	0.022	0.352
	1.50	108.15	0.030	0.031	0.031	0.488
	2.00	144.20	0.037	0.038	0.038	0.600
	2.50	180.25	0.044	0.044	0.044	0.704
	3.00	216.30	0.046	0.049	0.047	0.760
	3.50	252.35	0.053	0.057	0.055	0.880
	4.00	288.41	0.059	0.059	0.059	0.944
Dial Gauge No. 4	0.5	36.05	0.005	0.007	0.006	0.096
	1.0	72.10	0.013	0.013	0.013	0.208
	1.5	108.15	0.017	0.019	0.018	0.288
	2.0	144.20	0.025	0.025	0.025	0.400
	2.5	180.25	0.030	0.032	0.031	0.496
	3.0	216.30	0.034	0.033	0.034	0.536
	3.5	252.35	0.041	0.040	0.040	0.648
	4.0	288.41	0.043	0.044	0.044	0.696

Table 11. Lateral Deflection Results for Plate 3, Test 1.

(inches)

	Height of water (in)	qb^4 / Dh	Loading	Unloading	Average	w/h
Dial Gauge No. 1	1.0	25.24	0.030	0.032	0.031	0.496
	2.0	50.49	0.051	0.051	0.051	0.816
	3.0	75.73	0.066	0.069	0.067	1.072
	4.0	100.98	0.079	0.080	0.079	1.264
	5.0	126.22	0.090	0.094	0.092	1.472
	6.0	151.46	0.099	0.101	0.100	1.600
	7.0	176.71	0.106	0.108	0.107	1.712
	8.0	201.95	0.112	-	0.112	1.792
Dial Gauges No. 2 and3	1.0	25.24	0.018	0.022	0.020	0.320
	2.0	50.49	0.030	0.034	0.032	0.512
	3.0	75.73	0.040	0.042	0.041	0.656
	4.0	100.98	0.048	0.049	0.048	0.768
	5.0	126.22	0.056	0.058	0.057	0.912
	6.0	151.46	0.060	0.061	0.061	0.976
	7.0	176.71	0.065	0.066	0.066	1.056
	8.0	201.95	0.069	-	0.069	1.104
Dial Gauge No. 4	1.0	25.24	0.012	0.012	0.012	0.192
	2.0	50.49	0.019	0.021	0.020	0.320
	3.0	75.73	0.024	0.027	0.026	0.416
	4.0	100.98	0.029	0.031	0.030	0.480
	5.0	126.22	0.034	0.034	0.034	0.544
	6.0	151.46	0.038	0.038	0.038	0.608
	7.0	176.71	0.040	0.040	0.040	0.640
	8.0	201.95	0.042	-	0.042	0.673

Table 12. Lateral Deflection Results for Plate 3, Test 2.

(inches)

	Height of water (in.)	qb^4 / Dh	Loading	Unloading	Average	w/h
Dial Gauge No. 1	1.0	25.244	0.028	0.032	0.030	0.48
	2.0	50.49	0.047	0.050	0.049	0.78
	3.0	75.73	0.062	0.066	0.064	1.024
	4.0	100.98	0.075	0.079	0.077	1.232
	5.0	126.22	0.089	0.089	0.089	1.424
	6.0	151.46	0.095	0.097	0.096	1.536
	7.0	176.71	0.103	0.106	0.104	1.664
	8.0	201.95	0.109	-	0.109	1.744
Dial Gauge No. 2	1.0	25.24	0.018	0.022	0.020	0.032
	2.0	50.49	0.032	0.031	0.031	0.496
	3.0	75.73	0.038	0.042	0.040	0.640
	4.0	100.98	0.045	0.051	0.048	0.768
	5.0	126.22	0.054	0.060	0.057	0.912
	6.0	151.46	0.059	0.061	0.060	0.960
	7.0	176.71	0.065	0.065	0.065	1.040
	8.0	201.95	0.068	-	0.068	1.088
Dial Gauge No. 3	1.0	25.24	0.019	0.022	0.020	0.320
	2.0	50.49	0.028	0.031	0.030	0.480
	3.0	75.73	0.037	0.041	0.039	0.624
	4.0	100.98	0.045	0.048	0.047	0.752
	5.0	126.22	0.052	0.054	0.053	0.848
	6.0	151.46	0.056	0.060	0.058	0.928
	7.0	176.71	0.062	0.063	0.062	0.992
	8.0	201.95	0.065	-	0.065	1.040

Table 13. Lateral Deflection Results for Plate 3, Test 3.

(inches)

	Height of water(in)	qb^4/Dh	Loading	Unloading	Average	w/h
Dial Gauge No. 1	1.0	25.24	0.028	0.033	0.030	0.48
	2.0	50.49	0.045	0.050	0.048	0.768
	3.0	75.73	0.059	0.063	0.061	0.976
	4.0	100.98	0.075	0.077	0.076	1.216
	5.0	126.22	0.088	0.090	0.089	1.424
	6.0	151.46	0.093	0.098	0.095	1.520
	7.0	176.71	0.100	0.103	0.102	1.632
	8.0	201.95	0.109	-	0.109	1.744
Dial Gauges No. 2 &3	1.0	25.24	0.018	0.022	0.020	0.320
	2.0	50.49	0.028	0.033	0.030	0.480
	3.0	75.73	0.039	0.040	0.039	0.624
	4.0	100.98	0.046	0.053	0.049	0.784
	5.0	126.22	0.054	0.059	0.056	0.896
	6.0	151.46	0.059	0.061	0.060	0.960
	7.0	176.71	0.063	0.065	0.064	1.024
	8.0	201.95	0.068	-	0.068	1.088
Dial Gauge No. 4	1.0	25.24	0.009	0.013	0.011	0.176
	2.0	50.49	0.018	0.020	0.019	0.304
	3.0	75.73	0.022	0.027	0.024	0.384
	4.0	100.98	0.027	0.032	0.030	0.480
	5.0	126.22	0.030	0.036	0.033	0.528
	6.0	151.464	0.034	0.037	0.036	0.576
	7.0	176.71	0.038	0.040	0.039	0.624
	8.0	201.96	0.041	-	0.041	0.656

Table 14. Lateral Deflection Results for Plate 4, Test 1. (inches)

	p.s.i.	qb^4 / Dh	Loading	Unloading	Average	w/h
Dial Gauge No. 1	0.5	21.85	0.050	0.054	0.052	0.416
	1.0	43.69	0.086	0.091	0.088	0.704
	1.5	65.54	0.115	0.119	0.117	0.936
	2.0	87.38	0.147	0.153	0.150	1.200
	2.5	109.23	0.162	0.167	0.165	1.320
	3.0	131.08	0.182	0.187	0.184	1.472
	3.5	152.92	0.200	0.203	0.201	1.608
	4.0	174.77	0.208	0.214	0.211	1.688
	4.5	196.61	0.218	0.222	0.220	1.760
	5.0	218.46	0.228	0.233	0.231	1.848
	5.5	240.31	0.235	0.239	0.237	1.896
	6.0	262.15	0.243	-	0.243	1.944
Dial Gauges Nos. 2 and 3	0.5	21.85	0.027	0.029	0.028	0.232
	1.0	43.69	0.049	0.052	0.051	0.408
	1.5	65.54	0.069	0.071	0.070	0.056
	2.0	87.38	0.086	0.088	0.087	0.696
	2.5	109.23	0.099	0.102	0.100	0.800
	3.0	131.08	0.110	0.115	0.113	0.904
	3.5	152.92	0.121	0.125	0.123	0.984
	4.0	174.77	0.131	0.133	0.131	1.048
	4.5	196.61	0.132	0.139	0.136	1.008
	5.0	218.46	0.141	0.147	0.144	1.152
	5.5	240.31	0.147	0.151	0.149	1.192
	6.0	262.15	0.153	-	0.153	1.224
Dial Gauge No. 4	0.5	21.85	0.018	0.022	0.020	0.160
	1.0	43.69	0.037	0.039	0.038	0.304
	1.5	65.54	0.051	0.057	0.054	0.432
	2.0	87.38	0.064	0.068	0.066	0.528
	2.5	109.23	0.075	0.079	0.077	0.616
	3.0	131.08	0.089	0.089	0.089	0.712
	3.5	152.92	0.100	0.104	0.102	0.816
	4.0	174.77	0.108	0.110	0.109	0.872
	4.5	196.61	0.114	0.114	0.114	0.912
	5.0	218.46	0.122	0.122	0.122	0.976
	5.5	240.31	0.126	0.127	0.126	1.008
	6.0	262.15	0.131	-	0.131	1.048

Table 15. Lateral Deflection Results for Plate 4, Test 2.
(inches)

	p.s.i.	qb^4 / Dh	Loading	Unloading	Average	w/h
Dial Gauge No. 1	0.5	21.85	0.046	0.054	0.050	0.400
	1.0	43.69	0.086	0.083	0.085	0.681
	1.5	65.54	0.116	0.114	0.115	0.920
	2.0	87.38	0.145	0.149	0.147	1.180
	2.5	109.23	0.162	0.166	0.164	1.131
	3.0	131.08	0.180	0.185	0.182	1.460
	3.5	152.92	0.201	0.200	0.200	1.605
	4.0	174.77	0.216	0.210	0.208	1.660
	4.5	196.61	0.220	0.222	0.221	1.770
	5.0	218.46	0.230	0.231	0.230	1.830
	5.5	240.31	0.234	0.235	0.234	1.870
	6.0	262.15	0.243	-	0.243	1.940
Dial Gauges Nos. 2 and 3	0.5	21.85	0.026	0.029	0.027	0.216
	1.0	43.69	0.046	0.052	0.049	0.392
	1.5	65.54	0.068	0.071	0.069	0.551
	2.0	87.38	0.086	0.088	0.087	0.696
	2.5	109.23	0.098	0.098	0.098	0.784
	3.0	131.08	0.110	0.110	0.110	0.880
	3.5	152.92	0.119	0.123	0.121	0.969
	4.0	174.77	0.130	0.129	0.129	1.030
	4.5	196.61	0.130	0.138	0.134	1.070
	5.0	218.46	0.141	0.146	0.143	1.140
	5.5	240.31	0.148	0.149	0.148	1.180
	6.0	262.15	0.153	-	0.153	1.220
Dial Gauge No. 4	0.5	21.85	0.019	0.020	0.019	0.157
	1.0	43.69	0.037	0.038	0.037	0.296
	1.5	65.54	0.054	0.054	0.054	0.432
	2.0	87.38	0.065	0.067	0.066	0.528
	2.5	109.23	0.077	0.077	0.077	0.616
	3.0	131.08	0.092	0.089	0.090	0.671
	3.5	152.92	0.101	0.101	0.101	0.810
	4.0	174.77	0.109	0.107	0.108	0.865
	4.5	196.61	0.113	0.114	0.114	0.912
	5.0	218.46	0.122	0.122	0.122	0.977
	5.5	240.31	0.126	0.126	0.126	1.010
	6.0	262.15	0.131	-	0.131	1.040

Table 16. Lateral Deflection Results for Plate 4, Test 3.
(inches)

	p.s.i.	qb^4 / Dh	Loading	Unloading	Average	w/h
Dial Gauge No. 1	0.5	21.85	0.049	0.055	0.052	0.416
	1.0	43.69	0.083	0.091	0.087	0.696
	1.5	65.54	0.113	0.123	0.118	0.944
	2.0	87.38	0.140	0.150	0.145	1.160
	2.5	109.23	0.160	0.166	0.163	1.310
	3.0	131.08	0.178	0.186	0.182	1.450
	3.5	152.92	0.195	0.205	0.200	1.600
	4.0	174.77	0.206	0.216	0.211	1.690
	4.5	196.61	0.215	0.225	0.220	1.760
	5.0	218.46	0.229	0.231	0.230	1.840
	5.5	240.31	0.232	0.242	0.237	1.890
	6.0	262.15	0.243	-	0.243	1.940
Dial Gauges No. 2 and 3	0.5	21.85	0.026	0.032	0.029	0.232
	1.0	43.69	0.049	0.053	0.051	0.408
	1.5	65.54	0.068	0.072	0.070	0.560
	2.0	87.38	0.085	0.089	0.087	0.696
	2.5	109.23	0.097	0.101	0.099	0.791
	3.0	131.08	0.112	0.114	0.113	0.903
	3.5	152.92	0.120	0.126	0.123	0.983
	4.0	174.77	0.125	0.137	0.131	1.040
	4.5	196.61	0.133	0.139	0.136	1.090
	5.0	218.46	0.140	0.148	0.144	1.150
	5.5	240.31	0.146	0.152	0.149	1.190
	6.0	262.15	0.153	-	0.153	1.220
Dial Gauge No. 4	0.5	21.85	0.017	0.023	0.020	0.160
	1.0	43.69	0.034	0.037	0.036	0.296
	1.5	65.54	0.050	0.056	0.053	0.424
	2.0	87.38	0.063	0.069	0.066	0.527
	2.5	109.23	0.075	0.077	0.076	0.615
	3.0	131.08	0.086	0.092	0.089	0.712
	3.5	152.92	0.099	0.104	0.101	0.808
	4.0	174.77	0.110	0.108	0.109	0.863
	4.5	196.61	0.111	0.117	0.114	0.911
	5.0	218.46	0.120	0.124	0.122	0.975
	5.5	240.31	0.1[illegible]	0.128	0.126	1.010
	6.0	262.15	0.131	-	0.131	1.040

Table 17. Lateral Deflection Results for Plate 3, Yield Test.

(inches)

Dial Gauge No. 1

p.s.i.	qb^4/Dh	Deflection	w/h
1.0	699	0.217	3.48
1.5	1047	0.235	3.76
2.0	1400	0.248	3.97
2.5	1750	0.275	4.40
3.0	2100	0.285	4.57
3.5	2450	0.292	4.67
4.0	2800	0.312	5.00
4.5	3150	0.330	5.28
5.0	3500	0.346	5.54
5.5	3850	0.365	5.84
6.0	4200	0.380	6.09
7.0	4900	0.395	6.32
7.5	5200	0.415	6.65
8.0	5600	0.440	7.05
9.0	6300	0.470	7.52
10.0	7000	0.500	8.00

Table 18. Lateral Deflection Results for Plate 4, Yield Test.

(inches)

Dial Gauge No. 1

p.s.i.	qb^4 / Dh	Deflection	w/h
10	436.92	0.275	2.20
15	655.38	0.345	2.76
20	873.84	0.412	3.29
25	1092.3	0.47	3.76
30	1280.76	0.535	4.28
35	1499.22	0.585	4.68
40	1747.68	0.645	5.16
45	1966.14	0.690	5.52
50	2183.60	0.775	6.20
55	2402.06	0.815	6.52
60	2621.52	0.865	6.92
65	2839.98	0.912	7.29
70	3058.44	0.945	7.56
75	3276.90	1.025	8.20
80	3495.36	1.056	8.43
85	3713.82	1.085	8.68
90	3932.28	1.125	9.00
95	4150.74	1.195	9.55

EXPERIMENTAL DATA

FROM DIGITAL STRAIN INDICATOR

	Plate 1 Test 1 Zero Loading	Plate 1 Test 1 0.375 p.s.i. Loading	Plate 1 Test 1 0.5 p.s.i. Loading	Plate 1 Test 1 0.75 p.s.i. Loading	Plate 1 Test 1 1 p.s.i. Loading	Plate 1 Test 1 1.25 p.s.i. Loading	Plate 1 Test 1 1.25 p.s.i. Loading	Plate 1 Test 1 1.75 p.s.i. Loading	Plate 1 Test 1 2 p.s.i. Loading	Plate 1 Test 1 2.25 p.s.i. Loading	Plate 1 Test 1 2 p.s.i. Unloading	Plate 1 Test 1 1.5 p.s.i. Unloading	Plate 1 Test 1 1.25 p.s.i. Unloading
00	+002	+031	+012	+047	+031 x2	+033 x2	+044 x2	+050 x2	+057 x2	+053 x2	+056 x2	+044 x2	+032 x2
01	-003	-145	-167	-253	-165 x2	-187 x2	-2[illegible] x2	-233 x2	-251 x2	-267 x2	-254 x2	-213 x2	-192 x2
02	-004	-152	-164	-255	-166 x2	-1[illegible] x2	-2[illegible] x2	-233 x2	-2[illegible] x2	-295 x2	-253 x2	-211 x2	-188 x2
03	+000	-002	-002	+011	+009 x2	+009 x2	+01[illegible] x2	+020 x2	+024 x2	+025 x2	+022 x2	+014 x2	+008 x2
04	-009	-150	-177	-260	-169 x2	-189 x2	-21[illegible] x2	-239 x2	-25[illegible] x2	-308 x2	-260 x2	-222 x2	-195 x2
05	-012	-132	-147	-232	-149 x2	-165 x2	-192 x2	-217 x2	-232 x2	-282 x2	-233 x2	-194 x2	-169 x2
06	-014	-037	-040	-046	-023 x2	-029 x2	-032 x2	-033 x2	-030 x2	-038 x2	-033 x2	-035 x2	-032 x2
07	-011	-173	-205	-292	-192 x2	-213 x2	-230 x2	-269 x2	-286 x2	-347 x2	-290 x2	-245 x2	-226 x2
08	-013	-131	-146	-218	-204 x2	-154 x2	-171 x2	-153 x2	-206 x2	-240 x2	-209 x2	-175 x2	-158 x2
09	-013	-192	-219	-325	-210 x2	-237 x2	-26[illegible] x2	-301 x2	-322 x2	-350 x2	-324 x2	-277 x2	-244 x2
10	-013	-372	-427	-550	-424 x2	-479 x2	-539 x2	-603 x2	-651 x2	-709 x2	-650 x2	-552 x2	-490 x2
11	-011	-202	-240	-356	-223 x2	-252 x2	-276 x2	-322 x2	-337 x2	-365 x2	-334 x2	-283 x2	-255 x2
12	-015	-[illegible]	-220	-345	-212 x2	-239 x2	-2[illegible] x2	-304 x2	-322 x2	-348 x2	-316 x2	-269 x2	-237 x2
13	-016	-309	-415	-661	-420 x2	-475 x2	-53[illegible] x2	-602 x2	-644 x2	-708 x2	-641 x2	-545 x2	-483 x2
14	-011	-193	-217	-332	-215 x2	-2[illegible] x2	-270 x2	-306 x2	-324 x2	-359 x2	-324 x2	-282 x2	-252 x2
15	-003	+059	+060	+117	+060 x2	+030 x2	+104 x2	+122 x2	+132 x2	+142 x2	+133 x2	+106 x2	+092 x2
16	-010	+122	+149	+218	+145 x2	+170 x2	+188 x2	+210 x2	+223 x2	+252 x2	+220 x2	+187 x2	+176 x2
17	-007	+083	+104	+156	+105 x2	+1[illegible] x2	+145 x2	+162 x2	+169 x2	+181 x2	+176 x2	+147 x2	+132 x2
18	-003	+054	+114	+146	+103 x2	+124 x2	+141 x2	+153 x2	+166 x2	+183 x2	+176 x2	+154 x2	+141 x2
19	-002	+164	+193	+287	+186 x2	+215 x2	+238 x2	+270 x2	+236 x2	+290 x2	+297 x2	+244 x2	+228 x2
20	-003	+088	+103	+140	+109 x2	+123 x2	+137 x2	+133 x2	+150 x2	+172 x2	+162 x2	+148 x2	+136 x2
21	-002	-001	+000	-002	-004 x2	+002 x2	+004 x2	+002 x2	-001 x2	+000 x2	+000 x2	+002 x2	+002 x2
22	-003	-003	-004	-008	-011 x2	-005 x2	-007 x2	-006 x2	-008 x2	-008 x2	-011 x2	-008 x2	-009 x2
23	-003	-016	-016	-019	-015 x2	-017 x2	-017 x2	-017 x2	-020 x2	-021 x2	-021 x2	-019 x2	-017 x2
24	-002	-200	-222	-336	-212 x2	-243 x2	-269 x2	-307 x2	-340 x2	-358 x2	-346 x2	-27[illegible] x2	-247 x2
25	-012	-363	-419	-328	-409 x2	-464 x2	-52[illegible] x2	-595 x2	-630 x2	-687 x2	-637 x2	-5[illegible] x2	-476 x2
26	-007	-183	-213	-301	-200 x2	-222 x2	-2[illegible] x2	-27[illegible] x2	-305 x2	-325 x2	-308 x2	-261 x2	-230 x2
27	-001	+150	+184	+260	+190 x2	+179 x2	+2[illegible] x2	+202 x2	+302 x2	+330 x2	+304 x2	+255 x2	+206 x2
28	-005	+143	+184	+234	+182 x2	+121 x2	+23[illegible] x2	+271 x2	+290 x2	+314 x2	+290 x2	+238 x2	+192 x2
29	-004	-030	-032	-034	-025 x2	-037 x2	-[illegible] x2	-050 x2	-056 x2	-066 x2	-058 x2	-062 x2	-041 x2
30	-003	+130	+162	+248	+17[illegible] x2	+19[illegible] x2	+2[illegible] x2	+260 x2	+276 x2	+302 x2	+279 x2	+230 x2	+203 x2
31	-002	+152	+195	+280	+151 x2	+2[illegible] x2	+2[illegible] x2	+227 x2	+304 x2	+313 x2	+305 x2	+254 x2	+226 x2
32	-004	-027	-020	-025	-028 x2	-03[illegible] x2	-[illegible] x2	-040 x2	-053 x2	-063 x2	-054 x2	-042 x2	-038 x2
33	-004	+124	+155	+220	+1[illegible] x2	+17[illegible] x2	+20[illegible] x2	+233 x2	+250 x2	+272 x2	+252 x2	+214 x2	+187 x2
34	+002	+190	+237	+342	+22[illegible] x2	+2[illegible] x2	+2[illegible] x2	+333 x2	+356 x2	+389 x2	+359 x2	+302 x2	+264 x2
35	-001	+002	-002	+015	+003 x2	+00[illegible] x2	+0[illegible] x2	+003 x2	+006 x2	+006 x2	+006 x2	+010 x2	+006 x2
36	-003	+190	+253	+363	+2[illegible] x2	+27[illegible] x2	+3[illegible] x2	+360 x2	+388 x2	+426 x2	+391 x2	+333 x2	+290 x2
37	+004	+438	+531	+772	+5[illegible] x2	+5[illegible] x2	+6[illegible] x2	+775 x2	+830 x2	+905 x2	+833 x2	+708 x2	+622 x2
38	+005	+233	+273	+405	+27[illegible] x2	+31[illegible] x2	+3[illegible]9 x2	+409 x2	+439 x2	+473 x2	+439 x2	+371 x2	+330 x2
39	+003	+101	+213	+329	+2[illegible] x2	+24[illegible] x2	+284 x2	+327 x2	+349 x2	+386 x2	+349 x2	+284 x2	+250 x2
40	+003	+363	+440	+669	+[illegible] x2	+510 x2	+582 x2	+653 x2	+714 x2	+784 x2	+714 x2	+594 x2	+523 x2
41	+[illegible]	+156	+232	+335	+2[illegible] x2	+25[illegible] x2	+2[illegible] x2	+335 x2	+356 x2	+392 x2	+358 x2	+307 x2	+270 x2
42	-[illegible]	-035	-070	-110	-[illegible] x2	-072 x2	-077 x2	-035 x2	-091 x2	-094 x2	-091 x2	-077 x2	-071 x2
43	-[illegible]	-104	-115	-140	-[illegible] x2	-121 x2	-130 x2	-144 x2	-153 x2	-162 x2	-161 x2	-138 x2	-130 x2
44	-003	-084	-090	-062	-044 x2	+000 x2	-050 x2	-056 x2	-052 x2	-056 x2	-058 x2	-054 x2	-054 x2
45	-007	-070	-082	-131	-072 x2	-084 x2	-084 x2	-094 x2	-100 x2	-106 x2	-107 x2	-082 x2	-087 x2
46	-004	-147	-158	-273	-146 x2	-166 x2	-175 x2	-197 x2	-204 x2	-226 x2	-212 x2	-158 x2	-154 x2
47	-004	-070	-078	-126	-070 x2	-078 x2	-082 x2	-091 x2	-094 x2	-098 x2	-087 x2	-079 x2	-074 x2
48	-002	-006	-008	-005	-[illegible] x2	-007 x2	-006 x2	-005 x2	-008 x2	-015 x2	-008 x2	-008 x2	-007 x2
49	+002	-002	-003	-005	-007 x2	-007 x2	-006 x2	-003 x2	-005 x2	-010 x2	-007 x2	-008 x2	-008 x2
50	-[illegible]	-017	-014	-[illegible]	-002 x2	-004 x2	-003 x2	-004 x2	-004 x2	-006 x2	-004 x2	-003 x2	-004 x2
51	+[illegible]	+199	+252	+361	+247 x2	+278 x2	+321 x2	+364 x2	+390 x2	+427 x2	+392 x2	+334 x2	+286 x2
52	+005	+426	+50[illegible]	+714	+498 x2	+574 x2	+651 x2	+746 x2	+796 x2	+867 x2	+810 x2	+678 x2	+600 x2
53	+[illegible]	+233	+270	+384	+276 x2	+312 x2	+360 x2	+409 x2	+437 x2	+475 x2	+451 x2	+372 x2	+330 x2

Row	Plate 1 Test 1 1 p.s.i. Unloading	Plate 1 Test 1 0.75 p.s.i. Unloading	Plate 1 Test 1 0.5 p.s.i. Unloading	Plate 1 Test 1 0.375 p.s.i. Unloading	Plate 1 Test 1 Zero Unloading	Plate 1 Test 2 Zero Loading	Plate 1 Test 2 0.375 p.s.i. Loading	Plate 1 Test 2 0.5 p.s.i. Loading	Plate 1 Test 2 0.75 p.s.i. Loading	Plate 1 Test 2 1 p.s.i. Loading	Plate 1 Test 2 1.25 p.s.i. Loading	Plate 1 Test 2 1.5 p.s.i. Loading	Plate 1 Test 2 1.75 p.s.i. Loading
00	+031 x2	+048	+010	+029	+000	+000	+028	+012	+046	+033 x2	+0[illegible]4 x2	+[illegible]44 x2	+0[illegible] x2
01	-166 x2	-263	-176	-153	-010	-007	-148	-168	-257	-164 x2	-1[illegible]7 x2	-20[illegible] x2	-238 x2
02	-169 x2	-260	-168	-147	-004	-004	-143	-165	-257	-155 x2	-[illegible]84 x2	-[illegible] x2	-[illegible]6 x2
03	+008 x2	+009	-006	+000	-002	-002	+002	-002	+011	+00[illegible] x2	+00[illegible] x2	+01[illegible] x2	+0[illegible]9 x2
04	-172 x2	-265	-185	-158	-009	-009	-152	-178	-259	-168 x2	-[illegible]90 x2	-21[illegible] x2	-2[illegible] x2
05	-151 x2	-232	-149	-136	-010	-010	-133	-147	-231	149 x2	-[illegible]66 x2	-[illegible] x2	-218 x2
06	-029 x2	-051	-044	-040	-012	-014	-038	-037	-046	-028 x2	-029 x2	032 x2	-0[illegible] x2
07	-194 x2	-302	-216	-181	-010	-010	-174	-206	-292	-190 x2	-217 x2	-2[illegible] x2	-270 x2
08	-207 x2	-221	-151	-134	-012	-012	-131	-146	-217	-205 x2	-154 x2	[illegible] x2	-[illegible]3 x2
09	-215 x2	-334	-228	-207	-012	-012	-192	-220	-325	-210 x2	-238 x2	[illegible] x2	[illegible] x2
10	-434 x2	-669	-441	-405	-012	-013	-378	-430	-658	-424 x2	-480 x2	-5[illegible]8 x2	6[illegible] x2
11	-227 x2	-358	-243	-222	-014	-012	-207	-240	-356	-223 x2	+200 x2	-27[illegible] x2	-3[illegible]1 x2
12	-220 x2	-335	-212	-214	-015	-014	-194	-218	-344	-214 x2	-239 x2	[illegible] x2	3[illegible] x2
13	-434 x2	-666	-424	-429	-014	-015	-376	-417	-657	-420 x2	-475 x2	-537 x2	6[illegible] x2
14	-223 x2	-344	-231	-236	-003	-008	-195	-216	-332	-215 x2	-246 x2	-274 x2	-[illegible] x2
15	+080 x2	+126	+073	+058	-010	-011	+056	+068	+122	+080 x2	+090 x2	+105 x2	+[illegible] x2
16	+143 x2	+220	+154	+114	-008	-011	+115	+146	+218	+142 x2	+169 x2	+188 x2	+2[illegible] x2
17	+108 x2	+168	+110	+088	-008	-005	+083	+104	+156	+105 x2	+126 x2	+142 x2	+1[illegible] x2
18	+111 x2	+182	+145	+088	-008	-006	+091	+113	+147	+107 x2	+124 x2	+140 x2	+[illegible] x2
19	+187 x2	+318	+223	+164	-002	-002	+165	+197	+290	+184 x2	+216 x2	+238 x2	+[illegible] x2
20	+111 x2	+176	+147	+051	-002	-002	+085	+108	+141	+10[illegible] x2	+123 x2	+1[illegible]7 x2	+[illegible]2 x2
21	-004 x2	+001	-002	-001	-002	-002	-001	-001	+000	-004 x2	+002 x2	+00[illegible] x2	+[illegible]1 x2
22	-010 x2	-008	-003	-007	-002	-002	-003	-005	-009	-010 x2	-008 x2	-[illegible]07 x2	[illegible] x2
23	-016 x2	-017	-013	-014	-003	-003	-014	-014	-020	-017 x2	-016 x2	-01[illegible] x2	[illegible] x2
24	-213 x2	-344	-231	-202	-004	-007	-200	-222	-336	-212 x2	-243 x2	-[illegible] x2	-[illegible] x2
25	-410 x2	-655	-447	-367	-012	-012	-369	-417	-628	-410 x2	-464 x2	-524 x2	[illegible] x2
26	-198 x2	-322	-233	-179	-004	-007	-184	-213	-300	-200 x2	-222 x2	-[illegible]1 x2	-[illegible] x2
27	+192 x2	+294	+196	+143	-001	-002	+143	+184	+280	+190 x2	+198 x2	+2[illegible] x2	+[illegible] x2
28	+182 x2	+302	+184	+147	-004	-004	+148	+181	+233	+180 x2	+191 x2	+238 x2	+[illegible]1 x2
29	-[illegible] x2	-033	-038	-032	+004	+003	-032	-032	-033	-026 x2	-036 x2	-058 x2	-[illegible] x2
30	+1[illegible]2 x2	+260	+171	+131	-002	-004	+130	+162	+243	+171 x2	+196 x2	+224 x2	+[illegible] x2
31	+192 x2	+2[illegible]3	+203	+153	-001	-002	+152	+196	+287	+191 x2	+220 x2	+252 x2	+[illegible] x2
32	-029 x2	-028	-023	-029	-004	-004	-028	-019	-025	-028 x2	-036 x2	0[illegible]7 x2	[illegible] x2
33	+160 x2	+242	+167	+126	-006	-004	+122	+156	+226	+159 x2	+179 x2	+2[illegible] x2	+[illegible] x2
34	+230 x2	+355	+248	+194	+001	+002	+190	+237	+343	+228 x2	+2[illegible] x2	+[illegible] x2	+[illegible] x2
35	+008 x2	+014	-006	+001	+000	+000	+005	-003	+015	+008 x2	+007 x2	+01[illegible] x2	+[illegible] x2
36	+253 x2	+377	+265	+203	-001	-002	+196	+253	+364	+247 x2	+279 x2	+[illegible]21 x2	[illegible] x2
37	+532 x2	+810	+[illegible]63	+457	+004	+004	+438	+530	+772	+523 x2	+594 x2	+682 x2	[illegible] x2
38	+278 x2	+428	+2[illegible]	+240	+004	+004	+232	+279	+406	+273 x2	+31[illegible] x2	+35[illegible] x2	+409 x2
39	+230 x2	+331	+21[illegible]	+232	+003	+002	+180	+217	+330	+217 x2	+247 x2	+282 x2	[illegible] x2
40	+463 x2	+690	+[illegible]64	+427	+004	+002	+362	+447	+668	+446 x2	+511 x2	+581 x2	[illegible] x2
41	+234 x2	+353	+249	+207	+000	+000	+186	+232	+336	+228 x2	+2[illegible]9 x2	+296 x2	[illegible] x2
42	-086 x2	-108	-070	-064	-007	-008	-064	-070	-110	-085 x2	-0[illegible] x2	-07[illegible] x2	[illegible] x2
43	-112 x2	-154	-133	-107	-002	-005	-104	-117	-138	-109 x2	-121 x2	-13[illegible] x2	[illegible]4 x2
44	-04[illegible] x2	-071	-055	-049	-003	-008	-045	-050	-067	-043 x2	-049 x2	-[illegible] x2	[illegible] x2
45	-071 x2	-130	-082	-064	-006	-003	-073	-081	-131	-072 x2	-084 x2	-[illegible]84 x2	[illegible]4 x2
46	-152 x2	-253	-138	-151	-004	[illegible]	-148	-158	-273	-146 x2	-166 x2	-175 x2	-198 x2
47	-074 x2	-123	-077	-073	-003	-004	-070	-079	-126	-070 x2	-078 x2	-082 x2	-092 x2
48	-007 x2	-005	-00[illegible]	-007	-002	-002	-008	-007	-005	-006 x2	-007 x2	-006 x2	-004 x2
49	-007 x2	-004	-012	-002	+001	+002	-002	-007	-003	-006 x2	-007 x2	-006 x2	-003 x2
50	00[illegible] x2	010	012	-01[illegible]	-005	-007	-017	-016	-015	-003 x2	-[illegible] x2	-003 x2	-002 x2
51	+24[illegible] x2	+373	+2[illegible]	+19[illegible]	+002	+000	+198	+251	+361	+247 x2	+2[illegible]8 x2	+322 x2	+364 x2
52	+5[illegible] x2	+777	+[illegible]	+4[illegible]	+004	+005	+226	+[illegible]	+715	+498 x2	+374 x2	+650 x2	+744 x2
53	+27[illegible] x2	+42[illegible]	+[illegible]19	+2[illegible]	+002	[illegible]00	+232	+2[illegible]	+38[illegible]	+275 x2	+312 x2	+359 x2	+408 x2

Row	Plate 1 Test 2 2 p.s.i. Loading	Plate 1 Test 2 2.25 p.s.i.	Plate 1 Test 2 2 p.s.i. Unloading	Plate 1 Test 2 1.75 p.s.i. Unloading	Plate 1 Test 2 1.5 psi Unloading	Plate 1 Test 2 1.25 p.s.i. Unloading	Plate 1 Test 2 1 p.s.i. Unloading
00	+057 x2	+034 x2	+053 x2	+049 x2	+043 x2	+034 x2	+032 x2
01	-251 x2	-267 x2	-232 x2	-239 x2	-212 x2	-191 x2	-163 x2
02	-249 x2	-272 x2	-222 x2	-240 x2	-213 x2	-187 x2	-169 x2
03	+024 x2	+026 x2	+025 x2	+018 x2	+014 x2	+009 x2	+007 x2
04	-257 x2	-279 x2	-255 x2	-242 x2	-222 x2	-194 x2	-174 x2
05	232 x2	-252 x2	-232 x2	-222 x2	-193 x2	-169 x2	-152 x2
06	-031 x2	-032 x2	-031 x2	-034 x2	-032 x2	-032 x2	-032 x2
07	-206 x2	-210 x2	-205 x2	-274 x2	-244 x2	-225 x2	-200 x2
08	-207 x2	-220 x2	-200 x2	-195 x2	-174 x2	-158 x2	-203 x2
09	-322 x2	-356 x2	-319 x2	-307 x2	-277 x2	-244 x2	-213 x2
10	-651 x2	-724 x2	-652 x2	-620 x2	-552 x2	-483 x2	-435 x2
11	-336 x2	-371 x2	-340 x2	-325 x2	-283 x2	-251 x2	-227 x2
12	-322 x2	-356 x2	-322 x2	-312 x2	-263 x2	-241 x2	-211 x2
13	-644 x2	-733 x2	-649 x2	-619 x2	-543 x2	-482 x2	-423 x2
14	-327 x2	-374 x2	-329 x2	-324 x2	-281 x2	-249 x2	-221 x2
15	+131 x2	+143 x2	+130 x2	+122 x2	+105 x2	+092 x2	+083 x2
16	+225 x2	+254 x2	+233 x2	+210 x2	+183 x2	+171 x2	+148 x2
17	+170 x2	+180 x2	+190 x2	+161 x2	+147 x2	+131 x2	+112 x2
18	+155 x2	+160 x2	+169 x2	+160 x2	+154 x2	+132 x2	+127 x2
19	[illegible]	+288 x2	+283 x2	+271 x2	+243 x2	+228 x2	+196 x2
20	+165 x2	+175 x2	+162 x2	+153 x2	+143 x2	+132 x2	+118 x2
21	+000 x2	+000 x2	-001 x2	+001 x2	+002 x2	+001 x2	-004 x2
22	010 x2	-008 x2	-012 x2	-007 x2	-009 x2	-010 x2	-012 x2
23	020 x2	-022 x2	-022 x2	-019 x2	-013 x2	-017 x2	-016 x2
24	-340 x2	-350 x2	-342 x2	-331 x2	-273 x2	-247 x2	-216 x2
25	-630 x2	-686 x2	-633 x2	-595 x2	-533 x2	-470 x2	-422 x2
26	-305 x2	-323 x2	-312 x2	-273 x2	-263 x2	-224 x2	-209 x2
27	+302 x2	+331 x2	+301 x2	+282 x2	+255 x2	+204 x2	+196 x2
28	+290 x2	+314 x2	+255 x2	+272 x2	+240 x2	+191 x2	+183 x2
29	-055 x2	-057 x2	-057 x2	-051 x2	-062 x2	-040 x2	-029 x2
30	+275 x2	+304 x2	+277 x2	+260 x2	+230 x2	+200 x2	+173 x2
31	+304 x2	+313 x2	+303 x2	+283 x2	+253 x2	+224 x2	+194 x2
32	-053 x2	-064 x2	-052 x2	-041 x2	-041 x2	-037 x2	-030 x2
33	+250 x2	+274 x2	+250 x2	+234 x2	+214 x2	+184 x2	+167 x2
34	+256 x2	+390 x2	+359 x2	+334 x2	+302 x2	+263 x2	[illegible]
35	+006 x2	+006 x2	+003 x2	+007 x2	+010 x2	+006 x2	+00[illegible] x2
36	+006 x2	+434 x2	+387 x2	+363 x2	+303 x2	+289 x2	+257 x2
37	+830 x2	+913 x2	+833 x2	+783 x2	+703 x2	+610 x2	+550 x2
38	+433 x2	+475 x2	+441 x2	+411 x2	+371 x2	+320 x2	+290 x2
39	+340 x2	+335 x2	+349 x2	+340 x2	+283 x2	+256 x2	+219 x2
40	+714 x2	+735 x2	+713 x2	+684 x2	+593 x2	+531 x2	+457 x2
41	+355 x2	+394 x2	+360 x2	+339 x2	+307 x2	+268 x2	+238 x2
42	-091 x2	-092 x2	[illegible]	-086 x2	-077 x2	-072 x2	-08[illegible] x2
43	-132 x2	-133 x2	-135 x2	-147 x2	-138 x2	-128 x2	[illegible]
44	-052 x2	-059 x2	-068 x2	-058 x2	-054 x2	-054 x2	-046 x2
45	[illegible]	-133 x2	-098 x2	-094 x2	-082 x2	-084 x2	[illegible]
46	-204 x2	-226 x2	-210 x2	-202 x2	-159 x2	-178 x2	[illegible]
47	-094 x2	-103 x2	-096 x2	-096 x2	-079 x2	-081 x2	-059 x2
48	-008 x2	-015 x2	-008 x	-005 x2	-007 x2	-007 x2	-007 x2
49	[illegible]	-010 x2	-008 x2	-003 x2	-008 x2	-008 x2	-008 x2
50	-003 x2	-005 x2	[illegible]	-004 x2	-004 x2	-004 x2	-002 x2
51	[illegible]	+426 x2	+39[illegible] x2	+363 x2	+334 x2	+278 x2	+252 x2
52	+7[illegible]	+866 x2	+80[illegible] x2	+747 x2	+678 x2	+584 x2	+524 x2
53	+433 x2	+474 x2	+43[illegible] x2	+409 x2	+372 x2	+327 x2	+296 x2

Row	Plate 1 Test 2 0.75 p.s.i. Unloading	Plate 1 Test 2 0.5 p.s.i. Unloading	Plate 1 Test 2 0.375 p.s.i. Unloading	Plate 1 Test 2 Zero Unloading	Plate 1 Test 3 Zero Loading	Plate 1 Test 3 0.375 p.s.i. Loading	Plate 1 Test 3 0.5 p.s.i. Loading
00	+048	[illegible]	+031	+004	-002	+000	[illegible]
01	-262	[illegible]	-143	-003	-003	-140	[illegible]
02	-256	-170	-145	+001	-004	-143	-164
03	+010	-006	+001	+002	-002	+004	[illegible]
04	-265	-185	-154	-004	-003	-152	-176
05	-234	+000	-135	-004	-010	-132	-136
06	-050	-044	-039	-010	-013	-030	-038
07	-302	-216	-177	-007	-010	-174	-254
08	-221	-151	-134	-009	-012	-130	-136
09	-332	-223	-200	-007	-012	-193	-200
10	-665	-440	-392	-010	-014	-373	-426
11	-357	-243	-217	-009	-013	-203	-240
12	-343	-212	-206	-010	-012	-193	-222
13	-664	-425	-402	-022	-012	-374	-409
14	-343	-223	-224	+001	-009	-195	-210
15	+128	+074	+056	-005	-010	+064	+059
16	+226	+152	+114	-017	-005	+121	+150
17	+166	+113	+087	-015	-007	+082	+105
18	+180	+143	+083	-005	-007	+009	+117
19	+318	+226	+163	-002	-004	+162	+193
20	+176	+147	+083	-002	-002	+087	+109
21	+000	-002	+000	+000	-002	+000	[illegible]
22	-007	-005	-003	+001	-001	-005	[illegible]
23	-017	-016	-014	-002	-002	-014	-017
24	-344	-232	-202	-004	-007	-200	[illegible]
25	-554	-447	-363	-007	-010	-358	[illegible]
26	-322	-233	-182	-004	-007	-153	-212
27	+254	+137	+149	+000	[illegible]	+119	+154
28	+383	+184	+148	-004	-004	+147	+154
29	-037	-033	-032	+005	+003	-032	[illegible]
30	+261	+171	+131	-002	-002	+129	[illegible]
31	+297	+204	+154	+000	-002	+153	[illegible]
32	-023	-023	-023	-002	-003	-027	[illegible]
33	+242	+163	+125	-005	-005	+123	[illegible]
34	+354	+248	+193	+004	+003	+190	[illegible]
35	+014	-003	-004	+001	+001	+004	[illegible]
36	+378	+267	+204	+000	-001	+197	[illegible]
37	+310	+365	+454	+004	-003	+437	[illegible]
38	+428	+296	+239	+004	-004	+232	[illegible]
39	+332	+218	+222	+003	+003	+178	[illegible]
40	+689	+464	+413	+003	+002	+362	+44[illegible]
41	+353	+249	+203	+001	+002	+186	[illegible]
42	-103	-070	-095	-003	-007	-064	-07[illegible]
43	-152	-133	-103	-004	-004	-104	-114
44	-071	-054	-047	-007	-009	-045	[illegible]
45	-130	-084	-070	-004	-005	-072	-082
46	-253	[illegible]	-152	[illegible]	[illegible]	-147	-158
47	[illegible]	[illegible]	[illegible]	-002	-004	-070	-078
48	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-008	-007
49	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-002	007
50	-011	-013	-016	[illegible]	[illegible]	-017	[illegible]
51	+377	+265	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
52	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	+426	+508
53	+427	[illegible]	[illegible]	[illegible]	+002	+232	[illegible]

No.	Plate 1 Test 3 0.75 p.s.i. Loading	Plate 1 Test 3 1 p.s.i. Loading	Plate 1 Test 3 1.25 p.s.i. Loading	Plate 1 Test 3 1 p.s.i. Loading	Plate 1 Test 3 1.75 p.s.i. Loading	Plate 1 Test 3 2 p.s.i. Loading	Plate 1 Test 3 2.25 p.s.i. Loading	Plate 1 Test 3 2 p.s.i. Unloading	Plate 1 Test 3 1.75 p.s.i. Unloading	Plate 1 Test 3 1.5 p.s.i. Unloading	Plate 1 Test 3 1.25 p.s.i. Unloading	Plate 1 Test 3 1 p.s.i. Unloading
00	+048	+032	+033	+042	+040	+057	+053	+056	+049	+042	+032	+033
01	-264	-164	-187	-207	-237	-251	-265	-235	-242	-208	-191	-169
02	-262	-165	-104	-208	-234	-250	-270	-254	-240	-210	-167	-168
03	+003	+009	+009	+016	+013	+024	+026	+024	+010	+015	+003	+007
04	-263	-163	-109	-21[illegible]	-239	-237	-276	-260	-244	-215	-194	-174
05	-235	-143	-166	-192	-213	-232	-251	-235	-222	-192	-170	-151
06	-054	-228	-029	-132	-034	-031	-032	-033	-037	-032	-032	-031
07	-304	-150	-217	-239	-270	-2[illegible]	-307	-292	-278	-259	-224	-199
08	-224	-204	-154	-172	-193	-206	-217	-210	-197	-172	-157	-207
09	-336	-209	-237	-267	-302	-322	-349	-330	-309	-267	-244	-213
10	-670	-424	-477	-340	-609	-651	-709	-660	-621	-540	-409	-436
11	+000	-224	-249	-273	-323	-335	-365	-338	-327	-277	-253	-227
12	-342	-212	-240	-269	-304	-322	-343	-323	-304	-267	-240	-211
13	-168	-418	-474	-337	-604	-644	-706	-653	-610	-530	-482	-426
14	-351	-214	-244	-263	-313	-323	-355	-333	-322	-274	-241	-222
15	+123	+180	+390	+10[illegible]	+121	+130	+143	+132	+125	+103	+091	+083
16	+219	+144	+170	+155	+210	+227	+254	+227	+210	+187	+150	+146
17	+165	+100	+125	+142	+160	+171	+180	+172	+164	+144	+129	+113
18	+176	+1[illegible]	+124	+141	+153	+165	+181	+170	+175	+140	+1[illegible]	+127
19	+321	+184	+216	+237	+270	+235	+283	+29[illegible]	+280	+233	+2[illegible]	+198
20	+175	+103	+123	+136	+152	+161	+174	+16[illegible]	+151	+137	+[illegible]	+118
21	-002	-004	+002	+002	+001	+000	+000	-001	+000	+002	+001	-004
22	-010	-010	-008	-007	-007	-010	-003	-010	-005	-007	-010	-011
23	-013	-013	-017	-317	-013	-019	-020	-020	-010	-018	-01[illegible]	-016
24	-344	-212	-243	-270	-330	-340	-353	-342	-333	-274	-241	-216
25	-356	-410	-464	-324	-595	-630	-685	-632	-603	-538	-469	-422
26	-322	-199	-222	-251	-279	-305	-324	-304	-288	-260	-223	-208
27	+292	+190	+199	+250	+281	+301	+329	+305	+295	+255	+202	+196
28	+233	+131	+190	+2[illegible]	+270	+2[illegible]	+314	+290	+272	+239	+192	+182
29	-039	-023	-037	-053	+300	-[illegible]	-064	-058	-054	-062	-040	-029
30	+260	+171	+196	+224	+260	+27[illegible]	+302	+280	+26[illegible]	+230	+200	+173
31	+294	+133	+220	+252	+207	+304	+312	+305	+290	+254	+223	+195
32	-030	-023	-[illegible]	-037	-041	-[illegible]52	-053	-055	-043	-041	-037	-030
33	+242	+133	+1[illegible]	+207	+232	+250	+272	+254	+2[illegible]	+213	+184	+163
34	+354	+2[illegible]	+238	+296	+332	+356	+383	+359	+33[illegible]	+302	+263	+233
35	+013	+003	+003	+312	+007	+006	+003	+0[illegible]	+00[illegible]	+010	+007	+005
36	+377	+24[illegible]	+279	+[illegible]21	+361	[illegible]	+425	+3[illegible]	+370	+334	+288	+257
37	+311	+52[illegible]	+795	+602	+776	+830	+904	+844	+8[illegible]	+706	+610	+550
38	+423	+27[illegible]	+3[illegible]	+35[illegible]	+403	+439	+572	+444	+422	+370	+320	+283
39	+331	+21[illegible]	+243	+[illegible]84	+[illegible]	+349	+384	+35[illegible]	+327	+284	+256	+219
40	+329	+440	+[illegible]11	+552	+655	+[illegible]	+782	+73[illegible]	+67[illegible]	+594	+532	+456
41	+352	+228	+260	+29[illegible]	+33[illegible]	+357	+391	+366	+345	+307	+269	+239
42	-110	-0[illegible]	-072	-[illegible]77	-08[illegible]	-[illegible]91	-092	-090	-086	-077	-072	-084
43	-155	-103	-121	-[illegible]1	-[illegible]	[illegible]2	-16[illegible]	-158	-153	-138	-127	-118
44	-073	-043	-048	-051	-[illegible]	-[illegible]52	-036	-054	-059	-054	-054	-046
45	-133	-072	-08[illegible]	-00[illegible]	[illegible]	-098	-106	-096	-100	-083	-084	-080
46	-255	-146	-165	-175	-[illegible]	-204	-225	-216	-185	-159	-178	-137
47	-124	-070	-079	-082	-092	-093	-097	-097	-082	-078	-081	-058
48	[illegible]	-006	-007	-006	-004	-006	-015	-008	-007	-008	-007	-007
49	[illegible]	-007	-007	-004	003	-004	-010	-007	-00[illegible]	-008	-008	-008
50	-012	[illegible]	004	-[illegible]4	-[illegible]3	-[illegible]	-004	-003	-00[illegible]	-003	-004	-002
51	+373	+24[illegible]	+2[illegible]8	+3[illegible]	+3[illegible]	+[illegible]90	+428	+389	+37[illegible]	+334	+278	+253
52	+776	+498	+5[illegible]4	+651	+745	+797	+867	+804	+770	+679	+586	+525
53	+4[illegible]	+2[illegible]5	+312	+359	+408	+43[illegible]	+4[illegible]	+445	+426	+372	+327	+296
54					+397				[illegible]			
55					+397							

Gage	Plate 1 Test 3 0.75 p.s.i.	Plate 1 Test 3 0.5 p.s.i. Unloading	Plate 1 Test 3 0.375 p.s.i. Unloading	Plate 1 Test 3 Zero Unloading	Plate 2 Test 1 Zero Loading	Plate 2 Test 1 0.5" Loading	Plate 2 Test 1 1" Loading	Plate 2 Test 1 1½" Loading
00	+047	+012	+031	+002	-020	-027	-022	-002
01	-264	-175	-147	-005	-002	+031	+035	+131
02	-259	-167	-200	-003	-014	+012	+047	+005
03	+008	-307	+006	-002	-016	-035	-031	-045
04	-268	-185	-201	-009	-009	+035	+033	+129
05	-235	-149	-168	-009	-011	+012	+043	+071
06	-054	-044	-051	-012	-019	+000	-051	-057
07	-304	-216	-222	-010	-010	+035	+095	+132
08	-223	-150	-152	-012	-014	+000	+026	+054
09	-336	-229	-192	-009	-008	+064	+128	+190
10	-071	-443	-384	-012	-011	+075	+164	+250
11	-359	-242	-215	-012	-010	+020	+068	+110
12	-335	-217	-194	-012	-011	+013	+063	+126
13	-367	-425	-384	-004	-011	+066	+121	+191
14	-350	-230	-204	+002	-016	+002	+031	+064
15	+123	+073	+059	-004	-027	-051	-034	-053
16	+213	+152	+110	-010	-037	-065	-086	-103
17	+155	+112	+095	-007	-025	-047	-049	-005
18	+146	+143	+094	-007	-026	-034	-031	-047
19	+200	+223	+160	-002	-024	-061	-095	-123
20	+141	+145	+009	-004	-018	-037	-041	-053
21	+000	-002	-002	+000	-010	-016	-022	-032
22	-008	-010	-003	-001	-015	-022	-022	-040
23	-013	-015	-014	-003	-014	-024	-025	-032
24	-336	-232	-193	-003	-014	+020	+076	+126
25	-625	-447	-367	-010	+002	+079	+173	+253
26	-301	-234	-184	-007	-005	+043	+093	+163
27	+280	+194	+175	+000	-014	-046	-066	-092
28	+233	+185	+172	-004	-010	-050	-076	-122
29	-034	-037	-050	+005	-004	-037	-040	-105
30	+248	+172	+159	-002	-013	-032	-047	-061
31	+290	+202	+184	-001	-013	-050	-082	-123
32	-024	-022	-030	-003	-012	+000	-042	-053
33	+227	+165	+142	-004	-013	-002	-040	-049
34	+343	+243	+233	+002	-010	-048	-077	-113
35	+016	-006	+004	+000	-018	-103	-196	-204
36	+363	+267	+197	-001	-018	-090	-151	[illegible]
37	+763	+566	+440	+004	-010	-024	-037	[illegible]
38	+405	+297	+234	+005	-017	-062	-121	[illegible]
39	+323	+218	+183	+002	-011	-042	-074	[illegible]
40	+363	+465	+355	+004	-010	-060	-123	[illegible]
41	+333	+249	+188	+001	-015	-053	-104	[illegible]
42	-110	-070	-066	-007	-006	+016	+034	+042
43	-137	-133	-104	-007	+004	+033	+031	+058
44	-069	-054	-045	-008	[illegible]	[illegible]	+033	+040
45	-129	-083	-074	-004	[illegible]	[illegible]	+031	+054
46	-272	-139	-149	-003	[illegible]	[illegible]	[illegible]	[illegible]
47	-123	-077	-071	-002	[illegible]	[illegible]	[illegible]	[illegible]
48	-004	-010	-008	-001	[illegible]	[illegible]	[illegible]	-033
49	[illegible]	-011	-002	+003	-012	[illegible]	-021	029
50	-015	-012	-017	-004	[illegible]	[illegible]	-026	021
51	[illegible]	+266	+198	+001	[illegible]	-059	-121	185
52							203	[illegible]

Gage	Plate 2 Test 1 2" Loading	Plate 2 Test 1 2½" Loading	Plate 2 Test 1 3" Loading	Plate 2 Test 1 3½" Loading	Plate 2 Test 1 4" Loading	Plate 2 Test 1 3½" Unloading	Plate 2 Test 1 3" Unloading	Plate 2 Test 1 2½" Unloading
00	+016	+022	+019	+027	+035	+024	+020	+010
01	+146	+168	+187	+201	+227	+194	+176	+153
02	+116	+146	+165	+186	+208	+169	+154	+133
03	-026	-042	-040	-044	-049	-043	-043	-043
04	+161	+183	+202	+225	+253	+207	+180	+173
05	+092	+117	+128	+152	+170	+138	+117	+110
06	-048	-062	-060	-011	-062	-020	-060	-073
07	+176	+194	+220	+244	+213	+213	+200	+177
08	+072	+080	+094	+111	[illegible]	+095	+085	[illegible]
09	+222	+264	+292	+319	+348	+275	+272	[illegible]
10	+303	+368	+422	+476	+310	+405	+383	+350
11	+136	+178	+207	+240	+248	+203	+195	+163
12	+168	+212	+233	+273	+302	+240	+212	[illegible]
13	+277	+302	+354	+400	+420	+283	+304	[illegible]
14	+119	+111	+151	+163	+196	+111	+122	+090
15	-063	-062	-070	-059	-067	-058	-072	-062
16	-141	-160	-164	-073	-192	-070	-169	-160
17	-090	-079	-081	-080	-045	-071	-072	-070
18	-061	-054	-057	-068	-050	-043	-044	-034
19	-173	-178	-202	-210	-219	-203	-163	-167
20	-074	-073	-079	-073	[illegible]	-072	-057	[illegible]
21	-029	-035	-037	-037	-045	-037	-040	[illegible]
22	-038	-041	-043	-046	-054	-043	-045	-044
23	+013	-030	-026	-029	[illegible]	-029	-025	-032
24	+166	+215	+258	+293	[illegible]	[illegible]	+257	+214
25	+350	+426	+502	+564	[illegible]	[illegible]	+314	+422
26	+196	+246	+287	+311	[illegible]	[illegible]	+300	[illegible]
27	-110	-117	-120	-127	[illegible]	-111	-110	-106
28	-144	-169	-182	-198	-182	[illegible]	-180	-168
29	+463	+398	+367	+370	[illegible]	[illegible]	+360	+391
30	-070	-071	-074	-080	-031	[illegible]	-064	-062
31	-140	-164	-179	-190	-161	-183	-172	-156
32	-059	-073	-077	-082	-100	-087	-080	-075
33	-055	-054	-056	-055	-023	-042	-043	-039
34	-022	-157	-170	-163	-129	-167	-157	-142
35	-328	-398	-452	-300	[illegible]	[illegible]	-452	-399
36	-237	-250	-270	-244	-322	-265	-237	-228
37	-083	-056	-056	+017	-043	+012	-005	-005
38	-203	-238	-268	-262	-322	[illegible]	-253	-212
39	-141	-148	-168	-133	-206	-180	-143	-145
40	-280	-270	-326	-260	[illegible]	-317	[illegible]	[illegible]
41	-203	-224	-254	[illegible]	[illegible]	[illegible]	[illegible]	-197
42	+050	+062	+063	+060	[illegible]	[illegible]	+075	+059
43	+093	+092	+105	[illegible]	[illegible]	[illegible]	+095	+084
44	+063	+064	+079	+089	+098	+078	+068	+059
45	[illegible]	+081	+096	[illegible]	+117	+108	+098	+086
46	[illegible]	[illegible]	[illegible]	+158	[illegible]	+186	[illegible]	[illegible]
47	[illegible]	+067	[illegible]	[illegible]	[illegible]	[illegible]	+070	[illegible]
48	[illegible]	-036	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
49	-029	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
50	[illegible]	-023	[illegible]	[illegible]	[illegible]	[illegible]	-027	[illegible]
51	-222	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-262
52	-387	[illegible]	-499	[illegible]	-624	[illegible]	-499	-419
53	-204	[illegible]	[illegible]	-280	-302	-255	[illegible]	

	Plate 2 Test 1 2" Unloading	Plate 2 Test 1 1½" Unloading	Plate 2 Test 1 1" Unloading	Plate 2 Test 1 0.5" Unloading	Plate 2 Test 1 0" Unloading	Plate 2 Test 2 Zero Loading	Plate 2 Test 2 0.5" Loading	Plate 2 Test 2 1" Loading
00	+016	-007	-020	+000	-013	-020	-028	-021
01	+141	+127	+037	+032	-004	-002	+032	+033
02	+115	+086	+046	+011	-010	-012	+012	+040
03	-029	-046	-031	-033	-012	-016	-034	-032
04	+155	+129	+085	+035	-004	-008	+034	+085
05	+059	+070	+042	+012	-010	-011	+012	+042
06	-052	-060	-051	+000	-013	-018	-048	-050
07	+169	+132	+094	+034	-004	-008	+036	+095
08	+068	+053	+026	+000	-011	-014	+002	+027
09	+212	+188	+128	+065	-002	-007	+066	+130
10	+298	+242	+164	+079	+000	-010	+080	+163
11	+126	+106	+064	+019	-010	-010	+021	+066
12	+159	+118	+071	+016	-011	-011	+017	+070
13	+243	+169	+115	+058	-005	-008	+062	+120
14	+087	+054	+036	+011	-012	-016	+005	+033
15	-053	-054	-037	-052	-021	-026	-048	-034
16	-134	-102	-086	-066	-016	-029	-062	-084
17	-074	+003	-046	-048	-017	-026	-047	-046
18	-051	-044	-032	-036	-017	-024	-032	-032
19	-151	-128	-095	-060	-019	-024	-059	-095
20	-061	-052	-039	-036	-017	-017	-038	-041
21	-031	-034	-022	-017	-010	-011	-016	-022
22	-042	-042	-023	-022	-012	-015	-020	-023
23	+010	-034	-025	-024	-013	-015	-025	-025
24	+153	+124	+076	+022	-012	-014	+021	+076
25	+339	+290	+178	+080	+000	+001	+080	+179
26	+195	+161	+096	+043	-007	-008	+044	+096
27	-102	-092	-066	-045	-014	-014	-047	-066
28	-142	-122	-074	-049	-010	-009	-049	-074
29	+459	-104	-038	-039	-006	-006	-037	-040
30	-064	-062	-046	-032	-012	-012	-032	-047
31	-136	-123	-081	-050	-011	-011	-052	-082
32	-061	-058	-043	+000	-011	-012	+001	-043
33	-048	-043	-038	-002	-013	-012	-002	-038
34	-015	-118	-077	-049	-012	-012	-047	-077
35	-329	-284	-196	-102	-015	-017	-102	-197
36	-212	-194	-150	-090	-018	-019	-090	-151
37	-050	-043	-037	-023	-010	-010	-025	-037
38	-195	-170	-120	-062	-016	-017	-062	-121
39	-115	-084	-074	-038	-011	-011	-040	-074
40	-223	-168	-122	-058	-010	-010	-061	-124
41	-179	-140	-104	-050	-014	-014	-053	-104
42	+054	+044	+034	+018	-004	-006	+017	+033
43	+030	+050	+050	+034	+003	+004	+033	+050
44	+055	+035	+031	+013	-006	-004	+014	+030
45	+068	+061	+031	[illegible]	[illegible]	-003	+014	+032
46	+104	[illegible]	+060	[illegible]	+001	+004	+036	+063
47	[illegible]	[illegible]	[illegible]	[illegible]	-010	[illegible]	+007	+026
48	-032	-032	-015	-013	-011	-010	-014	-014
49	-033	-030	[illegible]	-013	-011	-012	-013	-022
50	-027	-028	[illegible]	[illegible]	-012	-011	[illegible]	-026
51	-216	-182	-119	[illegible]	-018	-013	-067	-120
52	-300	-303	-203	-096	-014	-014	[illegible]	-203
53	-181	-154	-103	[illegible]	-012	-011	-059	-104

	Plate 2 Test 2 1½" Loading	Plate 2 Test 2 2" Loading	Plate 2 Test 2 2½" Loading	Plate 2 Test 2 3" Loading	Plate 2 Test 2 3½" Loading	Plate 2 Test 2 4" Loading	Plate 2 Test 2 3½" Unloading	Plate 2 Test 2 3" Unloading
00	-003	+016	+018	+020	+026	+034	+026	+021
01	+130	+146	+167	+187	+202	+220	+196	+173
02	+085	+118	+146	+164	+185	+211	+175	+154
03	-045	-024	-043	-041	-043	-052	-046	-046
04	+130	+161	+183	+204	+228	+253	+214	+187
05	+070	+091	+117	+130	+152	+163	+145	+110
06	-068	-043	-062	-060	-010	-059	-010	-069
07	+132	+177	+193	+222	+246	+260	+226	+202
08	+054	+071	+080	+096	+111	+110	+102	+034
09	+190	+223	+264	+293	+318	+333	+295	+272
10	+246	+307	+370	+426	+473	+493	+441	+390
11	+110	+134	+174	+206	+242	+248	+225	+192
12	+122	+168	+206	+238	+280	+286	+275	+213
13	+190	+272	+301	+357	+402	+403	+376	+301
14	+060	+106	+113	+168	+184	+202	+153	+123
15	-054	-066	-065	-064	-060	-060	-059	-066
16	-108	-142	-160	-160	-074	-193	-060	-163
17	-006	-090	-080	-082	-085	-087	-077	-074
18	-043	-063	-051	-058	-070	-075	-041	-044
19	-127	-173	-177	-202	-224	-242	-206	-176
20	-053	-074	-072	-079	-090	-085	-073	-055
21	-034	-029	-034	-036	-033	-044	-038	-039
22	-039	-033	-041	-044	-045	-051	-047	-045
23	-038	+014	-032	-027	-029	-029	-029	-025
24	+126	+166	+216	+259	+293	+332	+294	+253
25	+294	+350	+424	+502	+564	+636	+555	+514
26	+168	+196	+245	+287	+311	+352	+302	+300
27	-092	-110	-117	-120	-127	-134	-115	-110
28	-122	-144	-169	-182	-199	-220	-198	-180
29	-104	+463	+398	+367	+371	+382	+364	+360
30	-060	-070	-071	-074	-080	-076	-065	-064
31	-123	-139	-163	-178	-190	-200	-184	-171
32	-058	-058	-072	-077	-082	-095	-087	-080
33	-048	-055	-054	-056	-058	-059	-042	-044
34	-113	-022	-155	-171	-180	-198	-167	-157
35	-284	-329	-393	-451	-498	+000	-502	-452
36	-200	-238	-251	-271	-295	-290	-264	[illegible]
37	-048	-082	-057	-056	-058	-008	+000	-005
38	-171	-206	-238	-268	-295	-300	-260	-253
39	-096	-140	-149	-163	[illegible]	-165	-180	-143
40	-192	-222	-278	-326	-361	-331	-326	-254
41	-158	-209	-223	-254	-276	-272	-240	-214
42	+042	+050	+064	[illegible]	+060	+033	+060	+073
43	+058	+094	+092	[illegible]	+110	+119	+102	+093
44	+040	+063	+063	+030	+090	+094	+078	+066
45	+054	+061	+080	+097	+111	+132	+112	+100
46	+080	+117	+123	+143	+160	+170	+185	+120
47	+040	+051	+068	[illegible]	+093	+097	+108	+069
48	-032	-028	-033	-034	-036	-038	-038	-038
49	+000	-029	-037	-039	-041	-042	-043	-042
50	-027	-029	[illegible]	[illegible]	-031	-028	-029	-027
51	-186	-222	[illegible]	-300	-339	-368	-332	-307
52	-308	-386	[illegible]	[illegible]	-561	-629	-531	-500
53	-156	-203	[illegible]	-252	-221	-306	-254	-246

	Plate 2 Test 2 2½" Unloading	Plate 2 Test 2 2" Unloading	Plate 2 Test 2 1½" Unloading	Plate 2 Test 2 1" Unloading	Plate 2 Test 2 0.5" Unloading	Plate 2 Test 2 zero Unloading	Plate 2 Test 3 Zero Loading	Plate 2 Test 3 0.5" Loading	Plate 2 Test 3 1" Loading	Plate 2 Test 3 1½" Loading	Plate 2 Test 3 2" Loading	Plate 2 Test 3 2½" Loading	Plate 2 Test 3 3" Loading	Plate 2 Test 3 3½" Loading	Plate 2 Test 3 4" Loading
00	+020	+017	-007	-021	-031	+000	-014	-030	-018	-004	+018	+019	+022	+026	+037
01	+159	+141	+121	+037	+032	-001	-002	+031	+038	+127	+146	+167	+189	+204	+229
02	+130	+114	+082	+046	+012	-012	-010	+012	+048	+086	+118	+142	+168	+135	+2[illegible]2
03	-045	-030	-049	-032	-035	-014	-012	-035	-032	-046	-026	-043	-038	-0[illegible]	-050
04	+172	+156	+122	+085	+035	-006	-005	+035	+086	+120	+162	+182	+206	+220	+259
05	+112	+090	+069	+042	+012	-010	-009	+011	+044	+070	+091	+117	+131	+154	+171
06	-073	-052	-073	-052	-050	-018	-014	-049	-050	-069	-047	-062	-058	-010	-0[illegible]
07	+177	+170	+122	+094	+033	-008	-004	+036	+096	+130	+177	+192	+223	+248	+27[illegible]
08	+075	+070	+051	-026	-002	-014	-011	+001	+027	+054	+072	+080	+096	+114	+[illegible]
09	+252	+212	+177	+128	+064	-006	-004	+066	+130	+188	+223	+264	+295	+322	+[illegible]
10	+348	+291	+231	+163	+081	-007	-002	+079	+166	+246	+305	+368	+426	+[illegible]80	+[illegible]
11	+163	+123	+104	+070	+018	-011	-010	+019	+070	+110	+136	+174	+209	+242	+2[illegible]
12	+206	+161	+113	+068	+009	-010	-011	+018	+064	+124	+168	+208	+233	+280	+312
13	+255	+249	+158	+119	+063	-003	-004	+065	+120	+191	+276	+300	+355	+[illegible]04	+4[illegible]
14	+091	+094	+050	+032	+004	-003	-014	+004	+032	+064	+111	+111	+160	+190	+2[illegible]
15	-062	-060	-052	-034	-052	-021	-020	-053	-053	-054	-064	-062	-064	-062	-070
16	-157	-134	-100	-087	-064	-029	-016	-063	-092	-108	-142	-155	-158	-074	-198
17	-072	-074	+006	-047	-048	-022	-019	-048	-058	-006	-089	-081	-078	-0[illegible]	-094
18	-033	-050	-037	-034	-034	-024	-014	-038	-042	-042	-063	-054	-055	-066	-070
19	-166	-152	-114	-098	-061	-024	-018	+000	-102	-125	-170	-178	-201	-224	-2[illegible]
20	-060	-061	-044	-040	-037	-017	-015	-038	-048	-052	-074	-072	-079	-0[illegible]	-0[illegible]
21	-037	-031	-037	-022	-016	-010	-010	-017	-021	-034	-029	-034	-035	-037	-[illegible]
22	-043	-042	-044	-022	-021	-014	-012	-020	-022	-040	-038	-042	-042	-04[illegible]	-[illegible]
23	-032	+012	-036	-025	-024	-014	-014	-025	-025	-034	+014	-032	-024	-028	-[illegible]
24	+214	+158	+115	+076	+021	-013	-012	+022	+076	+125	+166	+216	+260	+297	+[illegible]
25	+421	+339	+282	+181	+079	+001	+000	+078	+180	+294	+352	+425	+503	+564	+6[illegible]
26	+242	+196	+163	+096	+043	-007	-006	+042	+097	+162	+196	+245	+288	+315	+[illegible]
27	-104	-103	-085	-066	-046	-014	-014	-046	-066	-092	-110	-116	-120	-126	-[illegible]
28	-166	-141	-122	-074	+000	-009	-010	+000	-074	-122	-144	-169	-132	-200	-220
29	+391	+450	-109	-039	-037	-004	-005	-038	-038	-105	+464	+398	+368	+371	+3[illegible]
30	-061	-064	-057	-047	-032	-012	-012	-032	-048	-060	-070	-071	-074	-079	-080
31	-155	-137	-119	-082	-050	-012	-011	-052	-081	-122	-140	-163	-178	-191	-210
32	-076	-061	-060	-043	+000	-012	-011	+000	-042	-050	-058	-072	-076	-08[illegible]	-09[illegible]
33	-038	-048	-041	-039	-002	-012	-012	-002	-038	-048	-054	-054	-055	-05[illegible]	-0[illegible]4
34	-142	-014	-112	-076	-048	-011	-010	-047	-078	-117	-022	-156	-170	-181	-204
35	-398	-329	-283	-196	-102	-015	-016	-102	-196	-284	-328	-393	-450	-193	+000
36	-228	-211	-177	-151	-090	-019	-018	-090	-150	-200	-237	-251	-269	-297	-327
37	-004	-050	-019	-037	-023	-010	-010	-025	-037	-048	-083	-056	-056	-062	-06[illegible]
38	-212	-196	-154	-120	-060	-017	-017	-062	-120	-172	-206	-238	-268	-295	+~~[illegible]~~
39	-146	-114	-071	-075	-039	-010	-012	-039	-075	-096	-139	-148	-168	-180	-213
40	-252	-229	-136	-122	-053	-008	-009	-061	-123	-191	-230	-278	-326	-364	-310
41	-197	-179	-130	-106	-055	-015	-014	-058	-104	-159	-209	-223	-254	-279	-310
42	+068	+054	+044	+034	+0[illegible]8	-004	-[illegible]4	+016	+036	+042	+051	+063	+068	+062	+086
43	+083	+081	+048	+050	+033	+004	+002	+032	+051	+058	+096	+093	+106	+119	+129
44	+058	+054	+030	+030	+014	-002	[illegible]6	+013	+032	+040	+063	+064	+080	+092	+102
45	+006	+066	+062	+031	+[illegible]4	-002	-006	+013	+030	+052	+062	+081	+098	+112	+119
46	+150	+104	+072	+063	+[illegible]	+[illegible]	+001	+006	+064	+080	+118	+124	+145	+158	+174
47	+087	+050	+028	+022	+007	-003	-009	+007	+028	+040	+053	+068	+080	+094	+105
48	-042	-032	-036	-014	-[illegible]	[illegible]	-010	014	-014	-031	-026	-036	-034	-038	-038
49	-042	-038	-024	-022	-[illegible]	-011	-012	-01[illegible]	-021	-028	-028	-037	-040	-041	-042
50	-028	-026	-023	-023	-023	-011	-012	-022	-026	-0[illegible]	-028	-029	-028	-030	-028
51	262	-215	-180	[illegible]21	-067	-017	-018	-0[illegible]	+~~[illegible]~~	-185	-222	268	-300	+~~006~~	-368
52									-203	-307	-387	-446	-500	-564	-629
53									-103	-155	-203	-22[illegible]	-252	-279	-305

	Plate 2 Test 3 3½" Unload	Plate 2 Test 3 3" Unload	Plate 2 Test 3 2½" Unload	Plate 2 Test 3 2" Unload	Plate 2 Test 3 1½" Unload	Plate 2 Test 3 1" Unload	Plate 2 Test 3 0.5" Unload	Plate 2 Test 3 zero Unload
00	+023	+022	+018	+017	-004	-019	-031	-014
01	+196	+176	+159	+144	+120	+037	+030	-002
02	+176	+153	+136	+115	+000	+046	+013	-009
03	-046	-044	-047	-027	-050	-030	-036	-011
04	+214	+138	+172	+157	+122	+087	+035	-004
05	+144	+118	+112	+089	+063	+042	+012	-008
06	-018	-069	-073	-053	-074	-051	-049	-014
07	+227	+202	+177	+171	+122	+094	+034	-004
08	+101	+086	+074	+071	+050	+026	+000	-010
09	+297	+272	+254	+213	+177	+128	+065	-003
10	+439	+391	+348	+291	+230	+160	+074	+000
11	+223	+190	+162	+126	+104	+067	+019	+000
12	+274	+214	+202	+161	+112	+066	+015	-010
13	+370	+304	+285	+260	+158	+119	+064	-004
14	+154	+124	+100	+110	+048	+026	+002	-014
15	-059	-072	-061	-057	-052	-033	-050	-020
16	-069	-168	-158	-134	-100	-087	-061	-014
17	-074	-075	-072	-072	+008	-048	-047	-017
18	-041	-042	-035	-051	-036	-032	-036	-014
19	-203	+606	-167	-154	-116	-095	-058	-018
20	-070	-055	-060	-060	-043	-041	-037	-014
21	-038	-038	-038	-032	-033	-022	-016	-010
22	-046	-045	-044	-041	-044	-022	-022	-012
23	-029	-026	-032	+012	-036	-025	-024	-013
24	+294	+259	+214	+158	+116	+074	+020	-012
25	+556	+513	+420	+340	+222	+177	+078	+000
26	+302	+300	+242	+196	+164	+096	+044	-006
27	-115	-110	-106	-102	-035	-066	-045	-013
28	-198	-181	-168	-141	-121	-074	-050	-010
29	+364	+361	+392	+460	-100	-039	-039	+001
30	-066	-064	-062	-064	-056	-048	-032	-011
31	-184	-171	-155	-136	-120	-081	-051	-010
32	-087	-080	-076	-060	-060	-043	-001	-010
33	-042	-043	-038	-047	-042	-039	+000	-013
34	-167	-155	-142	-016	-111	-078	-049	-010
35	-502	-452	-398	-329	-286	-196	-102	-016
36	-263	-236	-228	-211	-176	-152	-090	-016
37	+009	-004	-005	-049	-018	-037	-024	-010
38	-258	-253	-211	-196	-163	-120	-062	-016
39	-179	-143	-145	-114	-073	-074	-040	-010
40	-322	-254	-251	-227	-137	-122	-060	-003
41	-246	-214	-197	-173	-123	-104	-058	-014
42	+066	+076	+069	+054	+046	+034	+018	-004
43	+102	+094	+082	+080	[illegible]	+050	+033	+004
44	+078	+068	+059	+055	+030	+032	+015	-004
45	+109	+093	+084	+068	[illegible]	+030	+014	-007
46	+198	+120	+151	+105	+072	+063	+036	+002
47	+108	+068	+088	+051	+039	+028	+007	-009
48	-038	-038	[illegible]	-032	038	-014	-014	-010
49	[illegible]	-042	-042	-032	032	022	-016	-010
50	[illegible]	-027	-027	-027	[illegible]	-026	-023	-012
51	[illegible]	-306	-262	-215	[illegible]	[illegible]	-068	-018
52	[illegible]	-500	-417	-360	[illegible]	[illegible]	-096	-015
53	[illegible]	[illegible]	[illegible]	-181	136	[illegible]	-060	-012

	Plate 3 Test 1 Zero Load	Plate 3 Test 1 1" Load	Plate 3 Test 1 2" load	Plate 3 Test 1 3" Load	Plate 3 Test 1 4" Load	Plate 3 Test 1 5" Load	Plate III Test 1 6" Load	Plate II Test 1 7" Load
00	-014	+000	-044	-038	-027	-020	-022	-022
01	-021	-092	-149	-168	-189	-208	-226	-240
02	-022	-114	-153	-189	-216	-236	-260	-271
03	-015	-050	-077	-084	-094	-100	-109	-110
04	-023	-124	-182	-211	-248	-272	-299	-316
05	-025	-123	-157	-184	-214	-233	-254	-273
06	-023	-092	-132	-153	-170	-192	-210	-219
07	-023	-148	-211	-260	-298	-334	-352	-390
08	-028	-105	-144	-184	-199	-224	-242	-260
09	-021	-081	-122	-146	-170	-188	-200	-220
10	-020	-115	-194	-248	-301	-344	-384	-427
11	-016	-081	-134	-160	-186	-221	-261	-270
12	-014	-060	-114	-126	-145	-169	-185	-210
13	-032	-124	-230	-290	-350	-392	+000	-502
14	-010	-116	-191	-222	-268	-294	-334	-383
15	-016	-004	-009	+022	+024	+044	+064	+076
16	-036	-007	+000	+007	+032	+037	+062	+064
17	-014	+027	+046	+084	+106	+129	+141	+155
18	-014	+021	+010	+037	+069	+086	+093	+111
19	+006	+060	+092	+122	+149	+161	+173	+185
20	-012	+029	+039	+065	+082	+085	+107	+118
21	-012	-012	-031	-040	-046	-054	-061	-069
22	-020	-036	-062	-006	-084	-096	-106	-110
23	-021	-058	-091	-110	-116	-120	-128	-137
24	-022	-068	-112	-141	-164	-195	-217	-236
25	-022	-102	-174	-224	-265	-302	-346	-376
26	-018	-074	-117	-132	-153	-164	-187	-207
27	-016	+034	+047	+067	+088	+108	+126	+142
28	-017	+008	+012	+026	+033	+048	+062	+073
29	-020	-067	-109	-124	+000	-155	-168	-186
30	-017	+036	+052	+084	+105	+131	+150	+177
31	-008	+040	+057	+093	+113	+142	+165	+190
32	-018	-026	-045	-054	-058	-062	-065	-067
33	-015	+032	+048	+091	+119	+142	+166	+198
34	-006	+072	+103	+150	+197	+241	+283	+319
35	-019	+006	+001	+012	+013	+021	+030	+045
36	-007	+052	+085	+133	+164	+202	+236	+272
37	-003	+182	+214	+310	+380	+451	+516	+573
38	-008	+056	+088	+135	+169	+203	+240	+274
39	-016	+028	+041	+083	+121	+146	+177	+210
40	-004	+130	+220	+308	+393	+463	+540	+615
41	+006	+068	+108	+162	+217	+262	+307	+355
42	-020	-031	-063	-059	-056	-052	-046	-043
43	-015	-043	-082	-094	-101	-104	-115	-118
44	-038	-039	-077	-084	-089	-099	-099	-100
45	-020	-028	-052	-036	-037	-024	+002	+015
46	-009	-036	-068	-067	-084	-086	-088	-087
47	-014	-027	-053	-054	-063	-065	-059	-060
48	-018	-026	-069	-088	-108	-131	-156	-180
49	-016	-023	-057	-076	-090	-107	-118	-142
50	-017	-028	-038	-038	-028	-024	-016	-005
51	-004	+056	+088	+127	+152	+186	+228	+251
52	-002	+132	+204	+276	+350	+408	+477	+531
53	-003	+064	+085	+129	+159	+190	+227	+258

	Plate III Test 1 8" Load	Plate III Test 1 8" Unload	Plate III Test 1 7" Unload	Plate III Test 1 6" unload	Plate III Test 1 6" Unload	Plate III Test 1 4" unload	Plate III Test 1 3" Unload	Plate 3 Test 1 2" unload	Plate 3 Test 1 1" unload	Plate 3 Test 1 0 Unload	Plate 3 Test 2 0 Load	Plate 3 Test 2 1" load	Plate 3 Test 2 2" load	Plate 3 Test 2 3" Load	Plate 3 Test 2 4" Load
00	-026	-024	-022	-021	-022	-026	-039	-036	-019	-014	-008	-018	-044	-036	-027
01	-251	-252	-240	-227	-209	-190	-168	-166	-090	-020	-011	-092	-148	-167	-189
02	-288	-288	-272	-258	-238	-218	-190	-174	-111	-020	-013	-110	-153	-188	-214
03	-122	-121	-111	-108	-102	-096	-084	-080	-050	-016	-013	-050	-077	-085	-095
04	-336	-337	-318	-300	-273	-250	-212	-197	-123	-022	-018	-123	-182	-213	-248
05	-287	-287	-272	-254	-234	-216	-185	-172	-121	-024	-016	-123	-159	-185	-215
06	-235	-235	-221	-211	-192	-174	-152	-141	-090	-023	+000	-092	-131	-152	-173
07	-418	-419	-390	-353	-335	-302	-260	-230	-146	-023	-022	-148	-212	-261	-298
08	-278	-280	-260	-242	-224	-200	-184	-155	-105	-028	-016	-105	-140	-184	-198
09	-238	-240	-220	-202	-188	-172	-145	-132	-079	-020	-011	-080	-123	-146	-170
10	-472	-475	-430	-383	-342	-310	-248	-214	-110	-032	-020	-115	-193	-247	-303
11	-302	-302	-271	-264	-224	-190	-162	-142	-078	-029	-014	-078	-134	-164	-188
12	-224	-228	-210	-188	-168	-146	-127	-120	-060	-026	-005	-058	-113	-127	-146
13	-552	-553	-500	-450	-394	-353	-291	-252	-122	-028	-017	-123	-232	-285	-350
14	-414	-418	-383	-334	-298	-268	-222	-200	-109	-028	-015	-112	-186	-229	-268
15	+084	+083	+076	+064	+043	+024	+023	+001	-004	-028	-015	-004	-008	+020	+026
16	+076	+083	+066	+061	+036	+034	+010	-013	-010	-050	-028	-007	-016	+009	+033
17	+170	+172	+152	+141	+131	+106	+084	+056	+026	-023	-006	+026	+048	+083	+106
18	+118	+120	+113	+094	+088	+068	+036	+025	+020	-034	-010	+019	+019	+040	+067
19	+200	+199	+184	+174	+159	+150	+124	+104	+062	-022	+009	+061	+093	+124	+148
20	+128	+129	+118	+107	+086	+083	+065	+946	+028	-011	+004	+030	+039	+064	+082
21	-076	-078	-068	-061	-054	-045	+000	-031	-013	-010	+006	-012	-030	-040	-046
22	-117	-117	-108	-106	-096	-084	-006	-064	-035	-020	-005	-035	-064	-006	-084
23	-148	-148	-137	-128	-121	-115	-110	-094	-057	-021	-008	-057	-092	-110	-115
24	-254	-254	-235	-216	-194	-164	-142	-114	-066	-035	-009	-066	-113	-142	-164
25	-416	-416	-376	-345	-302	-265	-225	-179	-100	-020	-007	-102	-175	-223	-265
26	-230	-230	-208	-188	-164	-153	-133	-118	-072	-058	-011	-074	-116	-132	-152
27	+156	+158	+142	+126	+108	+091	+066	+051	+034	-018	+004	+034	+048	+066	+089
28	+082	+081	+074	+062	+047	+035	+026	+013	+008	-015	+006	+008	+013	+025	+033
29	-198	-197	-188	-168	-155	-140	-124	-110	-067	-020	-004	-067	-108	-124	-140
30	+198	+198	+178	+150	+130	+105	+084	+056	+036	-016	+005	+036	+052	+083	+105
31	+213	+214	+190	+166	+142	+115	+093	+060	+038	-005	+008	+040	+058	+094	+114
32	-075	-075	-067	-065	-062	-058	-054	-044	-026	-017	-004	-025	-044	-054	-059
33	+222	+224	+198	+166	+142	+120	+092	+052	+033	-014	+006	+033	+048	+092	+120
34	+348	+349	+320	+284	+241	+199	+150	+106	+072	-005	+008	+073	+102	+152	+197
35	+046	+046	+045	+030	+022	+013	+012	+002	+006	-017	-002	+006	+002	+012	+013
36	+297	+298	+272	+236	+202	+164	+134	+088	+056	-006	+011	+057	+086	+134	+164
37	+638	+639	+574	+516	+452	+380	+310	+218	+140	+000	+012	+142	+214	+310	+379
38	+309	+309	+273	+242	+202	+169	+134	+091	+054	-007	+006	+056	+087	+135	+169
39	+236	+236	+208	+176	+146	+120	+080	+045	+029	-018	-002	+029	+042	+082	+122
40	+665	+665	+615	+541	+463	+393	+310	+224	+128	-002	+007	+130	+221	+309	+393
41	+397	+398	+355	+306	+261	+217	+162	+110	+067	+004	+009	+068	+108	+162	+216
42	-040	-040	-043	-045	-052	-056	-059	-063	-030	-020	-011	-031	-063	-060	-056
43	-124	-125	-118	-114	-105	-100	-093	-082	-042	-012	-004	-042	-082	-093	-100
44	-106	-105	-100	-099	-093	-091	-082	-079	-037	-039	-008	-038	-076	-082	-090
45	+021	+022	+015	+003	-026	-039	-036	-052	-028	+000	-012	-027	-051	-036	-038
46	-091	-090	-088	-087	-086	-085	-068	-067	-034	-009	-004	-036	-067	-068	-084
47	-068	-067	-060	-060	-055	-063	-053	-054	-025	-013	-005	-026	-052	-054	-063
48	-201	-202	-180	-157	-132	-107	-088	-070	-026	-019	-004	-026	-069	-088	-107
49	-155	-156	-144	-11[illegible]	-108	-090	-078	-058	-022	-014	-001	-023	-056	-077	-090
50	+004	+004	-006	-01[illegible]	-024	-028	-038	-040	-027	-016	+001	-028	-038	-038	-028
51	+278	+278	+250	+22[illegible]	+186	+152	+128	+088	+054	-004	+006	+057	+088	+128	+152
52	+576	+578	+532	+47[illegible]	+408	+350	+276	+204	+130	-002	+012	+132	+205	+276	+350
53	+283	+284	+258	+228	+190	+160	+128	+086	+064	-004	+010	+064	+085	+128	+160

Row	[illegible] Test 2 5" Load	Plate II Test 2 6" Load	Plate III Test 2 7" Load	Plate II Test 2 8" Load	Plate III Test 2 8" Unload	Plate III Test 2 7" unload	Plate III Test 2 6" unload	Plate II Test 2 5" unload	Plate II Test 2 4" unload	Plate III Test 2 3" unload	Plate 3 Test 2 2" unload	Plate 3 Test 2 1" unload	Plate 3 Test 2 0 unload	Plate 3 Test 3 0 Load	Plate 3 Test 3 1" Load	Plate 3 Test 3 2" Load
00	-021	-022	-020	-026	-026	-014	-014	-022	-019	-036	-042	+000	-009	-015	-018	-043
01	-208	-225	-240	-251	-252	-252	-238	-208	-204	-170	-154	-090	-013	-019	-092	-148
02	-236	-258	-273	-286	-289	-292	-279	-237	-235	-194	-159	-110	-013	-022	-111	-153
03	-101	-108	-110	-123	-119	-114	-112	-100	-099	-086	-078	-050	-012	-017	-050	-076
04	-273	-300	-316	-336	-338	-336	-319	-272	-268	-215	-188	-124	-020	-024	-124	-180
05	-233	-254	-274	-287	-287	-288	-270	-234	-231	-186	-163	-122	-019	-025	-123	-158
06	-192	-210	-218	-236	-236	-233	-219	-190	-184	-155	-135	-092	-020	-024	-091	-132
07	-334	-352	+000 -3	-418	-420	-420	-380	-334	-322	-265	-217	-146	-022	-023	-148	-211
08	-224	-242	-261	-279	-282	-279	-258	-224	-216	-186	-147	-105	-018	-028	-105	-142
09	-187	-200	-218	-239	-244	-236	-214	-189	-185	-147	-126	-080	-010	-021	-080	-122
10	-339	-385	-429	-470	-488	-465	-414	-342	-333	+000	-199	-112	-020	-020	-116	-192
11	-222	-262	-272	-302	-312	-290	-280	-224	-204	-164	-137	-076	-015	-018	-078	-133
12	-163	-180	-210	-227	-233	-227	-198	-165	-160	-130	-116	-060	-006	-008	-058	-105
13	-393	-448	-502	-551	-577	-539	-485	-392	-384	-293	-242	-121	-019	-028	-123	-233
14	-296	-334	-378	-414	-435	-407	-356	-296	-287	-233	-194	-110	-019	-006	-114	-183
15	+043	+064	+076	+034	+102	+098	+082	+043	+041	+022	-007	-003	-014	-015	-004	-010
16	+034	+063	+061	+077	+112	+098	+096	+030	+069	+010	-014	-008	-029	-032	-008	-018
17	+129	+140	+154	+169	+204	+192	+172	+128	+138	+086	+049	+027	-007	-014	+027	+047
18	+085	+094	+112	+120	+134	+135	+112	+086	+090	+038	+019	+018	-012	-012	+021	+016
19	+160	+174	+185	+196	+232	+225	+210	+159	+181	+123	+098	+060	+007	+007	+064	+088
20	+086	+108	+118	+128	+152	+146	+130	+086	+104	+065	+041	+029	+002	-013	+029	+038
21	-054	-062	-070	-078	-077	-068	-060	-054	-045	-040	-030	-014	+004	-010	-012	-029
22	-096	-106	-110	-118	-119	-114	-109	-096	-086	-006	-063	-035	-006	-019	-034	-062
23	-120	-128	-138	-148	-152	-142	-132	-120	-118	-110	-092	-059	-008	-022	-058	-090
24	-194	-216	-236	-254	-259	-242	-222	-194	-171	-144	-113	-066	-010	-023	-067	-110
25	-302	-344	-376	-415	-427	-392	-360	-304	-276	-226	-176	-100	-008	-022	-102	-173
26	-164	-188	-207	-230	-234	-215	-196	-164	-158	-132	-118	-071	-009	-017	-074	-116
27	+109	+126	+140	+156	+176	+174	+155	+108	+114	+067	+048	+034	+004	-018	+034	+049
28	+048	+062	+074	+079	+097	+098	+082	+047	+054	+026	+013	+008	+006	-017	+008	+012
29	-155	-168	-186	-198	-204	-198	-178	-156	-149	-124	-109	-067	-005	-020	-067	-106
30	+131	+151	+177	+198	+217	+219	+181	+130	+130	+085	+053	+037	+005	-018	+036	+052
31	+143	+166	+190	+213	+234	+228	+196	+142	+142	+094	+060	+041	+007	-006	+041	+059
32	-062	-065	-067	-076	-075	-066	-064	-063	-058	-054	-044	-026	-004	-019	-026	-044
33	+143	+167	+198	+222	+242	+237	+198	+142	+148	+092	+049	+033	+002	-015	+031	+048
34	+242	+284	+319	+347	+372	+374	+336	+242	+242	+152	+104	+072	+006	-006	+071	+101
35	+022	+030	+044	+045	+053	+060	+045	+021	+025	+011	+001	+002	-003	-019	+006	+003
36	+262	+237	+272	+296	+318	+317	+276	+201	+198	+134	+086	+057	+011	-007	+057	+086
37	+451	+516	+573	+637	+675	+662	+594	+452	+447	+311	+215	+140	+012	-003	+142	+214
38	+202	+240	+274	+308	+327	+321	+278	+202	+206	+135	+089	+054	+006	-008	+056	+088
39	+146	+176	+207	+236	+252	+250	+213	+148	+151	+081	+042	+030	-002	-016	+029	+043
40	+463	+540	+615	+664	+697	+700	+618	+463	+460	+310	+221	+128	+005	-002	+130	+222
41	+263	+306	+355	+397	+416	+402	+351	+262	+255	+162	+108	+066	+008	+003	+068	+108
42	-052	-045	-043	-041	-039	-040	-043	-052	-054	-060	-063	-030	-009	-020	-031	-062
43	-103	-116	-116	-123	-125	-120	+000	-104	-104	-093	-083	-042	-004	-014	-043	-081
44	-097	-099	-100	-104	-107	-104	-102	-098	-095	-082	-077	-037	-009	-038	-037	-076
45	-024	+004	+016	+021	+024	+024	+013	-025	-034	-037	-053	-027	-012	-021	-028	-050
46	-086	-087	-086	-090	-090	-084	-083	-088	-086	-068	-068	-034	-005	-008	-036	-067
47	-064	-059	-059	-068	-066	-053	-054	-065	-060	-054	-055	-026	-005	-012	-026	-052
48	-132	-156	-180	-201	-204	-189	-166	-132	-114	-088	-069	-027	-004	-018	-026	-068
49	-108	-119	-143	-155	-155	+000	-124	-107	-094	-077	-057	-023	+000	-016	-023	-056
50	-025	-016	-005	+004	+005	+000	-009	-025	-025	-038	-037	-028	+000	-017	+000	-040
51	+186	+228	+251	+278	+288	+282	+261	+185	+176	+128	+088	+055	+003	-004	+056	+089
52	+408	+477	+531	+576	+590	+598	+537	+407	+398	+276	+205	+129	+013	-004	+133	+205
53	+188	+227	+258	+284	+291	+290	+257	+190	+183	+128	+085	+063	+009	-004	+063	+085

	Plate 3 Test 3 7" load	Plate 3 Test 3 4" load	Plate 3 Test 3 5" load	Plate III Test 3 6" load	Plate III Test 3 7" load	Plate III Test 3 8" load	Plate III Test 3 7" unl	Plate III Test 3 6" unl
00	-038	-026	-022	-022	-022	-024	-017	-020
01	-168	-189	-208	-224	-240	-250	-247	-230
02	-190	-218	-238	-258	-272	-289	-281	-266
03	-084	-093	-100	-108	-108	-121	-112	-108
04	-212	-248	-271	-300	-316	-336	-325	-304
05	-184	-214	-233	-254	-272	-286	-278	-256
06	-152	-171	+000	-210	-220	-234	-223	-213
07	-260	-297	-334	-352	-390	-418	-398	-358
08	-185	-198	-224	-242	-260	-278	-265	-244
09	-147	-169	-187	-199	-220	-240	-224	-202
10	-246	-302	-340	-382	-429	-473	-437	-388
11	-160	-187	-220	-260	-268	-300	-275	-264
12	-125	-144	-168	-184	-209	-222	-216	-186
13	-288	-350	-392	-449	-500	-551	-509	-454
14	-232	-269	-293	-333	-380	-412	-385	-334
15	+010	+023	+044	+063	+076	+084	+076	+064
16	-003	+037	+035	+064	+066	+076	+070	+065
17	+077	+107	+130	+142	+155	+172	+160	+145
18	+029	+070	+086	+093	+114	+120	+113	+092
19	+110	+150	+160	+173	+185	+200	+190	+176
20	+053	+082	+086	+107	+118	+128	+120	+107
21	-040	-046	-054	-060	-068	-077	-069	-060
22	-005	-084	-096	-107	-108	-117	-110	-107
23	-109	-114	-120	-129	-137	-148	-137	-129
24	-142	-164	-194	-216	-236	-254	-236	-216
25	-223	-265	-302	-345	-375	-416	-377	-345
26	-132	-152	-164	-188	-207	-230	-288	-188
27	+067	+090	+110	+125	+142	+157	+144	+126
28	+025	+033	+048	+062	+074	+080	+074	+062
29	-124	-140	-155	-168	-186	-198	-187	-168
30	+084	+105	+131	+151	+177	+198	+179	+152
31	+094	+114	+143	+164	+191	+213	+192	+165
32	-054	+000	-061	-065	-066	-076	-067	-065
33	+092	+120	+142	+166	+198	+223	+199	+167
34	+152	+196	+242	+282	+318	+347	+321	+285
35	+012	+012	+022	+030	+045	+046	+046	+029
36	+133	+164	+201	+237	+272	+297	+274	+236
37	+310	+379	+452	+517	+573	+637	+574	+516
38	+135	+168	+202	+241	+273	+308	+275	+241
39	+083	+119	+146	+176	+208	+236	+210	+176
40	+310	+393	+463	+541	+614	+664	+616	+543
41	+163	+217	+262	+307	+355	+397	+356	+308
42	-059	-056	-052	-046	-042	-040	-043	-046
43	-093	-100	-106	-114	-118	-124	-118	-115
44	-082	+000	-098	-099	-100	-104	-101	-099
45	-036	-038	-024	+004	+016	+021	+015	+005
46	-067	-084	-086	-087	-087	-091	-087	-085
47	-053	-064	-064	-058	-060	-066	-059	-057
48	-087	-107	-131	-157	-180	-202	-180	-158
49	-076	-090	-106	-118	-143	-154	-143	-118
50	-038	-030	-025	-017	-005	+004	-005	-016
51	+128	+152	+186	+228	+251	+278	+251	+232
52	+276	+350	+408	+478	+532	+576	+532	+484
53	+128	+159	+190	+227	+257	+283	+258	+230
54							+301	

	Plate 3 Test 3 5" unload	Plate III Test 3 4" unload	Plate 3 Test 7 3" unload	Plate 3 Test 3 2" unload	Plate 3 Test 3 1" unload	Plate 3 Test 3 0 unload	[illegible]	Plate IV Test 1
00	-016	-024	-028	-044	-018	-009	-010	+016
01	-219	-192	-184	-150	-090	-011	+008	-154
02	-252	-217	-212	-154	-109	-011	+010	-179
03	-104	-096	-088	-078	-050	-010	+008	-060
04	-281	-250	-234	-182	-123	-019	+004	-188
05	-240	-215	-202	-158	-120	-018	+006	-147
06	-196	-173	-167	-131	-090	-019	-002	-132
07	-344	-300	-289	-212	-144	-022	-002	-290
08	-230	-201	-201	-143	-105	-016	+001	-194
09	-191	-171	-160	-123	-078	-010	-002	-205
10	-350	-310	-278	-197	-111	-022	+000	-418
11	-228	-188	-180	-134	-074	-014	+003	-226
12	-170	-146	-140	-106	-061	-005	+000	-168
13	-402	-352	-318	-236	-120	-020	-004	-338
14	-301	-270	-242	-192	-112	-016	+005	-162
15	+047	+024	+041	-010	-004	-014	+002	+061
16	+039	+032	+044	-018	-009	-031	-004	+118
17	+136	+107	+115	+048	+027	-006	+004	+123
18	+090	+070	+057	+016	+022	-012	+002	+114
19	+166	+151	+158	+092	+063	+006	-005	+188
20	+089	+083	+086	+039	+030	+002	-002	+120
21	-054	-046	-040	+000	-012	+003	+008	-048
22	-096	-085	-007	-062	-034	-005	+000	-046
23	-120	-116	-112	-091	-056	-008	+012	-040
24	-196	-164	-147	-112	-067	-010	+008	-204
25	-302	-266	-234	-175	-100	-007	+003	-384
26	-166	-153	-138	-116	-073	-007	+012	-193
27	+111	+089	+093	+048	+034	+006	+008	+198
28	+049	+034	+044	+012	+007	+006	-001	+121
29	-155	-140	-131	-107	-066	-006	+006	-130
30	+131	+106	+111	+052	+036	+006	+008	+196
31	+145	+114	+123	+058	+041	+008	+006	+186
32	-062	-060	-053	-044	-026	-004	+008	-071
33	+144	+121	+121	+048	+032	+004	+002	+216
34	+242	+198	+192	+104	+073	+007	+000	+272
35	+022	+012	+025	+002	+006	-003	+002	+000
36	+204	+164	+167	+086	+055	+012	+009	+239
37	+453	+380	+376	+215	+141	+013	+002	+478
38	+204	+169	+166	+088	+054	+006	+009	+201
39	+147	+119	+114	+043	+029	+000	+005	+170
40	+464	+393	+375	+221	+129	+007	+006	+403
41	+263	+216	+196	+108	+067	+009	+008	+220
42	-052	-058	-057	-064	-030	-010	+002	-052
43	-106	-101	-096	-082	-041	-003	+005	-106
44	-098	-090	-087	-076	-038	-009	+009	-095
45	-025	-039	-033	-052	-028	-014	+007	-052
46	-086	-085	-068	-067	-034	-005	+009	-129
47	-065	-063	-052	-052	-025	-005	+006	-076
48	-132	-107	-094	-069	-025	-005	+009	-069
49	-106	-090	-081	-056	-022	+000	+006	-056
50	-026	-028	-035	-037	-028	+000	+004	-007
51	+185	+152	+151	+088	+056	+005	+005	+232
52	+409	+351	+321	+204	+132	+011	+006	+468
53	+191	+159	+150	+085	+064	+008	+008	+204

Row	Plate IV Test 1 Loading 1 p.s.i.	Plate IV Test 1 Loading 1.5 p.s.i.	Plate IV Test 1 Loading 2 p	Plate IV Test 1 Loading 2.5 p.s.i.	Plate IV Test 1 Loading 3 p.s.i.	Plate IV Test 1 Loading 3.5 p.s.i.	Plate IV Test 1 Loading 4 p.s.i.	Plate IV Test 1 Loading 4.5 p.s.i.	Plate IV Test 1 Loading 5 p.s.i.	Plate IV Test 1 Loading 5.5 p.s.i.	Plate IV Test 1 Unloading 5 p.s.i.	Plate IV Test 1 4.5 p.s.i. Unload
00	+040	+040 x2	+054 x2	+058 x2	+066 x2	+042 x4	+045 x4	+050 x4	+050 x4	+055 x4	+050 x4	+050 x4
01	-238	-147 x2	-177 x2	-181 x2	-294 x2	-098 x4	-106 x4	-116 x4	-110 x4	-122 x4	-110 x4	-116 x4
02	-296	-193 x2	-237 x2	-237 x2	-256 x2	-131 x4	-144 x4	-151 x4	-152 x4	-163 x4	-154 x4	-152 x4
03	-092	-056 x2	-067 x2	-074 x2	-076 x2	-036 x4	-039 x4	-045 x4	-045 x4	-048 x4	-045 x4	-045 x4
04	-313	-208 x2	-251 x2	-270 x2	-296 x2	-156 x4	-174 x4	-189 x4	-190 x4	-206 x4	-190 x4	-188 x4
05	-246	-156 x2	-200 x2	-210 x2	-235 x2	-120 x4	-127 x4	-141 x4	-143 x4	-153 x4	-142 x4	-142 x4
06	-210	-135 x2	-165 x2	-174 x2	-189 x2	-096 x4	-103 x4	-116 x4	-116 x4	-122 x4	-116 x4	-115 x4
07	-467	-298 x2	-366 x2	-384 x2	-420 x2	-216 x4	-236 x4	-258 x4	-262 x4	-279 x4	-262 x4	-258 x4
08	-300	-190 x2	-238 x2	-252 x2	-268 x2	-133 x4	-147 x4	-159 x4	-162 x4	-170 x4	-162 x4	-159 x4
09	-318	-197 x2	-243 x2	-278 x2	-314 x2	-169 x4	+000 x4	-199 x4	-215 x4	-226 x4	-215 x4	-199 x4
10	-639	-405 x2	-486 x2	-560 x2	-638 x2	-347 x4	-378 x4	-408 x4	-433 x4	-464 x4	-432 x4	-408 x4
11	-352	-216 x2	-263 x2	-303 x2	-331 x2	-174 x4	-194 x4	-206 x4	-216 x4	-222 x4	-216 x4	-206 x4
12	-257	-162 x2	-197 x2	-270 x2	-250 x2	-134 x4	-141 x4	-156 x4	-168 x4	-128 x4	-168 x4	-158 x4
13	-528	-342 x2	-416 x2	-480 x2	-550 x2	-300 x4	-329 x4	-359 x4	-380 x4	-408 x4	-380 x4	-359 x4
14	-332	-217 x2	-269 x2	-312 x2	-346 x2	-191 x4	-206 x4	-227 x4	-245 x4	-256 x4	-244 x4	-228 x4
15	+116	+079 x2	+106 x2	+122 x2	+136 x2	+085 x4	+094 x4	+104 x4	+109 x4	+114 x4	+108 x4	+104 x4
16	+204	+140 x2	+168 x2	+196 x2	+217 x2	+128 x4	+131 x4	+144 x4	+153 x4	+160 x4	+151 x4	+144 x4
17	+224	+153 x2	+186 x2	+218 x2	+244 x2	+142 x4	+156 x4	+167 x4	+179 x4	+190 x4	+179 x4	+167 x4
18	+200	+132 x2	+163 x2	+187 x2	+216 x2	+123 x4	+134 x4	+142 x4	+150 x4	+162 x4	+152 x4	+143 x4
19	+308	+207 x2	+243 x2	+279 x2	+315 x2	+174 x4	+188 x4	+200 x4	+214 x4	+222 x4	+214 x4	+200 x4
20	+205	+142 x2	+176 x2	+197 x2	+233 x2	+129 x4	+144 x4	+154 x4	+164 x4	+175 x4	+164 x4	+153 x4
21	-058	-025 x2	-028 x2	-032 x2	-033 x2	-014 x4	-019 x4	-018 x4	-021 x4	-024 x4	-022 x4	-018 x4
22	-058	-036 x2	-040 x2	-052 x2	-056 x2	-030 x4	-034 x4	-039 x4	-042 x4	-048 x4	-043 x4	-039 x4
23	-057	-031 x2	-037 x2	-046 x2	-055 x2	-026 x4	-036 x4	-038 x4	-045 x4	-046 x4	-042 x4	-037 x4
24	-316	-197 x2	-232 x2	-271 x2	-310 x2	-169 x4	-188 x4	-201 x4	-218 x4	-234 x4	-218 x4	-200 x4
25	-626	-394 x2	-482 x2	-562 x2	-647 x2	-355 x4	-394 x4	-423 x4	-454 x4	-486 x4	-454 x4	-424 x4
26	-331	-208 x2	-253 x2	-302 x2	-336 x2	-184 x4	-207 x4	-214 x4	-226 x4	-242 x4	-225 x4	-215 x4
27	+342	+232 x2	+308 x2	+326 x2	+362 x2	+192 x4	+219 x4	+235 x4	+234 x4	+251 x4	+236 x4	+235 x4
28	+224	+157 x2	+192 x2	+196 x2	+220 x2	+123 x4	+128 x4	+145 x4	+143 x4	+147 x4	+141 x4	+146 x4
29	-205	-128 x2	-157 x2	-174 x2	-189 x2	-100 x4	-119 x4	-124 x4	-128 x4	-138 x4	-127 x4	-125 x4
30	+323	+234 x2	+305 x2	+338 x2	+363 x2	+206 x4	+229 x4	+248 x4	+254 x4	+276 x4	+254 x4	+248 x4
31	+332	+234 x2	+308 x2	+332 x2	+364 x2	+196 x4	+196 x4	+241 x4	+242 x4	+260 x4	+242 x4	+241 x4
32	-082	-044 x2	-056 x2	-060 x2	-067 x2	-032 x4	-042 x4	-042 x4	-042 x4	-050 x4	-040 x4	-042 x4
33	+376	+271 x2	+341 x2	+378 x2	+419 x2	+230 x4	+246 x4	+274 x4	+280 x4	+298 x4	+281 x4	+274 x4
34	+518	+368 x2	+456 x2	+485 x2	+524 x2	+284 x4	+304 x4	+334 x4	+346 x4	+370 x4	+344 x4	+337 x4
35	+060	+048 x2	+063 x2	+064 x2	+070 x2	+040 x4	+032 x4	+046 x4	+046 x4	+048 x4	+045 x4	[illegible]
36	+396	+267 x2	+329 x2	+388 x2	+450 x2	+258 x4	+280 x4	+301 x4	+326 x4	+348 x4	+326 x4	+301 x4
37	+811	+537 x2	+668 x2	+786 x2	+894 x2	+502 x4	+554 x4	+596 x4	+640 x4	+683 x4	+640 x4	[illegible]
38	+397	+268 x2	+331 x2	+386 x2	+437 x2	+248 x4	+266 x4	+291 x4	+314 x4	+334 x4	+314 x4	+291 x4
39	+313	+218 x2	+272 x2	+321 x2	+370 x2	+215 x4	+226 x4	+258 x4	+279 x4	+296 x4	+278 x4	[illegible]
40	+696	+473 x2	+570 x2	+697 x2	+792 x2	+452 x4	+480 x4	+536 x4	+575 x4	+615 x4	+574 x4	[illegible]
41	+396	+274 x2	+321 x2	+401 x2	+454 x2	+258 x4	+272 x4	+303 x4	+325 x4	+342 x4	+324 x4	[illegible]
42	-057	-028 x2	-028 x2	-024 x2	-024 x2	-004 x4	-004 x4	+001 x4	+001 x4	+001 x4	+002 x4	+001 x4
43	-166	-096 x2	-111 x2	-119 x2	-124 x2	-063 x4	-068 x4	-066 x4	-067 x4	-067 x4	-068 x4	[illegible]
44	-137	+000 x2	-094 x2	-103 x2	-108 x2	-056 x4	-062 x4	-073 x4	-066 x4	-069 x4	-066 x4	-072 x4
45	-066	-025 x2	+000 x2	-030 x2	-026 x2	-008 x4	-012 x4	-003 x4	-004 x4	+000 x4	-004 x4	[illegible]
46	-195	-112 x2	-124 x2	-138 x2	-150 x2	-075 x4	-083 x4	-083 x4	-083 x4	-088 x4	-082 x4	[illegible]
47	-086	-050 x2	-050 x2	-051 x2	-052 x2	-024 x4	-027 x4	-023 x4	-024 x4	-024 x4	-024 x4	[illegible]
48	-092	-058 x2	-073 x2	-083 x2	-107 x2	-057 x4	-071 x4	-072 x4	-081 x4	-093 x4	-083 x4	-072 x4
49	-068	-040 x2	-054 x2	-065 x2	-072 x2	-038 x4	-043 x4	-046 x4	-051 x4	-060 x4	-052 x4	[illegible]
50	+012	+030 x2	+038 x2	+048 x2	+062 x2	+040 x4	+052 x4	+053 x4	+058 x4	+068 x4	+058 x4	[illegible]
51	+391	+277 x2	+329 x2	+390 x2	+452 x2	+262 x4	+285 x4	+312 x4	+337 x4	+364 x4	+337 x4	+312 x4
52	+804	+532 x2	+568 x2	+790 x2	+910 x2	+510 x4	+564 x4	+609 x4	+657 x4	+701 x4	+657 x4	[illegible]
53	+380	+262 x2	+333 x2	+392 x2	+446 x2	+254 x4	+276 x4	+306 x4	+329 x4	+352 x4	+329 x4	[illegible]

Row	Plate IV Test 1 Unloading 4 p.s.i.	Plate IV Test 1 Unloading 3.5 p.s.i.	Plate IV Test 1 Unloading 3 p.s.i.	Plate IV Test 1 Unloading 2.5 p.s.i.	Plate IV Test 1 Unloading 2 p.s.i.	Plate IV Test 1 Unloading 1.5 p.s.i.	Plate IV Test 1 Unloading 1 p.s.i.	Plate IV Test 1 .5 psi	Plate IV Test 1 0 psi Unloading	Plate IV Test 1 0 psi Loading	Plate IV Test 2 0.5 psi Load	Plate IV Test 2 Loading 1 psi	Plate IV Test 2 Loading 1.5 psi
00	+044 x4	+042 x4	+068 x2	+060 x2	+053 x2	+040 x2	+042	+016	-005	-010	+016	+040	+040 x2
01	-106 x4	-098 x4	-294 x2	-182 x2	-177 x2	-148 x2	-238	-155	+007	+006	-152	-238	-148 x2
02	-144 x4	-132 x4	-257 x2	-237 x2	-236 x2	-191 x2	-296	-182	+014	+010	-180	-295	-192 x2
03	-038 x4	-036 x4	-076 x2	-073 x2	-068 x2	-057 x2	-093	-061	+009	+008	-062	-092	-056 x2
04	-174 x4	-155 x4	-296 x2	-271 x2	-250 x2	-208 x2	-312	-188	+007	+006	-187	-313	-203 x2
05	-127 x4	-120 x4	-235 x2	-211 x2	-200 x2	-156 x2	-246	-148	+006	+004	-148	-244	-156 x2
06	-104 x4	-096 x4	-189 x2	-175 x2	-162 x2	-135 x2	-210	-133	+002	-004	-135	-208	-133 x2
07	-237 x4	-216 x4	-420 x2	-386 x2	-366 x2	-297 x2	-467	-290	-001	-004	-291	-468	-298 x2
08	-147 x4	-133 x4	-267 x2	-251 x2	-238 x2	-190 x2	-302	-195	+008	+002	-195	-302	-191 x2
09	-189 x4	-170 x4	-312 x2	-278 x2	-243 x2	-196 x2	-316	-204	+002	-002	-203	-316	-196 x2
10	-378 x4	-346 x4	-639 x2	-560 x2	-485 x2	-404 x2	-639	-417	-001	-002	-418	-638	-406 x2
11	-194 x4	-174 x4	-332 x2	-303 x2	-260 x2	-217 x2	-351	-226	+008	+004	-227	+000	-217 x2
12	-141 x4	-132 x4	-248 x2	-268 x2	-196 x2	-161 x2	-256	-168	+005	+002	-169	-260	-161 x2
13	-329 x4	-300 x4	-550 x2	-480 x2	-415 x2	-342 x2	-528	-340	-002	-008	-340	-528	-343 x2
14	-206 x4	-190 x4	-346 x2	-312 x2	-268 x2	-218 x2	-331	-155	+005	-002	-164	-330	-217 x2
15	+094 x4	+085 x4	+135 x2	+122 x2	+106 x2	+080 x2	+114	+062	+005	-003	+062	+116	+080 x2
16	+132 x4	+130 x4	+218 x2	+198 x2	+168 x2	+139 x2	+204	+118	-002	-006	+118	+203	+140 x2
17	+156 x4	+142 x4	+245 x2	+219 x2	+186 x2	+152 x2	+224	+124	+000	+004	+124	+224	+154 x2
18	+135 x4	+123 x4	+217 x2	+191 x2	+164 x2	+130 x2	+197	+113	-001	+004	+117	+197	+132 x2
19	+188 x4	+174 x4	+317 x2	+280 x2	+244 x2	+184 x2	+309	+191	-010	-004	+188	+308	+205 x2
20	+145 x4	+129 x4	+232 x2	+198 x2	+175 x2	+139 x2	+205	+119	+000	+000	+119	+205	+142 x2
21	-019 x4	-014 x4	-034 x2	-032 x2	-027 x2	-025 x2	-057	-042	+010	+010	-043	-056	-025 x2
22	-033 x4	-031 x4	-055 x2	-050 x2	+000 x2	-037 x2	+000	-045	+005	+000	-045	-060	-036 x2
23	-036 x4	-026 x4	-053 x2	-049 x2	-037 x2	-030 x2	-056	+000	+012	+012	-039	-056	-030 x2
24	-187 x4	+000 x4	-312 x2	-272 x2	-232 x2	-198 x2	-316	-200	+007	+006	-202	-316	-199 x2
25	-394 x4	-352 x4	-646 x2	-562 x2	-481 x2	-394 x2	-626	-382	+006	+004	-384	-626	-394 x2
26	-206 x4	-184 x4	-337 x2	-300 x2	-254 x2	-207 x2	-331	-193	+012	+010	-194	-330	-208 x2
27	+220 x4	+192 x4	+362 x2	+326 x2	+308 x2	+239 x2	+342	+200	+002	+007	+202	+340	+238 x2
28	+131 x4	+123 x4	+220 x2	+194 x2	+194 x2	+157 x2	+223	+121	-001	-002	+122	+230	+158 x2
29	-119 x4	-100 x4	-188 x2	-173 x2	-156 x2	-129 x2	-203	-129	+010	+006	+000	-204	-129 x2
30	+229 x4	+205 x4	+363 x2	+340 x2	+304 x2	+236 x2	+322	+202	+007	+008	+197	+322	+234 x2
31	+197 x4	+198 x4	+365 x2	+332 x2	+304 x2	+236 x2	+329	+180	+009	+009	+183	+332	+233 x2
32	-042 x4	-033 x4	-065 x2	-058 x2	-055 x2	-044 x2	-082	-072	+010	+005	-070	-080	-044 x2
33	+246 x4	+231 x4	+420 x2	+376 x2	+342 x2	+268 x2	+378	+216	+007	+003	+220	+374	+268 x2
34	+305 x4	+284 x4	+524 x2	+483 x2	+456 x2	+371 x2	+520	+272	+006	+002	+278	+522	+354 x2
35	+033 x4	+038 x4	+068 x2	+064 x2	+064 x2	+048 x2	+058	-003	+006	+004	-001	+058	+048 x2
36	+280 x4	+259 x4	+448 x2	+388 x2	+329 x2	+268 x2	+397	+241	+010	+009	+240	+396	+265 x2
37	+550 x4	+503 x4	+894 x2	+786 x2	+668 x2	+536 x2	+810	+479	+000	+004	+479	+809	+538 x2
38	+266 x4	+248 x4	+437 x2	+387 x2	+332 x2	+268 x2	+397	+201	+004	+007	+202	+397	+265 x2
39	+226 x4	+214 x4	+370 x2	+322 x2	+270 x2	+196 x2	+306	+176	+005	+004	+178	+314	+218 x2
40	+480 x4	+454 x4	+792 x2	+697 x2	+570 x2	+472 x2	+697	+404	+007	+004	+404	+696	+474 x2
41	+272 x4	+259 x4	+454 x2	+401 x2	+322 x2	+275 x2	+396	+220	+009	+008	+221	+395	+275 x2
42	-004 x4	-004 x4	-025 x2	-024 x2	-029 x2	+000 x2	-058	-050	+006	+004	-052	-058	-029 x2
43	-068 x4	-063 x4	-124 x2	-118 x2	-111 x2	-095 x2	-166	-106	+010	+007	-106	-166	-096 x2
44	-061 x4	-056 x4	-108 x2	-103 x2	-095 x2	-079 x2	-137	-088	+002	+010	-089	-137	-079 x2
45	-011 x4	-008 x4	-028 x2	-030 x2	-032 x2	-026 x2	-063	-055	+010	+008	-050	-065	-026 x2
46	-083 x4	-075 x4	-150 x2	-139 x2	-124 x2	-112 x2	-195	-126	+010	+009	-128	-195	-112 x2
47	-027 x4	-024 x4	-052 x2	-052 x2	-050 x2	-050 x2	-085	-076	+010	+009	-076	-086	-052 x2
48	-070 x4	-057 x4	-107 x2	-082 x2	-072 x2	-058 x2	-088	-070	+012	+010	-070	-089	-055 x2
49	-044 x4	-037 x4	-072 x2	-063 x2	-054 x2	-041 x2	-073	-058	+010	+009	-058	-073	-042 x2
50	+052 x4	+040 x4	+062 x2	+047 x2	+038 x2	+001 x2	+013	-009	+008	+009	-010	+013	+030 x2
51	+286 x4	+261 x4	+453 x2	+390 x2	+330 x2	+277 x2	+392	+232	+007	+001	+232	+392	+277 x2
52	+559 x4	+510 x4	+907 x2	+790 x2	+568 x2	+532 x2	+804	+469	+009	+010	+468	+304	+533 x2
53	+276 x4	+254 x4	+443 x2	+392 x2	+333 x2	+262 x2	+380	+204	+009	+009	+205	+381	+262 x2
54										-002			

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Row	Plate IV Test 2 Loading 2 psi	Plate IV Test 2 Loading 2.5 psi	Plate IV Test 2 Loading 3 psi	Plate IV Test 2 Loading 3.5 p.s.i.	Plate IV Test 2 Loading 4 p.s.i.	Plate IV Test 2 Loading 4.5 p.s.i.	Plate IV Test 2 Loading 5 p.s.i.	Plate IV Test 2 Loading 5.5 p.s.i.	Plate IV Test 2 Unloading 5 p.s.i.	Plate IV Test 2 Unload 4.5 p.s.i.	Plate IV Test 2 Unloading 4 p.s.i.	Plate IV Test 2 Unloading 3.5 p.s.i.
00	+054 x2	+060 x2	+065 x2	+040 x4	+044 x4	+051 x4	+050 x4	+056 x4	+050 x4	+050 x4	+046 x4	+040 x4
01	-177 x2	-181 x2	-294 x2	-098 x4	-106 x4	-116 x4	-110 x4	-122 x4	-110 x4	-116 x4	-106 x4	-098 x4
02	-236 x2	-238 x2	-256 x2	-130 x4	-144 x4	-151 x4	-154 x4	-164 x4	-154 x4	-151 x4	-144 x4	-132 x4
03	-068 x2	-073 x2	-076 x2	-036 x4	-~~000~~ x4	-045 x4	-044 x4	-048 x4	-044 x4	-044 x4	-038 x4	-036 x4
04	-252 x2	-270 x2	-296 x2	-156 x4	-174 x4	-189 x4	+~~000~~ x4	-206 x4	-190 x4	-189 x4	-174 x4	-155 x4
05	-201 x2	-210 x2	-236 x2	-119 x4	-128 x4	-141 x4	-141 x4	-153 x4	-142 x4	-141 x4	-128 x4	-119 x4
06	-164 x2	-175 x2	+~~000~~ x2	-096 x4	-103 x4	-116 x4	-116 x4	-121 x4	-116 x4	-115 x4	-104 x4	-096 x4
07	-366 x2	-386 x2	+000 x2	-216 x4	-236 x4	-258 x4	-262 x4	-279 x4	-262 x4	-258 x4	-234 x4	-216 x4
08	-238 x2	-252 x2	-268 x2	-134 x4	-147 x4	-159 x4	-161 x4	-170 x4	-161 x4	-160 x4	-147 x4	-134 x4
09	-24[illegible] x2	-280 x2	-313 x2	+000 x4	-191 x4	-200 x4	-215 x4	-226 x4	-214 x4	-199 x4	-190 x4	-170 x4
10	-486 x2	-559 x2	-638 x2	-346 x4	-379 x4	-408 x4	-433 x4	-464 x4	-433 x4	-408 x4	-378 x4	-346 x4
11	-262 x2	-303 x2	-329 x2	-175 x4	-194 x4	-206 x4	-215 x4	-222 x4	-214 x4	-206 x4	-194 x4	-174 x4
12	-197 x2	-269 x2	-249 x2	-133 x4	-142 x4	-157 x4	-166 x4	-128 x4	-167 x4	-157 x4	-142 x4	-134 x4
13	-416 x2	-480 x2	-550 x2	-300 x4	-329 x4	-358 x4	-380 x4	-407 x4	-380 x4	-358 x4	+000 x4	-299 x4
14	-268 x2	-312 x2	-348 x2	-190 x4	-206 x4	-228 x4	-245 x4	-256 x4	-244 x4	-228 x4	-206 x4	-190 x4
15	+105 x2	+123 x2	+135 x2	+085 x4	+094 x4	+104 x4	+109 x4	+115 x4	+109 x4	+104 x4	+095 x4	+085 x4
16	+168 x2	+196 x2	+216 x2	+128 x4	+132 x4	+145 x4	+152 x4	+159 x4	+151 x4	+144 x4	+132 x4	+130 x4
17	+186 x2	+218 x2	+246 x2	+142 x4	+157 x4	+167 x4	+180 x4	+190 x4	+179 x4	+166 x4	+158 x4	+143 x4
18	+164 x2	+189 x2	+218 x2	+124 x4	+136 x4	+142 x4	+153 x4	+164 x4	+153 x4	+142 x4	+136 x4	+124 x4
19	+243 x2	+279 x2	+314 x2	+173 x4	+188 x4	+200 x4	+214 x4	+222 x4	+214 x4	+200 x4	+189 x4	+174 x4
20	+175 x2	+198 x2	+232 x2	+129 x4	+145 x4	+154 x4	+163 x4	+175 x4	+164 x4	+152 x4	+144 x4	+129 x4
21	-027 x2	-032 x2	-035 x2	-014 x4	-017 x4	-018 x4	-022 x4	-024 x4	-021 x4	-018 x4	-018 x4	-014 x4
22	+000 x2	-050 x2	-055 x2	-029 x4	-032 x4	-038 x4	-043 x4	+~~000~~ x4	-042 x4	-038 x4	-032 x4	-030 x4
23	-037 x2	-047 x2	-054 x2	-027 x4	-035 x4	-038 x4	-042 x4	-045 x4	-043 x4	-038 x4	-036 x4	-027 x4
24	-232 x2	-270 x2	-311 x2	-169 x4	-188 x4	-201 x4	-217 x4	-234 x4	-217 x4	-201 x4	-187 x4	-170 x4
25	-481 x2	-563 x2	-646 x2	-352 x4	-394 x4	-424 x4	-454 x4	-486 x4	-454 x4	-424 x4	-394 x4	-356 x4
26	-253 x2	-302 x2	-338 x2	-184 x4	-207 x4	-215 x4	-226 x4	-242 x4	-222 x4	-215 x4	-206 x4	-185 x4
27	+308 x2	+326 x2	+362 x2	+192 x4	+219 x4	+235 x4	+236 x4	+250 x4	+235 x4	+235 x4	+219 x4	+191 x4
28	+192 x2	+198 x2	+220 x2	+123 x4	+131 x4	+146 x4	+141 x4	+149 x4	+141 x4	+148 x4	+130 x4	+122 x4
29	-157 x2	-173 x2	-189 x2	-100 x4	-118 x4	-124 x4	-128 x4	-138 x4	-127 x4	-124 x4	-119 x4	-100 x4
30	+305 x2	+340 x2	+364 x2	+206 x4	+230 x4	+247 x4	+254 x4	+277 x4	+254 x4	+247 x4	+228 x4	+205 x4
31	+305 x2	+331 x2	+364 x2	+196 x4	+196 x4	+240 x4	+240 x4	+260 x4	+241 x4	+241 x4	+197 x4	+197 x4
32	-057 x2	-059 x2	-065 x2	-033 x4	-043 x4	-042 x4	-042 x4	-050 x4	-042 x4	-042 x4	-043 x4	-033 x4
33	+342 x2	+376 x2	+419 x2	+228 x4	+248 x4	+274 x4	+280 x4	+296 x4	+280 x4	+272 x4	+247 x4	+230 x4
34	+454 x2	+482 x2	+524 x2	+285 x4	+304 x4	+338 x4	+344 x4	+359 x4	+344 x4	+334 x4	+304 x4	+283 x4
35	+062 x2	+063 x2	+068 x2	+038 x4	+033 x4	+046 x4	+047 x4	+048 x4	+046 x4	+046 x4	+034 x4	+038 x4
36	+328 x2	+388 x2	+450 x2	+259 x4	+279 x4	+302 x4	+327 x4	+349 x4	+327 x4	+301 x4	+280 x4	+259 x4
37	+666 x2	+786 x2	+894 x2	+502 x4	+553 x4	+596 x4	+640 x4	+684 x4	+640 x4	+596 x4	+553 x4	+502 x4
38	+331 x2	+386 x2	+437 x2	+247 x4	+266 x4	+292 x4	+314 x4	+334 x4	+314 x4	+292 x4	+266 x4	+248 x4
39	+271 x2	+322 x2	+370 x2	+214 x4	+226 x4	+256 x4	+278 x4	+297 x4	+279 x4	+256 x4	+226 x4	+216 x4
40	+569 x2	+697 x2	+792 x2	+454 x4	+480 x4	+537 x4	+570 x4	+614 x4	+570 x4	+537 x4	+480 x4	+452 x4
41	+321 x2	+400 x2	+454 x2	+259 x4	+271 x4	+302 x4	+325 x4	+342 x4	+325 x4	+303 x4	+272 x4	+259 x4
42	-028 x2	-024 x2	-025 x2	-004 x4	-003 x4	+001 x4	+001 x4	+001 x4	+001 x4	+002 x4	-004 x4	-004 x4
43	-112 x2	-119 x2	-124 x2	-064 x4	-067 x4	-066 x4	-069 x4	-067 x4	-067 x4	-065 x4	-067 x4	-063 x4
44	-095 x2	-103 x2	+000 x2	-057 x4	-062 x4	-072 x4	-064 x4	-069 x4	-065 x4	-072 x4	-061 x4	-057 x4
45	-032 x2	-031 x2	-028 x2	-008 x4	-011 x4	-004 x4	-005 x4	+001 x4	-004 x4	-004 x4	-012 x4	-008 x4
46	-125 x2	-138 x2	-151 x2	-075 x4	-083 x4	-082 x4	-083 x4	-088 x4	-083 x4	-082 x4	-083 x4	-075 x4
47	-050 x2	-052 x2	-052 x2	-024 x4	-029 x4	-024 x4	-024 x4	-023 x4	-024 x4	-023 x4	-027 x4	-024 x4
48	-074 x2	-082 x2	-108 x2	-057 x4	-070 x4	-073 x4	-081 x4	-093 x4	-082 x4	-072 x4	-071 x4	-058 x4
49	-054 x2	-064 x2	-071 x2	-036 x4	-043 x4	-046 x4	-051 x4	-060 x4	-052 x4	-047 x4	-044 x4	-036 x4
50	+037 x2	+047 x2	+063 x2	+040 x4	+052 x4	+052 x4	+058 x4	+067 x4	+058 x4	+052 x4	+052 x4	+039 x4
51	+330 x2	+390 x2	+452 x2	+262 x4	+285 x4	+312 x4	+337 x4	+364 x4	+337 x4	+312 x4	+285 x4	+262 x4
52	+668 x2	+790 x2	+907 x2	+511 x4	+558 x4	+610 x4	+657 x4	+702 x4	+657 x4	+610 x4	+562 x4	+510 x4
53	+333 x2	+392 x2	+446 x2	+254 x4	+276 x4	+305 x4	+329 x4	+351 x4	+329 x4	+303 x4	+276 x4	+254 x4

	Plate IV Test 3 Loading	Plate IV Test 3 0.5 psi	Plate IV Test 3 Loading 1 p.s.i.	Plate IV Test 3 Loading 1.5 psi	Plate IV Test 3 Loading 2 psi.	Plate IV Test 3 Loading 2.5 psi.	Plate IV Test 3 Loading 3 psi.	Plate IV Test 2 Unloading 3 p.s.i.	Plate IV Test 2 Unloading 2.5 p.s.i.	Plate IV Test 2 Unloading 2 psi	Plate IV Test 2 Unloading 1.5 psi	Plate IV Test 2 Unloading 1 psi	Plate 1.0 Test 2 0.5 psi Unloading	Plate IV psi Test 2 Unloading
00	-009	+020	+043	+039 x2	+054 x2	+058 x2	+065 x2	+065 x2	+059 x2	+053 x2	+039 x2	+042	+015	-014
01	+004	-152	-237	-148 x2	-178 x2	-181 x2	-294 x2	-294 x2	-181 x2	-177 x2	-147 x2	-238	-153	-007
02	+010	-178	-296	-191 x2	-235 x2	-237 x2	-256 x2	-257 x2	-237 x2	-236 x2	-192 x2	-298	-182	-003
03	+008	-061	-092	-057 x2	-068 x2	-074 x2	-077 x2	-076 x2	-073 x2	-067 x2	-057 x2	-092	-062	-010
04	+006	-188	-312	-208 x2	-252 x2	-270 x2	-296 x2	-296 x2	-270 x2	-252 x2	-207 x2	-314	-186	+002
05	+006	-147	-248	-156 x2	-201 x2	-210 x2	-235 x2	-234 x2	-210 x2	-202 x2	-156 x2	-246	-146	-003
06	-001	-134	-212	-135 x2	-162 x2	-174 x2	-188 x2	-189 x2	-174 x2	-165 x2	-132 x2	-210	-136	-015
07	-004	-290	-467	-298 x2	-366 x2	-384 x2	-419 x2	-418 x2	-384 x2	-366 x2	-298 x2	-467	-289	-019
08	+004	-194	-302	-190 x2	-238 x2	-252 x2	-266 x2	-266 x2	-252 x2	-238 x2	-190 x2	-304	-195	-019
09	+000	-206	-316	-197 x2	-242 x2	-279 x2	-313 x2	-313 x2	-278 x2	-242 x2	-198 x2	-317	-204	-014
10	-002	-416	-638	-405 x2	-486 x2	-559 x2	+000 x2	-638 x2	-559 x2	-486 x2	-404 x2	-639	-416	-023
11	+004	-225	-351	-217 x2	-265 x2	-302 x2	-332 x2	-330 x2	-304 x2	-263 x2	-217 x2	-351	-226	-011
12	+002	-170	-256	-160 x2	-197 x2	-269 x2	-249 x2	-250 x2	-270 x2	-197 x2	-161 x2	-256	-169	-014
13	-004	-340	-529	-342 x2	-416 x2	-480 x2	+000 x2	+000 x2	-480 x2	-416 x2	-342 x2	-529	-340	-016
14	+015	-166	-328	-218 x2	-268 x2	-312 x2	-346 x2	-347 x2	-312 x2	-269 x2	-217 x2	-332	-166	-014
15	+004	+060	+114	+079 x2	+105 x2	+123 x2	+135 x2	+138 x2	+122 x2	+105 x2	+080 x2	+115	+061	-015
16	-003	+119	+204	+140 x2	+168 x2	+196 x2	+218 x2	+217 x2	+198 x2	+168 x2	+141 x2	+203	+119	-008
17	+004	+124	+225	+154 x2	+190 x2	+217 x2	+246 x2	+245 x2	+218 x2	+190 x2	+156 x2	+223	+124	-011
18	+004	+116	+192	+129 x2	+166 x2	+190 x2	+217 x2	+218 x2	+188 x2	+166 x2	+129 x2	+192	+117	-012
19	-004	+189	+309	+206 x2	+244 x2	+280 x2	+315 x2	+316 x2	+280 x2	+244 x2	+183 x2	+309	+189	-014
20	+003	+119	+205	+142 x2	+174 x2	+198 x2	+232 x2	+232 x2	+198 x2	+175 x2	+140 x2	+205	+118	-014
21	+008	-045	-058	-025 x2	-027 x2	-034 x2	-035 x2	-034 x2	-032 x2	-027 x2	-026 x2	-058	-042	-013
22	+005	-048	-059	-036 x2	-040 x2	-050 x2	-056 x2	-056 x2	-053 x2	-040 x2	-036 x2	-059	-047	-012
23	+012	-039	-056	-030 x2	-036 x2	+000 x2	-055 x2	-054 x2	-050 x2	-037 x2	-030 x2	-056	-040	-014
24	+006	-203	-317	-198 x2	-233 x2	-271 x2	-312 x2	-312 x2	-270 x2	-232 x2	-200 x2	-316	-202	-016
25	+004	-384	-626	-394 x2	-481 x2	-563 x2	-647 x2	-646 x2	-562 x2	-482 x2	-394 x2	-626	-382	-018
26	+008	-192	-328	-207 x2	-254 x2	-300 x2	-336 x2	-336 x2	-302 x2	-254 x2	-208 x2	-329	-192	-014
27	+006	+200	+343	+239 x2	+308 x2	+326 x2	+362 x2	+362 x2	+326 x2	+308 x2	+238 x2	+342	+198	-016
28	+000	+120	+224	+158 x2	+189 x2	+198 x2	+220 x2	+217 x2	+196 x2	+194 x2	+152 x2	+224	+117	-004
29	+009	+000	-204	-129 x2	-157 x2	-173 x2	-188 x2	-188 x2	-172 x2	-157 x2	-128 x2	-204	-130	-017
30	+008	+200	+325	+234 x2	+304 x2	+340 x2	+364 x2	+364 x2	+338 x2	+304 x2	+235 x2	+324	+194	-008
31	+009	+183	+330	+234 x2	+306 x2	+330 x2	+364 x2	+366 x2	+332 x2	+305 x2	+235 x2	+328	+181	-013
32	+010	-071	-082	-044 x2	-057 x2	-058 x2	-066 x2	-065 x2	-059 x2	-057 x2	-044 x2	-080	-070	-014
33	+002	+218	+380	+269 x2	+341 x2	+377 x2	+422 x2	+421 x2	+377 x2	+342 x2	+269 x2	+368	+218	-012
34	+006	+274	+520	+356 x2	+457 x2	+482 x2	+535 x2	+524 x2	+483 x2	+456 x2	+356 x2	+517	+273	-016
35	+008	-004	+056	+048 x2	+063 x2	+065 x2	+070 x2	+068 x2	+063 x2	+064 x2	+048 x2	+056	-003	-016
36	+014	+241	+396	+268 x2	+327 x2	+387 x2	+449 x2	+449 x2	+388 x2	+328 x2	+267 x2	+394	+240	-011
37	+008	+480	+811	+536 x2	+668 x2	+786 x2	+895 x2	+894 x2	+786 x2	+668 x2	+536 x2	+810	+478	-013
38	+008	+201	+397	+268 x2	+332 x2	+386 x2	+436 x2	+437 x2	+386 x2	+332 x2	+267 x2	+396	+201	-006
39	+006	+171	+314	+196 x2	+272 x2	+322 x2	+370 x2	+370 x2	+322 x2	+272 x2	+196 x2	+310	+174	-011
40	+008	+403	+696	+475 x2	+569 x2	+697 x2	+792 x2	+792 x2	+696 x2	+569 x2	+473 x2	+694	+403	-008
41	+009	+220	+395	+275 x2	+322 x2	+401 x2	+454 x2	+454 x2	+400 x2	+321 x2	+275 x2	+396	+218	-014
42	+003	-052	-058	-028 x2	-028 x2	-024 x2	-025 x2	-024 x2	-024 x2	-028 x2	-028 x2	-058	-051	-017
43	+008	-106	-166	-095 x2	-111 x2	-118 x2	-124 x2	-124 x2	-118 x2	-111 x2	096 x2	-166	-106	-014
44	+008	-089	-137	+000 x2	-093 x2	-103 x2	-108 x2	-108 x2	-103 x2	-094 x2	-079 x2	-136	-092	-012
45	+008	-054	-067	-023 x2	-031 x2	-032 x2	-028 x2	-027 x2	-031 x2	-030 x2	-026 x2	-064	-054	-012
46	+008	-126	-195	-112 x2	-125 x2	-138 x2	-152 x2	-151 x2	-139 x2	-125 x2	-112 x2	-196	-126	-016
47	+008	-076	-084	-051 x2	-050 x2	-052 x2	-053 x2	-053 x2	-052 x2	050 x2	-050 x2	-085	-075	-014
48	+003	-069	-090	-058 x2	-073 x2	-082 x2	-105 x2	-106 x2	-083 x2	-072 x2	-057 x2	-093	-070	-014
49	+006	-056	-071	+000 x2	-054 x2	-064 x2	-070 x2	-072 x2	-065 x2	-054 x2	-042 x2	-073	-057	-015
50	+005	-009	+012	+001 x2	+038 x2	+047 x2	+063 x2	+063 x2	+047 x2	+037 x2	+002 x2	+013	-009	-020
51	+006	+232	+391	+277 x2	+329 x2	+390 x2	+453 x2	+453 x2	+390 x2	+329 x2	+278 x2	+392	+233	-007
52	+008	+468	+805	+333 x2	+368 x2	+790 x2	+908 x2	+507 x2	+790 x2	+369 x2	+534 x2	+804	+469	-011
53	+009	+204	+381	+262 x2	+333 x2	+392 x2	+446 x2	+446 x2	+392 x2	+332 x2	+262 x2	+380	+204	-012

Row	Plate IV Test 3 Unloading 4.5 psi	Plate IV Test 3 Unloading 4 p.s.i	Plate IV Test 3 Unloading 3.5 psi	Plate IV Test 3 Unloading 3 psi	Plate IV Test 3 Unloading 2.5 psi	Plate IV Test 3 Unloading 2 p.s.i	Plate IV Test 3 Loading 3.5 psi	Plate IV Test 3 Loading 4 p.s.i	Plate IV Test 3 4.5 psi Loading	Plate IV Test 3 Loading 5 p.s.i	Plate IV Test 3 Loading 5.5 psi	Plate IV Test 3 Unloading 5 psi
00	+050 x4	+044 x4	+041 x4	+067 x2	+058 x2	+054 x2	+041 x4	+044 x4	+050 x4	+051 x4	+056 x4	+050 x4
01	-116 x4	-106 x4	-098 x4	-293 x2	-182 x2	-177 x2	-098 x4	-106 x4	-116 x4	-110 x4	-122 x4	-111 x4
02	-152 x4	-144 x4	-132 x4	-256 x2	-237 x2	-236 x2	-132 x4	-144 x4	-152 x4	-154 x4	-164 x4	-154 x4
03	-045 x4	-038 x4	-036 x4	-078 x2	-074 x2	-067 x2	-036 x4	+000 x4	-045 x4	-044 x4	-048 x4	-045 x4
04	-189 x4	-174 x4	-155 x4	-296 x2	-270 x2	-252 x2	-156 x4	-174 x4	-189 x4	-189 x4	-206 x4	-190 x4
05	-142 x4	-127 x4	-121 x4	-235 x2	-210 x2	-202 x2	-120 x4	-128 x4	-141 x4	-143 x4	-153 x4	-143 x4
06	-115 x4	-104 x4	-096 x4	-189 x2	-174 x2	-164 x2	-096 x4	-104 x4	-116 x4	-116 x4	-121 x4	-116 x4
07	-260 x4	-236 x4	-216 x4	-419 x2	-386 x2	-366 x2	-217 x4	-236 x4	-260 x4	-262 x4	-278 x4	-262 x4
08	-160 x4	-148 x4	-134 x4	-267 x2	-252 x2	-238 x2	-134 x4	-148 x4	-160 x4	-162 x4	-170 x4	-162 x4
09	-199 x4	-189 x4	-170 x4	-313 x2	-280 x2	-242 x2	-170 x4	-190 x4	-199 x4	-214 x4	-225 x4	-214 x4
10	-408 x4	-378 x4	-346 x4	-639 x2	-560 x2	-486 x2	-346 x4	-378 x4	-408 x4	-432 x4	-464 x4	-432 x4
11	-206 x4	-194 x4	-174 x4	-331 x2	-302 x2	-263 x2	-175 x4	-194 x4	-205 x4	-215 x4	-221 x4	-216 x4
12	-158 x4	-141 x4	-133 x4	-248 x2	-269 x2	-196 x2	-134 x4	-143 x4	-157 x4	-168 x4	-128 x4	-166 x4
13	-359 x4	-329 x4	-300 x4	-549 x2	-480 x2	-416 x2	-300 x4	+000 x4	-358 x4	-380 x4	-408 x4	+000 x4
14	-228 x4	-205 x4	-190 x4	-347 x2	-312 x2	-267 x2	-190 x4	-206 x4	-228 x4	-244 x4	-256 x4	-245 x4
15	+104 x4	+096 x4	+085 x4	+136 x2	+123 x2	+105 x2	+085 x4	+094 x4	+103 x4	+110 x4	+114 x4	+109 x4
16	+143 x4	+132 x4	+129 x4	+217 x2	+197 x2	+168 x2	+127 x4	+131 x4	+144 x4	+152 x4	+158 x4	+152 x4
17	+166 x4	+158 x4	+142 x4	+246 x2	+218 x2	+186 x2	+142 x4	+159 x4	+166 x4	+181 x4	+190 x4	+179 x4
18	+141 x4	+136 x4	+124 x4	+217 x2	+190 x2	+164 x2	+123 x4	+138 x4	+142 x4	+150 x4	+164 x4	+151 x4
19	+200 x4	+188 x4	+174 x4	+318 x2	+280 x2	+242 x2	+175 x4	+189 x4	+199 x4	+214 x4	+222 x4	+214 x4
20	+153 x4	+144 x4	+129 x4	+233 x2	+198 x2	+175 x2	+130 x4	+144 x4	+153 x4	+164 x4	+175 x4	+164 x4
21	-018 x4	-018 x4	-014 x4	-034 x2	-034 x2	-028 x2	-015 x4	-018 x4	-019 x4	-020 x4	-022 x4	-021 x4
22	-039 x4	-034 x4	-030 x4	-056 x2	-052 x2	-038 x2	-030 x4	-032 x4	-039 x4	-042 x4	-048 x4	-042 x4
23	-038 x4	-036 x4	-029 x4	-055 x2	-047 x2	-037 x2	-028 x4	-036 x4	-038 x4	-043 x4	-046 x4	-044 x4
24	-202 x4	-188 x4	-168 x4	-310 x2	-272 x2	-231 x2	-170 x4	-188 x4	-200 x4	-217 x4	-234 x4	-217 x4
25	-424 x4	-394 x4	-353 x4	-646 x2	-564 x2	-482 x2	-352 x4	-394 x4	-424 x4	-454 x4	-486 x4	-454 x4
26	-214 x4	-206 x4	-184 x4	-336 x2	-302 x2	-253 x2	-184 x4	-206 x4	-214 x4	-224 x4	-242 x4	-226 x4
27	+234 x4	+219 x4	+192 x4	+363 x2	+326 x2	+308 x2	+192 x4	+220 x4	+235 x4	+236 x4	+252 x4	+235 x4
28	+150 x4	+131 x4	+123 x4	+219 x2	+196 x2	+194 x2	+123 x4	+129 x4	+146 x4	+140 x4	+150 x4	+143 x4
29	-124 x4	-119 x4	-100 x4	-188 x2	-173 x2	-157 x2	-100 x4	-118 x4	-125 x4	-128 x4	-138 x4	-128 x4
30	+248 x4	+229 x4	+205 x4	+364 x2	+340 x2	+305 x2	+205 x4	+228 x4	+247 x4	+254 x4	+277 x4	+254 x4
31	+241 x4	+198 x4	+195 x4	+364 x2	+330 x2	+305 x2	+197 x4	+198 x4	+241 x4	+241 x4	+260 x4	+242 x4
32	-042 x4	-042 x4	-033 x4	-066 x2	-058 x2	-056 x2	-033 x4	-042 x4	-042 x4	-042 x4	-051 x4	-042 x4
33	+273 x4	+252 x4	+229 x4	+418 x2	+376 x2	+342 x2	+230 x4	+252 x4	+273 x4	+278 x4	+298 x4	+280 x4
34	+338 x4	+306 x4	+282 x4	+522 x2	+484 x2	+456 x2	+283 x4	+305 x4	+338 x4	+352 x4	+361 x4	+352 x4
35	+046 x4	+032 x4	+040 x4	+068 x2	+064 x2	+062 x2	+040 x4	+032 x4	+046 x4	+045 x4	+048 x4	+046 x4
36	+301 x4	+280 x4	+258 x4	+449 x2	+388 x2	+327 x2	+258 x4	+279 x4	+300 x4	+326 x4	+348 x4	+327 x4
37	+596 x4	+553 x4	+502 x4	+896 x2	+786 x2	+668 x2	+502 x4	+552 x4	+596 x4	+640 x4	+684 x4	+640 x4
38	+291 x4	+266 x4	+248 x4	+436 x2	+386 x2	+331 x2	+248 x4	+266 x4	+291 x4	+314 x4	+334 x4	+314 x4
39	+259 x4	+226 x4	+214 x4	+371 x2	+322 x2	+272 x2	+214 x4	+225 x4	+257 x4	+279 x4	+296 x4	+280 x4
40	+537 x4	+479 x4	+453 x4	+792 x2	+697 x2	+567 x2	+452 x4	+480 x4	+537 x4	+574 x4	+614 x4	+570 x4
41	+302 x4	+272 x4	+259 x4	+454 x2	+400 x2	+322 x2	+258 x4	+272 x4	+303 x4	+325 x4	+342 x4	+325 x4
42	+002 x4	-004 x4	-003 x4	-024 x2	-024 x2	-028 x2	-004 x4	-004 x4	+002 x4	+001 x4	+001 x4	+001 x4
43	-065 x4	-067 x4	-062 x4	-124 x2	-118 x2	-112 x2	-063 x4	-068 x4	-065 x4	-067 x4	-067 x4	-067 x4
44	-072 x4	-061 x4	-056 x4	-109 x2	-102 x2	-094 x2	-056 x4	-062 x4	-072 x4	-065 x4	[illegible] x4	-065 x4
45	-004 x4	-012 x4	-008 x4	-028 x2	-030 x2	-031 x2	-008 x4	-011 x4	-004 x4	-004 x4	[illegible] x4	-004 x4
46	-084 x4	-083 x4	-075 x4	-152 x2	-138 x2	-125 x2	-075 x4	-082 x4	-082 x4	-083 x4	[illegible] x4	-083 x4
47	-024 x4	-029 x4	-024 x4	-053 x2	-052 x2	-051 x2	-024 x4	-027 x4	-024 x4	-023 x4	[illegible] x4	-024 x4
48	-072 x4	-070 x4	-056 x4	-108 x2	-083 x2	-072 x2	-056 x4	-071 x4	-073 x4	-083 x4	[illegible] x4	-082 x4
49	-046 x4	-044 x4	-037 x4	-072 x2	-064 x2	-054 x2	-037 x4	-044 x4	-046 x4	-053 x4	[illegible] x4	-051 x4
50	+053 x4	+052 x4	+040 x4	+063 x2	+047 x2	+037 x2	+040 x4	+052 x4	+052 x4	+058 x4	[illegible] x4	+058 x4
51	+312 x4	+286 x4	+262 x4	+453 x2	+389 x2	+328 x2	+261 x4	+285 x4	+312 x4	+338 x4	[illegible] x4	+337 x4
52	+610 x4	+558 x4	+510 x4	+908 x2	+789 x2	+669 x2	+510 x4	+562 x4	+610 x4	+657 x4	[illegible] x4	+657 x4
53	+306 x4	+276 x4	+254 x4	+446 x2	+392 x2	+332 x2	+254 x4	+276 x4	+306 x4	+329 x4	[illegible] x4	+329 x4

Row	Plate IV Test 3 Unloading 1.5 psi	Plate IV Test 3 Unloading 1 psi	Plate IV Test 3 Unloading 0.5 psi	Plate IV Test 3 Unloading 0 psi	Plate III Yield 0 psi Loading	Plate III Yield 0.25 psi Loading	Plate III Yield Loading 0.375 psi
00	+040 x 2	+042	+015	-017	-010	+020	+030
01	-147 x 2	-238	[illegible]	-007	-005	-052	-060
02	-191 x 2	-296	[illegible]	-003	-004	-074	-090
03	-058 x 2	-092	[illegible]	-010	-005	-015	-019
04	-207 x 2	-312	-186	+002	-009	-080	-100
05	-156 x 2	-247	-145	-005	-006	-066	-084
06	-135 x 2	-209	-132	-014	-008	-051	-062
07	293 x 2	-467	+000	-019	-007	-106	-138
08	-190 x 2	-302	-194	-019	-008	-071	-088
09	-199 x 2	-318	-206	-014	-009	-065	-079
10	-406 x 2	+000	-416	-022	-012	-126	-154
11	-216 x 2	-351	-224	-012	-004	-063	-080
12	-162 x 2	-257	-167	-014	-009	-059	-075
13	-343 x 2	-528	-340	-022	-009	+000	-166
14	-217 x 2	-330	-162	-015	-011	-086	-107
15	+079 x 2	+115	+062	-014	-014	+055	+073
16	+139 x 2	+204	+118	-008	-016	+099	+128
17	+153 x 2	+224	+124	-009	-004	+100	+139
18	+133 x 2	+198	+118	-014	-008	+058	+071
19	+206 x 2	+310	+189	-016	-010	+108	+136
20	+142 x 2	+204	+119	-013	-003	+073	+088
21	-025 x 2	-058	-042	-016	-001	-008	-007
22	-036 x 2	+000	-045	-014	-004	-017	-019
23	-030 x 2	-057	-040	-014	-006	-024	-031
24	-198 x 2	-316	-202	-016	-008	-039	-048
25	-394 x 2	-626	-382	-018	-004	-071	-089
26	-208 x 2	-332	-192	-014	-008	-042	-053
27	+239 x 2	+341	+202	-016	+008	+097	+124
28	+157 x 2	+230	+117	-005	-006	+070	+092
29	-129 x 2	-205	+000	-015	-003	-044	-056
30	+234 x 2	+323	+198	-008	-001	+111	+147
31	+236 x 2	+329	[illegible]	-012	-002	+124	+165
32	-044 x 2	-078	-072	-013	-005	-006	-006
33	+264 x 2	+367	+218	-016	+002	+128	+168
34	+370 x 2	+520	+274	-016	+002	+185	+242
35	+051 x 2	+057	-003	-013	-004	+045	+061
36	+268 x 2	+395	+242	-011	-003	+142	+183
37	+537 x 2	+810	+480	-014	+001	+277	+361
38	+263 x 2	+396	+200	-014	-002	+142	+182
39	+218 x 2	+313	+170	-016	-003	+134	+171
40	+472 x 2	+696	+405	-006	+002	+276	+361
41	+275 x 2	+396	+222	-014	-005	+150	+193
42	-029 x 2	-058	-050	-020	-008	+010	+019
43	-095 x 2	-165	-104	-017	-007	+000	+010
44	080 x 2	-132	-090	-014	+000	-002	+004
45	-025 x 2	-069	-052	-011	+000	+036	+056
46	-112 x 2	-194	-126	-017	-003	+018	+038
47	048 x 2	-085	-075	-017	+002	+019	+036
48	-057 x 2	-091	-069	-015	-001	-042	-054
49	042 x 2	-069	-055	+000	+000	-030	-037
50	+001 x 2	+013	-008	-018	-005	+014	+022
51	+277 x 2	+391	+232	-010	+002	+116	+152
52	+533 x 2	+804	+470	-012	-003	+223	+296
53	+262 x 2	+380	+204	-011	-003	+114	+155

Row	Plate 3 Yield 2.5 psi	Plate 3 Yield 2.5 psi	Plate 3 Yield 2.75 psi	Plate 3 Yield 3 psi	Plate 3 Yield 3.25 psi	Plate 3 Yield 3.5 psi
00	+062 x 2	+068 x 2	+072 x 2	+080 x 2	+085 x 2	+091 x 2
01	-060 x 2	-060 x 2	-061 x 2	-061 x 2	-062 x 2	-061 x 2
02	-094 x 2	-096 x 2	-099 x 2	-100 x 2	-101 x 2	-102 x 2
03	-026 x 2	-028 x 2	-030 x 2	-030 x 2	-033 x 2	-035 x 2
04	-139 x 2	-149 x 2	-159 x 2	-167 x 2	-177 x 2	-184 x 2
05	-122 x 2	-130 x 2	-137 x 2	-142 x 2	+000 x 2	-156 x 2
06	-086 x 2	-092 x 2	-098 x 2	-102 x 2	-110 x 2	-114 x 2
07	-174 x 2	-184 x 2	-194 x 2	-202 x 2	-212 x 2	-221 x 2
08	-111 x 2	-119 x 2	-124 x 2	-128 x 2	-131 x 2	-135 x 2
09	-086 x 2	-088 x 2	-092 x 2	-094 x 2	-098 x 2	-100 x 2
10	-172 x 2	-178 x 2	-183 x 2	-188 x 2	-194 x 2	-200 x 2
11	-095 x 2	-098 x 2	-103 x 2	-105 x 2	-110 x 2	-111 x 2
12	-080 x 2	-082 x 2	-082 x 2	-083 x 2	-086 x 2	-088 x 2
13	-174 x 2	-130 x 2	-184 x 2	-190 x 2	-196 x 2	-201 x 2
14	-118 x 2	-120 x 2	-124 x 2	-128 x 2	-134 x 2	-137 x 2
15	+113 x 2	+121 x 2	+131 x 2	+140 x 2	+147 x 2	+155 x 2
16	+176 x 2	+189 x 2	+201 x 2	+213 x 2	+224 x 2	+234 x 2
17	+186 x 2	+200 x 2	+211 x 2	+223 x 2	+238 x 2	+249 x 2
18	+128 x 2	+138 x 2	+151 x 2	+160 x 2	+168 x 2	+177 x 2
19	+201 x 2	+214 x 2	+229 x 2	+243 x 2	+258 x 2	+268 x 2
20	+140 x 2	+150 x 2	+161 x 2	+109 x 2	+181 x 2	+191 x 2
21	+005 x 2	+007 x 2	+008 x 2	+011 x 2	+011 x 2	+014 x 2
22	-024 x 2	-025 x 2	-027 x 2	-026 x 2	-027 x 2	-027 x 2
23	-054 x 2	-060 x 2	-064 x 2	-070 x 2	-075 x 2	-080 x 2
24	-058 x 2	-060 x 2	-064 x 2	-065 x 2	-070 x 2	-071 x 2
25	-112 x 2	-119 x 2	-123 x 2	-129 x 2	-134 x 2	-138 x 2
26	-065 x 2	-068 x 2	-071 x 2	-074 x 2	-077 x 2	-080 x 2
27	+169 x 2	+179 x 2	+188 x 2	+200 x 2	+210 x 2	+219 x 2
28	+118 x 2	+124 x 2	+131 x 2	+138 x 2	+143 x 2	+147 x 2
29	-100 x 2	-109 x 2	-119 x 2	-128 x 2	-137 x 2	-145 x 2
30	+241 x 2	+258 x 2	+277 x 2	+296 x 2	+315 x 2	+332 x 2
31	+261 x 2	+280 x 2	+302 x 2	+321 x 2	+342 x 2	+358 x 2
32	-010 x 2	-010 x 2	-012 x 2	-014 x 2	-017 x 2	-019 x 2
33	+258 x 2	+276 x 2	+296 x 2	+315 x 2	+336 x 2	+352 x 2
34	+366 x 2	+390 x 2	+419 x 2	+445 x 2	+470 x 2	+490 x 2
35	+090 x 2	+096 x 2	+103 x 2	+108 x 2	+114 x 2	+118 x 2
36	+265 x 2	+281 x 2	+299 x 2	+317 x 2	+333 x 2	+349 x 2
37	+508 x 2	+534 x 2	+566 x 2	+596 x 2	+627 x 2	+652 x 2
38	+256 x 2	+270 x 2	+286 x 2	+303 x 2	+317 x 2	+330 x 2
39	+238 x 2	+252 x 2	+267 x 2	+281 x 2	+294 x 2	+307 x 2
40	+486 x 2	+519 x 2	+550 x 2	+578 x 2	+606 x 2	+631 x 2
41	+269 x 2	+288 x 2	+306 x 2	+324 x 2	+342 x 2	+356 x 2
42	+052 x 2	+058 x 2	+063 x 2	+068 x 2	+073 x 2	+078 x 2
43	+053 x 2	+059 x 2	+066 x 2	+071 x 2	+077 x 2	+081 x 2
44	+047 x 2	+055 x 2	+062 x 2	+067 x 2	+073 x 2	+078 x 2
45	+081 x 2	+088 x 2	+096 x 2	+102 x 2	+108 x 2	+113 x 2
46	+079 x 2	+088 x 2	+096 x 2	+103 x 2	+109 x 2	+115 x 2
47	+072 x 2	+079 x 2	+086 x 2	+093 x 2	+100 x 2	+106 x 2
48	-096 x 2	-106 x 2	-114 x 2	-125 x 2	-134 x 2	-141 x 2
49	-064 x 2	-070 x 2	-076 x 2	-082 x 2	-088 x 2	-094 x 2
50	+046 x 2	+052 x 2	+058 x 2	+062 x 2	+067 x 2	+072 x 2
51	+221 x 2	+237 x 2	+252 x 2	+266 x 2	+280 x 2	+293 x 2
52	+436 x 2	+465 x 2	+495 x 2	+525 x 2	+555 x 2	+579 x 2
53	+233 x 2	+250 x 2	+267 x 2	+283 x 2	+300 x 2	+314 x 2
54			+286 x 2			

	Plate 3 Yield 0.5 psi.	Plate 3 Yield 0.625 psi.	Plate 3 Yield .75 psi.	Plate 3 Yield 0.875 psi.	Plate 3 Yield 1 psi.	Plate 3 Yield 1.25 psi.	Plate 3 Yield 2.125 psi.	Plate 3 Yield 4 psi	Plate 3 Yield 4.5 psi	Plate 3 Yield 5 psi.	Plate 3 Yield 5.5 psi	Plate 3 Yield 6 psi	Plate 3 Yield 7 psi
00	+039	+046	+052	+059	+064	+078	+125	+104 x2	+112 x2	+123 x2	+132 x2	+141 x2	+160 x2
01	-068	-075	-079	-085	-089	-097	-113	-060 x2	-058 x2	-057 x2	-054 x2	-053 x2	-045 x2
02	-101	-109	-117	-126	-137	-148	-182	-103 x2	-102 x2	-101 x2	-102 x2	-097 x2	-093 x2
03	-022	-025	-025	-026	-029	-033	-046	-036 x2	-041 x2	-045 x2	-050 x2	-055 x2	-063 x2
04	-113	-129	-139	-153	-166	-191	-265	-201 x2	-214 x2	-228 x2	-238 x2	-251 x2	-273 x2
05	-096	-110	-119	-131	-142	-164	-232	-170 x2	-180 x2	-191 x2	-199 x2	-206 x2	-222 x2
06	-071	-080	-086	-095	-102	-118	-162	-124 x2	-134 x2	-143 x2	-154 x2	-162 x2	-179 x2
07	-152	-172	-185	-202	-218	-246	-336	-235 x2	-244 x2	-256 x2	-266 x2	-276 x2	-294 x2
08	-098	-110	-120	-132	-140	-160	-214	-142 x2	-148 x2	-153 x2	-155 x2	-160 x2	-167 x2
09	-086	-096	-102	-111	-118	-130	-166	-102 x2	-108 x2	-110 x2	-112 x2	-112 x2	-112 x2
10	-170	-191	-202	-217	-232	-258	-331	-207 x2	-220 x2	-225 x2	-231 x2	-235 x2	-238 x2
11	-091	-102	-111	-118	-129	-144	-184	-116 x2	-121 x2	-125 x2	-128 x2	+000 x2	-134 x2
12	-081	-092	-098	-103	-109	+000	-149	-086 x2	+000 x2	-091 x2	-090 x2	-088 x2	-087 x2
13	-178	-197	-208	-224	-237	-262	-338	-207 x2	-218 x2	-224 x2	-230 x2	-234 x2	-238 x2
14	-116	-130	-138	-148	-155	-177	-222	-141 x2	+000 x2	-158 x2	-165 x2	-168 x2	-178 x2
15	+083	+100	+106	+120	+134	+157	+221	+167 x2	+179 x2	+194 x2	+206 x2	+220 x2	+244 x2
16	+144	+168	+174	+196	+215	+250	+346	+258 x2	+274 x2	+291 x2	+307 x2	+322 x2	+353 x2
17	+157	+175	+190	+210	+230	+263	+366	+272 x2	+291 x2	+313 x2	+331 x2	+350 x2	+385 x2
18	+089	+100	+114	+134	+144	+166	+248	+199 x2	+215 x2	+233 x2	+251 x2	+268 x2	+300 x2
19	+160	+176	+200	+221	+242	+272	+390	+296 x2	+317 x2	+341 x2	+361 x2	+378 x2	+415 x2
20	+106	+119	+133	+152	+166	+184	+272	+212 x2	+230 x2	+250 x2	+265 x2	+282 x2	+317 x2
21	-007	-006	-007	-004	-004	+000	+012	+018 x2	+022 x2	+027 x2	+030 x2	+035 x2	+046 x2
22	-022	-024	-026	-027	-027	-032	-041	-028 x2	+000 x2	-030 x2	-030 x2	-032 x2	-031 x2
23	-034	-039	-042	-046	-053	-063	-102	-090 x2	-099 x2	-109 x2	-118 x2	-128 x2	-144 x2
24	-053	-060	-064	-071	-076	-086	-110	-074 x2	-079 x2	-082 x2	-086 x2	-090 x2	-098 x2
25	-100	-117	-126	-136	-146	-165	-218	-145 x2	-159 x2	-171 x2	-182 x2	-194 x2	-219 x2
26	-059	-065	-071	-077	-083	-092	-123	-086 x2	-094 x2	-102 x2	-111 x2	-120 x2	-135 x2
27	+142	+165	+176	+193	+212	+244	+332	+235 x2	+249 x2	+263 x2	+274 x2	+286 x2	+308 x2
28	+103	+120	+128	+140	+154	+173	+233	+155 x2	+160 x2	+165 x2	+168 x2	+171 x2	+176 x2
29	-065	-074	-083	-092	-102	-122	-188	-164 x2	-185 x2	-205 x2	-223 x2	-240 x2	-279 x2
30	+172	+198	+217	+243	+270	+316	+466	+365 x2	+398 x2	+430 x2	+456 x2	+483 x2	+536 x2
31	+187	+220	+241	+269	+297	+349	+508	+396 x2	+424 x2	+457 x2	+482 x2	+510 x2	+560 x2
32	-007	-006	-006	-007	-007	-010	-015	-024 x2	+000 x2	-036 x2	-040 x2	-046 x2	-058 x2
33	+192	+224	+243	+271	+298	+350	+501	+386 x2	+416 x2	+449 x2	+473 x2	+501 x2	+557 x2
34	+275	+322	+349	+386	+427	+496	+352 x2	+542 x2	+579 x2	+622 x2	+656 x2	+690 x2	+762 x2
35	+069	+083	+090	+100	+110	+127	+086 x2	+128 x2	+135 x2	+142 x2	+147 x2	+154 x2	+163 x2
36	+208	+242	+262	+289	+318	+369	+257 x2	+378 x2	+403 x2	+430 x2	+451 x2	+471 x2	+514 x2
37	+409	+468	+506	+560	+613	+704	+485 x2	+706 x2	+753 x2	+797 x2	+835 x2	+873 x2	+946 x2
38	+209	+240	+260	+286	+314	+360	+247 x2	+358 x2	+376 x2	+400 x2	+416 x2	+435 x2	+468 x2
39	+195	+224	+242	+267	+291	+338	+229 x2	+332 x2	+353 x2	+371 x2	+387 x2	+404 x2	+436 x2
40	+407	+466	+502	+554	+604	+692	+472 x2	+684 x2	+727 x2	+772 x2	+808 x2	+847 x2	+918 x2
41	+220	+254	+272	+302	+331	+378	+262 x2	+386 x2	+413 x2	+440 x2	+462 x2	+484 x2	+532 x2
42	+024	+032	+037	+043	+051	+061	+050 x2	+089 x2	+099 x2	+109 x2	+118 x2	+126 x2	+146 x2
43	+015	+023	+029	+036	+045	+059	+050 x2	+095 x2	+102 x2	+113 x2	+120 x2	+126 x2	+143 x2
44	+010	+017	+020	+026	+034	+047	+045 x2	+092 x2	+102 x2	+115 x2	+122 x2	+133 x2	+153 x2
45	+058	+072	+073	+081	+093	+115	+079 x2	+126 x2	+138 x2	+148 x2	+156 x2	+164 x2	+183 x2
46	+040	+056	+057	+064	+077	+101	+076 x2	+130 x2	+140 x2	+152 x2	+155 x2	+164 x2	+180 x2
47	+039	+052	+054	+060	+070	+092	+068 x2	+121 x2	+131 x2	+144 x2	+153 x2	+164 x2	+183 x2
48	-061	-071	-078	-087	-098	-117	-092 x2	-161 x2	-181 x2	-201 x2	-220 x2	-238 x2	-278 x2
49	-041	-048	-054	-059	-065	-078	-062 x2	-107 x2	+000 x2	-132 x2	-142 x2	-156 x2	-182 x2
50	+026	+032	+036	+040	+046	+056	+046 x2	+081 x2	+090 x2	+099 x2	+108 x2	+117 x2	+133 x2
51	+172	+202	+218	+241	+264	+306	+213 x2	+322 x2	+347 x2	+371 x2	+390 x2	+414 x2	+458 x2
52	+339	+391	+425	+468	+516	+599	+421 x2	+637 x2	+583 x2	+737 x2	+777 x2	+825 x2	+914 x2
53	+174	+204	+224	+248	+273	+318	+223 x2	+347 x2	+374 x2	+407 x2	+431 x2	+459 x2	+511 x2

Plate 3 Yield 7 p.s.i.	Plate 3 Yield 8 p.s.i.	Plate 3 Yield 9 p.s.i.	Plate 3 Yield 11 p.s.i.	Plate 3 Yield 12 p.s.i.	Plate 3 Yield 13 p.s.i.	Plate 3 Yield 14 p.s.i.	Plate 3 Yield 15 p.s.i.	Plate 3 Yield 16 p.s.i.	Plate 3 Yield 17 p.s.i.	Plate 3 Yield 18 p.s.i.	Plate 3 Yield 20 p.s.i.
00+081X4	00+086X4	00+094X4	00+108X4	00+116X4	00+124X4	00+128X4	00+138X4	00+143X4	00+147X4	00+153X4	00+164X4
01-026X4	01-024X4	01-021X4	01-016X4	01-014X4	01-011X4	01-010X4	01-008X4	01-003X4	01-001X4	01+002X4	01+008X4
02-046X4	02-044X4	02-042X4	02-035X4	02-032X4	02-026X4	02-024X4	02-016X4	02-006X4	02+000X4	02+008X4	02+024X4
03-038X4	03-039X4	03-042X4	03-052X4	03-057X4	03-060X4	03-067X4	03-073X4	03-079X4	03-088X4	03-094X4	03-100X4
04-145X4	04+000X4	04-158X4	04-177X4	04-186X4	04-194X4	04-205X4	04-215X4	04-223X4	04-236X4	04-243X4	04-254X4
05-118X4	05-120X4	05-126X4	05-133X4	05-137X4	05-140X4	05-145X4	05-151X4	05-154X4	05-160X4	05-167X4	05-174X4
06-098X4	06-102X4	06-108X4	06-128X4	06-136X4	06-146X4	06-160X4	06-173X4	06-187X4	06-198X4	06-206X4	06-218X4
07-156X4	07-160X4	07-167X4	07-188X4	07-196X4	07-205X4	07-217X4	07-225X4	07-235X4	07-244X4	07-248X4	07-246X4
08-089X4	08-090X4	08-096X4	08-104X4	08-108X4	08-112X4	08-115X4	08-119X4	08-120X4	08-123X4	08-124X4	08-121X4
09-060X4	09-064X4	09-066X4	09-079X4	09-082X4	09-084X4	09-089X4	09-090X4	09-097X4	09-098X4	09-097X4	09-091X4
10-128X4	10-130X4	10-134X4	10-155X4	10+000X4	10-162X4	10-168X4	10-171X4	10-181X4	10-182X4	10-180X4	10-168X4
11-073X4	11-076X4	11-080X4	11-092X4	11-094X4	11-098X4	11-100X4	11-104X4	11-111X4	11-113X4	11-114X4	11-108X4
12-047X4	12-048X4	12-046X4	12-047X4	12-044X4	12-041X4	12-040X4	12-034X4	12-032X4	12-028X4	12-021X4	12-008X4
13-127X4	13-130X4	13-129X4	13-137X4	13-135X4	13-132X4	13-134X4	13-128X4	13-131X4	13-129X4	13-124X4	13-104X4
14-094X4	14-097X4	14-098X4	14-105X4	14-107X4	14-107X4	14-110X4	14-111X4	14-115X4	14-118X4	14-118X4	14-110X4
15+125X4	15+132X4	15+142X4	15+161X4	15+170X4	15+180X4	15+188X4	15+200X4	15+210X4	15+220X4	15+229X4	15+247X4
16+178X4	16+184X4	16+200X4	16+218X4	16+227X4	16+240X4	16+245X4	16+257X4	16+262X4	16+269X4	16+276X4	16+292X4
17+198X4	17+205X4	17+220X4	17+248X4	17+263X4	17+276X4	17+286X4	17+302X4	17+318X4	17+328X4	17+340X4	17+363X4
18+155X4	18+162X4	18+174X4	18+200X4	18+212X4	18+224X4	18+234X4	18+249X4	18+262X4	18+274X4	18+285X4	18+308X4
19+212X4	19+220X4	19+237X4	19+259X4	19+270X4	19+283X4	19+292X4	19+306X4	19+313X4	19+323X4	19+332X4	19+350X4
20+164X4	20+170X4	20+184X4	20+210X4	20+224X4	20+237X4	20+247X4	20+262X4	20+276X4	20+286X4	20+298X4	20+323X4
21+022X4	21+025X4	21+031X4	21+044X4	21+048X4	21+056X4	21+062X4	21+070X4	21+079X4	21+087X4	21+096X4	21+114X4
22-019X4	22-018X4	22-016X4	22-016X4	22-015X4	22-014X4	22-012X4	22-011X4	22-008X4	22-006X4	22-004X4	22+001X4
23-079X4	23-083X4	23-091X4	23-107X4	23-115X4	23-123X4	23-129X4	23-137X4	23-142X4	23-153X4	23-160X4	23-176X4
24-053X4	24-057X4	24-060X4	24-071X4	24-074X4	24-078X4	24-075X4	24-073X4	24-071X4	24-068X4	24-062X4	24-047X4
25-119X4	25-126X4	25-132X4	25-150X4	25-154X4	25-154X4	25-156X4	25-149X4	25-149X4	25-144X4	25-134X4	25-104X4
26-075X4	26-078X4	26-085X4	26-094X4	26-096X4	26-098X4	26-097X4	26-094X4	26-093X4	26-090X4	26-085X4	26-068X4
27+157X4	27+161X4	27+168X4	27+180X4	27+188X4	27+193X4	27+199X4	27+204X4	27+213X4	27+216X4	27+219X4	27+228X4
28+086X4	28+086X4	28+088X4	28+085X4	28+085X4	28+084X4	28+082X4	28+082X4	28+078X4	28+075X4	28+072X4	28+068X4
29-153X4	29-161X4	29-178X4	29-215X4	29-234X4	29-248X4	29-265X4	29-286X4	29-309X4	29-328X4	29-343X4	29-377X4
30+276X4	30+287X4	30+308X4	30+347X4	30+366X4	30+383X4	30+402X4	30+425X4	30+451X4	30+471X4	30+492X4	30+534X4
31+288X4	31+300X4	31+322X4	31+359X4	31+376X4	31+397X4	31+414X4	31+438X4	31+460X4	31+476X4	31+495X4	31+528X4
32-036X4	32-039X4	32-044X4	32-057X4	32-065X4	32-070X4	32-076X4	32-082X4	32-092X4	32-099X4	32-106X4	32-124X4
33+289X4	33+302X4	33+327X4	33+375X4	33+399X4	33+421X4	33+442X4	33+465X4	33+488X4	33+510X4	33+526X4	33+557X4
34+392X4	34+408X4	34+440X4	34+494X4	34+526X4	34+555X4	34+576X4	34+610X4	34+637X4	34+660X4	34+678X4	34+708X4
35+080X4	35+081X4	35+085X4	35+091X4	35+098X4	35+104X4	35+106X4	35+112X4	35+114X4	35+116X4	35+116X4	35+111X4
36+264X4	36+274X4	36+295X4	36+328X4	36+345X4	36+360X4	36+370X4	36+388X4	36+403X4	36+414X4	36+423X4	36+439X4
37+486X4	37+504X4	37+540X4	37+600X4	37+628X4	37+653X4	37+673X4	37+699X4	37+721X4	37+739X4	37+752X4	37+772X4
38+242X4	38+250X4	38+270X4	38+304X4	38+320X4	38+333X4	38+346X4	38+360X4	38+370X4	38+380X4	38+386X4	38+397X4
39+222X4	39+229X4	39+240X4	39+260X4	39+267X4	39+274X4	39+280X4	39+286X4	39+291X4	39+294X4	39+295X4	39+296X4
40+470X4	40+486X4	40+515X4	40+564X4	40+587X4	40+606X4	40+621X4	40+641X4	40+657X4	40+668X4	40+678X4	40+692X4
41+274X4	41+283X4	41+304X4	41+340X4	41+357X4	41+370X4	41+380X4	41+394X4	41+408X4	41+419X4	41+428X4	41+443X4
42+074X4	42+078X4	42+086X4	42+102X4	42+110X4	42+118X4	42+124X4	42+133X4	42+140X4	42+149X4	42+157X4	42+170X4
43+069X4	43+073X4	43+080X4	43+089X4	43+094X4	43+098X4	43+102X4	43+107X4	43+109X4	43+112X4	43+115X4	43+121X4
44+077X4	44+082X4	44+091X4	44+105X4	44+114X4	44+121X4	44+127X4	44+138X4	44+144X4	44+149X4	44+157X4	44+170X4
45+094X4	45+100X4	45+108X4	45+124X4	45+134X4	45+142X4	45+150X4	45+159X4	45+165X4	45+172X4	45+180X4	45+199X4
46+090X4	46+094X4	46+102X4	46+110X4	46+116X4	46+121X4	46+123X4	46+129X4	46+129X4	46+133X4	46+135X4	46+140X4
47+094X4	47+100X4	47+110X4	47+126X4	47+135X4	47+142X4	47+150X4	47+161X4	47+168X4	47+175X4	47+182X4	47+198X4
48-153X4	48-162X4	48-181X4	48-220X4	48-242X4	48-263X4	48-285X4	48-312X4	48-332X4	48-359X4	48-387X4	48-435X4
49-100X4	49-108X4	49-120X4	49-145X4	49-160X4	49-176X4	49-190X4	49-208X4	49-222X4	49-238X4	49-254X4	49-285X4
50+068X4	50+072X4	50+079X4	50+092X4	50+098X4	50+103X4	50+110X4	50+117X4	50+122X4	50+131X4	50+138X4	50+150X4
51+237X4	51+246X4	51+266X4	51+303X4	51+320X4	51+337X4	51+348X4	51+363X4	51+372X4	51+379X4	51+386X4	51+396X4
52+472X4	52+492X4	52+531X4	52+594X4	52+625X4	52+651X4	52+668X4	52+690X4	52+709X4	52+720X4	52+729X4	52+742X4
53+265X4	53+276X4	53+297X4	53+333X4	53+350X4	53+362X4	53+370X4	53+380X4	53+387X4	53+394X4	53+398X4	53+403X4

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No.	Plate 3 Yield 22 psi	Plate 3 Yield 24 psi	Plate 3 Yield 26 psi	Plate 3 Yield 28 psi	Plate 3 Yield 30 psi	0̄0+34ī .) Readin	Plate 4 10 psi Yield	Plate 4 Yield 15 psi	Plate 4 Yield 20 psi	Plate 4 Yield 25 psi	Plate 4 Yield 30 psi	Plate 4 Yield 35 psi
00	+168x4	+176x4	+180x4	+184x4	+186x4	+000	+061x4	+088x4	+112x4	+0490	+0540	+0600
01	+012x4	+019x4	+026x4	+038x4	+050x4	+004	-105x4	-133x4	-160x4	-0750	-0850	-0920
02	+045x4	+064x4	+092x4	+118x4	+149x4	+004	-146x4	-188x4	-222x4	-1040	-1190	-1280
03	-114x4	-118x4	-129x4	-129x4	-128x4	+004	-036x4	-047x4	-058x4	-0350	-0440	-0580
04	-273x4	-277x4	-284x4	-277x4	-268x4	+005	-205x4	-287x4	+000x4	-1750	-2100	-2410
05	-182x4	-186x4	-188x4	-181x4	-173x4	-002	-157x4	-225x4	-290x4	-1430	-1740	-2100
06	-232x4	-234x4	-243x4	-240x4	-242x4	-003	-116x4	-161x4	-204x4	-1040	-1270	-1460
07	-250x4	-238x4	-225x4	-200x4	-171x4	+003	-258x4	-350x4	-434x4	-2120	-2460	-2720
08	-119x4	-109x4	-096x4	-077x4	-055x4	+002	-1[illegible]4x4	-202x4	-251x4	-1260	-1490	-1700
09	-086x4	-077x4	-067x4	-054x4	-042x4	-015	-155x4	-209x4	-256x4	-1200	-1330	-1440
10	-158x4	+000x4	-123x4	-099x4	-077x4	+003	-318x4	-428x4	-512x4	-2300	-2550	-2720
11	-104x4	-096x4	-088x4	-078x4	-066x4	+002	-15[illegible]x4	-217x4	-260x4	-1280	-1450	-1640
12	+003x4	+015x4	+024x4	+036x4	+046x4	+011	-12[illegible]4	-148x4	-154x4	-0670	-0640	-0620
13	-094x4	-076x4	-064x4	-046x4	-030x4	+007	-34[illegible]4	-448x4	-529x4	-2360	-2390	-2410
14	-108x4	-100x4	-099x4	-094x4	-092x4	+004	+000x4	-288x4	-345x4	-1580	-1790	-1960
15	+265x4	+283x4	+308x4	+326x4	+345x4	+008	+138x4	+181x4	+223x4	+1040	+1220	+1340
16	+303x4	+315x4	+326x4	+338x4	+348x4	-003	+171x4	+211x4	+241x4	+1030	+1110	+1180
17	+382x4	+403x4	+419x4	+436x4	+451x4	+006	+216x4	+278x4	+326x4	+1420	+1540	+1650
18	+330x4	+352x4	+373x4	+392x4	+418x4	+002	+174x4	+232x4	+282x4	+1320	+1520	+1690
19	+362x4	+375x4	+386x4	+396x4	+412x4	-004	+219x4	+272x4	+311x4	+1360	+1450	+1530
20	+345x4	+364x4	+380x4	+399x4	+418x4	-016	+173x4	+229x4	+275x4	+1210	+1310	+1420
21	+135x4	+156x4	+182x4	+204x4	+228x4	-007	-021x4	-026x4	-025x4	-0100	-0070	+~~0000~~
22	+004x4	+010x4	+014x4	+020x4	+028x4	-008	-040x4	-061x4	-077x4	-0380	-0390	-0400
23	-193x4	-208x4	-228x4	-242x4	-256x4	-017	-044x4	-076x4	-106x4	-0540	-0660	-0800
24	-035x4	-018x4	-007x4	+012x4	+025x4	-015	-173x4	-244x4	-292x4	-1360	-1480	-1570
25	-082x4	-052x4	-030x4	-003x4	+028x4	-014	-348x4	-481x4	-584x4	-2730	-2940	-3040
26	-056x4	-042x4	-030x4	-019x4	-008x4	-012	-174x4	-237x4	-287x4	-1340	-1410	+0000
27	+233x4	+240x4	+240x4	+243x4	+242x4	-016	+232x4	+312x4	+374x4	+1690	+1880	+2050
28	+058x4	+050x4	+037x4	+026x4	+014x4	-003	+123x4	+144x4	+158x4	+0660	+0680	+0720
29	-414x4	-444x4	-488x4	-522x4	-557x4	-013	-157x4	-242x4	-[illegible]0x4	-1730	-2190	-2740
30	+570x4	+604x4	+639x4	+663x4	+684x4	-006	+266x4	+374x4	+4[illegible]4x4	+2170	+2560	+3020
31	+557x4	+579x4	+598x4	+610x4	+616x4	+000	+246x4	+330x4	+396x4	+1820	+2150	+2530
32	-144x4	-166x4	-202x4	-234x4	-271x4	-004	-064x4	-110x4	-156x4	-0870	-1150	-1480
33	+582x4	+604x4	+622x4	+636x4	+647x4	-014	+280x4	+378x4	+466x4	+2180	+2520	+2830
34	+734x4	+752x4	+763x4	+769x4	+773x4	-016	+340x4	+458x4	+572x4	+2680	+3100	+3500
35	+102x4	+090x4	+071x4	+055x4	+032x4	-007	+035x4	+032x4	+024x4	+0020	-0140	-0300
36	+451x4	+459x4	+462x4	+464x4	+464x	-004	+237x4	+327x4	+393x4	+1660	+1780	+1860
37	+790x4	+802x4	+809x4	+815x4	+818x	-005	+485x4	+561x4	+792x4	+3570	+3890	+4120
38	+405x4	+410x4	+415x4	+417x4	+418x	-003	+234x4	+314x4	+372x4	+1630	+1760	+1830
39	+296x4	+295x4	+294x4	+293x4	+292x	-009	+238x4	+302x4	+352x4	+1580	+1670	+1630
40	+704x4	+713x4	+724x4	+732x4	+740x	-002	+516x4	+670x4	+782x4	+3490	+3760	+3920
41	+457x4	+469x4	+483x4	+496x4	+506x	-001	+288x4	+364x4	+407x4	+1780	+1910	+2030
42	+184x4	+200x4	+221x4	+236x4	+254x	-016	+018x4	+047x4	+072x4	+0380	+0510	+0620
43	+124x4	+130x4	+132x4	+137x4	+140x4	-013	-072x4	-082x4	-092x4	-0420	-0460	+0000
44	+180x4	+192x4	+198x4	+209x4	+215x4	-006	-066x4	-071x4	-075x4	-0340	-0370	-0420
45	+214x4	+229x4	+248x4	+264x4	+273x4	-012	+011x4	+029x4	+052x4	+0290	+0410	+0520
46	+143x4	+148x4	+148x4	+153x4	+149x4	-008	-085x4	-103x4	-120x4	-0540	-0600	+0000
47	+212x4	+226x4	+238x4	+251x4	+258x4	-004	-016x4	-007x4	+000x4	-0010	-0040	-0060
48	-491x4	-540x4	-614x4	-664x4	+000x4	-002	-080x4	-137x4	-184x4	-0950	-1140	-1280
49	-319x4	-347x4	-388x4	-416x4	-444x4	-008	[illegible]053x4	-089x4	-127x4	-0630	-0750	-0840
50	+166x4	+176x4	+200x4	+214x4	+231x4	-006	[illegible]359x4	+097x4	+134x4	[illegible]0620	[illegible]0730	+0880
51	+403x4	+408x4	+408x4	+411x4	+412x4	-001	+267x4	+369x4	+450x4	+2030	+2230	+2430
52	+746x4	+748x4	+745x4	+742x4	+739x4	-004	+[illegible]01x4	+[illegible]96x4	+345x4	+3830	+[illegible]270	+4510
53	+405x4	+402x4	+400x4	+396x4	+391x4	-006	+250x4	+346x4	+410x4	+1840	+20[illegible]0	+2160
54											+2060	

41 42

	Plate 4 Yield 40 p.s.i.	Plate 4 Yield 45 p.s.i.	Plate 4 Yield 50 p.s.i.	Plate 4 Yield 55 p.s.i.	Plate 4 Yield 60 p.s.i.	Plate 4 Yield 65 p.s.i.	Plate 4 Yield 70 p.s.i.	Plate 4 Yield 75 p.s.i.	Plate 4 Yield 80 p.s.i.	Plate 4 Yield 85 p.s.i.	Plate 4 Yield 90 p.s.i.	Plate 4 Yield 95 p.s.i.	Plate 4 Yield 100 p.s.i.
00	+0660	+0720	+0790	+0900	+1020	+1120	+1230	+1400	+1490	+1600	+1520	+1520	+1480
01	-0930	-0930	-0950	-0740	-0490	-0550	-0140	+0240	+0740	+0810	+1350	+1790	+1800
02	-1300	-1260	-1290	-0960	-0540	-0540	+0140	+0710	+1510	+1700	+2580	+3500	+3600
03	-0670	-0660	-0670	-0580	-0500	-0440	-0320	-0240	-0140	-0140	-0080	-0210	-0250
04	-2720	-2860	-3110	-2990	-2820	-2980	-2520	-2340	-1760	-1840	-1130	-0800	-0800
05	-2430	-2580	-2980	-2960	-2920	-3100	-2780	-2680	-2240	-2320	-1660	-1380	-1350
06	-1570	-1580	-1640	-1640	-1740	-1720	-1800	-1940	-1990	-2060	-2180	-2400	-2440
07	-2790	-2800	-2780	-2440	-2130	-2180	-1630	-1360	-0760	-0760	-0170	+0110	+0140
08	-1790	-1810	-1900	-1680	-1450	-1550	-1160	-1020	-0630	-0660	-0250	-0120	-0080
09	-1520	-1490	-1510	-1520	-1540	-1440	-1520	-1480	-1500	-1420	-1460	-1480	-1490
10	-2760	-2710	-2720	-2610	-2510	-2420	-2320	-2200	-2020	-1940	-1750	-1580	-1580
11	-1770	-1780	-1940	-1920	-1940	-1920	-1890	-1940	-1890	-1870	-1840	-1860	-1880
12	-0560	-0460	-0450	-0410	-0420	-0370	-0430	-0410	-0390	-0300	-0310	-0400	-0400
13	-2370	+0000	-2280	-2150	-2070	-2060	-2040	-1880	-1720	-1670	-1460	-1360	-1380
14	-2070	-2[illegible]	-2200	-2190	-2200	-2210	-2190	-2140	-2040	-2040	-1920	-1880	-1920
15	+1500	+1670	+1980	+2080	+2180	+2470	+2500	+2740	+2820	+3080	+3110	+3290	+3330
16	+1260	+1340	+1360	+1450	+1520	+1500	+1610	+1570	+1740	+1660	+1740	+1690	+1710
17	+1760	+1830	+1820	+1910	+2030	+2010	+2140	+2180	+2270	+2290	+2440	+2490	+2520
18	+1880	+2050	+2280	+2440	+2600	+2760	+2850	+3070	+3220	+3350	+3560	+3660	+3800
19	+1630	+1660	+1670	+1720	+1780	+1790	+1850	+1860	+1940	+2000	+2020	+2040	+2060
20	+1520	+1620	+1730	+1820	+1890	+2050	+2160	+2310	+2420	+2580	+2700	+2860	+2920
21	+0080	+0150	+0400	+0520	+0630	+0900	+0950	+1340	+1520	+2090	+2280	+3400	+3400
22	-0440	-0500	-0540	-0580	-0660	-0680	-0950	-1090	-1380	-1550	-1660	-1440	-1480
23	-0990	-1160	-1410	-1620	-1920	-2300	-2740	+0000	-3960	-4950	+0000	-5650	-5710
24	-1600	-1610	-1780	-1750	-1720	-1780	-1710	-1700	-1720	-1660	-1690	-1660	-1680
25	-2990	-2920	-2910	-2830	-2680	-2520	-2430	-2200	-2170	-1800	-1780	-1440	-1460
26	-1380	-1380	-1520	-1420	-1380	-1480	-1400	-1400	-1380	-1340	+0000	-1310	-1310
27	+2180	+2240	+2220	+2130	+1920	+1850	+1570	+1160	+0800	+0600	+0280	-0200	-0240
28	+0660	+0580	+0350	+0080	-0340	-0520	-1150	-1920	-2490	-2870	-3370	-4180	+0000
29	-3330	-3660	-4380	-5060	-5940	-6320	-7320	-8400	-9240	N0000	N0210	N0240	N0150
30	+3500	+3780	+4220	+4540	+4770	+4940	+5130	+5140	+5060	+5060	+4710	+4370	+4410
31	+2870	+3080	+3380	+3540	+3690	+3750	+3860	+4020	+4140	+4260	+4250	+4370	+4390
32	-1900	-2150	-2740	-3370	-4100	-4420	-5380	-6370	-7180	-7450	-8410	-8990	-9160
33	+3080	+3230	+3340	+3350	+3300	+3340	+3190	+2980	+2760	+2750	+2440	+2200	+2260
34	+3790	+3900	+4040	+4040	+4080	+4140	+4130	+4220	+4160	+4260	+4150	+4230	+4260
35	-0560	-0720	-1060	-1360	-1600	-1690	-1940	-2000	-2060	-2040	-2080	-1960	-2020
36	+1880	+1920	+1850	+1800	+1750	+1760	+1730	+1640	+1540	+1540	+1350	+1240	+1190
37	+4260	+4340	+4400	+4360	+4340	+4320	+4240	+4180	+4070	+4040	+3810	+3690	+3690
38	+1840	+1860	+1830	+1750	+1640	+1640	+1510	+1410	+1260	+1250	+0980	+0800	+0790
39	+1520	+1540	+1390	+1240	+1100	+1100	+0920	+0760	+0590	+0580	+0280	+0120	+0080
40	+3980	+4000	+4000	+3950	+3940	+3980	+3920	+3890	+3780	+3790	+3630	+3500	+3540
41	+2080	+2140	+2170	+2150	+2120	+2210	+2180	+2140	+2060	+2140	+1980	+1850	+1920
42	+0740	+0860	+1100	+1210	+1310	+1550	+1580	+1820	+1890	+2120	+2120	+2280	+2350
43	-0500	-0500	-0600	-0580	-0560	-0650	-0620	-0690	-0650	-0710	-0720	-0780	-0780
44	-0460	-0460	-0610	-0620	-0630	-0750	-0720	-0810	-0820	-0900	-0910	-1020	-0980
45	+0620	+0740	+0890	+0990	+1090	+1220	+1260	+1440	+1560	+1640	+1720	+1800	+1540
46	-0760	-0790	-1000	-1030	-1080	-1230	-1240	-1370	-1380	-1460	-1540	-1680	-1680
47	-0090	-0070	-0160	-0140	-0140	-0140	-0100	-0090	-0070	-0040	-0020	+0000	+0080
48	-1440	-1630	-1580	-1820	-2050	-2320	-2920	-3760	+0000	-6820	-7520	N0140	N0160
49	-0940	-1050	-1070	-1140	-1210	-1240	-1460	-1670	-1870	-2700	-2920	-4340	-4490
50	+1020	+1140	+1260	+1430	+1620	+2010	+2340	+3180	+3710	+4980	+5160	+5970	+6010
51	+2470	+2470	+2300	+2300	+2300	+2130	+2150	+2000	+1990	+1730	+1720	+1480	+1490
52	+4660	+4660	+4670	+4700	+4710	+4560	+4590	+4400	+4440	+4110	+4130	+3790	+3820
53	+2200	+2150	+1940	+1970	+1960	+1640	+1680	+1420	+1480	+1090	+1120	+0720	+0740

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NOMENCLATURE

D	=	flexural rigidity of plate
E	=	modulus of elasticity of plate material
G	=	shear modulus
Q	=	dimensionless uniformly distributed load
R	=	aspect ratio, b/a
U, V, W	=	dimensionless displacement components parallel to x, y, and z directions respectively.
W_o	=	dimensionless lateral displacement at center of plate
C_i, D_j, E_k, F_l, G_m, H_n	=	unknown constants
2a, 2b	=	sides of plates along α and β axes respectively
c, s	=	cos θ and sin θ
h	=	thickness of plate
n	=	outwardly drawn normal
q	=	intensity of uniformly distributed load
u, v, w	=	displacement of point on the middle plane of plate parallel to x, y, and z axes respectively
x, y, z	=	rectangular cartesian coordinates
θ	=	skew angle
α, β	=	oblique coordinates
γ_i	=	undetermined constants
ζ η	=	dimensionless oblique coordinates
ν	=	Poisson's ratio
σ''_x, σ''_y, τ''_{xy}	=	extreme fibre bending and shearing stresses

$\sigma_x', \sigma_y', \tau_{xy}'$ = membrane stresses in the middle surface of plate

S_x'', S_y'', S_{xy}'' = nondimensional bending stresses

S_x', S_y', S_{xy}' = nondimensional membrane stresses

∇ = Laplacian operator

VITA AUCTORIS

1937	Simon Shung Fun Ng was born in Canton, China, on March 6, 1937.
1945	In September, 1945, he entered Pui Ying School, Canton, China, where he obtained his elementary Education.
1950	In September, 1950, he enrolled at Wah Yan College, Hong Kong, where he obtained his secondary education.
1957	In September, 1957, he enrolled in first year Science at McGill University, Montreal, Canada.
1958	In September, 1958, he entered the University of British Columbia, Vancouver, Canada to study Civil Engineering.
1962	In May, 1962, he was graduated from the University of British Cokumbia with a Bachelor of Applied Science Degree. In June, he was employed as junior engineer in the hydro-electric design division of the International Power and Engineering Consultants, Ltd., Vancouver, British Columbia.
1963	In September, 1963, he enrolled at the University of Windsor for graduate studies.
1964	In October, 1964, he graduated from the University of Windsor with a Master's Degree in Applied Science. In the same year, he enrolled as a Ph. D. student in the Department of Civil Engineering.
1967	In January, 1967, He was employed as an engineer in the IBM datacentre, Toronto, Ontario.