

Proposed New Military Live Load for Highway Bridges in the United States

Thesis Appendices

Submitted to the Graduate Faculty of the  
University of New Orleans  
in partial fulfillment of the  
requirements for the degree of

Master of Science  
in  
Engineering  
Civil Engineering

by

Walter P. Parker, P.E.

B.S. Clemson University, 1987  
M.S. Missouri University of Science and Technology, 2000  
Graduate Certificate University of New Orleans, 2017

May, 2019

Copyright 2019, Walter Parker

## TABLE OF CONTENTS

<b>APPENDIX A: TABLES OF RECOMMENDED DESIGN VALUES .....</b>	<b>iii</b>
<b>APPENDIX B: FILES ASSOCIATED TO FIGURES AND TABLES .....</b>	<b>x</b>
<b>APPENDIX C: MAXIMUM MOMENT CALCULATIONS .....</b>	<b>xiii</b>
<b>APPENDIX D: STANAG/FM VS. CALCULATIONS COMPARISON .....</b>	<b>xiv</b>
<b>APPENDIX E: AXLE AT MIDSPAN CALCULATIONS .....</b>	<b>xv</b>
<b>APPENDIX F: VARIOUS HEAVY EQUIPMENT TRANSPORT VEHICLES .....</b>	<b>xvii</b>
<b>APPENDIX G: MULTIPLE MLC 100W VEHICLES ON A SINGLE SPAN.....</b>	<b>xviii</b>
<b>APPENDIX H: SPECIAL PERMIT VEHICLES CALCULATIONS .....</b>	<b>xix</b>
<b>APPENDIX I: RELIABILITY ANALYSIS CALCULATIONS .....</b>	<b>xx</b>
<b>APPENDIX J: CONSOLIDATED TABLES .....</b>	<b>xxii</b>

## **APPENDIX A: TABLES OF RECOMMENDED DESIGN VALUES**

Table of Maximum Moments, Shears and Reactions Simple Spans,  
 One Lane **With** Dynamic Load Allowance  
 AASHTO HL-93 Design Truck/Tandem and Uniform Lane Load

Span (ft)	Moment (kips-ft)	End Shear and End Reaction (k)	Span (ft)	Moment (kips-ft)	End Shear and End Reaction (k)
1	10.7	42.9	26	419.8	70.5
2	21.6	43.2	27	440.7	71.7
3	32.6	43.5	28	461.7	72.8
4	43.8	43.8	29	482.9	74.2
5	55.2	44.2	30	504.3	75.6
6	66.7	46.3	31	525.8	76.8
7	78.4	49.7	32	547.4	78.1
8	90.2	52.4	33	569.2	79.2
9	102.2	54.6	34	591.2	80.4
10	114.4	56.4	35	613.4	81.4
11	126.7	57.9	36	635.7	82.5
12	144.5	59.3	37	658.1	83.4
13	163.1	60.4	38	680.8	84.4
14	181.9	61.5	39	703.6	85.3
15	200.9	62.4	40	726.5	86.2
16	220.0	63.3	42	774.2	87.9
17	239.3	64.1	44	835.8	89.5
18	258.7	64.9	46	898.1	91.1
19	278.3	65.6	48	961.0	92.5
20	298.0	66.3	50	1,024.6	93.9
21	317.9	66.9	52	1,088.8	95.2
22	338.0	67.5	54	1,153.6	96.5
23	358.2	68.1	56	1,219.1	97.7
24	378.6	68.6	58	1,285.2	98.9
25	399.1	69.3	60	1,352.0	100.1

Table of Maximum Moments, Shears and Reactions Simple Spans,  
 One Lane **With** Dynamic Load Allowance  
 AASHTO HL-93 Design Truck/Tandem and Uniform Lane Load

Span (ft)	Moment (kips-ft)	End Shear and End Reaction (k)	Span (ft)	Moment (kips-ft)	End Shear and End Reaction (k)
62	1,419.4	101.2	160	5,506.0	141.4
64	1,487.4	102.3	170	6,009.4	144.9
66	1,556.1	103.3	180	6,528.8	148.4
68	1,625.4	104.4	190	7,064.2	151.9
70	1,695.4	105.4	200	7,615.6	155.3
72	1,766.0	106.4	210	8,183.0	158.7
74	1,837.3	107.4	220	8,766.4	162.1
76	1,909.1	108.3	230	9,365.8	165.5
78	1,981.7	109.3	240	9,981.2	168.8
80	2,054.8	110.2	250	10,612.6	172.2
82	2,128.6	111.1	260	11,260.0	175.5
84	2,203.1	112.0	270	11,923.4	178.8
86	2,278.1	112.9	280	12,602.8	182.2
88	2,353.9	113.8	290	13,298.2	185.5
90	2,430.2	114.6	300	14,009.6	188.8
92	2,507.2	115.5	350	17,806.6	205.2
94	2,584.9	116.3	400	22,003.6	221.5
96	2,663.1	117.2	450	26,600.6	237.8
98	2,742.1	118.0	500	31,597.6	254.0
100	2,821.6	118.8	550	36,994.6	270.1
110	3,229.0	122.8	600	42,791.6	286.3
120	3,652.4	126.7	700	55,585.6	318.5
130	4,091.8	130.5	800	69,979.6	350.6
140	4,547.2	134.2	900	85,973.6	382.8
150	5,018.6	137.8	1000	103,567.6	414.9

Table of Maximum Moments, Shears and Reactions Simple Spans,

One Lane **With** Dynamic Load Allowance

**AND** the Magnification Factor for the **Proposed Military Live Load**

Use for AASHTO Strength Condition I instead of HL-93 Values

---

Span (ft)		Moment (kips-ft)	End Shear and End Reaction (k)	Span (ft)		Moment (kips-ft)	End Shear and End Reaction (k)
1	-----	17.4	64.8	26	-----	684.3	106.5
2	-----	35.2	65.2	27	-----	718.3	108.3
3	-----	53.1	65.7	28	-----	752.6	109.9
4	-----	71.4	66.1	29	-----	787.1	112.0
5	-----	90.0	66.7	30	-----	822.0	114.2
6	-----	108.7	69.9	31	-----	857.1	116.0
7	-----	127.8	75.0	32	-----	892.3	117.9
8	-----	147.0	79.1	33	-----	927.8	119.6
9	-----	166.6	82.4	34	-----	963.7	121.4
10	-----	186.5	85.2	35	-----	999.8	122.9
11	-----	206.5	87.4	36	-----	1,036.2	124.6
12	-----	235.5	89.5	37	-----	1,072.7	125.9
13	-----	265.9	91.2	38	-----	1,109.7	127.4
14	-----	296.5	92.9	39	-----	1,146.9	128.8
15	-----	327.5	94.2	40	-----	1,184.2	130.2
16	-----	358.6	95.6	42	-----	1,261.9	132.7
17	-----	390.1	96.8	44	-----	1,362.4	135.1
18	-----	421.7	98.0	46	-----	1,463.9	137.6
19	-----	453.6	99.1	48	-----	1,566.4	139.7
20	-----	485.7	100.1	50	-----	1,670.1	141.8
21	-----	518.2	101.0	52	-----	1,770.8	143.8
22	-----	550.9	101.9	54	-----	1,872.1	145.7
23	-----	583.9	102.8	56	-----	1,974.0	147.5
24	-----	617.1	103.6	58	-----	2,076.4	149.3
25	-----	650.5	104.6	60	-----	2,179.4	151.2

Table of Maximum Moments, Shears and Reactions Simple Spans,

One Lane **With** Dynamic Load Allowance

**AND** the Magnification Factor for the **Proposed Military Live Load**

Use for AASHTO Strength Condition I instead of HL-93 Values

---

Span (ft)	Moment (kips-ft)	End Shear and End Reaction (k)	Span (ft)	Moment (kips-ft)	End Shear and End Reaction (k)
62	2,283.0	152.8	160	7,884.6	198.2
64	2,387.0	154.5	170	8,497.3	200.5
66	2,491.6	156.0	180	9,114.2	202.7
68	2,596.7	157.6	190	9,734.5	204.8
70	2,702.5	159.2	200	10,357.2	206.5
72	2,808.7	160.6	210	10,981.6	208.2
74	2,915.4	162.1	220	11,606.7	209.8
76	3,022.6	163.6	230	12,231.8	211.1
78	3,130.2	165.0	240	12,855.8	212.4
80	3,238.4	166.4	250	13,478.0	213.5
82	3,347.0	167.8	260	14,097.5	214.5
84	3,456.2	169.1	270	14,713.5	215.3
86	3,565.7	170.5	280	15,325.0	216.1
88	3,675.8	171.8	290	15,931.3	216.6
90	3,786.3	173.0	300	16,531.4	217.1
92	3,897.2	174.4	350	19,409.2	236.0
94	4,008.6	175.7	400	22,003.6	254.8
96	4,120.4	176.9	450	26,600.6	273.4
98	4,232.6	178.2	500	31,597.6	292.1
100	4,345.3	179.4	550	36,994.6	310.7
110	4,914.5	183.2	600	42,791.6	329.2
120	5,493.2	186.8	700	55,585.6	366.3
130	6,080.4	190.0	800	69,979.6	403.2
140	6,675.3	193.0	900	85,973.6	440.2
150	7,277.0	195.7	1000	103,567.6	477.1



Table of Maximum Moments, Shears and Reactions Simple Spans,

One Lane **With** Dynamic Load Allowance

**AND** the Magnification Factor for the **Louisiana Bridge Design (LADV-11)**

Use for AASHTO Strength Condition I instead of HL-93 Values

---

Span (ft)	Moment (kips-ft)	End Shear and End Reaction (k)	Span (ft)	Moment (kips-ft)	End Shear and End Reaction (k)
1	13.9	55.8	26	545.7	91.7
2	28.1	56.2	27	572.9	93.2
3	42.4	56.6	28	600.2	94.6
4	56.9	56.9	29	627.8	96.5
5	71.8	57.5	30	655.6	98.3
6	86.7	60.2	31	683.5	99.8
7	101.9	64.6	32	711.6	101.5
8	117.3	68.1	33	740.0	103.0
9	132.9	71.0	34	768.6	104.5
10	148.7	73.3	35	797.4	105.8
11	164.7	75.3	36	826.4	107.3
12	187.9	77.1	37	855.5	108.4
13	212.0	78.5	38	885.0	109.7
14	236.5	80.0	39	914.7	110.9
15	261.2	81.1	40	944.5	112.1
16	286.0	82.3	42	1,006.5	114.3
17	311.1	83.3	44	1,086.5	116.4
18	336.3	84.4	46	1,167.5	118.4
19	361.8	85.3	48	1,249.3	120.3
20	387.4	86.2	50	1,332.0	122.1
21	413.3	87.0	52	1,415.4	123.8
22	439.4	87.8	54	1,499.7	125.5
23	465.7	88.5	56	1,584.8	127.0
24	492.2	89.2	58	1,670.8	128.6
25	518.8	90.1	60	1,757.6	130.1

Table of Maximum Moments, Shears and Reactions Simple Spans,

One Lane **With** Dynamic Load Allowance

**AND** the Magnification Factor for the **Louisiana Bridge Design (LADV-11)**

Use for AASHTO Strength Condition I instead of HL-93 Values

Span (ft)	Moment (kips-ft)	End Shear and End Reaction (k)	Span (ft)	Moment (kips-ft)	End Shear and End Reaction (k)
62	1,845.2	131.6	160	7,157.8	183.8
64	1,933.6	133.0	170	7,812.2	188.4
66	2,022.9	134.3	180	8,487.4	192.9
68	2,113.0	135.7	190	9,183.5	197.5
70	2,204.0	137.0	200	9,900.3	201.9
72	2,295.8	138.3	210	10,637.9	206.3
74	2,388.4	139.6	220	11,396.3	210.7
76	2,481.9	140.8	230	12,175.6	215.1
78	2,576.2	142.0	240	12,975.6	219.4
80	2,671.2	143.3	250	13,708.0	222.4
82	2,767.2	144.4	260	14,450.3	225.2
84	2,864.0	145.6	270	15,202.4	228.0
86	2,961.6	146.8	280	15,963.5	230.8
88	3,060.0	147.9	290	16,733.6	233.4
90	3,159.3	149.0	300	17,512.0	236.0
92	3,259.4	150.1	350	21,516.3	248.0
94	3,360.3	151.2	400	25,670.9	258.4
96	3,462.1	152.3	450	29,925.7	267.5
98	3,564.7	153.4	500	34,230.8	275.1
100	3,668.1	154.4	550	38,536.1	281.4
110	4,197.7	159.6	600	42,791.6	286.3
120	4,748.1	164.7	700	55,585.6	318.5
130	5,319.3	169.7	800	69,979.6	350.6
140	5,911.4	174.5	900	85,973.6	382.8
150	6,524.2	179.1	1000	103,567.6	414.9

**APPENDIX B: DATA FILES ASSOCIATED WITH FIGURES AND TABLES**

**FIGURES<sup>1,2</sup> (see page vii for location of the figure in text)**

Figure 5-3	Appendix C. Max Moment Location Calculations
Figure 5-4	Appendix C. Max Moment Location Calculations
Figure 5-5	Appendix C. Max Moment Location Calculations
Figure 5-6	Appendix C. Max Moment Location Calculations
Figure 5-7	Appendix C. Max Moment Location Calculations
Figure 5-8	Appendix C. Max Moment Location Calculations
Figure 5-9	Appendix C. Max Moment Location Calculations
Figure 5-10	Appendix C. Max Moment Location Calculations
Figure 5-11	Appendix D. STANAG vs. Calculations Comparison.xlsx
Figure 5-12	Appendix D. STANAG vs. Calculations Comparison.xlsx
Figure 5-13	Appendix D. STANAG vs. Calculations Comparison.xlsx
Figure 5-14	Appendix D. STANAG vs. Calculations Comparison.xlsx
Figure 5-15	Appendix D. STANAG vs. Calculations Comparison.xlsx
Figure 5-16	Appendix D. STANAG vs. Calculations Comparison.xlsx
Figure 5-17	Appendix D. STANAG vs. Calculations Comparison.xlsx
Figure 5-18	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-19	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-20	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-21	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-22	Appendix F. Various HET Vehicles.xlsx
Figure 5-23	Appendix F. Various HET Vehicles.xlsx
Figure 5-24	Appendix F. Various HET Vehicles.xlsx
Figure 5-25	Appendix F. Various HET Vehicles.xlsx
Figure 5-26	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-27	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-28	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-29	Appendix G. Multiple MLC100W Vehicles Single Span.xlsx
Figure 5-30	Appendix G. Multiple MLC100W Vehicles Single Span.xlsx
Figure 5-31	Appendix G. Multiple MLC100W Vehicles Single Span.xlsx
Figure 5-32	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-33	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-34	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-35	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-36	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-37	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-38	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-39	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-40	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-41	Appendix E. Axle at Midspan Calculations.xlsx
Figure 5-42	Appendix E. Axle at Midspan Calculations.xlsx

Figure 5-43	Appendix E. Axle at Midspan Calculations.xlsx
Figure 6-4	Appendix I. Reliability Analysis.xlsx
Figure 6-5	Appendix I. Reliability Analysis.xlsx
Figure 6-6	Appendix I. Reliability Analysis.xlsx
Figure 6-7	Appendix I. Reliability Analysis.xlsx
Figure 6-8	Appendix I. Reliability Analysis.xlsx
Figure 6-9	Appendix I. Reliability Analysis.xlsx
Figure 6-10	Appendix I. Reliability Analysis.xlsx
Figure 6-11	Appendix I. Reliability Analysis.xlsx
Figure 6-12	Appendix I. Reliability Analysis.xlsx
Figure 6-13	Appendix I. Reliability Analysis.xlsx
Figure 6-14	Appendix I. Reliability Analysis.xlsx
Figure 6-15	Appendix I. Reliability Analysis.xlsx
Figure 6-16	Appendix I. Reliability Analysis.xlsx
Figure 6-17	Appendix I. Reliability Analysis.xlsx
Figure 6-18	Appendix I. Reliability Analysis.xlsx
Figure 6-19	Appendix I. Reliability Analysis.xlsx
Figure 6-20	Appendix I. Reliability Analysis.xlsx
Figure 6-21	Appendix I. Reliability Analysis.xlsx
Figure 7-1	Appendix E. Axle at Midspan Calculations.xlsx
Figure 7-2	Appendix E. Axle at Midspan Calculations.xlsx
Figure 7-3	Appendix E. Axle at Midspan Calculations.xlsx
Figure 7-4	Appendix E. Axle at Midspan Calculations.xlsx

## TABLES <sup>2,3,4</sup>

Table 5-1	Appendix C. Max Moment Location Calculations.xlsx
Table 5-2	Appendix C. Max Moment Location Calculations.xlsx
Table 5-3	Appendix C. Max Moment Location Calculations.xlsx
Table 5-4	Appendix D. STANAG vs. Calculations Comparison.xlsx Appendix E. Axle at Midspan Calculations.xlsx
Table 5-5	Appendix D. STANAG vs. Calculations Comparison.xlsx Appendix E. Axle at Midspan Calculations.xlsx
Table 5-6	Appendix E. Axle at Midspan Calculations.xlsx Appendix F. Various HET Vehicles.xlsx
Table 5-7	Appendix G. Multiple MLC100W Vehicles Single Span.xlsx
Table 5-8	Appendix G. Multiple MLC100W Vehicles Single Span.xlsx
Table 5-9	Appendix E. Axle at Midspan Calculations.xlsx Appendix G. Multiple MLC100W Vehicles Single Span.xlsx
Table 5-10	Appendix E. Axle at Midspan Calculations.xlsx Appendix H. Special Permit Vehicles.xlsx
Table 5-11	Appendix E. Axle at Midspan Calculations.xlsx Appendix H. Special Permit Vehicles.xlsx
Table 6-1	Appendix I. Reliability Analysis.xlsx
Table 7-1	Appendix E. Axle at Midspan Calculations.xlsx

### **B.1 APPENDIX B END NOTES**

1. See page vii for location of the figure in text
2. All file names begin with prefix “WP Parker 2019 UNO MSCE”
3. See page xvii for location of the table in text
4. The source data for these tables was consolidated and formatted into the tables that are included in an Microsoft Excel 2013 file entitled “WP Parker 2019 UNO MSCE Appendix J. Consolidated Tables 5.1-5.11 and 7.1.”

## APPENDIX C: MAXIMUM MOMENT CALCULATIONS

File Name: WP Parker 2019 UNO MSCE Appendix C. Max Moment Location Calculations

Contents (worksheets/tab names included in the Excel workbook are):	Page
Calculation Worksheets .....	C-2
Locate Max M,100',HL93 No Dyn I .....	C-3
Locate Max M,200',HL93 No Dyn I .....	C-5
Locate Max M,100',HL93 w. Dyn I .....	C-7
Locate Max M,200',HL93 w. Dyn I .....	C-9
Locate Max Mom, OHBD, 100ft .....	C-11
Locate Max Mom,CAN-CSA, 100ft .....	C-13
Locate Max Mom, MLC 40W, 100 ft .....	C-15
Locate Max Mom, MLC 50W, 100 ft .....	C-17
Locate Max Mom, MLC 60W, 100 ft .....	C-19
Locate Max Mom, MLC 70W, 100 ft .....	C-21
Locate Max Mom, MLC 80W, 100 ft .....	C-23
Locate Max Mom, MLC 90W, 100 ft .....	C-25
Locate Max Mom, MLC 100W, 100ft .....	C-27
Locate Max Mom, MLC 120W, 100ft .....	C-29
Tables (Tabulated Results from Calculation Worksheets) .....	C-31
Compare HL93 Max Mid vs Abs Mom .....	C-32
Figures .....	C-33
5-3.Locate Max M,100',HL93 No I .....	C-34
5-4.Locate Max M,200',HL93 No I .....	C-35
5-5.Locate Max M,100',HL93 w.I .....	C-36
5-6.Locate Max M,200',HL93 w.I .....	C-37
5-7.Compar Max Abs vs Midspan M .....	C-38
5-8.Diff Max Abs vs Midspan M's .....	C-39
5-9.Loc Max M,100',MLC 50W,No I .....	C-40
5-10.Loc MaxM,100',MLC100W,No I .....	C-41

## APPENDIX D: APPENDIX D: STANAG/FM VS. CALCULATIONS COMPARISON

File Name: WP Parker 2019 UNO MSCE Appendix D. STANAG vs. Calculations Comparison.xlsx

<u>Contents (worksheets/tab names included in the Excel workbook are):</u>	<u>Page</u>
Calculation Worksheets .....	D-2
MLC T-Vehs,Max M,30-100' FM chk .....	D-3
MLC T-Vehs,Max M,45-130' FM chk .....	D-4
MLC 40W,Max Mid M, 45-130' vsFM .....	D-5
MLC 50W,Max Mid M, 45-130' vsFM .....	D-6
MLC 60W,Max Mid M, 45-130' vsFM .....	D-7
MLC 70W,Max Mid M, 45-130' vsFM .....	D-8
MLC 80W,Max Mid M, 45-130' vsFM .....	D-9
MLC 90W,Max Mid M, 45-130' vsFM .....	D-10
MLC 100W,Max Mid M,45-130' vsFM .....	D-11
MLC 120W,Max Mid M,45-130' vsFM .....	D-12
MLC 40W,Max Abs M,45-130' vs FM .....	D-13
MLC 50W,Max Abs M,45-130' vs FM .....	D-14
MLC 60W,Max Abs M,45-130' vs FM .....	D-15
MLC 70W,Max Abs M,45-130' vs FM .....	D-16
MLC 80W,Max Abs M,45-130' vs FM .....	D-17
MLC 90W,Max Abs M,45-130'vs FM .....	D-18
MLC 100W,Max Abs M,45-130'vs FM .....	D-19
MLC 120W,Max Abs M,45-130'vs FM .....	D-20
Tables (Tabulated Results from Calculation Worksheets) .....	D-21
Compare Calc Max Abs M vs FM .....	D-22
Compare Calc Max MidspanM vs FM .....	D-25
Print Table Calc AbsMaxM vs FM .....	D-28
Perc Diff Max Midspan M vs AbsM .....	D-31
Figures .....	D-32
5-11. Shear 40T-120T 30-100ft .....	D-33
5-12. Moment 40T-120T 30-100ft .....	D-34
5-13. Shear 40W-120W 45-130ft .....	D-35
5-14. AbsMaxM 40W-120W 45-130ft .....	D-36
5-15. MidspanM 40W-120W 45-130ft .....	D-37
5-16. % Diff MidM vs. AbsMaxM .....	D-38
5-17. % Diff AbsMaxM Pos v. Mid .....	D-39
5-16A. % Diff Moments 0-1000 ft .....	D-40
5-17A. %Diff MaxM v. Mid,0-1000ft .....	D-41

## APPENDIX E: AXLE AT MIDSPAN CALCULATIONS

File Name: WP Parker 2019 UNO MSCE Appendix E. Axle at Midspan Calculations.xlsx

<u>Contents (worksheets/tab names included in the Excel workbook are):</u>	<u>Page</u>
Calculation Worksheets .....	E-2
MLC Track Vehs,Max V-M, 50-1000 .....	E-3
MLC 40W,Max V-M, 50-1000' spans .....	E-4
MLC 50W,Max V-M, 50-1000' spans .....	E-5
MLC 60W,Max V-M, 50-1000' spans .....	E-6
MLC 70W,Max V-M, 50-1000' spans .....	E-7
MLC 80W,Max V-M, 50-1000' spans .....	E-8
MLC 90W,Max V-M, 50-1000' spans .....	E-9
MLC 100W,Max V-M,50-1000' spans .....	E-10
MLC 120W,Max V-M,50-1000' spans .....	E-11
Uniform Loads,Max V-M,50-1000ft .....	E-12
HL93 NoImpact,Max V-M,50-1000ft .....	E-13
HL93+Impact, Max V-M, 50-1000ft .....	E-14
OHBD, Max V-M, 50-1000 ft .....	E-15
CAN-CSA, Max V-M, 50-1000 ft .....	E-16
Zhao Tabatabai,Max VM,50-1000ft .....	E-17
Wis SPV,Max V-M,50-1000 ft .....	E-18
STANAG HET,MaxMidspan,50-1K ft .....	E-20
KS DOT HET,MaxMidspan,50-1K ft .....	E-22
PropStdHET,MaxMidspan,50-1K ft .....	E-24
Tables (Tabulated Results from Calculation Worksheets) .....	E-26
Analyses Results, All,Tabulated .....	E-27
MaxVMmid,nrml HL93 noDyn, 50-1K .....	E-28
HL93 vs ProStd HET+MLC100W .....	E-29
Figures .....	E-30
5-18. Shear, MLCs HL93 NoImpact .....	E-31
5-19.Moment, MLCs HL93 NoImpact .....	E-32
5-20.Shear, MLCs HL93 nrml No I .....	E-33
5-21.Moment,MLCs HL93 nrml No I .....	E-34
5-26. % diff,AbsMax v MidspnM .....	E-35
5-27. Shear,MLC 100W+HETs, No I .....	E-36
5-28. Moment,MLC 100W+HETs,No I .....	E-37
5-32. 1-3x MLC 100W V,w Impact .....	E-38
5-33. 1-3x MLC 100W M,w Impact .....	E-39
5-34. 1-3x MLC 100W Shear Nrml .....	E-40
5-35. 1-3x MLC 100W Moment Nrml .....	E-41
5-36. Misc Design Codes, Shear .....	E-42
5-37. Misc Design Codes, Moment .....	E-43
5-38. Design Codes, Shear, Nrml .....	E-44
5-39. Design Codes, Moment,Nrml .....	E-45



5-40. 1-3MLC+SPVs Shear, Nrml .....	E-46
5-41. 1-3MLC+SPVs Moment, Nrml .....	E-47
5-42. LADV11+70T Shear, Nrml .....	E-48
5-43. LADV11+70T Moment, Nrml .....	E-49
7-1. New Cond II Shear wLADV11 .....	E-50
7-2. New Cond II Moment wLADV11 .....	E-51
7-3. New MFs Other LL, Shear .....	E-52
7-4. New MFs Other LL, Moment .....	E-53

## APPENDIX F: VARIOUS HEAVY EQUIPMENT TRANSPORT (HET) VEHICLES

File Name: WP Parker 2019 UNO MSCE Appendix F. Various HET Vehicles.xlsx

Contents (worksheets/tab names included in the Excel workbook are):	Page
Calculation Worksheets.....	F-2
STANAG HET, Max M 4-R, 300'span .....	F-3
STANAG HET, Max M R-5, 300'span .....	F-7
STANAG HET,M vic mid,300'span .....	F-11
STANAG HET,MaxM56,50-1000'spans .....	F-15
KS DOT HET, Max M 4-R, 300'span .....	F-19
KS DOT HET, Max M R-5, 300'span .....	F-23
KS DOT HET,M vic mid,300'span .....	F-27
KS DOT HET,MaxM56,50-1000'spans .....	F-31
Prop Std HET,MaxM 4-R, 300'span .....	F-35
Prop Std HET,MaxM R-5, 300'span .....	F-39
Pro Std HET,M vic mid,300'span .....	F-43
PropStdHET,MaxM56,50-1000'spans .....	F-47
Tables (Tabulated Results from Calculation Worksheets) .....	N/A
None	
Figures .....	F-51
5-23. STANAG HET,M vic midspan .....	F-52
5-24. KS DOT HET,M vic midspan .....	F-53
5-25. Pro Std HET,M vic midspan .....	F-54

**APPENDIX G: MULTIPLE MLC 100W VEHICLES ON A SINGLE SPAN**

File Name: WP Parker 2019 UNO MSCE Appendix G. Multiple MLC100W Vehicles Single Span.xlsx

Contents (worksheets/tab names included in the Excel workbook are):	Page
Calculation Worksheets.....	G-2
MLC 100W, 387' L, 300' sep, 2V .....	G-3
MLC 100W, 400' L, 300' sep, 2V .....	G-7
MLC 100W, 450' L, 300' sep, 2V .....	G-11
MLC 100W, 500' L, 300' sep, 2V .....	G-15
MLC 100W, 550' L, 300' sep, 2V .....	G-19
MLC 100W, 600' L, 300' sep, 2V .....	G-23
MLC 100W, 650' L, 300' sep, 2V .....	G-27
MLC 100W, 700' L, 300' sep, 2V .....	G-31
MLC 100W, 730' L, 300' sep, 2V .....	G-35
MLC 100W, 750' L, 300' sep, 2V .....	G-39
MLC 100W, 800' L, 300' sep, 2V .....	G-43
MLC 100W, 850' L, 300' sep, 2V .....	G-47
MLC 100W, 900' L, 300' sep, 2V .....	G-51
MLC 100W, 950' L, 300' sep, 2V .....	G-55
MLC 100W, 1000' L, 300' sep, 2V .....	G-59
MLC 100W, 730' L, 300' sep, 3V .....	G-63
MLC 100W, 800' L, 300' sep, 3V .....	G-67
MLC 100W, 900' L, 300' sep, 3V .....	G-71
MLC 100W, 1000' L, 300' sep, 3V .....	G-75
Tables (Tabulated Results from Calculation Worksheets) .....	N/A
None	
Figures.....	G-79
5-29. 2xMLC100W, 450'at 300'sep .....	G-80
5-30. 2xMLC100W, 730'at 300'sep .....	G-81
5-31. 3xMLC100W, 900'at 300'sep .....	G-82

## APPENDIX H: SPECIAL PERMIT VEHICLES CALCULATIONS

File Name: WP Parker 2019 UNO MSCE Appendix H. Special Permit Vehicles.xlsx

<u>Contents (worksheets/tab names included in the Excel workbook are):</u>	<u>Page</u>
Calculation Worksheets .....	H-2
LASDV-5 (10 axle), 100' span .....	H-3
LASDV-5 (10 axle), 200' span .....	H-6
LASDV-5 (10 axle), 300' span .....	H-9
LASDV-5 (10 axle), 400' span .....	H-12
LASDV-5 (10 axle), 500' span .....	H-15
LASDV-5 (10 axle), 600' span .....	H-18
LASDV-5 (10 axle), 700' span .....	H-21
LASDV-5 (10 axle), 800' span .....	H-24
LASDV-5 (10 axle), 900' span .....	H-27
LASDV-5 (10 axle), 1000' span .....	H-30
NW USA Permit WA-02, 100' span .....	H-33
NW USA Permit WA-02, 200' span .....	H-37
NW USA Permit WA-02, 300' span .....	H-41
NW USA Permit WA-02, 400' span .....	H-45
NW USA Permit WA-02, 500' span .....	H-49
NW USA Permit WA-02, 600' span .....	H-53
NW USA Permit WA-02, 700' span .....	H-57
NW USA Permit WA-02, 800' span .....	H-61
NW USA Permit WA-02, 900' span .....	H-65
NW USA Permit WA-02, 1000' span .....	H-69
Wis-SPV,MaxM 4-R, 100' span .....	H-73
Wis-SPV,MaxM 4-R, 200' span .....	H-77
Wis-SPV,MaxM 4-R, 300' span .....	H-81
Wis-SPV,MaxM 4-R, 400' span .....	H-85
Wis-SPV,MaxM 4-R, 500' span .....	H-89
Wis-SPV,MaxM 4-R, 600' span .....	H-93
Wis-SPV,MaxM 4-R, 700' span .....	H-97
Wis-SPV,MaxM 4-R, 800' span .....	H-101
Wis-SPV,MaxM 4-R, 900' span .....	H-105
Wis-SPV,MaxM 4-R, 1000' span .....	H-109
Tables (Tabulated Results from Calculation Worksheets) .....	N/A
None	
Figures .....	N/A
None	

**APPENDIX I: RELIABILITY ANALYSIS CALCULATIONS**

File Name: WP Parker 2019 UNO MSCE Appendix I. Reliability Analysis.xlsx

<u>Contents (worksheets/tab names included in the Excel workbook are):</u>	<u>Page</u>
Calculation Worksheets .....	I-2
Locate Max M 100W Frt 3axles .....	I-3
Locate Max M 100W Rear 3axles .....	I-4
Locate Max M 100W Frt 4axles .....	I-5
Locate Max M 100W Rear 4axles .....	I-6
MaxM 100W Front 3axle, Var Span .....	I-7
MaxM 100W Rear 3axles, Var Span .....	I-8
Max M 100W Frt 4axles, Var Span .....	I-9
MaxM 100W Rear 4axles, Var Span .....	I-10
MLC 100W, <= 44', Full Vehicle .....	I-11
Prop Std HET, Full Veh,Var Span .....	I-12
Prop Std HET,MaxM,82', full veh .....	I-13
Prop Std HET,MaxM,80', full veh .....	I-14
Prop Std HET,MaxM,75', full veh .....	I-15
Prop Std HET,MaxM,72', full veh .....	I-16
Prop Std HET,MaxM,70', full veh .....	I-17
Prop Std HET,MaxM,65', full veh .....	I-18
Prop Std HET,MaxM,62', full veh .....	I-19
Prop Std HET,MaxM, 90', Axs 2-9 .....	I-20
Prop Std HET,MaxM, 82', Axs 2-9 .....	I-21
Prop Std HET,MaxM, 80', Axs 2-9 .....	I-22
Prop Std HET,MaxM, 75', Axs 2-9 .....	I-23
Prop Std HET,MaxM, 72', Axs 2-9 .....	I-24
Prop Std HET,MaxM, 70', Axs 2-9 .....	I-25
Prop Std HET,MaxM, 65', Axs 2-9 .....	I-26
Prop Std HET,MaxM, 62', Axs 2-9 .....	I-27
Prop Std HET,MaxM, 60', Axs 2-9 .....	I-28
Prop Std HET,MaxM, 55', Axs 2-9 .....	I-29
Prop Std HET,MaxM, 53.25', 2-9 .....	I-30
Prop Std HET,MaxM, 52', Axs 2-9 .....	I-31
Prop Std HET,MaxM, 50', Axs 2-9 .....	I-32
Prop Std HET,MaxM, 49', Axs 2-9 .....	I-33
Prop Std HET,MaxM, 60', Axs 3-9 .....	I-34
Prop Std HET,MaxM, 55', Axs 3-9 .....	I-35
Prop Std HET,MaxM, 52', Axs 3-9 .....	I-36
Prop Std HET,MaxM, 50', Axs 3-9 .....	I-37
Prop Std HET,MaxM, 49', Axs 3-9 .....	I-38
Prop Std HET,MaxM, 47', Axs 3-9 .....	I-39
Prop Std HET,MaxM, 45', Axs 3-9 .....	I-40
Prop Std HET,MaxM, 44', Axs 3-9 .....	I-41
Prop Std HET,MaxM, 60', Axs 4-9 .....	I-42

Prop Std HET,MaxM, 55', Axs 4-9 .....	I-43
Prop Std HET,MaxM, 52', Axs 4-9 .....	I-44
Prop Std HET,MaxM, 50', Axs 4-9 .....	I-45
Prop Std HET,MaxM, 49', Axs 4-9 .....	I-46
Prop Std HET,MaxM, 47', Axs 4-9 .....	I-47
Prop Std HET,MaxM, 45', Axs 4-9 .....	I-48
Prop Std HET,MaxM, 44', Axs 4-9 .....	I-49
Prop Std HET,MaxM, 42', Axs 4-9 .....	I-50
Prop Std HET,MaxM, 40',Axs 4-9 .....	I-51
Prop Std HET,MaxM, 39', Axs 4-9 .....	I-52
HET, Ax 2-9, 13'offset, 65 ft .....	I-53
HET, Ax 2-9, 13'offset,var span .....	I-54
HET, Ax 3-9, 5'offset, 60 ft .....	I-55
HET, Ax 3-9, 5'offset,var span .....	I-56
HET, Ax 4-9, 5'offset, 60 ft .....	I-57
HET, Ax 4-9, 5'offset,var span .....	I-58
Tables (Tabulated Results from Calculation Worksheets) .....	I-59
6-1. Beta Database Calcs .....	I-60
Figures .....	I-66
6-4.Plot Probability of Failure .....	I-67
6-5. AASHTO Std I-Beam Types .....	I-68
6-6. 230K HET MaxV-M 4-100 ft .....	I-69
6-7. MLC 100W MaxV-M 4-180 ft .....	I-70
6-8. Max Shear, Var LL+Est DL .....	I-71
6-9. Max Moment, Var LL+Est DL .....	I-72
6-10. Calc Beta, 1x Lane, Shear .....	I-73
6-11. Calc Beta, 1x Lane,Moment .....	I-74
6-12.Calc Beta,HET+Convoy,Shear .....	I-75
6-13.Calc Beta,HET+Convy,Moment .....	I-76
6-14.Unfact Beta,1x Lane, Shear .....	I-77
6-15.Unfact Beta,1x Lane,Moment .....	I-78
6-16. NF Beta,HET+Convoy,Shear .....	I-79
6-17.NF Beta,HET+Convoy,Moment .....	I-80
6-18.Trad FS,Shear,SR div UFTS .....	I-81
6-19.Trad FS,Moment,MR div UFTM .....	I-82
6-20. FS vs Beta,combined V & M .....	I-83
6-21. Betas vs Var Lane Loading .....	I-84

## APPENDIX J: CONSOLIDATED TABLES

File Name: WP Parker 2019 UNO MSCE Appendix J. Consolidated Tables 5.1-5.11 and 7.1.xlsx

Contents (worksheets/tab names included in the Excel workbook are): Page

Table 5-1: Maximum Moments for AASHTO HL-93 Design Truck and Lane Load .....	J-2
Table 5-2: Maximum End Shear and Mid-span Moment for AASHTO HL-93 Design Truck and Lane Load of Span Lengths for Various Span Lengths .....	J-3
Table 5-3: Variations in Maximum Moment Magnitude and Location for AASHTO HL-93 Design Truck and Lane Load for Various Span Lengths .....	J-4
Table 5-4: Maximum End Shear for MLC 40 to 120 Hypothetical Wheeled and Tracked Vehicles on 50 to 1,000 ft (15.2 – 304.8 m) Spans .....	J-5
Table 5-5: Maximum Mid-span Moments for MLC 40 to 120 Hypothetical Wheeled and Tracked Vehicles on 50 to 1,000 ft (15.2 – 304.8 m) Spans .....	J-7
Table 5-6: Maximum End Shear and Mid-span Moments for HET systems and Single MLC100W Hypothetical Wheeled Vehicle, Various Span Lengths .....	J-9
Table 5-7: Maximum End Shears for 1-3 MLC100W Hypothetical Vehicles .....	J-11
Table 5-8: Maximum Moments for 1-3 MLC100W Hypothetical Vehicles .....	J-12
Table 5-9: Maximum End Shear and Mid-span Moments for Various Uniform Loads and 1-3 MLC100W Hypothetical Wheeled Vehicles, Various Span Lengths .....	J-13
Table 5-10: Maximum Shear and Mid-span Moments for State Permit Vehicles and 1-3 MLC100W Hypothetical Wheeled Vehicles on 50 to 1,000 ft (15.2 – 304.8 m) Span Length Simple Beams .....	J-15
Table 5-11: Maximum Shear and Mid-span Moments per Louisiana DOTD BDEM and 1-3 MLC100W Hypothetical Wheeled Vehicles on 50 to 1,000 ft (15.2 – 304.8 m) Span Length Simple Beams .....	J-17
Table 7-1: Proposed New Military Live Load Magnification Factors .....	J-19

## APPENDIX C: MAXIMUM MOMENT CALCULATIONS

**Filename: WP Parker UNO 2019 MSCE Thesis Data - Appendix C. Max Moment Location Calculations.xlsx**

**Contents (worksheets/tab names included in the Excel workbook are):**

<u>Calculation Worksheets</u>	<u>Page</u>	<u>Tables</u>	<u>Page</u>
Locate Max M,100',HL93 No Dyn I	C-2		C-31
Locate Max M,200',HL93 No Dyn I	C-3	Compare HL93 Max Mid vs Abs Mom	C-32
Locate Max M,100',HL93 w. Dyn I	C-5		
Locate Max M,200',HL93 w. Dyn I	C-7	<u>Figures</u>	C-33
Locate Max Mom, OHBD, 100ft	C-9	5-3.Locate Max M,100',HL93 No I	C-34
Locate Max Mom,CAN-CSA, 100ft	C-11	5-4.Locate Max M,200',HL93 No I	C-35
Locate Max Mom, MLC 40W, 100 ft	C-13	5-5.Locate Max M,100',HL93 w.I	C-36
Locate Max Mom, MLC 50W, 100 ft	C-15	5-6.Locate Max M,200',HL93 w.I	C-37
Locate Max Mom, MLC 60W, 100 ft	C-17	5-7.Compar Max Abs vs Midspan M	C-38
Locate Max Mom, MLC 70W, 100 ft	C-19	5-8.Diff Max Abs vs Midspan M's	C-39
Locate Max Mom, MLC 80W, 100 ft	C-21	5-9.Loc Max M,100',MLC 50W,No I	C-40
Locate Max Mom, MLC 90W, 100 ft	C-23	5-10.Loc MaxM,100',MLC100W,No I	C-41
Locate Max Mom, MLC 100W, 100ft	C-25		
Locate Max Mom, MLC 120W, 100ft	C-27		
	C-29		



## **CALCULATION WORKSHEETS**

Locate Max M,100',HL93 No Dyn I  
Locate Max M,200',HL93 No Dyn I  
Locate Max M,100',HL93 w. Dyn I  
Locate Max M,200',HL93 w. Dyn I  
Locate Max Mom, OHBD, 100ft  
Locate Max Mom,CAN-CSA, 100ft  
Locate Max Mom, MLC 40W, 100 ft  
Locate Max Mom, MLC 50W, 100 ft  
Locate Max Mom, MLC 60W, 100 ft  
Locate Max Mom, MLC 70W, 100 ft  
Locate Max Mom, MLC 80W, 100 ft  
Locate Max Mom, MLC 90W, 100 ft  
Locate Max Mom, MLC 100W, 100ft  
Locate Max Mom, MLC 120W, 100ft

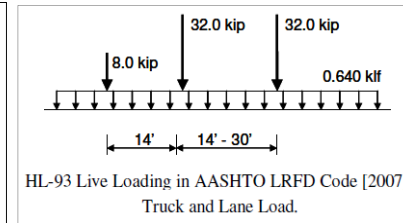
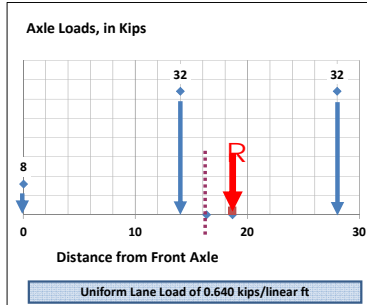
**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**      **THREE (3) AXLE**      **AASHTO LRFD (2007) HL-93, on 100 ft Span, No Dyn Impact**

Uniform Lane Loading:  Kips per Linear Ft

Dynamic Impact Factor:

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	4.0	8.0		0.0	35.59	0
2	16.0	32.0	14.00	14.0	142.34	427
Max Moment		0.0	2.333	16.3	0.00	498
Resultant		0.0	2.333	18.7	0.00	569
(Rear) 3	16.0	32.0	9.333	28.0	142.34	853
Totals	36.0	72.0	28.00		284.69	
				Resultant at location:	18.666	569
				Distance to Nearest Axle, "xR":	4.666 (Rear of Axle # 2)	

ft Span Length



Position of Midspan	Front #1 Axle	Middle #2 Axle	Location Max Moment	Resultant Location	Rear #3 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	L END
1/2 "xR" Fwd of Middle Axle #2	38.33	52.33	54.67	57.00	66.33	33.67
Middle Axle #2 at Mid-span	36.00	50.00	52.33	54.67	64.00	36.00
Btwn Middle Axle #2 & Resultant	33.67	47.67	50.00	52.33	61.67	38.33
Resultant at Mid-span	31.33	45.33	47.67	50.00	59.33	40.67
1/2 "xR" Rear of Resultant	29.00	43.00	45.33	47.67	57.00	43.00
Front Axle #1 at Front Support	0.00	14.00	16.33	18.67	28.00	72.00
Rear Axle #3 at Rear Supt (Max V)	72.00	86.00	88.33	90.67	100.00	0.00

SHEAR DUE TO AXLE CONCENTRATED LOADS ONLY						
Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Max Moment	Shear at Resultant Location	Shear at Rear #3 Axle	Reaction at Support "B"
RA	R-1	R-2	R-3	R-4	R-5	RB
kips	kips	kips	kips	kips	kips	kips
30.96	22.96	-9.04	-9.04	-9.04	-41.04	41.04
32.64	24.64	-7.36	-7.36	-7.36	-39.36	39.36
34.32	26.32	-5.68	-5.68	-5.68	-37.68	37.68
36.00	28.00	-4.00	-4.00	-4.00	-36.00	36.00
37.68	29.68	-2.32	-2.32	-2.32	-34.32	34.32
58.56	50.56	18.56	18.56	18.56	-13.44	13.44
6.72	-1.28	-33.28	-33.28	-33.28	-65.28	65.28

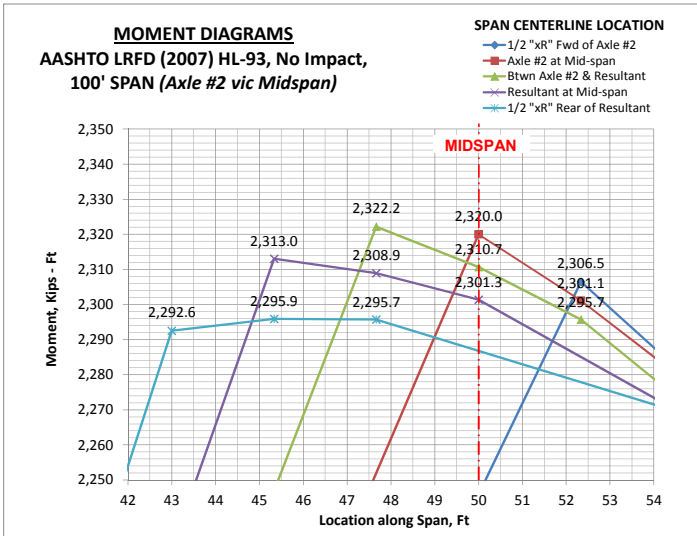
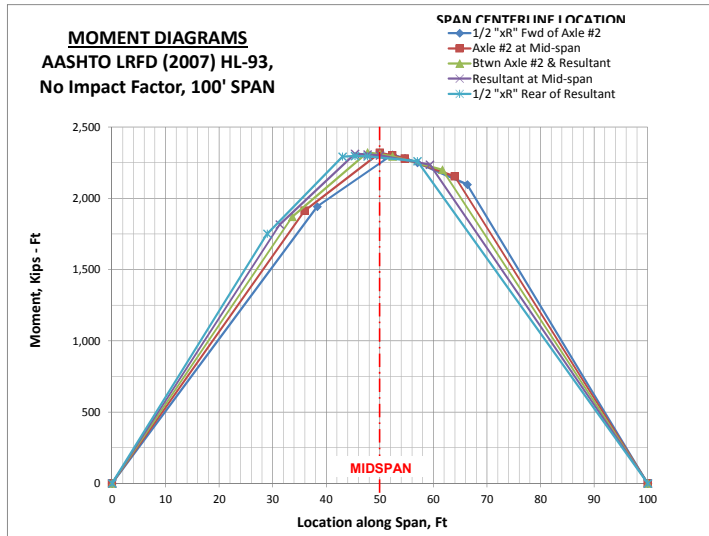
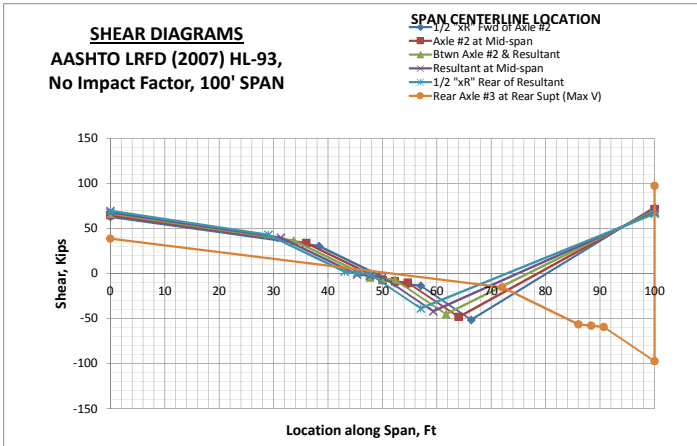
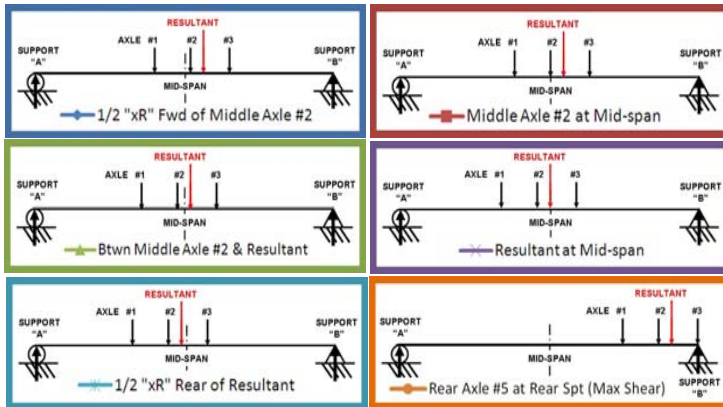
SHEAR DUE TO UNIFORM LINE LOAD						
Lane Load Reaction at Support "A"	Lane Load Shear at Front #1 Axle	Lane Load Shear at Middle #2 Axle	Lane Load Shear at Max Moment	Lane Load Shear at Resultant Location	Lane Load Shear at Rear #3 Axle	Lane Load Reaction at Support "B"
RA (U)	R-1 (U)	R-2 (U)	R-3 (U)	R-4 (U)	R-5 (U)	RB (U)
kips	kips	kips	kips	kips	kips	kips
32.00	7.47	-1.49	-2.99	-4.48	-10.45	32.00
32.00	8.96	0.00	-1.49	-2.99	-8.96	32.00
32.00	10.45	1.49	0.00	-1.49	-7.47	32.00
32.00	11.95	2.99	1.49	0.00	-5.97	32.00
32.00	13.44	4.48	2.99	1.49	-4.48	32.00
32.00	32.00	23.04	21.55	20.05	14.08	32.00
32.00	-14.08	-23.04	-24.53	-26.03	-32.00	32.00

MOMENT DUE TO UNIFORM LINE LOAD						
Lane Load Moment at Support "A"	Lane Load Moment at Front #1 Axle	Lane Load Moment at Middle #2 Axle	Lane Load Moment at Max Moment	Lane Load Moment at Resultant Location	Lane Load Moment at Rear #3 Axle	Lane Load Moment at Support "B"
M-RA (U)	M-1 (U)	M-2 (U)	M-3 (U)	M-4 (U)	M-5 (U)	M-RB (U)
kips	kips	kips	kips	kips	kips	kips
0.00	756.44	798.26	793.03	784.32	714.64	0.00
0.00	737.28	800.00	798.26	793.03	737.29	0.00
0.00	714.63	798.26	800.00	798.26	756.45	0.00
0.00	688.50	793.03	798.26	800.00	772.13	0.00
0.00	658.89	784.32	793.03	798.26	784.32	0.00
0.00	0.00	385.28	437.29	485.82	645.11	0.00
0.00	645.11	385.26	329.76	270.78	0.00	0.00

COMBINED SHEAR (AXLE LOADS PLUS UNIFORM LANE LOADING)							COMBINED MOMENT (AXLE LOADS PLUS UNIFORM LANE LOADING)								
Mid-span Location (As defined by following stated condition)	Shear at React A, kips	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Max Moment	Shear at Resultant Location	Shear at Rear #3 Axle	Shear at React B, kips	Mid-span Location (As defined by following stated condition)	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Location Max Mom, ft-kips	Moment at Resultant, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
1/2 "xR" Fwd of Axle #2	62.96	30.43	-10.53	-12.03	-13.52	-51.49	73.04	1/2 "xR" Fwd of Axle #2	0.0	1,943.3	2,306.5	2,280.2	2,250.4	2,096.4	0.0
Span Position (from Left)	0.00	38.33	52.33	54.67	57.00	66.33	100.00	Span Position (from Left)	0.00	38.33	52.33	54.67	57.00	66.33	100.00
Axle #2 at Mid-span	64.64	33.60	-7.36	-8.85	-10.35	-48.32	71.36	Axle #2 at Mid-span	0.0	1,912.3	2,320.0	2,301.1	2,278.7	2,154.3	0.0
Span Position (from Left)	0.00	36.00	50.00	52.33	54.67	64.00	100.00	Span Position (from Left)	0.00	36.00	50.00	52.33	54.67	64.00	100.00
Btwn Axle #2 & Resultant	66.32	36.77	-4.19	-5.68	-7.17	-45.15	69.68	Btwn Axle #2 & Resultant	0.0	1,870.1	2,322.2	2,310.7	2,295.7	2,200.9	0.0
Span Position (from Left)	0.00	33.67	47.67	50.00	52.33	61.67	100.00	Span Position (from Left)	0.00	33.67	47.67	50.00	52.33	61.67	100.00
Resultant at Mid-span	68.00	39.95	-1.01	-2.51	-4.00	-41.97	68.00	Resultant at Mid-span	0.0	1,816.5	2,313.0	2,308.9	2,301.3	2,236.1	0.0
Span Position (from Left)	0.00	31.33	45.33	47.67	50.00	59.33	100.00	Span Position (from Left)	0.00	31.33	45.33	47.67	50.00	59.33	100.00
1/2 "xR" Rear of Resultant	69.68	43.12	2.16	0.67	-0.83	-38.80	66.32	1/2 "xR" Rear of Resultant	0.0	1,751.6	2,292.6	2,295.9	2,295.7	2,260.1	0.0
Span Position (from Left)	0.00	29.00	43.00	45.33	47.67	57.00	100.00	Span Position (from Left)	0.00	29.00	43.00	45.33	47.67	57.00	100.00
Front Axle #1 at Front Supt	90.56	82.56	41.60	40.11	38.61	0.64	45.44								
Span Position (from Left)	0.00	0.00	14.00	16.33	18.67	28.00	100.00								
Axle #3 at Rear Supt (Max V)	38.72	-15.36	-56.32	-57.81	-59.31	-97.28	97.28								
Span Position (from Left)	0.00	72.00	86.00	88.33	90.67	100.00	100.00								

**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR** | **THREE (3) AXLE** | **AASHTO LRFD (2007) HL-93, on 100 ft Span, No Dyn Impact**

Possible Axle Load Locations Corresponding to following Shear and Moment Diagrams



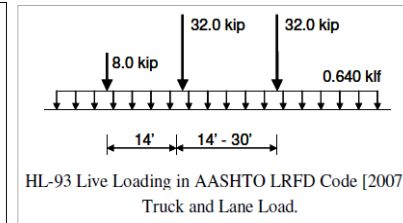
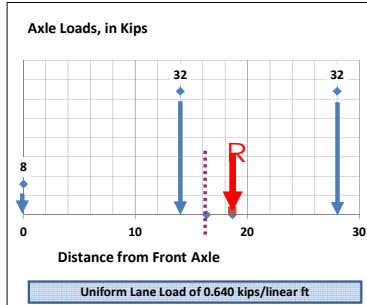
**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**      **THREE (3) AXLE**      **AASHTO LRFD (2007) HL-93, on 200 ft Span, No Dyn Impact**

Uniform Lane Loading:  Kips per Linear Ft

Dynamic Impact Factor:

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	4.0	8.0		0.0	35.59	0
2	16.0	32.0	14.00	14.0	142.34	427
Max Moment		0.0	2.333	16.3	0.00	498
Resultant		0.0	2.333	18.7	0.00	569
(Rear) 3	16.0	32.0	9.333	28.0	142.34	853
Totals	36.0	72.0	28.00		284.69	
		Resultant at location:		18.666		569
		Distance to Nearest Axle, "xR":	4.666	(Rear of Axle # 2)		

ft Span Length



Position of Midspan	Front #1 Axle	Middle #2 Axle	Location Max Moment	Resultant Location	Rear #3 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	L END
1/2 "xR" Fwd of Middle Axle #2	88.33	102.33	104.67	107.00	116.33	83.67
Middle Axle #2 at Mid-span	86.00	100.00	102.33	104.67	114.00	86.00
Btwn Middle Axle #2 & Resultant	83.67	97.67	100.00	102.33	111.67	88.33
Resultant at Mid-span	81.33	95.33	97.67	100.00	109.33	90.67
1/2 "xR" Rear of Resultant	79.00	93.00	95.33	97.67	107.00	93.00
Front Axle #1 at Front Support	0.00	14.00	16.33	18.67	28.00	172.00
Rear Axle #3 at Rear Supt (Max V)	172.00	186.00	188.33	190.67	200.00	0.00

SHEAR DUE TO AXLE CONCENTRATED LOADS ONLY						
Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Max Moment	Shear at Resultant Location	Shear at Rear #3 Axle	Reaction at Support "B"
RA	R-1	R-2	R-3	R-4	R-5	RB
kips	kips	kips	kips	kips	kips	kips
33.48	25.48	-6.52	-6.52	-6.52	-38.52	38.52
34.32	26.32	-5.68	-5.68	-5.68	-37.68	37.68
35.16	27.16	-4.84	-4.84	-4.84	-36.84	36.84
36.00	28.00	-4.00	-4.00	-4.00	-36.00	36.00
36.84	28.84	-3.16	-3.16	-3.16	-35.16	35.16
65.28	57.28	25.28	25.28	25.28	-6.72	6.72
3.36	-4.64	-36.64	-36.64	-36.64	-68.64	68.64

SHEAR DUE TO UNIFORM LINE LOAD						
Lane Load Reaction at Support "A"	Lane Load Shear at Front #1 Axle	Lane Load Shear at Middle #2 Axle	Lane Load Shear at Max Moment	Lane Load Shear at Resultant Location	Lane Load Shear at Rear #3 Axle	Lane Load Reaction at Support "B"
RA (U)	R-1 (U)	R-2 (U)	R-3 (U)	R-4 (U)	R-5 (U)	RB (U)
kips	kips	kips	kips	kips	kips	kips
64.00	7.47	-1.49	-2.99	-4.48	-10.45	64.00
64.00	8.96	0.00	-1.49	-2.99	-8.96	64.00
64.00	10.45	1.49	0.00	-1.49	-7.47	64.00
64.00	11.95	2.99	1.49	0.00	-5.97	64.00
64.00	13.44	4.48	2.99	1.49	-4.48	64.00
64.00	64.00	55.04	53.55	52.05	46.08	64.00
64.00	-46.08	-55.04	-56.53	-58.03	-64.00	64.00

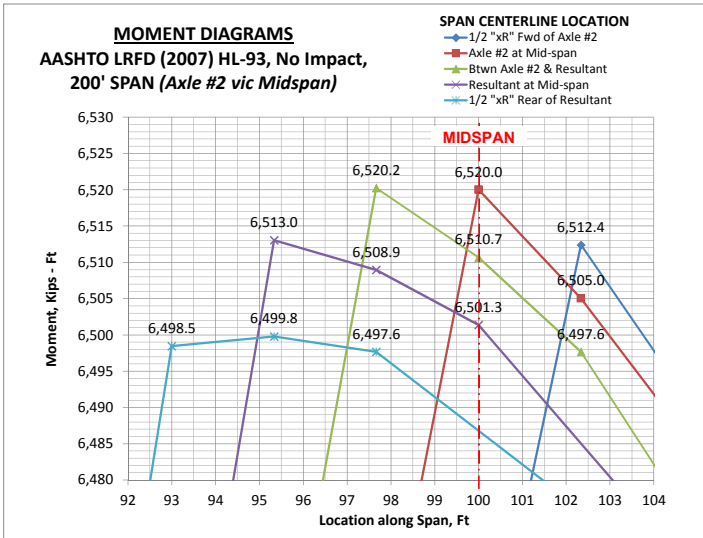
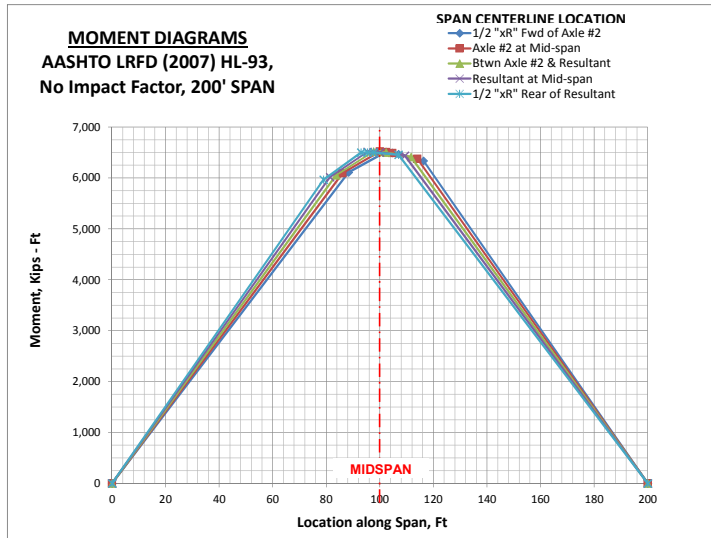
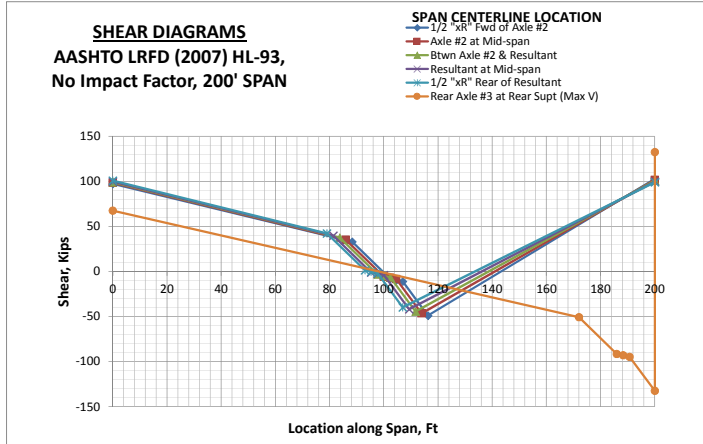
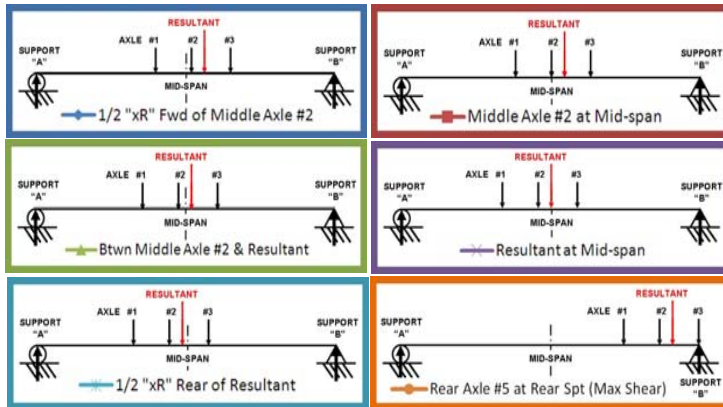
MOMENT DUE TO UNIFORM LINE LOAD						
Lane Load Moment at Support "A"	Lane Load Moment at Front #1 Axle	Lane Load Moment at Middle #2 Axle	Lane Load Moment at Max Moment	Lane Load Moment at Resultant Location	Lane Load Moment at Rear #3 Axle	Lane Load Moment at Support "B"
M-RA (U)	M-1 (U)	M-2 (U)	M-3 (U)	M-4 (U)	M-5 (U)	M-RB (U)
kips	kips	kips	kips	kips	kips	kips
0.00	3,156.44	3,198.26	3,193.03	3,184.32	3,114.64	0.00
0.00	3,137.28	3,200.00	3,198.26	3,193.03	3,137.29	0.00
0.00	3,114.63	3,198.26	3,200.00	3,198.26	3,156.45	0.00
0.00	3,088.50	3,193.03	3,198.26	3,200.00	3,172.13	0.00
0.00	3,058.89	3,184.32	3,193.03	3,198.26	3,184.32	0.00
0.00	0.00	833.28	959.95	1,083.13	1,541.07	0.00
0.00	1,541.07	833.22	703.07	569.44	0.00	0.00

COMBINED SHEAR (AXLE LOADS PLUS UNIFORM LANE LOADING)						
Mid-span Location (As defined by following stated condition)	Shear at React A, kips	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Max Moment	Shear at Resultant Location	Shear at Rear #3 Axle
1/2 "xR" Fwd of Axle #2	97.48	32.95	-8.01	-9.51	-11.00	-48.97
Span Position (from Left)	0.00	88.33	102.33	104.67	107.00	116.33
Axle #2 at Mid-span	98.32	35.28	-5.68	-7.17	-8.67	-46.64
Span Position (from Left)	0.00	86.00	100.00	102.33	104.67	114.00
Btwn Axle #2 & Resultant	99.16	37.61	-3.35	-4.84	-6.33	-44.31
Span Position (from Left)	0.00	83.67	97.67	100.00	102.33	111.67
Resultant at Mid-span	100.00	39.95	-1.01	-2.51	-4.00	-41.97
Span Position (from Left)	0.00	81.33	95.33	97.67	100.00	109.33
1/2 "xR" Rear of Resultant	100.84	42.28	1.32	-0.17	-1.67	-39.64
Span Position (from Left)	0.00	79.00	93.00	95.33	97.67	107.00
Front Axle #1 at Front Supt	129.28	121.28	80.32	78.83	77.33	39.36
Span Position (from Left)	0.00	0.00	14.00	16.33	18.67	28.00
Axle #3 at Rear Supt (Max V)	67.36	-50.72	-91.68	-93.17	-94.67	-132.64
Span Position (from Left)	0.00	172.00	186.00	188.33	190.67	200.00

COMBINED MOMENT (AXLE LOADS PLUS UNIFORM LANE LOADING)						
Mid-span Location (As defined by following stated condition)	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Location Max Mom, ft-kips	Moment at Resultant, ft-kips	Moment at Rear #3 Axle, ft-kips
1/2 "xR" Fwd of Axle #2	0.0	6,113.9	6,512.4	6,492.0	6,468.0	6,337.5
Span Position (from Left)	0.00	88.33	102.33	104.67	107.00	116.33
Axle #2 at Mid-span	0.0	6,088.8	6,520.0	6,505.0	6,486.5	6,377.8
Span Position (from Left)	0.00	86.00	100.00	102.33	104.67	114.00
Btwn Axle #2 & Resultant	0.0	6,056.4	6,520.2	6,510.7	6,497.6	6,410.7
Span Position (from Left)	0.00	83.67	97.67	100.00	102.33	111.67
Resultant at Mid-span	0.0	6,016.5	6,513.0	6,508.9	6,501.3	6,436.1
Span Position (from Left)	0.00	81.33	95.33	97.67	100.00	109.33
1/2 "xR" Rear of Resultant	0.0	5,969.3	6,498.5	6,499.8	6,497.6	6,454.2
Span Position (from Left)	0.00	79.00	93.00	95.33	97.67	107.00

**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR** | **THREE (3) AXLE** | **AASHTO LRFD (2007) HL-93, on 200 ft Span, No Dyn Impact**

Possible Axle Load Locations Corresponding to following Shear and Moment Diagrams



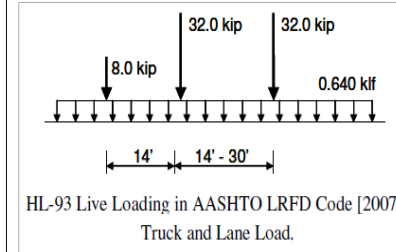
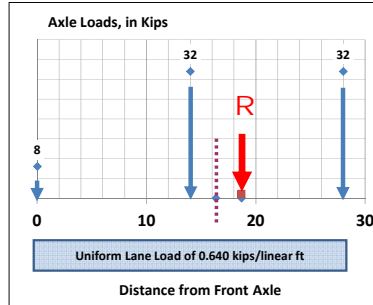
**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**      **THREE (3) AXLE**      **AASHTO LRFD (2007) HL-93, on 100 ft Span, w/ Impact**

Uniform Lane Loading:  Kips per Linear Ft

Dynamic Impact Factor:

Axle	Load (ST)		Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
	Load (kN)	Load (kips)			Load (kN)	Distance from front axle (cm)
(Front) 1	4.0	8.0	0.0	0.0	35.59	0
2	16.0	32.0	14.00	14.0	142.34	427
Max Moment	0.0	2.333	16.3	0.00	498	
Resultant	0.0	2.333	18.7	0.00	569	
(Rear) 3	16.0	32.0	9.333	28.0	142.34	853
Totals	36.0	72.0	28.00		284.69	
			Resultant at location:	18.666		569
			Distance to Nearest Axle, "xR":	4.666 (Rear of Axle # 2)		

ft Span Length



Position of Midspan	Front #1 Axle	Middle #2	Location Max	Resultant	Rear #3 Axle	Dist to Beam
	AX 1	AX 2	AX 3	AX 4	AX 5	L END
1/2 "xR" Fwd of Middle Axle #2	38.33	52.33	54.67	57.00	66.33	33.67
Middle Axle #2 at Mid-span	36.00	50.00	52.33	54.67	64.00	36.00
Btwn Middle Axle #2 & Resultant	33.67	47.67	50.00	52.33	61.67	38.33
Resultant at Mid-span	31.33	45.33	47.67	50.00	59.33	40.67
1/2 "xR" Rear of Resultant	29.00	43.00	45.33	47.67	57.00	43.00
Front Axle #1 at Front Support	0.00	14.00	16.33	18.67	28.00	72.00
Rear Axle #3 at Rear Supt (Max V)	72.00	86.00	88.33	90.67	100.00	0.00

SHEAR DUE TO AXLE CONCENTRATED LOADS ONLY						
Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Max Moment	Shear at Resultant Location	Shear at Rear #3 Axle	Reaction at Support "B"
RA	R-1	R-2	R-3	R-4	R-5	RB
kips	kips	kips	kips	kips	kips	kips
41.18	30.54	-12.02	-12.02	-12.02	-54.58	54.58
43.41	32.77	-9.79	-9.79	-9.79	-52.35	52.35
45.65	35.01	-7.55	-7.55	-7.55	-50.11	50.11
47.88	37.24	-5.32	-5.32	-5.32	-47.88	47.88
50.11	39.47	-3.09	-3.09	-3.09	-45.65	45.65
77.89	67.25	24.69	24.69	24.69	-17.87	17.87
8.94	-1.70	-44.26	-44.26	-44.26	-86.82	86.82

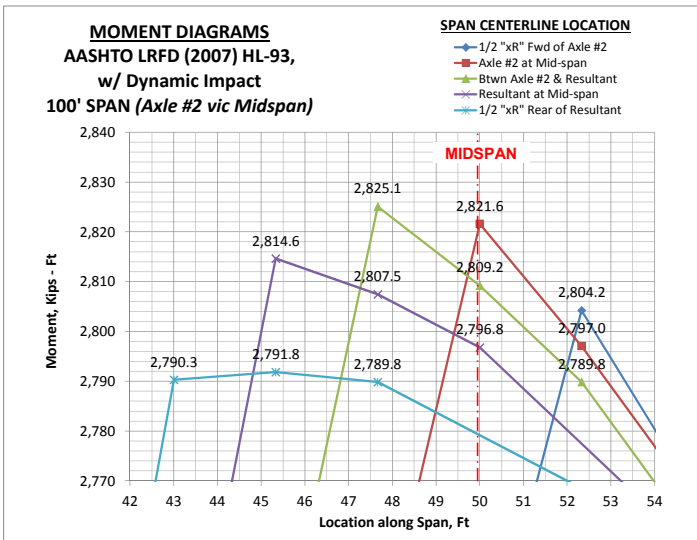
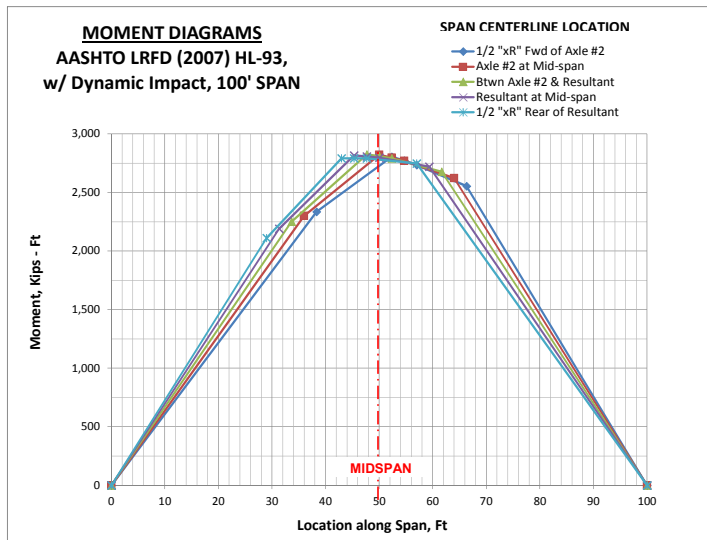
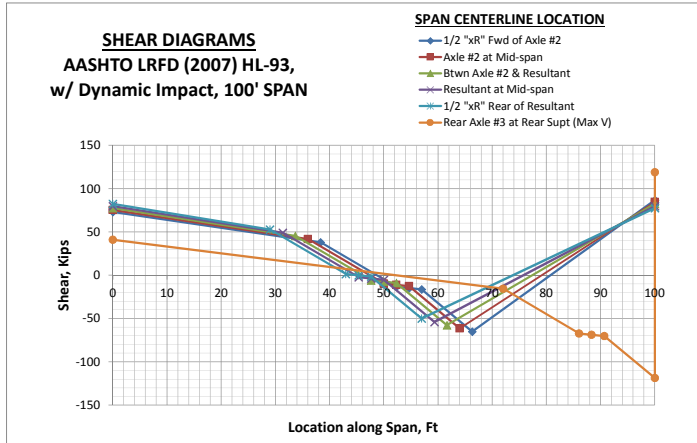
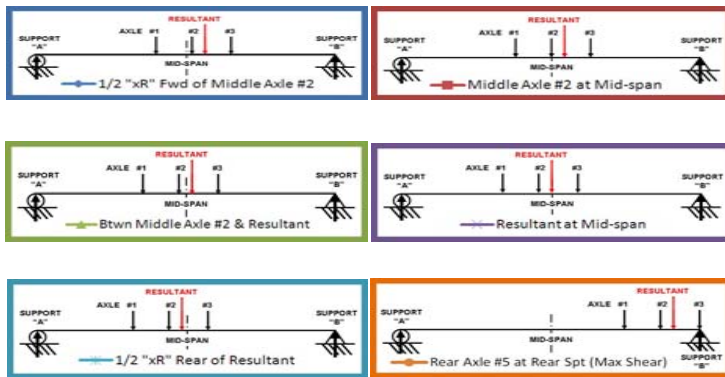
SHEAR DUE TO UNIFORM LINE LOAD						
Lane Load Reaction at Support "A"	Lane Load Shear at Front #1 Axle	Lane Load Shear at Middle #2 Axle	Lane Load Shear at Max Moment	Lane Load Shear at Resultant Location	Lane Load Shear at Rear #3 Axle	Lane Load Reaction at Support "B"
RA (U)	R-1 (U)	R-2 (U)	R-3 (U)	R-4 (U)	R-5 (U)	RB
kips	kips	kips	kips	kips	kips	(U)
32.00	7.47	-1.49	-2.99	-4.48	-10.45	32.00
32.00	8.96	0.00	-1.49	-2.99	-8.96	32.00
32.00	10.45	1.49	0.00	-1.49	-7.47	32.00
32.00	11.95	2.99	1.49	0.00	-5.97	32.00
32.00	13.44	4.48	2.99	1.49	-4.48	32.00
32.00	32.00	23.04	21.55	20.05	14.08	32.00
32.00	-14.08	-23.04	-24.53	-26.03	-32.00	32.00

MOMENT DUE TO UNIFORM LINE LOAD						
Lane Load Moment at Support "A"	Lane Load Moment at Front #1 Axle	Lane Load Moment at Middle #2 Axle	Lane Load Moment at Max Moment	Lane Load Moment at Resultant Location	Lane Load Moment at Rear #3 Axle	Lane Load Moment at Support "B"
M-RA (U)	M-1 (U)	M-2 (U)	M-3 (U)	M-4 (U)	M-5 (U)	M-RB (U)
kips	kips	kips	kips	kips	kips	kips
0.00	756.44	798.26	793.03	784.32	714.64	0.00
0.00	737.28	800.00	798.26	793.03	737.29	0.00
0.00	714.63	798.26	800.00	798.26	756.45	0.00
0.00	688.50	793.03	798.26	800.00	772.13	0.00
0.00	658.89	784.32	793.03	798.26	784.32	0.00
0.00	0.00	385.28	437.29	485.82	645.11	0.00
0.00	645.11	385.26	329.76	270.78	0.00	0.00

COMBINED SHEAR (AXLE LOADS PLUS UNIFORM LANE LOADING)							COMBINED MOMENT (AXLE LOADS PLUS UNIFORM LANE LOADING)								
Mid-span Location (As defined by following stated condition)	Shear at React A, kips	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Max Moment	Shear at Resultant Location	Shear at Rear #3 Axle	Shear at React B, kips	Mid-span Location (As defined by following stated condition)	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Location Max Mom, ft-kips	Moment at Resultant, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
1/2 "xR" Fwd of Axle #2	73.18	38.00	-13.52	-15.01	-16.50	-65.04	86.58	1/2 "xR" Fwd of Axle #2	0.0	2,334.9	2,804.2	2,771.0	2,734.2	2,552.3	0.0
Span Position (from Left)	0.00	38.33	52.33	54.67	57.00	66.33	100.00	Span Position (from Left)	0.00	38.33	52.33	54.67	57.00	66.33	100.00
Axle #2 at Mid-span	75.41	41.73	-9.79	-11.28	-12.77	-61.31	84.35	Axle #2 at Mid-span	0.0	2,300.1	2,821.6	2,797.0	2,769.0	2,621.9	0.0
Span Position (from Left)	0.00	36.00	50.00	52.33	54.67	64.00	100.00	Span Position (from Left)	0.00	36.00	50.00	52.33	54.67	64.00	100.00
Btwn Axle #2 & Resultant	77.65	45.46	-6.06	-7.55	-9.05	-57.58	82.11	Btwn Axle #2 & Resultant	0.0	2,251.4	2,825.1	2,809.2	2,789.8	2,677.5	0.0
Span Position (from Left)	0.00	33.67	47.67	50.00	52.33	61.67	100.00	Span Position (from Left)	0.00	33.67	47.67	50.00	52.33	61.67	100.00
Resultant at Mid-span	79.88	49.19	-2.33	-3.83	-5.32	-53.85	79.88	Resultant at Mid-span	0.0	2,188.8	2,814.6	2,807.5	2,796.8	2,719.3	0.0
Span Position (from Left)	0.00	31.33	45.33	47.67	50.00	59.33	100.00	Span Position (from Left)	0.00	31.33	45.33	47.67	50.00	59.33	100.00
1/2 "xR" Rear of Resultant	82.11	52.91	1.39	-0.10	-1.59	-50.13	77.65	1/2 "xR" Rear of Resultant	0.0	2,112.2	2,790.3	2,791.8	2,789.8	2,747.1	0.0
Span Position (from Left)	0.00	29.00	43.00	45.33	47.67	57.00	100.00	Span Position (from Left)	0.00	29.00	43.00	45.33	47.67	57.00	100.00
Front Axle #1 at Front Supt	109.89	99.25	47.73	46.23	44.74	-3.79	49.87								
Span Position (from Left)	0.00	0.00	14.00	16.33	18.67	28.00	100.00								
Axle #3 at Rear Supt (Max V)	40.94	-15.78	-67.30	-68.80	-70.29	-118.82	118.82								
Span Position (from Left)	0.00	72.00	86.00	88.33	90.67	100.00	100.00								

**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR** | **THREE (3) AXLE** | **AASHTO LRFD (2007) HL-93, on 100 ft Span, w/ Impact**

Possible Axle Load Locations Corresponding to following Shear and Moment Diagrams



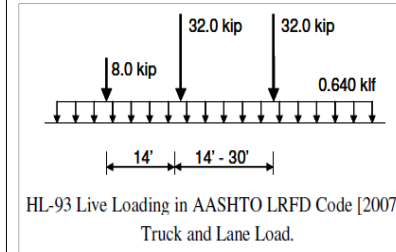
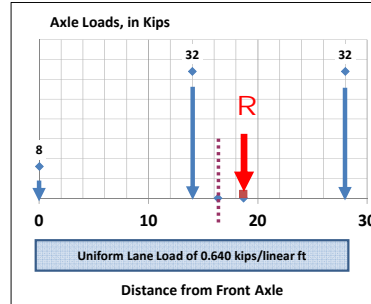
**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**      **THREE (3) AXLE**      **AASHTO LRFD (2007) HL-93, on 200 ft Span, w/ Impact**

Uniform Lane Loading:  Kips per Linear Ft

Dynamic Impact Factor:

Axle	Load (ST)		Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
	Load (kN)	Load (kips)			Load (kN)	Distance from front axle (cm)
(Front) 1	4.0	8.0	0.0	0.0	35.59	0
2	16.0	32.0	14.00	14.0	142.34	427
Max Moment	0.0	0.0	2.333	16.3	0.00	498
Resultant	0.0	0.0	2.333	18.7	0.00	569
(Rear) 3	16.0	32.0	9.333	28.0	142.34	853
<b>Totals</b>	<b>36.0</b>	<b>72.0</b>	<b>28.00</b>		<b>284.69</b>	
			Resultant at location:	18.666		569
			Distance to Nearest Axle, "xR":	4.666 (Rear of Axle # 2)		

ft Span Length



Position of Midspan	Front #1 Axle	Middle #2	Location Max	Resultant	Rear #3 Axle	Dist to Beam
	AX 1	AX 2	AX 3	AX 4	AX 5	L END
1/2 "xR" Fwd of Middle Axle #2	88.33	102.33	104.67	107.00	116.33	83.67
Middle Axle #2 at Mid-span	86.00	100.00	102.33	104.67	114.00	86.00
Btwn Middle Axle #2 & Resultant	83.67	97.67	100.00	102.33	111.67	88.33
Resultant at Mid-span	81.33	95.33	97.67	100.00	109.33	90.67
1/2 "xR" Rear of Resultant	79.00	93.00	95.33	97.67	107.00	93.00
Front Axle #1 at Front Support	0.00	14.00	16.33	18.67	28.00	172.00
Rear Axle #3 at Rear Supt (Max V)	172.00	186.00	188.33	190.67	200.00	0.00

SHEAR DUE TO AXLE CONCENTRATED LOADS ONLY						
Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Max Moment	Shear at Resultant Location	Shear at Rear #3 Axle	Reaction at Support "B"
RA	R-1	R-2	R-3	R-4	R-5	RB
44.53	33.89	-8.67	-8.67	-8.67	-51.23	51.23
45.65	35.01	-7.55	-7.55	-7.55	-50.11	50.11
46.76	36.12	-6.44	-6.44	-6.44	-49.00	49.00
47.88	37.24	-5.32	-5.32	-5.32	-47.88	47.88
49.00	38.36	-4.20	-4.20	-4.20	-46.76	46.76
86.82	76.18	33.62	33.62	33.62	-8.94	8.94
4.47	-6.17	-48.73	-48.73	-48.73	-91.29	91.29

SHEAR DUE TO UNIFORM LINE LOAD						
Lane Load Reaction at Support "A"	Lane Load Shear at Front #1 Axle	Lane Load Shear at Middle #2 Axle	Lane Load Shear at Max Moment	Lane Load Shear at Resultant Location	Lane Load Shear at Rear #3 Axle	Lane Load Reaction at Support "B"
RA (U)	R-1 (U)	R-2 (U)	R-3 (U)	R-4 (U)	R-5 (U)	RB
64.00	7.47	-1.49	-2.99	-4.48	-10.45	64.00
64.00	8.96	0.00	-1.49	-2.99	-8.96	64.00
64.00	10.45	1.49	0.00	-1.49	-7.47	64.00
64.00	11.95	2.99	1.49	0.00	-5.97	64.00
64.00	13.44	4.48	2.99	1.49	-4.48	64.00
64.00	64.00	55.04	53.55	52.05	46.08	64.00
64.00	-46.08	-55.04	-56.53	-58.03	-64.00	64.00

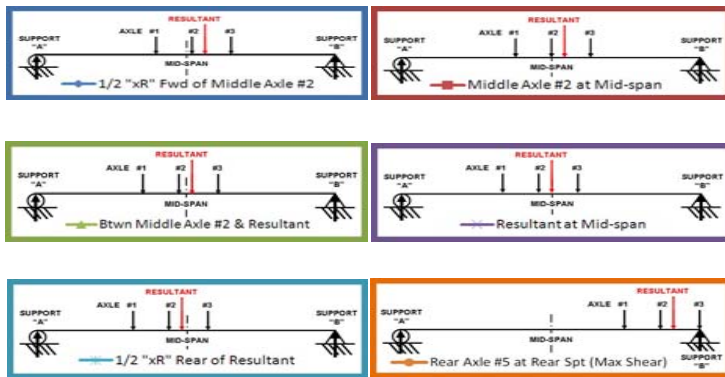
MOMENT DUE TO UNIFORM LINE LOAD						
Lane Load Moment at Support "A"	Lane Load Moment at Front #1 Axle	Lane Load Moment at Middle #2 Axle	Lane Load Moment at Max Moment	Lane Load Moment at Resultant Location	Lane Load Moment at Rear #3 Axle	Lane Load Moment at Support "B"
M-RA (U)	M-1 (U)	M-2 (U)	M-3 (U)	M-4 (U)	M-5 (U)	M-RB (U)
0.00	3,156.44	3,198.26	3,193.03	3,184.32	3,114.64	0.00
0.00	3,137.28	3,200.00	3,198.26	3,193.03	3,137.29	0.00
0.00	3,114.63	3,198.26	3,200.00	3,198.26	3,156.45	0.00
0.00	3,088.50	3,193.03	3,198.26	3,200.00	3,172.13	0.00
0.00	3,058.89	3,184.32	3,193.03	3,198.26	3,184.32	0.00
0.00	0.00	833.28	959.95	1,083.13	1,541.07	0.00
0.00	1,541.07	833.22	703.07	569.44	0.00	0.00

COMBINED SHEAR (AXLE LOADS PLUS UNIFORM LANE LOADING)								COMBINED MOMENT (AXLE LOADS PLUS UNIFORM LANE LOADING)							
Mid-span Location (As defined by following stated condition)	Shear at React A, kips	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Max Moment	Shear at Resultant Location	Shear at Rear #3 Axle	Shear at React B, kips	Mid-span Location (As defined by following stated condition)	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Location Max Mom, ft-kips	Moment at Resultant, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
1/2 "xR" Fwd of Axle #2	108.53	41.36	-10.16	-11.66	-13.15	-61.68	115.23	1/2 "xR" Fwd of Axle #2	0.0	7,089.8	7,606.1	7,580.6	7,551.7	7,401.0	0.0
Span Position (from Left)	0.00	88.33	102.33	104.67	107.00	116.33	200.00	Span Position (from Left)	0.00	88.33	102.33	104.67	107.00	116.33	200.00
Axle #2 at Mid-span	109.65	43.97	-7.55	-9.05	-10.54	-59.07	114.11	Axle #2 at Mid-span	0.0	7,062.8	7,615.6	7,596.3	7,573.4	7,447.2	0.0
Span Position (from Left)	0.00	86.00	100.00	102.33	104.67	114.00	200.00	Span Position (from Left)	0.00	86.00	100.00	102.33	104.67	114.00	200.00
Btwn Axle #2 & Resultant	110.76	46.58	-4.94	-6.44	-7.93	-56.46	113.00	Btwn Axle #2 & Resultant	0.0	7,027.1	7,616.5	7,603.2	7,586.4	7,484.6	0.0
Span Position (from Left)	0.00	83.67	97.67	100.00	102.33	111.67	200.00	Span Position (from Left)	0.00	83.67	97.67	100.00	102.33	111.67	200.00
Resultant at Mid-span	111.88	49.19	-2.33	-3.83	-5.32	-53.85	111.88	Resultant at Mid-span	0.0	6,982.8	7,608.6	7,601.5	7,590.8	7,513.3	0.0
Span Position (from Left)	0.00	81.33	95.33	97.67	100.00	109.33	200.00	Span Position (from Left)	0.00	81.33	95.33	97.67	100.00	109.33	200.00
1/2 "xR" Rear of Resultant	113.00	51.80	0.28	-1.22	-2.71	-51.24	110.76	1/2 "xR" Rear of Resultant	0.0	6,929.7	7,592.1	7,591.0	7,586.4	7,533.3	0.0
Span Position (from Left)	0.00	79.00	93.00	95.33	97.67	107.00	200.00	Span Position (from Left)	0.00	79.00	93.00	95.33	97.67	107.00	200.00
Front Axle #1 at Front Supt	150.82	140.18	88.66	87.17	85.68	37.14	72.94								
Span Position (from Left)	0.00	0.00	14.00	16.33	18.67	28.00	200.00								
Axle #3 at Rear Supt (Max V)	68.47	-52.25	-103.77	-105.27	-106.76	-155.29	155.29								
Span Position (from Left)	0.00	172.00	186.00	188.33	190.67	200.00	200.00								

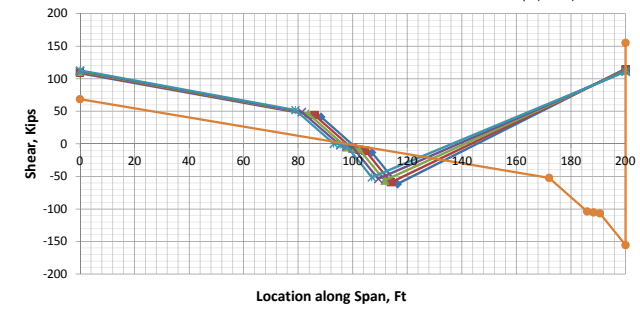


**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR** | **THREE (3) AXLE** | **AASHTO LRFD (2007) HL-93, on 200 ft Span, w/ Impact**

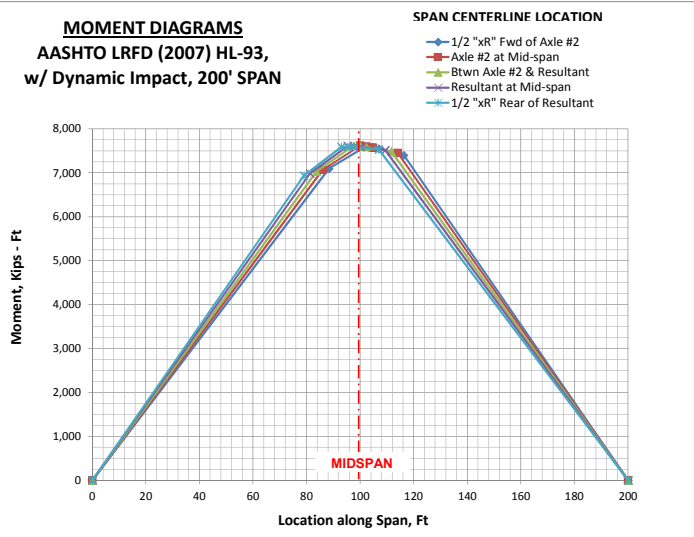
Possible Axle Load Locations Corresponding to following Shear and Moment Diagrams



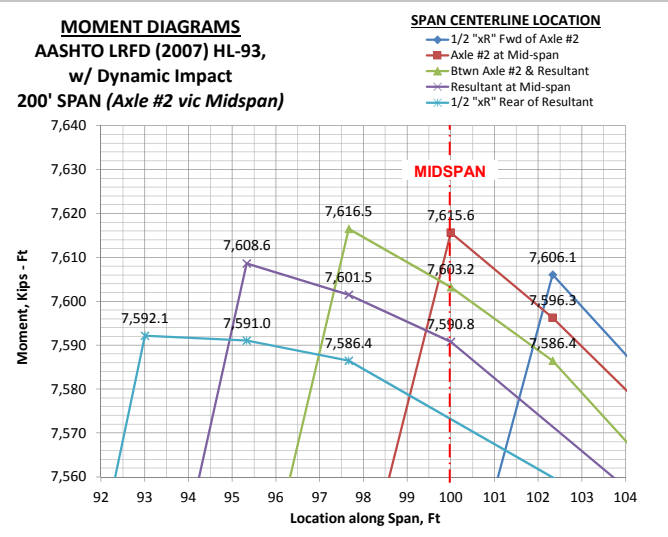
**SHEAR DIAGRAMS**  
AASHTO LRFD (2007) HL-93,  
w/ Dynamic Impact, 200' SPAN



**MOMENT DIAGRAMS**  
AASHTO LRFD (2007) HL-93,  
w/ Dynamic Impact, 200' SPAN



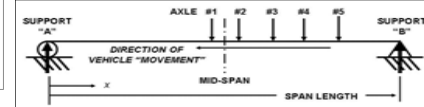
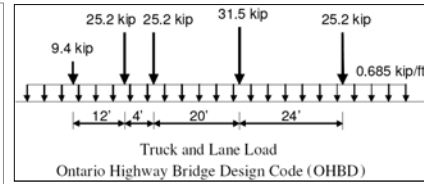
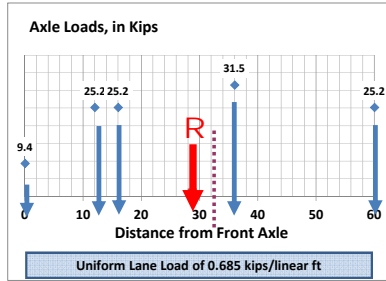
**MOMENT DIAGRAMS**  
AASHTO LRFD (2007) HL-93,  
w/ Dynamic Impact  
200' SPAN (Axle #2 vic Midspan)



**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR** **FIVE (5) AXLE** **Ontario Hwy Bridge (OHBD) Design Code, 100 ft Span**

Uniform Lane Loading :  Kips per Linear Ft

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	4.70	9.4	0.0	0.0	41.81	0
2	12.60	25.2	12.0	12.0	112.10	366
3	12.60	25.2	4.0	16.0	112.10	488
4	15.75	31.5	20.0	36.0	140.12	1097
(Rear) 5	12.60	25.2	24.0	60.0	112.10	1829
<b>Totals</b>	<b>58.3</b>	<b>116.5</b>	<b>60.00</b>		<b>476.40</b>	<b>877</b>
				<b>Resultant at location:</b>	<b>28.769</b>	
<b>100 ft Span Length</b>						



Position of Midspan	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	L END
Middle Axle #3 at Mid-span	34.00	46.00	50.00	70.00	94.00	6.00
Mid-span btwn Axle #3 & Resultant	27.62	39.62	43.62	63.62	87.62	12.38
Resultant at Mid-span	21.23	33.23	37.23	57.23	81.23	18.77
Mid-span btwn Axle #4 & Resultant	17.62	29.62	33.62	53.62	77.62	22.38
Middle Axle #4 at Mid-span	14.00	26.00	30.00	50.00	74.00	26.00
Front Axle #1 at Front Support	0.00	12.00	16.00	36.00	60.00	40.00
Rear Axle #5 at Rear Supt (Max V)	40.00	52.00	56.00	76.00	100.00	0.00

SHEAR DUE TO AXLE CONCENTRATED LOADS ONLY						
Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Middle #4 Axle	Shear at Rear #5 Axle	Reaction at Support "B"
RA	R-1	R-2	R-3	R-4	R-5	RB
kips	kips	kips	kips	kips	kips	kips
43.37	33.97	8.77	-16.43	-47.93	-73.13	73.13
50.81	41.41	16.21	-8.99	-40.49	-65.69	65.69
58.25	48.85	23.65	-1.55	-33.05	-58.25	58.25
62.46	53.06	27.86	2.66	-28.84	-54.04	54.04
66.67	57.27	32.07	6.87	-24.63	-49.83	49.83
82.98	73.58	48.38	23.18	-8.32	-33.52	33.52
36.38	26.98	1.78	-23.42	-54.92	-80.12	80.12

SHEAR DUE TO UNIFORM LINE LOAD						
Lane Load Reaction at Support "A"	Lane Load Shear at Front #1 Axle	Lane Load Shear at Middle #2 Axle	Lane Load Shear at Middle #3 Axle	Lane Load Shear at Middle #4 Axle	Lane Load Shear at Rear #5 Axle	Lane Load Reaction at Support "B"
RA (U)	R-1 (U)	R-2 (U)	R-3 (U)	R-4 (U)	R-5 (U)	RB
kips	kips	kips	kips	kips	kips	(U)
34.25	10.96	2.74	0.00	-13.70	-30.14	34.25
34.25	15.33	7.11	4.37	-9.33	-25.77	34.25
34.25	19.71	11.49	8.75	-4.95	-21.39	34.25
34.25	22.18	13.96	11.22	-2.48	-18.92	34.25
34.25	24.66	16.44	13.70	0.00	-16.44	34.25
34.25	34.25	26.03	23.29	9.59	-6.85	34.25
34.25	6.85	-1.37	-4.11	-17.81	-34.25	34.25

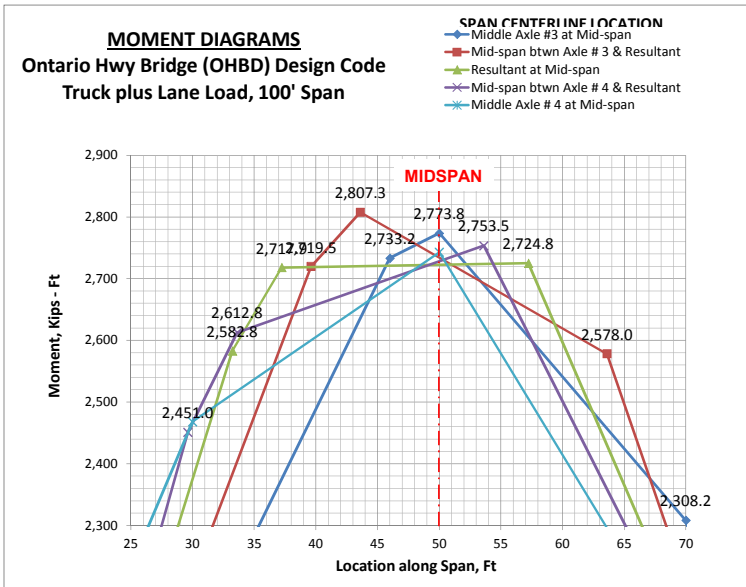
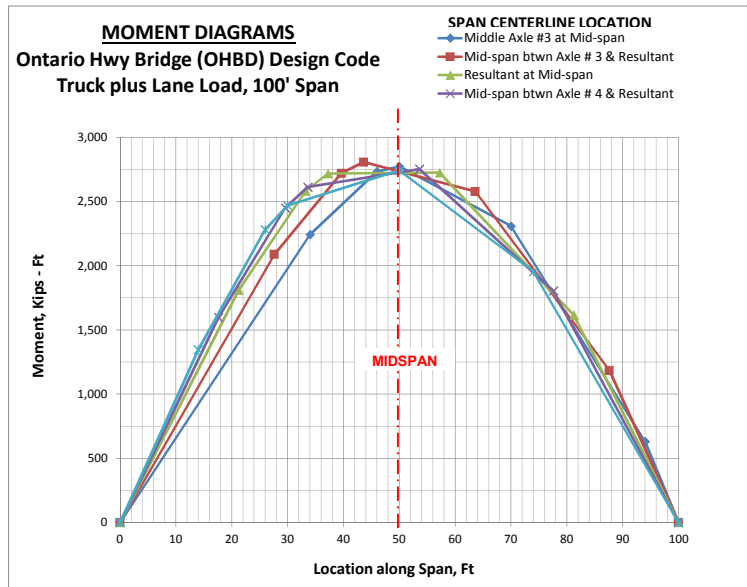
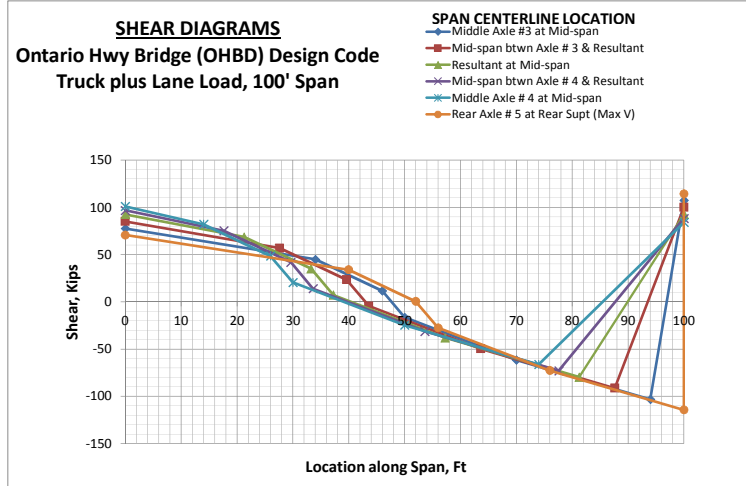
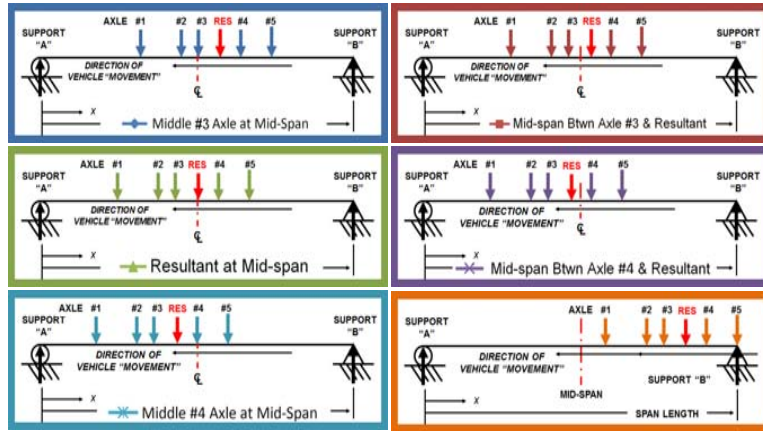
MOMENT DUE TO UNIFORM LINE LOAD						
Moment at Support "A"	Lane Load Moment at Front #1 Axle	Lane Load Moment at Middle #2 Axle	Lane Load Moment at Middle #3 Axle	Lane Load Moment at Middle #4 Axle	Lane Load Moment at Rear #5 Axle	Moment at Support "B"
M-RA (U)	M-1 (U)	M-2 (U)	M-3 (U)	M-4 (U)	M-5 (U)	M-RB (U)
kips	kips	kips	kips	kips	kips	kips
0.00	768.57	850.77	856.25	719.25	193.17	0.00
0.00	684.63	819.32	842.29	792.76	371.64	0.00
0.00	572.78	759.94	800.41	838.34	522.19	0.00
0.00	497.05	713.93	764.30	851.77	595.06	0.00
0.00	412.37	658.97	719.25	856.25	658.97	0.00
0.00	0.00	361.68	460.32	789.12	822.00	0.00
0.00	822.00	854.88	843.92	624.72	0.00	0.00

COMBINED SHEAR (AXLE LOADS PLUS UNIFORM LANE LOADING)						
Mid-span Location (As defined by following stated condition)	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Middle #2 Axle, kips	Shear at Middle #3 Axle, kips	Shear at Middle #4 Axle, kips	Shear at Rear #5 Axle, kips
Middle Axle #3 at Mid-span	77.62	44.93	11.51	-16.43	-61.63	-103.27
Span Position (from Left)	0.00	34.00	46.00	50.00	70.00	94.00
Mid-span btwn Axle #3 & Resultant	85.06	56.75	23.33	-4.61	-49.81	-91.45
Span Position (from Left)	0.00	27.62	39.62	43.62	63.62	87.62
Resultant at Mid-span	92.50	68.56	35.14	7.20	-38.00	-79.64
Span Position (from Left)	0.00	21.23	33.23	37.23	57.23	81.23
Mid-span btwn Axle #4 & Resultant	96.71	75.25	41.83	13.89	-31.31	-72.95
Span Position (from Left)	0.00	17.62	29.62	33.62	53.62	77.62
Middle Axle #4 at Mid-span	100.92	81.93	48.51	20.57	-24.63	-66.27
Span Position (from Left)	0.00	14.00	26.00	30.00	50.00	74.00
Front Axle #1 at Front Support	117.23	107.83	74.41	46.47	1.27	-40.37
Span Position (from Left)	0.00	0.00	12.00	16.00	36.00	60.00
Axle #5 at Rear Supt (Max V)	70.63	33.83	0.41	-27.53	-72.73	-114.37
Span Position (from Left)	0.00	40.00	52.00	56.00	76.00	100.00

COMBINED MOMENT (AXLE LOADS PLUS UNIFORM LANE LOADING)						
Mid-span Location (As defined by following stated condition)	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Middle #2 Axle, ft-kips	Moment at Middle #3 Axle, ft-kips	Moment at Middle #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips
Middle Axle #3 at Mid-span	0.0	2,243.3	2,733.2	2,773.8	2,308.2	631.9
Span Position (from Left)	0.00	34.00	46.00	50.00	70.00	94.00
Mid-span btwn Axle #3 & Resultant	0.0	2,087.8	2,719.5	2,807.3	2,578.0	1,185.2
Span Position (from Left)	0.00	27.62	39.62	43.62	63.62	87.62
Resultant at Mid-span	0.0	1,809.5	2,582.8	2,717.9	2,724.8	1,615.5
Span Position (from Left)	0.00	21.23	33.23	37.23	57.23	81.23
Mid-span btwn Axle #4 & Resultant	0.0	1,597.3	2,451.0	2,612.8	2,753.5	1,804.7
Span Position (from Left)	0.00	17.62	29.62	33.62	53.62	77.62
Middle Axle #4 at Mid-span	0.0	1,345.8	2,279.7	2,468.3	2,742.8	1,954.4
Span Position (from Left)	0.00	14.00	26.00	30.00	50.00	74.00

**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**      **FIVE (5) AXLE**      **Ontario Hwy Bridge (OHBD) Design Code, 100 ft Span**

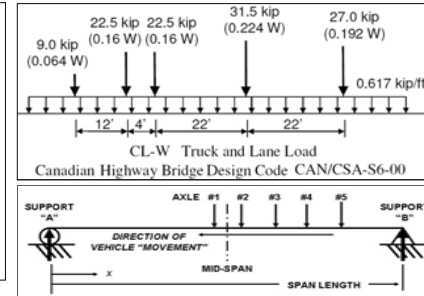
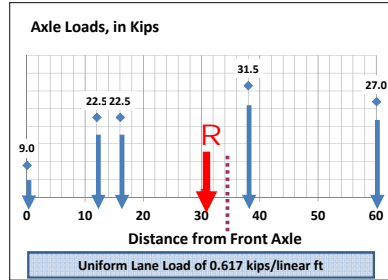
Possible Axle Load Locations Corresponding to following Shear and Moment Diagrams



**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**      **FIVE (5) AXLE**      **Canadian Hwy Bridge Design CL-W Load, 100 ft Span**

Uniform Lane Loading :  Kips per Linear Ft

Axle (Front) 1 2 3 4 5 (Rear)	Load (ST)		Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
	Load (kips)	Load (kN)			Distance from front axle (cm)	Distance from front axle (ft)
1	4.50	9.0	9.0	0.00	40.03	0
2	11.25	22.5	12.00	12.00	100.08	366
3	11.25	22.5	4.00	16.00	100.08	488
4	15.75	31.5	22.00	38.00	140.12	1158
5	13.50	27.0	22.00	60.00	120.10	1829
<b>Totals</b>	<b>56.3</b>	<b>112.5</b>	<b>60.00</b>		<b>460.39</b>	<b>934</b>
Resultant at location:				30.640	934	
<b>100 ft Span Length</b>						



Position of Midspan	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
	AX 1 ft	AX 2 ft	AX 3 ft	AX 4 ft	AX 5 ft	L END ft
Middle Axle #3 at Mid-span	34.00	46.00	50.00	72.00	94.00	6.00
Mid-span btwn Axle # 3 & Resultant	26.68	38.68	42.68	64.68	86.68	13.32
Resultant at Mid-span	19.36	31.36	35.36	57.36	79.36	20.64
Mid-span btwn Axle # 4 & Resultant	15.68	27.68	31.68	53.68	75.68	24.32
Middle Axle # 4 at Mid-span	12.00	24.00	28.00	50.00	72.00	28.00
Front Axle # 1 at Front Support	0.00	12.00	16.00	38.00	60.00	40.00
Rear Axle # 5 at Rear Supt (Max V)	40.00	52.00	56.00	78.00	100.00	0.00

SHEAR DUE TO AXLE CONCENTRATED LOADS ONLY						
Reaction at Support "A"	Shear at Front # 1 Axle	Shear at Middle # 2 Axle	Shear at Middle # 3 Axle	Shear at Middle # 4 Axle	Shear at Rear # 5 Axle	Reaction at Support "B"
RA	R-1	R-2	R-3	R-4	R-5	RB
kips	kips	kips	kips	kips	kips	kips
39.78	30.78	8.28	-14.22	-45.72	-72.72	72.72
48.02	39.02	16.52	-5.99	-37.49	-64.49	64.49
56.25	47.25	24.75	2.25	-29.25	-56.25	56.25
60.39	51.39	28.89	6.39	-25.11	-52.11	52.11
64.53	55.53	33.03	10.53	-20.97	-47.97	47.97
78.03	69.03	46.53	24.03	-7.47	-34.47	34.47
33.03	24.03	1.53	-20.97	-52.47	-79.47	79.47

SHEAR DUE TO UNIFORM LINE LOAD						
Lane Load Reaction at Support "A"	Lane Load Shear at Front #1 Axle	Lane Load Shear at Middle #2 Axle	Lane Load Shear at Middle #3 Axle	Lane Load Shear at Middle #4 Axle	Lane Load Shear at Rear #5 Axle	Lane Load Reaction at Support "B"
RA (U)	R-1 (U)	R-2 (U)	R-3 (U)	R-4 (U)	R-5 (U)	RB
kips	kips	kips	kips	kips	kips	(U)
30.85	9.87	2.47	0.00	-13.57	-27.15	30.85
30.85	14.39	6.98	4.52	-9.06	-22.63	30.85
30.85	18.90	11.50	9.03	-4.54	-18.12	30.85
30.85	21.18	13.77	11.30	-2.27	-15.84	30.85
30.85	23.45	16.04	13.57	0.00	-13.57	30.85
30.85	30.85	23.45	20.98	7.40	-6.17	30.85
30.85	6.17	-1.23	-3.70	-17.28	-30.85	30.85

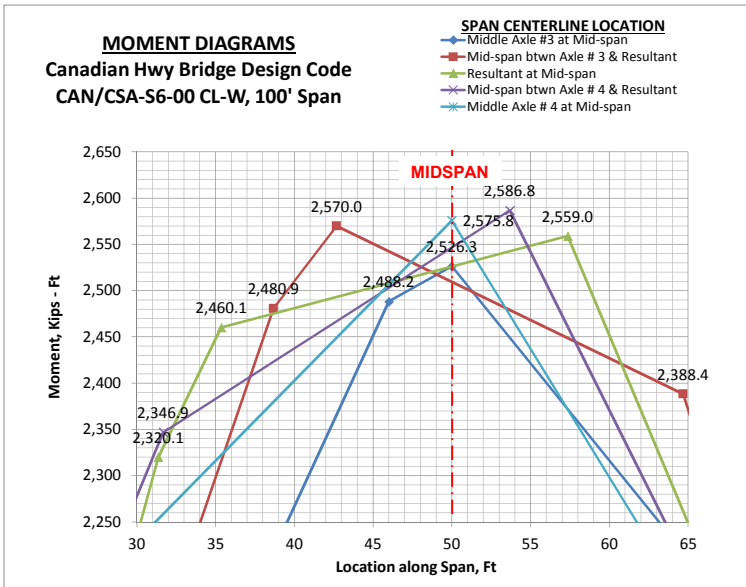
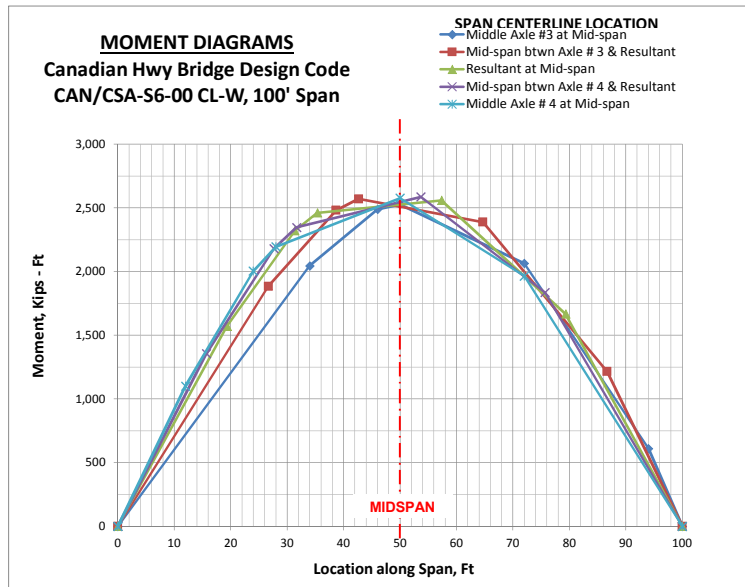
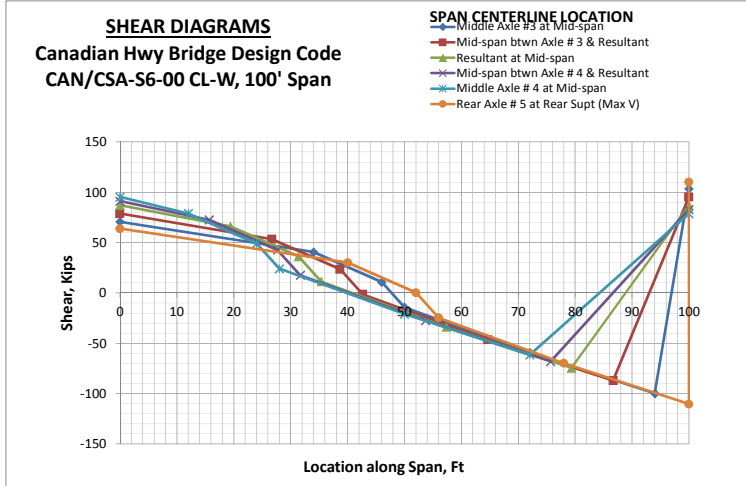
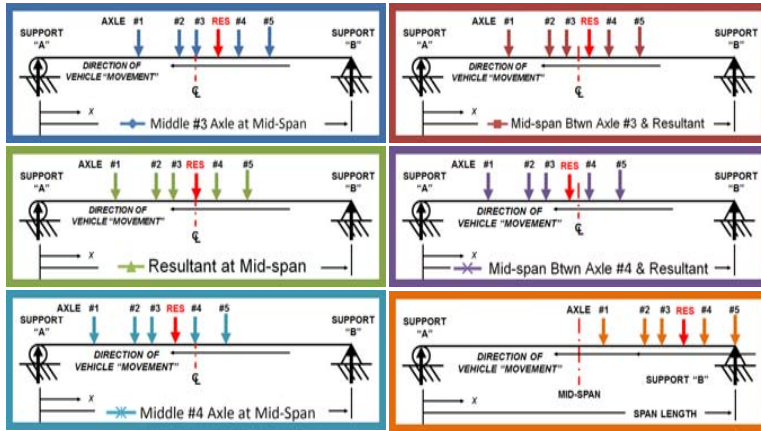
MOMENT DUE TO UNIFORM LINE LOAD						
Moment at Support "A"	Lane Load Moment at Front #1 Axle	Lane Load Moment at Middle #2 Axle	Lane Load Moment at Middle #3 Axle	Lane Load Moment at Middle #4 Axle	Lane Load Moment at Rear #5 Axle	Moment at Support "B"
M-RA (U)	M-1 (U)	M-2 (U)	M-3 (U)	M-4 (U)	M-5 (U)	M-RB (U)
kips	kips	kips	kips	kips	kips	kips
0.00	692.27	766.31	771.25	621.94	173.99	0.00
0.00	603.48	731.72	754.72	704.77	356.19	0.00
0.00	481.63	664.06	705.13	754.54	505.32	0.00
0.00	407.88	617.56	667.71	767.07	567.81	0.00
0.00	325.78	562.70	621.94	771.25	621.94	0.00
0.00	0.00	325.78	414.62	726.83	740.40	0.00
0.00	740.40	770.02	760.14	529.39	0.00	0.00

COMBINED SHEAR (AXLE LOADS PLUS UNIFORM LANE LOADING)						
Mid-span Location (As defined by following stated condition)	Shear at React A, kips	Shear at Front # 1 Axle, kips	Shear at Middle # 2 Axle, kips	Shear at Middle # 3 Axle, kips	Shear at Middle # 4 Axle, kips	Shear at Rear # 5 Axle, kips
Middle Axle #3 at Mid-span	70.63	40.65	10.75	-14.22	-59.29	103.57
Span Position (from Left)	0.00	34.00	46.00	50.00	72.00	100.00
an btwn Axle # 3 & Resultant	78.87	53.40	23.50	-1.47	-46.54	87.12
Span Position (from Left)	0.00	26.68	38.68	42.68	64.68	86.68
Resultant at Mid-span	87.10	66.15	36.25	11.28	-33.79	-74.37
Span Position (from Left)	0.00	19.36	31.36	35.36	57.36	79.36
an btwn Axle # 4 & Resultant	91.24	72.57	42.66	17.69	-27.38	-67.95
Span Position (from Left)	0.00	15.68	27.68	31.68	53.68	75.68
Middle Axle # 4 at Mid-span	95.38	78.98	49.07	24.10	-20.97	-61.54
Span Position (from Left)	0.00	12.00	24.00	28.00	50.00	72.00
ont Axle #1 at Front Support	108.88	99.88	69.98	45.01	-0.07	-40.64
Span Position (from Left)	0.00	0.00	12.00	16.00	38.00	60.00
Axle # 5 at Rear Supt (Max V)	63.88	30.20	0.30	-24.67	-69.75	-110.32
Span Position (from Left)	0.00	40.00	52.00	56.00	78.00	100.00

COMBINED MOMENT (AXLE LOADS PLUS UNIFORM LANE LOADING)						
Mid-span Location (As defined by following stated condition)	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips
Middle Axle #3 at Mid-span	0.0	2,044.8	2,488.2	2,526.3	2,064.1	610.3
Span Position (from Left)	0.00	34.00	46.00	50.00	72.00	100.00
an btwn Axle # 3 & Resultant	0.0	1,884.5	2,480.9	2,570.0	2,388.4	1,215.1
Span Position (from Left)	0.00	26.68	38.68	42.68	64.68	86.68
Resultant at Mid-span	0.0	1,570.6	2,320.1	2,460.1	2,559.0	1,666.3
Span Position (from Left)	0.00	19.36	31.36	35.36	57.36	79.36
an btwn Axle # 4 & Resultant	0.0	1,354.8	2,181.2	2,346.9	2,586.8	1,835.1
Span Position (from Left)	0.00	15.68	27.68	31.68	53.68	75.68
Middle Axle # 4 at Mid-span	0.0	1,100.1	2,003.4	2,194.8	2,575.8	1,965.1
Span Position (from Left)	0.00	12.00	24.00	28.00	50.00	72.00

**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**      **FIVE (5) AXLE**      **Canadian Hwy Bridge Design CL-W Load, 100 ft Span**

Possible Axle Load Locations Corresponding to following Shear and Moment Diagrams



**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**

**FOUR (4) AXLE**

**One (1x) MLC 40W Vehicle, on 100 ft Span**

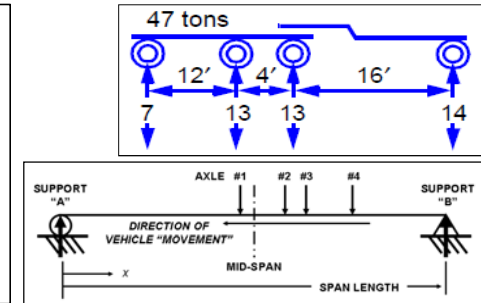
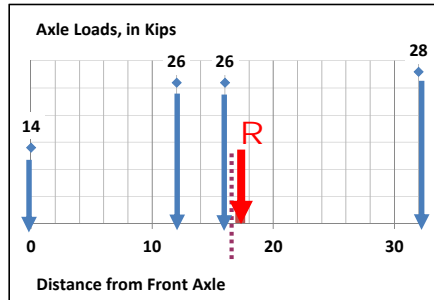
Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	7.0	14.0		0.0	62.28	0
2	13.0	26.0	12.0	12.0	115.65	366
3	13.0	26.0	4.0	16.0	115.65	488
(Rear) 4	14.0	28.0	16.0	32.0	124.55	975
<b>Totals</b>	<b>47.0</b>	<b>94.0</b>	<b>32.0</b>		<b>355.86</b>	

Resultant at location: 17.277  
Distance to Nearest Axle, "xR": 1.277 (Rear of Axle #3)

100 ft Span Length

	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Rear #4 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	L END
	ft	ft	ft	ft	ft
Position of Midspan					
1/2 "xR" Rear of Axle #3	34.638	46.638	50.638	66.638	33.362
Axle #3 at Mid-span	34.000	46.000	50.000	66.000	34.000
Btwn Axle #3 & Resultant	33.362	45.362	49.362	65.362	34.638
Resultant at Mid-span	32.723	44.723	48.723	64.723	35.277
1/2 "xR" Fwd of Resultant	32.085	44.085	48.085	64.085	35.915
Front Axle #1 at Front Support	0.00	12.00	16.00	32.00	68.00
Rear Axle #5 at Rear Spt (Max Shear)	68.00	80.00	84.00	100.00	0.00

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Rear #4 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Position of Midspan					
1/2 "xR" Rear of Axle #3	1,565.65	374.40	20.80	-332.80	-1,628.05
Axle #3 at Mid-span	1,557.20	381.60	23.20	-323.20	-1,638.80
Btwn Axle #3 & Resultant	1,547.98	388.80	25.60	-313.60	-1,648.78
Resultant at Mid-span	1,538.00	396.00	28.00	-304.00	-1,658.00
1/2 "xR" Fwd of Resultant	1,527.25	403.20	30.40	-294.40	-1,666.45



	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Rear #4 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	RB
	kips	kips	kips	kips	kips	kips
32.00	45.20	31.20	5.20	-20.80	-48.80	48.80
32.00	45.80	31.80	5.80	-20.20	-48.20	48.20
32.00	46.40	32.40	6.40	-19.60	-47.60	47.60
32.00	47.00	33.00	7.00	-19.00	-47.00	47.00
32.00	47.60	33.60	7.60	-18.40	-46.40	46.40
32.00	77.76	63.76	37.76	11.76	-16.24	16.24
32.00	13.84	-0.16	-26.16	-52.16	-80.16	80.16

	Mom Area to Beam End, ft-kips	Mom Area to Front #1 Axle, ft-kips	Mom Area to Mid #2 Axle, ft-kips	Mom Area to Mid #3 Axle, ft-kips	Mom Area to Rear #4 Axle, ft-kips	Mom Area to Beam End, ft-kips
	M-RA-End	M-1	M-2	M-3	M-4	M-RB-End
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
0.00	1,565.65	1,940.05	1,960.85	1,628.05	0.00	
0.00	1,557.20	1,938.80	1,962.00	1,638.80	0.00	
0.00	1,547.98	1,936.78	1,962.38	1,648.78	0.00	
0.00	1,538.00	1,934.00	1,962.00	1,658.00	0.00	
0.00	1,527.25	1,930.45	1,960.85	1,666.45	0.00	

SHEAR AT AXLE LOCATIONS FOR SHEAR (V) DIAGRAM						
Mid-span Location (As defined by following stated condition)	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Rear #4 Axle, kips	Shear at React B, kips
1/2 "xR" Rear of Axle #3	45.20	31.20	5.20	-20.80	-48.80	48.80
Span Position (from Left)	0.00	34.64	46.64	50.64	66.64	100.00
Axle #3 at Mid-span	45.80	31.80	5.80	-20.20	-48.20	48.20
Span Position (from Left)	0.00	34.00	46.00	50.00	66.00	100.00
Btwn Axle #3 & Resultant	46.40	32.40	6.40	-19.60	-47.60	47.60
Span Position (from Left)	0.00	33.36	45.36	49.36	65.36	100.00
Resultant at Mid-span	47.00	33.00	7.00	-19.00	-47.00	47.00
Span Position (from Left)	0.00	32.72	44.72	48.72	64.72	100.00
1/2 "xR" Fwd of Resultant	47.60	33.60	7.60	-18.40	-46.40	46.40
Span Position (from Left)	0.00	32.09	44.09	48.09	64.09	100.00
e #5 at Rear Spt (Max Shear)	13.84	-0.16	-26.16	-52.16	-80.16	80.16
Span Position (from Left)	0.00	68.00	80.00	84.00	100.00	100.00

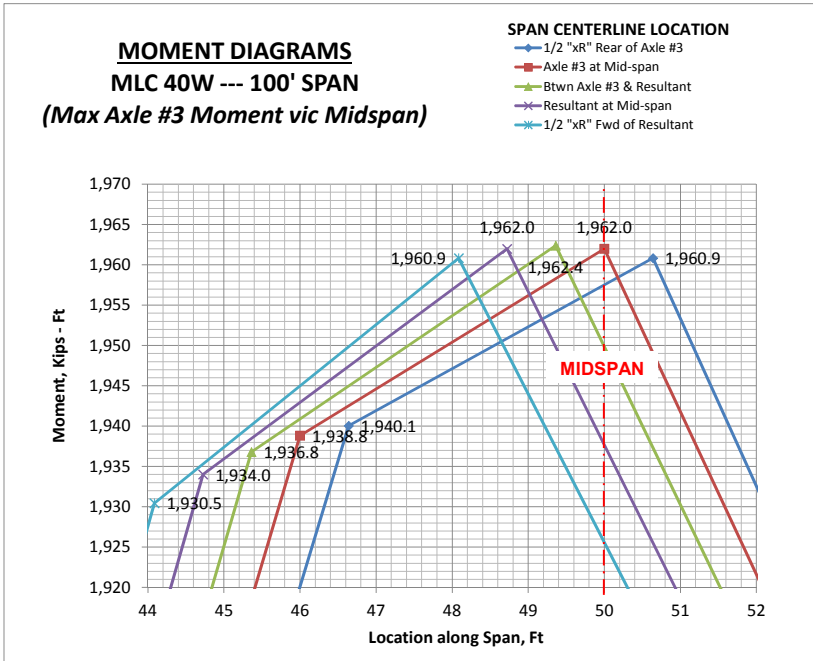
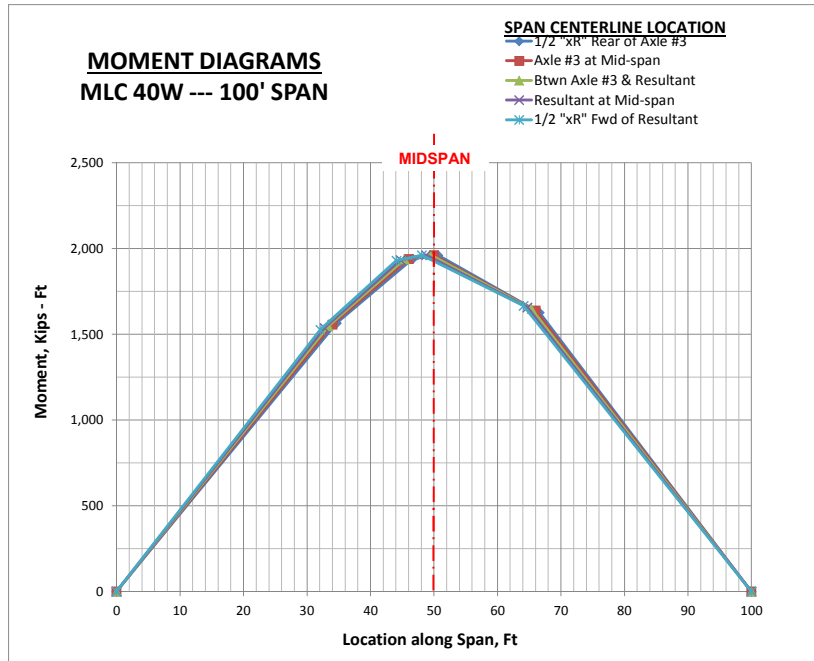
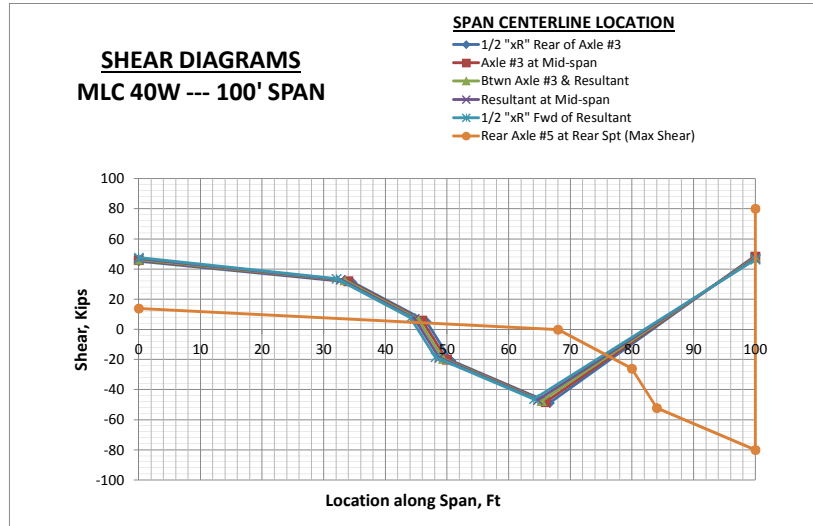
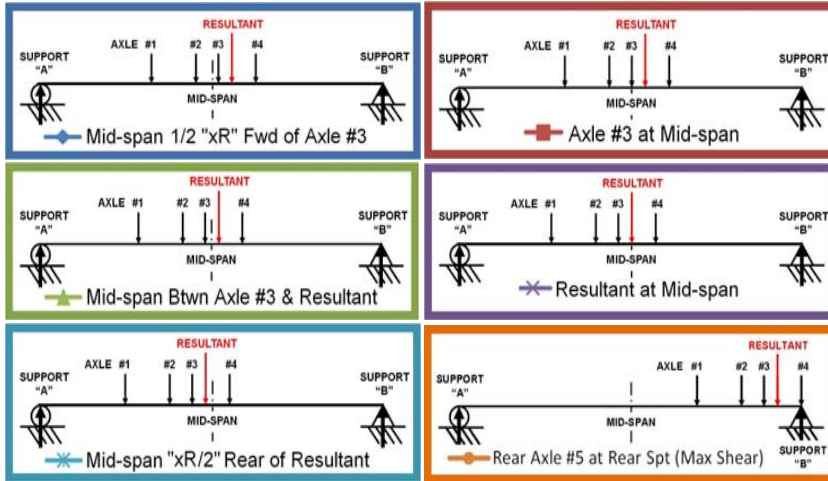
MOMENT AT AXLE LOCATIONS FOR MOMENT (M) DIAGRAM						
Mid-span Location (As defined by following stated condition)	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at React #4 Axle, ft-kips	Moment at React B, ft-kips
1/2 "xR" Rear of Axle #3	0.0	1,565.7	1,940.1	1,960.9	1,628.1	0.0
Span Position (from Left)	0.00	34.638	46.638	50.638	66.638	100.00
Axle #3 at Mid-span	0.0	1,557.2	1,938.8	1,962.0	1,638.8	0.0
Span Position (from Left)	0.00	34.000	46.000	50.000	66.000	100.00
Btwn Axle #3 & Resultant	0.0	1,548.0	1,936.8	1,962.4	1,648.8	0.0
Span Position (from Left)	0.00	33.362	45.362	49.362	65.362	100.00
Resultant at Mid-span	0.0	1,538.0	1,934.0	1,962.0	1,658.0	0.0
Span Position (from Left)	0.00	32.723	44.723	48.723	64.723	100.00
1/2 "xR" Fwd of Resultant	0.0	1,527.3	1,930.5	1,960.9	1,666.5	0.0
Span Position (from Left)	0.00	32.085	44.085	48.085	64.085	100.00

**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**

**FOUR (4) AXLE**

**One (1x) MLC 40W Vehicle, on 100 ft Span**

Possible Axle Load Locations Corresponding to following Shear and Moment Diagrams



**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**

**FOUR (4) AXLE**

**One (1x) MLC 50W Vehicle, on 100 ft Span**

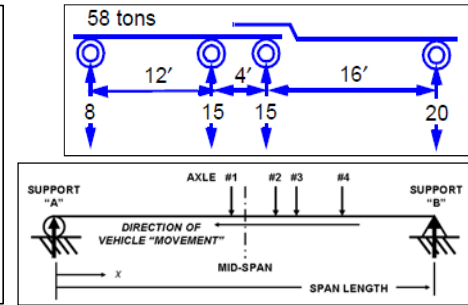
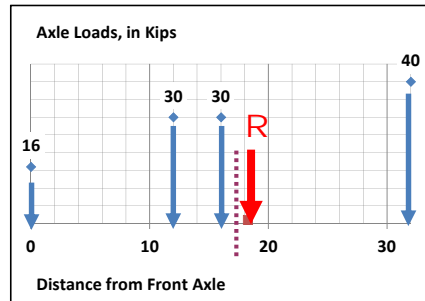
Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	8.0	16.0		0.0	71.17	0
2	15.0	30.0	12.0	12.0	133.45	366
3	15.0	30.0	4.0	16.0	133.45	488
(Rear) 4	20.0	40.0	16.0	32.0	177.93	975
<b>Totals</b>	<b>58.0</b>	<b>116.0</b>	<b>32.0</b>		<b>444.82</b>	
		Resultant at location:		18.276		557
		Distance to Nearest Axle, "xR":		2.276	(Rear of Axle #3)	

100 ft Span Length

	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Rear #4 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	L END
	ft	ft	ft	ft	ft
<b>Position of Midspan</b>					
1/2 "xR" Rear of Axle #3	35.138	47.138	51.138	67.138	32.862
Axle #3 at Mid-span	34.000	46.000	50.000	66.000	34.000
Btwn Axle #3 & Resultant	32.862	44.862	48.862	64.862	35.138
Resultant at Mid-span	31.724	43.724	47.724	63.724	36.276
1/2 "xR" Fwd of Resultant	30.586	42.586	46.586	62.586	37.414
Front Axle #1 at Front Support	0.00	12.00	16.00	32.00	68.00
Rear Axle #5 at Rear Spt (Max Shear)	68.00	80.00	84.00	100.00	0.00

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Rear #4 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
<b>Position of Midspan</b>					
1/2 "xR" Rear of Axle #3	1,898.85	456.48	32.16	-351.36	-2,036.13
Axle #3 at Mid-span	1,882.24	472.32	37.44	-330.24	-2,061.76
Btwn Axle #3 & Resultant	1,862.62	488.16	42.72	-309.12	-2,084.38
Resultant at Mid-span	1,840.00	504.00	48.00	-288.00	-2,104.00
1/2 "xR" Fwd of Resultant	1,814.37	519.84	53.28	-266.88	-2,120.61

SHEAR AT AXLE LOCATIONS FOR SHEAR (V) DIAGRAM						
Mid-span Location (As defined by following stated condition)	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Rear #4 Axle, kips	Shear at React B, kips
1/2 "xR" Rear of Axle #3	54.04	38.04	8.04	-21.96	-61.96	61.96
Span Position (from Left)	0.00	35.14	47.14	51.14	67.14	100.00
Axle #3 at Mid-span	55.36	39.36	9.36	-20.64	-60.64	60.64
Span Position (from Left)	0.00	34.00	46.00	50.00	66.00	100.00
Btwn Axle #3 & Resultant	56.68	40.68	10.68	-19.32	-59.32	59.32
Span Position (from Left)	0.00	32.86	44.86	48.86	64.86	100.00
Resultant at Mid-span	58.00	42.00	12.00	-18.00	-58.00	58.00
Span Position (from Left)	0.00	31.72	43.72	47.72	63.72	100.00
1/2 "xR" Fwd of Resultant	59.32	43.32	13.32	-16.68	-56.68	56.68
Span Position (from Left)	0.00	30.59	42.59	46.59	62.59	100.00
e #5 at Rear Spt (Max Shear)	15.92	-0.08	-30.08	-60.08	-100.08	100.08
Span Position (from Left)	0.00	68.00	80.00	84.00	100.00	100.00



	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Rear #4 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	RB
	kips	kips	kips	kips	kips	kips
32.00	54.04	38.04	8.04	-21.96	-61.96	61.96
32.00	55.36	39.36	9.36	-20.64	-60.64	60.64
32.00	56.68	40.68	10.68	-19.32	-59.32	59.32
32.00	58.00	42.00	12.00	-18.00	-58.00	58.00
32.00	59.32	43.32	13.32	-16.68	-56.68	56.68
32.00	94.80	78.80	48.80	18.80	-21.20	21.20
32.00	15.92	-0.08	-30.08	-60.08	-100.08	100.08

	Mom Area to Beam End, ft-kips	Mom Area to Front #1 Axle, ft-kips	Mom Area to Mid #2 Axle, ft-kips	Mom Area to Mid #3 Axle, ft-kips	Mom Area to Rear #4 Axle, ft-kips	Mom Area to Beam End, ft-kips
	M-RA-End	M-1	M-2	M-3	M-4	M-RB-End
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
0.00	1,898.85	2,355.33	2,387.49	2,036.13	0.00	
0.00	1,882.24	2,354.56	2,392.00	2,061.76	0.00	
0.00	1,862.62	2,350.78	2,393.50	2,084.38	0.00	
0.00	1,840.00	2,344.00	2,392.00	2,104.00	0.00	
0.00	1,814.37	2,334.21	2,387.49	2,120.61	0.00	

MOMENT AT AXLE LOCATIONS FOR MOMENT (M) DIAGRAM						
Mid-span Location (As defined by following stated condition)	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at React #4 Axle, ft-kips	Moment at React B, ft-kips
1/2 "xR" Rear of Axle #3	0.0	1,898.9	2,355.3	2,387.5	2,036.1	0.0
Span Position (from Left)	0.00	35.138	47.138	51.138	67.138	100.00
Axle #3 at Mid-span	0.0	1,882.2	2,354.6	2,392.0	2,061.8	0.0
Span Position (from Left)	0.00	34.000	46.000	50.000	66.000	100.00
Btwn Axle #3 & Resultant	0.0	1,862.6	2,350.8	2,393.5	2,084.4	0.0
Span Position (from Left)	0.00	32.862	44.862	48.862	64.862	100.00
Resultant at Mid-span	0.0	1,840.0	2,344.0	2,392.0	2,104.0	0.0
Span Position (from Left)	0.00	31.724	43.724	47.724	63.724	100.00
1/2 "xR" Fwd of Resultant	0.0	1,814.4	2,334.2	2,387.5	2,120.6	0.0
Span Position (from Left)	0.00	30.586	42.586	46.586	62.586	100.00

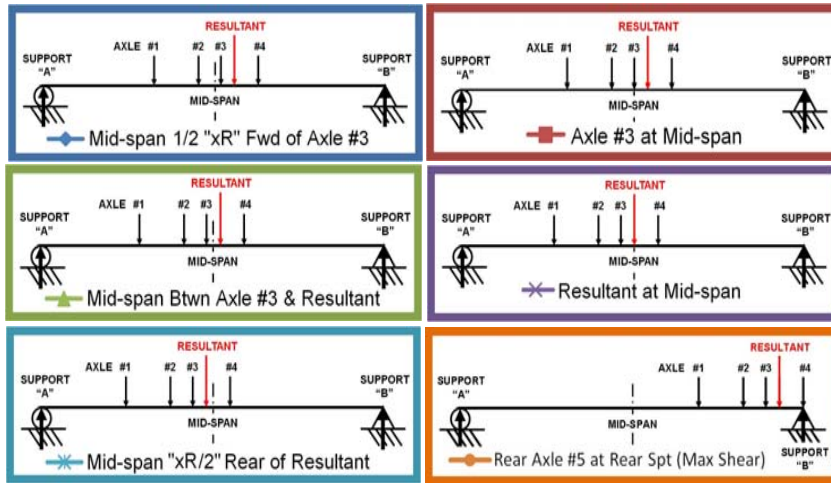


**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**

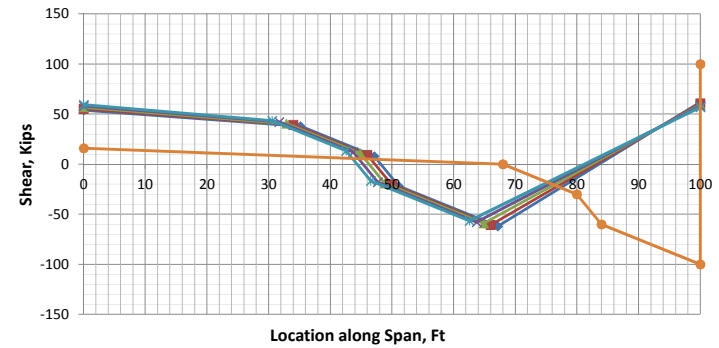
**FOUR (4) AXLE**

**One (1x) MLC 50W Vehicle, on 100 ft Span**

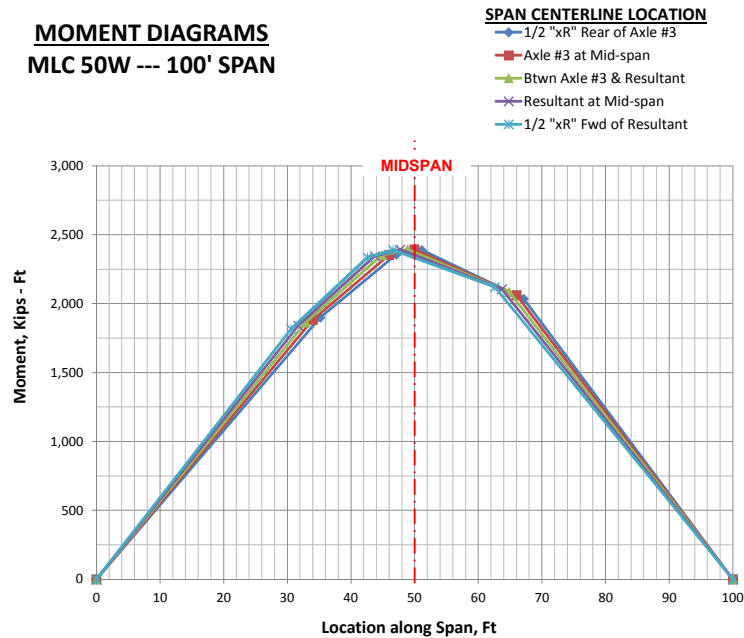
Possible Axle Load Locations Corresponding to following Shear and Moment Diagrams



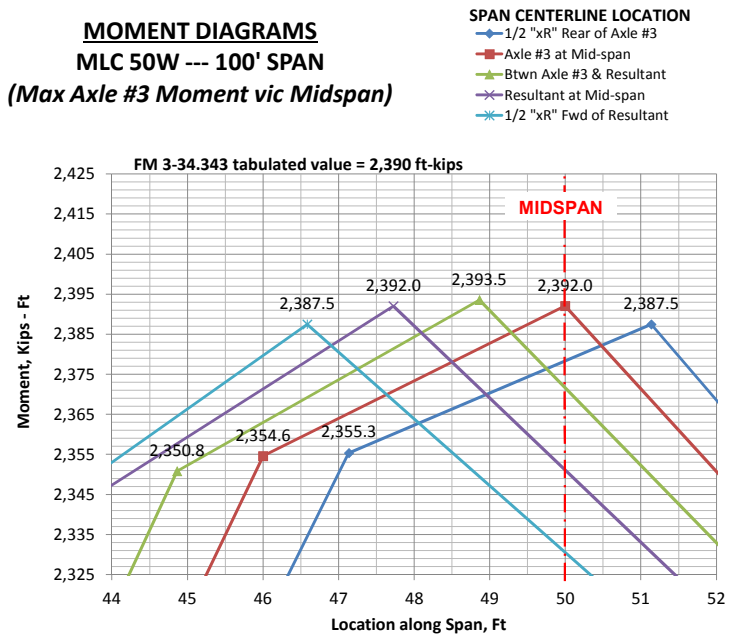
**SHEAR DIAGRAMS  
MLC 50W --- 100' SPAN**



**MOMENT DIAGRAMS  
MLC 50W --- 100' SPAN**



**MOMENT DIAGRAMS  
MLC 50W --- 100' SPAN  
(Max Axle #3 Moment vic Midspan)**

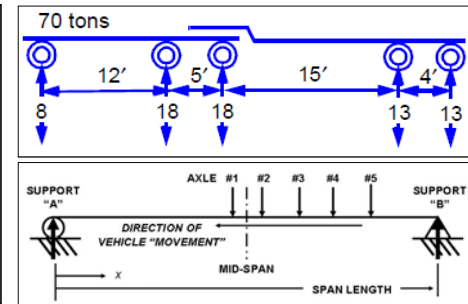
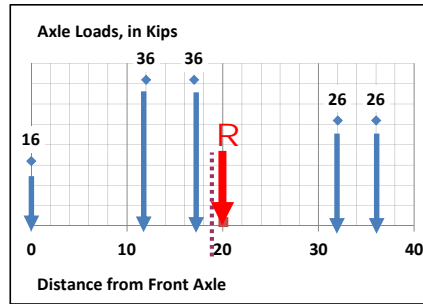


**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**

**FIVE (5) AXLE**

**One (1x) MLC 60W Vehicle, on 100 ft Span**

Axle	Load (ST)	Load (kips)	Distance		SI / Metric Units	
			btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	8.0	16.0		0.0	71.17	0
2	18.0	36.0	12.0	12.0	160.14	366
3	18.0	36.0	5.0	17.0	160.14	518
4	13.0	26.0	15.0	32.0	115.65	975
(Rear) 5	13.0	26.0	4.0	36.0	115.65	1097
<b>Totals</b>	<b>70.0</b>	<b>140.0</b>	<b>36.0</b>		<b>551.58</b>	
		Resultant at location:		<b>20.086</b>		<b>612</b>
		Distance to Nearest Axle, "xR":		<b>3.086</b>	<i>(Rear of Axle #3)</i>	



	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	L END
	ft	ft	ft	ft	ft	ft
<b>Position of Midspan</b>						
1/2 "xR" Fwd of Axle #3	34.543	46.543	51.543	66.543	70.543	29.457
Axle #3 at Mid-span	33.000	45.000	50.000	65.000	69.000	31.000
Btwn Axle #3 & Resultant	31.457	43.457	48.457	63.457	67.457	32.543
Resultant at Mid-span	29.914	41.914	46.914	61.914	65.914	34.086
1/2 "xR" Rear of Resultant	28.371	40.371	45.371	60.371	64.371	35.629
Front Axle #1 at Front Support	0.00	12.00	17.00	32.00	36.00	64.00
Rear Axle #5 at Rear Spt (Max Shear)	64.00	76.00	81.00	96.00	100.00	0.00

	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Middle #4 Axle	Shear at Rear #5 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	R-5	RB
	kips	kips	kips	kips	kips	kips	kips
36.00	63.52	47.52	11.52	-24.48	-50.48	-76.48	76.48
36.00	65.68	49.68	13.68	-22.32	-48.32	-74.32	74.32
36.00	67.84	51.84	15.84	-20.16	-46.16	-72.16	72.16
36.00	70.00	54.00	18.00	-18.00	-44.00	-70.00	70.00
36.00	72.16	56.16	20.16	-15.84	-41.84	-67.84	67.84
36.00	111.88	95.88	59.88	-23.88	-2.12	-28.12	28.12
36.00	22.28	6.28	-29.72	-65.72	-91.72	-117.72	117.72

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Middle #4 Axle	Mom Area to Rear #5 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-5	MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
<b>Position of Midspan</b>						
1/2 "xR" Fwd of Axle #3	2,194.16	570.24	57.60	-367.20	-201.92	-2,252.88
Axle #3 at Mid-span	2,167.44	596.16	68.40	-334.80	-193.28	-2,303.92
Btwn Axle #3 & Resultant	2,134.05	622.08	79.20	-302.40	-184.64	-2,348.29
Resultant at Mid-span	2,094.00	648.00	90.00	-270.00	-176.00	-2,386.00
1/2 "xR" Rear of Resultant	2,047.28	673.92	100.80	-237.60	-167.36	-2,417.04

	Mom Area to Front #1 Axle	Mom Area to Mid #2 Axle	Mom Area to Mid #3 Axle	Mom Area to Mid #4 Axle	Mom Area to Rear #5 Axle	Mom Area to Beam End
	M-1	M-2	M-3	M-4	M-5	M-RB-End
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
0.00	2,194.16	2,764.40	2,822.00	2,454.80	2,252.88	0.00
0.00	2,167.44	2,763.60	2,832.00	2,497.20	2,303.92	0.00
0.00	2,134.05	2,756.13	2,835.33	2,532.93	2,348.29	0.00
0.00	2,094.00	2,742.00	2,832.00	2,562.00	2,386.00	0.00
0.00	2,047.28	2,721.20	2,822.00	2,584.40	2,417.04	0.00

SHEAR AT AXLE LOCATIONS FOR SHEAR (V) DIAGRAM							
Mid-span Location (As defined by following stated condition)	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at React B, kips
1/2 "xR" Rear of Axle #3	63.52	47.52	11.52	-24.48	-50.48	-76.48	76.48
Span Position (from Left)	0.00	34.54	46.54	51.54	66.54	70.54	100.00
Axle #3 at Mid-span	65.68	49.68	13.68	-22.32	-48.32	-74.32	74.32
Span Position (from Left)	0.00	33.00	45.00	50.00	65.00	69.00	100.00
Btwn Axle #3 & Resultant	67.84	51.84	15.84	-20.16	-46.16	-72.16	72.16
Span Position (from Left)	0.00	31.46	43.46	48.46	63.46	67.46	100.00
Resultant at Mid-span	70.00	54.00	18.00	-18.00	-44.00	-70.00	70.00
Span Position (from Left)	0.00	29.91	41.91	46.91	61.91	65.91	100.00
1/2 "xR" Fwd of Resultant	72.16	56.16	20.16	-15.84	-41.84	-67.84	67.84
Span Position (from Left)	0.00	28.37	40.37	45.37	60.37	64.37	100.00
e #5 at Rear Spt (Max Shear)	22.28	6.28	-29.72	-65.72	-91.72	-117.72	117.72
Span Position (from Left)	0.00	64.00	76.00	81.00	96.00	100.00	0.00

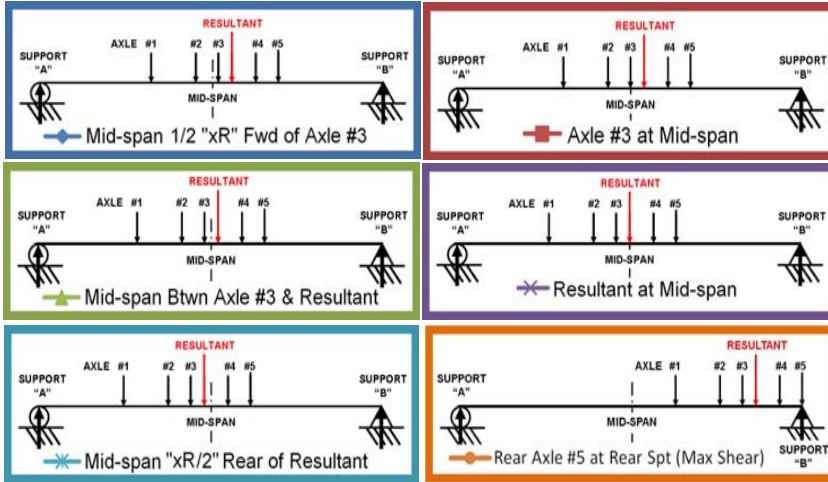
MOMENT AT AXLE LOCATIONS FOR MOMENT (M) DIAGRAM							
Mid-span Location (As defined by following stated condition)	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at React B, ft-kips
1/2 "xR" Rear of Axle #3	0.0	2,194.2	2,764.4	2,822.0	2,454.8	2,252.9	0.0
Span Position (from Left)	0.00	34,543	46,543	51,543	66,543	70,543	100.00
Axle #3 at Mid-span	0.0	2,167.4	2,763.6	2,832.0	2,497.2	2,303.9	0.0
Span Position (from Left)	0.00	33,000	45,000	50,000	65,000	69,000	100.00
Btwn Axle #3 & Resultant	0.0	2,134.1	2,756.1	2,835.3	2,532.9	2,348.3	0.0
Span Position (from Left)	0.00	31,457	43,457	48,457	63,457	67,457	100.00
Resultant at Mid-span	0.0	2,094.0	2,742.0	2,832.0	2,562.0	2,386.0	0.0
Span Position (from Left)	0.00	29,914	41,914	46,914	61,914	65,914	100.00
1/2 "xR" Fwd of Resultant	0.0	2,047.3	2,721.2	2,822.0	2,584.4	2,417.0	0.0
Span Position (from Left)	0.00	28,371	40,371	45,371	60,371	64,371	100.00

**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**

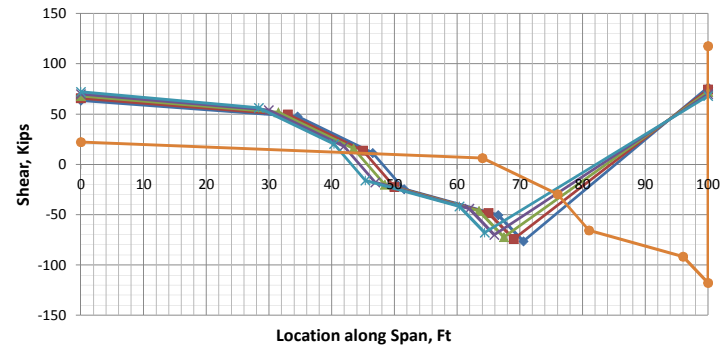
**FIVE (5) AXLE**

**One (1x) MLC 60W Vehicle, on 100 ft Span**

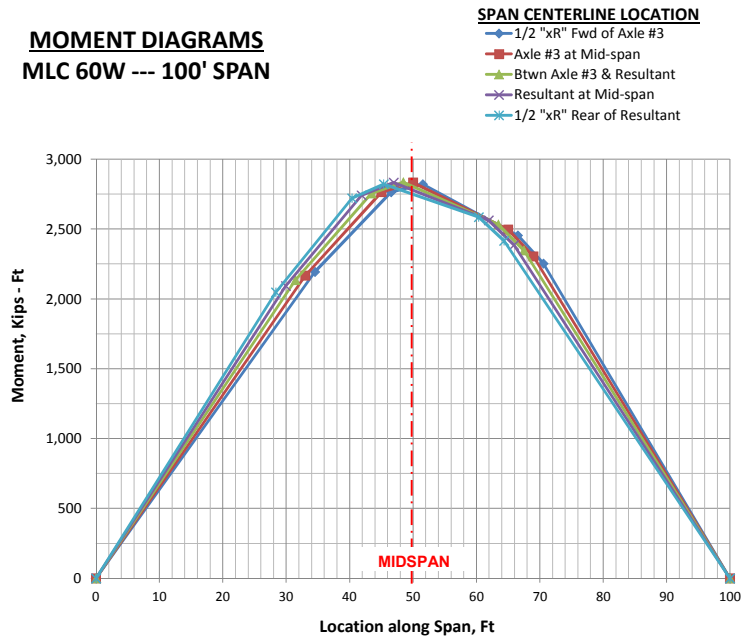
Possible Axle Load Locations Corresponding to following Shear and Moment Diagrams



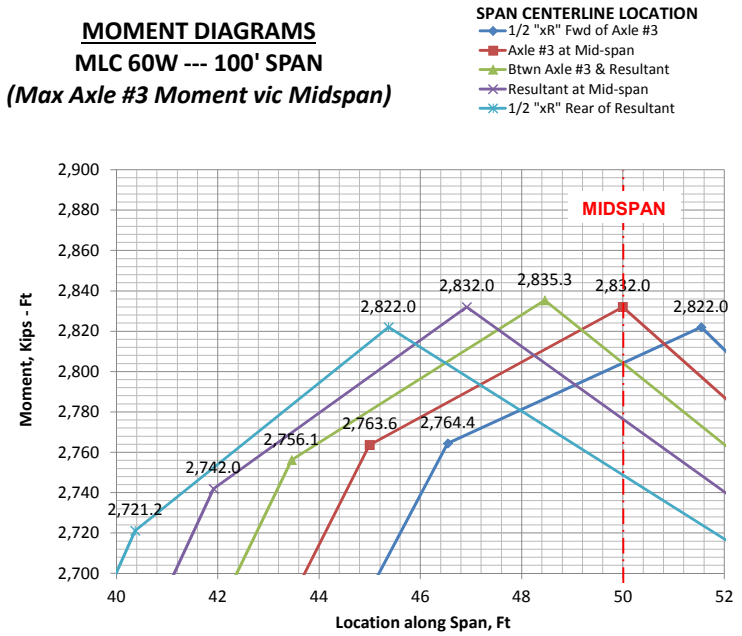
**SHEAR DIAGRAMS  
MLC 60W --- 100' SPAN**



**MOMENT DIAGRAMS  
MLC 60W --- 100' SPAN**



**MOMENT DIAGRAMS  
MLC 60W --- 100' SPAN  
(Max Axle #3 Moment vic Midspan)**



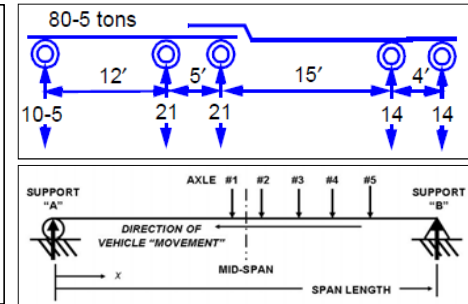
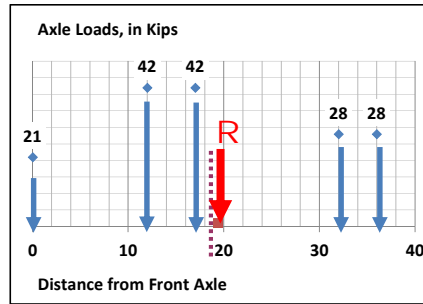
**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**

**FIVE (5) AXLE**

**One (1x) MLC 70W Vehicle, on 100 ft Span**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.5	21.0		0.0	93.41	0
2	21.0	42.0	12.0	12.0	186.83	366
3	21.0	42.0	5.0	17.0	186.83	518
4	14.0	28.0	15.0	32.0	124.55	975
(Rear) 5	14.0	28.0	4.0	36.0	124.55	1097
<b>Totals</b>	<b>80.5</b>	<b>161.0</b>	<b>36.0</b>		<b>622.75</b>	
		Resultant at location:		19.391		591
		Distance to Nearest Axle, "xR":		2.391	(Rear of Axle # 3)	

100 ft Span Length



	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	L END
	ft	ft	ft	ft	ft	ft
Position of Midspan						
1/2 "xR" Fwd of Axle #3	34.196	46.196	51.196	66.196	70.196	29.804
Axle #3 at Mid-span	33.000	45.000	50.000	65.000	69.000	31.000
Btwn Axle #3 & Resultant	31.804	43.804	48.804	63.804	67.804	32.196
Resultant at Mid-span	30.609	42.609	47.609	62.609	66.609	33.391
1/2 "xR" Rear of Resultant	29.413	41.413	46.413	61.413	65.413	34.587
Front Axle #1 at Front Support	0.00	12.00	17.00	32.00	36.00	64.00
Rear Axle #5 at Rear Spt (Max Shear)	64.00	76.00	81.00	96.00	100.00	0.00

	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Middle #4 Axle	Shear at Rear #5 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	R-5	RB
	kips	kips	kips	kips	kips	kips	kips
36.00	74.73	53.73	11.73	-30.28	-58.28	-86.28	161.00
36.00	76.65	55.65	13.65	-28.35	-56.35	-84.35	161.00
36.00	78.58	57.58	15.58	-26.43	-54.43	-82.43	161.00
36.00	80.50	59.50	17.50	-24.50	-52.50	-80.50	161.00
36.00	82.43	61.43	19.43	-22.58	-50.58	-78.58	161.00
36.00	129.78	108.78	66.78	24.78	-3.22	-31.22	161.00
36.00	26.74	5.74	-36.26	-78.26	-106.26	-134.26	134.26

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Middle #4 Axle	Mom Area to Rear #5 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-5	MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Position of Midspan						
1/2 "xR" Fwd of Axle #3	2,555.27	644.70	58.63	-454.13	-233.10	-2,571.37
Axle #3 at Mid-span	2,529.45	667.80	68.25	-425.25	-225.40	-2,614.85
Btwn Axle #3 & Resultant	2,499.03	690.90	77.88	-396.38	-217.70	-2,653.73
Resultant at Mid-span	2,464.00	714.00	87.50	-367.50	-210.00	-2,688.00
1/2 "xR" Rear of Resultant	2,424.37	737.10	97.13	-338.63	-202.30	-2,717.67

	Mom Area to Front #1 Axle	Mom Area to Mid #2 Axle	Mom Area to Mid #3 Axle	Mom Area to Mid #4 Axle	Mom Area to Rear #5 Axle	Mom Area to Beam End
	M-1	M-2	M-3	M-4	M-5	M-RB-End
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
0.00	2,555.27	3,199.97	3,258.60	2,804.47	2,571.37	0.00
0.00	2,529.45	3,197.25	3,265.50	2,840.25	2,614.85	0.00
0.00	2,499.03	3,189.93	3,267.80	2,871.43	2,653.73	0.00
0.00	2,464.00	3,178.00	3,265.50	2,898.00	2,688.00	0.00
0.00	2,424.37	3,161.47	3,258.60	2,919.97	2,717.67	0.00

SHEAR AT AXLE LOCATIONS FOR SHEAR (V) DIAGRAM							
Mid-span Location (As defined by following stated condition)	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at React B, kips
1/2 "xR" Rear of Axle #3	74.73	53.73	11.73	-30.28	-58.28	-86.28	86.28
Span Position (from Left)	0.00	34.20	46.20	51.20	66.20	70.20	100.00
Axle #3 at Mid-span	76.65	55.65	13.65	-28.35	-56.35	-84.35	84.35
Span Position (from Left)	0.00	33.00	45.00	50.00	65.00	69.00	100.00
Btwn Axle #3 & Resultant	78.58	57.58	15.58	-26.43	-54.43	-82.43	82.43
Span Position (from Left)	0.00	31.80	43.80	48.80	63.80	67.80	100.00
Resultant at Mid-span	80.50	59.50	17.50	-24.50	-52.50	-80.50	80.50
Span Position (from Left)	0.00	30.61	42.61	47.61	62.61	66.61	100.00
1/2 "xR" Fwd of Resultant	82.43	61.43	19.43	-22.58	-50.58	-78.58	78.58
Span Position (from Left)	0.00	29.41	41.41	46.41	61.41	65.41	100.00
e #5 at Rear Spt (Max Shear)	26.74	5.74	-36.26	-78.26	-106.26	-134.26	134.26
Span Position (from Left)	0.00	64.00	76.00	81.00	96.00	100.00	100.00

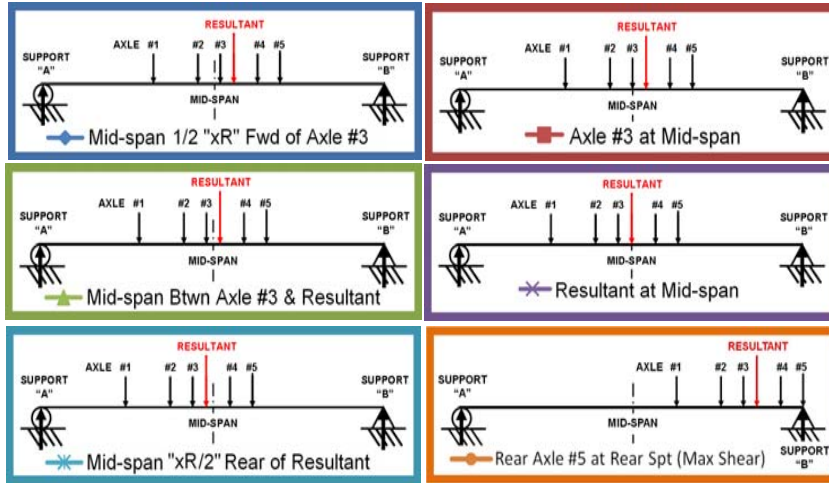
MOMENT AT AXLE LOCATIONS FOR MOMENT (M) DIAGRAM							
Mid-span Location (As defined by following stated condition)	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
1/2 "xR" Rear of Axle #3	0.0	2,555.3	3,200.0	3,258.6	2,804.5	2,571.4	0.0
Span Position (from Left)	0.00	34.196	46.196	51.196	66.196	70.196	100.00
Axle #3 at Mid-span	0.0	2,529.5	3,197.3	3,265.5	2,840.3	2,614.9	0.0
Span Position (from Left)	0.00	33.000	45.000	50.000	65.000	69.000	100.00
Btwn Axle #3 & Resultant	0.0	2,499.0	3,189.9	3,267.8	2,871.4	2,653.7	0.0
Span Position (from Left)	0.00	31.804	43.804	48.804	63.804	67.804	100.00
Resultant at Mid-span	0.0	2,464.0	3,178.0	3,265.5	2,898.0	2,688.0	0.0
Span Position (from Left)	0.00	30.609	42.609	47.609	62.609	66.609	100.00
1/2 "xR" Fwd of Resultant	0.0	2,424.4	3,161.5	3,258.6	2,920.0	2,717.7	0.0
Span Position (from Left)	0.00	29.413	41.413	46.413	61.413	65.413	100.00

**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**

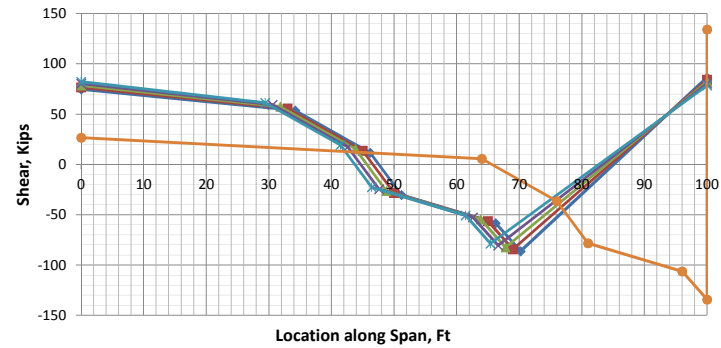
**FIVE (5) AXLE**

**One (1x) MLC 70W Vehicle, on 100 ft Span**

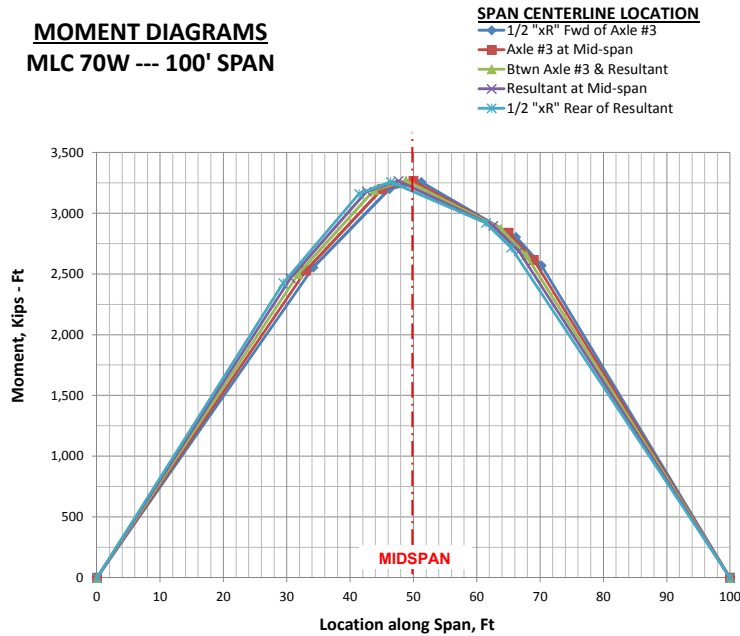
Possible Axle Load Locations Corresponding to following Shear and Moment Diagrams



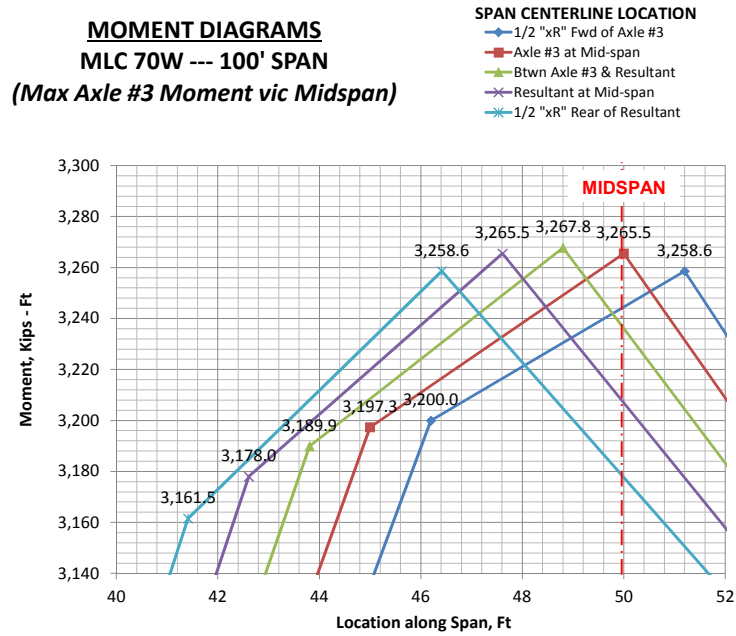
**SHEAR DIAGRAMS  
MLC 70W --- 100' SPAN**



**MOMENT DIAGRAMS  
MLC 70W --- 100' SPAN**



**MOMENT DIAGRAMS  
MLC 70W --- 100' SPAN  
(Max Axle #3 Moment vic Midspan)**



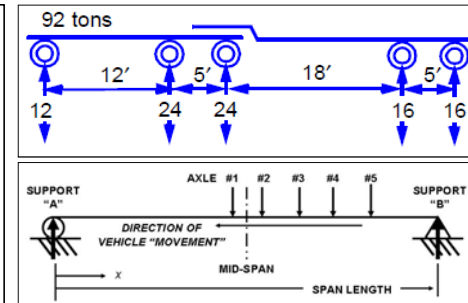
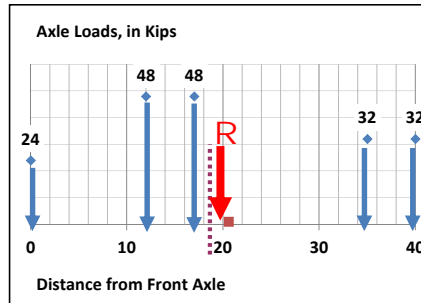
**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**

**FIVE (5) AXLE**

**One (1x) MLC 80W Vehicle, on 100 ft Span**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	12.0	24.0		0.0	106.76	0
2	24.0	48.0	12.0	12.0	213.51	366
3	24.0	48.0	5.0	17.0	213.51	518
4	16.0	32.0	18.0	35.0	142.34	1067
(Rear) 5	16.0	32.0	5.0	40.0	142.34	1219
<b>Totals</b>	<b>92.0</b>	<b>184.0</b>	<b>40.0</b>		<b>711.72</b>	
		Resultant at location:		20.609		628
		Distance to Nearest Axle, "xR":		3.609		

100 ft Span Length



	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	L END
	ft	ft	ft	ft	ft	ft
Position of Midspan						
1/2 "xR" Fwd of Axle #3	34.804	46.804	51.804	69.804	74.804	25.196
Axle #3 at Mid-span	33.000	45.000	50.000	68.000	73.000	27.000
Btwn Axle #3 & Resultant	31.196	43.196	48.196	66.196	71.196	28.804
Resultant at Mid-span	29.391	41.391	46.391	64.391	69.391	30.609
1/2 "xR" Rear of Resultant	27.587	39.587	44.587	62.587	67.587	32.413
Front Axle #1 at Front Support	0.00	12.00	17.00	35.00	40.00	60.00
Rear Axle #5 at Rear Spt (Max Shear)	60.00	72.00	77.00	95.00	100.00	0.00

	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Middle #4 Axle	Shear at Rear #5 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	R-5	RB
	kips	kips	kips	kips	kips	kips	kips
40.00	82.04	58.04	10.04	-37.96	-69.96	-101.96	101.96
40.00	85.36	61.36	13.36	-34.64	-66.64	-98.64	98.64
40.00	88.68	64.68	16.68	-31.32	-63.32	-95.32	95.32
40.00	92.00	68.00	20.00	-28.00	-60.00	-92.00	92.00
40.00	95.32	71.32	23.32	-24.68	-56.68	-88.68	88.68
40.00	146.08	122.08	74.08	26.08	-5.92	-37.92	37.92
40.00	35.68	11.68	-36.32	-84.32	-116.32	-148.32	148.32

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Middle #4 Axle	Mom Area to Rear #5 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-5	MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Position of Midspan						
1/2 "xR" Fwd of Axle #3	2,855.35	696.48	50.20	-683.28	-349.80	-2,568.95
Axle #3 at Mid-span	2,816.88	736.32	66.80	-623.52	-333.20	-2,663.28
Btwn Axle #3 & Resultant	2,766.43	776.16	83.40	-563.76	-316.60	-2,745.63
Resultant at Mid-span	2,704.00	816.00	100.00	-504.00	-300.00	-2,816.00
1/2 "xR" Rear of Resultant	2,629.59	855.84	116.60	-444.24	-283.40	-2,874.39

	Mom Area to Front #1 Axle	Mom Area to Mid #2 Axle	Mom Area to Mid #3 Axle	Mom Area to Mid #4 Axle	Mom Area to Rear #5 Axle	Mom Area to Beam End
	M-RA-End	M-1	M-2	M-3	M-4	M-5
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
0.00	2,855.35	3,551.83	3,602.03	2,918.75	2,568.95	0.00
0.00	2,816.88	3,553.20	3,620.00	2,996.48	2,663.28	0.00
0.00	2,766.43	3,542.59	3,625.99	3,062.23	2,745.63	0.00
0.00	2,704.00	3,520.00	3,620.00	3,116.00	2,816.00	0.00
0.00	2,629.59	3,485.43	3,602.03	3,157.79	2,874.39	0.00

SHEAR AT AXLE LOCATIONS FOR SHEAR (V) DIAGRAM							
Mid-span Location (As defined by following stated condition)	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at React B, kips
1/2 "xR" Rear of Axle #3	82.04	58.04	10.04	-37.96	-69.96	-101.96	101.96
Span Position (from Left)	0.00	34.80	46.80	51.80	69.80	74.80	100.00
Axle #3 at Mid-span	85.36	61.36	13.36	-34.64	-66.64	-98.64	98.64
Span Position (from Left)	0.00	33.00	45.00	50.00	68.00	73.00	100.00
Btwn Axle #3 & Resultant	88.68	64.68	16.68	-31.32	-63.32	-95.32	95.32
Span Position (from Left)	0.00	31.20	43.20	48.20	66.20	71.20	100.00
Resultant at Mid-span	92.00	68.00	20.00	-28.00	-60.00	-92.00	92.00
Span Position (from Left)	0.00	29.39	41.39	46.39	64.39	69.39	100.00
1/2 "xR" Fwd of Resultant	95.32	71.32	23.32	-24.68	-56.68	-88.68	88.68
Span Position (from Left)	0.00	27.59	39.59	44.59	62.59	67.59	100.00
e #5 at Rear Spt (Max Shear)	35.68	11.68	-36.32	-84.32	-116.32	-148.32	148.32
Span Position (from Left)	0.00	60.00	72.00	77.00	95.00	100.00	100.00

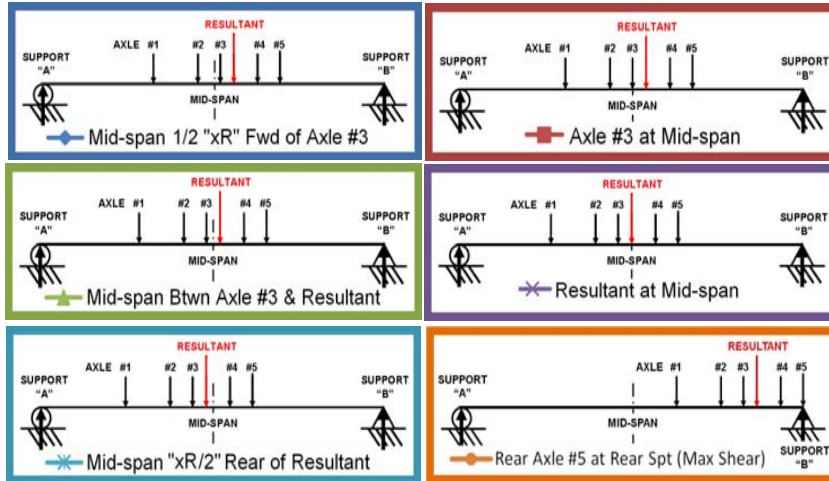
MOMENT AT AXLE LOCATIONS FOR MOMENT (M) DIAGRAM							
Mid-span Location (As defined by following stated condition)	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
1/2 "xR" Rear of Axle #3	0.0	2,855.35	3,551.83	3,602.03	2,918.75	2,568.95	0.0
Span Position (from Left)	0.00	34,804	46,804	51,804	69,804	74,804	100,000
Axle #3 at Mid-span	0.0	2,816.9	3,553.2	3,620.0	2,996.5	2,663.3	0.0
Span Position (from Left)	0.00	33,000	45,000	50,000	68,000	73,000	100,000
Btwn Axle #3 & Resultant	0.0	2,766.4	3,542.6	3,626.0	3,062.2	2,745.6	0.0
Span Position (from Left)	0.00	31,196	43,196	48,196	66,196	71,196	100,000
Resultant at Mid-span	0.0	2,704.0	3,520.0	3,620.0	3,116.0	2,816.0	0.0
Span Position (from Left)	0.00	29,391	41,391	46,391	64,391	69,391	100,000
1/2 "xR" Fwd of Resultant	0.0	2,629.6	3,485.4	3,602.0	3,157.8	2,874.4	0.0
Span Position (from Left)	0.00	27,587	39,587	44,587	62,587	67,587	100,000

**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**

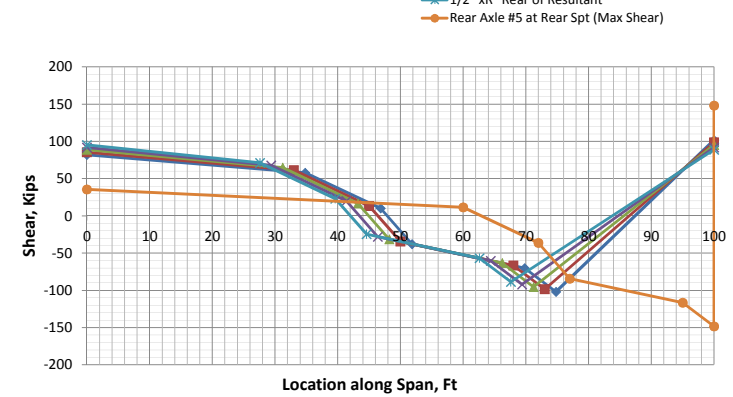
**FIVE (5) AXLE**

**One (1x) MLC 80W Vehicle, on 100 ft Span**

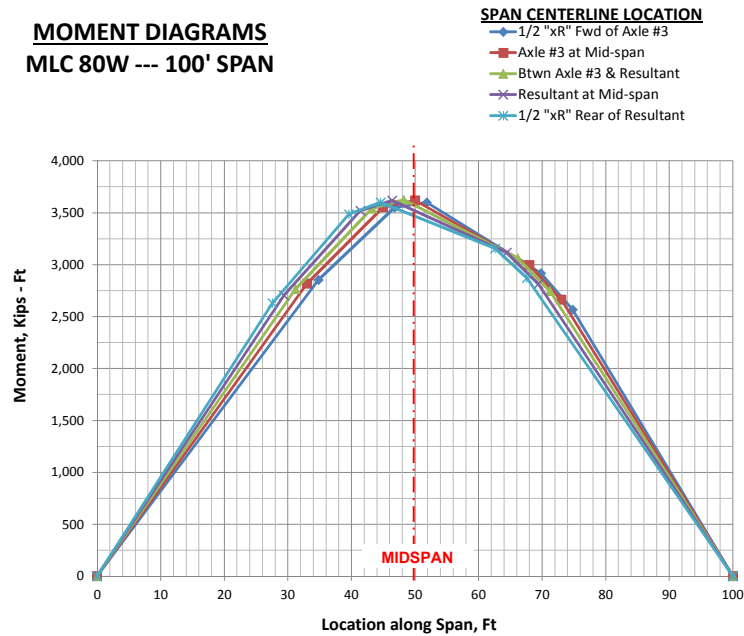
Possible Axle Load Locations Corresponding to following Shear and Moment Diagrams



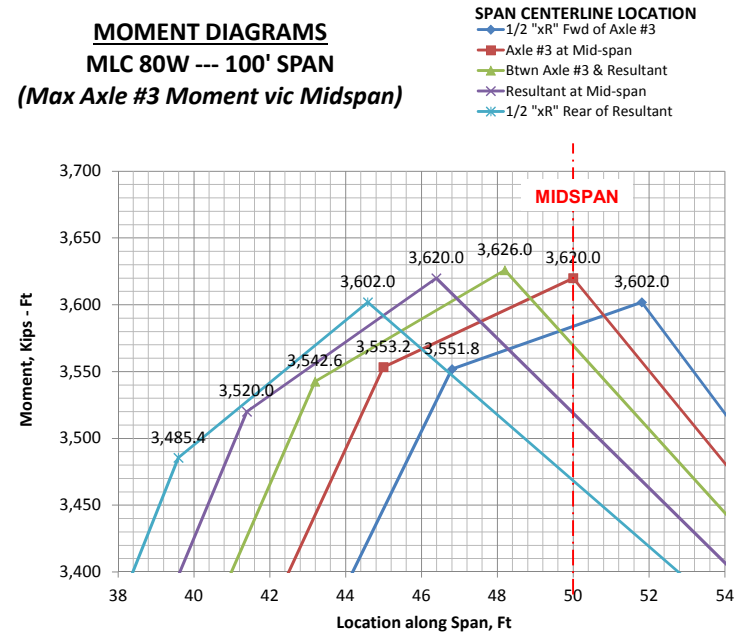
**SHEAR DIAGRAMS**  
**MLC 80W --- 100' SPAN**



**MOMENT DIAGRAMS**  
**MLC 80W --- 100' SPAN**



**MOMENT DIAGRAMS**  
**MLC 80W --- 100' SPAN**  
**(Max Axle #3 Moment vic Midspan)**

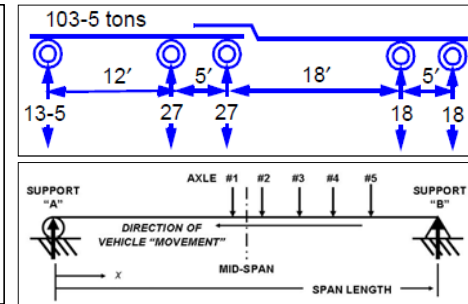
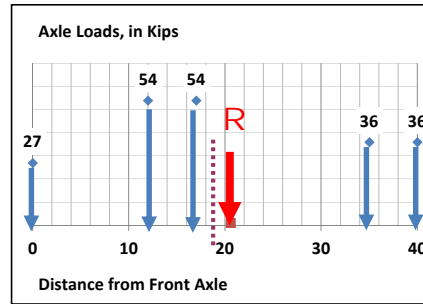


**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**

**FIVE (5) AXLE**

**One (1x) MLC 90W Vehicle, on 100 ft Span**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	13.5	27.0		0.0	120.10	0
2	27.0	54.0	12.0	12.0	240.20	366
3	27.0	54.0	5.0	17.0	240.20	518
4	18.0	36.0	18.0	35.0	160.14	1067
(Rear) 5	18.0	36.0	5.0	40.0	160.14	1219
<b>Totals</b>	<b>103.5</b>	<b>207.0</b>	<b>40.0</b>		<b>800.68</b>	
		Resultant at location:		20.609		628
		Distance to Nearest Axle, "xR":		3.609		



	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	L END
	ft	ft	ft	ft	ft	ft
Position of Midspan						
1/2 "xR" Fwd of Axle #3	34.804	46.804	51.804	69.804	74.804	25.196
Axle #3 at Mid-span	33.000	45.000	50.000	68.000	73.000	27.000
Btwn Axle #3 & Resultant	31.196	43.196	48.196	66.196	71.196	28.804
Resultant at Mid-span	29.391	41.391	46.391	64.391	69.391	30.609
1/2 "xR" Rear of Resultant	27.587	39.587	44.587	62.587	67.587	32.413
Front Axle #1 at Front Support	0.00	12.00	17.00	35.00	40.00	60.00
Rear Axle #5 at Rear Spt (Max Shear)	60.00	72.00	77.00	95.00	100.00	0.00

	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Middle #4 Axle	Shear at Rear #5 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	R-5	RB
	kips	kips	kips	kips	kips	kips	kips
40.00	92.30	65.30	11.30	-42.71	-78.71	-114.71	114.71
40.00	96.03	69.03	15.03	-38.97	-74.97	-110.97	110.97
40.00	99.77	72.77	18.77	-35.24	-71.24	-107.24	107.24
40.00	103.50	76.50	22.50	-31.50	-67.50	-103.50	103.50
40.00	107.24	80.24	26.24	-27.77	-63.77	-99.77	99.77
40.00	164.34	137.34	83.34	29.34	-6.66	-42.66	42.66
40.00	40.14	13.14	-40.86	-94.86	-130.86	-166.86	166.86

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Middle #4 Axle	Mom Area to Rear #5 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-5	MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Position of Midspan						
1/2 "xR" Fwd of Axle #3	3,212.27	783.54	56.48	-768.69	-393.53	-2,890.07
Axle #3 at Mid-span	3,168.99	828.36	75.15	-701.46	-374.85	-2,996.19
Btwn Axle #3 & Resultant	3,112.23	873.18	93.82	-634.23	-356.18	-3,088.83
Resultant at Mid-span	3,042.00	918.00	112.50	-567.00	-337.50	-3,168.00
1/2 "xR" Rear of Resultant	2,958.29	962.82	131.18	-499.77	-318.83	-3,233.69

	Mom Area to Front #1 Axle	Mom Area to Mid #2 Axle	Mom Area to Mid #3 Axle	Mom Area to Mid #4 Axle	Mom Area to Rear #5 Axle	Mom Area to Beam End
	M-RA-End	M-1	M-2	M-3	M-4	M-5
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
0.00	3,212.27	3,995.81	4,052.28	3,283.59	2,890.07	0.00
0.00	3,168.99	3,997.35	4,072.50	3,371.04	2,996.19	0.00
0.00	3,112.23	3,985.41	4,079.24	3,445.01	3,088.83	0.00
0.00	3,042.00	3,960.00	4,072.50	3,505.50	3,168.00	0.00
0.00	2,958.29	3,921.11	4,052.28	3,552.51	3,233.69	0.00

SHEAR AT AXLE LOCATIONS FOR SHEAR (V) DIAGRAM							
Mid-span Location (As defined by following stated condition)	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at React B, kips
1/2 "xR" Rear of Axle #3	92.30	65.30	11.30	-42.71	-78.71	-114.71	114.71
Span Position (from Left)	0.00	34.80	46.80	51.80	69.80	74.80	100.00
Axle #3 at Mid-span	96.03	69.03	15.03	-38.97	-74.97	-110.97	110.97
Span Position (from Left)	0.00	33.00	45.00	50.00	68.00	73.00	100.00
Btwn Axle #3 & Resultant	99.77	72.77	18.77	-35.24	-71.24	-107.24	107.24
Span Position (from Left)	0.00	31.20	43.20	48.20	66.20	71.20	100.00
Resultant at Mid-span	103.50	76.50	22.50	-31.50	-67.50	-103.50	103.50
Span Position (from Left)	0.00	29.39	41.39	46.39	64.39	69.39	100.00
1/2 "xR" Fwd of Resultant	107.24	80.24	26.24	-27.77	-63.77	-99.77	99.77
Span Position (from Left)	0.00	27.59	39.59	44.59	62.59	67.59	100.00
e #5 at Rear Spt (Max Shear)	40.14	13.14	-40.86	-94.86	-130.86	-166.86	166.86
Span Position (from Left)	0.00	60.00	72.00	77.00	95.00	100.00	100.00

MOMENT AT AXLE LOCATIONS FOR MOMENT (M) DIAGRAM							
Mid-span Location (As defined by following stated condition)	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
1/2 "xR" Rear of Axle #3	0.0	3,212.3	3,995.8	4,052.3	3,283.6	2,890.1	0.0
Span Position (from Left)	0.00	34,804	46,804	51,804	69,804	74,804	100,000
Axle #3 at Mid-span	0.0	3,169.0	3,997.4	4,072.5	3,371.0	2,996.2	0.0
Span Position (from Left)	0.00	33,000	45,000	50,000	68,000	73,000	100,000
Btwn Axle #3 & Resultant	0.0	3,112.2	3,985.4	4,079.2	3,445.0	3,088.8	0.0
Span Position (from Left)	0.00	31,196	43,196	48,196	66,196	71,196	100,000
Resultant at Mid-span	0.0	3,042.0	3,960.0	4,072.5	3,505.5	3,168.0	0.0
Span Position (from Left)	0.00	29,391	41,391	46,391	64,391	69,391	100,000
1/2 "xR" Fwd of Resultant	0.0	2,958.3	3,921.1	4,052.3	3,552.5	3,233.7	0.0
Span Position (from Left)	0.00	27,587	39,587	44,587	62,587	67,587	100,000

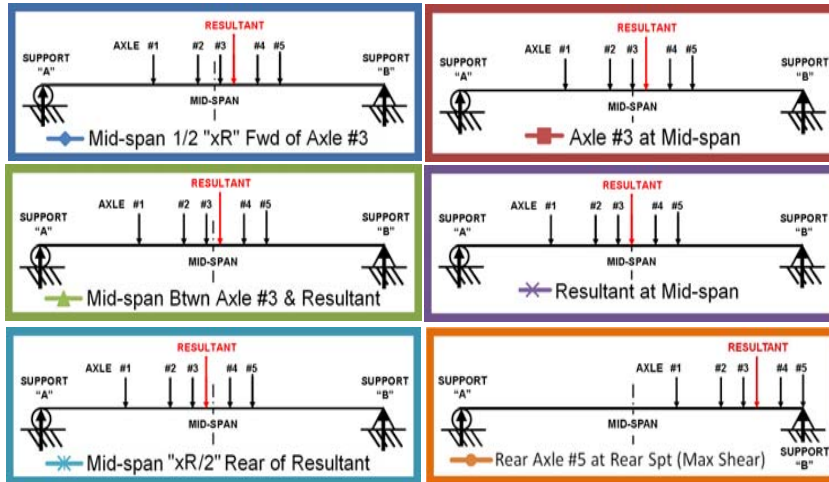


**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**

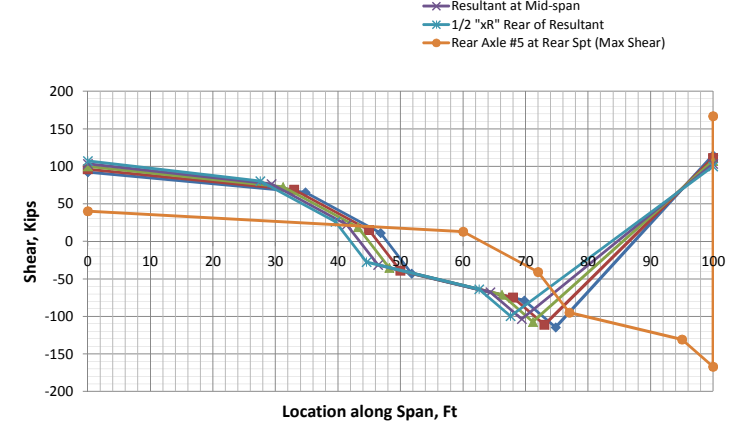
**FIVE (5) AXLE**

**One (1x) MLC 90W Vehicle, on 100 ft Span**

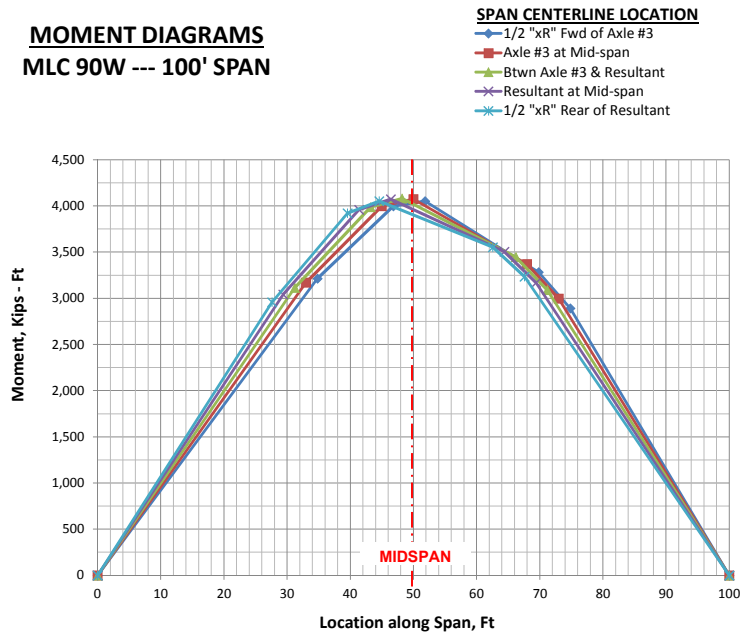
Possible Axle Load Locations Corresponding to following Shear and Moment Diagrams



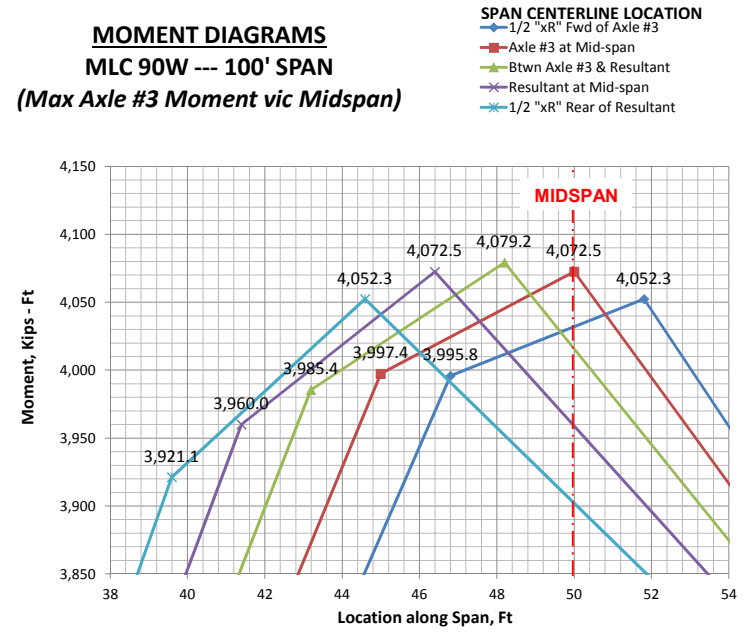
**SHEAR DIAGRAMS**  
**MLC 90W --- 100' SPAN**



**MOMENT DIAGRAMS**  
**MLC 90W --- 100' SPAN**



**MOMENT DIAGRAMS**  
**MLC 90W --- 100' SPAN**  
**(Max Axle #3 Moment vic Midspan)**



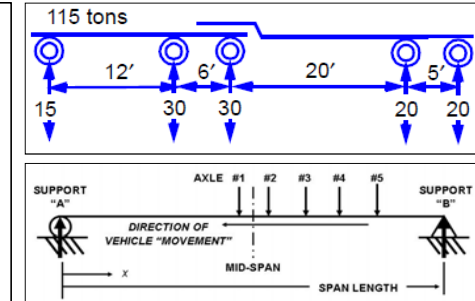
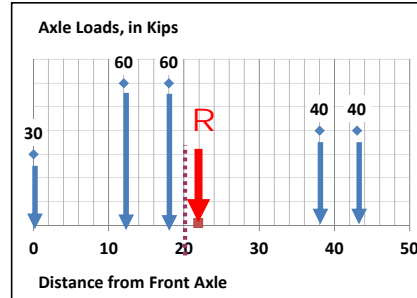
**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**

**FIVE (5) AXLE**

**One (1x) MLC 100W Vehicle, on 100 ft Span**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	15.0	30.0		0.0	133.45	0
2	30.0	60.0	12.0	12.0	266.89	366
3	30.0	60.0	6.0	18.0	266.89	549
4	20.0	40.0	20.0	38.0	177.93	1158
(Rear) 5	20.0	40.0	5.0	43.0	177.93	1311
<b>Totals</b>	<b>115.0</b>	<b>230.0</b>	<b>43.0</b>		<b>889.64</b>	
		Resultant at location:		21.913		668
		Distance to Nearest Axle, "xR":		3.913		

100 ft Span Length



	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	L END
	ft	ft	ft	ft	ft	ft
Position of Midspan						
1/2 "xR" Fwd of Axle #3	33.957	45.957	51.957	71.957	76.957	23.043
Axle #3 at Mid-span	32.000	44.000	50.000	70.000	75.000	25.000
Btwn Axle #3 & Resultant	30.043	42.043	48.043	68.043	73.043	26.957
Resultant at Mid-span	28.087	40.087	46.087	66.087	71.087	28.913
1/2 "xR" Rear of Resultant	26.130	38.130	44.130	64.130	69.130	30.870
Front Axle #1 at Front Support	0.00	12.00	18.00	38.00	43.00	57.00
Rear Axle #5 at Rear Spt (Max Shear)	57.00	69.00	75.00	95.00	100.00	0.00

	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Middle #4 Axle	Shear at Rear #5 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	R-5	RB
	kips	kips	kips	kips	kips	kips	kips
43.00	101.50	71.50	11.50	-48.50	-88.50	-128.50	128.50
43.00	106.00	76.00	16.00	-44.00	-84.00	-124.00	124.00
43.00	110.50	80.50	20.50	-39.50	-79.50	-119.50	119.50
43.00	115.00	85.00	25.00	-35.00	-75.00	-115.00	115.00
43.00	119.50	89.50	29.50	-30.50	-70.50	-110.50	110.50
43.00	179.60	149.60	89.60	29.60	-10.40	-50.40	50.40
43.00	48.50	18.50	-41.50	-101.50	-141.50	-181.50	181.50

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Middle #4 Axle	Mom Area to Rear #5 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-5	MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Position of Midspan						
1/2 "xR" Fwd of Axle #3	3,446.59	858.00	69.00	-970.00	-442.50	-2,961.09
Axle #3 at Mid-span	3,392.00	912.00	96.00	-880.00	-420.00	-3,100.00
Btwn Axle #3 & Resultant	3,319.80	966.00	123.00	-790.00	-397.50	-3,221.30
Resultant at Mid-span	3,230.00	1,020.00	150.00	-700.00	-375.00	-3,325.00
1/2 "xR" Rear of Resultant	3,122.59	1,074.00	177.00	-610.00	-352.50	-3,411.09

	Mom Area to Front #1 Axle	Mom Area to Mid #2 Axle	Mom Area to Mid #3 Axle	Mom Area to Mid #4 Axle	Mom Area to Rear #5 Axle	Mom Area to Beam End
	M-RA-End	M-1	M-2	M-3	M-4	M-5
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
0.00	3,446.59	4,304.59	4,373.59	3,403.59	2,961.09	0.00
0.00	3,392.00	4,304.00	4,400.00	3,520.00	3,100.00	0.00
0.00	3,319.80	4,285.80	4,408.80	3,618.80	3,221.30	0.00
0.00	3,230.00	4,250.00	4,400.00	3,700.00	3,325.00	0.00
0.00	3,122.59	4,196.59	4,373.59	3,763.59	3,411.09	0.00

SHEAR AT AXLE LOCATIONS FOR SHEAR (V) DIAGRAM							
Mid-span Location (As defined by following stated condition)	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at React B, kips
1/2 "xR" Rear of Axle #3	101.50	71.50	11.50	-48.50	-88.50	-128.50	128.50
Span Position (from Left)	0.00	33.96	45.96	51.96	71.96	76.96	100.00
Axle #3 at Mid-span	106.00	76.00	16.00	-44.00	-84.00	-124.00	124.00
Span Position (from Left)	0.00	32.00	44.00	50.00	70.00	75.00	100.00
Btwn Axle #3 & Resultant	110.50	80.50	20.50	-39.50	-79.50	-119.50	119.50
Span Position (from Left)	0.00	30.04	42.04	48.04	68.04	73.04	100.00
Resultant at Mid-span	115.00	85.00	25.00	-35.00	-75.00	-115.00	115.00
Span Position (from Left)	0.00	28.09	40.09	46.09	66.09	71.09	100.00
1/2 "xR" Fwd of Resultant	119.50	89.50	29.50	-30.50	-70.50	-110.50	110.50
Span Position (from Left)	0.00	26.13	38.13	44.13	64.13	69.13	100.00
e #5 at Rear Spt (Max Shear)	48.50	18.50	-41.50	-101.50	-141.50	-181.50	181.50
Span Position (from Left)	0.00	57.00	69.00	75.00	95.00	100.00	100.00

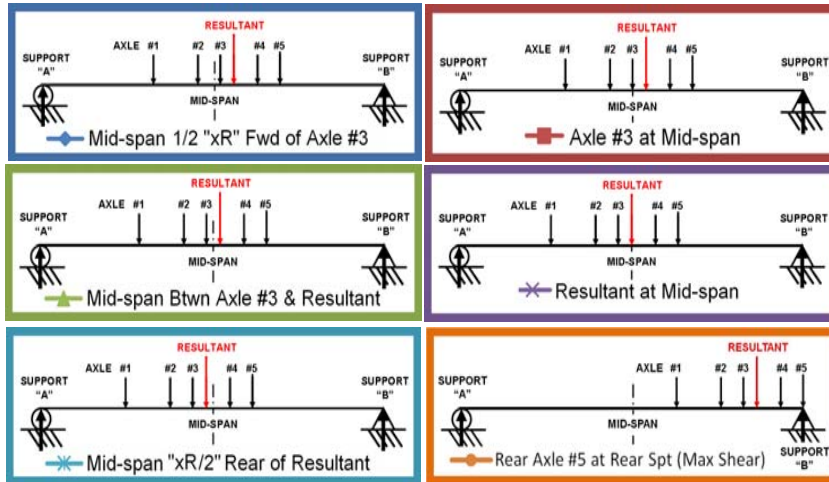
MOMENT AT AXLE LOCATIONS FOR MOMENT (M) DIAGRAM							
Mid-span Location (As defined by following stated condition)	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
1/2 "xR" Rear of Axle #3	0.0	3,446.6	4,304.6	4,373.6	3,403.6	2,961.1	0.0
Span Position (from Left)	0.00	33,957	45,957	51,957	71,957	76,957	100,000
Axle #3 at Mid-span	0.0	3,392.0	4,304.0	4,400.0	3,520.0	3,100.0	0.0
Span Position (from Left)	0.00	32,000	44,000	50,000	70,000	75,000	100,000
Btwn Axle #3 & Resultant	0.0	3,319.8	4,285.8	4,408.8	3,618.8	3,221.3	0.0
Span Position (from Left)	0.00	30,043	42,043	48,043	68,043	73,043	100,000
Resultant at Mid-span	0.0	3,230.0	4,250.0	4,400.0	3,700.0	3,325.0	0.0
Span Position (from Left)	0.00	28,087	40,087	46,087	66,087	71,087	100,000
1/2 "xR" Fwd of Resultant	0.0	3,122.6	4,196.6	4,373.6	3,763.6	3,411.1	0.0
Span Position (from Left)	0.00	26,130	38,130	44,130	64,130	69,130	100,000

**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**

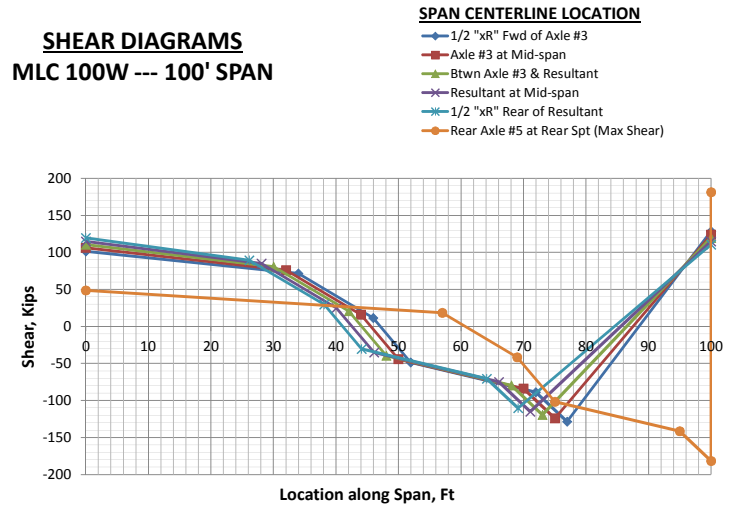
**FIVE (5) AXLE**

**One (1x) MLC 100W Vehicle, on 100 ft Span**

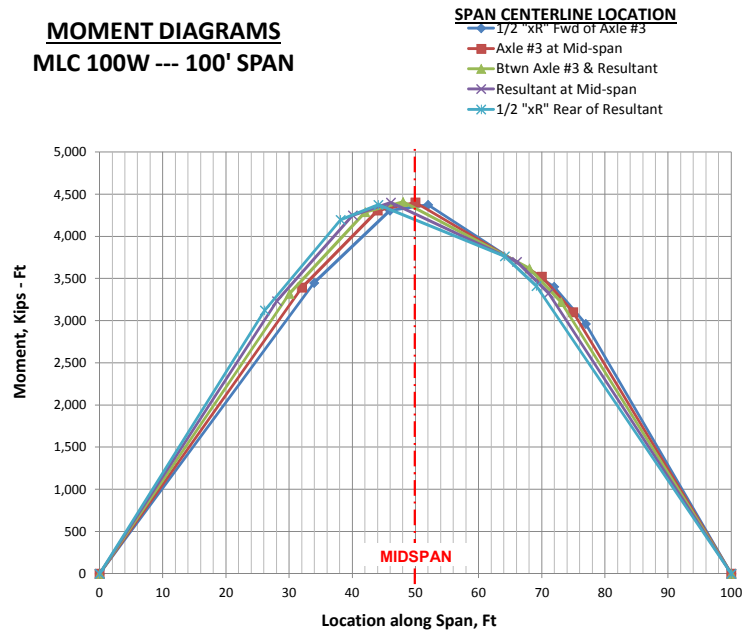
Possible Axle Load Locations Corresponding to following Shear and Moment Diagrams



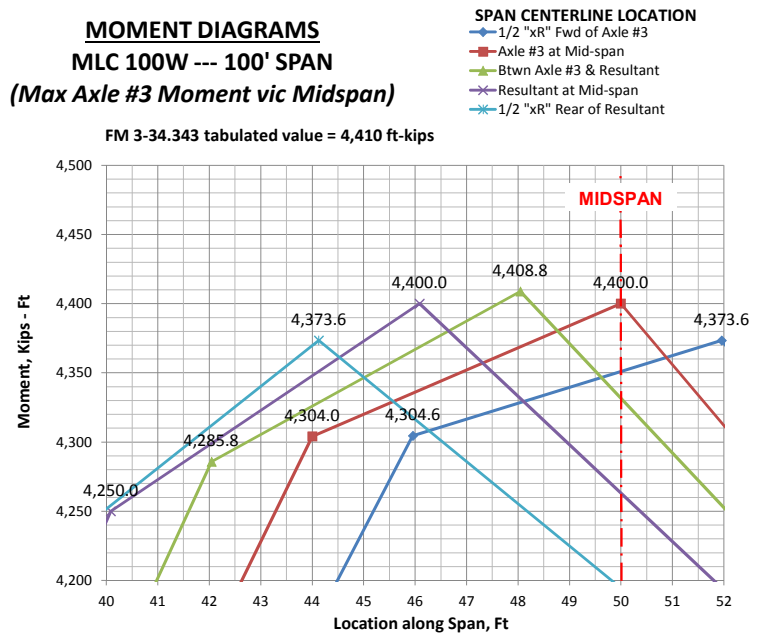
**SHEAR DIAGRAMS  
MLC 100W --- 100' SPAN**



**MOMENT DIAGRAMS  
MLC 100W --- 100' SPAN**



**MOMENT DIAGRAMS  
MLC 100W --- 100' SPAN  
(Max Axle #3 Moment vic Midspan)**

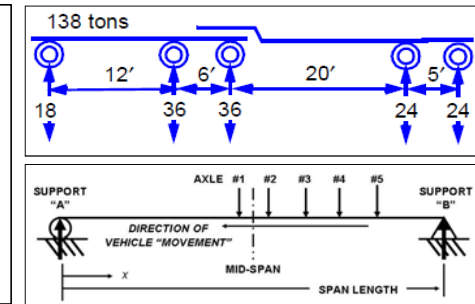
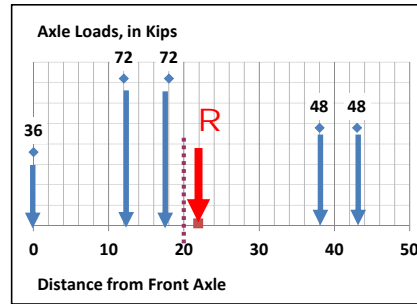


**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**

**FIVE (5) AXLE**

**One (1x) MLC 120W Vehicle, on 100 ft Span**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	18.0	36.0		0.0	160.14	0
2	36.0	72.0	12.0	12.0	320.27	366
3	36.0	72.0	6.0	18.0	320.27	549
4	24.0	48.0	20.0	38.0	213.51	1158
(Rear) 5	24.0	48.0	5.0	43.0	213.51	1311
<b>Totals</b>	<b>138.0</b>	<b>276.0</b>	<b>43.0</b>		<b>1067.57</b>	<b>668</b>
		Resultant at location:		21.913		
		Distance to Nearest Axle, "xR":		3.913		



	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	L END
	ft	ft	ft	ft	ft	ft
<b>Position of Midspan</b>						
1/2 "xR" Fwd of Axle #3	33.957	45.957	51.957	71.957	76.957	23.043
Axle #3 at Mid-span	32.000	44.000	50.000	70.000	75.000	25.000
Btwn Axle #3 & Resultant	30.043	42.043	48.043	68.043	73.043	26.957
Resultant at Mid-span	28.087	40.087	46.087	66.087	71.087	28.913
1/2 "xR" Rear of Resultant	26.130	38.130	44.130	64.130	69.130	30.870
Front Axle #1 at Front Support	0.00	12.00	18.00	38.00	43.00	57.00
Rear Axle #5 at Rear Spt (Max Shear)	57.00	69.00	75.00	95.00	100.00	0.00

	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Middle #4 Axle	Shear at Rear #5 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	R-5	RB
	kips	kips	kips	kips	kips	kips	kips
43.00	121.80	85.80	13.80	-58.20	-106.20	-154.20	276.00
43.00	127.20	91.20	19.20	-52.80	-100.80	-148.80	276.00
43.00	132.60	96.60	24.60	-47.40	-95.40	-143.40	276.00
43.00	138.00	102.00	30.00	-42.00	-90.00	-138.00	276.00
43.00	143.40	107.40	35.40	-36.60	-84.60	-132.60	276.00
43.00	215.52	179.52	107.52	35.52	-12.48	-60.48	60.48
43.00	58.20	22.20	-49.80	-121.80	-169.80	-217.80	217.80

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Middle #4 Axle	Mom Area to Rear #5 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-5	MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
<b>Position of Midspan</b>						
1/2 "xR" Fwd of Axle #3	4,135.90	1,029.60	82.80	-1,164.00	-531.00	-3,553.30
Axle #3 at Mid-span	4,070.40	1,094.40	115.20	-1,056.00	-504.00	-3,720.00
Btwn Axle #3 & Resultant	3,983.77	1,159.20	147.60	-948.00	-477.00	-3,865.57
Resultant at Mid-span	3,876.00	1,224.00	180.00	-840.00	-450.00	-3,990.00
1/2 "xR" Rear of Resultant	3,747.10	1,288.80	212.40	-732.00	-423.00	-4,093.30

	Mom Area to Front #1 Axle	Mom Area to Mid #2 Axle	Mom Area to Mid #3 Axle	Mom Area to Mid #4 Axle	Mom Area to Rear #5 Axle	Mom Area to Beam End
	M-RA-End	M-1	M-2	M-3	M-4	M-5
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
0.00	4,135.90	5,165.50	5,248.30	4,084.30	3,553.30	0.00
0.00	4,070.40	5,164.80	5,280.00	4,224.00	3,720.00	0.00
0.00	3,983.77	5,142.97	5,290.57	4,342.57	3,865.57	0.00
0.00	3,876.00	5,100.00	5,280.00	4,440.00	3,990.00	0.00
0.00	3,747.10	5,035.90	5,248.30	4,516.30	4,093.30	0.00

SHEAR AT AXLE LOCATIONS FOR SHEAR (V) DIAGRAM							
Mid-span Location (As defined by following stated condition)	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at React B, kips
1/2 "xR" Rear of Axle #3	121.80	85.80	13.80	-58.20	-106.20	-154.20	154.20
Span Position (from Left)	0.00	33.96	45.96	51.96	71.96	76.96	100.00
Axle #3 at Mid-span	127.20	91.20	19.20	-52.80	-100.80	-148.80	148.80
Span Position (from Left)	0.00	32.00	44.00	50.00	70.00	75.00	100.00
Btwn Axle #3 & Resultant	132.60	96.60	24.60	-47.40	-95.40	-143.40	143.40
Span Position (from Left)	0.00	30.04	42.04	48.04	68.04	73.04	100.00
Resultant at Mid-span	138.00	102.00	30.00	-42.00	-90.00	-138.00	138.00
Span Position (from Left)	0.00	28.09	40.09	46.09	66.09	71.09	100.00
1/2 "xR" Fwd of Resultant	143.40	107.40	35.40	-36.60	-84.60	-132.60	132.60
Span Position (from Left)	0.00	26.13	38.13	44.13	64.13	69.13	100.00
e #5 at Rear Spt (Max Shear)	58.20	22.20	-49.80	-121.80	-169.80	-217.80	<b>217.80</b>
Span Position (from Left)	0.00	57.00	69.00	75.00	95.00	100.00	<b>100.00</b>

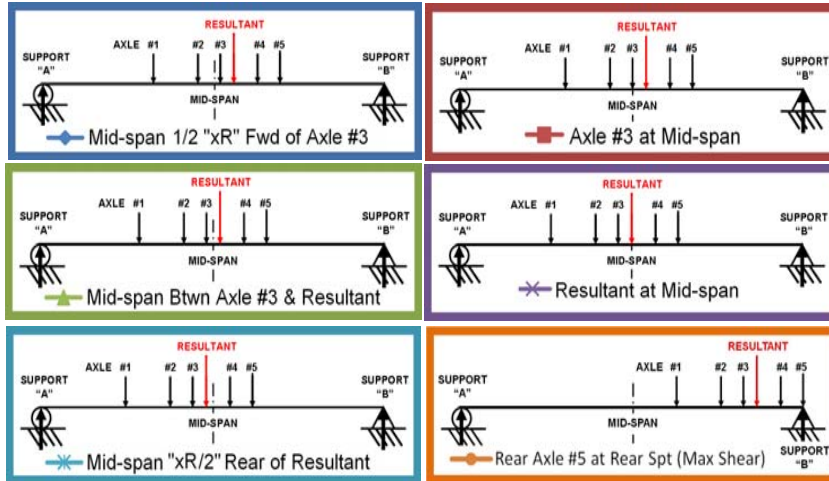
MOMENT AT AXLE LOCATIONS FOR MOMENT (M) DIAGRAM							
Mid-span Location (As defined by following stated condition)	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
1/2 "xR" Rear of Axle #3	0.0	4,135.9	5,165.5	5,248.3	4,084.3	3,553.3	0.0
Span Position (from Left)	0.00	33,957	45,957	51,957	71,957	76,957	100,000
Axle #3 at Mid-span	0.0	4,070.4	5,164.8	<b>5,280.0</b>	4,224.0	3,720.0	0.0
Span Position (from Left)	0.00	32,000	44,000	<b>50,000</b>	70,000	75,000	100,000
Btwn Axle #3 & Resultant	0.0	3,983.8	5,143.0	<b>5,290.6</b>	4,342.6	3,865.6	0.0
Span Position (from Left)	0.00	30,043	42,043	<b>48,043</b>	68,043	73,043	100,000
Resultant at Mid-span	0.0	3,876.0	5,100.0	5,280.0	4,440.0	3,990.0	0.0
Span Position (from Left)	0.00	28,087	40,087	46,087	66,087	71,087	100,000
1/2 "xR" Fwd of Resultant	0.0	3,747.1	5,035.9	5,248.3	4,516.3	4,093.3	0.0
Span Position (from Left)	0.00	26,130	38,130	44,130	64,130	69,130	100,000

**CALCULATIONS TO VERIFY AXLE LOCATIONS FOR MAXIMUM MOMENT(S) AND SHEAR**

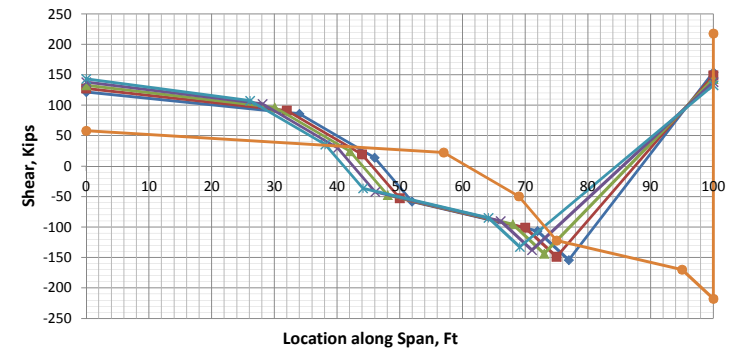
**FIVE (5) AXLE**

**One (1x) MLC 120W Vehicle, on 100 ft Span**

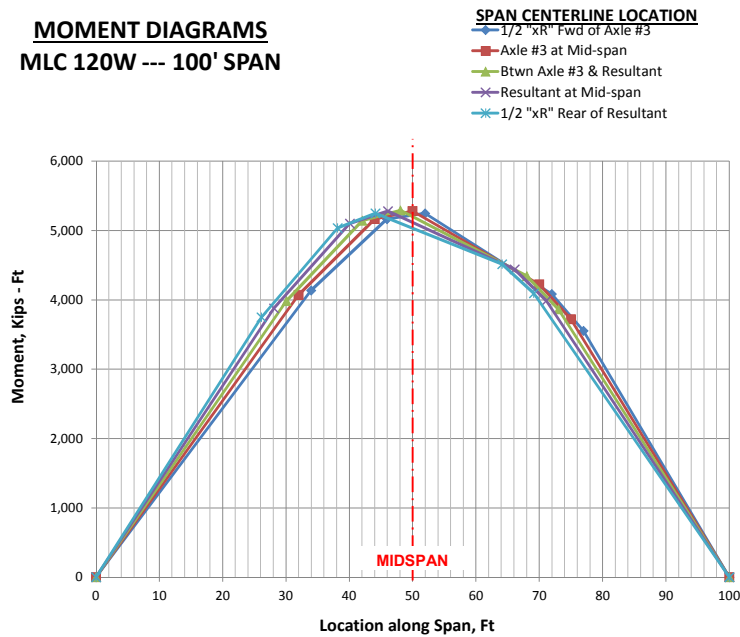
Possible Axle Load Locations Corresponding to following Shear and Moment Diagrams



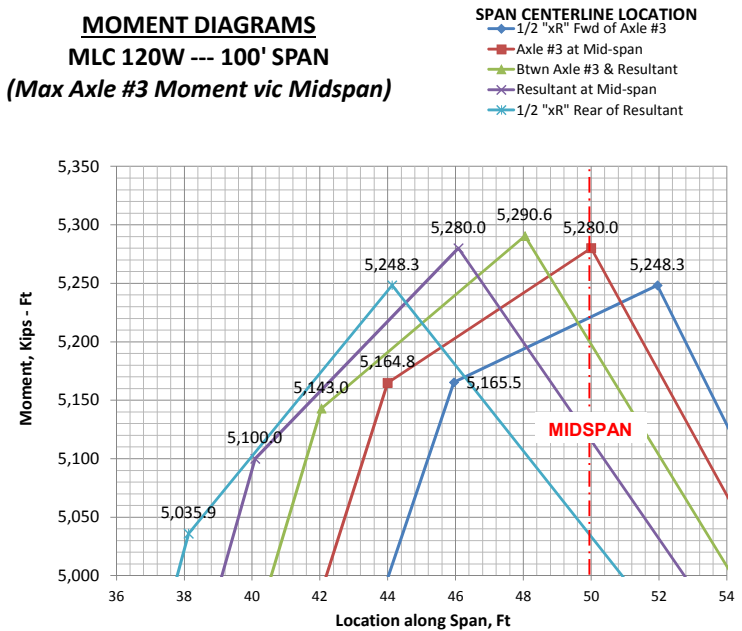
**SHEAR DIAGRAMS  
MLC 120W --- 100' SPAN**



**MOMENT DIAGRAMS  
MLC 120W --- 100' SPAN**



**MOMENT DIAGRAMS  
MLC 120W --- 100' SPAN  
(Max Axle #3 Moment vic Midspan)**



## **TABLES (TABULATED RESULTS FROM CALCULATION WORKSHEETS)**

Compare HL93 Max Mid vs Abs Mom

**Comparison of Difference (as Percentages) between Maximum Mid-span and Absoluter Moment Magnitudes and Position Along Spar  
AASHTO HL-93 Design Truck and Uniform Lane Loading, with No Dynamic Impact**

**Maximum Mid-Span Moment**

Span, ft	Axle #2 POS	Mid-span	Max Mom.	Max Shear
50.00	25.00	25.00	820.02	74.56
60.00	30.00	30.00	1,088.02	80.00
70.00	35.00	35.00	1,372.02	84.80
80.00	40.00	40.00	1,672.02	89.20
90.00	45.00	45.00	1,988.02	93.33
100.00	50.00	50.00	2,320.02	97.28
110.00	55.00	55.00	2,668.02	101.09
120.00	60.00	60.00	3,032.02	104.80
130.00	65.00	65.00	3,412.02	108.43
140.00	70.00	70.00	3,808.02	112.00
150.00	75.00	75.00	4,220.02	115.52
160.00	80.00	80.00	4,648.02	119.00
170.00	85.00	85.00	5,092.02	122.45
180.00	90.00	90.00	5,552.02	125.87
190.00	95.00	95.00	6,028.02	129.26
200.00	100.00	100.00	6,520.02	132.64
220.00	110.00	110.00	7,552.02	139.35
240.00	120.00	120.00	8,648.02	146.00
260.00	130.00	130.00	9,808.02	152.62
280.00	140.00	140.00	11,032.02	159.20
300.00	150.00	150.00	12,320.02	165.76
350.00	175.00	175.00	15,820.02	182.08
400.00	200.00	200.00	19,720.02	198.32
450.00	225.00	225.00	24,020.02	214.51
500.00	250.00	250.00	28,720.02	230.66
550.00	275.00	275.00	33,820.02	246.78
600.00	300.00	300.00	39,320.02	262.88
650.00	325.00	325.00	45,220.02	278.97
700.00	350.00	350.00	51,520.02	295.04
750.00	375.00	375.00	58,220.02	311.10
800.00	400.00	400.00	65,320.02	327.16
900.00	450.00	450.00	80,720.02	359.25
1,000.00	500.00	500.00	97,720.02	391.33

**Maximum Absolute Moment**

Span, ft	Axle #2 POS	Mid-span	Max Mom.	Mid-span Mom.	Max Shear
50.00	22.67	25.00	826.11	810.68	74.56
60.00	27.67	30.00	1,092.81	1,078.68	80.00
70.00	32.67	35.00	1,375.87	1,362.68	84.80
80.00	37.67	40.00	1,675.17	1,662.68	89.20
90.00	42.67	45.00	1,990.63	1,978.68	93.33
100.00	47.67	50.00	2,322.19	2,310.68	97.28
110.00	52.67	55.00	2,669.84	2,658.68	101.09
120.00	57.67	60.00	3,033.54	3,022.68	104.80
130.00	62.67	65.00	3,413.29	3,402.68	108.43
140.00	67.67	70.00	3,809.07	3,798.68	112.00
150.00	72.67	75.00	4,220.89	4,210.68	115.52
160.00	77.67	80.00	4,648.72	4,638.68	119.00
170.00	82.67	85.00	5,092.58	5,082.68	122.45
180.00	87.67	90.00	5,552.45	5,542.68	125.87
190.00	92.67	95.00	6,028.34	6,018.68	129.26
200.00	97.67	100.00	6,520.23	6,510.68	132.64
220.00	107.67	110.00	7,552.06	7,542.68	139.35
240.00	117.67	120.00	8,647.91	8,638.68	146.00
260.00	127.67	130.00	9,807.78	9,798.68	152.62
280.00	137.67	140.00	11,031.67	11,022.68	159.20
300.00	147.67	150.00	12,319.58	12,310.68	165.76
350.00	172.67	175.00	15,819.39	15,810.68	182.08
400.00	197.67	200.00	19,719.25	19,710.68	198.32
450.00	222.67	225.00	24,019.15	24,010.68	214.51
500.00	247.67	250.00	28,719.06	28,710.68	230.66
550.00	272.67	275.00	33,818.99	33,810.68	246.78
600.00	297.67	300.00	39,318.93	39,310.68	262.88
650.00	322.67	325.00	45,218.88	45,210.68	278.97
700.00	347.67	350.00	51,518.83	51,510.68	295.04
750.00	372.67	375.00	58,218.80	58,210.68	311.10
800.00	397.67	400.00	65,318.76	65,310.68	327.16
900.00	447.67	450.00	80,718.71	80,710.68	359.25
1,000.00	497.67	500.00	97,718.67	97,710.68	391.33

% Diff btwn Axle Mid-span and Max Abs Moments	% Diff btwn Axle #2 Pos and Mid-span
-0.738%	9.332%
-0.438%	7.777%
-0.280%	6.666%
-0.188%	5.833%
-0.131%	5.184%
-0.094%	4.666%
-0.068%	4.242%
-0.050%	3.888%
-0.037%	3.589%
-0.028%	3.333%
-0.021%	3.111%
-0.015%	2.916%
-0.011%	2.745%
-0.008%	2.592%
-0.005%	2.456%
-0.003%	2.333%
-0.001%	2.121%
0.001%	1.944%
0.002%	1.795%
0.003%	1.666%
0.004%	1.555%
0.004%	1.333%
0.004%	1.167%
0.004%	1.037%
0.003%	0.933%
0.003%	0.848%
0.003%	0.778%
0.003%	0.718%
0.002%	0.667%
0.002%	0.622%
0.002%	0.583%
0.002%	0.518%
0.001%	0.467%

**Comparison of Difference (as Percentages) between Maximum Mid-span and Absoluter Moment Magnitudes and Position Along Spar  
AASHTO HL-93 Design Truck and Uniform Lane Loading, with Dynamic Impact**

**Maximum Mid-Span Moment**

Span, ft	Axle #2 POS	Mid-span	Max Mom.	Max Shear
50.00	25.00	25.00	1,024.62	93.89
60.00	30.00	30.00	1,352.02	100.06
70.00	35.00	35.00	1,695.42	105.39
80.00	40.00	40.00	2,054.82	110.19
90.00	45.00	45.00	2,430.22	114.63
100.00	50.00	50.00	2,821.62	118.82
110.00	55.00	55.00	3,229.02	122.84
120.00	60.00	60.00	3,652.42	126.71
130.00	65.00	65.00	4,091.82	130.49
140.00	70.00	70.00	4,547.22	134.18
150.00	75.00	75.00	5,018.62	137.80
160.00	80.00	80.00	5,506.02	141.37
170.00	85.00	85.00	6,009.42	144.90
180.00	90.00	90.00	6,528.82	148.39
190.00	95.00	95.00	7,064.22	151.86
200.00	100.00	100.00	7,615.62	155.29
220.00	110.00	110.00	8,766.42	162.10
240.00	120.00	120.00	9,981.22	168.84
260.00	130.00	130.00	11,260.02	175.52
280.00	140.00	140.00	12,602.82	182.17
300.00	150.00	150.00	14,009.62	188.78
350.00	175.00	175.00	17,806.62	205.21
400.00	200.00	200.00	22,003.62	221.53
450.00	225.00	225.00	26,600.62	237.77
500.00	250.00	250.00	31,597.62	253.97
550.00	275.00	275.00	36,994.62	270.14
600.00	300.00	300.00	42,791.62	286.27
650.00	325.00	325.00	48,988.62	302.39
700.00	350.00	350.00	55,585.62	318.48
750.00	375.00	375.00	62,582.62	334.57
800.00	400.00	400.00	69,979.62	350.64
900.00	450.00	450.00	85,973.62	382.77
1,000.00	500.00	500.00	103,567.62	414.87

**Maximum Absolute Moment**

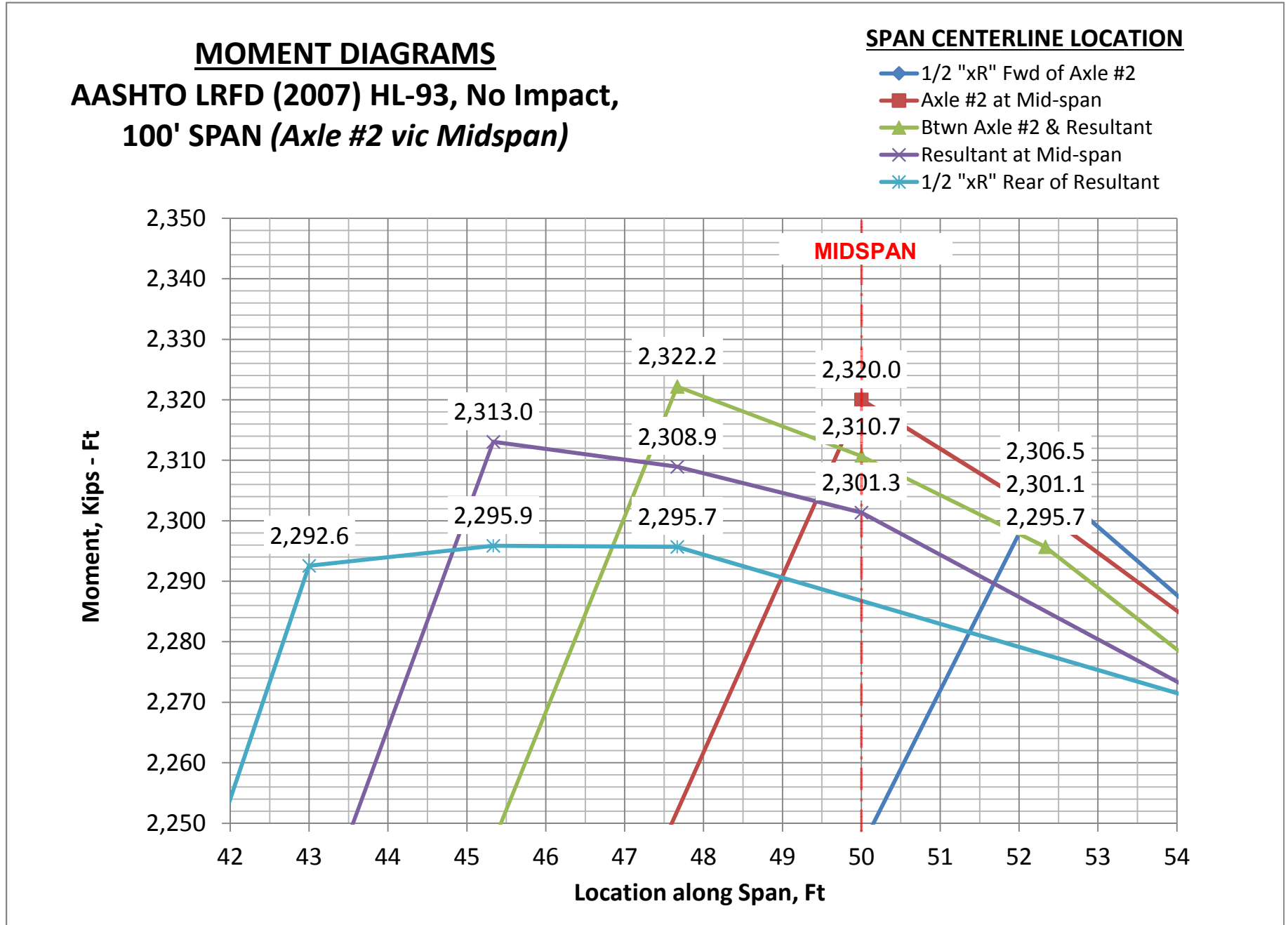
Span, ft	Axle #2 POS	Mid-span	Max Mom.	Mid-span Mom.	Max Shear
50.00	22.67	25.00	1,033.30	1,012.21	93.89
60.00	27.67	30.00	1,358.97	1,339.61	100.06
70.00	32.67	35.00	1,701.13	1,683.01	105.39
80.00	37.67	40.00	2,059.60	2,042.41	110.19
90.00	42.67	45.00	2,434.27	2,417.81	114.63
100.00	47.67	50.00	2,825.99	2,809.21	118.82
110.00	52.67	55.00	3,232.02	3,216.61	122.84
120.00	57.67	60.00	3,655.02	3,640.01	126.71
130.00	62.67	65.00	4,094.09	4,079.41	130.49
140.00	67.67	70.00	4,549.20	4,534.81	134.18
150.00	72.67	75.00	5,020.35	5,006.21	137.80
160.00	77.67	80.00	5,507.54	5,493.61	141.37
170.00	82.67	85.00	6,010.75	5,997.01	144.90
180.00	87.67	90.00	6,529.98	6,516.41	148.39
190.00	92.67	95.00	7,065.22	7,051.81	151.86
200.00	97.67	100.00	7,616.49	7,603.21	155.29
220.00	107.67	110.00	8,767.05	8,754.01	162.10
240.00	117.67	120.00	9,981.65	9,968.81	168.84
260.00	127.67	130.00	11,260.28	11,247.61	175.52
280.00	137.67	140.00	12,602.94	12,590.41	182.17
300.00	147.67	150.00	14,009.62	13,997.21	188.78
350.00	172.67	175.00	17,806.37	17,794.21	205.21
400.00	197.67	200.00	22,003.18	21,991.21	221.53
450.00	222.67	225.00	26,600.04	26,588.21	237.77
500.00	247.67	250.00	31,596.92	31,585.21	253.97
550.00	272.67	275.00	36,993.83	36,982.21	270.14
600.00	297.67	300.00	42,790.75	42,779.21	286.27
650.00	322.67	325.00	48,987.68	48,976.21	302.39
700.00	347.67	350.00	55,584.62	55,573.21	318.48
750.00	372.67	375.00	62,581.57	62,570.21	334.57
800.00	397.67	400.00	69,978.53	69,967.21	350.64
900.00	447.67	450.00	85,972.46	85,961.21	382.77
1,000.00	497.67	500.00	103,566.40	103,555.21	414.87

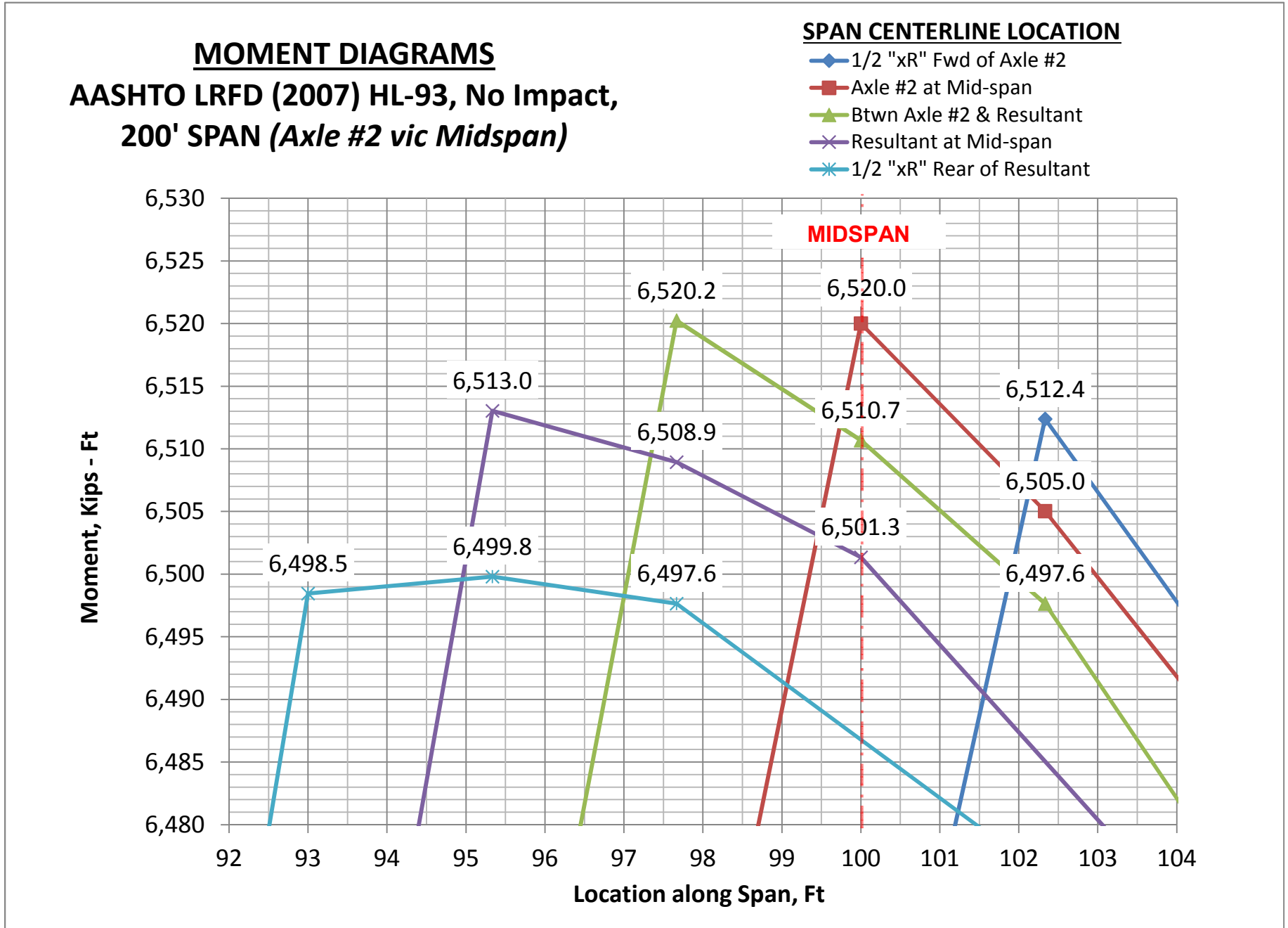
% Diff btwn Axle Mid-span and Max Abs Moments	% Diff btwn Axle #2 Pos and Mid-span
-0.840%	9.332%
-0.511%	7.777%
-0.335%	6.666%
-0.232%	5.833%
-0.166%	5.184%
-0.123%	4.666%
-0.093%	4.242%
-0.071%	3.888%
-0.055%	3.589%
-0.044%	3.333%
-0.035%	3.111%
-0.028%	2.916%
-0.022%	2.745%
-0.018%	2.592%
-0.014%	2.456%
-0.011%	2.333%
-0.007%	2.121%
-0.004%	1.944%
-0.002%	1.795%
-0.001%	1.666%
0.000%	1.555%
0.001%	1.333%
0.002%	1.167%
0.002%	1.037%
0.002%	0.933%
0.002%	0.848%
0.002%	0.778%
0.002%	0.718%
0.002%	0.667%
0.002%	0.622%
0.002%	0.583%
0.001%	0.518%
0.001%	0.467%

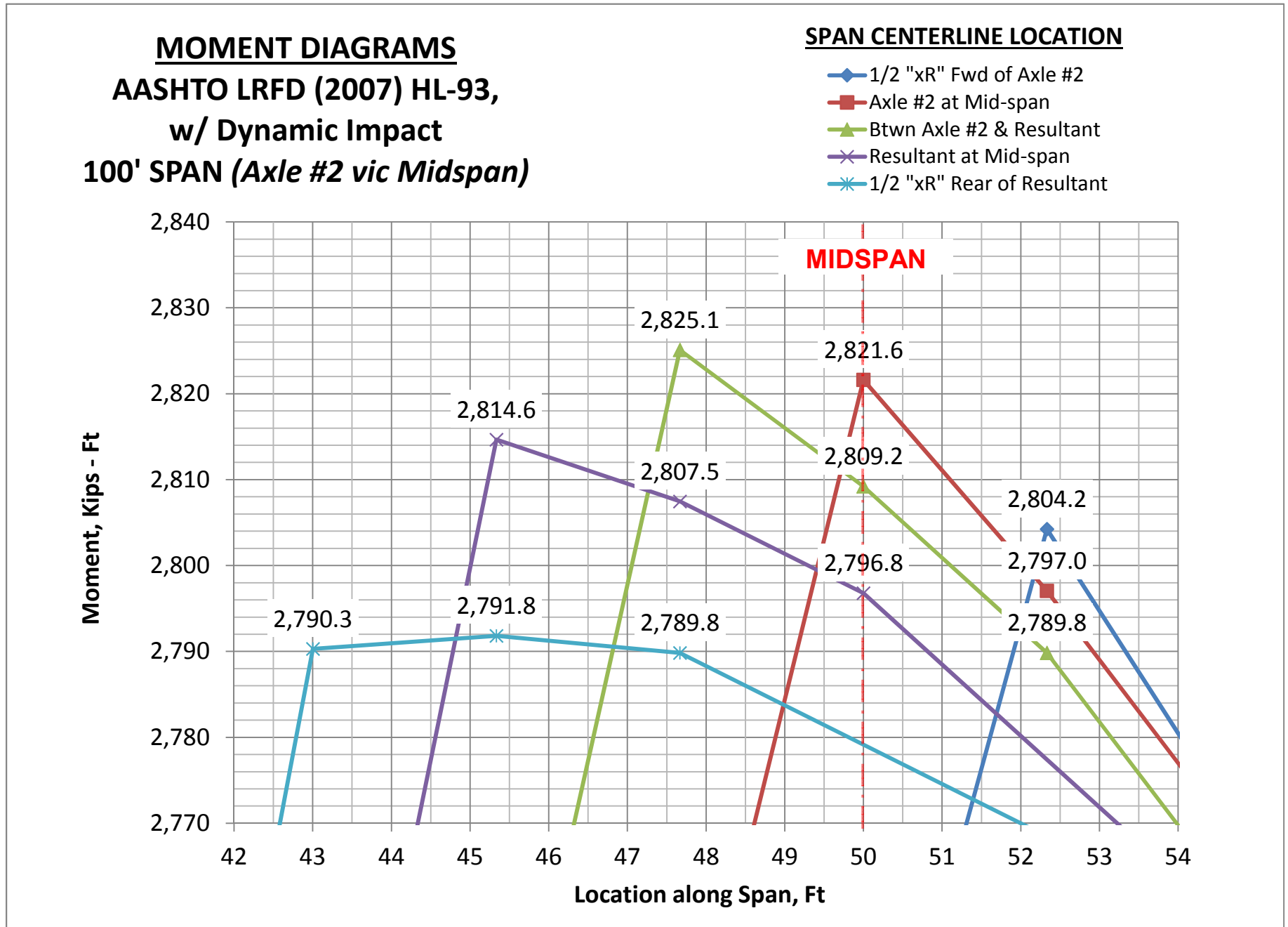
## **FIGURES**

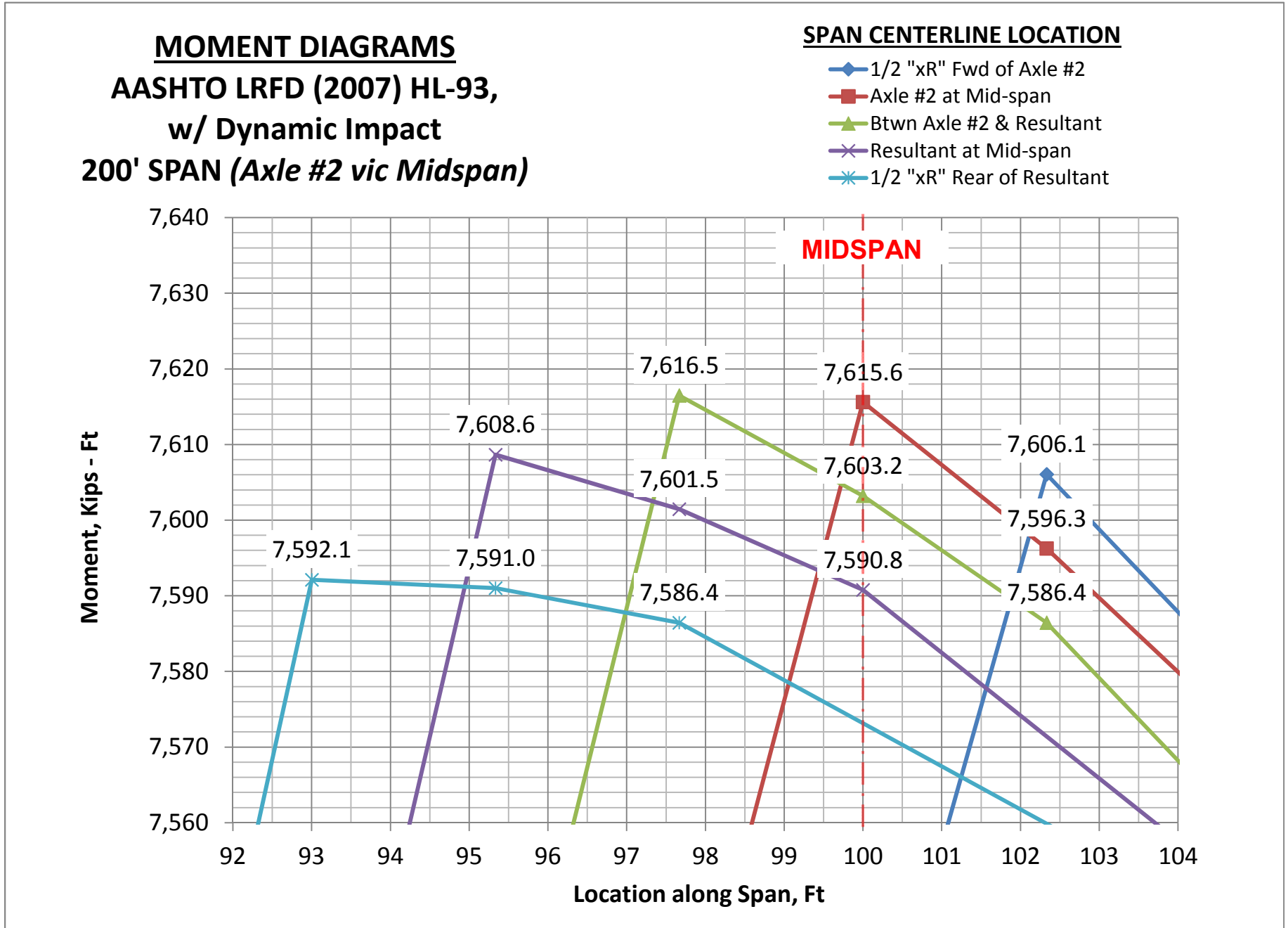
- 5-3. Locate Max M, 100', HL93 No I
- 5-4. Locate Max M, 200', HL93 No I
- 5-5. Locate Max M, 100', HL93 w. I
- 5-6. Locate Max M, 200', HL93 w. I
- 5-7. Compar Max Abs vs Midspan M
- 5-8. Diff Max Abs vs Midspan M's
- 5-9. Loc Max M, 100', MLC 50W, No I
- 5-10. Loc Max M, 100', MLC 100W, No I

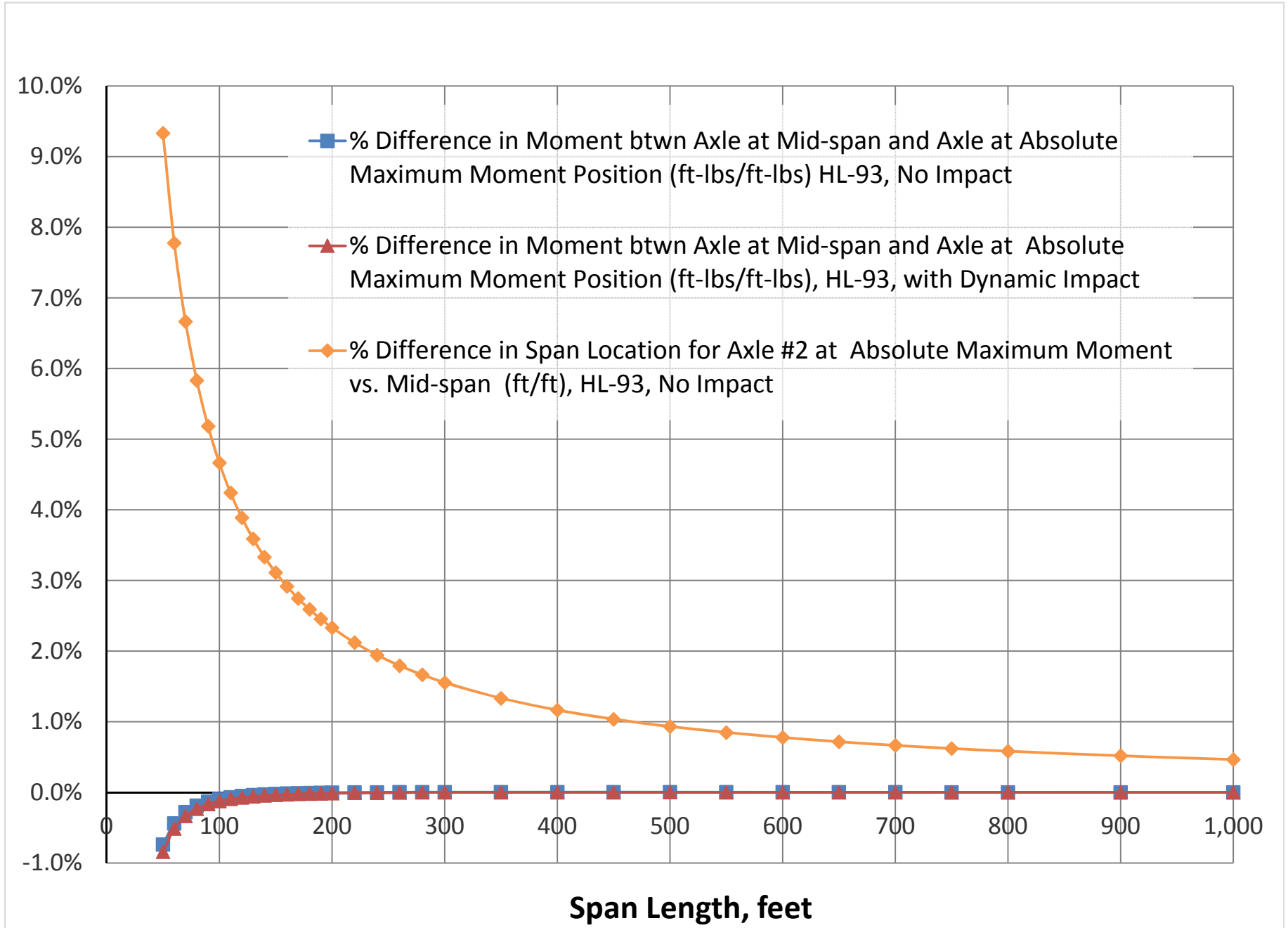


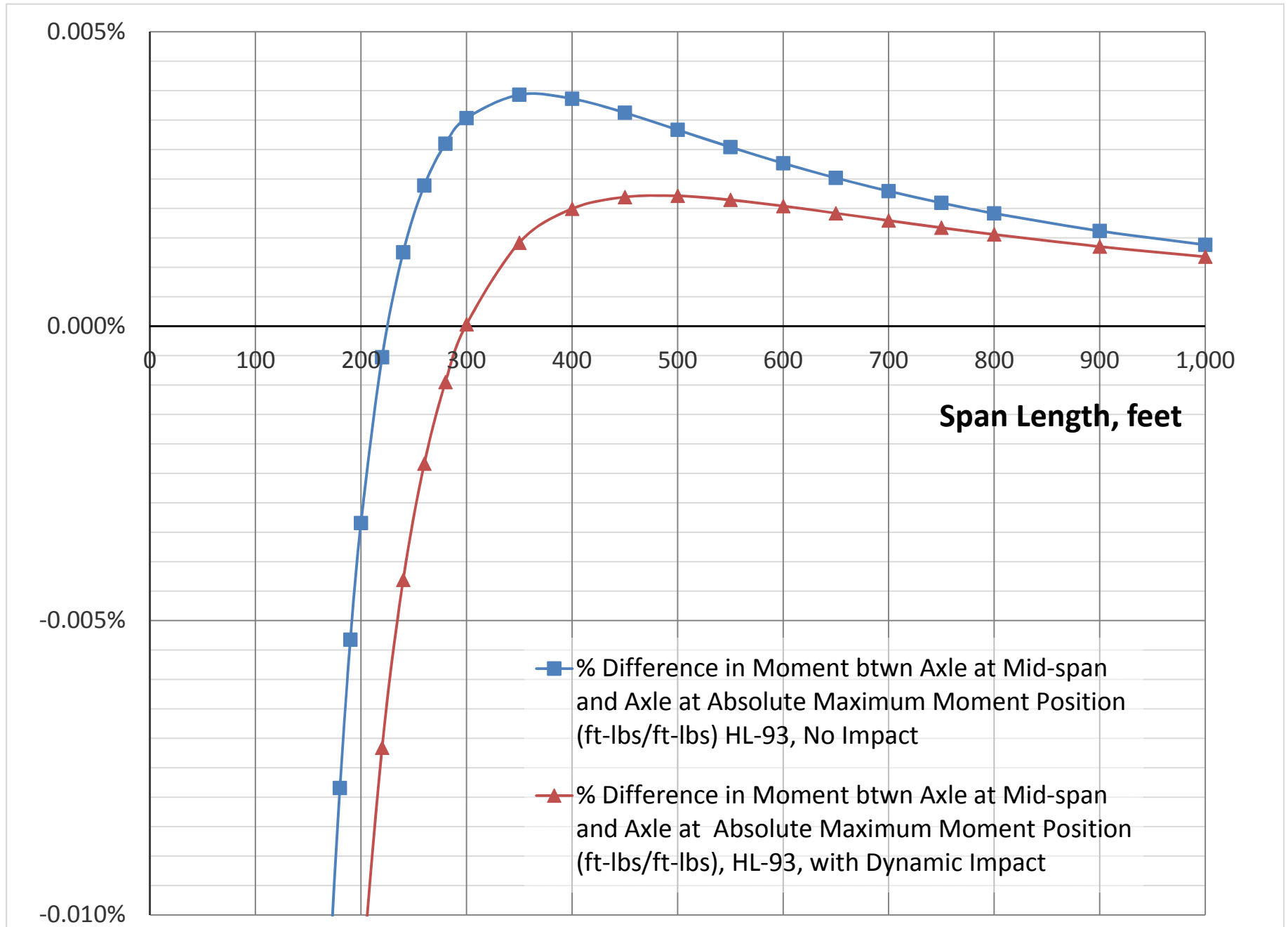












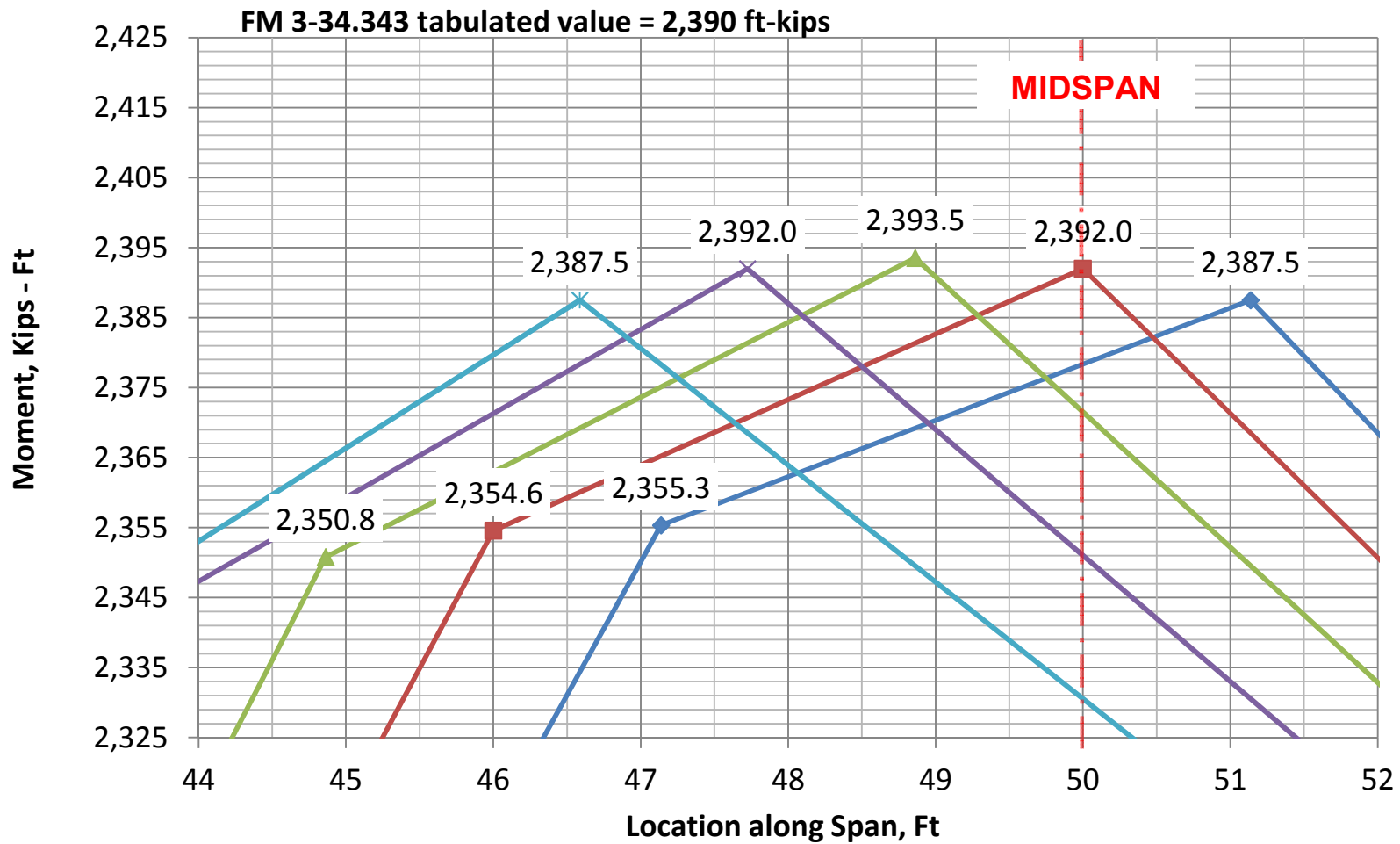
## MOMENT DIAGRAMS

### MLC 50W --- 100' SPAN

*(Max Axle #3 Moment vic Midspan)*

**SPAN CENTERLINE LOCATION**

- ◆ 1/2 "xR" Rear of Axle #3
- Axle #3 at Mid-span
- ▲ Btw Axle #3 & Resultant
- ✕ Resultant at Mid-span
- ✧ 1/2 "xR" Fwd of Resultant



# MOMENT DIAGRAMS

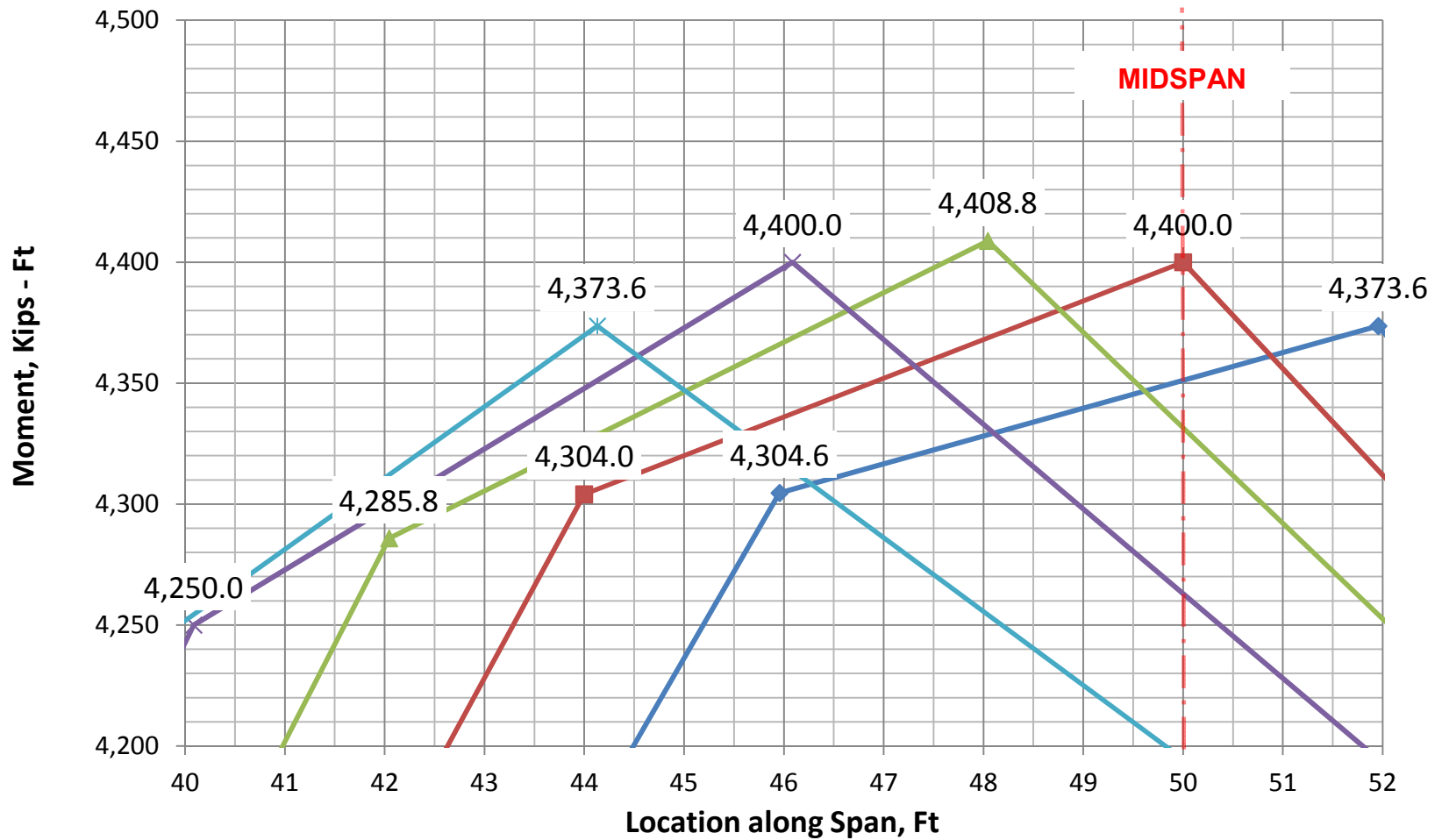
## MLC 100W --- 100' SPAN

*(Max Axle #3 Moment vic Midspan)*

**SPAN CENTERLINE LOCATION**

- ◆ 1/2 "xR" Fwd of Axle #3
- Axle #3 at Mid-span
- ▲ Btwn Axle #3 & Resultant
- ✕ Resultant at Mid-span
- ✧ 1/2 "xR" Rear of Resultant

FM 3-34.343 tabulated value = 4,410 ft-kips





**END OF APPENDIX C**

## APPENDIX D: STANAG/FM VS. CALCULATIONS COMPARISON

**Filename: WP Parker UNO 2019 MSCE Thesis Data - Appendix D. STANAG vs. Calculations Comparison.xlsx**

**Contents (worksheets/tab names included in the Excel workbook are):**

<u>Calculation Worksheets</u>	<u>Page</u>	<u>Tables</u>	<u>Page</u>
MLC T-Vehs,Max M,30-100' FM chk	D-2		D-21
MLC T-Vehs,Max M,45-130' FM chk	D-3	Compare Calc Max Abs M vs FM	D-22
MLC 40W,Max Mid M, 45-130' vsFM	D-4	Compare Calc Max MidspanM vs FM	D-25
MLC 50W,Max Mid M, 45-130' vsFM	D-5	Print Table Calc AbsMaxM vs FM	D-28
MLC 60W,Max Mid M, 45-130' vsFM	D-6	Perc Diff Max Midspan M vs AbsM	D-31
MLC 70W,Max Mid M, 45-130' vsFM	D-7		
MLC 80W,Max Mid M, 45-130' vsFM	D-8	<u>Figures</u>	D-32
MLC 90W,Max Mid M, 45-130' vsFM	D-9	5-11. Shear 40T-120T 30-100ft	D-33
MLC 100W,Max Mid M,45-130' vsFM	D-10	5-12. Moment 40T-120T 30-100ft	D-34
MLC 120W,Max Mid M,45-130' vsFM	D-11	5-13. Shear 40W-120W 45-130ft	D-35
MLC 40W,Max Abs M,45-130' vs FM	D-12	5-14. AbsMaxM 40W-120W 45-130ft	D-36
MLC 50W,Max Abs M,45-130' vs FM	D-13	5-15. MidspanM 40W-120W 45-130ft	D-37
MLC 60W,Max Abs M,45-130' vs FM	D-14	5-16. % Diff MidM vs. AbsMaxM	D-38
MLC 70W,Max Abs M,45-130' vs FM	D-15	5-17. % Diff AbsMaxM Pos v. Mid	D-39
MLC 80W,Max Abs M,45-130' vs FM	D-16	5-16A. % Diff Moments 0-1000 ft	D-40
MLC 90W,Max Abs M,45-130' vs FM	D-17	5-17A.%Diff MaxM v.Mid,0-1000ft	D-41
MLC 100W,Max Abs M,45-130'vs FM	D-18		
MLC 120W,Max Abs M,45-130'vs FM	D-19		
	D-20		

## **CALCULATION WORKSHEETS**

MLC T-Vehs,Max M,30-100' FM chk  
MLC T-Vehs,Max M,45-130' FM chk  
MLC 40W,Max Mid M, 45-130' vsFM  
MLC 50W,Max Mid M, 45-130' vsFM  
MLC 60W,Max Mid M, 45-130' vsFM  
MLC 70W,Max Mid M, 45-130' vsFM  
MLC 80W,Max Mid M, 45-130' vsFM  
MLC 90W,Max Mid M, 45-130' vsFM  
MLC 100W,Max Mid M,45-130' vsFM  
MLC 120W,Max Mid M,45-130' vsFM  
MLC 40W,Max Abs M,45-130' vs FM  
MLC 50W,Max Abs M,45-130' vs FM  
MLC 60W,Max Abs M,45-130' vs FM  
MLC 70W,Max Abs M,45-130' vs FM  
MLC 80W,Max Abs M,45-130' vs FM  
MLC 90W,Max Abs M,45-130'vs FM  
MLC 100W,Max Abs M,45-130'vs FM  
MLC 120W,Max Abs M,45-130'vs FM

**TRACKED VEHICLES** Check of FM3.34-343 (STANAG 21) Hypothetical Tracked Vehicles, 40T - 120T, Maximum Shear and Moment, 50'- 1,000' Spans

MLC 40T			
Vehicle Weight		Load (ST) <b>40</b>	Load (kips) <b>80</b>
Track Length		<b>12</b> feet	
Track Distributed Load		<b>6.667</b> kips per ft	
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
30.00	16.00	64.00	480.0
35.00	13.71	66.29	580.0
40.00	12.00	68.00	680.0
45.00	10.67	69.33	780.0
50.00	9.60	70.40	880.0
55.00	8.73	71.27	980.0
60.00	8.00	72.00	1,080.0
70.00	6.86	73.14	1,280.0
80.00	6.00	74.00	1,480.0
90.00	5.33	74.67	1,680.0
100.00	4.80	75.20	1,880.0

MLC 50T			
Vehicle Weight		Load (ST) <b>50</b>	Load (kips) <b>100</b>
Track Length		<b>13</b> feet	
Track Distributed Load		<b>7.692</b> kips per ft	
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
30.00	21.67	78.33	587.5
35.00	18.57	81.43	712.5
40.00	16.25	83.75	837.5
45.00	14.44	85.56	962.5
50.00	13.00	87.00	1,087.5
55.00	11.82	88.18	1,212.5
60.00	10.83	89.17	1,337.5
70.00	9.29	90.71	1,587.5
80.00	8.13	91.88	1,837.5
90.00	7.22	92.78	2,087.5
100.00	6.50	93.50	2,337.5

MLC 60T			
Vehicle Weight		Load (ST) <b>60</b>	Load (kips) <b>120</b>
Track Length		<b>14</b> feet	
Track Distributed Load		<b>8.571</b> kips per ft	
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
30.00	28.00	92.00	690.0
35.00	24.00	96.00	840.0
40.00	21.00	99.00	990.0
45.00	18.67	101.33	1,140.0
50.00	16.80	103.20	1,290.0
55.00	15.27	104.73	1,440.0
60.00	14.00	106.00	1,590.0
70.00	12.00	108.00	1,890.0
80.00	10.50	109.50	2,190.0
90.00	9.33	110.67	2,490.0
100.00	8.40	111.60	2,790.0

MLC 70T			
Vehicle Weight		Load (ST) <b>70</b>	Load (kips) <b>140</b>
Track Length		<b>15</b> feet	
Track Distributed Load		<b>9.333</b> kips per ft	
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
30.00	35.00	105.00	787.5
35.00	30.00	110.00	962.5
40.00	26.25	113.75	1,137.5
45.00	23.33	116.67	1,312.5
50.00	21.00	119.00	1,487.5
55.00	19.09	120.91	1,662.5
60.00	17.50	122.50	1,837.5
70.00	15.00	125.00	2,187.5
80.00	13.13	126.88	2,537.5
90.00	11.67	128.33	2,887.5
100.00	10.50	129.50	3,237.5

MLC 80T			
Vehicle Weight		Load (ST) <b>80</b>	Load (kips) <b>160</b>
Track Length		<b>16</b> feet	
Track Distributed Load		<b>10.000</b> kips per ft	
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
30.00	42.67	117.33	880.0
35.00	36.57	123.43	1,080.0
40.00	32.00	128.00	1,280.0
45.00	28.44	131.56	1,480.0
50.00	25.60	134.40	1,680.0
55.00	23.27	136.73	1,880.0
60.00	21.33	138.67	2,080.0
70.00	18.29	141.71	2,480.0
80.00	16.00	144.00	2,880.0
90.00	14.22	145.78	3,280.0
100.00	12.80	147.20	3,680.0

MLC 90T			
Vehicle Weight		Load (ST) <b>90</b>	Load (kips) <b>180</b>
Track Length		<b>17</b> feet	
Track Distributed Load		<b>10.588</b> kips per ft	
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
30.00	51.00	129.00	967.5
35.00	43.71	136.29	1,192.5
40.00	38.25	141.75	1,417.5
45.00	34.00	146.00	1,642.5
50.00	30.60	149.40	1,867.5
55.00	27.82	152.18	2,092.5
60.00	25.50	154.50	2,317.5
70.00	21.86	158.14	2,767.5
80.00	19.13	160.88	3,217.5
90.00	17.00	163.00	3,667.5
100.00	15.30	164.70	4,117.5

MLC 100T			
Vehicle Weight		Load (ST) <b>100</b>	Load (kips) <b>200</b>
Track Length		<b>18</b> feet	
Track Distributed Load		<b>11.111</b> kips per ft	
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
30.00	60.00	140.00	1,050.0
35.00	51.43	148.57	1,300.0
40.00	45.00	155.00	1,550.0
45.00	40.00	160.00	1,800.0
50.00	36.00	164.00	2,050.0
55.00	32.73	167.27	2,300.0
60.00	30.00	170.00	2,550.0
70.00	25.71	174.29	3,050.0
80.00	22.50	177.50	3,550.0
90.00	20.00	180.00	4,050.0
100.00	18.00	182.00	4,550.0

MLC 120T			
Vehicle Weight		Load (ST) <b>120</b>	Load (kips) <b>240</b>
Track Length		<b>20</b> feet	
Track Distributed Load		<b>12.000</b> kips per ft	
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
30.00	80.00	160.00	1,200.0
35.00	68.57	171.43	1,500.0
40.00	60.00	180.00	1,800.0
45.00	53.33	186.67	2,100.0
50.00	48.00	192.00	2,400.0
55.00	43.64	196.36	2,700.0
60.00	40.00	200.00	3,000.0
70.00	34.29	205.71	3,600.0
80.00	30.00	210.00	4,200.0
90.00	26.67	213.33	4,800.0
100.00	24.00	216.00	5,400.0

**TRACKED VEHICLES** Check of FM3.34-343 (STANAG 21) Hypothetical Tracked Vehicles, 40T - 120T, Maximum Shear and Moment, 50'- 1,000' Spans

MLC 40T			
Vehicle Weight		Load (ST) <b>40</b>	Load (kips) <b>80</b>
Track Length		<b>12</b> feet	
Track Distributed Load		<b>6.667</b> kips per ft	
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
45.00	10.67	69.33	780.0
50.00	9.60	70.40	880.0
55.00	8.73	71.27	980.0
60.00	8.00	72.00	1,080.0
70.00	6.86	73.14	1,280.0
80.00	6.00	74.00	1,480.0
90.00	5.33	74.67	1,680.0
100.00	4.80	75.20	1,880.0
110.00	4.36	75.64	2,080.0
120.00	4.00	76.00	2,280.0
130.00	3.69	76.31	2,480.0

MLC 50T			
Vehicle Weight		Load (ST) <b>50</b>	Load (kips) <b>100</b>
Track Length		<b>13</b> feet	
Track Distributed Load		<b>7.692</b> kips per ft	
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
45.00	14.44	85.56	962.5
50.00	13.00	87.00	1,087.5
55.00	11.82	88.18	1,212.5
60.00	10.83	89.17	1,337.5
70.00	9.29	90.71	1,587.5
80.00	8.13	91.88	1,837.5
90.00	7.22	92.78	2,087.5
100.00	6.50	93.50	2,337.5
110.00	5.91	94.09	2,587.5
120.00	5.42	94.58	2,837.5
130.00	5.00	95.00	3,087.5

MLC 60T			
Vehicle Weight		Load (ST) <b>60</b>	Load (kips) <b>120</b>
Track Length		<b>14</b> feet	
Track Distributed Load		<b>8.571</b> kips per ft	
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
45.00	18.67	101.33	1,140.0
50.00	16.80	103.20	1,290.0
55.00	15.27	104.73	1,440.0
60.00	14.00	106.00	1,590.0
70.00	12.00	108.00	1,890.0
80.00	10.50	109.50	2,190.0
90.00	9.33	110.67	2,490.0
100.00	8.40	111.60	2,790.0
110.00	7.64	112.36	3,090.0
120.00	7.00	113.00	3,390.0
130.00	6.46	113.54	3,690.0

MLC 70T			
Vehicle Weight		Load (ST) <b>70</b>	Load (kips) <b>140</b>
Track Length		<b>15</b> feet	
Track Distributed Load		<b>9.333</b> kips per ft	
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
45.00	23.33	116.67	1,312.5
50.00	21.00	119.00	1,487.5
55.00	19.09	120.91	1,662.5
60.00	17.50	122.50	1,837.5
70.00	15.00	125.00	2,187.5
80.00	13.13	126.88	2,537.5
90.00	11.67	128.33	2,887.5
100.00	10.50	129.50	3,237.5
110.00	9.55	130.45	3,587.5
120.00	8.75	131.25	3,937.5
130.00	8.08	131.92	4,287.5

MLC 80T			
Vehicle Weight		Load (ST) <b>80</b>	Load (kips) <b>160</b>
Track Length		<b>16</b> feet	
Track Distributed Load		<b>10.000</b> kips per ft	
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
45.00	28.44	131.56	1,480.0
50.00	25.60	134.40	1,680.0
55.00	23.27	136.73	1,880.0
60.00	21.33	138.67	2,080.0
70.00	18.29	141.71	2,480.0
80.00	16.00	144.00	2,880.0
90.00	14.22	145.78	3,280.0
100.00	12.80	147.20	3,680.0
110.00	11.64	148.36	4,080.0
120.00	10.67	149.33	4,480.0
130.00	9.85	150.15	4,880.0

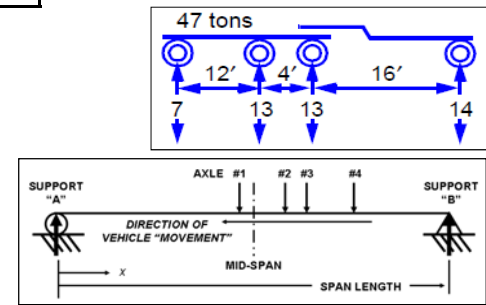
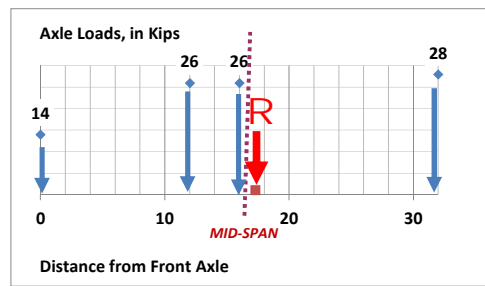
MLC 90T			
Vehicle Weight		Load (ST) <b>90</b>	Load (kips) <b>180</b>
Track Length		<b>17</b> feet	
Track Distributed Load		<b>10.588</b> kips per ft	
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
45.00	34.00	146.00	1,642.5
50.00	30.60	149.40	1,867.5
55.00	27.82	152.18	2,092.5
60.00	25.50	154.50	2,317.5
70.00	21.86	158.14	2,767.5
80.00	19.13	160.88	3,217.5
90.00	17.00	163.00	3,667.5
100.00	15.30	164.70	4,117.5
110.00	13.91	166.09	4,567.5
120.00	12.75	167.25	5,017.5
130.00	11.77	168.23	5,467.5

MLC 100T			
Vehicle Weight		Load (ST) <b>100</b>	Load (kips) <b>200</b>
Track Length		<b>18</b> feet	
Track Distributed Load		<b>11.111</b> kips per ft	
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
45.00	40.00	160.00	1,800.0
50.00	36.00	164.00	2,050.0
55.00	32.73	167.27	2,300.0
60.00	30.00	170.00	2,550.0
70.00	25.71	174.29	3,050.0
80.00	22.50	177.50	3,550.0
90.00	20.00	180.00	4,050.0
100.00	18.00	182.00	4,550.0
110.00	16.36	183.64	5,050.0
120.00	15.00	185.00	5,550.0
130.00	13.85	186.15	6,050.0

MLC 120T			
Vehicle Weight		Load (ST) <b>120</b>	Load (kips) <b>240</b>
Track Length		<b>20</b> feet	
Track Distributed Load		<b>12.000</b> kips per ft	
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
45.00	53.33	186.67	2,100.0
50.00	48.00	192.00	2,400.0
55.00	43.64	196.36	2,700.0
60.00	40.00	200.00	3,000.0
70.00	34.29	205.71	3,600.0
80.00	30.00	210.00	4,200.0
90.00	26.67	213.33	4,800.0
100.00	24.00	216.00	5,400.0
110.00	21.82	218.18	6,000.0
120.00	20.00	220.00	6,600.0
130.00	18.46	221.54	7,200.0

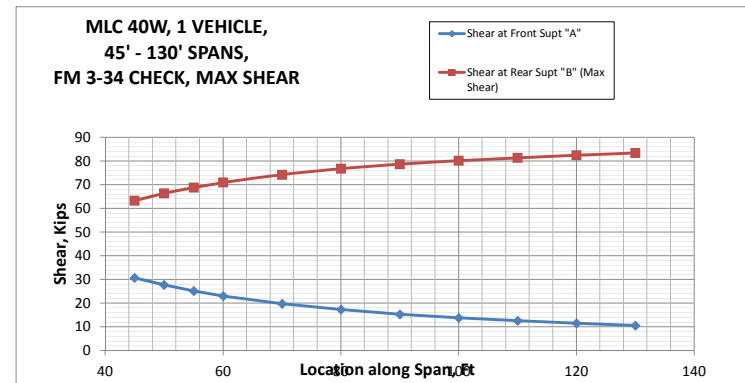
**FOUR (4) AXLE**      **One (1x) MLC 40W Vehicle, Check of FM 3-34.343 Shear and Moment values vs. Calculated Values, 45' - 130' spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	7.0	14.0		0.0	62.28	0
2	13.0	26.0	12.0	12.0	115.65	366
3	13.0	26.0	4.0	16.0	115.65	488
(Rear) 4	14.0	28.0	16.0	32.0	124.55	975
<b>Totals</b>	<b>47.0</b>	<b>94.0</b>	<b>32.0</b>		<b>355.86</b>	
				Resultant at location:	17.277	527
				Distance to Nearest Axle, "xR":	1.277	(Rear of Axle # 3)

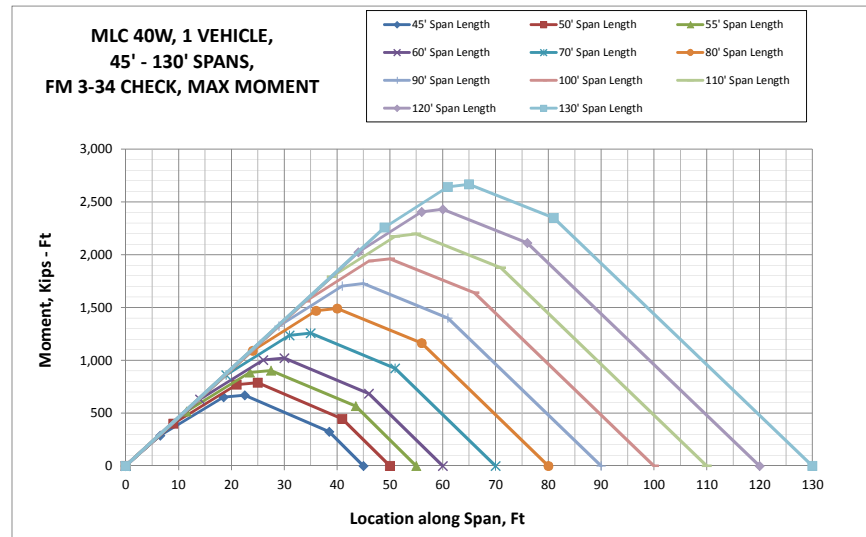


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Rear #4 Axle	Dist to Beam End
ft	ft	ft	ft	ft	ft
45.00	6.50	18.50	22.50	38.50	6.50
50.00	9.00	21.00	25.00	41.00	9.00
55.00	11.50	23.50	27.50	43.50	11.50
60.00	14.00	26.00	30.00	46.00	14.00
70.00	19.00	31.00	35.00	51.00	19.00
80.00	24.00	36.00	40.00	56.00	24.00
90.00	29.00	41.00	45.00	61.00	29.00
100.00	34.00	46.00	50.00	66.00	34.00
110.00	39.00	51.00	55.00	71.00	39.00
120.00	44.00	56.00	60.00	76.00	44.00
130.00	49.00	61.00	65.00	81.00	49.00

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
30.76	63.24
27.68	66.32
25.16	68.84
23.07	70.93
19.77	74.23
17.30	76.70
15.38	78.62
13.84	80.16
12.58	81.42
11.53	82.47
10.65	83.35

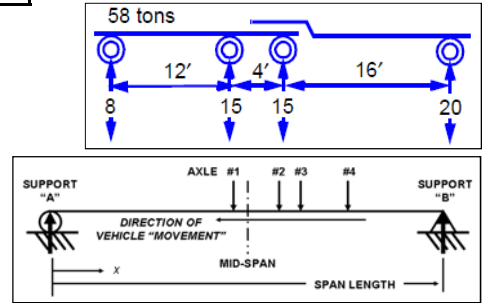
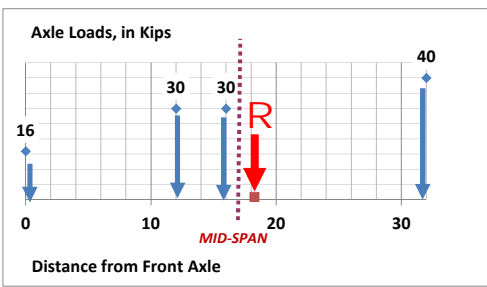


MOMENT							
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Rear #4 Axle, ft-kips	Moment at React B, ft-kips
45	Moment	0.0	288.2	652.2	669.5	322.8	0.0
	Axle Location on Span	0.00	6.500	18.500	22.500	38.500	45.00
50	Moment	0.0	401.4	768.6	787.0	444.6	0.0
	Axle Location on Span	0.00	9.000	21.000	25.000	41.000	50.00
55	Moment	0.0	515.4	885.2	904.5	565.6	0.0
	Axle Location on Span	0.00	11.500	23.500	27.500	43.500	55.00
60	Moment	0.0	630.0	1,002.0	1,022.0	686.0	0.0
	Axle Location on Span	0.00	14.000	26.000	30.000	46.000	60.00
70	Moment	0.0	860.4	1,235.9	1,257.0	925.6	0.0
	Axle Location on Span	0.00	19.000	31.000	35.000	51.000	70.00
80	Moment	0.0	1,092.0	1,470.0	1,492.0	1,164.0	0.0
	Axle Location on Span	0.00	24.000	36.000	40.000	56.000	80.00
90	Moment	0.0	1,324.3	1,704.3	1,727.0	1,401.7	0.0
	Axle Location on Span	0.00	29.000	41.000	45.000	61.000	90.00
100	Moment	0.0	1,557.2	1,938.8	1,962.0	1,638.8	0.0
	Axle Location on Span	0.00	34.000	46.000	50.000	66.000	100.00
110	Moment	0.0	1,790.5	2,173.4	2,197.0	1,875.5	0.0
	Axle Location on Span	0.00	39.000	51.000	55.000	71.000	110.00
120	Moment	0.0	2,024.0	2,408.0	2,432.0	2,112.0	0.0
	Axle Location on Span	0.00	44.000	56.000	60.000	76.000	120.00
130	Moment	0.0	2,257.8	2,642.7	2,667.0	2,348.2	0.0
	Axle Location on Span	0.00	49.000	61.000	65.000	81.000	130.00



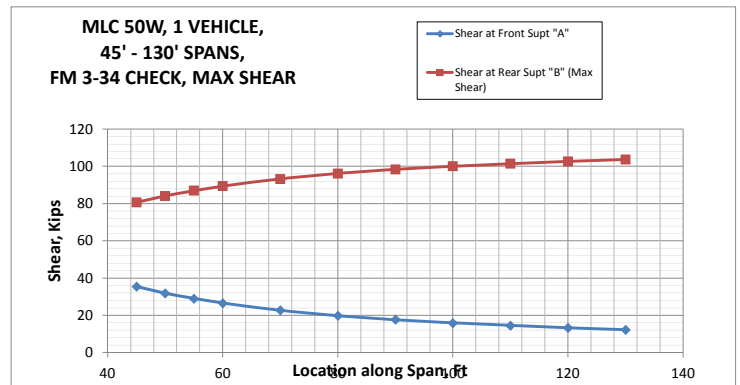
**FOUR (4) AXLE One (1x) MLC 40W Vehicle, Check of FM 3-34.343 Shear and Moment values vs. Calculated Values, 45' - 130' spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	8.0	16.0		0.0	71.17	0
2	15.0	30.0	12.0	12.0	133.45	366
3	15.0	30.0	4.0	16.0	133.45	488
(Rear) 4	20.0	40.0	16.0	32.0	177.93	975
<b>Totals</b>	<b>58.0</b>	<b>116.0</b>	<b>32.0</b>		<b>444.82</b>	
				Resultant at location:	18.276	557
				Distance to Nearest Axle, "xR":	2.276	(Rear of Axle #3)

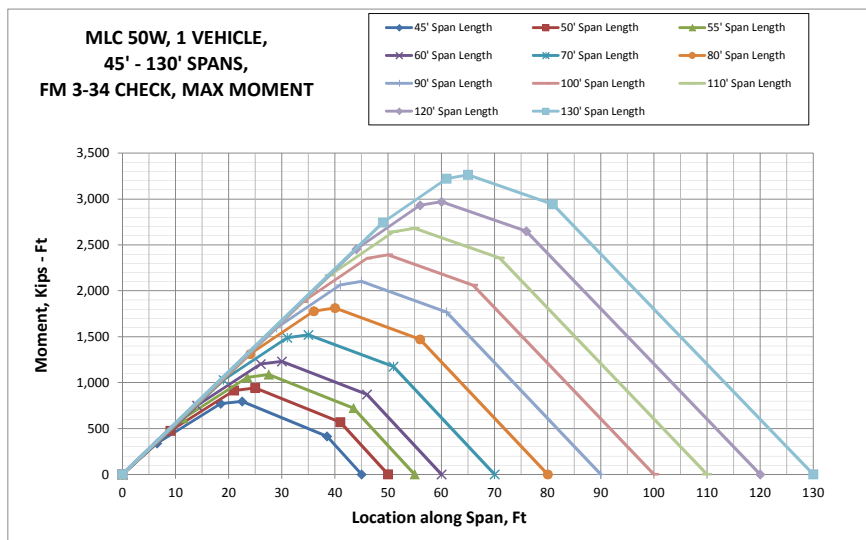


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Rear #4 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	L END
ft	ft	ft	ft	ft	ft
45.00	6.50	18.50	22.50	38.50	6.50
50.00	9.00	21.00	25.00	41.00	9.00
55.00	11.50	23.50	27.50	43.50	11.50
60.00	14.00	26.00	30.00	46.00	14.00
70.00	19.00	31.00	35.00	51.00	19.00
80.00	24.00	36.00	40.00	56.00	24.00
90.00	29.00	41.00	45.00	61.00	29.00
100.00	34.00	46.00	50.00	66.00	34.00
110.00	39.00	51.00	55.00	71.00	39.00
120.00	44.00	56.00	60.00	76.00	44.00
130.00	49.00	61.00	65.00	81.00	49.00

Span Length	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B	
kips	kips	
45	35.38	80.62
50	31.84	84.16
55	28.95	87.05
60	26.53	89.47
70	22.74	93.26
80	19.90	96.10
90	17.69	98.31
100	15.92	100.08
110	14.47	101.53
120	13.27	102.73
130	12.25	103.75

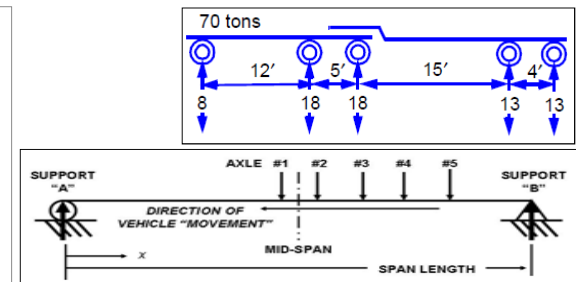
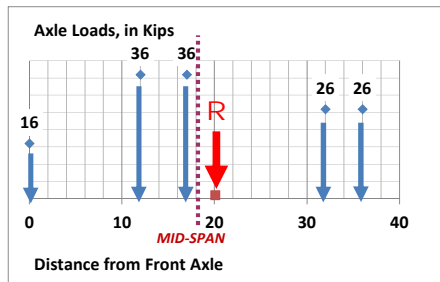


Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Rear #4 Axle, ft-kips	Moment at React B, ft-kips
45	Moment	0.0	338.9	772.5	797.0	415.1	0.0
	Axle Location on Span	0.00	6.500	18.500	22.500	38.500	45.00
50	Moment	0.0	474.5	915.1	942.0	569.5	0.0
	Axle Location on Span	0.00	9.000	21.000	25.000	41.000	50.00
55	Moment	0.0	611.8	1,058.2	1,087.0	722.2	0.0
	Axle Location on Span	0.00	11.500	23.500	27.500	43.500	55.00
60	Moment	0.0	750.4	1,201.6	1,232.0	873.6	0.0
	Axle Location on Span	0.00	14.000	26.000	30.000	46.000	60.00
70	Moment	0.0	1,030.3	1,489.1	1,522.0	1,173.7	0.0
	Axle Location on Span	0.00	19.000	31.000	35.000	51.000	70.00
80	Moment	0.0	1,312.8	1,777.2	1,812.0	1,471.2	0.0
	Axle Location on Span	0.00	24.000	36.000	40.000	56.000	80.00
90	Moment	0.0	1,596.9	2,065.7	2,102.0	1,767.1	0.0
	Axle Location on Span	0.00	29.000	41.000	45.000	61.000	90.00
100	Moment	0.0	1,882.2	2,354.6	2,392.0	2,061.8	0.0
	Axle Location on Span	0.00	34.000	46.000	50.000	66.000	100.00
110	Moment	0.0	2,168.4	2,643.6	2,682.0	2,355.6	0.0
	Axle Location on Span	0.00	39.000	51.000	55.000	71.000	110.00
120	Moment	0.0	2,455.2	2,932.8	2,972.0	2,648.8	0.0
	Axle Location on Span	0.00	44.000	56.000	60.000	76.000	120.00
130	Moment	0.0	2,742.5	3,222.1	3,262.0	2,941.5	0.0
	Axle Location on Span	0.00	49.000	61.000	65.000	81.000	130.00



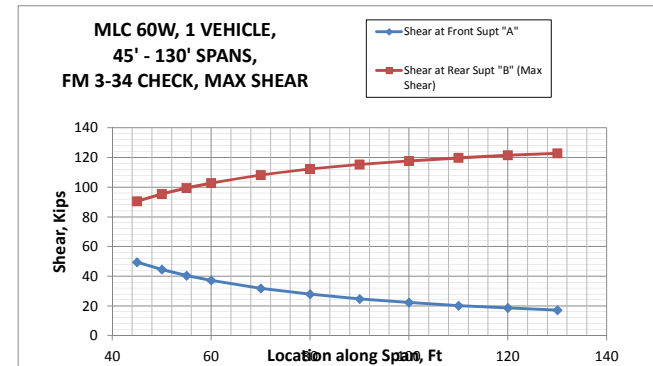
**FIVE (5) AXLE**      **One (1x) MLC 60W Vehicle, Check of FM 3-34.343 Shear and Moment values vs. Calculated Values, 45' - 130' spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	8.0	16.0		0.0	71.17	0
2	18.0	36.0	12.0	12.0	160.14	366
3	18.0	36.0	5.0	17.0	160.14	518
4	13.0	26.0	15.0	32.0	115.65	975
(Rear) 5	13.0	26.0	4.0	36.0	115.65	1097
<b>Totals</b>	<b>70.0</b>	<b>140.0</b>	<b>36.0</b>		<b>551.58</b>	
		Resultant at location:		<b>20.086</b>		<b>612</b>
		Distance to Nearest Axle, "xR":		<b>3.086</b>	<b>(Rear of Axle # 3)</b>	

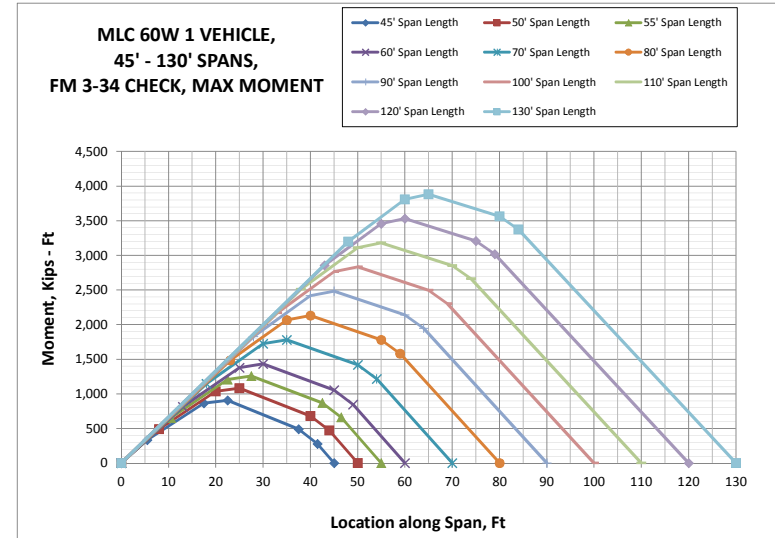


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
45.00	5.50	17.50	22.50	37.50	41.50	3.50
50.00	8.00	20.00	25.00	40.00	44.00	6.00
55.00	10.50	22.50	27.50	42.50	46.50	8.50
60.00	13.00	25.00	30.00	45.00	49.00	11.00
70.00	18.00	30.00	35.00	50.00	54.00	16.00
80.00	23.00	35.00	40.00	55.00	59.00	21.00
90.00	28.00	40.00	45.00	60.00	64.00	26.00
100.00	33.00	45.00	50.00	65.00	69.00	31.00
110.00	38.00	50.00	55.00	70.00	74.00	36.00
120.00	43.00	55.00	60.00	75.00	79.00	41.00
130.00	48.00	60.00	65.00	80.00	84.00	46.00

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
49.51	90.49
44.56	95.44
40.51	99.49
37.13	102.87
31.83	108.17
27.85	112.15
24.76	115.24
22.28	117.72
20.25	119.75
18.57	121.43
17.14	122.86



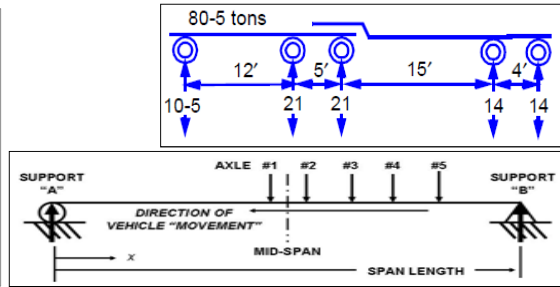
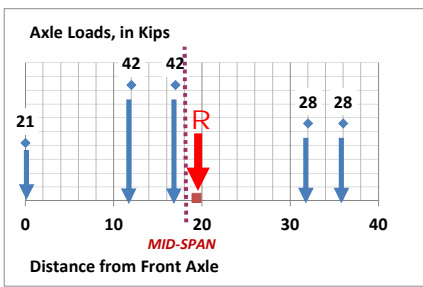
MOMENT								
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
45	Moment	0.0	332.2	865.0	907.0	493.0	278.6	0.0
	Axle Location on Span	0.00	5.500	17.500	22.500	37.500	41.500	45.000
50	Moment	0.0	490.9	1,035.2	1,082.0	682.4	471.8	0.0
	Axle Location on Span	0.00	8.000	20.000	25.000	40.000	44.000	50.000
55	Moment	0.0	652.5	1,206.3	1,257.0	869.2	661.8	0.0
	Axle Location on Span	0.00	10.500	22.500	27.500	42.500	46.500	55.000
60	Moment	0.0	816.4	1,378.0	1,432.0	1,054.0	849.2	0.0
	Axle Location on Span	0.00	13.000	25.000	30.000	45.000	49.000	60.000
70	Moment	0.0	1,148.9	1,722.9	1,782.0	1,419.4	1,218.7	0.0
	Axle Location on Span	0.00	18.000	30.000	35.000	50.000	54.000	70.000
80	Moment	0.0	1,485.8	2,069.0	2,132.0	1,781.0	1,583.4	0.0
	Axle Location on Span	0.00	23.000	35.000	40.000	55.000	59.000	80.000
90	Moment	0.0	1,825.6	2,416.0	2,482.0	2,140.0	1,944.8	0.0
	Axle Location on Span	0.00	28.000	40.000	45.000	60.000	64.000	90.000
100	Moment	0.0	2,167.4	2,763.6	2,832.0	2,497.2	2,303.9	0.0
	Axle Location on Span	0.00	33.000	45.000	50.000	65.000	69.000	100.000
110	Moment	0.0	2,510.8	3,111.6	3,182.0	2,853.1	2,661.4	0.0
	Axle Location on Span	0.00	38.000	50.000	55.000	70.000	74.000	110.000
120	Moment	0.0	2,855.2	3,460.0	3,532.0	3,208.0	3,017.6	0.0
	Axle Location on Span	0.00	43.000	55.000	60.000	75.000	79.000	120.000
130	Moment	0.0	3,200.5	3,808.6	3,882.0	3,562.2	3,372.9	0.0
	Axle Location on Span	0.00	48.000	60.000	65.000	80.000	84.000	130.000





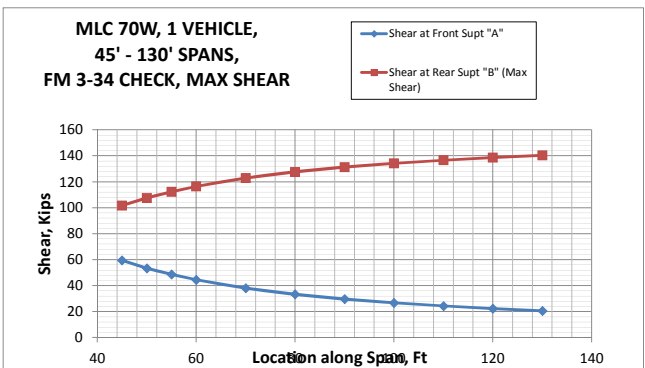
**FIVE (5) AXLE**      **One (1x) MLC 70W Vehicle, Check of FM 3-34.343 Shear and Moment values vs. Calculated Values, 45' - 130' spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.5	21.0		0.0	93.41	0
2	21.0	42.0	12.0	12.0	186.83	366
3	21.0	42.0	5.0	17.0	186.83	518
4	14.0	28.0	15.0	32.0	124.55	975
(Rear) 5	14.0	28.0	4.0	36.0	124.55	1097
<b>Totals</b>	<b>80.5</b>	<b>161.0</b>	<b>36.0</b>		<b>622.75</b>	
		Resultant at location:		19.391		591
		Distance to Nearest Axle, "xR":		2.391	(Rear of Axle #3)	

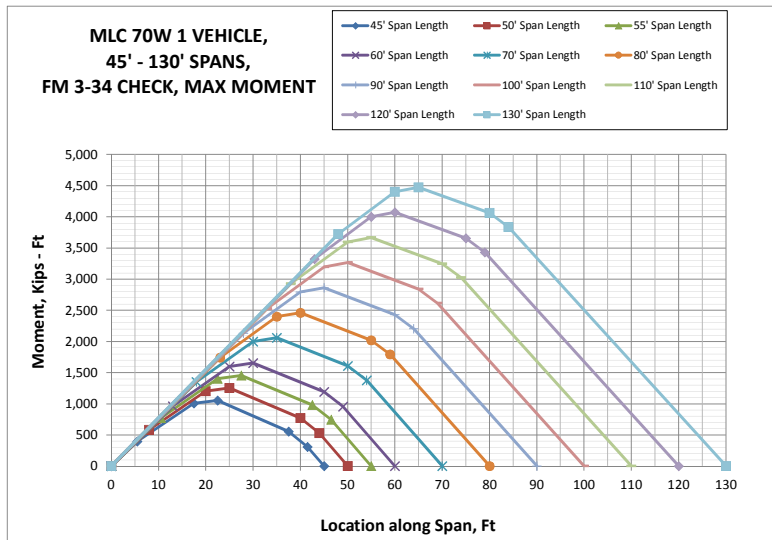


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
45.00	5.50	17.50	22.50	37.50	41.50	3.50
50.00	8.00	20.00	25.00	40.00	44.00	6.00
55.00	10.50	22.50	27.50	42.50	46.50	8.50
60.00	13.00	25.00	30.00	45.00	49.00	11.00
70.00	18.00	30.00	35.00	50.00	54.00	16.00
80.00	23.00	35.00	40.00	55.00	59.00	21.00
90.00	28.00	40.00	45.00	60.00	64.00	26.00
100.00	33.00	45.00	50.00	65.00	69.00	31.00
110.00	38.00	50.00	55.00	70.00	74.00	36.00
120.00	43.00	55.00	60.00	75.00	79.00	41.00
130.00	48.00	60.00	65.00	80.00	84.00	46.00

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
59.42	101.58
53.48	107.52
48.62	112.38
44.57	116.43
38.20	122.80
33.43	127.58
29.71	131.29
26.74	134.26
24.31	136.69
22.28	138.72
20.57	140.43

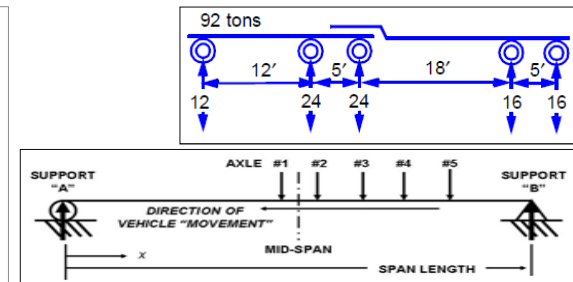
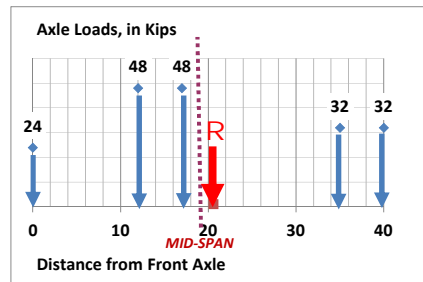


MOMENT								
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
45	Moment	0.0	395.7	1,007.0	1,051.8	555.9	311.7	0.0
	Axle Location on Span	0.00	5.500	17.500	22.500	37.500	41.500	45.000
50	Moment	0.0	582.4	1,204.0	1,253.0	770.0	529.2	0.0
	Axle Location on Span	0.00	8.000	20.000	25.000	40.000	44.000	50.000
55	Moment	0.0	771.8	1,401.8	1,454.3	981.8	743.8	0.0
	Axle Location on Span	0.00	10.500	22.500	27.500	42.500	46.500	55.000
60	Moment	0.0	963.1	1,600.1	1,655.5	1,191.8	956.1	0.0
	Axle Location on Span	0.00	13.000	25.000	30.000	45.000	49.000	60.000
70	Moment	0.0	1,350.0	1,998.0	2,058.0	1,608.0	1,376.0	0.0
	Axle Location on Span	0.00	18.000	30.000	35.000	50.000	54.000	70.000
80	Moment	0.0	1,740.8	2,397.1	2,460.5	2,020.8	1,791.6	0.0
	Axle Location on Span	0.00	23.000	35.000	40.000	55.000	59.000	80.000
90	Moment	0.0	2,134.2	2,796.9	2,863.0	2,431.3	2,204.2	0.0
	Axle Location on Span	0.00	28.000	40.000	45.000	60.000	64.000	90.000
100	Moment	0.0	2,529.5	3,197.3	3,265.5	2,840.3	2,614.9	0.0
	Axle Location on Span	0.00	33.000	45.000	50.000	65.000	69.000	100.000
110	Moment	0.0	2,926.0	3,598.0	3,668.0	3,248.0	3,024.0	0.0
	Axle Location on Span	0.00	38.000	50.000	55.000	70.000	74.000	110.000
120	Moment	0.0	3,323.5	3,999.0	4,070.5	3,654.9	3,432.0	0.0
	Axle Location on Span	0.00	43.000	55.000	60.000	75.000	79.000	120.000
130	Moment	0.0	3,721.8	4,400.3	4,473.0	4,061.1	3,839.2	0.0
	Axle Location on Span	0.00	48.000	60.000	65.000	80.000	84.000	130.000



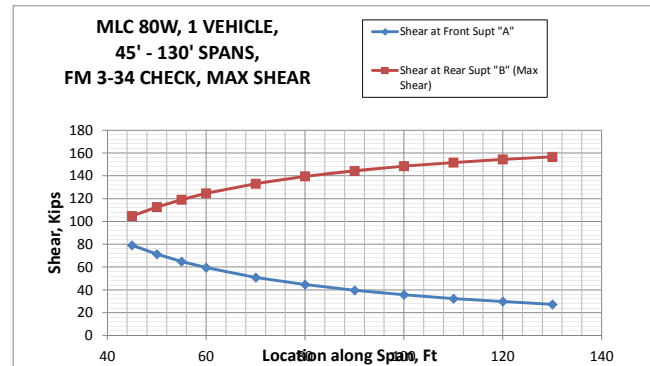
**FIVE (5) AXLE**      **One (1x) MLC 80W Vehicle, Check of FM 3-34.343 Shear and Moment values vs. Calculated Values, 45' - 130' spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	12.0	24.0		0.0	106.76	0
2	24.0	48.0	12.0	12.0	213.51	366
3	24.0	48.0	5.0	17.0	213.51	518
4	16.0	32.0	18.0	35.0	142.34	1067
(Rear) 5	16.0	32.0	5.0	40.0	142.34	1219
<b>Totals</b>	<b>92.0</b>	<b>184.0</b>	<b>40.0</b>		<b>711.72</b>	
		Resultant at location:		20.609		628
		Distance to Nearest Axle, "xR":		3.609	(Rear of Axle #3)	

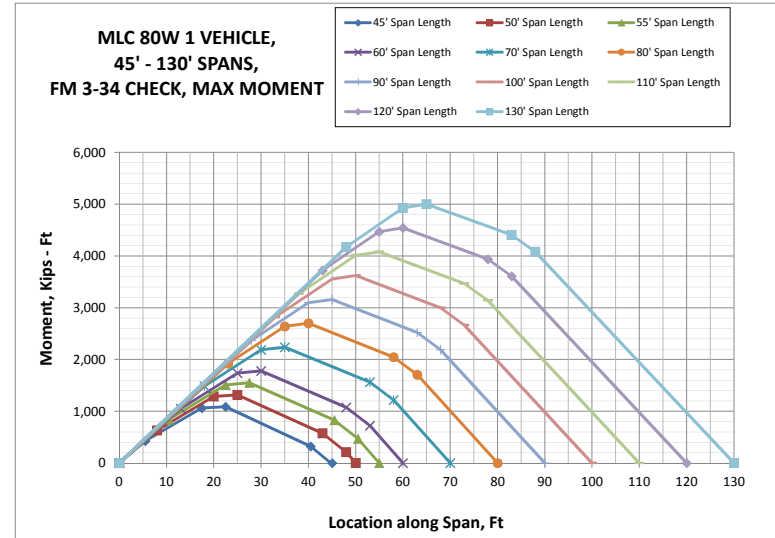


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
45.00	5.50	17.50	22.50	40.50	45.50	-0.50
50.00	8.00	20.00	25.00	43.00	48.00	2.00
55.00	10.50	22.50	27.50	45.50	50.50	4.50
60.00	13.00	25.00	30.00	48.00	53.00	7.00
70.00	18.00	30.00	35.00	53.00	58.00	12.00
80.00	23.00	35.00	40.00	58.00	63.00	17.00
90.00	28.00	40.00	45.00	63.00	68.00	22.00
100.00	33.00	45.00	50.00	68.00	73.00	27.00
110.00	38.00	50.00	55.00	73.00	78.00	32.00
120.00	43.00	55.00	60.00	78.00	83.00	37.00
130.00	48.00	60.00	65.00	83.00	88.00	42.00

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
79.29	104.71
71.36	112.64
64.87	119.13
59.47	124.53
50.97	133.03
44.60	139.40
39.64	144.36
35.68	148.32
32.44	151.56
29.73	154.27
27.45	156.55

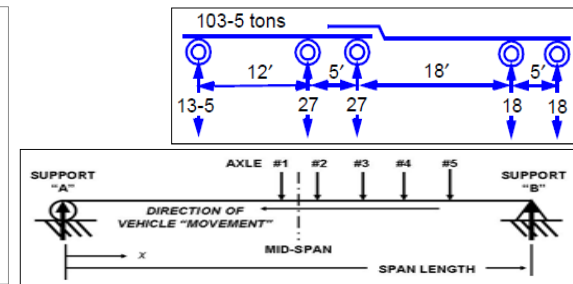
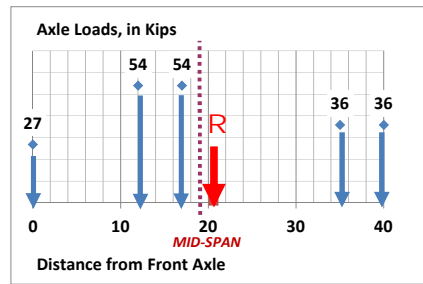


MOMENT								
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
45	Moment	0.0	424.8	1,063.8	1,090.0	320.4	-53.4	0.0
	Axle Location on Span	0.00	5.500	17.500	22.500	40.500	45.500	45.00
50	Moment	0.0	629.8	1,286.4	1,320.0	577.0	210.6	0.0
	Axle Location on Span	0.00	8.000	20.000	25.000	43.000	48.000	50.00
55	Moment	0.0	839.2	1,510.4	1,550.0	828.7	468.3	0.0
	Axle Location on Span	0.00	10.500	22.500	27.500	45.500	50.500	55.00
60	Moment	0.0	1,052.1	1,735.3	1,780.0	1,076.8	721.5	0.0
	Axle Location on Span	0.00	13.000	25.000	30.000	48.000	53.000	60.00
70	Moment	0.0	1,485.3	2,187.4	2,240.0	1,565.3	1,217.8	0.0
	Axle Location on Span	0.00	18.000	30.000	35.000	53.000	58.000	70.00
80	Moment	0.0	1,925.1	2,641.5	2,700.0	2,046.6	1,705.1	0.0
	Axle Location on Span	0.00	23.000	35.000	40.000	58.000	63.000	80.00
90	Moment	0.0	2,369.4	3,096.9	3,160.0	2,523.2	2,186.3	0.0
	Axle Location on Span	0.00	28.000	40.000	45.000	63.000	68.000	90.00
100	Moment	0.0	2,816.9	3,553.2	3,620.0	2,996.5	2,663.3	0.0
	Axle Location on Span	0.00	33.000	45.000	50.000	68.000	73.000	100.00
110	Moment	0.0	3,266.6	4,010.2	4,080.0	3,467.3	3,137.2	0.0
	Axle Location on Span	0.00	38.000	50.000	55.000	73.000	78.000	110.00
120	Moment	0.0	3,718.1	4,467.7	4,540.0	3,936.4	3,608.7	0.0
	Axle Location on Span	0.00	43.000	55.000	60.000	78.000	83.000	120.00
130	Moment	0.0	4,170.8	4,925.5	5,000.0	4,404.1	4,078.5	0.0
	Axle Location on Span	0.00	48.000	60.000	65.000	83.000	88.000	130.00



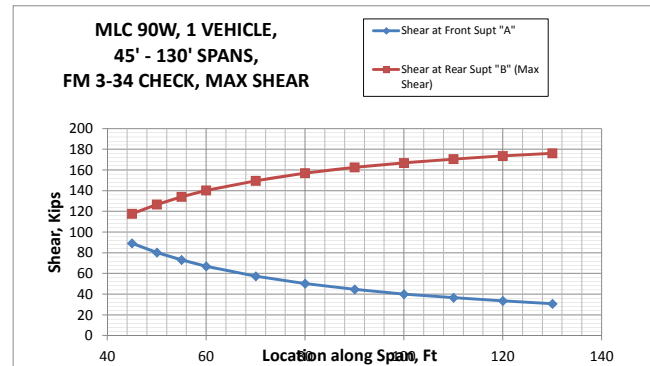
**FIVE (5) AXLE**      **One (1x) MLC 90W Vehicle, Check of FM 3-34.343 Shear and Moment values vs. Calculated Values, 45' - 130' spans**

Axle	Load (ST)		Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
	Load (ST)	Load (kips)			Load (kN)	Distance from front axle (cm)
(Front) 1	13.5	27.0		0.0	120.10	0
2	27.0	54.0	12.0	12.0	240.20	366
3	27.0	54.0	5.0	17.0	240.20	518
4	18.0	36.0	18.0	35.0	160.14	1067
(Rear) 5	18.0	36.0	5.0	40.0	160.14	1219
<b>Totals</b>	<b>103.5</b>	<b>207.0</b>	<b>40.0</b>		<b>800.68</b>	
		Resultant at location:		20.609		628
		Distance to Nearest Axle, "xR":		3.609	(Rear of Axle #3)	

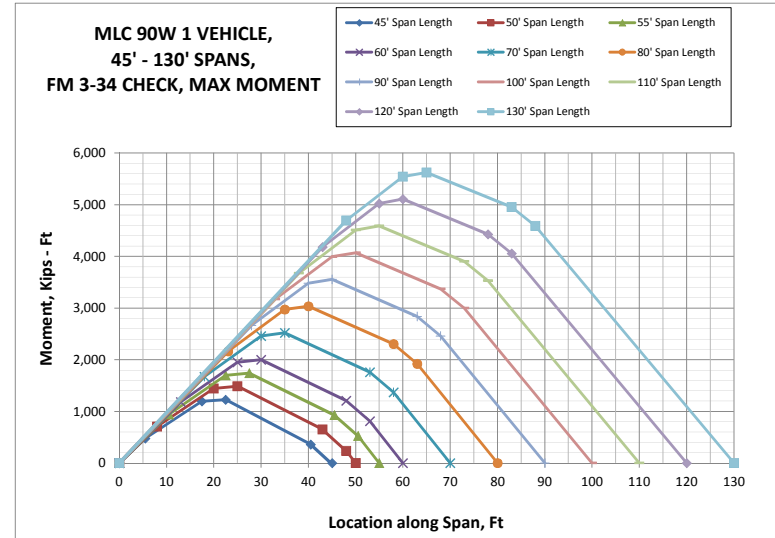


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
45.00	5.50	17.50	22.50	40.50	45.50	-0.50
50.00	8.00	20.00	25.00	43.00	48.00	2.00
55.00	10.50	22.50	27.50	45.50	50.50	4.50
60.00	13.00	25.00	30.00	48.00	53.00	7.00
70.00	18.00	30.00	35.00	53.00	58.00	12.00
80.00	23.00	35.00	40.00	58.00	63.00	17.00
90.00	28.00	40.00	45.00	63.00	68.00	22.00
100.00	33.00	45.00	50.00	68.00	73.00	27.00
110.00	38.00	50.00	55.00	73.00	78.00	32.00
120.00	43.00	55.00	60.00	78.00	83.00	37.00
130.00	48.00	60.00	65.00	83.00	88.00	42.00

Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
89.20	117.80
80.28	126.72
72.98	134.02
66.90	140.10
57.34	149.66
50.18	156.83
44.60	162.40
40.14	166.86
36.49	170.51
33.45	173.55
30.88	176.12

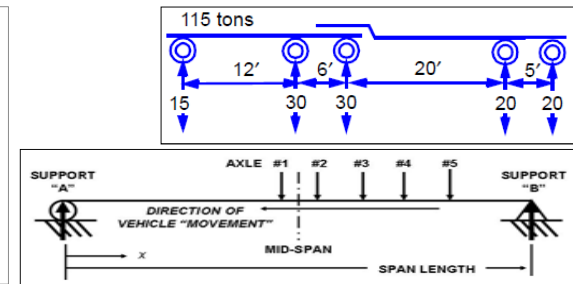
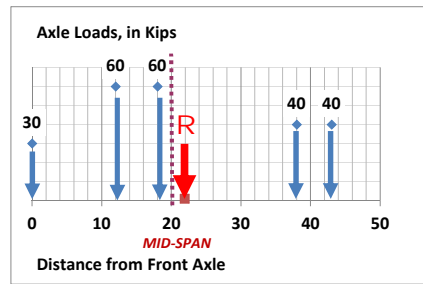


Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
		45	Moment	0.0	478.0	1,196.8	1,226.3	360.5
	Axle Location on Span	0.00	5.500	17.500	22.500	40.500	45.500	45.000
50	Moment	0.0	708.5	1,447.2	1,485.0	649.1	236.9	0.0
	Axle Location on Span	0.00	8.000	20.000	25.000	43.000	48.000	50.000
55	Moment	0.0	944.1	1,699.2	1,743.8	932.3	526.9	0.0
	Axle Location on Span	0.00	10.500	22.500	27.500	45.500	50.500	55.000
60	Moment	0.0	1,183.7	1,952.3	2,002.5	1,211.4	811.7	0.0
	Axle Location on Span	0.00	13.000	25.000	30.000	48.000	53.000	60.000
70	Moment	0.0	1,670.9	2,460.9	2,520.0	1,760.9	1,370.1	0.0
	Axle Location on Span	0.00	18.000	30.000	35.000	53.000	58.000	70.000
80	Moment	0.0	2,165.7	2,971.7	3,037.5	2,302.4	1,918.2	0.0
	Axle Location on Span	0.00	23.000	35.000	40.000	58.000	63.000	80.000
90	Moment	0.0	2,665.6	3,484.0	3,555.0	2,838.6	2,459.6	0.0
	Axle Location on Span	0.00	28.000	40.000	45.000	63.000	68.000	90.000
100	Moment	0.0	3,169.0	3,997.4	4,072.5	3,371.0	2,996.2	0.0
	Axle Location on Span	0.00	33.000	45.000	50.000	68.000	73.000	100.000
110	Moment	0.0	3,674.9	4,511.5	4,590.0	3,900.8	3,529.3	0.0
	Axle Location on Span	0.00	38.000	50.000	55.000	73.000	78.000	110.000
120	Moment	0.0	4,182.8	5,026.1	5,107.5	4,428.5	4,059.8	0.0
	Axle Location on Span	0.00	43.000	55.000	60.000	78.000	83.000	120.000
130	Moment	0.0	4,692.2	5,541.2	5,625.0	4,954.6	4,588.3	0.0
	Axle Location on Span	0.00	48.000	60.000	65.000	83.000	88.000	130.000



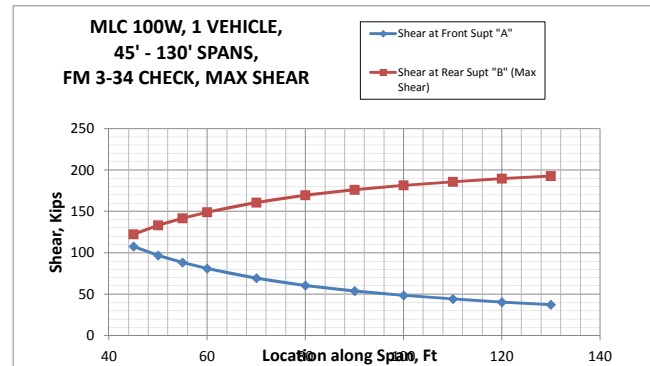
**FIVE (5) AXLE**      **One (1x) MLC 100W Vehicle, Check of FM 3-34.343 Shear and Moment values vs. Calculated Values, 45' - 130' spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	15.0	30.0		0.0	133.45	0
2	30.0	60.0	12.0	12.0	266.89	366
3	30.0	60.0	6.0	18.0	266.89	549
4	20.0	40.0	20.0	38.0	177.93	1158
(Rear) 5	20.0	40.0	5.0	43.0	177.93	1311
<b>Totals</b>	<b>115.0</b>	<b>230.0</b>	<b>43.0</b>		<b>889.64</b>	
		Resultant at location:		21.913		668
		Distance to Nearest Axle, "xR":		3.913	(Rear of Axle #3)	

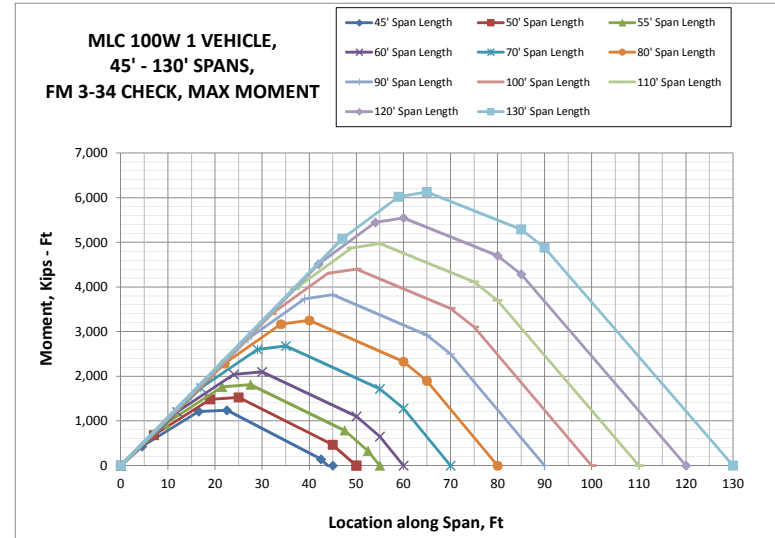


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
45.00	4.50	16.50	22.50	42.50	47.50	-2.50
50.00	7.00	19.00	25.00	45.00	50.00	0.00
55.00	9.50	21.50	27.50	47.50	52.50	2.50
60.00	12.00	24.00	30.00	50.00	55.00	5.00
70.00	17.00	29.00	35.00	55.00	60.00	10.00
80.00	22.00	34.00	40.00	60.00	65.00	15.00
90.00	27.00	39.00	45.00	65.00	70.00	20.00
100.00	32.00	44.00	50.00	70.00	75.00	25.00
110.00	37.00	49.00	55.00	75.00	80.00	30.00
120.00	42.00	54.00	60.00	80.00	85.00	35.00
130.00	47.00	59.00	65.00	85.00	90.00	40.00

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
107.78	122.22
97.00	133.00
88.18	141.82
80.83	149.17
69.29	160.71
60.63	169.38
53.89	176.11
48.50	181.50
44.09	185.91
40.42	189.58
37.31	192.69

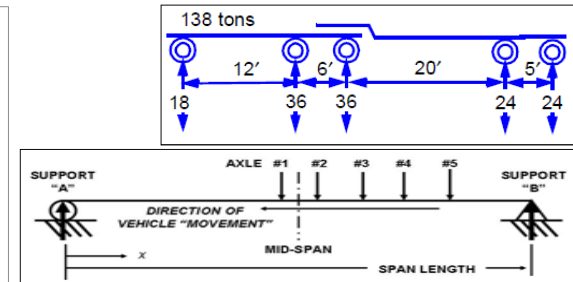
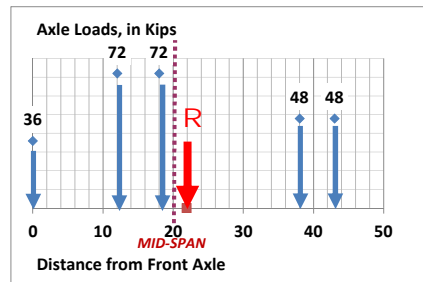


MOMENT								
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
45	Moment	0.0	427.5	1,207.5	1,237.5	137.5	-337.5	0.0
	Axle Location on Span	0.00	4.500	16.500	22.500	42.500	47.500	45.000
50	Moment	0.0	679.0	1,483.0	1,525.0	465.0	0.0	0.0
	Axle Location on Span	0.00	7.000	19.000	25.000	45.000	50.000	50.000
55	Moment	0.0	937.0	1,760.7	1,812.5	785.2	328.4	0.0
	Axle Location on Span	0.00	9.500	21.500	27.500	47.500	52.500	55.000
60	Moment	0.0	1,200.0	2,040.0	2,100.0	1,100.0	650.0	0.0
	Axle Location on Span	0.00	12.000	24.000	30.000	50.000	55.000	60.000
70	Moment	0.0	1,736.4	2,602.1	2,675.0	1,717.9	1,278.6	0.0
	Axle Location on Span	0.00	17.000	29.000	35.000	55.000	60.000	70.000
80	Moment	0.0	2,282.5	3,167.5	3,250.0	2,325.0	1,893.8	0.0
	Axle Location on Span	0.00	22.000	34.000	40.000	60.000	65.000	80.000
90	Moment	0.0	2,835.0	3,735.0	3,825.0	2,925.0	2,500.0	0.0
	Axle Location on Span	0.00	27.000	39.000	45.000	65.000	70.000	90.000
100	Moment	0.0	3,392.0	4,304.0	4,400.0	3,520.0	3,100.0	0.0
	Axle Location on Span	0.00	32.000	44.000	50.000	70.000	75.000	100.000
110	Moment	0.0	3,952.3	4,874.1	4,975.0	4,111.4	3,695.5	0.0
	Axle Location on Span	0.00	37.000	49.000	55.000	75.000	80.000	110.000
120	Moment	0.0	4,515.0	5,445.0	5,550.0	4,700.0	4,287.5	0.0
	Axle Location on Span	0.00	42.000	54.000	60.000	80.000	85.000	120.000
130	Moment	0.0	5,079.6	6,016.5	6,125.0	5,286.5	4,876.9	0.0
	Axle Location on Span	0.00	47.000	59.000	65.000	85.000	90.000	130.000



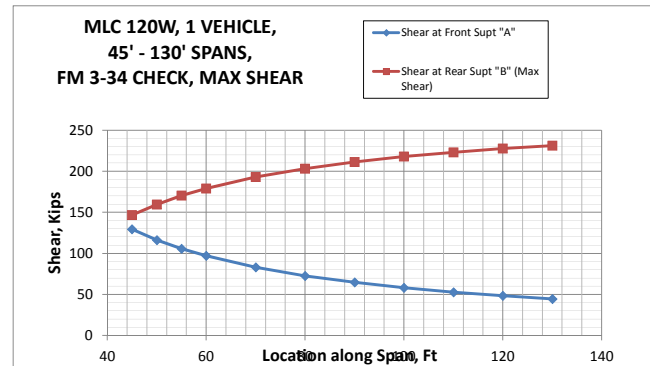
**FIVE (5) AXLE**      **One (1x) MLC 120W Vehicle, Check of FM 3-34.343 Shear and Moment values vs. Calculated Values, 45' - 130' spans**

Axle	Load (ST)		Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
	Load (ST)	Load (kips)			Load (kN)	Distance from front axle (cm)
(Front) 1	18.0	36.0		0.0	160.14	0
2	36.0	72.0	12.0	12.0	320.27	366
3	36.0	72.0	6.0	18.0	320.27	549
4	24.0	48.0	20.0	38.0	213.51	1158
(Rear) 5	24.0	48.0	5.0	43.0	213.51	1311
<b>Totals</b>	<b>138.0</b>	<b>276.0</b>	<b>43.0</b>		<b>1067.57</b>	
		Resultant at location:		21.913		668
		Distance to Nearest Axle, "xR":		3.913	(Rear of Axle #3)	

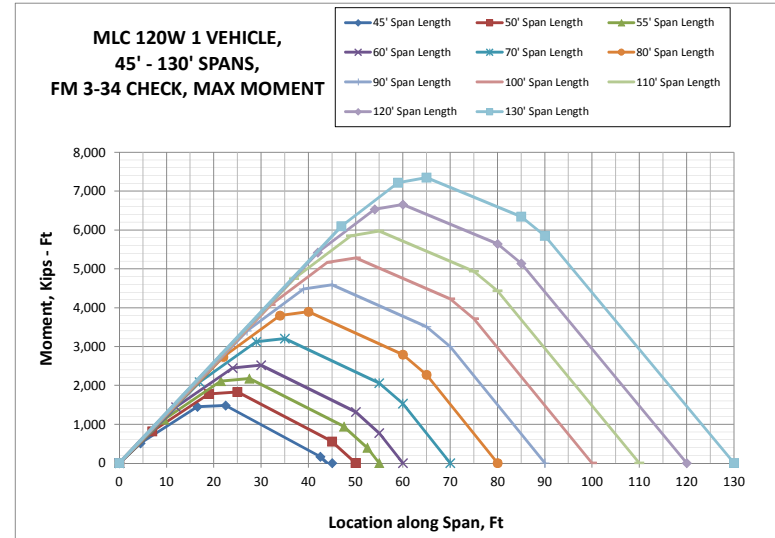


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
45.00	4.50	16.50	22.50	42.50	47.50	-2.50
50.00	7.00	19.00	25.00	45.00	50.00	0.00
55.00	9.50	21.50	27.50	47.50	52.50	2.50
60.00	12.00	24.00	30.00	50.00	55.00	5.00
70.00	17.00	29.00	35.00	55.00	60.00	10.00
80.00	22.00	34.00	40.00	60.00	65.00	15.00
90.00	27.00	39.00	45.00	65.00	70.00	20.00
100.00	32.00	44.00	50.00	70.00	75.00	25.00
110.00	37.00	49.00	55.00	75.00	80.00	30.00
120.00	42.00	54.00	60.00	80.00	85.00	35.00
130.00	47.00	59.00	65.00	85.00	90.00	40.00

Span Length	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B	
kips	kips	
45	129.33	146.67
50	116.40	159.60
55	105.82	170.18
60	97.00	179.00
70	83.14	192.86
80	72.75	203.25
90	64.67	211.33
100	58.20	217.80
110	52.91	223.09
120	48.50	227.50
130	44.77	231.23

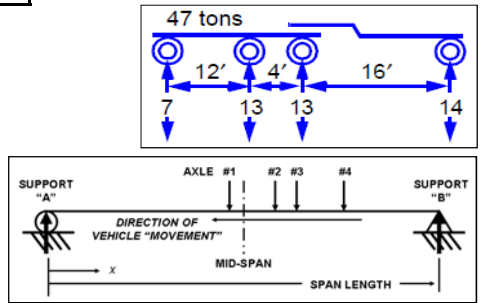
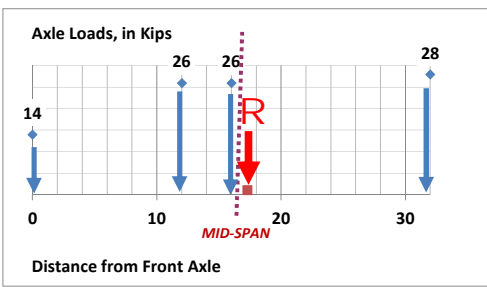


Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
45	Moment	0.0	513.0	1,449.0	1,485.0	165.0	-405.0	0.0
	Axle Location on Span	0.00	4.500	16.500	22.500	42.500	47.500	45.000
50	Moment	0.0	814.8	1,779.6	1,830.0	558.0	0.0	0.0
	Axle Location on Span	0.00	7.000	19.000	25.000	45.000	50.000	50.000
55	Moment	0.0	1,124.5	2,112.8	2,175.0	942.3	394.1	0.0
	Axle Location on Span	0.00	9.500	21.500	27.500	47.500	52.500	55.000
60	Moment	0.0	1,440.0	2,448.0	2,520.0	1,320.0	780.0	0.0
	Axle Location on Span	0.00	12.000	24.000	30.000	50.000	55.000	60.000
70	Moment	0.0	2,083.7	3,122.6	3,210.0	2,061.4	1,534.3	0.0
	Axle Location on Span	0.00	17.000	29.000	35.000	55.000	60.000	70.000
80	Moment	0.0	2,739.0	3,801.0	3,900.0	2,790.0	2,272.5	0.0
	Axle Location on Span	0.00	22.000	34.000	40.000	60.000	65.000	80.000
90	Moment	0.0	3,402.0	4,482.0	4,590.0	3,510.0	3,000.0	0.0
	Axle Location on Span	0.00	27.000	39.000	45.000	65.000	70.000	90.000
100	Moment	0.0	4,070.4	5,164.8	5,280.0	4,224.0	3,720.0	0.0
	Axle Location on Span	0.00	32.000	44.000	50.000	70.000	75.000	100.000
110	Moment	0.0	4,742.7	5,848.9	5,970.0	4,933.6	4,434.5	0.0
	Axle Location on Span	0.00	37.000	49.000	55.000	75.000	80.000	110.000
120	Moment	0.0	5,418.0	6,534.0	6,660.0	5,640.0	5,145.0	0.0
	Axle Location on Span	0.00	42.000	54.000	60.000	80.000	85.000	120.000
130	Moment	0.0	6,095.5	7,219.8	7,350.0	6,343.8	5,852.3	0.0
	Axle Location on Span	0.00	47.000	59.000	65.000	85.000	90.000	130.000



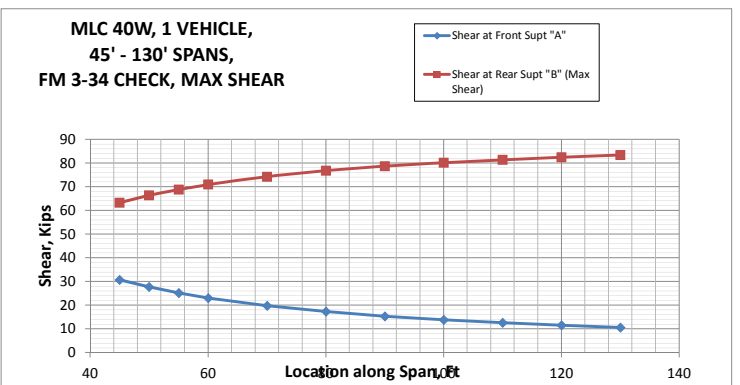
**FOUR (4) AXLE**      **One (1x) MLC 40W Vehicle, Check of FM 3-34.343 Shear and Moment values vs. Calculated Values, 45' - 130' spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	7.0	14.0		0.0	62.28	0
2	13.0	26.0	12.0	12.0	115.65	366
3	13.0	26.0	4.0	16.0	115.65	488
(Rear) 4	14.0	28.0	16.0	32.0	124.55	975
<b>Totals</b>	<b>47.0</b>	<b>94.0</b>	<b>32.0</b>		<b>355.86</b>	
				Resultant at location:	17.277	527
				Distance to Nearest Axle, "xR":	1.277	(Rear of Axle # 3)

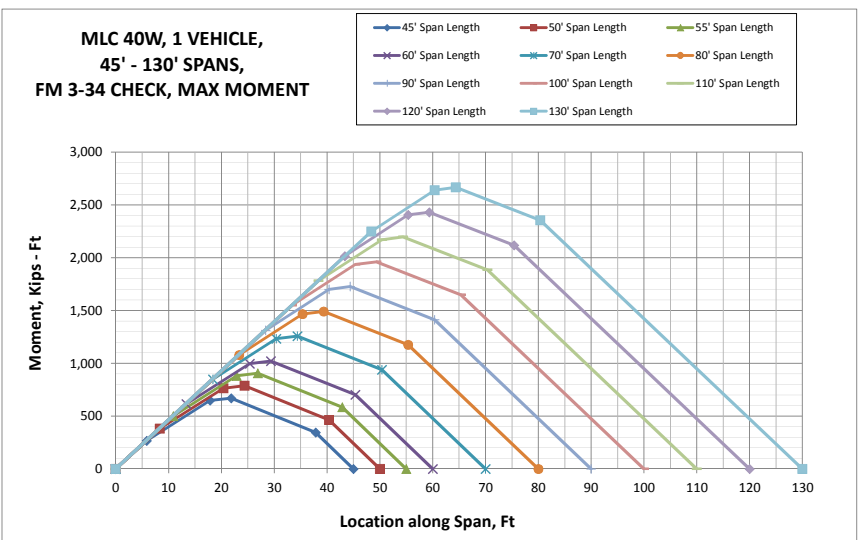


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Rear #4 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	L END
ft	ft	ft	ft	ft	ft
45.00	5.86	17.86	21.86	37.86	7.14
50.00	8.36	20.36	24.36	40.36	9.64
55.00	10.86	22.86	26.86	42.86	12.14
60.00	13.36	25.36	29.36	45.36	14.64
70.00	18.36	30.36	34.36	50.36	19.64
80.00	23.36	35.36	39.36	55.36	24.64
90.00	28.36	40.36	44.36	60.36	29.64
100.00	33.36	45.36	49.36	65.36	34.64
110.00	38.36	50.36	54.36	70.36	39.64
120.00	43.36	55.36	59.36	75.36	44.64
130.00	48.36	60.36	64.36	80.36	49.64

Span Length	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B	
kips	kips	
45	30.76	63.24
50	27.68	66.32
55	25.16	68.84
60	23.07	70.93
70	19.77	74.23
80	17.30	76.70
90	15.38	78.62
100	13.84	80.16
110	12.58	81.42
120	11.53	82.47
130	10.65	83.35

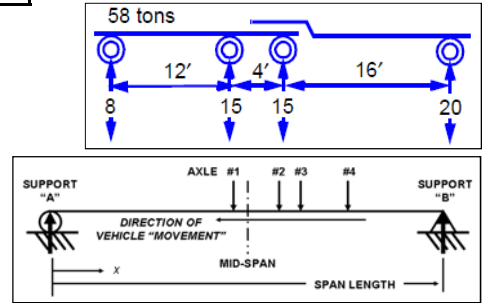
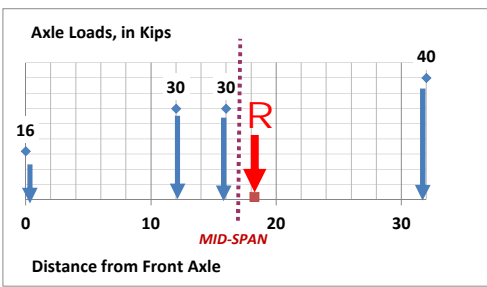


Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Rear #4 Axle, ft-kips	Moment at React B, ft-kips
45	Moment	0.0	267.7	647.7	670.4	345.0	0.0
	Axle Location on Span	0.00	5.862	17.862	21.862	37.862	45.00
50	Moment	0.0	383.0	764.6	787.8	464.6	0.0
	Axle Location on Span	0.00	8.362	20.362	24.362	40.362	50.00
55	Moment	0.0	498.7	881.6	905.2	583.7	0.0
	Axle Location on Span	0.00	10.862	22.862	26.862	42.862	55.00
60	Moment	0.0	614.6	998.6	1,022.6	702.6	0.0
	Axle Location on Span	0.00	13.362	25.362	29.362	45.362	60.00
70	Moment	0.0	847.3	1,233.0	1,257.5	939.8	0.0
	Axle Location on Span	0.00	18.362	30.362	34.362	50.362	70.00
80	Moment	0.0	1,080.5	1,467.5	1,492.5	1,176.5	0.0
	Axle Location on Span	0.00	23.362	35.362	39.362	55.362	80.00
90	Moment	0.0	1,314.1	1,702.1	1,727.4	1,412.8	0.0
	Axle Location on Span	0.00	28.362	40.362	44.362	60.362	90.00
100	Moment	0.0	1,548.0	1,936.8	1,962.4	1,648.8	0.0
	Axle Location on Span	0.00	33.362	45.362	49.362	65.362	100.00
110	Moment	0.0	1,782.1	2,171.5	2,197.3	1,884.6	0.0
	Axle Location on Span	0.00	38.362	50.362	54.362	70.362	110.00
120	Moment	0.0	2,016.3	2,406.3	2,432.3	2,120.3	0.0
	Axle Location on Span	0.00	43.362	55.362	59.362	75.362	120.00
130	Moment	0.0	2,250.7	2,641.1	2,667.3	2,355.9	0.0
	Axle Location on Span	0.00	48.362	60.362	64.362	80.362	130.00



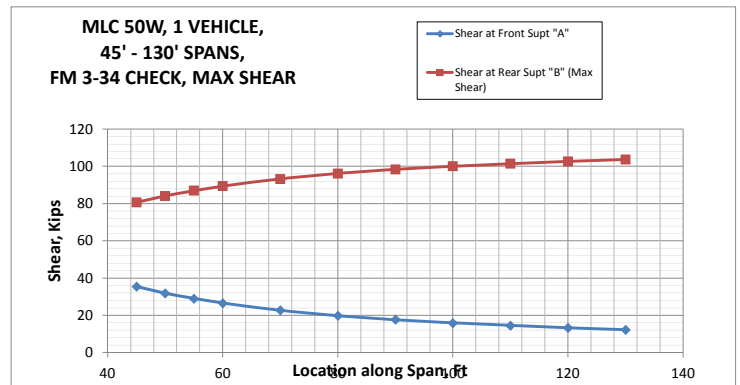
**FOUR (4) AXLE One (1x) MLC 40W Vehicle, Check of FM 3-34.343 Shear and Moment values vs. Calculated Values, 45' - 130' spans**

Axle	Load (ST)		Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
	Load (ST)	Load (kips)			Load (kN)	Distance from front axle (cm)
(Front) 1	8.0	16.0		0.0	71.17	0
2	15.0	30.0	12.0	12.0	133.45	366
3	15.0	30.0	4.0	16.0	133.45	488
(Rear) 4	20.0	40.0	16.0	32.0	177.93	975
<b>Totals</b>	<b>58.0</b>	<b>116.0</b>	<b>32.0</b>		<b>444.82</b>	
Resultant at location:				18.276		557
Distance to Nearest Axle, "xR":				2.276	(Rear of Axle #3)	

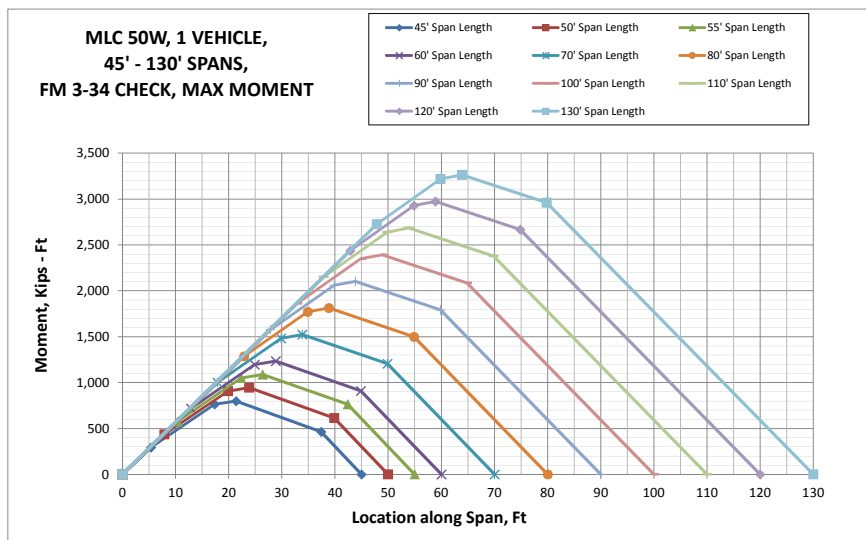


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Rear #4 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	
L	ft	ft	ft	ft	L END
45.00	5.36	17.36	21.36	37.36	7.64
50.00	7.86	19.86	23.86	39.86	10.14
55.00	10.36	22.36	26.36	42.36	12.64
60.00	12.86	24.86	28.86	44.86	15.14
70.00	17.86	29.86	33.86	49.86	20.14
80.00	22.86	34.86	38.86	54.86	25.14
90.00	27.86	39.86	43.86	59.86	30.14
100.00	32.86	44.86	48.86	64.86	35.14
110.00	37.86	49.86	53.86	69.86	40.14
120.00	42.86	54.86	58.86	74.86	45.14
130.00	47.86	59.86	63.86	79.86	50.14

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
35.38	80.62
31.84	84.16
28.95	87.05
26.53	89.47
22.74	93.26
19.90	96.10
17.69	98.31
15.92	100.08
14.47	101.53
13.27	102.73
12.25	103.75

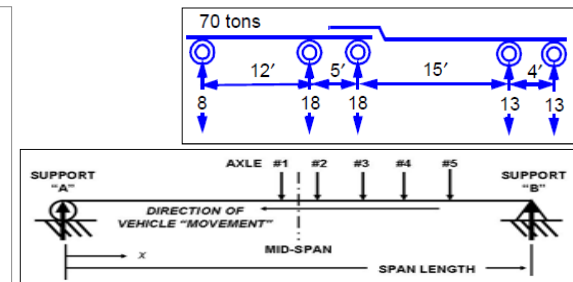
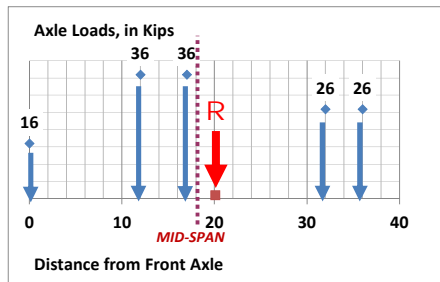


MOMENT							
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Rear #4 Axle, ft-kips	Moment at React B, ft-kips
45	Moment	0.0	295.3	764.1	800.3	465.4	0.0
	Axle Location on Span	0.00	5.362	17.362	21.362	37.362	45.00
50	Moment	0.0	435.2	907.6	945.0	614.8	0.0
	Axle Location on Span	0.00	7.862	19.862	23.862	39.862	50.00
55	Moment	0.0	576.1	1,051.3	1,089.7	763.3	0.0
	Axle Location on Span	0.00	10.362	22.362	26.362	42.362	55.00
60	Moment	0.0	717.7	1,195.3	1,234.5	911.3	0.0
	Axle Location on Span	0.00	12.862	24.862	28.862	44.862	60.00
70	Moment	0.0	1,002.3	1,483.7	1,524.1	1,206.0	0.0
	Axle Location on Span	0.00	17.862	29.862	33.862	49.862	70.00
80	Moment	0.0	1,288.3	1,772.5	1,813.9	1,499.5	0.0
	Axle Location on Span	0.00	22.862	34.862	38.862	54.862	80.00
90	Moment	0.0	1,575.1	2,061.5	2,103.7	1,792.2	0.0
	Axle Location on Span	0.00	27.862	39.862	43.862	59.862	90.00
100	Moment	0.0	1,862.6	2,350.8	2,393.5	2,084.4	0.0
	Axle Location on Span	0.00	32.862	44.862	48.862	64.862	100.00
110	Moment	0.0	2,150.6	2,640.2	2,683.4	2,376.2	0.0
	Axle Location on Span	0.00	37.862	49.862	53.862	69.862	110.00
120	Moment	0.0	2,438.9	2,929.7	2,973.2	2,667.7	0.0
	Axle Location on Span	0.00	42.862	54.862	58.862	74.862	120.00
130	Moment	0.0	2,727.4	3,219.2	3,263.2	2,958.9	0.0
	Axle Location on Span	0.00	47.862	59.862	63.862	79.862	130.00



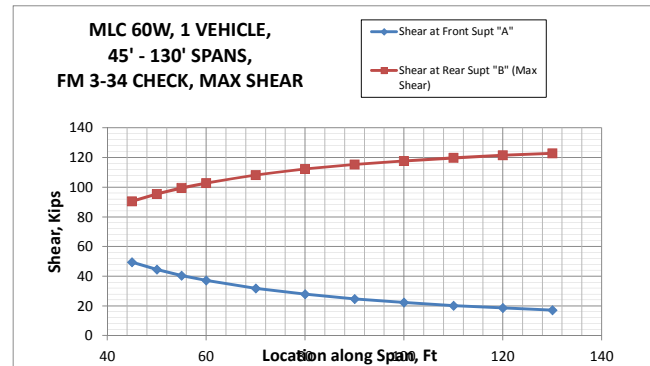
**FIVE (5) AXLE**      **One (1x) MLC 60W Vehicle, Check of FM 3-34.343 Shear and Moment values vs. Calculated Values, 45' - 130' spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	8.0	16.0		0.0		71.17
2	18.0	36.0	12.0	12.0		160.14
3	18.0	36.0	5.0	17.0		160.14
4	13.0	26.0	15.0	32.0		115.65
(Rear) 5	13.0	26.0	4.0	36.0		115.65
<b>Totals</b>	<b>70.0</b>	<b>140.0</b>	<b>36.0</b>			<b>551.58</b>
		Resultant at location:		20.086		612
		Distance to Nearest Axle, "xR":		3.086	(Rear of Axle #3)	

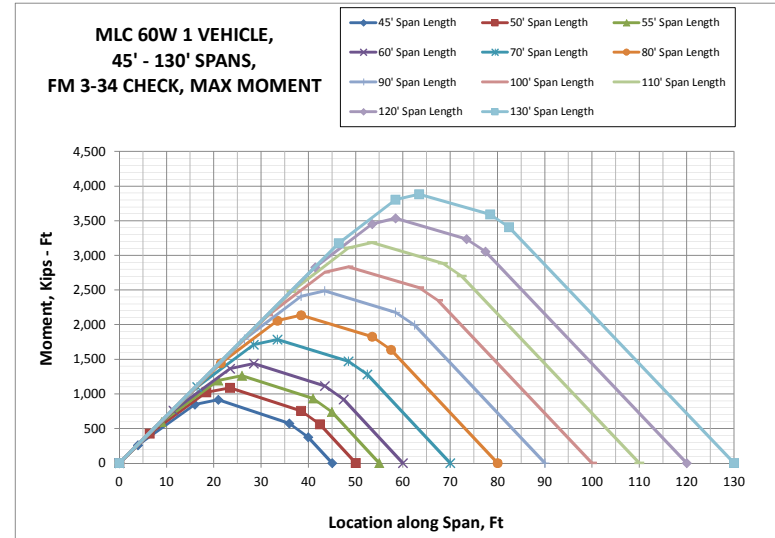


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
45.00	3.96	15.96	20.96	35.96	39.96	5.04
50.00	6.46	18.46	23.46	38.46	42.46	7.54
55.00	8.96	20.96	25.96	40.96	44.96	10.04
60.00	11.46	23.46	28.46	43.46	47.46	12.54
70.00	16.46	28.46	33.46	48.46	52.46	17.54
80.00	21.46	33.46	38.46	53.46	57.46	22.54
90.00	26.46	38.46	43.46	58.46	62.46	27.54
100.00	31.46	43.46	48.46	63.46	67.46	32.54
110.00	36.46	48.46	53.46	68.46	72.46	37.54
120.00	41.46	53.46	58.46	73.46	77.46	42.54
130.00	46.46	58.46	63.46	78.46	82.46	47.54

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
49.51	90.49
44.56	95.44
40.51	99.49
37.13	102.87
31.83	108.17
27.85	112.15
24.76	115.24
22.28	117.72
20.25	119.75
18.57	121.43
17.14	122.86



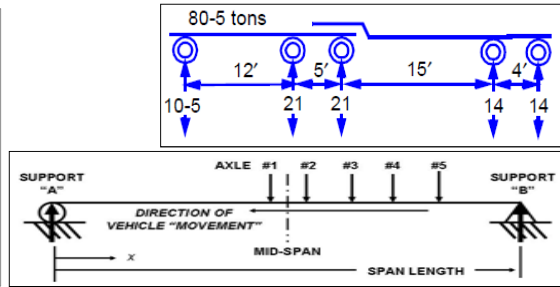
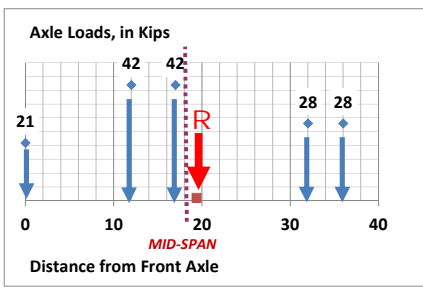
MOMENT								
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
45	Moment	0.0	258.0	848.4	914.4	572.4	377.2	0.0
	Axle Location on Span	0.00	3.957	15.957	20.957	35.957	39.957	45.00
50	Moment	0.0	424.1	1,020.3	1,088.7	753.9	560.6	0.0
	Axle Location on Span	0.00	6.457	18.457	23.457	38.457	42.457	50.00
55	Moment	0.0	591.8	1,192.7	1,263.1	934.2	742.4	0.0
	Axle Location on Span	0.00	8.957	20.957	25.957	40.957	44.957	55.00
60	Moment	0.0	760.8	1,365.6	1,437.6	1,113.6	923.2	0.0
	Axle Location on Span	0.00	11.457	23.457	28.457	43.457	47.457	60.00
70	Moment	0.0	1,101.2	1,712.2	1,786.8	1,470.5	1,282.1	0.0
	Axle Location on Span	0.00	16.457	28.457	33.457	48.457	52.457	70.00
80	Moment	0.0	1,444.1	2,059.7	2,136.2	1,825.7	1,638.9	0.0
	Axle Location on Span	0.00	21.457	33.457	38.457	53.457	57.457	80.00
90	Moment	0.0	1,788.5	2,407.7	2,485.7	2,179.7	1,994.1	0.0
	Axle Location on Span	0.00	26.457	38.457	43.457	58.457	62.457	90.00
100	Moment	0.0	2,134.1	2,756.1	2,835.3	2,532.9	2,348.3	0.0
	Axle Location on Span	0.00	31.457	43.457	48.457	63.457	67.457	100.00
110	Moment	0.0	2,480.4	3,104.8	3,185.0	2,885.6	2,701.7	0.0
	Axle Location on Span	0.00	36.457	48.457	53.457	68.457	72.457	110.00
120	Moment	0.0	2,827.4	3,453.8	3,534.8	3,237.8	3,054.6	0.0
	Axle Location on Span	0.00	41.457	53.457	58.457	73.457	77.457	120.00
130	Moment	0.0	3,174.8	3,802.9	3,884.6	3,589.6	3,407.0	0.0
	Axle Location on Span	0.00	46.457	58.457	63.457	78.457	82.457	130.00





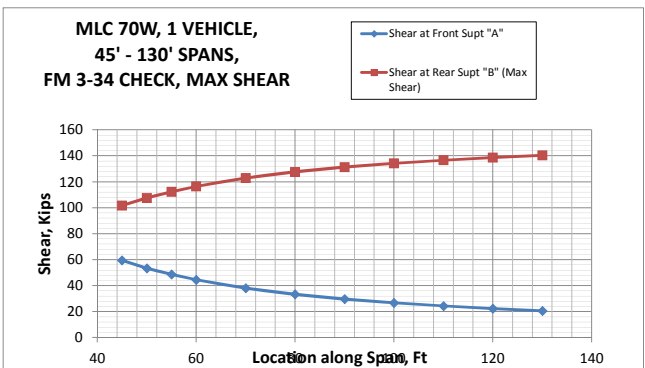
**FIVE (5) AXLE**      **One (1x) MLC 70W Vehicle, Check of FM 3-34.343 Shear and Moment values vs. Calculated Values, 45' - 130' spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.5	21.0	0.0	0.0	93.41	0
2	21.0	42.0	12.0	12.0	186.83	366
3	21.0	42.0	5.0	17.0	186.83	518
4	14.0	28.0	15.0	32.0	124.55	975
(Rear) 5	14.0	28.0	4.0	36.0	124.55	1097
<b>Totals</b>	<b>80.5</b>	<b>161.0</b>	<b>36.0</b>		<b>622.75</b>	
		Resultant at location:		19.391		591
		Distance to Nearest Axle, "xR":		2.391	(Rear of Axle #3)	

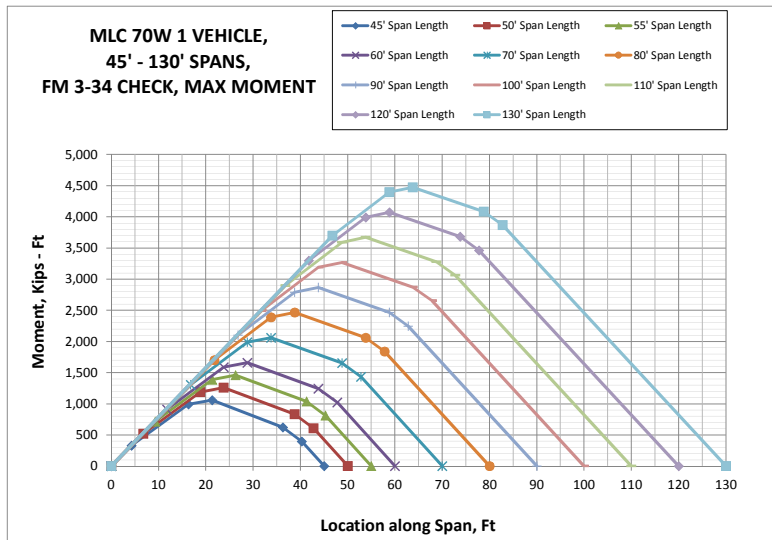


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
45.00	4.30	16.30	21.30	36.30	40.30	4.70
50.00	6.80	18.80	23.80	38.80	42.80	7.20
55.00	9.30	21.30	26.30	41.30	45.30	9.70
60.00	11.80	23.80	28.80	43.80	47.80	12.20
70.00	16.80	28.80	33.80	48.80	52.80	17.20
80.00	21.80	33.80	38.80	53.80	57.80	22.20
90.00	26.80	38.80	43.80	58.80	62.80	27.20
100.00	31.80	43.80	48.80	63.80	67.80	32.20
110.00	36.80	48.80	53.80	68.80	72.80	37.20
120.00	41.80	53.80	58.80	73.80	77.80	42.20
130.00	46.80	58.80	63.80	78.80	82.80	47.20

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
59.42	101.58
53.48	107.52
48.62	112.38
44.57	116.43
38.20	122.80
33.43	127.58
29.71	131.29
26.74	134.26
24.31	136.69
22.28	138.72
20.57	140.43

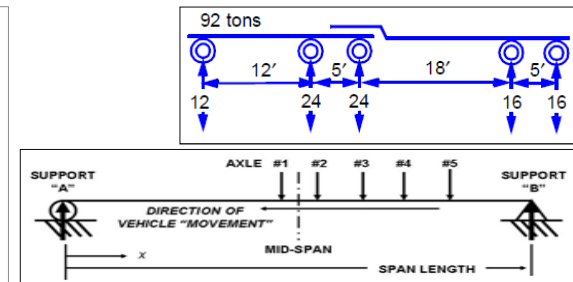
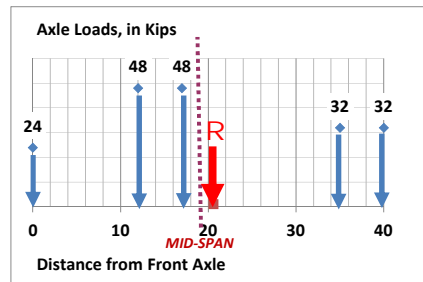


MOMENT								
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
45	Moment	0.0	328.1	990.8	1,056.9	625.2	398.1	0.0
	Axle Location on Span	0.00	4.304	16.304	21.304	36.304	40.304	45.00
50	Moment	0.0	521.6	1,189.4	1,257.6	832.4	607.0	0.0
	Axle Location on Span	0.00	6.804	18.804	23.804	38.804	42.804	50.00
55	Moment	0.0	716.4	1,388.4	1,458.4	1,038.4	814.4	0.0
	Axle Location on Span	0.00	9.304	21.304	26.304	41.304	45.304	55.00
60	Moment	0.0	912.4	1,587.9	1,659.3	1,243.7	1,020.9	0.0
	Axle Location on Span	0.00	11.804	23.804	28.804	43.804	47.804	60.00
70	Moment	0.0	1,306.5	1,987.5	2,061.3	1,652.5	1,431.5	0.0
	Axle Location on Span	0.00	16.804	28.804	33.804	48.804	52.804	70.00
80	Moment	0.0	1,702.8	2,387.9	2,463.4	2,059.8	1,840.2	0.0
	Axle Location on Span	0.00	21.804	33.804	38.804	53.804	57.804	80.00
90	Moment	0.0	2,100.4	2,788.8	2,865.6	2,466.0	2,247.4	0.0
	Axle Location on Span	0.00	26.804	38.804	43.804	58.804	62.804	90.00
100	Moment	0.0	2,499.0	3,189.9	3,267.8	2,871.4	2,653.7	0.0
	Axle Location on Span	0.00	31.804	43.804	48.804	63.804	67.804	100.00
110	Moment	0.0	2,898.3	3,591.3	3,670.1	3,276.3	3,059.3	0.0
	Axle Location on Span	0.00	36.804	48.804	53.804	68.804	72.804	110.00
120	Moment	0.0	3,298.2	3,992.9	4,072.4	3,680.9	3,464.4	0.0
	Axle Location on Span	0.00	41.804	53.804	58.804	73.804	77.804	120.00
130	Moment	0.0	3,698.4	4,394.7	4,474.8	4,085.1	3,869.1	0.0
	Axle Location on Span	0.00	46.804	58.804	63.804	78.804	82.804	130.00



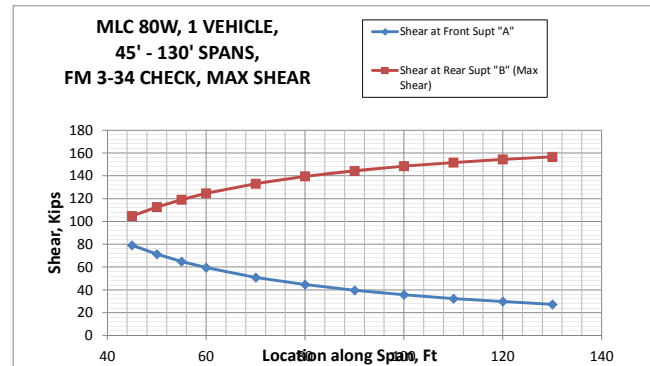
**FIVE (5) AXLE**      **One (1x) MLC 80W Vehicle, Check of FM 3-34.343 Shear and Moment values vs. Calculated Values, 45' - 130' spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	12.0	24.0		0.0	106.76	0
2	24.0	48.0	12.0	12.0	213.51	366
3	24.0	48.0	5.0	17.0	213.51	518
4	16.0	32.0	18.0	35.0	142.34	1067
(Rear) 5	16.0	32.0	5.0	40.0	142.34	1219
<b>Totals</b>	<b>92.0</b>	<b>184.0</b>	<b>40.0</b>		<b>711.72</b>	
		Resultant at location:		20.609		628
		Distance to Nearest Axle, "xR":		3.609	(Rear of Axle #3)	

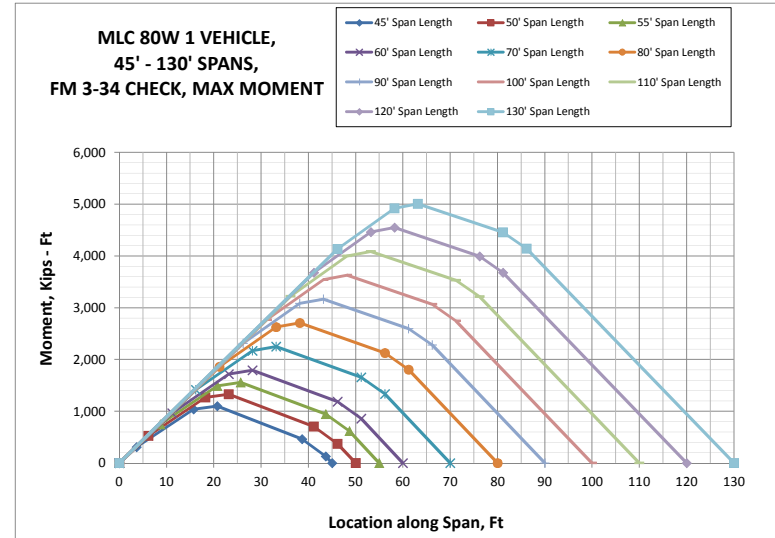


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
45.00	3.70	15.70	20.70	38.70	43.70	1.30
50.00	6.20	18.20	23.20	41.20	46.20	3.80
55.00	8.70	20.70	25.70	43.70	48.70	6.30
60.00	11.20	23.20	28.20	46.20	51.20	8.80
70.00	16.20	28.20	33.20	51.20	56.20	13.80
80.00	21.20	33.20	38.20	56.20	61.20	18.80
90.00	26.20	38.20	43.20	61.20	66.20	23.80
100.00	31.20	43.20	48.20	66.20	71.20	28.80
110.00	36.20	48.20	53.20	71.20	76.20	33.80
120.00	41.20	53.20	58.20	76.20	81.20	38.80
130.00	46.20	58.20	63.20	81.20	86.20	43.80

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
79.29	104.71
71.36	112.64
64.87	119.13
59.47	124.53
50.97	133.03
44.60	139.40
39.64	144.36
35.68	148.32
32.44	151.56
29.73	154.27
27.45	156.55

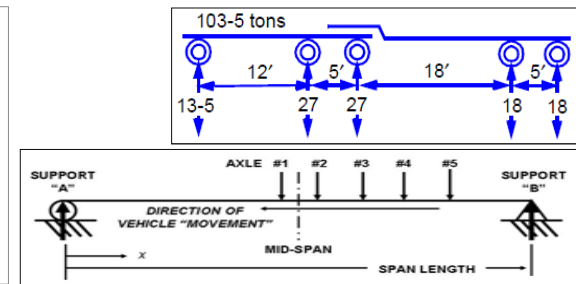
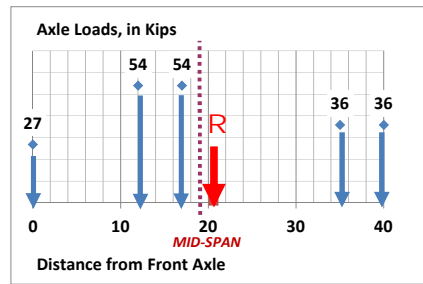


MOMENT								
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
45	Moment	0.0	312.7	1,040.2	1,103.3	466.5	129.6	0.0
	Axle Location on Span	0.00	3.696	15.696	20.696	38.696	43.696	45.00
50	Moment	0.0	528.9	1,265.2	1,332.0	708.5	375.3	0.0
	Axle Location on Span	0.00	6.196	18.196	23.196	41.196	46.196	50.00
55	Moment	0.0	747.5	1,491.1	1,560.9	948.2	618.1	0.0
	Axle Location on Span	0.00	8.696	20.696	25.696	43.696	48.696	55.00
60	Moment	0.0	968.1	1,717.7	1,790.0	1,186.4	858.7	0.0
	Axle Location on Span	0.00	11.196	23.196	28.196	46.196	51.196	60.00
70	Moment	0.0	1,413.2	2,172.3	2,248.6	1,659.2	1,335.5	0.0
	Axle Location on Span	0.00	16.196	28.196	33.196	51.196	56.196	70.00
80	Moment	0.0	1,862.0	2,628.2	2,707.5	2,128.8	1,808.0	0.0
	Axle Location on Span	0.00	21.196	33.196	38.196	56.196	61.196	80.00
90	Moment	0.0	2,313.4	3,085.1	3,166.7	2,596.3	2,277.8	0.0
	Axle Location on Span	0.00	26.196	38.196	43.196	61.196	66.196	90.00
100	Moment	0.0	2,766.4	3,542.6	3,626.0	3,062.2	2,745.6	0.0
	Axle Location on Span	0.00	31.196	43.196	48.196	66.196	71.196	100.00
110	Moment	0.0	3,220.8	4,000.5	4,085.4	3,527.1	3,212.0	0.0
	Axle Location on Span	0.00	36.196	48.196	53.196	71.196	76.196	110.00
120	Moment	0.0	3,676.0	4,458.8	4,545.0	3,991.2	3,677.4	0.0
	Axle Location on Span	0.00	41.196	53.196	58.196	76.196	81.196	120.00
130	Moment	0.0	4,132.0	4,917.4	5,004.6	4,454.6	4,141.9	0.0
	Axle Location on Span	0.00	46.196	58.196	63.196	81.196	86.196	130.00



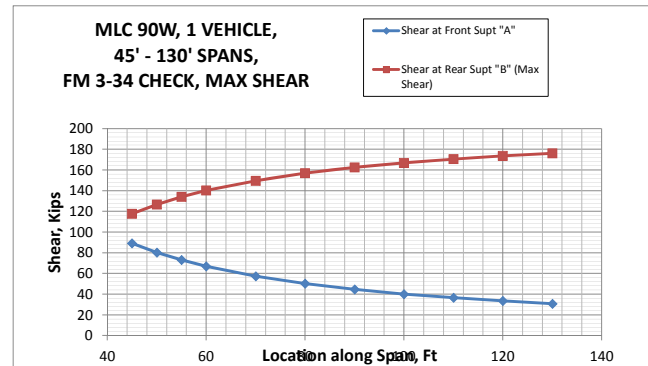
**FIVE (5) AXLE**      **One (1x) MLC 90W Vehicle, Check of FM 3-34.343 Shear and Moment values vs. Calculated Values, 45' - 130' spans**

Axle	Load (ST)		Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
	Load (ST)	Load (kips)			Load (kN)	Distance from front axle (cm)
(Front) 1	13.5	27.0	0.0	0.0	120.10	0
2	27.0	54.0	12.0	12.0	240.20	366
3	27.0	54.0	5.0	17.0	240.20	518
4	18.0	36.0	18.0	35.0	160.14	1067
(Rear) 5	18.0	36.0	5.0	40.0	160.14	1219
<b>Totals</b>	<b>103.5</b>	<b>207.0</b>	<b>40.0</b>		<b>800.68</b>	
		Resultant at location:		20.609		628
		Distance to Nearest Axle, "xR":		3.609	(Rear of Axle #3)	

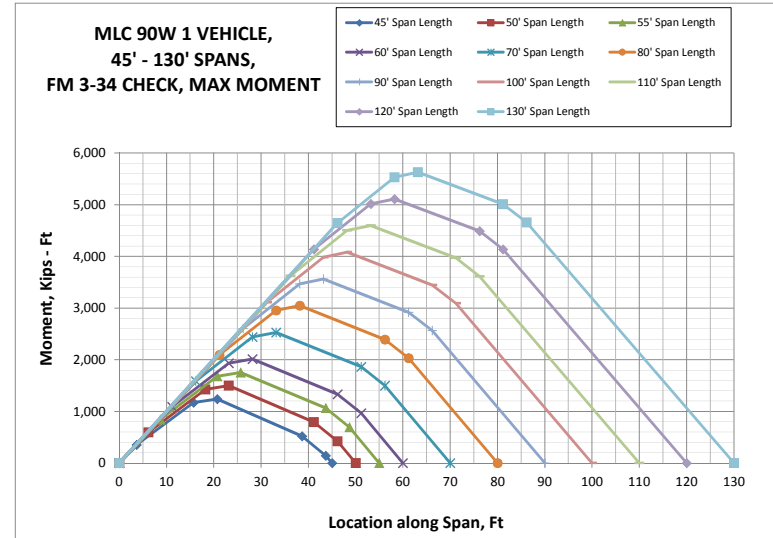


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
45.00	3.70	15.70	20.70	38.70	43.70	1.30
50.00	6.20	18.20	23.20	41.20	46.20	3.80
55.00	8.70	20.70	25.70	43.70	48.70	6.30
60.00	11.20	23.20	28.20	46.20	51.20	8.80
70.00	16.20	28.20	33.20	51.20	56.20	13.80
80.00	21.20	33.20	38.20	56.20	61.20	18.80
90.00	26.20	38.20	43.20	61.20	66.20	23.80
100.00	31.20	43.20	48.20	66.20	71.20	28.80
110.00	36.20	48.20	53.20	71.20	76.20	33.80
120.00	41.20	53.20	58.20	76.20	81.20	38.80
130.00	46.20	58.20	63.20	81.20	86.20	43.80

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
89.20	117.80
80.28	126.72
72.98	134.02
66.90	140.10
57.34	149.66
50.18	156.83
44.60	162.40
40.14	166.86
36.49	170.51
33.45	173.55
30.88	176.12

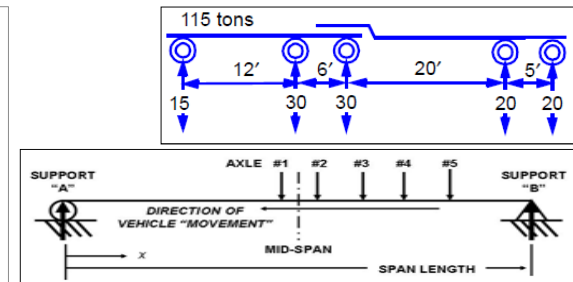
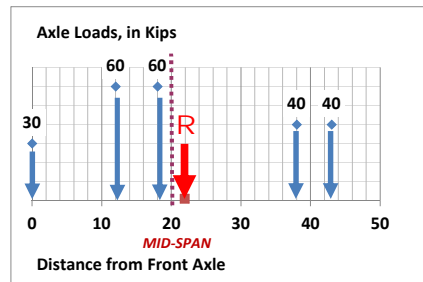


MOMENT								
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
45	Moment	0.0	351.8	1,170.2	1,241.2	524.8	145.8	0.0
	Axle Location on Span	0.00	3.696	15.696	20.696	38.696	43.696	45.00
50	Moment	0.0	595.0	1,423.3	1,498.5	797.0	422.2	0.0
	Axle Location on Span	0.00	6.196	18.196	23.196	41.196	46.196	50.00
55	Moment	0.0	840.9	1,677.5	1,756.0	1,066.8	695.3	0.0
	Axle Location on Span	0.00	8.696	20.696	25.696	43.696	48.696	55.00
60	Moment	0.0	1,089.1	1,932.4	2,013.7	1,334.7	966.1	0.0
	Axle Location on Span	0.00	11.196	23.196	28.196	46.196	51.196	60.00
70	Moment	0.0	1,589.8	2,443.8	2,529.6	1,866.6	1,502.4	0.0
	Axle Location on Span	0.00	16.196	28.196	33.196	51.196	56.196	70.00
80	Moment	0.0	2,094.8	2,956.8	3,045.9	2,394.9	2,034.0	0.0
	Axle Location on Span	0.00	21.196	33.196	38.196	56.196	61.196	80.00
90	Moment	0.0	2,602.5	3,470.7	3,562.5	2,920.8	2,562.5	0.0
	Axle Location on Span	0.00	26.196	38.196	43.196	61.196	66.196	90.00
100	Moment	0.0	3,112.2	3,985.4	4,079.2	3,445.0	3,088.8	0.0
	Axle Location on Span	0.00	31.196	43.196	48.196	66.196	71.196	100.00
110	Moment	0.0	3,623.3	4,500.6	4,596.1	3,968.0	3,613.5	0.0
	Axle Location on Span	0.00	36.196	48.196	53.196	71.196	76.196	110.00
120	Moment	0.0	4,135.1	5,016.2	5,113.1	4,490.1	4,137.0	0.0
	Axle Location on Span	0.00	41.196	53.196	58.196	76.196	81.196	120.00
130	Moment	0.0	4,648.5	5,532.0	5,630.2	5,011.5	4,659.6	0.0
	Axle Location on Span	0.00	46.196	58.196	63.196	81.196	86.196	130.00



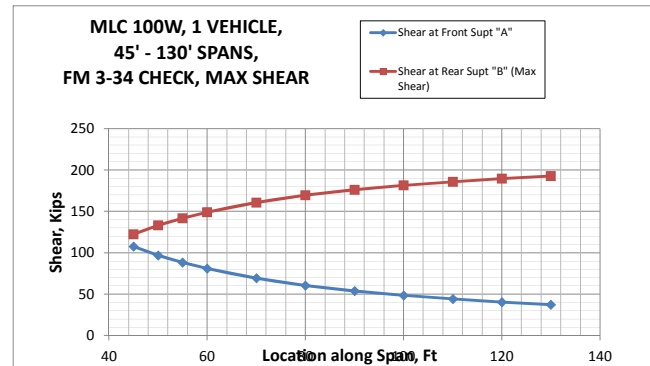
**FIVE (5) AXLE**      **One (1x) MLC 100W Vehicle, Check of FM 3-34.343 Shear and Moment values vs. Calculated Values, 45' - 130' spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	15.0	30.0		0.0	133.45	0
2	30.0	60.0	12.0	12.0	266.89	366
3	30.0	60.0	6.0	18.0	266.89	549
4	20.0	40.0	20.0	38.0	177.93	1158
(Rear) 5	20.0	40.0	5.0	43.0	177.93	1311
<b>Totals</b>	<b>115.0</b>	<b>230.0</b>	<b>43.0</b>		<b>889.64</b>	
		Resultant at location:		21.913		668
		Distance to Nearest Axle, "xR":		3.913	(Rear of Axle #3)	

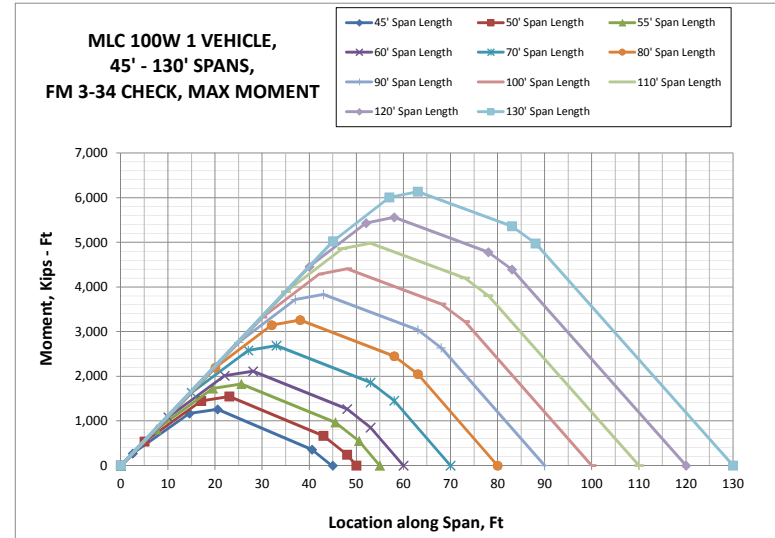


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
L	ft	ft	ft	ft	ft	ft
45.00	2.54	14.54	20.54	40.54	45.54	-0.54
50.00	5.04	17.04	23.04	43.04	48.04	1.96
55.00	7.54	19.54	25.54	45.54	50.54	4.46
60.00	10.04	22.04	28.04	48.04	53.04	6.96
70.00	15.04	27.04	33.04	53.04	58.04	11.96
80.00	20.04	32.04	38.04	58.04	63.04	16.96
90.00	25.04	37.04	43.04	63.04	68.04	21.96
100.00	30.04	42.04	48.04	68.04	73.04	26.96
110.00	35.04	47.04	53.04	73.04	78.04	31.96
120.00	40.04	52.04	58.04	78.04	83.04	36.96
130.00	45.04	57.04	63.04	83.04	88.04	41.96

Span Length	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
	Vmax A	Vmax B
45	107.78	122.22
50	97.00	133.00
55	88.18	141.82
60	80.83	149.17
70	69.29	160.71
80	60.63	169.38
90	53.89	176.11
100	48.50	181.50
110	44.09	185.91
120	40.42	189.58
130	37.31	192.69

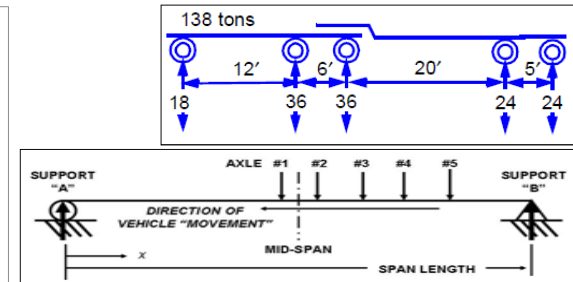
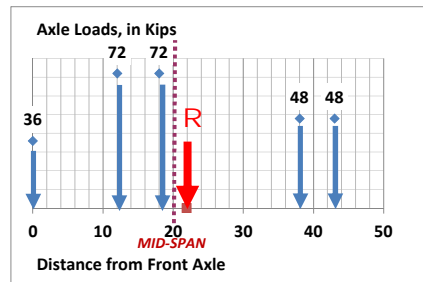


Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
	Axle Location on Span	0.00	2.543	14.543	20.543	40.543	45.543	45.00
50	Moment	0.0	534.6	1,446.6	1,542.6	662.6	242.6	0.0
	Axle Location on Span	0.00	5.043	17.043	23.043	43.043	48.043	50.00
55	Moment	0.0	805.8	1,727.6	1,828.5	964.9	549.0	0.0
	Axle Location on Span	0.00	7.543	19.543	25.543	45.543	50.543	55.00
60	Moment	0.0	1,079.7	2,009.7	2,114.7	1,264.7	852.2	0.0
	Axle Location on Span	0.00	10.043	22.043	28.043	48.043	53.043	60.00
70	Moment	0.0	1,633.3	2,576.1	2,687.6	1,859.0	1,451.9	0.0
	Axle Location on Span	0.00	15.043	27.043	33.043	53.043	58.043	70.00
80	Moment	0.0	2,192.3	3,144.8	3,261.0	2,448.5	2,045.4	0.0
	Axle Location on Span	0.00	20.043	32.043	38.043	58.043	63.043	80.00
90	Moment	0.0	2,754.8	3,714.8	3,834.8	3,034.8	2,634.8	0.0
	Axle Location on Span	0.00	25.043	37.043	43.043	63.043	68.043	90.00
100	Moment	0.0	3,319.8	4,285.8	4,408.8	3,618.8	3,221.3	0.0
	Axle Location on Span	0.00	30.043	42.043	48.043	68.043	73.043	100.00
110	Moment	0.0	3,886.6	4,857.5	4,983.0	4,201.2	3,805.7	0.0
	Axle Location on Span	0.00	35.043	47.043	53.043	73.043	78.043	110.00
120	Moment	0.0	4,454.8	5,429.8	5,557.3	4,782.3	4,388.6	0.0
	Axle Location on Span	0.00	40.043	52.043	58.043	78.043	83.043	120.00
130	Moment	0.0	5,024.1	6,002.5	6,131.8	5,362.5	4,970.2	0.0
	Axle Location on Span	0.00	45.043	57.043	63.043	83.043	88.043	130.00



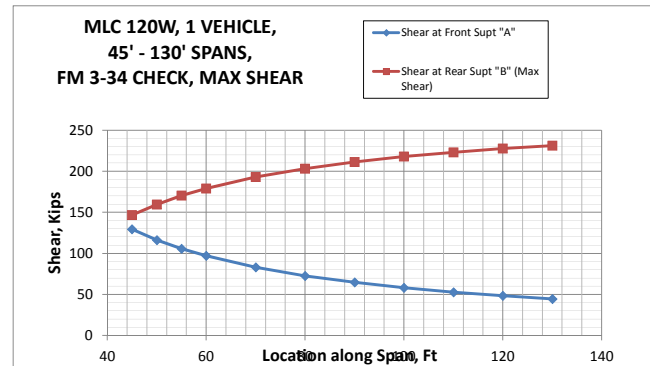
**FIVE (5) AXLE**      **One (1x) MLC 120W Vehicle, Check of FM 3-34.343 Shear and Moment values vs. Calculated Values, 45' - 130' spans**

Axle	Load (ST)		Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
	Load (ST)	Load (kips)			Load (kN)	Distance from front axle (cm)
(Front) 1	18.0	36.0		0.0	160.14	0
2	36.0	72.0	12.0	12.0	320.27	366
3	36.0	72.0	6.0	18.0	320.27	549
4	24.0	48.0	20.0	38.0	213.51	1158
(Rear) 5	24.0	48.0	5.0	43.0	213.51	1311
<b>Totals</b>	<b>138.0</b>	<b>276.0</b>	<b>43.0</b>		<b>1067.57</b>	
		Resultant at location:		21.913		668
		Distance to Nearest Axle, "xR":		3.913	(Rear of Axle # 3)	

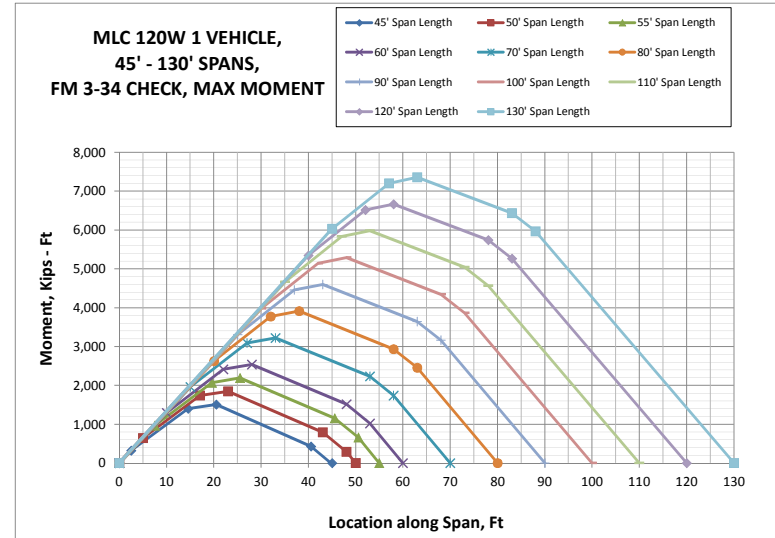


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
45.00	2.54	14.54	20.54	40.54	45.54	-0.54
50.00	5.04	17.04	23.04	43.04	48.04	1.96
55.00	7.54	19.54	25.54	45.54	50.54	4.46
60.00	10.04	22.04	28.04	48.04	53.04	6.96
70.00	15.04	27.04	33.04	53.04	58.04	11.96
80.00	20.04	32.04	38.04	58.04	63.04	16.96
90.00	25.04	37.04	43.04	63.04	68.04	21.96
100.00	30.04	42.04	48.04	68.04	73.04	26.96
110.00	35.04	47.04	53.04	73.04	78.04	31.96
120.00	40.04	52.04	58.04	78.04	83.04	36.96
130.00	45.04	57.04	63.04	83.04	88.04	41.96

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
129.33	146.67
116.40	159.60
105.82	170.18
97.00	179.00
83.14	192.86
72.75	203.25
64.67	211.33
58.20	217.80
52.91	223.09
48.50	227.50
44.77	231.23



MOMENT								
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
45	Moment	0.0	320.5	1,400.5	1,508.5	428.5	-81.5	0.0
	Axle Location on Span	0.00	2.543	14.543	20.543	40.543	45.543	45.00
50	Moment	0.0	641.5	1,735.9	1,851.1	795.1	291.1	0.0
	Axle Location on Span	0.00	5.043	17.043	23.043	43.043	48.043	50.00
55	Moment	0.0	966.9	2,073.1	2,194.2	1,157.8	658.8	0.0
	Axle Location on Span	0.00	7.543	19.543	25.543	45.543	50.543	55.00
60	Moment	0.0	1,295.6	2,411.6	2,537.6	1,517.6	1,022.6	0.0
	Axle Location on Span	0.00	10.043	22.043	28.043	48.043	53.043	60.00
70	Moment	0.0	1,960.0	3,091.4	3,225.1	2,230.8	1,742.2	0.0
	Axle Location on Span	0.00	15.043	27.043	33.043	53.043	58.043	70.00
80	Moment	0.0	2,630.7	3,773.7	3,913.2	2,938.2	2,454.5	0.0
	Axle Location on Span	0.00	20.043	32.043	38.043	58.043	63.043	80.00
90	Moment	0.0	3,305.7	4,457.7	4,601.7	3,641.7	3,161.7	0.0
	Axle Location on Span	0.00	25.043	37.043	43.043	63.043	68.043	90.00
100	Moment	0.0	3,983.8	5,143.0	5,290.6	4,342.6	3,865.6	0.0
	Axle Location on Span	0.00	30.043	42.043	48.043	68.043	73.043	100.00
110	Moment	0.0	4,664.0	5,829.1	5,979.6	5,041.4	4,566.9	0.0
	Axle Location on Span	0.00	35.043	47.043	53.043	73.043	78.043	110.00
120	Moment	0.0	5,345.8	6,515.8	6,668.8	5,738.8	5,266.3	0.0
	Axle Location on Span	0.00	40.043	52.043	58.043	78.043	83.043	120.00
130	Moment	0.0	6,028.9	7,203.1	7,358.1	6,435.1	5,964.3	0.0
	Axle Location on Span	0.00	45.043	57.043	63.043	83.043	88.043	130.00



## **TABLES (TABULATED RESULTS FROM CALCULATION WORKSHEETS)**

Compare Calc Max Abs M vs FM

Compare Calc Max MidspanM vs FM

Print Table Calc AbsMaxM vs FM

Perc Diff Max Midspan M vs AbsM

**PERCENTAGE DIFFERENCE BTWN FM 3-34 VALUES AND CALCULATED VALUES**

**WHEELED VEHICLE MOMENT (IN KIP-FEET) (FOR ABSOLUTE MAX MOMENT)**

MLC CLASS	SPAN LENGTH, FT										
	45	50	55	60	70	80	90	100	110	120	130
40W	-0.10%	-0.03%	0.02%	0.06%	0.04%	-0.03%	-0.03%	0.02%	-0.12%	0.10%	-0.10%
50W	0.04%	0.00%	-0.02%	-0.04%	-0.06%	-0.01%	0.17%	0.15%	0.13%	0.11%	0.10%
60W	0.04%	-0.03%	0.00%	-0.03%	0.04%	-0.18%	-0.17%	-0.16%	-0.16%	-0.15%	0.12%
70W	-0.01%	0.05%	0.03%	0.08%	0.06%	0.14%	-0.15%	-0.07%	0.00%	0.06%	0.11%
80W	0.03%	0.00%	-0.01%	0.00%	-0.06%	-0.09%	-0.11%	-0.11%	-0.11%	-0.11%	-0.11%
90W	-0.06%	-0.03%	-0.06%	0.19%	-0.01%	-0.13%	0.07%	-0.02%	-0.08%	0.06%	0.00%
100W	-5.34%	-0.03%	0.03%	0.22%	-0.09%	0.03%	0.12%	-0.03%	0.06%	-0.05%	0.03%
120W	-5.31%	0.01%	-0.04%	-0.09%	-0.15%	0.08%	0.04%	0.01%	-0.01%	-0.02%	-0.03%

**TRACKED VEHICLE MOMENT (IN KIP-FEET)**

MLC CLASS	SPAN LENGTH, FT										
	30	35	40	45	50	55	60	70	80	90	100
40T	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.00%
50T	0.09%	-0.07%	-0.06%	0.05%	0.05%	0.04%	-0.04%	-0.03%	0.03%	-0.12%	-0.11%
60T	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
70T	0.06%	-0.05%	-0.04%	0.04%	0.64%	0.03%	0.03%	-0.11%	-0.10%	-0.09%	-0.08%
80T	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
90T	0.05%	-0.04%	-0.04%	-0.03%	0.03%	0.12%	-0.11%	-0.09%	-0.08%	-0.07%	-0.06%
100T	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
120T	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

**WHEELED VEHICLE SHEAR (IN TONS) (FOR ABSOLUTE MAX MOMENT)**

MLC CLASS	SPAN LENGTH, FT										
	45	50	55	60	70	80	90	100	110	120	130
40W	-3.06%	-0.60%	-0.01%	-0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.01%	-0.01%
50W	0.00%	0.00%	-0.01%	0.01%	0.00%	0.00%	-0.01%	0.00%	0.01%	-0.01%	-0.01%
60W	-4.33%	-2.13%	-0.43%	0.01%	-0.01%	-0.01%	0.00%	0.00%	0.00%	0.01%	0.00%
70W	-5.91%	-3.27%	-1.23%	-0.01%	0.00%	0.00%	0.01%	0.00%	-0.01%	0.00%	-0.01%
80W	-11.56%	-8.09%	-5.42%	-3.31%	-0.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
90W	-11.56%	-8.09%	-5.42%	-3.31%	-0.18%	0.00%	0.00%	0.00%	0.01%	0.01%	0.00%
100W	-15.64%	-11.57%	-8.45%	-5.98%	-2.35%	0.00%	-0.01%	0.00%	0.00%	0.00%	0.00%
120W	-14.66%	-11.57%	-8.45%	-5.99%	-2.34%	0.02%	-0.03%	0.00%	0.04%	-0.04%	0.01%

**TRACKED VEHICLE SHEAR (IN TONS)**

MLC CLASS	SPAN LENGTH, FT										
	30	35	40	45	50	55	60	70	80	90	100
40T	0.00%	0.01%	0.00%	-0.01%	0.00%	-0.01%	0.00%	0.00%	0.00%	0.01%	0.00%
50T	-0.01%	-0.01%	-0.01%	-0.01%	0.00%	0.00%	0.01%	-0.01%	-0.01%	0.00%	0.00%
60T	0.00%	0.00%	0.00%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.36%
70T	0.00%	0.00%	-0.01%	0.01%	0.00%	-0.01%	0.00%	0.00%	0.00%	-0.01%	0.00%
80T	-0.01%	-0.01%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%
90T	0.00%	0.00%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
100T	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
120T	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.00%	-0.03%	0.00%

**CALCULATED VALUES**

**WHEELED VEHICLE MOMENT (IN KIP-FEET) (FOR ABSOLUTE MAX MOMENT)**

MLC CLASS	SPAN LENGTH, FT										
	45	50	55	60	70	80	90	100	110	120	130
40W	670	788	905	1,023	1,258	1,492	1,727	1,962	2,197	2,432	2,667
50W	800	945	1,090	1,235	1,524	1,814	2,104	2,394	2,683	2,973	3,263
60W	914	1,089	1,263	1,438	1,787	2,136	2,486	2,835	3,185	3,535	3,885
70W	1,057	1,258	1,458	1,659	2,061	2,463	2,866	3,268	3,670	4,072	4,475
80W	1,103	1,332	1,561	1,790	2,249	2,707	3,167	3,626	4,085	4,545	5,005
90W	1,241	1,498	1,756	2,014	2,530	3,046	3,562	4,079	4,596	5,113	5,630
100W	1,257	1,543	1,829	2,115	2,688	3,261	3,835	4,409	4,983	5,557	6,132
120W	1,508	1,851	2,194	2,538	3,225	3,913	4,602	5,291	5,980	6,669	7,358

**TRACKED VEHICLE MOMENT (IN KIP-FEET)**

MLC CLASS	SPAN LENGTH, FT										
	30	35	40	45	50	55	60	70	80	90	100
40T	480	580	680	780	880	980	1,080	1,280	1,480	1,680	1,880
50T	588	713	838	963	1,088	1,213	1,338	1,588	1,838	2,088	2,338
60T	690	840	990	1,140	1,290	1,440	1,590	1,890	2,190	2,490	2,790
70T	788	963	1,138	1,313	1,488	1,663	1,838	2,188	2,538	2,888	3,238
80T	880	1,080	1,280	1,480	1,680	1,880	2,080	2,480	2,880	3,280	3,680
90T	968	1,193	1,418	1,643	1,868	2,093	2,318	2,768	3,218	3,668	4,118
100T	1,050	1,300	1,550	1,800	2,050	2,300	2,550	3,050	3,550	4,050	4,550
120T	1,200	1,500	1,800	2,100	2,400	2,700	3,000	3,600	4,200	4,800	5,400

**CALCULATED VALUES**

**WHEELED VEHICLE SHEAR (IN TONS) (FOR ABSOLUTE MAX MOMENT)**

MLC CLASS	SPAN LENGTH, FT										
	45	50	55	60	70	80	90	100	110	120	130
40W	31.6	33.2	34.4	35.5	37.1	38.4	39.3	40.1	40.7	41.2	41.7
50W	40.3	42.1	43.5	44.7	46.6	48.1	49.2	50.0	50.8	51.4	51.9
60W	45.2	47.7	49.7	51.4	54.1	56.1	57.6	58.9	59.9	60.7	61.4
70W	50.8	53.8	56.2	58.2	61.4	63.8	65.6	67.1	68.3	69.4	70.2
80W	52.4	56.3	59.6	62.3	66.5	69.7	72.2	74.2	75.8	77.1	78.3
90W	58.9	63.4	67.0	70.1	74.8	78.4	81.2	83.4	85.3	86.8	88.1
100W	61.1	66.5	70.9	74.6	80.4	84.7	88.1	90.8	93.0	94.8	96.3
120W	73.3	79.8	85.1	89.5	96.4	101.6	105.7	108.9	111.5	113.8	115.6

**TRACKED VEHICLE SHEAR (IN TONS)**

MLC CLASS	SPAN LENGTH, FT										
	30	35	40	45	50	55	60	70	80	90	100
40T	32.0	33.1	34.0	34.7	35.2	35.6	36.0	36.6	37.0	37.3	37.6
50T	39.2	40.7	41.9	42.8	43.5	44.1	44.6	45.4	45.9	46.4	46.8
60T	46.0	48.0	49.5	50.7	51.6	52.4	53.0	54.0	54.8	55.3	55.8
70T	52.5	55.0	56.9	58.3	59.5	60.5	61.3	62.5	63.4	64.2	64.8
80T	58.7	61.7	64.0	65.8	67.2	68.4	69.3	70.9	72.0	72.9	73.6
90T	64.5	68.1	70.9	73.0	74.7	76.1	77.3	79.1	80.4	81.5	82.4
100T	70.0	74.3	77.5	80.0	82.0	83.6	85.0	87.1	88.8	90.0	91.0
120T	80.0	85.7	90.0	93.3	96.0	98.2	100.0	102.9	105.0	106.7	108.0

**FM 3.34 VALUIES**

**WHEELED VEHICLE MOMENT (IN KIP-FEET)**

MLC CLASS	SPAN LENGPTH, FT										
	45	50	55	60	70	80	90	100	110	120	130
40W	671	788	905	1,022	1,257	1,493	1,728	1,962	2,200	2,430	2,670
50W	800	945	1,090	1,235	1,525	1,814	2,100	2,390	2,680	2,970	3,260
60W	914	1,089	1,263	1,438	1,786	2,140	2,490	2,840	3,190	3,540	3,880
70W	1,057	1,257	1,458	1,658	2,060	2,460	2,870	3,270	3,670	4,070	4,470
80W	1,103	1,332	1,561	1,790	2,250	2,710	3,170	3,630	4,090	4,550	5,010
90W	1,242	1,499	1,757	2,010	2,530	3,050	3,560	4,080	4,600	5,110	5,630
100W	1,328	1,543	1,828	2,110	2,690	3,260	3,830	4,410	4,980	5,560	6,130
120W	1,593	1,851	2,195	2,540	3,230	3,910	4,600	5,290	5,980	6,670	7,360

**TRACKED VEHICLE MOMENT (IN KIP-FEET)**

MLC CLASS	SPAN LENGPTH, FT										
	30	35	40	45	50	55	60	70	80	90	100
40T	480	580	680	780	880	980	1,080	1,280	1,480	1,679	1,880
50T	587	713	838	962	1,087	1,212	1,338	1,588	1,837	2,090	2,340
60T	690	840	990	1,140	1,290	1,440	1,590	1,890	2,190	2,490	2,790
70T	787	963	1,138	1,312	1,478	1,662	1,837	2,190	2,540	2,890	3,240
80T	880	1,080	1,280	1,480	1,680	1,880	2,080	2,480	2,880	3,280	3,680
90T	967	1,193	1,418	1,643	1,867	2,090	2,320	2,770	3,220	3,670	4,120
100T	1,050	1,300	1,550	1,800	2,050	2,300	2,550	3,050	3,550	4,050	4,550
120T	1,200	1,500	1,800	2,100	2,400	2,700	3,000	3,600	4,200	4,800	5,400

**FM 3.34 VALUIES**

**WHEELED VEHICLE SHEAR (IN TONS)**

MLC CLASS	SPAN LENGPTH, FT										
	45	50	55	60	70	80	90	100	110	120	130
40W	32.6	33.4	34.4	35.5	37.1	38.4	39.3	40.1	40.7	41.2	41.7
50W	40.3	42.1	43.5	44.7	46.6	48.1	49.2	50.0	50.8	51.4	51.9
60W	47.3	48.8	50.0	51.4	54.1	56.1	57.6	58.9	59.9	60.7	61.4
70W	54.0	55.6	56.9	58.2	61.4	63.8	65.6	67.1	68.4	69.4	70.2
80W	59.2	61.3	63.0	64.4	66.6	69.7	72.2	74.2	75.8	77.1	78.3
90W	66.6	68.9	70.9	72.5	75.0	78.4	81.2	83.4	85.3	86.8	88.1
100W	72.4	75.2	77.5	79.3	82.3	84.7	88.1	90.8	93.0	94.8	96.4
120W	85.9	90.2	92.9	95.2	98.7	101.6	105.7	108.9	111.5	113.8	115.6

**TRACKED VEHICLE SHEAR (IN TONS)**

MLC CLASS	SPAN LENGPTH, FT										
	30	35	40	45	50	55	60	70	80	90	100
40T	32.0	33.1	34.0	34.7	35.2	35.6	36.0	36.6	37.0	37.3	37.6
50T	39.2	40.7	41.9	42.8	43.5	44.1	44.6	45.4	45.9	46.4	46.8
60T	46.0	48.0	49.5	50.7	51.6	52.4	53.0	54.0	54.8	55.3	55.6
70T	52.5	55.0	56.9	58.3	59.5	60.5	61.3	62.5	63.4	64.2	64.8
80T	58.7	61.7	64.0	65.8	67.2	68.4	69.3	70.9	72.0	72.9	73.6
90T	64.5	68.1	70.9	73.0	74.7	76.1	77.3	79.1	80.4	81.5	82.4
100T	70.0	74.3	77.5	80.0	82.0	83.6	85.0	87.1	88.8	90.0	91.0
120T	80.0	85.7	90.0	93.3	96.0	98.2	100.0	102.9	105.0	106.7	108.0

**WHEELED AND TRACKED VEHICLE SHEAR (IN KIPS)**

MLC CLASS	SPAN LENGPTH, FT										
	45.00	50.00	55.00	60.00	70.00	80.00	90.00	100.00	110.00	120.00	130.00
40W	63.2	66.3	68.8	70.9	74.2	76.7	78.6	80.2	81.4	82.5	83.4
50W	80.6	84.2	87.1	89.5	93.3	96.1	98.3	100.1	101.5	102.7	103.8
60W	90.5	95.4	99.5	102.9	108.2	112.2	115.2	117.7	119.7	121.4	122.9
70W	101.6	107.5	112.4	116.4	122.8	127.6	131.3	134.3	136.7	138.7	140.4
80W	104.7	112.6	119.1	124.5	133.0	139.4	144.4	148.3	151.6	154.3	156.6
90W	117.8	126.7	134.0	140.1	149.7	156.8	162.4	166.9	170.5	173.6	176.1
100W	122.2	133.0	141.8	149.2	160.7	169.4	176.1	181.5	185.9	189.6	192.7
120W	146.7	159.6	170.2	179.0	192.9	203.3	211.3	217.8	223.1	227.5	231.2

**WHEELED AND TRACKED VEHICLE SHEAR (IN KIPS)**

MLC CLASS	SPAN LENGPTH, FT										
	30	35	40	45	50	55	60	70	80	90	100
40T	64.0	66.3	68.0	69.3	70.4	71.3	72.0	73.1	74.0	74.7	75.2
50T	78.3	81.4	83.8	85.6	87.0	88.2	89.2	90.7	91.9	92.8	93.5
60T	92.0	96.0	99.0	101.3	103.2	104.7	106.0	108.0	109.5	110.7	111.6
70T	105.0	110.0	113.8	116.7	119.0	120.9	122.5	125.0	126.9	128.3	129.5
80T	117.3	123.4	128.0	131.6	134.4	136.7	138.7	141.7	144.0	145.8	147.2
90T	129.0	136.3	141.8	146.0	149.4	152.2	154.5	158.1	160.9	163.0	164.7
100T	140.0	148.6	155.0	160.0	164.0	167.3	170.0	174.3	177.5	180.0	182.0
120T	160.0	171.4	180.0	186.7	192.0	196.4	200.0	205.7	210.0	213.3	216.0



**WHEELED AND TRACKED VEHICLE SHEAR (IN KIPS)**

MLC CLASS	SPAN LENGTH, FT										
	45	50	55	60	70	80	90	100	110	120	130
40W	65.2	66.7	68.8	70.9	74.2	76.7	78.6	80.2	81.4	82.5	83.4
50W	80.6	84.2	87.1	89.5	93.3	96.1	98.3	100.1	101.5	102.7	103.8
60W	94.6	97.5	99.9	102.9	108.2	112.2	115.2	117.7	119.7	121.4	122.9
70W	108.0	111.2	113.8	116.4	122.8	127.6	131.3	134.3	136.7	138.7	140.4
80W	118.4	122.6	126.0	128.8	133.3	139.4	144.4	148.3	151.6	154.3	156.6
90W	133.2	137.9	141.7	144.9	149.9	156.8	162.4	166.9	170.5	173.5	176.1
100W	144.9	150.4	154.9	158.7	164.6	169.4	176.1	181.5	185.9	189.6	192.7
120W	171.9	180.5	185.9	190.4	197.5	203.2	211.4	217.8	223.0	227.6	231.2

**WHEELED AND TRACKED VEHICLE SHEAR (IN KIPS)**

MLC CLASS	SPAN LENGTH, FT										
	30	35	40	45	50	55	60	70	80	90	100
40T	64.0	66.3	68.0	69.3	70.4	71.3	72.0	73.1	74.0	74.7	75.2
50T	78.3	81.4	83.8	85.6	87.0	88.2	89.2	90.7	91.9	92.8	93.5
60T	92.0	96.0	99.0	101.3	103.2	104.7	106.0	108.0	109.5	110.7	111.2
70T	105.0	110.0	113.8	116.7	119.0	120.9	122.5	125.0	126.9	128.3	129.5
80T	117.3	123.4	128.0	131.6	134.4	136.7	138.7	141.7	144.0	145.8	147.2
90T	129.0	136.3	141.8	146.0	149.4	152.2	154.5	158.1	160.9	163.0	164.7
100T	140.0	148.6	155.0	160.0	164.0	167.3	170.0	174.3	177.5	180.0	182.0
120T	160.0	171.4	180.0	186.7	192.0	196.4	200.0	205.8	210.0	213.4	216.0

**PERCENTAGE DIFFERENCE BTWN FM 3-34 VALUES AND CALCULATED VALUES**

**WHEELED VEHICLE MOMENT (IN KIP-FEET) (MAX MOMENT FOR AXLE AT MID-SPAN)**

MLC CLASS	SPAN LENGTH, FT										
	45	50	55	60	70	80	90	100	110	120	130
40W	-0.22%	-0.13%	-0.06%	0.00%	0.00%	-0.07%	-0.06%	0.00%	-0.14%	0.08%	-0.11%
50W	-0.38%	-0.32%	-0.28%	-0.24%	-0.20%	-0.11%	0.10%	0.08%	0.07%	0.07%	0.06%
60W	-0.77%	-0.64%	-0.48%	-0.42%	-0.22%	-0.37%	-0.32%	-0.28%	-0.25%	-0.23%	0.05%
70W	-0.50%	-0.32%	-0.26%	-0.15%	-0.10%	0.02%	-0.24%	-0.14%	-0.05%	0.01%	0.07%
80W	-1.18%	-0.90%	-0.70%	-0.56%	-0.44%	-0.37%	-0.32%	-0.28%	-0.24%	-0.22%	-0.20%
90W	-1.27%	-0.93%	-0.75%	-0.37%	-0.40%	-0.41%	-0.14%	-0.18%	-0.22%	-0.05%	-0.09%
100W	-6.81%	-1.17%	-0.85%	-0.47%	-0.56%	-0.31%	-0.13%	-0.23%	-0.10%	-0.18%	-0.08%
120W	-6.78%	-1.13%	-0.91%	-0.79%	-0.62%	-0.26%	-0.22%	-0.19%	-0.17%	-0.15%	-0.14%

**TRACKED VEHICLE MOMENT (IN KIP-FEET)**

MLC CLASS	SPAN LENGTH, FT										
	30	35	40	45	50	55	60	70	80	90	100
40T	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.00%
50T	0.09%	-0.07%	-0.06%	0.05%	0.05%	0.04%	-0.04%	-0.03%	0.03%	-0.12%	-0.11%
60T	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
70T	0.06%	-0.05%	-0.04%	0.04%	0.64%	0.03%	0.03%	-0.11%	-0.10%	-0.09%	-0.08%
80T	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
90T	0.05%	-0.04%	-0.04%	-0.03%	0.03%	0.12%	-0.11%	-0.09%	-0.08%	-0.07%	-0.06%
100T	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
120T	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

**WHEELED VEHICLE SHEAR (IN TONS) (MAX MOMENT FOR AXLE AT MID-SPAN)**

MLC CLASS	SPAN LENGTH, FT										
	45	50	55	60	70	80	90	100	110	120	130
40W	-3.06%	-0.60%	-0.01%	-0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.01%	-0.01%
50W	0.00%	0.00%	-0.01%	0.01%	0.00%	0.00%	-0.01%	0.00%	0.01%	-0.01%	-0.01%
60W	-4.33%	-2.13%	-0.43%	0.01%	-0.01%	-0.01%	0.00%	0.00%	0.00%	0.01%	0.00%
70W	-5.91%	-3.27%	-1.23%	-0.01%	0.00%	0.00%	0.01%	0.00%	-0.01%	0.00%	-0.01%
80W	-11.56%	-8.09%	-5.42%	-3.31%	-0.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
90W	-11.56%	-8.09%	-5.42%	-3.31%	-0.18%	0.00%	0.00%	0.00%	0.01%	0.01%	0.00%
100W	-15.64%	-11.57%	-8.45%	-5.98%	-2.35%	0.00%	-0.01%	0.00%	0.00%	0.00%	0.00%
120W	-14.66%	-11.57%	-8.45%	-5.99%	-2.34%	0.02%	-0.03%	0.00%	0.04%	-0.04%	0.01%

**TRACKED VEHICLE SHEAR (IN TONS)**

MLC CLASS	SPAN LENGTH, FT										
	30	35	40	45	50	55	60	70	80	90	100
40T	0.00%	0.01%	0.00%	-0.01%	0.00%	-0.01%	0.00%	0.00%	0.00%	0.01%	0.00%
50T	-0.01%	-0.01%	-0.01%	-0.01%	0.00%	0.00%	0.01%	-0.01%	-0.01%	0.00%	0.00%
60T	0.00%	0.00%	0.00%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.36%
70T	0.00%	0.00%	-0.01%	0.01%	0.00%	-0.01%	0.00%	0.00%	0.00%	-0.01%	0.00%
80T	-0.01%	-0.01%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%
90T	0.00%	0.00%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
100T	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
120T	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.00%	-0.03%	0.00%

**CALCULATED VALUES**

**WHEELED VEHICLE MOMENT (IN KIP-FEET) (MAX MOMENT FOR AXLE AT MID-SPAN)**

MLC CLASS	SPAN LENGTH, FT										
	45	50	55	60	70	80	90	100	110	120	130
40W	670	787	905	1,022	1,257	1,492	1,727	1,962	2,197	2,432	2,667
50W	797	942	1,087	1,232	1,522	1,812	2,102	2,392	2,682	2,972	3,262
60W	907	1,082	1,257	1,432	1,782	2,132	2,482	2,832	3,182	3,532	3,882
70W	1,052	1,253	1,454	1,656	2,058	2,461	2,863	3,266	3,668	4,071	4,473
80W	1,090	1,320	1,550	1,780	2,240	2,700	3,160	3,620	4,080	4,540	5,000
90W	1,226	1,485	1,744	2,003	2,520	3,038	3,555	4,073	4,590	5,108	5,625
100W	1,238	1,525	1,813	2,100	2,675	3,250	3,825	4,400	4,975	5,550	6,125
120W	1,485	1,830	2,175	2,520	3,210	3,900	4,590	5,280	5,970	6,660	7,350

**TRACKED VEHICLE MOMENT (IN KIP-FEET)**

MLC CLASS	SPAN LENGTH, FT										
	30	35	40	45	50	55	60	70	80	90	100
40T	480	580	680	780	880	980	1,080	1,280	1,480	1,680	1,880
50T	588	713	838	963	1,088	1,213	1,338	1,588	1,838	2,088	2,338
60T	690	840	990	1,140	1,290	1,440	1,590	1,890	2,190	2,490	2,790
70T	788	963	1,138	1,313	1,488	1,663	1,838	2,188	2,538	2,888	3,238
80T	880	1,080	1,280	1,480	1,680	1,880	2,080	2,480	2,880	3,280	3,680
90T	968	1,193	1,418	1,643	1,868	2,093	2,318	2,768	3,218	3,668	4,118
100T	1,050	1,300	1,550	1,800	2,050	2,300	2,550	3,050	3,550	4,050	4,550
120T	1,200	1,500	1,800	2,100	2,400	2,700	3,000	3,600	4,200	4,800	5,400

**CALCULATED VALUES**

**WHEELED VEHICLE SHEAR (IN TONS) (MAX MOMENT FOR AXLE AT MID-SPAN)**

MLC CLASS	SPAN LENGTH, FT										
	45	50	55	60	70	80	90	100	110	120	130
40W	31.6	33.2	34.4	35.5	37.1	38.4	39.3	40.1	40.7	41.2	41.7
50W	40.3	42.1	43.5	44.7	46.6	48.1	49.2	50.0	50.8	51.4	51.9
60W	45.2	47.7	49.7	51.4	54.1	56.1	57.6	58.9	59.9	60.7	61.4
70W	50.8	53.8	56.2	58.2	61.4	63.8	65.6	67.1	68.3	69.4	70.2
80W	52.4	56.3	59.6	62.3	66.5	69.7	72.2	74.2	75.8	77.1	78.3
90W	58.9	63.4	67.0	70.1	74.8	78.4	81.2	83.4	85.3	86.8	88.1
100W	61.1	66.5	70.9	74.6	80.4	84.7	88.1	90.8	93.0	94.8	96.3
120W	73.3	79.8	85.1	89.5	96.4	101.6	105.7	108.9	111.5	113.8	115.6

**TRACKED VEHICLE SHEAR (IN TONS)**

MLC CLASS	SPAN LENGTH, FT										
	30	35	40	45	50	55	60	70	80	90	100
40T	32.0	33.1	34.0	34.7	35.2	35.6	36.0	36.6	37.0	37.3	37.6
50T	39.2	40.7	41.9	42.8	43.5	44.1	44.6	45.4	45.9	46.4	46.8
60T	46.0	48.0	49.5	50.7	51.6	52.4	53.0	54.0	54.8	55.3	55.8
70T	52.5	55.0	56.9	58.3	59.5	60.5	61.3	62.5	63.4	64.2	64.8
80T	58.7	61.7	64.0	65.8	67.2	68.4	69.3	70.9	72.0	72.9	73.6
90T	64.5	68.1	70.9	73.0	74.7	76.1	77.3	79.1	80.4	81.5	82.4
100T	70.0	74.3	77.5	80.0	82.0	83.6	85.0	87.1	88.8	90.0	91.0
120T	80.0	85.7	90.0	93.3	96.0	98.2	100.0	102.9	105.0	106.7	108.0

**FM 3.34 VALUIES**

**WHEELED VEHICLE MOMENT (IN KIP-FEET)**

MLC CLASS	SPAN LENGPTH, FT										
	45	50	55	60	70	80	90	100	110	120	130
40W	671	788	905	1,022	1,257	1,493	1,728	1,962	2,200	2,430	2,670
50W	800	945	1,090	1,235	1,525	1,814	2,100	2,390	2,680	2,970	3,260
60W	914	1,089	1,263	1,438	1,786	2,140	2,490	2,840	3,190	3,540	3,880
70W	1,057	1,257	1,458	1,658	2,060	2,460	2,870	3,270	3,670	4,070	4,470
80W	1,103	1,332	1,561	1,790	2,250	2,710	3,170	3,630	4,090	4,550	5,010
90W	1,242	1,499	1,757	2,010	2,530	3,050	3,560	4,080	4,600	5,110	5,630
100W	1,328	1,543	1,828	2,110	2,690	3,260	3,830	4,410	4,980	5,560	6,130
120W	1,593	1,851	2,195	2,540	3,230	3,910	4,600	5,290	5,980	6,670	7,360

**TRACKED VEHICLE MOMENT (IN KIP-FEET)**

MLC CLASS	SPAN LENGPTH, FT										
	30	35	40	45	50	55	60	70	80	90	100
40T	480	580	680	780	880	980	1,080	1,280	1,480	1,679	1,880
50T	587	713	838	962	1,087	1,212	1,338	1,588	1,837	2,090	2,340
60T	690	840	990	1,140	1,290	1,440	1,590	1,890	2,190	2,490	2,790
70T	787	963	1,138	1,312	1,478	1,662	1,837	2,190	2,540	2,890	3,240
80T	880	1,080	1,280	1,480	1,680	1,880	2,080	2,480	2,880	3,280	3,680
90T	967	1,193	1,418	1,643	1,867	2,090	2,320	2,770	3,220	3,670	4,120
100T	1,050	1,300	1,550	1,800	2,050	2,300	2,550	3,050	3,550	4,050	4,550
120T	1,200	1,500	1,800	2,100	2,400	2,700	3,000	3,600	4,200	4,800	5,400

**FM 3.34 VALUIES**

**WHEELED VEHICLE SHEAR (IN TONS)**

MLC CLASS	SPAN LENGPTH, FT										
	45	50	55	60	70	80	90	100	110	120	130
40W	32.6	33.4	34.4	35.5	37.1	38.4	39.3	40.1	40.7	41.2	41.7
50W	40.3	42.1	43.5	44.7	46.6	48.1	49.2	50.0	50.8	51.4	51.9
60W	47.3	48.8	50.0	51.4	54.1	56.1	57.6	58.9	59.9	60.7	61.4
70W	54.0	55.6	56.9	58.2	61.4	63.8	65.6	67.1	68.4	69.4	70.2
80W	59.2	61.3	63.0	64.4	66.6	69.7	72.2	74.2	75.8	77.1	78.3
90W	66.6	68.9	70.9	72.5	75.0	78.4	81.2	83.4	85.3	86.8	88.1
100W	72.4	75.2	77.5	79.3	82.3	84.7	88.1	90.8	93.0	94.8	96.4
120W	85.9	90.2	92.9	95.2	98.7	101.6	105.7	108.9	111.5	113.8	115.6

**TRACKED VEHICLE SHEAR (IN TONS)**

MLC CLASS	SPAN LENGPTH, FT										
	30	35	40	45	50	55	60	70	80	90	100
40T	32.0	33.1	34.0	34.7	35.2	35.6	36.0	36.6	37.0	37.3	37.6
50T	39.2	40.7	41.9	42.8	43.5	44.1	44.6	45.4	45.9	46.4	46.8
60T	46.0	48.0	49.5	50.7	51.6	52.4	53.0	54.0	54.8	55.3	55.6
70T	52.5	55.0	56.9	58.3	59.5	60.5	61.3	62.5	63.4	64.2	64.8
80T	58.7	61.7	64.0	65.8	67.2	68.4	69.3	70.9	72.0	72.9	73.6
90T	64.5	68.1	70.9	73.0	74.7	76.1	77.3	79.1	80.4	81.5	82.4
100T	70.0	74.3	77.5	80.0	82.0	83.6	85.0	87.1	88.8	90.0	91.0
120T	80.0	85.7	90.0	93.3	96.0	98.2	100.0	102.9	105.0	106.7	108.0

**WHEELED AND TRACKED VEHICLE SHEAR (IN KIPS)**

MLC CLASS	SPAN LENGPTH, FT										
	45.00	50.00	55.00	60.00	70.00	80.00	90.00	100.00	110.00	120.00	130.00
40W	63.2	66.3	68.8	70.9	74.2	76.7	78.6	80.2	81.4	82.5	83.4
50W	80.6	84.2	87.1	89.5	93.3	96.1	98.3	100.1	101.5	102.7	103.8
60W	90.5	95.4	99.5	102.9	108.2	112.2	115.2	117.7	119.7	121.4	122.9
70W	101.6	107.5	112.4	116.4	122.8	127.6	131.3	134.3	136.7	138.7	140.4
80W	104.7	112.6	119.1	124.5	133.0	139.4	144.4	148.3	151.6	154.3	156.6
90W	117.8	126.7	134.0	140.1	149.7	156.8	162.4	166.9	170.5	173.6	176.1
100W	122.2	133.0	141.8	149.2	160.7	169.4	176.1	181.5	185.9	189.6	192.7
120W	146.7	159.6	170.2	179.0	192.9	203.3	211.3	217.8	223.1	227.5	231.2

**WHEELED AND TRACKED VEHICLE SHEAR (IN KIPS)**

MLC CLASS	SPAN LENGPTH, FT										
	30	35	40	45	50	55	60	70	80	90	100
40T	64.0	66.3	68.0	69.3	70.4	71.3	72.0	73.1	74.0	74.7	75.2
50T	78.3	81.4	83.8	85.6	87.0	88.2	89.2	90.7	91.9	92.8	93.5
60T	92.0	96.0	99.0	101.3	103.2	104.7	106.0	108.0	109.5	110.7	111.6
70T	105.0	110.0	113.8	116.7	119.0	120.9	122.5	125.0	126.9	128.3	129.5
80T	117.3	123.4	128.0	131.6	134.4	136.7	138.7	141.7	144.0	145.8	147.2
90T	129.0	136.3	141.8	146.0	149.4	152.2	154.5	158.1	160.9	163.0	164.7
100T	140.0	148.6	155.0	160.0	164.0	167.3	170.0	174.3	177.5	180.0	182.0
120T	160.0	171.4	180.0	186.7	192.0	196.4	200.0	205.7	210.0	213.3	216.0

**WHEELED AND TRACKED VEHICLE SHEAR (IN KIPS)**

MLC CLASS	SPAN LENGTH, FT										
	45	50	55	60	70	80	90	100	110	120	130
40W	65.2	66.7	68.8	70.9	74.2	76.7	78.6	80.2	81.4	82.5	83.4
50W	80.6	84.2	87.1	89.5	93.3	96.1	98.3	100.1	101.5	102.7	103.8
60W	94.6	97.5	99.9	102.9	108.2	112.2	115.2	117.7	119.7	121.4	122.9
70W	108.0	111.2	113.8	116.4	122.8	127.6	131.3	134.3	136.7	138.7	140.4
80W	118.4	122.6	126.0	128.8	133.3	139.4	144.4	148.3	151.6	154.3	156.6
90W	133.2	137.9	141.7	144.9	149.9	156.8	162.4	166.9	170.5	173.5	176.1
100W	144.9	150.4	154.9	158.7	164.6	169.4	176.1	181.5	185.9	189.6	192.7
120W	171.9	180.5	185.9	190.4	197.5	203.2	211.4	217.8	223.0	227.6	231.2

**WHEELED AND TRACKED VEHICLE SHEAR (IN KIPS)**

MLC CLASS	SPAN LENGTH, FT										
	30	35	40	45	50	55	60	70	80	90	100
40T	64.0	66.3	68.0	69.3	70.4	71.3	72.0	73.1	74.0	74.7	75.2
50T	78.3	81.4	83.8	85.6	87.0	88.2	89.2	90.7	91.9	92.8	93.5
60T	92.0	96.0	99.0	101.3	103.2	104.7	106.0	108.0	109.5	110.7	111.2
70T	105.0	110.0	113.8	116.7	119.0	120.9	122.5	125.0	126.9	128.3	129.5
80T	117.3	123.4	128.0	131.6	134.4	136.7	138.7	141.7	144.0	145.8	147.2
90T	129.0	136.3	141.8	146.0	149.4	152.2	154.5	158.1	160.9	163.0	164.7
100T	140.0	148.6	155.0	160.0	164.0	167.3	170.0	174.3	177.5	180.0	182.0
120T	160.0	171.4	180.0	186.7	192.0	196.4	200.0	205.8	210.0	213.4	216.0

**COMPARISON OF STANAG 21/FM 3-34.343 TABLE VALUES VS. CALCULATED VALUES**

**PERCENTAGE DIFFERENCE BTWN FM 3-34 VALUES AND CALCULATED VALUES (FOR ABSOLUTE MAX MOMENT)**

**WHEELED VEHICLE MOMENT (IN KIP-FEET)**

SPAN LENGTH	45	50	55	60	70	80	90	100	110	120	130
40W	-0.10%	-0.03%	0.02%	0.06%	0.04%	-0.03%	-0.03%	0.02%	-0.12%	0.10%	-0.10%
50W	0.04%	0.00%	-0.02%	-0.04%	-0.06%	-0.01%	0.17%	0.15%	0.13%	0.11%	0.10%
60W	0.04%	-0.03%	0.00%	-0.03%	0.04%	-0.18%	-0.17%	-0.16%	-0.16%	-0.15%	0.12%
70W	-0.01%	0.05%	0.03%	0.08%	0.06%	0.14%	-0.15%	-0.07%	0.00%	0.06%	0.11%
80W	0.03%	0.00%	-0.01%	0.00%	-0.06%	-0.09%	-0.11%	-0.11%	-0.11%	-0.11%	-0.11%
90W	-0.06%	-0.03%	-0.06%	0.19%	-0.01%	-0.13%	0.07%	-0.02%	-0.08%	0.06%	0.00%
100W	-5.34%	-0.03%	0.03%	0.22%	-0.09%	0.03%	0.12%	-0.03%	0.06%	-0.05%	0.03%
120W	-5.31%	0.01%	-0.04%	-0.09%	-0.15%	0.08%	0.04%	0.01%	-0.01%	-0.02%	-0.03%

**TRACKED VEHICLE MOMENT (IN KIP-FEET)**

SPAN LENGTH	30	35	40	45	50	55	60	70	80	90	100
40T	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.00%
50T	0.09%	-0.07%	-0.06%	0.05%	0.05%	0.04%	-0.04%	-0.03%	0.03%	-0.12%	-0.11%
60T	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
70T	0.06%	-0.05%	-0.04%	0.04%	0.64%	0.03%	0.03%	-0.11%	-0.10%	-0.09%	-0.08%
80T	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
90T	0.05%	-0.04%	-0.04%	-0.03%	0.03%	0.12%	-0.11%	-0.09%	-0.08%	-0.07%	-0.06%
100T	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
120T	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

**COMPARISON OF STANAG 21/FM 3-34.343 TABLE VALUES VS. CALCULATED VALUES**

**PERCENTAGE DIFFERENCE BTWN FM 3-34 VALUES AND CALCULATED VALUES (FOR ABSOLUTE MAX MOMENT)**

**WHEELED VEHICLE SHEAR (IN TONS)**

SPAN LENGTH	45	50	55	60	70	80	90	100	110	120	130
40W	-3.06%	-0.60%	-0.01%	-0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.01%	-0.01%
50W	0.00%	0.00%	-0.01%	0.01%	0.00%	0.00%	-0.01%	0.00%	0.01%	-0.01%	-0.01%
60W	-4.33%	-2.13%	-0.43%	0.01%	-0.01%	-0.01%	0.00%	0.00%	0.00%	0.01%	0.00%
70W	-5.91%	-3.27%	-1.23%	-0.01%	0.00%	0.00%	0.01%	0.00%	-0.01%	0.00%	-0.01%
80W	-11.56%	-8.09%	-5.42%	-3.31%	-0.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
90W	-11.56%	-8.09%	-5.42%	-3.31%	-0.18%	0.00%	0.00%	0.00%	0.01%	0.01%	0.00%
100W	-15.64%	-11.57%	-8.45%	-5.98%	-2.35%	0.00%	-0.01%	0.00%	0.00%	0.00%	0.00%
120W	-14.66%	-11.57%	-8.45%	-5.99%	-2.34%	0.02%	-0.03%	0.00%	0.04%	-0.04%	0.01%

**TRACKED VEHICLE SHEAR (IN TONS)**

SPAN LENGTH	30	35	40	45	50	55	60	70	80	90	100
40T	0.00%	0.01%	0.00%	-0.01%	0.00%	-0.01%	0.00%	0.00%	0.00%	0.01%	0.00%
50T	-0.01%	-0.01%	-0.01%	-0.01%	0.00%	0.00%	0.01%	-0.01%	-0.01%	0.00%	0.00%
60T	0.00%	0.00%	0.00%	-0.01%	0.00%	0.01%	0.00%	0.00%	0.00%	0.01%	0.36%
70T	0.00%	0.00%	-0.01%	0.01%	0.00%	-0.01%	0.00%	0.00%	0.00%	-0.01%	0.00%
80T	-0.01%	-0.01%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%
90T	0.00%	0.00%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
100T	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
120T	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.04%	0.00%	-0.03%	0.00%

**COMPARISON OF STANAG 21/FM 3-34.343 TABLE VALUES VS. CALCULATED VALUES**

**NEW INDEPENDENTLY CALCULATED VALUES (FOR ABSOLUTE MAX MOMENT)**

**WHEELED VEHICLE MOMENT (IN KIP-FEET)**

SPAN LENGTH	45	50	55	60	70	80	90	100	110	120	130
40W	670.4	787.8	905.2	1,022.6	1,257.5	1,492.5	1,727.4	1,962.4	2,197.3	2,432.3	2,667.3
50W	800.3	945.0	1,089.7	1,234.5	1,524.1	1,813.9	2,103.7	2,393.5	2,683.4	2,973.3	3,263.2
60W	914.4	1,088.7	1,263.1	1,437.6	1,786.8	2,136.2	2,485.7	2,835.3	3,185.0	3,534.8	3,884.6
70W	1,056.9	1,257.6	1,458.4	1,659.3	2,061.3	2,463.4	2,865.6	3,267.8	3,670.1	4,072.4	4,474.8
80W	1,103.3	1,332.0	1,560.9	1,790.0	2,248.6	2,707.5	3,166.7	3,626.0	4,085.4	4,545.0	5,004.6
90W	1,241.2	1,498.5	1,756.0	2,013.7	2,529.6	3,045.9	3,562.5	4,079.2	4,596.1	5,113.1	5,630.2
100W	1,257.1	1,542.6	1,828.5	2,114.7	2,687.6	3,261.0	3,834.8	4,408.8	4,983.0	5,557.3	6,131.8
120W	1,508.5	1,851.1	2,194.2	2,537.6	3,225.1	3,913.2	4,601.7	5,290.6	5,979.6	6,668.8	7,358.1

**TRACKED VEHICLE MOMENT (IN KIP-FEET)**

SPAN LENGTH	30	35	40	45	50	55	60	70	80	90	100
40T	480.0	580.0	680.0	780.0	880.0	980.0	1,080.0	1,280.0	1,480.0	1,680.0	1,880.0
50T	587.5	712.5	837.5	962.5	1,087.5	1,212.5	1,337.5	1,587.5	1,837.5	2,087.5	2,337.5
60T	690.0	840.0	990.0	1,140.0	1,290.0	1,440.0	1,590.0	1,890.0	2,190.0	2,490.0	2,790.0
70T	787.5	962.5	1,137.5	1,312.5	1,487.5	1,662.5	1,837.5	2,187.5	2,537.5	2,887.5	3,237.5
80T	880.0	1,080.0	1,280.0	1,480.0	1,680.0	1,880.0	2,080.0	2,480.0	2,880.0	3,280.0	3,680.0
90T	967.5	1,192.5	1,417.5	1,642.5	1,867.5	2,092.5	2,317.5	2,767.5	3,217.5	3,667.5	4,117.5
100T	1,050.0	1,300.0	1,550.0	1,800.0	2,050.0	2,300.0	2,550.0	3,050.0	3,550.0	4,050.0	4,550.0
120T	1,200.0	1,500.0	1,800.0	2,100.0	2,400.0	2,700.0	3,000.0	3,600.0	4,200.0	4,800.0	5,400.0

**COMPARISON OF STANAG 21/FM 3-34.343 TABLE VALUES VS. CALCULATED VALUES**

**NEW INDEPENDENTLY CALCULATED VALUES (FOR ABSOLUTE MAX MOMENT)**

**WHEELED VEHICLE SHEAR (IN TONS)**

SPAN LENGTH	45	50	55	60	70	80	90	100	110	120	130
40W	31.62	33.16	34.42	35.47	37.11	38.35	39.31	40.08	40.71	41.23	41.68
50W	40.31	42.08	43.53	44.73	46.63	48.05	49.16	50.04	50.76	51.37	51.88
60W	45.24	47.72	49.75	51.43	54.09	56.08	57.62	58.86	59.87	60.72	61.43
70W	50.79	53.76	56.19	58.22	61.40	63.79	65.64	67.13	68.35	69.36	70.22
80W	52.36	56.32	59.56	62.27	66.51	69.70	72.18	74.16	75.78	77.13	78.28
90W	58.90	63.36	67.01	70.05	74.83	78.41	81.20	83.43	85.25	86.78	88.06
100W	61.11	66.50	70.91	74.58	80.36	84.69	88.06	90.75	92.95	94.79	96.35
120W	73.33	79.80	85.09	89.50	96.43	101.63	105.67	108.90	111.55	113.75	115.62

**TRACKED VEHICLE SHEAR (IN TONS)**

SPAN LENGTH	30	35	40	45	50	55	60	70	80	90	100
40T	32.00	33.14	34.00	34.67	35.20	35.64	36.00	36.57	37.00	37.33	37.60
50T	39.17	40.71	41.88	42.78	43.50	44.09	44.58	45.36	45.94	46.39	46.75
60T	46.00	48.00	49.50	50.67	51.60	52.36	53.00	54.00	54.75	55.33	55.80
70T	52.50	55.00	56.88	58.33	59.50	60.45	61.25	62.50	63.44	64.17	64.75
80T	58.67	61.71	64.00	65.78	67.20	68.36	69.33	70.86	72.00	72.89	73.60
90T	64.50	68.14	70.88	73.00	74.70	76.09	77.25	79.07	80.44	81.50	82.35
100T	70.00	74.29	77.50	80.00	82.00	83.64	85.00	87.14	88.75	90.00	91.00
120T	80.00	85.71	90.00	93.33	96.00	98.18	100.00	102.86	105.00	106.67	108.00

**COMPARISON OF STANAG 21/FM 3-34.343 TABLE VALUES VS. CALCULATED VALUES**

**STANAG 21/FM 3-34.343 TABULATED VALUES**

**WHEELED VEHICLE MOMENT (IN KIP-FEET)**

SPAN LENGTH	45	50	55	60	70	80	90	100	110	120	130
40W	671.0	788.0	905.0	1,022.0	1,257.0	1,493.0	1,728.0	1,962.0	2,200	2,430	2,670
50W	800.0	945.0	1,090.0	1,235.0	1,525.0	1,814.0	2,100.0	2,390.0	2,680	2,970	3,260
60W	914.0	1,089.0	1,263.0	1,438.0	1,786.0	2,140.0	2,490.0	2,840.0	3,190	3,540	3,880
70W	1,057.0	1,257.0	1,458.0	1,658.0	2,060.0	2,460.0	2,870.0	3,270.0	3,670	4,070	4,470
80W	1,103.0	1,332.0	1,561.0	1,790.0	2,250.0	2,710.0	3,170.0	3,630.0	4,090	4,550	5,010
90W	1,242.0	1,499.0	1,757.0	2,010.0	2,530.0	3,050.0	3,560.0	4,080.0	4,600	5,110	5,630
100W	1,328.0	1,543.0	1,828.0	2,110.0	2,690.0	3,260.0	3,830.0	4,410.0	4,980	5,560	6,130
120W	1,593.0	1,851.0	2,195.0	2,540.0	3,230.0	3,910.0	4,600.0	5,290.0	5,980	6,670	7,360

**TRACKED VEHICLE MOMENT (IN KIP-FEET)**

SPAN LENGTH	30	35	40	45	50	55	60	70	80	90	100
40T	480.0	580.0	680.0	780.0	880.0	980.0	1,080.0	1,280.0	1,480	1,679	1,880
50T	587.0	713.0	838.0	962.0	1,087.0	1,212.0	1,338.0	1,588.0	1,837	2,090	2,340
60T	690.0	840.0	990.0	1,140.0	1,290.0	1,440.0	1,590.0	1,890.0	2,190	2,490	2,790
70T	787.0	963.0	1,138.0	1,312.0	1,478.0	1,662.0	1,837.0	2,190.0	2,540	2,890	3,240
80T	880.0	1,080.0	1,280.0	1,480.0	1,680.0	1,880.0	2,080.0	2,480.0	2,880	3,280	3,680
90T	967.0	1,193.0	1,418.0	1,643.0	1,867.0	2,090.0	2,320.0	2,770.0	3,220	3,670	4,120
100T	1,050.0	1,300.0	1,550.0	1,800.0	2,050.0	2,300.0	2,550.0	3,050.0	3,550	4,050	4,550
120T	1,200.0	1,500.0	1,800.0	2,100.0	2,400.0	2,700.0	3,000.0	3,600.0	4,200	4,800	5,400

**COMPARISON OF STANAG 21/FM 3-34.343 TABLE VALUES VS. CALCULATED VALUES**

**STANAG 21/FM 3-34.343 TABULATED VALUES**

**WHEELED VEHICLE SHEAR (IN TONS)**

SPAN LENGTH	45	50	55	60	70	80	90	100	110	120	130
40W	32.62	33.36	34.42	35.47	37.11	38.35	39.31	40.08	40.71	41.23	41.68
50W	40.31	42.08	43.53	44.73	46.63	48.05	49.16	50.04	50.76	51.37	51.88
60W	47.29	48.76	49.96	51.43	54.09	56.08	57.62	58.86	59.87	60.71	61.43
70W	53.98	55.58	56.89	58.22	61.40	63.79	65.64	67.13	68.35	69.36	70.22
80W	59.20	61.28	62.98	64.40	66.63	69.70	72.18	74.16	75.78	77.13	78.28
90W	66.60	68.94	70.85	72.45	74.96	78.41	81.20	83.43	85.25	86.77	88.06
100W	72.44	75.20	77.45	79.33	82.29	84.69	88.06	90.75	92.95	94.79	96.35
120W	85.93	90.24	92.94	95.20	98.74	101.60	105.70	108.90	111.50	113.80	115.60

**TRACKED VEHICLE SHEAR (IN TONS)**

SPAN LENGTH	30	35	40	45	50	55	60	70	80	90	100
40T	32.00	33.14	34.00	34.67	35.20	35.64	36.00	36.57	37.00	37.33	37.60
50T	39.17	40.72	41.88	42.78	43.50	44.09	44.58	45.36	45.94	46.39	46.75
60T	46.00	48.00	49.50	50.67	51.60	52.36	53.00	54.00	54.75	55.33	55.60
70T	52.50	55.00	56.88	58.33	59.50	60.46	61.25	62.50	63.44	64.17	64.75
80T	58.67	61.72	64.00	65.78	67.20	68.36	69.33	70.86	72.00	72.89	73.60
90T	64.50	68.14	70.88	73.00	74.70	76.09	77.25	79.07	80.44	81.50	82.35
100T	70.00	74.28	77.50	80.00	82.00	83.64	85.00	87.14	88.75	90.00	91.00
120T	80.00	85.71	90.00	93.33	96.00	98.18	100.00	102.90	105.00	106.70	108.00

**PERCENTAGE DIFFERENCE BTWN ABSOLUTE MAX MOMENT & MAX MOMENT FOR AXLE AT MIDSPAN**

Span Length, ft	Mid-span Location, ft	Hypothetical Vehicle Type							
		MLC 40W	MLC 50W	MLC 60W	MLC 70W	MLC 80W	MLC 90W	MLC 100W	MLC 120W
45	22.5	2.84%	5.06%	6.86%	5.31%	8.02%	8.02%	8.70%	8.70%
50	25	2.55%	4.55%	6.17%	4.78%	7.22%	7.22%	7.83%	7.83%
55	27.5	2.32%	4.14%	5.61%	4.35%	6.56%	6.56%	7.11%	7.11%
60	30	2.13%	3.79%	5.14%	3.99%	6.01%	6.01%	6.52%	6.52%
70	35	1.82%	3.25%	4.41%	3.42%	5.16%	5.16%	5.59%	5.59%
80	40	1.60%	2.84%	3.86%	2.99%	4.51%	4.51%	4.89%	4.89%
90	45	1.42%	2.53%	3.43%	2.66%	4.01%	4.01%	4.35%	4.35%
100	50	1.28%	2.28%	3.09%	2.39%	3.61%	3.61%	3.91%	3.91%
110	55	1.16%	2.07%	2.81%	2.17%	3.28%	3.28%	3.56%	3.56%
120	60	1.06%	1.90%	2.57%	1.99%	3.01%	3.01%	3.26%	3.26%
130	65	0.98%	1.75%	2.37%	1.84%	2.78%	2.78%	3.01%	3.01%
200	100	0.64%	1.14%	1.54%	1.20%	1.80%	1.80%	1.96%	1.96%
300	150	0.43%	0.76%	1.03%	0.80%	1.20%	1.20%	1.30%	1.30%
400	200	0.32%	0.57%	0.77%	0.60%	0.90%	0.90%	0.98%	0.98%
500	250	0.26%	0.46%	0.62%	0.48%	0.72%	0.72%	0.78%	0.78%
600	300	0.21%	0.38%	0.51%	0.40%	0.60%	0.60%	0.65%	0.65%
700	350	0.18%	0.33%	0.44%	0.34%	0.52%	0.52%	0.56%	0.56%
800	400	0.16%	0.28%	0.39%	0.30%	0.45%	0.45%	0.49%	0.49%
900	450	0.14%	0.25%	0.34%	0.27%	0.40%	0.40%	0.43%	0.43%
1000	500	0.13%	0.23%	0.31%	0.24%	0.36%	0.36%	0.39%	0.39%



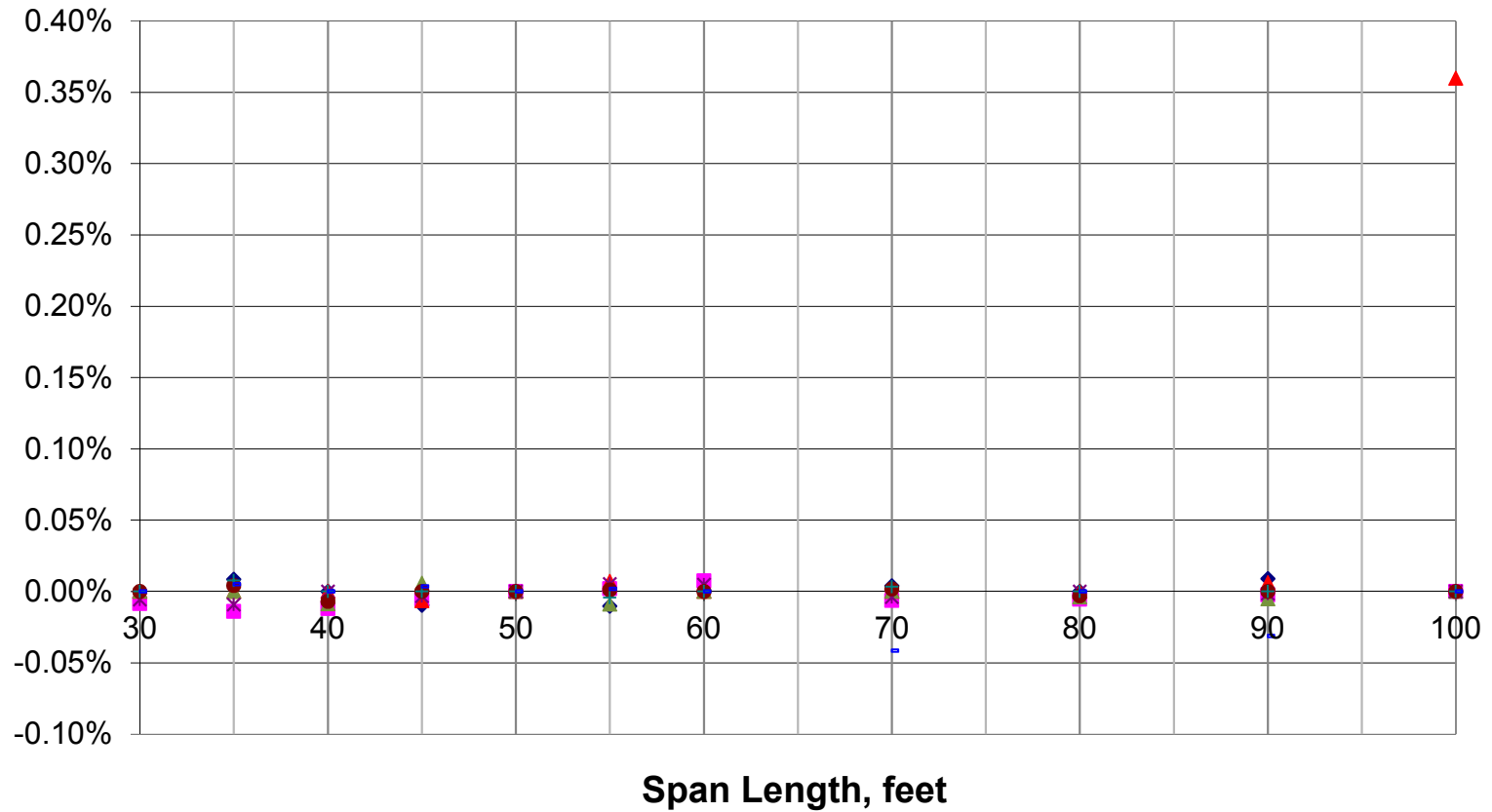
## **FIGURES**

- 5-11. Shear 40T-120T 30-100ft
- 5-12. Moment 40T-120T 30-100ft
- 5-13. Shear 40W-120W 45-130ft
- 5-14. AbsMaxM 40W-120W 45-130ft
- 5-15. MidspanM 40W-120W 45-130ft
- 5-16. % Diff MidM vs. AbsMaxM
- 5-17. % Diff AbsMaxM Pos v. Mid
- 5-16A. % Diff Moments 0-1000 ft
- 5-17A. %Diff MaxM v. Mid, 0-1000ft

**Comparison of STANAG 21/FM 3-34.343 Table Values vs. Calculated Values**

**TRACKED VEHICLE SHEAR  
 MLC 40T - 120T, 30' - 100' SPAN LENGTHS**

**Percent (%) Difference between FM 3-34.343 Values  
 and Calculated Values**

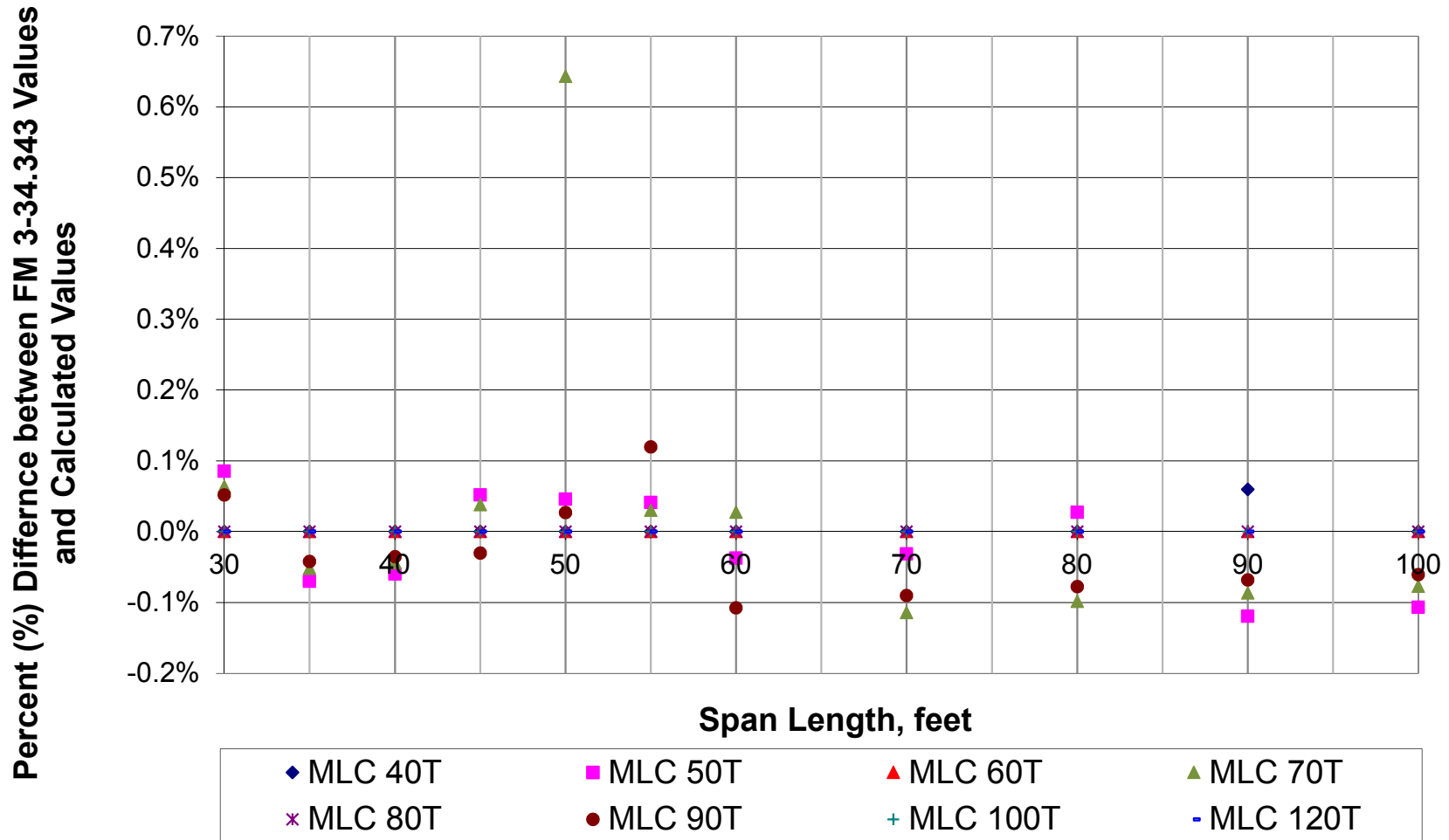


Source File: WP Parker 2019 UNO MSCE Appendix D. STANAG vs. Calculations Comparison.xlsx

Worksheet: 5-11. Shear 40T-120T 30-100ft

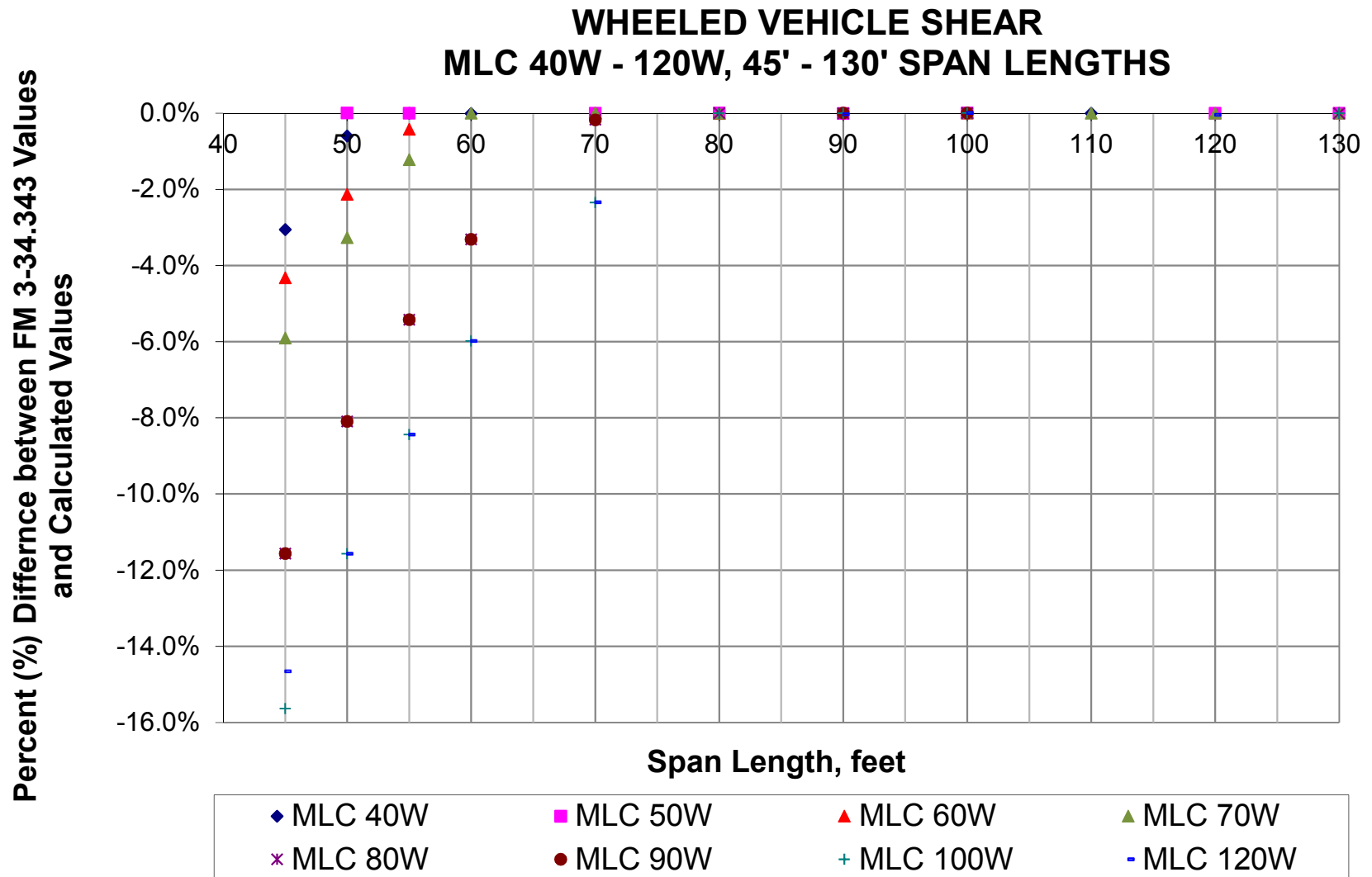
### Comparison of STANAG 21/FM 3-34.343 Table Values vs. Calculated Values

#### TRACKED VEHICLE MOMENT MLC 40T - 120T, 30' - 100' SPAN LENGTHS



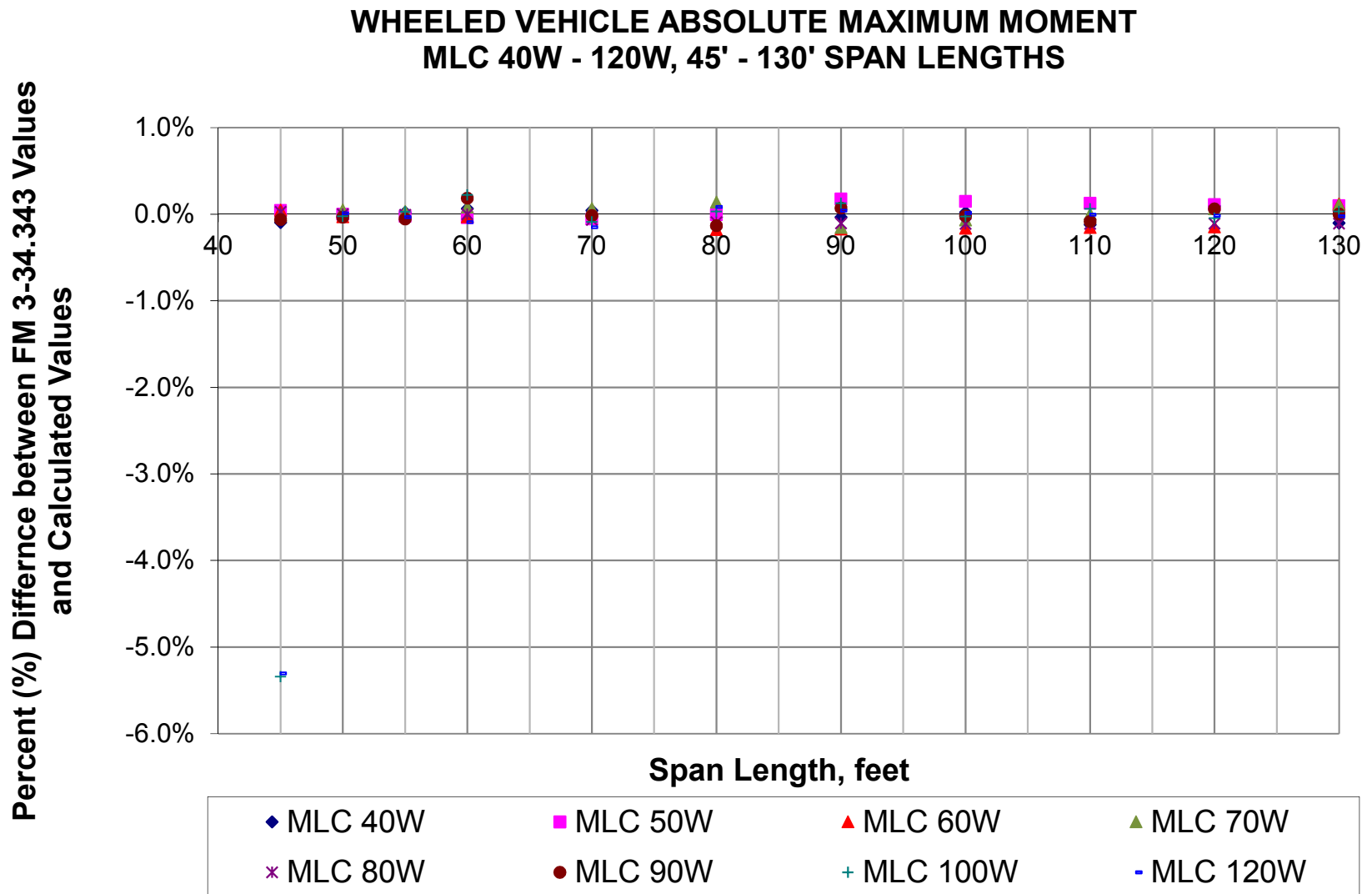
Source File: WP Parker 2019 UNO MSCE Appendix D. STANAG vs. Calculations Comparison.xlsx  
 Worksheet: 5-12. Moment 40T-120T 30-100ft

## Comparison of STANAG 21/FM 3-34.343 Table Values vs. Calculated Values



Source File: WP Parker 2019 UNO MSCE Appendix D. STANAG vs. Calculations Comparison.xlsx  
 Worksheet: 5-13. Shear 40W-120W 45-130ft

## Comparison of STANAG 21/FM 3-34.343 Table Values vs. Calculated Values



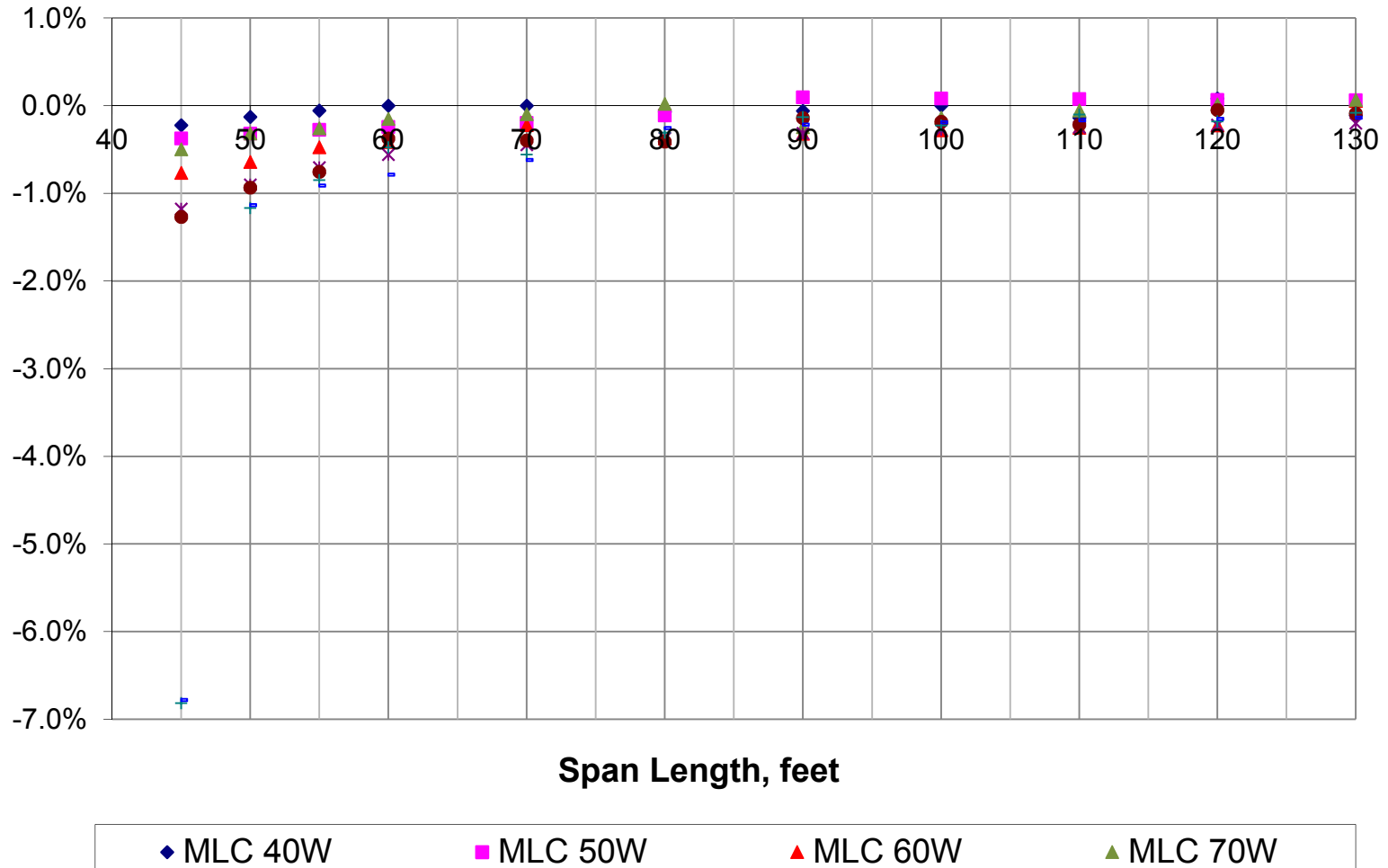
Source File: WP Parker 2019 UNO MSCE Appendix D. STANAG vs. Calculations Comparison.xlsx

Worksheet: 5-14. AbsMaxM 40W-120W 45-130ft

**Comparison of STANAG 21/FM 3-34.343 Table Values vs. Calculated Values**

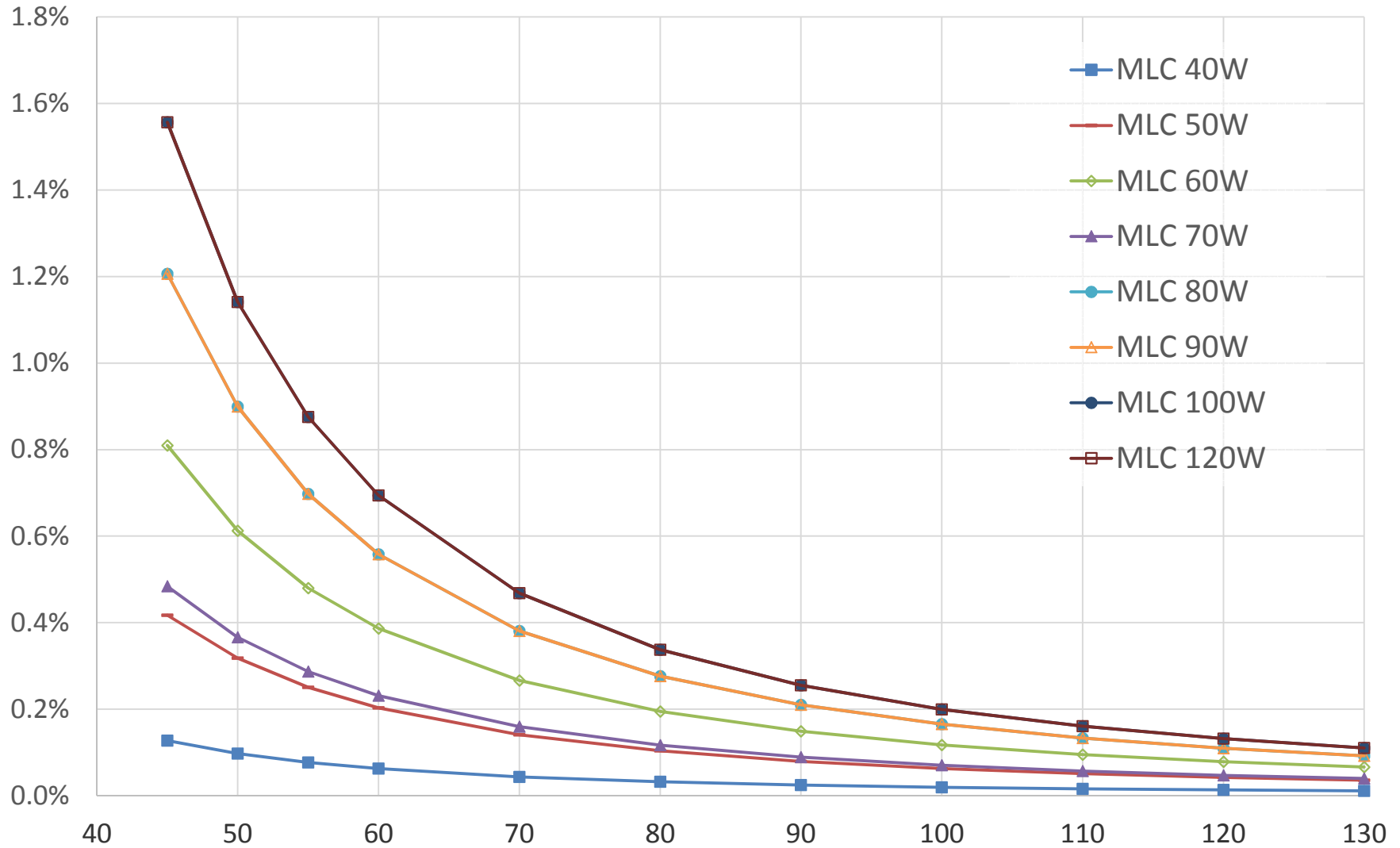
**WHEELED VEHICLE MAXIMUM MID-SPAN MOMENTS  
 MLC 40W - 120W, 45' - 130' SPAN LENGTHS**

Percent (%) Difference between FM 3-34.343 Values and  
 Calculated Values



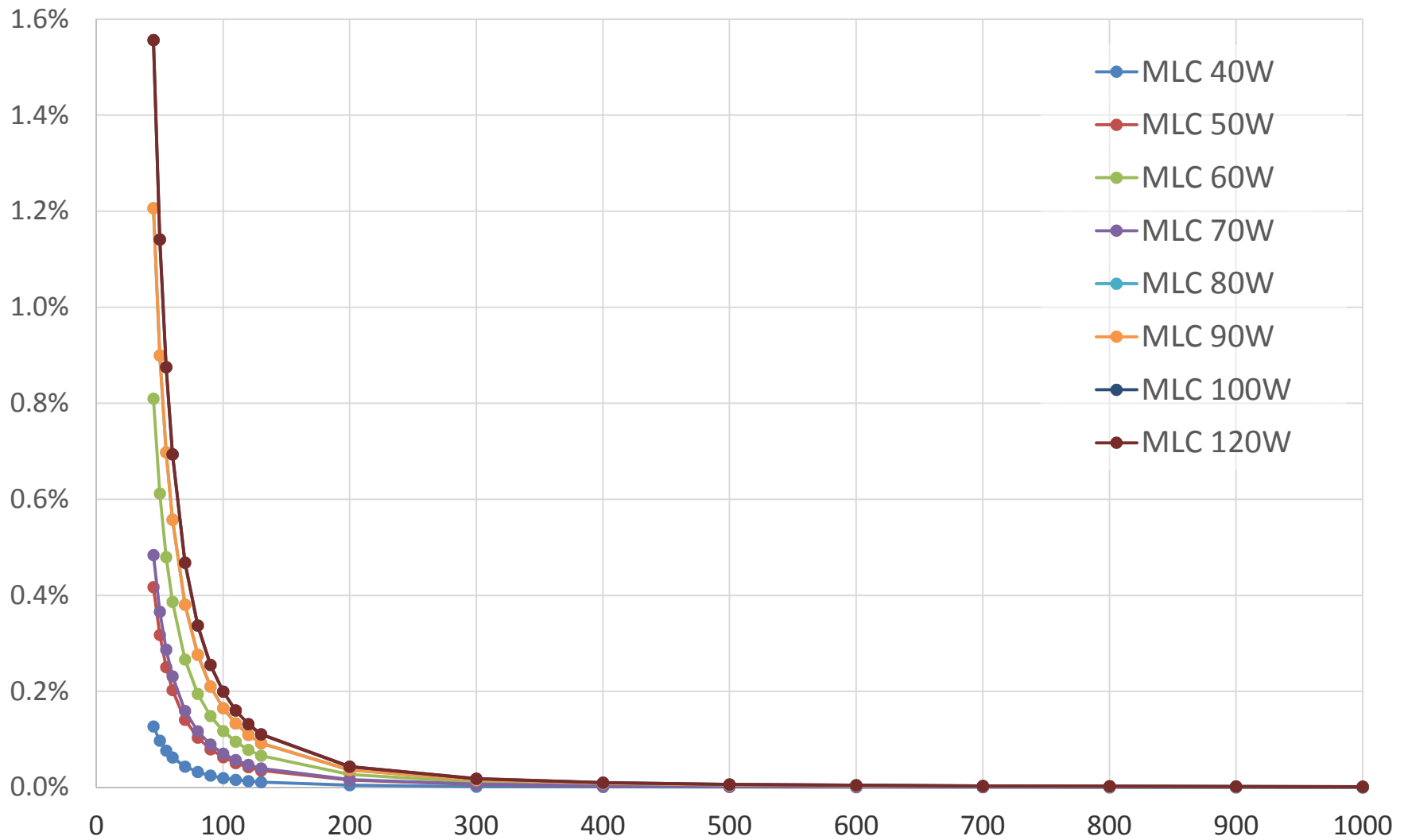
Source File: WP Parker 2019 UNO MSCE Appendix D: STANAG vs. Calculations Comparison.xlsx  
 Worksheet: 5-15.MidspanM 40W-120W 45-130ft

### Percent Difference between Mid-span Moment and Maximum Absolute Moment (ft-lbs/ft-lbs), Various MLC Wheeled Vehicles



Source file: WF Parker 2019 UNO MSCE Appendix D: STAAD vs. Calculations Comparison.xlsx  
Worksheet: 5-16. % Diff MidM vs. AbsMaxM

### Percent Difference between Mid-span Moment and Maximum Absolute Moment (ft-lbs/ft-lbs), Various MLC Wheeled Vehicles, 0-1,000 ft

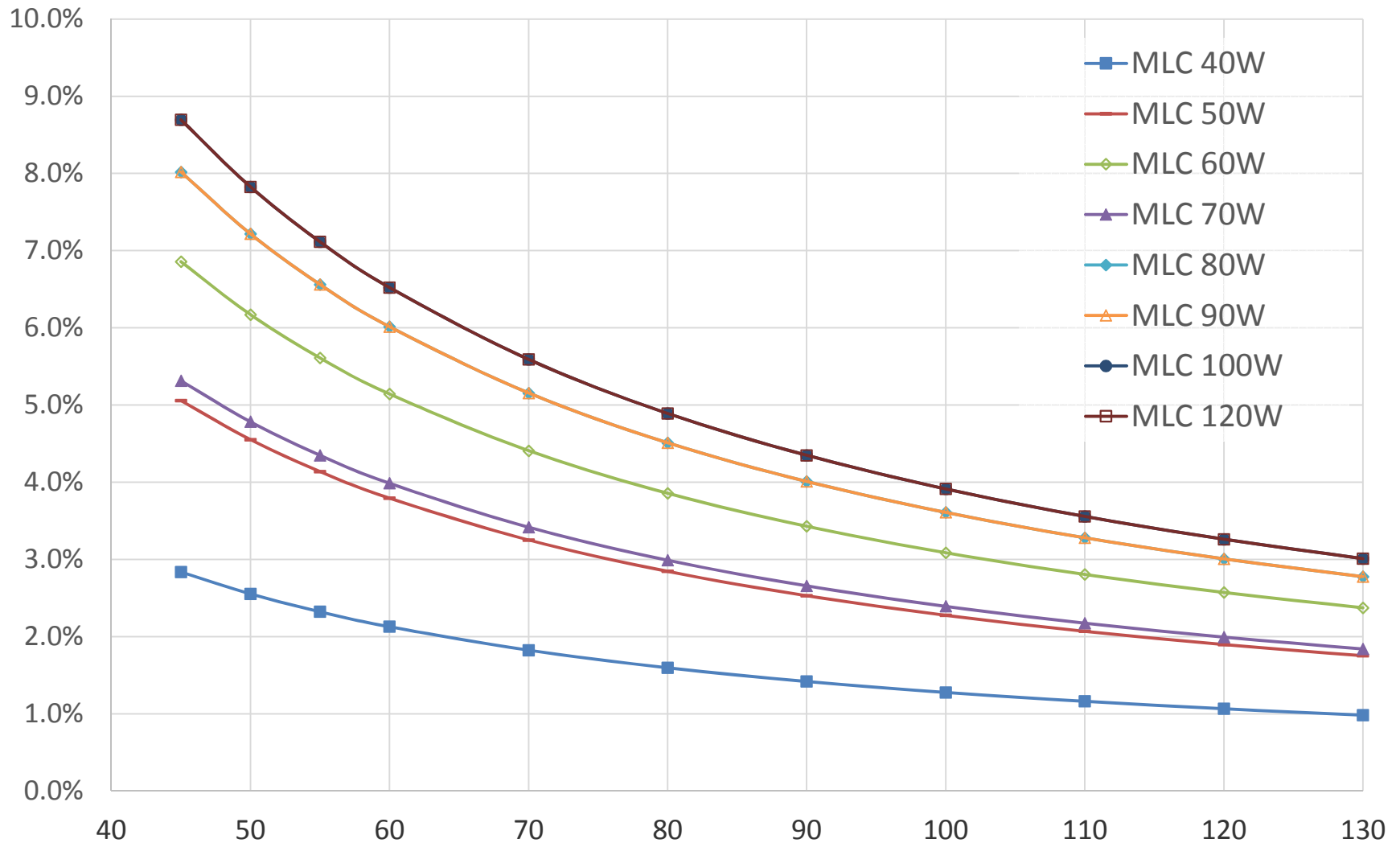


Source file: WF Parker 2019 UNO MSCE Appendix D: STANAG vs. Calculations Comparison.xlsx

Worksheet: 5-16A. % Diff Moments 0-1000 ft

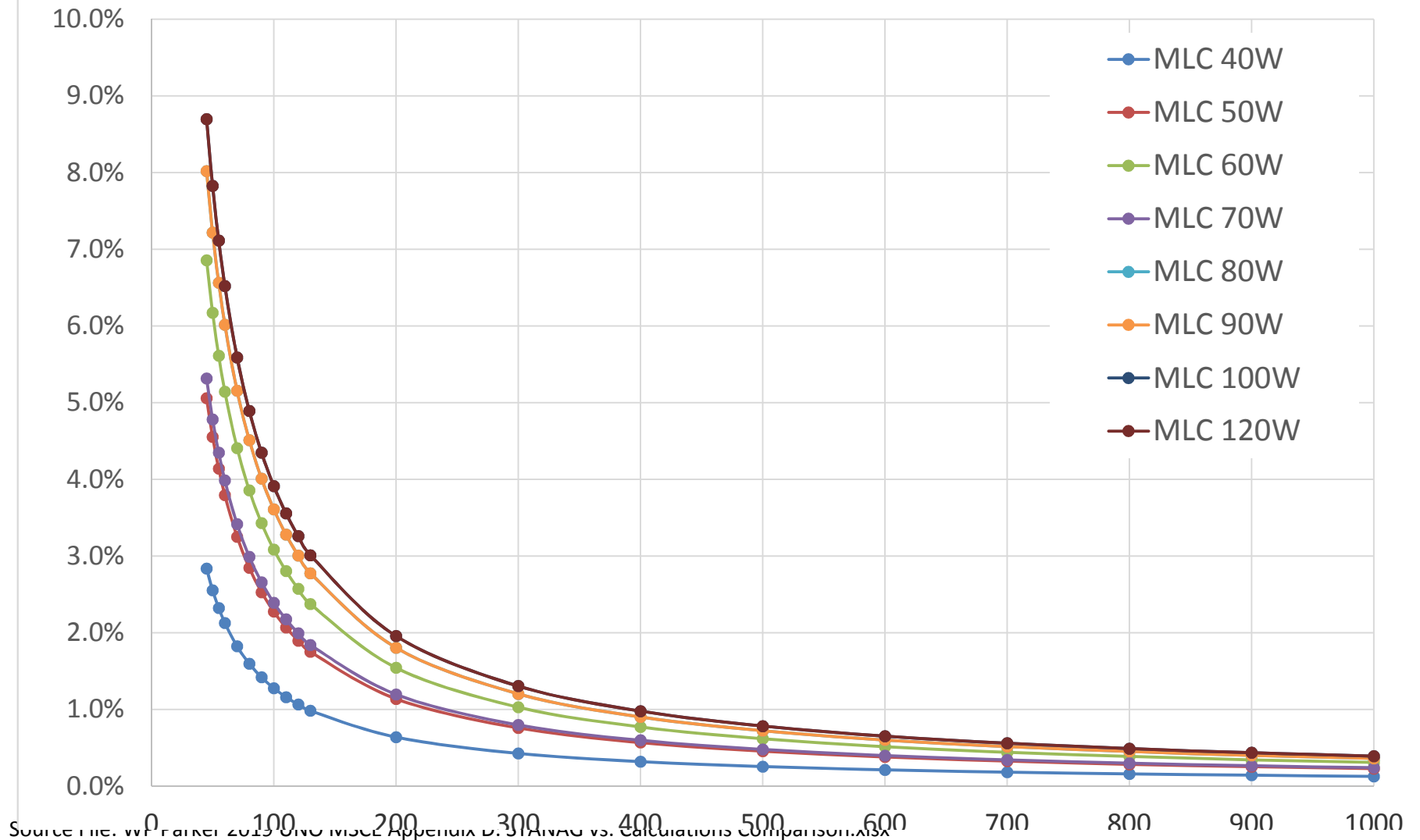


### Percent Difference in Span Location for Middle Axle at Maximum Midspan vs. Absolute Max, Various MLC Wheeled Vehicles



Source file: WF Parker 2019 UNO MSCE Appendix D: STAAD vs. Calculations Comparison.xlsx  
 Worksheet: 5-17. % Diff AbsMaxM Pos v. Mid

### Percent Difference in Span Location for Middle Axle at Maximum Midspan vs. Absolute Max, Various MLC Wheeled Vehicles, 0 - 1,000 ft



Source: Mr. W. Parker, 2019, UNO MLC Approach D. Span vs. Calculations Comparison, MSX  
 Worksheet: 5-17A.%Diff MaxM v.Mid,0-1000ft

**END OF APPENDIX D**

## APPENDIX E: AXLE AT MIDSPAN CALCULATIONS

Filename: WP Parker UNO 2019 MSCE Thesis Data - Appendix E. Axle at Midspan Calculations.xlsx

Contents (worksheets/tab names included in the Excel workbook are):

<u>Calculation Worksheets</u>	<u>Page</u>	<u>Figures</u>	<u>Page</u>
MLC Track Vehs,Max V-M, 50-1000	E-2		E-30
MLC 40W,Max V-M, 50-1000' spans	E-3	5-18. Shear, MLCs HL93 NoImpact	E-31
MLC 50W,Max V-M, 50-1000' spans	E-4	5-19.Moment, MLCs HL93 NoImpact	E-32
MLC 60W,Max V-M, 50-1000' spans	E-5	5-20.Shear, MLCs HL93 nrml No I	E-33
MLC 70W,Max V-M, 50-1000' spans	E-6	5-21.Moment,MLCs HL93 nrml No I	E-34
MLC 80W,Max V-M, 50-1000' spans	E-7	5-26. % diff,AbsMax v MidspnM	E-35
MLC 90W,Max V-M, 50-1000' spans	E-8	5-27. Shear,MLC 100W+HETs, No I	E-36
MLC 100W,Max V-M,50-1000' spans	E-9	5-28. Moment,MLC 100W+HETs,No I	E-37
MLC 120W,Max V-M,50-1000' spans	E-10	5-32. 1-3x MLC 100W V,w Impact	E-38
Uniform Loads,Max V-M,50-1000ft	E-11	5-33. 1-3x MLC 100W M,w Impact	E-39
HL93 NoImpact,Max V-M,50-1000ft	E-12	5-34. 1-3x MLC 100W Shear Nrml	E-40
HL93+Impact, Max V-M, 50-1000ft	E-13	5-35. 1-3x MLC 100W Moment Nrml	E-41
OHBD, Max V-M, 50-1000 ft	E-14	5-36. Misc Design Codes, Shear	E-42
CAN-CSA, Max V-M, 50-1000 ft	E-15	5-37. Misc Design Codes, Moment	E-43
Zhao Tabatabai,MaxVM,50-1000ft	E-.16	5-38. Design Codes, Shear, Nrml	E-44
Wis SPV,Max V-M,50-1000 ft	E-17	5-39. Design Codes, Moment,Nrml	E-45
STANAG HET,MaxMidspan,50-1K ft	E-18	5-40. 1-3MLC+SPVs Shear, Nrml	E-46
KS DOT HET,MaxMidspan,50-1K ft	E-20	5-41. 1-3MLC+SPVs Moment, Nrml	E-47
PropStdHET,MaxMidspan,50-1K ft	E-22	5-42. LADV11+70T Shear, Nrml	E-48
	E-24	5-43. LADV11+70T Moment, Nrml	E-49
		7-1. New Cond II Shear wLADV11	E-50
	E-26	7-2. New Cond II Moment wLADV11	E-51
<b>Tables</b>		7-3. New MFs Other LL, Shear	E-52
Analyses Results, All,Tabulated	E-27	7-4. New MFs Other LL, Moment	E-53
MaxVMmid,nrml HL93 noDyn, 50-1K	E-28		
HL93 vs ProStd HET+MLC100W	E-29		

## **CALCULATION WORKSHEETS**

MLC Track Vehs,Max V-M, 50-1000  
MLC 40W,Max V-M, 50-1000' spans  
MLC 50W,Max V-M, 50-1000' spans  
MLC 60W,Max V-M, 50-1000' spans  
MLC 70W,Max V-M, 50-1000' spans  
MLC 80W,Max V-M, 50-1000' spans  
MLC 90W,Max V-M, 50-1000' spans  
MLC 100W,Max V-M,50-1000' spans  
MLC 120W,Max V-M,50-1000' spans  
Uniform Loads,Max V-M,50-1000ft  
HL93 NoImpact,Max V-M,50-1000ft  
HL93+Impact, Max V-M, 50-1000ft  
OHBD, Max V-M, 50-1000 ft  
CAN-CSA, Max V-M, 50-1000 ft  
Zhao Tabatabai,MaxVM,50-1000ft  
Wis SPV,Max V-M,50-1000 ft  
STANAG HET,MaxMidspan,50-1K ft  
KS DOT HET,MaxMidspan,50-1K ft  
PropStdHET,MaxMidspan,50-1K ft

**TRACKED VEHICLES** **FM3.34-343 (STANAG 21) Hypothetical Tracked Vehicles, 40T - 120T, Calculation of Maximum Shear and Moment, 50'- 1,000' Spans**

MLC 40T			
Vehicle Weight		Load (ST)	Load (kips)
40		40	80
Track Length		12 feet	
Track Distributed Load		6.667 kips per ft	
MAX SHEAR		MAX MOMENT	
Span Length	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
50.00	9.60	70.40	880
100.00	4.80	75.20	1,880
200.00	2.40	77.60	3,880
300.00	1.60	78.40	5,880
400.00	1.20	78.80	7,880
500.00	0.96	79.04	9,880
600.00	0.80	79.20	11,880
700.00	0.69	79.31	13,880
800.00	0.60	79.40	15,880
900.00	0.53	79.47	17,880
1,000.00	0.48	79.52	19,880

MLC 50T			
Vehicle Weight		Load (ST)	Load (kips)
50		50	100
Track Length		13 feet	
Track Distributed Load		7.692 kips per ft	
MAX SHEAR		MAX MOMENT	
Span Length	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
50.00	13.00	87.00	1,088
100.00	6.50	93.50	2,338
200.00	3.25	96.75	4,838
300.00	2.17	97.83	7,338
400.00	1.63	98.38	9,838
500.00	1.30	98.70	12,338
600.00	1.08	98.92	14,838
700.00	0.93	99.07	17,338
800.00	0.81	99.19	19,838
900.00	0.72	99.28	22,338
1,000.00	0.65	99.35	24,838

MLC 60T			
Vehicle Weight		Load (ST)	Load (kips)
60		60	120
Track Length		14 feet	
Track Distributed Load		8.571 kips per ft	
MAX SHEAR		MAX MOMENT	
Span Length	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
50.00	16.80	103.20	1,290
100.00	8.40	111.60	2,790
200.00	4.20	115.80	5,790
300.00	2.80	117.20	8,790
400.00	2.10	117.90	11,790
500.00	1.68	118.32	14,790
600.00	1.40	118.60	17,790
700.00	1.20	118.80	20,790
800.00	1.05	118.95	23,790
900.00	0.93	119.07	26,790
1,000.00	0.84	119.16	29,790

MLC 70T			
Vehicle Weight		Load (ST)	Load (kips)
70		70	140
Track Length		15 feet	
Track Distributed Load		9.333 kips per ft	
MAX SHEAR		MAX MOMENT	
Span Length	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
50.00	21.00	119.00	1,488
100.00	10.50	129.50	3,238
200.00	5.25	134.75	6,738
300.00	3.50	136.50	10,238
400.00	2.63	137.38	13,738
500.00	2.10	137.90	17,238
600.00	1.75	138.25	20,738
700.00	1.50	138.50	24,238
800.00	1.31	138.69	27,738
900.00	1.17	138.83	31,238
1,000.00	1.05	138.95	34,738

MLC 80T			
Vehicle Weight		Load (ST)	Load (kips)
80		80	160
Track Length		16 feet	
Track Distributed Load		10.000 kips per ft	
MAX SHEAR		MAX MOMENT	
Span Length	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
50.00	25.60	134.40	1,680
100.00	12.80	147.20	3,680
200.00	6.40	153.60	7,680
300.00	4.27	155.73	11,680
400.00	3.20	156.80	15,680
500.00	2.56	157.44	19,680
600.00	2.13	157.87	23,680
700.00	1.83	158.17	27,680
800.00	1.60	158.40	31,680
900.00	1.42	158.58	35,680
1,000.00	1.28	158.72	39,680

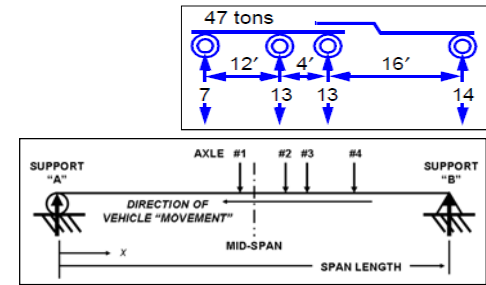
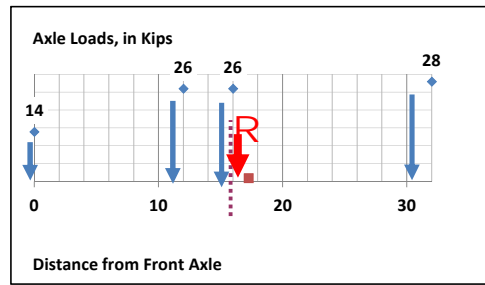
MLC 90T			
Vehicle Weight		Load (ST)	Load (kips)
90		90	180
Track Length		17 feet	
Track Distributed Load		10.588 kips per ft	
MAX SHEAR		MAX MOMENT	
Span Length	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
50.00	30.60	149.40	1,868
100.00	15.30	164.70	4,118
200.00	7.65	172.35	8,618
300.00	5.10	174.90	13,118
400.00	3.83	176.18	17,618
500.00	3.06	176.94	22,118
600.00	2.55	177.45	26,618
700.00	2.19	177.81	31,118
800.00	1.91	178.09	35,618
900.00	1.70	178.30	40,118
1,000.00	1.53	178.47	44,618

MLC 100T			
Vehicle Weight		Load (ST)	Load (kips)
100		100	200
Track Length		18 feet	
Track Distributed Load		11.111 kips per ft	
MAX SHEAR		MAX MOMENT	
Span Length	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
50.00	36.00	164.00	2,050
100.00	18.00	182.00	4,550
200.00	9.00	191.00	9,550
300.00	6.00	194.00	14,550
400.00	4.50	195.50	19,550
500.00	3.60	196.40	24,550
600.00	3.00	197.00	29,550
700.00	2.57	197.43	34,550
800.00	2.25	197.75	39,550
900.00	2.00	198.00	44,550
1,000.00	1.80	198.20	49,550

MLC 120T			
Vehicle Weight		Load (ST)	Load (kips)
120		120	240
Track Length		20 feet	
Track Distributed Load		12.000 kips per ft	
MAX SHEAR		MAX MOMENT	
Span Length	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
50.00	48.00	192.00	2,400
100.00	24.00	216.00	5,400
200.00	12.00	228.00	11,400
300.00	8.00	232.00	17,400
400.00	6.00	234.00	23,400
500.00	4.80	235.20	29,400
600.00	4.00	236.00	35,400
700.00	3.43	236.57	41,400
800.00	3.00	237.00	47,400
900.00	2.67	237.33	53,400
1,000.00	2.40	237.60	59,400

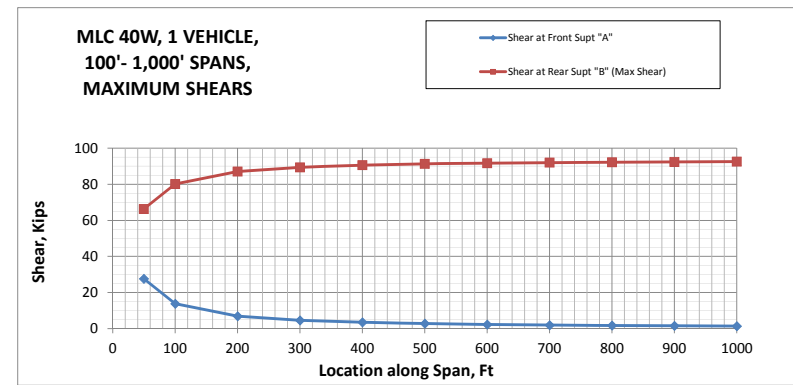
**FOUR (4) AXLE** FM3.34-343 (STANAG 21) One (1x) Hypothetical MLC 40W Vehicle, Calculation of Maximum Shear and Moment, 50'- 1,000' Spans

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	7.0	14.0		0.0	62.28	0
2	13.0	26.0	12.0	12.0	115.65	366
3	13.0	26.0	4.0	16.0	115.65	488
(Rear) 4	14.0	28.0	16.0	32.0	124.55	975
<b>Totals</b>	<b>47.0</b>	<b>94.0</b>	<b>32.0</b>		<b>355.86</b>	
				<b>Resultant at location:</b>	<b>17.277</b>	<b>527</b>
				<b>Distance to Nearest Axle, "xR":</b>	<b>1.277</b>	<b>(Rear of Axle # 3)</b>

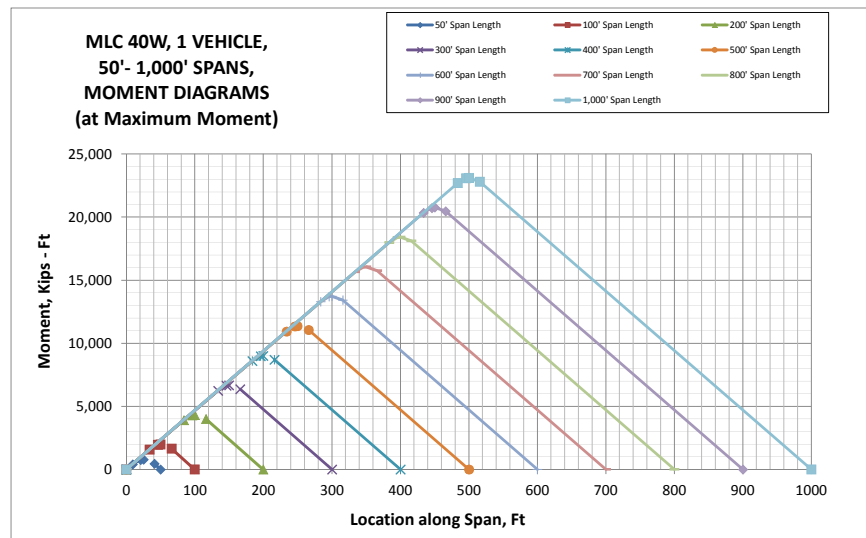


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Rear #4 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	LEND
ft	ft	ft	ft	ft	ft
50.00	9.00	21.00	25.00	41.00	9.00
100.00	34.00	46.00	50.00	66.00	34.00
200.00	84.00	96.00	100.00	116.00	84.00
300.00	134.00	146.00	150.00	166.00	134.00
400.00	184.00	196.00	200.00	216.00	184.00
500.00	234.00	246.00	250.00	266.00	234.00
600.00	284.00	296.00	300.00	316.00	284.00
700.00	334.00	346.00	350.00	366.00	334.00
800.00	384.00	396.00	400.00	416.00	384.00
900.00	434.00	446.00	450.00	466.00	434.00
1000.00	484.00	496.00	500.00	516.00	484.00

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
27.68	66.32
13.84	80.16
6.92	87.08
4.61	89.39
3.46	90.54
2.77	91.23
2.31	91.69
1.98	92.02
1.73	92.27
1.54	92.46
1.38	92.62

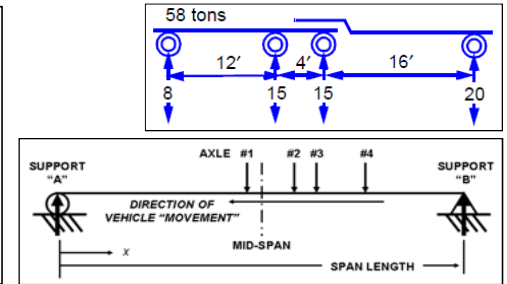
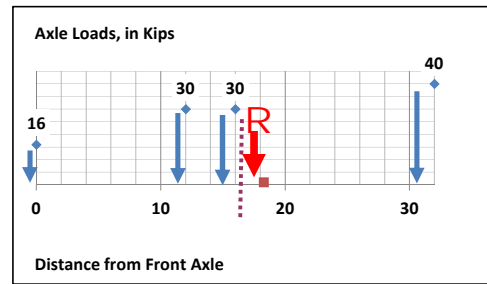


MOMENT							
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at React B, ft-kips
50	Moment	0.0	401.40	768.60	787.00	444.60	0.0
	Axle Location on Span	0.00	9.00	21.00	25.00	41.00	50.00
100	Moment	0.0	1,557.20	1,938.80	1,962.00	1,638.80	0.0
	Axle Location on Span	0.00	34.00	46.00	50.00	66.00	100.00
200	Moment	0.0	3,897.60	4,286.40	4,312.00	3,998.40	0.0
	Axle Location on Span	0.00	84.00	96.00	100.00	116.00	200.00
300	Moment	0.0	6,244.40	6,635.60	6,662.00	6,351.60	0.0
	Axle Location on Span	0.00	134.00	146.00	150.00	166.00	300.00
400	Moment	0.0	8,592.80	8,985.20	9,012.00	8,703.20	0.0
	Axle Location on Span	0.00	184.00	196.00	200.00	216.00	400.00
500	Moment	0.0	10,941.84	11,334.96	11,362.00	11,054.16	0.0
	Axle Location on Span	0.00	234.00	246.00	250.00	266.00	500.00
600	Moment	0.0	13,291.20	13,684.80	13,712.00	13,404.80	0.0
	Axle Location on Span	0.00	284.00	296.00	300.00	316.00	600.00
700	Moment	0.0	15,640.74	16,034.69	16,062.00	15,755.26	0.0
	Axle Location on Span	0.00	334.00	346.00	350.00	366.00	700.00
800	Moment	0.0	17,990.40	18,384.60	18,412.00	18,105.60	0.0
	Axle Location on Span	0.00	384.00	396.00	400.00	416.00	800.00
900	Moment	0.0	20,340.13	20,734.53	20,762.00	20,455.87	0.0
	Axle Location on Span	0.00	434.00	446.00	450.00	466.00	900.00
1,000	Moment	0.0	22,689.92	23,084.48	23,112.00	22,806.08	0.0
	Axle Location on Span	0.00	484.00	496.00	500.00	516.00	1000.00



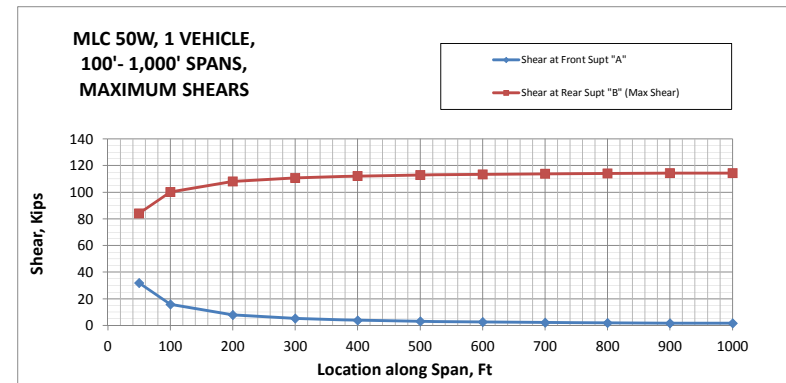
**FOUR (4) AXLE** FM3.34-343 (STANAG 21) One (1x) Hypothetical MLC 50W Vehicle, Calculation of Maximum Shear and Moment, 50'- 1,000' Spans

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	8.0	16.0		0.0	71.17	0
2	15.0	30.0	12.0	12.0	133.45	366
3	15.0	30.0	4.0	16.0	133.45	488
(Rear) 4	20.0	40.0	16.0	32.0	177.93	975
<b>Totals</b>	<b>58.0</b>	<b>116.0</b>	<b>32.0</b>		<b>444.82</b>	<b>557</b>
				Resultant at location:	18.276	
				Distance to Nearest Axle, "xR":	2.276	(Rear of Axle # 3)

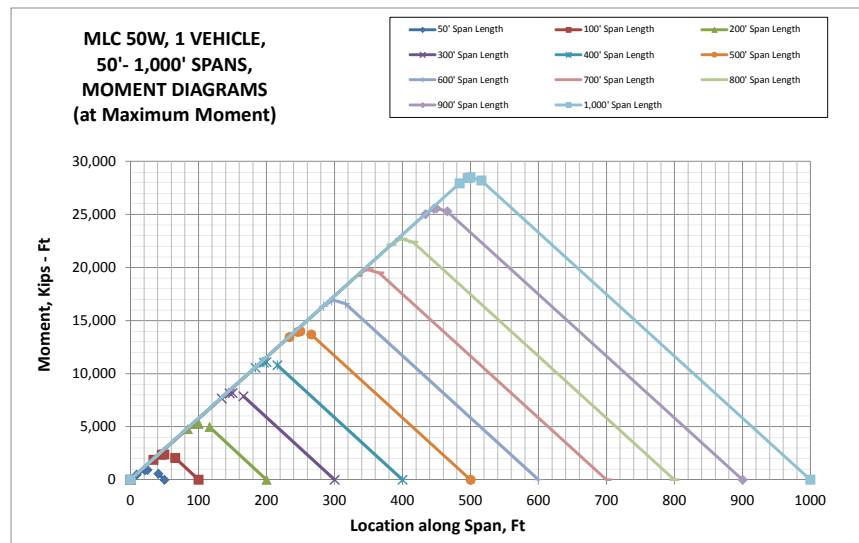


Span Length	Front #1 Axle	Middle #2	Middle #3	Rear #4 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	
50.00	9.00	21.00	25.00	41.00	9.00
100.00	34.00	46.00	50.00	66.00	34.00
200.00	84.00	96.00	100.00	116.00	84.00
300.00	134.00	146.00	150.00	166.00	134.00
400.00	184.00	196.00	200.00	216.00	184.00
500.00	234.00	246.00	250.00	266.00	234.00
600.00	284.00	296.00	300.00	316.00	284.00
700.00	334.00	346.00	350.00	366.00	334.00
800.00	384.00	396.00	400.00	416.00	384.00
900.00	434.00	446.00	450.00	466.00	434.00
1000.00	484.00	496.00	500.00	516.00	484.00

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
31.84	84.16
15.92	100.08
7.96	108.04
5.31	110.69
3.98	112.02
3.18	112.82
2.65	113.35
2.27	113.73
1.99	114.01
1.77	114.23
1.59	114.41



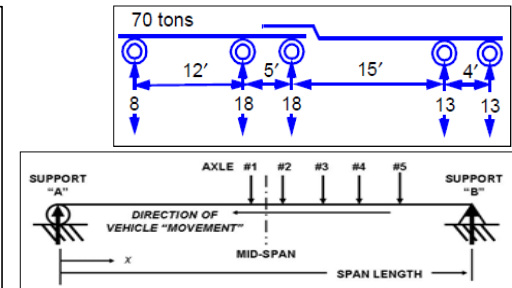
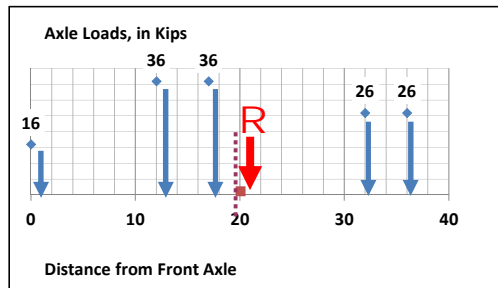
MOMENT							
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at React B, ft-kips
50	Moment	0.0	474.48	915.12	942.00	569.52	0.0
	Axle Location on Span	0.00	9.00	21.00	25.00	41.00	50.00
100	Moment	0.0	1,882.24	2,354.56	2,392.00	2,061.76	0.0
	Axle Location on Span	0.00	34.00	46.00	50.00	66.00	100.00
200	Moment	0.0	4,761.12	5,249.28	5,292.00	4,982.88	0.0
	Axle Location on Span	0.00	84.00	96.00	100.00	116.00	200.00
300	Moment	0.0	7,654.08	8,147.52	8,192.00	7,889.92	0.0
	Axle Location on Span	0.00	134.00	146.00	150.00	166.00	300.00
400	Moment	0.0	10,550.56	11,046.64	11,092.00	10,793.44	0.0
	Axle Location on Span	0.00	184.00	196.00	200.00	216.00	400.00
500	Moment	0.0	13,448.45	13,946.11	13,992.00	13,695.55	0.0
	Axle Location on Span	0.00	234.00	246.00	250.00	266.00	500.00
600	Moment	0.0	16,347.04	16,845.76	16,892.00	16,596.96	0.0
	Axle Location on Span	0.00	284.00	296.00	300.00	316.00	600.00
700	Moment	0.0	19,246.03	19,745.51	19,792.00	19,497.97	0.0
	Axle Location on Span	0.00	334.00	346.00	350.00	366.00	700.00
800	Moment	0.0	22,145.28	22,645.32	22,692.00	22,398.72	0.0
	Axle Location on Span	0.00	384.00	396.00	400.00	416.00	800.00
900	Moment	0.0	25,044.69	25,545.17	25,592.00	25,299.31	0.0
	Axle Location on Span	0.00	434.00	446.00	450.00	466.00	900.00
1,000	Moment	0.0	27,944.22	28,445.06	28,492.00	28,199.78	0.0
	Axle Location on Span	0.00	484.00	496.00	500.00	516.00	1,000.00





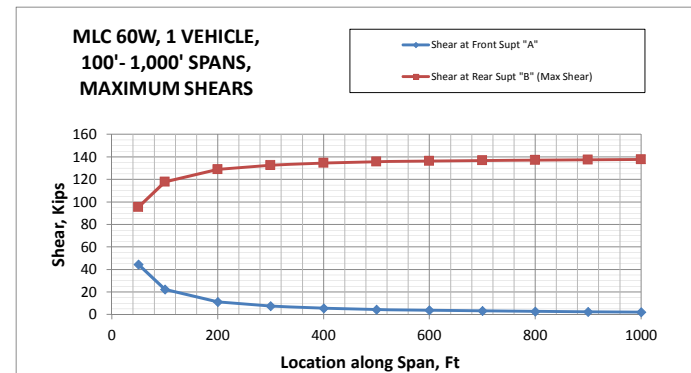
**FIVE (5) AXLE FM3.34-343 (STANAG 21) One (1x) Hypothetical MLC 60W Vehicle, Calculation of Maximum Shear and Moment, 50'- 1,000' Spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	8.0	16.0		0.0	71.17	0
2	18.0	36.0	12.0	12.0	160.14	366
3	18.0	36.0	5.0	17.0	160.14	518
4	13.0	26.0	15.0	32.0	115.65	975
(Rear) 5	13.0	26.0	4.0	36.0	115.65	1097
<b>Totals</b>	<b>70.0</b>	<b>140.0</b>	<b>36.0</b>		<b>551.58</b>	
		Resultant at location:		20.086		612
		Distance to Nearest Axle, "xR":		3.086	(Rear of Axle # 3)	

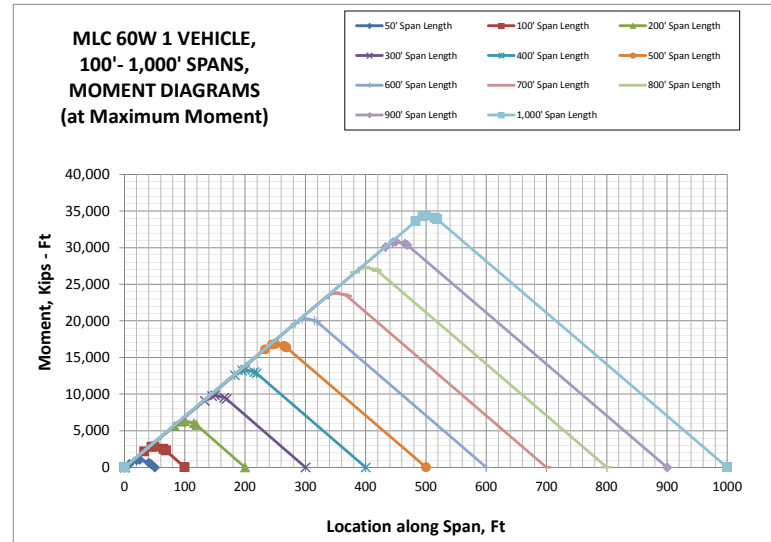


Span Length	Front #1 Axle		Middle #2 Axle		Middle #3 Axle		Middle #4 Axle		Rear #5 Axle		Dist to Beam End
	L	AX 1	AX 2	AX 3	AX 4	AX 5	AX 4	AX 5	L END		
50.00	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
50.00		8.00	20.00	25.00	40.00	44.00	61.00	61.00	61.00	61.00	61.00
100.00		33.00	45.00	50.00	65.00	69.00	86.00	86.00	86.00	86.00	86.00
200.00		83.00	95.00	100.00	115.00	119.00	136.00	136.00	136.00	136.00	136.00
300.00		133.00	145.00	150.00	165.00	169.00	186.00	186.00	186.00	186.00	186.00
400.00		183.00	195.00	200.00	215.00	219.00	236.00	236.00	236.00	236.00	236.00
500.00		233.00	245.00	250.00	265.00	269.00	286.00	286.00	286.00	286.00	286.00
600.00		283.00	295.00	300.00	315.00	319.00	336.00	336.00	336.00	336.00	336.00
700.00		333.00	345.00	350.00	365.00	369.00	386.00	386.00	386.00	386.00	386.00
800.00		383.00	395.00	400.00	415.00	419.00	436.00	436.00	436.00	436.00	436.00
900.00		433.00	445.00	450.00	465.00	469.00	486.00	486.00	486.00	486.00	486.00
1000.00		483.00	495.00	500.00	515.00	519.00	536.00	536.00	536.00	536.00	536.00

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
44.56	95.44
22.28	117.72
11.14	128.86
7.43	132.57
5.57	134.43
4.46	135.54
3.71	136.29
3.18	136.82
2.79	137.22
2.48	137.52
2.23	137.77

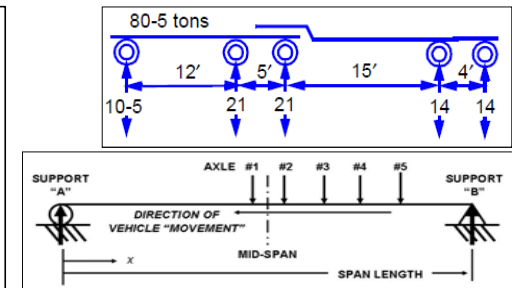
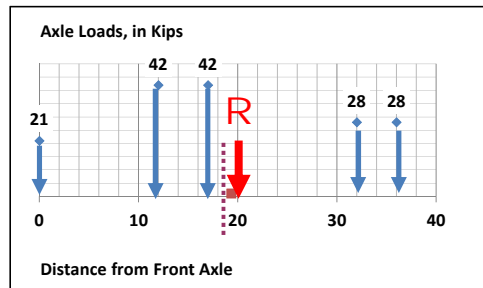


MOMENT								
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
50	Moment	0.0	490.88	1,035.20	1,082.00	682.40	471.84	0.0
	Axle Location on Span	0.00	8.00	20.00	25.00	40.00	44.00	50.00
100	Moment	0.0	2,167.44	2,763.60	2,832.00	2,497.20	2,303.92	0.0
	Axle Location on Span	0.00	33.00	45.00	50.00	65.00	69.00	100.00
200	Moment	0.0	5,630.72	6,252.80	6,332.00	6,029.60	5,844.96	0.0
	300 ation on Span	0.00	83.00	95.00	100.00	115.00	119.00	200.00
300	Moment	0.0	9,118.48	9,749.20	9,832.00	9,540.40	9,358.64	0.0
	500 ation on Span	0.00	133.00	145.00	150.00	165.00	169.00	300.00
400	Moment	0.0	12,612.36	13,247.40	13,332.00	13,045.80	12,865.48	0.0
	Axle Location on Span	0.00	183.00	195.00	200.00	215.00	219.00	400.00
500	Moment	0.0	16,108.69	16,746.32	16,832.00	16,549.04	16,369.58	0.0
	Axle Location on Span	0.00	233.00	245.00	250.00	265.00	269.00	500.00
600	Moment	0.0	19,606.24	20,245.60	20,332.00	20,051.20	19,872.32	0.0
	Axle Location on Span	0.00	283.00	295.00	300.00	315.00	319.00	600.00
700	Moment	0.0	23,104.49	23,745.09	23,832.00	23,552.74	23,374.27	0.0
	Axle Location on Span	0.00	333.00	345.00	350.00	365.00	369.00	700.00
800	Moment	0.0	26,603.18	27,244.70	27,332.00	27,053.90	26,875.74	0.0
	Axle Location on Span	0.00	383.00	395.00	400.00	415.00	419.00	800.00
900	Moment	0.0	30,102.16	30,744.40	30,832.00	30,554.80	30,376.88	0.0
	Axle Location on Span	0.00	433.00	445.00	450.00	465.00	469.00	900.00
1,000	Moment	0.0	33,601.34	34,244.16	34,332.00	34,055.52	33,877.79	0.0
	Axle Location on Span	0.00	483.00	495.00	500.00	515.00	519.00	1,000.00



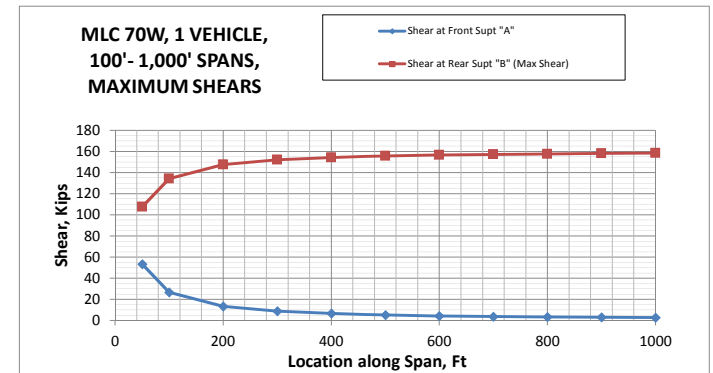
**FIVE (5) AXLE FM3.34-343 (STANAG 21) One (1x) Hypothetical MLC 70W Vehicle, Calculation of Maximum Shear and Moment, 50'- 1,000' Spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.5	21.0		0.0	93.41	0
2	21.0	42.0	12.0	12.0	186.83	366
3	21.0	42.0	5.0	17.0	186.83	518
4	14.0	28.0	15.0	32.0	124.55	975
(Rear) 5	14.0	28.0	4.0	36.0	124.55	1097
<b>Totals</b>	<b>80.5</b>	<b>161.0</b>	<b>36.0</b>		<b>622.75</b>	
		Resultant at location:		19.391		591
		Distance to Nearest Axle, "xR":		2.391	(Rear of Axle # 3)	

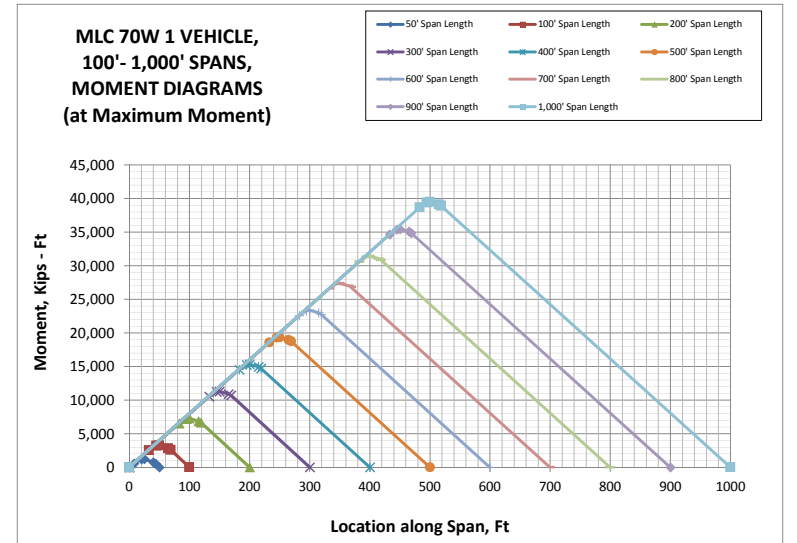


Span Length	Front #1 Axle	Middle #2	Middle #3	Middle #4	Rear #5 Axle	Dist to Beam
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
50.00	8.00	20.00	25.00	40.00	44.00	6.00
100.00	33.00	45.00	50.00	65.00	69.00	31.00
200.00	83.00	95.00	100.00	115.00	119.00	81.00
300.00	133.00	145.00	150.00	165.00	169.00	131.00
400.00	183.00	195.00	200.00	215.00	219.00	181.00
500.00	233.00	245.00	250.00	265.00	269.00	231.00
600.00	283.00	295.00	300.00	315.00	319.00	281.00
700.00	333.00	345.00	350.00	365.00	369.00	331.00
800.00	383.00	395.00	400.00	415.00	419.00	381.00
900.00	433.00	445.00	450.00	465.00	469.00	431.00
1000.00	483.00	495.00	500.00	515.00	519.00	481.00

MAX SHEAR	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
	Vmax A	Vmax B
	kips	kips
50.00	53.48	107.52
100.00	26.74	134.26
200.00	13.37	147.63
300.00	8.91	152.09
400.00	6.69	154.32
500.00	5.35	155.65
600.00	4.46	156.54
700.00	3.82	157.18
800.00	3.34	157.66
900.00	2.97	158.03
1000.00	2.67	158.33

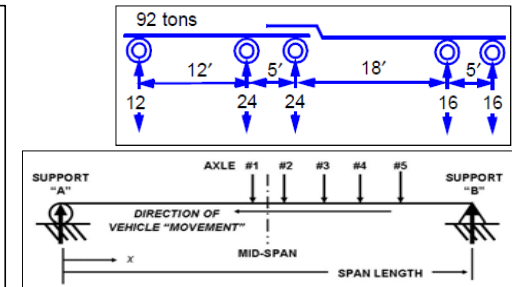
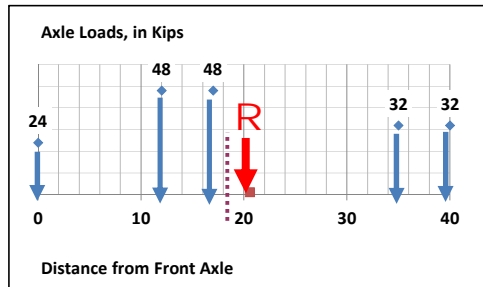


MOMENT								
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
50	Moment	0.0	582.40	1,204.00	1,253.00	770.00	529.20	0.0
	Axle Location on Span	0.00	8.00	20.00	25.00	40.00	44.00	50.00
100	Moment	0.0	2,529.45	3,197.25	3,265.50	2,840.25	2,614.85	0.0
	Axle Location on Span	0.00	33.00	45.00	50.00	65.00	69.00	100.00
200	Moment	0.0	6,521.73	7,212.63	7,290.50	6,894.13	6,676.43	0.0
	300 ation on Span	0.00	83.00	95.00	100.00	115.00	119.00	200.00
300	Moment	0.0	10,535.82	11,234.42	11,315.50	10,928.75	10,713.62	0.0
	500 ation on Span	0.00	133.00	145.00	150.00	165.00	169.00	300.00
400	Moment	0.0	14,555.36	15,257.81	15,340.50	14,958.56	14,744.71	0.0
	Axle Location on Span	0.00	183.00	195.00	200.00	215.00	219.00	400.00
500	Moment	0.0	18,577.09	19,281.85	19,365.50	18,986.45	18,773.37	0.0
	Axle Location on Span	0.00	233.00	245.00	250.00	265.00	269.00	500.00
600	Moment	0.0	22,599.91	23,306.21	23,390.50	23,013.38	22,800.81	0.0
	Axle Location on Span	0.00	283.00	295.00	300.00	315.00	319.00	600.00
700	Moment	0.0	26,623.35	27,330.75	27,415.50	27,039.75	26,827.55	0.0
	Axle Location on Span	0.00	333.00	345.00	350.00	365.00	369.00	700.00
800	Moment	0.0	30,647.18	31,355.41	31,440.50	31,065.78	30,853.86	0.0
	Axle Location on Span	0.00	383.00	395.00	400.00	415.00	419.00	800.00
900	Moment	0.0	34,671.27	35,380.14	35,465.50	35,091.58	34,879.87	0.0
	Axle Location on Span	0.00	433.00	445.00	450.00	465.00	469.00	900.00
1,000	Moment	0.0	38,695.55	39,404.93	39,490.50	39,117.23	38,905.69	0.0
	Axle Location on Span	0.00	483.00	495.00	500.00	515.00	519.00	1,000.00



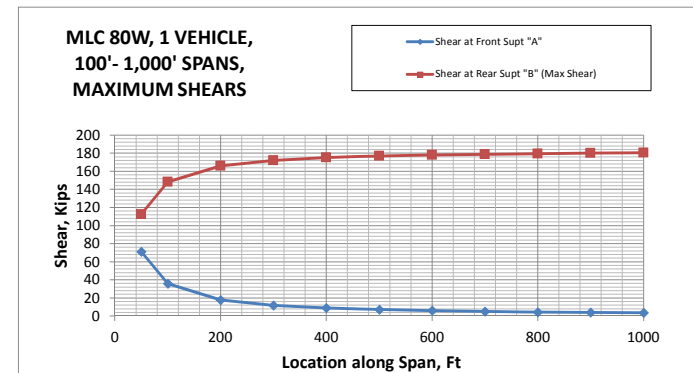
**FIVE (5) AXLE FM3.34-343 (STANAG 21) One (1x) Hypothetical MLC 80W Vehicle, Calculation of Maximum Shear and Moment, 50'- 1,000' Spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	12.0	24.0		0.0	106.76	0
2	24.0	48.0	12.0	12.0	213.51	366
3	24.0	48.0	5.0	17.0	213.51	518
4	16.0	32.0	18.0	35.0	142.34	1067
(Rear) 5	16.0	32.0	5.0	40.0	142.34	1219
<b>Totals</b>	<b>92.0</b>	<b>184.0</b>	<b>40.0</b>		<b>711.72</b>	
		Resultant at location:		20.609		628
		Distance to Nearest Axle, "xR":		3.609	(Rear of Axle # 3)	

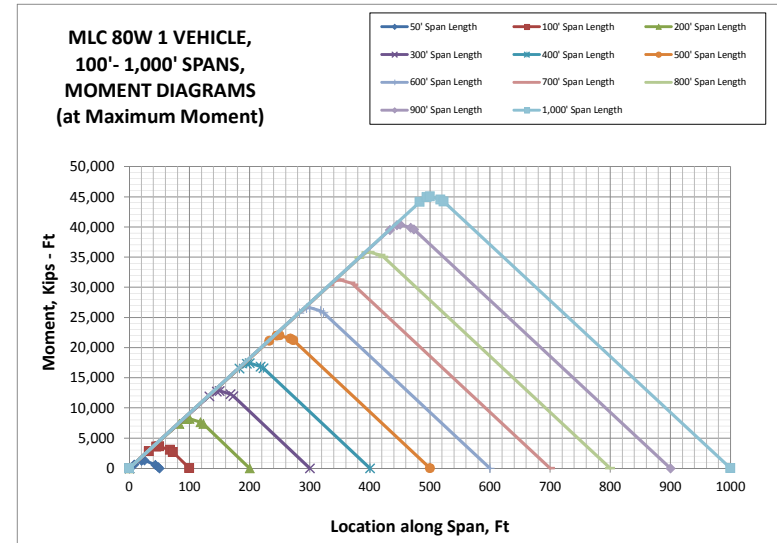


Span Length	Front #1 Axle		Middle #2 Axle		Middle #3 Axle		Middle #4 Axle		Rear #5 Axle		Dist to Beam End
	L	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8		
50.00	8.00	20.00	25.00	43.00	48.00	2.00					
100.00	33.00	45.00	50.00	68.00	73.00	27.00					
200.00	83.00	95.00	100.00	118.00	123.00	77.00					
300.00	133.00	145.00	150.00	168.00	173.00	127.00					
400.00	183.00	195.00	200.00	218.00	223.00	177.00					
500.00	233.00	245.00	250.00	268.00	273.00	227.00					
600.00	283.00	295.00	300.00	318.00	323.00	277.00					
700.00	333.00	345.00	350.00	368.00	373.00	327.00					
800.00	383.00	395.00	400.00	418.00	423.00	377.00					
900.00	433.00	445.00	450.00	468.00	473.00	427.00					
1000.00	483.00	495.00	500.00	518.00	523.00	477.00					

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
71.36	112.64
35.68	148.32
17.84	166.16
11.89	172.11
8.92	175.08
7.14	176.86
5.95	178.05
5.10	178.90
4.46	179.54
3.96	180.04
3.57	180.43

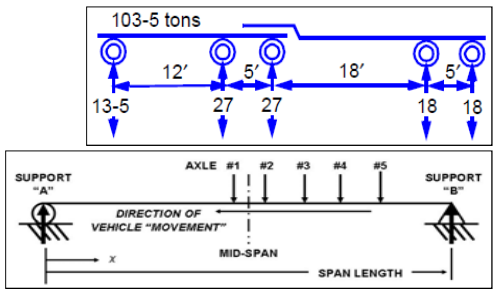
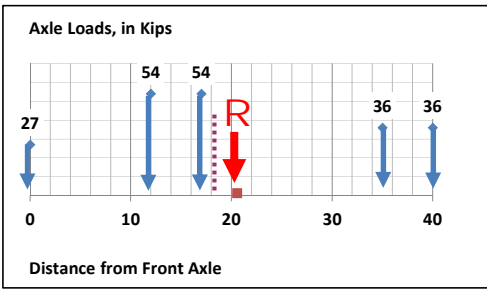


MOMENT								
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
50	Moment	0.0	629.76	1,286.40	1,320.00	576.96	210.56	0.0
	Axle Location on Span	0.00	8.00	20.00	25.00	43.00	48.00	50.00
100	Moment	0.0	2,816.88	3,553.20	3,620.00	2,996.48	2,663.28	0.0
	Axle Location on Span	0.00	33.00	45.00	50.00	68.00	73.00	100.00
200	Moment	0.0	7,360.44	8,136.60	8,220.00	7,656.24	7,339.64	0.0
	300 ation on Span	0.00	83.00	95.00	100.00	118.00	123.00	200.00
300	Moment	0.0	11,941.63	12,731.07	12,820.00	12,276.16	11,965.09	0.0
	500 ation on Span	0.00	133.00	145.00	150.00	168.00	173.00	300.00
400	Moment	0.0	16,532.22	17,328.30	17,420.00	16,886.12	16,577.82	0.0
	Axle Location on Span	0.00	183.00	195.00	200.00	218.00	223.00	400.00
500	Moment	0.0	21,126.58	21,926.64	22,020.00	21,492.10	21,185.46	0.0
	Axle Location on Span	0.00	233.00	245.00	250.00	268.00	273.00	500.00
600	Moment	0.0	25,722.81	26,525.53	26,620.00	26,096.08	25,790.55	0.0
	Axle Location on Span	0.00	283.00	295.00	300.00	318.00	323.00	600.00
700	Moment	0.0	30,320.13	31,124.74	31,220.00	30,698.93	30,394.18	0.0
	Axle Location on Span	0.00	333.00	345.00	350.00	368.00	373.00	700.00
800	Moment	0.0	34,918.11	35,724.15	35,820.00	35,301.06	34,996.91	0.0
	Axle Location on Span	0.00	383.00	395.00	400.00	418.00	423.00	800.00
900	Moment	0.0	39,516.54	40,323.69	40,420.00	39,902.72	39,599.03	0.0
	Axle Location on Span	0.00	433.00	445.00	450.00	468.00	473.00	900.00
1,000	Moment	0.0	44,115.29	44,923.32	45,020.00	44,504.05	44,200.73	0.0
	Axle Location on Span	0.00	483.00	495.00	500.00	518.00	523.00	1,000.00



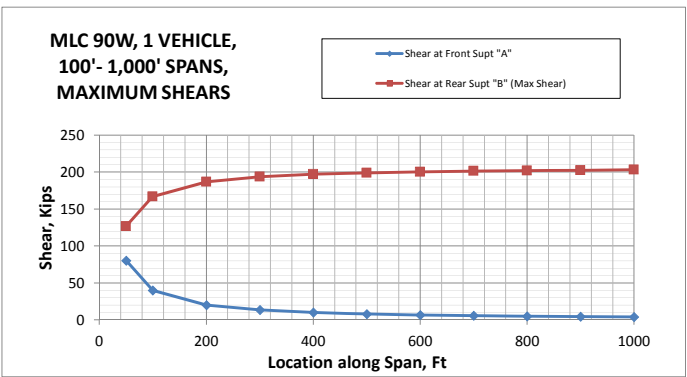
**FIVE (5) AXLE FM3.34-343 (STANAG 21) One (1x) Hypothetical MLC 90W Vehicle, Calculation of Maximum Shear and Moment, 50'- 1,000' Spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	13.5	27.0		0.0	120.10	0
2	27.0	54.0	12.0	12.0	240.20	366
3	27.0	54.0	5.0	17.0	240.20	518
4	18.0	36.0	18.0	35.0	160.14	1067
(Rear) 5	18.0	36.0	5.0	40.0	160.14	1219
<b>Totals</b>	<b>103.5</b>	<b>207.0</b>	<b>40.0</b>		<b>800.68</b>	
				Resultant at location:	20.609	628
				Distance to Nearest Axle, "xR":	3.609	(Rear of Axle # 3)

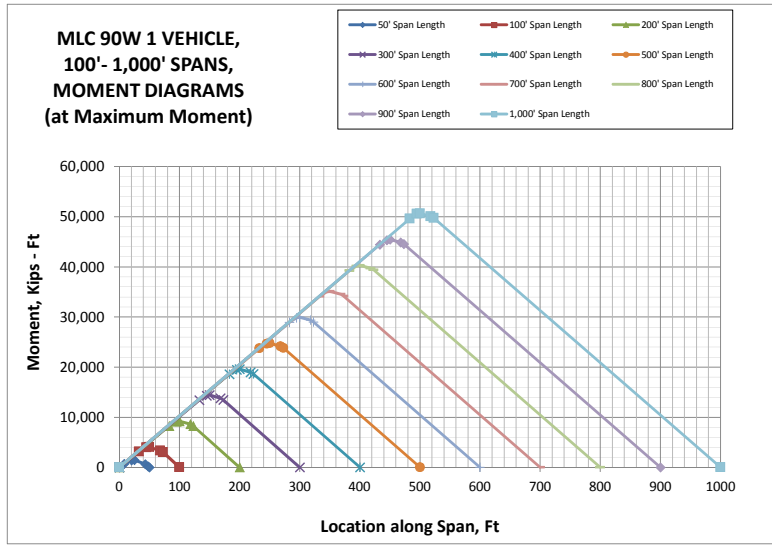


Span Length	Front #1 Axle	Middle #2	Middle #3	Middle #4	Rear #5 Axle	Dist to Beam
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
50.00	8.00	20.00	25.00	43.00	48.00	2.00
100.00	33.00	45.00	50.00	68.00	73.00	27.00
200.00	83.00	95.00	100.00	118.00	123.00	77.00
300.00	133.00	145.00	150.00	168.00	173.00	127.00
400.00	183.00	195.00	200.00	218.00	223.00	177.00
500.00	233.00	245.00	250.00	268.00	273.00	227.00
600.00	283.00	295.00	300.00	318.00	323.00	277.00
700.00	333.00	345.00	350.00	368.00	373.00	327.00
800.00	383.00	395.00	400.00	418.00	423.00	377.00
900.00	433.00	445.00	450.00	468.00	473.00	427.00
1000.00	483.00	495.00	500.00	518.00	523.00	477.00

MAX SHEAR	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
	Vmax A	Vmax B
	kips	kips
	80.28	126.72
	40.14	166.86
	20.07	186.93
	13.38	193.62
	10.04	196.97
	8.03	198.97
	6.69	200.31
	5.73	201.27
	5.02	201.98
	4.46	202.54
	4.01	202.99

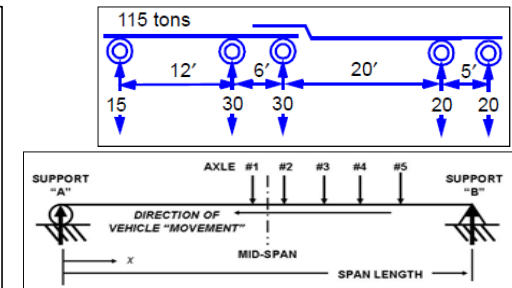
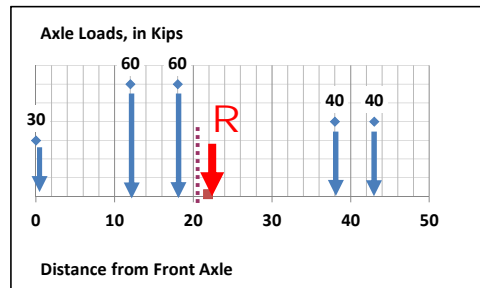


MOMENT								
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
50	Moment	0.0	708.48	1,447.20	1,485.00	649.08	236.88	0.0
	Axle Location on Span	0.00	8.00	20.00	25.00	43.00	48.00	50.00
100	Moment	0.0	3,168.99	3,997.35	4,072.50	3,371.04	2,996.19	0.0
	Axle Location on Span	0.00	33.00	45.00	50.00	68.00	73.00	100.00
200	Moment	0.0	8,280.50	9,153.68	9,247.50	8,613.27	8,257.10	0.0
	300 ation on Span	0.00	83.00	95.00	100.00	118.00	123.00	200.00
300	Moment	0.0	13,434.33	14,322.45	14,422.50	13,810.68	13,460.73	0.0
	500 ation on Span	0.00	133.00	145.00	150.00	168.00	173.00	300.00
400	Moment	0.0	18,598.75	19,494.34	19,597.50	18,996.89	18,650.05	0.0
	Axle Location on Span	0.00	183.00	195.00	200.00	218.00	223.00	400.00
500	Moment	0.0	23,767.40	24,667.47	24,772.50	24,178.61	23,833.64	0.0
	Axle Location on Span	0.00	233.00	245.00	250.00	268.00	273.00	500.00
600	Moment	0.0	28,938.17	29,841.23	29,947.50	29,358.09	29,014.37	0.0
	Axle Location on Span	0.00	283.00	295.00	300.00	318.00	323.00	600.00
700	Moment	0.0	34,110.14	35,015.34	35,122.50	34,536.29	34,193.46	0.0
	Axle Location on Span	0.00	333.00	345.00	350.00	368.00	373.00	700.00
800	Moment	0.0	39,282.87	40,189.67	40,297.50	39,713.69	39,371.52	0.0
	Axle Location on Span	0.00	383.00	395.00	400.00	418.00	423.00	800.00
900	Moment	0.0	44,456.11	45,364.15	45,472.50	44,890.56	44,548.91	0.0
	Axle Location on Span	0.00	433.00	445.00	450.00	468.00	473.00	900.00
1,000	Moment	0.0	49,629.70	50,538.74	50,647.50	50,067.05	49,725.82	0.0
	Axle Location on Span	0.00	483.00	495.00	500.00	518.00	523.00	1,000.00



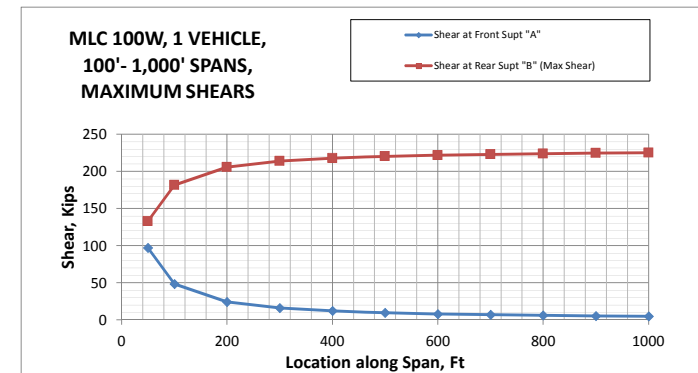
**FIVE (5) AXLE FM3.34-343 (STANAG 21) One (1x) Hypothetical MLC 100W Vehicle, Calculation of Maximum Shear and Moment, 50'- 1,000' Spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	15.0	30.0	30.0	0.0	133.45	0
2	30.0	60.0	12.0	12.0	266.89	366
3	30.0	60.0	6.0	18.0	266.89	549
4	20.0	40.0	20.0	38.0	177.93	1158
(Rear) 5	20.0	40.0	5.0	43.0	177.93	1311
<b>Totals</b>	<b>115.0</b>	<b>230.0</b>	<b>43.0</b>		<b>889.64</b>	
				Resultant at location:	21.913	668
				Distance to Nearest Axle, "xR":	3.913 (Rear of Axle # 3)	

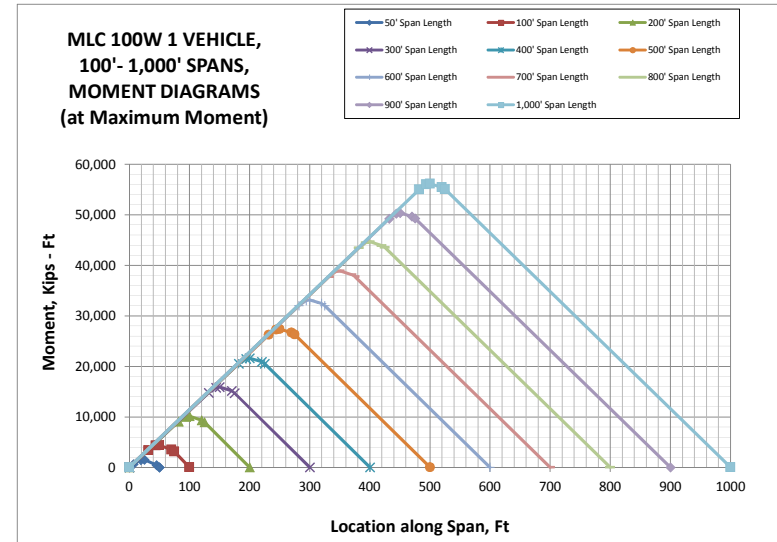


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
50.00	7.00	19.00	25.00	45.00	50.00	0.00
100.00	32.00	44.00	50.00	70.00	75.00	25.00
200.00	82.00	94.00	100.00	120.00	125.00	75.00
300.00	132.00	144.00	150.00	170.00	175.00	125.00
400.00	182.00	194.00	200.00	220.00	225.00	175.00
500.00	232.00	244.00	250.00	270.00	275.00	225.00
600.00	282.00	294.00	300.00	320.00	325.00	275.00
700.00	332.00	344.00	350.00	370.00	375.00	325.00
800.00	382.00	394.00	400.00	420.00	425.00	375.00
900.00	432.00	444.00	450.00	470.00	475.00	425.00
1000.00	482.00	494.00	500.00	520.00	525.00	475.00

Span Length	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B	Vmax B
kips	kips	kips
50	97.00	133.00
100	48.50	181.50
200	24.25	205.75
300	16.17	213.83
400	12.13	217.88
500	9.70	220.30
600	8.08	221.92
700	6.93	223.07
800	6.06	223.94
900	5.39	224.61
1000	4.85	225.15

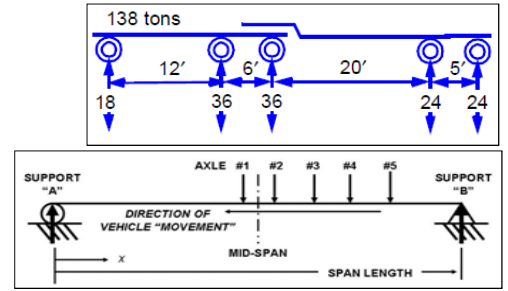
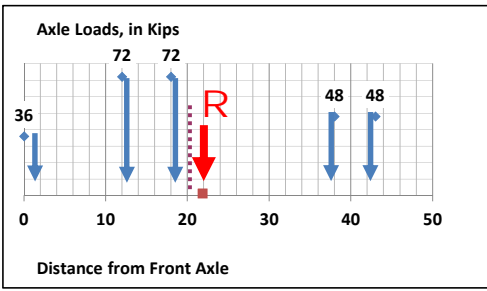


Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
50	Moment	0.0	679.00	1,483.00	1,525.00	465.00	0.00	0.0
	Axle Location on Span	0.00	7.00	19.00	25.00	45.00	50.00	50.00
100	Moment	0.0	3,392.00	4,304.00	4,400.00	3,520.00	3,100.00	0.0
	Axle Location on Span	0.00	32.00	44.00	50.00	70.00	75.00	100.00
200	Moment	0.0	9,061.00	10,027.00	10,150.00	9,360.00	8,962.50	0.0
	300 ation on Span	0.00	82.00	94.00	100.00	120.00	125.00	200.00
300	Moment	0.0	14,784.00	15,768.00	15,900.00	15,140.00	14,750.00	0.0
	500 ation on Span	0.00	132.00	144.00	150.00	170.00	175.00	300.00
400	Moment	0.0	20,520.50	21,513.50	21,650.00	20,905.00	20,518.75	0.0
	Axle Location on Span	0.00	182.00	194.00	200.00	220.00	225.00	400.00
500	Moment	0.0	26,262.40	27,260.80	27,400.00	26,664.00	26,280.00	0.0
	Axle Location on Span	0.00	232.00	244.00	250.00	270.00	275.00	500.00
600	Moment	0.0	32,007.00	33,009.00	33,150.00	32,420.00	32,037.50	0.0
	Axle Location on Span	0.00	282.00	294.00	300.00	320.00	325.00	600.00
700	Moment	0.0	37,753.14	38,757.71	38,900.00	38,174.29	37,792.86	0.0
	Axle Location on Span	0.00	332.00	344.00	350.00	370.00	375.00	700.00
800	Moment	0.0	43,500.25	44,506.75	44,650.00	43,927.50	43,546.88	0.0
	Axle Location on Span	0.00	382.00	394.00	400.00	420.00	425.00	800.00
900	Moment	0.0	49,248.00	50,256.00	50,400.00	49,680.00	49,300.00	0.0
	Axle Location on Span	0.00	432.00	444.00	450.00	470.00	475.00	900.00
1,000	Moment	0.0	54,996.20	56,005.40	56,150.00	55,432.00	55,052.50	0.0
	Axle Location on Span	0.00	482.00	494.00	500.00	520.00	525.00	1,000.00



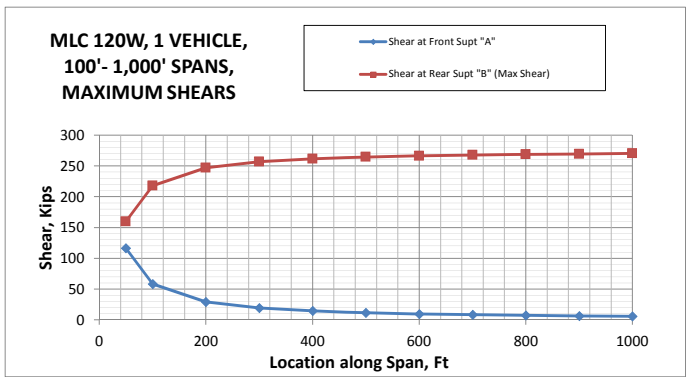
**FIVE (5) AXLE FM3.34-343 (STANAG 21) One (1x) Hypothetical MLC 120W Vehicle, Calculation of Maximum Shear and Moment, 50'- 1,000' Spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	18.0	36.0		0.0	160.14	0
2	36.0	72.0	12.0	12.0	320.27	366
3	36.0	72.0	6.0	18.0	320.27	549
4	24.0	48.0	20.0	38.0	213.51	1158
(Rear) 5	24.0	48.0	5.0	43.0	213.51	1311
<b>Totals</b>	<b>138.0</b>	<b>276.0</b>	<b>43.0</b>		<b>1067.57</b>	
				Resultant at location:	21.913	668
				Distance to Nearest Axle, "xR":	3.913	(Rear of Axle # 3)

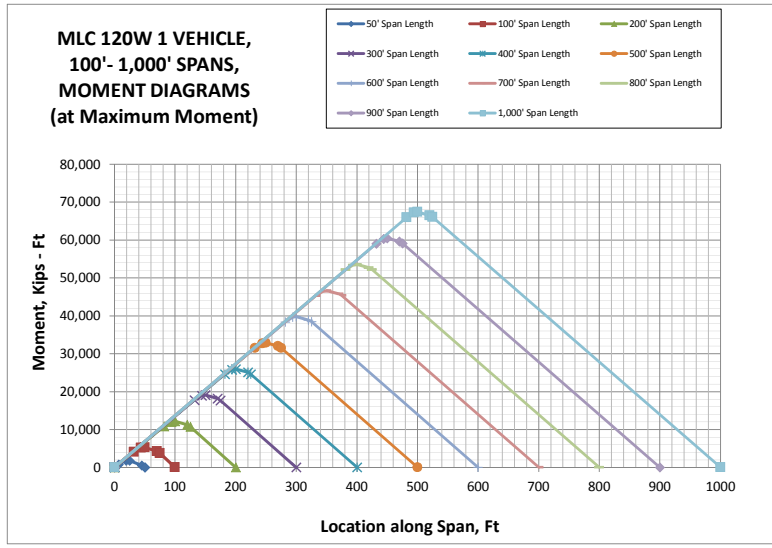


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
50.00	7.00	19.00	25.00	45.00	50.00	0.00
100.00	32.00	44.00	50.00	70.00	75.00	25.00
200.00	82.00	94.00	100.00	120.00	125.00	75.00
300.00	132.00	144.00	150.00	170.00	175.00	125.00
400.00	182.00	194.00	200.00	220.00	225.00	175.00
500.00	232.00	244.00	250.00	270.00	275.00	225.00
600.00	282.00	294.00	300.00	320.00	325.00	275.00
700.00	332.00	344.00	350.00	370.00	375.00	325.00
800.00	382.00	394.00	400.00	420.00	425.00	375.00
900.00	432.00	444.00	450.00	470.00	475.00	425.00
1000.00	482.00	494.00	500.00	520.00	525.00	475.00

Span Length	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B	Vmax B
kips	kips	kips
50	116.40	159.60
100	58.20	217.80
200	29.10	246.90
300	19.40	256.60
400	14.55	261.45
500	11.64	264.36
600	9.70	266.30
700	8.31	267.69
800	7.28	268.73
900	6.47	269.53
1000	5.82	270.18



Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
50	Moment	0.0	814.80	1,779.60	1,830.00	558.00	0.00	0.0
	Axle Location on Span	0.00	7.00	19.00	25.00	45.00	50.00	50.00
100	Moment	0.0	4,070.40	5,164.80	5,280.00	4,224.00	3,720.00	0.0
	Axle Location on Span	0.00	32.00	44.00	50.00	70.00	75.00	100.00
200	Moment	0.0	10,873.20	12,032.40	12,180.00	11,232.00	10,755.00	0.0
	300 ation on Span	0.00	82.00	94.00	100.00	120.00	125.00	200.00
300	Moment	0.0	17,740.80	18,921.60	19,080.00	18,168.00	17,700.00	0.0
	500 ation on Span	0.00	132.00	144.00	150.00	170.00	175.00	300.00
400	Moment	0.0	24,624.60	25,816.20	25,980.00	25,086.00	24,622.50	0.0
	Axle Location on Span	0.00	182.00	194.00	200.00	220.00	225.00	400.00
500	Moment	0.0	31,514.88	32,712.96	32,880.00	31,996.80	31,536.00	0.0
	Axle Location on Span	0.00	232.00	244.00	250.00	270.00	275.00	500.00
600	Moment	0.0	38,408.40	39,610.80	39,780.00	38,904.00	38,445.00	0.0
	Axle Location on Span	0.00	282.00	294.00	300.00	320.00	325.00	600.00
700	Moment	0.0	45,303.77	46,509.26	46,680.00	45,809.14	45,351.43	0.0
	Axle Location on Span	0.00	332.00	344.00	350.00	370.00	375.00	700.00
800	Moment	0.0	52,200.30	53,408.10	53,580.00	52,713.00	52,256.25	0.0
	Axle Location on Span	0.00	382.00	394.00	400.00	420.00	425.00	800.00
900	Moment	0.0	59,097.60	60,307.20	60,480.00	59,616.00	59,160.00	0.0
	Axle Location on Span	0.00	432.00	444.00	450.00	470.00	475.00	900.00
1,000	Moment	0.0	65,995.44	67,206.48	67,380.00	66,518.40	66,063.00	0.0
	Axle Location on Span	0.00	482.00	494.00	500.00	520.00	525.00	1,000.00



**UNIFORM LOADINGS** **Maximum Shear and Moment, Various Lane Loadings, 50'- 1,000' Spans**

HL-93 Lane Loading ONLY			
Lane Loading (ENTER) <input type="text" value="0.640"/> kips per ft			
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
50.00	16.00	16.00	200
100.00	32.00	32.00	800
200.00	64.00	64.00	3,200
300.00	96.00	96.00	7,200
400.00	128.00	128.00	12,800
500.00	160.00	160.00	20,000
600.00	192.00	192.00	28,800
700.00	224.00	224.00	39,200
800.00	256.00	256.00	51,200
900.00	288.00	288.00	64,800
1,000.00	320.00	320.00	80,000

HL-93 Alternative Military Loading (LLOnly)			
Lane Loading (ENTER) <input type="text" value="0.640"/> kips per ft Plus two 25K loads, 4' apart, centered at mid-span			
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
50.00	41.00	41.00	775
100.00	57.00	57.00	2,000
200.00	89.00	89.00	5,650
300.00	121.00	121.00	10,900
400.00	153.00	153.00	17,750
500.00	185.00	185.00	26,200
600.00	217.00	217.00	36,250
700.00	249.00	249.00	47,900
800.00	281.00	281.00	61,150
900.00	313.00	313.00	76,000
1,000.00	345.00	345.00	92,450

HL-93 Alternative Military Loading (LL+Impact)				
Lane Loading (ENTER) <input type="text" value="0.640"/> kips per ft Plus two 25K loads, 4' apart, centered at mid-span, plus impact				
Span Length	LRFD Dynamic Impact Factor, 33%	MAX SHEAR		MAX MOMENT
		Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L		Vmax A	Vmax B	M max
ft	%	kips	kips	ft-kips
50.00	33.0%	49.25	49.25	965
100.00	33.0%	65.25	65.25	2,396
200.00	33.0%	97.25	97.25	6,459
300.00	33.0%	129.25	129.25	12,121
400.00	33.0%	161.25	161.25	19,384
500.00	33.0%	193.25	193.25	28,246
600.00	33.0%	225.25	225.25	38,709
700.00	33.0%	257.25	257.25	50,771
800.00	33.0%	289.25	289.25	64,434
900.00	33.0%	321.25	321.25	79,696
1,000.00	33.0%	353.25	353.25	96,559

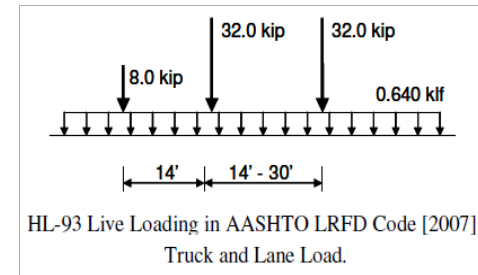
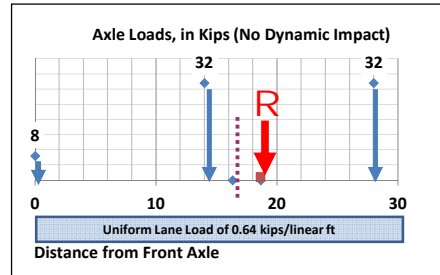
Saturated Flow, from M. Lutomirska PhD thesis, 2009			
Lane Loading (ENTER) <input type="text" value="0.810"/> kips per ft			
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
50.00	20.25	20.25	253
100.00	40.50	40.50	1,013
200.00	81.00	81.00	4,050
300.00	121.50	121.50	9,113
400.00	162.00	162.00	16,200
500.00	202.50	202.50	25,313
600.00	243.00	243.00	36,450
700.00	283.50	283.50	49,613
800.00	324.00	324.00	64,800
900.00	364.50	364.50	82,013
1,000.00	405.00	405.00	101,250

Proposed Stopped Logistic Truck Convoy Lane Load			
Lane Loading (ENTER) <input type="text" value="0.965"/> kips per ft			
Span Length	MAX SHEAR		MAX MOMENT
	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)	Max Moment at Mid-span
L	Vmax A	Vmax B	M max
ft	kips	kips	ft-kips
50.00	24.13	24.13	302
100.00	48.25	48.25	1,206
200.00	96.50	96.50	4,825
300.00	144.75	144.75	10,856
400.00	193.00	193.00	19,300
500.00	241.25	241.25	30,156
600.00	289.50	289.50	43,425
700.00	337.75	337.75	59,106
800.00	386.00	386.00	77,200
900.00	434.25	434.25	97,706
1,000.00	482.50	482.50	120,625

**THREE (3) AXLE AASHTO LRFD Code (2007) HL-93 Live Load, with No Dynamic Impact, Calculation of Maximum Shear and Moment, 50'- 1,000' Spans**

Uniform Lane Loading:  Kips per Linear Ft

Axle	Load (ST)	Load (kips)	Distance		SI / Metric Units	
			btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	4.0	8.0		0.000	35.59	0
2	16.0	32.0	14.000	14.000	142.34	427
Max Moment Resultant (Rear) 3		0.0	2.333	16.333	0.00	498
		0.0	2.333	18.666	0.00	569
	16.0	32.0	9.333	27.999	142.34	853
<b>Totals</b>			<b>36.0</b>	<b>72.0</b>	<b>28.0</b>	<b>284.69</b>
Resultant at location:				18.666	569	
Distance to Nearest Axle, "xR":				2.333 (Rear of Axle # 3)		

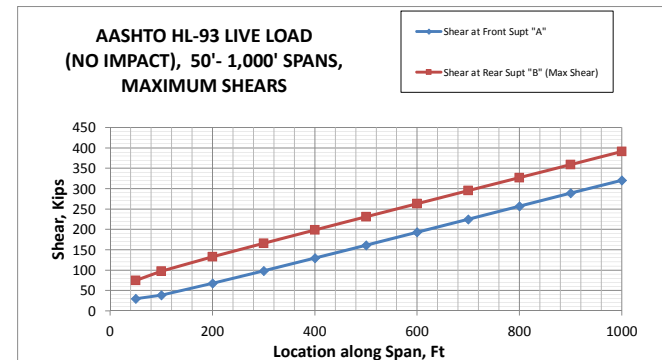


**FOR THE CALCULATION OF MAXIMUM MID-SPAN MOMENT - AXLE #2 LOCATED AT MID-SPAN**

Span Length	Front #1 Axle	Middle #2 Axle	Resultant Location	Rear #3 Axle	Dist to Beam End
L	AX 1	AX 2	RES	AX 3	L END
ft	ft	ft	ft	ft	ft
50.00	11.00	25.00	29.67	39.00	11.00
100.00	36.00	50.00	54.67	64.00	36.00
200.00	86.00	100.00	104.67	114.00	86.00
300.00	136.00	150.00	154.67	164.00	136.00
400.00	186.00	200.00	204.67	214.00	186.00
500.00	236.00	250.00	254.67	264.00	236.00
600.00	286.00	300.00	304.67	314.00	286.00
700.00	336.00	350.00	354.67	364.00	336.00
800.00	386.00	400.00	404.67	414.00	386.00
900.00	436.00	450.00	454.67	464.00	436.00
1000.00	486.00	500.00	504.67	514.00	486.00

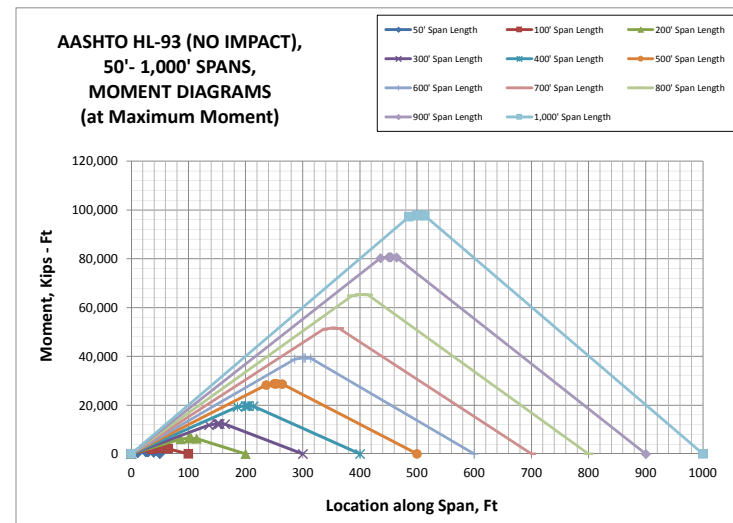
**MAX SHEAR**

Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
29.44	74.56
38.72	97.28
67.36	132.64
98.24	165.76
129.68	198.32
161.34	230.66
193.12	262.88
224.96	295.04
256.84	327.16
288.75	359.25
320.67	391.33



**MOMENT**

Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Resultant, ft-kips	Moment at Rear #3 Axle, ft-kips	Moment at React B, ft-kips
50	Moment	0.0	459.37	820.02	793.27	763.03	607.24
	Axle Location on Span	0.00	11.00	25.00	27.33	29.67	50.00
100	Moment	0.0	1,912.33	2,320.02	2,301.10	2,278.71	2,154.28
	Axle Location on Span	0.00	36.00	50.00	52.33	54.67	100.00
200	Moment	0.0	6,088.81	6,520.02	6,505.02	6,486.55	6,377.79
	Axle Location on Span	0.00	86.00	100.00	102.33	104.67	200.00
300	Moment	0.0	11,880.97	12,320.02	12,306.33	12,289.16	12,185.63
	Axle Location on Span	0.00	136.00	150.00	152.33	154.67	300.00
400	Moment	0.0	19,277.05	19,720.02	19,706.98	19,690.47	19,589.55
	Axle Location on Span	0.00	186.00	200.00	202.33	204.67	400.00
500	Moment	0.0	28,274.70	28,720.02	28,707.37	28,691.25	28,591.90
	Axle Location on Span	0.00	236.00	250.00	252.33	254.67	500.00
600	Moment	0.0	38,873.14	39,320.02	39,307.64	39,291.77	39,193.47
	Axle Location on Span	0.00	286.00	300.00	302.33	304.67	600.00
700	Moment	0.0	51,072.02	51,520.02	51,507.82	51,492.15	51,394.59
	Axle Location on Span	0.00	336.00	350.00	352.33	354.67	700.00
800	Moment	0.0	64,871.18	65,320.02	65,307.96	65,292.43	65,195.43
	Axle Location on Span	0.00	386.00	400.00	402.33	404.67	800.00
900	Moment	0.0	80,270.52	80,720.02	80,708.07	80,692.64	80,596.08
	Axle Location on Span	0.00	436.00	450.00	452.33	454.67	900.00
1,000	Moment	0.0	97,270.00	97,720.02	97,708.16	97,692.82	97,596.61
	Axle Location on Span	0.00	486.00	500.00	502.33	504.67	1000.00

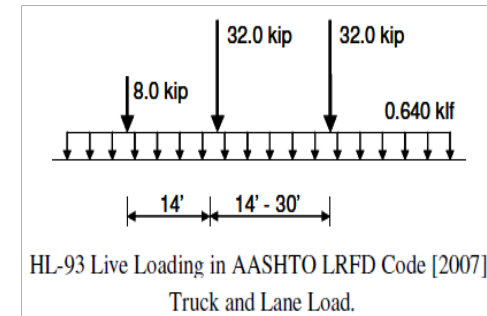
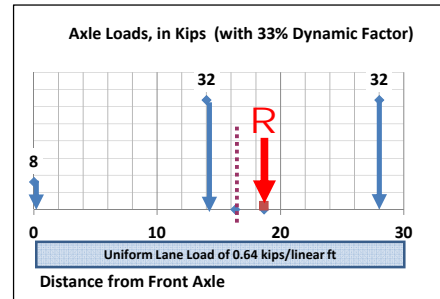




**THREE (3) AXLE AASHTO LRFD Code (2007) HL-93 Live Load, with 33% Dynamic Impact, Calculation of Maximum Shear and Moment, 50'- 1,000' Spans**

Uniform Lane Loading:  Kips per Linear Ft

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	4.0	8.0		0.000	35.59	0
2	16.0	32.0	14.000	14.000	142.34	427
Mid-span		0.0	2.333	16.333	0.00	498
Resultant		0.0	2.333	18.666	0.00	569
(Rear) 3	16.0	32.0	9.333	27.999	142.34	853
<b>Totals</b>	<b>36.0</b>	<b>72.0</b>	<b>28.0</b>		<b>284.69</b>	
				Resultant at location:	18.666	569
				Distance to Nearest Axle, "xR":	2.333 (Rear of Axle # 3)	

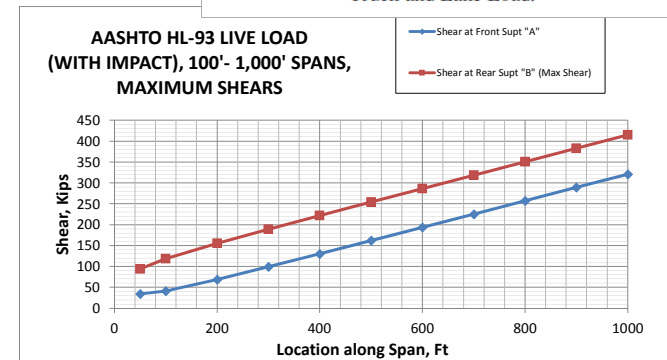


**FOR THE CALCULATION OF MAXIMUM MID-SPAN MOMENT - AXLE #2 LOCATED AT MID-SPAN**

Span Length	Front #1 Axle	Middle #2 Axle	Resultant Location	Rear #3 Axle	Dist to Beam End
L	AX 1	AX 2	RES	AX 3	L END
ft	ft	ft	ft	ft	ft
50.00	11.00	25.00	29.67	39.00	11.00
100.00	36.00	50.00	54.67	64.00	36.00
200.00	86.00	100.00	104.67	114.00	86.00
300.00	136.00	150.00	154.67	164.00	136.00
400.00	186.00	200.00	204.67	214.00	186.00
500.00	236.00	250.00	254.67	264.00	236.00
600.00	286.00	300.00	304.67	314.00	286.00
700.00	336.00	350.00	354.67	364.00	336.00
800.00	386.00	400.00	404.67	414.00	386.00
900.00	436.00	450.00	454.67	464.00	436.00
1000.00	486.00	500.00	504.67	514.00	486.00

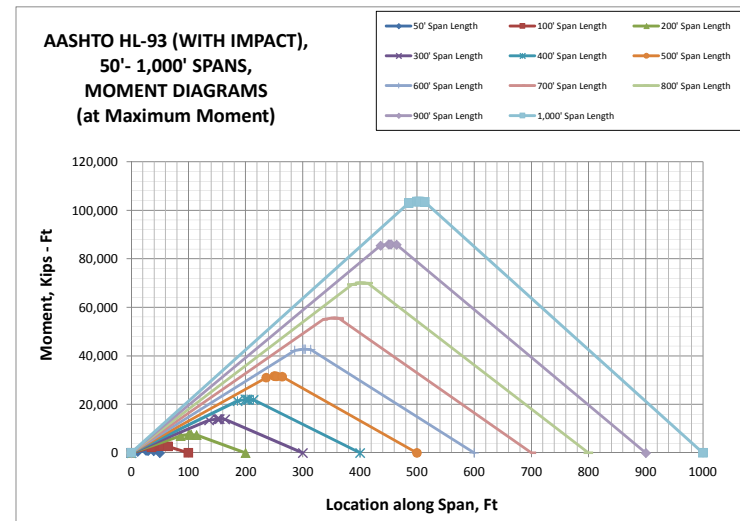
**MAX SHEAR**

Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
33.87	93.89
40.94	118.82
68.47	155.29
98.98	188.78
130.23	221.53
161.79	253.97
193.49	286.27
225.28	318.48
257.12	350.64
288.99	382.77
320.89	414.87



**MOMENT**

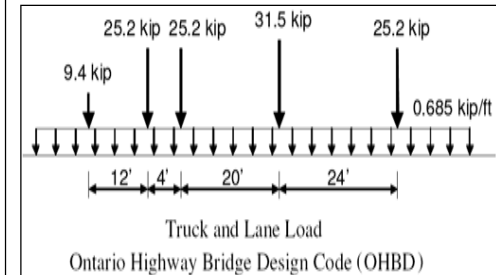
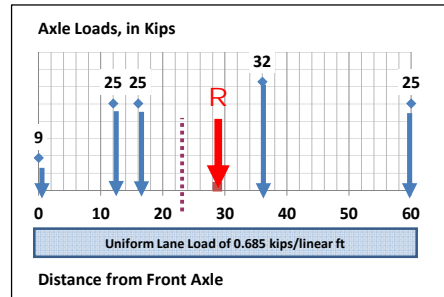
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid-span, ft-kips	Moment at Resultant, ft-kips	Moment at Rear #3 Axle, ft-kips	Moment at React B, ft-kips
50	Moment	0.0	565.66	1,024.62	989.62	951.13	762.33	0.0
	Axle Location on Span	0.00	11.00	25.00	27.33	29.67	39.00	50.00
100	Moment	0.0	2,300.10	2,821.62	2,797.04	2,768.98	2,621.88	0.0
	Axle Location on Span	0.00	36.00	50.00	52.33	54.67	64.00	100.00
200	Moment	0.0	7,062.82	7,615.62	7,596.26	7,573.41	7,447.16	0.0
	Axle Location on Span	0.00	86.00	100.00	102.33	104.67	114.00	200.00
300	Moment	0.0	13,446.39	14,009.62	13,991.99	13,970.88	13,851.58	0.0
	Axle Location on Span	0.00	136.00	150.00	152.33	154.67	164.00	300.00
400	Moment	0.0	21,435.18	22,003.62	21,986.86	21,966.62	21,850.80	0.0
	Axle Location on Span	0.00	186.00	200.00	202.33	204.67	214.00	400.00
500	Moment	0.0	31,026.05	31,597.62	31,581.38	31,561.66	31,447.93	0.0
	Axle Location on Span	0.00	236.00	250.00	252.33	254.67	264.00	500.00
600	Moment	0.0	42,217.97	42,791.62	42,775.73	42,756.36	42,644.01	0.0
	Axle Location on Span	0.00	286.00	300.00	302.33	304.67	314.00	600.00
700	Moment	0.0	55,010.48	55,585.62	55,569.98	55,550.85	55,439.50	0.0
	Axle Location on Span	0.00	336.00	350.00	352.33	354.67	364.00	700.00
800	Moment	0.0	69,403.36	69,979.62	69,964.16	69,945.23	69,834.62	0.0
	Axle Location on Span	0.00	386.00	400.00	402.33	404.67	414.00	800.00
900	Moment	0.0	85,396.49	85,973.62	85,958.31	85,939.51	85,829.49	0.0
	Axle Location on Span	0.00	436.00	450.00	452.33	454.67	464.00	900.00
1,000	Moment	0.0	102,989.80	103,567.62	103,552.43	103,533.75	103,424.18	0.0
	Axle Location on Span	0.00	486.00	500.00	502.33	504.67	514.00	1000.00



**FIVE (5) AXLE** Ontario Highway Bridge (OHBD) Design Code, Calculation of Maximum Shear and Moment Calculation, 50'- 1,000' Spans

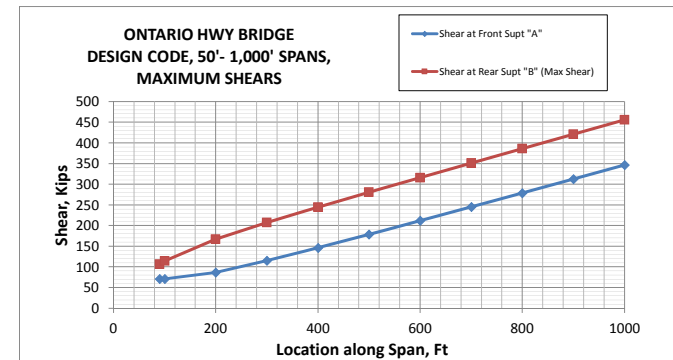
Uniform Lane Loading: **0.685** Kips per Linear Ft

Axle	Load (ST)		Distance		SI / Metric Units	
	Load (kips)	Load (kips)	btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	4.70	9.4		0.00	41.81	0
2	12.60	25.2	12.00	12.00	112.10	366
3	12.60	25.2	4.00	16.00	112.10	488
4	15.75	31.5	20.00	36.00	140.12	1097
(Rear) 5	12.60	25.2	24.00	60.00	112.10	1829
<b>Totals</b>	<b>58.25</b>	<b>116.5</b>	<b>60.00</b>		<b>476.40</b>	
Resultant at location:				<b>28.769</b>	<b>877</b>	
Distance to Nearest Axle, "xR":				<b>12.769</b>	<b>(Rear of Axle # 3)</b>	

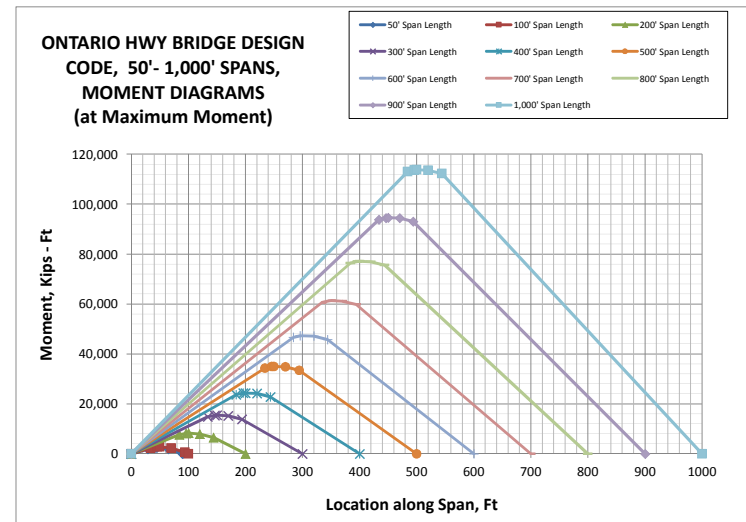


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
90.00	29.00	41.00	45.00	65.00	89.00	1.00
100.00	34.00	46.00	50.00	70.00	94.00	6.00
200.00	84.00	96.00	100.00	120.00	144.00	56.00
300.00	134.00	146.00	150.00	170.00	194.00	106.00
400.00	184.00	196.00	200.00	220.00	244.00	156.00
500.00	234.00	246.00	250.00	270.00	294.00	206.00
600.00	284.00	296.00	300.00	320.00	344.00	256.00
700.00	334.00	346.00	350.00	370.00	394.00	306.00
800.00	384.00	396.00	400.00	420.00	444.00	356.00
900.00	434.00	446.00	450.00	470.00	494.00	406.00
1000.00	484.00	496.00	500.00	520.00	544.00	456.00

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
71.25	106.90
70.63	114.37
86.69	166.81
114.88	207.12
146.10	244.40
178.53	280.47
211.56	315.94
244.95	351.05
278.55	385.95
312.29	420.71
346.14	455.36



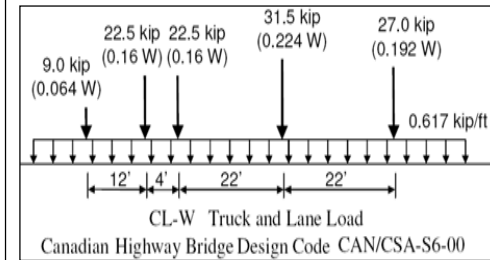
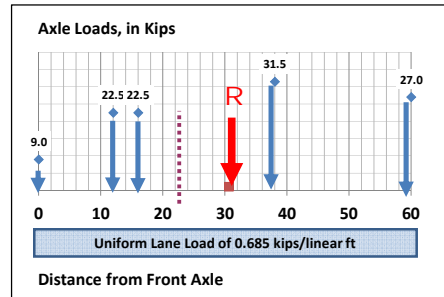
MOMENT								
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
90	Moment	0.0	1,815.79	2,285.85	2,319.81	1,821.23	105.26	0.0
	Axle Location on Span	0.00	29.00	41.00	45.00	65.00	89.00	90.00
100	Moment	0.0	2,243.29	2,733.17	2,773.75	2,308.23	631.93	0.0
	Axle Location on Span	0.00	34.00	46.00	50.00	70.00	94.00	100.00
200	Moment	0.0	7,605.53	8,184.67	8,255.00	7,938.24	6,440.45	0.0
	Axle Location on Span	0.00	84.00	96.00	100.00	120.00	144.00	200.00
300	Moment	0.0	14,759.61	15,368.50	15,448.75	15,181.58	13,743.29	0.0
	Axle Location on Span	0.00	134.00	146.00	150.00	170.00	194.00	300.00
400	Moment	0.0	23,646.02	24,269.80	24,355.00	24,112.62	22,704.08	0.0
	Axle Location on Span	0.00	184.00	196.00	200.00	220.00	244.00	400.00
500	Moment	0.0	34,252.87	34,885.57	34,973.75	34,746.25	33,355.56	0.0
	Axle Location on Span	0.00	234.00	246.00	250.00	270.00	294.00	500.00
600	Moment	0.0	46,576.19	47,214.84	47,305.00	47,087.41	45,708.63	0.0
	Axle Location on Span	0.00	284.00	296.00	300.00	320.00	344.00	600.00
700	Moment	0.0	60,614.27	61,257.17	61,348.75	61,138.25	59,767.96	0.0
	Axle Location on Span	0.00	334.00	346.00	350.00	370.00	394.00	700.00
800	Moment	0.0	76,366.27	77,012.36	77,105.00	76,899.81	75,535.90	0.0
	Axle Location on Span	0.00	384.00	396.00	400.00	420.00	444.00	800.00
900	Moment	0.0	93,831.72	94,480.28	94,573.75	94,372.69	93,013.74	0.0
	Axle Location on Span	0.00	434.00	446.00	450.00	470.00	494.00	900.00
1,000	Moment	0.0	113,010.32	113,660.87	113,755.00	113,557.25	112,202.27	0.0
	Axle Location on Span	0.00	484.00	496.00	500.00	520.00	544.00	1000.00



**FIVE (5) AXLE** Canadian Highway Bridge Design Code, CL-W Load, Calculation of Max Shear and Moment Calculation, 50'- 1,000' Spans

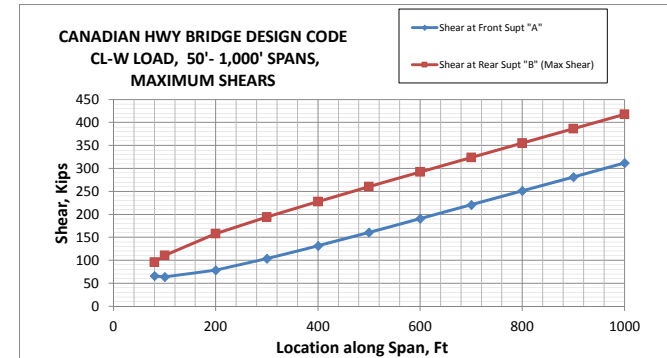
Uniform Lane Loading: **0.617** Kips per Linear Ft

Axle	Load (ST)		Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
	Load (kips)	Load (kN)			Distance from front axle (cm)	Distance from front axle (ft)
(Front) 1	4.50	9.0		0.00	40.03	0
2	11.25	22.5	12.00	12.00	100.08	366
3	11.25	22.5	4.00	16.00	100.08	488
4	15.75	31.5	22.00	38.00	140.12	1158
(Rear) 5	13.50	27.0	22.00	60.00	120.10	1829
<b>Totals</b>	<b>56.25</b>	<b>112.5</b>	<b>60.00</b>		<b>460.39</b>	
Resultant at location:				30.640		934
Distance to Nearest Axle, "xR":				7.36	(Forward of Axle # 3)	

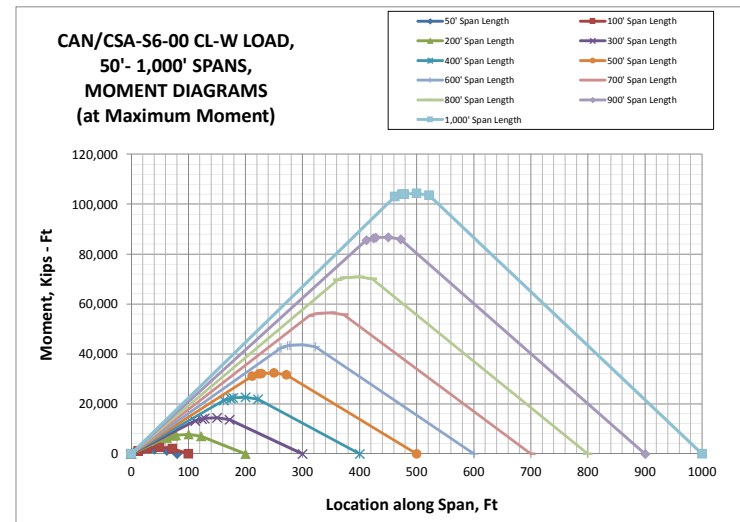


Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
80.00	2.00	14.00	18.00	40.00	62.00	18.00
100.00	12.00	24.00	28.00	50.00	72.00	28.00
200.00	62.00	74.00	78.00	100.00	122.00	78.00
300.00	112.00	124.00	128.00	150.00	172.00	128.00
400.00	162.00	174.00	178.00	200.00	222.00	178.00
500.00	212.00	224.00	228.00	250.00	272.00	228.00
600.00	262.00	274.00	278.00	300.00	322.00	278.00
700.00	312.00	324.00	328.00	350.00	372.00	328.00
800.00	362.00	374.00	378.00	400.00	422.00	378.00
900.00	412.00	424.00	428.00	450.00	472.00	428.00
1000.00	462.00	474.00	478.00	500.00	522.00	478.00

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
65.97	95.89
63.88	110.32
78.22	157.69
103.56	194.04
131.66	227.64
160.86	260.14
190.61	292.10
220.67	323.73
250.93	355.17
281.32	386.48
311.80	417.70

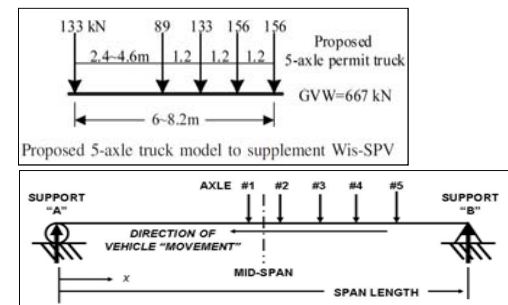
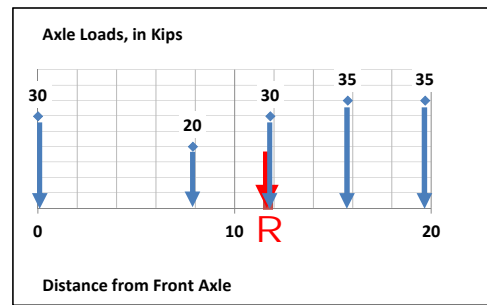


MOMENT								
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
80	Moment	0.0	181.33	1,109.45	1,309.09	1,735.60	1,170.49	0.0
	Axle Location on Span	0.00	2.00	14.00	18.00	40.00	62.00	80.00
100	Moment	0.0	1,100.14	2,003.42	2,194.78	2,575.75	1,965.10	0.0
	Axle Location on Span	0.00	12.00	24.00	28.00	50.00	72.00	100.00
200	Moment	0.0	6,383.71	7,237.31	7,412.11	7,702.00	7,000.27	0.0
	Axle Location on Span	0.00	62.00	74.00	78.00	100.00	122.00	200.00
300	Moment	0.0	13,104.90	13,941.94	14,111.22	14,370.75	13,638.66	0.0
	Axle Location on Span	0.00	112.00	124.00	128.00	150.00	172.00	300.00
400	Moment	0.0	21,342.37	22,171.13	22,337.65	22,582.00	21,834.73	0.0
	Axle Location on Span	0.00	162.00	174.00	178.00	200.00	222.00	400.00
500	Moment	0.0	31,111.85	31,935.65	32,100.50	32,335.75	31,579.37	0.0
	Axle Location on Span	0.00	212.00	224.00	228.00	250.00	272.00	500.00
600	Moment	0.0	42,418.59	43,239.07	43,402.83	43,632.00	42,869.55	0.0
	Axle Location on Span	0.00	262.00	274.00	278.00	300.00	322.00	600.00
700	Moment	0.0	55,264.83	56,082.95	56,245.91	56,470.75	55,703.96	0.0
	Axle Location on Span	0.00	312.00	324.00	328.00	350.00	372.00	700.00
800	Moment	0.0	69,651.70	70,468.04	70,630.42	70,852.00	70,081.96	0.0
	Axle Location on Span	0.00	362.00	374.00	378.00	400.00	422.00	800.00
900	Moment	0.0	85,579.82	86,394.78	86,556.70	86,775.75	86,003.18	0.0
	Axle Location on Span	0.00	412.00	424.00	428.00	450.00	472.00	900.00
1,000	Moment	0.0	103,049.56	103,863.43	104,024.97	104,242.00	103,467.40	0.0
	Axle Location on Span	0.00	462.00	474.00	478.00	500.00	522.00	1000.00



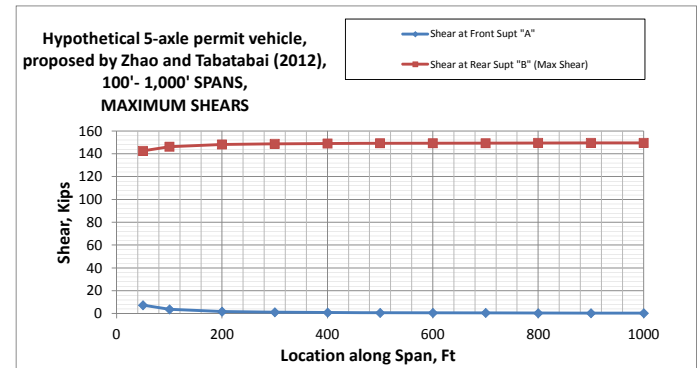
**FIVE (5) AXLE Hypothetical 5-axle permit vehicle, proposed by Zhao and Tabatabai (2012), 50'- 1,000' Spans**

Axle	Load (ST)	Load (kips)	Distance btwn axles (meters)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (meters)
(Front) 1	14.95	29.90		0.0	133.0	0.0
2	10.00	20.01	2.4	7.874	89.0	2.4
3	14.95	29.90	1.2	11.811	133.0	3.6
4	17.54	35.07	1.2	15.748	156.0	4.8
(Rear) 5	17.54	35.07	1.2	19.685	156.0	6.0
<b>Totals</b>	<b>75.0</b>	<b>149.9</b>	<b>6.0</b>		<b>667.0</b>	
Resultant at location:				11.693		3.564
Distance to Nearest Axle, "xR":				-0.118	(Rear of Axle # 3)	

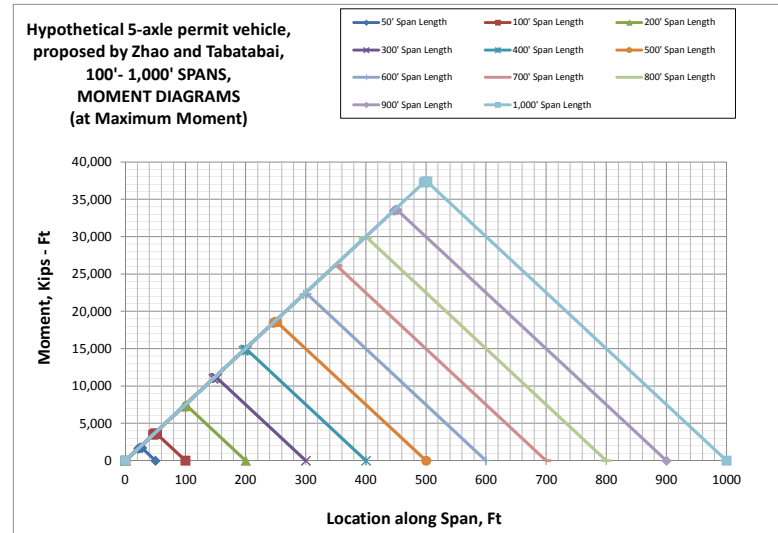


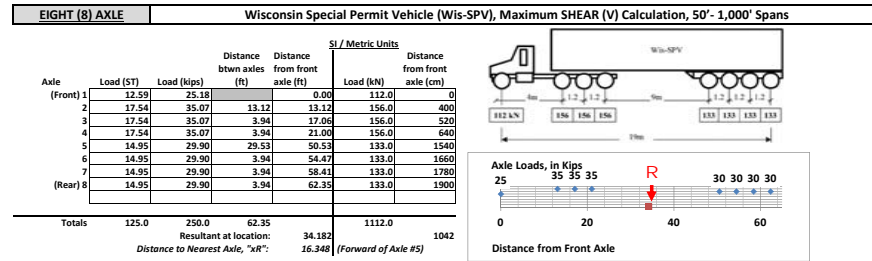
Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	L END
L	ft	ft	ft	ft	ft	ft
50.00	21.40	23.80	25.00	26.20	27.40	22.60
100.00	46.40	48.80	50.00	51.20	52.40	47.60
200.00	96.40	98.80	100.00	101.20	102.40	97.60
300.00	146.40	148.80	150.00	151.20	152.40	147.60
400.00	196.40	198.80	200.00	201.20	202.40	197.60
500.00	246.40	248.80	250.00	251.20	252.40	247.60
600.00	296.40	298.80	300.00	301.20	302.40	297.60
700.00	346.40	348.80	350.00	351.20	352.40	347.60
800.00	396.40	398.80	400.00	401.20	402.40	397.60
900.00	446.40	448.80	450.00	451.20	452.40	447.60
1000.00	496.40	498.80	500.00	501.20	502.40	497.60

MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
7.31	142.64
3.65	146.29
1.83	148.12
1.22	148.73
0.91	149.03
0.73	149.22
0.61	149.34
0.52	149.43
0.46	149.49
0.41	149.54
0.37	149.58



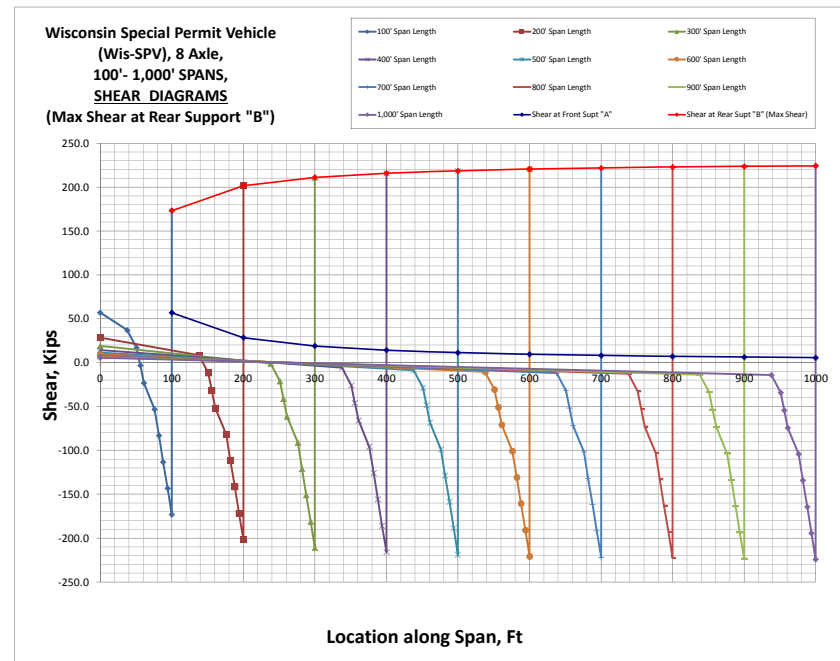
MOMENT								
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
50	Moment	0.0	1,606.75	1,715.19	1,745.39	1,739.72	1,691.97	0.0
	Axle Location on Span	0.00	21.40	23.80	25.00	26.20	27.40	50.00
100	Moment	0.0	3,481.29	3,589.60	3,619.74	3,614.00	3,566.19	0.0
	Axle Location on Span	0.00	46.40	48.80	50.00	51.20	52.40	100.00
200	Moment	0.0	7,230.08	7,338.32	7,368.43	7,362.66	7,314.81	0.0
	Axle Location on Span	0.00	96.40	98.80	100.00	101.20	102.40	200.00
300	Moment	0.0	10,978.80	11,087.02	11,117.12	11,111.34	11,063.48	0.0
	Axle Location on Span	0.00	146.40	148.80	150.00	151.20	152.40	300.00
400	Moment	0.0	14,727.51	14,835.72	14,865.81	14,860.03	14,812.16	0.0
	Axle Location on Span	0.00	196.40	198.80	200.00	201.20	202.40	400.00
500	Moment	0.0	18,476.21	18,584.41	18,614.50	18,608.71	18,560.84	0.0
	Axle Location on Span	0.00	246.40	248.80	250.00	251.20	252.40	500.00
600	Moment	0.0	22,224.90	22,333.10	22,363.19	22,357.40	22,309.53	0.0
	Axle Location on Span	0.00	296.40	298.80	300.00	301.20	302.40	600.00
700	Moment	0.0	25,973.60	26,081.79	26,111.88	26,106.09	26,058.22	0.0
	Axle Location on Span	0.00	346.40	348.80	350.00	351.20	352.40	700.00
800	Moment	0.0	29,722.29	29,830.49	29,860.57	29,854.78	29,806.91	0.0
	Axle Location on Span	0.00	396.40	398.80	400.00	401.20	402.40	800.00
900	Moment	0.0	33,470.98	33,579.18	33,609.26	33,603.47	33,555.59	0.0
	Axle Location on Span	0.00	446.40	448.80	450.00	451.20	452.40	900.00
1,000	Moment	0.0	37,219.68	37,327.87	37,357.95	37,352.16	37,304.28	0.0
	Axle Location on Span	0.00	496.40	498.80	500.00	501.20	502.40	1,000.00





MAXIMUM SHEAR (Calculated by positioning vehicle so that the rear axle is located at left-most ("rear") support "B")

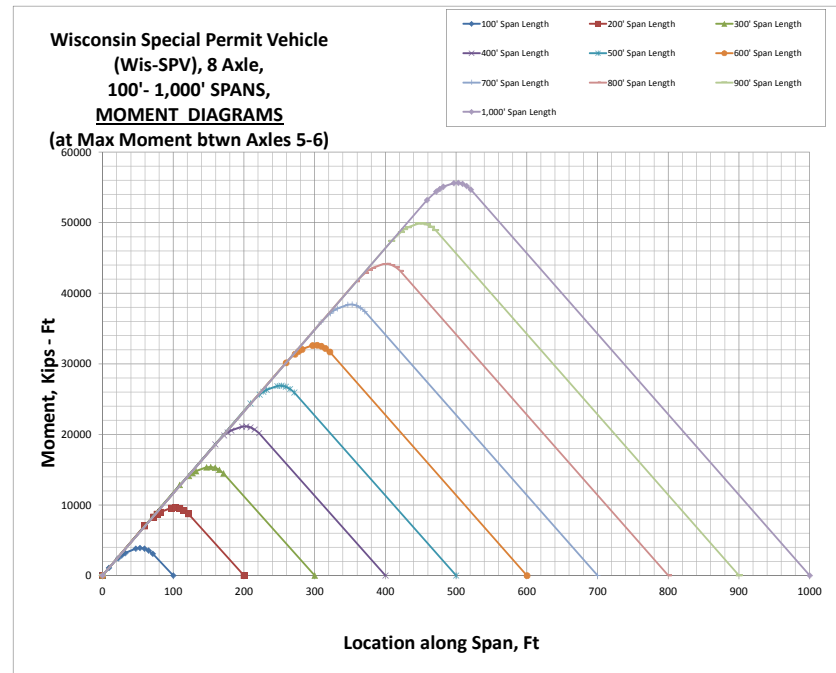
Span Length, ft	Calculated SHEARS and Locations	Reaction at Right Supt "A" (Vmax A)	Front Axle #1 (AX 1)	Middle Axle #2 (AX 2)	Middle Axle #3 (AX 3)	Middle Axle #4 (AX 4)	Middle Axle #5 (AX 5)	Middle Axle #6 (AX 6)	Middle Axle #7 (AX 7)	Rear Axle #8 (AX 8)	Reaction at Left Supt "B" (Vmax B)
100	Shear at Axle Location, kips	164.54	239.36	104.29	69.22	34.15	4.25	25.65	58.85	85.45	85.45
Check FBD	Axle Location on Span, ft	0.00	0.00	13.12	17.06	21.00	50.53	54.47	58.41	62.35	100.00
100	Shear at Axle Location, kips	70.42	45.24	10.17	-24.90	-59.97	-89.87	-119.77	-149.67	-179.57	-179.57
	Axle Location on Span, ft	0.00	37.65	50.77	54.71	58.65	88.18	92.12	96.06	100.00	100.00
200	Shear at Axle Location, kips	35.21	10.03	-25.04	-60.11	-95.18	-125.08	-154.98	-184.88	-214.78	-214.78
	Axle Location on Span, ft	0.00	137.65	150.77	154.71	158.65	188.18	192.12	196.06	200.00	200.00
300	Shear at Axle Location, kips	23.47	-1.71	-36.78	-71.85	-106.92	-136.82	-166.72	-196.62	-226.52	-226.52
	Axle Location on Span, ft	0.00	237.65	250.77	254.71	258.65	288.18	292.12	296.06	300.00	300.00
400	Shear at Axle Location, kips	17.60	-7.57	-42.64	-77.71	-112.78	-142.68	-172.58	-202.48	-232.38	-232.38
	Axle Location on Span, ft	0.00	337.65	350.77	354.71	358.65	388.18	392.12	396.06	400.00	400.00
500	Shear at Axle Location, kips	14.08	-11.10	-46.17	-81.24	-116.31	-146.21	-176.11	-206.01	-235.91	-235.91
	Axle Location on Span, ft	0.00	437.65	450.77	454.71	458.65	488.18	492.12	496.06	500.00	500.00
600	Shear at Axle Location, kips	11.74	-13.44	-48.51	-83.58	-118.65	-148.55	-178.45	-208.35	-238.25	-238.25
	Axle Location on Span, ft	0.00	537.65	550.77	554.71	558.65	588.18	592.12	596.06	600.00	600.00
700	Shear at Axle Location, kips	10.06	-15.12	-50.19	-85.26	-120.33	-150.23	-180.13	-210.03	-239.93	-239.93
	Axle Location on Span, ft	0.00	637.65	650.77	654.71	658.65	688.18	692.12	696.06	700.00	700.00
800	Shear at Axle Location, kips	8.80	-16.38	-51.45	-86.52	-121.59	-151.49	-181.39	-211.29	-241.19	-241.19
	Axle Location on Span, ft	0.00	737.65	750.77	754.71	758.65	788.18	792.12	796.06	800.00	800.00
900	Shear at Axle Location, kips	7.82	-17.35	-52.42	-87.49	-122.56	-152.46	-182.36	-212.26	-242.16	-242.16
	Axle Location on Span, ft	0.00	837.65	850.77	854.71	858.65	888.18	892.12	896.06	900.00	900.00
1,000	Shear at Axle Location, kips	7.04	-18.14	-53.21	-88.28	-123.35	-153.25	-183.15	-213.05	-242.95	-242.95
	Axle Location on Span, ft	0.00	937.65	950.77	954.71	958.65	988.18	992.12	996.06	1000.00	1,000.00



EIGHT (8) AXLE Wisconsin Special Permit Vehicle (Wis-SPV), Maximum MOMENT (M) Calculation, 50'- 1,000' Spans									
Axle	Load (kN)	Load (kips)	Distance		SI / Metric Units				
			btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)			
(Front) 1	12.5	35.2	0.00	0.00	112.00	0			
2	17.54	35.1	13.12	13.12	156.00	400			
3	17.54	35.1	3.94	17.06	156.00	520			
4	17.54	35.1	3.94	21.00	156.00	640			
5	14.95	29.9	29.53	30.53	133.00	1540			
6	14.95	29.9	3.94	54.47	133.00	1660			
7	14.95	29.9	3.94	58.41	133.00	1780			
(Rear) 8	14.95	29.9	3.94	62.35	133.00	1900			
Totals	125.0	250.0	62.35	1112.0	1042		Resultant at location: <b>34.182</b> Distance to Nearest Axle, "XR": <b>16.348</b> (Forward of Axle #5)		

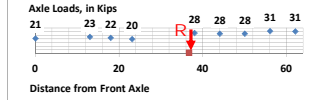
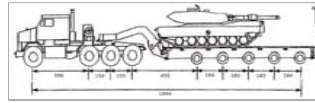
MAXIMUM MOMENT (Calculated by positioning vehicle so that Axle #4 is at mid-span)

Span Length, ft	Calculated MOMENTS and Locations	Moment at Right Support "A"	Front Axle #1 (AX 1)	Middle Axle #2 (AX 2)	Middle Axle #3 (AX 3)	Middle Axle #4 (AX 4)	Middle Axle #5 (AX 5)	Middle Axle #6 (AX 6)	Middle Axle #7 (AX 7)	Rear Axle #8 (AX 8)	Rear Axle #9 (AX 9)	Moment at Left Support "B"
100	Moment at Axle Pos, ft-kips	0.0	2,669.2	3,546.4	3,671.7	3,658.8	2,526.4	2,257.5	1,870.8	1,366.2	1,366.2	0.0
	Axle Location on Span	0.00	29.00	42.12	46.06	50.00	79.53	83.47	87.41	91.35	91.35	100.00
200	Moment at Axle Pos, ft-kips	0.0	8,572.9	9,666.3	9,856.5	9,908.5	9,262.6	9,058.7	8,736.9	8,297.3	8,297.3	0.0
	Axle Location on Span	0.00	79.00	92.12	96.06	100.00	129.53	133.47	137.41	141.35	141.35	200.00
300	Moment at Axle Pos, ft-kips	0.0	14,707.3	15,872.7	16,084.6	16,158.2	15,674.5	15,402.2	15,192.1	14,774.1	14,774.1	0.0
	Axle Location on Span	0.00	129.00	142.12	146.06	150.00	179.53	183.47	187.41	191.35	191.35	300.00
400	Moment at Axle Pos, ft-kips	0.0	20,899.3	22,100.8	22,323.5	22,407.9	22,005.4	21,833.8	21,544.5	21,137.4	21,137.4	0.0
	Axle Location on Span	0.00	179.00	192.12	196.06	200.00	229.53	233.47	237.41	241.35	241.35	400.00
500	Moment at Axle Pos, ft-kips	0.0	27,114.45	28,337.56	28,566.69	28,657.64	28,303.73	28,138.70	27,855.86	27,455.23	27,455.23	0.0
	Axle Location on Span	0.00	229.00	242.12	246.06	250.00	279.53	283.47	287.41	291.35	291.35	500.00
600	Moment at Axle Pos, ft-kips	0.0	33,341.10	34,578.62	34,812.08	34,907.36	34,585.88	34,425.18	34,146.68	33,750.37	33,750.37	0.0
	Axle Location on Span	0.00	279.00	292.12	296.06	300.00	329.53	333.47	337.41	341.35	341.35	600.00
700	Moment at Axle Pos, ft-kips	0.0	39,574.34	40,822.16	41,058.71	41,157.08	40,858.77	40,701.16	40,425.75	40,032.53	40,032.53	0.0
	Axle Location on Span	0.00	329.00	342.12	346.06	350.00	379.53	383.47	387.41	391.35	391.35	700.00
800	Moment at Axle Pos, ft-kips	0.0	45,811.71	47,067.24	47,308.11	47,406.80	47,125.87	46,970.58	46,697.40	46,306.58	46,306.58	0.0
	Axle Location on Span	0.00	379.00	392.12	396.06	400.00	429.53	433.47	437.41	441.35	441.35	800.00
900	Moment at Axle Pos, ft-kips	0.0	52,051.81	53,313.36	53,554.03	53,656.52	53,389.10	53,235.62	52,964.32	52,575.23	52,575.23	0.0
	Axle Location on Span	0.00	429.00	442.12	446.06	450.00	479.53	483.47	487.41	491.35	491.35	900.00
1,000	Moment at Axle Pos, ft-kips	0.0	58,293.8	59,560.2	59,802.3	59,906.2	59,649.6	59,497.6	59,227.7	58,840.1	58,840.1	0.0
	Axle Location on Span	0.00	479.00	492.12	496.06	500.00	529.53	533.47	537.41	541.35	541.35	1,000.00



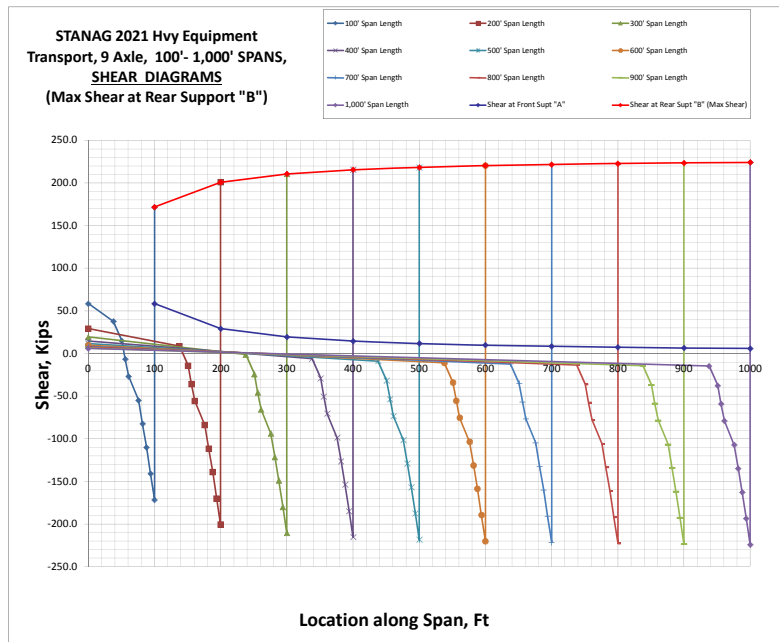
**NINE (9) AXLE** **One (1x) STANAG US HET System, Maximum SHEAR (V) Calculation, 50'- 1,000' Spans**

Axle (Front) 1	Load (ST)	Load (kips)	SI / Metric Units			
			Distance btwn axles (ft)	Distance from front axle (ft)	Load (kN)	Distance from front axle (cm)
1	10.35	20.7	0.00	0.00	92.07	0
2	11.45	22.9	13.00	13.00	101.83	396
3	10.77	21.5	5.04	18.04	95.79	550
4	9.97	19.9	5.08	23.12	88.70	705
5	14.08	28.2	14.92	38.04	125.26	1160
6	13.80	27.6	6.04	44.08	122.77	1344
7	13.80	27.6	6.00	50.09	122.77	1527
8	15.45	30.9	6.00	56.09	137.45	1710
9	15.35	30.7	6.04	62.13	136.56	1894
<b>Totals</b>	<b>115.0</b>	<b>230.0</b>	<b>62.13</b>			<b>1023.2</b>
Resultant at location:			36.769	1121		
Distance to Nearest Axle, "xft":			1.272	(Forward of Axle #5)		

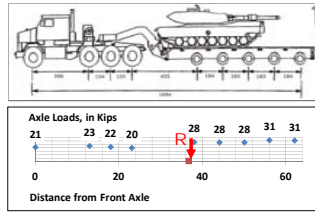


**MAXIMUM SHEAR (Calculated by positioning vehicle so that the rear axle is located at left-most ("rear") support "B")**

Span Length, ft	Calculated SHEARS and Locations	Reaction at Right Supt "A" (Vmax A)									Reaction at Left Supt "B" (Vmax B)	
		Front Axle #1 (AX 1)	Middle Axle #2 (AX 2)	Middle Axle #3 (AX 3)	Middle Axle #4 (AX 4)	Middle Axle #5 (AX 5)	Middle Axle #6 (AX 6)	Middle Axle #7 (AX 7)	Middle Axle #8 (AX 8)	Rear Axle #9 (AX 9)		
<b>100</b>	Shear at Axle Location, kips	145.45	124.75	101.86	80.32	60.38	32.22	4.62	-22.98	-53.88	-84.58	84.58
	Axle Location on Span, ft	0.00	0.00	13.00	18.04	21.12	38.04	44.08	50.09	56.09	62.13	100.00
<b>100</b>	Shear at Axle Location, kips	58.33	37.54	14.74	-6.79	-26.73	-54.89	-82.49	-110.09	-140.99	-171.69	171.69
	Axle Location on Span, ft	0.00	37.87	50.87	55.91	60.99	75.91	81.96	87.96	93.96	100.00	100.00
<b>200</b>	Shear at Axle Location, kips	29.17	8.47	-14.42	-35.96	-55.90	-84.06	-111.66	-139.26	-170.16	-200.86	200.86
	Axle Location on Span, ft	0.00	137.87	150.87	155.91	160.99	175.91	181.96	187.96	193.96	200.00	200.00
<b>300</b>	Shear at Axle Location, kips	19.44	-1.23	-24.15	-45.68	-65.62	-93.78	-124.38	-148.98	-179.88	-210.58	210.58
	Axle Location on Span, ft	0.00	237.87	250.87	255.91	260.99	275.91	281.96	287.96	293.96	300.00	300.00
<b>400</b>	Shear at Axle Location, kips	14.58	-6.12	-29.01	-50.54	-70.48	-98.64	-126.24	-153.84	-184.74	-215.44	215.44
	Axle Location on Span, ft	0.00	337.87	350.87	355.91	360.99	375.91	381.96	387.96	393.96	400.00	400.00
<b>500</b>	Shear at Axle Location, kips	11.67	-9.03	-31.93	-53.46	-73.40	-101.56	-129.16	-156.76	-187.66	-218.36	218.36
	Axle Location on Span, ft	0.00	437.87	450.87	455.91	460.99	475.91	481.96	487.96	493.96	500.00	500.00
<b>600</b>	Shear at Axle Location, kips	9.72	-10.98	-33.87	-55.40	-75.35	-103.50	-131.10	-158.70	-189.60	-220.30	220.30
	Axle Location on Span, ft	0.00	537.87	550.87	555.91	560.99	575.91	581.96	587.96	593.96	600.00	600.00
<b>700</b>	Shear at Axle Location, kips	8.33	-12.37	-35.26	-56.79	-76.73	-104.89	-132.49	-160.09	-190.99	-221.69	221.69
	Axle Location on Span, ft	0.00	637.87	650.87	655.91	660.99	675.91	681.96	687.96	693.96	700.00	700.00
<b>800</b>	Shear at Axle Location, kips	7.29	-13.41	-36.30	-57.83	-77.78	-105.94	-133.53	-161.13	-192.03	-222.73	222.73
	Axle Location on Span, ft	0.00	737.87	750.87	755.91	760.99	775.91	781.96	787.96	793.96	800.00	800.00
<b>900</b>	Shear at Axle Location, kips	6.48	-14.22	-37.11	-58.65	-78.59	-106.75	-134.35	-161.94	-192.84	-223.54	223.54
	Axle Location on Span, ft	0.00	837.87	850.87	855.91	860.99	875.91	881.96	887.96	893.96	900.00	900.00
<b>1,000</b>	Shear at Axle Location, kips	5.83	-14.87	-37.76	-59.29	-79.23	-107.39	-134.99	-162.59	-193.49	-224.19	224.19
	Axle Location on Span, ft	0.00	937.87	950.87	955.91	960.99	975.91	981.96	987.96	993.96	1000.00	1,000.00

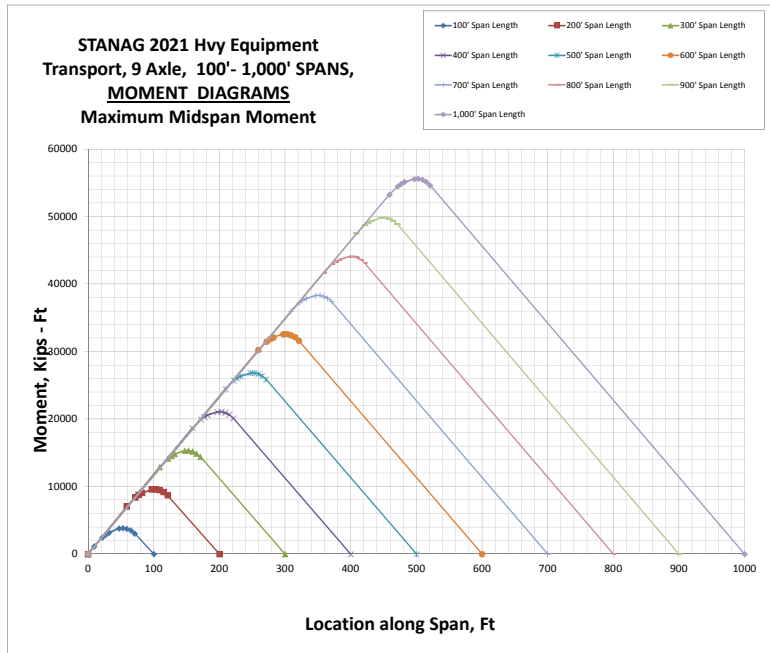


NINE (9) AXLE		One (1x) STANAG US HET System, Maximum Midspan Moments, 50'- 1,000' Spans				
Axle	Load (ST)	Load (kips)	Distance		S <sub>1</sub> / Metric Units	
			btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	10.35	20.7	0.00	0.00	92.07	0
2	11.45	22.9	13.00	13.00	101.83	396
3	10.77	21.5	5.04	18.04	95.79	550
4	9.97	19.9	5.08	23.12	88.70	705
5	14.08	28.2	14.92	38.04	125.26	1160
6	13.80	27.6	6.04	44.08	122.77	1344
7	13.80	27.6	6.00	50.09	122.77	1527
8	15.45	30.9	6.00	56.09	137.45	1710
(Rear) 9	15.35	30.7	6.04	62.13	136.56	1894
Totals	115.0	230.0	62.13		1023.2	
			Resultant at location:	36.769		1121
			Distance to Nearest Axle, "xR":	1.272	(Forward of Axle #5)	



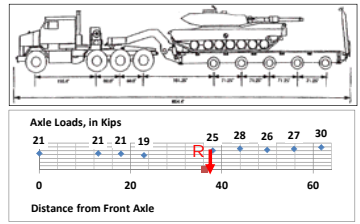
**MAXIMUM MID-SPAN MOMENT**

Span Length, ft	Calculated MOMENTS and Locations	Moment at Right Support "A"	Front Axle #1 (AX 1)	Middle Axle #2 (AX 2)	Middle Axle #3 (AX 3)	Middle Axle #4 (AX 4)	Middle Axle #5 (AX 5)	Middle Axle #6 (AX 6)	Middle Axle #7 (AX 7)	Middle Axle #8 (AX 8)	Rear Axle #9 (AX 9)	Moment at Left Support "B"
100	Moment at Axle Pos, ft-kips Axle Location on Span	0.0 0.00	779.9 5.92	2,224.6 18.36	2,669.6 22.04	3,008.6 25.04	3,706.4 30.86	3,818.9 31.82	3,764.9 31.60	3,545.4 29.50	3,137.6 26.12	0.0 0.00
200	Moment at Axle Pos, ft-kips Axle Location on Span	0.0 0.00	6,901.4 55.92	8,236.8 68.91	8,639.3 73.96	8,935.6 79.04	9,507.9 79.04	9,569.5 79.04	9,465.1 79.04	9,195.1 79.04	8,736.4 79.04	0.0 0.00
300	Moment at Axle Pos, ft-kips Axle Location on Span	0.0 0.00	12,775.7 105.92	14,074.6 118.91	14,463.0 123.96	14,745.0 129.04	15,275.4 129.04	15,320.1 129.04	15,198.9 129.04	14,912.0 129.04	14,436.4 129.04	0.0 0.00
400	Moment at Axle Pos, ft-kips Axle Location on Span	0.0 0.00	18,588.2 155.92	19,868.8 168.91	20,250.2 173.96	20,525.1 179.04	21,034.6 179.04	21,070.8 179.04	20,941.1 179.04	20,645.8 179.04	20,161.7 179.04	0.0 0.00
500	Moment at Axle Pos, ft-kips Axle Location on Span	0.0 0.00	24,375.91 205.92	25,645.61 218.91	26,022.73 223.96	26,293.36 229.04	26,790.29 229.04	26,821.42 229.04	26,686.71 229.04	26,386.39 229.04	25,897.20 229.04	0.0 0.00
600	Moment at Axle Pos, ft-kips Axle Location on Span	0.0 0.00	30,151.28 255.92	31,413.89 268.91	31,787.98 273.96	32,055.76 279.04	32,544.32 279.04	32,572.06 279.04	32,433.99 279.04	32,130.30 279.04	31,637.72 279.04	0.0 0.00
700	Moment at Axle Pos, ft-kips Axle Location on Span	0.0 0.00	35,919.58 305.92	37,176.78 318.91	37,549.06 323.96	37,814.80 329.04	38,297.38 329.04	38,322.70 329.04	38,182.23 329.04	37,876.14 329.04	37,381.13 329.04	0.0 0.00
800	Moment at Axle Pos, ft-kips Axle Location on Span	0.0 0.00	41,683.47 355.92	42,936.77 368.91	43,307.51 373.96	43,571.74 379.04	44,049.84 379.04	44,073.34 379.04	43,931.04 379.04	43,623.17 379.04	43,126.31 379.04	0.0 0.00
900	Moment at Axle Pos, ft-kips Axle Location on Span	0.0 0.00	47,444.42 405.92	48,694.67 418.91	49,064.25 423.96	49,327.28 429.04	49,801.80 429.04	49,823.98 429.04	49,680.30 429.04	49,371.01 429.04	48,872.77 429.04	0.0 0.00
1,000	Moment at Axle Pos, ft-kips Axle Location on Span	0.0 0.00	53,203.1 455.92	54,451.1 468.91	54,819.8 473.96	55,081.8 479.04	55,553.7 479.04	55,574.6 479.04	55,429.8 479.04	55,119.4 479.04	54,620.0 479.04	0.0 0.00



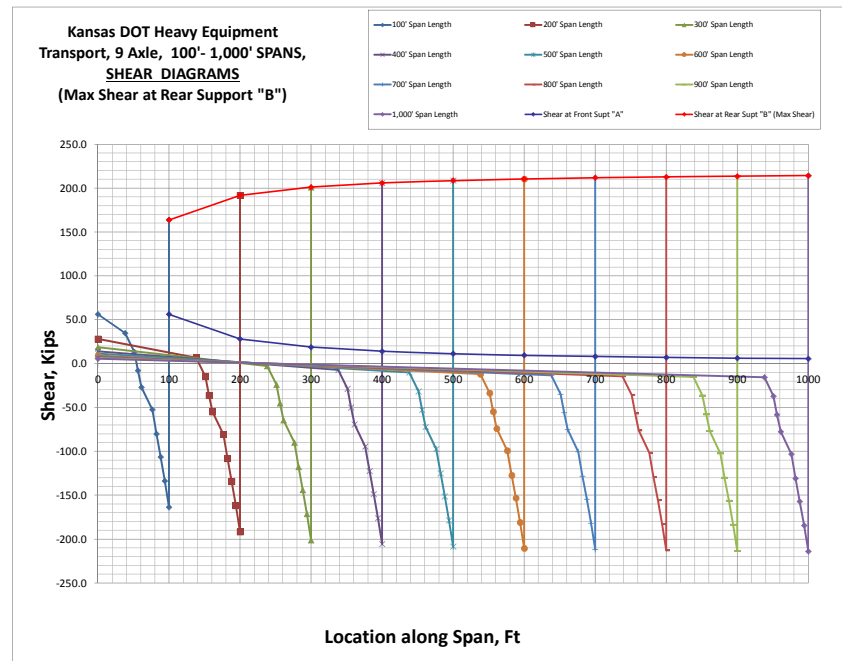


NINE (9) AXLE										One (1x) Kansas DOT HET System, Maximum SHEAR (V) Calculation, 50'- 1,000' Spans										
Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units		Load (kN)	Distance from front axle (cm)												
(Front) 1	10.70	21.4	12.92	0.00	95.19		394													
2	10.70	21.4	12.92	12.92	95.19		394													
3	10.60	21.2	5.00	17.92	94.30		546													
4	9.60	19.2	5.00	22.92	85.41		699													
5	12.70	25.4	15.10	38.02	112.98		1150													
6	13.50	27.8	5.94	43.96	123.66		1340													
7	13.10	26.2	5.94	49.90	116.54		1521													
8	13.70	27.4	5.94	55.83	121.88		1702													
(Rear) 9	14.90	29.8	5.94	61.77	132.56		1883													
Totals	109.9	219.8	61.77		977.7															
				Resultant at location:	36.223		1104													
				Distance to Nearest Axle, "xR":	1.797		(Forward of Axle #5)													

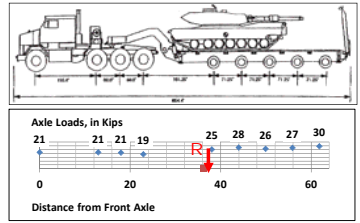


MAXIMUM SHEAR (Calculated by positioning vehicle so that the rear axle is located at left-most ("rear") support "B")

Span Length, ft	Calculated SHEARS and Locations	Reaction at Right Supt "A" (Vmax A)	Front Axle #1 (AX 1)	Middle Axle #2 (AX 2)	Middle Axle #3 (AX 3)	Middle Axle #4 (AX 4)	Middle Axle #5 (AX 5)	Middle Axle #6 (AX 6)	Middle Axle #7 (AX 7)	Middle Axle #8 (AX 8)	Rear Axle #9 (AX 9)	Reaction at Left Supt "B" (Vmax B)
100	Shear at Axle Location, kips	140.18	218.78	97.38	-76.18	-56.98	-31.59	-2.78	-22.42	-49.82	-79.62	79.62
100	Check FBD	0.00	0.00	22.92	17.92	22.92	38.02	43.96	49.90	55.83	61.77	100.00
	Axle Location on Span, ft	0.00	34.75	13.35	-7.85	-27.05	-52.45	-80.25	-106.45	-133.85	-163.65	163.65
200	Shear at Axle Location, kips	28.08	6.68	-14.72	-35.92	-55.12	-80.52	-108.32	-134.52	-161.92	-191.72	191.72
	Axle Location on Span, ft	0.00	38.23	51.15	61.15	61.15	76.25	82.19	88.13	94.06	100.00	100.00
300	Shear at Axle Location, kips	18.72	-2.68	-24.08	-45.28	-64.48	-89.88	-117.68	-143.88	-171.28	-201.08	201.08
	Axle Location on Span, ft	0.00	238.23	251.15	256.15	261.15	276.25	282.19	288.13	294.06	300.00	300.00
400	Shear at Axle Location, kips	14.04	-7.36	-28.76	-49.96	-69.16	-94.56	-122.36	-148.56	-175.96	-205.76	205.76
	Axle Location on Span, ft	0.00	338.23	351.15	356.15	361.15	376.25	382.19	388.13	394.06	400.00	400.00
500	Shear at Axle Location, kips	11.23	-10.17	-31.37	-52.77	-71.97	-97.37	-125.17	-151.37	-178.77	-208.57	208.57
	Axle Location on Span, ft	0.00	438.23	451.15	456.15	461.15	476.25	482.19	488.13	494.06	500.00	500.00
600	Shear at Axle Location, kips	9.31	-12.09	-33.49	-54.69	-73.89	-99.29	-127.09	-153.29	-180.69	-210.49	210.44
	Axle Location on Span, ft	0.00	538.23	551.15	556.15	561.15	576.25	582.19	588.13	594.06	600.00	600.00
700	Shear at Axle Location, kips	8.02	-13.38	-34.78	-55.98	-75.18	-100.58	-128.38	-154.58	-181.98	-211.78	211.78
	Axle Location on Span, ft	0.00	638.23	651.15	656.15	661.15	676.25	682.19	688.13	694.06	700.00	700.00
800	Shear at Axle Location, kips	7.02	-14.38	-35.78	-56.98	-75.18	-101.58	-129.38	-155.58	-182.98	-212.78	212.78
	Axle Location on Span, ft	0.00	738.23	751.15	756.15	761.15	776.25	782.19	788.13	794.06	800.00	800.00
900	Shear at Axle Location, kips	6.24	-15.16	-36.56	-57.76	-76.96	-102.36	-130.16	-156.36	-183.76	-213.56	213.56
	Axle Location on Span, ft	0.00	838.23	851.15	856.15	861.15	876.25	882.19	888.13	894.06	900.00	900.00
1,000	Shear at Axle Location, kips	5.62	-15.78	-37.18	-58.38	-77.58	-102.98	-130.78	-156.98	-184.38	-214.18	214.18
	Axle Location on Span, ft	0.00	938.23	951.15	956.15	961.15	976.25	982.19	988.13	994.06	1000.00	1,000.00

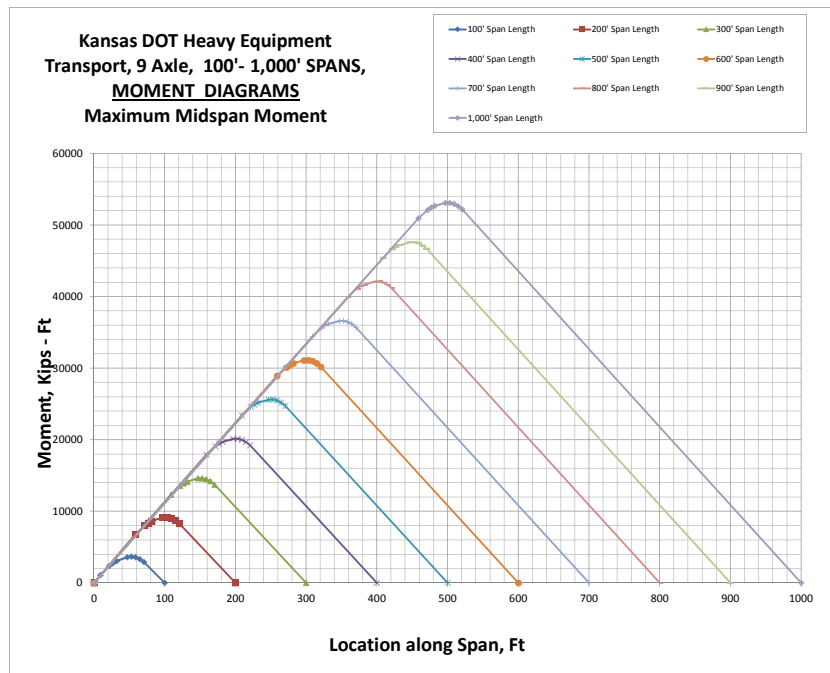


NINE (9) AXLE		One (1x) Kansas DOT HET System, Maximum Midspan Moments, 50'- 1,000' Spans					
Axle (Front)	Load (ST) Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units		Distance from front axle (cm)	
				Load (kN)	Distance from front axle (cm)		
1	10.70	21.4	0.00	95.19		0	
2	10.70	21.4	12.92	95.19		394	
3	10.60	21.2	5.00	17.92		546	
4	9.60	19.2	5.00	22.92		699	
5	12.70	25.4	15.10	38.02		1159	
6	13.90	27.8	5.94	43.96		1340	
7	13.10	26.2	5.94	49.90		1521	
8	13.70	27.4	5.94	55.83		1702	
9 (Rear)	14.90	29.8	5.94	61.77		1883	
Totals	109.9	219.8	61.77			977.7	
			Resultant at location:	36.223		1104	
			Distance to Nearest Axle, "XR":	1.797	(Forward of Axle #5)		

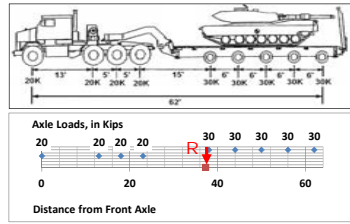


**MAXIMUM MID-SPAN MOMENT**

Span Length, ft	Calculated MOMENTS and Locations	Moment at Right Support "A"	Front Axle #1 (AX 1)	Middle Axle #2 (AX 2)	Middle Axle #3 (AX 3)	Middle Axle #4 (AX 4)	Middle Axle #5 (AX 5)	Middle Axle #6 (AX 6)	Middle Axle #7 (AX 7)	Middle Axle #8 (AX 8)	Rear Axle #9 (AX 9)	Moment at Left Support "B"
100	Moment at Axle Pos, ft-kips	0.0	766.7	2,129.4	2,549.9	2,864.4	3,524.5	3,633.2	3,576.8	3,364.8	2,990.2	0.0
100	Axle Location on Span	0.00	6.04	18.96	23.96	28.96	44.06	50.00	55.94	61.88	67.81	100.00
200	Moment at Axle Pos, ft-kips	0.0	6,635.4	7,888.3	8,266.3	8,538.3	9,070.0	9,128.2	9,021.3	8,758.9	8,333.8	0.0
200	Axle Location on Span	0.00	56.04	68.96	73.96	78.96	94.06	100.00	105.94	111.88	117.81	200.00
300	Moment at Axle Pos, ft-kips	0.0	12,254.9	13,471.3	13,835.1	14,092.0	14,581.8	14,623.2	14,499.5	14,220.2	13,778.3	0.0
300	Axle Location on Span	0.00	106.04	118.96	123.96	128.96	144.06	150.00	155.94	161.88	167.81	300.00
400	Moment at Axle Pos, ft-kips	0.0	17,812.2	19,010.2	19,367.0	19,617.7	20,085.2	20,118.2	19,986.1	19,698.4	19,248.0	0.0
400	Axle Location on Span	0.00	156.04	168.96	173.96	178.96	194.06	200.00	205.94	211.88	217.81	400.00
500	Moment at Axle Pos, ft-kips	0.0	23,344.58	24,531.63	24,884.13	25,130.63	25,585.27	25,613.18	25,476.02	25,183.31	24,727.90	0.0
500	Axle Location on Span	0.00	206.04	218.96	223.96	228.96	244.06	250.00	255.94	261.88	267.81	500.00
600	Moment at Axle Pos, ft-kips	0.0	28,864.49	30,044.22	30,393.89	30,637.55	31,083.63	31,108.18	30,967.66	30,571.58	30,212.81	0.0
600	Axle Location on Span	0.00	256.04	268.96	273.96	278.96	294.06	300.00	305.94	311.88	317.81	600.00
700	Moment at Axle Pos, ft-kips	0.0	34,377.28	35,551.78	35,899.43	36,141.07	36,581.04	36,603.18	36,460.25	36,161.77	35,700.60	0.0
700	Axle Location on Span	0.00	306.04	318.96	323.96	328.96	344.06	350.00	355.94	361.88	367.81	700.00
800	Moment at Axle Pos, ft-kips	0.0	39,885.63	41,056.21	41,402.33	41,642.48	42,077.84	42,098.18	41,953.45	41,653.16	41,190.10	0.0
800	Axle Location on Span	0.00	356.04	368.96	373.96	378.96	394.06	400.00	405.94	411.88	417.81	800.00
900	Moment at Axle Pos, ft-kips	0.0	45,391.01	46,558.54	46,903.48	47,142.43	47,574.24	47,593.18	47,447.05	47,145.36	46,680.98	0.0
900	Axle Location on Span	0.00	406.04	418.96	423.96	428.96	444.06	450.00	455.94	461.88	467.81	900.00
1,000	Moment at Axle Pos, ft-kips	0.0	50,894.3	52,059.4	52,403.4	52,641.4	53,070.4	53,088.2	52,940.9	52,638.1	52,172.6	0.0
1,000	Axle Location on Span	0.00	456.04	468.96	473.96	478.96	494.06	500.00	505.94	511.88	517.81	1,000.00

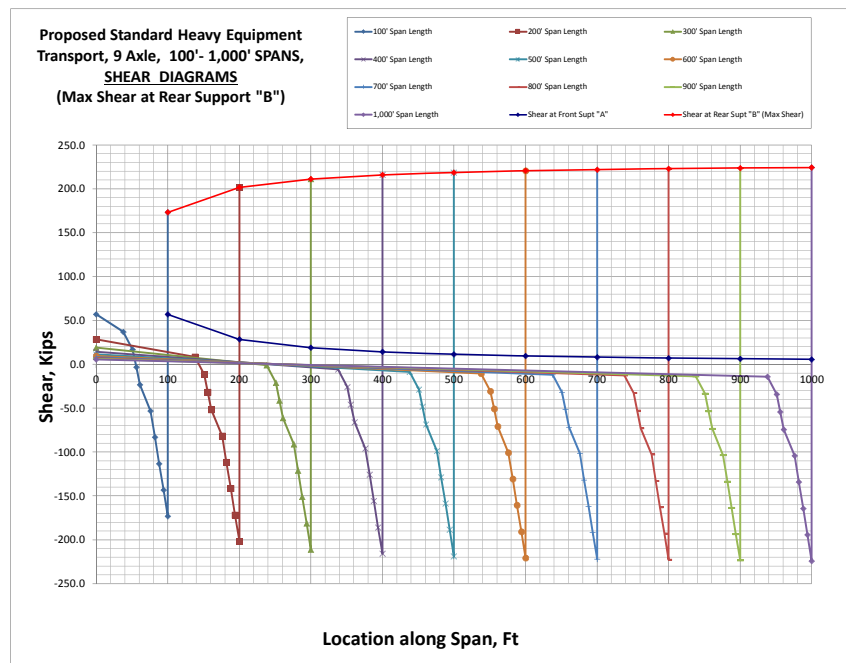


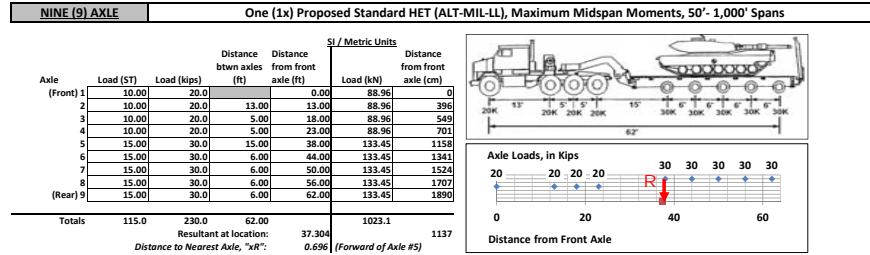
NINE (9) AXLE										One (1x) Proposed Standard HET (ALT-MIL-LL), Maximum SHEAR (V) Calculation, 50'- 1,000' Spans																			
Axle	Load (kN)	Load (kips)	Distance		SI / Metric Units		Load (kN)	Distance from front axle (cm)	Load (kN)	Distance from front axle (cm)	Load (kN)	Distance from front axle (cm)	Load (kN)	Distance from front axle (cm)	Load (kN)	Distance from front axle (cm)	Load (kN)	Distance from front axle (cm)	Load (kN)	Distance from front axle (cm)									
			btwn axles (ft)	from front axle (ft)	Distance from front axle (m)	Distance from front axle (cm)																							
(Front) 1	10.00	20.0	0.00	0.00	88.96	0	10.00	0.00	88.96	0	10.00	0.00	88.96	0	10.00	0.00	88.96	0	10.00	0.00	88.96	0							
2	10.00	20.0	13.00	13.00	88.96	396	10.00	13.00	88.96	396	10.00	13.00	88.96	396	10.00	13.00	88.96	396	10.00	13.00	88.96	396	10.00	13.00	88.96	396			
3	10.00	20.0	5.00	18.00	88.96	549	10.00	5.00	88.96	549	10.00	5.00	88.96	549	10.00	5.00	88.96	549	10.00	5.00	88.96	549	10.00	5.00	88.96	549			
4	10.00	20.0	5.00	23.00	88.96	701	10.00	5.00	88.96	701	10.00	5.00	88.96	701	10.00	5.00	88.96	701	10.00	5.00	88.96	701	10.00	5.00	88.96	701			
5	15.00	30.0	15.00	38.00	133.45	1158	15.00	15.00	133.45	1158	15.00	15.00	133.45	1158	15.00	15.00	133.45	1158	15.00	15.00	133.45	1158	15.00	15.00	133.45	1158			
6	15.00	30.0	6.00	44.00	133.45	1341	15.00	6.00	133.45	1341	15.00	6.00	133.45	1341	15.00	6.00	133.45	1341	15.00	6.00	133.45	1341	15.00	6.00	133.45	1341			
7	15.00	30.0	6.00	50.00	133.45	1524	15.00	6.00	133.45	1524	15.00	6.00	133.45	1524	15.00	6.00	133.45	1524	15.00	6.00	133.45	1524	15.00	6.00	133.45	1524			
8	15.00	30.0	6.00	56.00	133.45	1707	15.00	6.00	133.45	1707	15.00	6.00	133.45	1707	15.00	6.00	133.45	1707	15.00	6.00	133.45	1707	15.00	6.00	133.45	1707			
(Rear) 9	15.00	30.0	6.00	62.00	133.45	1890	15.00	6.00	133.45	1890	15.00	6.00	133.45	1890	15.00	6.00	133.45	1890	15.00	6.00	133.45	1890	15.00	6.00	133.45	1890			
Totals	115.0	230.0	62.00		1023.1																								
Resultant at location:		37.304		1137																									
Distance to Nearest Axle, "xR":		0.696		(Forward of Axle #5)																									



MAXIMUM SHEAR (Calculated by positioning vehicle so that the rear axle is located at left-most ("rear") support "B").

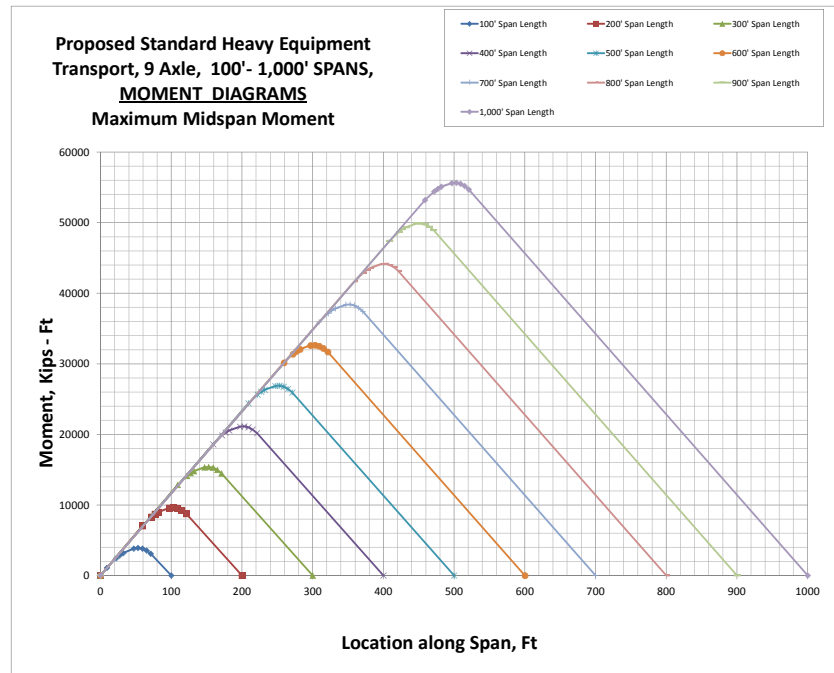
Span Length, ft	Calculated SHEARS and Locations	Reaction at Right Supt "A" (Vmax A)	Front Axle #1	Middle Axle #2 (AX 2)	Middle Axle #3 (AX 3)	Middle Axle #4 (AX 4)	Middle Axle #5 (AX 5)	Middle Axle #6 (AX 6)	Middle Axle #7 (AX 7)	Middle Axle #8 (AX 8)	Rear Axle #9 (AX 9)	Reaction at Left Supt "B" (Vmax B)
			(AX 1)	(AX 2)	(AX 3)	(AX 4)	(AX 5)	(AX 6)	(AX 7)	(AX 8)	(AX 9)	
100	Shear at Axle Location, kips	144.27	124.20	104.20	84.20	64.20	44.20	24.20	4.20	-15.80	-35.80	-55.80
100	Check FBD Axle Location on Span, ft	0.00	0.00	13.00	18.00	23.00	28.00	33.00	38.00	43.00	48.00	53.00
100	Shear at Axle Location, kips	56.80	36.80	16.80	-3.20	-23.20	-53.20	-83.20	-113.20	-143.20	-173.20	-203.20
200	Shear at Axle Location, kips	28.40	8.40	-11.60	-31.60	-51.60	-81.60	-111.60	-141.60	-171.60	-201.60	-231.60
300	Shear at Axle Location, kips	18.93	-1.07	-21.07	-41.07	-61.07	-81.07	-101.07	-121.07	-141.07	-161.07	-181.07
400	Shear at Axle Location, kips	14.20	-5.80	-25.80	-45.80	-65.80	-85.80	-105.80	-125.80	-145.80	-165.80	-185.80
500	Shear at Axle Location, kips	11.36	-8.64	-28.64	-48.64	-68.64	-88.64	-108.64	-128.64	-148.64	-168.64	-188.64
600	Shear at Axle Location, kips	9.47	-10.53	-30.53	-50.53	-70.53	-90.53	-110.53	-130.53	-150.53	-170.53	-190.53
700	Shear at Axle Location, kips	8.11	-11.89	-31.89	-51.89	-71.89	-91.89	-111.89	-131.89	-151.89	-171.89	-191.89
800	Shear at Axle Location, kips	7.10	-12.90	-32.90	-52.90	-72.90	-92.90	-112.90	-132.90	-152.90	-172.90	-192.90
900	Shear at Axle Location, kips	6.31	-13.69	-33.69	-53.69	-73.69	-93.69	-113.69	-133.69	-153.69	-173.69	-193.69
1,000	Shear at Axle Location, kips	5.68	-14.32	-34.32	-54.32	-74.32	-94.32	-114.32	-134.32	-154.32	-174.32	-194.32





**MAXIMUM MID-SPAN MOMENT**

Span Length, ft	Calculated MOMENTS and Locations	Moment at Right Support "A"	Front Axle #1 (AX 1)	Middle Axle #2 (AX 2)	Middle Axle #3 (AX 3)	Middle Axle #4 (AX 4)	Middle Axle #5 (AX 5)	Middle Axle #6 (AX 6)	Middle Axle #7 (AX 7)	Middle Axle #8 (AX 8)	Rear Axle #9 (AX 9)	Moment at Left Support "B"
100	Moment at Axle Pos, ft-kips	0.0	782.4	2,217.6	2,669.6	3,021.6	3,777.6	3,900.0	3,842.4	3,604.8	3,187.2	0.0
	Axle Location on Span	0.00	6.00	19.00	24.00	29.00	44.00	50.00	56.00	62.00	68.00	100.00
200	Moment at Axle Pos, ft-kips	0.0	6,871.2	8,206.3	8,619.8	8,933.3	9,573.8	9,650.0	9,546.2	9,262.4	8,798.6	0.0
	Axle Location on Span	0.00	56.00	69.00	74.00	79.00	94.00	100.00	106.00	112.00	118.00	200.00
300	Moment at Axle Pos, ft-kips	0.0	12,734.1	14,035.9	14,436.5	14,737.2	15,339.2	15,400.0	15,280.8	14,981.6	14,502.4	0.0
	Axle Location on Span	0.00	106.00	119.00	124.00	129.00	144.00	150.00	156.00	162.00	168.00	300.00
400	Moment at Axle Pos, ft-kips	0.0	18,540.6	19,825.7	20,219.9	20,514.2	21,096.9	21,150.0	21,023.1	20,716.2	20,229.3	0.0
	Axle Location on Span	0.00	156.00	169.00	174.00	179.00	194.00	200.00	206.00	212.00	218.00	400.00
500	Moment at Axle Pos, ft-kips	0.0	24,324.48	25,599.52	25,989.92	26,280.32	26,851.52	26,900.00	26,768.48	26,456.96	25,965.44	0.0
	Axle Location on Span	0.00	206.00	219.00	224.00	229.00	244.00	250.00	256.00	262.00	268.00	500.00
600	Moment at Axle Pos, ft-kips	0.0	30,097.07	31,365.43	31,753.27	32,041.10	32,604.60	32,650.00	32,515.40	32,200.80	31,706.20	0.0
	Axle Location on Span	0.00	256.00	269.00	274.00	279.00	294.00	300.00	306.00	312.00	318.00	600.00
700	Moment at Axle Pos, ft-kips	0.0	35,863.20	37,126.80	37,512.80	37,798.80	38,356.80	38,400.00	38,263.20	37,946.40	37,449.60	0.0
	Axle Location on Span	0.00	306.00	319.00	324.00	329.00	344.00	350.00	356.00	362.00	368.00	700.00
800	Moment at Axle Pos, ft-kips	0.0	41,625.30	42,885.30	43,269.95	43,554.58	44,108.45	44,150.00	44,011.55	43,693.10	43,194.65	0.0
	Axle Location on Span	0.00	356.00	369.00	374.00	379.00	394.00	400.00	406.00	412.00	418.00	800.00
900	Moment at Axle Pos, ft-kips	0.0	47,384.71	48,641.96	49,025.51	49,309.07	49,859.73	49,900.00	49,760.27	49,440.53	48,940.80	0.0
	Axle Location on Span	0.00	406.00	419.00	424.00	429.00	444.00	450.00	456.00	462.00	468.00	900.00
1,000	Moment at Axle Pos, ft-kips	0.0	53,142.2	54,397.3	54,780.0	55,062.7	55,610.8	55,650.0	55,509.2	55,188.5	54,687.7	0.0
	Axle Location on Span	0.00	456.00	469.00	474.00	479.00	494.00	500.00	506.00	512.00	518.00	1,000.00



## **TABLES (TABULATED RESULTS FROM CALCULATION WORKSHEETS)**

Analyses Results, All, Tabulated  
MaxVMmid, nrml HL93 noDyn, 50-1K  
HL93 vs ProStd HET+MLC100W

Shear at Rear Supt "B" (Max Shear)								
Span	MLC 40T	MLC 50T	MLC 60T	MLC 70T	MLC 80T	MLC 90T	MLC 100T	MLC 120T
L, feet	Vmax, kips	Vmax, kips	Vmax, kips	Vmax, kips	Vmax, kips	Vmax, kips	Vmax, kips	Vmax, kips
50	70.40	87.00	103.20	119.00	134.40	149.40	164.00	192.00
100	75.20	93.50	111.60	129.50	147.20	164.70	182.00	216.00
200	77.60	96.75	115.80	134.75	153.60	172.35	191.00	228.00
300	78.40	97.83	117.20	136.50	155.73	174.90	194.00	232.00
400	78.80	98.38	117.90	137.38	156.80	176.18	195.50	234.00
500	79.04	98.70	118.32	137.90	157.44	176.94	196.40	235.20
600	79.20	98.92	118.60	138.25	157.87	177.45	197.00	236.00
700	79.31	99.07	118.80	138.50	158.17	177.81	197.43	236.57
800	79.40	99.19	118.95	138.69	158.40	178.09	197.75	237.00
900	79.47	99.28	119.07	138.83	158.58	178.30	198.00	237.33
1,000	79.52	99.35	119.16	138.95	158.72	178.47	198.20	237.60

Shear at Rear Supt "B" (Max Shear)											
Span	AASHTO HL-93 Truck and Lane Load (no Impact)	AASHTO HL-93 Truck and Lane Load (with Impact)	AASHTO Alternative Military Tandem (AMT) and Lane Load (with Impact)	Span	Ontario Hwy Bridge Design	CAN/CSA-06-00, CL-W Load	Span	Kansas DOT Heavy Equipment Transporter (HET)	STANAG 21 Heavy Equipment Transporter (HET)	Proposed Standard Heavy Equipment Transporter (HET)	Proposed Std HET (new Alt Mil Std), with Dynamic Impact
L, feet	Vmax, kips	Vmax, kips	Vmax, kips	L, feet	Vmax, kips	Vmax, kips	L, feet	Vmax, kips	Vmax, kips	Vmax, kips	Vmax, kips
50	74.56	93.89	49.25	76	94.66	91.60	100	163.65	171.69	173.20	230.36
100	97.28	118.82	65.25	100	114.37	110.32	200	191.72	200.86	201.60	268.13
200	132.64	155.29	97.25	200	166.81	157.69	300	201.08	210.58	211.07	280.72
300	165.76	188.78	129.25	300	207.12	194.04	400	205.76	215.44	215.80	287.01
400	198.32	221.53	161.25	400	244.40	227.64	500	208.57	218.36	218.64	290.79
500	230.66	253.97	193.25	500	280.47	260.14	600	210.44	220.30	220.53	293.31
600	262.88	286.27	225.25	600	315.94	292.10	700	211.78	221.69	221.89	295.11
700	295.04	318.48	257.25	700	351.05	323.73	800	212.78	222.73	222.90	296.46
800	327.16	350.64	289.25	800	385.95	355.17	900	213.56	223.54	223.69	297.51
900	359.25	382.77	321.25	900	420.71	386.48	1,000	214.18	224.19	224.32	298.35
1,000	391.33	414.87	353.25	1,000	455.36	417.70					

Span	MLC 40W	MLC 50W	MLC 60W	MLC 70W	MLC 80W	MLC 90W	MLC 100W	MLC 120W
L, feet	Vmax, kips	Vmax, kips	Vmax, kips	Vmax, kips	Vmax, kips	Vmax, kips	Vmax, kips	Vmax, kips
50	66.32	84.16	95.44	107.52	112.64	126.72	133.00	159.60
100	80.16	100.08	117.72	134.26	148.32	166.86	181.50	217.80
200	87.08	108.04	128.86	147.63	166.16	186.93	205.75	246.90
300	89.39	110.69	132.57	152.09	172.11	193.62	213.83	256.60
400	90.54	112.02	134.43	154.32	175.08	196.97	217.88	261.45
500	91.23	112.82	135.54	155.65	176.86	198.97	220.30	264.36
600	91.69	113.35	136.29	156.54	178.05	200.31	221.92	266.30
700	92.02	113.73	136.82	157.18	178.90	201.27	223.07	267.69
800	92.27	114.01	137.22	157.66	179.54	201.98	223.94	268.73
900	92.46	114.23	137.52	158.03	180.04	202.54	224.61	269.53
1,000	92.62	114.41	137.77	158.33	180.43	202.99	225.15	270.18

Span	Maximum End Shear, 1-3x MLC 100W Vehicles	Maximum End Shear, 2x MLC 100W Vehicles	Maximum End Shear, 3x MLC 100W Vehicles	Span	Maximum End Shear, 1-3x MLC 100W Vehicles (No Impact)	Maximum End Shear, 1-3x MLC 100W Vehicles (with Dynamic Impact)	Span	Saturated Flow, from M. Lutomirska PhD thesis (2009)	Proposed Logistic Truck Convoy Lane Load	MLC 70T (with Dynamic Impact)	Louisiana Special Design Veh Type 5 (LASDV-5)
L, feet	Vmax, kips	Vmax, kips	Vmax, kips	L, feet	Vmax, kips	Vmax, kips	L, feet	Vmax, kips	Vmax, kips	Vmax, kips	Vmax, kips
50	133.00			50	133.00	176.89	50	20.25	24.13	158.27	
100	117.72			100	181.50	241.40	100	40.50	48.25	172.24	142.13
200	205.75			200	205.75	273.65	200	81.00	96.50	179.22	175.56
300	213.83			300	213.83	284.40	300	121.50	144.75	181.55	186.71
400	217.88	238.53		400	217.88	307.34	400	162.00	193.00	182.71	192.28
500	220.30	282.82		500	220.30	317.24	500	202.50	241.25	183.41	195.63
600	221.92	312.35		600	221.92	376.15	600	243.00	289.50	183.87	197.85
700	223.07	333.44		700	223.07	415.43	700	283.50	337.75	184.21	199.45
800	223.94	349.26	375.98	800	223.94	443.48	800	324.00	386.00	184.45	200.64
900	224.61	361.57	410.87	900	224.61	460.00	900	364.50	434.25	184.65	201.57
1,000	225.15	371.41	438.78	1,000	225.15	500.05	1,000	405.00	482.50	184.80	202.31
						546.45					
						583.58					

Max Moment at Mid-span								
Span	MLC 40T	MLC 50T	MLC 60T	MLC 70T	MLC 80T	MLC 90T	MLC 100T	MLC 120T
L, feet	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips
50	880.0	1,087.5	1,290.0	1,487.5	1,680.0	1,867.5	2,050.0	2,400.0
100	1,880.0	2,337.5	2,790.0	3,237.5	3,680.0	4,117.5	4,550.0	5,400.0
200	3,880.0	4,837.5	5,790.0	6,737.5	7,680.0	8,617.5	9,550.0	11,400.0
300	5,880.0	7,337.5	8,790.0	10,237.5	11,680.0	13,117.5	14,550.0	17,400.0
400	7,880.0	9,837.5	11,790.0	13,737.5	15,680.0	17,617.5	19,550.0	23,400.0
500	9,880.0	12,337.5	14,790.0	17,237.5	19,680.0	22,117.5	24,550.0	29,400.0
600	11,880.0	14,837.5	17,790.0	20,737.5	23,680.0	26,617.5	29,550.0	35,400.0
700	13,880.0	17,337.5	20,790.0	24,237.5	27,680.0	31,117.5	34,550.0	41,400.0
800	15,880.0	19,837.5	23,790.0	27,737.5	31,680.0	35,617.5	39,550.0	47,400.0
900	17,880.0	22,337.5	26,790.0	31,237.5	35,680.0	40,117.5	44,550.0	53,400.0
1,000	19,880.0	24,837.5	29,790.0	34,737.5	39,680.0	44,617.5	49,550.0	59,400.0

Max Moment at Mid-span											
Span	AASHTO HL-93 Truck and Lane Load (no Impact)	AASHTO HL-93 Truck and Lane Load (with Impact)	AASHTO Alternative Military Tandem (AMT) and Lane Load (with Impact)	Span	Ontario Hwy Bridge Design	CAN/CSA-06-00, CL-W Load	Span	Kansas DOT Heavy Equipment Transporter (HET)	STANAG 21 Heavy Equipment Transporter (HET)	Proposed Standard Heavy Equipment Transporter (HET)	Proposed Std HET (new Alt Mil Std), with Dynamic Impact
L, feet	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips	L, feet	Mmax, ft-kips	Mmax, ft-kips	L, feet	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips
50	820.0	1,024.6	964.8	50	1,761.6	1,551.3	100	3,633.2	3,818.9	3,900.0	5,187.0
100	2,320.0	2,821.6	2,396.0	100	2,807.3	2,586.8	200	9,128.2	9,569.5	9,650.0	12,834.5
200	6,520.0	7,615.6	6,458.5	200	8,264.8	7,705.4	300	14,623.2	15,320.1	15,400.0	20,482.0
300	12,320.0	14,009.6	12,121.0	300	15,450.6	14,371.7	400	20,118.2	21,070.8	21,150.0	28,129.0
400	19,720.0	22,003.6	19,383.5	400	24,352.9	22,581.6	500	25,613.2	26,821.4	26,900.0	35,777.0
500	28,720.0	31,597.6	28,246.0	500	34,969.3	32,334.6	600	31,108.2	32,572.1	32,650.0	43,424.5
600	39,320.0	42,791.6	38,708.5	600	47,299.0	43,630.4	700	36,603.2	38,322.7	38,400.0	51,072.0
700	51,520.0	55,585.6	50,771.0	700	61,341.6	56,468.7	800	42,098.2	44,073.3	44,150.0	58,719.5
800	65,320.0	69,979.6	64,433.5	800	77,097.0	70,849.7	900	47,593.2	49,824.0	49,900.0	66,367.0
900	80,720.0	85,973.6	79,696.0	900	94,565.1	87,773.3	1,000	53,088.2	55,574.6	55,650.0	74,014.5
1,000	97,720.0	103,567.6	96,558.5	1,000	113,745.8	104,239.3					

Span	MLC 40W	MLC 50W	MLC 60W	MLC 70W	MLC 80W	MLC 90W	MLC 100W	MLC 120W
L, feet	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips
50	787.0	942.0	1,082.0	1,253.0	1,320.0	1,485.0	1,525.0	1,830.0
100	1,962.0	2,392.0	2,832.0	3,265.5	3,620.0	4,072.5	4,400.0	5,280.0
200	4,312.0	5,292.0	6,332.0	7,290.0	8,220.0	9,247.5	10,150.0	12,180.0
300	6,662.0	8,192.0	9,832.0	11,315.5	12,820.0	14,422.5	15,900.0	19,080.0
400	9,012.0	11,092.0	13,332.0	15,340.5	17,420.0	19,597.5	21,650.0	25,980.0
500	11,362.0	13,992.0	16,832.0	19,365.5	22,020.0	24,772.5	27,400.0	32,880.0
600	13,712.0	16,892.0	20,332.0	23,390.5	26,620.0	29,947.5	33,150.0	39,780.0
700	16,062.0	19,792.0	23,832.0	27,415.5	31,220.0	35,122.5	38,900.0	46,680.0
800	18,412.0	22,692.0	27,332.0	31,440.5	35,820.0	40,297.5	44,650.0	53,580.0
900	20,762.0	25,592.0	30,832.0	35,465.5	40,420.0	45,472.5	50,400.0	60,480.0
1,000	23,112.0	28,492.0	34,332.0	39,490.5	45,020.0	50,647.5	56,150.0	67,380.0

Span	Maximum Mid-span Moment, 1x MLC 100W Vehicles	Maximum Mid-span Moment, 2x MLC 100W Vehicles	Maximum Mid-span Moment, 3x MLC 100W Vehicles	Span	Maximum Mid-span Moment, 1-3x MLC 100W Vehicles	Multiple MLC 100W Vehicles on span (with Dynamic Impact)	Span	Saturated Flow, from M. Lutomirska PhD thesis (2009)	Proposed Logistic Truck Convoy Lane Load	MLC 70T (with Dynamic Impact)	Louisiana Special Design Veh Type 5 (LASDV-5)
L, feet	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips	L, feet	Mmax, ft-kips	Mmax, ft-kips	L, feet	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips	Mmax, ft-kips
50	1,525.0			50	1,525.0	2,028.3	50	253.1	301.6	1,978.4	
100	4,400.0			100	4,400.0	5,852.0	100	1,012.5	1,206.3	4,305.9	3,514.6
200	10,150.0			200	10,150.0	13,499.5	200	4,050.0	4,825.0	8,960.9	8,739.2
300	15,900.0			300	15,900.0	21,147.0	300	9,112.5	10,856.3	13,615.9	13,964.1



**TABULATED VALUES USED FOR THE DEVELOPMENT OF PROPOSED NEW MILITARY LIVE LOAD MAGNIFICATION FACTORS**

HL-93 (with Impact)			MLC 100W, 1->2->3 Vehicles on Span (No Impact)			Proposed 230K HET (No Impact)			MLC 70T (No Impact)		
Span Length	Max Shear	Max Moment	Span	Max Shear	Max Moment	Span	Max Shear	Max Moment	Span	Max Shear	Max Moment
ft	Vmax	Mmax	ft	kips	ft-kips	ft	kips	ft-kips	ft	kips	ft-kips
2	43.2	71.6	2	30.0	30.0	2	9.3	4.7	2	9.3	4.7
4	43.6	63.6	4	30.0	30.0	4	18.7	18.7	4	18.7	18.7
6	46.3	90.0	6	30.0	45.0	6	28.0	42.0	6	28.0	42.0
8	52.4	90.2	8	37.5	60.0	8	37.5	60.0	8	37.5	60.0
10	56.4	114.4	10	42.0	75.0	10	42.0	75.0	10	42.0	75.0
12	59.3	144.5	12	45.0	90.0	12	45.0	90.0	12	45.0	90.0
14	61.5	181.9	14	51.4	135.0	14	51.4	135.0	14	51.4	135.0
15	62.4	200.9	15	54.0	157.5	15	54.0	157.5	15	54.0	157.5
16	63.3	220.0	16	56.3	180.0	16	56.3	180.0	16	56.3	180.0
18	64.9	258.7	18	60.0	225.0	18	60.0	225.0	18	60.0	225.0
20	66.3	298.0	20	64.0	240.0	20	64.0	240.0	20	64.0	240.0
25	69.3	399.1	25	78.0	397.5	25	78.0	397.5	25	78.0	397.5
30	72.7	504.3	30	90.0	585.0	30	90.0	585.0	30	90.0	585.0
35	81.4	613.4	35	124.3	952.5	35	98.6	772.5	35	110.0	962.5
40	86.2	726.5	40	127.5	1,140.0	40	105.5	960.0	40	113.8	1,137.5
45	90.3	866.9	45	130.0	1,327.5	45	113.1	1,147.5	45	116.7	1,312.5
50	93.9	1,024.6	50	133.0	1,523.3	50	121.2	1,323.0	50	119.0	1,487.5
55	97.1	1,186.3	55	141.8	1,828.3	55	129.3	1,521.8	55	120.9	1,662.5
60	100.1	1,352.0	60	149.2	2,144.7	60	136.0	1,748.6	60	122.5	1,837.5
65	102.8	1,521.7	65	155.4	2,401.0	65	142.6	2,010.5	65	123.8	2,012.5
70	105.4	1,695.4	70	160.7	2,687.6	70	148.9	2,272.4	70	125.0	2,187.5
75	107.8	1,873.1	75	165.3	2,974.2	75	154.3	2,534.4	75	126.0	2,362.5
80	110.2	2,054.8	80	169.4	3,261.0	80	159.0	2,795.5	80	126.9	2,537.5
85	112.4	2,240.5	85	173.2	3,537.5	85	163.2	3,067.8	85	127.6	2,712.5
90	114.6	2,430.2	90	176.1	3,834.8	90	166.9	3,325.0	90	128.3	2,887.5
95	116.8	2,623.9	95	179.0	4,112.5	95	170.2	3,612.5	95	128.9	3,062.5
100	118.8	2,821.6	100	181.5	4,400.0	100	173.2	3,900.0	100	129.5	3,237.5
110	122.8	3,229.0	110	185.9	4,975.0	110	178.4	4,475.0	110	130.5	3,587.5
120	126.7	3,655.0	120	189.6	5,557.3	120	182.7	5,050.0	120	131.3	3,937.5
130	130.5	4,091.8	130	192.7	6,131.8	130	186.3	5,625.0	130	131.9	4,287.5
140	134.2	4,547.2	140	195.4	6,706.3	140	189.4	6,200.0	140	132.5	4,637.5
150	137.8	5,018.6	150	197.7	7,275.0	150	192.1	6,775.0	150	133.0	4,987.5
160	141.4	5,506.0	160	199.7	7,855.5	160	194.5	7,350.0	160	133.4	5,337.5
170	144.9	6,009.4	170	201.5	8,425.0	170	196.6	7,925.0	170	133.8	5,687.5
180	148.4	6,530.0	180	203.1	9,004.9	180	198.4	8,500.0	180	134.2	6,037.5
190	151.9	7,064.2	190	204.5	9,575.0	190	200.1	9,075.0	190	134.5	6,387.5
200	155.3	7,615.6	200	205.8	10,150.0	200	201.6	9,650.0	200	134.8	6,737.5
250	172.2	10,612.6	250	210.6	12,525.0	250	207.3	12,525.0	250	135.8	8,487.5
300	188.8	14,009.6	300	213.8	15,900.0	300	211.1	15,400.0	300	136.5	10,237.5
400	221.5	22,001.6	400	226.5	21,650.0	400	215.8	21,150.0	400	137.4	13,737.5
500	254.0	31,597.6	500	232.8	27,400.0	500	218.6	26,900.0	500	137.9	17,237.5
600	286.3	42,791.6	600	232.4	34,199.5	600	220.5	32,650.0	600	138.3	20,737.5
700	318.5	55,385.6	700	231.4	44,984.6	700	221.9	38,400.0	700	138.5	24,237.5
800	350.6	69,979.6	800	230.6	57,763.1	800	222.9	44,150.0	800	138.7	27,737.5
900	382.8	85,973.6	900	230.0	75,012.9	900	223.7	49,900.0	900	138.8	31,237.5
1,000	414.9	103,567.6	1,000	229.8	92,262.6	1,000	224.3	55,650.0	1,000	139.0	34,737.5

**TABULATED VALUES USED FOR THE DEVELOPMENT OF PROPOSED NEW MILITARY LIVE LOAD MAGNIFICATION FACTORS**

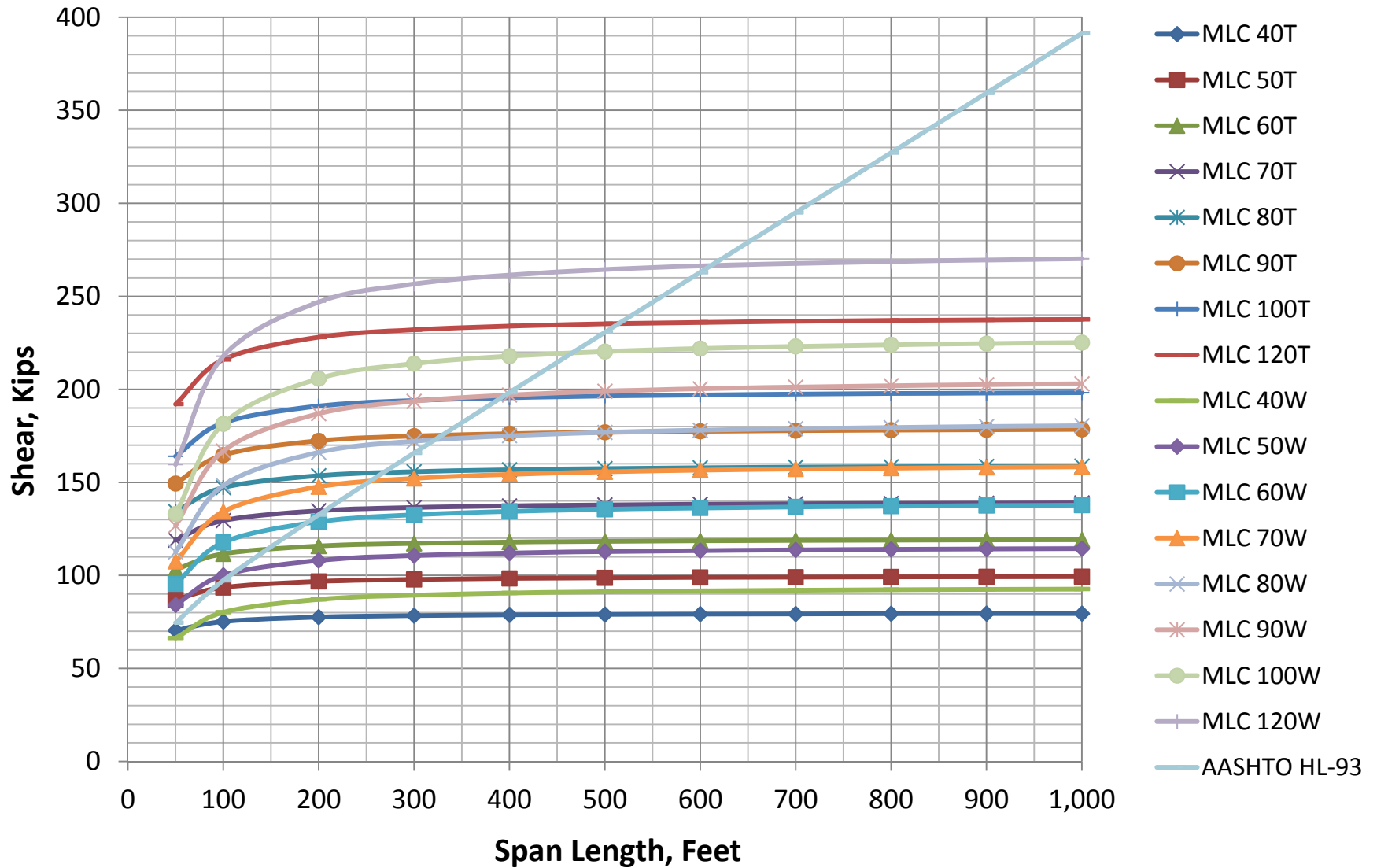
MLC 100W, 1->2->3 Vehicles on Span (with Impact)			Proposed HET (with Impact)			MLC 70T (with Impact)			MLC 100W, 1->2->3 Vehicles on Span (with Impact) NORMALIZED			Proposed 230K HET (with Impact) NORMALIZED			MLC 70T (with Impact) NORMALIZED		
Span	Max Shear	Max Moment	Span	Max Shear	Max Moment	Span	Max Shear	Max Moment	Span	Max Shear	Max Moment	Span	Max Shear	Max Moment	Span	Max Shear	Max Moment
ft	kips	ft-kips	ft	kips	ft-kips	ft	kips	ft-kips	ft	kips	ft-kips	ft	kips	ft-kips	ft	kips	ft-kips
2	39.9	20.0	2	39.9	20.0	2	12.4	6.2	2	1.85	1.85	2	0.92	0.92	2	0.29	0.29
4	39.9	24.8	4	39.9	24.8	4	24.8	24.8	4	1.82	1.82	4	0.91	0.91	4	0.57	0.57
6	39.9	59.9	6	39.9	59.9	6	37.2	59.9	6	1.73	1.79	6	0.86	0.90	6	0.81	0.84
8	49.9	79.8	8	49.9	79.8	8	49.7	99.3	8	1.90	1.77	8	0.95	0.88	8	0.95	1.10
10	55.9	99.8	10	55.9	99.8	10	62.1	155.2	10	1.98	1.74	10	0.99	0.87	10	1.10	1.36
12	59.9	119.7	12	59.9	119.7	12	74.5	233.4	12	2.02	1.66	12	1.01	0.83	12	1.26	1.55
14	68.4	179.6	14	68.4	179.6	14	68.4	179.6	14	2.08	1.75	14	1.11	0.99	14	1.41	1.67
15	71.8	209.5	15	71.8	209.5	15	93.1	304.1	15	2.05	1.79	15	1.15	1.04	15	1.49	1.74
16	74.8	239.4	16	74.8	239.4	16	98.9	395.7	16	2.05	1.81	16	1.18	1.09	16	1.56	1.80
18	79.8	299.3	18	79.8	299.3	18	108.6	488.8	18	2.05	1.85	18	1.23	1.16	18	1.67	1.89
20	87.8	319.2	20	87.8	319.2	20	116.6	581.9	20	2.11	1.87	20	1.32	1.07	20	1.76	1.95
25	107.7	528.7	25	107.7	528.7	25	130.3	814.6	25	2.19	1.92	25	1.50	1.32	25	1.88	2.04
30	119.7	778.1	30	119.7	778.1	30	139.7	1,047.4	30	2.19	2.02	30	1.65	1.54	30	1.92	2.08
35	165.3	1,266.8	35	165.3	1,266.8	35	146.3	1,280.1	35	2.03	2.07	35	1.61	1.68	35	1.80	2.09
40	169.6	1,516.2	40	169.6	1,516.2	40	153.3	1,512.9	40	1.97	2.09	40	1.63	1.76	40	1.75	2.08
45	172.9	1,765.6	45	172.9	1,765.6	45	155.2	1,745.6	45	1.91	2.04	45	1.67	1.76	45	1.72	2.01
50	188.6	2,028.6	50	188.6	2,028.6	50	158.3	1,978.4	50	1.88	1.98	50	1.72	1.72	50	1.69	1.93
55	188.6	2,431.9	55	188.6	2,431.9	55	160.8	2,211.1	55	1.94	2.05	55	1.77	1.71	55	1.66	1.86
60	198.4	2,835.7	60	198.4	2,835.7	60	162.9	2,443.9	60	1.98	2.08	60	1.83	1.72	60	1.63	1.81
65	206.7	3,193.4	65	206.7	3,193.4	65	164.7	2,676.6	65	2.01	2.10	65	1.84	1.76	65	1.60	1.76
70	213.8	3,574.5	70	213.8	3,574.5	70	166.3	2,909.4	70	2.03	2.11	70	1.88	1.78	70	1.58	1.72
75	219.9	3,955.7	75	219.9	3,955.7	75	167.6	3,142.1	75	2.04	2.11	75	1.90	1.80	75	1.55	1.68
80	225.3	4,337.1	80	225.3	4,337.1	80	168.7	3,374.9	80	2.04	2.11	80	1.92	1.81	80	1.53	1.64
85	230.0	4,704.9	85	230.0	4,704.9	85	169.8	3,607.6	85	2.05	2.10	85	1.93	1.82	85	1.51	1.61
90	234.2	5,100.3	90	234.2	5,100.3	90	170.7	3,840.4	90	2.04	2.10	90	1.94	1.82	90	1.49	1.58
95	238.0	5,469.6	95	238.0	5,469.6	95	171.5	4,073.1	95	2.04	2.08	95	1.94	1.83	95	1.47	1.55
100	241.4	5,852.0	100	241.4	5,852.0	100	172.2	4,305.9	100	2.03	2.07	100	1.94	1.84	100	1.45	1.53
110	247.3	6,951.8	110	247.3	6,951.8	110	173.5	6,773.4	110	2.01	2.05	110	1.93	1.84	110	1.41	1.48
120	252.1	7,391.3	120	252.1	7,391.3	120	174.6	8,236.9	120	1.99	2.02	120	1.92	1.84	120	1.38	1.43
130	256.3	8,155.3	130	256.3	8,155.3	130	175.5	9,702.4	130	1.96	1.99	130	1.90	1.83	130	1.34	1.39
140	259.8	8,919.4	140	259.8	8,919.4	140	176.2	11,167.9	140	1.94	1.96	140	1.88	1.81	140	1.31	1.36
150	262.0	9,678.5	150	262.0	9,678.5	150	176.9	12,632.4	150	1.91	1.93	150	1.85	1.80	150	1.28	1.32
160	265.6	10,447.8	160	265.6	10,447.8	160	177.5	14,096.9	160	1.88	1.90	160	1.83	1.78	160	1.26	1.29
170	268.0	11,205.3	170	268.0	11,205.3	170	178.0	15,561.4	170	1.85	1.86	170	1.80	1.75	170	1.23	1.26
180	270.1	11,976.5	180	270.1	11,976.5	180	178.4	17,025.9	180	1.82	1.83	180	1.78	1.73	180	1.20	1.23
190	271.9																



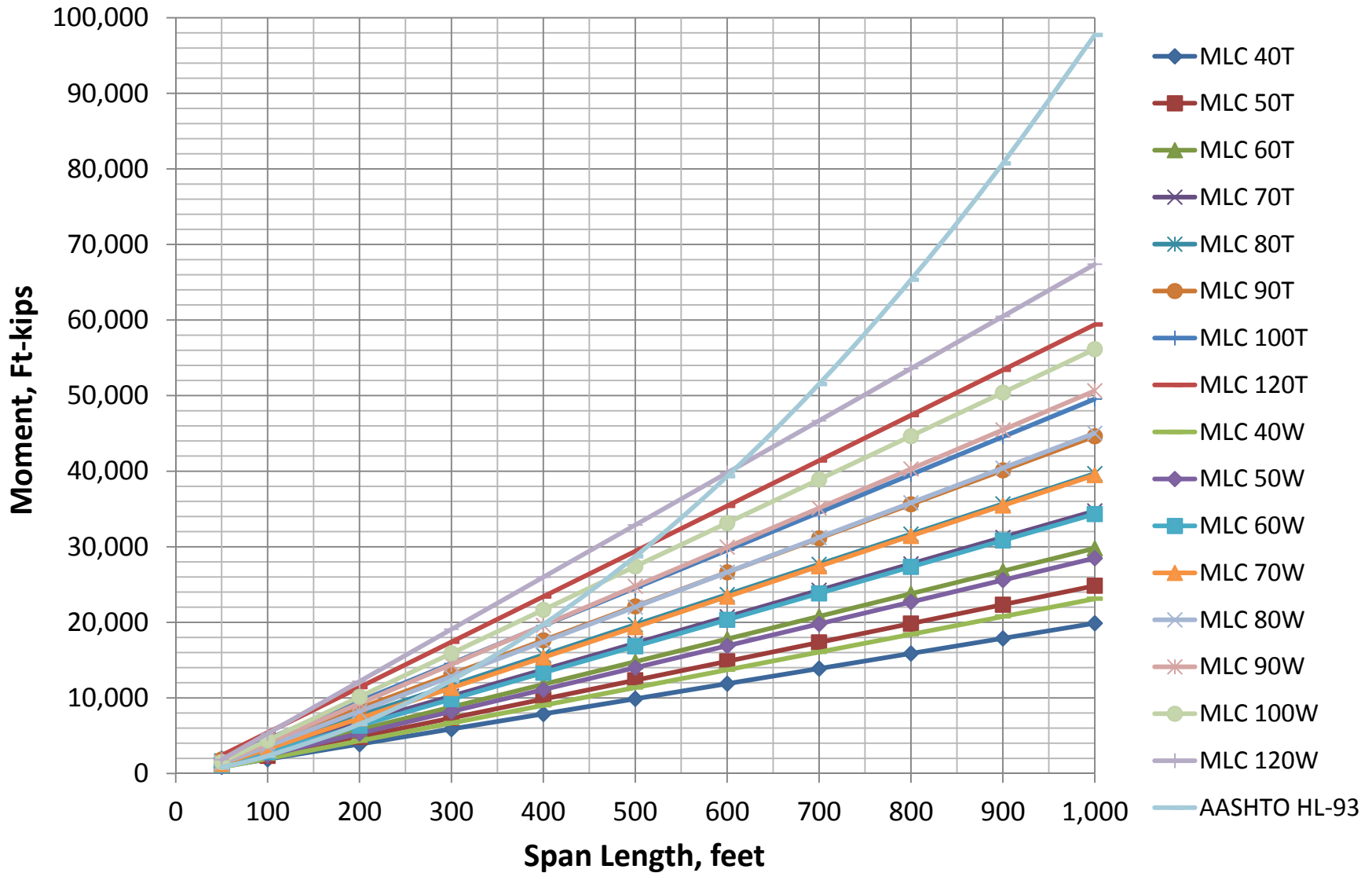
## **FIGURES**

- 5-18. Shear, MLCs HL93 NoImpact
- 5-19. Moment, MLCs HL93 NoImpact
- 5-20. Shear, MLCs HL93 nrml No I
- 5-21. Moment, MLCs HL93 nrml No I
- 5-26. % diff, AbsMax v MidspnM
- 5-27. Shear, MLC 100W+HETs, No I
- 5-28. Moment, MLC 100W+HETs, No I
- 5-32. 1-3x MLC 100W V, w Impact
- 5-33. 1-3x MLC 100W M, w Impact
- 5-34. 1-3x MLC 100W Shear Nrml
- 5-35. 1-3x MLC 100W Moment Nrml
- 5-36. Misc Design Codes, Shear
- 5-37. Misc Design Codes, Moment
- 5-38. Design Codes, Shear, Nrml
- 5-39. Design Codes, Moment, Nrml
- 5-40. 1-3MLC+SPVs Shear, Nrml
- 5-41. 1-3MLC+SPVs Moment, Nrml
- 5-42. LADV11+70T Shear, Nrml
- 5-43. LADV11+70T Moment, Nrml
- 7-1. New Cond II Shear wLADV11
- 7-2. New Cond II Moment wLADV11
- 7-3. New MFs Other LL, Shear
- 7-4. New MFs Other LL, Moment

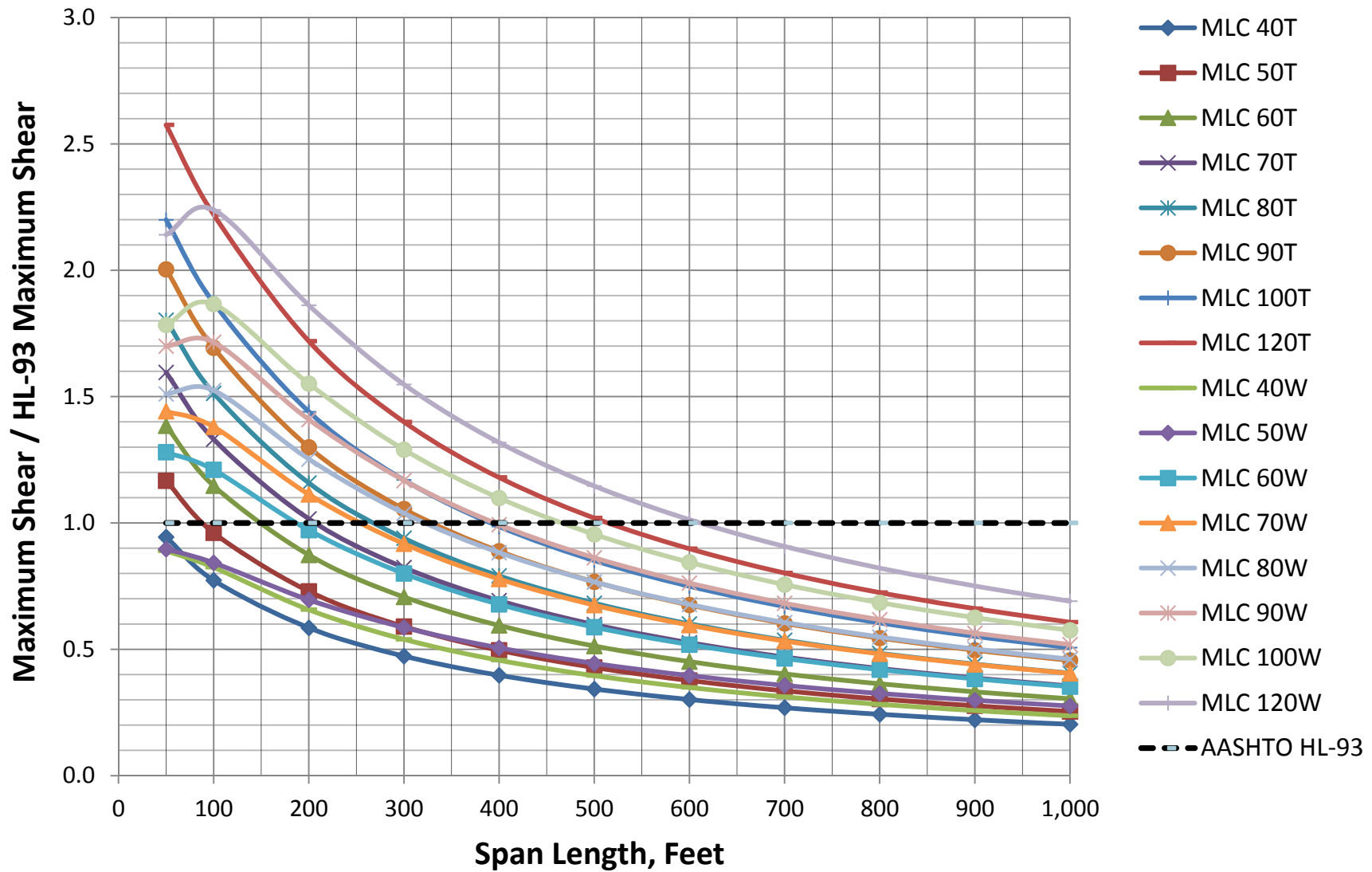
## Calculated Shear Curves for Tracked and Wheeled MLC Vehicles and AASHTO HL-93



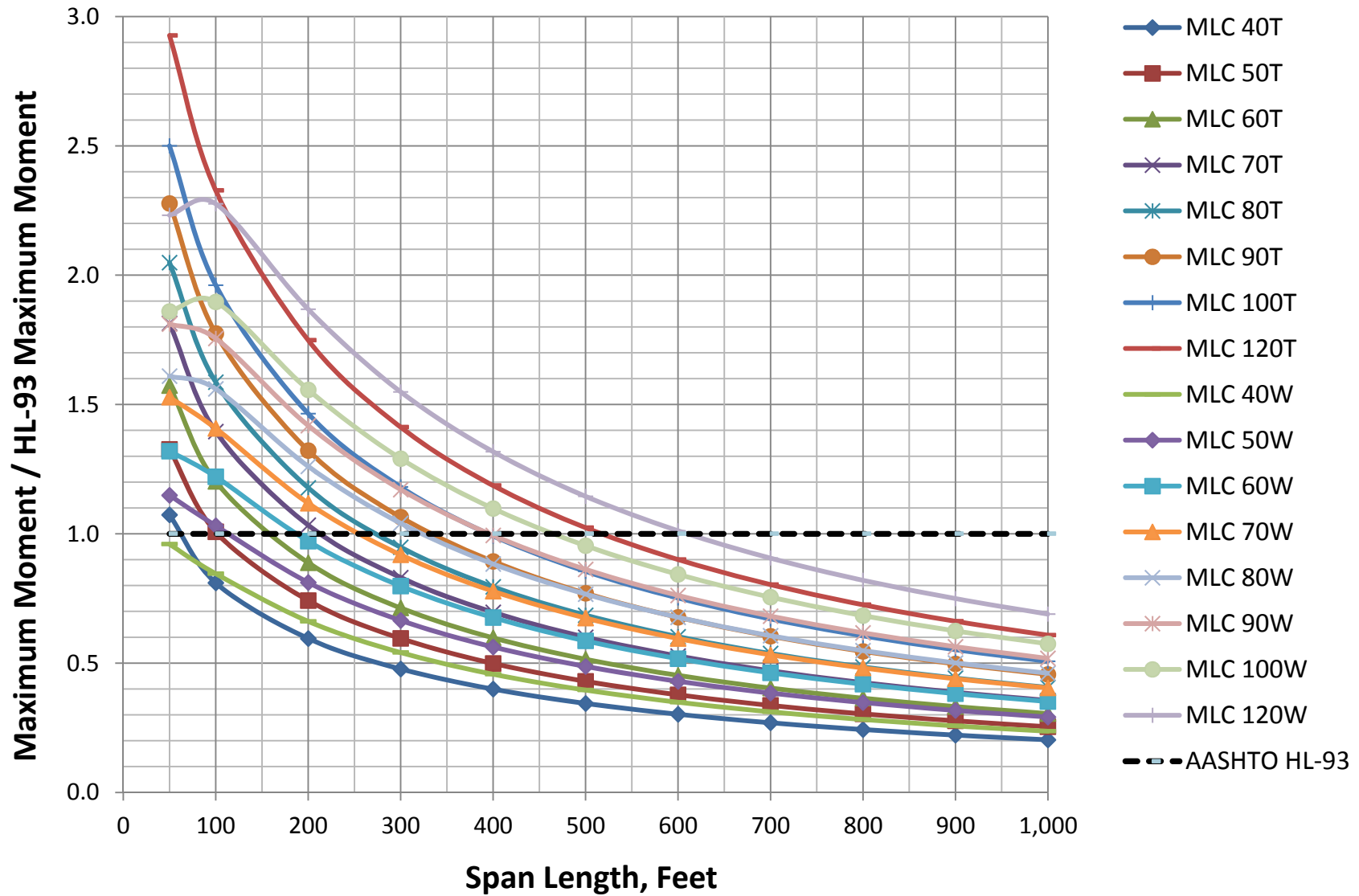
## Calculated Mid-span Moment Curves for Tracked and Wheeled MLC Vehicles and AASHTO HL-93



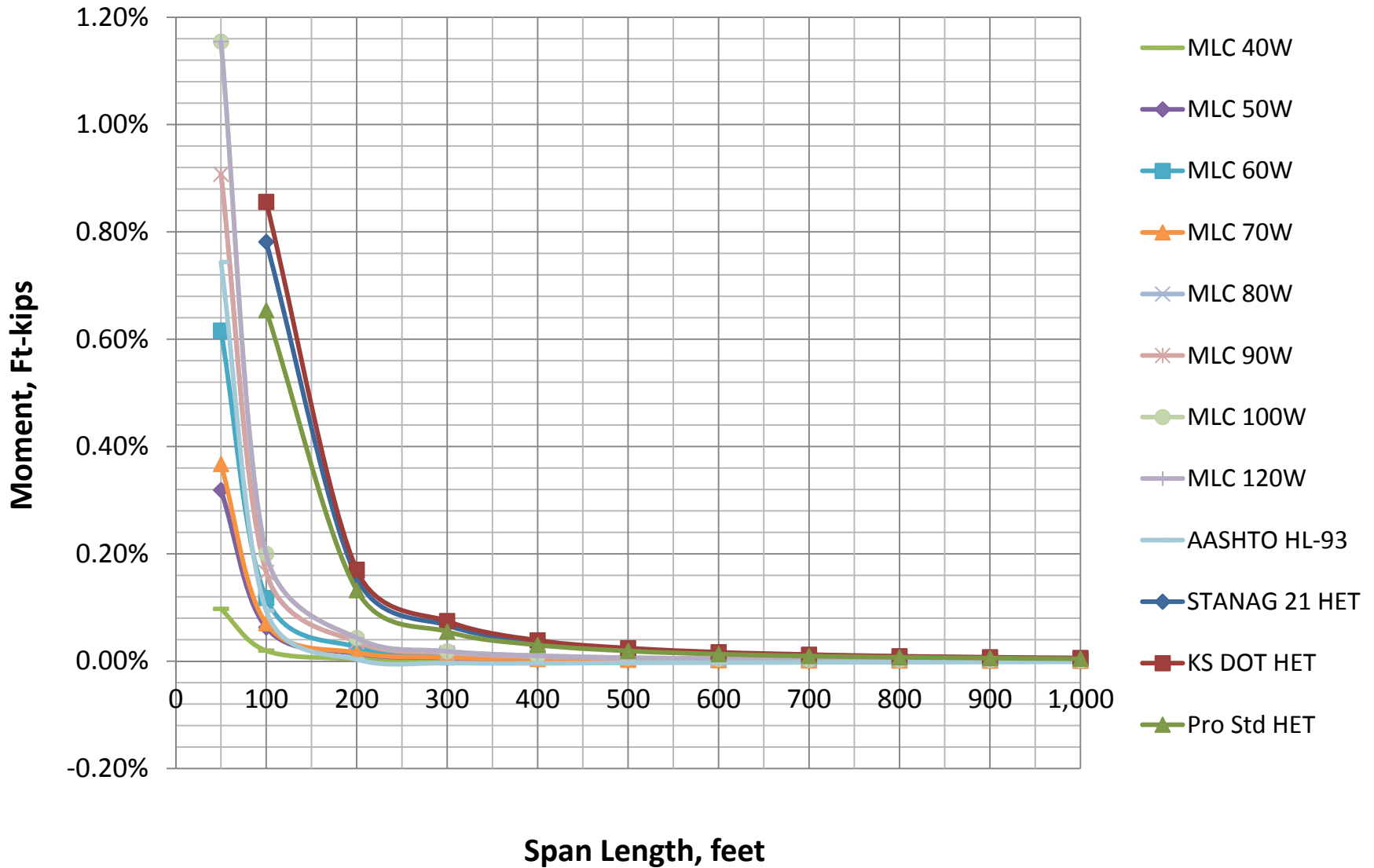
## Calculated Shear Curves for Tracked and Wheeled MLC Vehicles, normalized to the AASHTO HL-93 LRFD Design Truck and Lane Loading

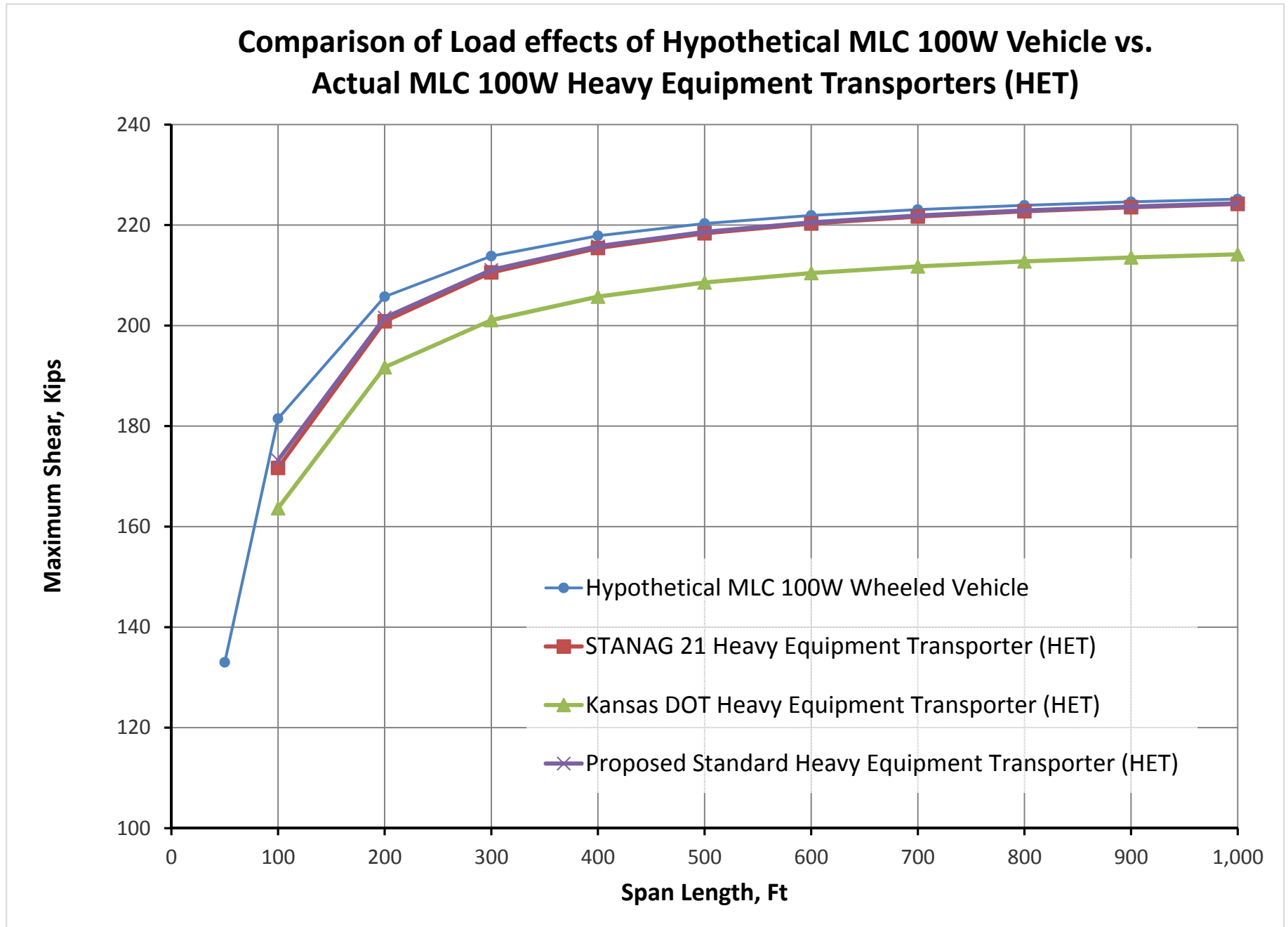


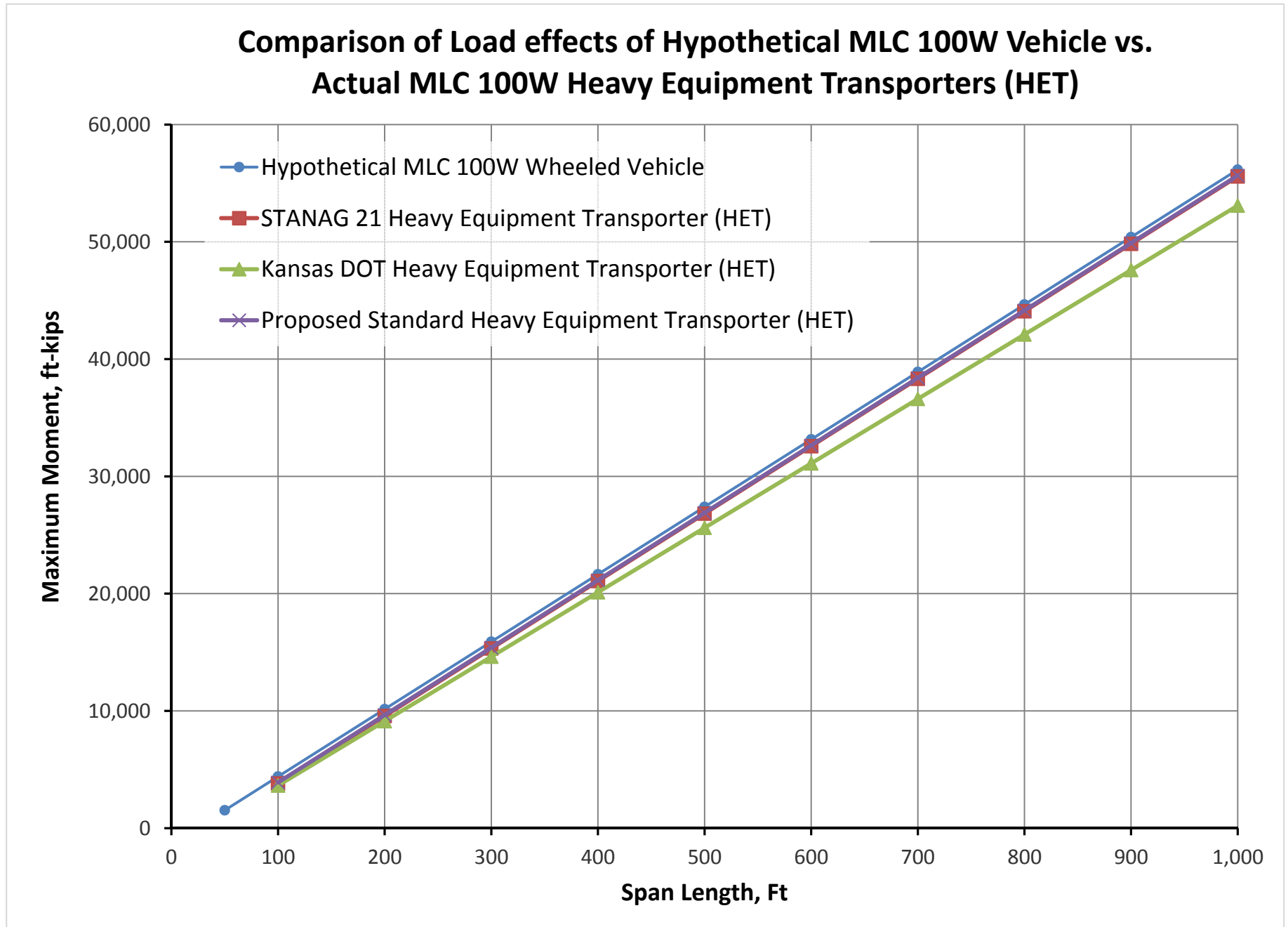
## Calculated Midspan Moment Curves for Tracked and Wheeled MLC Vehicles, normalized to AASHTO HL-93 LRFD Design Truck & Lane Load



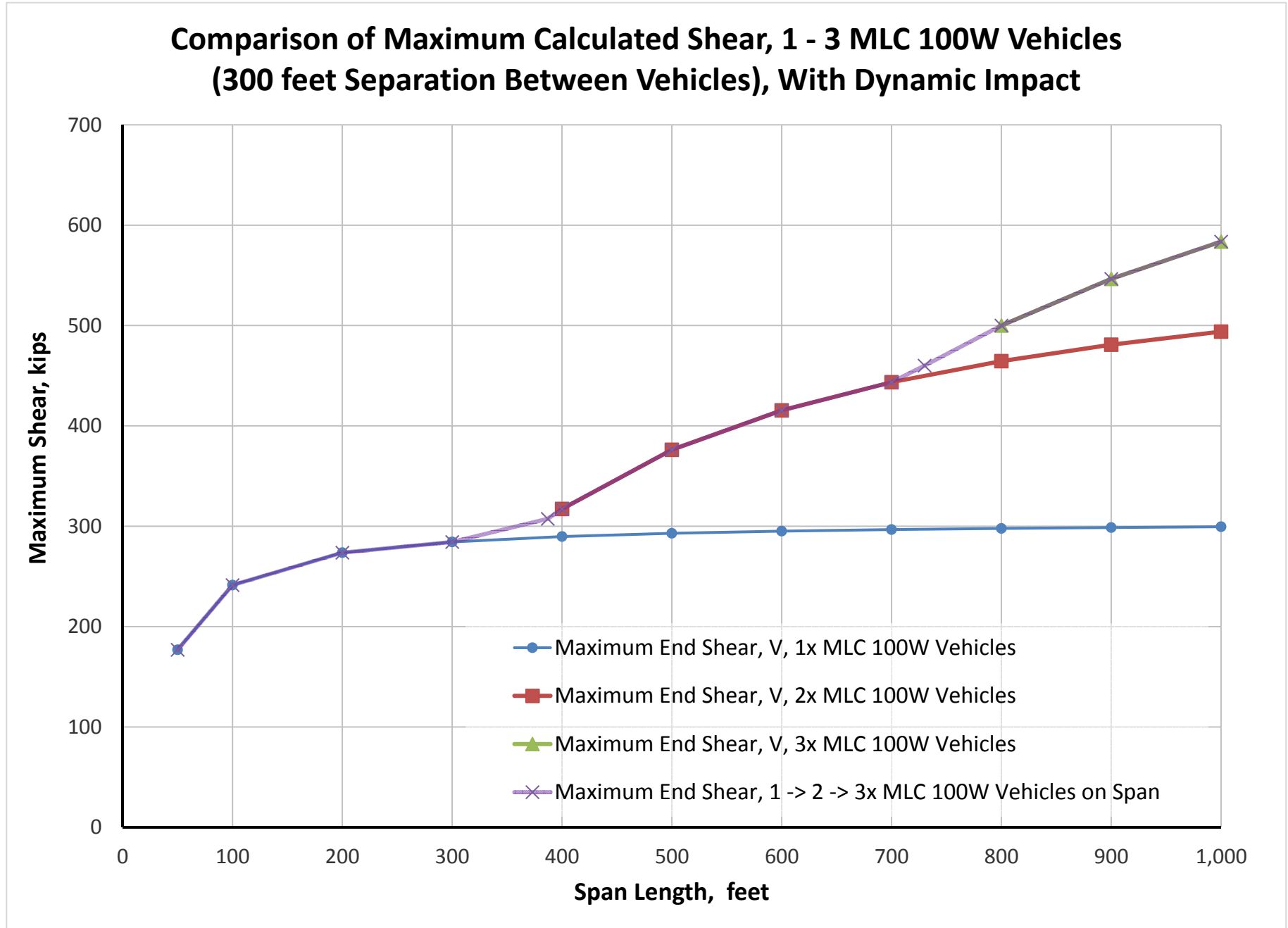
## Percent Difference between Maximum Absolute and Mid-span Moments for MLC Wheeled Vehicles

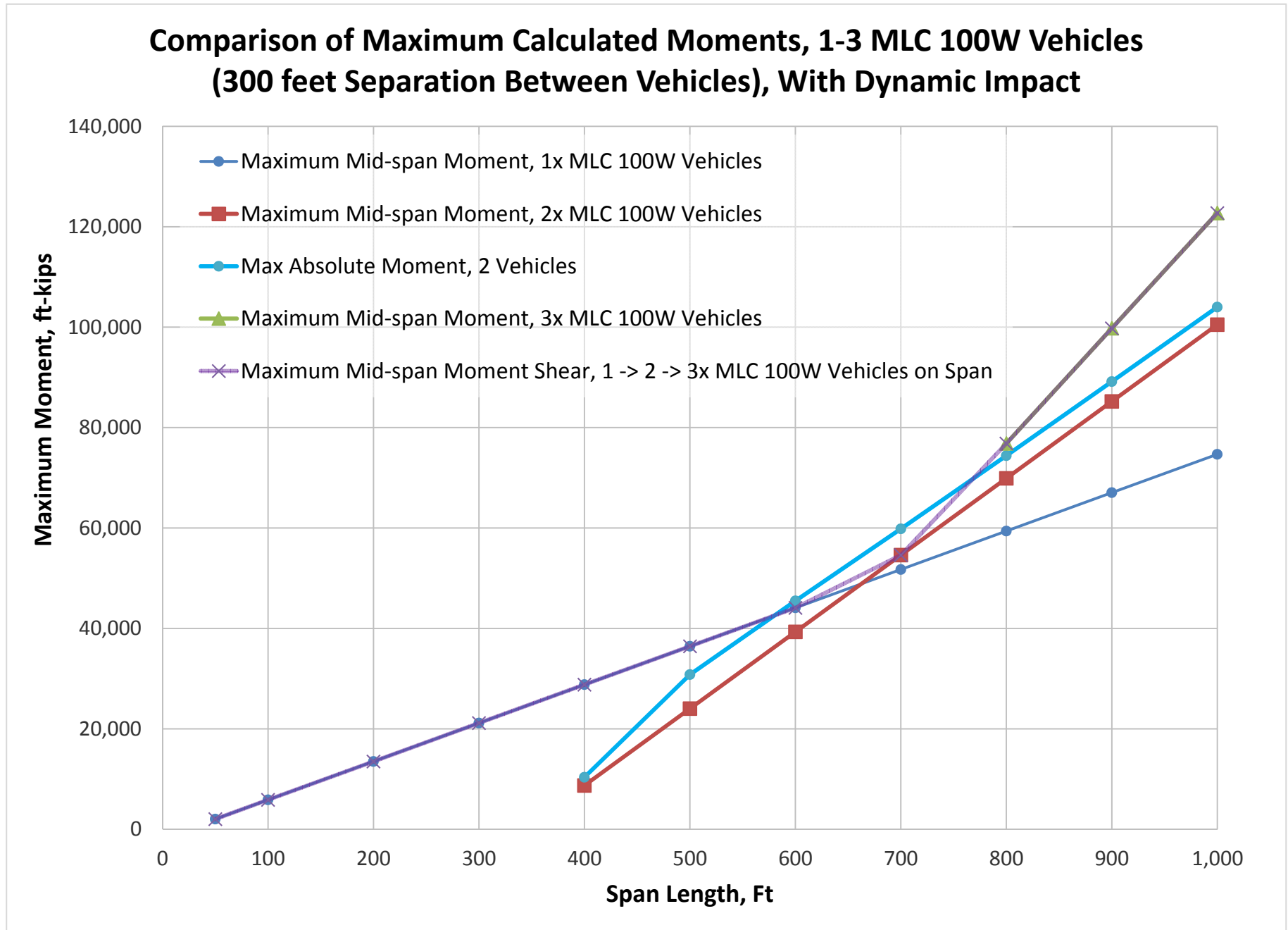




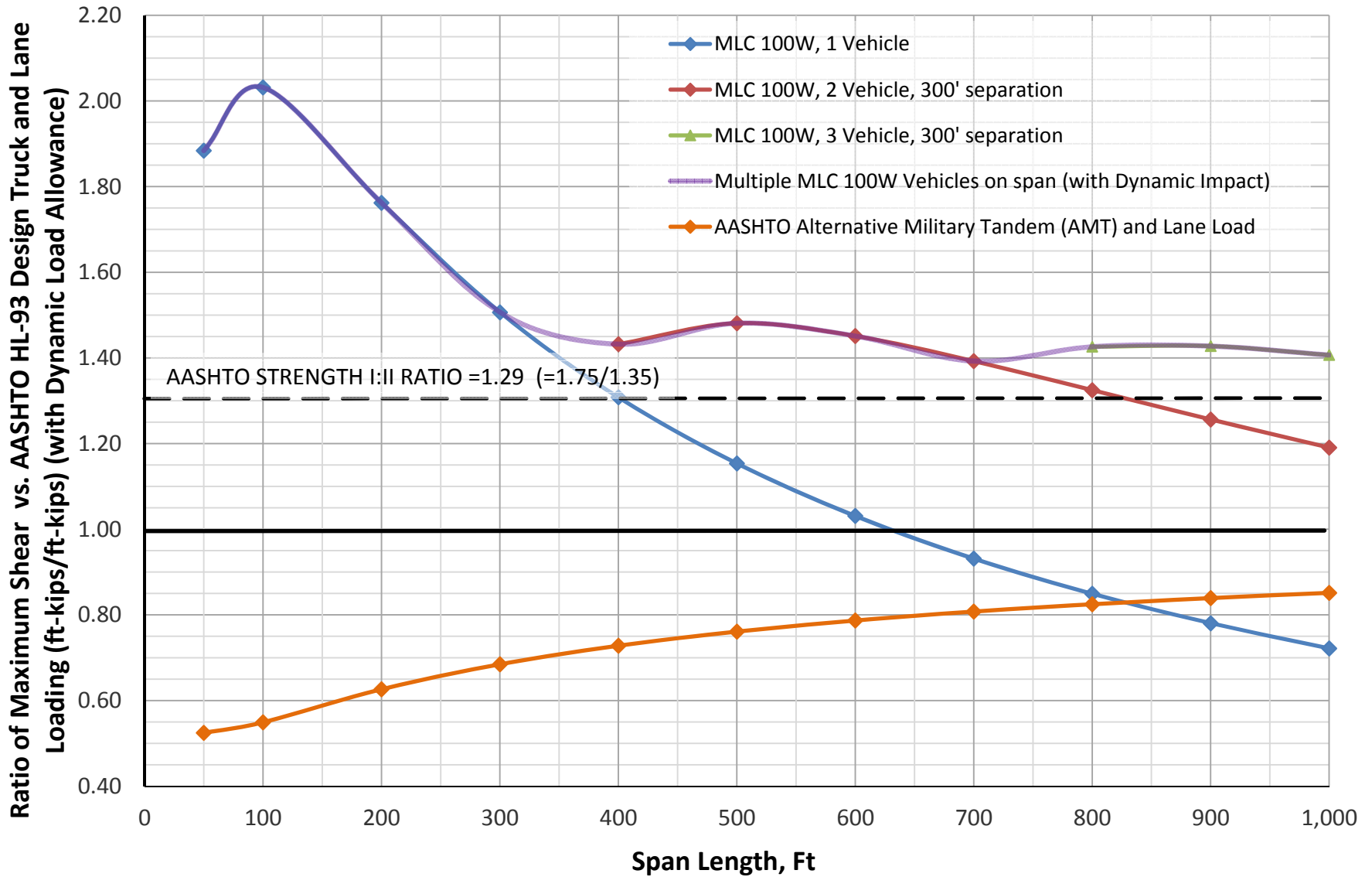




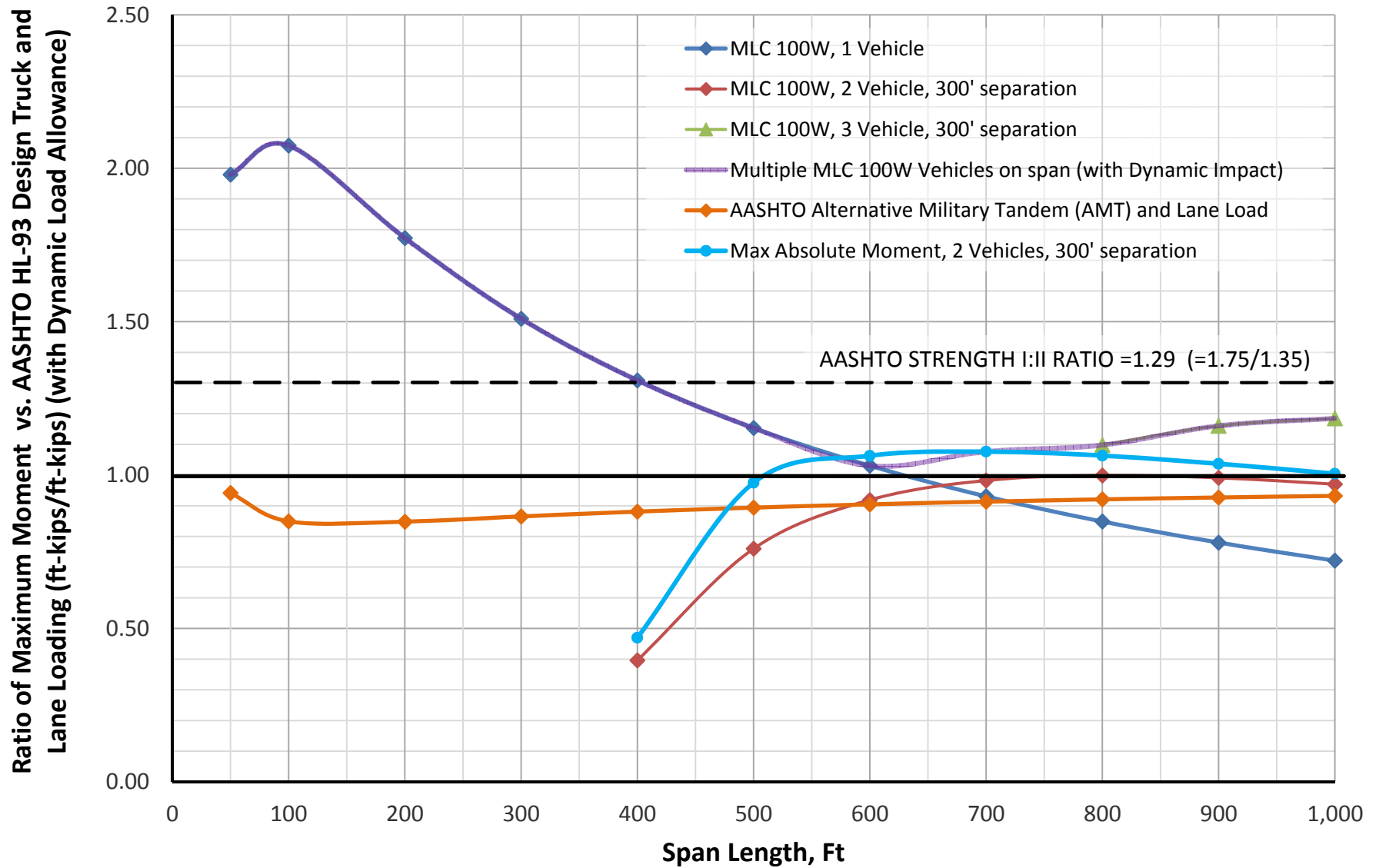




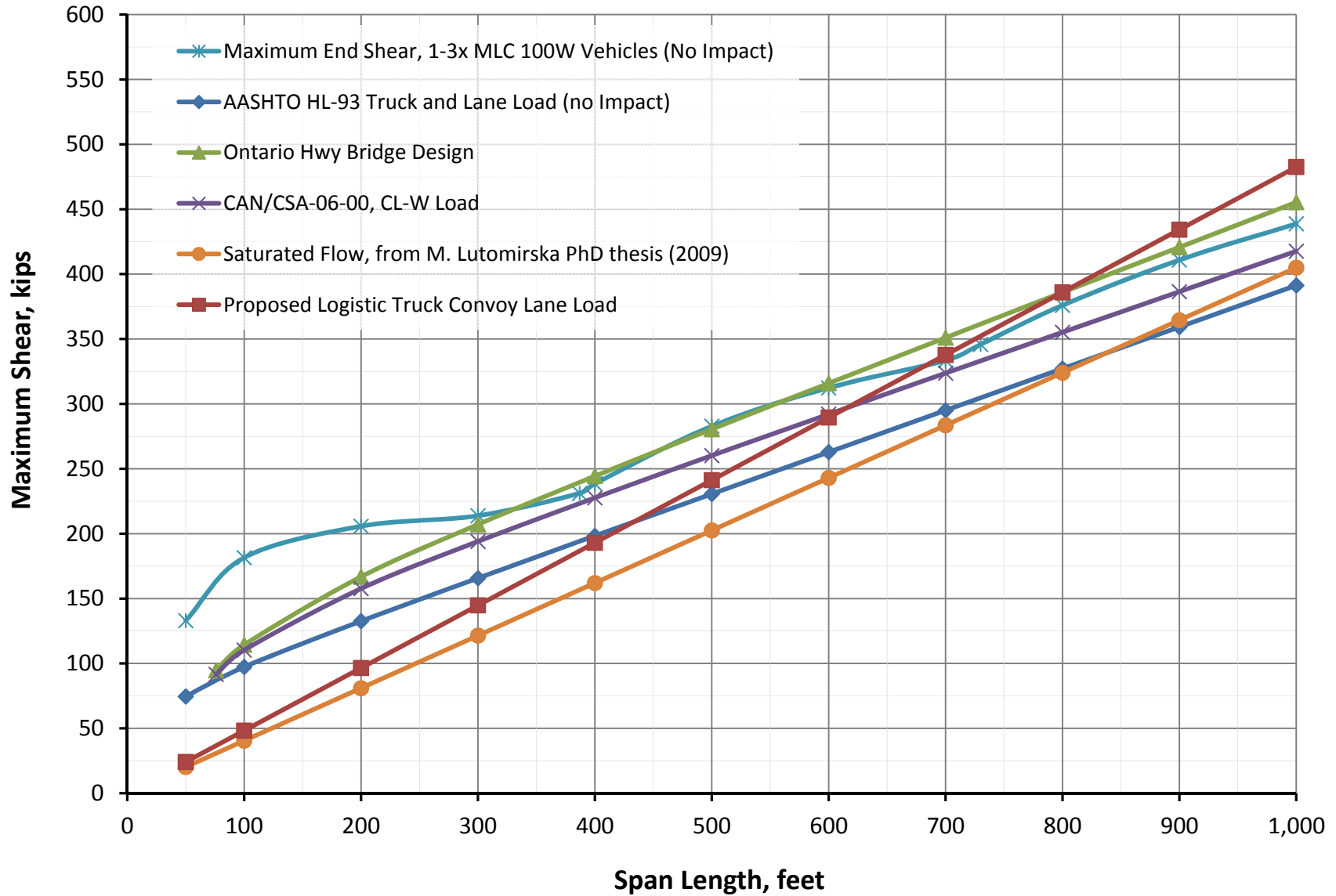
### Comparison of Maximum Shear for 1 to 3 MLC 100W Vehicles, Long Span Simple Beams (300 ft separation between vehicles)



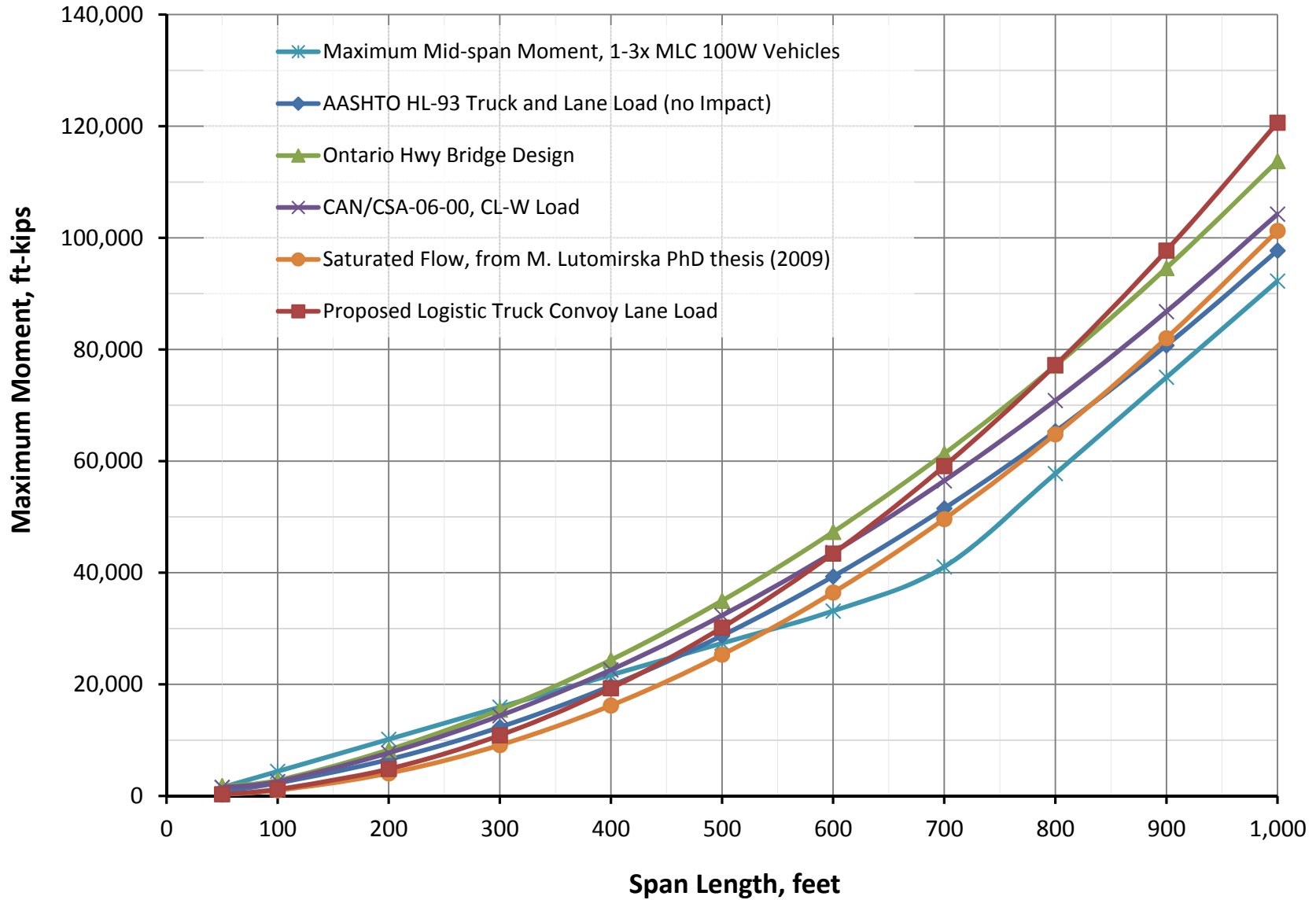
### Comparison of Maximum Moment for 1 to 3 MLC 100W Vehicles, Long Span Simple Beams (300 ft separation between vehicles)



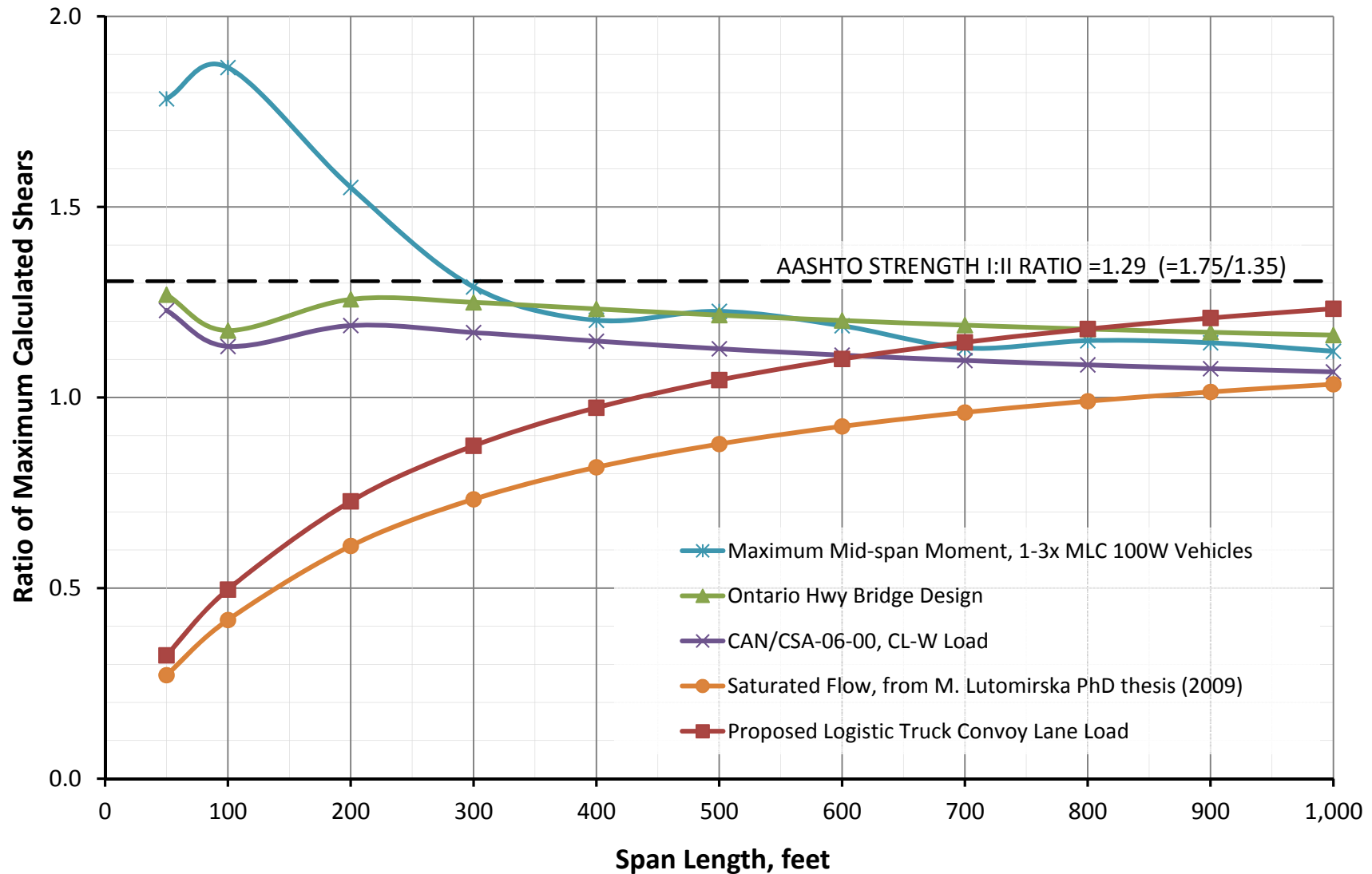
### Comparison of Maximum End Shear, Various Design Codes (No Impact)



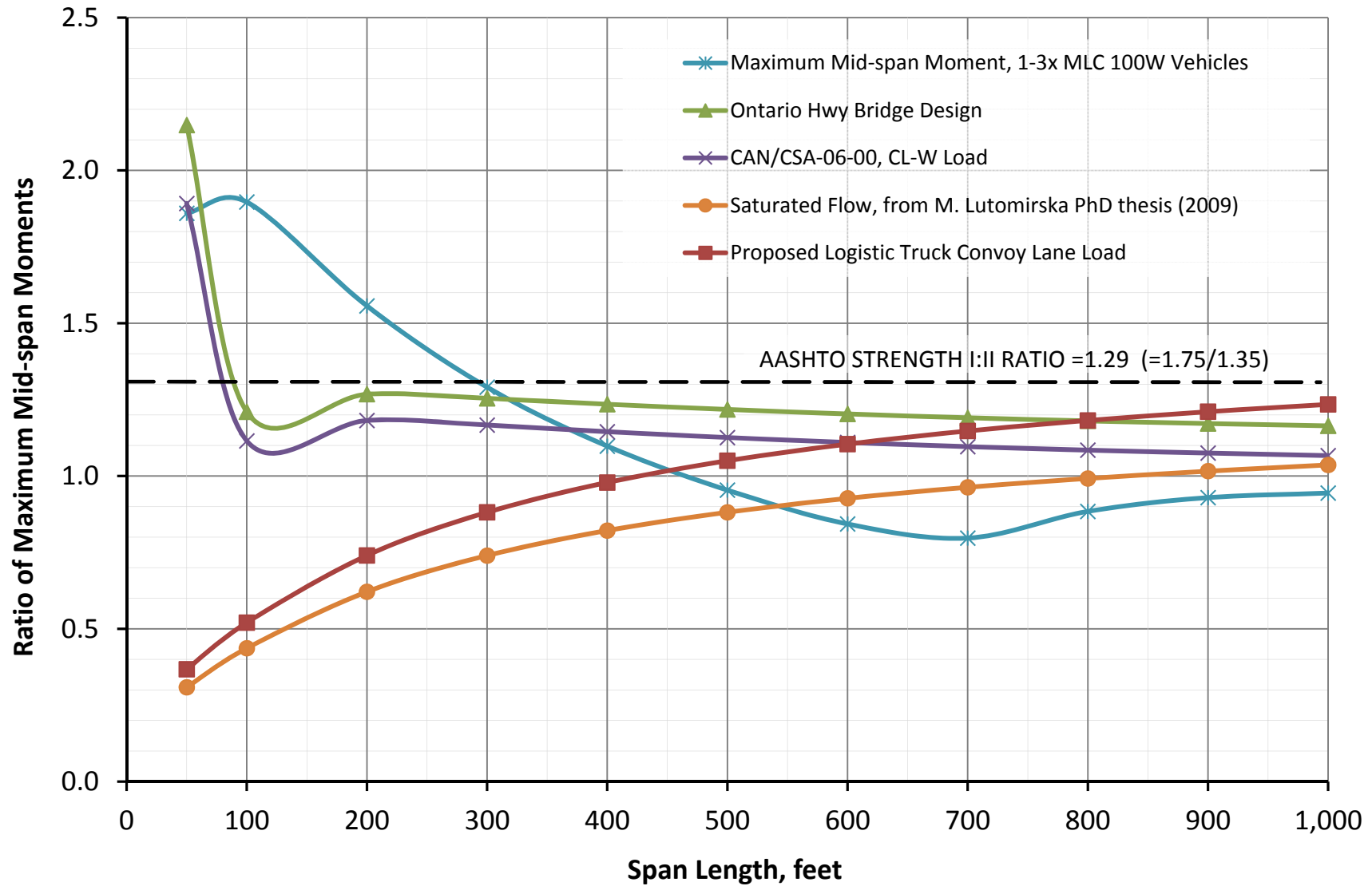
## Comparison of Maximum Mid-span Moments, Various Design Codes (No Dynamic Impact)



## Comparison of Maximum Shear, Various Design Loads, normalized to AASHTO HL-93 Design Truck and Lane Loading (No Dynamic Impact)

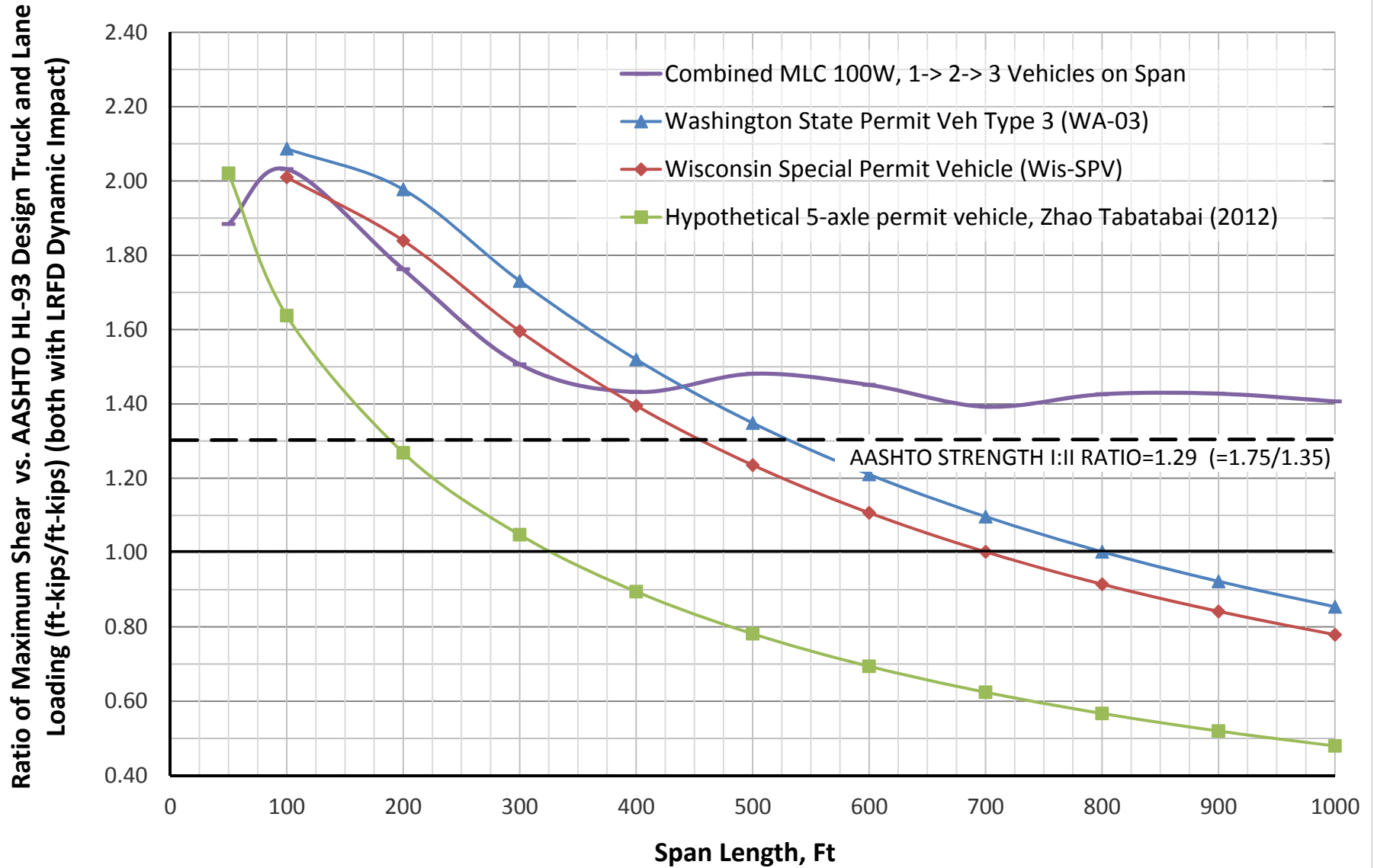


## Comparison of Maximum Mid-span Moment, Various Design Loads, normalized to AASHTO HL-93 Design Live Loading (No Impact)

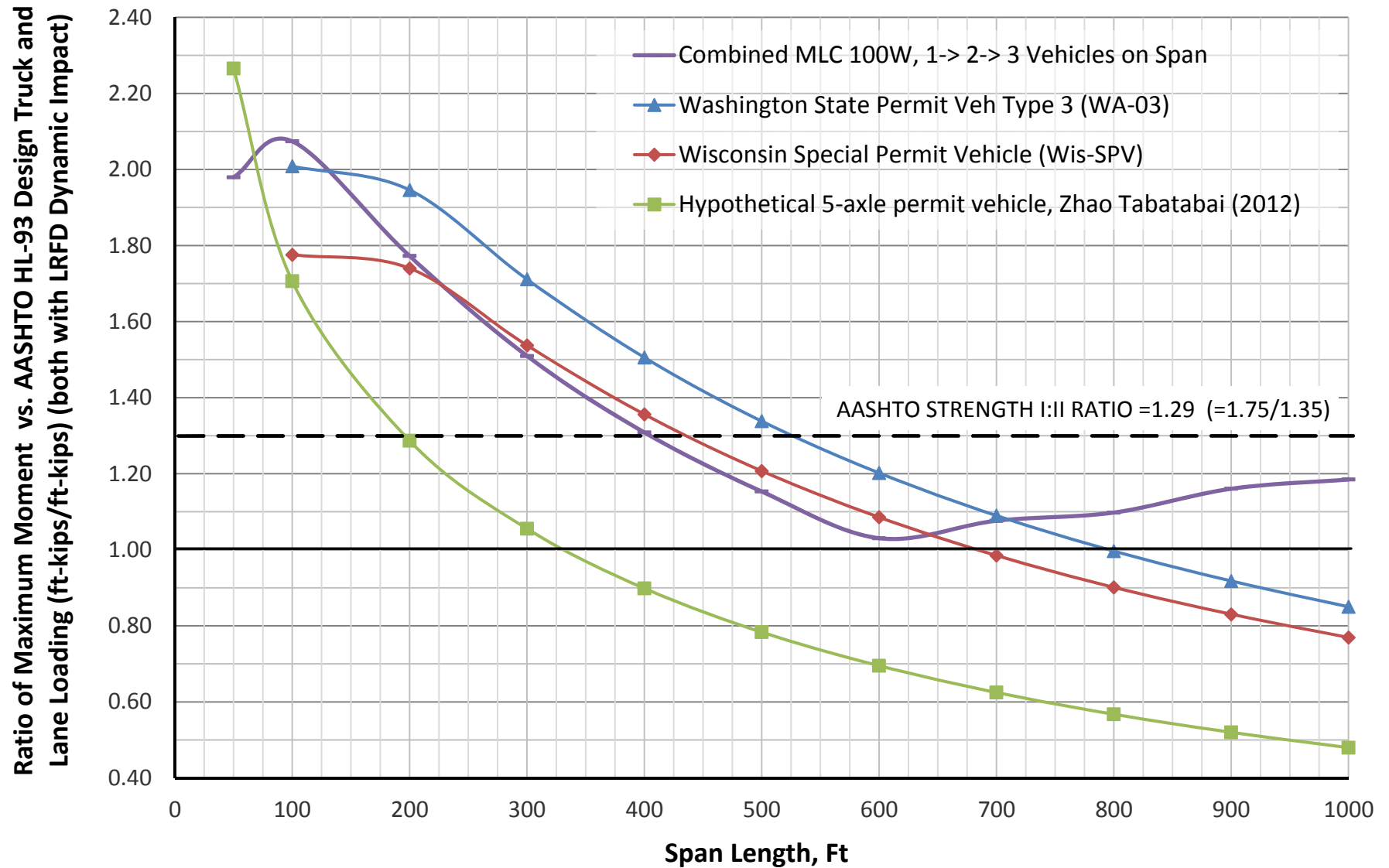




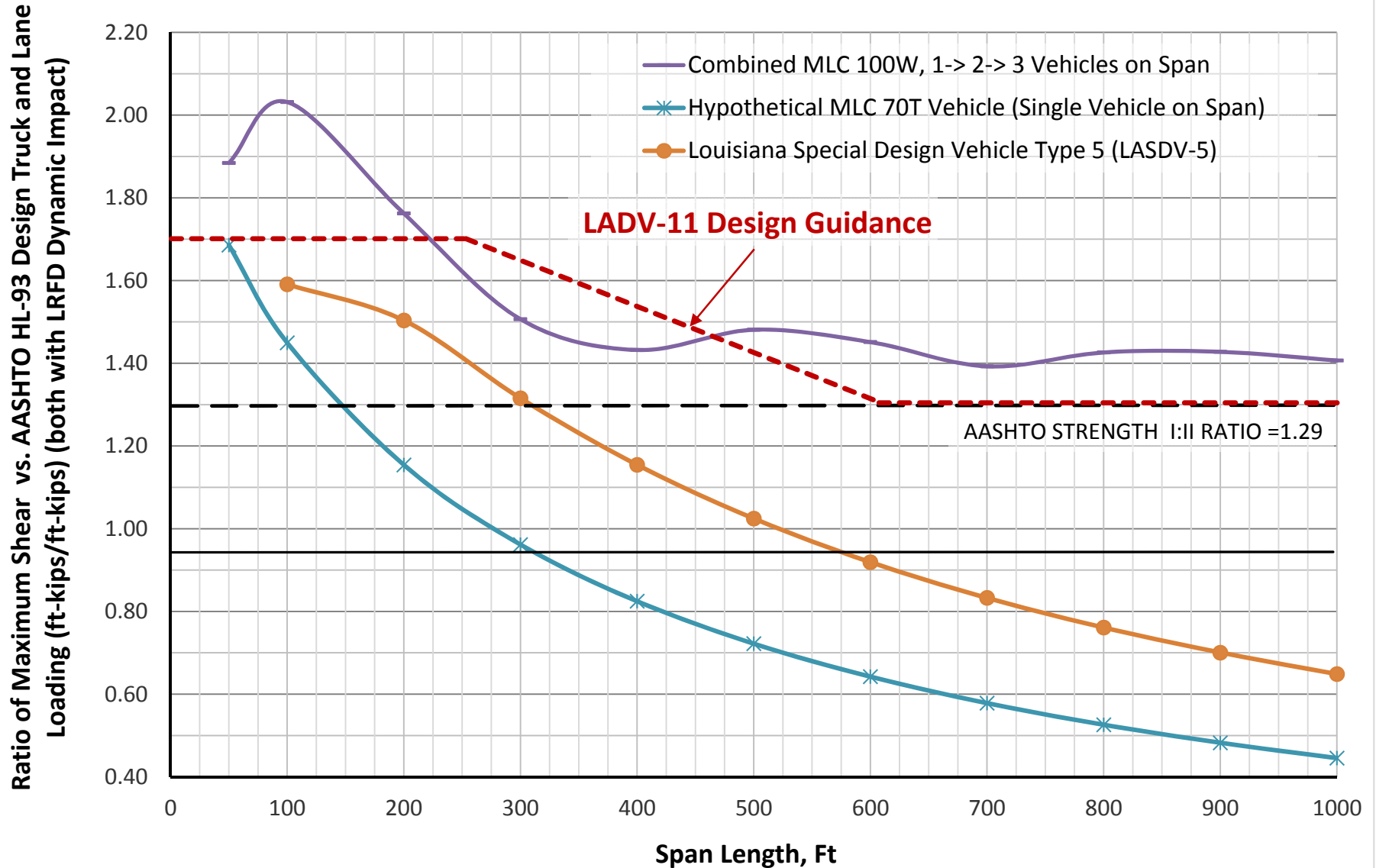
## Comparison of Maximum End Shear for 1-3 MLC 100W Vehicles, Permit Vehicles, and MLC 70T Vehicle on Span



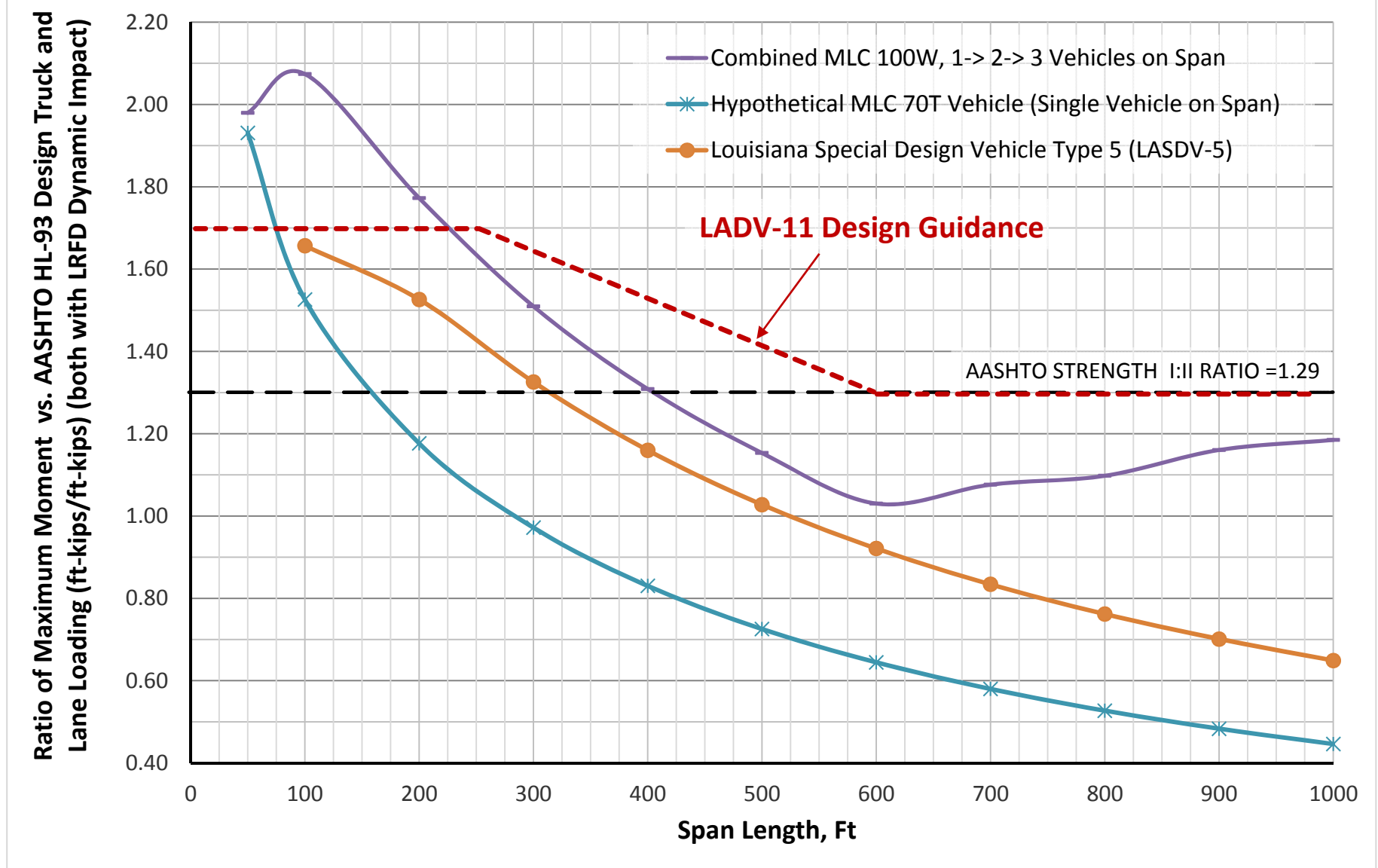
### Comparison of Maximum Mid-span Moment for 1-3 MLC 100W Vehicles, Permit Vehicles, and MLC 70T Vehicle on Span



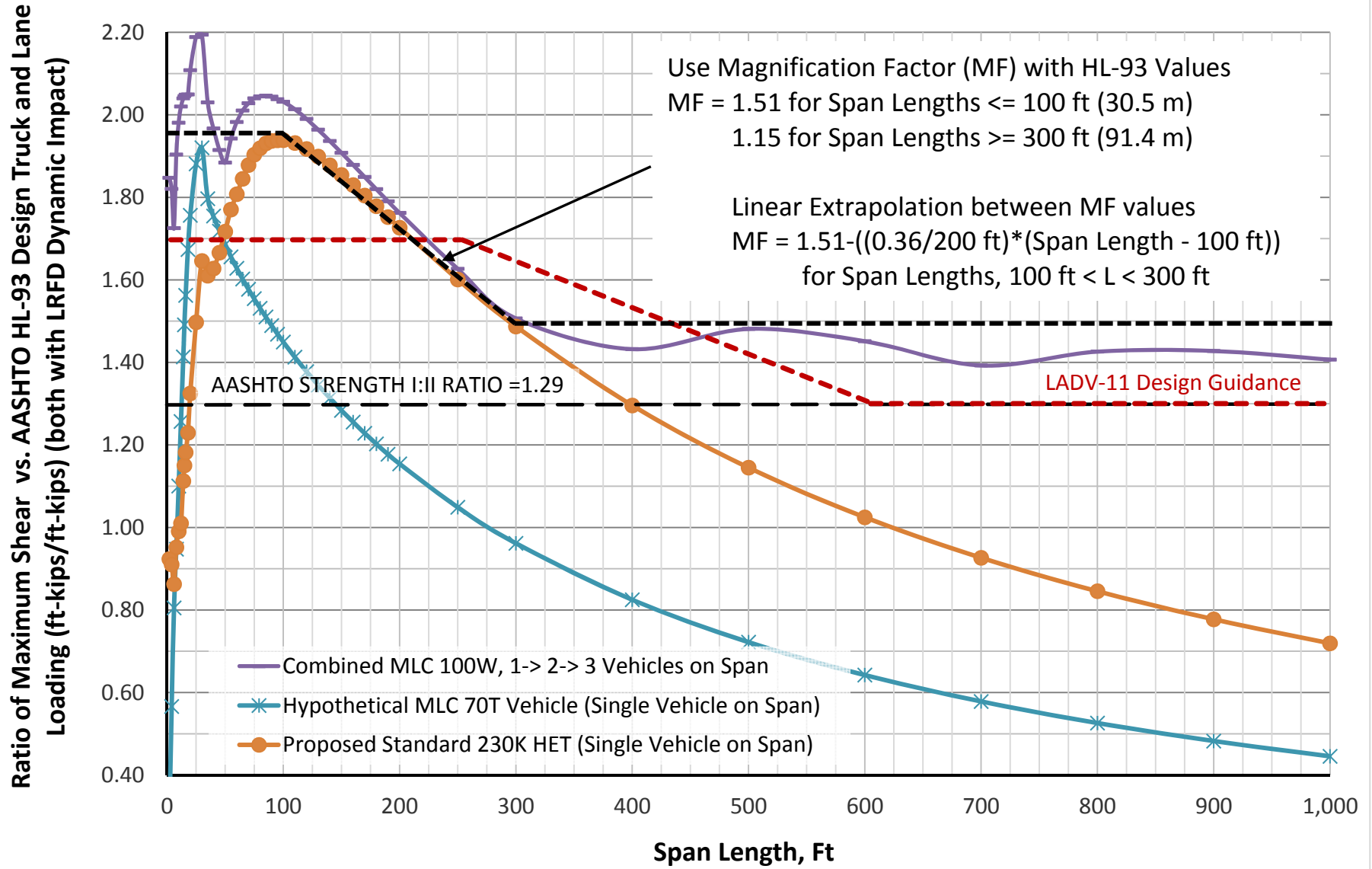
## Comparison of Maximum End Shear for MLC 100W Vehicles and Louisiana Design Guidance with MLC 70T Vehicle on Span



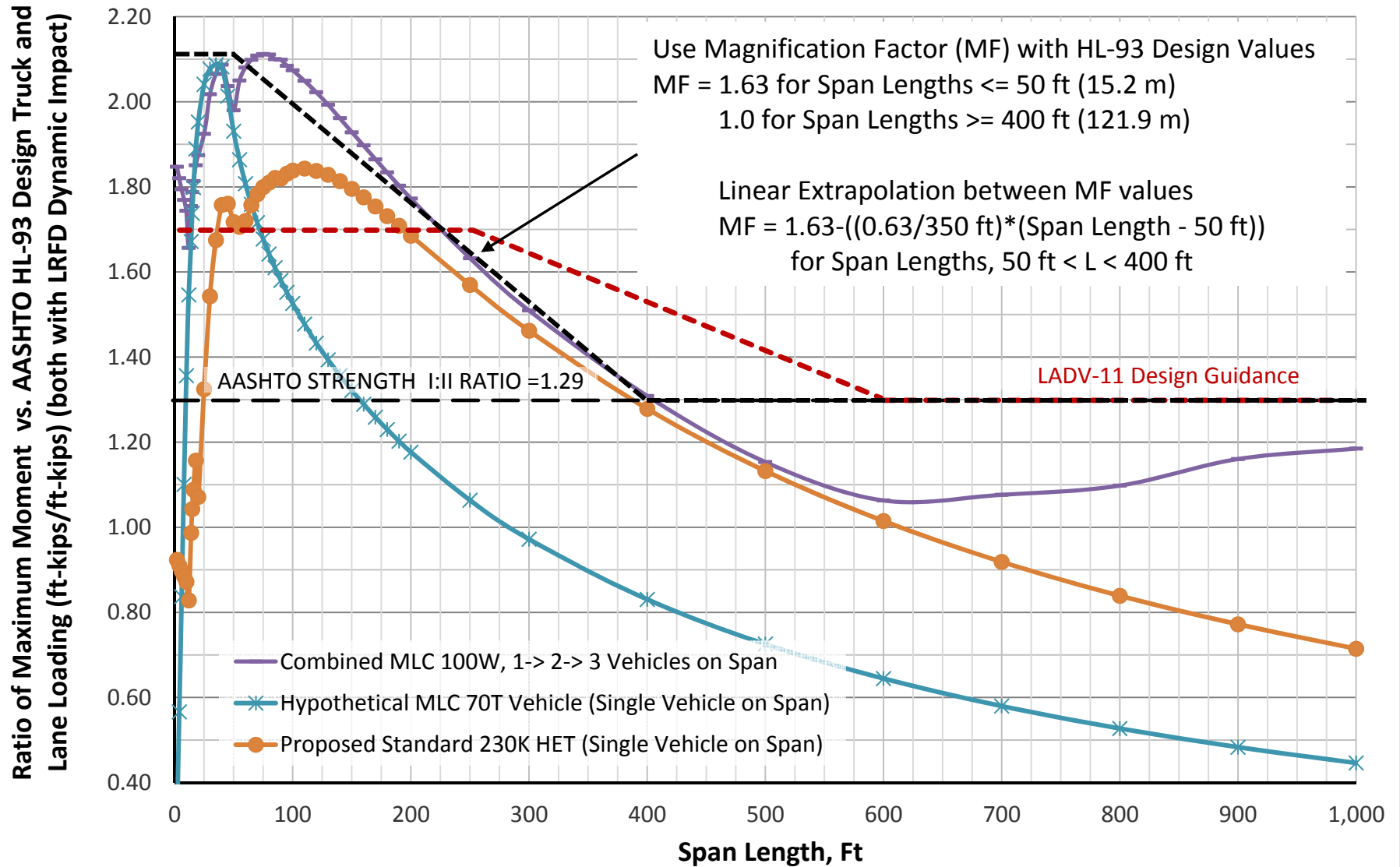
### Comparison of Maximum Mid-span Moment for MLC 100W Vehicles and Louisiana Design Guidance with MLC 70T Vehicle on Span



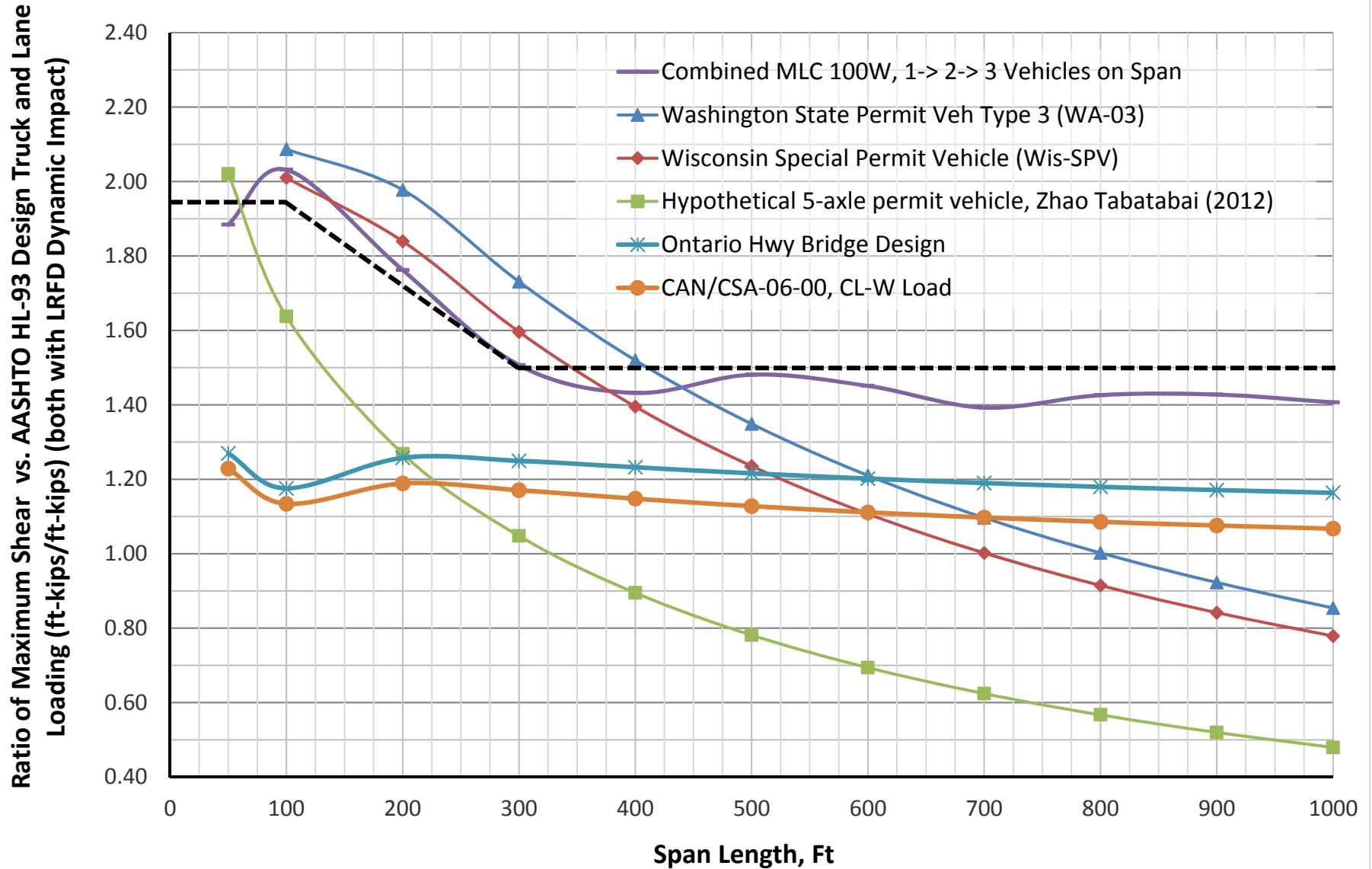
### Proposed MFs for New Military Live Load AASHTO Strength Condition II for Maximum End Shear (shown with LADV-11)

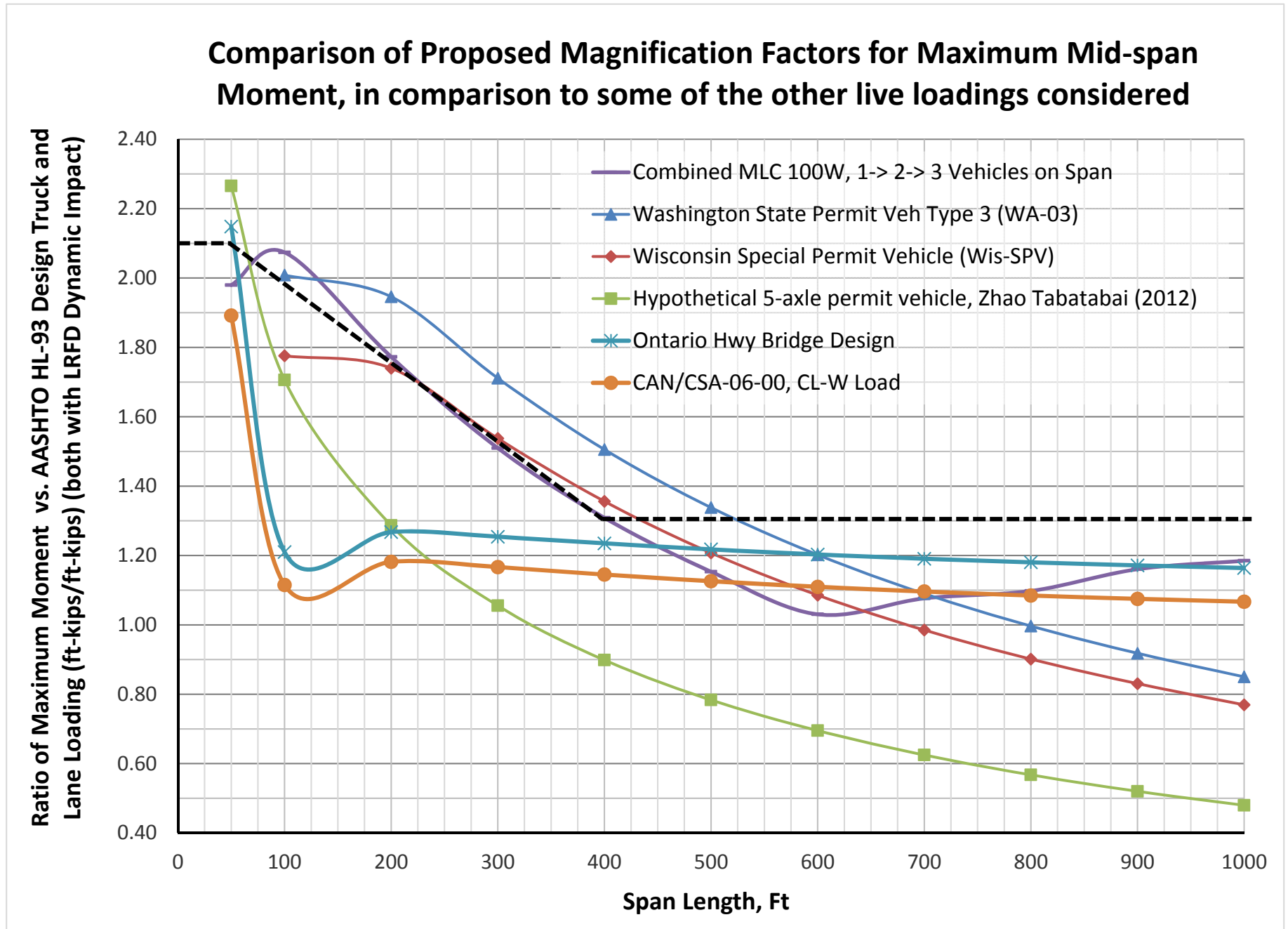


### Proposed MFs for New Military Live Load AASHTO Strength Condition II for Maximum Mid-span Moment (shown with LADV-11)



## Comparison of Proposed Magnification Factors for End Shear, in comparison to some of the other live loadings considered







**END OF APPENDIX E**

## APPENDIX F: VARIOUS HEAVY EQUIPMENT TRANSPORT (HET) VEHICLES

Filename: WP Parker UNO 2019 MSCE Thesis Data - Appendix F. Various HET Vehicles.xlsx

Contents (worksheets/tab names included in the Excel workbook are):

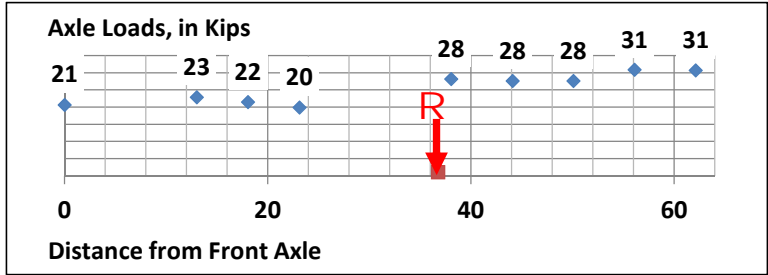
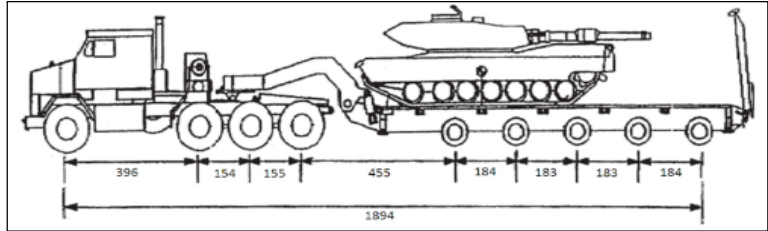
	<u>Page</u>
<b><u>Calculation Worksheets</u></b>	F-2
STANAG HET, Max M 4-R, 300'span	F-3
STANAG HET, Max M R-5, 300'span	F-7
STANAG HET,M vic mid,300'span	F-11
STANAG HET,MaxM56,50-1000'spans	F-15
KS DOT HET, Max M 4-R, 300'span	F-19
KS DOT HET, Max M R-5, 300'span	F-23
KS DOT HET,M vic mid,300'span	F-27
KS DOT HET,MaxM56,50-1000'spans	F-31
Prop Std HET,MaxM 4-R, 300'span	F-35
Prop Std HET,MaxM R-5, 300'span	F-39
Pro Std HET,M vic mid,300'span	F-43
PropStdHET,MaxM56,50-1000'spans	F-47
<b><u>Tables</u></b>	NA
None	NA
<b><u>Figures</u></b>	F-51
5-23. STANAG HET,M vic midspan	F-52
5-24. KS DOT HET,M vic midspan	F-53
5-25. Pro Std HET,M vic midspan	F-54

## **CALCULATION WORKSHEETS**

STANAG HET, Max M 4-R, 300'span  
STANAG HET, Max M R-5, 300'span  
STANAG HET,M vic mid,300'span  
STANAG HET,MaxM56,50-1000'spans  
KS DOT HET, Max M 4-R, 300'sp  
KS DOT HET, Max M R-5, 300'span  
KS DOT HET,M vic mid,300'span  
KS DOT HET,MaxM56,50-1000'spans  
Prop Std HET,MaxM 4-R, 300'span  
Prop Std HET,MaxM R-5, 300'span  
Pro Std HET,M vic mid,300'span  
PropStdHET,MaxM56,50-1000'spans

**NINE (9) AXLE** **One (1x) STANAG 2021 Ed 6 US Heavy Equip Transport System, on 300' Span**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.35	20.70		0.00	92.07	0
2	11.45	22.89	13.00	13.00	101.83	396
3	10.77	21.53	5.04	18.04	95.79	550
4	9.97	19.94	5.08	23.12	88.70	705
5	14.08	28.16	14.92	38.04	125.26	1160
6	13.80	27.60	6.04	44.08	122.77	1344
7	13.80	27.60	6.00	50.09	122.77	1527
8	15.45	30.90	6.00	56.09	137.45	1710
(Rear) 9	15.35	30.70	6.04	62.13	136.56	1894
<b>Totals</b>	<b>115.01</b>	<b>230.03</b>	<b>62.13</b>		<b>1023.2</b>	
				<b>Resultant at location:</b>	<b>36.769</b>	<b>1121</b>
				<b>Distance to Nearest Axle, "xR":</b>	<b>1.272 (Forward of Axle #5)</b>	



**300 ft Span Length**

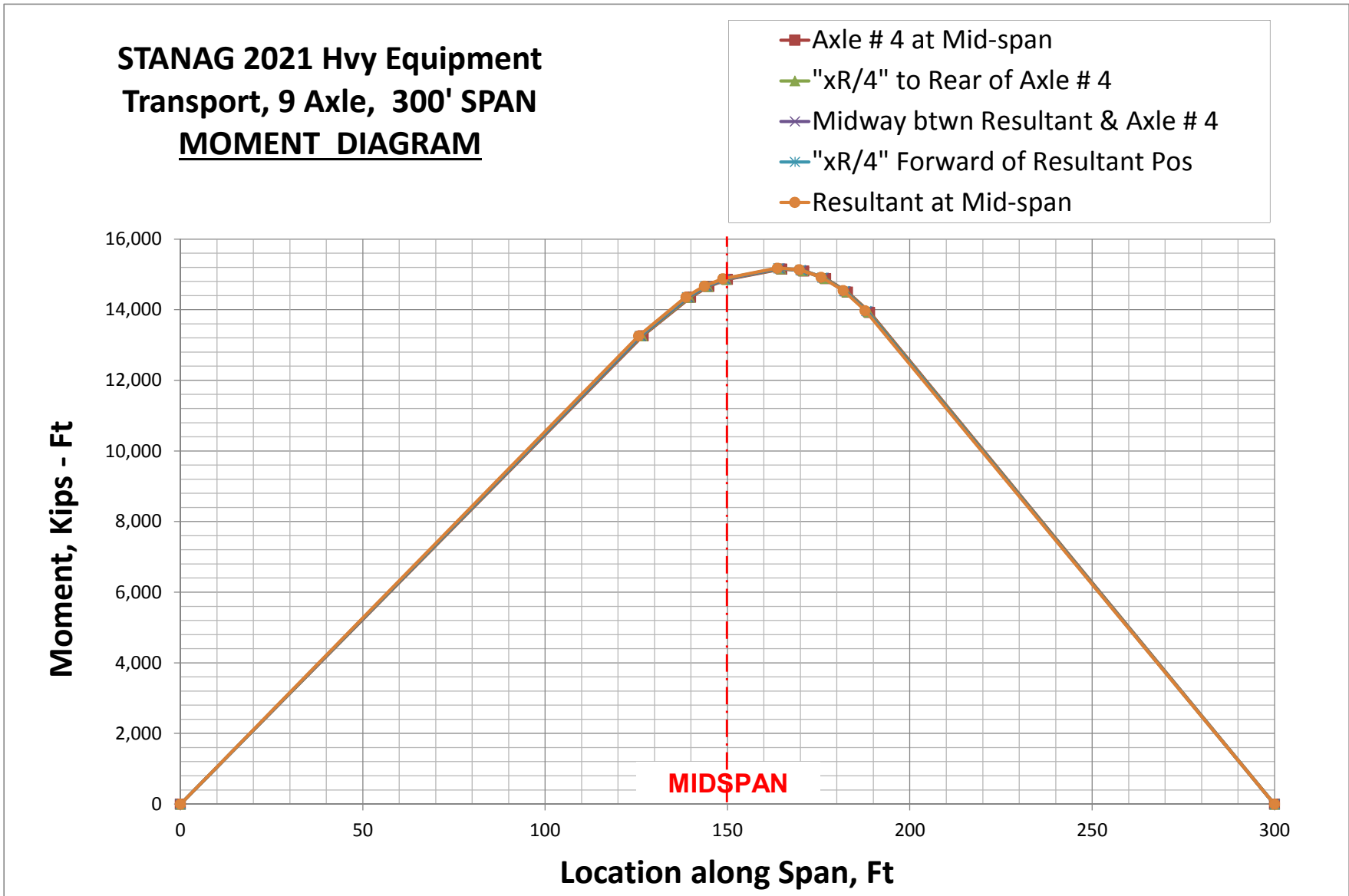
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Axle # 4 at Mid-span	126.88	139.88	144.92	<b>150.00</b>	164.92	170.96	176.96	182.96	189.01	110.99
"xR/4" to Rear of Axle # 4	126.56	139.56	144.60	149.68	164.60	170.64	176.64	182.64	188.69	111.31
Midway btwn Resultant & Axle # 4	126.24	139.24	144.28	149.36	164.28	170.33	176.33	182.33	188.37	111.63
"xR/4" Forward of Resultant Pos	125.92	138.92	143.96	149.05	163.96	170.01	176.01	182.01	188.05	111.95
Resultant at Mid-span	125.60	138.60	143.65	148.73	163.65	169.69	175.69	181.69	187.73	112.27

<b><u>NINE (9) AXLE</u></b>	<b>One (1x) STANAG 2021 Ed 6 US Heavy Equip Transport System, on 300' Span</b>	
-----------------------------	--	--

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
Axle # 4 at Mid-span	104.55	83.85	60.96	39.42	19.48	-8.68	-36.28	-63.88	-94.78	-125.48	125.48
POS	0.00	126.88	139.88	144.92	150.00	164.92	170.96	176.96	182.96	189.01	300.00
"xR/4" to Rear of Axle # 4	104.79	84.09	61.20	39.67	19.73	-8.43	-36.03	-63.63	-94.53	-125.23	125.23
POS	0.00	126.56	139.56	144.60	149.68	164.60	170.64	176.64	182.64	188.69	300.00
Midway btwn Resultant & Axle # 4	105.04	84.34	61.45	39.91	19.97	-8.19	-35.79	-63.39	-94.29	-124.99	124.99
POS	0.00	126.24	139.24	144.28	149.36	164.28	170.33	176.33	182.33	188.37	300.00
"xR/4" Forward of Resultant Pos	105.28	84.58	61.69	40.15	20.21	-7.95	-35.55	-63.14	-94.04	-124.74	124.74
POS	0.00	125.92	138.92	143.96	149.05	163.96	170.01	176.01	182.01	188.05	300.00
Resultant at Mid-span	105.53	84.83	61.93	40.40	20.46	-7.70	-35.30	-62.90	-93.80	-124.50	124.50
POS	0.00	125.60	138.60	143.65	148.73	163.65	169.69	175.69	181.69	187.73	300.00

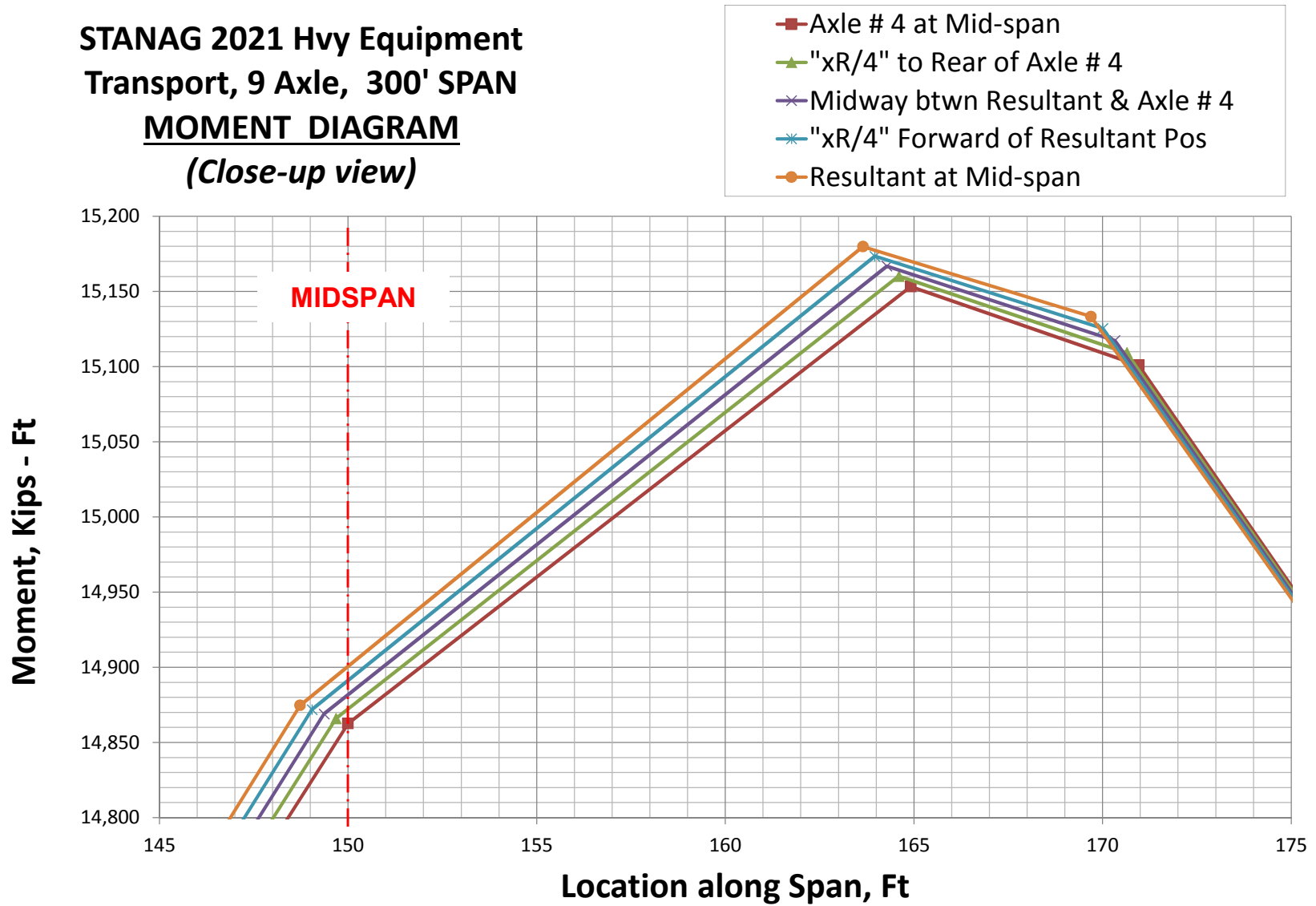
MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
Axle # 4 at Mid-span	0.0	13,264.9	14,354.9	14,662.3	14,862.6	15,153.3	15,100.8	14,883.1	14,499.8	13,927.1	0.0
POS	0.00	126.88	139.88	144.92	150.00	164.92	170.96	176.96	182.96	189.01	300.00
"xR/4" to Rear of Axle # 4	0.0	13,262.5	14,355.7	14,664.3	14,865.9	15,160.1	15,109.2	14,893.0	14,511.1	13,939.8	0.0
POS	0.00	126.56	139.56	144.60	149.68	164.60	170.64	176.64	182.64	188.69	300.00
Midway btwn Resultant & Axle # 4	0.0	13,260.0	14,356.3	14,666.1	14,869.0	15,166.9	15,117.4	14,902.6	14,522.3	13,952.4	0.0
POS	0.00	126.24	139.24	144.28	149.36	164.28	170.33	176.33	182.33	188.37	300.00
"xR/4" Forward of Resultant Pos	0.0	13,257.30	14,356.76	14,667.84	14,871.91	15,173.46	15,125.44	14,912.14	14,533.23	13,964.89	0.00
POS	0.00	125.92	138.92	143.96	149.05	163.96	170.01	176.01	182.01	188.05	300.00
Resultant at Mid-span	0.0	13,254.45	14,357.08	14,669.38	14,874.69	15,179.88	15,133.34	14,921.50	14,544.06	13,977.19	0.00
POS	0.00	125.60	138.60	143.65	148.73	163.65	169.69	175.69	181.69	187.73	300.00

**NINE (9) AXLE**      **One (1x) STANAG 2021 Ed 6 US Heavy Equip Transport System, on 300' Span**



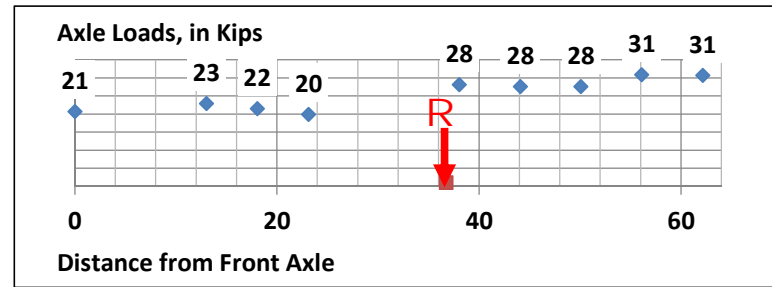
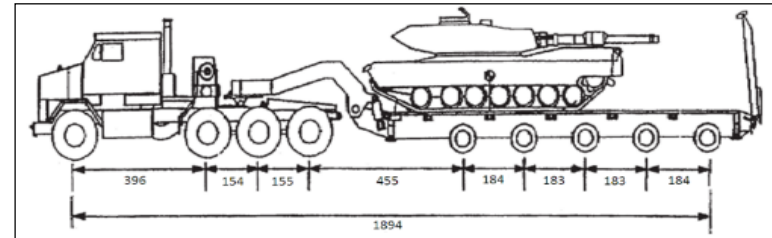
**NINE (9) AXLE**      **One (1x) STANAG 2021 Ed 6 US Heavy Equip Transport System, on 300' Span**

**STANAG 2021 Hvy Equipment  
Transport, 9 Axle, 300' SPAN  
MOMENT DIAGRAM  
(Close-up view)**



**NINE (9) AXLE** **One (1x) STANAG 2021 Ed 6 US Heavy Equip Transport System, on 300' Span**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.35	20.70		0.00	92.07	0
2	11.45	22.89	13.00	13.00	101.83	396
3	10.77	21.53	5.04	18.04	95.79	550
4	9.97	19.94	5.08	23.12	88.70	705
5	14.08	28.16	14.92	38.04	125.26	1160
6	13.80	27.60	6.04	44.08	122.77	1344
7	13.80	27.60	6.00	50.09	122.77	1527
8	15.45	30.90	6.00	56.09	137.45	1710
(Rear) 9	15.35	30.70	6.04	62.13	136.56	1894
<b>Totals</b>	<b>115.01</b>	<b>230.03</b>	<b>62.13</b>		<b>1023.2</b>	
				<b>Resultant at location:</b>	<b>36.769</b>	<b>1121</b>
				<b>Distance to Nearest Axle, "xR":</b>	<b>1.272</b>	<b>(Forward of Axle #5)</b>



**300 ft Span Length**

	Front #1 Axle Position AX 1 ft	Middle #2 Axle Position AX 2 ft	Middle #3 Axle Position AX 3 ft	Middle #4 Axle Position AX 4 ft	Middle #5 Axle Position AX 5 ft	Middle #6 Axle Position AX 6 ft	Middle #7 Axle Position AX 7 ft	Middle #8 Axle Position AX 8 ft	Rear #9 Axle Position AX 9 ft	Dist to Beam End L END ft
"xR / 2" Fwd of Resultant	113.87	126.87	131.91	136.99	151.91	157.95	163.95	169.95	176.00	124.00
Resultant at Mid-span	113.23	126.23	131.27	136.35	151.27	157.32	163.32	169.32	175.36	124.64
Btwn Resultant & Axle # 5	112.59	125.59	130.64	135.72	150.64	156.68	162.68	168.68	174.72	125.28
Axle # 5 at Mid-span	111.96	124.96	130.00	135.08	<b>150.00</b>	156.04	162.04	168.04	174.09	125.91
"xR / 2" Rear of Axle # 5	111.32	124.32	129.36	134.45	149.36	155.41	161.41	167.41	173.45	126.55



<b>NINE (9) AXLE</b>	<b>One (1x) STANAG 2021 Ed 6 US Heavy Equip Transport System, on 300' Span</b>	
----------------------	--	--

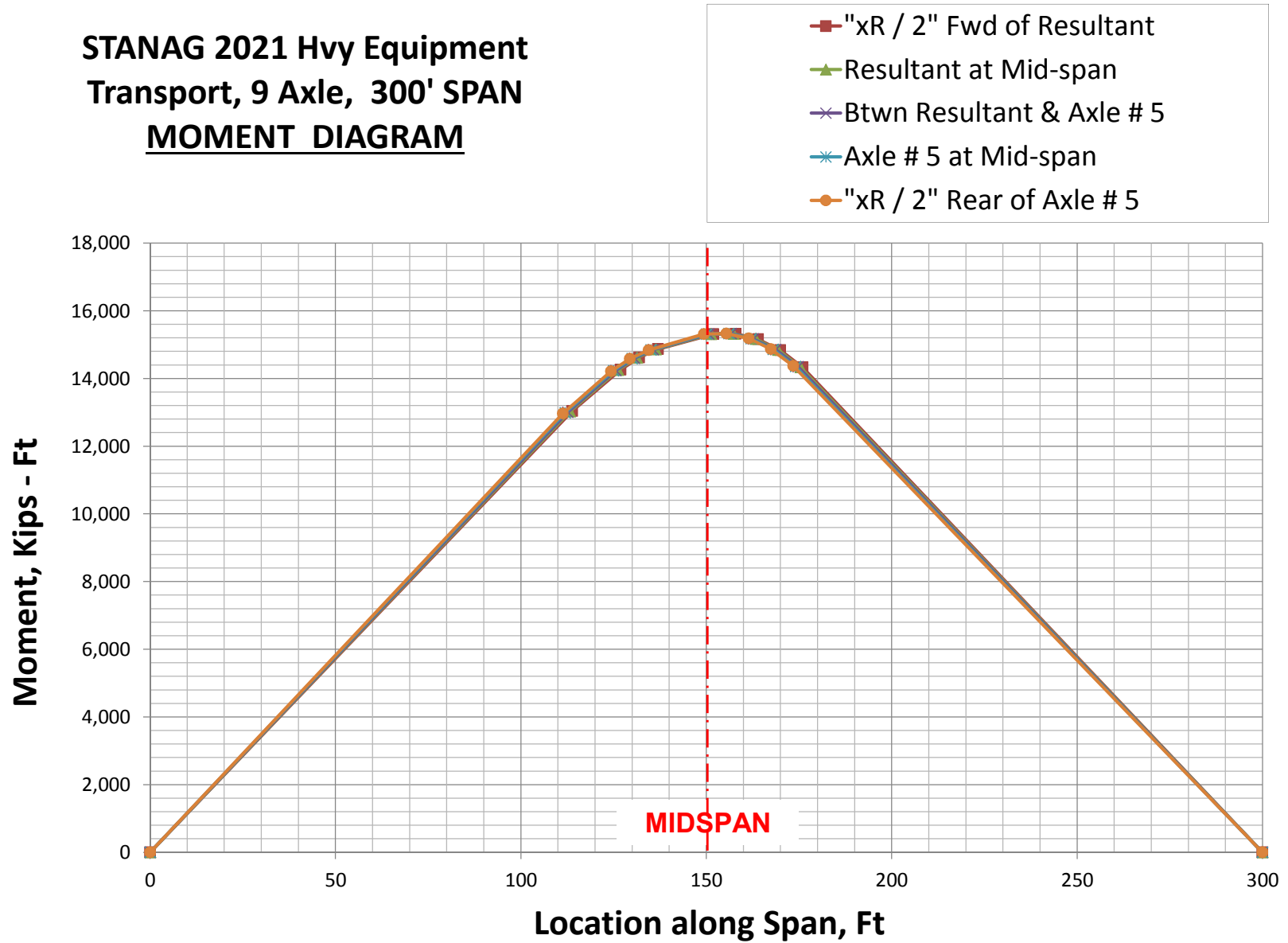
SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
"xR / 2" Fwd of Resultant	114.53	93.83	70.93	49.40	29.46	1.30	-26.30	-53.90	-84.80	-115.50	115.50
POS	0.00	113.87	126.87	131.91	136.99	151.91	157.95	163.95	169.95	176.00	300.00
Resultant at Mid-span	115.01	94.31	71.42	49.89	29.95	1.79	-25.81	-53.41	-84.31	-115.01	115.01
POS	0.00	113.23	126.23	131.27	136.35	151.27	157.32	163.32	169.32	175.36	300.00
Btwn Resultant & Axle # 5	115.50	94.80	71.91	50.37	30.43	2.27	-25.33	-52.93	-83.83	-114.53	114.53
POS	0.00	112.59	125.59	130.64	135.72	150.64	156.68	162.68	168.68	174.72	300.00
Axle # 5 at Mid-span	115.99	95.29	72.40	50.86	30.92	2.76	-24.84	-52.44	-83.34	-114.04	114.04
POS	0.00	111.96	124.96	130.00	135.08	150.00	156.04	162.04	168.04	174.09	300.00
"xR / 2" Rear of Axle # 5	116.48	95.78	72.88	51.35	31.41	3.25	-24.35	-51.95	-82.85	-113.55	113.55
POS	0.00	111.32	124.32	129.36	134.45	149.36	155.41	161.41	167.41	173.45	300.00

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
"xR / 2" Fwd of Resultant	0.0	13,040.6	14,260.2	14,617.9	14,869.0	15,308.4	15,316.3	15,158.4	14,835.0	14,322.5	0.0
POS	0.00	113.87	126.87	131.91	136.99	151.91	157.95	163.95	169.95	176.00	300.00
Resultant at Mid-span	0.0	13,023.0	14,248.9	14,609.1	14,862.6	15,309.3	15,320.1	15,165.2	14,844.7	14,335.2	0.0
POS	0.00	113.23	126.23	131.27	136.35	151.27	157.32	163.32	169.32	175.36	300.00
Btwn Resultant & Axle # 5	0.0	13,004.8	14,237.0	14,599.7	14,855.7	15,309.7	15,323.4	15,171.4	14,853.8	14,347.2	0.0
POS	0.00	112.59	125.59	130.64	135.72	150.64	156.68	162.68	168.68	174.72	300.00
Axle # 5 at Mid-span	0.0	12,985.89	14,224.52	14,589.59	14,848.07	15,309.35	15,326.03	15,176.99	14,862.32	14,358.68	0.00
POS	0.00	111.96	124.96	130.00	135.08	150.00	156.04	162.04	168.04	174.09	300.00
"xR / 2" Rear of Axle # 5	0.0	12,966.40	14,211.38	14,578.91	14,839.86	15,308.42	15,328.05	15,181.93	14,870.19	14,369.50	0.00
POS	0.00	111.32	124.32	129.36	134.45	149.36	155.41	161.41	167.41	173.45	300.00

**NINE (9) AXLE**

**One (1x) STANAG 2021 Ed 6 US Heavy Equip Transport System, on 300' Span**

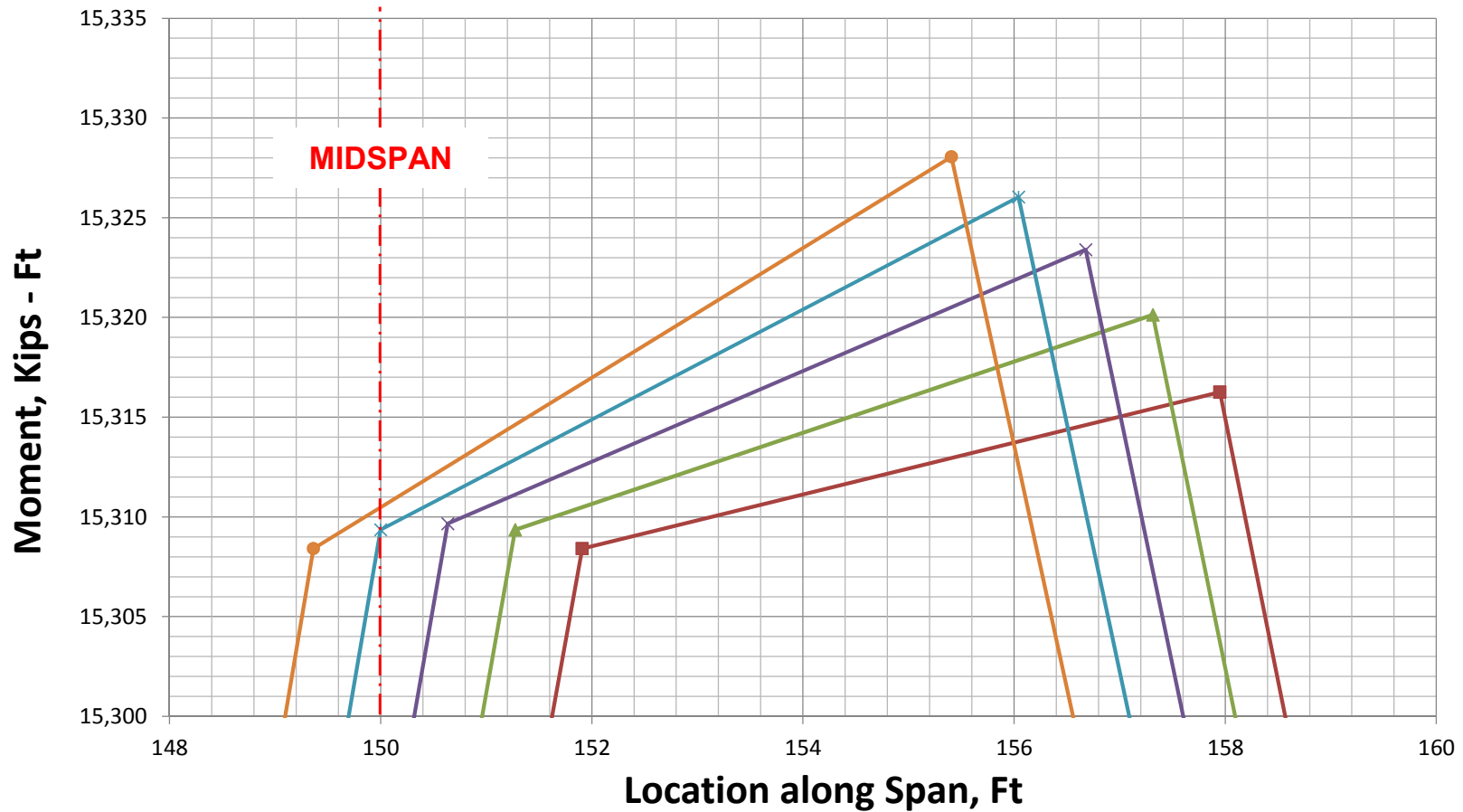
**STANAG 2021 Hvy Equipment  
Transport, 9 Axle, 300' SPAN  
MOMENT DIAGRAM**



**NINE (9) AXLE**      **One (1x) STANAG 2021 Ed 6 US Heavy Equip Transport System, on 300' Span**

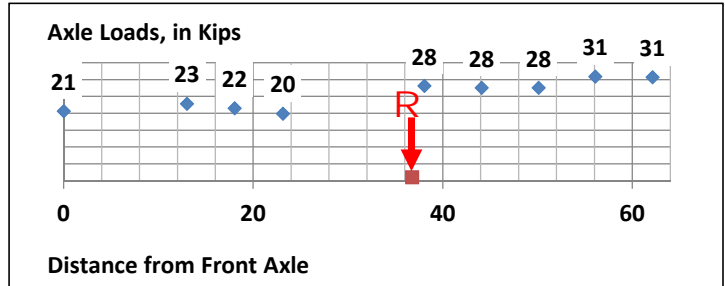
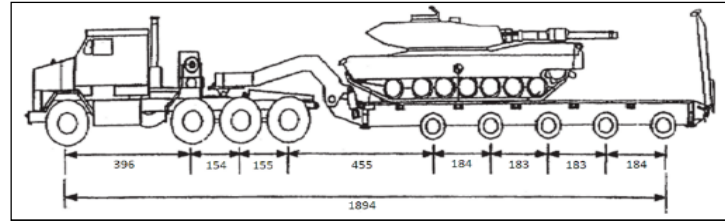
**STANAG 2021 Hvy Equipment  
 Transport, 9 Axle, 300' SPAN  
 MOMENT DIAGRAM  
 (Close-up view)**

- "xR / 2" Fwd of Resultant
- ▲—Resultant at Mid-span
- ×—Btwn Resultant & Axle # 5
- \*—Axle # 5 at Mid-span
- "xR / 2" Rear of Axle # 5



**NINE (9) AXLE** **One (1x) STANAG 2021 Ed 6 US Heavy Equip Transport System, on 300' Span**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.35	20.70		0.00	92.07	0
2	11.45	22.89	13.00	13.00	101.83	396
3	10.77	21.53	5.04	18.04	95.79	550
4	9.97	19.94	5.08	23.12	88.70	705
5	14.08	28.16	14.92	38.04	125.26	1160
6	13.80	27.60	6.04	44.08	122.77	1344
7	13.80	27.60	6.00	50.09	122.77	1527
8	15.45	30.90	6.00	56.09	137.45	1710
(Rear) 9	15.35	30.70	6.04	62.13	136.56	1894
<b>Totals</b>	<b>115.01</b>	<b>230.03</b>	<b>62.13</b>		<b>1023.2</b>	
				<b>Resultant at location:</b>	<b>36.769</b>	<b>1121</b>
				<b>Distance to Nearest Axle, "xR":</b>	<b>1.272 (Forward of Axle #5)</b>	



**300 ft Span Length**

	Front #1 Axle Position AX 1 ft	Middle #2 Axle Position AX 2 ft	Middle #3 Axle Position AX 3 ft	Middle #4 Axle Position AX 4 ft	Middle #5 Axle Position AX 5 ft	Middle #6 Axle Position AX 6 ft	Middle #7 Axle Position AX 7 ft	Middle #8 Axle Position AX 8 ft	Rear #9 Axle Position AX 9 ft	Dist to Beam End ft
Resultant at Mid-span	113.23	126.23	131.27	136.35	151.27	157.32	163.32	169.32	175.36	124.64
Axle # 4 at Mid-span	126.88	139.88	144.92	<b>150.00</b>	164.92	170.96	176.96	182.96	189.01	110.99
Axle # 5 at Mid-span	111.96	124.96	130.00	135.08	<b>150.00</b>	156.04	162.04	168.04	174.09	125.91
Axle # 6 at Mid-span	105.92	118.91	123.96	129.04	143.96	<b>150.00</b>	156.00	162.00	168.04	131.96
Axle # 7 at Mid-span	99.91	112.91	117.96	123.04	137.96	144.00	<b>150.00</b>	156.00	162.04	137.96
Midspan btwn Resultant-Axle # 4	120.05	133.05	138.10	143.18	158.10	164.14	170.14	176.14	182.18	117.82
Midspan btwn Resultant-Axle # 5	112.59	125.59	130.64	135.72	150.64	156.68	162.68	168.68	174.72	125.28
Midspan btwn Resultant-Axle # 6	109.57	122.57	127.61	132.70	147.61	153.66	159.66	165.66	171.70	128.30
Midspan btwn Resultant-Axle # 7	106.57	119.57	124.61	129.70	144.61	150.66	156.66	162.66	168.70	131.30

**NINE (9) AXLE** **One (1x) STANAG 2021 Ed 6 US Heavy Equip Transport System, on 300' Span**

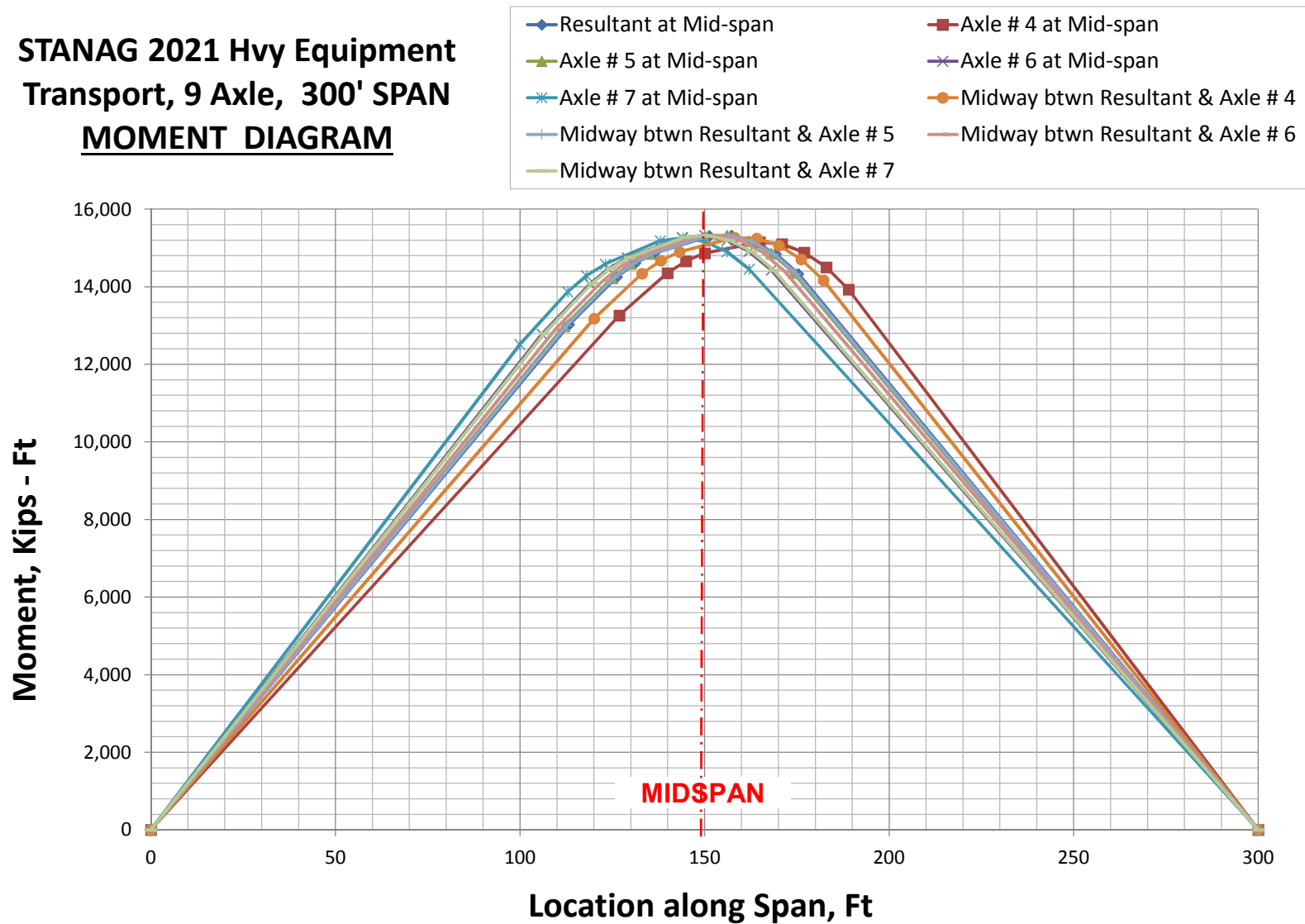
SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
Resultant at Mid-span	115.01	94.31	71.42	49.89	29.95	1.79	-25.81	-53.41	-84.31	-115.01	115.01
POS	0.00	113.23	126.23	131.27	136.35	151.27	157.32	163.32	169.32	175.36	300.00
Axle # 4 at Mid-span	104.55	83.85	60.96	39.42	19.48	-8.68	-36.28	-63.88	-94.78	-125.48	125.48
POS	0.00	126.88	139.88	144.92	150.00	164.92	170.96	176.96	182.96	189.01	300.00
Axle # 5 at Mid-span	115.99	95.29	72.40	50.86	30.92	2.76	-24.84	-52.44	-83.34	-114.04	114.04
POS	0.00	111.96	124.96	130.00	135.08	150.00	156.04	162.04	168.04	174.09	300.00
Axle # 6 at Mid-span	120.62	99.92	77.03	55.50	35.55	7.39	-20.20	-47.80	-78.70	-109.40	109.40
POS	0.00	105.92	118.91	123.96	129.04	143.96	150.00	156.00	162.00	168.04	300.00
Axle # 7 at Mid-span	125.22	104.52	81.63	60.10	40.16	12.00	-15.60	-43.20	-74.10	-104.80	104.80
POS	0.00	99.91	112.91	117.96	123.04	137.96	144.00	150.00	156.00	162.04	300.00
Midspan btwn Resultant-Axle # 4	109.78	89.08	66.19	44.65	24.71	-3.45	-31.05	-58.65	-89.54	-120.24	120.24
POS	0.00	120.05	133.05	138.10	143.18	158.10	164.14	170.14	176.14	182.18	300.00
Midspan btwn Resultant-Axle # 5	115.50	94.80	71.91	50.37	30.43	2.27	-25.33	-52.93	-83.83	-114.53	114.53
POS	0.00	112.59	125.59	130.64	135.72	150.64	156.68	162.68	168.68	174.72	300.00
Midspan btwn Resultant-Axle # 6	117.82	97.12	74.23	52.69	32.75	4.59	-23.01	-50.61	-81.51	-112.21	112.21
POS	0.00	109.57	122.57	127.61	132.70	147.61	153.66	159.66	165.66	171.70	300.00
Midspan btwn Resultant-Axle # 7	120.12	99.42	76.53	54.99	35.05	6.89	-20.71	-48.31	-79.21	-109.91	109.91
POS	0.00	106.57	119.57	124.61	129.70	144.61	150.66	156.66	162.66	168.70	300.00

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
Resultant at Mid-span	0.0	13,023.0	14,248.9	14,609.1	14,862.6	15,309.3	15,320.1	15,165.2	14,844.7	14,335.2	0.0
POS	0.00	113.23	126.23	131.27	136.35	151.27	157.32	163.32	169.32	175.36	300.00
Axle # 4 at Mid-span	0.0	13,264.9	14,354.9	14,662.3	14,862.6	15,153.3	15,100.8	14,883.1	14,499.8	13,927.1	0.0
POS	0.00	126.88	139.88	144.92	150.00	164.92	170.96	176.96	182.96	189.01	300.00
Axle # 5 at Mid-span	0.0	12,985.9	14,224.5	14,589.6	14,848.1	15,309.3	15,326.0	15,177.0	14,862.3	14,358.7	0.0
POS	0.00	111.96	124.96	130.00	135.08	150.00	156.04	162.04	168.04	174.09	300.00
Axle # 6 at Mid-span	0.0	12,775.7	14,074.6	14,463.0	14,745.0	15,275.4	15,320.1	15,198.9	14,912.0	14,436.4	0.0
POS	0.00	105.92	118.91	123.96	129.04	143.96	150.00	156.00	162.00	168.04	300.00
Axle # 7 at Mid-span	0.0	12,511.6	13,870.3	14,281.9	14,587.3	15,186.4	15,258.9	15,165.2	14,906.0	14,458.2	0.0
POS	0.00	99.91	112.91	117.96	123.04	137.96	144.00	150.00	156.00	162.04	300.00
Midspan btwn Resultant-Axle # 4	0.0	13,179.7	14,337.6	14,671.4	14,898.3	15,267.0	15,246.2	15,059.9	14,708.0	14,166.8	0.0
POS	0.00	120.05	133.05	138.10	143.18	158.10	164.14	170.14	176.14	182.18	300.00
Midspan btwn Resultant-Axle # 5	0.0	13,004.8	14,237.0	14,599.7	14,855.7	15,309.7	15,323.4	15,171.4	14,853.8	14,347.2	0.0
POS	0.00	112.59	125.59	130.64	135.72	150.64	156.68	162.68	168.68	174.72	300.00
Midspan btwn Resultant-Axle # 6	0.0	12,909.6	14,172.0	14,546.3	14,814.1	15,302.7	15,330.4	15,192.3	14,888.6	14,396.1	0.0
POS	0.00	109.57	122.57	127.61	132.70	147.61	153.66	159.66	165.66	171.70	300.00
Midspan btwn Resultant-Axle # 7	0.0	12,801.3	14,093.6	14,479.5	14,759.0	15,281.9	15,323.5	15,199.2	14,909.3	14,430.7	0.0
POS	0.00	106.57	119.57	124.61	129.70	144.61	150.66	156.66	162.66	168.70	300.00

**NINE (9) AXLE**

**One (1x) STANAG 2021 Ed 6 US Heavy Equip Transport System, on 300' Span**

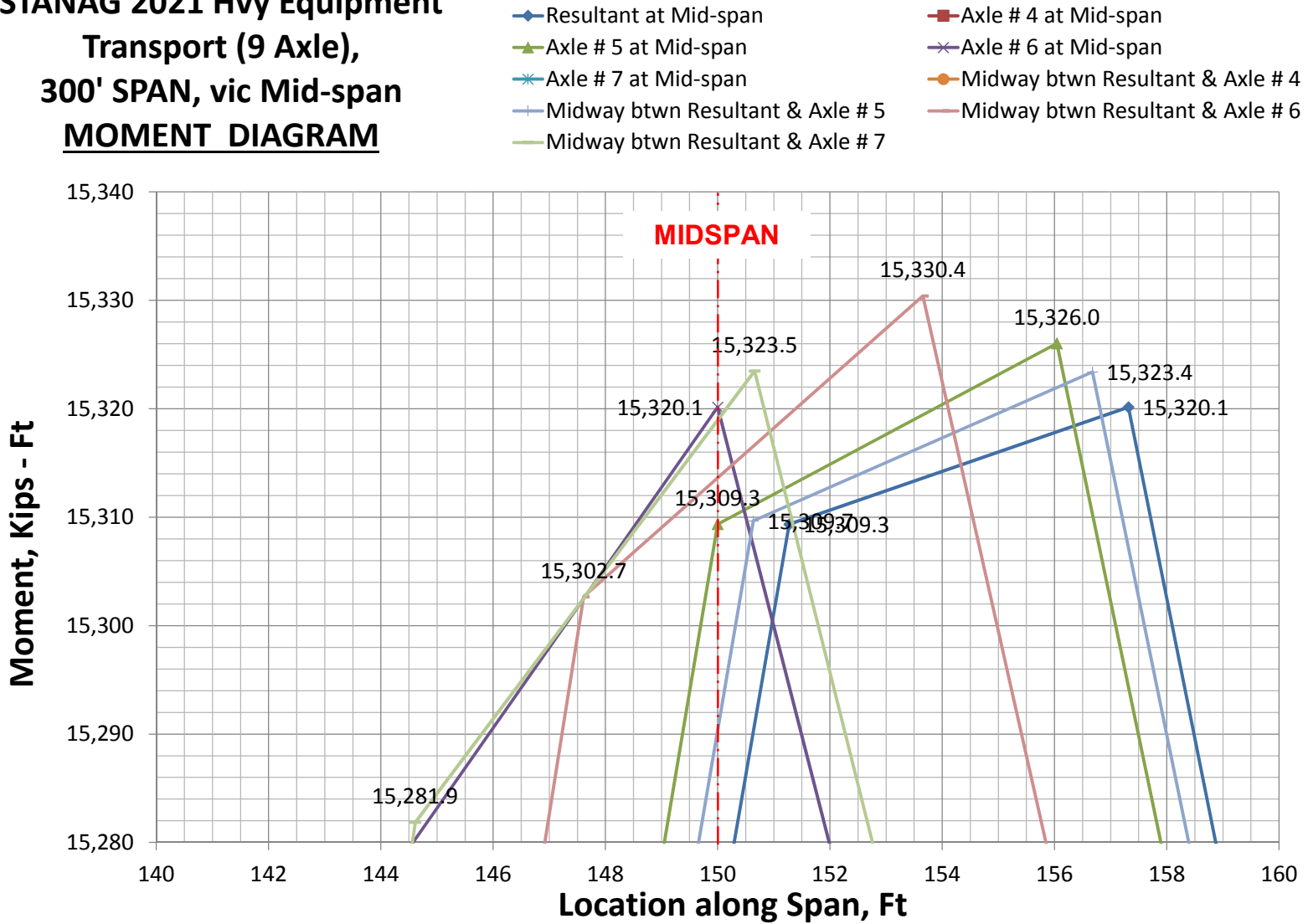
**STANAG 2021 Hvy Equipment  
Transport, 9 Axle, 300' SPAN  
MOMENT DIAGRAM**



**NINE (9) AXLE**

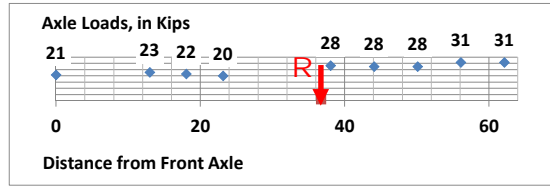
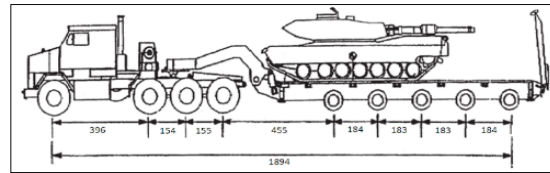
**One (1x) STANAG 2021 Ed 6 US Heavy Equip Transport System, on 300' Span**

**STANAG 2021 Hvy Equipment  
 Transport (9 Axle),  
 300' SPAN, vic Mid-span  
 MOMENT DIAGRAM**



**NINE (9) AXLE**      **One (1x) STANAG US HET System, Max Moment Calculation (midway btwn Axle #5 and #6), 50'- 1,000' Spans**

Axle	Load (ST)	Load (kips)	SI / Metric Units			
			Distance btwn axles (ft)	Distance from front axle (ft)	Distance from front axle (cm)	
(Front) 1	10.35	20.7		0.00	92.07	0
2	11.45	22.9	13.00	13.00	101.83	396
3	10.77	21.5	5.04	18.04	95.79	550
4	9.97	19.9	5.08	23.12	88.70	705
5	14.08	28.2	14.92	38.04	125.26	1160
6	13.80	27.6	6.04	44.08	122.77	1344
7	13.80	27.6	6.00	50.09	122.77	1527
8	15.45	30.9	6.00	56.09	137.45	1710
(Rear) 9	15.35	30.7	6.04	62.13	136.56	1894
<b>Totals</b>	<b>115.0</b>	<b>230.0</b>	<b>62.13</b>		<b>1023.2</b>	
		Resultant at location:		36.769		1121
		Distance to Nearest Axle, "xR":		1.272	(Forward of Axle #5)	



**MAXIMUM SHEAR CALCULATIONS**

Span Length	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
50.00	-12.13	0.87	5.91	10.99	25.91	31.96	37.96	43.96	50.00	0.00
100.0	37.87	50.87	55.91	60.99	75.91	81.96	87.96	93.96	100.00	0.00
200.0	137.87	150.87	155.91	160.99	175.91	181.96	187.96	193.96	200.00	0.00
300.0	237.87	250.87	255.91	260.99	275.91	281.96	287.96	293.96	300.00	0.00
400.0	337.87	350.87	355.91	360.99	375.91	381.96	387.96	393.96	400.00	0.00
500.0	437.87	450.87	455.91	460.99	475.91	481.96	487.96	493.96	500.00	0.00
600.0	537.87	550.87	555.91	560.99	575.91	581.96	587.96	593.96	600.00	0.00
700.0	637.87	650.87	655.91	660.99	675.91	681.96	687.96	693.96	700.00	0.00
800.0	737.87	750.87	755.91	760.99	775.91	781.96	787.96	793.96	800.00	0.00
900.0	837.87	850.87	855.91	860.99	875.91	881.96	887.96	893.96	900.00	0.00
1,000.0	937.87	950.87	955.91	960.99	975.91	981.96	987.96	993.96	1000.00	0.00

**MAXIMUM V CALCS**

Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
116.67	113.36
58.33	171.69
29.17	200.86
19.44	210.58
14.58	215.44
11.67	218.36
9.72	220.30
8.33	221.69
7.29	222.73
6.48	223.54
5.83	224.19

**MAXIMUM MOMENT CALCULATIONS**

Span Length	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
50.00	-16.06	-3.06	1.98	7.06	21.98	28.02	34.02	40.02	46.07	3.93
100.0	8.94	21.94	26.98	32.06	46.98	53.02	59.02	65.02	71.07	28.93
200.0	58.94	71.94	76.98	82.06	96.98	103.02	109.02	115.02	121.07	78.93
300.0	108.94	121.94	126.98	132.06	146.98	153.02	159.02	165.02	171.07	128.93
400.0	158.94	171.94	176.98	182.06	196.98	203.02	209.02	215.02	221.07	178.93
500.0	208.94	221.94	226.98	232.06	246.98	253.02	259.02	265.02	271.07	228.93
600.0	258.94	271.94	276.98	282.06	296.98	303.02	309.02	315.02	321.07	278.93
700.0	308.94	321.94	326.98	332.06	346.98	353.02	359.02	365.02	371.07	328.93
800.0	358.94	371.94	376.98	382.06	396.98	403.02	409.02	415.02	421.07	378.93
900.0	408.94	421.94	426.98	432.06	446.98	453.02	459.02	465.02	471.07	428.93
1,000.0	458.94	471.94	476.98	482.06	496.98	503.02	509.02	515.02	521.07	478.93

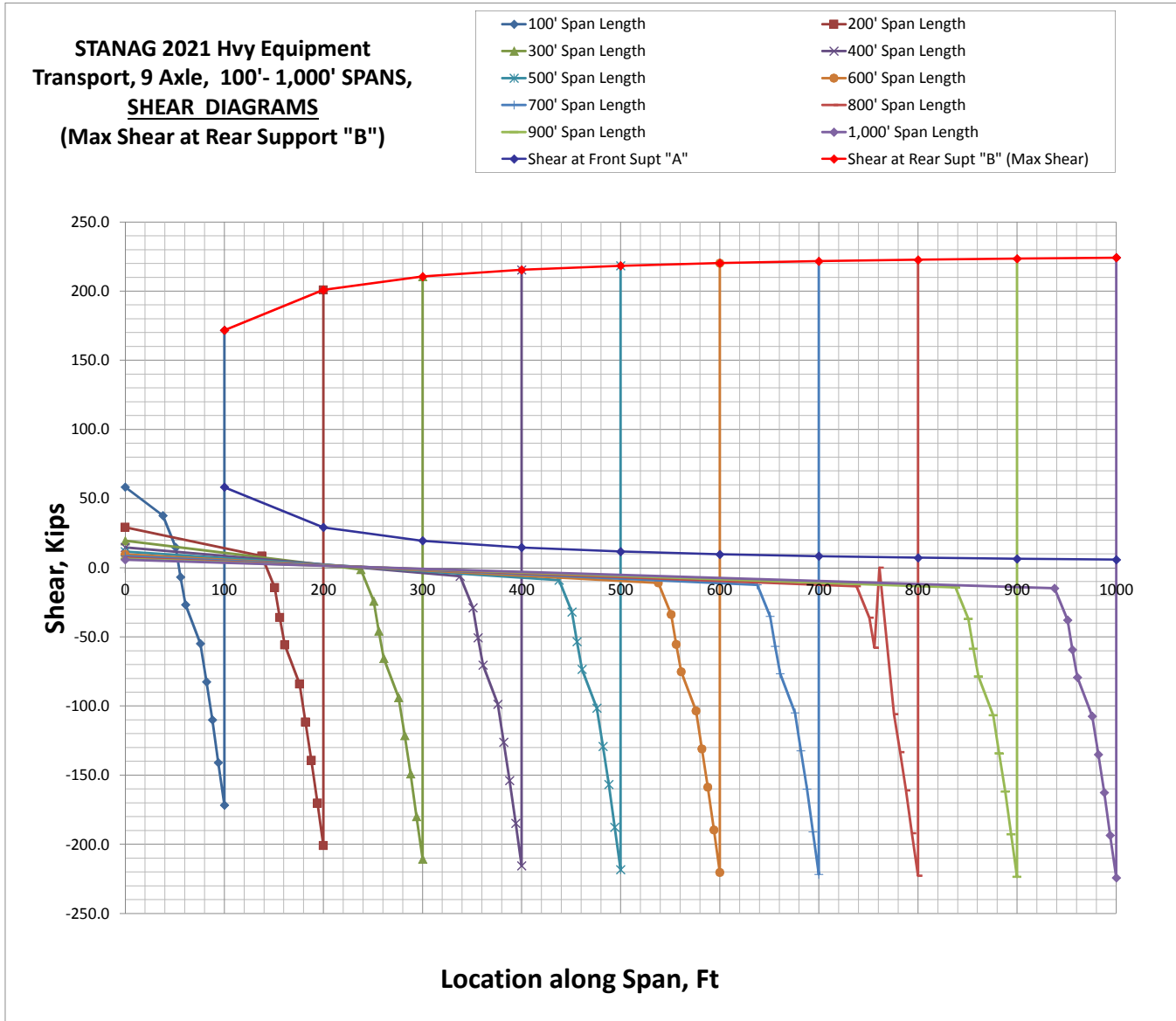


**NINE (9) AXLE**      **One (1x) STANAG US HET System, Max Moment Calculation (midway btwn Axle #5 and #6), 50'- 1,000' Spans**

Span Length, ft	Calculated SHEARS and Locations	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
50	Moment on Span	124.89	104.19	81.30	59.76	39.82	11.66	-15.94	-43.54	-74.44	-105.14	105.14
	Axle Location on Span	0.00	-16.06	-3.06	1.98	7.06	21.98	28.02	34.02	40.02	46.07	50.00
100	Shear at Axle	124.89	104.19	81.30	59.76	39.82	11.66	-15.94	-43.54	-74.44	-105.14	105.14
	Axle Location on Span	0.00	8.94	21.94	26.98	32.06	46.98	53.02	59.02	65.02	71.07	100.00
200	Shear at Axle	119.95	99.25	76.36	54.82	34.88	6.72	-20.88	-48.48	-79.38	-110.07	110.07
	Axle Location on Span	0.00	58.94	71.94	76.98	82.06	96.98	103.02	109.02	115.02	121.07	200.00
300	Shear at Axle	118.31	97.61	74.71	53.18	33.24	5.08	-22.52	-50.12	-81.02	-111.72	111.72
	Axle Location on Span	0.00	108.94	121.94	126.98	132.06	146.98	153.02	159.02	165.02	171.07	300.00
400	Shear at Axle	117.48	96.78	73.89	52.36	32.41	4.25	-23.34	-50.94	-81.84	-112.54	112.54
	Axle Location on Span	0.00	158.94	171.94	176.98	182.06	196.98	203.02	209.02	215.02	221.07	400.00
500	Shear at Axle	116.99	96.29	73.40	51.86	31.92	3.76	-23.84	-51.44	-82.34	-113.04	113.04
	Axle Location on Span	0.00	208.94	221.94	226.98	232.06	246.98	253.02	259.02	265.02	271.07	500.00
600	Shear at Axle	116.66	95.96	73.07	51.53	31.59	3.43	-24.17	-51.77	-82.67	-113.37	113.37
	Axle Location on Span	0.00	258.94	271.94	276.98	282.06	296.98	303.02	309.02	315.02	321.07	600.00
700	Shear at Axle	116.42	95.72	72.83	51.30	31.36	3.20	-24.40	-52.00	-82.90	-113.60	113.60
	Axle Location on Span	0.00	308.94	321.94	326.98	332.06	346.98	353.02	359.02	365.02	371.07	700.00
800	Shear at Axle	116.25	95.55	72.66	51.12	31.18	3.02	-24.58	-52.18	-83.08	-113.78	113.78
	Axle Location on Span	0.00	358.94	371.94	376.98	382.06	396.98	403.02	409.02	415.02	421.07	800.00
900	Shear at Axle	116.11	95.41	72.52	50.98	31.04	2.88	-24.72	-52.32	-83.22	-113.92	113.92
	Axle Location on Span	0.00	408.94	421.94	426.98	432.06	446.98	453.02	459.02	465.02	471.07	900.00
1,000	Shear at Axle	116.00	95.30	72.41	50.87	30.93	2.77	-24.83	-52.43	-83.33	-114.03	114.03
	Axle Location on Span	0.00	458.94	471.94	476.98	482.06	496.98	503.02	509.02	515.02	521.07	1,000.00

Span Length, ft	Calculated MOMENTS and Locations	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
50	Moment	0.00	-2,164.75	-682.03	-222.27	131.64	873.05	1,003.22	966.86	764.88	374.72	0.00
	Axle Location on Span	0.00	-16.06	-3.06	1.98	7.06	21.98	28.02	34.02	40.02	46.07	50.00
100	Moment	0.0	1,116.1	2,470.5	2,880.4	3,184.2	3,778.2	3,848.7	3,753.1	3,491.8	3,042.0	0.0
	Axle Location on Span	0.00	8.94	21.94	26.98	32.06	46.98	53.02	59.02	65.02	71.07	100.00
200	Moment	0.0	7,069.6	8,359.7	8,744.8	9,023.4	9,543.8	9,584.4	9,459.2	9,168.3	8,688.6	0.0
	Axle Location on Span	0.00	58.94	71.94	76.98	82.06	96.98	103.02	109.02	115.02	121.07	200.00
300	Moment	0.0	12,887.8	14,156.6	14,533.3	14,803.6	15,299.4	15,330.1	15,194.9	14,894.2	14,404.5	0.0
	Axle Location on Span	0.00	108.94	121.94	126.98	132.06	146.98	153.02	159.02	165.02	171.07	300.00
400	Moment	0.0	18,672.2	19,930.3	20,302.9	20,569.0	21,052.5	21,078.2	20,938.2	20,632.5	20,137.8	0.0
	Axle Location on Span	0.00	158.94	171.94	176.98	182.06	196.98	203.02	209.02	215.02	221.07	400.00
500	Moment	0.0	24,443.16	25,694.79	26,064.91	26,328.47	26,804.66	26,827.39	26,684.34	26,375.68	25,878.08	0.00
	Axle Location on Span	0.00	208.94	221.94	226.98	232.06	246.98	253.02	259.02	265.02	271.07	500.00
600	Moment	0.0	30,207.32	31,454.67	31,823.13	32,085.01	32,556.29	32,577.03	32,432.01	32,121.37	31,621.79	0.00
	Axle Location on Span	0.00	258.94	271.94	276.98	282.06	296.98	303.02	309.02	315.02	321.07	600.00
700	Moment	0.0	35,967.62	37,211.91	37,579.18	37,839.87	38,307.65	38,326.97	38,180.53	37,868.48	37,367.48	0.00
	Axle Location on Span	0.00	308.94	321.94	326.98	332.06	346.98	353.02	359.02	365.02	371.07	700.00
800	Moment	0.0	41,725.50	42,967.51	43,333.88	43,593.68	44,058.82	44,077.07	43,929.58	43,616.47	43,114.40	0.00
	Axle Location on Span	0.00	358.94	371.94	376.98	382.06	396.98	403.02	409.02	415.02	421.07	800.00
900	Moment	0.0	47,481.78	48,722.00	49,087.68	49,346.78	49,809.88	49,827.30	49,678.98	49,365.05	48,862.15	0.00
	Axle Location on Span	0.00	408.94	421.94	426.98	432.06	446.98	453.02	459.02	465.02	471.07	900.00
1,000	Moment	0.0	53,236.9	54,475.7	54,840.8	55,099.4	55,560.8	55,577.6	55,428.6	55,114.0	54,610.5	0.0
	Axle Location on Span	0.00	458.94	471.94	476.98	482.06	496.98	503.02	509.02	515.02	521.07	1,000.00

**NINE (9) AXLE**      **One (1x) STANAG US HET System, Max Moment Calculation (midway btwn Axle #5 and #6), 50'- 1,000' Spans**

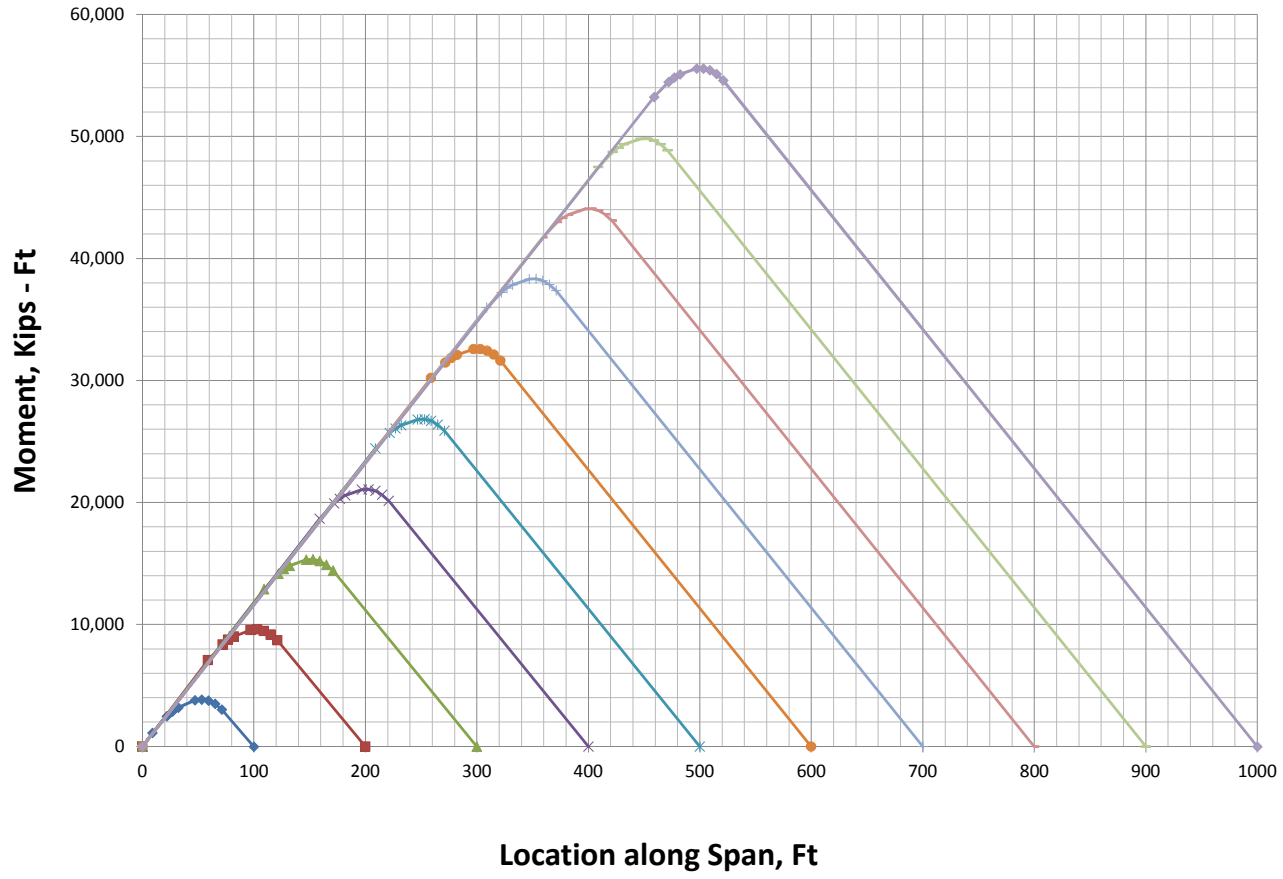


100' Span Length      200' Span Length

**NINE (9) AXLE**      **One (1x) STANAG US HET System, Max Moment Calculation (midway btwn Axle #5 and #6), 50'- 1,000' Spans**

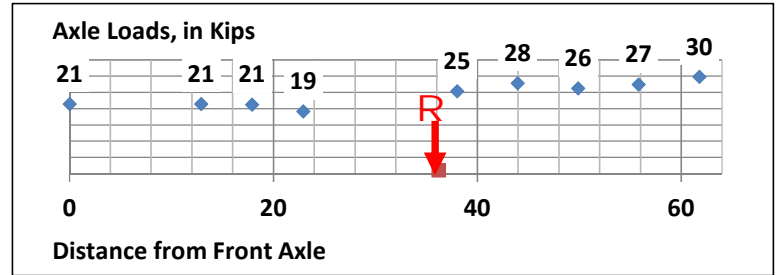
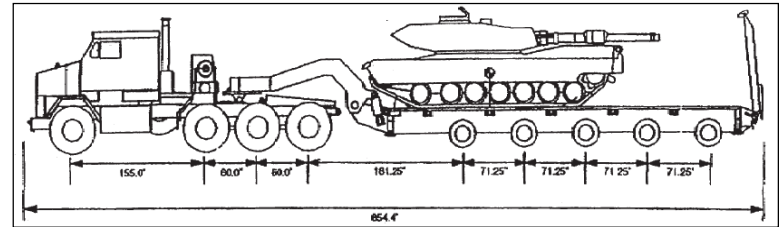
**STANAG 2021 Hvy Equipment  
 Transport, 9 Axle, 100'- 1,000' SPANS,  
MOMENT DIAGRAMS  
 (at Max Moment btwn Axles 5-6)**

- 100' Span Length
- 200' Span Length
- 300' Span Length
- 400' Span Length
- 500' Span Length
- 600' Span Length
- 700' Span Length
- 800' Span Length
- 900' Span Length
- 1,000' Span Length



**NINE (9) AXLE** **One (1x) Kansas DOT Heavy Equipment Transport System, on 300' Span**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.70	21.40		0.00	95.19	0
2	10.70	21.40	12.92	12.92	95.19	394
3	10.60	21.20	5.00	17.92	94.30	546
4	9.60	19.20	5.00	22.92	85.41	699
5	12.70	25.40	15.10	38.02	112.98	1159
6	13.90	27.80	5.94	43.96	123.66	1340
7	13.10	26.20	5.94	49.90	116.54	1521
8	13.70	27.40	5.94	55.83	121.88	1702
(Rear) 9	14.90	29.80	5.94	61.77	132.56	1883
<b>Totals</b>	<b>109.90</b>	<b>219.80</b>	<b>61.77</b>		<b>977.7</b>	
		<b>Resultant at location:</b>		<b>36.223</b>		<b>1104</b>
		<b>Distance to Nearest Axle, "xR":</b>		<b>1.797</b>	<b>(Forward of Axle #5)</b>	



**300 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Axle # 4 at Mid-span	127.08	140.00	145.00	<b>150.00</b>	165.10	171.04	176.98	182.92	188.85	111.15
"xR/4" to Rear of Axle # 4	126.63	139.55	144.55	149.55	164.65	170.59	176.53	182.47	188.40	111.60
Midway btwn Resultant & Axle # 4	126.18	139.10	144.10	149.10	164.21	170.14	176.08	182.02	187.96	112.04
"xR/4" Forward of Resultant Pos	125.74	138.65	143.65	148.65	163.76	169.69	175.63	181.57	187.51	112.49
Resultant at Mid-span	125.29	138.20	143.20	148.20	163.31	169.24	175.18	181.12	187.06	112.94

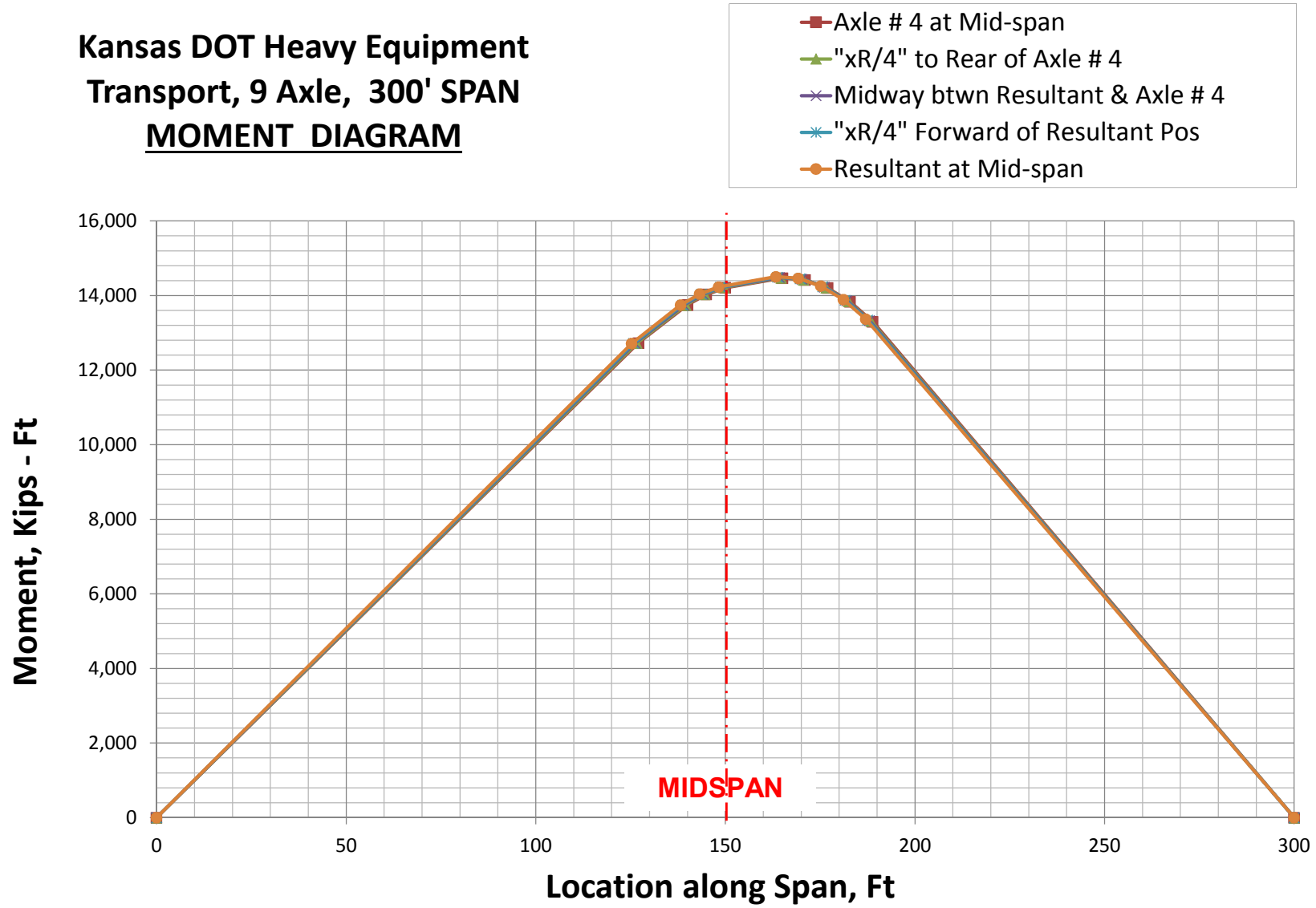
<b><u>NINE (9) AXLE</u></b>	<b>One (1x) Kansas DOT Heavy Equipment Transport System, on 300' Span</b>	
-----------------------------	---	--

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
Axle # 4 at Mid-span	100.15	78.75	57.35	36.15	16.95	-8.45	-36.25	-62.45	-89.85	-119.65	119.65
POS	0.00	127.08	140.00	145.00	150.00	165.10	171.04	176.98	182.92	188.85	300.00
"xR/4" to Rear of Axle # 4	100.48	79.08	57.68	36.48	17.28	-8.12	-35.92	-62.12	-89.52	-119.32	119.32
POS	0.00	126.63	139.55	144.55	149.55	164.65	170.59	176.53	182.47	188.40	300.00
Midway btwn Resultant & Axle # 4	100.81	79.41	58.01	36.81	17.61	-7.79	-35.59	-61.79	-89.19	-118.99	118.99
POS	0.00	126.18	139.10	144.10	149.10	164.21	170.14	176.08	182.02	187.96	300.00
"xR/4" Forward of Resultant Pos	101.14	79.74	58.34	37.14	17.94	-7.46	-35.26	-61.46	-88.86	-118.66	118.66
POS	0.00	125.74	138.65	143.65	148.65	163.76	169.69	175.63	181.57	187.51	300.00
Resultant at Mid-span	101.47	80.07	58.67	37.47	18.27	-7.13	-34.93	-61.13	-88.53	-118.33	118.33
POS	0.00	125.29	138.20	143.20	148.20	163.31	169.24	175.18	181.12	187.06	300.00

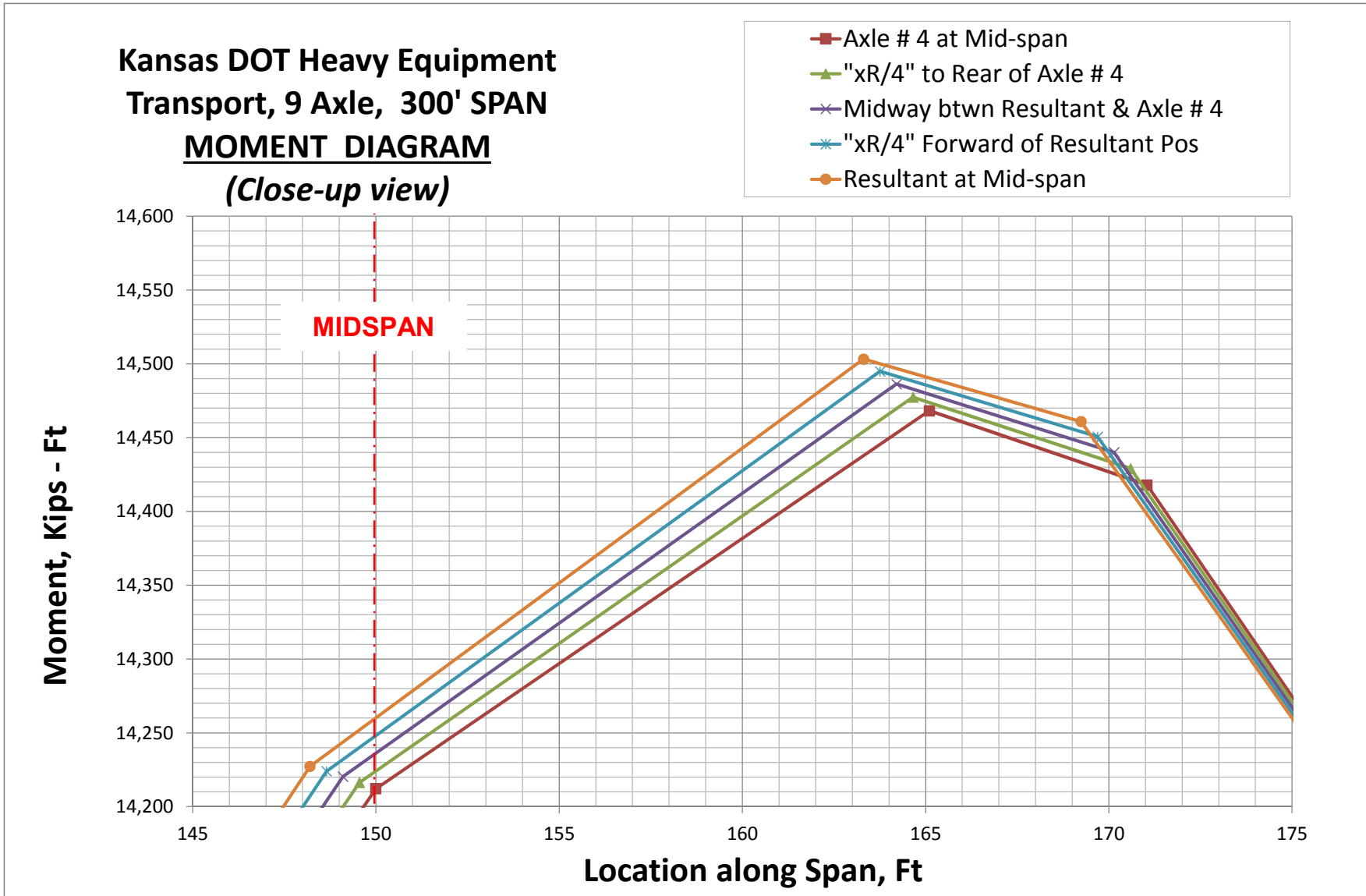
MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
Axle # 4 at Mid-span	0.0	12,727.5	13,744.7	14,031.4	14,212.2	14,468.2	14,418.0	14,202.8	13,832.0	13,298.5	0.0
POS	0.00	127.08	140.00	145.00	150.00	165.10	171.04	176.98	182.92	188.85	300.00
"xR/4" to Rear of Axle # 4	0.0	12,724.2	13,745.6	14,034.0	14,216.4	14,477.4	14,429.2	14,215.9	13,847.1	13,315.6	0.0
POS	0.00	126.63	139.55	144.55	149.55	164.65	170.59	176.53	182.47	188.40	300.00
Midway btwn Resultant & Axle # 4	0.0	12,720.6	13,746.3	14,036.3	14,220.3	14,486.3	14,440.1	14,228.7	13,861.9	13,332.3	0.0
POS	0.00	126.18	139.10	144.10	149.10	164.21	170.14	176.08	182.02	187.96	300.00
"xR/4" Forward of Resultant Pos	0.0	12,716.65	13,746.60	14,038.30	14,223.99	14,494.93	14,450.63	14,241.26	13,876.33	13,348.72	0.00
POS	0.00	125.74	138.65	143.65	148.65	163.76	169.69	175.63	181.57	187.51	300.00
Resultant at Mid-span	0.0	12,712.45	13,746.66	14,040.00	14,227.33	14,503.25	14,460.90	14,253.49	13,890.52	13,364.86	0.00
POS	0.00	125.29	138.20	143.20	148.20	163.31	169.24	175.18	181.12	187.06	300.00

**NINE (9) AXLE**      **One (1x) Kansas DOT Heavy Equipment Transport System, on 300' Span**

**Kansas DOT Heavy Equipment Transport, 9 Axle, 300' SPAN**  
**MOMENT DIAGRAM**

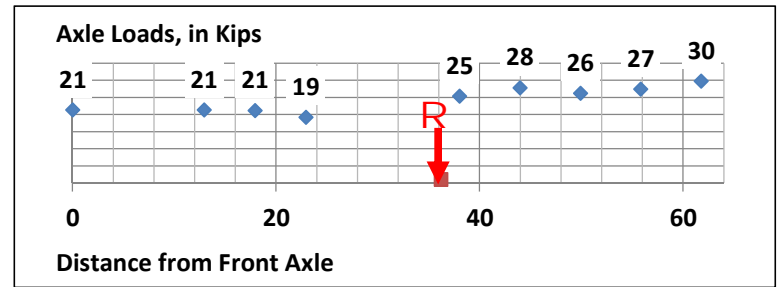
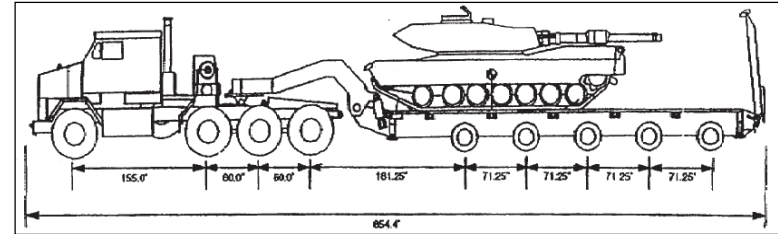


**NINE (9) AXLE**      **One (1x) Kansas DOT Heavy Equipment Transport System, on 300' Span**



**NINE (9) AXLE** **One (1x) Kansas DOT Heavy Equipment Transport System, on 300' Span**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.70	21.40		0.00	95.19	0
2	10.70	21.40	12.92	12.92	95.19	394
3	10.60	21.20	5.00	17.92	94.30	546
4	9.60	19.20	5.00	22.92	85.41	699
5	12.70	25.40	15.10	38.02	112.98	1159
6	13.90	27.80	5.94	43.96	123.66	1340
7	13.10	26.20	5.94	49.90	116.54	1521
8	13.70	27.40	5.94	55.83	121.88	1702
(Rear) 9	14.90	29.80	5.94	61.77	132.56	1883
<b>Totals</b>	<b>109.90</b>	<b>219.80</b>	<b>61.77</b>		<b>977.7</b>	
				<b>Resultant at location:</b>	<b>36.223</b>	<b>1104</b>
				<b>Distance to Nearest Axle, "xR":</b>	<b>1.797</b>	<b>(Forward of Axle #5)</b>



**300 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
"xR / 2" Fwd of Resultant	114.68	127.59	132.59	137.59	152.70	158.63	164.57	170.51	176.45	123.55
Resultant at Mid-span	113.78	126.69	131.69	136.69	151.80	157.73	163.67	169.61	175.55	124.45
Btwn Resultant & Axle # 5	112.88	125.79	130.79	135.79	150.90	156.84	162.77	168.71	174.65	125.35
Axle # 5 at Mid-span	111.98	124.90	129.90	134.90	<b>150.00</b>	155.94	161.88	167.81	173.75	126.25
"xR / 2" Rear of Axle # 5	111.08	124.00	129.00	134.00	149.10	155.04	160.98	166.91	172.85	127.15



<b>NINE (9) AXLE</b>	<b>One (1x) Kansas DOT Heavy Equipment Transport System, on 300' Span</b>	
----------------------	---	--

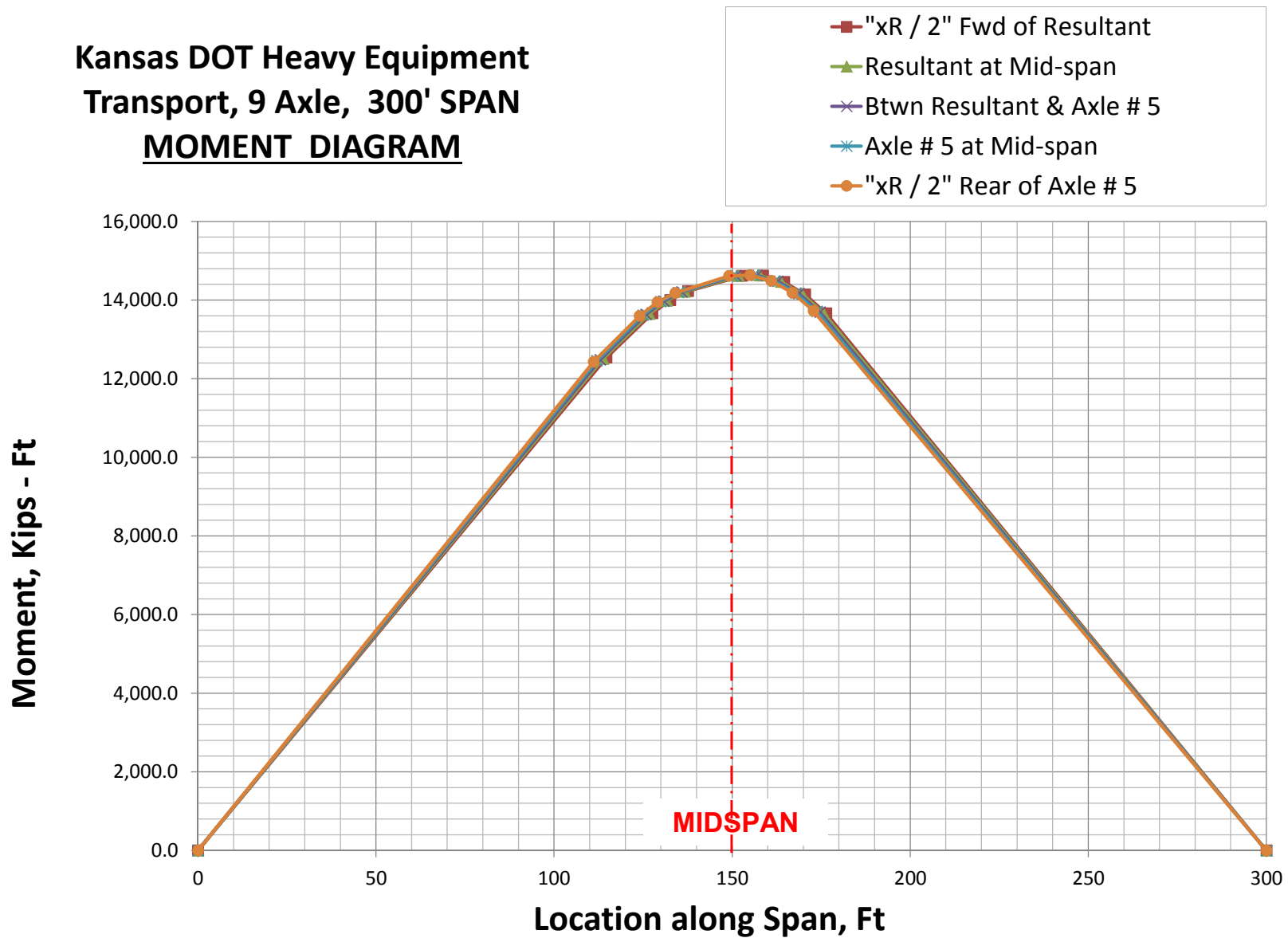
SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
"xR / 2" Fwd of Resultant	109.24	87.84	66.44	45.24	26.04	0.64	-27.16	-53.36	-80.76	-110.56	110.56
POS	0.00	114.68	127.59	132.59	137.59	152.70	158.63	164.57	170.51	176.45	300.00
Resultant at Mid-span	109.90	88.50	67.10	45.90	26.70	1.30	-26.50	-52.70	-80.10	-109.90	109.90
POS	0.00	113.78	126.69	131.69	136.69	151.80	157.73	163.67	169.61	175.55	300.00
Btwn Resultant & Axle # 5	110.56	89.16	67.76	46.56	27.36	1.96	-25.84	-52.04	-79.44	-109.24	109.24
POS	0.00	112.88	125.79	130.79	135.79	150.90	156.84	162.77	168.71	174.65	300.00
Axle # 5 at Mid-span	111.22	89.82	68.42	47.22	28.02	2.62	-25.18	-51.38	-78.78	-108.58	108.58
POS	0.00	111.98	124.90	129.90	134.90	150.00	155.94	161.88	167.81	173.75	300.00
"xR / 2" Rear of Axle # 5	111.88	90.48	69.08	47.88	28.68	3.28	-24.52	-50.72	-78.12	-107.92	107.92
POS	0.00	111.08	124.00	129.00	134.00	149.10	155.04	160.98	166.91	172.85	300.00

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
"xR / 2" Fwd of Resultant	0.0	12,527.3	13,661.9	13,994.1	14,220.3	14,613.7	14,617.5	14,456.2	14,139.4	13,659.9	0.0
POS	0.00	114.68	127.59	132.59	137.59	152.70	158.63	164.57	170.51	176.45	300.00
Resultant at Mid-span	0.0	12,504.0	13,647.2	13,982.7	14,212.2	14,615.5	14,623.2	14,465.8	14,152.9	13,677.3	0.0
POS	0.00	113.78	126.69	131.69	136.69	151.80	157.73	163.67	169.61	175.55	300.00
Btwn Resultant & Axle # 5	0.0	12,479.6	13,631.2	13,970.0	14,202.8	14,616.0	14,627.7	14,474.2	14,165.2	13,693.6	0.0
POS	0.00	112.88	125.79	130.79	135.79	150.90	156.84	162.77	168.71	174.65	300.00
Axle # 5 at Mid-span	0.0	12,453.98	13,614.12	13,956.20	14,192.29	14,615.46	14,631.00	14,481.47	14,176.38	13,708.61	0.00
POS	0.00	111.98	124.90	129.90	134.90	150.00	155.94	161.88	167.81	173.75	300.00
"xR / 2" Rear of Axle # 5	0.0	12,427.17	13,595.81	13,941.19	14,180.56	14,613.68	14,633.13	14,487.52	14,186.34	13,722.47	0.00
POS	0.00	111.08	124.00	129.00	134.00	149.10	155.04	160.98	166.91	172.85	300.00

**NINE (9) AXLE**

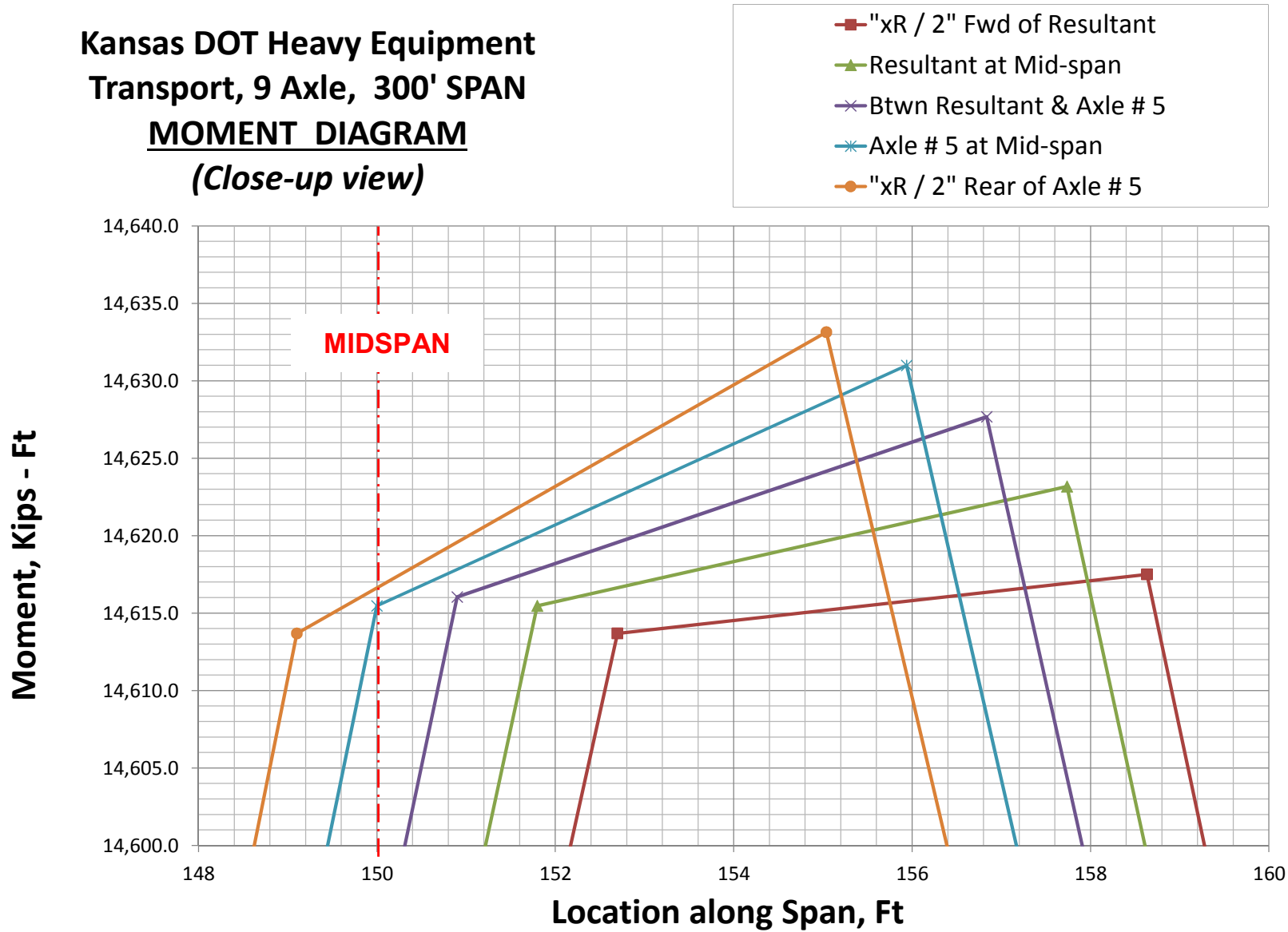
**One (1x) Kansas DOT Heavy Equipment Transport System, on 300' Span**

**Kansas DOT Heavy Equipment  
Transport, 9 Axle, 300' SPAN  
MOMENT DIAGRAM**



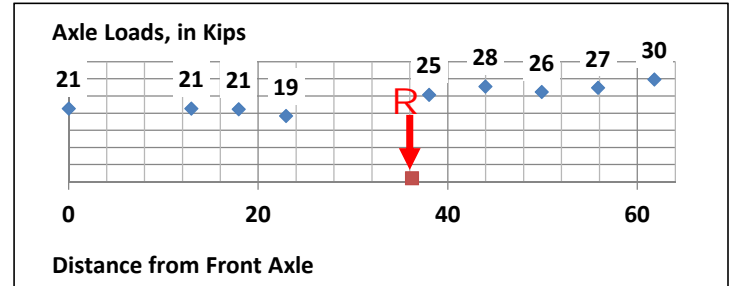
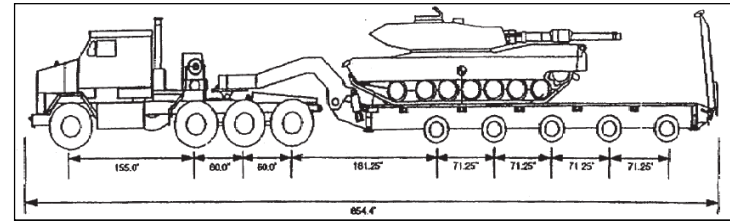
**NINE (9) AXLE**      **One (1x) Kansas DOT Heavy Equipment Transport System, on 300' Span**

**Kansas DOT Heavy Equipment Transport, 9 Axle, 300' SPAN**  
**MOMENT DIAGRAM**  
*(Close-up view)*



**NINE (9) AXLE** **One (1x) Kansas DOT Heavy Equipment Transport System, on 300' Span**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.70	21.40		0.00	95.19	0
2	10.70	21.40	12.92	12.92	95.19	394
3	10.60	21.20	5.00	17.92	94.30	546
4	9.60	19.20	5.00	22.92	85.41	699
5	12.70	25.40	15.10	38.02	112.98	1159
6	13.90	27.80	5.94	43.96	123.66	1340
7	13.10	26.20	5.94	49.90	116.54	1521
8	13.70	27.40	5.94	55.83	121.88	1702
(Rear) 9	14.90	29.80	5.94	61.77	132.56	1883
<b>Totals</b>	<b>109.90</b>	<b>219.80</b>	<b>61.77</b>		<b>977.7</b>	
				<b>Resultant at location: 36.223</b>		<b>1104</b>
				<b>Distance to Nearest Axle, "xR": 1.797 (Forward of Axle #5)</b>		



**300 ft Span Length**

	Front #1 Axle Position AX 1 ft	Middle #2 Axle Position AX 2 ft	Middle #3 Axle Position AX 3 ft	Middle #4 Axle Position AX 4 ft	Middle #5 Axle Position AX 5 ft	Middle #6 Axle Position AX 6 ft	Middle #7 Axle Position AX 7 ft	Middle #8 Axle Position AX 8 ft	Rear #9 Axle Position AX 9 ft	Dist to Beam End ft
Resultant at Mid-span	113.78	126.69	131.69	136.69	151.80	157.73	163.67	169.61	175.55	124.45
Axle # 4 at Mid-span	127.08	140.00	145.00	<b>150.00</b>	165.10	171.04	176.98	182.92	188.85	111.15
Axle # 5 at Mid-span	111.98	124.90	129.90	134.90	<b>150.00</b>	155.94	161.88	167.81	173.75	126.25
Axle # 6 at Mid-span	106.04	118.96	123.96	128.96	144.06	<b>150.00</b>	155.94	161.88	167.81	132.19
Axle # 7 at Mid-span	100.10	113.02	118.02	123.02	138.13	144.06	<b>150.00</b>	155.94	161.88	138.13
Midspan btwn Resultant-Axle # 4	120.43	133.35	138.35	143.35	158.45	164.39	170.33	176.26	182.20	117.80
Midspan btwn Resultant-Axle # 5	112.88	125.79	130.79	135.79	150.90	156.84	162.77	168.71	174.65	125.35
Midspan btwn Resultant-Axle # 6	109.91	122.83	127.83	132.83	147.93	153.87	159.80	165.74	171.68	128.32
Midspan btwn Resultant-Axle # 7	106.94	119.86	124.86	129.86	144.96	150.90	156.84	162.77	168.71	131.29

**NINE (9) AXLE** **One (1x) Kansas DOT Heavy Equipment Transport System, on 300' Span**

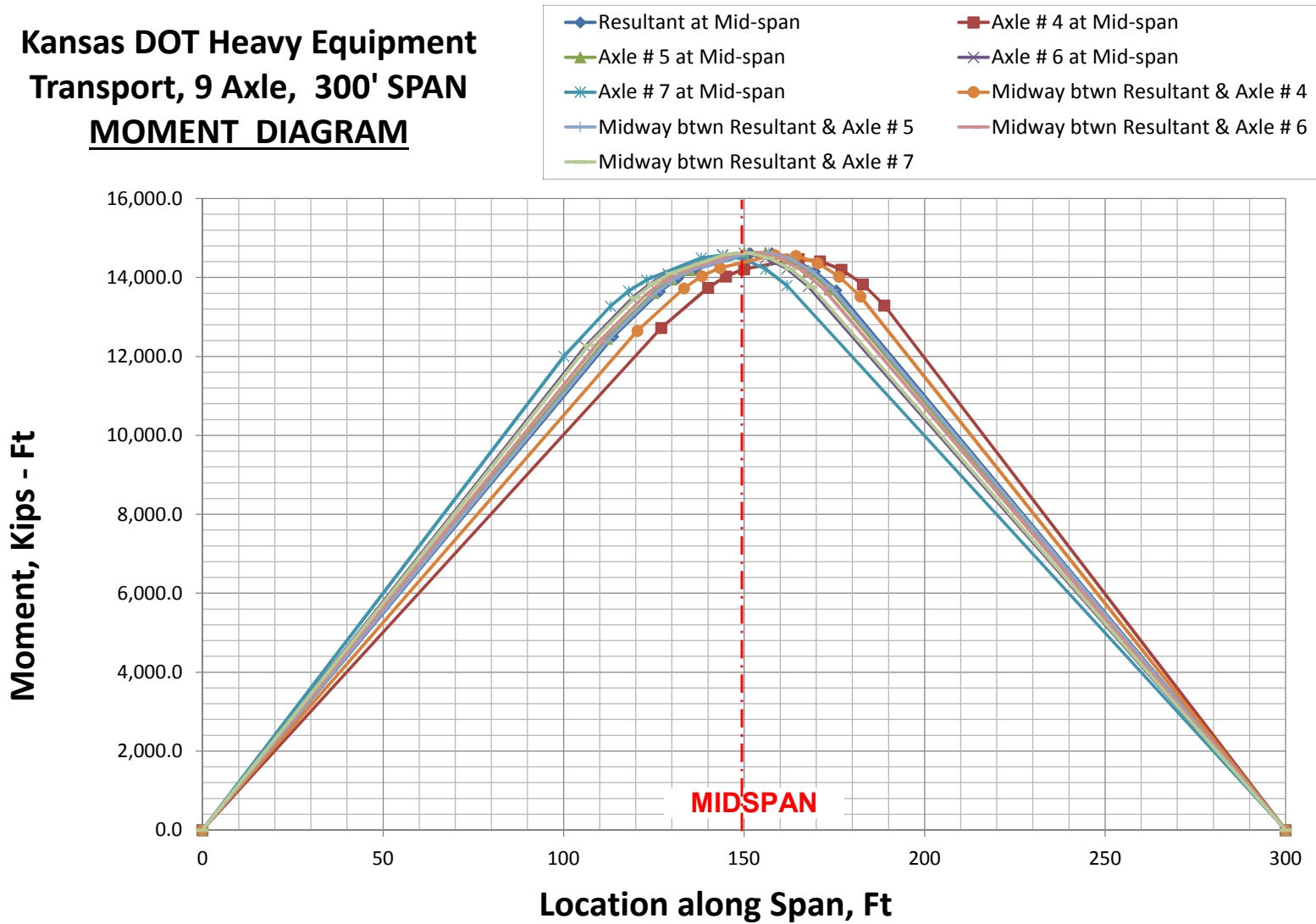
SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
Resultant at Mid-span	109.90	88.50	67.10	45.90	26.70	1.30	-26.50	-52.70	-80.10	-109.90	109.90
POS	0.00	113.78	126.69	131.69	136.69	151.80	157.73	163.67	169.61	175.55	300.00
Axle # 4 at Mid-span	100.15	78.75	57.35	36.15	16.95	-8.45	-36.25	-62.45	-89.85	-119.65	119.65
POS	0.00	127.08	140.00	145.00	150.00	165.10	171.04	176.98	182.92	188.85	300.00
Axle # 5 at Mid-span	111.22	89.82	68.42	47.22	28.02	2.62	-25.18	-51.38	-78.78	-108.58	108.58
POS	0.00	111.98	124.90	129.90	134.90	150.00	155.94	161.88	167.81	173.75	300.00
Axle # 6 at Mid-span	115.57	94.17	72.77	51.57	32.37	6.97	-20.83	-47.03	-74.43	-104.23	104.23
POS	0.00	106.04	118.96	123.96	128.96	144.06	150.00	155.94	161.88	167.81	300.00
Axle # 7 at Mid-span	119.92	98.52	77.12	55.92	36.72	11.32	-16.48	-42.68	-70.08	-99.88	99.88
POS	0.00	100.10	113.02	118.02	123.02	138.13	144.06	150.00	155.94	161.88	300.00
Midspan btwn Resultant-Axle # 4	105.03	83.63	62.23	41.03	21.83	-3.57	-31.37	-57.57	-84.97	-114.77	114.77
POS	0.00	120.43	133.35	138.35	143.35	158.45	164.39	170.33	176.26	182.20	300.00
Midspan btwn Resultant-Axle # 5	110.56	89.16	67.76	46.56	27.36	1.96	-25.84	-52.04	-79.44	-109.24	109.24
POS	0.00	112.88	125.79	130.79	135.79	150.90	156.84	162.77	168.71	174.65	300.00
Midspan btwn Resultant-Axle # 6	112.73	91.33	69.93	48.73	29.53	4.13	-23.67	-49.87	-77.27	-107.07	107.07
POS	0.00	109.91	122.83	127.83	132.83	147.93	153.87	159.80	165.74	171.68	300.00
Midspan btwn Resultant-Axle # 7	114.91	93.51	72.11	50.91	31.71	6.31	-21.49	-47.69	-75.09	-104.89	104.89
POS	0.00	106.94	119.86	124.86	129.86	144.96	150.90	156.84	162.77	168.71	300.00

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
Resultant at Mid-span	0.0	12,504.0	13,647.2	13,982.7	14,212.2	14,615.5	<b>14,623.2</b>	14,465.8	14,152.9	13,677.3	0.0
POS	0.00	113.78	126.69	131.69	136.69	151.80	<b>157.73</b>	163.67	169.61	175.55	300.00
Axle # 4 at Mid-span	0.0	12,727.5	13,744.7	14,031.4	14,212.2	14,468.2	14,418.0	14,202.8	13,832.0	13,298.5	0.0
POS	0.00	127.08	140.00	145.00	150.00	165.10	171.04	176.98	182.92	188.85	300.00
Axle # 5 at Mid-span	0.0	12,454.0	13,614.1	13,956.2	14,192.3	14,615.5	14,631.0	14,481.5	14,176.4	13,708.6	0.0
POS	0.00	111.98	124.90	129.90	134.90	150.00	155.94	161.88	167.81	173.75	300.00
Axle # 6 at Mid-span	0.0	12,254.9	13,471.3	13,835.1	14,092.9	14,581.8	<b>14,623.2</b>	14,499.5	14,220.2	13,778.3	0.0
POS	0.00	106.04	118.96	123.96	128.96	144.06	<b>150.00</b>	155.94	161.88	167.81	300.00
Axle # 7 at Mid-span	0.0	12,004.2	13,276.7	13,662.3	13,941.9	14,496.5	14,563.7	14,465.8	14,212.4	13,796.3	0.0
POS	0.00	100.10	113.02	118.02	123.02	138.13	144.06	150.00	155.94	161.88	300.00
Midspan btwn Resultant-Axle # 4	0.0	12,648.2	13,728.4	14,039.5	14,244.6	14,574.3	14,553.0	14,366.8	14,024.9	13,520.4	0.0
POS	0.00	120.43	133.35	138.35	143.35	158.45	164.39	170.33	176.26	182.20	300.00
Midspan btwn Resultant-Axle # 5	0.0	12,479.6	13,631.2	13,970.0	14,202.8	14,616.0	14,627.7	14,474.2	14,165.2	13,693.6	0.0
POS	0.00	112.88	125.79	130.79	135.79	150.90	156.84	162.77	168.71	174.65	300.00
Midspan btwn Resultant-Axle # 6	0.0	12,390.4	13,570.2	13,919.8	14,163.5	14,609.6	<b>14,634.1</b>	14,493.6	14,197.5	13,738.8	0.0
POS	0.00	109.91	122.83	127.83	132.83	147.93	<b>153.87</b>	159.80	165.74	171.68	300.00
Midspan btwn Resultant-Axle # 7	0.0	12,288.4	13,496.2	13,856.7	14,111.3	14,590.2	14,627.7	14,500.1	14,216.9	13,771.1	0.0
POS	0.00	106.94	119.86	124.86	129.86	144.96	150.90	156.84	162.77	168.71	300.00

**NINE (9) AXLE**

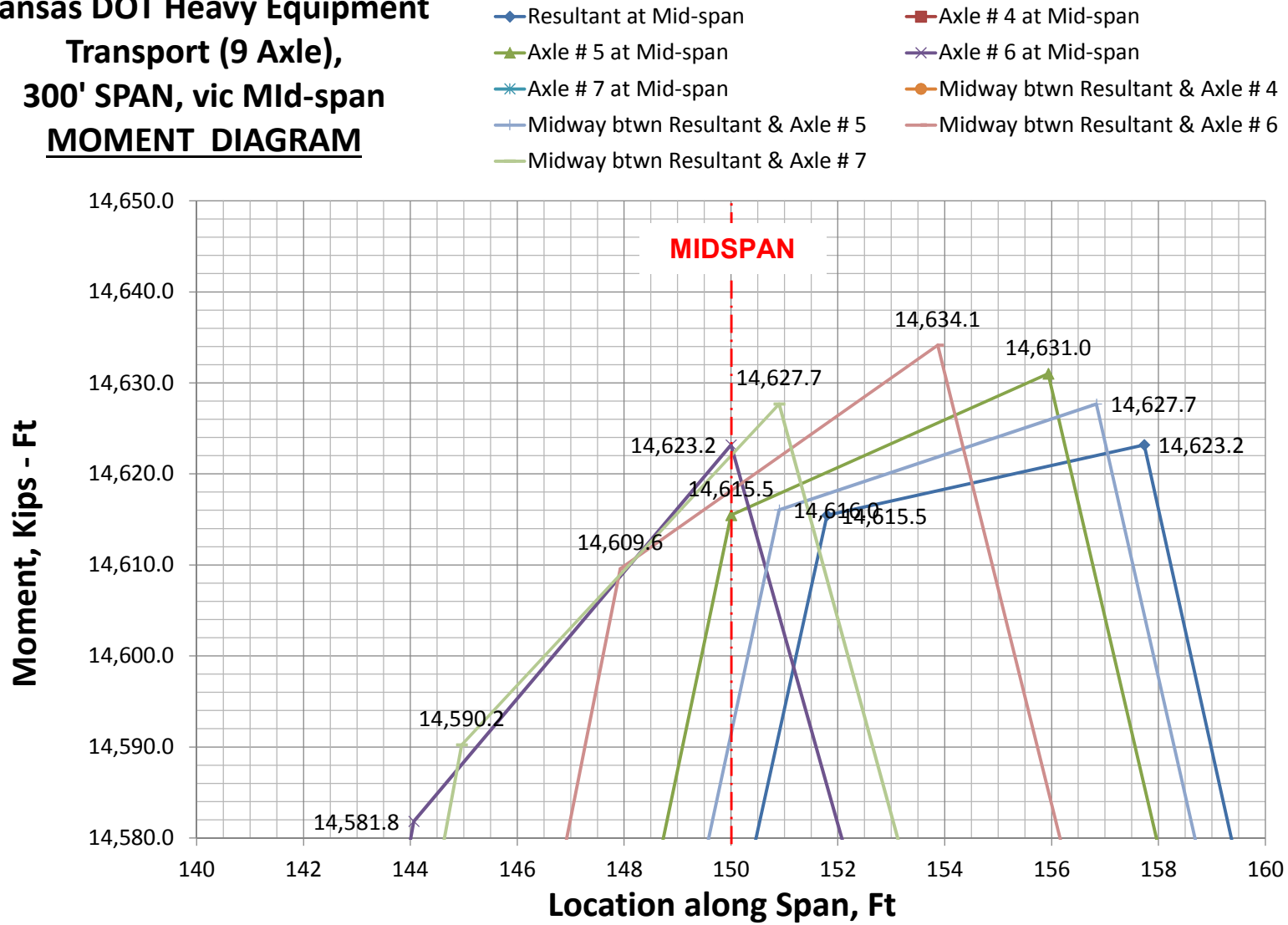
**One (1x) Kansas DOT Heavy Equipment Transport System, on 300' Span**

**Kansas DOT Heavy Equipment  
Transport, 9 Axle, 300' SPAN  
MOMENT DIAGRAM**



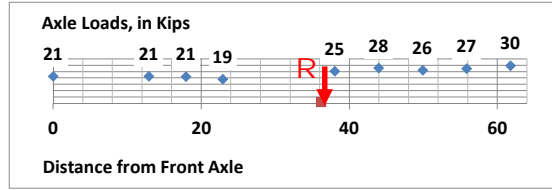
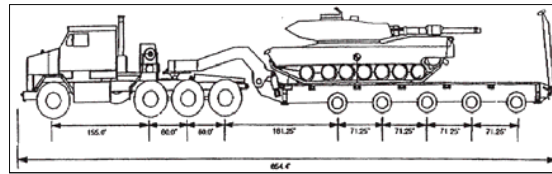
**NINE (9) AXLE** **One (1x) Kansas DOT Heavy Equipment Transport System, on 300' Span**

**Kansas DOT Heavy Equipment Transport (9 Axle), 300' SPAN, vic Mid-span**  
**MOMENT DIAGRAM**



**NINE (9) AXLE**      **One (1x) Kansas DOT HET System, Max Moment Calculation (midway btwn Axle #5 and #6), 50'- 1,000' Spans**

Axle	Load (ST)	Load (kips)	SI / Metric Units			
			Distance btwn axles (ft)	Distance from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	10.70	21.4		0.00	95.19	0
2	10.70	21.4	12.92	12.92	95.19	394
3	10.60	21.2	5.00	17.92	94.30	546
4	9.60	19.2	5.00	22.92	85.41	699
5	12.70	25.4	15.10	38.02	112.98	1159
6	13.90	27.8	5.94	43.96	123.66	1340
7	13.10	26.2	5.94	49.90	116.54	1521
8	13.70	27.4	5.94	55.83	121.88	1702
(Rear) 9	14.90	29.8	5.94	61.77	132.56	1883
<b>Totals</b>	<b>109.9</b>	<b>219.8</b>	<b>61.77</b>		<b>977.7</b>	
Resultant at location:				36.223		1104
Distance to Nearest Axle, "xR":				1.797	(Forward of Axle #5)	



**MAXIMUM SHEAR CALCULATIONS**

Span Length	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
50.00	-11.77	1.15	6.15	11.15	26.25	32.19	38.13	44.06	50.00	0.00
100.0	38.23	51.15	56.15	61.15	76.25	82.19	88.13	94.06	100.00	0.00
200.0	138.23	151.15	156.15	161.15	176.25	182.19	188.13	194.06	200.00	0.00
300.0	238.23	251.15	256.15	261.15	276.25	282.19	288.13	294.06	300.00	0.00
400.0	338.23	351.15	356.15	361.15	376.25	382.19	388.13	394.06	400.00	0.00
500.0	438.23	451.15	456.15	461.15	476.25	482.19	488.13	494.06	500.00	0.00
600.0	538.23	551.15	556.15	561.15	576.25	582.19	588.13	594.06	600.00	0.00
700.0	638.23	651.15	656.15	661.15	676.25	682.19	688.13	694.06	700.00	0.00
800.0	738.23	751.15	756.15	761.15	776.25	782.19	788.13	794.06	800.00	0.00
900.0	838.23	851.15	856.15	861.15	876.25	882.19	888.13	894.06	900.00	0.00
1,000.0	938.23	951.15	956.15	961.15	976.25	982.19	988.13	994.06	1000.00	0.00

**MAXIMUM V CALCS**

Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
112.31	107.49
56.15	163.65
28.08	191.72
18.72	201.08
14.04	205.76
11.23	208.57
9.36	210.44
8.02	211.78
7.02	212.78
6.24	213.56
5.62	214.18

**MAXIMUM MOMENT CALCULATIONS**

Span Length	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
50.00	-15.99	-3.07	1.93	6.93	22.03	27.97	33.91	39.84	45.78	4.22
100.0	9.01	21.93	26.93	31.93	47.03	52.97	58.91	64.84	70.78	29.22
200.0	59.01	71.93	76.93	81.93	97.03	102.97	108.91	114.84	120.78	79.22
300.0	109.01	121.93	126.93	131.93	147.03	152.97	158.91	164.84	170.78	129.22
400.0	159.01	171.93	176.93	181.93	197.03	202.97	208.91	214.84	220.78	179.22
500.0	209.01	221.93	226.93	231.93	247.03	252.97	258.91	264.84	270.78	229.22
600.0	259.01	271.93	276.93	281.93	297.03	302.97	308.91	314.84	320.78	279.22
700.0	309.01	321.93	326.93	331.93	347.03	352.97	358.91	364.84	370.78	329.22
800.0	359.01	371.93	376.93	381.93	397.03	402.97	408.91	414.84	420.78	379.22
900.0	409.01	421.93	426.93	431.93	447.03	452.97	458.91	464.84	470.78	429.22
1,000.0	459.01	471.93	476.93	481.93	497.03	502.97	508.91	514.84	520.78	479.22

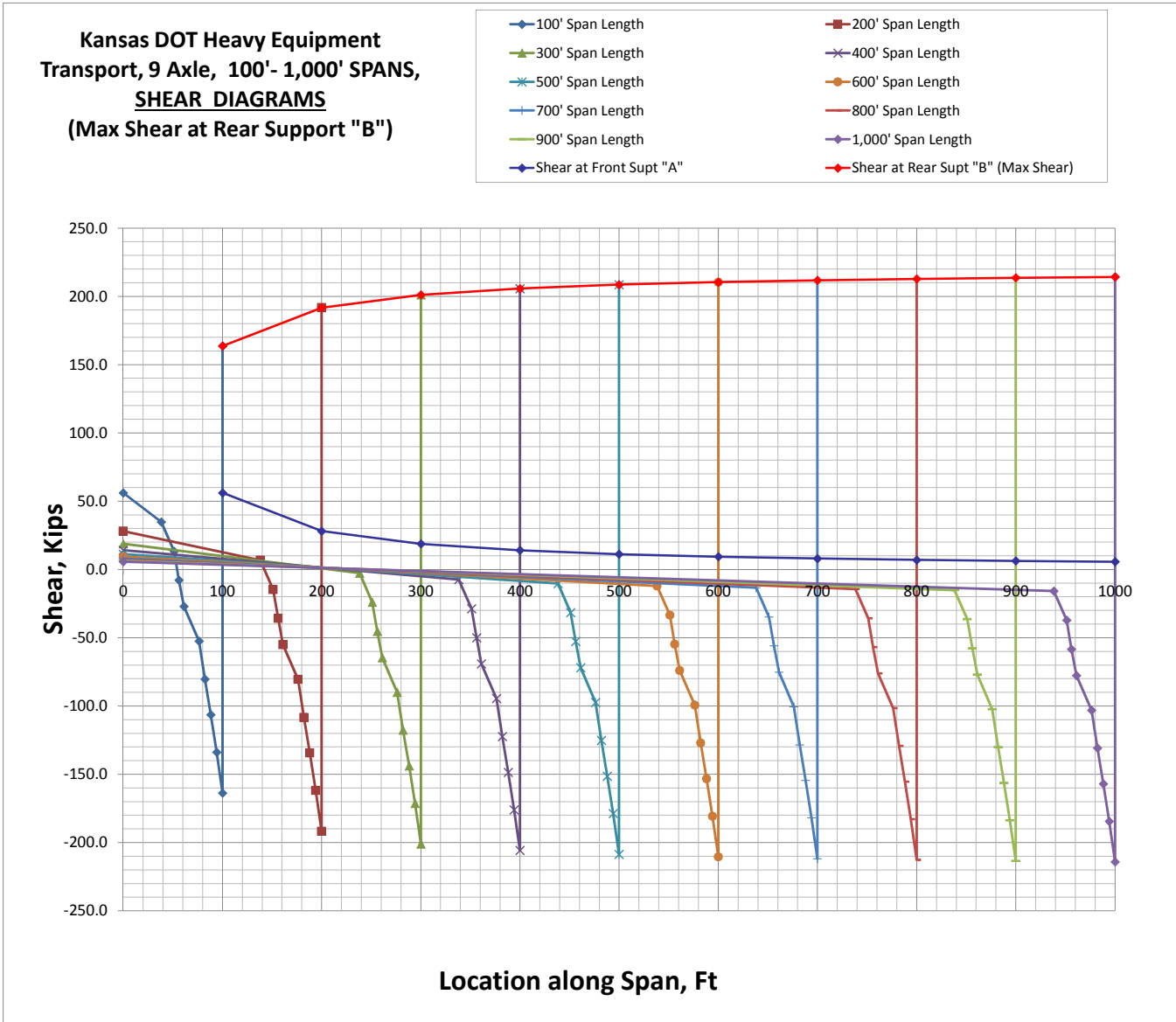


**NINE (9) AXLE**      **One (1x) Kansas DOT HET System, Max Moment Calculation (midway btwn Axle #5 and #6), 50'- 1,000' Spans**

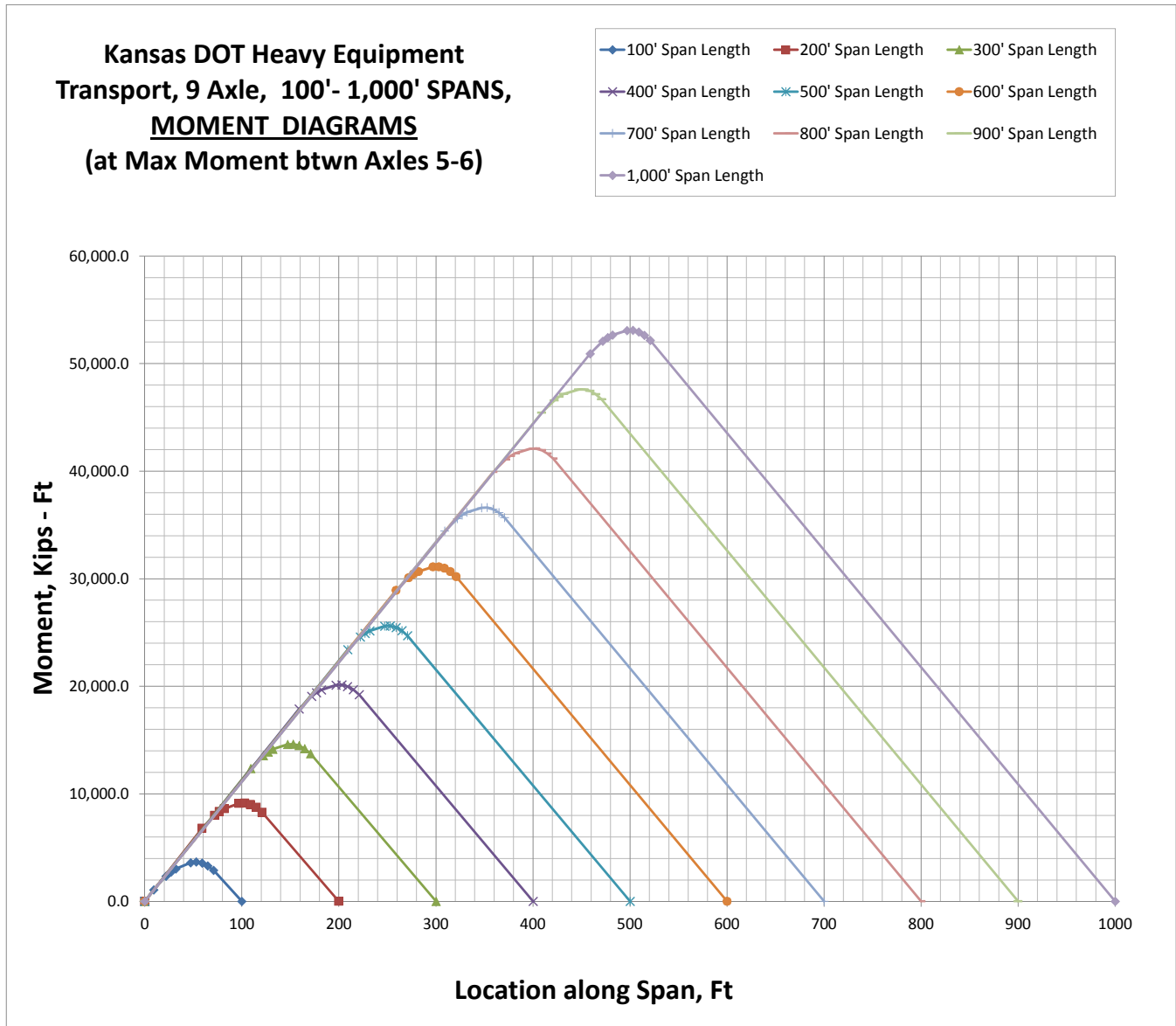
Span Length, ft	Calculated SHEARS and Locations	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
50	Moment on Span	120.38	98.98	77.58	56.38	37.18	11.78	-16.02	-42.22	-69.62	-99.42	99.42
	Axle Location on Span	0.00	-15.99	-3.07	1.93	6.93	22.03	27.97	33.91	39.84	45.78	50.00
100	Shear at Axle	120.38	98.98	77.58	56.38	37.18	11.78	-16.02	-42.22	-69.62	-99.42	99.42
	Axle Location on Span	0.00	9.01	21.93	26.93	31.93	47.03	52.97	58.91	64.84	70.78	100.00
200	Shear at Axle	115.14	93.74	72.34	51.14	31.94	6.54	-21.26	-47.46	-74.86	-104.66	104.66
	Axle Location on Span	0.00	59.01	71.93	76.93	81.93	97.03	102.97	108.91	114.84	120.78	200.00
300	Shear at Axle	113.39	91.99	70.59	49.39	30.19	4.79	-23.01	-49.21	-76.61	-106.41	106.41
	Axle Location on Span	0.00	109.01	121.93	126.93	131.93	147.03	152.97	158.91	164.84	170.78	300.00
400	Shear at Axle	112.52	91.12	69.72	48.52	29.32	3.92	-23.88	-50.08	-77.48	-107.28	107.28
	Axle Location on Span	0.00	159.01	171.93	176.93	181.93	197.03	202.97	208.91	214.84	220.78	400.00
500	Shear at Axle	112.00	90.60	69.20	48.00	28.80	3.40	-24.40	-50.60	-78.00	-107.80	107.80
	Axle Location on Span	0.00	209.01	221.93	226.93	231.93	247.03	252.97	258.91	264.84	270.78	500.00
600	Shear at Axle	111.65	90.25	68.85	47.65	28.45	3.05	-24.75	-50.95	-78.35	-108.15	108.15
	Axle Location on Span	0.00	259.01	271.93	276.93	281.93	297.03	302.97	308.91	314.84	320.78	600.00
700	Shear at Axle	111.40	90.00	68.60	47.40	28.20	2.80	-25.00	-51.20	-78.60	-108.40	108.40
	Axle Location on Span	0.00	309.01	321.93	326.93	331.93	347.03	352.97	358.91	364.84	370.78	700.00
800	Shear at Axle	111.21	89.81	68.41	47.21	28.01	2.61	-25.19	-51.39	-78.79	-108.59	108.59
	Axle Location on Span	0.00	359.01	371.93	376.93	381.93	397.03	402.97	408.91	414.84	420.78	800.00
900	Shear at Axle	111.06	89.66	68.26	47.06	27.86	2.46	-25.34	-51.54	-78.94	-108.74	108.74
	Axle Location on Span	0.00	409.01	421.93	426.93	431.93	447.03	452.97	458.91	464.84	470.78	900.00
1,000	Shear at Axle	110.95	89.55	68.15	46.95	27.75	2.35	-25.45	-51.65	-79.05	-108.85	108.85
	Axle Location on Span	0.00	459.01	471.93	476.93	481.93	497.03	502.97	508.91	514.84	520.78	1,000.00

Span Length, ft	Calculated MOMENTS and Locations	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
50	Moment	0.00	-2,092.28	-678.52	-238.25	96.01	815.76	947.88	914.94	726.44	375.25	0.00
	Axle Location on Span	0.00	-15.99	-3.07	1.93	6.93	22.03	27.97	33.91	39.84	45.78	50.00
100	Moment	0.0	1,084.6	2,363.1	2,751.0	3,032.8	3,594.4	3,664.3	3,569.1	3,318.4	2,905.0	0.0
	Axle Location on Span	0.00	9.01	21.93	26.93	31.93	47.03	52.97	58.91	64.84	70.78	100.00
200	Moment	0.0	6,794.3	8,005.1	8,366.8	8,622.5	9,104.9	9,143.7	9,017.5	8,735.7	8,291.2	0.0
	Axle Location on Span	0.00	59.01	71.93	76.93	81.93	97.03	102.97	108.91	114.84	120.78	200.00
300	Moment	0.0	12,360.9	13,549.1	13,902.1	14,149.1	14,605.1	14,633.5	14,496.9	14,204.8	13,749.9	0.0
	Axle Location on Span	0.00	109.01	121.93	126.93	131.93	147.03	152.97	158.91	164.84	170.78	300.00
400	Moment	0.0	17,891.7	19,068.7	19,417.2	19,659.8	20,102.7	20,126.0	19,984.2	19,686.8	19,226.8	0.0
	Axle Location on Span	0.00	159.01	171.93	176.93	181.93	197.03	202.97	208.91	214.84	220.78	400.00
500	Moment	0.0	23,408.17	24,578.36	24,924.33	25,164.31	25,599.24	25,619.40	25,474.49	25,174.03	24,710.87	0.00
	Axle Location on Span	0.00	209.01	221.93	226.93	231.93	247.03	252.97	258.91	264.84	270.78	500.00
600	Moment	0.0	28,917.48	30,083.16	30,427.39	30,665.62	31,095.27	31,113.36	30,966.38	30,663.84	30,198.62	0.00
	Axle Location on Span	0.00	259.01	271.93	276.93	281.93	297.03	302.97	308.91	314.84	320.78	600.00
700	Moment	0.0	34,422.70	35,585.16	35,928.15	36,165.13	36,591.01	36,607.62	36,459.16	36,155.14	35,688.43	0.00
	Axle Location on Span	0.00	309.01	321.93	326.93	331.93	347.03	352.97	358.91	364.84	370.78	700.00
800	Moment	0.0	39,925.37	41,085.41	41,427.46	41,663.51	42,086.57	42,102.06	41,952.50	41,647.36	41,179.55	0.00
	Axle Location on Span	0.00	359.01	371.93	376.93	381.93	397.03	402.97	408.91	414.84	420.78	800.00
900	Moment	0.0	45,426.34	46,584.50	46,925.82	47,161.14	47,582.00	47,596.63	47,446.20	47,140.21	46,671.52	0.00
	Axle Location on Span	0.00	409.01	421.93	426.93	431.93	447.03	452.97	458.91	464.84	470.78	900.00
1,000	Moment	0.0	50,926.1	52,082.8	52,423.5	52,658.2	53,077.3	53,091.3	52,940.2	52,633.5	52,164.1	0.0
	Axle Location on Span	0.00	459.01	471.93	476.93	481.93	497.03	502.97	508.91	514.84	520.78	1,000.00

**NINE (9) AXLE**      **One (1x) Kansas DOT HET System, Max Moment Calculation (midway btwn Axle #5 and #6), 50'- 1,000' Spans**

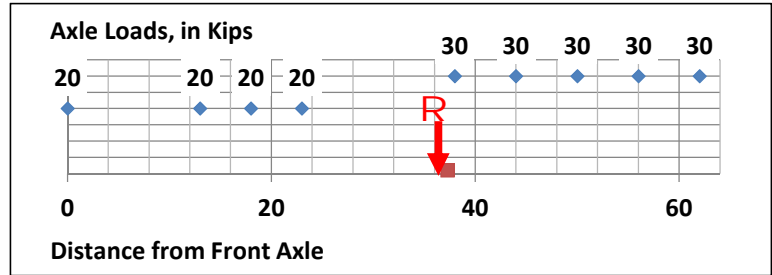
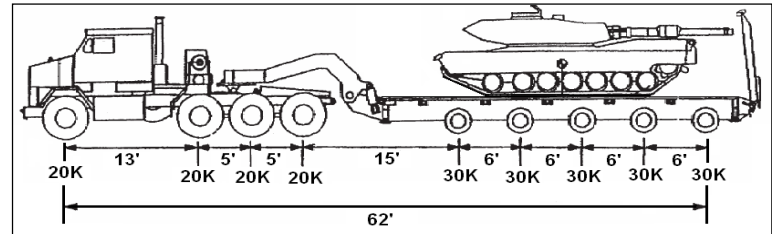


**NINE (9) AXLE**      **One (1x) Kansas DOT HET System, Max Moment Calculation (midway btwn Axle #5 and #6), 50'- 1,000' Spans**



**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), on 300' Span**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.00	20.00		0.00	88.96	0
2	10.00	20.00	13.00	13.00	88.96	396
3	10.00	20.00	5.00	18.00	88.96	549
4	10.00	20.00	5.00	23.00	88.96	701
5	15.00	30.00	15.00	38.00	133.45	1158
6	15.00	30.00	6.00	44.00	133.45	1341
7	15.00	30.00	6.00	50.00	133.45	1524
8	15.00	30.00	6.00	56.00	133.45	1707
(Rear) 9	15.00	30.00	6.00	62.00	133.45	1890
<b>Totals</b>	<b>115.00</b>	<b>230.00</b>	<b>62.00</b>		<b>1023.1</b>	
				<b>Resultant at location:</b>	<b>37.304</b>	<b>1137</b>
				<b>Distance to Axle # 4, "xR":</b>	<b>14.304 (Rear of Axle # 4)</b>	



**300 ft Span Length**

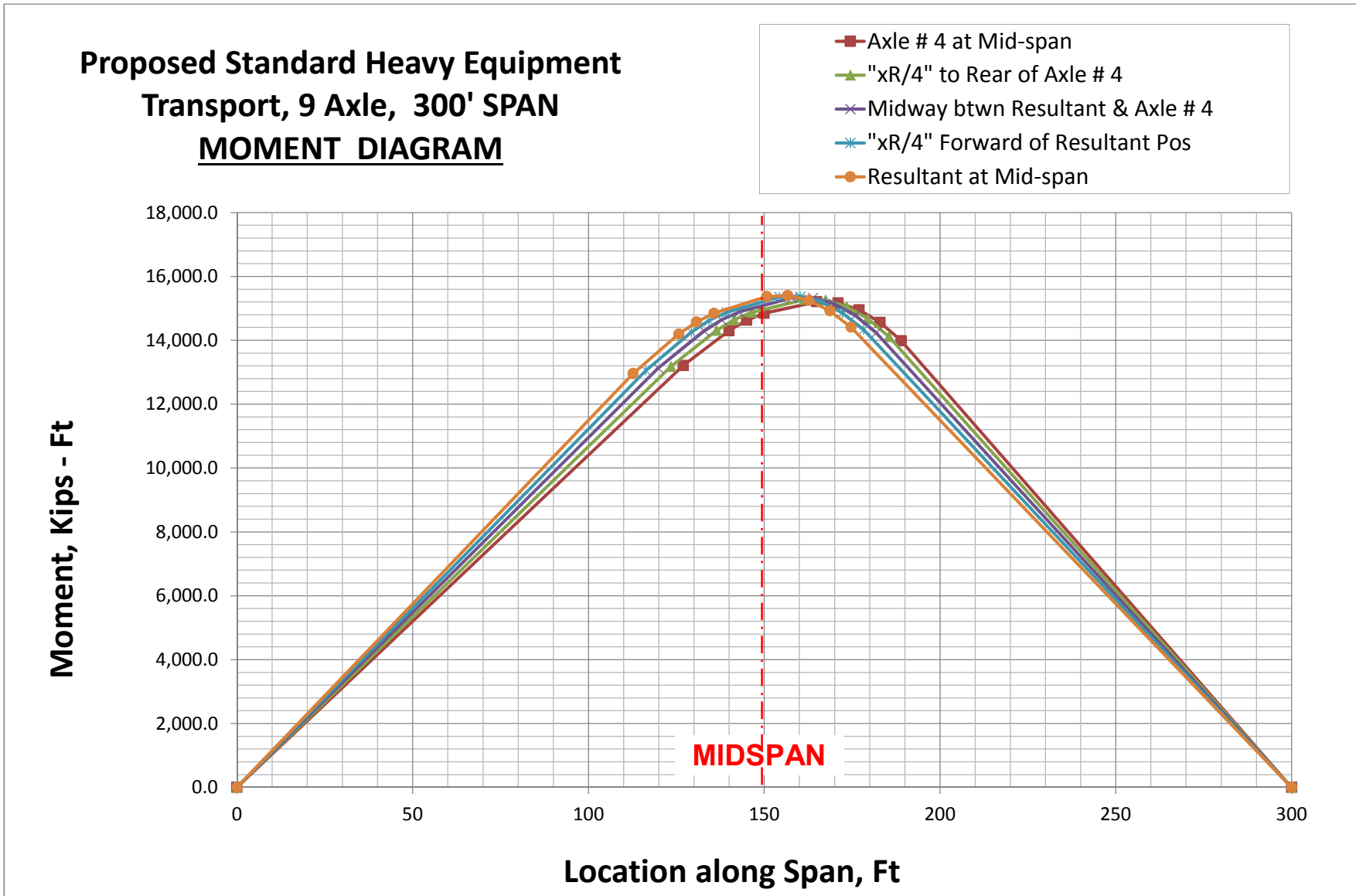
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Axle # 4 at Mid-span	127.00	140.00	145.00	<b>150.00</b>	165.00	171.00	177.00	183.00	189.00	111.00
"xR/4" to Rear of Axle # 4	123.42	136.42	141.42	146.42	161.42	167.42	173.42	179.42	185.42	114.58
Midway btwn Resultant & Axle # 4	119.85	132.85	137.85	142.85	157.85	163.85	169.85	175.85	181.85	118.15
"xR/4" Forward of Resultant Pos	116.27	129.27	134.27	139.27	154.27	160.27	166.27	172.27	178.27	121.73
Resultant at Mid-span	112.70	125.70	130.70	135.70	150.70	156.70	162.70	168.70	174.70	125.30

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), on 300' Span**

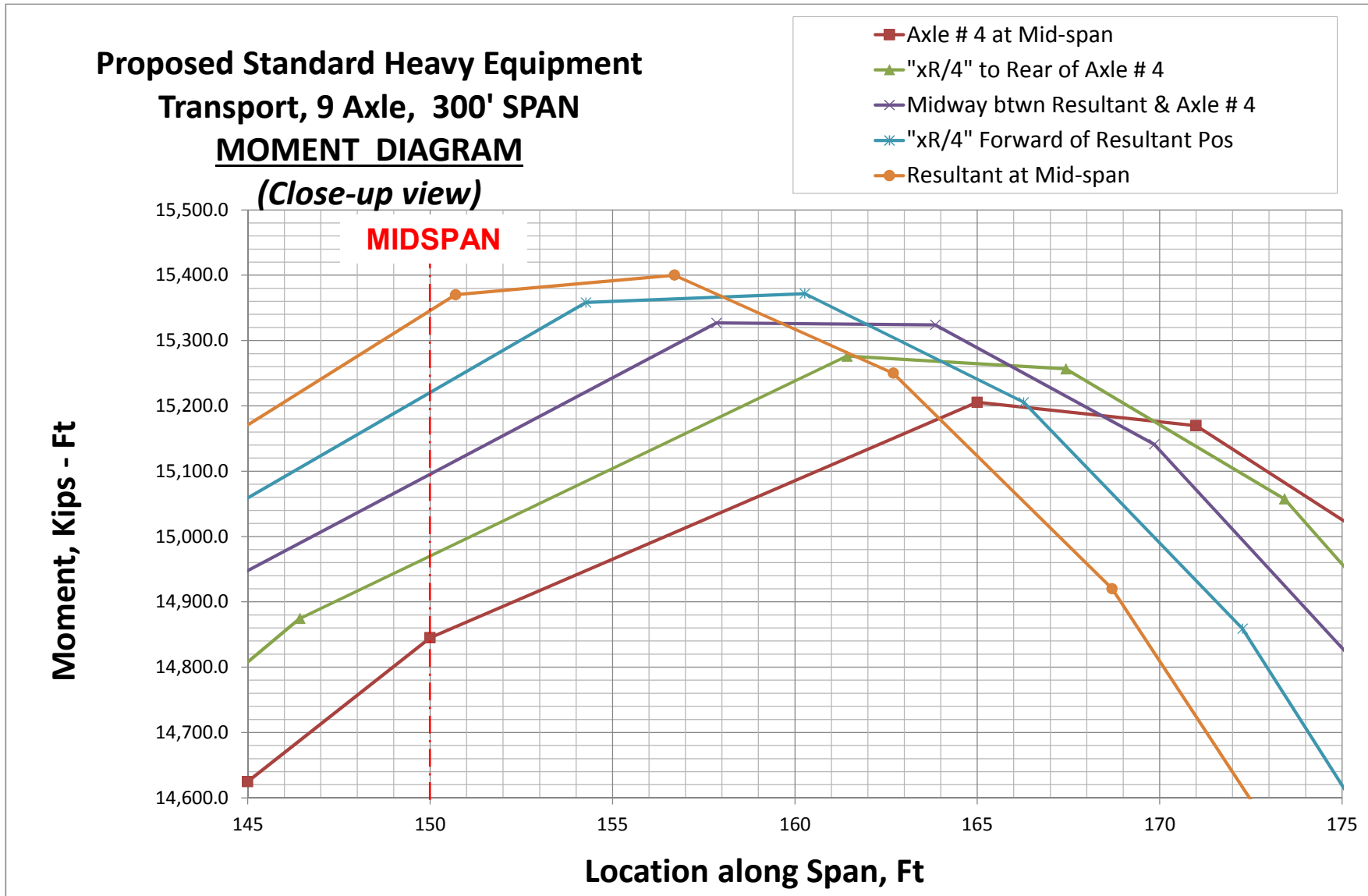
SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
Axle # 4 at Mid-span	104.03	84.03	64.03	44.03	24.03	-5.97	-35.97	-65.97	-95.97	-125.97	125.97
POS	0.00	127.00	140.00	145.00	150.00	165.00	171.00	177.00	183.00	189.00	300.00
"xR/4" to Rear of Axle # 4	106.78	86.78	66.78	46.78	26.78	-3.22	-33.23	-63.23	-93.23	-123.23	123.23
POS	0.00	123.42	136.42	141.42	146.42	161.42	167.42	173.42	179.42	185.42	300.00
Midway btwn Resultant & Axle # 4	109.52	89.52	69.52	49.52	29.52	-0.48	-30.48	-60.48	-90.48	-120.48	120.48
POS	0.00	119.85	132.85	137.85	142.85	157.85	163.85	169.85	175.85	181.85	300.00
"xR/4" Forward of Resultant Pos	112.26	92.26	72.26	52.26	32.26	2.26	-27.74	-57.74	-87.74	-117.74	117.74
POS	0.00	116.27	129.27	134.27	139.27	154.27	160.27	166.27	172.27	178.27	300.00
Resultant at Mid-span	115.00	95.00	75.00	55.00	35.00	5.00	-25.00	-55.00	-85.00	-115.00	115.00
POS	0.00	112.70	125.70	130.70	135.70	150.70	156.70	162.70	168.70	174.70	300.00

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
Axle # 4 at Mid-span	0.0	13,212.2	14,304.7	14,624.8	14,845.0	15,205.5	15,169.7	14,953.9	14,558.1	13,982.3	0.0
POS	0.00	127.00	140.00	145.00	150.00	165.00	171.00	177.00	183.00	189.00	300.00
"xR/4" to Rear of Axle # 4	0.0	13,178.6	14,306.7	14,640.5	14,874.4	15,276.0	15,256.7	15,057.3	14,678.0	14,118.6	0.0
POS	0.00	123.42	136.42	141.42	146.42	161.42	167.42	173.42	179.42	185.42	300.00
Midway btwn Resultant & Axle # 4	0.0	13,125.3	14,289.1	14,636.6	14,884.2	15,327.0	15,324.1	15,141.2	14,778.3	14,235.4	0.0
POS	0.00	119.85	132.85	137.85	142.85	157.85	163.85	169.85	175.85	181.85	300.00
"xR/4" Forward of Resultant Pos	0.0	13,052.47	14,251.83	14,613.12	14,874.41	15,358.29	15,371.84	15,205.39	14,858.94	14,332.49	0.0
POS	0.00	116.27	129.27	134.27	139.27	154.27	160.27	166.27	172.27	178.27	300.00
Resultant at Mid-span	0.0	12,960.00	14,195.00	14,570.00	14,845.00	15,370.00	15,400.00	15,250.00	14,920.00	14,410.00	0.0
POS	0.00	112.70	125.70	130.70	135.70	150.70	156.70	162.70	168.70	174.70	300.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), on 300' Span**

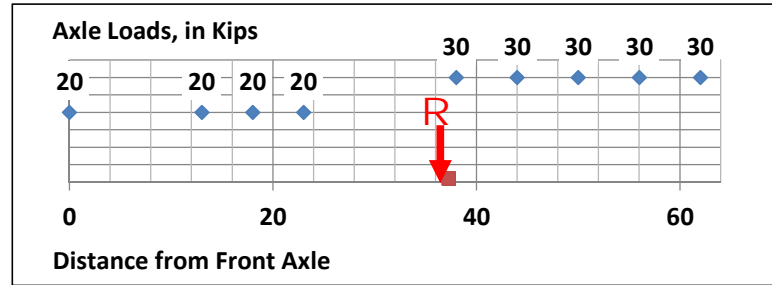
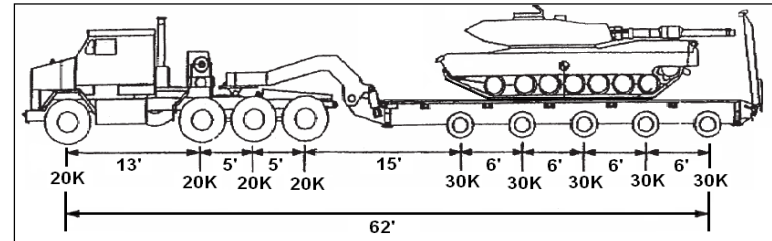


**NINE (9) AXLE** | **One (1x) Proposed Standard HET (Alternative Military Live Load), on 300' Span**



**NINE (9) AXLE** **One (1x) Proposed Standard HET (Alternative Military Live Load), on 300' Span**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.00	20.00		0.00	88.96	0
2	10.00	20.00	13.00	13.00	88.96	396
3	10.00	20.00	5.00	18.00	88.96	549
4	10.00	20.00	5.00	23.00	88.96	701
5	15.00	30.00	15.00	38.00	133.45	1158
6	15.00	30.00	6.00	44.00	133.45	1341
7	15.00	30.00	6.00	50.00	133.45	1524
8	15.00	30.00	6.00	56.00	133.45	1707
(Rear) 9	15.00	30.00	6.00	62.00	133.45	1890
<b>Totals</b>	<b>115.00</b>	<b>230.00</b>	<b>62.00</b>		<b>1023.1</b>	
				<b>Resultant at location:</b>		<b>1137</b>
				<b>Distance to Nearest Axle, "xR":</b>	<b>0.696</b>	<b>(Forward of Axle #5)</b>



**300 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
"xR / 2" Fwd of Resultant	113.04	126.04	131.04	136.04	151.04	157.04	163.04	169.04	175.04	124.96
Resultant at Mid-span	112.70	125.70	130.70	135.70	150.70	156.70	162.70	168.70	174.70	125.30
Btwn Resultant & Axle # 5	112.35	125.35	130.35	135.35	150.35	156.35	162.35	168.35	174.35	125.65
Axle # 5 at Mid-span	112.00	125.00	130.00	135.00	<b>150.00</b>	156.00	162.00	168.00	174.00	126.00
"xR / 2" Rear of Axle # 5	111.65	124.65	129.65	134.65	149.65	155.65	161.65	167.65	173.65	126.35



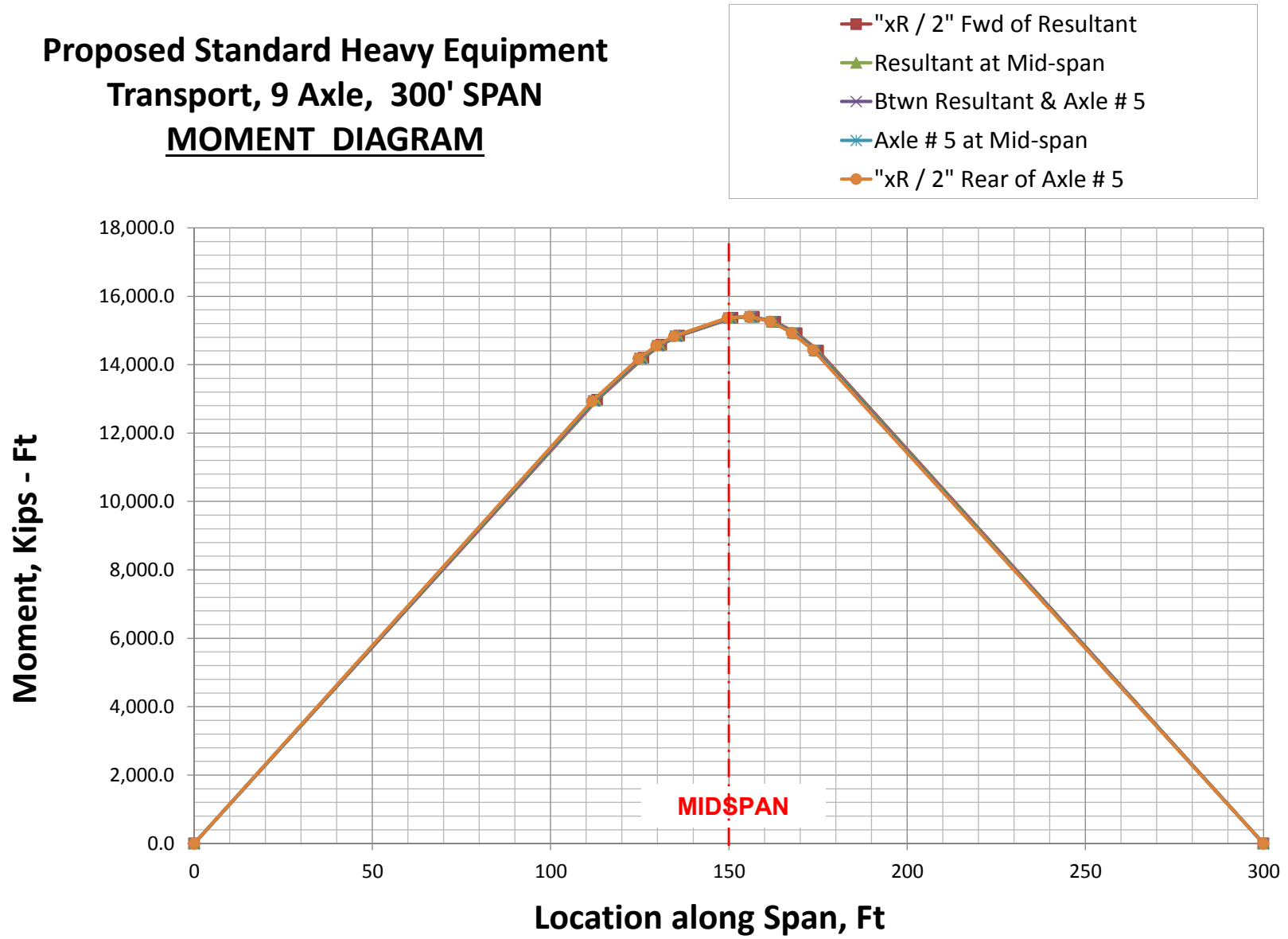
<b>NINE (9) AXLE</b>	<b>One (1x) Proposed Standard HET (Alternative Military Live Load), on 300' Span</b>	
----------------------	--	--

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
"xR / 2" Fwd of Resultant	114.73	94.73	74.73	54.73	34.73	4.73	-25.27	-55.27	-85.27	-115.27	115.27
POS	0.00	113.04	126.04	131.04	136.04	151.04	157.04	163.04	169.04	175.04	300.00
Resultant at Mid-span	115.00	95.00	75.00	55.00	35.00	5.00	-25.00	-55.00	-85.00	-115.00	115.00
POS	0.00	112.70	125.70	130.70	135.70	150.70	156.70	162.70	168.70	174.70	300.00
Btwn Resultant & Axle # 5	115.27	95.27	75.27	55.27	35.27	5.27	-24.73	-54.73	-84.73	-114.73	114.73
POS	0.00	112.35	125.35	130.35	135.35	150.35	156.35	162.35	168.35	174.35	300.00
Axle # 5 at Mid-span	115.53	95.53	75.53	55.53	35.53	5.53	-24.47	-54.47	-84.47	-114.47	114.47
POS	0.00	112.00	125.00	130.00	135.00	150.00	156.00	162.00	168.00	174.00	300.00
"xR / 2" Rear of Axle # 5	115.80	95.80	75.80	55.80	35.80	5.80	-24.20	-54.20	-84.20	-114.20	114.20
POS	0.00	111.65	124.65	129.65	134.65	149.65	155.65	161.65	167.65	173.65	300.00

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
"xR / 2" Fwd of Resultant	0.0	12,969.9	14,201.4	14,575.1	14,848.7	15,369.7	15,398.1	15,246.5	14,914.9	14,403.3	0.0
POS	0.00	113.04	126.04	131.04	136.04	151.04	157.04	163.04	169.04	175.04	300.00
Resultant at Mid-span	0.0	12,960.0	14,195.0	14,570.0	14,845.0	15,370.0	15,400.0	15,250.0	14,920.0	14,410.0	0.0
POS	0.00	112.70	125.70	130.70	135.70	150.70	156.70	162.70	168.70	174.70	300.00
Btwn Resultant & Axle # 5	0.0	12,950.0	14,188.4	14,564.8	14,841.1	15,370.1	15,401.7	15,253.3	14,924.9	14,416.5	0.0
POS	0.00	112.35	125.35	130.35	135.35	150.35	156.35	162.35	168.35	174.35	300.00
Axle # 5 at Mid-span	0.0	12,939.73	14,181.67	14,559.33	14,837.00	15,370.00	15,403.20	15,256.40	14,929.60	14,422.80	0.00
POS	0.00	112.00	125.00	130.00	135.00	150.00	156.00	162.00	168.00	174.00	300.00
"xR / 2" Rear of Axle # 5	0.0	12,929.32	14,174.72	14,553.72	14,832.72	15,369.72	15,404.52	15,259.32	14,934.12	14,428.92	0.00
POS	0.00	111.65	124.65	129.65	134.65	149.65	155.65	161.65	167.65	173.65	300.00

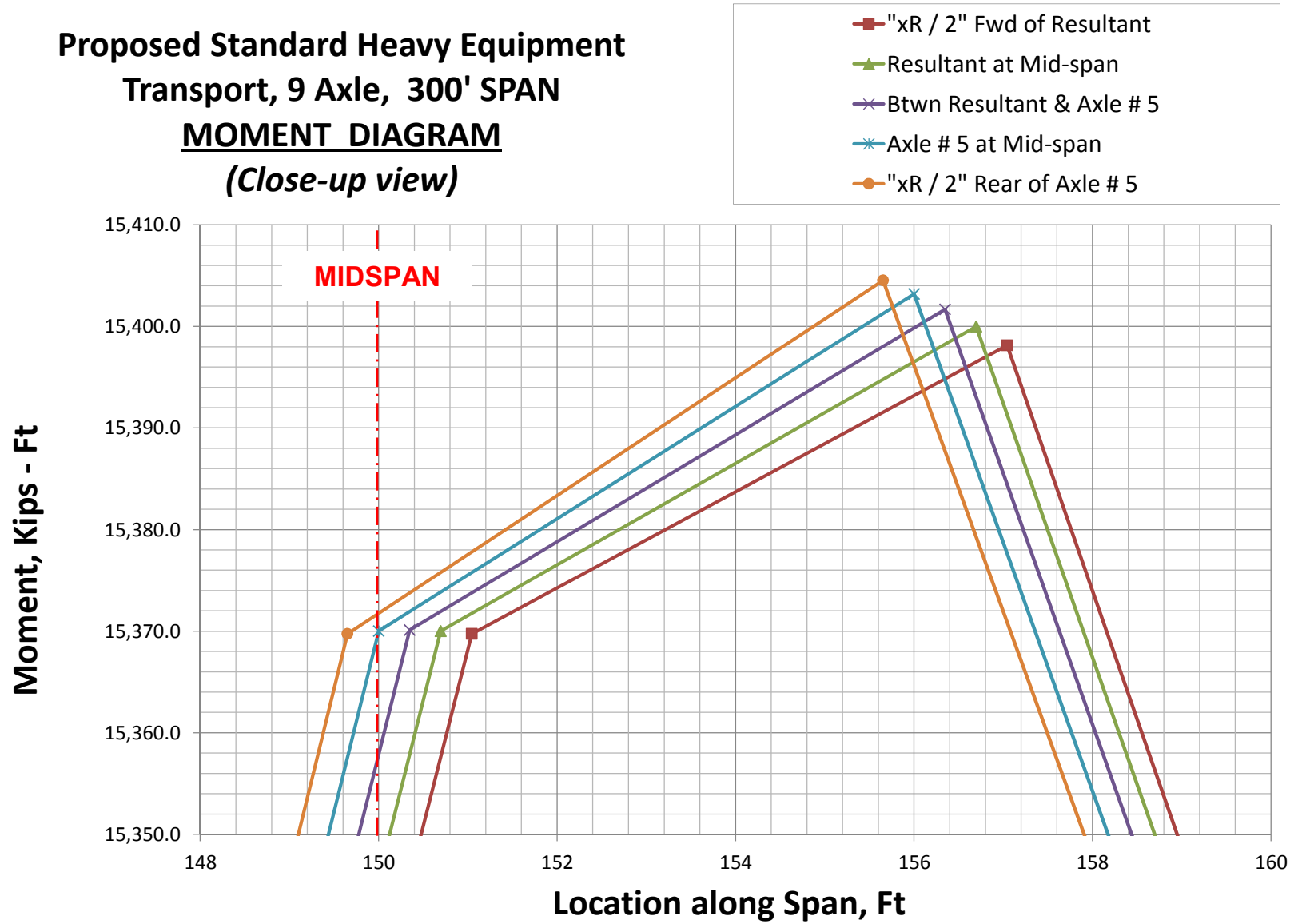
**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), on 300' Span**

**Proposed Standard Heavy Equipment  
 Transport, 9 Axle, 300' SPAN  
MOMENT DIAGRAM**



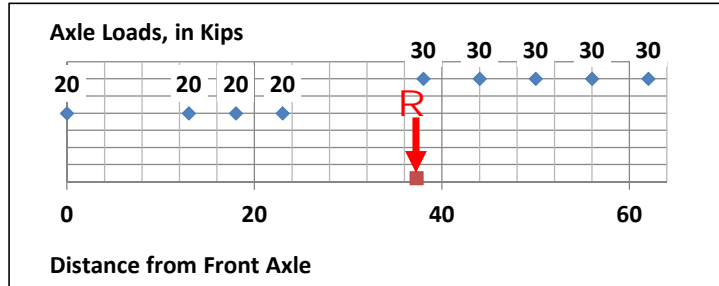
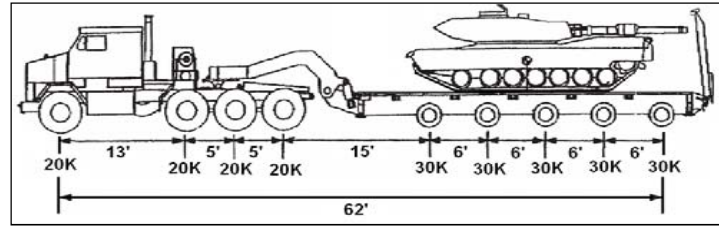
**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), on 300' Span**

**Proposed Standard Heavy Equipment  
 Transport, 9 Axle, 300' SPAN  
 MOMENT DIAGRAM  
 (Close-up view)**



**NINE (9) AXLE** **One (1x) Proposed Standard HET (Alternative Military Live Load), on 300' Span**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.00	20.00		0.00	88.96	0
2	10.00	20.00	13.00	13.00	88.96	396
3	10.00	20.00	5.00	18.00	88.96	549
4	10.00	20.00	5.00	23.00	88.96	701
5	15.00	30.00	15.00	38.00	133.45	1158
6	15.00	30.00	6.00	44.00	133.45	1341
7	15.00	30.00	6.00	50.00	133.45	1524
8	15.00	30.00	6.00	56.00	133.45	1707
(Rear) 9	15.00	30.00	6.00	62.00	133.45	1890
<b>Totals</b>	<b>115.00</b>	<b>230.00</b>	<b>62.00</b>		<b>1023.1</b>	
				Resultant at location:	37.304	1137
				Distance to Nearest Axle, "xR":	0.696	(Forward of Axle #5)



**300 ft Span Length**

	Front #1 Axle Position AX 1 ft	Middle #2 Axle Position AX 2 ft	Middle #3 Axle Position AX 3 ft	Middle #4 Axle Position AX 4 ft	Middle #5 Axle Position AX 5 ft	Middle #6 Axle Position AX 6 ft	Middle #7 Axle Position AX 7 ft	Middle #8 Axle Position AX 8 ft	Rear #9 Axle Position AX 9 ft	Dist to Beam End ft
Resultant at Mid-span	112.70	125.70	130.70	135.70	150.70	156.70	162.70	168.70	174.70	125.30
Axle # 4 at Mid-span	127.00	140.00	145.00	<b>150.00</b>	165.00	171.00	177.00	183.00	189.00	111.00
Axle # 5 at Mid-span	112.00	125.00	130.00	135.00	<b>150.00</b>	156.00	162.00	168.00	174.00	126.00
Axle # 6 at Mid-span	106.00	119.00	124.00	129.00	144.00	<b>150.00</b>	156.00	162.00	168.00	132.00
Axle # 7 at Mid-span	100.00	113.00	118.00	123.00	138.00	144.00	<b>150.00</b>	156.00	162.00	138.00
Midspan btwn Resultant-Axle # 4	119.85	132.85	137.85	142.85	157.85	163.85	169.85	175.85	181.85	118.15
Midspan btwn Resultant-Axle # 5	112.35	125.35	130.35	135.35	150.35	156.35	162.35	168.35	174.35	125.65
Midspan btwn Resultant-Axle # 6	109.35	122.35	127.35	132.35	147.35	153.35	159.35	165.35	171.35	128.65
Midspan btwn Resultant-Axle # 7	106.35	119.35	124.35	129.35	144.35	150.35	156.35	162.35	168.35	131.65

**NINE (9) AXLE** **One (1x) Proposed Standard HET (Alternative Military Live Load), on 300' Span**

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
Resultant at Mid-span	115.00	95.00	75.00	55.00	35.00	5.00	-25.00	-55.00	-85.00	-115.00	115.00
POS	0.00	112.70	125.70	130.70	135.70	150.70	156.70	162.70	168.70	174.70	300.00
Axle # 4 at Mid-span	104.03	84.03	64.03	44.03	24.03	-5.97	-35.97	-65.97	-95.97	-125.97	125.97
POS	0.00	127.00	140.00	145.00	150.00	165.00	171.00	177.00	183.00	189.00	300.00
Axle # 5 at Mid-span	115.53	95.53	75.53	55.53	35.53	5.53	-24.47	-54.47	-84.47	-114.47	114.47
POS	0.00	112.00	125.00	130.00	135.00	150.00	156.00	162.00	168.00	174.00	300.00
Axle # 6 at Mid-span	120.13	100.13	80.13	60.13	40.13	10.13	-19.87	-49.87	-79.87	-109.87	109.87
POS	0.00	106.00	119.00	124.00	129.00	144.00	150.00	156.00	162.00	168.00	300.00
Axle # 7 at Mid-span	124.73	104.73	84.73	64.73	44.73	14.73	-15.27	-45.27	-75.27	-105.27	105.27
POS	0.00	100.00	113.00	118.00	123.00	138.00	144.00	150.00	156.00	162.00	300.00
Midspan btwn Resultant-Axle # 4	109.52	89.52	69.52	49.52	29.52	-0.48	-30.48	-60.48	-90.48	-120.48	120.48
POS	0.00	119.85	132.85	137.85	142.85	157.85	163.85	169.85	175.85	181.85	300.00
Midspan btwn Resultant-Axle # 5	115.27	95.27	75.27	55.27	35.27	5.27	-24.73	-54.73	-84.73	-114.73	114.73
POS	0.00	112.35	125.35	130.35	135.35	150.35	156.35	162.35	168.35	174.35	300.00
Midspan btwn Resultant-Axle # 6	117.57	97.57	77.57	57.57	37.57	7.57	-22.43	-52.43	-82.43	-112.43	112.43
POS	0.00	109.35	122.35	127.35	132.35	147.35	153.35	159.35	165.35	171.35	300.00
Midspan btwn Resultant-Axle # 7	119.87	99.87	79.87	59.87	39.87	9.87	-20.13	-50.13	-80.13	-110.13	110.13
POS	0.00	106.35	119.35	124.35	129.35	144.35	150.35	156.35	162.35	168.35	300.00

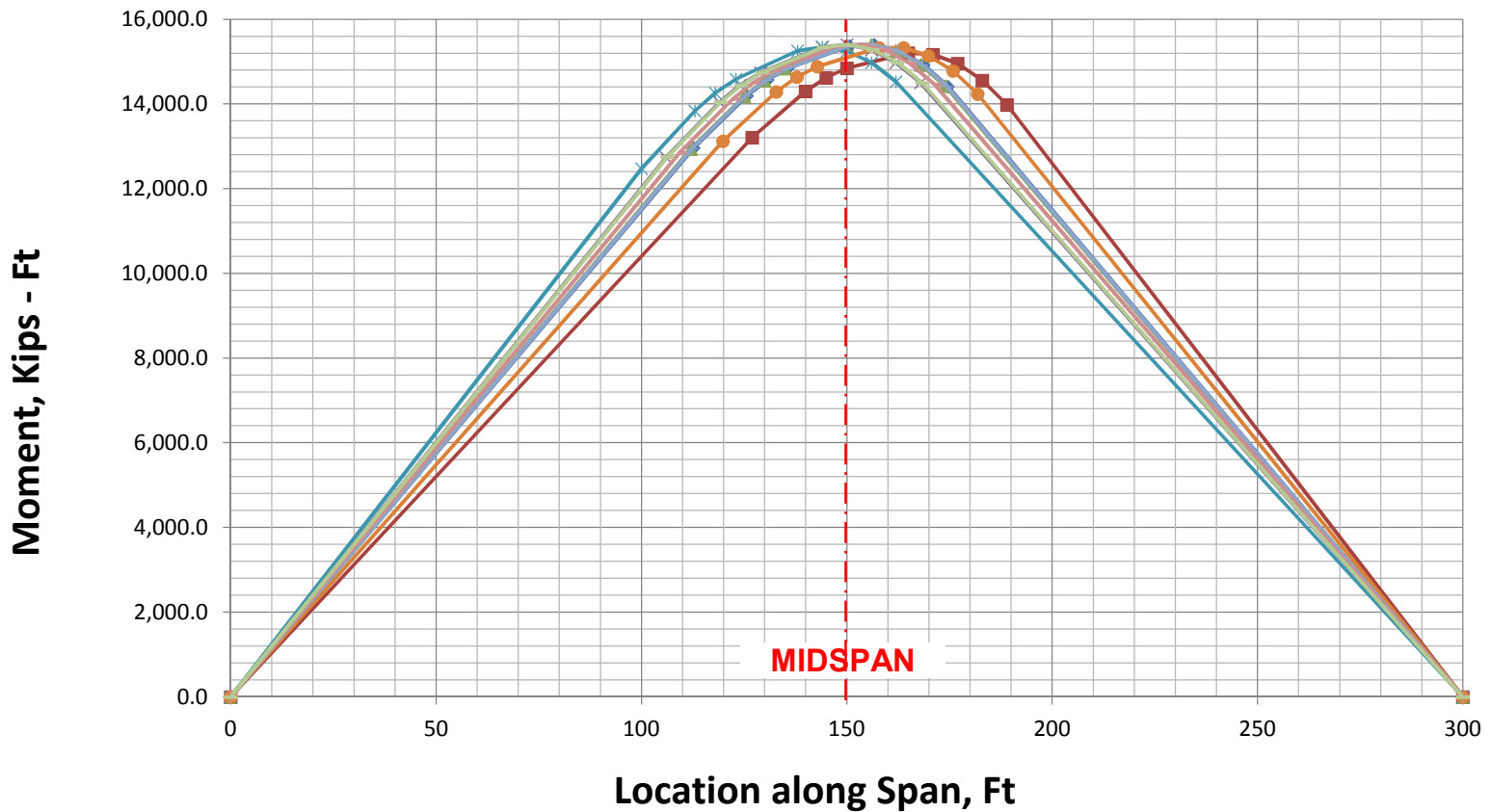
MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
Resultant at Mid-span	0.0	12,960.0	14,195.0	14,570.0	14,845.0	15,370.0	<b>15,400.0</b>	15,250.0	14,920.0	14,410.0	0.0
POS	0.00	112.70	125.70	130.70	135.70	150.70	<b>156.70</b>	162.70	168.70	174.70	300.00
Axle # 4 at Mid-span	0.0	13,212.2	14,304.7	14,624.8	14,845.0	15,205.5	15,169.7	14,953.9	14,558.1	13,982.3	0.0
POS	0.00	127.00	140.00	145.00	150.00	165.00	171.00	177.00	183.00	189.00	300.00
Axle # 5 at Mid-span	0.0	12,939.7	14,181.7	14,559.3	14,837.0	15,370.0	15,403.2	15,256.4	14,929.6	14,422.8	0.0
POS	0.00	112.00	125.00	130.00	135.00	150.00	156.00	162.00	168.00	174.00	300.00
Axle # 6 at Mid-span	0.0	12,734.1	14,035.9	14,436.5	14,737.2	15,339.2	<b>15,400.0</b>	15,280.8	14,981.6	14,502.4	0.0
POS	0.00	106.00	119.00	124.00	129.00	144.00	<b>150.00</b>	156.00	162.00	168.00	300.00
Axle # 7 at Mid-span	0.0	12,473.3	13,834.9	14,258.5	14,582.2	15,253.2	15,341.6	15,250.0	14,978.4	14,526.8	0.0
POS	0.00	100.00	113.00	118.00	123.00	138.00	144.00	150.00	156.00	162.00	300.00
Midspan btwn Resultant-Axle # 4	0.0	13,125.3	14,289.1	14,636.6	14,884.2	15,327.0	15,324.1	15,141.2	14,778.3	14,235.4	0.0
POS	0.00	119.85	132.85	137.85	142.85	157.85	163.85	169.85	175.85	181.85	300.00
Midspan btwn Resultant-Axle # 5	0.0	12,950.0	14,188.4	14,564.8	14,841.1	15,370.1	15,401.7	15,253.3	14,924.9	14,416.5	0.0
POS	0.00	112.35	125.35	130.35	135.35	150.35	156.35	162.35	168.35	174.35	300.00
Midspan btwn Resultant-Axle # 6	0.0	12,855.7	14,124.0	14,511.9	14,799.7	15,363.2	<b>15,408.6</b>	15,274.0	14,959.4	14,464.8	0.0
POS	0.00	109.35	122.35	127.35	132.35	147.35	<b>153.35</b>	159.35	165.35	171.35	300.00
Midspan btwn Resultant-Axle # 7	0.0	12,747.6	14,045.8	14,445.2	14,744.5	15,342.5	15,401.7	15,280.9	14,980.1	14,499.3	0.0
POS	0.00	106.35	119.35	124.35	129.35	144.35	150.35	156.35	162.35	168.35	300.00

**NINE (9) AXLE**

**One (1x) Proposed Standard HET (Alternative Military Live Load), on 300' Span**

**Proposed Std Hvy Equipment  
 Transport, 9 Axle, 300' SPAN  
MOMENT DIAGRAM**

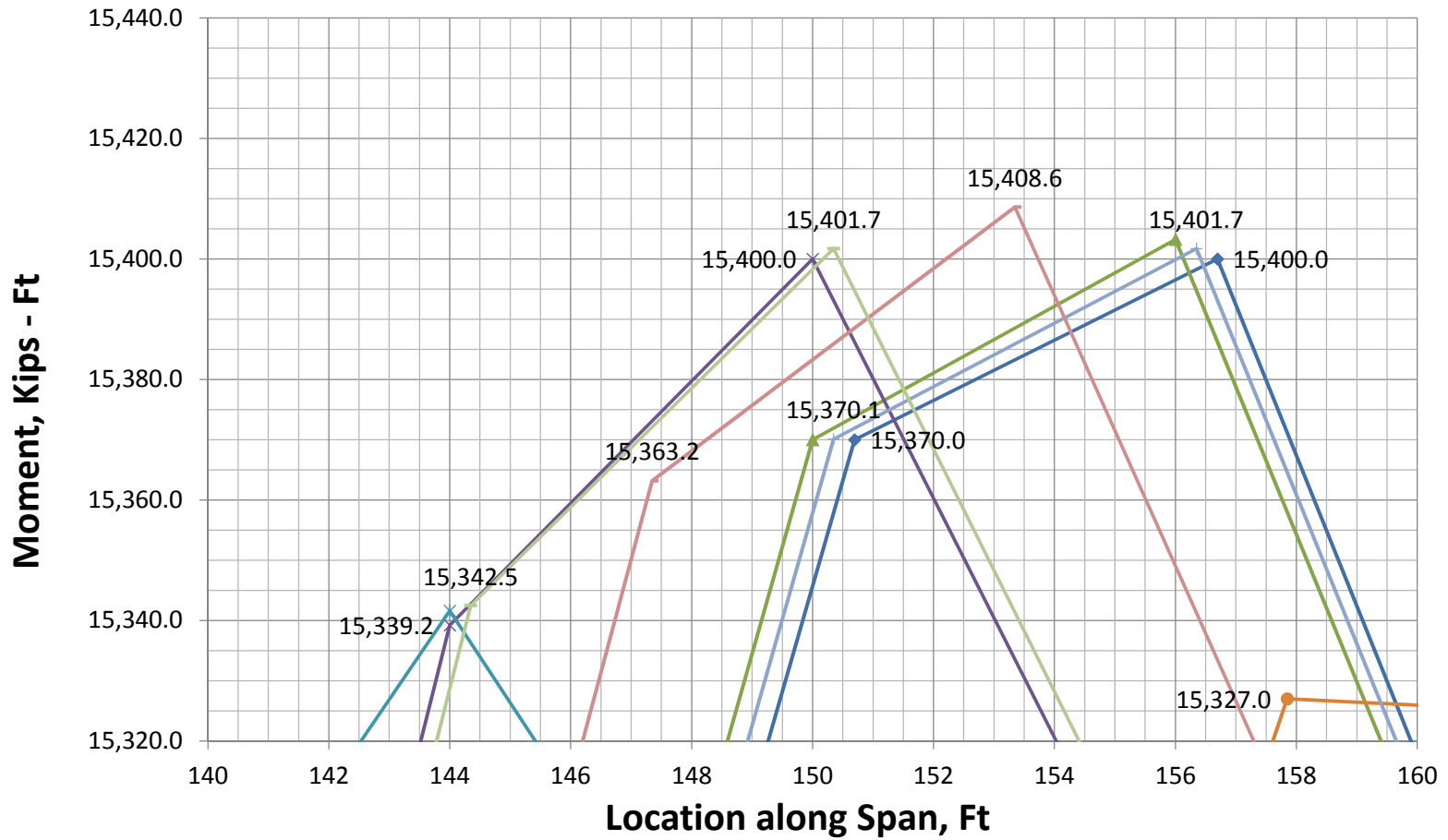
- ◆ Resultant at Mid-span
- ▲ Axle # 5 at Mid-span
- ✦ Axle # 7 at Mid-span
- ◆ Midway btwn Resultant & Axle # 5
- ◆ Midway btwn Resultant & Axle # 7
- Axle # 4 at Mid-span
- ✦ Axle # 6 at Mid-span
- Midway btwn Resultant & Axle # 4
- Midway btwn Resultant & Axle # 6



**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), on 300' Span**

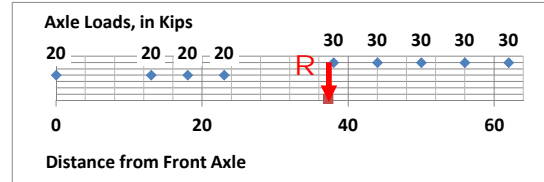
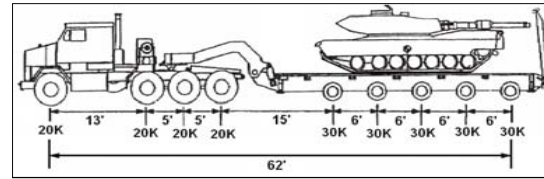
**Proposed Std Hvy Equipment Transport (9 Axle), 300' SPAN, vic Mid-span**  
**MOMENT DIAGRAM**

- ◆ Resultant at Mid-span
- ▲ Axle # 5 at Mid-span
- ✱ Axle # 7 at Mid-span
- ◆ Midway btwn Resultant & Axle # 5
- ◆ Midway btwn Resultant & Axle # 7
- Axle # 4 at Mid-span
- ✱ Axle # 6 at Mid-span
- Midway btwn Resultant & Axle # 4
- Midway btwn Resultant & Axle # 6



**NINE (9) AXLE**      **One (1x) Proposed Standard HET (ALT-MIL-LL), Max Moment (midway btwn Axle #5 and #6), 50'- 1,000' Spans**

Axle	Load (ST)	Load (kips)	SI / Metric Units			
			Distance btwn axles (ft)	Distance from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	10.00	20.0		0.00	88.96	0
2	10.00	20.0	13.00	13.00	88.96	396
3	10.00	20.0	5.00	18.00	88.96	549
4	10.00	20.0	5.00	23.00	88.96	701
5	15.00	30.0	15.00	38.00	133.45	1158
6	15.00	30.0	6.00	44.00	133.45	1341
7	15.00	30.0	6.00	50.00	133.45	1524
8	15.00	30.0	6.00	56.00	133.45	1707
(Rear) 9	15.00	30.0	6.00	62.00	133.45	1890
<b>Totals</b>	<b>115.0</b>	<b>230.0</b>	<b>62.00</b>		<b>1023.1</b>	
			<b>Resultant at location:</b>	<b>37.304</b>		<b>1137</b>
			<b>Distance to Nearest Axle, "xR":</b>	<b>0.696</b>	<b>(Forward of Axle #5)</b>	



**MAXIMUM SHEAR CALCULATIONS**

Span Length	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
50.00	-12.00	1.00	6.00	11.00	26.00	32.00	38.00	44.00	50.00	0.00
100.0	38.00	51.00	56.00	61.00	76.00	82.00	88.00	94.00	100.00	0.00
200.0	138.00	151.00	156.00	161.00	176.00	182.00	188.00	194.00	200.00	0.00
300.0	238.00	251.00	256.00	261.00	276.00	282.00	288.00	294.00	300.00	0.00
400.0	338.00	351.00	356.00	361.00	376.00	382.00	388.00	394.00	400.00	0.00
500.0	438.00	451.00	456.00	461.00	476.00	482.00	488.00	494.00	500.00	0.00
600.0	538.00	551.00	556.00	561.00	576.00	582.00	588.00	594.00	600.00	0.00
700.0	638.00	651.00	656.00	661.00	676.00	682.00	688.00	694.00	700.00	0.00
800.0	738.00	751.00	756.00	761.00	776.00	782.00	788.00	794.00	800.00	0.00
900.0	838.00	851.00	856.00	861.00	876.00	882.00	888.00	894.00	900.00	0.00
1,000.0	938.00	951.00	956.00	961.00	976.00	982.00	988.00	994.00	1000.00	0.00

**MAXIMUM V CALCS**

Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
113.60	116.40
56.80	173.20
28.40	201.60
18.93	211.07
14.20	215.80
11.36	218.64
9.47	220.53
8.11	221.89
7.10	222.90
6.31	223.69
5.68	224.32

**MAXIMUM MOMENT CALCULATIONS**

Span Length	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
50.00	-16.00	-3.00	2.00	7.00	22.00	28.00	34.00	40.00	46.00	4.00
100.0	9.00	22.00	27.00	32.00	47.00	53.00	59.00	65.00	71.00	29.00
200.0	59.00	72.00	77.00	82.00	97.00	103.00	109.00	115.00	121.00	79.00
300.0	109.00	122.00	127.00	132.00	147.00	153.00	159.00	165.00	171.00	129.00
400.0	159.00	172.00	177.00	182.00	197.00	203.00	209.00	215.00	221.00	179.00
500.0	209.00	222.00	227.00	232.00	247.00	253.00	259.00	265.00	271.00	229.00
600.0	259.00	272.00	277.00	282.00	297.00	303.00	309.00	315.00	321.00	279.00
700.0	309.00	322.00	327.00	332.00	347.00	353.00	359.00	365.00	371.00	329.00
800.0	359.00	372.00	377.00	382.00	397.00	403.00	409.00	415.00	421.00	379.00
900.0	409.00	422.00	427.00	432.00	447.00	453.00	459.00	465.00	471.00	429.00
1,000.0	459.00	472.00	477.00	482.00	497.00	503.00	509.00	515.00	521.00	479.00

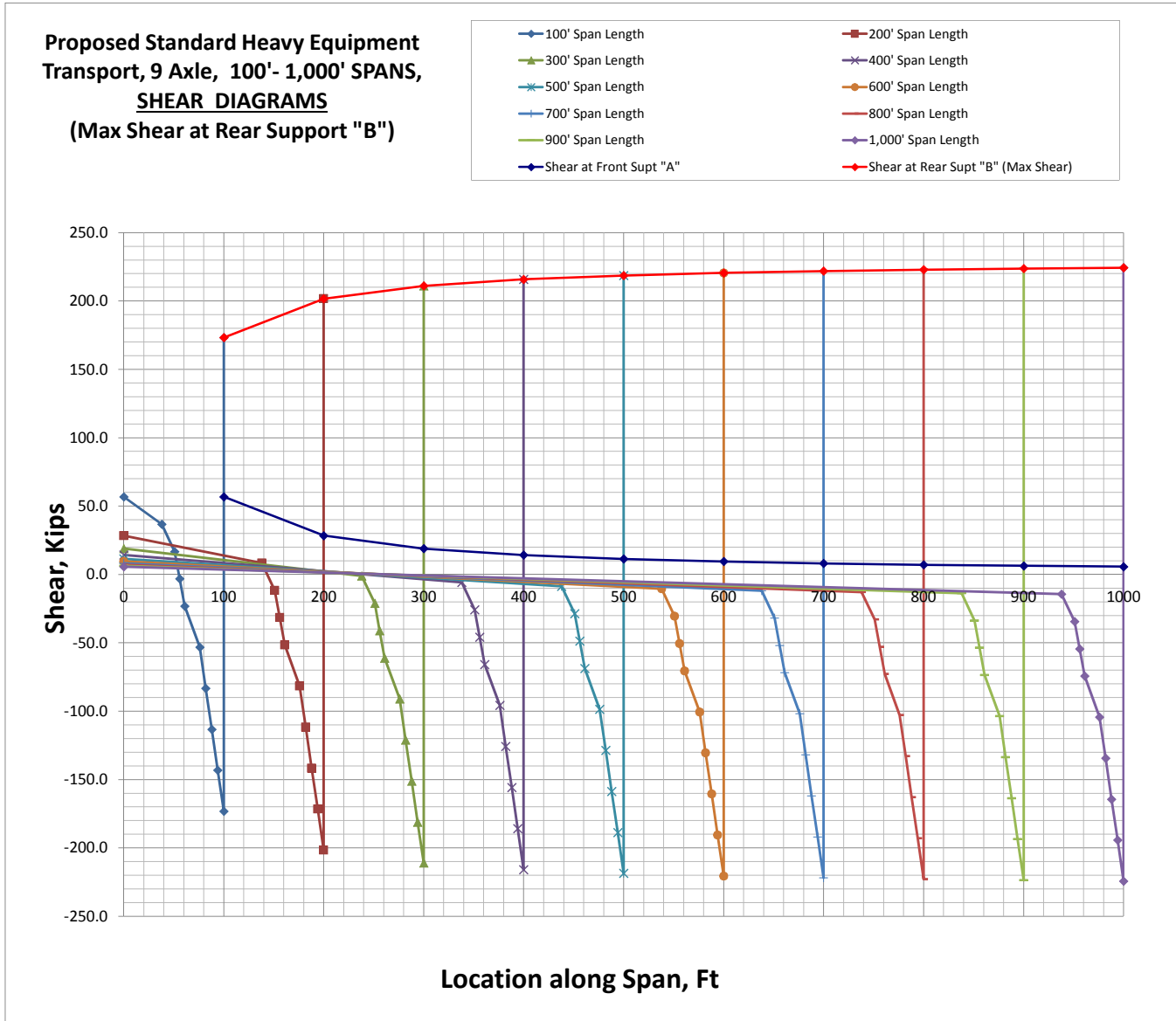


**NINE (9) AXLE**      **One (1x) Proposed Standard HET (ALT-MIL-LL), Max Moment (midway btwn Axle #5 and #6), 50'- 1,000' Spans**

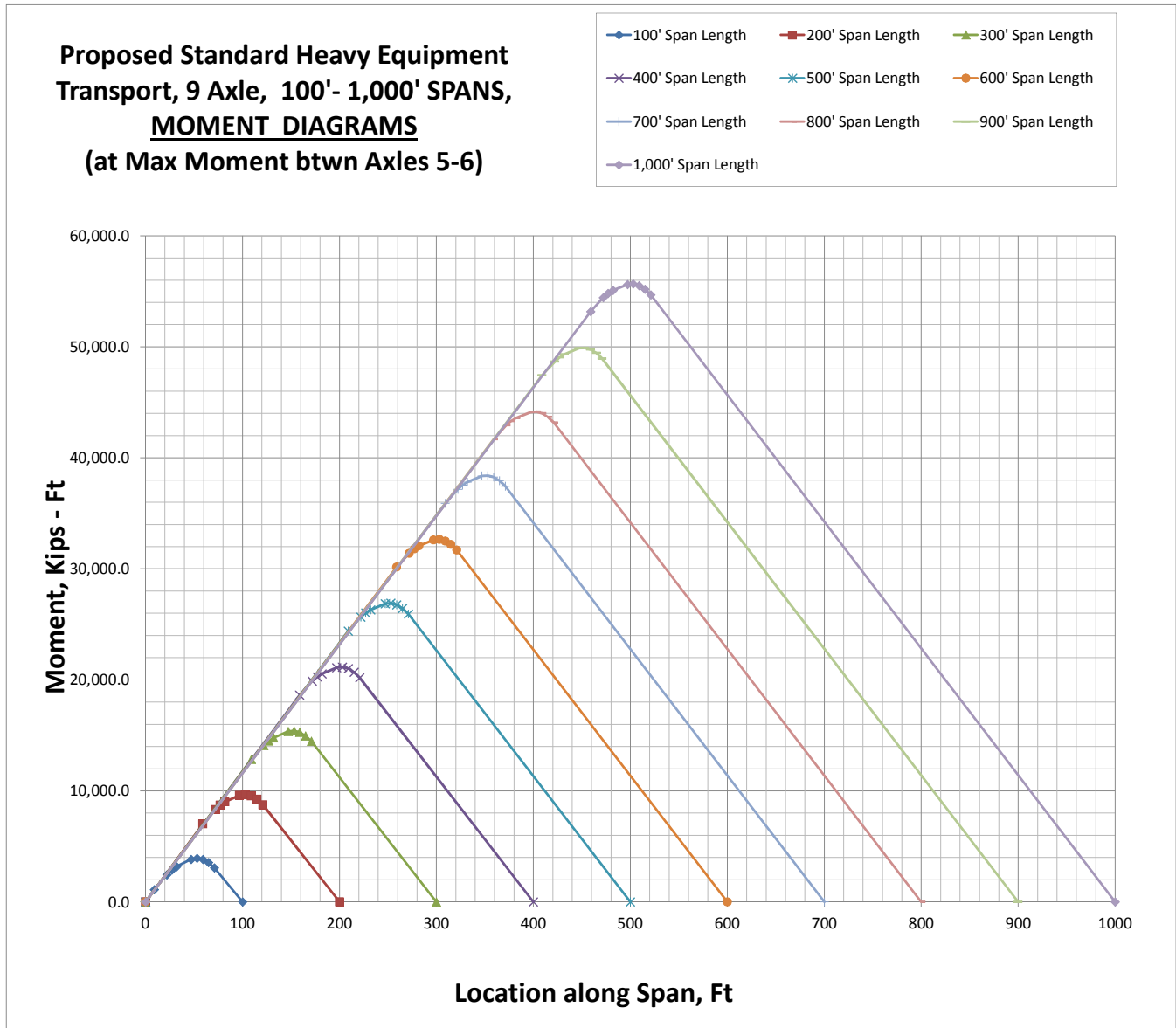
Span Length, ft	Calculated SHEARS and Locations	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
50	Moment on Span	123.50	103.50	83.50	63.50	43.50	13.50	-16.50	-46.50	-76.50	-106.50	106.50
	Axle Location on Span	0.00	-16.00	-3.00	2.00	7.00	22.00	28.00	34.00	40.00	46.00	50.00
100	Shear at Axle	123.50	103.50	83.50	63.50	43.50	13.50	-16.50	-46.50	-76.50	-106.50	106.50
	Axle Location on Span	0.00	9.00	22.00	27.00	32.00	47.00	53.00	59.00	65.00	71.00	100.00
200	Shear at Axle	119.25	99.25	79.25	59.25	39.25	9.25	-20.75	-50.75	-80.75	-110.75	110.75
	Axle Location on Span	0.00	59.00	72.00	77.00	82.00	97.00	103.00	109.00	115.00	121.00	200.00
300	Shear at Axle	117.83	97.83	77.83	57.83	37.83	7.83	-22.17	-52.17	-82.17	-112.17	112.17
	Axle Location on Span	0.00	109.00	122.00	127.00	132.00	147.00	153.00	159.00	165.00	171.00	300.00
400	Shear at Axle	117.13	97.13	77.13	57.13	37.13	7.13	-22.88	-52.88	-82.88	-112.88	112.88
	Axle Location on Span	0.00	159.00	172.00	177.00	182.00	197.00	203.00	209.00	215.00	221.00	400.00
500	Shear at Axle	116.70	96.70	76.70	56.70	36.70	6.70	-23.30	-53.30	-83.30	-113.30	113.30
	Axle Location on Span	0.00	209.00	222.00	227.00	232.00	247.00	253.00	259.00	265.00	271.00	500.00
600	Shear at Axle	116.42	96.42	76.42	56.42	36.42	6.42	-23.58	-53.58	-83.58	-113.58	113.58
	Axle Location on Span	0.00	259.00	272.00	277.00	282.00	297.00	303.00	309.00	315.00	321.00	600.00
700	Shear at Axle	116.21	96.21	76.21	56.21	36.21	6.21	-23.79	-53.79	-83.79	-113.79	113.79
	Axle Location on Span	0.00	309.00	322.00	327.00	332.00	347.00	353.00	359.00	365.00	371.00	700.00
800	Shear at Axle	116.06	96.06	76.06	56.06	36.06	6.06	-23.94	-53.94	-83.94	-113.94	113.94
	Axle Location on Span	0.00	359.00	372.00	377.00	382.00	397.00	403.00	409.00	415.00	421.00	800.00
900	Shear at Axle	115.94	95.94	75.94	55.94	35.94	5.94	-24.06	-54.06	-84.06	-114.06	114.06
	Axle Location on Span	0.00	409.00	422.00	427.00	432.00	447.00	453.00	459.00	465.00	471.00	900.00
1,000	Shear at Axle	115.85	95.85	75.85	55.85	35.85	5.85	-24.15	-54.15	-84.15	-114.15	114.15
	Axle Location on Span	0.00	459.00	472.00	477.00	482.00	497.00	503.00	509.00	515.00	521.00	1,000.00

Span Length, ft	Calculated MOMENTS and Locations	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
50	Moment	0.00	-2,112.00	-656.00	-196.00	164.00	944.00	1,076.00	1,028.00	800.00	392.00	0.00
	Axle Location on Span	0.00	-16.00	-3.00	2.00	7.00	22.00	28.00	34.00	40.00	46.00	50.00
100	Moment	0.0	1,111.5	2,457.0	2,874.5	3,192.0	3,844.5	3,925.5	3,826.5	3,547.5	3,088.5	0.0
	Axle Location on Span	0.00	9.00	22.00	27.00	32.00	47.00	53.00	59.00	65.00	71.00	100.00
200	Moment	0.0	7,035.8	8,326.0	8,722.3	9,018.5	9,607.3	9,662.8	9,538.3	9,233.8	8,749.3	0.0
	Axle Location on Span	0.00	59.00	72.00	77.00	82.00	97.00	103.00	109.00	115.00	121.00	200.00
300	Moment	0.0	12,843.8	14,115.7	14,504.8	14,794.0	15,361.5	15,408.5	15,275.5	14,962.5	14,469.5	0.0
	Axle Location on Span	0.00	109.00	122.00	127.00	132.00	147.00	153.00	159.00	165.00	171.00	300.00
400	Moment	0.0	18,622.9	19,885.5	20,271.1	20,556.8	21,113.6	21,156.4	21,019.1	20,701.9	20,204.6	0.0
	Axle Location on Span	0.00	159.00	172.00	177.00	182.00	197.00	203.00	209.00	215.00	221.00	400.00
500	Moment	0.0	24,390.30	25,647.40	26,030.90	26,314.40	26,864.90	26,905.10	26,765.30	26,445.50	25,945.70	0.00
	Axle Location on Span	0.00	209.00	222.00	227.00	232.00	247.00	253.00	259.00	265.00	271.00	500.00
600	Moment	0.0	30,151.92	31,405.33	31,787.42	32,069.50	32,615.75	32,654.25	32,512.75	32,191.25	31,689.75	0.00
	Axle Location on Span	0.00	259.00	272.00	277.00	282.00	297.00	303.00	309.00	315.00	321.00	600.00
700	Moment	0.0	35,910.21	37,161.00	37,542.07	37,823.14	38,366.36	38,403.64	38,260.93	37,938.21	37,435.50	0.00
	Axle Location on Span	0.00	309.00	322.00	327.00	332.00	347.00	353.00	359.00	365.00	371.00	700.00
800	Moment	0.0	41,666.44	42,915.25	43,295.56	43,575.88	44,116.81	44,153.19	44,009.56	43,685.94	43,182.31	0.00
	Axle Location on Span	0.00	359.00	372.00	377.00	382.00	397.00	403.00	409.00	415.00	421.00	800.00
900	Moment	0.0	47,421.28	48,668.56	49,048.28	49,328.00	49,867.17	49,902.83	49,758.50	49,434.17	48,929.83	0.00
	Axle Location on Span	0.00	409.00	422.00	427.00	432.00	447.00	453.00	459.00	465.00	471.00	900.00
1,000	Moment	0.0	53,175.2	54,421.2	54,800.5	55,079.7	55,617.5	55,652.6	55,507.7	55,182.8	54,677.9	0.0
	Axle Location on Span	0.00	459.00	472.00	477.00	482.00	497.00	503.00	509.00	515.00	521.00	1,000.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (ALT-MIL-LL), Max Moment (midway btwn Axle #5 and #6), 50'- 1,000' Spans**



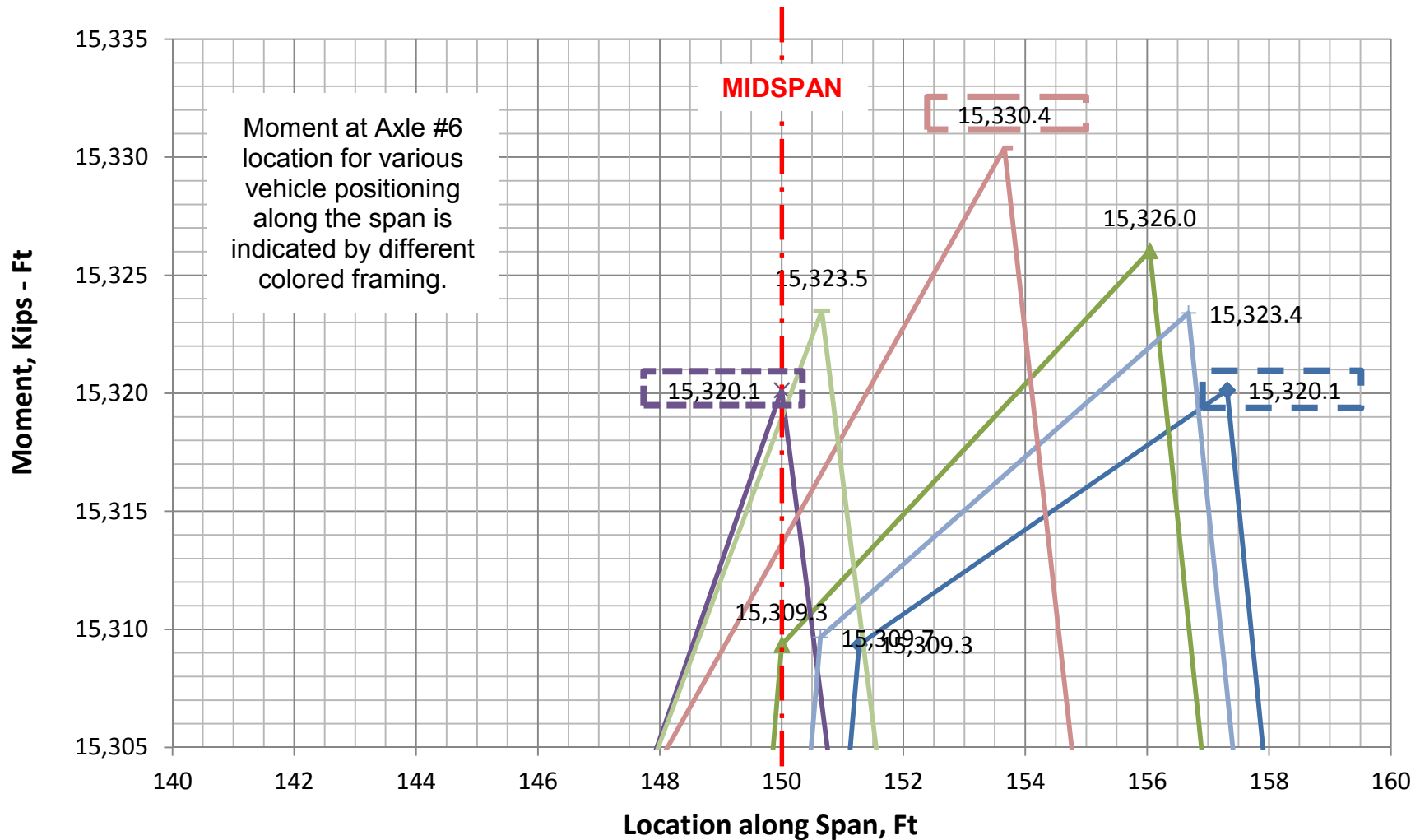
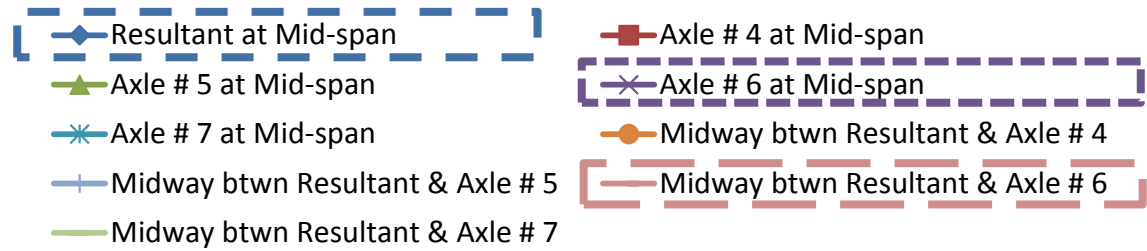
**NINE (9) AXLE**      **One (1x) Proposed Standard HET (ALT-MIL-LL), Max Moment (midway btwn Axle #5 and #6), 50'- 1,000' Spans**



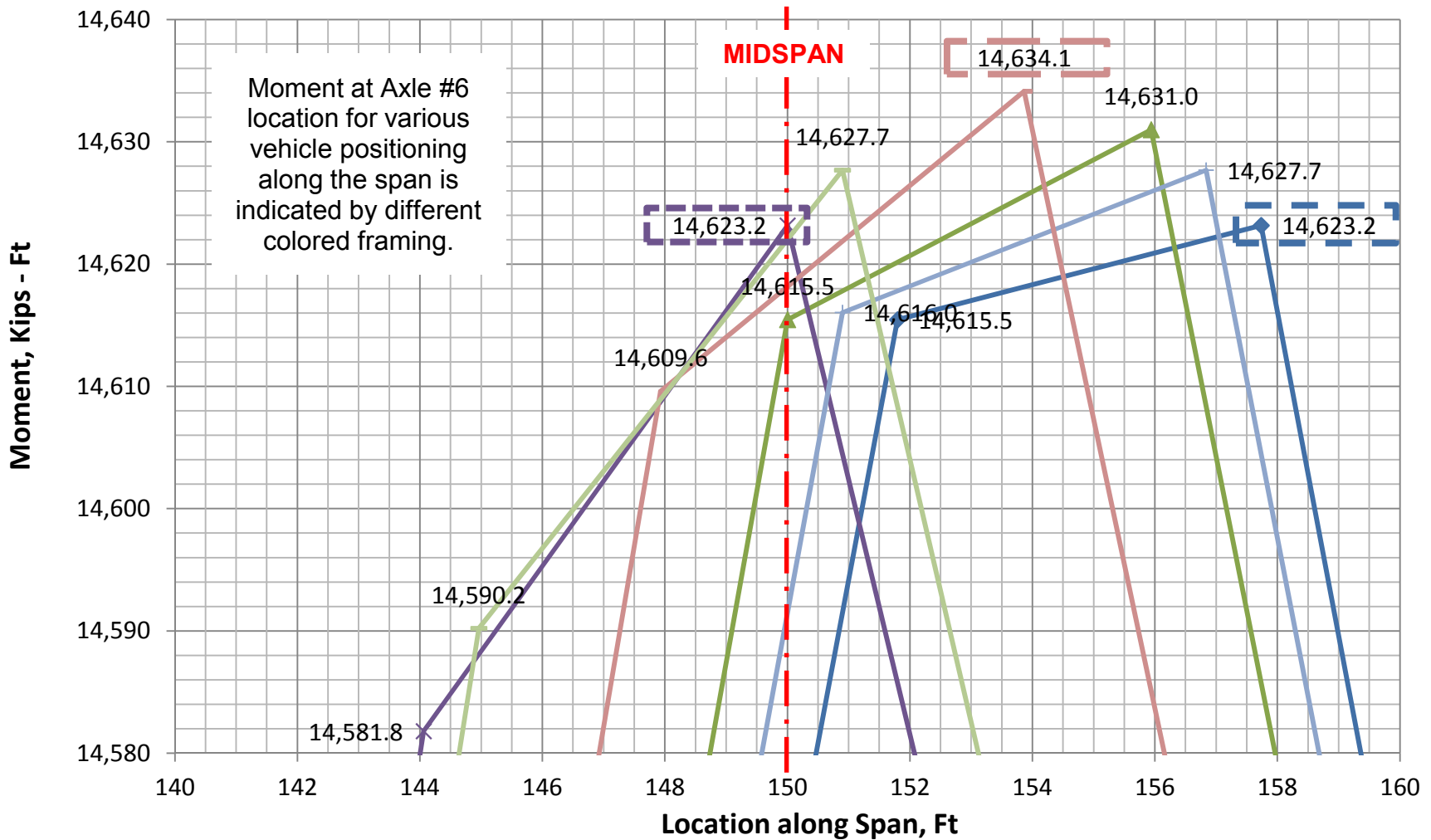
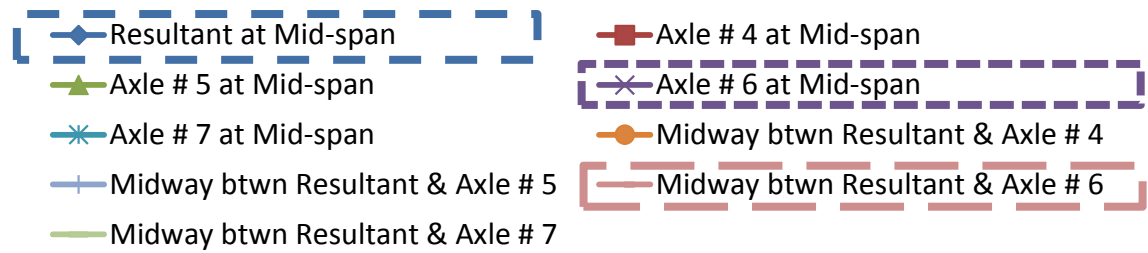
## **FIGURES**

- 5-23. STANAG HET,M vic midspan
- 5-24. KS DOT HET,M vic midspan
- 5-25. Pro Std HET,M vic midspan

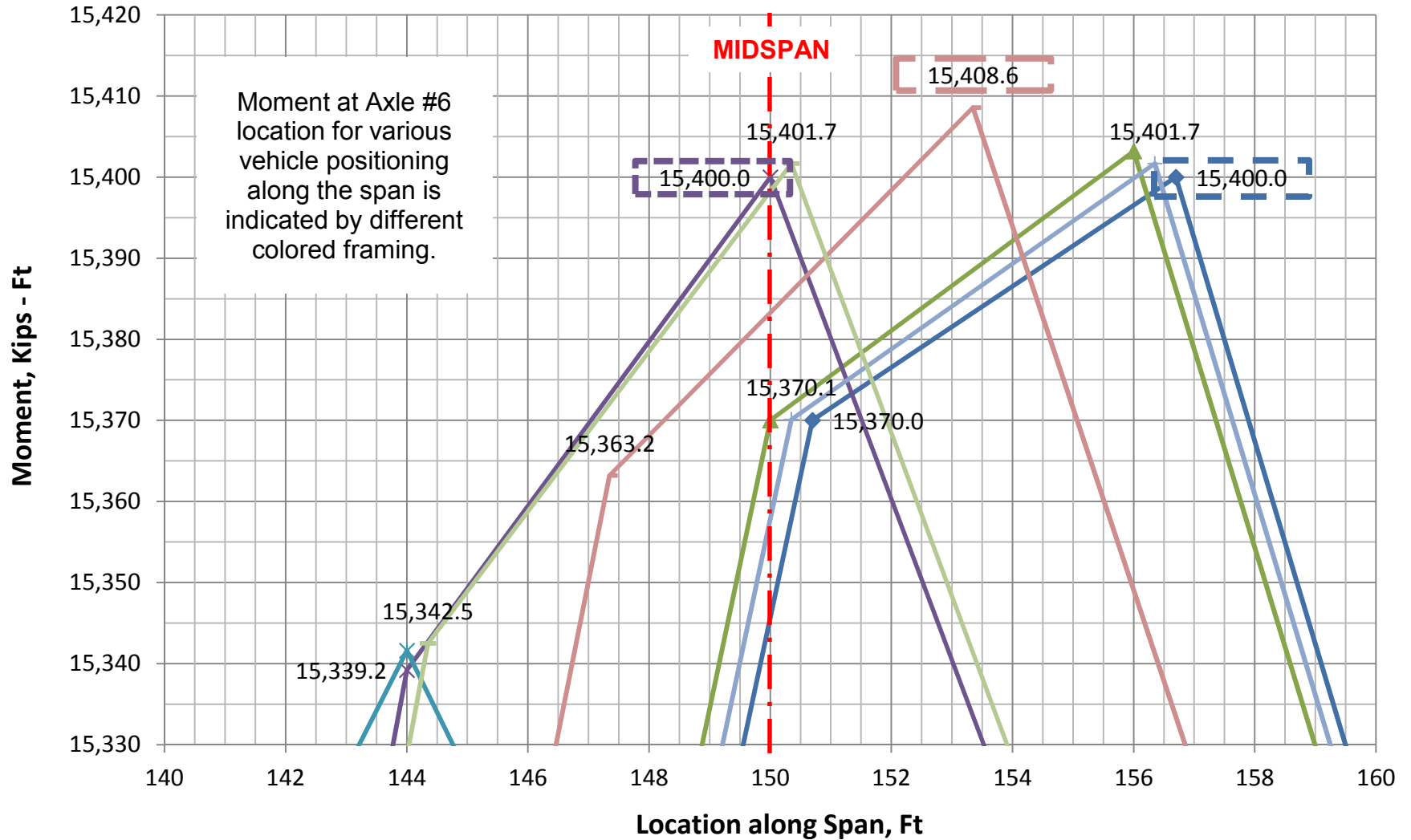
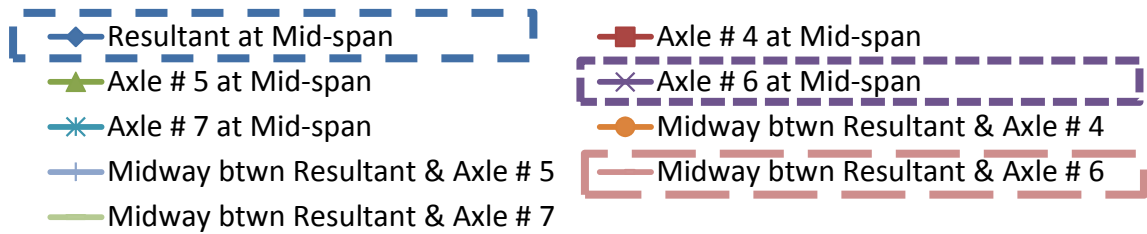
### STANAG 2021 Hvy Equipment Transport (9 Axle), 300' SPAN, vic Mid-span MOMENT DIAGRAM



### Kansas DOT Hvy Equipment Transport (9 Axle), 300' SPAN, vic Mid-span MOMENT DIAGRAM



**Proposed Std Hvy Equipment  
 Transport (9 Axle),  
 300' SPAN, vic Mid-span  
 MOMENT DIAGRAM**



**END OF APPENDIX F**



## APPENDIX G: MULTIPLE MLC 100W VEHICLES ON A SINGLE SPAN

Filename: WP Parker UNO 2019 MSCE Thesis Data - Appendix G. Multiple MLC100W Vehicles Single Span.xlsx

Contents (worksheets/tab names included in the Excel workbook are):

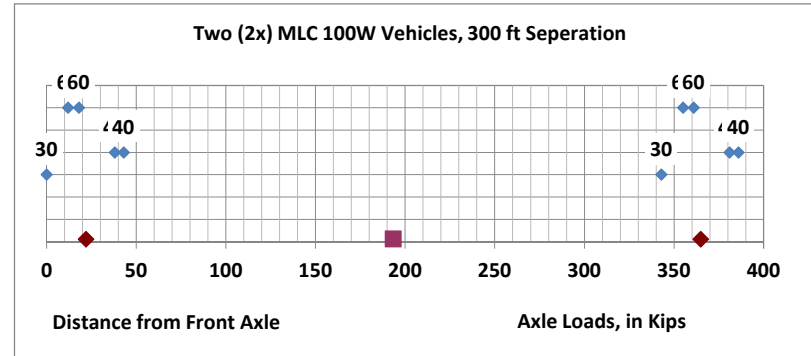
<u>Calculation Worksheets</u>	<u>Page</u>	<u>Tables</u>	<u>Page</u>
MLC 100W, 387' L, 300' sep, 2V	G-2	None	NA
MLC 100W, 400' L, 300' sep, 2V	G-3		NA
MLC 100W, 450' L, 300' sep, 2V	G-7		
MLC 100W, 500' L, 300' sep, 2V	G-11	<u>Figures</u>	G-79
MLC 100W, 550' L, 300' sep, 2V	G-15	5-29. 2xMLC100W, 450'at 300'sep	G-80
MLC 100W, 600' L, 300' sep, 2V	G-19	5-30. 2xMLC100W, 730'at 300'sep	G-81
MLC 100W, 650' L, 300' sep, 2V	G-23	5-31. 3xMLC100W, 900'at 300'sep	G-82
MLC 100W, 700' L, 300' sep, 2V	G-27		
MLC 100W, 730' L, 300' sep, 2V	G-31		
MLC 100W, 750' L, 300' sep, 2V	G-35		
MLC 100W, 800' L, 300' sep, 2V	G-39		
MLC 100W, 850' L, 300' sep, 2V	G-43		
MLC 100W, 900' L, 300' sep, 2V	G-47		
MLC 100W, 950' L, 300' sep, 2V	G-51		
MLC 100W, 1000' L, 300' sep, 2V	G-55		
MLC 100W, 730' L, 300' sep, 3V	G-59		
MLC 100W, 800' L, 300' sep, 3V	G-63		
MLC 100W, 900' L, 300' sep, 3V	G-67		
MLC 100W, 1000' L, 300' sep, 3V	G-71		
	G-75		

## **CALCULATION WORKSHEETS**

MLC 100W, 387' L, 300' sep, 2V  
MLC 100W, 400' L, 300' sep, 2V  
MLC 100W, 450' L, 300' sep, 2V  
MLC 100W, 500' L, 300' sep, 2V  
MLC 100W, 550' L, 300' sep, 2V  
MLC 100W, 600' L, 300' sep, 2V  
MLC 100W, 650' L, 300' sep, 2V  
MLC 100W, 700' L, 300' sep, 2V  
MLC 100W, 730' L, 300' sep, 2V  
MLC 100W, 750' L, 300' sep, 2V  
MLC 100W, 800' L, 300' sep, 2V  
MLC 100W, 850' L, 300' sep, 2V  
MLC 100W, 900' L, 300' sep, 2V  
MLC 100W, 950' L, 300' sep, 2V  
MLC 100W, 1000' L, 300' sep, 2V  
MLC 100W, 730' L, 300' sep, 3V  
MLC 100W, 800' L, 300' sep, 3V  
MLC 100W, 900' L, 300' sep, 3V  
MLC 100W, 1000' L, 300' sep, 3V

**TEN (10) AXLE** **Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 387' (~118 m) total span length, Travel Speeds (with Impact)**

	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
<b>Totals</b>		<b>230.0</b>	<b>460.0</b>	<b>386.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 193.413 ft, from Front axle of 1st vehicle

**387** ft, Total Span Length      **33%** Dynamic Impact Factor

**POSSIBLE VEHICLE LOCATIONS USED FOR SHEAR AND MOMENT CALCULATIONS**

	VEHICLE NO. 1					VEHICLE NO. 2					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Vehicle # 1 (Left Side), Front (#1) Axle at Support	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	1.00
Resultant of both Vehicles at Mid-span	0.09	12.09	18.09	38.09	43.09	343.09	355.09	361.09	381.09	386.09	0.91
Vehicle # 1, Axle # 1, at 1/9 Available Span Length	0.11	12.11	18.11	38.11	43.11	343.11	355.11	361.11	381.11	386.11	0.89
Vehicle # 1, Axle # 1, at 2/9 Available Span Length	0.22	12.22	18.22	38.22	43.22	343.22	355.22	361.22	381.22	386.22	0.78
Vehicle # 1, Axle # 1, at 3/9 Available Span Length	0.33	12.33	18.33	38.33	43.33	343.33	355.33	361.33	381.33	386.33	0.67
Vehicle # 1, Axle # 1, at 4/9 Available Span Length	0.44	12.44	18.44	38.44	43.44	343.44	355.44	361.44	381.44	386.44	0.56
Vehicle # 1, Axle # 1, at 5/9 Available Span Length	0.56	12.56	18.56	38.56	43.56	343.56	355.56	361.56	381.56	386.56	0.44
Vehicle # 1, Axle # 1, at 6/9 Available Span Length	0.67	12.67	18.67	38.67	43.67	343.67	355.67	361.67	381.67	386.67	0.33
Vehicle # 1, Axle # 1, at 7/9 Available Span Length	0.78	12.78	18.78	38.78	43.78	343.78	355.78	361.78	381.78	386.78	0.22
Vehicle # 1, Axle # 1, at 8/9 Available Span Length	0.89	12.89	18.89	38.89	43.89	343.89	355.89	361.89	381.89	386.89	0.11
Vehicle #2 (Right Side), Rear (#3) Axle at Support (Max V)	1.00	13.00	19.00	39.00	44.00	344.00	356.00	362.00	382.00	387.00	0.00

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 387' (~118 m) total span length, Travel Speeds (with Impact)

**SHEAR CALCULATIONS**

SHEAR	Shear at React A, kips	VEHICLE NO. 1					VEHICLE NO. 2					Shear at React B, kips
		Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	
Vehicle #1 (Left), Front (#1) Axle at Support	306.04	266.14	186.34	106.54	53.34	0.14	-39.76	-119.56	-199.36	-252.56	-305.76	305.76
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	387.00
Resultant of both Vehicles at Mid-span	305.90	266.00	186.20	106.40	53.20	0.00	-39.90	-119.70	-199.50	-252.70	-305.90	305.90
Axle Positions	0.00	0.09	12.09	18.09	38.09	43.09	343.09	355.09	361.09	381.09	386.09	387.00
Vehicle #2, Rear (#3) Axle at Support (Max V)	304.46	264.56	184.76	104.96	51.76	-1.44	-41.34	-121.14	-200.94	-254.14	-307.34	307.34
Axle Positions	0.00	1.00	13.00	19.00	39.00	44.00	344.00	356.00	362.00	382.00	387.00	387.00

**307.3** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**217.5** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips

**217.3** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	Moment at React A, ft-kips	VEHICLE NO. 1					VEHICLE NO. 2					Moment at React B, ft-kips
		Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	
Vehicle #1 (Left), Front (#1) Axle at Support	0.00	0.00	3,193.65	4,311.67	6,442.42	6,709.11	6,750.35	6,273.20	5,555.83	1,568.58	305.76	0.00
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	387.00
Resultant of both Vehicles at Mid-span	0.00	26.60	3,218.60	4,335.80	6,463.80	6,729.80	6,729.80	6,251.00	5,532.80	1,542.80	279.30	0.00
Axle Positions	0.00	0.09	12.09	18.09	38.09	43.09	343.09	355.09	361.09	381.09	386.09	387.00
Vehicle #1, Axle #1, at 1/9 Avail. Span Length	0.00	33.98	3,225.53	4,342.50	6,469.73	6,735.54	6,724.09	6,244.83	5,526.40	1,535.64	271.95	0.00
Axle Positions	0.00	0.11	12.11	18.11	38.11	43.11	343.11	355.11	361.11	381.11	386.11	387.00
Vehicle #1, Axle #1, at 2/9 Avail. Span Length	0.00	67.93	3,257.36	4,373.28	6,497.00	6,761.94	6,697.78	6,216.42	5,496.93	1,502.66	238.09	0.00
Axle Positions	0.00	0.22	12.22	18.22	38.22	43.22	343.22	355.22	361.22	381.22	386.22	387.00
Vehicle #1, Axle #1, at 3/9 Avail. Span Length	0.00	101.84	3,289.16	4,404.03	6,524.24	6,788.29	<b>6,671.44</b>	<b>6,187.97</b>	<b>5,467.43</b>	<b>1,469.64</b>	<b>204.19</b>	0.00
Axle Positions	0.00	0.33	12.33	18.33	38.33	43.33	<b>343.33</b>	<b>355.33</b>	<b>361.33</b>	<b>381.33</b>	<b>386.33</b>	387.00
Vehicle #1, Axle #1, at 4/9 Avail. Span Length	0.00	135.70	3,320.92	4,434.73	6,551.43	6,814.60	6,645.06	6,159.48	5,437.89	1,436.58	170.26	0.00
Axle Positions	0.00	0.44	12.44	18.44	38.44	43.44	343.44	355.44	361.44	381.44	386.44	387.00
Vehicle #1, Axle #1, at 5/9 Avail. Span Length	0.00	169.53	3,352.64	4,465.40	6,578.58	6,840.88	6,618.64	6,130.95	5,408.30	1,403.49	136.28	0.00
Axle Positions	0.00	0.56	12.56	18.56	38.56	43.56	343.56	355.56	361.56	381.56	386.56	387.00
Vehicle #1, Axle #1, at 6/9 Avail. Span Length	0.00	203.32	3,384.32	4,496.03	6,605.70	6,867.11	6,592.18	6,102.38	5,378.68	1,370.35	102.27	0.00
Axle Positions	0.00	0.67	12.67	18.67	38.67	43.67	343.67	355.67	361.67	381.67	386.67	387.00
Vehicle #1, Axle #1, at 7/9 Avail. Span Length	0.00	237.07	3,415.97	4,526.61	6,632.77	6,893.31	6,565.68	6,073.78	5,349.02	1,337.18	68.22	0.00
Axle Positions	0.00	0.78	12.78	18.78	38.78	43.78	343.78	355.78	361.78	381.78	386.78	387.00
Vehicle #1, Axle #1, at 8/9 Avail. Span Length	0.00	270.78	3,447.57	4,557.16	6,659.81	6,919.47	6,539.14	6,045.13	5,319.32	1,303.97	34.13	0.00
Axle Positions	0.00	0.89	12.89	18.89	38.89	43.89	343.89	355.89	361.89	381.89	386.89	387.00
Vehicle #2, Rear (#3) Axle at Support	0.00	<b>304.46</b>	<b>3,479.14</b>	<b>4,587.68</b>	<b>6,686.81</b>	<b>6,945.59</b>	6,512.57	6,016.45	5,289.59	1,270.72	0.00	0.00
Axle Positions	0.00	<b>1.00</b>	<b>13.00</b>	<b>19.00</b>	<b>39.00</b>	<b>44.00</b>	344.00	356.00	362.00	382.00	387.00	387.00

**6,946** MLC 100W 2x Vehicle on Span Maximum Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

**20,903** MLC 100W 1x Vehicle on Span Maximum Midspan Moment w/Impact, kips

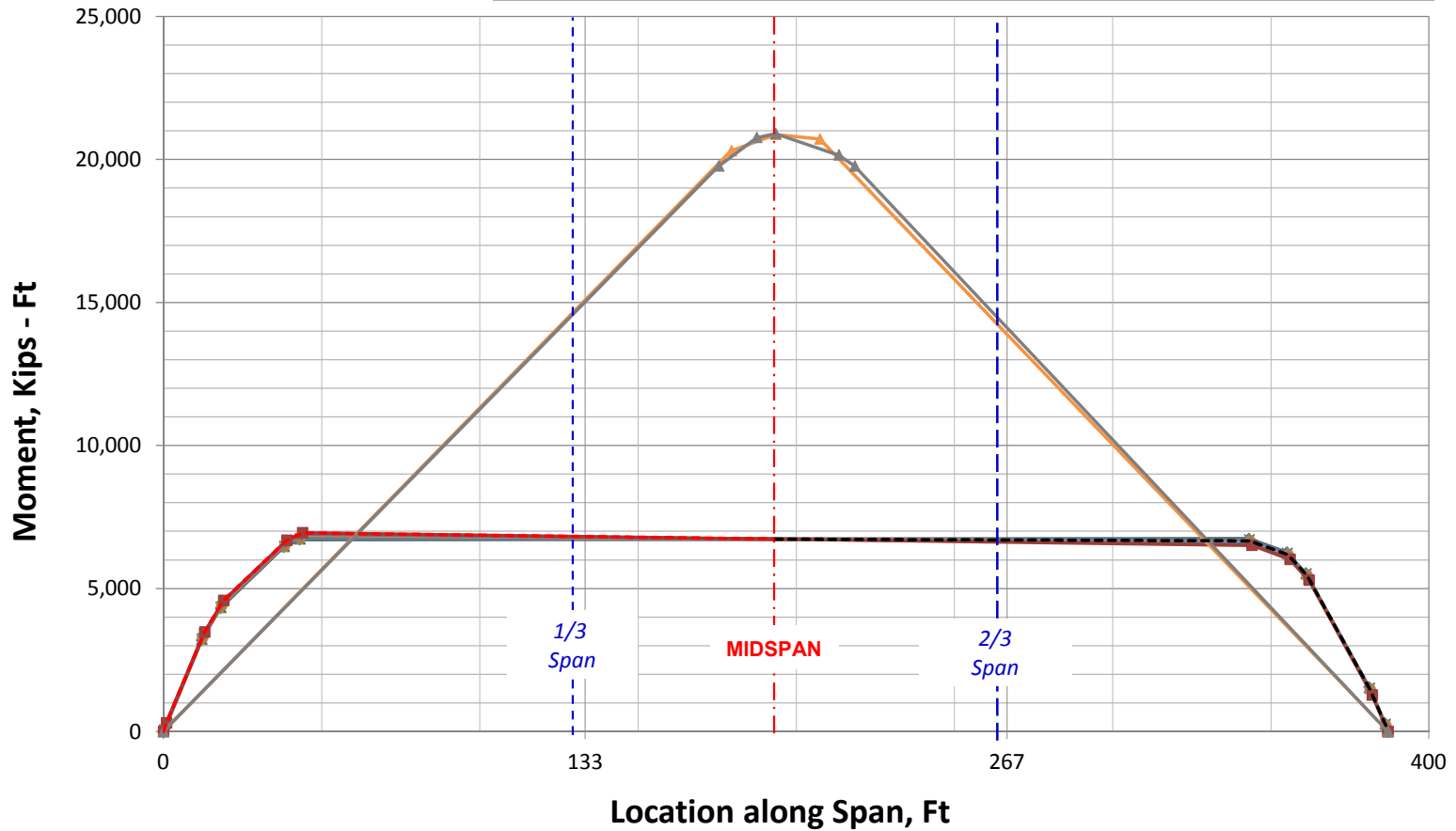
**20,874** Maximum AASHTO HL-93 Single Span Design Moment w/Impact, ft-kips

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 387' (~118 m) total span length, Travel Speeds (with Impact)

**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 387' (~118 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

**MOMENT DIAGRAMS**

- ◆— Veh #1, Front (#1) Axle at Spt
- ×— Veh #1, Axle #1, at 1/9 Available Span
- Veh #1, Axle #1, at 3/9 Available Span
- Veh #1, Axle #1, at 5/9 Available Span
- ▲— Veh #1, Axle #1, at 7/9 Available Span
- Veh #2, Rear (#3) Axle at Spt (Max V)
- ▲— MLC 100W Max Moment 1 Vehicle (with Impact)
- Max Values Curve, Right Side
- ▲— Resultant of both Vehicles at Mid-span
- ×— Veh #1, Axle #1, at 2/9 Available Span
- Veh #1, Axle #1, at 4/9 Available Span
- Veh #1, Axle #1, at 6/9 Available Span
- Veh #1, Axle #1, at 8/9 Available Span
- ▲— AASHTO HL-93 Max Moment (with Impact)
- - - Max Values Curve, Left Side

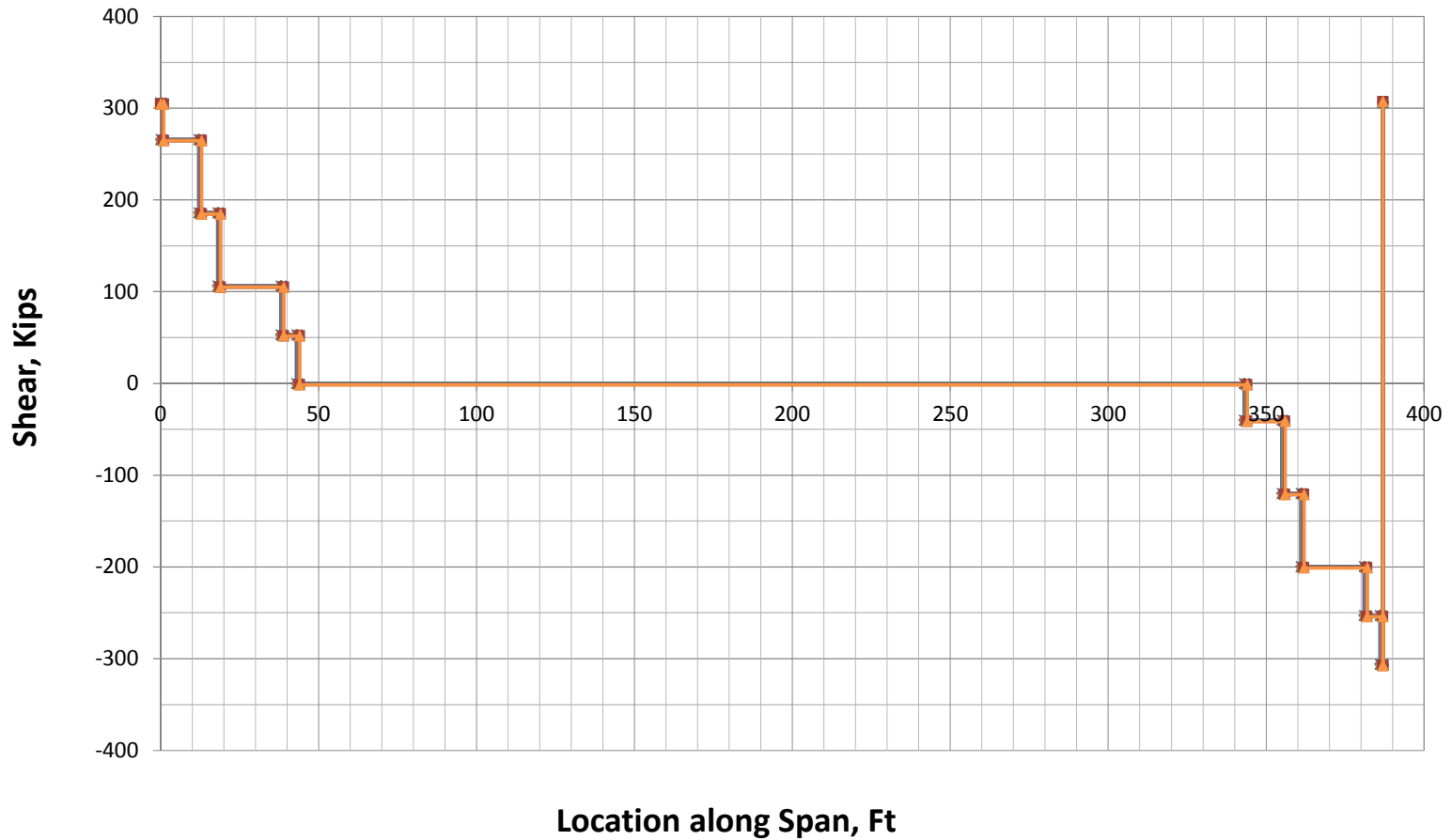


**TEN (10) AXLE**      **Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 387' (~118 m) total span length, Travel Speeds (with Impact)**

**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 387' (~118 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

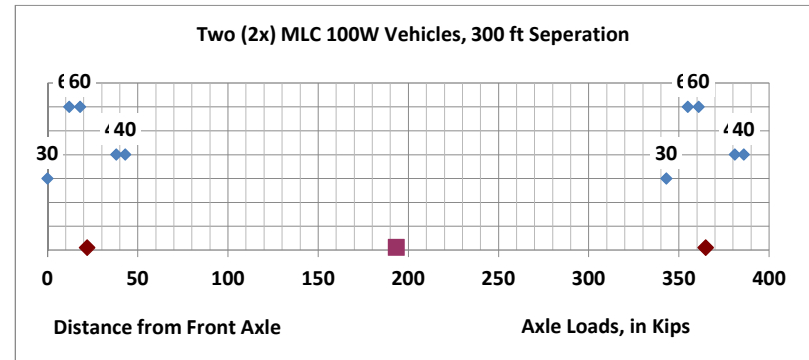
**SHEAR DIAGRAMS**

- ◆ Veh #1, Front (#1) Axle at Spt
- ✕ Veh #1, Axle #1, at 1/9 Available Span
- Veh #1, Axle #1, at 3/9 Available Span
- Veh #1, Axle #1, at 5/9 Available Span
- ◆ Veh #1, Axle #1, at 7/9 Available Span
- ▲ Veh #2, Rear (#3) Axle at Spt (Max V)
- ◆ Resultant of both Vehicles at Mid-span
- ✕ Veh #1, Axle #1, at 2/9 Available Span
- Veh #1, Axle #1, at 4/9 Available Span
- Veh #1, Axle #1, at 6/9 Available Span
- Veh #1, Axle #1, at 8/9 Available Span



**TEN (10) AXLE** **Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 400' (~122 m) total span length, Travel Speeds (with Impact)**

	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
<b>Totals</b>		<b>230.0</b>	<b>460.0</b>	<b>386.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 193.413 ft, from Front axle of 1st vehicle

400 ft, Total Span Length      33% Dynamic Impact Factor

**POSSIBLE VEHICLE LOCATIONS USED FOR SHEAR AND MOMENT CALCULATIONS**

	VEHICLE NO. 1					VEHICLE NO. 2					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Vehicle # 1 (Left Side), Front (#1) Axle at Support	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	14.00
Resultant of both Vehicles at Mid-span	6.59	18.59	24.59	44.59	49.59	349.59	361.59	367.59	387.59	392.59	7.41
Vehicle # 1, Axle # 1, at 1/9 Available Span Length	1.56	13.56	19.56	39.56	44.56	344.56	356.56	362.56	382.56	387.56	12.44
Vehicle # 1, Axle # 1, at 2/9 Available Span Length	3.11	15.11	21.11	41.11	46.11	346.11	358.11	364.11	384.11	389.11	10.89
Vehicle # 1, Axle # 1, at 3/9 Available Span Length	4.67	16.67	22.67	42.67	47.67	347.67	359.67	365.67	385.67	390.67	9.33
Vehicle # 1, Axle # 1, at 4/9 Available Span Length	6.22	18.22	24.22	44.22	49.22	349.22	361.22	367.22	387.22	392.22	7.78
Vehicle # 1, Axle # 1, at 5/9 Available Span Length	7.78	19.78	25.78	45.78	50.78	350.78	362.78	368.78	388.78	393.78	6.22
Vehicle # 1, Axle # 1, at 6/9 Available Span Length	9.33	21.33	27.33	47.33	52.33	352.33	364.33	370.33	390.33	395.33	4.67
Vehicle # 1, Axle # 1, at 7/9 Available Span Length	10.89	22.89	28.89	48.89	53.89	353.89	365.89	371.89	391.89	396.89	3.11
Vehicle # 1, Axle # 1, at 8/9 Available Span Length	12.44	24.44	30.44	50.44	55.44	355.44	367.44	373.44	393.44	398.44	1.56
Vehicle #2 (Right Side), Rear (#3) Axle at Support (Max V)	14.00	26.00	32.00	52.00	57.00	357.00	369.00	375.00	395.00	400.00	0.00

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 400' (~122 m) total span length, Travel Speeds (with Impact)

**SHEAR CALCULATIONS**

SHEAR	Shear at React A, kips	VEHICLE NO. 1					VEHICLE NO. 2					Shear at React B, kips
		Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	
Vehicle #1 (Left), Front (#1) Axle at Support	315.97	276.07	196.27	116.47	63.27	10.07	-29.83	-109.63	-189.43	-242.63	-295.83	295.83
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	400.00
Resultant of both Vehicles at Mid-span	305.90	266.00	186.20	106.40	53.20	0.00	-39.90	-119.70	-199.50	-252.70	-305.90	305.90
Axle Positions	0.00	6.59	18.59	24.59	44.59	49.59	349.59	361.59	367.59	387.59	392.59	400.00
Vehicle #2, Rear (#3) Axle at Support (Max V)	294.56	254.66	174.86	95.06	41.86	-11.34	-51.24	-131.04	-210.84	-264.04	-317.24	317.24
Axle Positions	0.00	14.00	26.00	32.00	52.00	57.00	357.00	369.00	375.00	395.00	400.00	400.00

**317.2** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**217.9** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips

**221.5** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	Moment at React A, ft-kips	VEHICLE NO. 1					VEHICLE NO. 2					Moment at React B, ft-kips
		Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	
Vehicle #1 (Left), Front (#1) Axle at Support	0.00	0.00	3,312.90	4,490.55	6,820.04	7,136.41	10,158.84	9,800.94	9,143.18	5,354.68	4,141.55	0.00
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	400.00
Resultant of both Vehicles at Mid-span	0.00	2,014.95	5,206.95	6,324.15	8,452.15	8,718.15	8,718.15	8,239.35	7,521.15	3,531.15	2,267.65	0.00
Axle Positions	0.00	6.59	18.59	24.59	44.59	49.59	349.59	361.59	367.59	387.59	392.59	400.00
Vehicle #1, Axle #1, at 1/9 Avail. Span Length	0.00	487.82	3,772.16	4,935.53	7,217.45	7,521.92	9,830.58	9,444.13	8,772.10	4,936.01	3,710.99	0.00
Axle Positions	0.00	1.56	13.56	19.56	39.56	44.56	344.56	356.56	362.56	382.56	387.56	400.00
Vehicle #1, Axle #1, at 2/9 Avail. Span Length	0.00	968.23	4,224.02	5,373.12	7,607.45	7,900.03	9,494.92	9,079.92	8,393.61	4,509.94	3,273.02	0.00
Axle Positions	0.00	3.11	15.11	21.11	41.11	46.11	346.11	358.11	364.11	384.11	389.11	400.00
Vehicle #1, Axle #1, at 3/9 Avail. Span Length	0.00	1,441.24	4,668.48	5,803.31	7,990.05	8,270.73	9,151.86	8,708.30	8,007.73	4,076.47	2,827.65	0.00
Axle Positions	0.00	4.67	16.67	22.67	42.67	47.67	347.67	359.67	365.67	385.67	390.67	400.00
Vehicle #1, Axle #1, at 4/9 Avail. Span Length	0.00	1,906.85	5,105.54	6,226.09	8,365.25	8,634.04	8,801.40	8,329.29	7,614.44	3,635.59	2,374.88	0.00
Axle Positions	0.00	6.22	18.22	24.22	44.22	49.22	349.22	361.22	367.22	387.22	392.22	400.00
Vehicle #1, Axle #1, at 5/9 Avail. Span Length	0.00	2,365.06	5,535.20	6,641.47	8,733.04	8,989.94	8,443.53	7,942.87	7,213.74	3,187.32	1,914.71	0.00
Axle Positions	0.00	7.78	19.78	25.78	45.78	50.78	350.78	362.78	368.78	388.78	393.78	400.00
Vehicle #1, Axle #1, at 6/9 Avail. Span Length	0.00	2,815.86	5,957.45	7,049.45	9,093.44	9,338.44	8,078.26	7,549.05	6,805.65	2,731.64	1,447.14	0.00
Axle Positions	0.00	9.33	21.33	27.33	47.33	52.33	352.33	364.33	370.33	390.33	395.33	400.00
Vehicle #1, Axle #1, at 7/9 Avail. Span Length	0.00	3,259.26	6,372.31	7,450.03	9,446.43	9,679.53	7,705.59	7,147.83	6,390.15	2,268.56	972.16	0.00
Axle Positions	0.00	10.89	22.89	28.89	48.89	53.89	353.89	365.89	371.89	391.89	396.89	400.00
Vehicle #1, Axle #1, at 8/9 Avail. Span Length	0.00	3,695.27	6,779.76	7,843.20	9,792.02	10,013.23	7,325.52	6,739.21	5,967.26	1,798.08	489.78	0.00
Axle Positions	0.00	12.44	24.44	30.44	50.44	55.44	355.44	367.44	373.44	393.44	398.44	400.00
Vehicle #2, Rear (#3) Axle at Support	0.00	4,123.86	7,179.81	8,228.98	10,130.21	10,339.52	6,938.04	6,323.19	5,536.96	1,320.19	0.00	0.00
Axle Positions	0.00	14.00	26.00	32.00	52.00	57.00	357.00	369.00	375.00	395.00	400.00	400.00

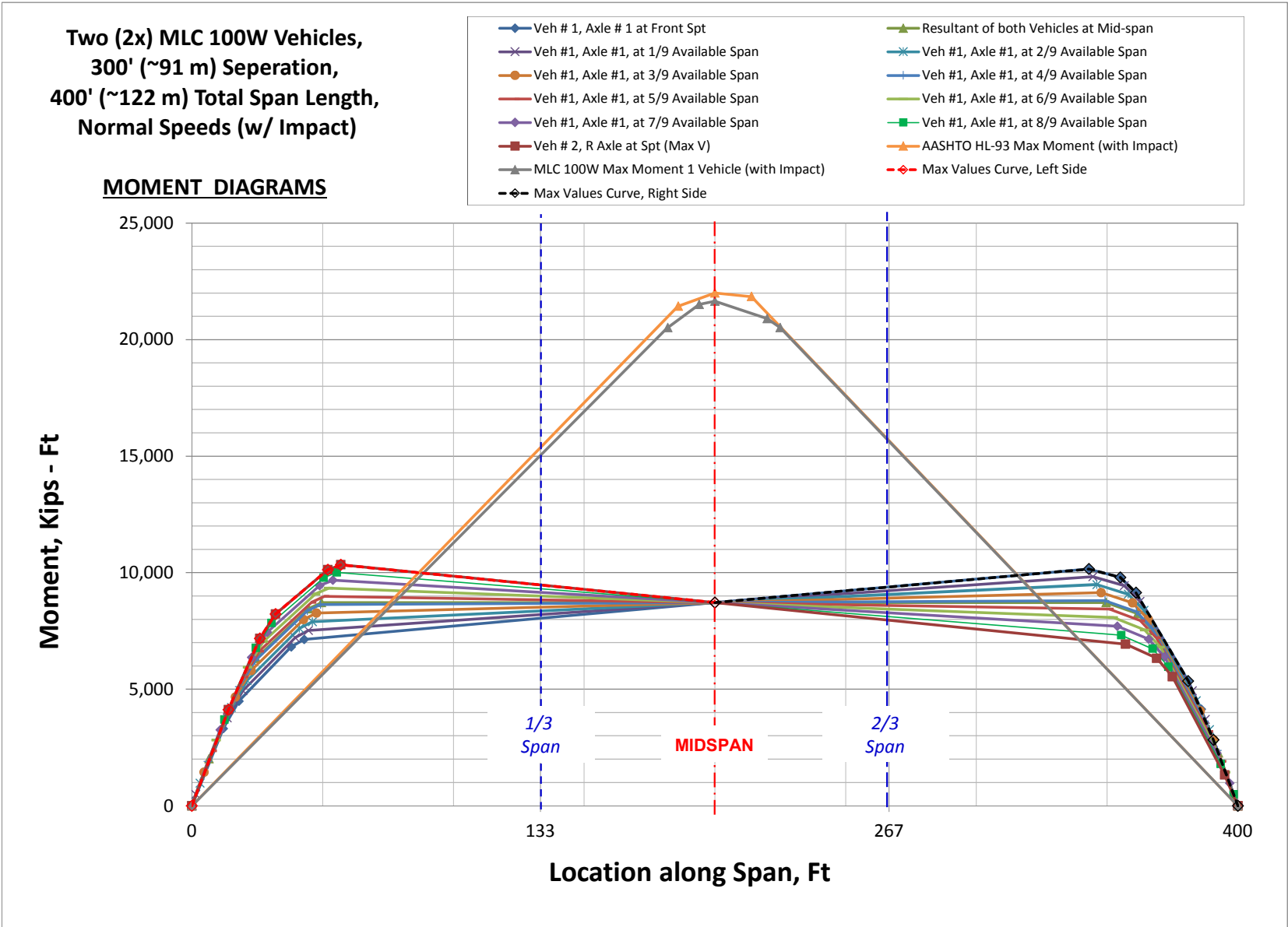
**10,340** MLC 100W 2x Vehicle on Span Maximum Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

**21,650** MLC 100W 1x Vehicle on Span Maximum Midspan Moment w/Impact, kips

**22,004** Maximum AASHTO HL-93 Single Span Design Moment w/Impact, ft-kips



**TEN (10) AXLE**      **Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 400' (~122 m) total span length, Travel Speeds (with Impact)**

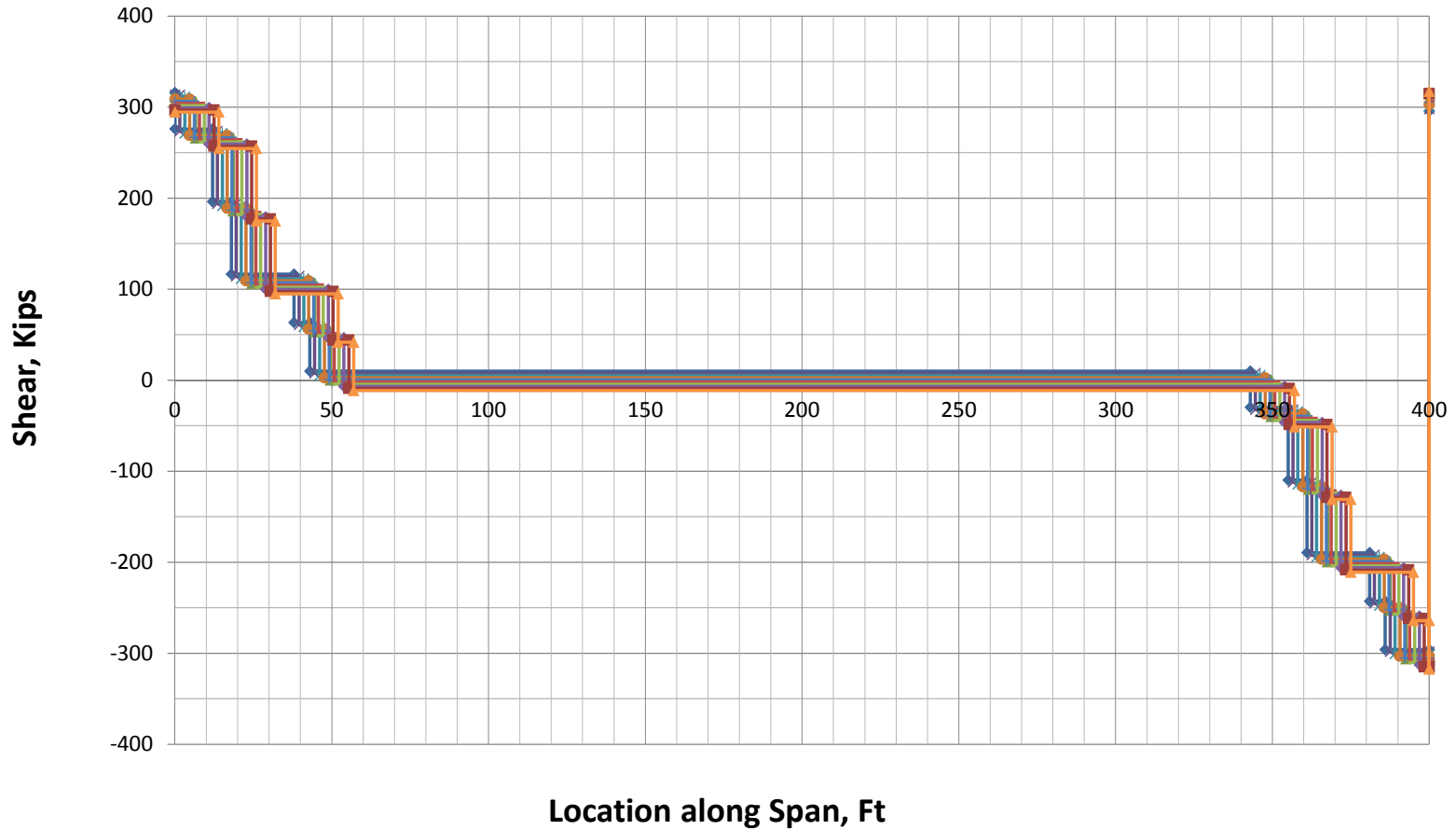


**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 400' (~122 m) total span length, Travel Speeds (with Impact)

**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 400' (~122 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

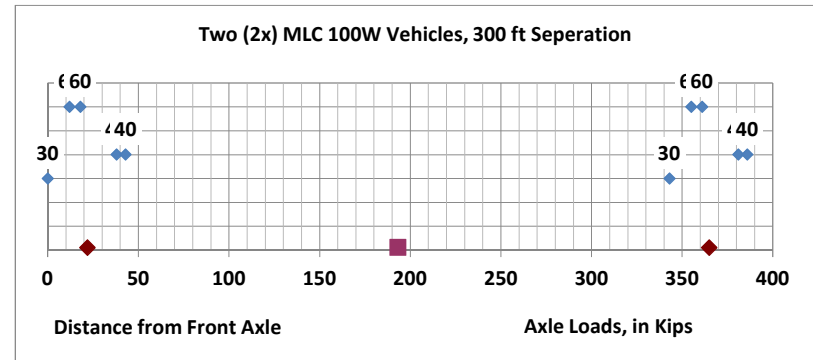
**SHEAR DIAGRAMS**

- ◆ Veh # 1, Axle # 1 at Front Spt
- ✕ Veh #1, Axle #1, at 1/9 Available Span
- Veh #1, Axle #1, at 3/9 Available Span
- Veh #1, Axle #1, at 5/9 Available Span
- ◆ Veh #1, Axle #1, at 7/9 Available Span
- ▲ Veh # 2, R Axle at Spt (Max V)
- ▲ Resultant of both Vehicles at Mid-span
- ✕ Veh #1, Axle #1, at 2/9 Available Span
- Veh #1, Axle #1, at 4/9 Available Span
- Veh #1, Axle #1, at 6/9 Available Span
- Veh #1, Axle #1, at 8/9 Available Span



**TEN (10) AXLE** **Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 450' (~137 m) total span length, Travel Speeds (with Impact)**

	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
<b>Totals</b>		<b>230.0</b>	<b>460.0</b>	<b>386.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 193.413 ft, from Front axle of 1st vehicle

450 ft, Total Span Length      33% Dynamic Impact Factor

**POSSIBLE VEHICLE LOCATIONS USED FOR SHEAR AND MOMENT CALCULATIONS**

	VEHICLE NO. 1					VEHICLE NO. 2					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Vehicle # 1 (Left Side), Front (#1) Axle at Support	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	64.00
Resultant of both Vehicles at Mid-span	31.59	43.59	49.59	69.59	74.59	374.59	386.59	392.59	412.59	417.59	32.41
Vehicle # 1, Axle # 1, at 1/9 Available Span Length	7.11	19.11	25.11	45.11	50.11	350.11	362.11	368.11	388.11	393.11	56.89
Vehicle # 1, Axle # 1, at 2/9 Available Span Length	14.22	26.22	32.22	52.22	57.22	357.22	369.22	375.22	395.22	400.22	49.78
Vehicle # 1, Axle # 1, at 3/9 Available Span Length	21.33	33.33	39.33	59.33	64.33	364.33	376.33	382.33	402.33	407.33	42.67
Vehicle # 1, Axle # 1, at 4/9 Available Span Length	28.44	40.44	46.44	66.44	71.44	371.44	383.44	389.44	409.44	414.44	35.56
Vehicle # 1, Axle # 1, at 5/9 Available Span Length	35.56	47.56	53.56	73.56	78.56	378.56	390.56	396.56	416.56	421.56	28.44
Vehicle # 1, Axle # 1, at 6/9 Available Span Length	42.67	54.67	60.67	80.67	85.67	385.67	397.67	403.67	423.67	428.67	21.33
Vehicle # 1, Axle # 1, at 7/9 Available Span Length	49.78	61.78	67.78	87.78	92.78	392.78	404.78	410.78	430.78	435.78	14.22
Vehicle # 1, Axle # 1, at 8/9 Available Span Length	56.89	68.89	74.89	94.89	99.89	399.89	411.89	417.89	437.89	442.89	7.11
Vehicle #2 (Right Side), Rear (#3) Axle at Support (Max V)	64.00	76.00	82.00	102.00	107.00	407.00	419.00	425.00	445.00	450.00	0.00

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 450' (~137 m) total span length, Travel Speeds (with Impact)

**SHEAR CALCULATIONS**

SHEAR	Shear at React A, kips	VEHICLE NO. 1					VEHICLE NO. 2					Shear at React B, kips
		Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	
Vehicle #1 (Left), Front (#1) Axle at Support	348.84	308.94	229.14	149.34	96.14	42.94	3.04	-76.76	-156.56	-209.76	-262.96	262.96
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	450.00
Resultant of both Vehicles at Mid-span	305.90	266.00	186.20	106.40	53.20	0.00	-39.90	-119.70	-199.50	-252.70	-305.90	305.90
Axle Positions	0.00	31.59	43.59	49.59	69.59	74.59	374.59	386.59	392.59	412.59	417.59	450.00
Vehicle #2, Rear (#3) Axle at Support (Max V)	261.83	221.93	142.13	62.33	9.13	-44.07	-83.97	-163.77	-243.57	-296.77	-349.97	349.97
Axle Positions	0.00	64.00	76.00	82.00	102.00	107.00	407.00	419.00	425.00	445.00	450.00	450.00

**350.0** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**219.2** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips

**237.8** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	Moment at React A, ft-kips	VEHICLE NO. 1					VEHICLE NO. 2					Moment at React B, ft-kips
		Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	
Vehicle #1 (Left), Front (#1) Axle at Support	0.00	0.00	3,707.33	5,082.20	8,069.08	8,549.80	<b>21,433.07</b>	<b>21,469.60</b>	<b>21,009.06</b>	17,877.95	16,829.17	0.00
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	<b>343.00</b>	<b>355.00</b>	<b>361.00</b>	381.00	386.00	450.00
Resultant of both Vehicles at Mid-span	0.00	9,662.45	12,854.45	13,971.65	16,099.65	16,365.65	16,365.65	15,886.85	15,168.65	11,178.65	9,915.15	0.00
Axle Positions	0.00	31.59	43.59	49.59	69.59	74.59	374.59	386.59	392.59	412.59	417.59	450.00
Vehicle # 1, Axle # 1, at 1/9 Avail. Span Length	0.00	2,411.92	6,003.24	7,320.09	10,113.62	10,546.00	20,528.88	20,449.40	19,930.85	16,606.38	15,509.26	0.00
Axle Positions	0.00	7.11	19.11	25.11	45.11	50.11	350.11	362.11	368.11	388.11	393.11	450.00
Vehicle # 1, Axle # 1, at 2/9 Avail. Span Length	0.00	4,686.34	8,161.64	9,420.49	12,020.66	12,404.70	19,487.19	19,291.69	18,715.14	<b>15,197.31</b>	14,051.85	0.00
Axle Positions	0.00	14.22	26.22	32.22	52.22	57.22	357.22	369.22	375.22	<b>395.22</b>	400.22	450.00
Vehicle # 1, Axle # 1, at 3/9 Avail. Span Length	0.00	6,823.26	<b>10,182.55</b>	11,383.39	13,790.20	14,125.90	18,308.01	17,996.49	17,361.93	13,650.74	12,456.94	0.00
Axle Positions	0.00	21.33	<b>33.33</b>	39.33	59.33	64.33	364.33	376.33	382.33	402.33	407.33	450.00
Vehicle # 1, Axle # 1, at 4/9 Avail. Span Length	0.00	8,822.68	12,065.95	13,208.79	15,422.23	15,709.60	16,991.32	16,563.79	15,871.23	11,966.67	10,724.54	0.00
Axle Positions	0.00	28.44	40.44	46.44	66.44	71.44	371.44	383.44	389.44	409.44	414.44	450.00
Vehicle # 1, Axle # 1, at 5/9 Avail. Span Length	0.00	10,684.60	13,811.86	14,896.68	16,916.77	17,155.80	15,537.14	14,993.59	14,243.02	10,145.11	8,854.63	0.00
Axle Positions	0.00	35.56	47.56	53.56	73.56	78.56	378.56	390.56	396.56	416.56	421.56	450.00
Vehicle # 1, Axle # 1, at 6/9 Avail. Span Length	0.00	12,409.02	15,420.26	16,447.08	18,273.81	18,464.50	13,945.45	13,285.89	12,477.31	<b>8,186.04</b>	6,847.22	0.00
Axle Positions	0.00	42.67	54.67	60.67	80.67	85.67	385.67	397.67	403.67	<b>423.67</b>	428.67	450.00
Vehicle # 1, Axle # 1, at 7/9 Avail. Span Length	0.00	13,995.95	<b>16,891.17</b>	17,859.98	19,493.35	19,635.69	12,216.27	11,440.69	10,574.10	6,089.47	4,702.31	0.00
Axle Positions	0.00	49.78	<b>61.78</b>	67.78	87.78	92.78	392.78	404.78	410.78	430.78	435.78	450.00
Vehicle # 1, Axle # 1, at 8/9 Avail. Span Length	0.00	15,445.37	18,224.58	19,135.38	20,575.39	20,669.39	10,349.58	9,457.99	8,533.39	3,855.40	2,419.91	0.00
Axle Positions	0.00	56.89	68.89	74.89	94.89	99.89	399.89	411.89	417.89	437.89	442.89	450.00
Vehicle #2, Rear (#3) Axle at Support	<b>0.00</b>	16,757.29	19,420.48	<b>20,273.28</b>	<b>21,519.93</b>	<b>21,565.60</b>	8,345.40	7,337.79	6,355.18	1,483.84	0.00	<b>0.00</b>
Axle Positions	<b>0.00</b>	64.00	76.00	<b>82.00</b>	<b>102.00</b>	<b>107.00</b>	407.00	419.00	425.00	445.00	450.00	<b>450.00</b>

**21,566** MLC 100W 2x Vehicle on Span Maximum Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

**24,525** MLC 100W 1x Vehicle on Span Maximum Midspan Moment w/Impact, kips

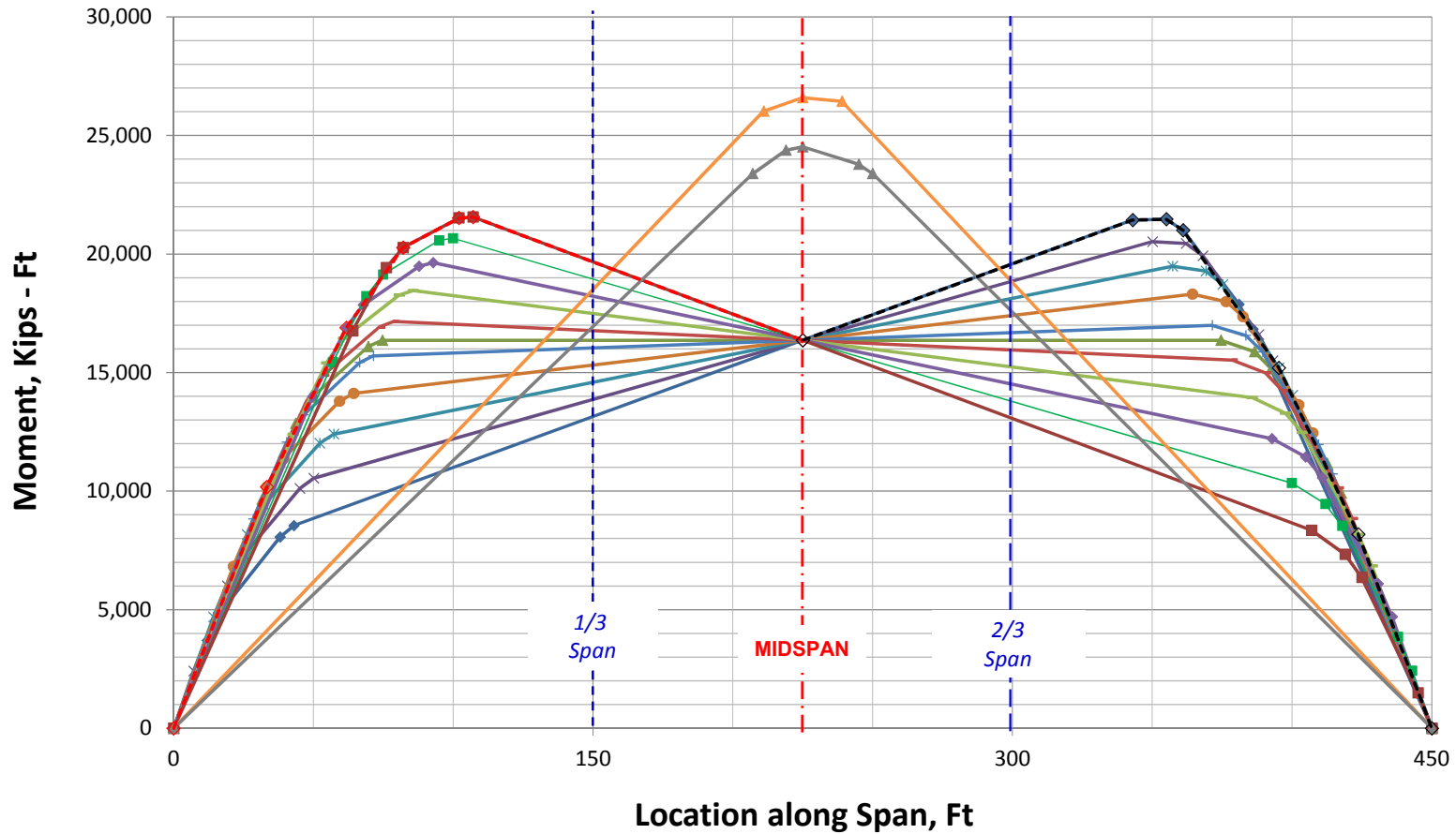
**26,601** Maximum AASHTO HL-93 Single Span Design Moment w/Impact, ft-kips

**TEN (10) AXLE**      **Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 450' (~137 m) total span length, Travel Speeds (with Impact)**

**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 450' (~137 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

**MOMENT DIAGRAMS**

- ◆— Veh # 1, Axle # 1 at Front Spt
- ×— Veh #1, Axle #1, at 1/9 Available Span
- Veh #1, Axle #1, at 3/9 Available Span
- Veh #1, Axle #1, at 5/9 Available Span
- ◇— Veh #1, Axle #1, at 7/9 Available Span
- Veh # 2, R Axle at Spt (Max V)
- ▲— MLC 100W Max Moment 1 Vehicle (with Impact)
- ◆— Max Values Curve, Right Side
- ▲— Resultant of both Vehicles at Mid-span
- ×— Veh #1, Axle #1, at 2/9 Available Span
- ◆— Veh #1, Axle #1, at 4/9 Available Span
- Veh #1, Axle #1, at 6/9 Available Span
- Veh #1, Axle #1, at 8/9 Available Span
- ▲— AASHTO HL-93 Max Moment (with Impact)
- ◆— Max Values Curve, Left Side

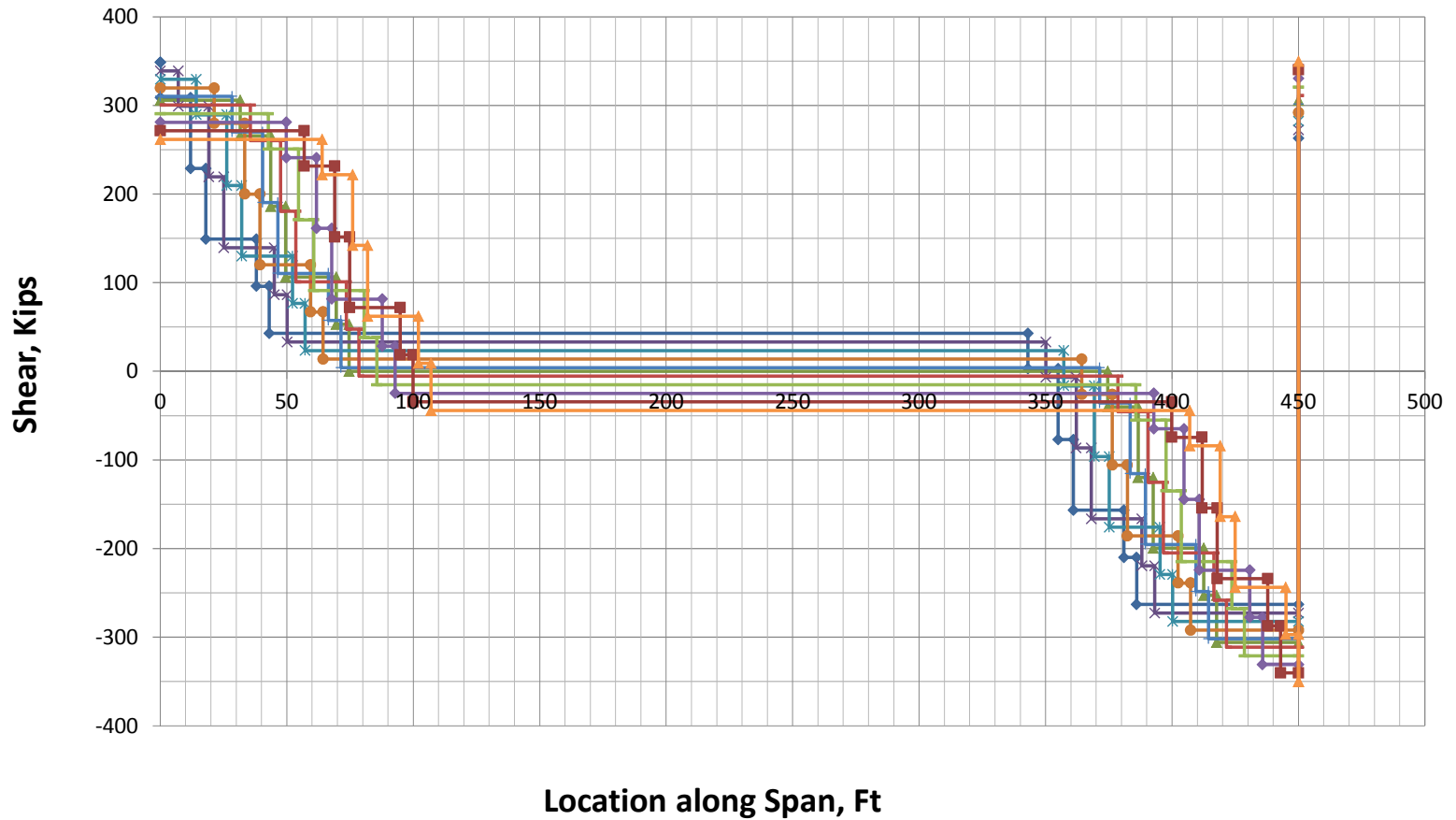


**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 450' (~137 m) total span length, Travel Speeds (with Impact)

**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 450' (~137 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

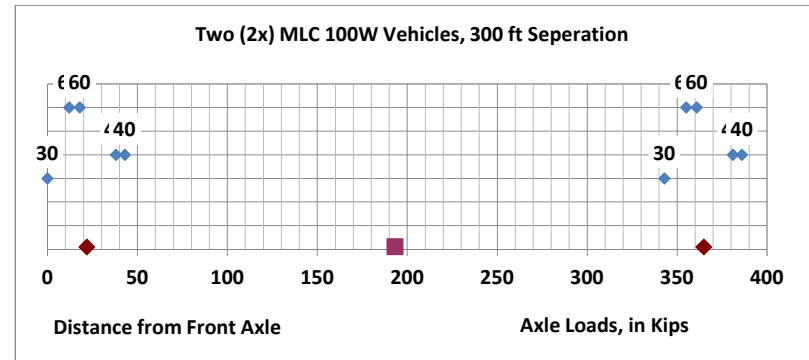
**SHEAR DIAGRAMS**

- ◆ Veh # 1, Axle # 1 at Front Spt
- ✕ Veh # 1, Axle #1, at 1/9 Available Span
- Veh # 1, Axle #1, at 3/9 Available Span
- Veh # 1, Axle #1, at 5/9 Available Span
- ◆ Veh # 1, Axle #1, at 7/9 Available Span
- ▲ Veh # 2, R Axle at Spt (Max V)
- ▲ Resultant of both Vehicles at Mid-span
- ✕ Veh # 1, Axle #1, at 2/9 Available Span
- Veh # 1, Axle #1, at 4/9 Available Span
- Veh # 1, Axle #1, at 6/9 Available Span
- Veh # 1, Axle #1, at 8/9 Available Span



**TEN (10) AXLE** **Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 500' (~152 m) total span length, Travel Speeds (with Impact)**

	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
<b>Totals</b>		<b>230.0</b>	<b>460.0</b>	<b>386.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 193.413 ft, from Front axle of 1st vehicle

500 ft, Total Span Length

33% Dynamic Impact Factor

**POSSIBLE VEHICLE LOCATIONS USED FOR SHEAR AND MOMENT CALCULATIONS**

	VEHICLE NO. 1					VEHICLE NO. 2					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Vehicle # 1 (Left Side), Front (#1) Axle at Support	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	114.00
Resultant of both Vehicles at Mid-span	56.59	68.59	74.59	94.59	99.59	399.59	411.59	417.59	437.59	442.59	57.41
Vehicle # 1, Axle # 1, at 1/9 Available Span Length	12.67	24.67	30.67	50.67	55.67	355.67	367.67	373.67	393.67	398.67	101.33
Vehicle # 1, Axle # 1, at 2/9 Available Span Length	25.33	37.33	43.33	63.33	68.33	368.33	380.33	386.33	406.33	411.33	88.67
Vehicle # 1, Axle # 1, at 3/9 Available Span Length	38.00	50.00	56.00	76.00	81.00	381.00	393.00	399.00	419.00	424.00	76.00
Vehicle # 1, Axle # 1, at 4/9 Available Span Length	50.67	62.67	68.67	88.67	93.67	393.67	405.67	411.67	431.67	436.67	63.33
Vehicle # 1, Axle # 1, at 5/9 Available Span Length	63.33	75.33	81.33	101.33	106.33	406.33	418.33	424.33	444.33	449.33	50.67
Vehicle # 1, Axle # 1, at 6/9 Available Span Length	76.00	88.00	94.00	114.00	119.00	419.00	431.00	437.00	457.00	462.00	38.00
Vehicle # 1, Axle # 1, at 7/9 Available Span Length	88.67	100.67	106.67	126.67	131.67	431.67	443.67	449.67	469.67	474.67	25.33
Vehicle # 1, Axle # 1, at 8/9 Available Span Length	101.33	113.33	119.33	139.33	144.33	444.33	456.33	462.33	482.33	487.33	12.67
Vehicle #2 (Right Side), Rear (#3) Axle at Support (Max V)	114.00	126.00	132.00	152.00	157.00	457.00	469.00	475.00	495.00	500.00	0.00

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 500' (~152 m) total span length, Travel Speeds (with Impact)

**SHEAR CALCULATIONS**

SHEAR	Shear at React A, kips	VEHICLE NO. 1					VEHICLE NO. 2					Shear at React B, kips
		Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	
Vehicle #1 (Left), Front (#1) Axle at Support	375.14	335.24	255.44	175.64	122.44	69.24	29.34	-50.46	-130.26	-183.46	-236.66	236.66
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	500.00
Resultant of both Vehicles at Mid-span	305.90	266.00	186.20	106.40	53.20	0.00	-39.90	-119.70	-199.50	-252.70	-305.90	305.90
Axle Positions	0.00	56.59	68.59	74.59	94.59	99.59	399.59	411.59	417.59	437.59	442.59	500.00
Vehicle #2, Rear (#3) Axle at Support (Max V)	235.65	195.75	115.95	36.15	-17.05	-70.25	-110.15	-189.95	-269.75	-322.95	-376.15	376.15
Axle Positions	0.00	114.00	126.00	132.00	152.00	157.00	457.00	469.00	475.00	495.00	500.00	500.00

**376.2** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**220.3** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips

**254.0** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	Moment at React A, ft-kips	VEHICLE NO. 1					VEHICLE NO. 2					Moment at React B, ft-kips
		Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	
Vehicle #1 (Left), Front (#1) Axle at Support	0.00	0.00	4,022.88	5,555.52	9,068.31	9,680.51	30,452.45	<b>30,804.53</b>	30,501.77	27,896.56	26,979.26	0.00
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	<b>355.00</b>	361.00	381.00	386.00	500.00
Resultant of both Vehicles at Mid-span	0.00	17,309.95	20,501.95	21,619.15	23,747.15	24,013.15	24,013.15	23,534.35	22,816.15	18,826.15	17,562.65	0.00
Axle Positions	0.00	56.59	68.59	74.59	94.59	99.59	399.59	411.59	417.59	437.59	442.59	500.00
Vehicle # 1, Axle # 1, at 1/9 Avail. Span Length	0.00	4,555.45	8,392.34	9,831.99	13,034.80	13,569.51	29,691.77	29,857.86	29,462.10	26,546.92	25,552.13	0.00
Axle Positions	0.00	12.67	24.67	30.67	50.67	55.67	355.67	367.67	373.67	393.67	398.67	500.00
Vehicle # 1, Axle # 1, at 2/9 Avail. Span Length	0.00	8,718.26	12,369.17	13,715.82	16,608.66	17,065.87	28,538.45	28,518.55	28,029.80	24,804.64	23,732.35	0.00
Axle Positions	0.00	25.33	37.33	43.33	63.33	68.33	368.33	380.33	386.33	406.33	411.33	500.00
Vehicle # 1, Axle # 1, at 3/9 Avail. Span Length	0.00	<b>12,488.43</b>	15,953.35	17,207.01	19,789.87	20,169.58	26,992.48	26,786.60	<b>26,204.86</b>	22,669.72	21,519.93	0.00
Axle Positions	0.00	<b>38.00</b>	50.00	56.00	76.00	81.00	381.00	393.00	<b>399.00</b>	419.00	424.00	500.00
Vehicle # 1, Axle # 1, at 4/9 Avail. Span Length	0.00	15,865.97	19,144.89	20,305.56	22,578.44	22,880.66	25,053.88	24,662.01	23,987.27	<b>20,142.16</b>	<b>18,914.88</b>	0.00
Axle Positions	0.00	50.67	62.67	68.67	88.67	93.67	393.67	405.67	411.67	<b>431.67</b>	<b>436.67</b>	500.00
Vehicle # 1, Axle # 1, at 5/9 Avail. Span Length	0.00	<b>18,850.86</b>	21,943.80	23,011.47	24,974.37	25,199.10	22,722.64	22,144.78	21,377.05	17,221.95	15,917.18	0.00
Axle Positions	0.00	<b>63.33</b>	75.33	81.33	101.33	106.33	406.33	418.33	424.33	444.33	449.33	500.00
Vehicle # 1, Axle # 1, at 6/9 Avail. Span Length	0.00	21,443.11	24,350.07	25,324.74	26,977.67	27,124.90	19,998.76	19,234.91	18,374.19	13,909.11	<b>12,526.84</b>	0.00
Axle Positions	0.00	76.00	88.00	94.00	114.00	119.00	419.00	431.00	437.00	457.00	<b>462.00</b>	500.00
Vehicle # 1, Axle # 1, at 7/9 Avail. Span Length	0.00	23,642.72	26,363.69	<b>27,245.38</b>	28,588.32	28,658.06	16,882.24	15,932.40	14,978.69	10,203.63	8,743.87	0.00
Axle Positions	0.00	88.67	100.67	<b>106.67</b>	126.67	131.67	431.67	443.67	449.67	469.67	474.67	500.00
Vehicle # 1, Axle # 1, at 8/9 Avail. Span Length	0.00	25,449.70	27,984.68	28,773.37	29,806.33	29,798.58	13,373.08	12,237.26	11,190.55	6,105.51	4,568.25	0.00
Axle Positions	0.00	101.33	113.33	119.33	139.33	144.33	444.33	456.33	462.33	482.33	487.33	500.00
Vehicle #2, Rear (#3) Axle at Support	0.00	26,864.03	29,213.02	<b>29,908.72</b>	30,631.71	<b>30,546.46</b>	9,471.28	8,149.47	7,009.77	1,614.75	0.00	0.00
Axle Positions	0.00	114.00	126.00	<b>132.00</b>	152.00	<b>157.00</b>	457.00	469.00	475.00	495.00	500.00	500.00

**30,805** MLC 100W 2x Vehicle on Span Maximum Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

**27,400** MLC 100W 1x Vehicle on Span Maximum Midspan Moment w/Impact, kips

**31,598** Maximum AASHTO HL-93 Single Span Design Moment w/Impact, ft-kips

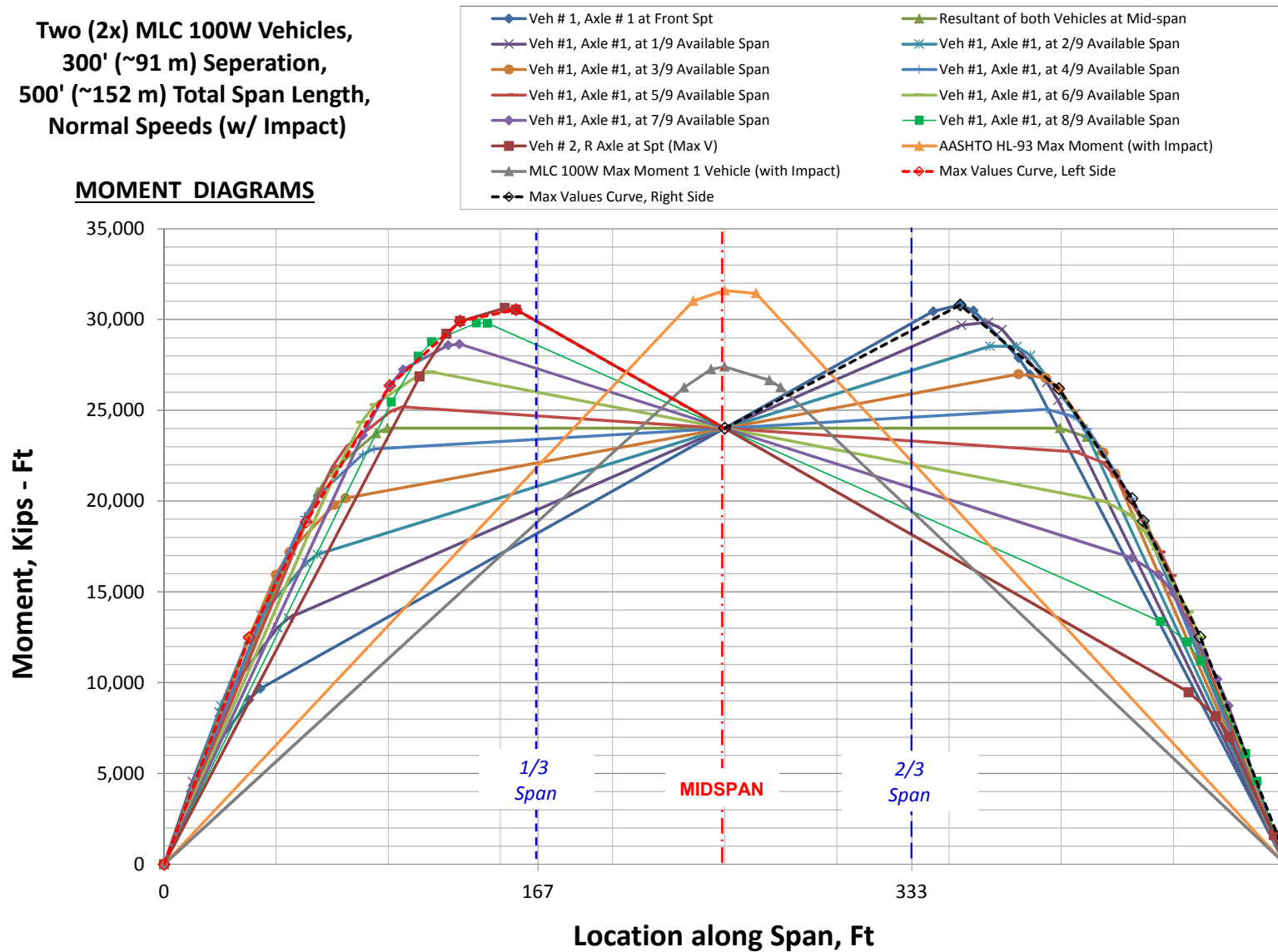


**TEN (10) AXLE**

**Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 500' (~152 m) total span length, Travel Speeds (with Impact)**

**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 500' (~152 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

**MOMENT DIAGRAMS**

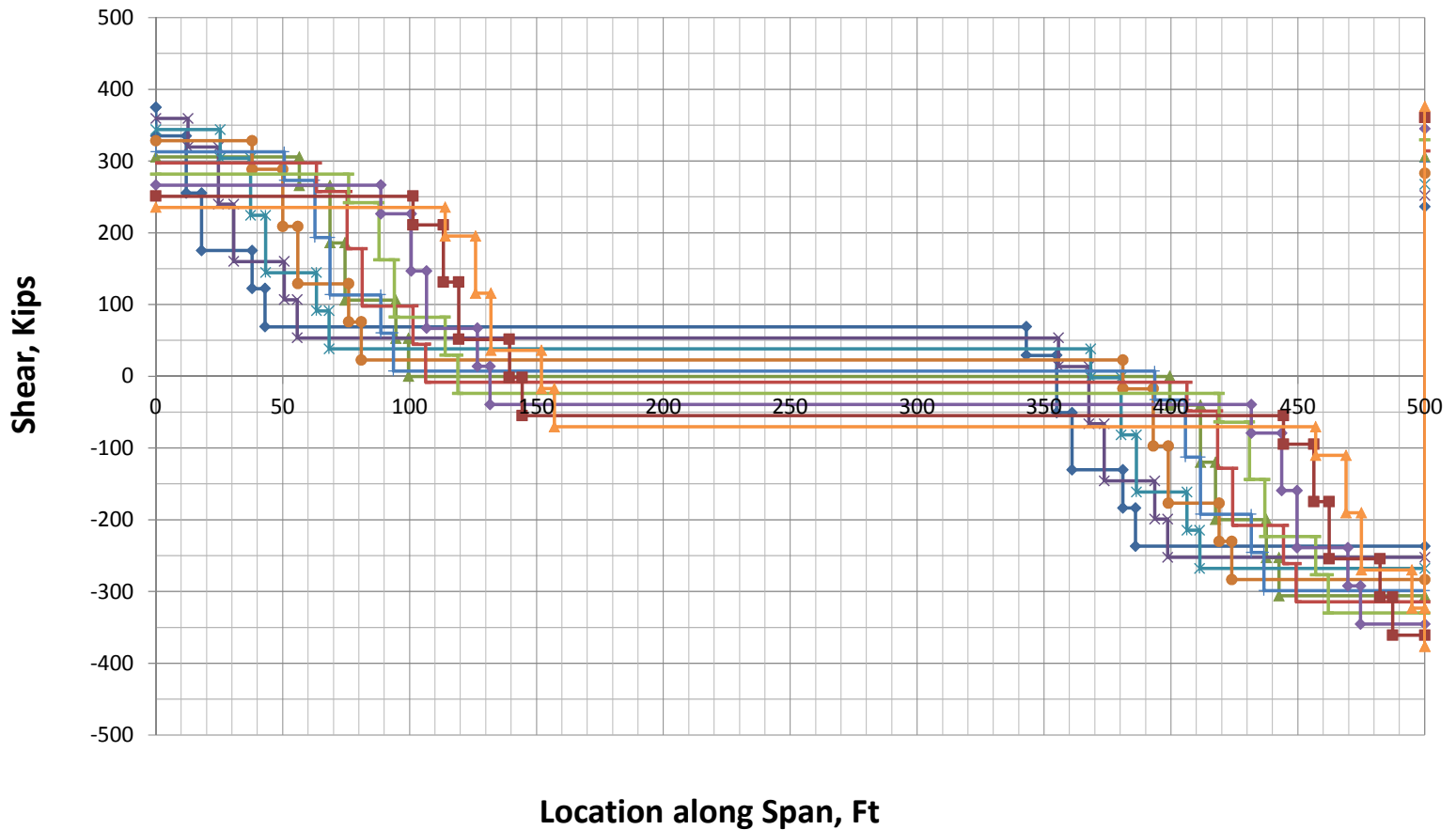


**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 500' (~152 m) total span length, Travel Speeds (with Impact)

**Two (2x) MLC 100W Vehicles,  
300' (~91 m) Separation,  
500' (~152 m) Total Span Length,  
Normal Speeds (w/ Impact)**

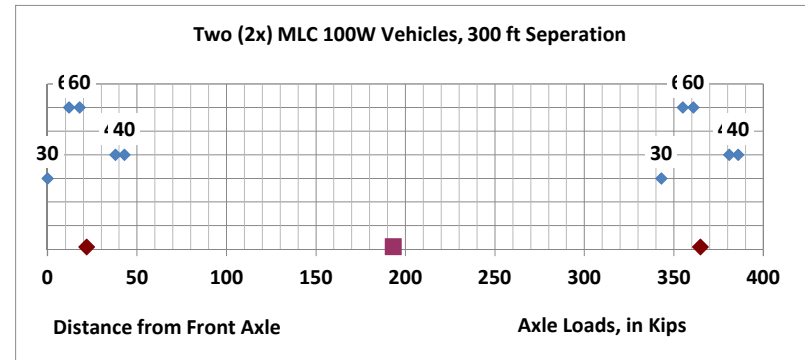
**SHEAR DIAGRAMS**

- ◆ Veh # 1, Axle # 1 at Front Spt
- ✕ Veh #1, Axle #1, at 1/9 Available Span
- Veh #1, Axle #1, at 3/9 Available Span
- Veh #1, Axle #1, at 5/9 Available Span
- ◆ Veh #1, Axle #1, at 7/9 Available Span
- ▲ Veh # 2, R Axle at Spt (Max V)
- ▲ Resultant of both Vehicles at Mid-span
- ✕ Veh #1, Axle #1, at 2/9 Available Span
- ◆ Veh #1, Axle #1, at 4/9 Available Span
- Veh #1, Axle #1, at 6/9 Available Span
- Veh #1, Axle #1, at 8/9 Available Span



**TEN (10) AXLE** **Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 550' (~168 m) total span length, Travel Speeds (with Impact)**

	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
<b>Totals</b>		<b>230.0</b>	<b>460.0</b>	<b>386.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle

Resultant on both Vehicles on Span Length is: 193.413 ft, from Front axle of 1st vehicle

550 ft, Total Span Length

33% Dynamic Impact Factor

**POSSIBLE VEHICLE LOCATIONS USED FOR SHEAR AND MOMENT CALCULATIONS**

	VEHICLE NO. 1					VEHICLE NO. 2					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Vehicle # 1 (Left Side), Front (#1) Axle at Support	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	164.00
Resultant of both Vehicles at Mid-span	81.59	93.59	99.59	119.59	124.59	424.59	436.59	442.59	462.59	467.59	82.41
Vehicle # 1, Axle # 1, at 1/9 Available Span Length	18.22	30.22	36.22	56.22	61.22	361.22	373.22	379.22	399.22	404.22	145.78
Vehicle # 1, Axle # 1, at 2/9 Available Span Length	36.44	48.44	54.44	74.44	79.44	379.44	391.44	397.44	417.44	422.44	127.56
Vehicle # 1, Axle # 1, at 3/9 Available Span Length	54.67	66.67	72.67	92.67	97.67	397.67	409.67	415.67	435.67	440.67	109.33
Vehicle # 1, Axle # 1, at 4/9 Available Span Length	72.89	84.89	90.89	110.89	115.89	415.89	427.89	433.89	453.89	458.89	91.11
Vehicle # 1, Axle # 1, at 5/9 Available Span Length	91.11	103.11	109.11	129.11	134.11	434.11	446.11	452.11	472.11	477.11	72.89
Vehicle # 1, Axle # 1, at 6/9 Available Span Length	109.33	121.33	127.33	147.33	152.33	452.33	464.33	470.33	490.33	495.33	54.67
Vehicle # 1, Axle # 1, at 7/9 Available Span Length	127.56	139.56	145.56	165.56	170.56	470.56	482.56	488.56	508.56	513.56	36.44
Vehicle # 1, Axle # 1, at 8/9 Available Span Length	145.78	157.78	163.78	183.78	188.78	488.78	500.78	506.78	526.78	531.78	18.22
Vehicle #2 (Right Side), Rear (#3) Axle at Support (Max V)	164.00	176.00	182.00	202.00	207.00	507.00	519.00	525.00	545.00	550.00	0.00

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 550' (~168 m) total span length, Travel Speeds (with Impact)

**SHEAR CALCULATIONS**

SHEAR	Shear at React A, kips	VEHICLE NO. 1					VEHICLE NO. 2					Shear at React B, kips
		Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	
Vehicle #1 (Left), Front (#1) Axle at Support	396.65	356.75	276.95	197.15	143.95	90.75	50.85	-28.95	-108.75	-161.95	-215.15	215.15
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	550.00
Resultant of both Vehicles at Mid-span	305.90	266.00	186.20	106.40	53.20	0.00	-39.90	-119.70	-199.50	-252.70	-305.90	305.90
Axle Positions	0.00	81.59	93.59	99.59	119.59	124.59	424.59	436.59	442.59	462.59	467.59	550.00
Vehicle #2, Rear (#3) Axle at Support (Max V)	214.23	174.33	94.53	14.73	-38.47	-91.67	-131.57	-211.37	-291.17	-344.37	-397.57	397.57
Axle Positions	0.00	164.00	176.00	182.00	202.00	207.00	507.00	519.00	525.00	545.00	550.00	550.00

**397.6** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**221.2** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips

**270.1** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	Moment at React A, ft-kips	VEHICLE NO. 1					VEHICLE NO. 2					Moment at React B, ft-kips
		Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	
Vehicle #1 (Left), Front (#1) Axle at Support	0.00	0.00	4,281.05	5,942.78	9,885.87	10,605.64	37,831.95	<b>38,442.20</b>	38,268.53	36,093.61	35,283.88	0.00
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	<b>355.00</b>	361.00	381.00	386.00	550.00
Resultant of both Vehicles at Mid-span	0.00	24,957.45	28,149.45	29,266.65	31,394.65	31,660.65	31,660.65	31,181.85	30,463.65	26,473.65	25,210.15	0.00
Axle Positions	0.00	81.59	93.59	99.59	119.59	124.59	424.59	436.59	442.59	462.59	467.59	550.00
Vehicle # 1, Axle # 1, at 1/9 Avail. Span Length	0.00	6,858.56	10,896.38	12,436.49	15,974.18	16,592.60	37,737.99	38,105.01	37,809.71	35,229.41	34,318.33	0.00
Axle Positions	0.00	18.22	30.22	36.22	56.22	61.22	361.22	373.22	379.22	399.22	404.22	550.00
Vehicle # 1, Axle # 1, at 2/9 Avail. Span Length	0.00	12,978.41	16,772.99	18,191.48	21,323.78	21,840.85	36,905.32	<b>37,029.09</b>	36,612.18	33,626.48	32,614.06	0.00
Axle Positions	0.00	36.44	48.44	54.44	74.44	79.44	379.44	<b>391.44</b>	397.44	417.44	422.44	550.00
Vehicle # 1, Axle # 1, at 3/9 Avail. Span Length	0.00	18,359.53	<b>21,910.88</b>	23,207.75	25,934.65	26,350.38	35,333.92	35,214.46	34,675.93	31,284.84	30,171.06	0.00
Axle Positions	0.00	54.67	<b>66.67</b>	72.67	92.67	97.67	397.67	409.67	415.67	435.67	440.67	550.00
Vehicle # 1, Axle # 1, at 4/9 Avail. Span Length	0.00	23,001.94	26,310.05	27,485.30	29,806.81	30,121.18	33,023.81	32,661.11	<b>32,000.97</b>	28,204.47	26,989.35	0.00
Axle Positions	0.00	72.89	84.89	90.89	110.89	115.89	415.89	427.89	<b>433.89</b>	453.89	458.89	550.00
Vehicle # 1, Axle # 1, at 5/9 Avail. Span Length	0.00	26,905.63	<b>29,970.50</b>	31,024.13	32,940.24	33,153.27	29,974.98	29,369.04	28,587.28	<b>24,385.39</b>	23,068.92	0.00
Axle Positions	0.00	91.11	<b>103.11</b>	109.11	129.11	134.11	434.11	446.11	452.11	<b>472.11</b>	477.11	550.00
Vehicle # 1, Axle # 1, at 6/9 Avail. Span Length	0.00	30,070.60	32,892.23	33,824.24	35,334.96	35,446.64	26,187.42	25,338.25	24,434.87	19,827.59	18,409.77	0.00
Axle Positions	0.00	109.33	121.33	127.33	147.33	152.33	452.33	464.33	470.33	490.33	495.33	550.00
Vehicle # 1, Axle # 1, at 7/9 Avail. Span Length	0.00	32,496.84	35,075.24	<b>35,885.64</b>	36,990.96	37,001.29	21,661.15	20,568.75	19,543.74	<b>14,531.07</b>	13,011.90	0.00
Axle Positions	0.00	127.56	139.56	<b>145.56</b>	165.56	170.56	470.56	482.56	488.56	<b>508.56</b>	513.56	550.00
Vehicle # 1, Axle # 1, at 8/9 Avail. Span Length	0.00	34,184.37	36,519.53	<b>37,208.31</b>	37,908.24	37,817.22	16,396.16	15,060.52	13,913.90	8,495.83	6,875.31	0.00
Axle Positions	0.00	145.78	157.78	<b>163.78</b>	183.78	188.78	488.78	500.78	506.78	526.78	531.78	550.00
Vehicle #2, Rear (#3) Axle at Support	<b>0.00</b>	35,133.18	37,225.10	37,792.26	<b>38,086.80</b>	37,894.43	10,392.45	8,813.57	7,545.33	1,721.87	0.00	0.00
Axle Positions	<b>0.00</b>	164.00	176.00	182.00	<b>202.00</b>	207.00	507.00	519.00	525.00	545.00	550.00	550.00

**38,442** MLC 100W 2x Vehicle on Span Maximum Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

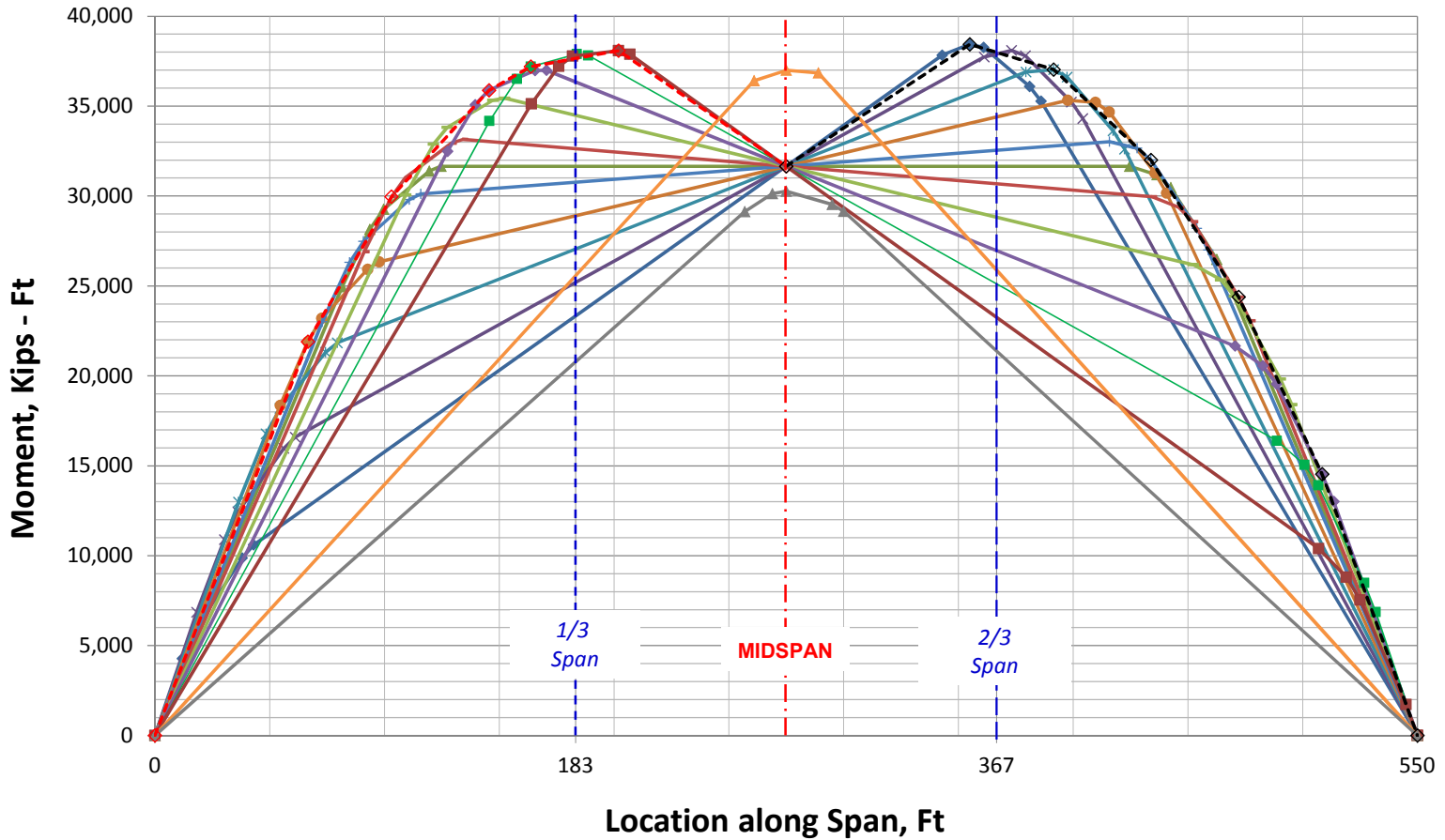
**30,275** MLC 100W 1x Vehicle on Span Maximum Midspan Moment w/Impact, kips

**36,995** Maximum AASHTO HL-93 Single Span Design Moment w/Impact, ft-kips

**TEN (10) AXLE**      **Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 550' (~168 m) total span length, Travel Speeds (with Impact)**

**Two (2x) MLC 100W Vehicles,  
300' (~91 m) Separation,  
550' (~168 m) Total Span Length,  
Normal Speeds (w/ Impact)**

**MOMENT DIAGRAMS**

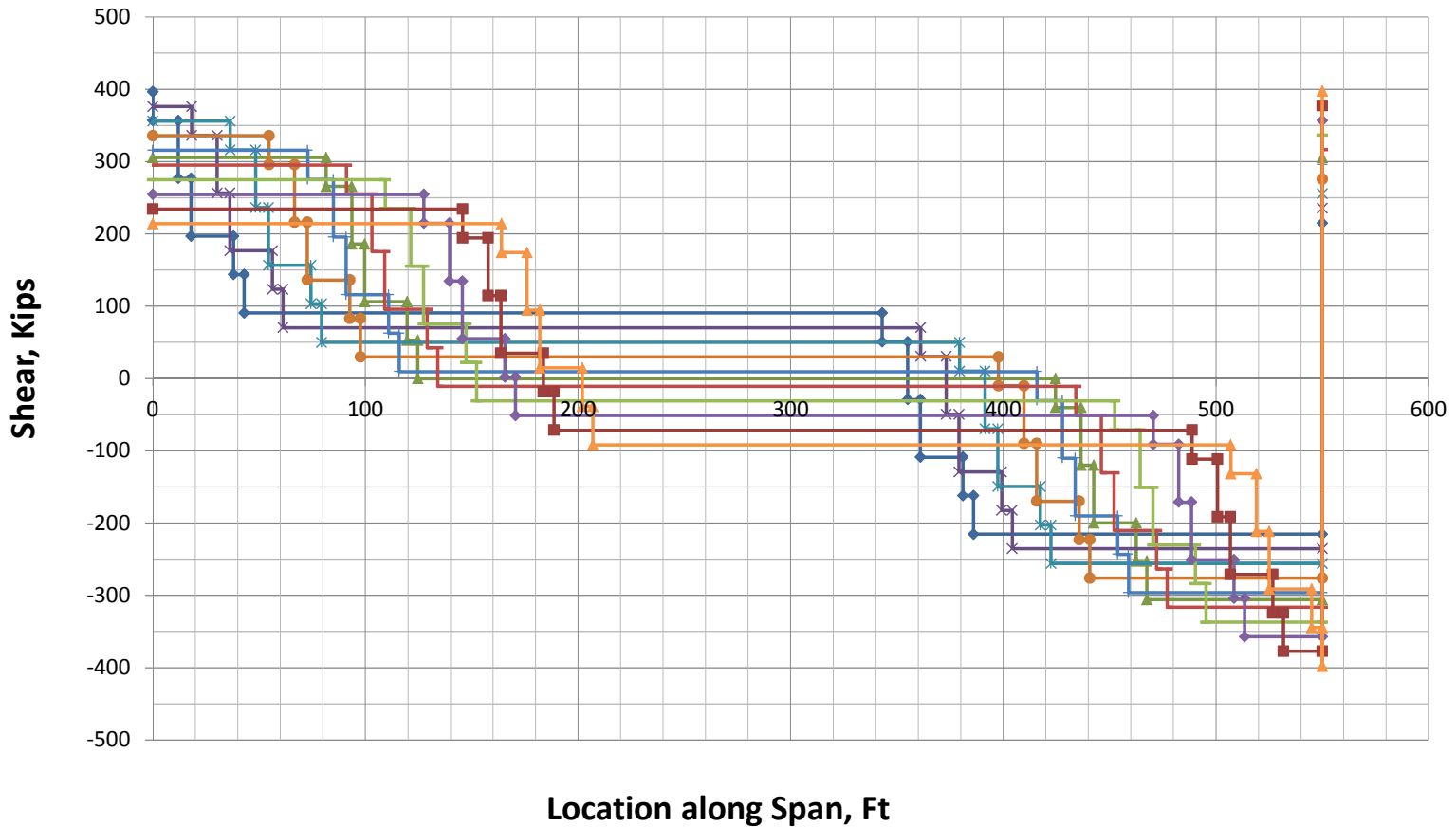


**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 550' (~168 m) total span length, Travel Speeds (with Impact)

**Two (2x) MLC 100W Vehicles,  
300' (~91 m) Separation,  
550' (~168 m) Total Span Length,  
Normal Speeds (w/ Impact)**

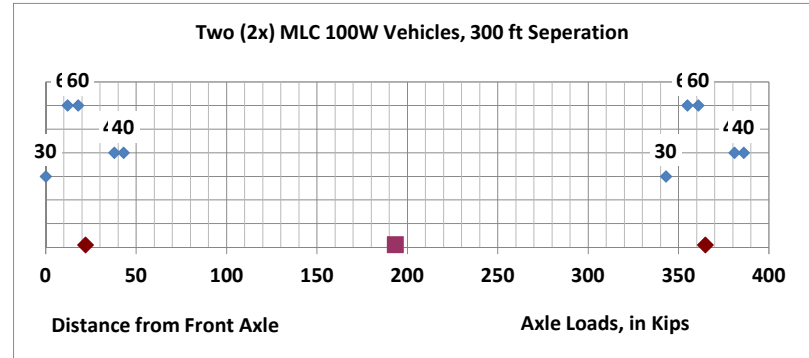
**SHEAR DIAGRAMS**

- ◆ Veh # 1, Axle # 1 at Front Spt
- ✕ Veh #1, Axle #1, at 1/9 Available Span
- Veh #1, Axle #1, at 3/9 Available Span
- Veh #1, Axle #1, at 5/9 Available Span
- ◆ Veh #1, Axle #1, at 7/9 Available Span
- ▲ Veh # 2, R Axle at Spt (Max V)
- ▲ Resultant of both Vehicles at Mid-span
- ✕ Veh #1, Axle #1, at 2/9 Available Span
- ◆ Veh #1, Axle #1, at 4/9 Available Span
- Veh #1, Axle #1, at 6/9 Available Span
- Veh #1, Axle #1, at 8/9 Available Span



**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 600' (~183 m) total span length, Travel Speeds (with Impact)

	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
<b>Totals</b>		<b>230.0</b>	<b>460.0</b>	<b>386.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle

Resultant on both Vehicles on Span Length is: 193.413 ft, from Front axle of 1st vehicle

600 ft, Total Span Length

33% Dynamic Impact Factor

**POSSIBLE VEHICLE LOCATIONS USED FOR SHEAR AND MOMENT CALCULATIONS**

	VEHICLE NO. 1					VEHICLE NO. 2					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Vehicle # 1 (Left Side), Front (#1) Axle at Support	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	214.00
Resultant of both Vehicles at Mid-span	106.59	118.59	124.59	144.59	149.59	449.59	461.59	467.59	487.59	492.59	107.41
Vehicle # 1, Axle # 1, at 1/9 Available Span Length	23.78	35.78	41.78	61.78	66.78	366.78	378.78	384.78	404.78	409.78	190.22
Vehicle # 1, Axle # 1, at 2/9 Available Span Length	47.56	59.56	65.56	85.56	90.56	390.56	402.56	408.56	428.56	433.56	166.44
Vehicle # 1, Axle # 1, at 3/9 Available Span Length	71.33	83.33	89.33	109.33	114.33	414.33	426.33	432.33	452.33	457.33	142.67
Vehicle # 1, Axle # 1, at 4/9 Available Span Length	95.11	107.11	113.11	133.11	138.11	438.11	450.11	456.11	476.11	481.11	118.89
Vehicle # 1, Axle # 1, at 5/9 Available Span Length	118.89	130.89	136.89	156.89	161.89	461.89	473.89	479.89	499.89	504.89	95.11
Vehicle # 1, Axle # 1, at 6/9 Available Span Length	142.67	154.67	160.67	180.67	185.67	485.67	497.67	503.67	523.67	528.67	71.33
Vehicle # 1, Axle # 1, at 7/9 Available Span Length	166.44	178.44	184.44	204.44	209.44	509.44	521.44	527.44	547.44	552.44	47.56
Vehicle # 1, Axle # 1, at 8/9 Available Span Length	190.22	202.22	208.22	228.22	233.22	533.22	545.22	551.22	571.22	576.22	23.78
Vehicle #2 (Right Side), Rear (#3) Axle at Support (Max V)	214.00	226.00	232.00	252.00	257.00	557.00	569.00	575.00	595.00	600.00	0.00

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 600' (~183 m) total span length, Travel Speeds (with Impact)

**SHEAR CALCULATIONS**

SHEAR	Shear at React A, kips	VEHICLE NO. 1					VEHICLE NO. 2					Shear at React B, kips
		Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	
Vehicle #1 (Left), Front (#1) Axle at Support	414.58	374.68	294.88	215.08	161.88	108.68	68.78	-11.02	-90.82	-144.02	-197.22	197.22
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	600.00
Resultant of both Vehicles at Mid-span	305.90	266.00	186.20	106.40	53.20	0.00	-39.90	-119.70	-199.50	-252.70	-305.90	305.90
Axle Positions	0.00	106.59	118.59	124.59	144.59	149.59	449.59	461.59	467.59	487.59	492.59	600.00
Vehicle #2, Rear (#3) Axle at Support (Max V)	196.37	156.47	76.67	-3.13	-56.33	-109.53	-149.43	-229.23	-309.03	-362.23	-415.43	415.43
Axle Positions	0.00	214.00	226.00	232.00	252.00	257.00	557.00	569.00	575.00	595.00	600.00	600.00

**415.4** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**221.9** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips

**286.3** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	Moment at React A, ft-kips	VEHICLE NO. 1					VEHICLE NO. 2					Moment at React B, ft-kips
		Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	
Vehicle #1 (Left), Front (#1) Axle at Support	0.00	0.00	4,496.20	6,265.50	10,567.16	11,376.58	43,981.53	44,806.92	44,740.82	42,924.49	42,204.40	0.00
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	600.00
Resultant of both Vehicles at Mid-span	0.00	32,604.95	35,796.95	36,914.15	39,042.15	39,308.15	39,308.15	38,829.35	38,111.15	34,121.15	32,857.65	0.00
Axle Positions	0.00	106.59	118.59	124.59	144.59	149.59	449.59	461.59	467.59	487.59	492.59	600.00
Vehicle # 1, Axle # 1, at 1/9 Avail. Span Length	0.00	9,281.36	13,486.62	15,110.44	18,927.20	19,615.39	44,946.72	45,481.17	45,269.60	42,968.35	42,127.04	0.00
Axle Positions	0.00	23.78	35.78	41.78	61.78	66.78	366.78	378.78	384.78	404.78	409.78	600.00
Vehicle # 1, Axle # 1, at 2/9 Avail. Span Length	0.00	17,409.73	21,324.03	22,802.39	26,134.23	26,701.20	44,758.90	45,002.41	44,645.36	41,859.21	40,896.67	0.00
Axle Positions	0.00	47.56	59.56	65.56	85.56	90.56	390.56	402.56	408.56	428.56	433.56	600.00
Vehicle # 1, Axle # 1, at 3/9 Avail. Span Length	0.00	24,385.08	28,008.45	29,341.33	32,188.27	32,634.00	43,418.08	43,370.65	42,868.13	39,597.07	38,513.30	0.00
Axle Positions	0.00	71.33	83.33	89.33	109.33	114.33	414.33	426.33	432.33	452.33	457.33	600.00
Vehicle # 1, Axle # 1, at 4/9 Avail. Span Length	0.00	30,207.44	33,539.85	34,727.26	37,089.29	37,413.80	40,924.26	40,585.88	39,937.89	36,181.92	34,976.93	0.00
Axle Positions	0.00	95.11	107.11	113.11	133.11	138.11	438.11	450.11	456.11	476.11	481.11	600.00
Vehicle # 1, Axle # 1, at 5/9 Avail. Span Length	0.00	34,876.78	37,918.26	38,960.19	40,837.32	41,040.60	37,277.44	36,648.11	35,854.65	31,613.77	30,287.55	0.00
Axle Positions	0.00	118.89	130.89	136.89	156.89	161.89	461.89	473.89	479.89	499.89	504.89	600.00
Vehicle # 1, Axle # 1, at 6/9 Avail. Span Length	0.00	38,393.13	41,143.66	42,040.12	43,432.34	43,514.39	32,477.61	31,557.34	30,618.40	25,892.61	24,445.17	0.00
Axle Positions	0.00	142.67	154.67	160.67	180.67	185.67	485.67	497.67	503.67	523.67	528.67	600.00
Vehicle # 1, Axle # 1, at 7/9 Avail. Span Length	0.00	40,756.47	43,216.06	43,967.05	44,874.35	44,835.18	26,524.77	25,313.56	24,229.15	19,018.46	17,449.78	0.00
Axle Positions	0.00	166.44	178.44	184.44	204.44	209.44	509.44	521.44	527.44	547.44	552.44	600.00
Vehicle # 1, Axle # 1, at 8/9 Avail. Span Length	0.00	41,966.81	44,135.45	44,740.97	45,163.37	45,002.97	19,418.94	17,916.78	16,686.90	10,991.29	9,301.39	0.00
Axle Positions	0.00	190.22	202.22	208.22	228.22	233.22	533.22	545.22	551.22	571.22	576.22	600.00
Vehicle #2, Rear (#3) Axle at Support	0.00	42,024.14	43,901.84	44,361.88	44,299.37	44,017.75	11,160.10	9,366.99	7,991.64	1,811.13	0.00	0.00
Axle Positions	0.00	214.00	226.00	232.00	252.00	257.00	557.00	569.00	575.00	595.00	600.00	600.00

**45,481** MLC 100W 2x Vehicle on Span Maximum Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

**33,150** MLC 100W 1x Vehicle on Span Maximum Midspan Moment w/Impact, kips

**42,792** Maximum AASHTO HL-93 Single Span Design Moment w/Impact, ft-kips

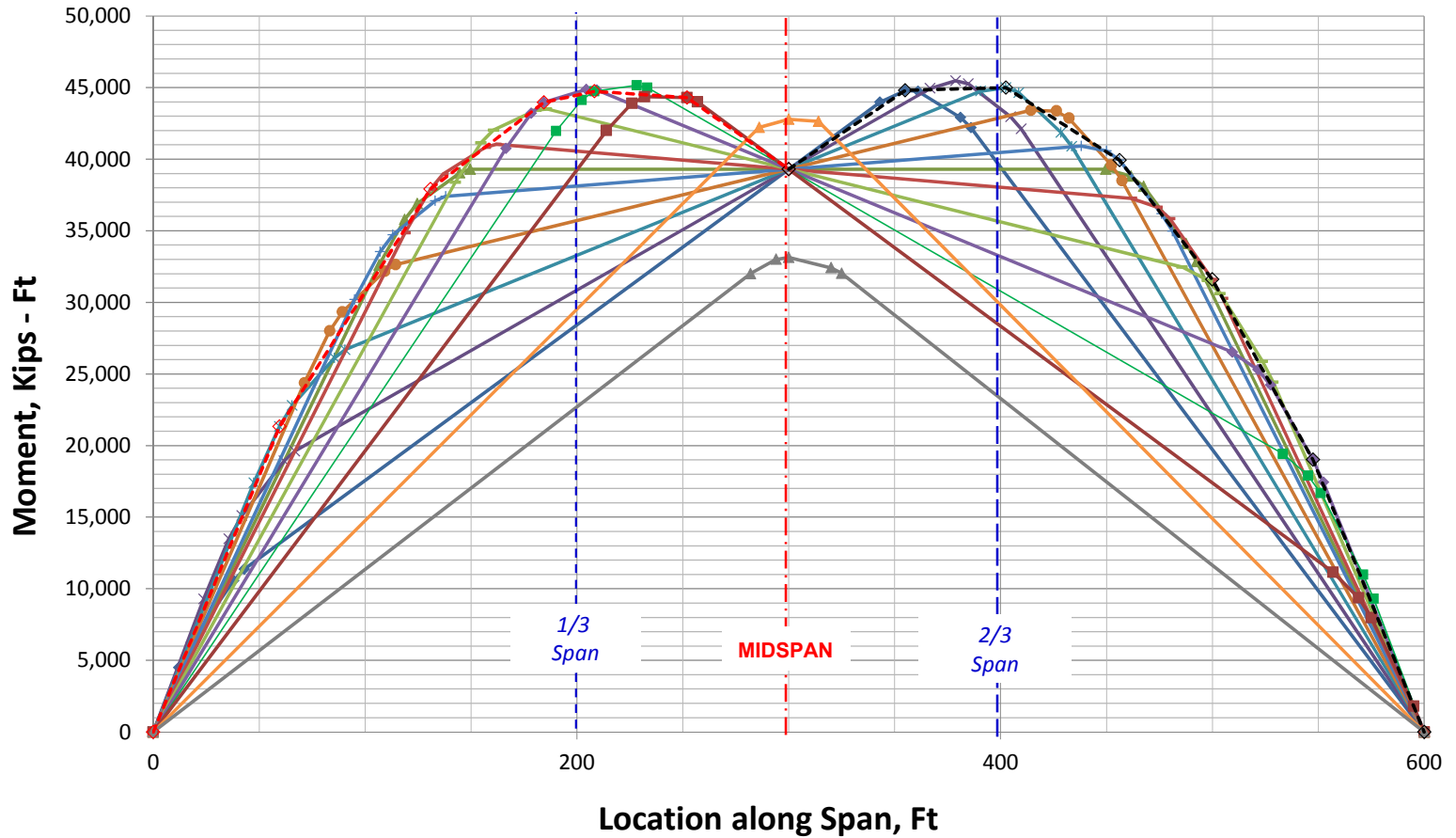


**TEN (10) AXLE**

**Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 600' (~183 m) total span length, Travel Speeds (with Impact)**

**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 600' (~183 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

**MOMENT DIAGRAMS**

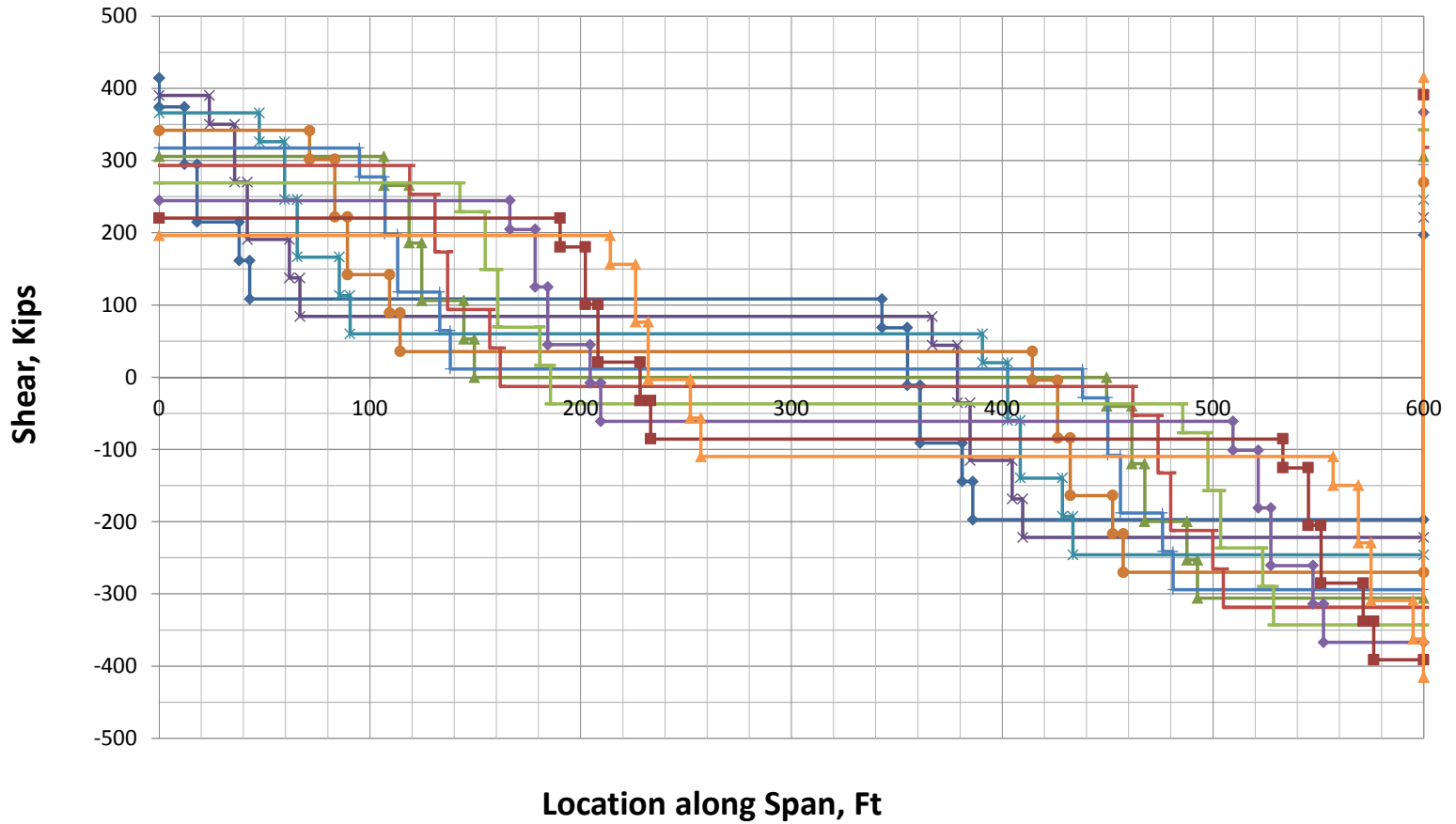


**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 600' (~183 m) total span length, Travel Speeds (with Impact)

**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 600' (~183 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

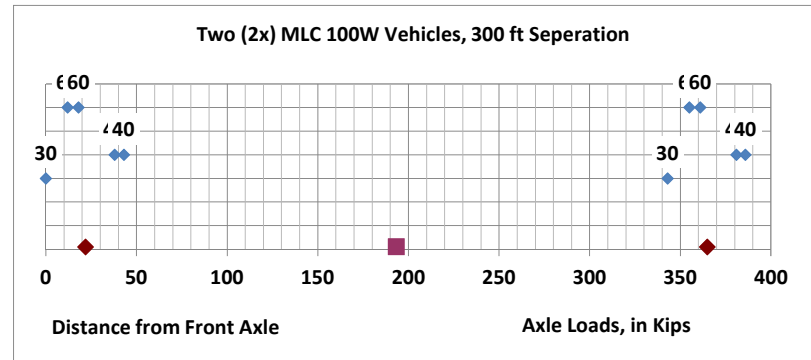
- ◆ Veh # 1, Axle # 1 at Front Spt
- ✕ Veh #1, Axle #1, at 1/9 Available Span
- Veh #1, Axle #1, at 3/9 Available Span
- Veh #1, Axle #1, at 5/9 Available Span
- ◆ Veh #1, Axle #1, at 7/9 Available Span
- ▲ Veh # 2, R Axle at Spt (Max V)
- ▲ Resultant of both Vehicles at Mid-span
- ✕ Veh #1, Axle #1, at 2/9 Available Span
- Veh #1, Axle #1, at 4/9 Available Span
- Veh #1, Axle #1, at 6/9 Available Span
- Veh #1, Axle #1, at 8/9 Available Span

**SHEAR DIAGRAMS**



**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 650' (~198 m) total span length, Travel Speeds (with Impact)

	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
<b>Totals</b>		<b>230.0</b>	<b>460.0</b>	<b>386.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 193.413 ft, from Front axle of 1st vehicle

650 ft, Total Span Length      33% Dynamic Impact Factor

**POSSIBLE VEHICLE LOCATIONS USED FOR SHEAR AND MOMENT CALCULATIONS**

	VEHICLE NO. 1					VEHICLE NO. 2					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Vehicle # 1 (Left Side), Front (#1) Axle at Support	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	264.00
Resultant of both Vehicles at Mid-span	131.59	143.59	149.59	169.59	174.59	474.59	486.59	492.59	512.59	517.59	132.41
Vehicle # 1, Axle # 1, at 1/9 Available Span Length	29.33	41.33	47.33	67.33	72.33	372.33	384.33	390.33	410.33	415.33	234.67
Vehicle # 1, Axle # 1, at 2/9 Available Span Length	58.67	70.67	76.67	96.67	101.67	401.67	413.67	419.67	439.67	444.67	205.33
Vehicle # 1, Axle # 1, at 3/9 Available Span Length	88.00	100.00	106.00	126.00	131.00	431.00	443.00	449.00	469.00	474.00	176.00
Vehicle # 1, Axle # 1, at 4/9 Available Span Length	117.33	129.33	135.33	155.33	160.33	460.33	472.33	478.33	498.33	503.33	146.67
Vehicle # 1, Axle # 1, at 5/9 Available Span Length	146.67	158.67	164.67	184.67	189.67	489.67	501.67	507.67	527.67	532.67	117.33
Vehicle # 1, Axle # 1, at 6/9 Available Span Length	176.00	188.00	194.00	214.00	219.00	519.00	531.00	537.00	557.00	562.00	88.00
Vehicle # 1, Axle # 1, at 7/9 Available Span Length	205.33	217.33	223.33	243.33	248.33	548.33	560.33	566.33	586.33	591.33	58.67
Vehicle # 1, Axle # 1, at 8/9 Available Span Length	234.67	246.67	252.67	272.67	277.67	577.67	589.67	595.67	615.67	620.67	29.33
Vehicle #2 (Right Side), Rear (#3) Axle at Support (Max V)	264.00	276.00	282.00	302.00	307.00	607.00	619.00	625.00	645.00	650.00	0.00

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 650' (~198 m) total span length, Travel Speeds (with Impact)

**SHEAR CALCULATIONS**

SHEAR	Shear at React A, kips	VEHICLE NO. 1					VEHICLE NO. 2					Shear at React B, kips
		Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	
Vehicle #1 (Left), Front (#1) Axle at Support	429.75	389.85	310.05	230.25	177.05	123.85	83.95	4.15	-75.65	-128.85	-182.05	182.05
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	650.00
Resultant of both Vehicles at Mid-span	305.90	266.00	186.20	106.40	53.20	0.00	-39.90	-119.70	-199.50	-252.70	-305.90	305.90
Axle Positions	0.00	131.59	143.59	149.59	169.59	174.59	474.59	486.59	492.59	512.59	517.59	650.00
Vehicle #2, Rear (#3) Axle at Support (Max V)	181.27	141.37	61.57	-18.23	-71.43	-124.63	-164.53	-244.33	-324.13	-377.33	-430.53	430.53
Axle Positions	0.00	264.00	276.00	282.00	302.00	307.00	607.00	619.00	625.00	645.00	650.00	650.00

**430.5** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**222.5** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips

**302.4** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

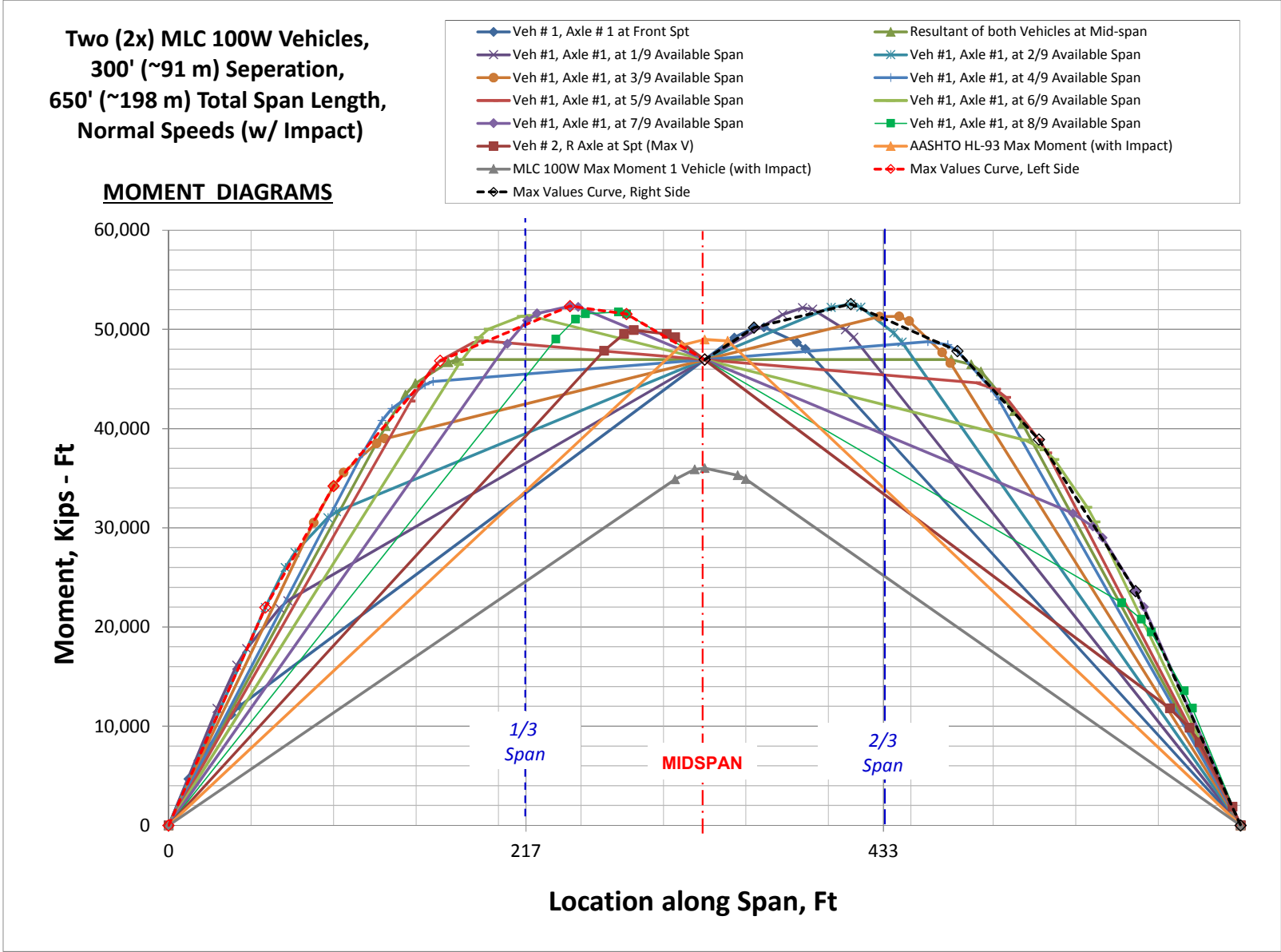
MOMENT	Moment at React A, ft-kips	VEHICLE NO. 1					VEHICLE NO. 2					Moment at React B, ft-kips
		Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	
Vehicle #1 (Left), Front (#1) Axle at Support	0.00	0.00	4,678.24	6,538.57	11,143.64	12,028.91	49,185.02	<b>50,192.46</b>	50,217.38	48,704.46	48,060.23	0.00
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	<b>355.00</b>	361.00	381.00	386.00	650.00
Resultant of both Vehicles at Mid-span	0.00	40,252.45	43,444.45	44,561.65	46,689.65	46,955.65	46,955.65	46,476.85	45,758.65	41,768.65	40,505.15	0.00
Axle Positions	0.00	131.59	143.59	149.59	169.59	174.59	474.59	486.59	492.59	512.59	517.59	650.00
Vehicle # 1, Axle # 1, at 1/9 Avail. Span Length	0.00	11,796.23	16,143.16	17,837.83	21,890.71	22,637.93	51,511.21	52,187.34	52,046.61	49,981.49	49,199.21	0.00
Axle Positions	0.00	29.33	41.33	47.33	67.33	72.33	372.33	384.33	390.33	410.33	415.33	650.00
Vehicle # 1, Axle # 1, at 2/9 Avail. Span Length	0.00	<b>21,972.71</b>	25,988.33	27,517.34	31,018.03	31,627.21	52,217.65	<b>52,562.47</b>	52,256.08	49,638.78	48,718.45	0.00
Axle Positions	0.00	<b>58.67</b>	70.67	76.67	96.67	101.67	401.67	<b>413.67</b>	419.67	439.67	444.67	650.00
Vehicle # 1, Axle # 1, at 3/9 Avail. Span Length	0.00	30,529.43	<b>34,213.74</b>	35,577.09	38,525.60	38,996.73	51,304.34	51,317.85	50,845.80	47,676.31	46,617.93	0.00
Axle Positions	0.00	88.00	<b>100.00</b>	106.00	126.00	131.00	431.00	443.00	449.00	469.00	474.00	650.00
Vehicle # 1, Axle # 1, at 4/9 Avail. Span Length	0.00	37,466.40	40,819.40	42,017.09	44,413.41	44,746.49	48,771.28	48,453.47	<b>47,815.76</b>	44,094.08	42,897.66	0.00
Axle Positions	0.00	117.33	129.33	135.33	155.33	160.33	460.33	472.33	<b>478.33</b>	498.33	503.33	650.00
Vehicle # 1, Axle # 1, at 5/9 Avail. Span Length	0.00	42,783.62	45,805.30	<b>46,837.34</b>	48,681.47	48,876.50	44,618.46	43,969.33	43,165.97	<b>38,892.10</b>	37,557.64	0.00
Axle Positions	0.00	146.67	158.67	<b>164.67</b>	184.67	189.67	489.67	501.67	507.67	<b>527.67</b>	532.67	650.00
Vehicle # 1, Axle # 1, at 6/9 Avail. Span Length	0.00	46,481.09	49,171.45	50,037.83	51,329.77	51,386.76	38,845.88	37,865.45	36,896.43	32,070.37	30,597.86	0.00
Axle Positions	0.00	176.00	188.00	194.00	214.00	219.00	519.00	531.00	537.00	557.00	562.00	650.00
Vehicle # 1, Axle # 1, at 7/9 Avail. Span Length	0.00	48,558.80	50,917.85	51,618.57	<b>52,358.33</b>	52,277.26	31,453.56	30,141.81	29,007.13	<b>23,628.89</b>	22,018.33	0.00
Axle Positions	0.00	205.33	217.33	223.33	<b>243.33</b>	248.33	548.33	560.33	566.33	<b>586.33</b>	591.33	650.00
Vehicle # 1, Axle # 1, at 8/9 Avail. Span Length	0.00	49,016.75	51,044.49	51,579.56	51,767.12	<b>51,548.01</b>	22,441.48	20,798.41	19,498.08	13,567.65	11,819.04	0.00
Axle Positions	0.00	234.67	246.67	252.67	272.67	<b>277.67</b>	577.67	589.67	595.67	615.67	620.67	650.00
Vehicle #2, Rear (#3) Axle at Support	<b>0.00</b>	47,854.96	49,551.38	49,920.79	49,556.17	49,199.01	11,809.64	9,835.27	8,369.28	1,886.66	0.00	<b>0.00</b>
Axle Positions	<b>0.00</b>	264.00	276.00	282.00	302.00	307.00	607.00	619.00	625.00	645.00	650.00	<b>650.00</b>

**52,562** MLC 100W 2x Vehicle on Span Maximum Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

**36,025** MLC 100W 1x Vehicle on Span Maximum Midspan Moment w/Impact, kips

**48,989** Maximum AASHTO HL-93 Single Span Design Moment w/Impact, ft-kips

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 650' (~198 m) total span length, Travel Speeds (with Impact)

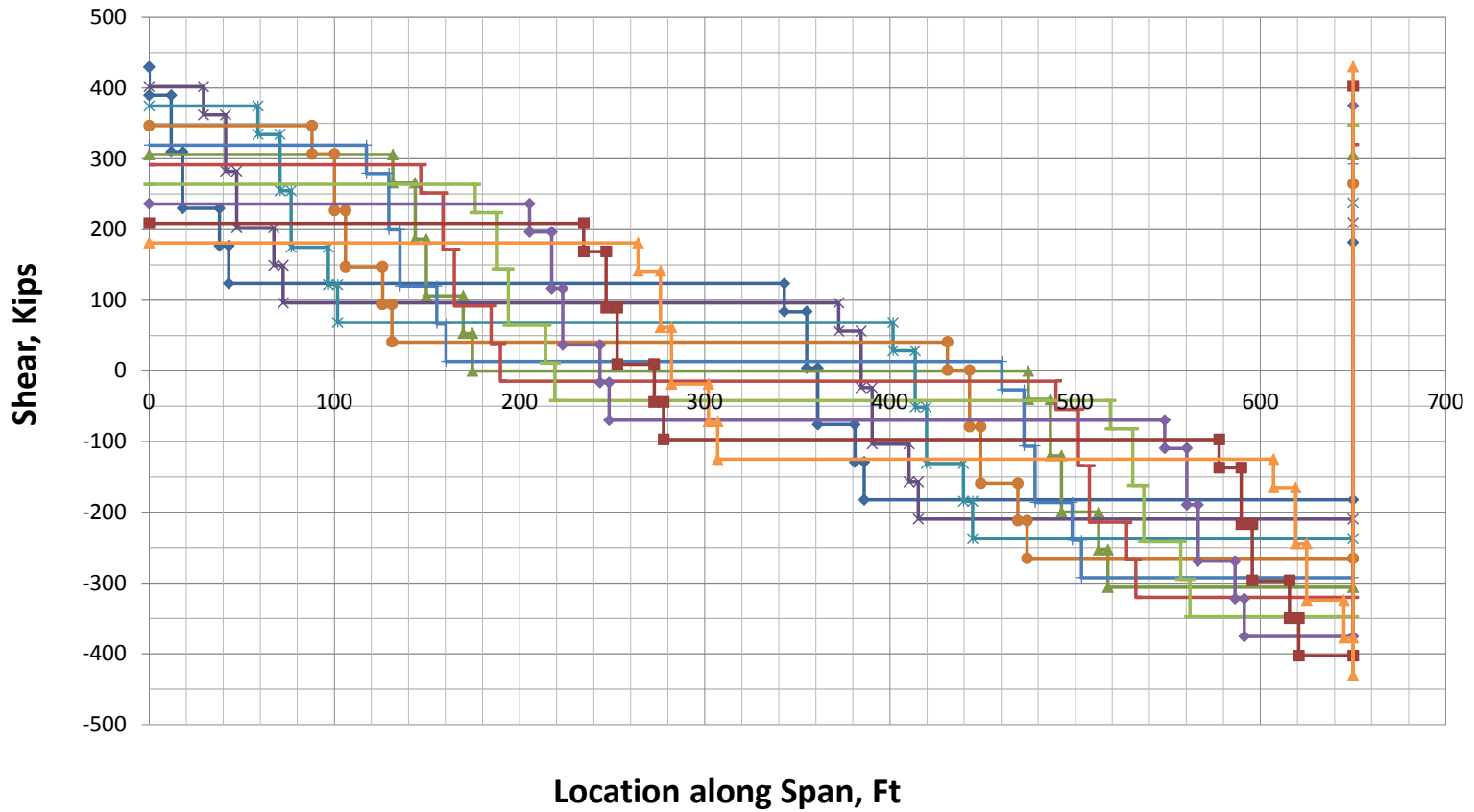


**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 650' (~198 m) total span length, Travel Speeds (with Impact)

**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 650' (~198 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

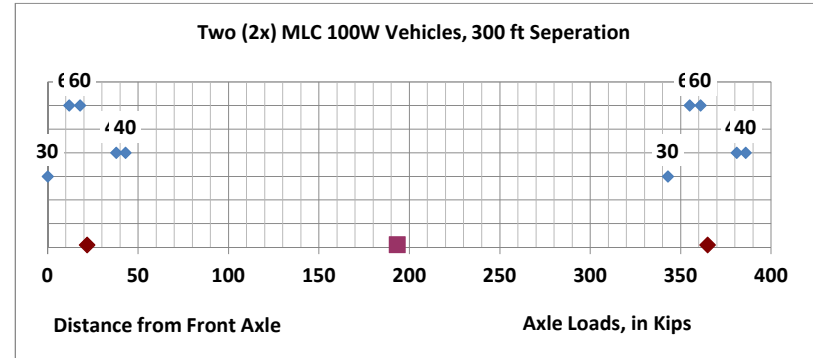
**SHEAR DIAGRAMS**

- ◆ Veh # 1, Axle # 1 at Front Spt
- ✕ Veh # 1, Axle #1, at 1/9 Available Span
- Veh #1, Axle #1, at 3/9 Available Span
- Veh #1, Axle #1, at 5/9 Available Span
- ◆ Veh #1, Axle #1, at 7/9 Available Span
- ▲ Veh # 2, R Axle at Spt (Max V)
- ▲ Resultant of both Vehicles at Mid-span
- ✕ Veh #1, Axle #1, at 2/9 Available Span
- Veh #1, Axle #1, at 4/9 Available Span
- Veh #1, Axle #1, at 6/9 Available Span
- Veh #1, Axle #1, at 8/9 Available Span



**TEN (10) AXLE** **Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 700' (~213 m) total span length, Travel Speeds (with Impact)**

	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
<b>Totals</b>		<b>230.0</b>	<b>460.0</b>	<b>386.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 193.413 ft, from Front axle of 1st vehicle

700 ft, Total Span Length      33% Dynamic Impact Factor

**POSSIBLE VEHICLE LOCATIONS USED FOR SHEAR AND MOMENT CALCULATIONS**

	VEHICLE NO. 1					VEHICLE NO. 2					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Vehicle # 1 (Left Side), Front (#1) Axle at Support	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	314.00
Resultant of both Vehicles at Mid-span	156.59	168.59	174.59	194.59	199.59	499.59	511.59	517.59	537.59	542.59	157.41
Vehicle # 1, Axle # 1, at 1/9 Available Span Length	34.89	46.89	52.89	72.89	77.89	377.89	389.89	395.89	415.89	420.89	279.11
Vehicle # 1, Axle # 1, at 2/9 Available Span Length	69.78	81.78	87.78	107.78	112.78	412.78	424.78	430.78	450.78	455.78	244.22
Vehicle # 1, Axle # 1, at 3/9 Available Span Length	104.67	116.67	122.67	142.67	147.67	447.67	459.67	465.67	485.67	490.67	209.33
Vehicle # 1, Axle # 1, at 4/9 Available Span Length	139.56	151.56	157.56	177.56	182.56	482.56	494.56	500.56	520.56	525.56	174.44
Vehicle # 1, Axle # 1, at 5/9 Available Span Length	174.44	186.44	192.44	212.44	217.44	517.44	529.44	535.44	555.44	560.44	139.56
Vehicle # 1, Axle # 1, at 6/9 Available Span Length	209.33	221.33	227.33	247.33	252.33	552.33	564.33	570.33	590.33	595.33	104.67
Vehicle # 1, Axle # 1, at 7/9 Available Span Length	244.22	256.22	262.22	282.22	287.22	587.22	599.22	605.22	625.22	630.22	69.78
Vehicle # 1, Axle # 1, at 8/9 Available Span Length	279.11	291.11	297.11	317.11	322.11	622.11	634.11	640.11	660.11	665.11	34.89
Vehicle #2 (Right Side), Rear (#3) Axle at Support (Max V)	314.00	326.00	332.00	352.00	357.00	657.00	669.00	675.00	695.00	700.00	0.00

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 700' (~213 m) total span length, Travel Speeds (with Impact)

**SHEAR CALCULATIONS**

SHEAR	Shear at React A, kips	VEHICLE NO. 1					VEHICLE NO. 2					Shear at React B, kips
		Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	
Vehicle #1 (Left), Front (#1) Axle at Support Axle Positions	442.76 0.00	402.86 0.00	323.06 12.00	243.26 18.00	190.06 38.00	136.86 43.00	96.96 343.00	17.16 355.00	-62.64 361.00	-115.84 381.00	-169.04 386.00	169.04 700.00
Resultant of both Vehicles at Mid-span Axle Positions	305.90 0.00	266.00 156.59	186.20 168.59	106.40 174.59	53.20 194.59	0.00 199.59	-39.90 499.59	-119.70 511.59	-199.50 517.59	-252.70 537.59	-305.90 542.59	305.90 700.00
Vehicle #2, Rear (#3) Axle at Support (Max V) Axle Positions	168.32 0.00	128.42 314.00	48.62 326.00	-31.18 332.00	-84.38 352.00	-137.58 357.00	-177.48 657.00	-257.28 669.00	-337.08 675.00	-390.28 695.00	-443.48 700.00	443.48 700.00

**443.5** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**223.1** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips

**318.5** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	Moment at React A, ft-kips	VEHICLE NO. 1					VEHICLE NO. 2					Moment at React B, ft-kips
		Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	
Vehicle #1 (Left), Front (#1) Axle at Support Axle Positions	0.00 0.00	0.00 0.00	4,834.28 12.00	6,772.63 18.00	11,637.77 38.00	12,588.05 43.00	53,645.15 343.00	54,808.64 355.00	54,911.58 361.00	53,658.72 381.00	53,079.50 386.00	0.00 700.00
Resultant of both Vehicles at Mid-span Axle Positions	0.00 0.00	47,899.95 156.59	51,091.95 168.59	<b>52,209.15</b> <b>174.59</b>	54,337.15 194.59	54,603.15 199.59	54,603.15 499.59	54,124.35 511.59	53,406.15 517.59	49,416.15 537.59	48,152.65 542.59	0.00 700.00
Vehicle # 1, Axle # 1, at 1/9 Avail. Span Length Axle Positions	0.00 0.00	14,383.44 34.89	18,851.81 46.89	20,607.19 52.89	24,862.47 72.89	25,660.29 77.89	57,569.53 377.89	58,367.10 389.89	58,287.08 395.89	56,424.36 415.89	55,692.68 420.89	0.00 700.00
Vehicle # 1, Axle # 1, at 2/9 Avail. Span Length Axle Positions	0.00 0.00	26,639.15 69.78	<b>30,741.60</b> <b>81.78</b>	32,314.03 87.78	35,959.45 107.78	36,604.81 112.78	59,366.18 412.78	<b>59,797.83</b> <b>424.78</b>	59,534.86 430.78	57,062.28 450.78	56,178.14 455.78	0.00 700.00
Vehicle # 1, Axle # 1, at 3/9 Avail. Span Length Axle Positions	0.00 0.00	36,767.13 104.67	40,503.67 116.67	41,893.14 122.67	44,928.71 142.67	45,421.60 147.67	59,035.10 447.67	<b>59,100.84</b> <b>459.67</b>	58,654.91 465.67	55,572.48 485.67	54,535.87 490.67	0.00 700.00
Vehicle # 1, Axle # 1, at 4/9 Avail. Span Length Axle Positions	0.00 0.00	44,767.39 139.56	48,138.02 151.56	49,344.53 157.56	51,770.24 177.56	52,110.67 182.56	56,576.30 482.56	56,276.12 494.56	<b>55,647.24</b> <b>500.56</b>	51,954.95 520.56	50,765.87 525.56	0.00 700.00
Vehicle # 1, Axle # 1, at 5/9 Avail. Span Length Axle Positions	0.00 0.00	50,639.92 174.44	53,644.63 186.44	<b>54,668.19</b> <b>192.44</b>	56,484.04 212.44	56,672.00 217.44	51,989.77 517.44	51,323.68 529.44	50,511.84 535.44	<b>46,209.69</b> <b>555.44</b>	44,868.15 560.44	0.00 700.00
Vehicle # 1, Axle # 1, at 6/9 Avail. Span Length Axle Positions	0.00 0.00	54,384.73 209.33	57,023.53 221.33	57,864.12 227.33	<b>59,070.12</b> <b>247.33</b>	59,105.62 252.33	45,275.52 552.33	44,243.51 564.33	43,248.71 570.33	38,336.70 590.33	36,842.70 595.33	0.00 700.00
Vehicle # 1, Axle # 1, at 7/9 Avail. Span Length Axle Positions	0.00 0.00	56,001.81 244.22	58,274.69 256.22	58,932.33 262.22	59,528.47 282.22	<b>59,411.50</b> <b>287.22</b>	36,433.54 587.22	35,035.62 599.22	33,857.86 605.22	<b>28,335.99</b> <b>625.22</b>	26,689.53 630.22	0.00 700.00
Vehicle # 1, Axle # 1, at 8/9 Avail. Span Length Axle Positions	0.00 0.00	55,491.17 279.11	57,398.13 291.11	57,872.82 297.11	57,859.09 317.11	57,589.66 322.11	25,463.83 622.11	23,700.00 634.11	22,339.28 640.11	16,207.56 660.11	14,408.63 665.11	0.00 700.00
Vehicle #2, Rear (#3) Axle at Support Axle Positions	<b>0.00</b> <b>0.00</b>	52,852.79 314.00	54,393.85 326.00	54,685.57 332.00	54,061.99 352.00	53,640.10 357.00	12,366.40 657.00	10,236.65 669.00	8,692.98 675.00	1,951.40 695.00	0.00 700.00	<b>0.00</b> <b>700.00</b>

**59,798** MLC 100W 2x Vehicle on Span Maximum Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

**38,900** MLC 100W 1x Vehicle on Span Maximum Midspan Moment w/Impact, kips

**55,586** Maximum AASHTO HL-93 Single Span Design Moment w/Impact, ft-kips



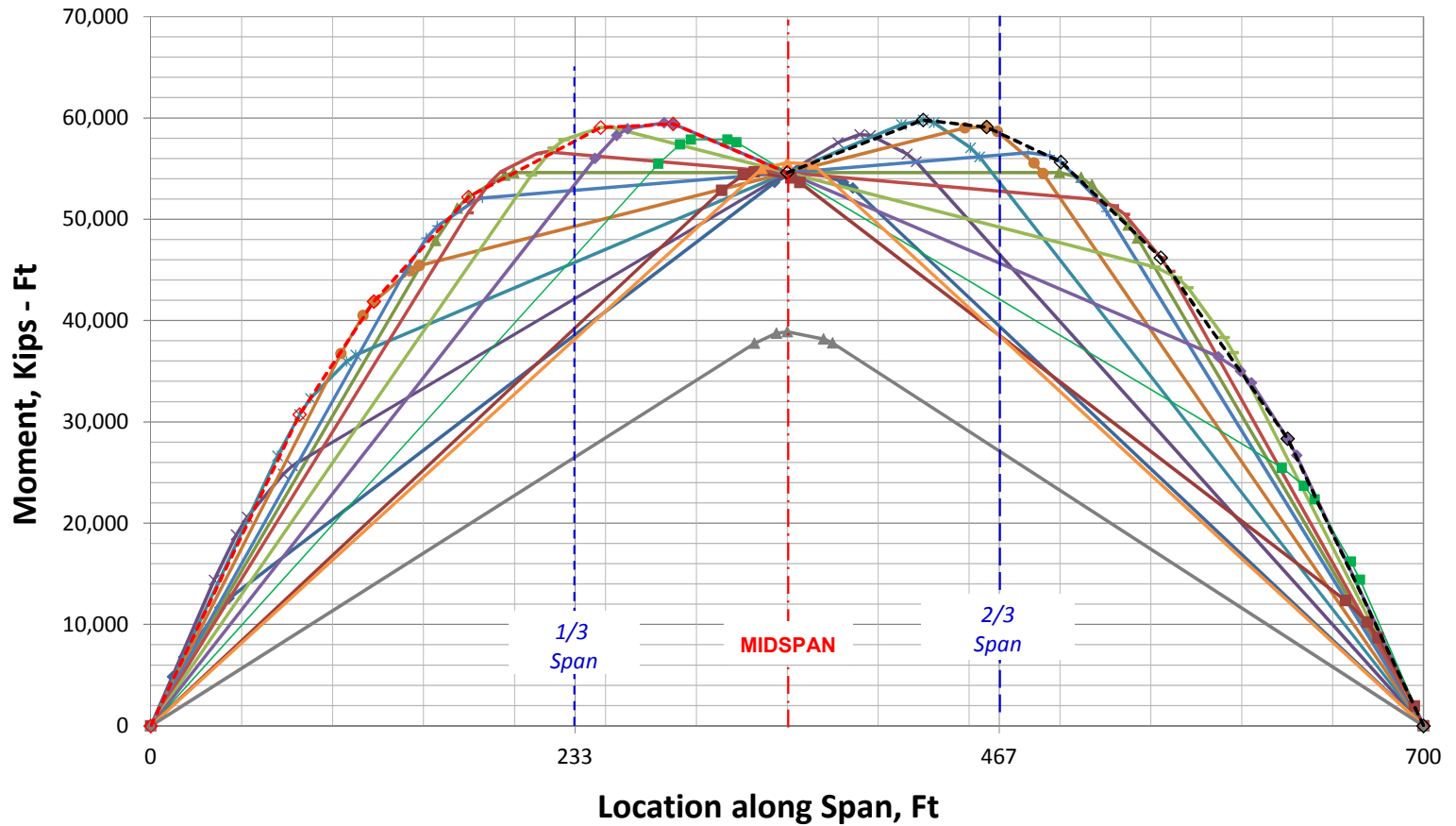
**TEN (10) AXLE**

**Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 700' (~213 m) total span length, Travel Speeds (with Impact)**

**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 700' (~213 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

**MOMENT DIAGRAMS**

- Veh # 1, Axle # 1 at Front Spt
- ×— Veh # 1, Axle #1, at 1/9 Available Span
- Veh # 1, Axle #1, at 3/9 Available Span
- Veh # 1, Axle #1, at 5/9 Available Span
- Veh # 1, Axle #1, at 7/9 Available Span
- Veh # 2, R Axle at Spt (Max V)
- ▲— MLC 100W Max Moment 1 Vehicle (with Impact)
- ◆— Max Values Curve, Right Side
- ▲— Resultant of both Vehicles at Mid-span
- ×— Veh # 1, Axle #1, at 2/9 Available Span
- Veh # 1, Axle #1, at 4/9 Available Span
- Veh # 1, Axle #1, at 6/9 Available Span
- Veh # 1, Axle #1, at 8/9 Available Span
- ▲— AASHTO LRFD HL-93 (No Impact)
- ◆— Max Values Curve, Left Side

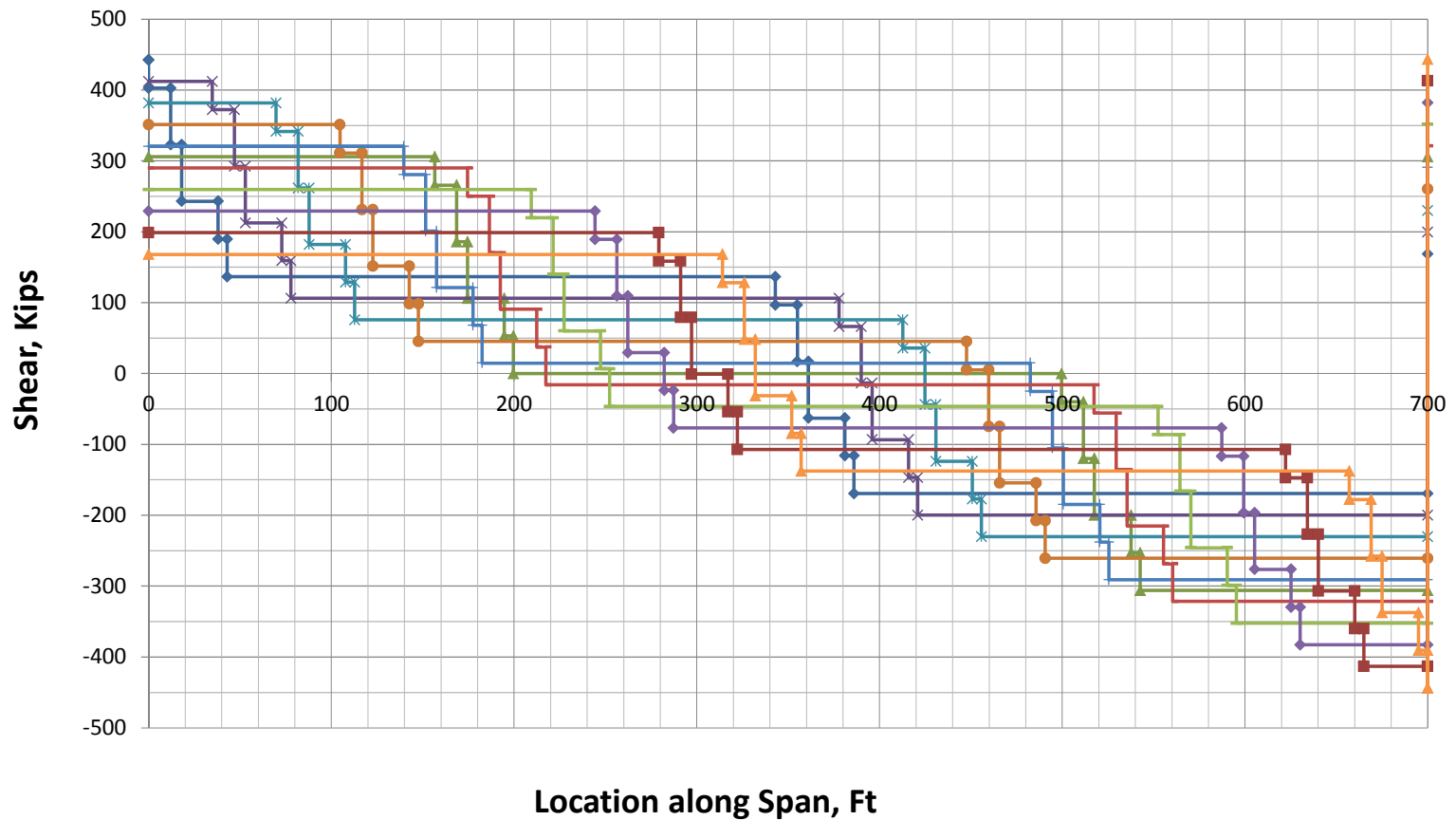


**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 700' (~213 m) total span length, Travel Speeds (with Impact)

**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 700' (~213 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

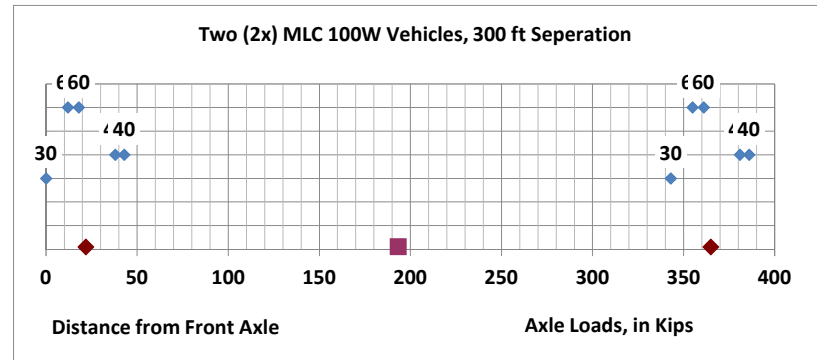
**SHEAR DIAGRAMS**

- ◆ Veh # 1, Axle # 1 at Front Spt
- ✕ Veh #1, Axle #1, at 1/9 Available Span
- Veh #1, Axle #1, at 3/9 Available Span
- Veh #1, Axle #1, at 5/9 Available Span
- ◆ Veh #1, Axle #1, at 7/9 Available Span
- ▲ Veh # 2, R Axle at Spt (Max V)
- ▲ Resultant of both Vehicles at Mid-span
- ✕ Veh #1, Axle #1, at 2/9 Available Span
- Veh #1, Axle #1, at 4/9 Available Span
- Veh #1, Axle #1, at 6/9 Available Span
- Veh #1, Axle #1, at 8/9 Available Span



**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 730' (~223 m) total span length, Travel Speeds (with Impact)

	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
<b>Totals</b>		<b>230.0</b>	<b>460.0</b>	<b>386.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 193.413 ft, from Front axle of 1st vehicle

**730** ft, Total Span Length      **33%** Dynamic Impact Factor

**POSSIBLE VEHICLE LOCATIONS USED FOR SHEAR AND MOMENT CALCULATIONS**

	VEHICLE NO. 1					VEHICLE NO. 2					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Vehicle # 1 (Left Side), Front (#1) Axle at Support	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	344.00
Resultant of both Vehicles at Mid-span	171.59	183.59	189.59	209.59	214.59	514.59	526.59	532.59	552.59	557.59	172.41
Vehicle # 1, Axle # 1, at 1/9 Available Span Length	38.22	50.22	56.22	76.22	81.22	381.22	393.22	399.22	419.22	424.22	305.78
Vehicle # 1, Axle # 1, at 2/9 Available Span Length	76.44	88.44	94.44	114.44	119.44	419.44	431.44	437.44	457.44	462.44	267.56
Vehicle # 1, Axle # 1, at 3/9 Available Span Length	114.67	126.67	132.67	152.67	157.67	457.67	469.67	475.67	495.67	500.67	229.33
Vehicle # 1, Axle # 1, at 4/9 Available Span Length	152.89	164.89	170.89	190.89	195.89	495.89	507.89	513.89	533.89	538.89	191.11
Vehicle # 1, Axle # 1, at 5/9 Available Span Length	191.11	203.11	209.11	229.11	234.11	534.11	546.11	552.11	572.11	577.11	152.89
Vehicle # 1, Axle # 1, at 6/9 Available Span Length	229.33	241.33	247.33	267.33	272.33	572.33	584.33	590.33	610.33	615.33	114.67
Vehicle # 1, Axle # 1, at 7/9 Available Span Length	267.56	279.56	285.56	305.56	310.56	610.56	622.56	628.56	648.56	653.56	76.44
Vehicle # 1, Axle # 1, at 8/9 Available Span Length	305.78	317.78	323.78	343.78	348.78	648.78	660.78	666.78	686.78	691.78	38.22
Vehicle #2 (Right Side), Rear (#3) Axle at Support (Max V)	344.00	356.00	362.00	382.00	387.00	687.00	699.00	705.00	725.00	730.00	0.00

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 730' (~223 m) total span length, Travel Speeds (with Impact)

**SHEAR CALCULATIONS**

SHEAR	Shear at React A, kips	VEHICLE NO. 1					VEHICLE NO. 2					Shear at React B, kips
		Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	
Vehicle #1 (Left), Front (#1) Axle at Support	449.70	409.80	330.00	250.20	197.00	143.80	103.90	24.10	-55.70	-108.90	-162.10	162.10
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	730.00
Resultant of both Vehicles at Mid-span	305.90	266.00	186.20	106.40	53.20	0.00	-39.90	-119.70	-199.50	-252.70	-305.90	305.90
Axle Positions	0.00	171.59	183.59	189.59	209.59	214.59	514.59	526.59	532.59	552.59	557.59	730.00
Vehicle #2, Rear (#3) Axle at Support (Max V)	161.40	121.50	41.70	-38.10	-91.30	-144.50	-184.40	-264.20	-344.00	-397.20	-450.40	450.40
Axle Positions	0.00	344.00	356.00	362.00	382.00	387.00	687.00	699.00	705.00	725.00	730.00	730.00

**450.4** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**223.4** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips

**328.1** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	Moment at React A, ft-kips	VEHICLE NO. 1					VEHICLE NO. 2					Moment at React B, ft-kips
		Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	
Vehicle #1 (Left), Front (#1) Axle at Support	0.00	0.00	4,917.65	6,897.67	11,901.75	12,886.77	56,027.96	57,274.81	57,419.43	56,305.51	55,761.03	0.00
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	730.00
Resultant of both Vehicles at Mid-span	0.00	52,488.45	55,680.45	<b>56,797.65</b>	58,925.65	59,191.65	59,191.65	58,712.85	57,994.65	54,004.65	52,741.15	0.00
Axle Positions	0.00	171.59	183.59	<b>189.59</b>	209.59	214.59	514.59	526.59	532.59	552.59	557.59	730.00
Vehicle # 1, Axle # 1, at 1/9 Avail. Span Length	0.00	15,964.30	20,497.55	22,285.37	26,648.78	27,473.64	61,004.82	61,867.26	61,819.69	60,065.10	59,360.45	0.00
Axle Positions	0.00	38.22	50.22	56.22	76.22	81.22	381.22	393.22	399.22	419.22	424.22	730.00
Vehicle # 1, Axle # 1, at 2/9 Avail. Span Length	0.00	29,479.82	<b>33,628.67</b>	35,224.30	38,947.04	39,611.73	63,532.90	<b>64,010.95</b>	63,771.17	61,375.92	60,511.10	0.00
Axle Positions	0.00	76.44	<b>88.44</b>	94.44	114.44	119.44	419.44	<b>431.44</b>	437.44	457.44	462.44	730.00
Vehicle # 1, Axle # 1, at 3/9 Avail. Span Length	0.00	40,546.58	44,311.02	<b>45,714.45</b>	48,796.53	49,301.05	63,612.21	<b>63,705.86</b>	<b>63,273.88</b>	60,237.96	59,212.98	0.00
Axle Positions	0.00	114.67	126.67	<b>132.67</b>	152.67	157.67	457.67	<b>469.67</b>	<b>475.67</b>	495.67	500.67	730.00
Vehicle # 1, Axle # 1, at 4/9 Avail. Span Length	0.00	49,164.56	52,544.61	53,755.83	56,197.24	56,541.59	61,242.75	60,951.99	<b>60,327.82</b>	56,651.23	55,466.08	0.00
Axle Positions	0.00	152.89	164.89	170.89	190.89	195.89	495.89	507.89	<b>513.89</b>	533.89	538.89	730.00
Vehicle # 1, Axle # 1, at 5/9 Avail. Span Length	0.00	55,333.77	58,329.41	59,348.44	61,149.18	61,333.36	56,424.51	55,749.36	54,932.98	<b>50,615.72</b>	49,270.41	0.00
Axle Positions	0.00	191.11	203.11	209.11	229.11	234.11	534.11	546.11	552.11	<b>572.11</b>	577.11	730.00
Vehicle # 1, Axle # 1, at 6/9 Avail. Span Length	0.00	59,054.20	61,665.45	62,492.27	<b>63,652.35</b>	63,676.37	49,157.50	48,097.95	47,089.37	42,131.45	40,625.97	0.00
Axle Positions	0.00	229.33	241.33	247.33	<b>267.33</b>	272.33	572.33	584.33	590.33	610.33	615.33	730.00
Vehicle # 1, Axle # 1, at 7/9 Avail. Span Length	0.00	60,325.87	62,552.71	63,187.33	63,706.74	<b>63,570.59</b>	39,441.72	37,997.77	36,796.99	<b>31,198.40</b>	29,532.75	0.00
Axle Positions	0.00	267.56	279.56	285.56	305.56	<b>310.56</b>	610.56	622.56	628.56	<b>648.56</b>	653.56	730.00
Vehicle # 1, Axle # 1, at 8/9 Avail. Span Length	0.00	59,148.76	60,991.20	61,433.62	61,312.36	61,016.05	27,277.17	25,448.81	24,055.83	17,816.58	15,990.76	0.00
Axle Positions	0.00	305.78	317.78	323.78	343.78	348.78	648.78	660.78	666.78	686.78	691.78	730.00
Vehicle #2, Rear (#3) Axle at Support	<b>0.00</b>	55,522.87	56,980.92	57,231.14	56,469.21	56,012.73	12,663.84	10,451.09	8,865.91	1,985.98	0.00	<b>0.00</b>
Axle Positions	<b>0.00</b>	344.00	356.00	362.00	382.00	387.00	687.00	699.00	705.00	725.00	730.00	<b>730.00</b>

**64,011** MLC 100W 2x Vehicle on Span Maximum Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

**40,625** MLC 100W 1x Vehicle on Span Maximum Midspan Moment w/Impact, kips

**59,736** Maximum AASHTO HL-93 Single Span Design Moment w/Impact, ft-kips

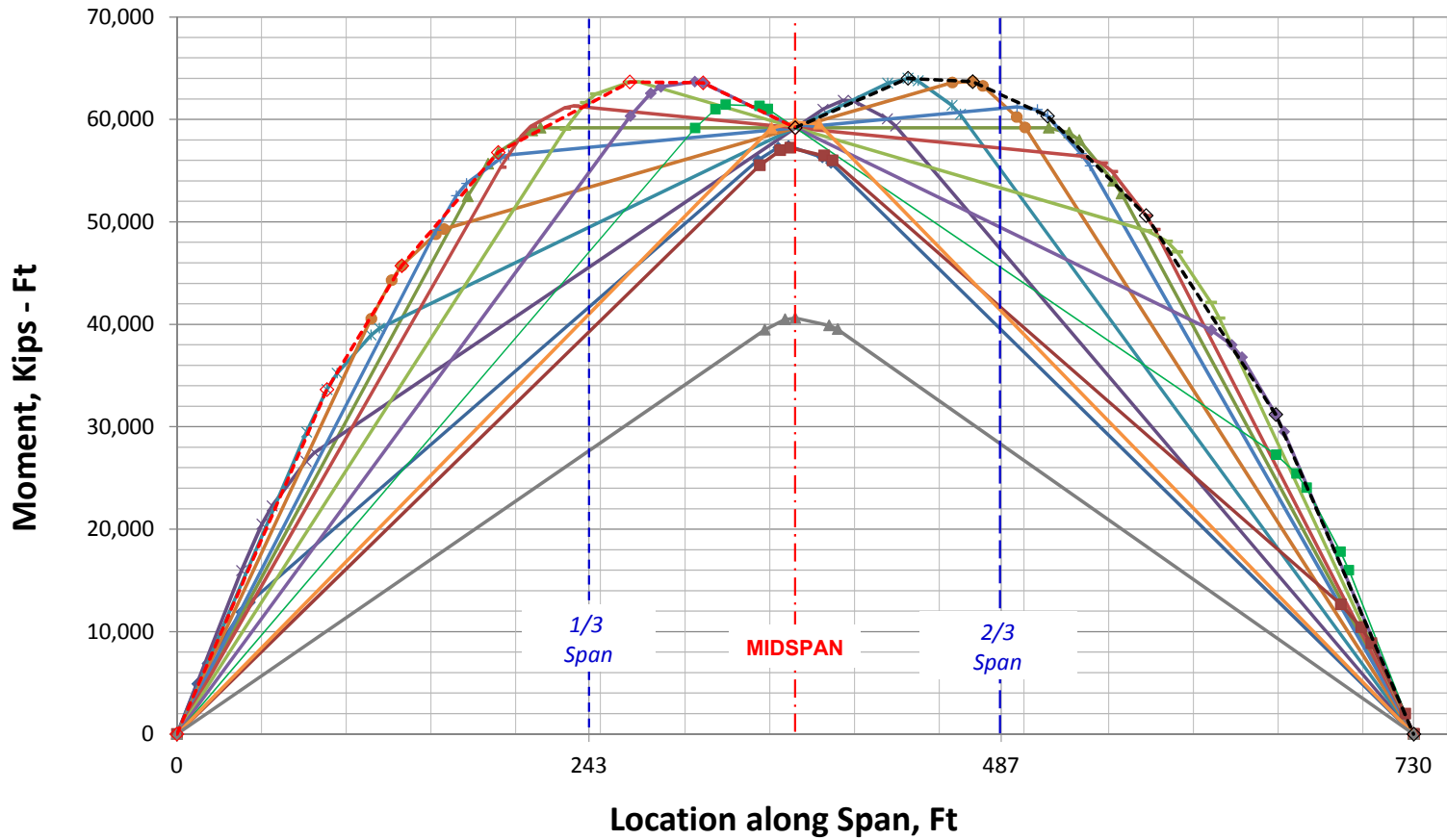
**TEN (10) AXLE**

**Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 730' (~223 m) total span length, Travel Speeds (with Impact)**

**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 730' (~223 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

**MOMENT DIAGRAMS**

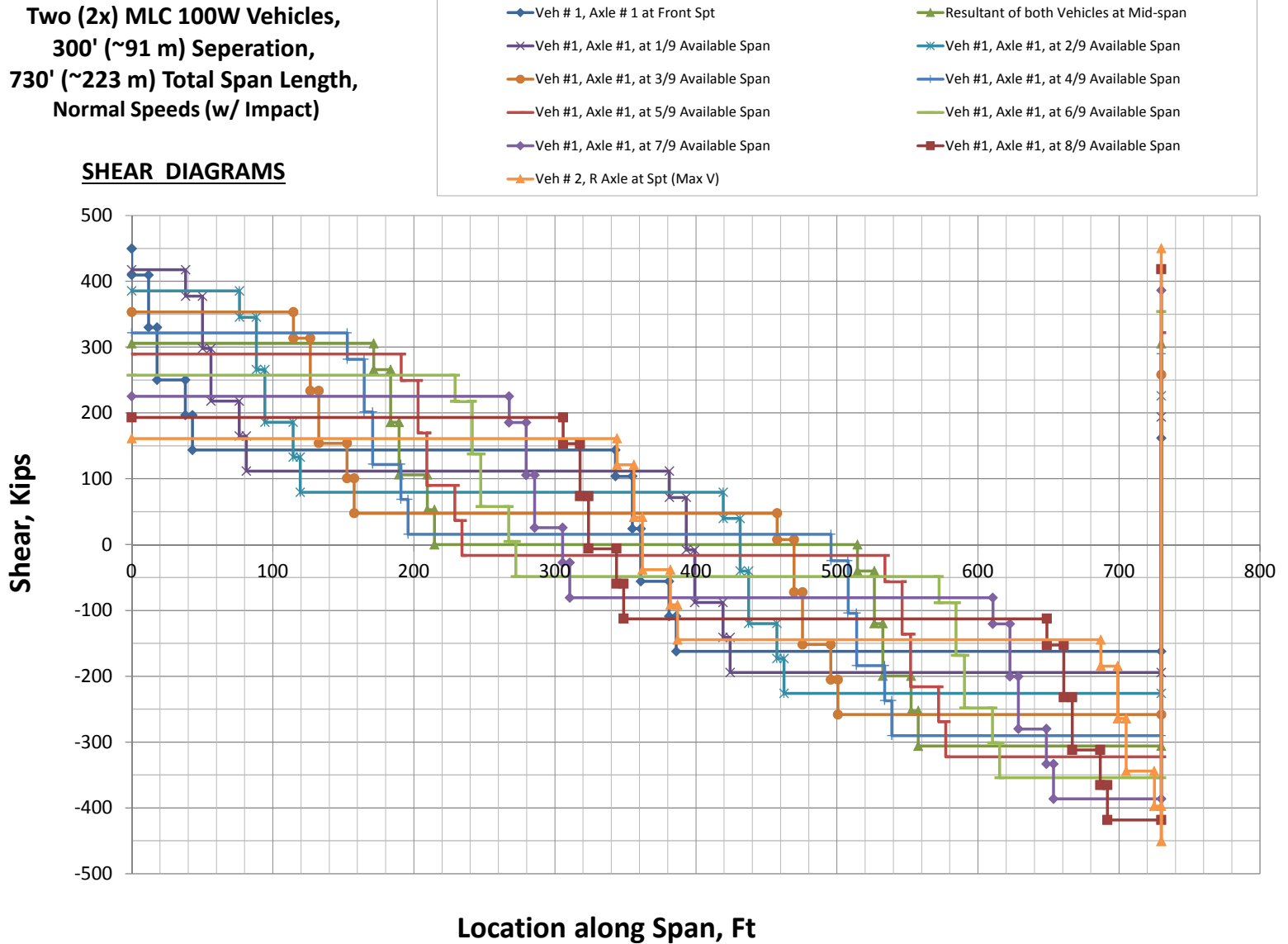
- Veh # 1, Axle # 1 at Front Spt
- ×— Veh #1, Axle #1, at 1/9 Available Span
- Veh #1, Axle #1, at 3/9 Available Span
- Veh #1, Axle #1, at 5/9 Available Span
- Veh #1, Axle #1, at 7/9 Available Span
- Veh # 2, R Axle at Spt (Max V)
- ▲— MLC 100W Max Moment 1 Vehicle (with Impact)
- ◆— Max Values Curve, Right Side
- ▲— Resultant of both Vehicles at Mid-span
- ×— Veh #1, Axle #1, at 2/9 Available Span
- Veh #1, Axle #1, at 4/9 Available Span
- Veh #1, Axle #1, at 6/9 Available Span
- Veh #1, Axle #1, at 8/9 Available Span
- ▲— AASHTO HL-93 Max Moment (with Impact)
- ◆— Max Values Curve, Left Side



**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 730' (~223 m) total span length, Travel Speeds (with Impact)

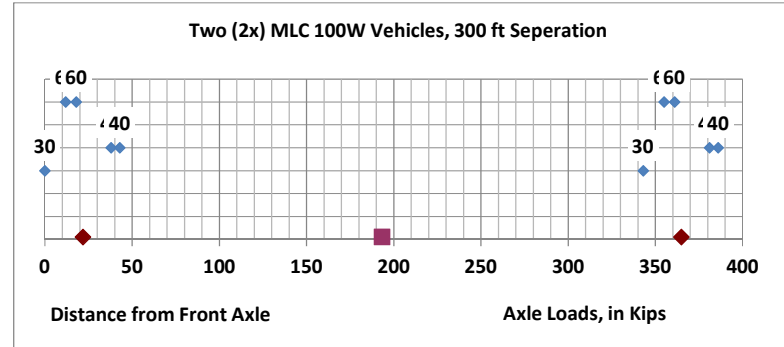
**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 730' (~223 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

**SHEAR DIAGRAMS**



**TEN (10) AXLE Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 750' (~229 m) total span length, Travel Speeds (with Impact)**

	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
<b>Totals</b>		<b>230.0</b>	<b>460.0</b>	<b>386.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 193.413 ft, from Front axle of 1st vehicle

750 ft, Total Span Length

33% Dynamic Impact Factor

**POSSIBLE VEHICLE LOCATIONS USED FOR SHEAR AND MOMENT CALCULATIONS**

	VEHICLE NO. 1					VEHICLE NO. 2					Dist to Beam End L END
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
Vehicle # 1 (Left Side), Front (#1) Axle at Support	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	364.00
Resultant of both Vehicles at Mid-span	181.59	193.59	199.59	219.59	224.59	524.59	536.59	542.59	562.59	567.59	182.41
Vehicle # 1, Axle # 1, at 1/9 Available Span Length	40.44	52.44	58.44	78.44	83.44	383.44	395.44	401.44	421.44	426.44	323.56
Vehicle # 1, Axle # 1, at 2/9 Available Span Length	80.89	92.89	98.89	118.89	123.89	423.89	435.89	441.89	461.89	466.89	283.11
Vehicle # 1, Axle # 1, at 3/9 Available Span Length	121.33	133.33	139.33	159.33	164.33	464.33	476.33	482.33	502.33	507.33	242.67
Vehicle # 1, Axle # 1, at 4/9 Available Span Length	161.78	173.78	179.78	199.78	204.78	504.78	516.78	522.78	542.78	547.78	202.22
Vehicle # 1, Axle # 1, at 5/9 Available Span Length	202.22	214.22	220.22	240.22	245.22	545.22	557.22	563.22	583.22	588.22	161.78
Vehicle # 1, Axle # 1, at 6/9 Available Span Length	242.67	254.67	260.67	280.67	285.67	585.67	597.67	603.67	623.67	628.67	121.33
Vehicle # 1, Axle # 1, at 7/9 Available Span Length	283.11	295.11	301.11	321.11	326.11	626.11	638.11	644.11	664.11	669.11	80.89
Vehicle # 1, Axle # 1, at 8/9 Available Span Length	323.56	335.56	341.56	361.56	366.56	666.56	678.56	684.56	704.56	709.56	40.44
Vehicle #2 (Right Side), Rear (#3) Axle at Support (Max V)	364.00	376.00	382.00	402.00	407.00	707.00	719.00	725.00	745.00	750.00	0.00

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 750' (~229 m) total span length, Travel Speeds (with Impact)

**SHEAR CALCULATIONS**

SHEAR	VEHICLE NO. 1						VEHICLE NO. 2					
	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at React B, kips
Vehicle #1 (Left), Front (#1) Axle at Support	454.03	414.13	334.33	254.53	201.33	148.13	108.23	28.43	-51.37	-104.57	-157.77	157.77
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	750.00
Resultant of both Vehicles at Mid-span	305.90	266.00	186.20	106.40	53.20	0.00	-39.90	-119.70	-199.50	-252.70	-305.90	305.90
Axle Positions	0.00	181.59	193.59	199.59	219.59	224.59	524.59	536.59	542.59	562.59	567.59	750.00
Vehicle #2, Rear (#3) Axle at Support (Max V)	157.10	117.20	37.40	-42.40	-95.60	-148.80	-188.70	-268.50	-348.30	-401.50	-454.70	454.70
Axle Positions	0.00	364.00	376.00	382.00	402.00	407.00	707.00	719.00	725.00	745.00	750.00	750.00

**454.7** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**223.5** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips  
**334.6** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	VEHICLE NO. 1						VEHICLE NO. 2					
	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
Vehicle #1 (Left), Front (#1) Axle at Support	0.00	0.00	4,969.52	6,975.48	12,066.01	13,072.64	57,510.60	58,809.32	58,979.88	57,952.41	57,429.54	0.00
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	750.00
Resultant of both Vehicles at Mid-span	0.00	55,547.45	58,739.45	59,856.65	61,984.65	62,250.65	62,250.65	61,771.85	61,053.65	57,063.65	55,800.15	0.00
Axle Positions	0.00	181.59	193.59	199.59	219.59	224.59	524.59	536.59	542.59	562.59	567.59	750.00
Vehicle # 1, Axle # 1, at 1/9 Avail. Span Length	0.00	17,028.51	21,602.13	23,410.14	27,840.83	28,682.50	63,222.90	64,125.71	64,098.32	62,411.01	61,723.19	0.00
Axle Positions	0.00	40.44	52.44	58.44	78.44	83.44	383.44	395.44	401.44	421.44	426.44	750.00
Vehicle # 1, Axle # 1, at 2/9 Avail. Span Length	0.00	31,388.35	35,566.06	37,176.12	40,946.97	41,623.69	66,266.52	66,773.43	66,548.09	64,200.94	63,348.16	0.00
Axle Positions	0.00	80.89	92.89	98.89	118.89	123.89	423.89	435.89	441.89	461.89	466.89	750.00
Vehicle # 1, Axle # 1, at 3/9 Avail. Span Length	0.00	43,079.51	46,861.32	48,273.42	51,384.44	51,896.20	66,641.46	66,752.47	66,329.18	63,322.20	62,304.45	0.00
Axle Positions	0.00	121.33	133.33	139.33	159.33	164.33	464.33	476.33	482.33	502.33	507.33	750.00
Vehicle # 1, Axle # 1, at 4/9 Avail. Span Length	0.00	52,101.99	55,487.90	56,702.05	59,153.23	59,500.03	64,347.73	64,062.84	63,441.59	59,774.77	58,592.07	0.00
Axle Positions	0.00	161.78	173.78	179.78	199.78	204.78	504.78	516.78	522.78	542.78	547.78	750.00
Vehicle # 1, Axle # 1, at 5/9 Avail. Span Length	0.00	58,455.80	61,445.80	62,462.00	64,253.35	64,435.18	59,385.32	58,704.53	57,885.33	53,558.67	52,211.01	0.00
Axle Positions	0.00	202.22	214.22	220.22	240.22	245.22	545.22	557.22	563.22	583.22	588.22	750.00
Vehicle # 1, Axle # 1, at 6/9 Avail. Span Length	0.00	62,140.93	64,735.03	65,553.28	66,684.79	66,701.66	51,754.23	50,677.54	49,660.39	44,673.89	43,161.27	0.00
Axle Positions	0.00	242.67	254.67	260.67	280.67	285.67	585.67	597.67	603.67	623.67	628.67	750.00
Vehicle # 1, Axle # 1, at 7/9 Avail. Span Length	0.00	63,157.38	65,355.58	65,975.88	66,447.55	66,299.46	41,454.47	39,981.87	38,766.77	33,120.44	31,442.86	0.00
Axle Positions	0.00	283.11	295.11	301.11	321.11	326.11	626.11	638.11	644.11	664.11	669.11	750.00
Vehicle # 1, Axle # 1, at 8/9 Avail. Span Length	0.00	61,505.15	63,307.45	63,729.80	63,541.63	63,228.59	28,486.03	26,617.53	25,204.48	18,898.31	17,055.77	0.00
Axle Positions	0.00	323.56	335.56	341.56	361.56	366.56	666.56	678.56	684.56	704.56	709.56	750.00
Vehicle #2, Rear (#3) Axle at Support	0.00	57,184.25	58,590.65	58,815.05	57,967.04	57,489.04	12,848.92	10,584.51	8,973.51	2,007.50	0.00	0.00
Axle Positions	0.00	364.00	376.00	382.00	402.00	407.00	707.00	719.00	725.00	745.00	750.00	750.00

**66,773** MLC 100W 2x Vehicle on Span Maximum Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

**41,775** MLC 100W 1x Vehicle on Span Maximum Midspan Moment w/Impact, kips  
**62,583** Maximum AASHTO HL-93 Single Span Design Moment w/Impact, ft-kips

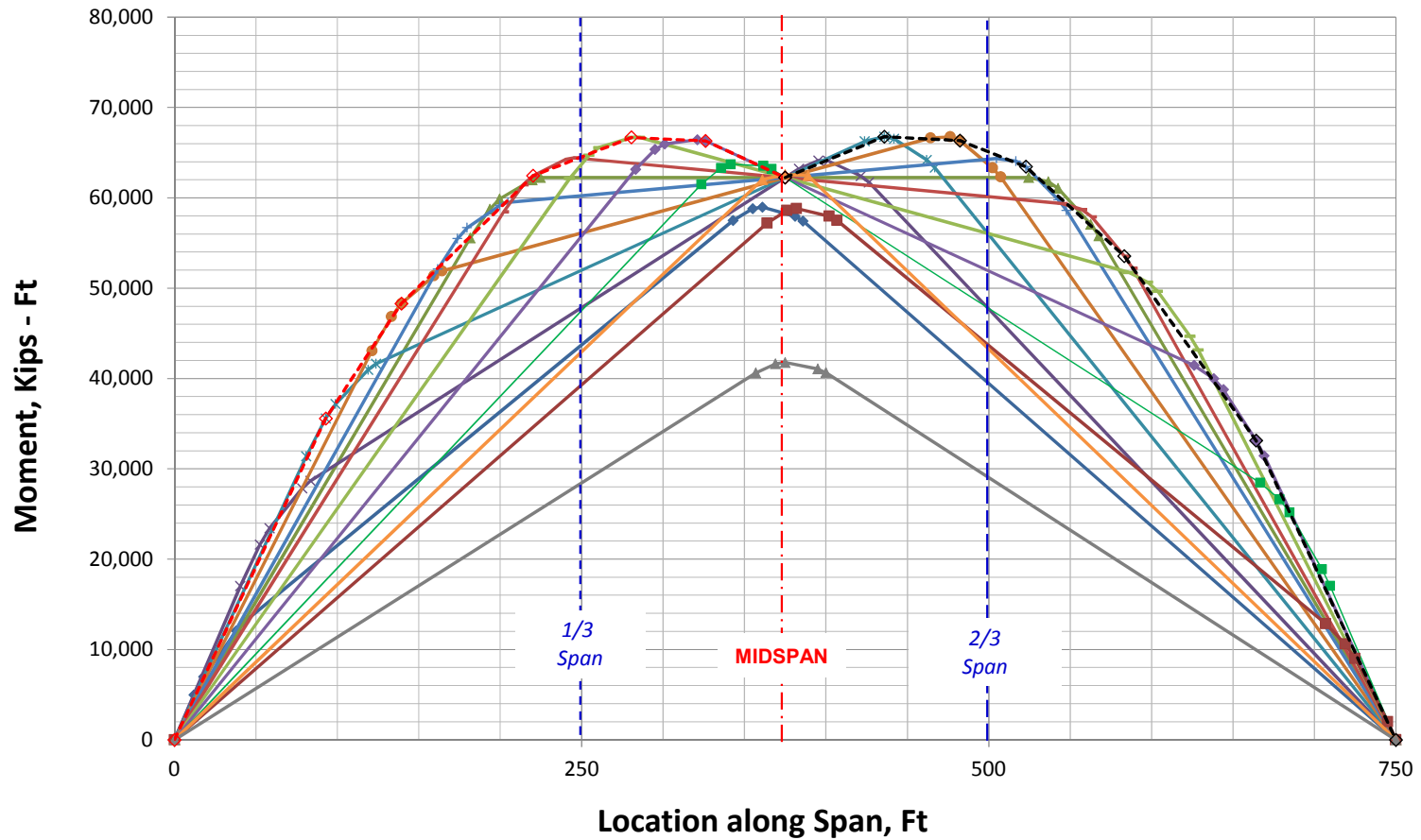


**TEN (10) AXLE**      **Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 750' (~229 m) total span length, Travel Speeds (with Impact)**

**Two (2x) MLC 100W Vehicles,  
300' (~91 m) Separation,  
750' (~229 m) Total Span Length,  
Normal Speeds (w/ Impact)**

**MOMENT DIAGRAMS**

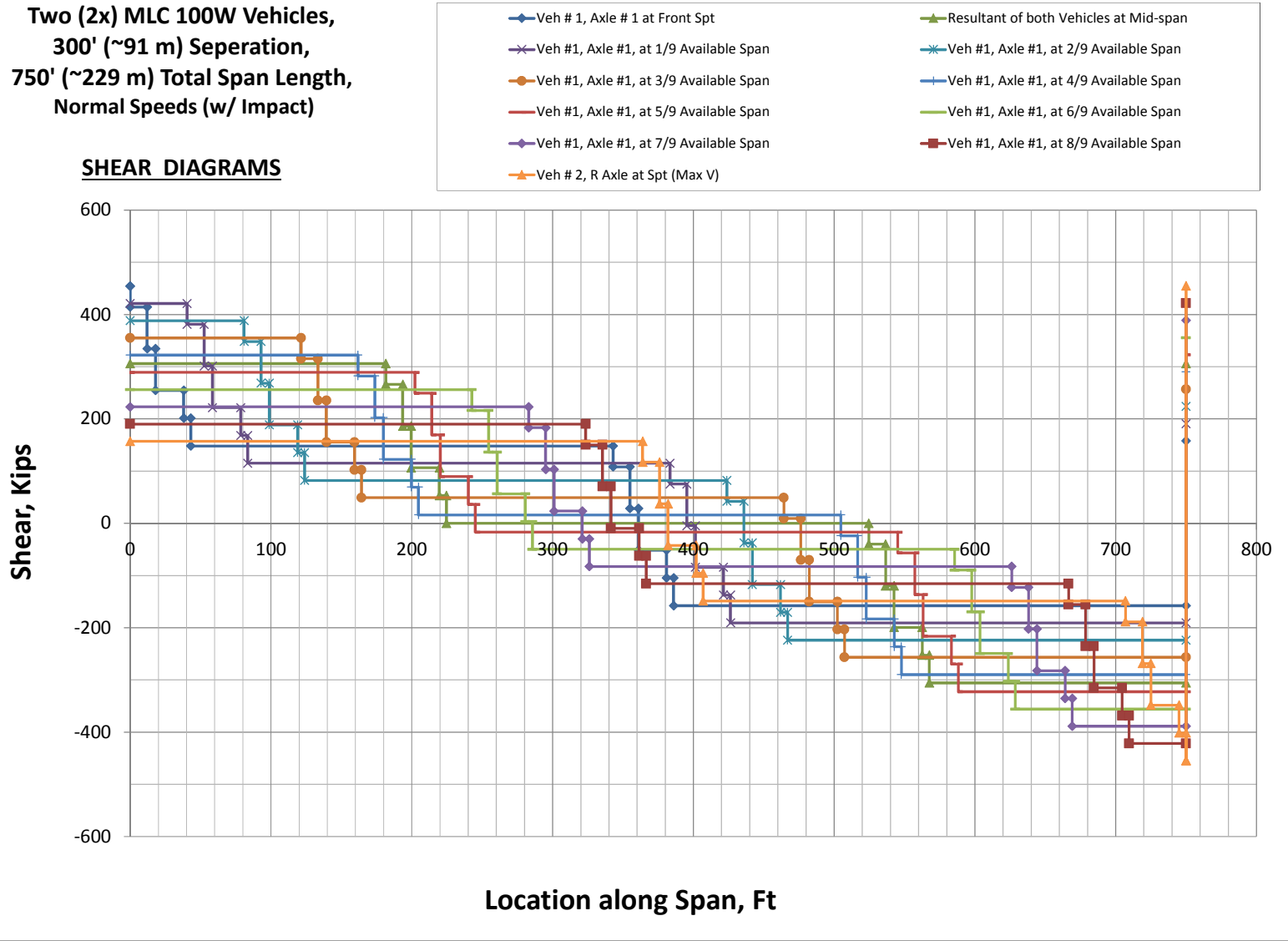
- ◆— Veh # 1, Axle # 1 at Front Spt
- ×— Veh # 1, Axle #1, at 1/9 Available Span
- Veh # 1, Axle #1, at 3/9 Available Span
- Veh # 1, Axle #1, at 5/9 Available Span
- ▲— Veh # 1, Axle #1, at 7/9 Available Span
- Veh # 1, Axle #1, at 8/9 Available Span
- Veh # 2, R Axle at Spt (Max V)
- ▲— MLC 100W Max Moment 1 Vehicle (with Impact)
- ◆— Max Values Curve, Right Side
- ▲— Resultant of both Vehicles at Mid-span
- ×— Veh # 1, Axle #1, at 2/9 Available Span
- Veh # 1, Axle #1, at 4/9 Available Span
- ▲— Veh # 1, Axle #1, at 6/9 Available Span
- Veh # 1, Axle #1, at 8/9 Available Span
- ▲— AASHTO HL-93 Max Moment (with Impact)
- ◆— Max Values Curve, Left Side



**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 750' (~229 m) total span length, Travel Speeds (with Impact)

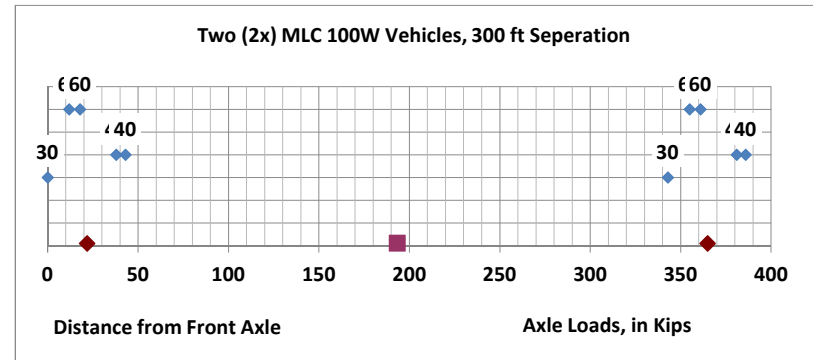
**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 750' (~229 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

**SHEAR DIAGRAMS**



**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 800' (~244 m) total span length, Travel Speeds (with Impact)

	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
<b>Totals</b>		<b>230.0</b>	<b>460.0</b>	<b>386.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 193.413 ft, from Front axle of 1st vehicle

800 ft, Total Span Length      33% Dynamic Impact Factor

**POSSIBLE VEHICLE LOCATIONS USED FOR SHEAR AND MOMENT CALCULATIONS**

	VEHICLE NO. 1					VEHICLE NO. 2					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Vehicle # 1 (Left Side), Front (#1) Axle at Support	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	414.00
Resultant of both Vehicles at Mid-span	206.59	218.59	224.59	244.59	249.59	549.59	561.59	567.59	587.59	592.59	207.41
Vehicle # 1, Axle # 1, at 1/9 Available Span Length	46.00	58.00	64.00	84.00	89.00	389.00	401.00	407.00	427.00	432.00	368.00
Vehicle # 1, Axle # 1, at 2/9 Available Span Length	92.00	104.00	110.00	130.00	135.00	435.00	447.00	453.00	473.00	478.00	322.00
Vehicle # 1, Axle # 1, at 3/9 Available Span Length	138.00	150.00	156.00	176.00	181.00	481.00	493.00	499.00	519.00	524.00	276.00
Vehicle # 1, Axle # 1, at 4/9 Available Span Length	184.00	196.00	202.00	222.00	227.00	527.00	539.00	545.00	565.00	570.00	230.00
Vehicle # 1, Axle # 1, at 5/9 Available Span Length	230.00	242.00	248.00	268.00	273.00	573.00	585.00	591.00	611.00	616.00	184.00
Vehicle # 1, Axle # 1, at 6/9 Available Span Length	276.00	288.00	294.00	314.00	319.00	619.00	631.00	637.00	657.00	662.00	138.00
Vehicle # 1, Axle # 1, at 7/9 Available Span Length	322.00	334.00	340.00	360.00	365.00	665.00	677.00	683.00	703.00	708.00	92.00
Vehicle # 1, Axle # 1, at 8/9 Available Span Length	368.00	380.00	386.00	406.00	411.00	711.00	723.00	729.00	749.00	754.00	46.00
Vehicle #2 (Right Side), Rear (#3) Axle at Support (Max V)	414.00	426.00	432.00	452.00	457.00	757.00	769.00	775.00	795.00	800.00	0.00

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 800' (~244 m) total span length, Travel Speeds (with Impact)

**SHEAR CALCULATIONS**

SHEAR	Shear at React A, kips	VEHICLE NO. 1					VEHICLE NO. 2					Shear at React B, kips
		Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	
Vehicle #1 (Left), Front (#1) Axle at Support Axle Positions	463.89 0.00	423.99 0.00	344.19 12.00	264.39 18.00	211.19 38.00	157.99 43.00	118.09 343.00	38.29 355.00	-41.51 361.00	-94.71 381.00	-147.91 386.00	147.91 800.00
Resultant of both Vehicles at Mid-span Axle Positions	305.90 0.00	266.00 206.59	186.20 218.59	106.40 224.59	53.20 244.59	0.00 249.59	-39.90 549.59	-119.70 561.59	-199.50 567.59	-252.70 587.59	-305.90 592.59	305.90 800.00
Vehicle #2, Rear (#3) Axle at Support Axle Positions	147.28 0.00	107.38 414.00	27.58 426.00	-52.22 432.00	-105.42 452.00	-158.62 457.00	-198.52 757.00	-278.32 769.00	-358.12 775.00	-411.32 795.00	-464.52 800.00	464.52 800.00

**464.5** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**223.9** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips

**350.6** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

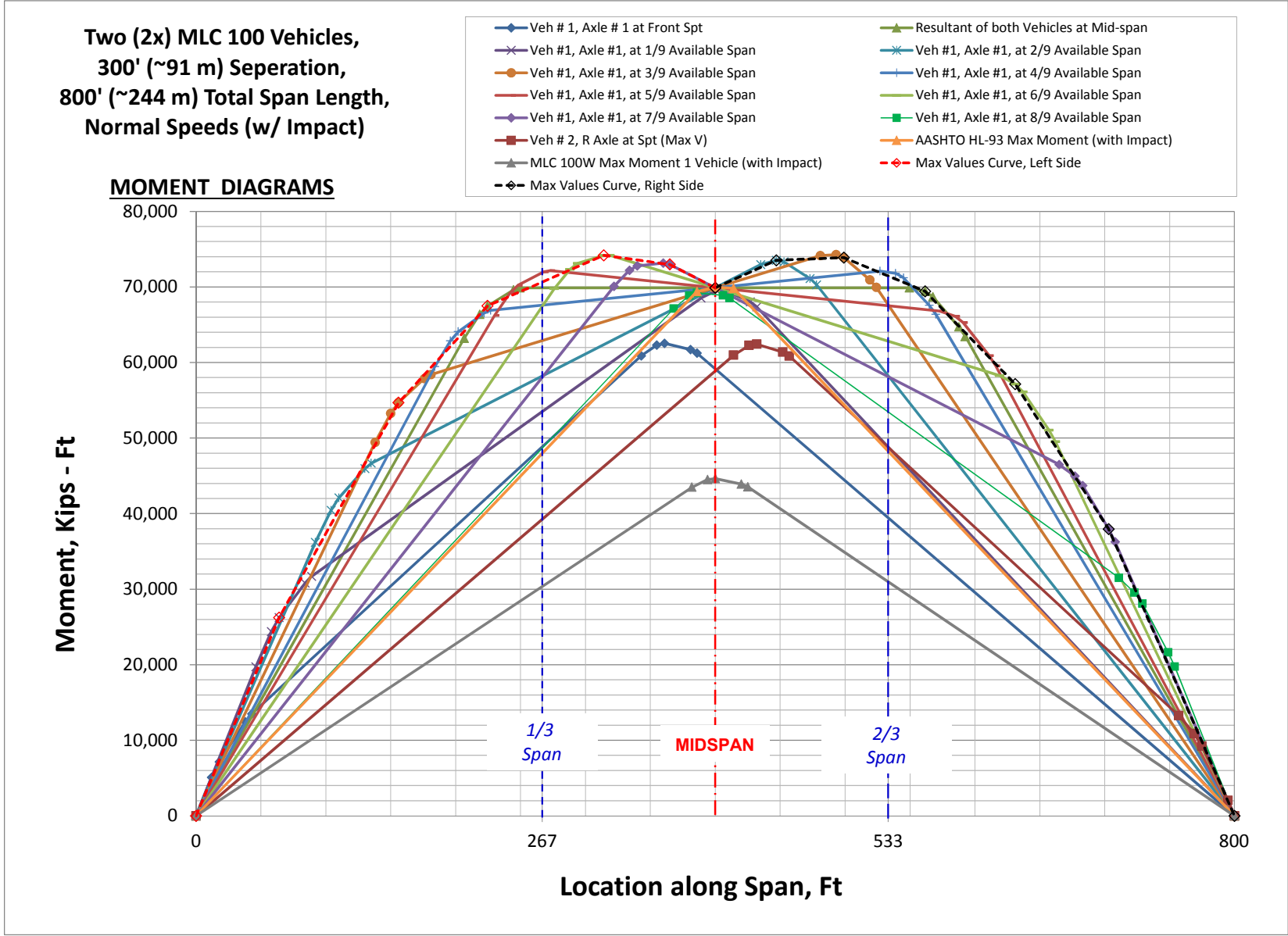
MOMENT	Moment at React A, ft-kips	VEHICLE NO. 1					VEHICLE NO. 2					Moment at React B, ft-kips
		Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	
Vehicle #1 (Left), Front (#1) Axle at Support Axle Positions	0.00 0.00	0.00 0.00	5,087.85 12.00	7,152.97 18.00	12,440.72 38.00	13,496.66 43.00	60,892.87 343.00	62,309.92 355.00	62,539.64 361.00	61,709.39 381.00	61,235.83 386.00	0.00 800.00
Resultant of both Vehicles at Mid-span Axle Positions	0.00 0.00	63,194.95 206.59	66,386.95 218.59	<b>67,504.15</b> <b>224.59</b>	69,632.15 244.59	69,898.15 249.59	69,898.15 549.59	<b>69,419.35</b> <b>561.59</b>	68,701.15 567.59	64,711.15 587.59	63,447.65 592.59	0.00 800.00
Vehicle # 1, Axle # 1, at 1/9 Avail. Span Length Axle Positions	0.00 0.00	19,720.61 46.00	24,386.31 58.00	<b>26,240.37</b> <b>64.00</b>	30,824.55 84.00	31,704.59 89.00	68,547.25 389.00	69,542.16 401.00	69,560.81 407.00	68,026.99 427.00	67,377.53 432.00	0.00 800.00
Vehicle # 1, Axle # 1, at 2/9 Avail. Span Length Axle Positions	0.00 0.00	36,204.79 92.00	40,448.36 104.00	42,091.34 110.00	45,971.95 130.00	46,676.10 135.00	72,965.21 435.00	<b>73,537.98</b> <b>447.00</b>	73,345.56 453.00	71,108.17 473.00	70,282.82 478.00	0.00 800.00
Vehicle # 1, Axle # 1, at 3/9 Avail. Span Length Axle Positions	0.00 0.00	49,452.56 138.00	53,273.98 150.00	<b>54,705.89</b> <b>156.00</b>	57,882.93 176.00	58,411.19 181.00	74,146.75 481.00	74,297.37 493.00	<b>73,893.89</b> <b>499.00</b>	70,952.92 519.00	69,951.68 524.00	0.00 800.00
Vehicle # 1, Axle # 1, at 4/9 Avail. Span Length Axle Positions	0.00 0.00	59,463.90 184.00	62,863.18 196.00	64,084.02 202.00	66,557.49 222.00	66,909.86 227.00	72,091.87 527.00	71,820.35 539.00	71,205.79 545.00	67,561.26 565.00	66,384.12 570.00	0.00 800.00
Vehicle # 1, Axle # 1, at 5/9 Avail. Span Length Axle Positions	0.00 0.00	66,238.82 230.00	69,215.96 242.00	70,225.73 248.00	71,995.63 268.00	72,172.10 273.00	66,800.56 573.00	66,106.90 585.00	65,281.27 591.00	60,933.17 611.00	59,580.14 616.00	0.00 800.00
Vehicle # 1, Axle # 1, at 6/9 Avail. Span Length Axle Positions	0.00 0.00	69,777.32 276.00	72,332.32 288.00	73,131.01 294.00	<b>74,197.34</b> <b>314.00</b>	74,197.92 319.00	58,272.84 619.00	<b>57,157.03</b> <b>631.00</b>	56,120.33 637.00	51,068.66 657.00	49,539.74 662.00	0.00 800.00
Vehicle # 1, Axle # 1, at 7/9 Avail. Span Length Axle Positions	0.00 0.00	70,079.40 322.00	72,212.25 334.00	72,799.88 340.00	73,162.64 360.00	<b>72,987.32</b> <b>365.00</b>	46,508.69 665.00	44,970.74 677.00	43,722.97 683.00	<b>37,967.73</b> <b>703.00</b>	36,262.92 708.00	0.00 800.00
Vehicle # 1, Axle # 1, at 8/9 Avail. Span Length Axle Positions	0.00 0.00	67,145.05 368.00	68,855.76 380.00	69,232.32 386.00	68,891.51 406.00	68,540.30 411.00	31,508.12 711.00	29,548.03 723.00	28,089.18 729.00	21,630.37 749.00	19,749.67 754.00	0.00 800.00
Vehicle #2, Rear (#3) Axle at Support Axle Positions	<b>0.00</b> <b>0.00</b>	60,974.28 414.00	62,262.85 426.00	62,428.34 432.00	61,383.96 452.00	60,856.86 457.00	13,271.12 757.00	10,888.89 769.00	9,218.98 775.00	2,056.60 795.00	0.00 800.00	<b>0.00</b> <b>800.00</b>

**74,297** MLC 100W 2x Vehicle on Span Maximum Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

**44,650** MLC 100W 1x Vehicle on Span Maximum Midspan Moment w/Impact, kips

**69,980** Maximum AASHTO HL-93 Single Span Design Moment w/Impact, ft-kips

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 800' (~244 m) total span length, Travel Speeds (with Impact)

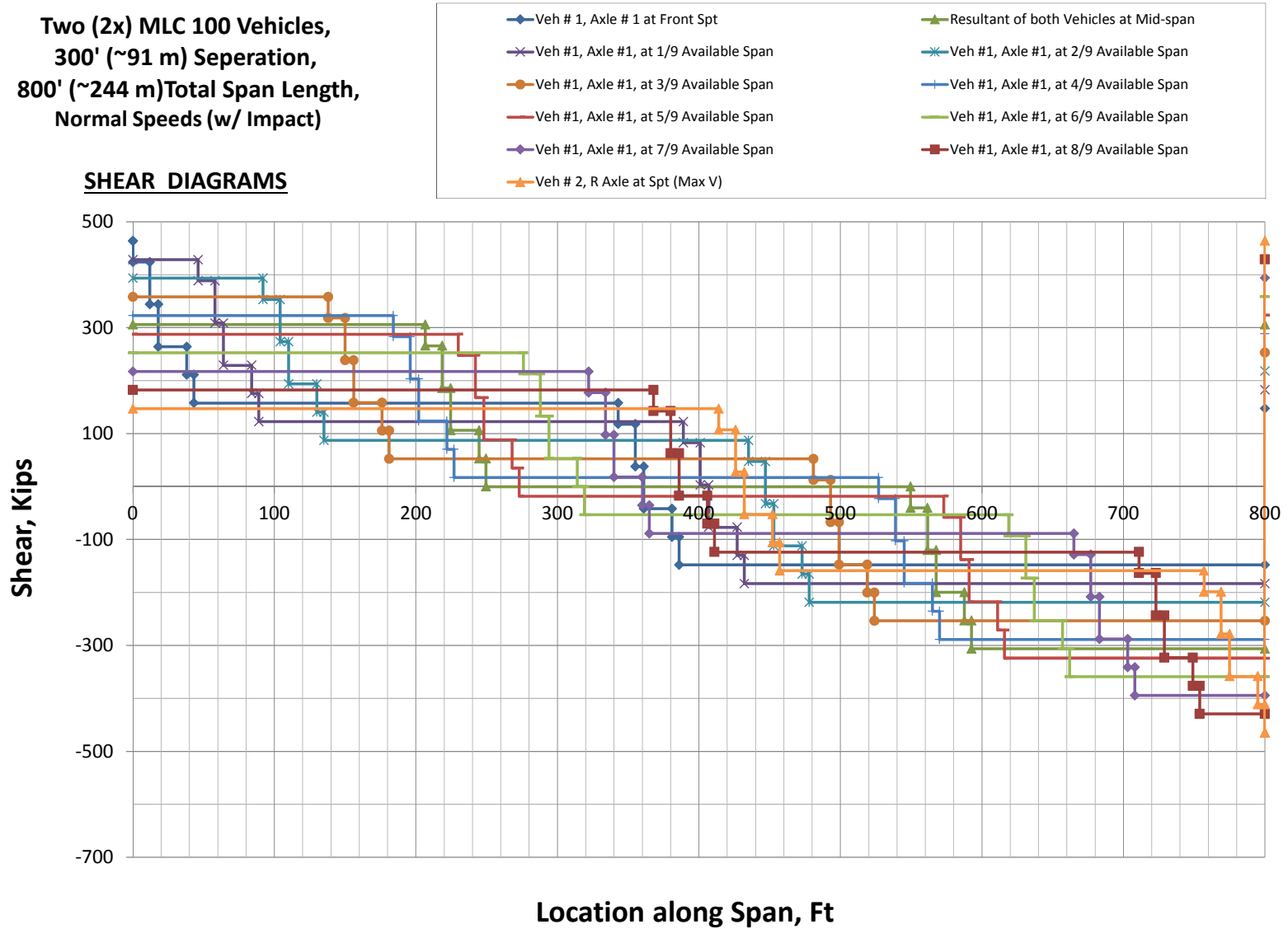


**TEN (10) AXLE**

**Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 800' (~244 m) total span length, Travel Speeds (with Impact)**

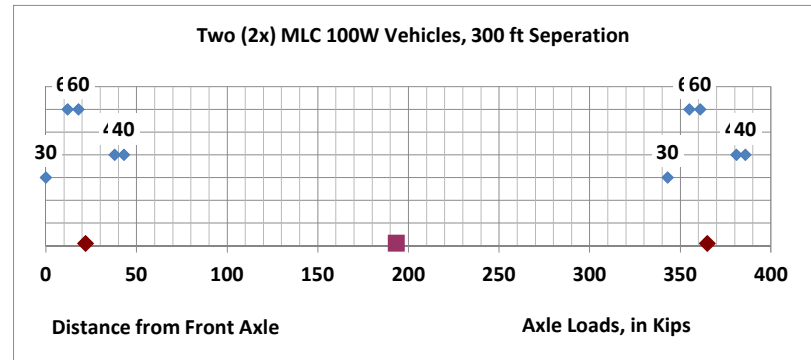
**Two (2x) MLC 100 Vehicles,  
 300' (~91 m) Separation,  
 800' (~244 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

**SHEAR DIAGRAMS**



**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 850' (~259 m) total span length, Travel Speeds (with Impact)

	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
<b>Totals</b>		<b>230.0</b>	<b>460.0</b>	<b>386.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 193.413 ft, from Front axle of 1st vehicle

850 ft, Total Span Length      33% Dynamic Impact Factor

**POSSIBLE VEHICLE LOCATIONS USED FOR SHEAR AND MOMENT CALCULATIONS**

	VEHICLE NO. 1					VEHICLE NO. 2					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Vehicle # 1 (Left Side), Front (#1) Axle at Support	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	464.00
Resultant of both Vehicles at Mid-span	231.59	243.59	249.59	269.59	274.59	574.59	586.59	592.59	612.59	617.59	232.41
Vehicle # 1, Axle # 1, at 1/9 Available Span Length	51.56	63.56	69.56	89.56	94.56	394.56	406.56	412.56	432.56	437.56	412.44
Vehicle # 1, Axle # 1, at 2/9 Available Span Length	103.11	115.11	121.11	141.11	146.11	446.11	458.11	464.11	484.11	489.11	360.89
Vehicle # 1, Axle # 1, at 3/9 Available Span Length	154.67	166.67	172.67	192.67	197.67	497.67	509.67	515.67	535.67	540.67	309.33
Vehicle # 1, Axle # 1, at 4/9 Available Span Length	206.22	218.22	224.22	244.22	249.22	549.22	561.22	567.22	587.22	592.22	257.78
Vehicle # 1, Axle # 1, at 5/9 Available Span Length	257.78	269.78	275.78	295.78	300.78	600.78	612.78	618.78	638.78	643.78	206.22
Vehicle # 1, Axle # 1, at 6/9 Available Span Length	309.33	321.33	327.33	347.33	352.33	652.33	664.33	670.33	690.33	695.33	154.67
Vehicle # 1, Axle # 1, at 7/9 Available Span Length	360.89	372.89	378.89	398.89	403.89	703.89	715.89	721.89	741.89	746.89	103.11
Vehicle # 1, Axle # 1, at 8/9 Available Span Length	412.44	424.44	430.44	450.44	455.44	755.44	767.44	773.44	793.44	798.44	51.56
Vehicle #2 (Right Side), Rear (#3) Axle at Support (Max V)	464.00	476.00	482.00	502.00	507.00	807.00	819.00	825.00	845.00	850.00	0.00

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 850' (~259 m) total span length, Travel Speeds (with Impact)

**SHEAR CALCULATIONS**

SHEAR	Shear at React A, kips	VEHICLE NO. 1					VEHICLE NO. 2					Shear at React B, kips
		Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	
Vehicle #1 (Left), Front (#1) Axle at Support	472.59	432.69	352.89	273.09	219.89	166.69	126.79	46.99	-32.81	-86.01	-139.21	139.21
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	850.00
Resultant of both Vehicles at Mid-span	305.90	266.00	186.20	106.40	53.20	0.00	-39.90	-119.70	-199.50	-252.70	-305.90	305.90
Axle Positions	0.00	231.59	243.59	249.59	269.59	274.59	574.59	586.59	592.59	612.59	617.59	850.00
Vehicle #2, Rear (#3) Axle at Support (Max V)	138.62	98.72	18.92	-60.88	-114.08	-167.28	-207.18	-286.98	-366.78	-419.98	-473.18	473.18
Axle Positions	0.00	464.00	476.00	482.00	502.00	507.00	807.00	819.00	825.00	845.00	850.00	850.00

**473.2** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**224.3** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips

**366.7** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	Moment at React A, ft-kips	VEHICLE NO. 1					VEHICLE NO. 2					Moment at React B, ft-kips
		Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	
Vehicle #1 (Left), Front (#1) Axle at Support	0.00	0.00	5,192.26	7,309.59	12,771.35	13,870.79	63,877.22	65,398.68	65,680.61	65,024.37	64,594.31	0.00
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	850.00
Resultant of both Vehicles at Mid-span	0.00	70,842.45	74,034.45	75,151.65	77,279.65	77,545.65	77,545.65	77,066.85	76,348.65	72,358.65	71,095.15	0.00
Axle Positions	0.00	231.59	243.59	249.59	269.59	274.59	574.59	586.59	592.59	612.59	617.59	850.00
Vehicle # 1, Axle # 1, at 1/9 Avail. Span Length	0.00	22,451.43	27,198.39	29,093.07	33,812.68	34,726.58	73,600.65	74,676.81	74,736.10	73,337.70	72,722.10	0.00
Axle Positions	0.00	51.56	63.56	69.56	89.56	94.56	394.56	406.56	412.56	432.56	437.56	850.00
Vehicle # 1, Axle # 1, at 2/9 Avail. Span Length	0.00	41,076.62	45,378.29	47,050.32	51,027.77	51,756.13	79,497.84	80,128.71	79,965.35	77,824.80	77,023.66	0.00
Axle Positions	0.00	103.11	115.11	121.11	141.11	146.11	446.11	458.11	464.11	484.11	489.11	850.00
Vehicle # 1, Axle # 1, at 3/9 Avail. Span Length	0.00	55,875.58	59,731.95	61,181.34	64,416.63	64,959.45	81,568.80	81,754.38	81,368.37	78,485.66	77,498.98	0.00
Axle Positions	0.00	154.67	166.67	172.67	192.67	197.67	497.67	509.67	515.67	535.67	540.67	850.00
Vehicle # 1, Axle # 1, at 4/9 Avail. Span Length	0.00	66,848.30	70,259.38	71,486.12	73,979.26	74,336.54	79,813.53	79,553.81	78,945.15	75,320.28	74,148.07	0.00
Axle Positions	0.00	206.22	218.22	224.22	244.22	249.22	549.22	561.22	567.22	587.22	592.22	850.00
Vehicle # 1, Axle # 1, at 5/9 Avail. Span Length	0.00	73,994.79	76,960.58	77,964.67	79,715.65	79,887.39	74,232.02	73,527.01	72,695.70	68,328.68	66,970.92	0.00
Axle Positions	0.00	257.78	269.78	275.78	295.78	300.78	600.78	612.78	618.78	638.78	643.78	850.00
Vehicle # 1, Axle # 1, at 6/9 Avail. Span Length	0.00	77,315.05	79,835.54	80,616.99	81,625.81	81,612.01	64,824.28	63,673.97	62,620.02	57,510.84	55,967.54	0.00
Axle Positions	0.00	309.33	321.33	327.33	347.33	352.33	652.33	664.33	670.33	690.33	695.33	850.00
Vehicle # 1, Axle # 1, at 7/9 Avail. Span Length	0.00	76,809.08	78,884.27	79,443.07	79,709.73	79,510.40	51,590.31	49,994.70	48,718.10	42,866.76	41,137.93	0.00
Axle Positions	0.00	360.89	372.89	378.89	398.89	403.89	703.89	715.89	721.89	741.89	746.89	850.00
Vehicle # 1, Axle # 1, at 8/9 Avail. Span Length	0.00	72,476.87	74,106.77	74,442.92	73,967.42	73,582.55	34,530.10	32,489.20	30,989.95	24,396.45	22,482.08	0.00
Axle Positions	0.00	412.44	424.44	430.44	450.44	455.44	755.44	767.44	773.44	793.44	798.44	850.00
Vehicle #2, Rear (#3) Axle at Support	0.00	64,318.42	65,503.03	65,616.54	64,398.88	63,828.47	13,643.66	11,157.46	9,435.57	2,099.91	0.00	0.00
Axle Positions	0.00	464.00	476.00	482.00	502.00	507.00	807.00	819.00	825.00	845.00	850.00	850.00

**81,754** MLC 100W 2x Vehicle on Span Maximum Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

**47,525** MLC 100W 1x Vehicle on Span Maximum Midspan Moment w/Impact, kips

**77,777** Maximum AASHTO HL-93 Single Span Design Moment w/Impact, ft-kips

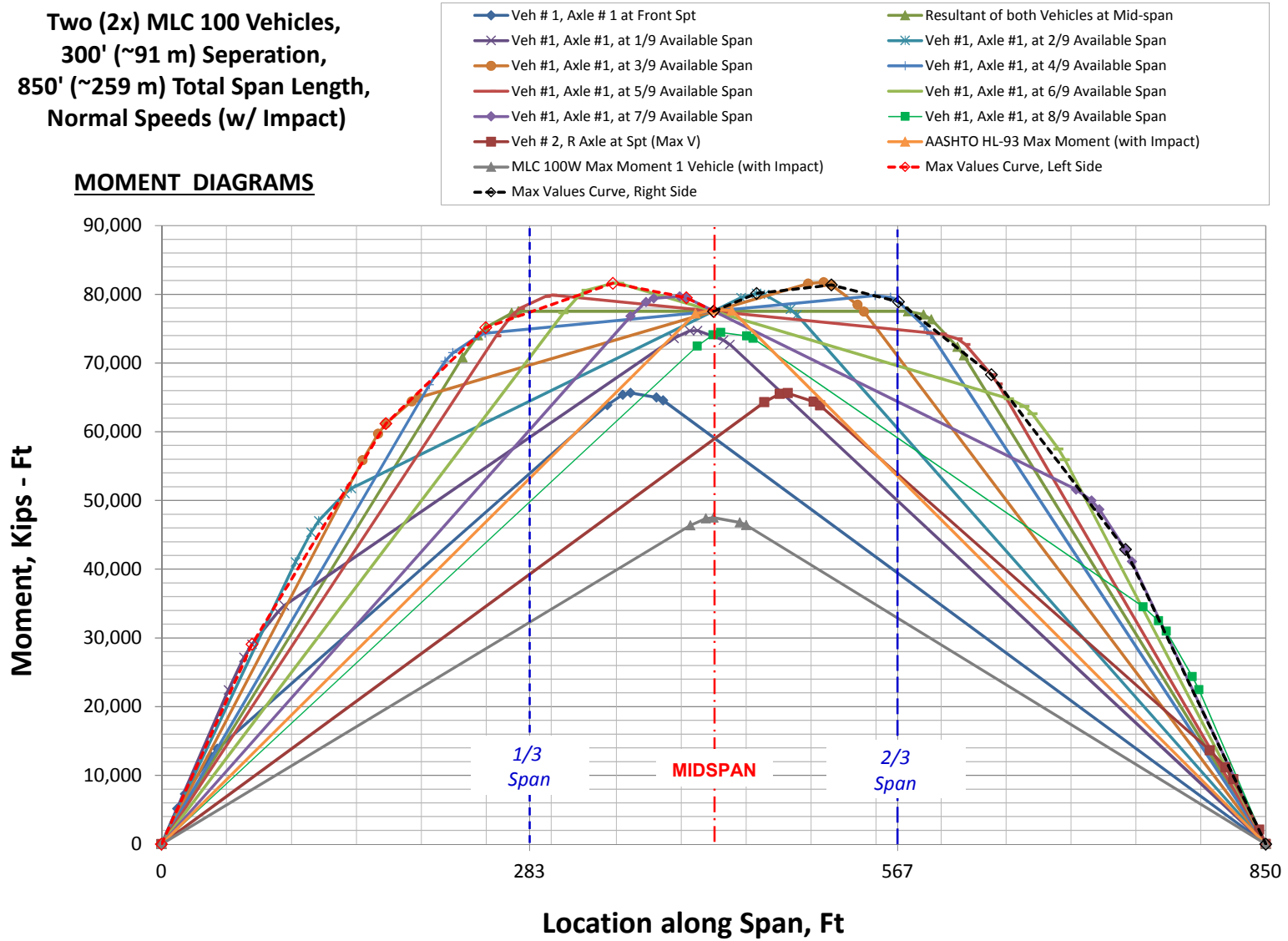


**TEN (10) AXLE**

**Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 850' (~259 m) total span length, Travel Speeds (with Impact)**

**Two (2x) MLC 100 Vehicles,  
300' (~91 m) Separation,  
850' (~259 m) Total Span Length,  
Normal Speeds (w/ Impact)**

**MOMENT DIAGRAMS**

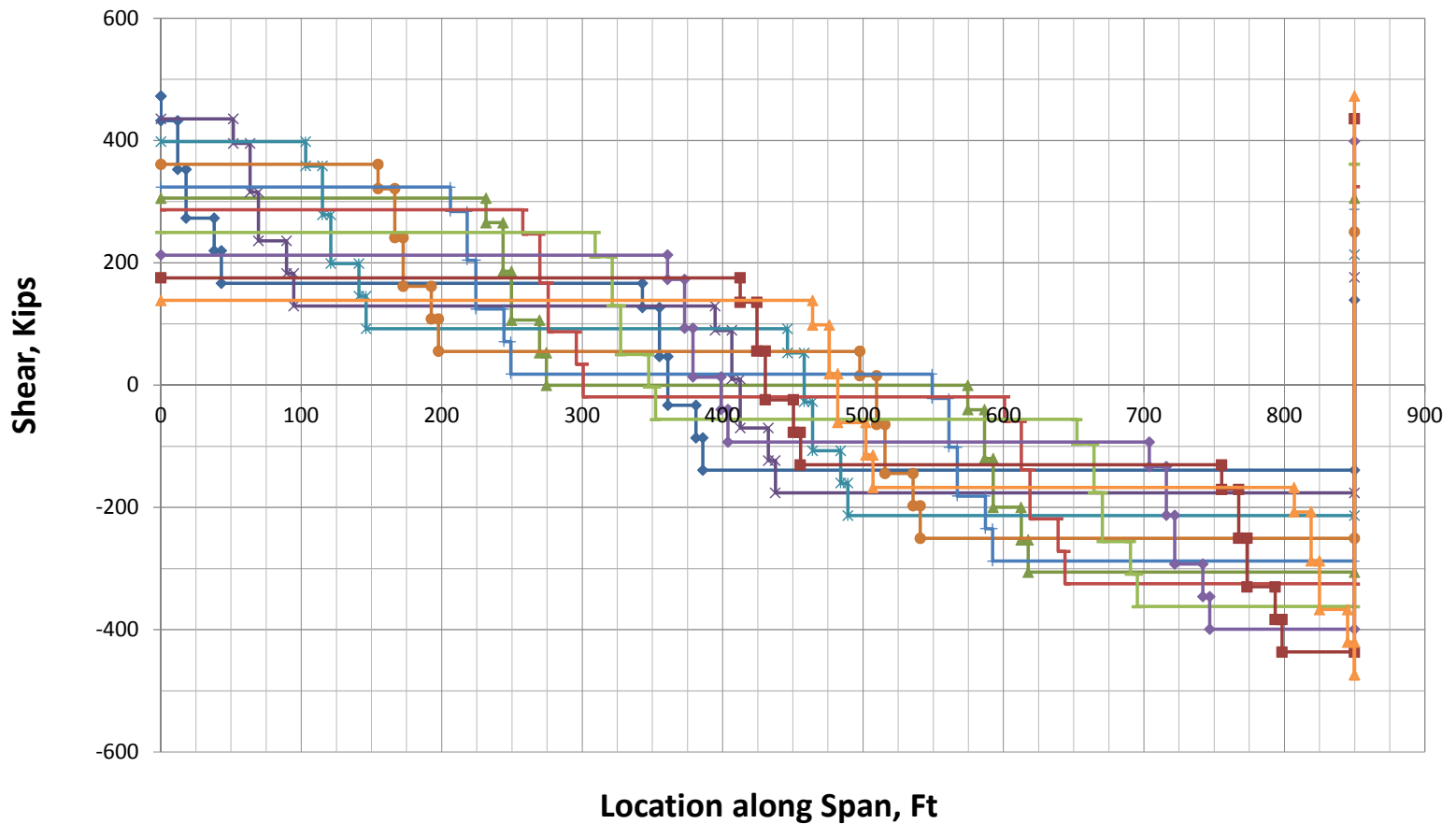


**TEN (10) AXLE**

**Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 850' (~259 m) total span length, Travel Speeds (with Impact)**

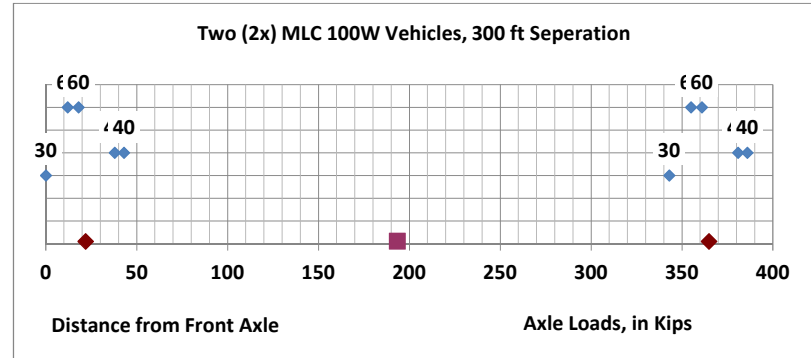
**Two (2x) MLC 100 Vehicles,  
 300' (~91 m) Separation,  
 850' (~259 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

**SHEAR DIAGRAMS**



**TEN (10) AXLE** **Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 900' (~274 m) total span length, Travel Speeds (with Impact)**

	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
<b>Totals</b>		<b>230.0</b>	<b>460.0</b>	<b>386.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 193.413 ft, from Front axle of 1st vehicle

900 ft, Total Span Length      33% Dynamic Impact Factor

**POSSIBLE VEHICLE LOCATIONS USED FOR SHEAR AND MOMENT CALCULATIONS**

	VEHICLE NO. 1					VEHICLE NO. 2					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Vehicle # 1 (Left Side), Front (#1) Axle at Support	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	514.00
Resultant of both Vehicles at Mid-span	256.59	268.59	274.59	294.59	299.59	599.59	611.59	617.59	637.59	642.59	257.41
Vehicle # 1, Axle # 1, at 1/9 Available Span Length	57.11	69.11	75.11	95.11	100.11	400.11	412.11	418.11	438.11	443.11	456.89
Vehicle # 1, Axle # 1, at 2/9 Available Span Length	114.22	126.22	132.22	152.22	157.22	457.22	469.22	475.22	495.22	500.22	399.78
Vehicle # 1, Axle # 1, at 3/9 Available Span Length	171.33	183.33	189.33	209.33	214.33	514.33	526.33	532.33	552.33	557.33	342.67
Vehicle # 1, Axle # 1, at 4/9 Available Span Length	228.44	240.44	246.44	266.44	271.44	571.44	583.44	589.44	609.44	614.44	285.56
Vehicle # 1, Axle # 1, at 5/9 Available Span Length	285.56	297.56	303.56	323.56	328.56	628.56	640.56	646.56	666.56	671.56	228.44
Vehicle # 1, Axle # 1, at 6/9 Available Span Length	342.67	354.67	360.67	380.67	385.67	685.67	697.67	703.67	723.67	728.67	171.33
Vehicle # 1, Axle # 1, at 7/9 Available Span Length	399.78	411.78	417.78	437.78	442.78	742.78	754.78	760.78	780.78	785.78	114.22
Vehicle # 1, Axle # 1, at 8/9 Available Span Length	456.89	468.89	474.89	494.89	499.89	799.89	811.89	817.89	837.89	842.89	57.11
Vehicle #2 (Right Side), Rear (#3) Axle at Support (Max V)	514.00	526.00	532.00	552.00	557.00	857.00	869.00	875.00	895.00	900.00	0.00

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 900' (~274 m) total span length, Travel Speeds (with Impact)

**SHEAR CALCULATIONS**

SHEAR	Shear at React A, kips	VEHICLE NO. 1					VEHICLE NO. 2					Shear at React B, kips
		Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	
Vehicle #1 (Left), Front (#1) Axle at Support	480.32	440.42	360.62	280.82	227.62	174.42	134.52	54.72	-25.08	-78.28	-131.48	131.48
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	900.00
Resultant of both Vehicles at Mid-span	305.90	266.00	186.20	106.40	53.20	0.00	-39.90	-119.70	-199.50	-252.70	-305.90	305.90
Axle Positions	0.00	256.59	268.59	274.59	294.59	299.59	599.59	611.59	617.59	637.59	642.59	900.00
Vehicle #2, Rear (#3) Axle at Support (Max V)	130.92	91.02	11.22	-68.58	-121.78	-174.98	-214.88	-294.68	-374.48	-427.68	-480.88	480.88
Axle Positions	0.00	514.00	526.00	532.00	552.00	557.00	857.00	869.00	875.00	895.00	900.00	900.00

**480.9** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**224.6** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips

**382.8** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	Moment at React A, ft-kips	VEHICLE NO. 1					VEHICLE NO. 2					Moment at React B, ft-kips
		Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	
Vehicle #1 (Left), Front (#1) Axle at Support	0.00	0.00	5,285.07	7,448.80	13,065.24	14,203.35	66,529.98	68,144.25	68,472.58	67,971.02	67,579.63	0.00
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	900.00
Resultant of both Vehicles at Mid-span	0.00	78,489.95	81,681.95	82,799.15	84,927.15	85,193.15	85,193.15	84,714.35	83,996.15	80,006.15	78,742.65	0.00
Axle Positions	0.00	256.59	268.59	274.59	294.59	299.59	599.59	611.59	617.59	637.59	642.59	900.00
Vehicle # 1, Axle # 1, at 1/9 Avail. Span Length	0.00	25,214.51	30,033.70	<b>31,964.50</b>	36,804.48	37,748.48	78,428.25	79,576.65	79,672.04	78,394.03	77,808.52	0.00
Axle Positions	0.00	57.11	69.11	<b>75.11</b>	95.11	100.11	400.11	412.11	418.11	438.11	443.11	900.00
Vehicle # 1, Axle # 1, at 2/9 Avail. Span Length	0.00	45,994.59	50,347.91	52,045.77	56,109.29	56,859.18	85,892.09	86,574.61	86,437.07	84,382.59	83,602.97	0.00
Axle Positions	0.00	114.22	126.22	132.22	152.22	157.22	457.22	469.22	475.22	495.22	500.22	900.00
Vehicle # 1, Axle # 1, at 3/9 Avail. Span Length	0.00	62,340.24	66,227.68	<b>67,692.60</b>	70,979.67	71,535.44	88,921.49	<b>89,138.14</b>	88,767.66	85,936.73	84,962.99	0.00
Axle Positions	0.00	171.33	183.33	<b>189.33</b>	209.33	214.33	514.33	<b>526.33</b>	532.33	552.33	557.33	900.00
Vehicle # 1, Axle # 1, at 4/9 Avail. Span Length	0.00	74,251.45	77,673.02	<b>78,905.00</b>	81,415.61	81,777.27	87,516.46	<b>87,267.23</b>	86,663.81	83,056.43	81,888.58	0.00
Axle Positions	0.00	228.44	240.44	<b>246.44</b>	266.44	271.44	571.44	<b>583.44</b>	589.44	609.44	614.44	900.00
Vehicle # 1, Axle # 1, at 5/9 Avail. Span Length	0.00	81,728.22	84,683.92	85,682.96	<b>87,417.12</b>	87,584.66	81,677.00	<b>80,961.89</b>	80,125.54	75,741.69	74,379.73	0.00
Axle Positions	0.00	285.56	297.56	303.56	<b>323.56</b>	328.56	628.56	<b>640.56</b>	646.56	666.56	671.56	900.00
Vehicle # 1, Axle # 1, at 6/9 Avail. Span Length	0.00	84,770.57	87,260.39	88,026.50	<b>88,984.20</b>	88,957.62	71,403.10	70,222.12	<b>69,152.83</b>	63,992.52	62,436.45	0.00
Axle Positions	0.00	342.67	354.67	360.67	<b>380.67</b>	385.67	685.67	697.67	<b>703.67</b>	723.67	728.67	900.00
Vehicle # 1, Axle # 1, at 7/9 Avail. Span Length	0.00	83,378.48	85,402.42	85,935.59	86,116.84	85,896.15	56,694.76	55,047.91	53,745.68	<b>47,808.92</b>	46,058.73	0.00
Axle Positions	0.00	399.78	411.78	417.78	437.78	442.78	742.78	754.78	760.78	<b>780.78</b>	785.78	900.00
Vehicle # 1, Axle # 1, at 8/9 Avail. Span Length	0.00	77,551.95	79,110.02	79,410.26	78,815.04	78,400.24	37,552.00	35,439.27	33,904.10	27,190.89	25,246.58	0.00
Axle Positions	0.00	456.89	468.89	474.89	494.89	499.89	799.89	811.89	817.89	837.89	842.89	900.00
Vehicle #2, Rear (#3) Axle at Support	<b>0.00</b>	67,291.00	68,383.19	68,450.49	67,078.82	66,469.90	13,974.80	11,396.19	9,628.09	2,138.42	0.00	<b>0.00</b>
Axle Positions	<b>0.00</b>	514.00	526.00	532.00	552.00	557.00	857.00	869.00	875.00	895.00	900.00	<b>900.00</b>

**89,138** MLC 100W 2x Vehicle on Span Maximum Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

**50,400** MLC 100W 1x Vehicle on Span Maximum Midspan Moment w/Impact, kips

**85,974** Maximum AASHTO HL-93 Single Span Design Moment w/Impact, ft-kips

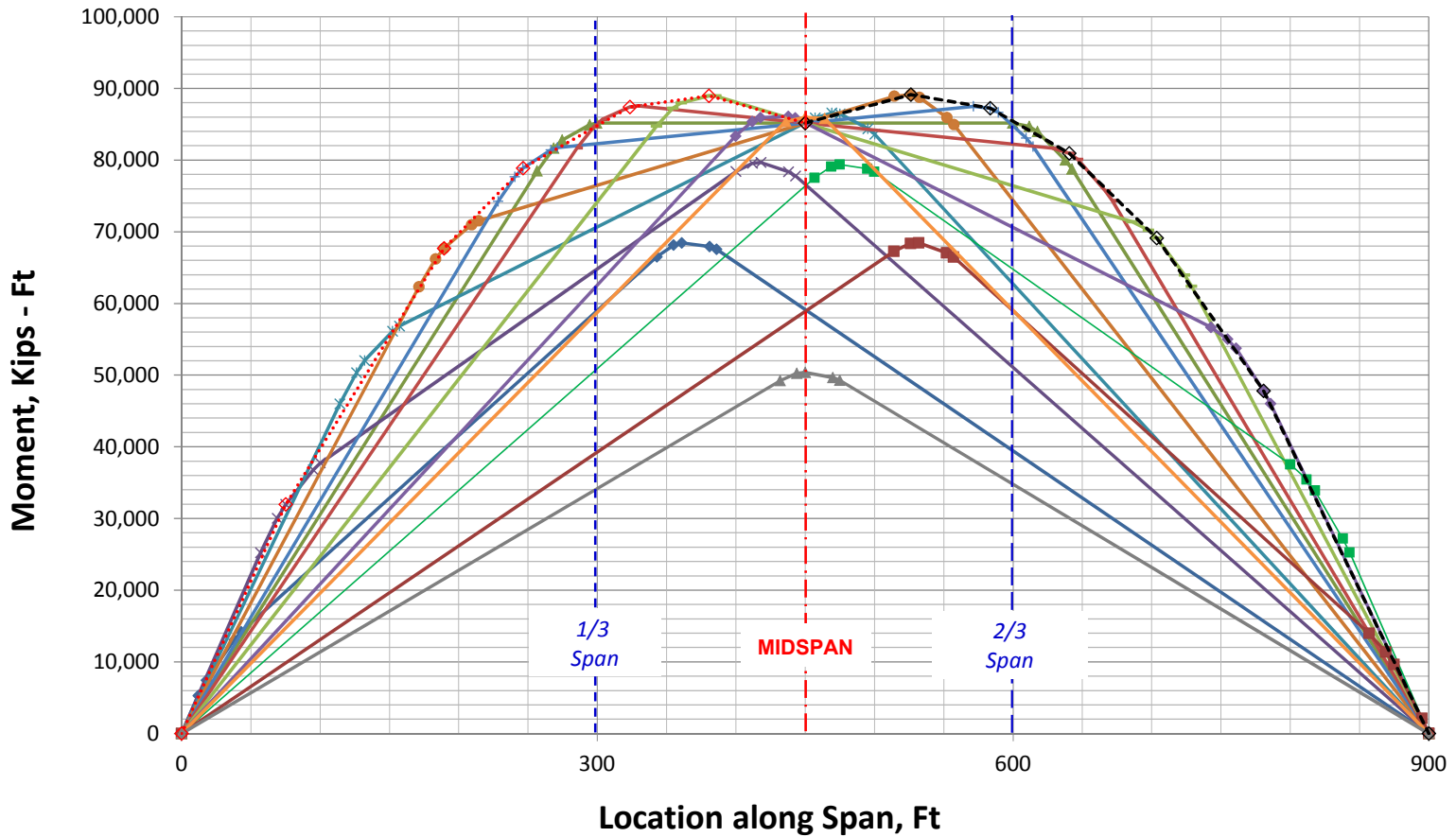
**TEN (10) AXLE**

**Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 900' (~274 m) total span length, Travel Speeds (with Impact)**

**Two (2x) MLC 100W Vehicles,  
300' (~91 m) Separation,  
900' (~274 m) Total Span Length,  
Normal Speeds (w/ Impact)**

**MOMENT DIAGRAMS**

- ◆— Veh # 1, Axle # 1 at Front Spt
- ×— Veh #1, Axle #1, at 1/9 Available Span
- Veh #1, Axle #1, at 3/9 Available Span
- Veh #1, Axle #1, at 5/9 Available Span
- ◇— Veh #1, Axle #1, at 7/9 Available Span
- Veh # 2, R Axle at Spt (Max V)
- ▲— MLC 100W Max Moment 1 Vehicle (with Impact)
- ◆— Max Values Curve, Right Side
- ▲— Resultant of both Vehicles at Mid-span
- ×— Veh #1, Axle #1, at 2/9 Available Span
- Veh #1, Axle #1, at 4/9 Available Span
- ◇— Veh #1, Axle #1, at 6/9 Available Span
- Veh #1, Axle #1, at 8/9 Available Span
- ▲— AASHTO HL-93 Max Moment (with Impact)
- ◆— Max Values Curve, Left Side

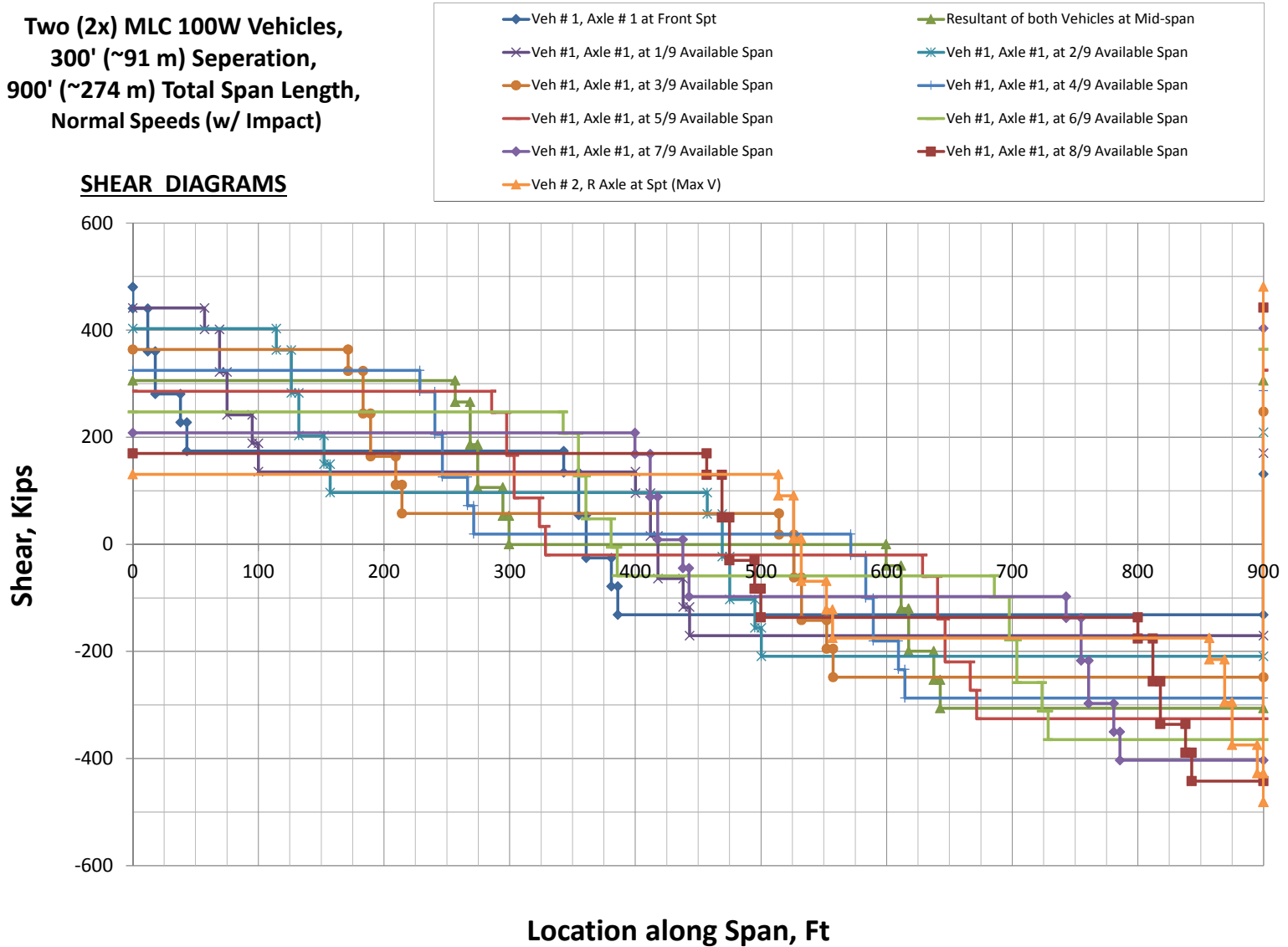


**TEN (10) AXLE**

**Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 900' (~274 m) total span length, Travel Speeds (with Impact)**

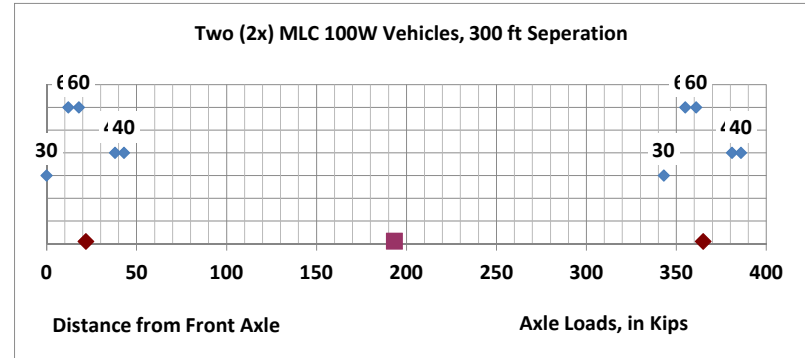
**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 900' (~274 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

**SHEAR DIAGRAMS**



**TEN (10) AXLE** **Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 950' (~290 m) total span length, Travel Speeds (with Impact)**

	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
<b>Totals</b>		<b>230.0</b>	<b>460.0</b>	<b>386.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 193.413 ft, from Front axle of 1st vehicle

950 ft, Total Span Length      33% Dynamic Impact Factor

**POSSIBLE VEHICLE LOCATIONS USED FOR SHEAR AND MOMENT CALCULATIONS**

	VEHICLE NO. 1					VEHICLE NO. 2					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Vehicle # 1 (Left Side), Front (#1) Axle at Support	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	564.00
Resultant of both Vehicles at Mid-span	281.59	293.59	299.59	319.59	324.59	624.59	636.59	642.59	662.59	667.59	282.41
Vehicle # 1, Axle # 1, at 1/9 Available Span Length	62.67	74.67	80.67	100.67	105.67	405.67	417.67	423.67	443.67	448.67	501.33
Vehicle # 1, Axle # 1, at 2/9 Available Span Length	125.33	137.33	143.33	163.33	168.33	468.33	480.33	486.33	506.33	511.33	438.67
Vehicle # 1, Axle # 1, at 3/9 Available Span Length	188.00	200.00	206.00	226.00	231.00	531.00	543.00	549.00	569.00	574.00	376.00
Vehicle # 1, Axle # 1, at 4/9 Available Span Length	250.67	262.67	268.67	288.67	293.67	593.67	605.67	611.67	631.67	636.67	313.33
Vehicle # 1, Axle # 1, at 5/9 Available Span Length	313.33	325.33	331.33	351.33	356.33	656.33	668.33	674.33	694.33	699.33	250.67
Vehicle # 1, Axle # 1, at 6/9 Available Span Length	376.00	388.00	394.00	414.00	419.00	719.00	731.00	737.00	757.00	762.00	188.00
Vehicle # 1, Axle # 1, at 7/9 Available Span Length	438.67	450.67	456.67	476.67	481.67	781.67	793.67	799.67	819.67	824.67	125.33
Vehicle # 1, Axle # 1, at 8/9 Available Span Length	501.33	513.33	519.33	539.33	544.33	844.33	856.33	862.33	882.33	887.33	62.67
Vehicle #2 (Right Side), Rear (#3) Axle at Support (Max V)	564.00	576.00	582.00	602.00	607.00	907.00	919.00	925.00	945.00	950.00	0.00

**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 950' (~290 m) total span length, Travel Speeds (with Impact)

**SHEAR CALCULATIONS**

SHEAR	Shear at React A, kips	VEHICLE NO. 1					VEHICLE NO. 2					Shear at React B, kips
		Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	
Vehicle #1 (Left), Front (#1) Axle at Support	487.24	447.34	367.54	287.74	234.54	181.34	141.44	61.64	-18.16	-71.36	-124.56	124.56
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	950.00
Resultant of both Vehicles at Mid-span	305.90	266.00	186.20	106.40	53.20	0.00	-39.90	-119.70	-199.50	-252.70	-305.90	305.90
Axle Positions	0.00	281.59	293.59	299.59	319.59	324.59	624.59	636.59	642.59	662.59	667.59	950.00
Vehicle #2, Rear (#3) Axle at Support (Max V)	124.03	84.13	4.33	-75.47	-128.67	-181.87	-221.77	-301.57	-381.37	-434.57	-487.77	487.77
Axle Positions	0.00	564.00	576.00	582.00	602.00	607.00	907.00	919.00	925.00	945.00	950.00	950.00

**487.8** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**224.9** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips

**398.8** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	Moment at React A, ft-kips	VEHICLE NO. 1					VEHICLE NO. 2					Moment at React B, ft-kips
		Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	
Vehicle #1 (Left), Front (#1) Axle at Support	0.00	0.00	5,368.10	7,573.36	13,328.20	14,500.91	68,903.51	70,600.81	70,970.66	70,607.50	70,250.71	0.00
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	950.00
Resultant of both Vehicles at Mid-span	0.00	86,137.45	89,329.45	90,446.65	92,574.65	92,840.65	92,840.65	92,361.85	91,643.65	87,653.65	86,390.15	0.00
Axle Positions	0.00	281.59	293.59	299.59	319.59	324.59	624.59	636.59	642.59	662.59	667.59	950.00
Vehicle # 1, Axle # 1, at 1/9 Avail. Span Length	0.00	28,004.77	32,888.59	<b>34,851.70</b>	39,799.39	40,770.31	83,065.71	84,278.73	84,406.44	83,236.13	82,677.55	0.00
Axle Positions	0.00	62.67	74.67	<b>80.67</b>	100.67	105.67	405.67	417.67	423.67	443.67	448.67	950.00
Vehicle # 1, Axle # 1, at 2/9 Avail. Span Length	0.00	50,951.43	55,350.95	57,071.92	61,212.46	61,981.60	92,169.80	92,898.53	92,784.09	90,806.64	90,046.28	0.00
Axle Positions	0.00	125.33	137.33	143.33	163.33	168.33	468.33	480.33	486.33	506.33	511.33	950.00
Vehicle # 1, Axle # 1, at 3/9 Avail. Span Length	0.00	68,839.96	72,755.20	<b>74,234.02</b>	77,567.42	78,134.77	96,215.77	<b>96,460.21</b>	96,103.63	93,319.03	92,356.88	0.00
Axle Positions	0.00	188.00	200.00	<b>206.00</b>	226.00	231.00	531.00	<b>543.00</b>	549.00	569.00	574.00	950.00
Vehicle # 1, Axle # 1, at 4/9 Avail. Span Length	0.00	81,670.38	85,101.33	<b>86,338.00</b>	88,864.26	89,229.82	95,203.62	<b>94,963.77</b>	94,365.05	90,773.30	89,609.36	0.00
Axle Positions	0.00	250.67	262.67	<b>268.67</b>	288.67	293.67	593.67	<b>605.67</b>	611.67	631.67	636.67	950.00
Vehicle # 1, Axle # 1, at 5/9 Avail. Span Length	0.00	89,442.67	92,389.34	93,383.87	<b>95,102.97</b>	95,266.75	89,133.35	<b>88,409.21</b>	87,568.35	83,169.45	81,803.73	0.00
Axle Positions	0.00	313.33	325.33	331.33	<b>351.33</b>	356.33	656.33	<b>668.33</b>	674.33	694.33	699.33	950.00
Vehicle # 1, Axle # 1, at 6/9 Avail. Span Length	0.00	92,156.85	94,619.22	95,371.61	<b>96,283.57</b>	96,245.56	78,004.96	76,796.54	<b>75,713.53</b>	70,507.49	68,939.98	0.00
Axle Positions	0.00	376.00	388.00	394.00	<b>414.00</b>	419.00	719.00	731.00	<b>737.00</b>	757.00	762.00	950.00
Vehicle # 1, Axle # 1, at 7/9 Avail. Span Length	0.00	89,812.91	91,790.99	92,301.24	92,406.05	92,166.25	61,818.45	60,125.74	58,800.59	<b>52,787.40</b>	51,018.10	0.00
Axle Positions	0.00	438.67	450.67	456.67	476.67	481.67	781.67	793.67	799.67	<b>819.67</b>	824.67	950.00
Vehicle # 1, Axle # 1, at 8/9 Avail. Span Length	0.00	82,410.84	83,904.64	84,172.74	83,470.41	83,028.83	40,573.83	38,396.83	36,829.53	30,009.19	28,038.11	0.00
Axle Positions	0.00	501.33	513.33	519.33	539.33	544.33	844.33	856.33	862.33	882.33	887.33	950.00
Vehicle #2, Rear (#3) Axle at Support	<b>0.00</b>	69,950.66	70,960.18	70,986.13	69,476.65	68,833.28	14,271.08	11,609.79	9,800.35	2,172.87	0.00	<b>0.00</b>
Axle Positions	<b>0.00</b>	564.00	576.00	582.00	602.00	607.00	907.00	919.00	925.00	945.00	950.00	<b>950.00</b>

**96,460** MLC 100W 2x Vehicle on Span Maximum Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

**53,275** MLC 100W 1x Vehicle on Span Maximum Midspan Moment w/Impact, kips

**94,571** Maximum AASHTO HL-93 Single Span Design Moment w/Impact, ft-kips



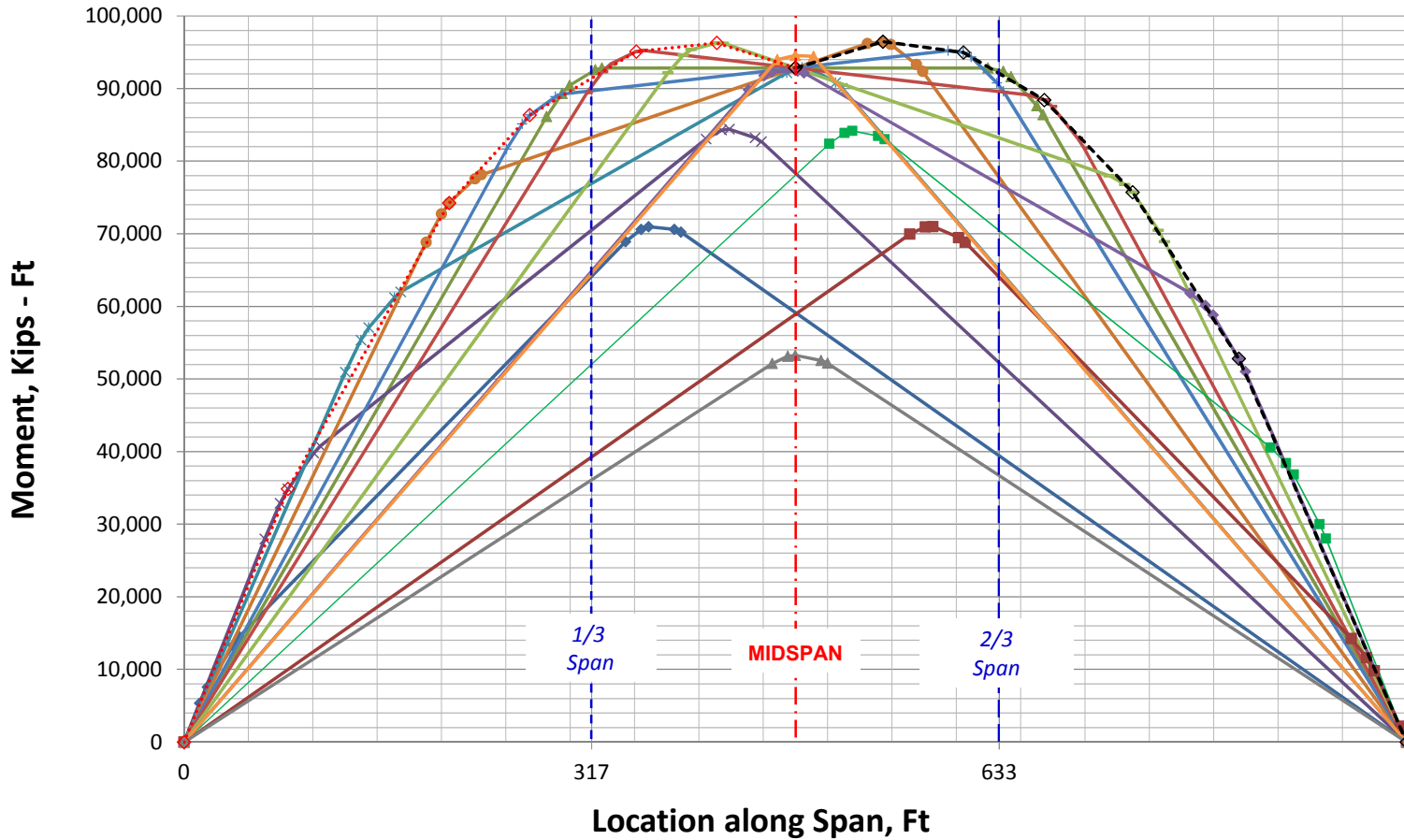
**TEN (10) AXLE**

**Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 950' (~290 m) total span length, Travel Speeds (with Impact)**

**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 950' (~290 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

**MOMENT DIAGRAMS**

- ◆— Veh # 1, Axle # 1 at Front Spt
- ×— Veh #1, Axle #1, at 1/9 Available Span
- Veh #1, Axle #1, at 3/9 Available Span
- Veh #1, Axle #1, at 5/9 Available Span
- ◇— Veh #1, Axle #1, at 7/9 Available Span
- Veh # 2, R Axle at Spt (Max V)
- ▲— MLC 100W Max Moment 1 Vehicle (with Impact)
- ◆— Max Values Curve, Right Side
- ▲— Resultant of both Vehicles at Mid-span
- ×— Veh #1, Axle #1, at 2/9 Available Span
- Veh #1, Axle #1, at 4/9 Available Span
- ◇— Veh #1, Axle #1, at 6/9 Available Span
- Veh #1, Axle #1, at 8/9 Available Span
- ▲— AASHTO HL-93 Max Moment (with Impact)
- ◆— Max Values Curve, Left Side

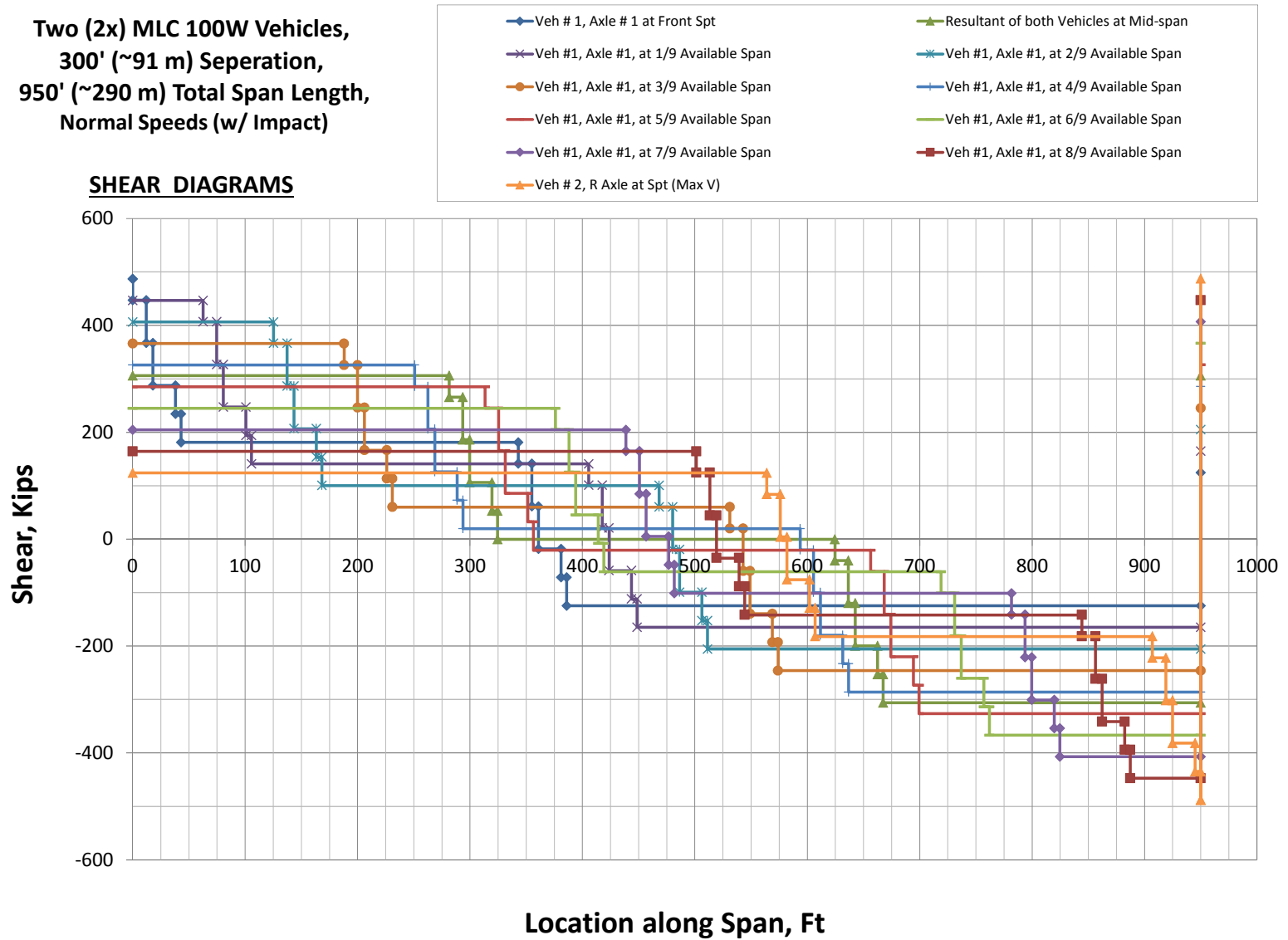


**TEN (10) AXLE**

**Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 950' (~290 m) total span length, Travel Speeds (with Impact)**

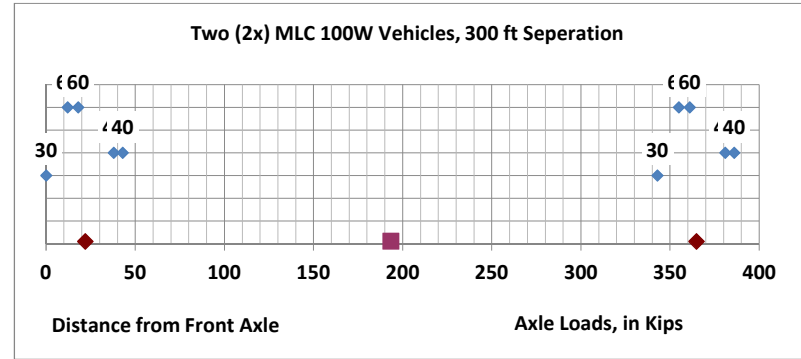
**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 950' (~290 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

**SHEAR DIAGRAMS**



**TEN (10) AXLE Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 1,000' (~305 m) total span length, Travel Speeds (with Impact)**

	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
<b>Totals</b>		<b>230.0</b>	<b>460.0</b>	<b>386.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 193.413 ft, from Front axle of 1st vehicle

1,000 ft, Total Span Length      33% Dynamic Impact Factor

**POSSIBLE VEHICLE LOCATIONS USED FOR SHEAR AND MOMENT CALCULATIONS**

	VEHICLE NO. 1					VEHICLE NO. 2					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Vehicle # 1 (Left Side), Front (#1) Axle at Support	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	614.00
Resultant of both Vehicles at Mid-span	306.59	318.59	324.59	344.59	349.59	649.59	661.59	667.59	687.59	692.59	307.41
Vehicle # 1, Axle # 1, at 1/9 Available Span Length	68.22	80.22	86.22	106.22	111.22	411.22	423.22	429.22	449.22	454.22	545.78
Vehicle # 1, Axle # 1, at 2/9 Available Span Length	136.44	148.44	154.44	174.44	179.44	479.44	491.44	497.44	517.44	522.44	477.56
Vehicle # 1, Axle # 1, at 3/9 Available Span Length	204.67	216.67	222.67	242.67	247.67	547.67	559.67	565.67	585.67	590.67	409.33
Vehicle # 1, Axle # 1, at 4/9 Available Span Length	272.89	284.89	290.89	310.89	315.89	615.89	627.89	633.89	653.89	658.89	341.11
Vehicle # 1, Axle # 1, at 5/9 Available Span Length	341.11	353.11	359.11	379.11	384.11	684.11	696.11	702.11	722.11	727.11	272.89
Vehicle # 1, Axle # 1, at 6/9 Available Span Length	409.33	421.33	427.33	447.33	452.33	752.33	764.33	770.33	790.33	795.33	204.67
Vehicle # 1, Axle # 1, at 7/9 Available Span Length	477.56	489.56	495.56	515.56	520.56	820.56	832.56	838.56	858.56	863.56	136.44
Vehicle # 1, Axle # 1, at 8/9 Available Span Length	545.78	557.78	563.78	583.78	588.78	888.78	900.78	906.78	926.78	931.78	68.22
Vehicle #2 (Right Side), Rear (#3) Axle at Support (Max V)	614.00	626.00	632.00	652.00	657.00	957.00	969.00	975.00	995.00	1000.00	0.00

**TEN (10) AXLE Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 1,000' (~305 m) total span length, Travel Speeds (with Impact)**

**SHEAR CALCULATIONS**

SHEAR	Shear at React A, kips	VEHICLE NO. 1					VEHICLE NO. 2					Shear at React B, kips
		Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	
Vehicle #1 (Left), Front (#1) Axle at Support	493.47	453.57	373.77	293.97	240.77	187.57	147.67	67.87	-11.93	-65.13	-118.33	118.33
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	1000.00
Resultant of both Vehicles at Mid-span	305.90	266.00	186.20	106.40	53.20	0.00	-39.90	-119.70	-199.50	-252.70	-305.90	305.90
Axle Positions	0.00	306.59	318.59	324.59	344.59	349.59	649.59	661.59	667.59	687.59	692.59	1000.00
Vehicle #2, Rear (#3) Axle at Support (Max V)	117.82	77.92	-1.88	-81.68	-134.88	-188.08	-227.98	-307.78	-387.58	-440.78	-493.98	493.98
Axle Positions	0.00	614.00	626.00	632.00	652.00	657.00	957.00	969.00	975.00	995.00	1000.00	1000.00

**494.0** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**225.2** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips

**414.9** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	Moment at React A, ft-kips	VEHICLE NO. 1					VEHICLE NO. 2					Moment at React B, ft-kips
		Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	
Vehicle #1 (Left), Front (#1) Axle at Support	0.00	0.00	5,442.84	7,685.46	13,564.86	14,768.71	71,039.68	72,811.71	73,218.93	72,980.33	72,654.68	0.00
Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	1,000.00
Resultant of both Vehicles at Mid-span	0.00	93,784.95	96,976.95	98,094.15	100,222.15	100,488.15	100,488.15	100,009.35	99,291.15	95,301.15	94,037.65	0.00
Axle Positions	0.00	306.59	318.59	324.59	344.59	349.59	649.59	661.59	667.59	687.59	692.59	1,000.00
Vehicle #1, Axle #1, at 1/9 Avail. Span Length	0.00	30,818.13	35,760.11	<b>37,752.30</b>	42,796.93	43,792.09	87,541.55	88,812.73	88,969.52	87,896.15	87,361.81	0.00
Axle Positions	0.00	68.22	80.22	<b>86.22</b>	106.22	111.22	411.22	423.22	429.22	449.22	454.22	1,000.00
Vehicle #1, Axle #1, at 2/9 Avail. Span Length	0.00	55,941.29	60,382.41	62,124.17	66,334.03	67,120.50	98,348.46	99,118.77	99,025.13	97,117.00	96,373.96	0.00
Axle Positions	0.00	136.44	148.44	154.44	174.44	179.44	479.44	491.44	497.44	517.44	522.44	1,000.00
Vehicle #1, Axle #1, at 3/9 Avail. Span Length	0.00	75,369.49	79,309.75	<b>80,801.08</b>	84,176.17	84,753.95	103,460.40	<b>103,729.86</b>	103,385.78	100,642.88	99,691.15	0.00
Axle Positions	0.00	204.67	216.67	<b>222.67</b>	242.67	247.67	547.67	<b>559.67</b>	565.67	585.67	590.67	1,000.00
Vehicle #1, Axle #1, at 4/9 Avail. Span Length	0.00	89,102.72	92,542.12	<b>93,783.02</b>	96,323.34	96,692.43	102,877.37	<b>102,645.97</b>	102,051.47	98,473.80	97,313.38	0.00
Axle Positions	0.00	272.89	284.89	<b>290.89</b>	310.89	315.89	615.89	<b>627.89</b>	633.89	653.89	658.89	1,000.00
Vehicle #1, Axle #1, at 5/9 Avail. Span Length	0.00	97,140.98	100,079.52	101,069.99	<b>102,775.55</b>	102,935.94	96,599.38	<b>95,867.12</b>	95,022.18	90,609.75	89,240.64	0.00
Axle Positions	0.00	341.11	353.11	359.11	<b>379.11</b>	384.11	684.11	<b>696.11</b>	702.11	722.11	727.11	1,000.00
Vehicle #1, Axle #1, at 6/9 Avail. Span Length	0.00	99,484.28	101,921.96	102,661.99	<b>103,532.79</b>	103,484.49	84,626.42	83,393.29	<b>82,297.93</b>	77,050.73	75,472.93	0.00
Axle Positions	0.00	409.33	421.33	427.33	<b>447.33</b>	452.33	752.33	764.33	<b>770.33</b>	790.33	795.33	1,000.00
Vehicle #1, Axle #1, at 7/9 Avail. Span Length	0.00	96,132.61	98,069.42	98,559.03	98,595.06	98,338.07	66,958.49	65,224.51	63,878.72	<b>57,796.74</b>	56,010.25	0.00
Axle Positions	0.00	477.56	489.56	495.56	515.56	520.56	820.56	832.56	838.56	<b>858.56</b>	863.56	1,000.00
Vehicle #1, Axle #1, at 8/9 Avail. Span Length	0.00	87,085.97	88,521.93	88,761.10	87,962.37	87,496.68	43,595.60	41,360.75	39,764.53	32,847.79	30,852.61	0.00
Axle Positions	0.00	545.78	557.78	563.78	583.78	588.78	888.78	900.78	906.78	926.78	931.78	1,000.00
Vehicle #2, Rear (#3) Axle at Support	<b>0.00</b>	72,344.37	73,279.46	73,268.21	71,634.70	70,960.33	14,537.74	11,802.03	9,955.38	2,203.88	0.00	<b>0.00</b>
Axle Positions	<b>0.00</b>	614.00	626.00	632.00	652.00	657.00	957.00	969.00	975.00	995.00	1,000.00	<b>1,000.00</b>

**103,730** MLC 100W 2x Vehicle on Span Maximum Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

**56,150** MLC 100W 1x Vehicle on Span Maximum Midspan Moment w/Impact, kips

**103,568** Maximum AASHTO HL-93 Single Span Design Moment w/Impact, ft-kips

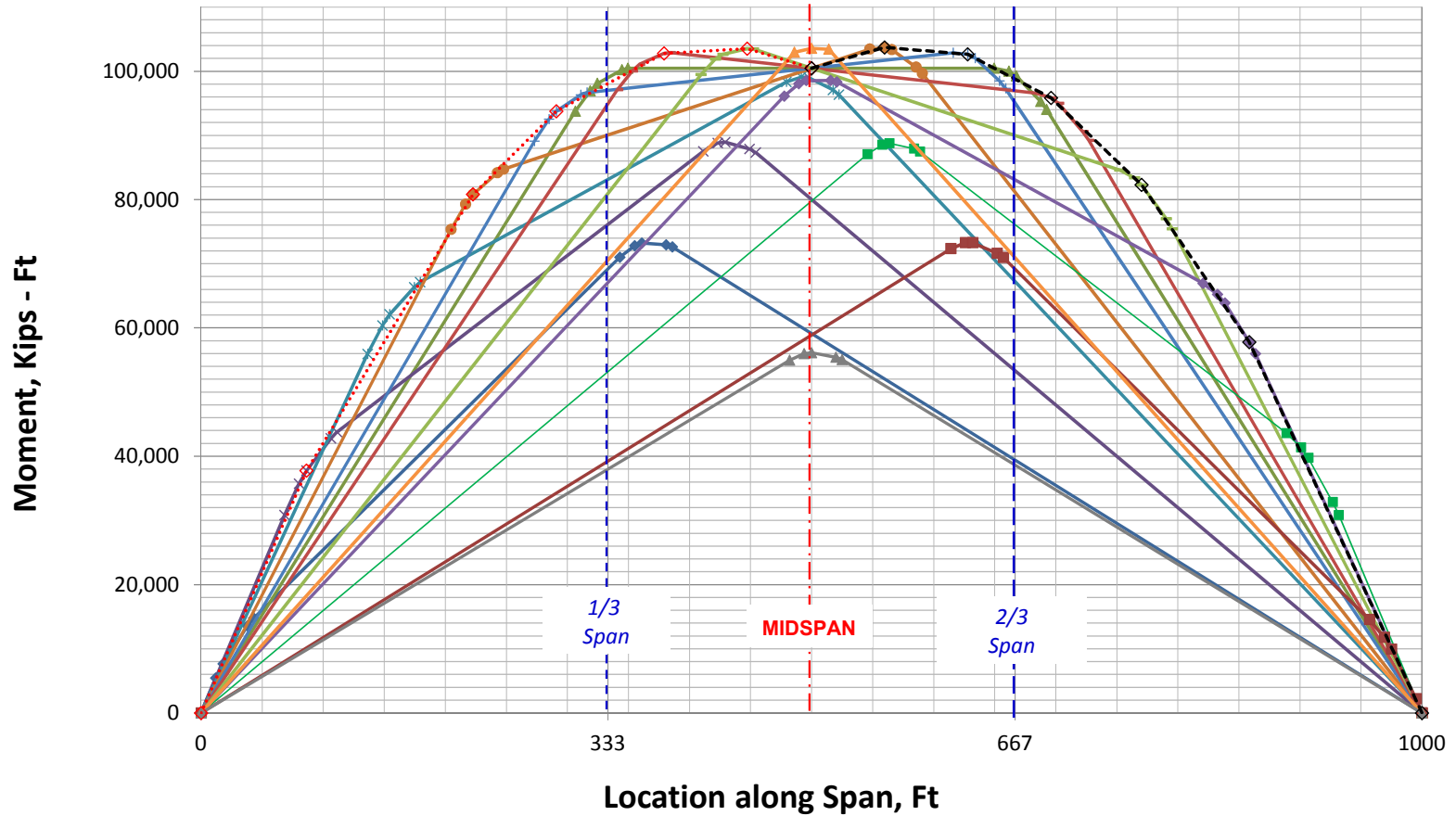
**TEN (10) AXLE**

**Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 1,000' (~305 m) total span length, Travel Speeds (with Impact)**

**Two (2x) MLC 100W Vehicles,  
300' (~91 m) Separation,  
1,000' (~305 m) Total Span Length,  
Normal Speeds (w/ Impact)**

**MOMENT DIAGRAMS**

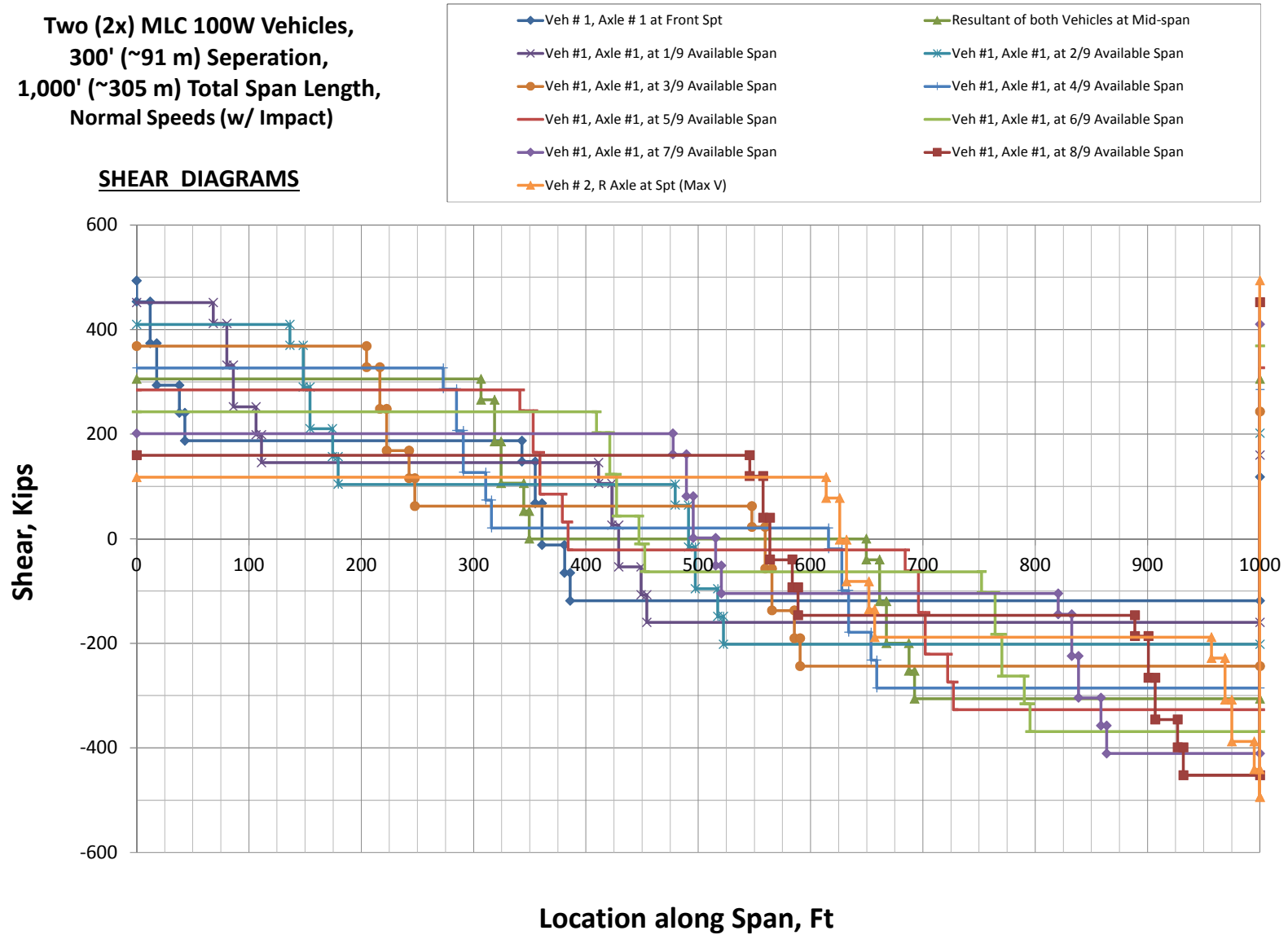
- ◆— Veh # 1, Axle # 1 at Front Spt
- ×— Veh #1, Axle #1, at 1/9 Available Span
- Veh #1, Axle #1, at 3/9 Available Span
- Veh #1, Axle #1, at 5/9 Available Span
- ▲— Veh #1, Axle #1, at 7/9 Available Span
- Veh # 2, R Axle at Spt (Max V)
- ▲— MLC 100W Max Moment 1 Vehicle (with Impact)
- ◆— Max Values Curve, Right Side
- ▲— Resultant of both Vehicles at Mid-span
- ×— Veh #1, Axle #1, at 2/9 Available Span
- Veh #1, Axle #1, at 4/9 Available Span
- ▲— Veh #1, Axle #1, at 6/9 Available Span
- Veh #1, Axle #1, at 8/9 Available Span
- ▲— AASHTO HL-93 Max Moment (with Impact)
- ◆— Max Values Curve, Left Side



**TEN (10) AXLE** Two (2x) MLC 100W Vehicles, 300' (~91 m) separation, 1,000' (~305 m) total span length, Travel Speeds (with Impact)

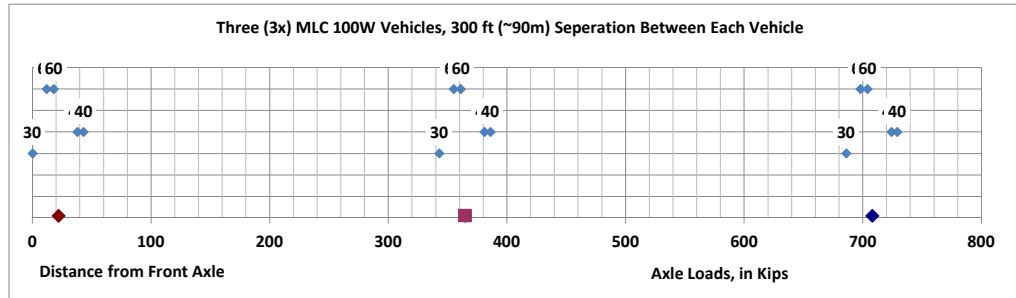
**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 1,000' (~305 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

**SHEAR DIAGRAMS**



**FIFTEEN (15) AXLE** **Three (3x) MLC 100W Vehicles, 300' (~91 m) separation, 730' (~223 m) total span length, Travel Speeds (with Impact)**

Vehicle	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
MLC 100 Vehicle # 3 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	686.00
	2-2	30.0	60.0	12.00	698.00
	2-3	30.0	60.0	6.00	704.00
	2-4	20.0	40.0	20.00	724.00
	(Rear) 2-5	20.0	40.0	5.00	729.00
<b>Totals</b>		<b>345.0</b>	<b>690.0</b>	<b>729.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Vehicle #3 Resultant at: 707.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 364.913 ft, from Front axle of 1st vehicle

**730** ft, Total Span Length **33%** Dynamic Impact Factor

	VEHICLE NO. 1					VEHICLE NO. 2					VEHICLE NO. 3					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	
Veh # 1, Axle # 1 at Front Spt	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	686.00	698.00	704.00	724.00	729.00	1.00
Resultant of Vehicles at Mid-span	0.09	12.09	18.09	38.09	43.09	343.09	355.09	361.09	381.09	386.09	686.09	698.09	704.09	724.09	729.09	0.91
Veh # 1, Axle # 1, at 1/4 Available Span Length	0.02	12.02	18.02	38.02	43.02	343.02	355.02	361.02	381.02	386.02	686.02	698.02	704.02	724.02	729.02	0.98
Veh # 1, Axle # 1, at 1/2 Available Span Length	0.04	12.04	18.04	38.04	43.04	343.04	355.04	361.04	381.04	386.04	686.04	698.04	704.04	724.04	729.04	0.96
Veh # 1, Axle # 1, at 3/4 Available Span Length	0.07	12.07	18.07	38.07	43.07	343.07	355.07	361.07	381.07	386.07	686.07	698.07	704.07	724.07	729.07	0.93
Special Case: Centered on Span	0.50	12.50	18.50	38.50	43.50	343.50	355.50	361.50	381.50	386.50	686.50	698.50	704.50	724.50	729.50	0.50
Veh # 2, R Axle at Spt (Max V)	1.00	13.00	19.00	39.00	44.00	344.00	356.00	362.00	382.00	387.00	687.00	699.00	705.00	725.00	730.00	0.00

**FIFTEEN (15) AXLE** **Three (3x) MLC 100W Vehicles, 300' (~91 m) separation, 730' (~223 m) total span length, Travel Speeds (with Impact)**

**SHEAR CALCULATIONS**

SHEAR	VEHICLE NO. 1						VEHICLE NO. 2						VEHICLE NO. 3					
	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at React B, kips	
Veh # 1, Axle # 1 at Front Spt Axle Positions	458.96	419.06	339.26	259.46	206.26	153.06	113.16	33.36	-46.44	-99.64	-152.84	-192.74	-272.54	-352.34	-405.54	-458.74	458.74	
Both Vehs Equi-dist from Mid-span Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	686.00	698.00	704.00	724.00	729.00	730.00	
Veh # 1, Axle # 1, at 1/4 Avail Span Axle Positions	458.85	418.95	339.15	259.35	206.15	152.95	113.05	33.25	-46.55	-99.75	-152.95	-192.85	-272.65	-352.45	-405.65	-458.85	458.85	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	0.09	12.09	18.09	38.09	43.09	343.09	355.09	361.09	381.09	386.09	686.09	698.09	704.09	724.09	729.09	730.00	
Veh # 1, Axle # 1, at 1/4 Avail Span Axle Positions	458.93	419.03	339.23	259.43	206.23	153.03	113.13	33.33	-46.47	-99.67	-152.87	-192.77	-272.57	-352.37	-405.57	-458.77	458.77	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	0.02	12.02	18.02	38.02	43.02	343.02	355.02	361.02	381.02	386.02	686.02	698.02	704.02	724.02	729.02	730.00	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	458.90	419.00	339.20	259.40	206.20	153.00	113.10	33.30	-46.50	-99.70	-152.90	-192.80	-272.60	-352.40	-405.60	-458.80	458.80	
Special Case: Centered on Span Axle Positions	0.00	0.04	12.04	18.04	38.04	43.04	343.04	355.04	361.04	381.04	386.04	686.04	698.04	704.04	724.04	729.04	730.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	458.88	418.98	339.18	259.38	206.18	152.98	113.08	33.28	-46.52	-99.72	-152.92	-192.82	-272.62	-352.42	-405.62	-458.82	458.82	
Special Case: Centered on Span Axle Positions	0.00	0.07	12.07	18.07	38.07	43.07	343.07	355.07	361.07	381.07	386.07	686.07	698.07	704.07	724.07	729.07	730.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	458.33	418.43	338.63	258.83	205.63	152.43	112.53	32.73	-47.07	-100.27	-153.47	-193.37	-273.17	-352.97	-406.17	-459.37	459.37	
Veh # 2, R Axle at Spt (Max V) Axle Positions	0.00	0.50	12.50	18.50	38.50	43.50	343.50	355.50	361.50	381.50	386.50	686.50	698.50	704.50	724.50	729.50	730.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	457.70	427.70	367.70	307.70	267.70	227.70	197.70	137.70	77.70	37.70	-2.30	-32.30	-92.30	-152.30	-192.30	-232.30	460.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	0.00	1.00	13.00	19.00	39.00	44.00	344.00	356.00	362.00	382.00	387.00	687.00	699.00	705.00	725.00	730.00	730.00	

460.0 MLC 100W 3x Vehicle on Span Maximum Shear w/Impact, kips  
450.4 MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

223.4 MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips  
328.1 Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	VEHICLE NO. 1						VEHICLE NO. 2						VEHICLE NO. 3					
	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips	
Veh # 1, Axle # 1 at Front Spt Axle Positions	0.0	0.0	5,028.7	7,064.3	12,253.5	13,284.8	59,202.5	60,560.5	60,760.6	59,831.8	59,333.6	13,481.4	11,168.5	9,533.3	2,486.4	458.7	0.0	
Both Vehs Equi-dist from Mid-span Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	686.00	698.00	704.00	724.00	729.00	730.00	
Both Vehs Equi-dist from Mid-span Axle Positions	0.0	39.9	5,067.3	7,102.2	12,289.2	13,320.0	59,205.0	60,561.6	60,761.1	59,830.1	59,331.3	13,446.3	11,132.1	9,496.2	2,447.2	419.0	0.0	
# 1, Axle # 1, at 1/4 Available Span Axle Positions	0.00	0.09	12.09	18.09	38.09	43.09	343.09	355.09	361.09	381.09	386.09	686.09	698.09	704.09	724.09	729.09	730.00	
# 1, Axle # 1, at 1/4 Available Span Axle Positions	0.0	10.0	5,038.4	7,073.8	12,262.4	13,293.6	59,203.1	60,560.7	60,760.7	59,831.4	59,333.0	13,472.6	11,159.4	9,524.0	2,476.6	448.8	0.0	
# 1, Axle # 1, at 1/4 Available Span Axle Positions	0.00	0.02	12.02	18.02	38.02	43.02	343.02	355.02	361.02	381.02	386.02	686.02	698.02	704.02	724.02	729.02	730.00	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.0	20.0	5,048.0	7,083.2	12,271.3	13,302.4	59,203.7	60,561.0	60,760.8	59,830.9	59,332.5	13,463.8	11,150.3	9,514.7	2,466.8	438.8	0.0	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	0.04	12.04	18.04	38.04	43.04	343.04	355.04	361.04	381.04	386.04	686.04	698.04	704.04	724.04	729.04	730.00	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	0.0	29.9	5,057.7	7,092.7	12,280.3	13,311.2	59,204.4	60,561.3	60,760.9	59,830.5	59,331.9	13,455.1	11,141.2	9,505.5	2,457.0	428.9	0.0	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	0.00	0.07	12.07	18.07	38.07	43.07	343.07	355.07	361.07	381.07	386.07	686.07	698.07	704.07	724.07	729.07	730.00	
Special Case: Centered on Span Axle Positions	0.0	229.17	5,250.33	7,282.12	12,458.73	13,486.89	59,216.11	60,566.48	60,762.87	59,821.48	59,320.14	13,279.36	10,958.93	9,319.92	2,260.53	229.68	0.00	
Special Case: Centered on Span Axle Positions	0.00	0.50	12.50	18.50	38.50	43.50	343.50	355.50	361.50	381.50	386.50	686.50	698.50	704.50	724.50	729.50	730.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	0.0	457.70	5,471.33	7,499.34	12,663.39	13,688.40	59,229.05	60,571.88	60,764.49	59,810.54	59,306.05	13,076.71	10,748.73	9,105.95	2,033.99	0.00	0.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	0.00	1.00	13.00	19.00	39.00	44.00	344.00	356.00	362.00	382.00	387.00	687.00	699.00	705.00	725.00	730.00	730.00	

60,764 MLC 100W 3x Vehicle on Span Maximum vic Mid-span Moment w/Impact, kips  
64,011 MLC 100W 2x Vehicle on Span Maximum (Absolute) Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

40,625 MLC 100W 1x Vehicle on Span Maximum Mid-span Moment w/Impact, kips  
59,736 AASHTO HL-93 Single Span Design Midspan Moment w/Impact, ft-kips



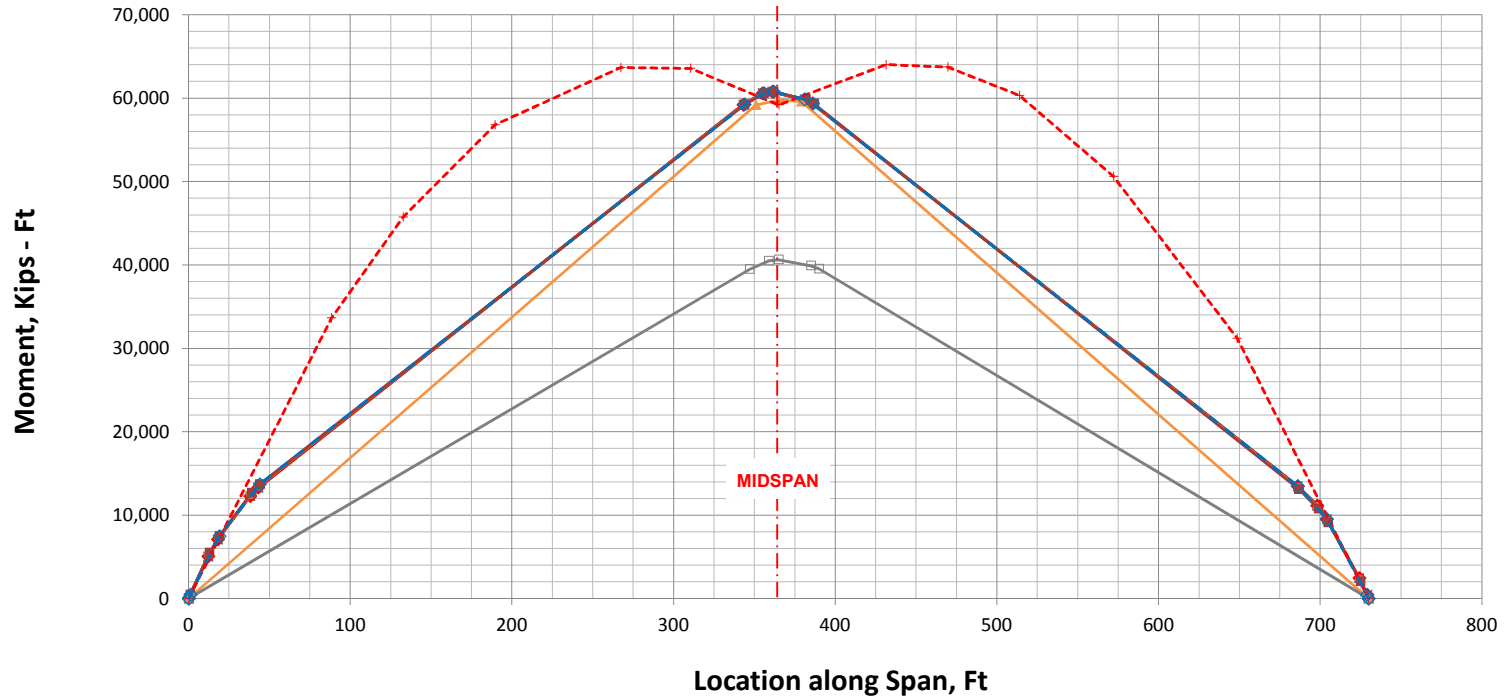
**FIFTEEN (15) AXLE**

**Three (3x) MLC 100W Vehicles, 300' (~91 m) separation, 730' (~223 m) total span length, Travel Speeds (with Impact)**

**Three (3x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 730' (~223 m) Total Span Length,  
 Travel Speeds (with Impact)**

**MOMENT DIAGRAMS**

- ◆— Veh # 1, Axle # 1 at Front Spt
- ×— Veh # 1, Axle # 1, at 1/4 Available Span Length
- ◇— Veh # 1, Axle # 1, at 1/2 Available Span Length
- ◇— Veh # 1, Axle # 1, at 3/4 Available Span Length
- Veh # 2, R Axle at Spt (Max V)
- MLC 100W Max Moment 1 Vehicle (with Impact)
- ◇— MLC 100W 3x Veh Max M Envelope
- ▲— Resultant of Vehicles at Mid-span
- ×— Veh # 1, Axle # 1, at 1/2 Available Span Length
- Special Case: Centered on Span
- ▲— AASHTO HL-93 Max Moment (with Impact)
- +— MLC 100W 2x Veh Max M Envelope



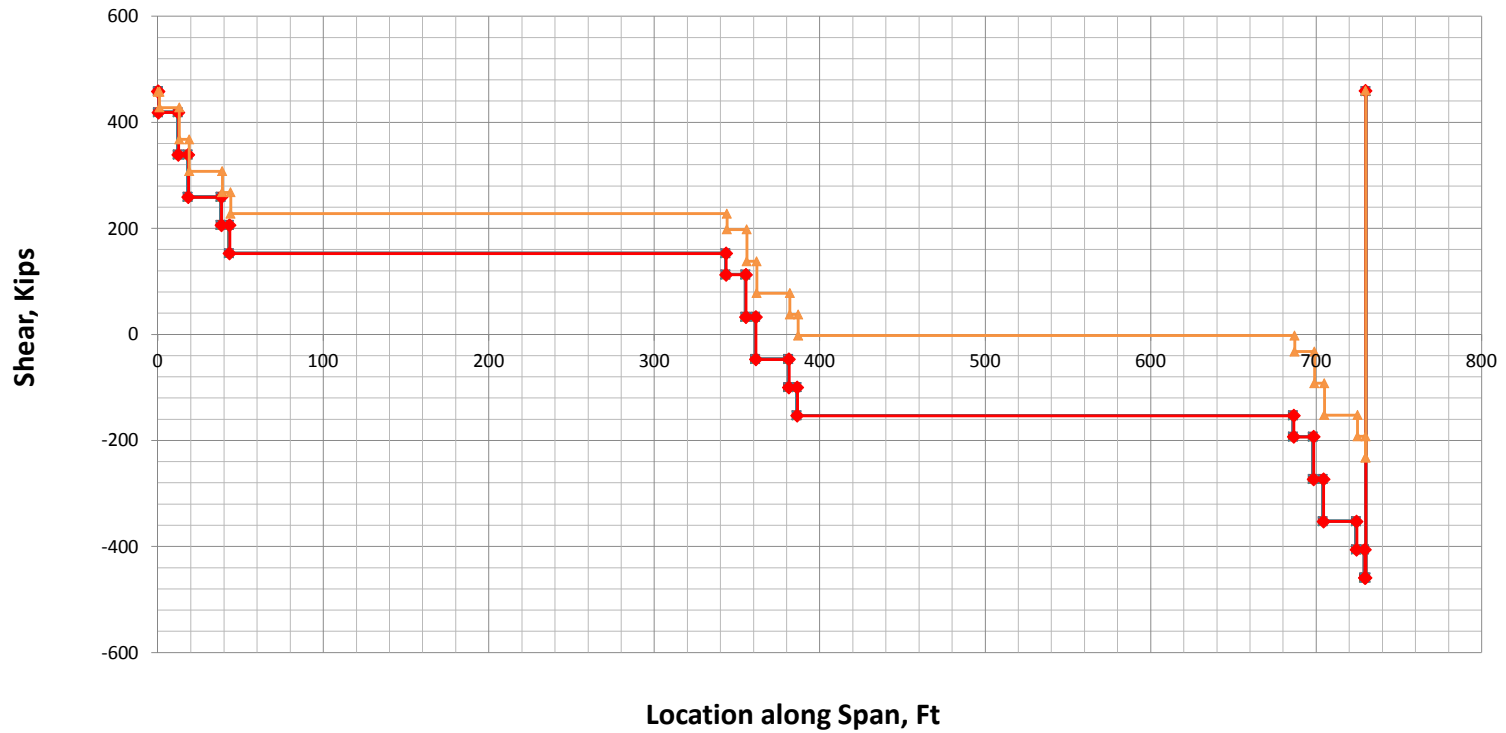
**FIFTEEN (15) AXLE**

**Three (3x) MLC 100W Vehicles, 300' (~91 m) separation, 730' (~223 m) total span length, Travel Speeds (with Impact)**

**Three (3x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 730' (~223 m) Total Span Length,  
 Travel Speeds (with Impact)**

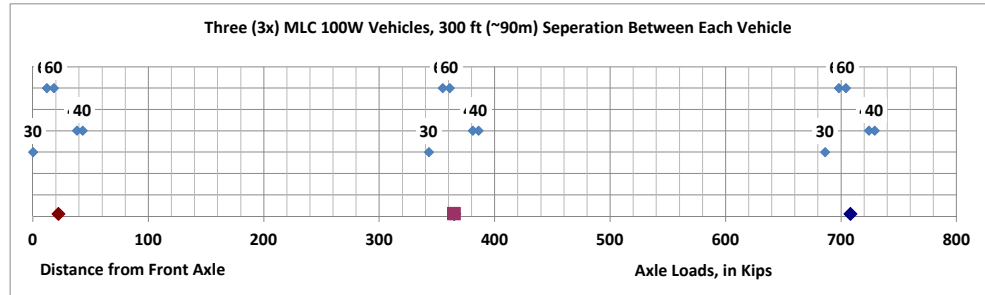
**SHEAR DIAGRAMS**

- Veh # 1, Axle # 1 at Front Spt
- ▲— Veh # 1, Axle # 1, at 1/4 Available Span Length
- ★— Veh # 1, Axle # 1, at 3/4 Available Span Length
- ▲— Veh # 2, R Axle at Spt (Max V)
- Resultant of Vehicles at Mid-span
- ✱— Veh # 1, Axle # 1, at 1/2 Available Span Length
- ◆— Special Case: Centered on Span



**FIFTEEN (15) AXLE** **Three (3x) MLC 100W Vehicles, 300' (~91 m) separation, 800' (~244 m) total span length, Travel Speeds (with Impact)**

Vehicle	Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
MLC 100 Vehicle # 3 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	686.00
	2-2	30.0	60.0	12.00	698.00
	2-3	30.0	60.0	6.00	704.00
	2-4	20.0	40.0	20.00	724.00
	(Rear) 2-5	20.0	40.0	5.00	729.00
<b>Totals</b>		<b>345.0</b>	<b>690.0</b>	<b>729.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Vehicle #3 Resultant at: 707.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 364.913 ft, from Front axle of 1st vehicle

**800** ft, Total Span Length **33%** Dynamic Impact Factor

	VEHICLE NO. 1					VEHICLE NO. 2					VEHICLE NO. 3					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	
Veh # 1, Axle # 1 at Front Spt	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	686.00	698.00	704.00	724.00	729.00	71.00
Resultant of Vehicles at Mid-span	35.09	47.09	53.09	73.09	78.09	378.09	390.09	396.09	416.09	421.09	721.09	733.09	739.09	759.09	764.09	35.91
Veh # 1, Axle # 1, at 1/4 Available Span Length	8.77	20.77	26.77	46.77	51.77	351.77	363.77	369.77	389.77	394.77	694.77	706.77	712.77	732.77	737.77	62.23
Veh # 1, Axle # 1, at 1/2 Available Span Length	17.54	29.54	35.54	55.54	60.54	360.54	372.54	378.54	398.54	403.54	703.54	715.54	721.54	741.54	746.54	53.46
Veh # 1, Axle # 1, at 3/4 Available Span Length	26.32	38.32	44.32	64.32	69.32	369.32	381.32	387.32	407.32	412.32	712.32	724.32	730.32	750.32	755.32	44.68
Veh # 2, Axle #3 at Mid-span (Max Moment)	39.00	51.00	57.00	77.00	82.00	382.00	394.00	400.00	420.00	425.00	725.00	737.00	743.00	763.00	768.00	32.00
Veh # 2, R Axle at Spt (Max V)	71.00	83.00	89.00	109.00	114.00	414.00	426.00	432.00	452.00	457.00	757.00	769.00	775.00	795.00	800.00	0.00

**FIFTEEN (15) AXLE** **Three (3x) MLC 100W Vehicles, 300' (~91 m) separation, 800' (~244 m) total span length, Travel Speeds (with Impact)**

**SHEAR CALCULATIONS**

SHEAR	VEHICLE NO. 1						VEHICLE NO. 2						VEHICLE NO. 3					
	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at React B, kips	
Veh # 1, Axle # 1 at Front Spt Axle Positions	499.10	459.20	379.40	299.60	246.40	193.20	153.30	73.50	-6.30	-59.50	-112.70	-152.60	-232.40	-312.20	-365.40	-418.60	418.60	
Both Vehs Equi-dist from Mid-span Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	686.00	698.00	704.00	724.00	729.00	800.00	
Veh # 1, Axle # 1, at 1/4 Avail Span Axle Positions	458.85	418.95	339.15	259.35	206.15	152.95	113.05	33.25	-46.55	-99.75	-152.95	-192.85	-272.65	-352.45	-405.65	-458.85	458.85	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	35.09	47.09	53.09	73.09	78.09	378.09	390.09	396.09	416.09	421.09	721.09	733.09	739.09	759.09	764.09	800.00	
Veh # 1, Axle # 1, at 3/4 Available Span Axle Positions	489.04	449.14	369.34	289.54	236.34	183.14	143.24	63.44	-16.36	-69.56	-122.76	-162.66	-242.46	-322.26	-375.46	-428.66	428.66	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	8.77	20.77	26.77	46.77	51.77	351.77	363.77	369.77	389.77	394.77	694.77	712.77	712.77	732.77	737.77	800.00	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	478.97	439.07	359.27	279.47	226.27	173.07	133.17	53.37	-26.43	-79.63	-132.83	-172.73	-252.53	-332.33	-385.53	-438.73	438.73	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	17.54	29.54	35.54	55.54	60.54	360.54	372.54	378.54	398.54	403.54	703.54	715.54	721.54	741.54	746.54	800.00	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	468.91	429.01	349.21	269.41	216.21	163.01	123.11	43.31	-36.49	-89.69	-142.89	-182.79	-262.59	-342.39	-395.59	-448.79	448.79	
# 2, Axle # 3 at Mid-span (Max M) Axle Positions	0.00	26.32	38.32	44.32	64.32	69.32	369.32	381.32	387.32	407.32	412.32	712.32	724.32	730.32	750.32	755.32	800.00	
# 2, Axle # 3 at Mid-span (Max M) Axle Positions	454.36	414.46	334.66	254.86	201.66	148.46	108.56	28.76	-51.04	-104.24	-157.44	-197.34	-277.14	-356.94	-410.14	-463.34	463.34	
# 2, Axle # 3 at Mid-span (Max M) Axle Positions	0.00	39.00	51.00	57.00	77.00	82.00	382.00	394.00	400.00	420.00	425.00	725.00	737.00	743.00	763.00	768.00	800.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	417.65	387.65	327.65	267.65	227.65	187.65	157.65	97.65	37.65	-2.35	-42.35	-72.35	-132.35	-192.35	-232.35	-272.35	500.05	
Veh # 2, R Axle at Spt (Max V) Axle Positions	0.00	71.00	83.00	89.00	109.00	114.00	414.00	426.00	432.00	452.00	457.00	757.00	769.00	775.00	795.00	800.00	800.00	

**500.0** MLC 100W 3x Vehicle on Span Maximum Shear w/Impact, kips  
**464.5** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**223.9** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips  
**350.6** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	VEHICLE NO. 1						VEHICLE NO. 2						VEHICLE NO. 3					
	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips	
Veh # 1, Axle # 1 at Front Spt Axle Positions	0.0	0.0	5,510.4	7,786.8	13,778.8	15,010.8	72,970.5	74,810.1	<b>75,251.1</b>	75,125.1	74,827.6	<b>41,017.3</b>	39,186.1	37,791.7	31,547.7	29,720.7	0.0	
Both Vehs Equi-dist from Mid-span Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	<b>361.00</b>	381.00	386.00	<b>686.00</b>	698.00	704.00	724.00	729.00	800.00	
Veh # 1, Axle # 1, at 1/4 Avail Span Axle Positions	0.0	16,099.7	21,127.1	23,162.0	28,349.0	29,379.7	75,264.7	76,621.3	76,820.8	75,889.8	75,391.1	29,506.1	27,191.9	25,556.0	18,507.0	16,478.7	0.0	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	35.09	47.09	53.09	73.09	78.09	378.09	390.09	396.09	416.09	421.09	721.09	733.09	739.09	759.09	764.09	800.00	
Veh # 1, Axle # 1, at 3/4 Avail Span Axle Positions	0.0	4,289.7	9,679.3	11,895.4	17,686.1	18,867.8	73,808.8	75,527.7	75,908.3	75,581.0	75,233.2	38,404.3	36,452.3	34,997.5	28,552.3	26,675.0	0.0	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	8.77	20.77	26.77	46.77	51.77	351.77	363.77	369.77	389.77	394.77	694.77	706.77	712.77	732.77	737.77	800.00	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	0.0	8,402.9	13,671.8	<b>15,827.4</b>	21,416.9	22,548.3	74,470.7	76,068.7	76,389.0	75,860.5	75,462.4	35,614.7	33,542.0	32,026.9	25,380.4	23,452.7	0.0	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	17.54	29.54	<b>35.54</b>	55.54	60.54	360.54	372.54	378.54	398.54	403.54	703.54	715.54	721.54	741.54	746.54	800.00	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	0.0	12,339.5	17,487.7	19,582.9	24,971.2	26,052.3	74,955.9	76,433.3	76,693.2	75,963.4	75,515.0	32,648.7	30,455.2	<b>28,879.7</b>	22,031.9	20,054.0	0.0	
# 2, Axle # 3 at Mid-span (Max M) Axle Positions	0.00	26.32	38.32	44.32	64.32	69.32	369.32	381.32	387.32	407.32	412.32	712.32	724.32	<b>730.32</b>	750.32	755.32	800.00	
# 2, Axle # 3 at Mid-span (Max M) Axle Positions	0.0	17,720.09	22,693.62	<b>24,701.59</b>	29,798.82	30,807.12	75,345.50	76,648.23	<b>76,820.80</b>	75,800.03	75,278.83	28,047.21	25,679.14	24,016.31	16,877.53	<b>14,826.84</b>	0.00	
# 2, Axle # 3 at Mid-span (Max M) Axle Positions	0.00	39.00	51.00	<b>57.00</b>	77.00	82.00	382.00	394.00	<b>400.00</b>	420.00	425.00	725.00	737.00	743.00	763.00	<b>768.00</b>	800.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	0.0	29,653.38	34,186.42	<b>35,974.14</b>	40,337.20	<b>41,161.97</b>	74,687.95	75,550.18	<b>75,502.50</b>	<b>73,747.57</b>	73,042.84	14,798.81	11,990.25	10,107.17	2,234.23	0.00	0.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	0.00	71.00	83.00	<b>89.00</b>	109.00	<b>114.00</b>	414.00	426.00	<b>432.00</b>	<b>452.00</b>	457.00	757.00	769.00	775.00	795.00	800.00	800.00	

**76,821** MLC 100W 3x Vehicle on Span Maximum Mid-span Moment w/Impact, kips  
**74,297** MLC 100W 2x Vehicle on Span Maximum (Absolute) Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

**44,650** MLC 100W 1x Vehicle on Span Maximum Mid-span Moment w/Impact, kips  
**69,980** AASHTO HL-93 Single Span Design Midspan Moment w/Impact, ft-kips

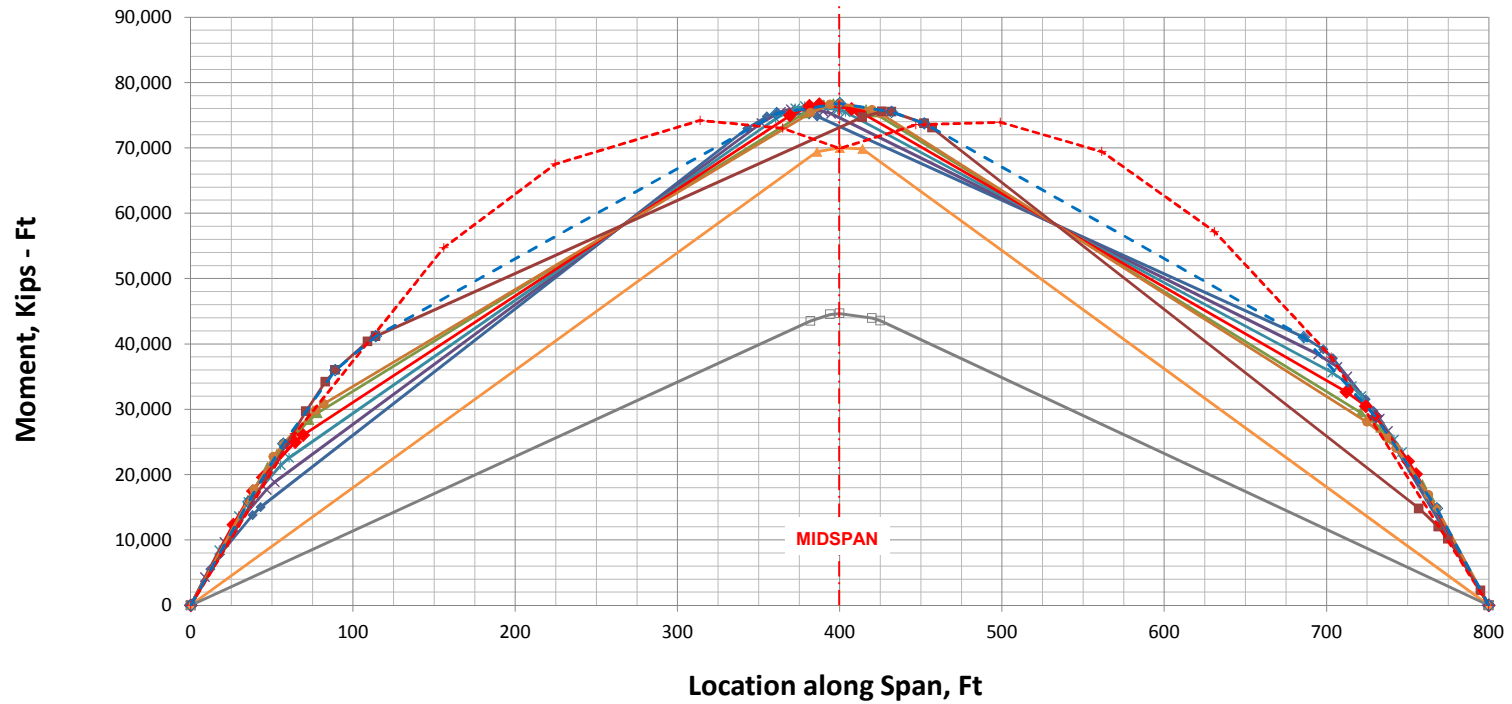
**FIFTEEN (15) AXLE**

**Three (3x) MLC 100W Vehicles, 300' (~91 m) separation, 800' (~244 m) total span length, Travel Speeds (with Impact)**

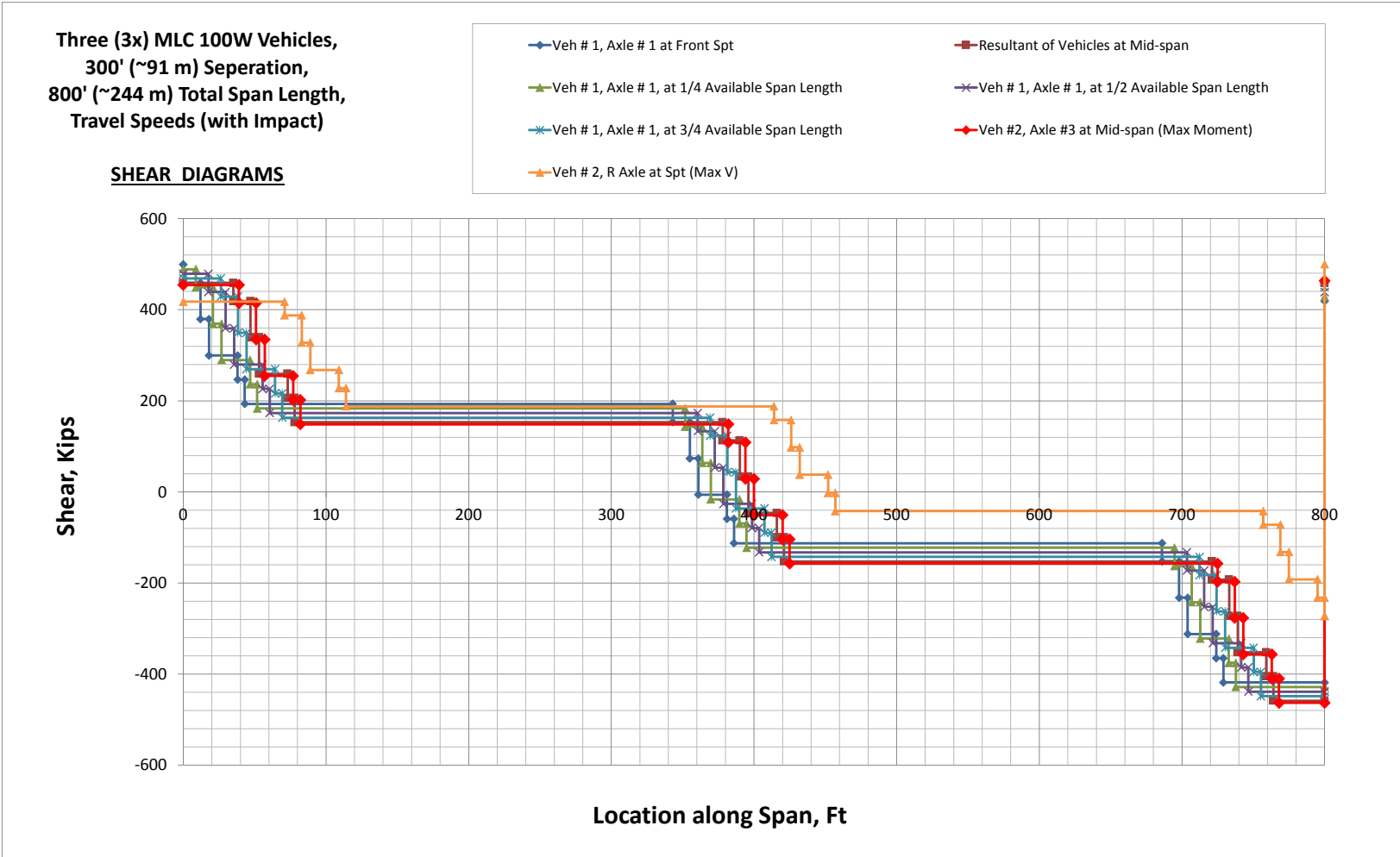
**Three (3x) MLC 100W Vehicles,  
300' (~91 m) Separation,  
800' (~244 m) Total Span Length,  
Travel Speeds (with Impact)**

**MOMENT DIAGRAMS**

- ◆— Veh # 1, Axle # 1 at Front Spt
- ×— Veh # 1, Axle # 1, at 1/4 Available Span Length
- ♦— Veh # 1, Axle # 1, at 3/4 Available Span Length
- Veh # 2, R Axle at Spt (Max V)
- MLC 100W Max Moment 1 Vehicle (with Impact)
- ◇— MLC 100W 3x Veh Max M Envelope
- ▲— Resultant of Vehicles at Mid-span
- \*— Veh # 1, Axle # 1, at 1/2 Available Span Length
- Veh # 2, Axle #3 at Mid-span (Max Moment)
- ▲— AASHTO HL-93 Max Moment (with Impact)
- +— MLC 100W 2x Veh Max M Envelope

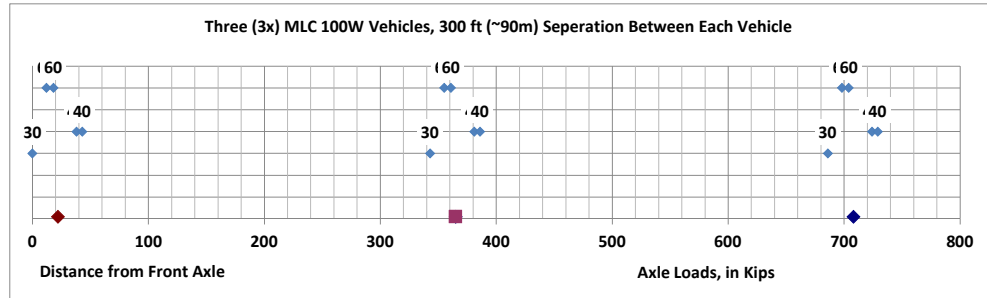


**FIFTEEN (15) AXLE**      **Three (3x) MLC 100W Vehicles, 300' (~91 m) separation, 800' (~244 m) total span length, Travel Speeds (with Impact)**



**FIFTEEN (15) AXLE** **Three (3x) MLC 100W Vehicles, 300' (~91 m) separation, 900' (~274 m) total span length, Travel Speeds (with Impact)**

Vehicle	Axle	Load (ST)	Load (kips)	Distance from front btwn axles (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0		0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
MLC 100 Vehicle # 3 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	686.00
	2-2	30.0	60.0	12.00	698.00
	2-3	30.0	60.0	6.00	704.00
	2-4	20.0	40.0	20.00	724.00
	(Rear) 2-5	20.0	40.0	5.00	729.00
<b>Totals</b>		<b>345.0</b>	<b>690.0</b>	<b>729.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Vehicle #3 Resultant at: 707.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 364.913 ft, from Front axle of 1st vehicle

**900** ft, Total Span Length **33%** Dynamic Impact Factor

	VEHICLE NO. 1					VEHICLE NO. 2					VEHICLE NO. 3					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	
Veh # 1, Axle # 1 at Front Spt	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	686.00	698.00	704.00	724.00	729.00	171.00
Resultant of Vehicles at Mid-span	85.09	97.09	103.09	123.09	128.09	428.09	440.09	446.09	466.09	471.09	771.09	783.09	789.09	809.09	814.09	85.91
Veh # 1, Axle # 1, at 1/4 Available Span Length	21.27	33.27	39.27	59.27	64.27	364.27	376.27	382.27	402.27	407.27	707.27	719.27	725.27	745.27	750.27	149.73
Veh # 1, Axle # 1, at 1/2 Available Span Length	42.54	54.54	60.54	80.54	85.54	385.54	397.54	403.54	423.54	428.54	728.54	740.54	746.54	766.54	771.54	128.46
Veh # 1, Axle # 1, at 3/4 Available Span Length	63.82	75.82	81.82	101.82	106.82	406.82	418.82	424.82	444.82	449.82	749.82	761.82	767.82	787.82	792.82	107.18
Veh # 2, Axle #3 at Mid-span (Max Moment)	89.00	101.00	107.00	127.00	132.00	432.00	444.00	450.00	470.00	475.00	775.00	787.00	793.00	813.00	818.00	82.00
Veh # 2, R Axle at Spt (Max V)	171.00	183.00	189.00	209.00	214.00	514.00	526.00	532.00	552.00	557.00	857.00	869.00	875.00	895.00	900.00	0.00

**FIFTEEN (15) AXLE** **Three (3x) MLC 100W Vehicles, 300' (~91 m) separation, 900' (~274 m) total span length, Travel Speeds (with Impact)**

**SHEAR CALCULATIONS**

SHEAR	VEHICLE NO. 1						VEHICLE NO. 2						VEHICLE NO. 3					
	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at React B, kips	
Veh # 1, Axle # 1 at Front Spt Axle Positions	545.61	505.71	425.91	346.11	292.91	239.71	199.81	120.01	40.21	-12.99	-66.19	-106.09	-185.89	-265.69	-318.89	-372.09	372.09	
Both Vehs Equi-dist from Mid-span Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	686.00	698.00	704.00	724.00	729.00	900.00	
Veh # 1, Axle # 1, at 1/4 Avail Span Axle Positions	545.61	418.95	339.15	259.35	206.15	152.95	113.05	33.25	-46.55	-99.75	-152.95	-192.85	-272.65	-352.45	-405.65	-458.85	458.85	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	85.09	97.09	103.09	123.09	128.09	428.09	440.09	446.09	466.09	471.09	771.09	783.09	789.09	809.09	814.09	900.00	
Veh # 1, Axle # 1, at 1/4 Avail Span Axle Positions	523.92	484.02	404.22	324.42	271.22	218.02	178.12	98.32	18.52	-34.68	-87.88	-127.78	-207.58	-287.38	-340.58	-393.78	393.78	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	21.27	33.27	39.27	59.27	64.27	364.27	376.27	382.27	402.27	407.27	707.27	719.27	725.27	745.27	750.27	900.00	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	502.23	462.33	382.53	302.73	249.53	196.33	156.43	76.63	-3.17	-56.37	-109.57	-149.47	-229.27	-309.07	-362.27	-415.47	415.47	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	0.00	42.54	54.54	60.54	80.54	85.54	385.54	397.54	403.54	423.54	428.54	728.54	740.54	746.54	766.54	771.54	900.00	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	480.54	440.64	360.84	281.04	227.84	174.64	134.74	54.94	-24.86	-78.06	-131.26	-171.16	-250.96	-330.76	-383.96	-437.16	437.16	
# 2, Axle # 3 at Mid-span (Max M) Axle Positions	0.00	63.82	75.82	81.82	101.82	106.82	406.82	418.82	424.82	444.82	449.82	749.82	761.82	767.82	787.82	792.82	900.00	
# 2, Axle # 3 at Mid-span (Max M) Axle Positions	454.86	414.96	335.16	255.36	202.16	148.96	109.06	29.26	-50.54	-103.74	-156.94	-196.84	-276.64	-356.44	-409.64	-462.84	462.84	
Veh # 2, R Axle at Spt (Max V) Axle Positions	0.00	89.00	101.00	107.00	127.00	132.00	432.00	444.00	450.00	470.00	475.00	775.00	787.00	793.00	813.00	818.00	900.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	371.25	341.25	281.25	221.25	181.25	141.25	111.25	51.25	-8.75	-48.75	-88.75	-118.75	-178.75	-238.75	-278.75	-318.75	546.45	
Veh # 2, R Axle at Spt (Max V) Axle Positions	0.00	171.00	183.00	189.00	209.00	214.00	514.00	526.00	532.00	552.00	557.00	857.00	869.00	875.00	895.00	900.00	900.00	

**546.5** MLC 100W 3x Vehicle on Span Maximum Shear w/Impact, kips  
**480.9** MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

**224.6** MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips  
**382.8** Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	VEHICLE NO. 1						VEHICLE NO. 2						VEHICLE NO. 3					
	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips	
Veh # 1, Axle # 1 at Front Spt Axle Positions	0.0	0.0	6,068.5	8,624.0	15,546.2	17,010.7	88,923.8	91,321.6	92,041.6	92,845.8	92,780.9	72,924.0	71,650.9	70,535.6	65,221.8	63,627.3	0.0	
Both Vehs Equi-dist from Mid-span Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	686.00	698.00	704.00	724.00	729.00	900.00	
Veh # 1, Axle # 1, at 1/4 Avail Span Axle Positions	0.0	39,042.2	44,069.6	46,104.5	51,291.5	52,322.2	98,207.2	99,563.8	99,763.3	98,832.3	98,333.6	52,448.6	50,134.4	48,498.5	41,449.5	39,421.2	0.0	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	85.09	97.09	103.09	123.09	128.09	428.09	440.09	446.09	466.09	471.09	771.09	783.09	789.09	809.09	814.09	900.00	
Veh # 1, Axle # 1, at 1/4 Avail Span Axle Positions	0.0	11,144.7	16,952.9	19,378.3	25,866.7	27,222.8	92,628.8	94,766.3	95,356.2	95,726.6	95,553.2	69,189.3	67,655.9	66,410.5	60,662.9	58,960.0	0.0	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	21.27	33.27	39.27	59.27	64.27	364.27	376.27	382.27	402.27	407.27	707.27	719.27	725.27	745.27	750.27	900.00	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.0	21,366.6	26,914.6	29,209.8	35,264.4	36,512.0	95,411.1	97,288.2	97,748.0	97,684.6	97,402.8	64,531.8	62,738.2	61,362.6	55,181.2	53,369.8	0.0	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	0.00	42.54	54.54	60.54	80.54	85.54	385.54	397.54	403.54	423.54	428.54	728.54	740.54	746.54	766.54	771.54	900.00	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	0.0	30,665.8	35,953.5	38,118.5	43,739.3	44,878.5	97,270.5	98,887.4	99,217.0	98,719.8	98,329.5	58,951.6	56,897.6	55,391.9	48,776.7	46,856.9	0.0	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	0.00	63.82	75.82	81.82	101.82	106.82	406.82	418.82	424.82	444.82	449.82	749.82	761.82	767.82	787.82	792.82	900.00	
# 2, Axle # 3 at Mid-span (Max M) Axle Positions	0.0	40,482.54	45,462.06	47,473.02	52,580.22	53,591.02	98,279.02	99,587.74	99,763.30	98,752.50	98,233.80	51,151.80	48,789.72	47,129.88	40,001.08	37,952.88	0.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	0.00	89.00	101.00	107.00	127.00	132.00	432.00	444.00	450.00	470.00	475.00	775.00	787.00	793.00	813.00	818.00	900.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	0.0	63,483.29	67,459.46	68,968.75	72,403.69	72,996.43	92,600.63	92,906.00	92,579.88	89,896.83	88,960.06	16,794.26	13,428.83	11,267.32	2,466.26	0.00	0.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	0.00	171.00	183.00	189.00	209.00	214.00	514.00	526.00	532.00	552.00	557.00	857.00	869.00	875.00	895.00	900.00	900.00	

**99,763** MLC 100W 3x Vehicle on Span Maximum Mid-span Moment w/Impact, kips  
**89,138** MLC 100W 2x Vehicle on Span Maximum (Absolute) Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

**50,400** MLC 100W 1x Vehicle on Span Maximum Mid-span Moment w/Impact, kips  
**85,974** AASHTO HL-93 Single Span Design Midspan Moment w/Impact, ft-kips

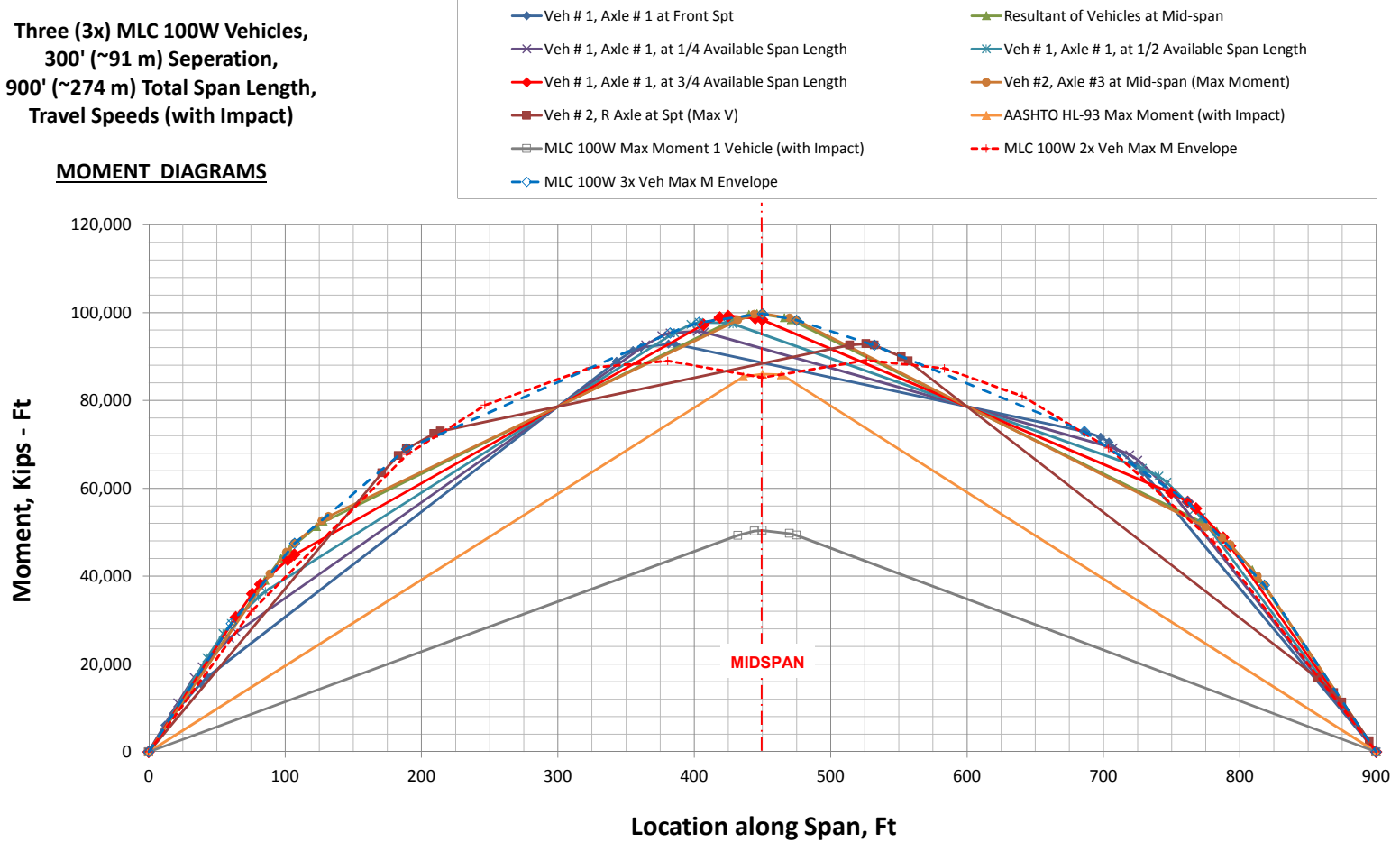


**FIFTEEN (15) AXLE**

**Three (3x) MLC 100W Vehicles, 300' (~91 m) separation, 900' (~274 m) total span length, Travel Speeds (with Impact)**

**Three (3x) MLC 100W Vehicles,  
300' (~91 m) Separation,  
900' (~274 m) Total Span Length,  
Travel Speeds (with Impact)**

**MOMENT DIAGRAMS**

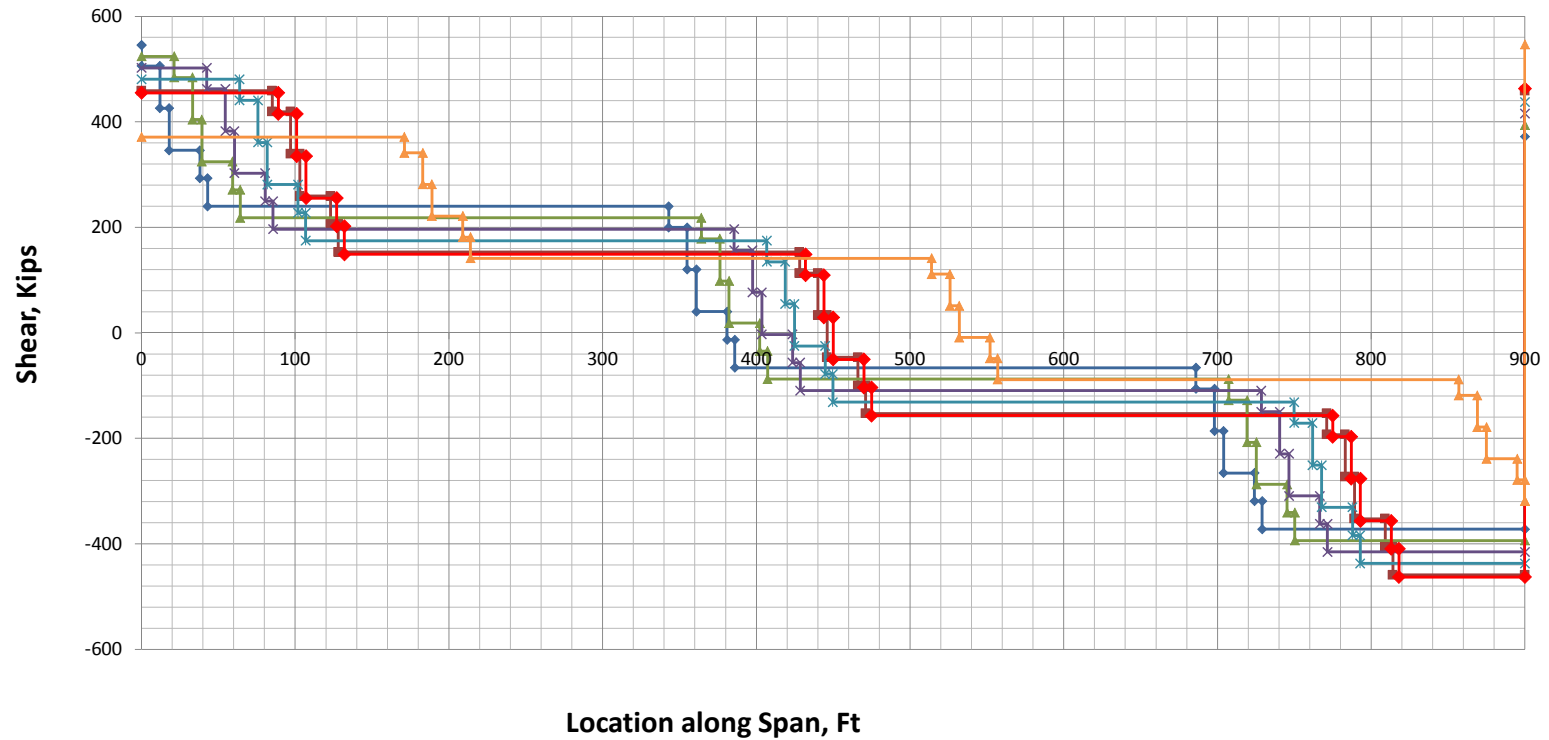


**FIFTEEN (15) AXLE**

**Three (3x) MLC 100W Vehicles, 300' (~91 m) separation, 900' (~274 m) total span length, Travel Speeds (with Impact)**

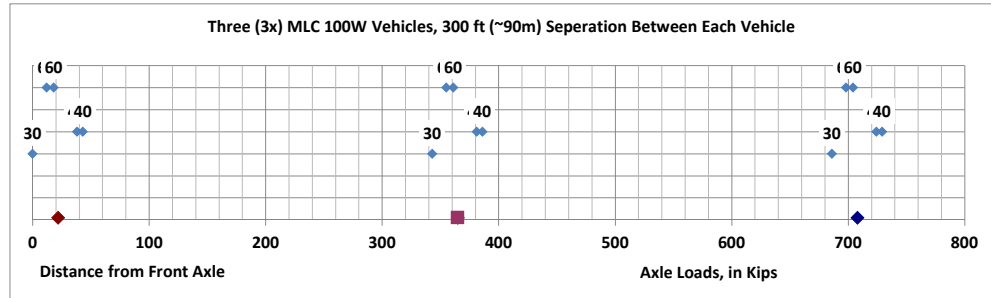
**Three (3x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 900' (~274 m) Total Span Length,  
 Travel Speeds (with Impact)**

**SHEAR DIAGRAMS**



**FIFTEEN (15) AXLE** **Three (3x) MLC 100W Vehicles, 300' (~91 m) separation, 1,000' (~305 m) total span length, Travel Speeds (with Impact)**

Vehicle	Axle	Load (ST)	Load (kips)	Distance from front axle, 1st vehicle (ft)	Distance from front axle, 1st vehicle (ft)
MLC 100 Vehicle # 1 (230K, 43' L)	(Front) 1-1	15.0	30.0	0.00	0.00
	1-2	30.0	60.0	12.00	12.00
	1-3	30.0	60.0	6.00	18.00
	1-4	20.0	40.0	20.00	38.00
	(Rear) 1-5	20.0	40.0	5.00	43.00
MLC 100 Vehicle # 2 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	343.00
	2-2	30.0	60.0	12.00	355.00
	2-3	30.0	60.0	6.00	361.00
	2-4	20.0	40.0	20.00	381.00
	(Rear) 2-5	20.0	40.0	5.00	386.00
MLC 100 Vehicle # 3 (230K, 43' L)	(Front) 2-1	15.0	30.0	300.0	686.00
	2-2	30.0	60.0	12.00	698.00
	2-3	30.0	60.0	6.00	704.00
	2-4	20.0	40.0	20.00	724.00
	(Rear) 2-5	20.0	40.0	5.00	729.00
<b>Totals</b>		<b>345.0</b>	<b>690.0</b>	<b>729.00</b>	



Vehicle #1 Resultant at: 21.913 ft, from Front axle of 1st vehicle  
 Vehicle #2 Resultant at: 364.913 ft, from Front axle of 1st vehicle  
 Vehicle #3 Resultant at: 707.913 ft, from Front axle of 1st vehicle  
 Resultant on both Vehicles on Span Length is: 364.913 ft, from Front axle of 1st vehicle

**1,000** ft, Total Span Length **33%** Dynamic Impact Factor

	VEHICLE NO. 1					VEHICLE NO. 2					VEHICLE NO. 3					Dist to Beam End
	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Rear #5 Axle Position	
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Veh # 1, Axle # 1 at Front Spt	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	686.00	698.00	704.00	724.00	729.00	271.00
Resultant of Vehicles at Mid-span	135.09	147.09	153.09	173.09	178.09	478.09	490.09	496.09	516.09	521.09	821.09	833.09	839.09	859.09	864.09	135.91
Veh # 1, Axle # 1, at 1/4 Available Span Length	33.77	45.77	51.77	71.77	76.77	376.77	388.77	394.77	414.77	419.77	719.77	731.77	737.77	757.77	762.77	237.23
Veh # 1, Axle # 1, at 1/2 Available Span Length	67.54	79.54	85.54	105.54	110.54	410.54	422.54	428.54	448.54	453.54	753.54	765.54	771.54	791.54	796.54	203.46
Veh # 1, Axle # 1, at 3/4 Available Span Length	101.32	113.32	119.32	139.32	144.32	444.32	456.32	462.32	482.32	487.32	787.32	799.32	805.32	825.32	830.32	169.68
Veh # 2, Axle #3 at Mid-span (Max Moment)	139.00	151.00	157.00	177.00	182.00	482.00	494.00	500.00	520.00	525.00	825.00	837.00	843.00	863.00	868.00	132.00
Veh # 2, R Axle at Spt (Max V)	271.00	283.00	289.00	309.00	314.00	614.00	626.00	632.00	652.00	657.00	957.00	969.00	975.00	995.00	1000.00	0.00

**FIFTEEN (15) AXLE** **Three (3x) MLC 100W Vehicles, 300' (~91 m) separation, 1,000' (~305 m) total span length, Travel Speeds (with Impact)**

**SHEAR CALCULATIONS**

SHEAR	VEHICLE NO. 1						VEHICLE NO. 2						VEHICLE NO. 3					
	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at React B, kips	
Veh # 1, Axle # 1 at Front Spt Axle Positions	582.82	542.92	463.12	383.32	330.12	276.92	237.02	157.22	77.42	24.22	-28.98	-68.88	-148.68	-228.48	-281.68	-334.88	334.88	
Both Vehs Equi-dist from Mid-span Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	686.00	698.00	704.00	724.00	729.00	1000.00	
Veh # 1, Axle # 1, at 1/4 Avail Span Axle Positions	458.85	418.95	339.15	259.35	206.15	152.95	113.05	33.25	-46.55	-99.75	-152.95	-192.85	-272.65	-352.45	-405.65	-458.85	458.85	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	135.09	147.09	153.09	173.09	178.09	478.09	490.09	496.09	516.09	521.09	821.09	833.09	839.09	859.09	864.09	1000.00	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	551.83	511.93	432.13	352.33	299.13	245.93	206.03	126.23	46.43	-6.77	-59.97	-99.87	-179.67	-259.47	-312.67	-365.87	365.87	
# 2, Axle # 3 at Mid-span (Max M) Axle Positions	0.00	33.77	45.77	51.77	71.77	76.77	376.77	388.77	394.77	414.77	419.77	719.77	731.77	737.77	757.77	762.77	1000.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	520.83	480.93	401.13	321.33	268.13	214.93	175.03	95.23	15.43	-37.77	-90.97	-130.87	-210.67	-290.47	-343.67	-396.87	396.87	
# 1, Axle # 1, at 1/4 Available Span Axle Positions	0.00	67.54	79.54	85.54	105.54	110.54	410.54	422.54	428.54	448.54	453.54	753.54	765.54	771.54	791.54	796.54	1000.00	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	489.84	449.94	370.14	290.34	237.14	183.94	144.04	64.24	-15.56	-68.76	-121.96	-161.86	-241.66	-321.46	-374.66	-427.86	427.86	
# 2, Axle # 3 at Mid-span (Max M) Axle Positions	0.00	101.32	113.32	119.32	139.32	144.32	444.32	456.32	462.32	482.32	487.32	787.32	799.32	805.32	825.32	830.32	1000.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	455.26	415.36	335.56	255.76	202.56	149.36	109.46	29.66	-50.14	-103.34	-156.54	-196.44	-276.24	-356.04	-409.24	-462.44	462.44	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	139.00	151.00	157.00	177.00	182.00	482.00	494.00	500.00	520.00	525.00	825.00	837.00	843.00	863.00	868.00	1000.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	334.12	304.12	244.12	184.12	144.12	104.12	74.12	14.12	-45.88	-85.88	-125.88	-155.88	-215.88	-275.88	-315.88	-355.88	355.88	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	271.00	283.00	289.00	309.00	314.00	614.00	626.00	632.00	652.00	657.00	957.00	969.00	975.00	995.00	1000.00	1000.00	

583.6 MLC 100W 3x Vehicle on Span Maximum Shear w/Impact, kips  
494.0 MLC 100W 2x Vehicle on Span Maximum Shear w/Impact, kips

225.2 MLC 100W 1x Vehicle on Span Maximum Shear w/Impact, kips  
414.9 Maximum AASHTO HL-93 Single Span Shear w/Impact, kips

**MOMENT CALCULATIONS**

MOMENT	VEHICLE NO. 1						VEHICLE NO. 2						VEHICLE NO. 3					
	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips	
Veh # 1, Axle # 1 at Front Spt Axle Positions	0.0	0.0	6,515.0	9,293.7	16,960.1	18,610.7	101,686.5	104,530.8	105,474.1	107,022.5	107,143.5	98,449.3	97,622.8	96,730.7	92,161.1	90,752.7	0.0	
Both Vehs Equi-dist from Mid-span Axle Positions	0.00	0.00	12.00	18.00	38.00	43.00	343.00	355.00	361.00	381.00	386.00	686.00	698.00	704.00	724.00	729.00	1000.00	
Veh # 1, Axle # 1, at 1/4 Avail Span Axle Positions	0.0	61,984.7	67,012.1	69,047.0	74,234.0	75,264.7	121,149.7	122,506.3	122,705.8	121,774.8	121,276.1	75,391.1	73,076.9	71,441.0	64,392.0	62,363.7	0.0	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	135.09	147.09	153.09	173.09	178.09	478.09	490.09	496.09	516.09	521.09	821.09	833.09	839.09	859.09	864.09	1000.00	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	0.0	18,636.2	24,779.3	27,372.0	34,418.6	35,914.2	109,692.3	112,164.6	112,922.0	113,850.5	113,816.7	95,824.8	94,626.3	93,548.2	88,358.8	86,795.4	0.0	
# 2, Axle # 3 at Mid-span (Max M) Axle Positions	0.00	33.77	45.77	51.77	71.77	76.77	376.77	388.77	394.77	414.77	419.77	719.77	731.77	737.77	757.77	762.77	1000.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	0.0	35,179.0	40,950.2	43,357.0	49,783.7	51,124.4	115,604.8	117,705.2	118,276.6	118,585.3	118,396.5	91,106.9	89,536.5	88,272.5	82,463.2	80,744.8	0.0	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	67.54	79.54	85.54	105.54	110.54	410.54	422.54	428.54	448.54	453.54	753.54	765.54	771.54	791.54	796.54	1000.00	
# 1, Axle # 1, at 3/4 Available Span Axle Positions	0.0	49,628.5	55,027.8	57,248.6	63,055.5	64,241.2	119,423.9	121,152.4	121,537.9	121,226.7	120,882.9	84,295.6	82,353.3	80,903.4	74,474.2	72,600.9	0.0	
# 2, Axle # 3 at Mid-span (Max M) Axle Positions	0.00	101.32	113.32	119.32	139.32	144.32	444.32	456.32	462.32	482.32	487.32	787.32	799.32	805.32	825.32	830.32	1000.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	0.0	63,281.00	68,265.31	70,278.66	75,393.84	76,406.64	121,214.34	122,527.85	122,705.80	121,702.98	121,186.28	74,223.98	71,866.68	70,209.24	63,088.42	61,042.21	0.00	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	139.00	151.00	157.00	177.00	182.00	482.00	494.00	500.00	520.00	525.00	825.00	837.00	843.00	863.00	868.00	1000.00	
Veh # 2, R Axle at Spt (Max V) Axle Positions	0.0	90,547.22	94,077.90	95,364.43	98,056.88	98,464.00	106,930.78	106,790.65	106,241.78	102,816.24	101,693.85	18,390.63	14,579.70	12,195.44	2,651.89	0.00	0.00	
# 1, Axle # 1, at 1/2 Available Span Axle Positions	0.00	271.00	283.00	289.00	309.00	314.00	614.00	626.00	632.00	652.00	657.00	957.00	969.00	975.00	995.00	1000.00	1000.00	

122,706 MLC 100W 3x Vehicle on Span Maximum Mid-span Moment w/Impact, kips  
103,730 MLC 100W 2x Vehicle on Span Maximum (Absolute) Moment w/Impact, kips  
300 ft Separation between MLC 100W Hypothetical Vehicles

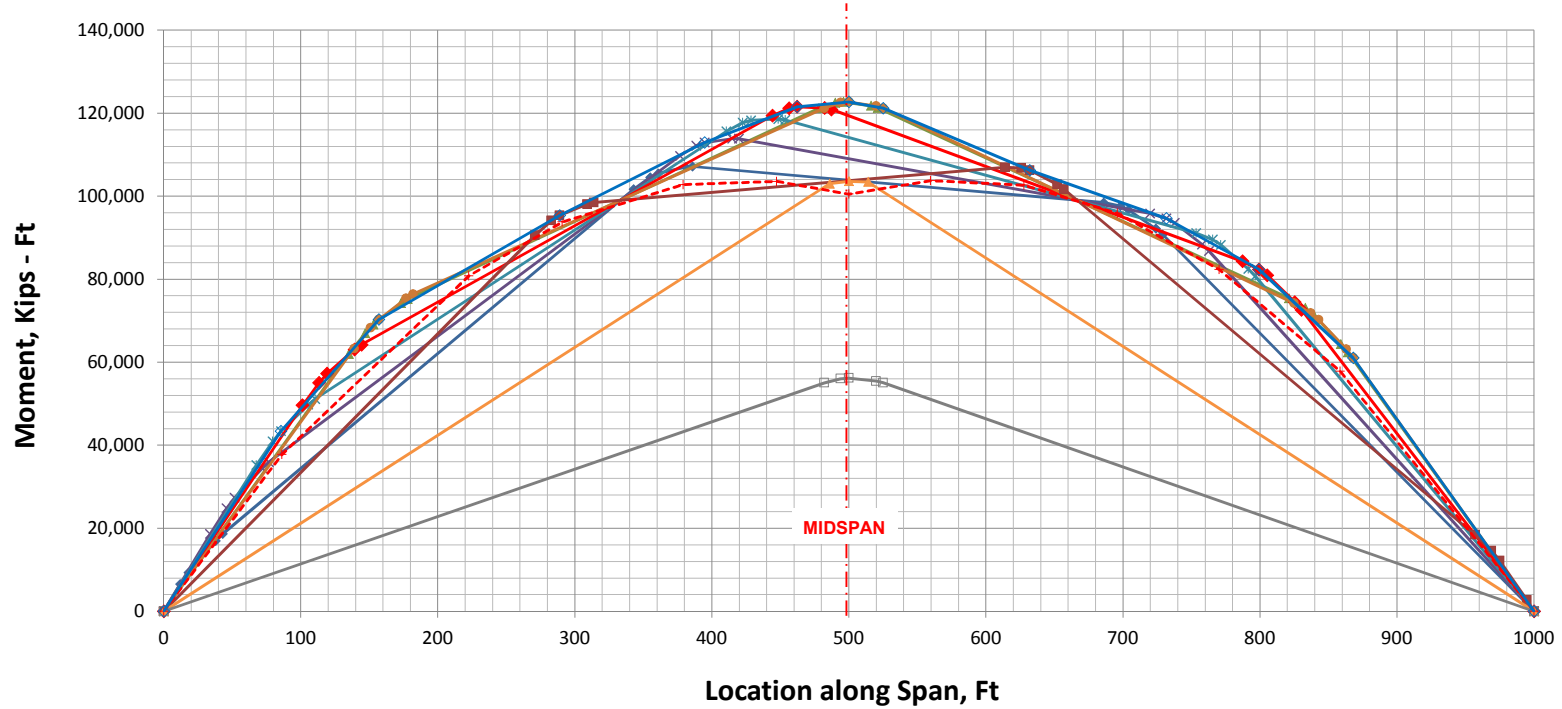
56,150 MLC 100W 1x Vehicle on Span Maximum Mid-span Moment w/Impact, kips  
103,568 AASHTO HL-93 Single Span Design Midspan Moment w/Impact, ft-kips

**FIFTEEN (15) AXLE**      **Three (3x) MLC 100W Vehicles, 300' (~91 m) separation, 1,000' (~305 m) total span length, Travel Speeds (with Impact)**

**Three (3x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 1,000' (~305 m) Total Span Length,  
 Travel Speeds (with Impact)**

**MOMENT DIAGRAMS**

- Veh # 1, Axle # 1 at Front Spt
- x— Veh # 1, Axle # 1, at 1/4 Available Span Length
- ♦— Veh # 1, Axle # 1, at 3/4 Available Span Length
- Veh # 2, R Axle at Spt (Max V)
- MLC 100W Max Moment 1 Vehicle (with Impact)
- ◇— MLC 100W 3x Veh Max M Envelope
- ▲— Resultant of Vehicles at Mid-span
- x— Veh # 1, Axle # 1, at 1/2 Available Span Length
- Veh # 2, Axle #3 at Mid-span (Max Moment)
- ▲— AASHTO HL-93 Max Moment (with Impact)
- +— MLC 100W 2x Veh Max M Envelope

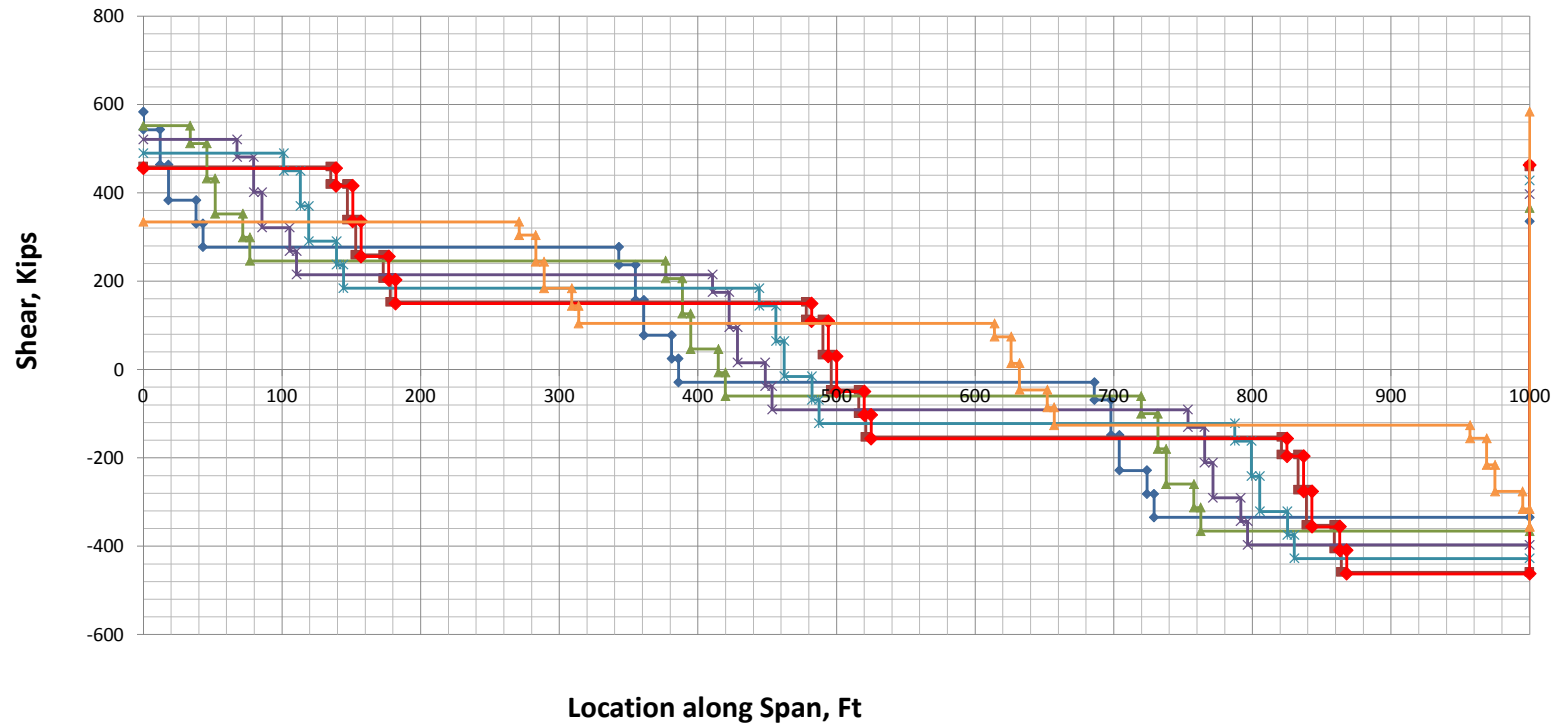
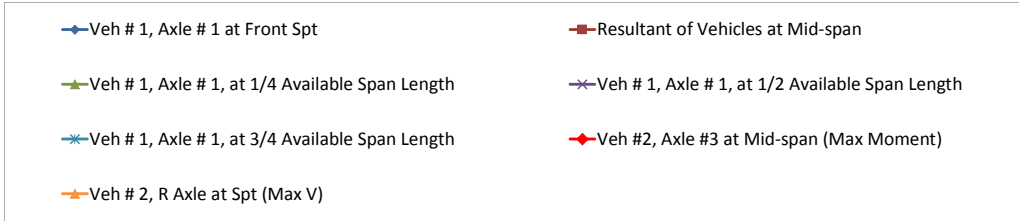


**FIFTEEN (15) AXLE**

**Three (3x) MLC 100W Vehicles, 300' (~91 m) separation, 1,000' (~305 m) total span length, Travel Speeds (with Impact)**

**Three (3x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 1,000' (~305 m) Total Span Length,  
 Travel Speeds (with Impact)**

**SHEAR DIAGRAMS**



## **FIGURES**

5-29. 2xMLC100W, 450'at 300'sep

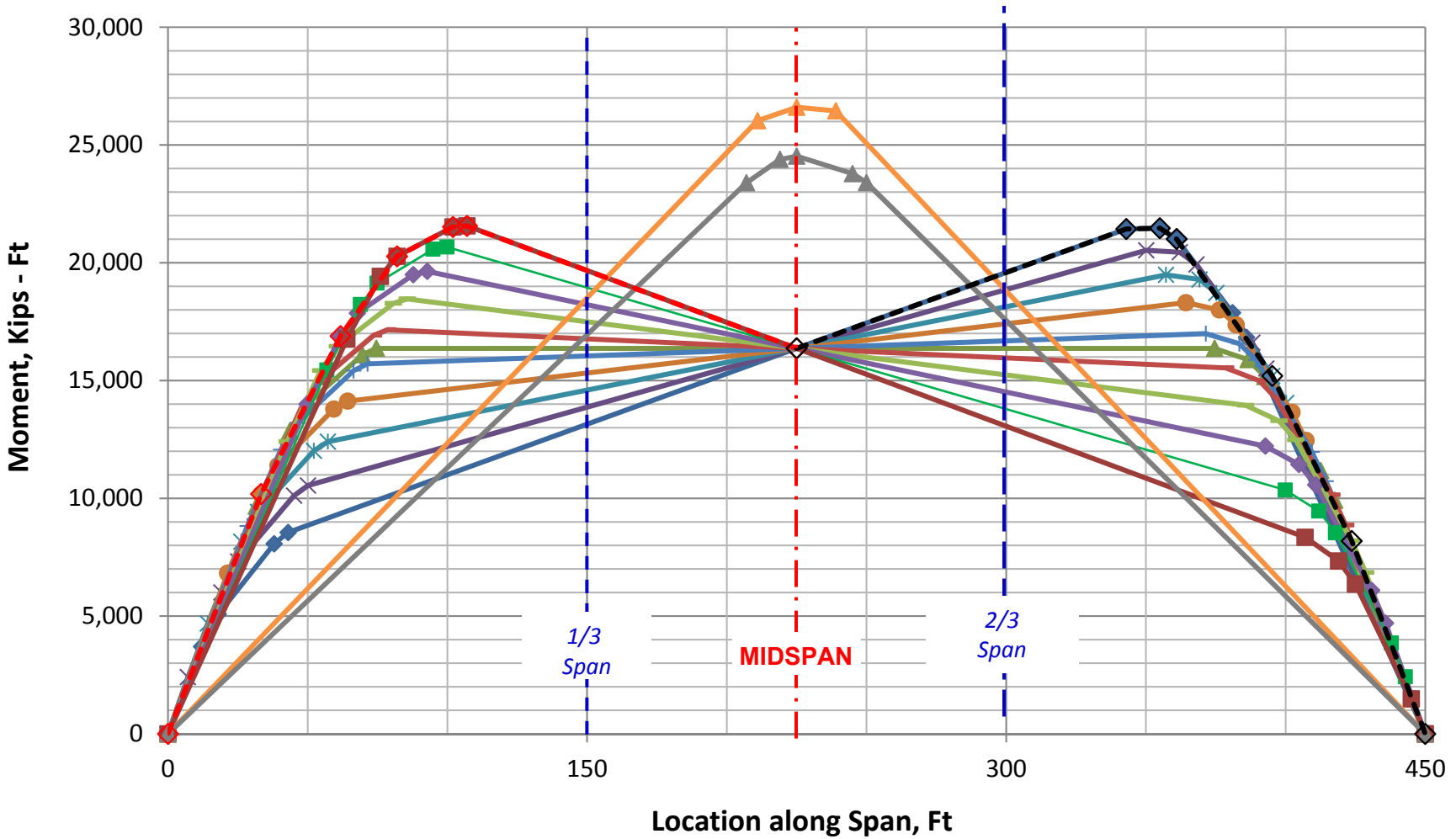
5-30. 2xMLC100W, 730'at 300'sep

5-31. 3xMLC100W, 900'at 300'sep

**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 450' (~137 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

**MOMENT DIAGRAMS**

- ◆— Veh # 1, Axle # 1 at Front Spt
- ×— Veh #1, Axle #1, at 1/9 Available Span
- Veh #1, Axle #1, at 3/9 Available Span
- Veh #1, Axle #1, at 5/9 Available Span
- ◇— Veh #1, Axle #1, at 7/9 Available Span
- Veh #1, Axle #1, at 8/9 Available Span
- Veh # 2, R Axle at Spt (Max V)
- ▲— MLC 100W Max Moment 1 Vehicle (with Impact)
- ◆— Max Values Curve, Right Side
- ▲— Resultant of both Vehicles at Mid-span
- ×— Veh #1, Axle #1, at 2/9 Available Span
- ◆— Veh #1, Axle #1, at 4/9 Available Span
- ◇— Veh #1, Axle #1, at 6/9 Available Span
- Veh #1, Axle #1, at 8/9 Available Span
- ▲— AASHTO HL-93 Max Moment (with Impact)
- ◆— Max Values Curve, Left Side

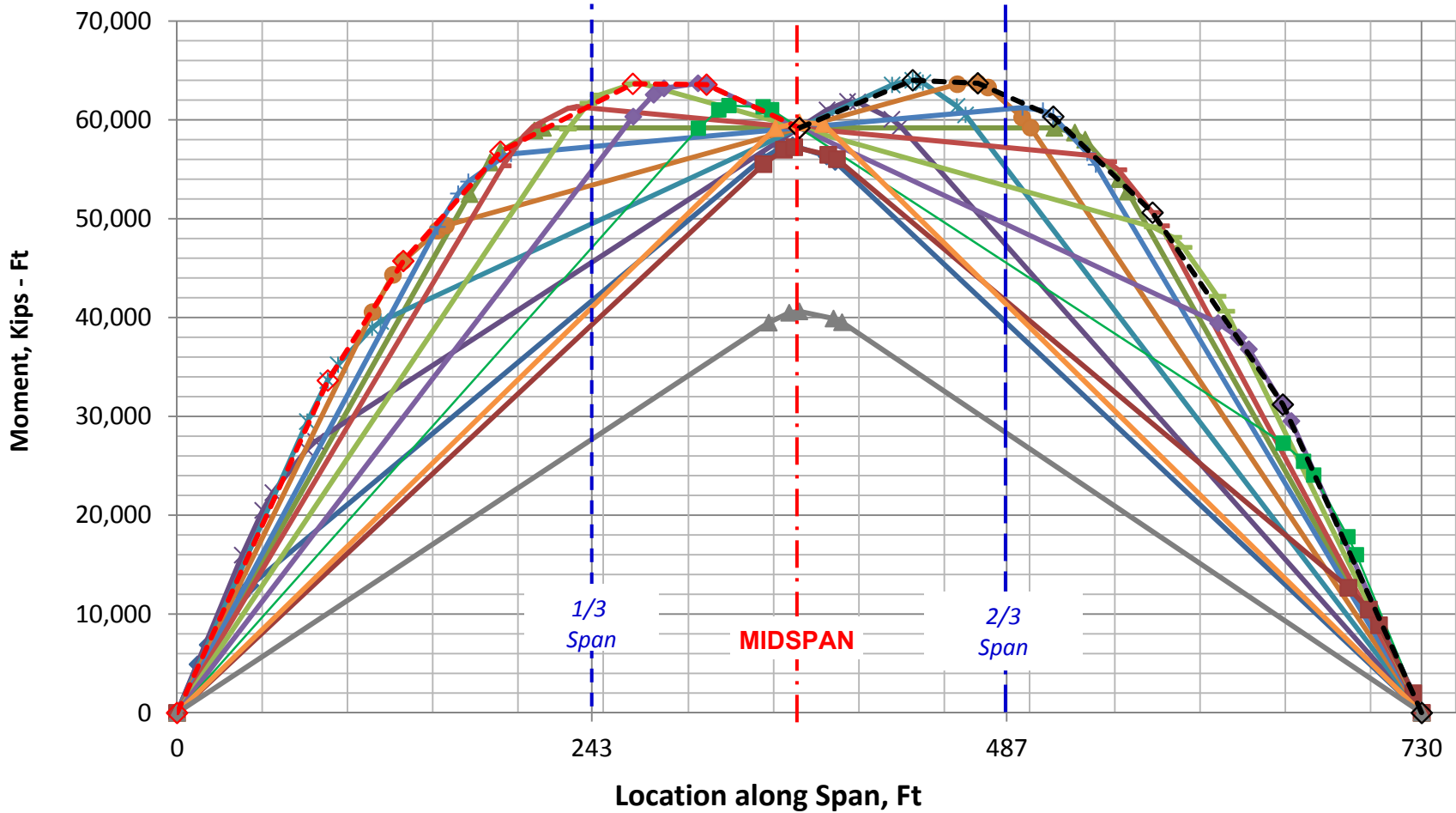




**Two (2x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 730' (~223 m) Total Span Length,  
 Normal Speeds (w/ Impact)**

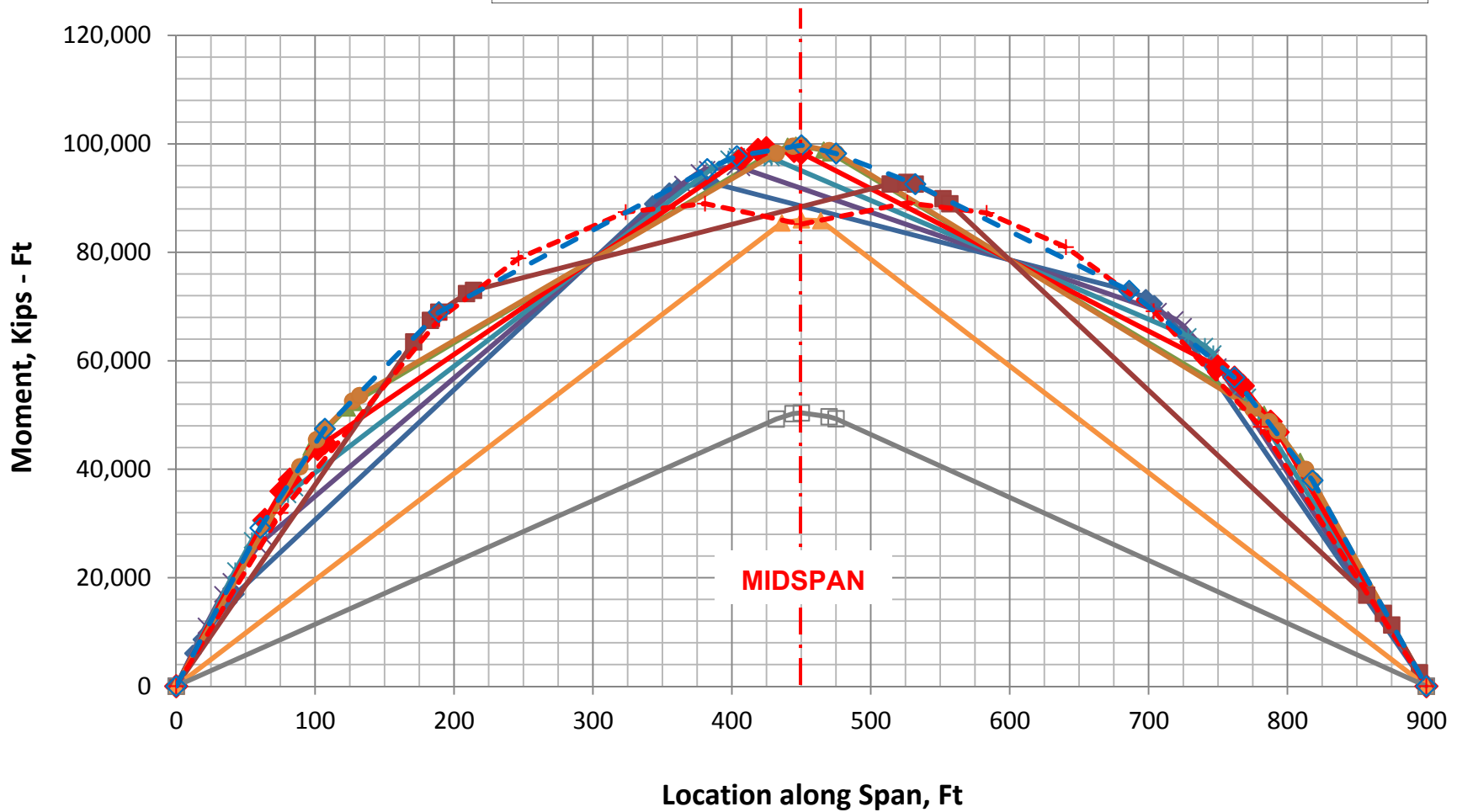
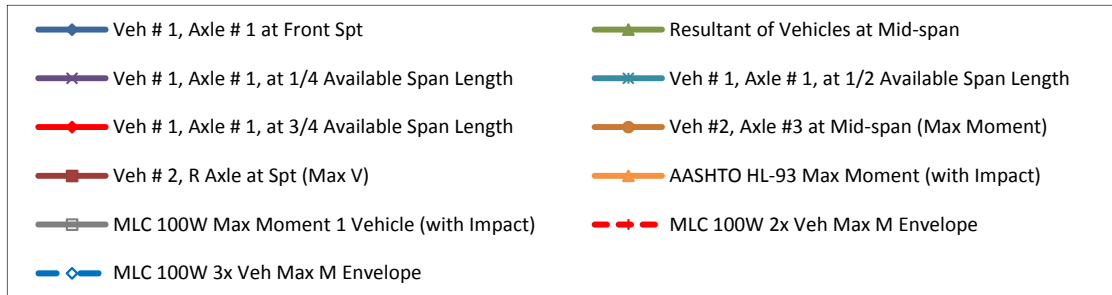
**MOMENT DIAGRAMS**

- ◆— Veh # 1, Axle # 1 at Front Spt
- ×— Veh #1, Axle #1, at 1/9 Available Span
- Veh #1, Axle #1, at 3/9 Available Span
- Veh #1, Axle #1, at 5/9 Available Span
- ◇— Veh #1, Axle #1, at 7/9 Available Span
- Veh # 2, R Axle at Spt (Max V)
- ▲— MLC 100W Max Moment 1 Vehicle (with Impact)
- ◆— Max Values Curve, Right Side
- ▲— Resultant of both Vehicles at Mid-span
- ×— Veh #1, Axle #1, at 2/9 Available Span
- Veh #1, Axle #1, at 4/9 Available Span
- Veh #1, Axle #1, at 6/9 Available Span
- ◇— Veh #1, Axle #1, at 8/9 Available Span
- AASHTO HL-93 Max Moment (with Impact)
- ◆— Max Values Curve, Left Side



**Three (3x) MLC 100W Vehicles,  
 300' (~91 m) Separation,  
 900' (~274 m) Total Span Length,  
 Travel Speeds (with Impact)**

**MOMENT DIAGRAMS**



**END OF APPENDIX G**

## APPENDIX H: SPECIAL PERMIT VEHICLES CALCULATIONS

Filename: WP Parker UNO 2019 MSCE Thesis Data - Appendix H. Special Permit Vehicles.xlsx

Contents (worksheets/tab names included in the Excel workbook are):

<u>Calculation Worksheets</u>	<u>Page</u>		<u>Page</u>
LASDV-5 (10 axle), 100' span	H-2	Wis-SPV,MaxM 4-R, 100' span	H-73
LASDV-5 (10 axle), 200' span	H-3	Wis-SPV,MaxM 4-R, 200' span	H-77
LASDV-5 (10 axle), 300' span	H-6	Wis-SPV,MaxM 4-R, 300' span	H-81
LASDV-5 (10 axle), 400' span	H-9	Wis-SPV,MaxM 4-R, 400' span	H-85
LASDV-5 (10 axle), 500' span	H-12	Wis-SPV,MaxM 4-R, 500' span	H-89
LASDV-5 (10 axle), 600' span	H-15	Wis-SPV,MaxM 4-R, 600' span	H-93
LASDV-5 (10 axle), 700' span	H-18	Wis-SPV,MaxM 4-R, 700' span	H-97
LASDV-5 (10 axle), 800' span	H-21	Wis-SPV,MaxM 4-R, 800' span	H-101
LASDV-5 (10 axle), 900' span	H-24	Wis-SPV,MaxM 4-R, 900' span	H-105
LASDV-5 (10 axle), 1000' span	H-27	Wis-SPV,MaxM 4-R, 1000' span	H-109
LASDV-5 (10 axle), 1000' span	H-30		
NW USA Permit WA-02, 100' span	H-33	<b><u>Tables</u></b>	NA
NW USA Permit WA-02, 200' span	H-37	None	NA
NW USA Permit WA-02, 300' span	H-41		
NW USA Permit WA-02, 400' span	H-45	<b><u>Figures</u></b>	NA
NW USA Permit WA-02, 500' span	H-49	None	NA
NW USA Permit WA-02, 600' span	H-53		
NW USA Permit WA-02, 700' span	H-57		
NW USA Permit WA-02, 800' span	H-61		
NW USA Permit WA-02, 900' span	H-65		
NW USA Permit WA-02, 1000' span	H-69		

## **CALCULATION WORKSHEETS**

LASDV-5 (10 axle), 100' span  
LASDV-5 (10 axle), 200' span  
LASDV-5 (10 axle), 300' span  
LASDV-5 (10 axle), 400' span  
LASDV-5 (10 axle), 500' span  
LASDV-5 (10 axle), 600' span  
LASDV-5 (10 axle), 700' span  
LASDV-5 (10 axle), 800' span  
LASDV-5 (10 axle), 900' span  
LASDV-5 (10 axle), 1000' span

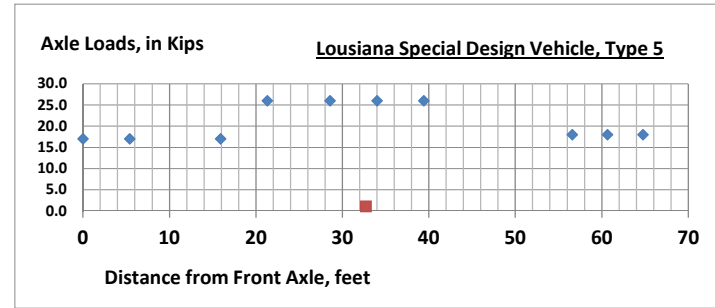
NW USA Permit WA-02, 100' span  
NW USA Permit WA-02, 200' span  
NW USA Permit WA-02, 300' span  
NW USA Permit WA-02, 400' span  
NW USA Permit WA-02, 500' span  
NW USA Permit WA-02, 600' span  
NW USA Permit WA-02, 700' span  
NW USA Permit WA-02, 800' span  
NW USA Permit WA-02, 900' span  
NW USA Permit WA-02, 1000' span

Wis-SPV,MaxM 4-R, 100' span  
Wis-SPV,MaxM 4-R, 200' span  
Wis-SPV,MaxM 4-R, 300' span  
Wis-SPV,MaxM 4-R, 400' span  
Wis-SPV,MaxM 4-R, 500' span  
Wis-SPV,MaxM 4-R, 600' span  
Wis-SPV,MaxM 4-R, 700' span  
Wis-SPV,MaxM 4-R, 800' span  
Wis-SPV,MaxM 4-R, 900' span  
Wis-SPV,MaxM 4-R, 1000' span

**TEN (10) AXLE Louisiana Special Design Vehicle Type 5 (LASDV-5), 100' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	8.5	17.0		0.000	75.62	0
2	8.5	17.0	5.42	5.417	75.62	165
3	8.5	17.0	10.50	15.917	75.62	485
4	13.0	26.0	5.42	21.333	115.65	650
5	13.0	26.0	7.25	28.583	115.65	871
6	13.0	26.0	5.4	34.000	115.65	1036
7	13.0	26.0	5.42	39.417	115.65	1201
8	9.0	18.0	17.17	56.583	80.07	1725
9	9.0	18.0	4.08	60.667	80.07	1849
(Rear) 10	9.0	18.0	4.08	64.750	80.07	1974
<b>Totals</b>	<b>104.5</b>	<b>209.0</b>	<b>64.75</b>		<b>9956.80</b>	<b>485</b>

Resultant of Axle Load is: **32.753 ft, from First (Forward) axle**



**100 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
<b>FROM LEFT BEAM SUPPORT</b>	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Front Axle # 1 at Front Support	0.00	5.42	15.92	21.33	28.58	34.00	39.42	56.58	60.67	64.75	35.25
Middle Axle # 5 at Mid-Span	21.42	26.83	37.33	42.75	50.00	55.42	60.83	78.00	82.08	86.17	13.83
Resultant at Mid-Span	17.25	22.66	33.16	38.58	45.83	51.25	56.66	73.83	77.91	82.00	18.00
Predicted Location Max Mom at Mid-Span	16.62	22.04	32.54	37.96	45.21	50.62	56.04	73.21	77.29	81.37	18.63
Middle Axle # 6 at Mid-Span	16.00	21.42	31.92	37.33	44.58	50.00	55.42	72.58	76.67	80.75	19.25
Mid-Span between Axles # 6 and 7	13.29	18.71	29.21	34.63	41.88	47.29	52.71	69.88	73.96	78.04	21.96
Rear Axle #10 at Rear Support (Max V)	35.25	40.67	51.17	56.58	63.83	69.25	74.67	91.83	95.92	100.00	0

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	140.55	123.55	106.55	89.55	63.55	37.55	11.55	-14.45	-32.45	-50.45	-68.45	68.45
Middle Axle # 5 at Mid-Span	95.79	78.79	61.79	44.79	18.79	-7.21	-33.21	-59.21	-77.21	-95.21	-113.21	113.21
Resultant at Mid-Span	104.50	87.50	70.50	53.50	27.50	1.50	-24.50	-50.50	-68.50	-86.50	-104.50	104.39
Predicted Location Max Mom at Mid-Span	105.80	88.80	71.80	54.80	28.80	2.80	-23.20	-49.20	-67.20	-85.20	-103.20	103.30
Middle Axle # 6 at Mid-Span	107.11	90.11	73.11	56.11	30.11	4.11	-21.89	-47.89	-65.89	-83.89	-101.89	101.89
Mid-Span between Axles # 6 and 7	112.77	95.77	78.77	61.77	35.77	9.77	-16.23	-42.23	-60.23	-78.23	-96.23	96.23
Rear Axle #10 at Rear Support (Max V)	66.87	49.87	32.87	15.87	-10.13	-36.13	-62.13	-88.13	-106.13	-124.13	-142.13	142.13

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Middle Axle # 5 at Mid-Span	0.0	2,051.4	2,478.2	3,126.9	3,369.5	3,505.7	3,466.6	3,286.7	2,270.2	1,954.9	1,566.1	0.0
Resultant at Mid-Span	0.0	1,802.3	2,276.3	3,016.5	3,306.3	3,505.7	3,513.8	3,381.1	2,514.2	2,234.5	1,881.3	0.0
Predicted Location Max Mom at Mid-Span	0.0	1,758.8	2,239.9	2,993.8	3,290.6	3,499.5	3,514.6	3,389.0	2,544.5	2,270.1	1,922.2	0.0
Middle Axle # 6 at Mid-Span	0.0	1,713.7	2,201.8	2,969.4	3,273.3	3,491.6	3,513.8	3,395.2	2,573.1	2,304.0	1,961.4	0.0
Mid-Span between Axles # 6 and 7	0.0	1,498.9	2,017.6	2,844.7	3,179.2	3,438.5	3,491.4	3,403.5	2,678.5	2,432.6	2,113.1	0.0

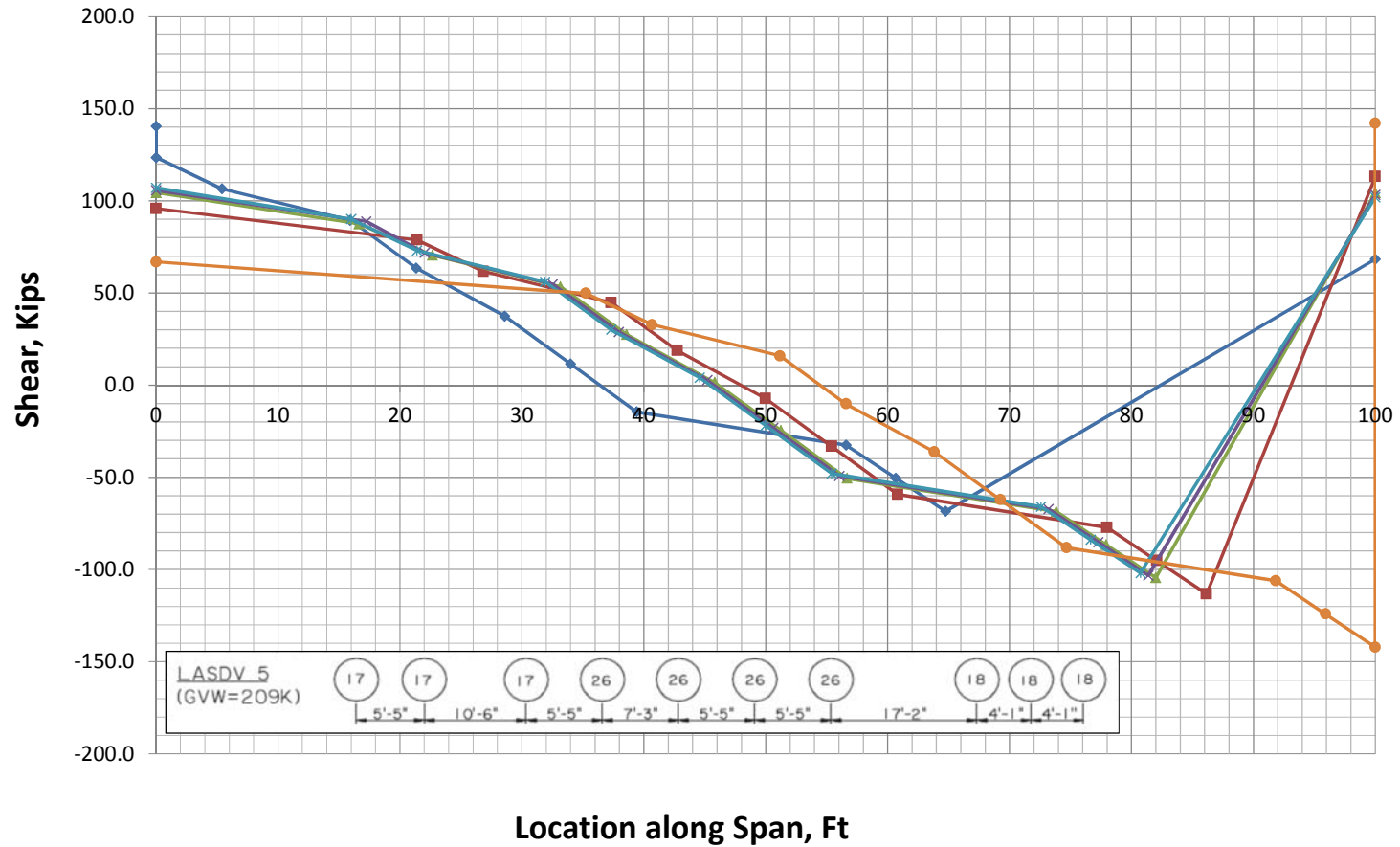
**TEN (10) AXLE**

**Louisiana Special Design Vehicle Type 5 (LASDV-5), 100' span length**

**Louisiana Special Design Vehicle  
 Type 5 (LASDV-5), 100' span length,**

**SHEAR DIAGRAMS**

- ◆ Front Axle # 1 at Front Support
- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✱ Predicted Location Max Mom at Mid-Span
- ✱ Middle Axle # 6 at Mid-Span
- Rear Axle #10 at Rear Support (Max V)



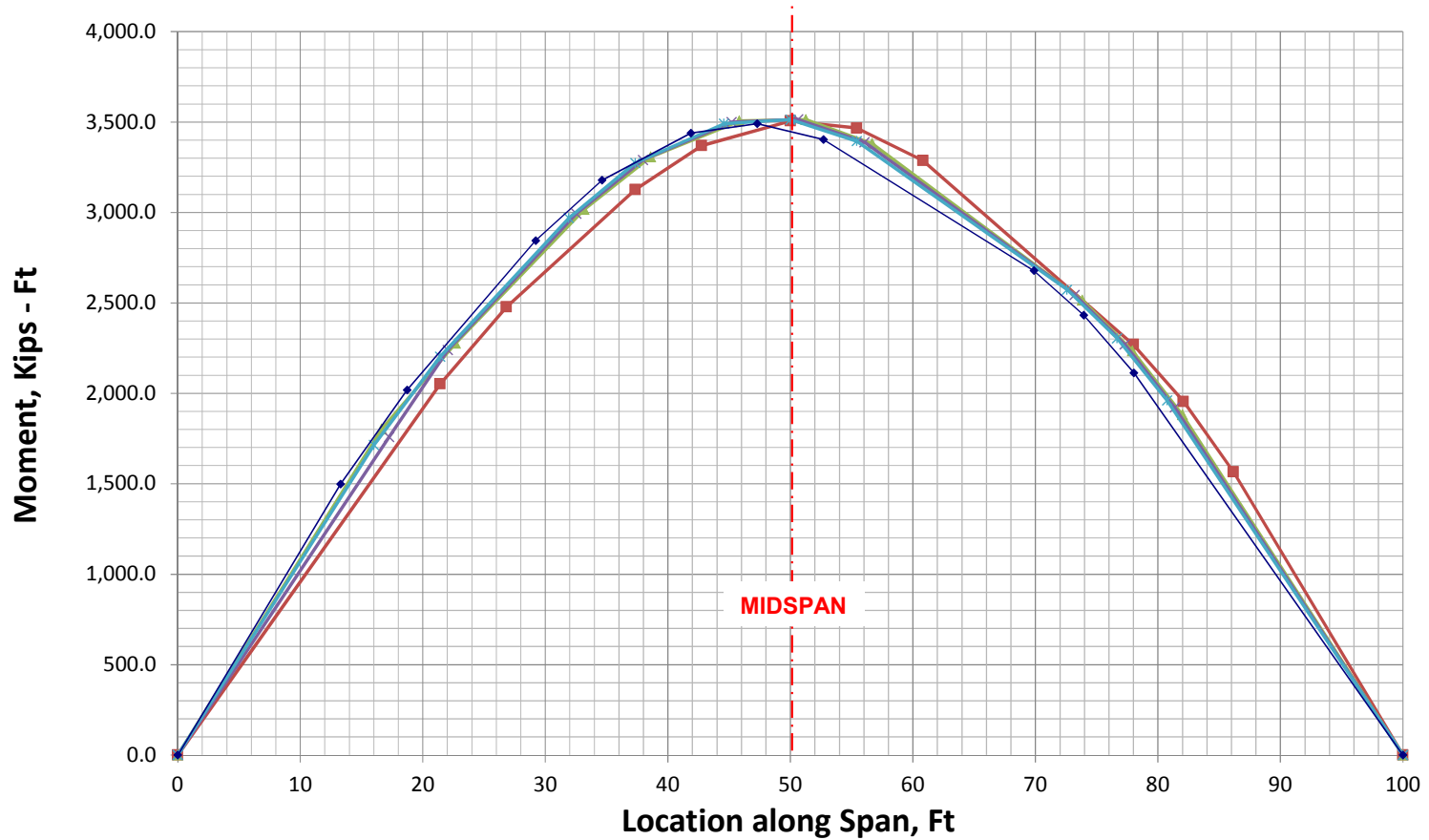
**TEN (10) AXLE**

**Louisiana Special Design Vehicle Type 5 (LASDV-5), 100' span length**

**Louisiana Special Design Vehicle  
 Type 5 (LASDV-5), 100' span length,**

**MOMENT DIAGRAMS**

- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✕ Predicted Location Max Mom at Mid-Span
- ✧ Middle Axle # 6 at Mid-Span
- ◆ Mid-Span between Axles # 6 and 7

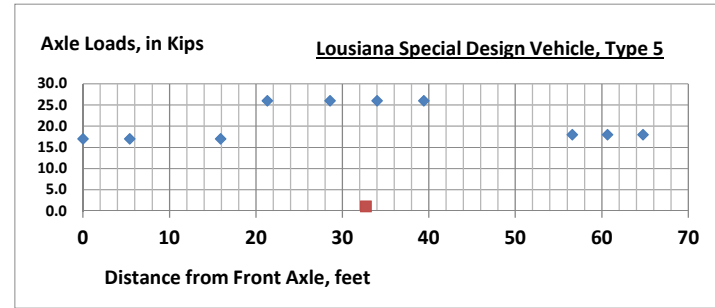




**TEN (10) AXLE Louisiana Special Design Vehicle Type 5 (LASDV-5), 200' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	8.5	17.0		0.000	75.62	0
2	8.5	17.0	5.42	5.417	75.62	165
3	8.5	17.0	10.50	15.917	75.62	485
4	13.0	26.0	5.42	21.333	115.65	650
5	13.0	26.0	7.25	28.583	115.65	871
6	13.0	26.0	5.4	34.000	115.65	1036
7	13.0	26.0	5.42	39.417	115.65	1201
8	9.0	18.0	17.17	56.583	80.07	1725
9	9.0	18.0	4.08	60.667	80.07	1849
(Rear) 10	9.0	18.0	4.08	64.750	80.07	1974
<b>Totals</b>	<b>104.5</b>	<b>209.0</b>	<b>64.75</b>		<b>9956.80</b>	<b>485</b>

Resultant of Axle Load is: **32.753 ft, from First (Forward) axle**



**200 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
<b>FROM LEFT BEAM SUPPORT</b>											
Front Axle # 1 at Front Support	0.00	5.42	15.92	21.33	28.58	34.00	39.42	56.58	60.67	64.75	135.25
Middle Axle # 5 at Mid-Span	71.42	76.83	87.33	92.75	100.00	105.42	110.83	128.00	132.08	136.17	63.83
Resultant at Mid-Span	67.25	72.66	83.16	88.58	95.83	101.25	106.66	123.83	127.91	132.00	68.00
Predicted Location Max Mom at Mid-Span	66.62	72.04	82.54	87.96	95.21	100.62	106.04	123.21	127.29	131.37	68.63
Middle Axle # 6 at Mid-Span	66.00	71.42	81.92	87.33	94.58	100.00	105.42	122.58	126.67	130.75	69.25
Mid-Span between Axles # 6 and 7	63.29	68.71	79.21	84.63	91.88	97.29	102.71	119.88	123.96	128.04	71.96
Rear Axle #10 at Rear Support (Max V)	135.25	140.67	151.17	156.58	163.83	169.25	174.67	191.83	195.92	200.00	0

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	174.77	157.77	140.77	123.77	97.77	71.77	45.77	19.77	1.77	-16.23	-34.23	34.23
Middle Axle # 5 at Mid-Span	100.14	83.14	66.14	49.14	23.14	-2.86	-28.86	-54.86	-72.86	-90.86	-108.86	108.86
Resultant at Mid-Span	104.50	87.50	70.50	53.50	27.50	1.50	-24.50	-50.50	-68.50	-86.50	-104.50	104.45
Predicted Location Max Mom at Mid-Span	105.15	88.15	71.15	54.15	28.15	2.15	-23.85	-49.85	-67.85	-85.85	-103.85	103.90
Middle Axle # 6 at Mid-Span	105.80	88.80	71.80	54.80	28.80	2.80	-23.20	-49.20	-67.20	-85.20	-103.20	103.20
Mid-Span between Axles # 6 and 7	108.63	91.63	74.63	57.63	31.63	5.63	-20.37	-46.37	-64.37	-82.37	-100.37	100.37
Rear Axle #10 at Rear Support (Max V)	33.44	16.44	-0.56	-17.56	-43.56	-69.56	-95.56	-121.56	-139.56	-157.56	-175.56	175.56

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Middle Axle # 5 at Mid-Span	0.0	7,151.9	7,602.2	8,296.7	8,562.9	8,730.7	8,715.2	8,558.9	7,617.2	7,319.7	6,948.7	0.0
Resultant at Mid-Span	0.0	7,027.3	7,501.3	8,241.5	8,531.3	8,730.7	8,738.8	8,606.1	7,739.2	7,459.5	7,106.3	0.0
Predicted Location Max Mom at Mid-Span	0.0	7,005.6	7,483.1	8,230.2	8,523.5	8,727.6	8,739.2	8,610.1	7,754.3	7,477.3	7,126.7	0.0
Middle Axle # 6 at Mid-Span	0.0	6,983.0	7,464.0	8,218.0	8,514.8	8,723.6	8,738.8	8,613.2	7,768.6	7,494.3	7,146.4	0.0
Mid-Span between Axles # 6 and 7	0.0	6,875.6	7,371.9	8,155.6	8,467.8	8,697.1	8,727.6	8,617.3	7,821.4	7,558.5	7,222.2	0.0

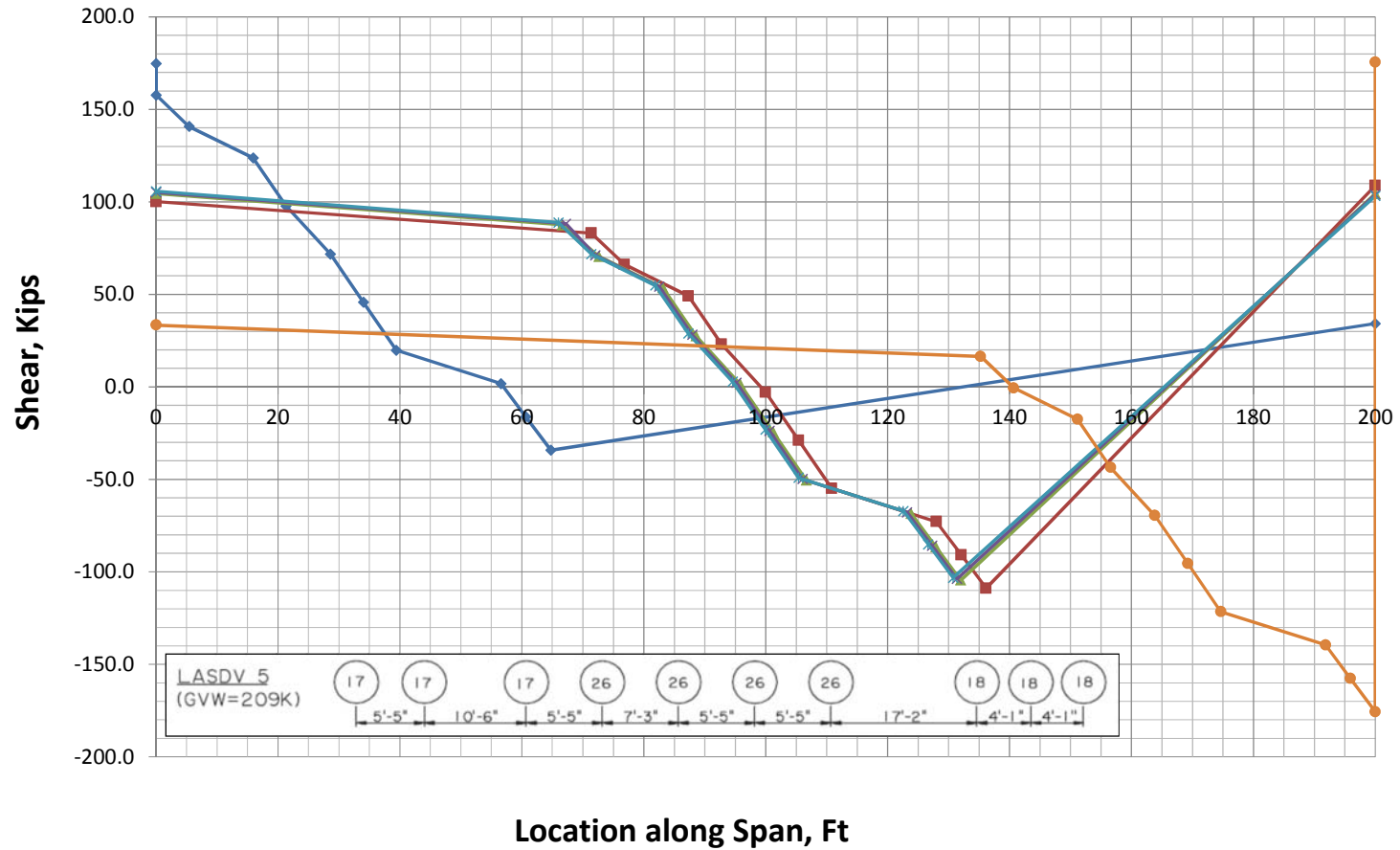
**TEN (10) AXLE**

**Louisiana Special Design Vehicle Type 5 (LASDV-5), 200' span length**

**Louisiana Special Design Vehicle  
 Type 5 (LASDV-5), 200' span length,**

**SHEAR DIAGRAMS**

- ◆ Front Axle # 1 at Front Support
- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✱ Predicted Location Max Mom at Mid-Span
- ✱ Middle Axle # 6 at Mid-Span
- Rear Axle #10 at Rear Support (Max V)



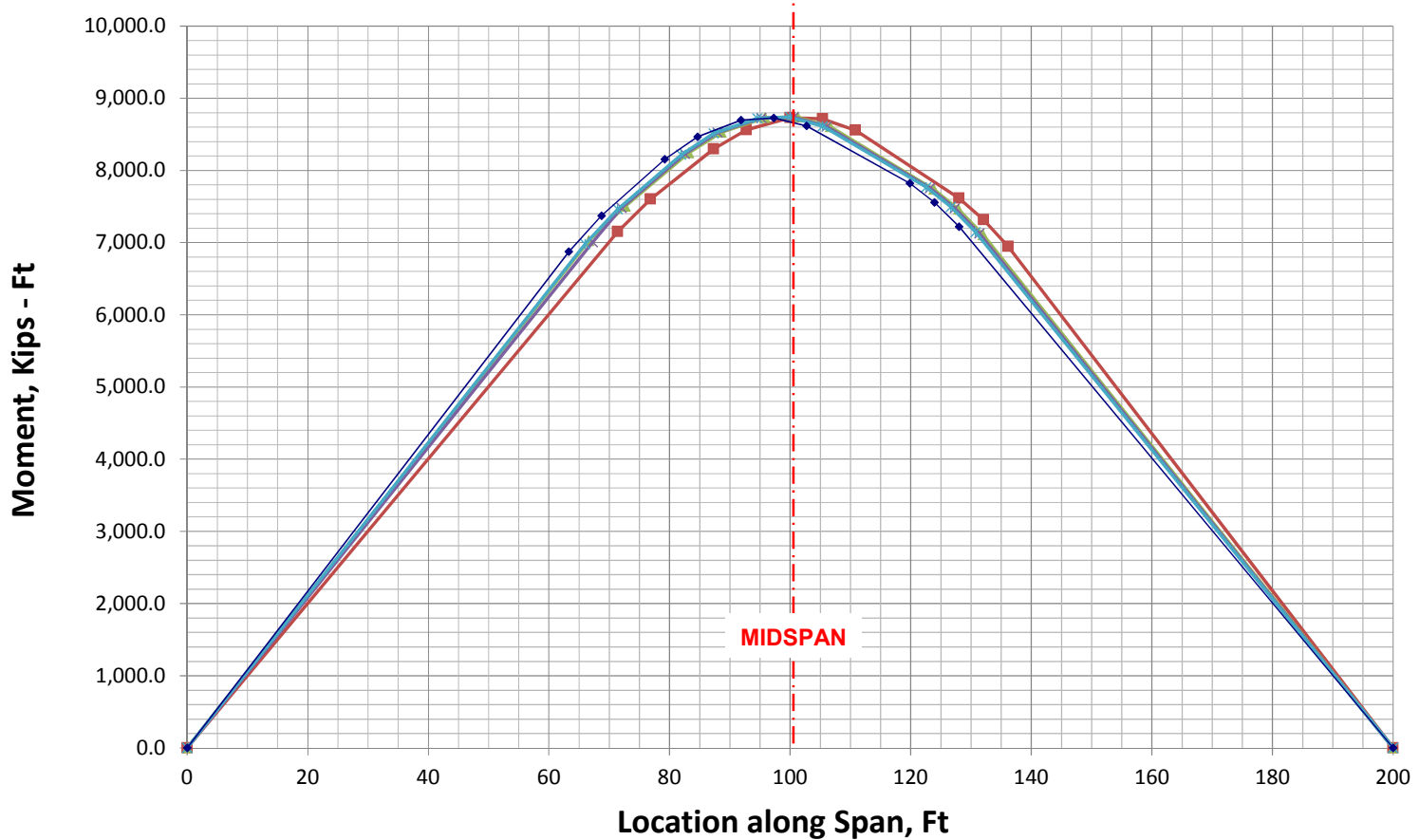
**TEN (10) AXLE**

**Louisiana Special Design Vehicle Type 5 (LASDV-5), 200' span length**

**Louisiana Special Design Vehicle  
 Type 5 (LASDV-5), 200' span length,**

**MOMENT DIAGRAMS**

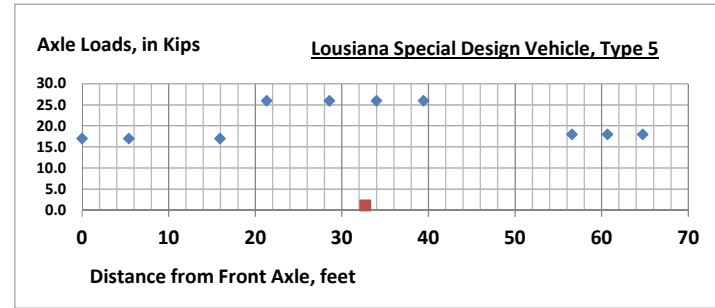
- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✕ Predicted Location Max Mom at Mid-Span
- ✧ Middle Axle # 6 at Mid-Span
- ◆ Mid-Span between Axles # 6 and 7



**TEN (10) AXLE Louisiana Special Design Vehicle Type 5 (LASDV-5), 300' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	8.5	17.0		0.000	75.62	0
2	8.5	17.0	5.42	5.417	75.62	165
3	8.5	17.0	10.50	15.917	75.62	485
4	13.0	26.0	5.42	21.333	115.65	650
5	13.0	26.0	7.25	28.583	115.65	871
6	13.0	26.0	5.4	34.000	115.65	1036
7	13.0	26.0	5.42	39.417	115.65	1201
8	9.0	18.0	17.17	56.583	80.07	1725
9	9.0	18.0	4.08	60.667	80.07	1849
(Rear) 10	9.0	18.0	4.08	64.750	80.07	1974
<b>Totals</b>	<b>104.5</b>	<b>209.0</b>	<b>64.75</b>		<b>9956.80</b>	<b>485</b>

Resultant of Axle Load is: **32.753 ft, from First (Forward) axle**



**300 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
FROM LEFT BEAM SUPPORT	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Front Axle # 1 at Front Support	0.00	5.42	15.92	21.33	28.58	34.00	39.42	56.58	60.67	64.75	235.25
Middle Axle # 5 at Mid-Span	121.42	126.83	137.33	142.75	150.00	155.42	160.83	178.00	182.08	186.17	113.83
Resultant at Mid-Span	117.25	122.66	133.16	138.58	145.83	151.25	156.66	173.83	177.91	182.00	118.00
Predicted Location Max Mom at Mid-Span	116.62	122.04	132.54	137.96	145.21	150.62	156.04	173.21	177.29	181.37	118.63
Middle Axle # 6 at Mid-Span	116.00	121.42	131.92	137.33	144.58	150.00	155.42	172.58	176.67	180.75	119.25
Mid-Span between Axles # 6 and 7	113.29	118.71	129.21	134.63	141.88	147.29	152.71	169.88	173.96	178.04	121.96
Rear Axle #10 at Rear Support (Max V)	235.25	240.67	251.17	256.58	263.83	269.25	274.67	291.83	295.92	300.00	0

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	186.18	169.18	152.18	135.18	109.18	83.18	57.18	31.18	13.18	-4.82	-22.82	22.82
Middle Axle # 5 at Mid-Span	101.60	84.60	67.60	50.60	24.60	-1.40	-27.40	-53.40	-71.40	-89.40	-107.40	107.40
Resultant at Mid-Span	104.50	87.50	70.50	53.50	27.50	1.50	-24.50	-50.50	-68.50	-86.50	-104.50	104.46
Predicted Location Max Mom at Mid-Span	104.93	87.93	70.93	53.93	27.93	1.93	-24.07	-50.07	-68.07	-86.07	-104.07	104.10
Middle Axle # 6 at Mid-Span	105.37	88.37	71.37	54.37	28.37	2.37	-23.63	-49.63	-67.63	-85.63	-103.63	103.63
Mid-Span between Axles # 6 and 7	107.26	90.26	73.26	56.26	30.26	4.26	-21.74	-47.74	-65.74	-83.74	-101.74	101.74
Rear Axle #10 at Rear Support (Max V)	22.29	5.29	-11.71	-28.71	-54.71	-80.71	-106.71	-132.71	-150.71	-168.71	-186.71	<b>186.71</b>

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Middle Axle # 5 at Mid-Span	0.0	12,335.4	12,793.6	13,503.3	13,777.4	13,955.7	13,948.1	13,799.7	12,882.9	12,591.3	12,226.2	0.0
Resultant at Mid-Span	0.0	12,252.3	12,726.3	13,466.5	13,756.3	13,955.7	13,963.8	13,831.1	12,964.2	12,684.5	12,331.3	0.0
Predicted Location Max Mom at Mid-Span	0.0	12,237.8	12,714.1	13,459.0	13,751.1	13,953.6	<b>13,964.1</b>	13,833.7	12,974.3	12,696.4	12,344.9	0.0
Middle Axle # 6 at Mid-Span	0.0	12,222.8	12,701.5	13,450.8	13,745.3	13,951.0	<b>13,963.8</b>	13,835.8	12,983.8	12,707.7	12,358.0	0.0
Mid-Span between Axles # 6 and 7	0.0	12,151.2	12,640.1	13,409.2	13,714.0	13,933.3	13,956.4	13,838.6	13,019.0	12,750.5	12,408.6	0.0

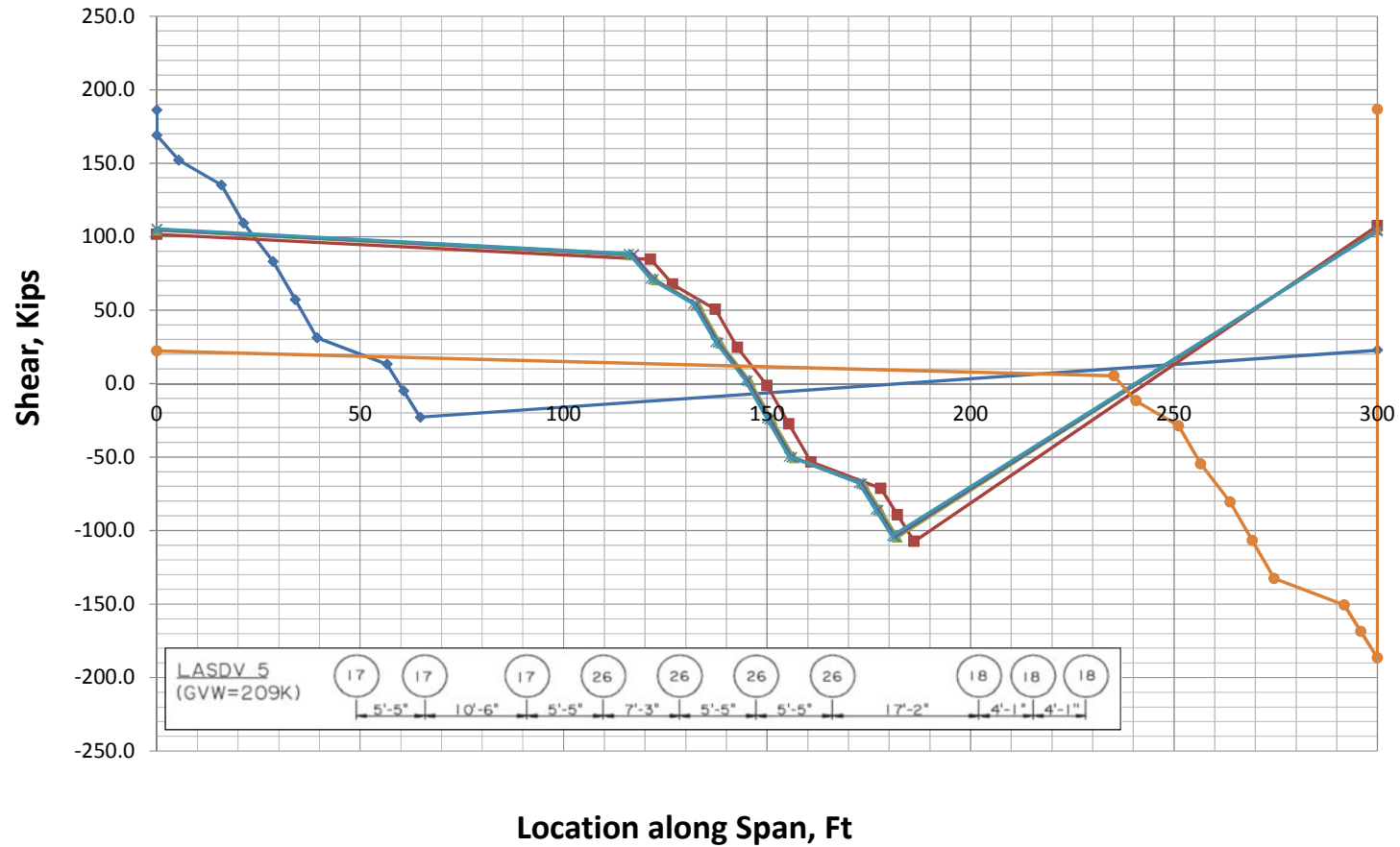
**TEN (10) AXLE**

**Louisiana Special Design Vehicle Type 5 (LASDV-5), 300' span length**

**Louisiana Special Design Vehicle  
 Type 5 (LASDV-5), 300' span length,**

**SHEAR DIAGRAMS**

- ◆ Front Axle # 1 at Front Support
- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✕ Predicted Location Max Mom at Mid-Span
- ✧ Middle Axle # 6 at Mid-Span
- Rear Axle #10 at Rear Support (Max V)

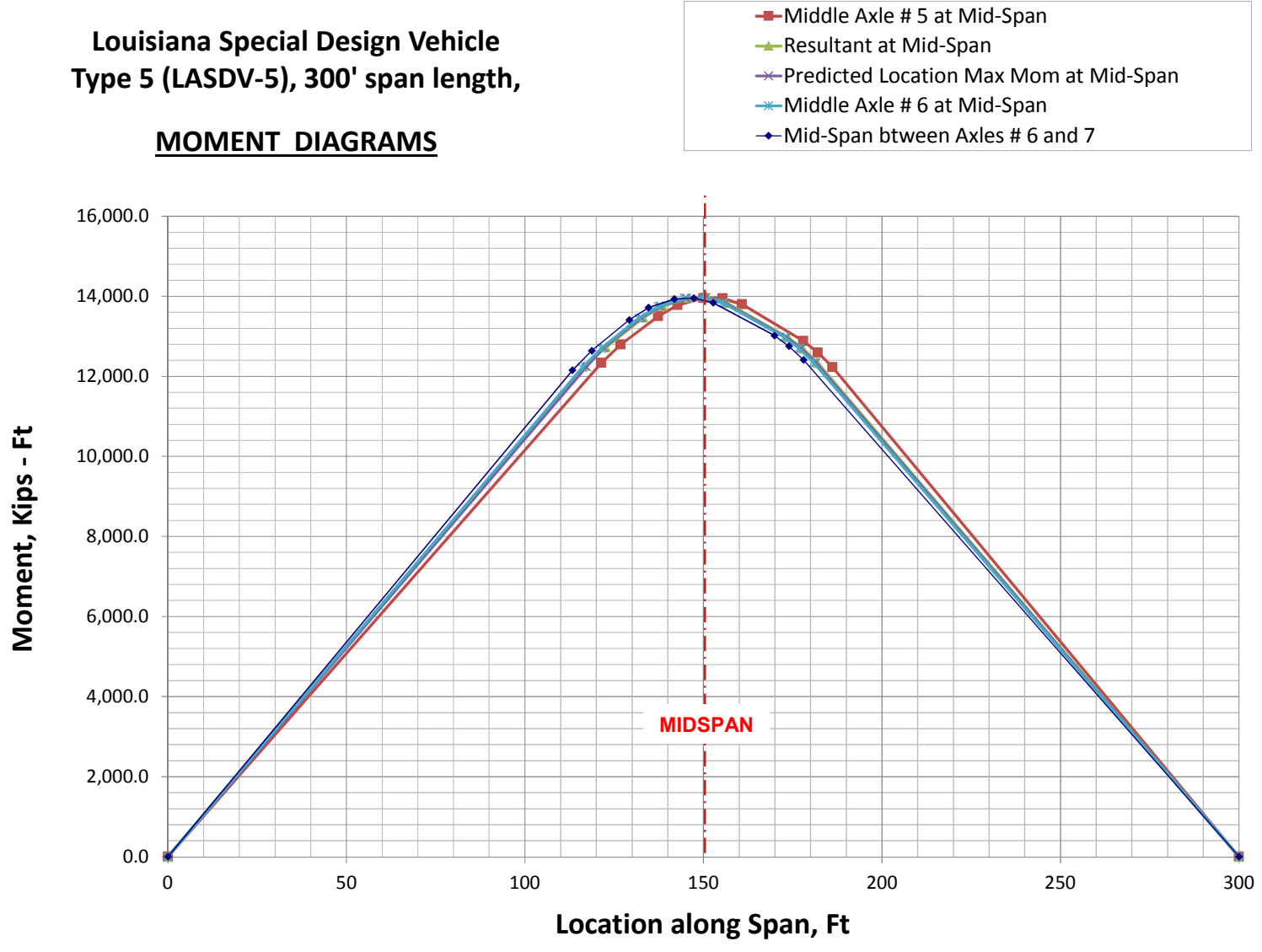


TEN (10) AXLE

Louisiana Special Design Vehicle Type 5 (LASDV-5), 300' span length

### Louisiana Special Design Vehicle Type 5 (LASDV-5), 300' span length,

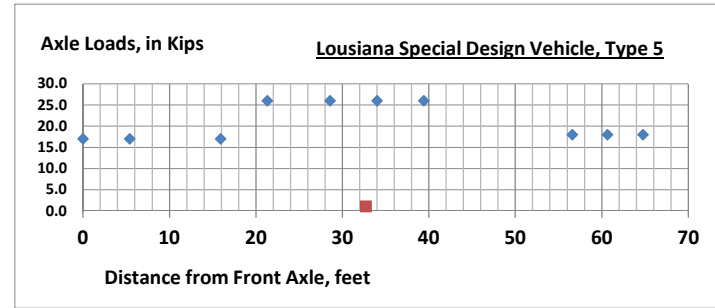
#### MOMENT DIAGRAMS



**TEN (10) AXLE Louisiana Special Design Vehicle Type 5 (LASDV-5), 400' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	8.5	17.0		0.000	75.62	0
2	8.5	17.0	5.42	5.417	75.62	165
3	8.5	17.0	10.50	15.917	75.62	485
4	13.0	26.0	5.42	21.333	115.65	650
5	13.0	26.0	7.25	28.583	115.65	871
6	13.0	26.0	5.4	34.000	115.65	1036
7	13.0	26.0	5.42	39.417	115.65	1201
8	9.0	18.0	17.17	56.583	80.07	1725
9	9.0	18.0	4.08	60.667	80.07	1849
(Rear) 10	9.0	18.0	4.08	64.750	80.07	1974
<b>Totals</b>	<b>104.5</b>	<b>209.0</b>	<b>64.75</b>		<b>9956.80</b>	<b>485</b>

Resultant of Axle Load is: **32.753 ft, from First (Forward) axle**



**400 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
<b>FROM LEFT BEAM SUPPORT</b>											
Front Axle # 1 at Front Support	0.00	5.42	15.92	21.33	28.58	34.00	39.42	56.58	60.67	64.75	335.25
Middle Axle # 5 at Mid-Span	171.42	176.83	187.33	192.75	200.00	205.42	210.83	228.00	232.08	236.17	163.83
Resultant at Mid-Span	167.25	172.66	183.16	188.58	195.83	201.25	206.66	223.83	227.91	232.00	168.00
Predicted Location Max Mom at Mid-Span	166.62	172.04	182.54	187.96	195.21	200.62	206.04	223.21	227.29	231.37	168.63
Middle Axle # 6 at Mid-Span	166.00	171.42	181.92	187.33	194.58	200.00	205.42	222.58	226.67	230.75	169.25
Mid-Span between Axles # 6 and 7	163.29	168.71	179.21	184.63	191.88	197.29	202.71	219.88	223.96	228.04	171.96
Rear Axle #10 at Rear Support (Max V)	335.25	340.67	351.17	356.58	363.83	369.25	374.67	391.83	395.92	400.00	0

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	191.89	174.89	157.89	140.89	114.89	88.89	62.89	36.89	18.89	0.89	-17.11	17.11
Middle Axle # 5 at Mid-Span	102.32	85.32	68.32	51.32	25.32	-0.68	-26.68	-52.68	-70.68	-88.68	-106.68	106.68
Resultant at Mid-Span	104.50	87.50	70.50	53.50	27.50	1.50	-24.50	-50.50	-68.50	-86.50	-104.50	104.47
Predicted Location Max Mom at Mid-Span	104.83	87.83	70.83	53.83	27.83	1.83	-24.17	-50.17	-68.17	-86.17	-104.17	104.20
Middle Axle # 6 at Mid-Span	105.15	88.15	71.15	54.15	28.15	2.15	-23.85	-49.85	-67.85	-85.85	-103.85	103.85
Mid-Span between Axles # 6 and 7	106.57	89.57	72.57	55.57	29.57	3.57	-22.43	-48.43	-66.43	-84.43	-102.43	102.43
Rear Axle #10 at Rear Support (Max V)	16.72	-0.28	-17.28	-34.28	-60.28	-86.28	-112.28	-138.28	-156.28	-174.28	-192.28	<b>192.28</b>

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Middle Axle # 5 at Mid-Span	0.0	17,539.6	18,001.8	18,719.1	18,997.1	19,180.7	19,177.0	19,032.5	18,128.2	17,839.6	17,477.5	0.0
Resultant at Mid-Span	0.0	17,477.3	17,951.3	18,691.5	18,981.3	19,180.7	19,188.8	19,056.1	18,189.2	17,909.5	17,556.3	0.0
Predicted Location Max Mom at Mid-Span	0.0	17,466.5	17,942.2	18,685.9	18,977.4	19,179.1	<b>19,189.0</b>	19,058.1	18,196.8	17,918.4	17,566.5	0.0
Middle Axle # 6 at Mid-Span	0.0	17,455.2	17,932.7	18,679.8	18,973.1	19,177.2	19,188.8	19,059.7	18,203.9	17,926.9	17,576.3	0.0
Mid-Span between Axles # 6 and 7	0.0	17,401.5	17,886.6	18,648.6	18,949.6	19,163.9	19,183.2	19,061.7	18,230.3	17,959.0	17,614.2	0.0

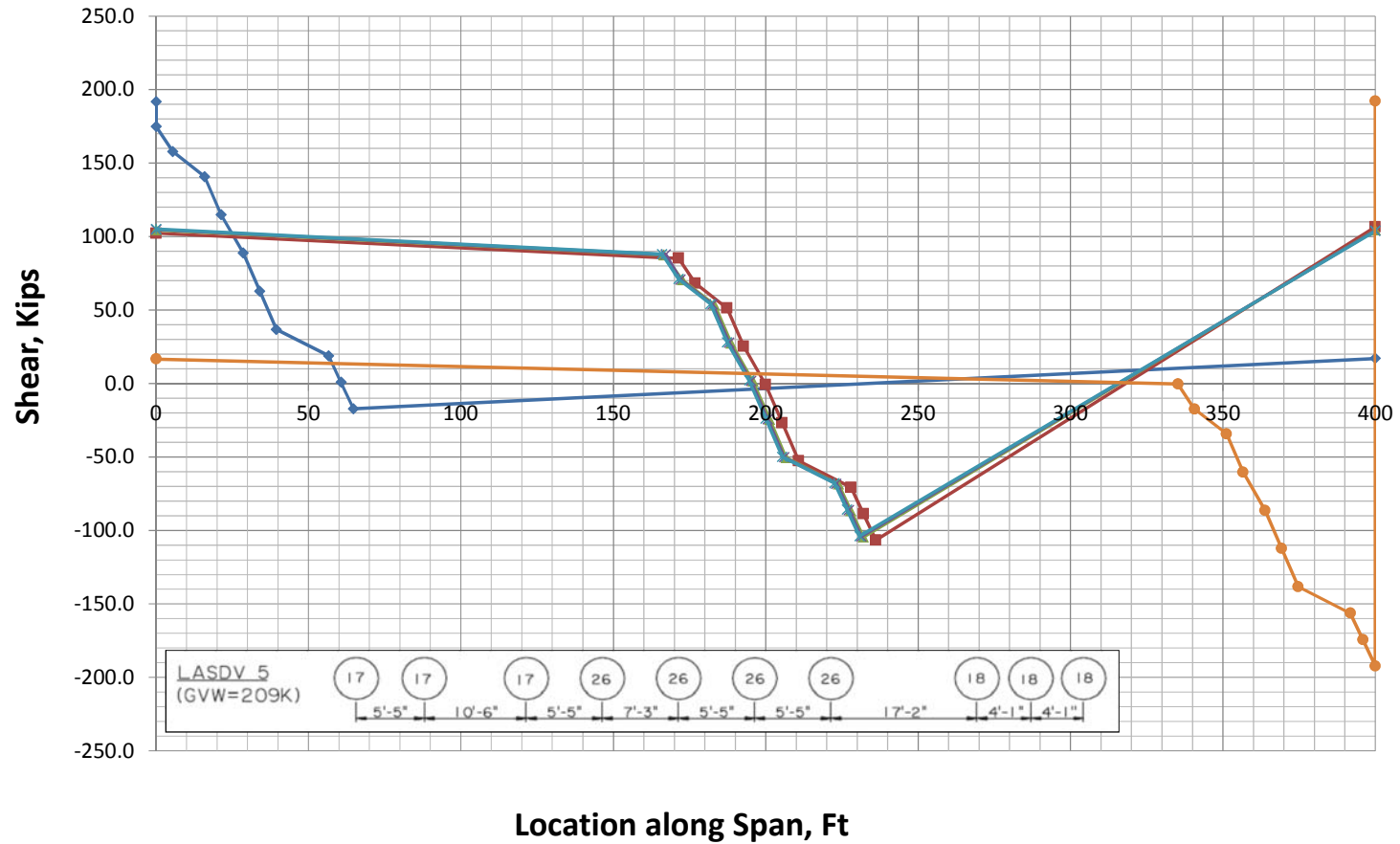
TEN (10) AXLE

Louisiana Special Design Vehicle Type 5 (LASDV-5), 400' span length

### Louisiana Special Design Vehicle Type 5 (LASDV-5), 400' span length,

#### SHEAR DIAGRAMS

- ◆ Front Axle # 1 at Front Support
- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✖ Predicted Location Max Mom at Mid-Span
- ✱ Middle Axle # 6 at Mid-Span
- Rear Axle #10 at Rear Support (Max V)



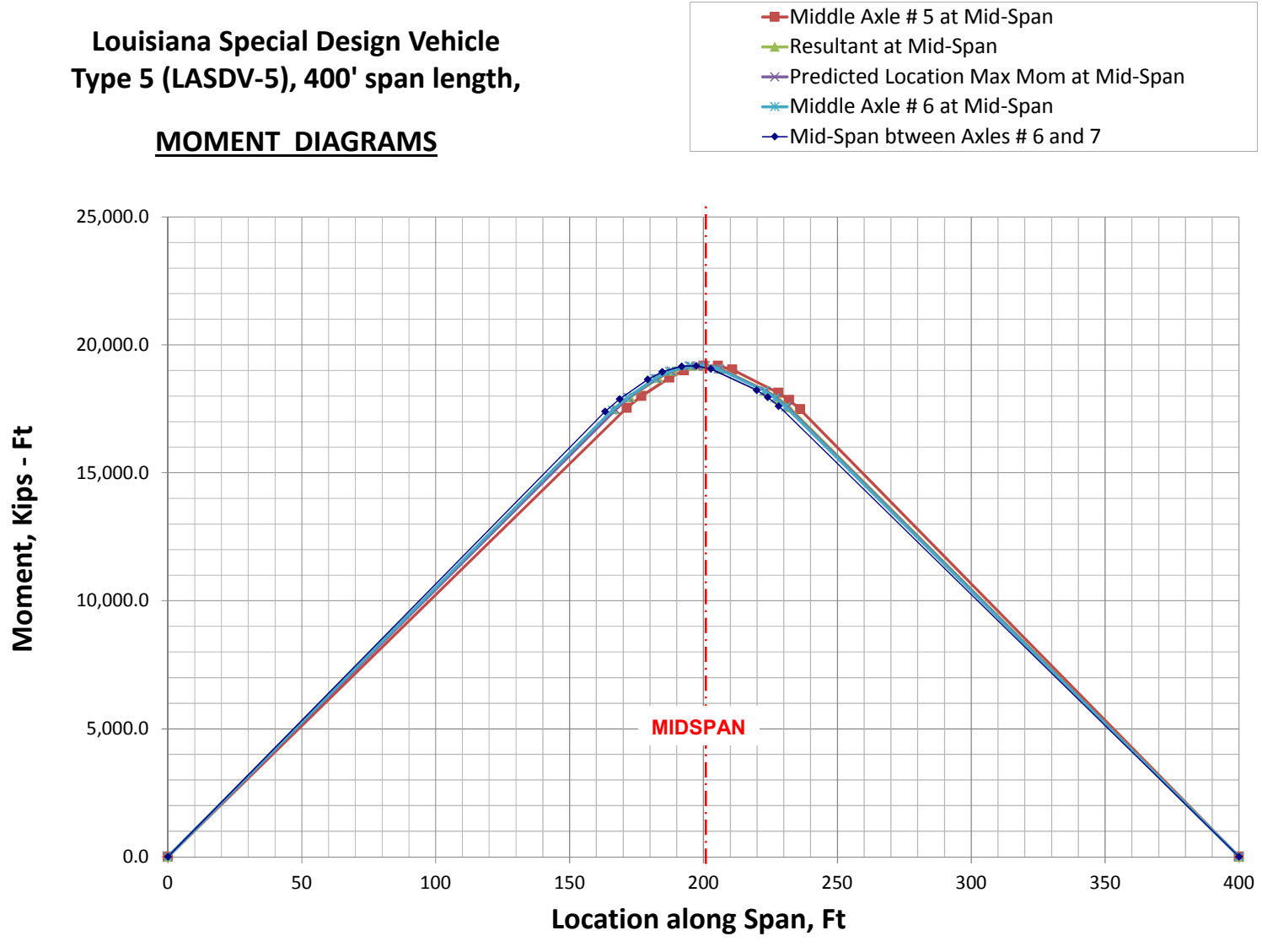


TEN (10) AXLE

Louisiana Special Design Vehicle Type 5 (LASDV-5), 400' span length

### Louisiana Special Design Vehicle Type 5 (LASDV-5), 400' span length,

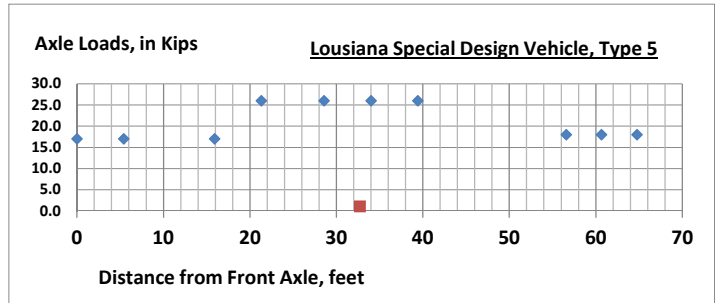
#### MOMENT DIAGRAMS



**TEN (10) AXLE Louisiana Special Design Vehicle Type 5 (LASDV-5), 500' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	8.5	17.0		0.000	75.62	0
2	8.5	17.0	5.42	5.417	75.62	165
3	8.5	17.0	10.50	15.917	75.62	485
4	13.0	26.0	5.42	21.333	115.65	650
5	13.0	26.0	7.25	28.583	115.65	871
6	13.0	26.0	5.4	34.000	115.65	1036
7	13.0	26.0	5.42	39.417	115.65	1201
8	9.0	18.0	17.17	56.583	80.07	1725
9	9.0	18.0	4.08	60.667	80.07	1849
(Rear) 10	9.0	18.0	4.08	64.750	80.07	1974
<b>Totals</b>	<b>104.5</b>	<b>209.0</b>	<b>64.75</b>		<b>9956.80</b>	<b>485</b>

Resultant of Axle Load is: **32.753 ft, from First (Forward) axle**



**500 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
<b>FROM LEFT BEAM SUPPORT</b>	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Front Axle # 1 at Front Support	0.00	5.42	15.92	21.33	28.58	34.00	39.42	56.58	60.67	64.75	435.25
Middle Axle # 5 at Mid-Span	221.42	226.83	237.33	242.75	250.00	255.42	260.83	278.00	282.08	286.17	213.83
Resultant at Mid-Span	217.25	222.66	233.16	238.58	245.83	251.25	256.66	273.83	277.91	282.00	218.00
Predicted Location Max Mom at Mid-Span	216.62	222.04	232.54	237.96	245.21	250.62	256.04	273.21	277.29	281.37	218.63
Middle Axle # 6 at Mid-Span	216.00	221.42	231.92	237.33	244.58	250.00	255.42	272.58	276.67	280.75	219.25
Mid-Span between Axles # 6 and 7	213.29	218.71	229.21	234.63	241.88	247.29	252.71	269.88	273.96	278.04	221.96
Rear Axle #10 at Rear Support (Max V)	435.25	440.67	451.17	456.58	463.83	469.25	474.67	491.83	495.92	500.00	0

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	195.31	178.31	161.31	144.31	118.31	92.31	66.31	40.31	22.31	4.31	-13.69	13.69
Middle Axle # 5 at Mid-Span	102.76	85.76	68.76	51.76	25.76	-0.24	-26.24	-52.24	-70.24	-88.24	-106.24	106.24
Resultant at Mid-Span	104.50	87.50	70.50	53.50	27.50	1.50	-24.50	-50.50	-68.50	-86.50	-104.50	104.48
Predicted Location Max Mom at Mid-Span	104.76	87.76	70.76	53.76	27.76	1.76	-24.24	-50.24	-68.24	-86.24	-104.24	104.26
Middle Axle # 6 at Mid-Span	105.02	88.02	71.02	54.02	28.02	2.02	-23.98	-49.98	-67.98	-85.98	-103.98	103.98
Mid-Span between Axles # 6 and 7	106.15	89.15	72.15	55.15	29.15	3.15	-22.85	-48.85	-66.85	-84.85	-102.85	102.85
Rear Axle #10 at Rear Support (Max V)	13.37	-3.63	-20.63	-37.63	-63.63	-89.63	-115.63	-141.63	-159.63	-177.63	-195.63	<b>195.63</b>

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Middle Axle # 5 at Mid-Span	0.0	22,752.1	23,216.7	23,938.6	24,219.0	24,405.7	24,404.4	24,262.2	23,365.4	23,078.6	22,718.3	0.0
Resultant at Mid-Span	0.0	22,702.3	23,176.3	23,916.5	24,206.3	24,405.7	24,413.8	24,281.1	23,414.2	23,134.5	22,781.3	0.0
Predicted Location Max Mom at Mid-Span	0.0	22,693.6	23,169.0	23,912.0	24,203.2	24,404.5	<b>24,414.0</b>	24,282.7	23,420.3	23,141.6	22,789.5	0.0
Middle Axle # 6 at Mid-Span	0.0	22,684.6	23,161.4	23,907.1	24,199.7	24,402.9	<b>24,413.8</b>	24,283.9	23,426.0	23,148.4	22,797.3	0.0
Mid-Span between Axles # 6 and 7	0.0	22,641.6	23,124.6	23,882.2	24,180.9	24,392.3	24,409.4	24,285.6	23,447.1	23,174.1	22,827.7	0.0

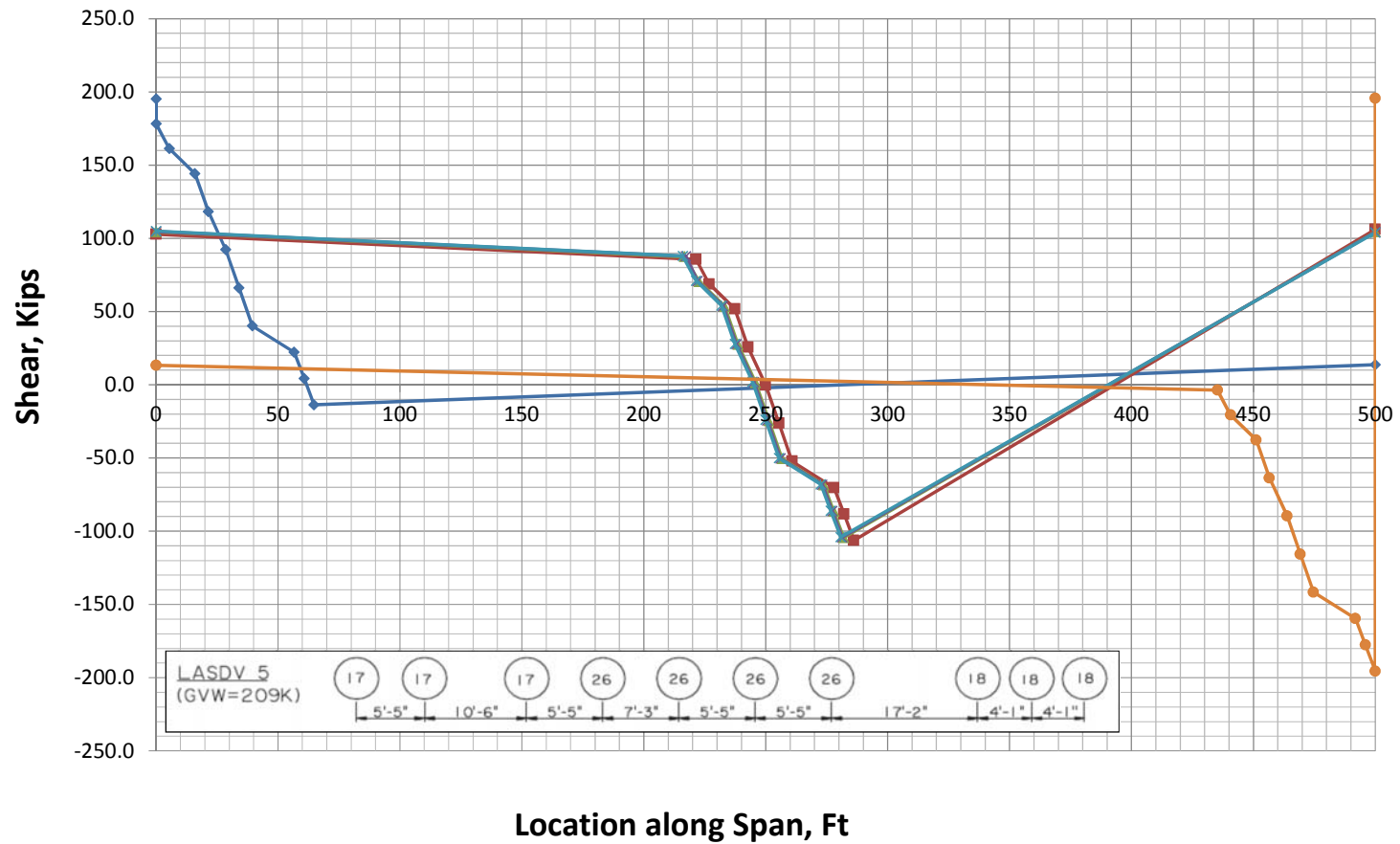
**TEN (10) AXLE**

**Louisiana Special Design Vehicle Type 5 (LASDV-5), 500' span length**

**Louisiana Special Design Vehicle  
 Type 5 (LASDV-5), 500' span length,**

**SHEAR DIAGRAMS**

- ◆ Front Axle # 1 at Front Support
- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✕ Predicted Location Max Mom at Mid-Span
- ✱ Middle Axle # 6 at Mid-Span
- Rear Axle #10 at Rear Support (Max V)

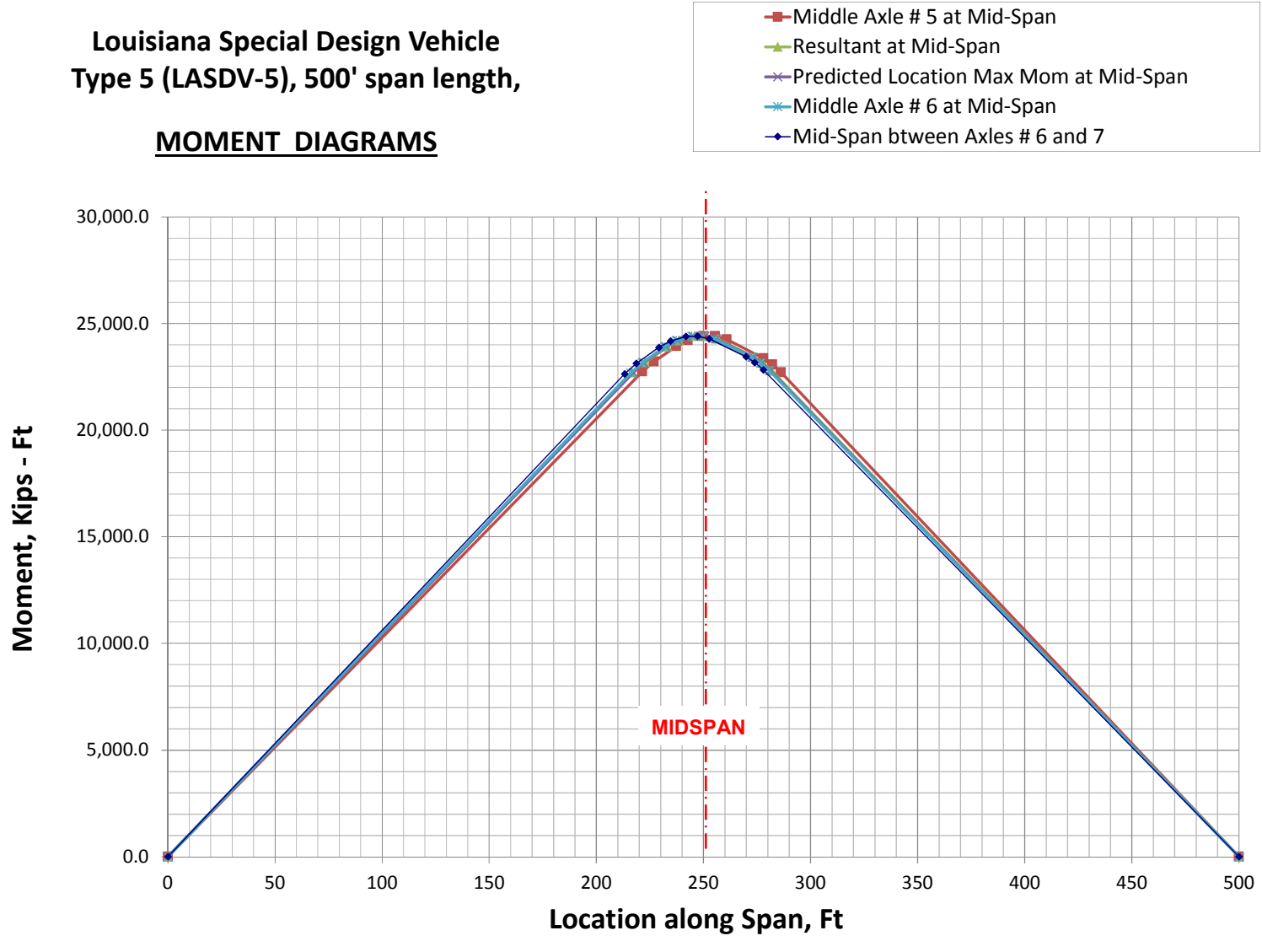


TEN (10) AXLE

Louisiana Special Design Vehicle Type 5 (LASDV-5), 500' span length

### Louisiana Special Design Vehicle Type 5 (LASDV-5), 500' span length,

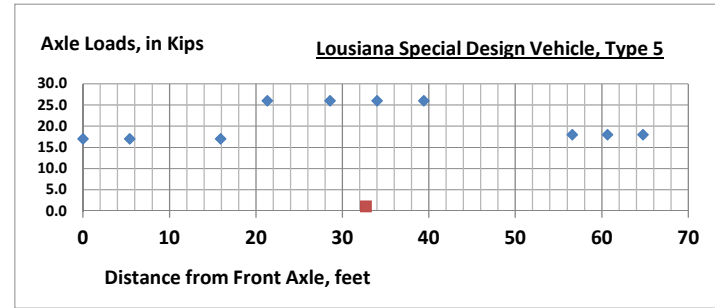
#### MOMENT DIAGRAMS



**TEN (10) AXLE Louisiana Special Design Vehicle Type 5 (LASDV-5), 600' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	8.5	17.0		0.000	75.62	0
2	8.5	17.0	5.42	5.417	75.62	165
3	8.5	17.0	10.50	15.917	75.62	485
4	13.0	26.0	5.42	21.333	115.65	650
5	13.0	26.0	7.25	28.583	115.65	871
6	13.0	26.0	5.4	34.000	115.65	1036
7	13.0	26.0	5.42	39.417	115.65	1201
8	9.0	18.0	17.17	56.583	80.07	1725
9	9.0	18.0	4.08	60.667	80.07	1849
(Rear) 10	9.0	18.0	4.08	64.750	80.07	1974
<b>Totals</b>	<b>104.5</b>	<b>209.0</b>	<b>64.75</b>		<b>9956.80</b>	<b>485</b>

Resultant of Axle Load is: **32.753 ft, from First (Forward) axle**



**600 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
<b>FROM LEFT BEAM SUPPORT</b>											
Front Axle # 1 at Front Support	0.00	5.42	15.92	21.33	28.58	34.00	39.42	56.58	60.67	64.75	535.25
Middle Axle # 5 at Mid-Span	271.42	276.83	287.33	292.75	300.00	305.42	310.83	328.00	332.08	336.17	263.83
Resultant at Mid-Span	267.25	272.66	283.16	288.58	295.83	301.25	306.66	323.83	327.91	332.00	268.00
Predicted Location Max Mom at Mid-Span	266.62	272.04	282.54	287.96	295.21	300.62	306.04	323.21	327.29	331.37	268.63
Middle Axle # 6 at Mid-Span	266.00	271.42	281.92	287.33	294.58	300.00	305.42	322.58	326.67	330.75	269.25
Mid-Span between Axles # 6 and 7	263.29	268.71	279.21	284.63	291.88	297.29	302.71	319.88	323.96	328.04	271.96
Rear Axle #10 at Rear Support (Max V)	535.25	540.67	551.17	556.58	563.83	569.25	574.67	591.83	595.92	600.00	0

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	197.59	180.59	163.59	146.59	120.59	94.59	68.59	42.59	24.59	6.59	-11.41	11.41
Middle Axle # 5 at Mid-Span	103.05	86.05	69.05	52.05	26.05	0.05	-25.95	-51.95	-69.95	-87.95	-105.95	105.95
Resultant at Mid-Span	104.50	87.50	70.50	53.50	27.50	1.50	-24.50	-50.50	-68.50	-86.50	-104.50	104.48
Predicted Location Max Mom at Mid-Span	104.72	87.72	70.72	53.72	27.72	1.72	-24.28	-50.28	-68.28	-86.28	-104.28	104.30
Middle Axle # 6 at Mid-Span	104.93	87.93	70.93	53.93	27.93	1.93	-24.07	-50.07	-68.07	-86.07	-104.07	104.07
Mid-Span between Axles # 6 and 7	105.88	88.88	71.88	54.88	28.88	2.88	-23.12	-49.12	-67.12	-85.12	-103.12	103.12
Rear Axle #10 at Rear Support (Max V)	11.15	-5.85	-22.85	-39.85	-65.85	-91.85	-117.85	-143.85	-161.85	-179.85	-197.85	<b>197.85</b>

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Middle Axle # 5 at Mid-Span	0.0	27,968.8	28,434.9	29,159.9	29,441.9	29,630.7	29,631.0	29,490.4	28,598.5	28,312.9	27,953.8	0.0
Resultant at Mid-Span	0.0	27,927.3	28,401.3	29,141.5	29,431.3	29,630.7	29,638.8	29,506.1	28,639.2	28,359.5	28,006.3	0.0
Predicted Location Max Mom at Mid-Span	0.0	27,920.1	28,395.2	29,137.7	29,428.7	29,629.7	<b>29,639.0</b>	29,507.4	28,644.2	28,365.4	28,013.1	0.0
Middle Axle # 6 at Mid-Span	0.0	27,912.6	28,388.9	29,133.7	29,425.8	29,628.4	<b>29,638.8</b>	29,508.5	28,649.0	28,371.1	28,019.7	0.0
Mid-Span between Axles # 6 and 7	0.0	27,876.8	28,358.2	29,112.9	29,410.1	29,619.5	29,635.1	29,509.9	28,666.6	28,392.5	28,044.9	0.0

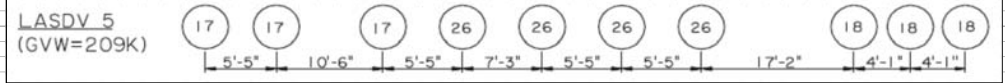
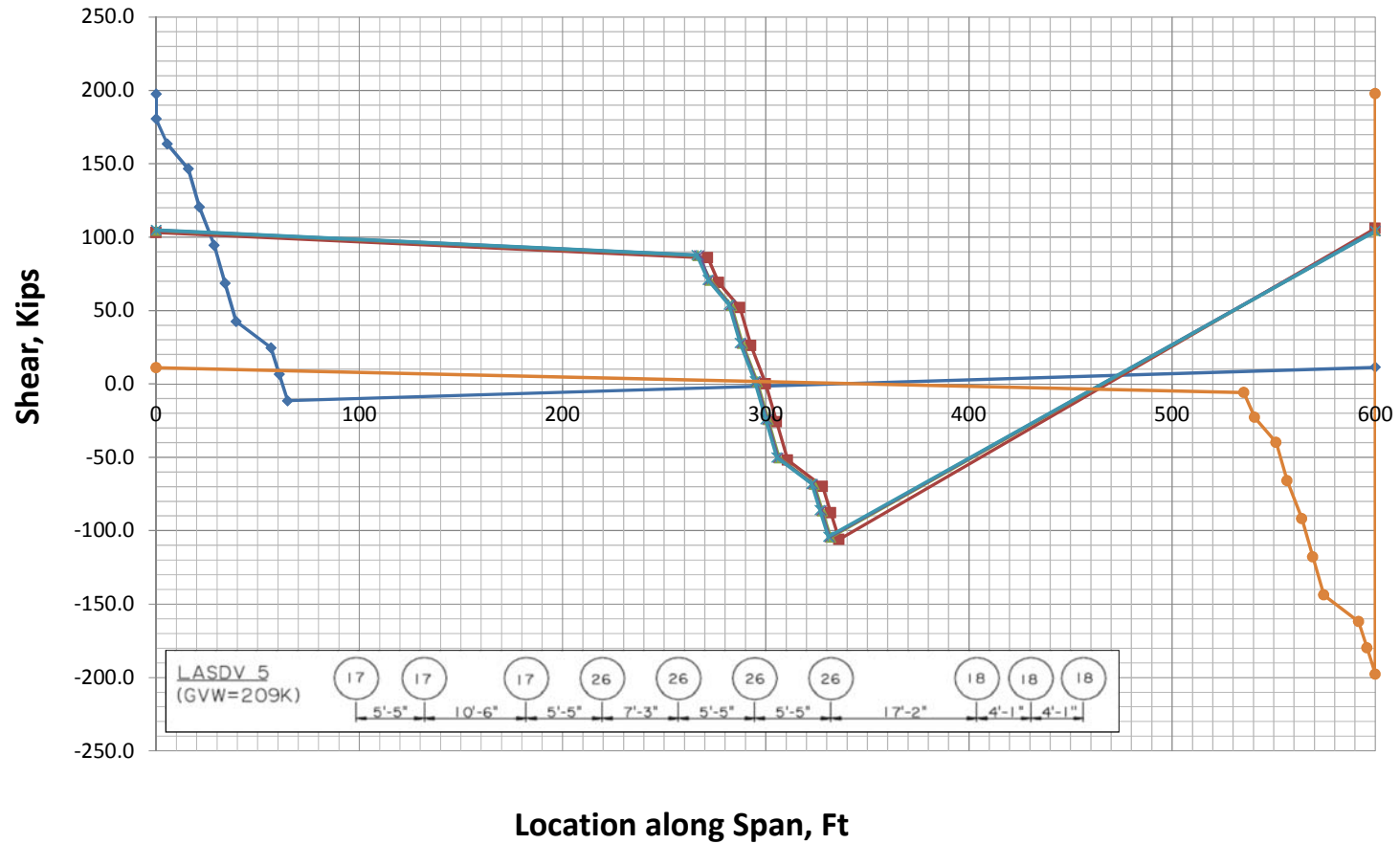
**TEN (10) AXLE**

**Louisiana Special Design Vehicle Type 5 (LASDV-5), 600' span length**

**Louisiana Special Design Vehicle  
 Type 5 (LASDV-5), 600' span length,**

**SHEAR DIAGRAMS**

- ◆ Front Axle # 1 at Front Support
- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✖ Predicted Location Max Mom at Mid-Span
- ✱ Middle Axle # 6 at Mid-Span
- Rear Axle #10 at Rear Support (Max V)

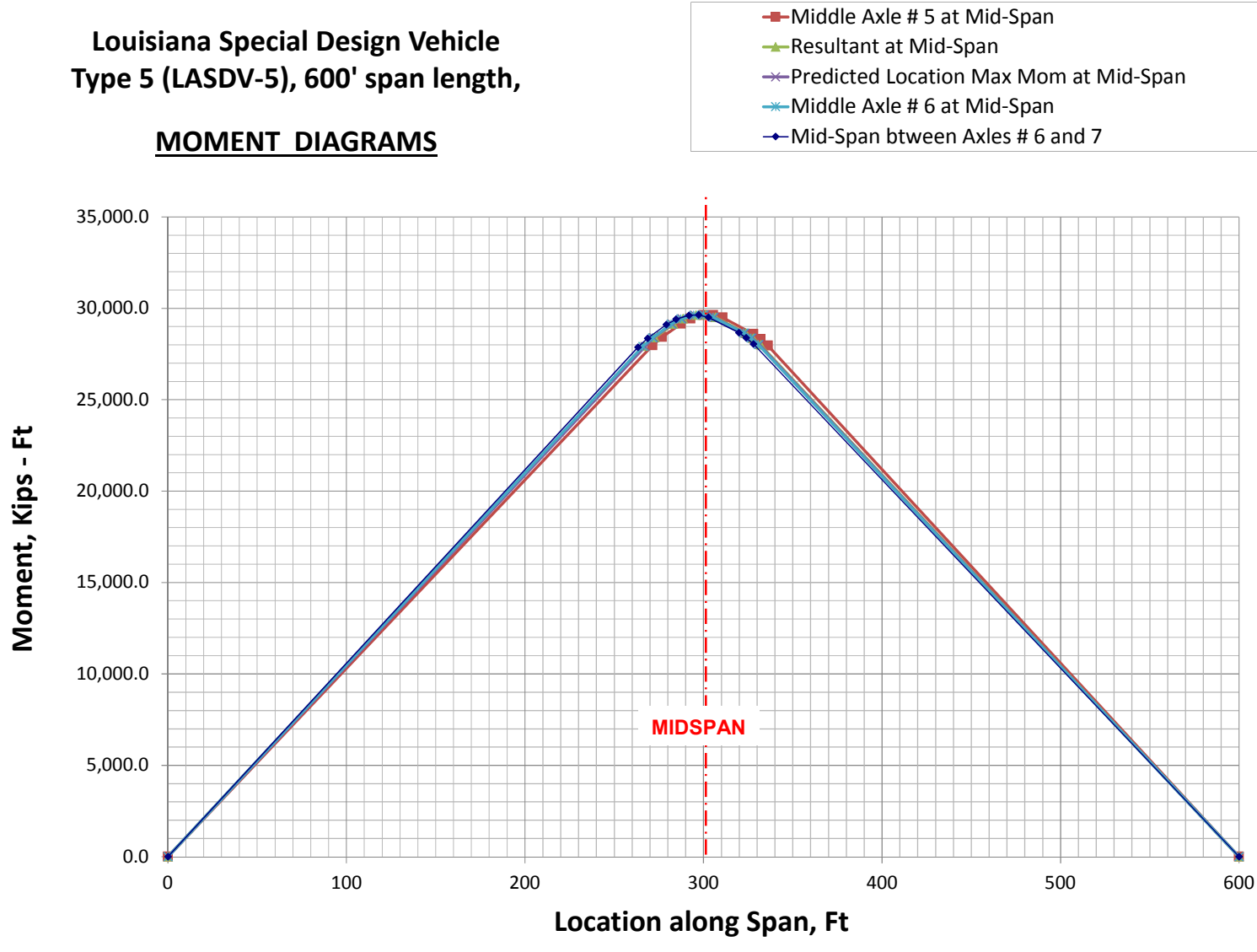


TEN (10) AXLE

Louisiana Special Design Vehicle Type 5 (LASDV-5), 600' span length

### Louisiana Special Design Vehicle Type 5 (LASDV-5), 600' span length,

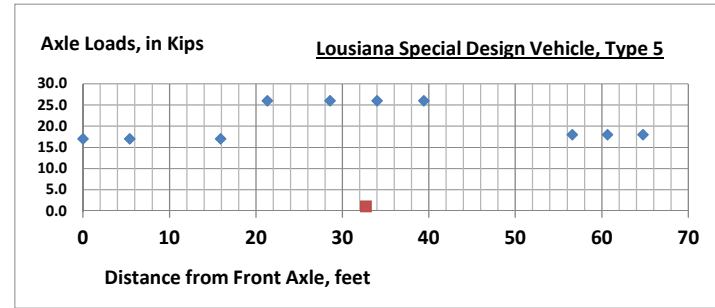
#### MOMENT DIAGRAMS



**TEN (10) AXLE Louisiana Special Design Vehicle Type 5 (LASDV-5), 700' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	8.5	17.0		0.000	75.62	0
2	8.5	17.0	5.42	5.417	75.62	165
3	8.5	17.0	10.50	15.917	75.62	485
4	13.0	26.0	5.42	21.333	115.65	650
5	13.0	26.0	7.25	28.583	115.65	871
6	13.0	26.0	5.4	34.000	115.65	1036
7	13.0	26.0	5.42	39.417	115.65	1201
8	9.0	18.0	17.17	56.583	80.07	1725
9	9.0	18.0	4.08	60.667	80.07	1849
(Rear) 10	9.0	18.0	4.08	64.750	80.07	1974
<b>Totals</b>	<b>104.5</b>	<b>209.0</b>	<b>64.75</b>		<b>9956.80</b>	<b>485</b>

Resultant of Axle Load is: **32.753 ft, from First (Forward) axle**



**700 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
<b>FROM LEFT BEAM SUPPORT</b>											
Front Axle # 1 at Front Support	0.00	5.42	15.92	21.33	28.58	34.00	39.42	56.58	60.67	64.75	635.25
Middle Axle # 5 at Mid-Span	321.42	326.83	337.33	342.75	350.00	355.42	360.83	378.00	382.08	386.17	313.83
Resultant at Mid-Span	317.25	322.66	333.16	338.58	345.83	351.25	356.66	373.83	377.91	382.00	318.00
Predicted Location Max Mom at Mid-Span	316.62	322.04	332.54	337.96	345.21	350.62	356.04	373.21	377.29	381.37	318.63
Middle Axle # 6 at Mid-Span	316.00	321.42	331.92	337.33	344.58	350.00	355.42	372.58	376.67	380.75	319.25
Mid-Span between Axles # 6 and 7	313.29	318.71	329.21	334.63	341.88	347.29	352.71	369.88	373.96	378.04	321.96
Rear Axle #10 at Rear Support (Max V)	635.25	640.67	651.17	656.58	663.83	669.25	674.67	691.83	695.92	700.00	0

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	199.22	182.22	165.22	148.22	122.22	96.22	70.22	44.22	26.22	8.22	-9.78	9.78
Middle Axle # 5 at Mid-Span	103.26	86.26	69.26	52.26	26.26	0.26	-25.74	-51.74	-69.74	-87.74	-105.74	105.74
Resultant at Mid-Span	104.50	87.50	70.50	53.50	27.50	1.50	-24.50	-50.50	-68.50	-86.50	-104.50	104.48
Predicted Location Max Mom at Mid-Span	104.69	87.69	70.69	53.69	27.69	1.69	-24.31	-50.31	-68.31	-86.31	-104.31	104.33
Middle Axle # 6 at Mid-Span	104.87	87.87	70.87	53.87	27.87	1.87	-24.13	-50.13	-68.13	-86.13	-104.13	104.13
Mid-Span between Axles # 6 and 7	105.68	88.68	71.68	54.68	28.68	2.68	-23.32	-49.32	-67.32	-85.32	-103.32	103.32
Rear Axle #10 at Rear Support (Max V)	9.55	-7.45	-24.45	-41.45	-67.45	-93.45	-119.45	-145.45	-163.45	-181.45	-199.45	<b>199.45</b>

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Middle Axle # 5 at Mid-Span	0.0	33,187.9	33,655.1	34,382.3	34,665.4	34,855.7	34,857.1	34,717.6	33,829.4	33,544.6	33,186.3	0.0
Resultant at Mid-Span	0.0	33,152.3	33,626.3	34,366.5	34,656.3	34,855.7	34,863.8	34,731.1	33,864.2	33,584.5	33,231.3	0.0
Predicted Location Max Mom at Mid-Span	0.0	33,146.1	33,621.1	34,363.3	34,654.1	34,854.8	<b>34,863.9</b>	34,732.2	33,868.5	33,589.6	33,237.1	0.0
Middle Axle # 6 at Mid-Span	0.0	33,139.7	33,615.6	34,359.8	34,651.6	34,853.7	<b>34,863.8</b>	34,733.1	33,872.6	33,594.4	33,242.7	0.0
Mid-Span between Axles # 6 and 7	0.0	33,109.0	33,589.3	34,342.0	34,638.2	34,846.1	34,860.6	34,734.3	33,887.7	33,612.8	33,264.4	0.0



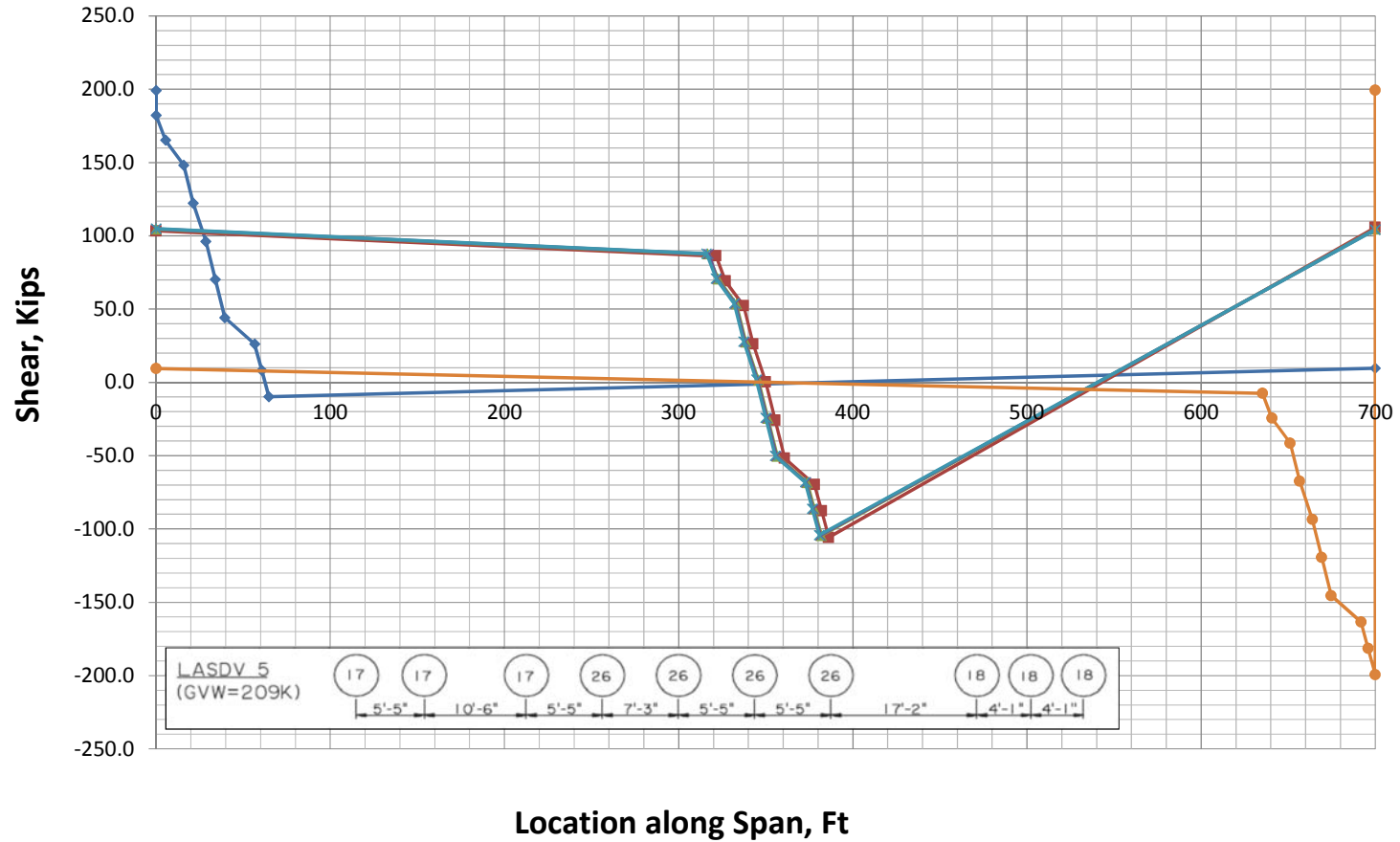
**TEN (10) AXLE**

**Louisiana Special Design Vehicle Type 5 (LASDV-5), 700' span length**

**Louisiana Special Design Vehicle  
 Type 5 (LASDV-5), 700' span length,**

**SHEAR DIAGRAMS**

- ◆ Front Axle # 1 at Front Support
- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✕ Predicted Location Max Mom at Mid-Span
- ✱ Middle Axle # 6 at Mid-Span
- Rear Axle #10 at Rear Support (Max V)

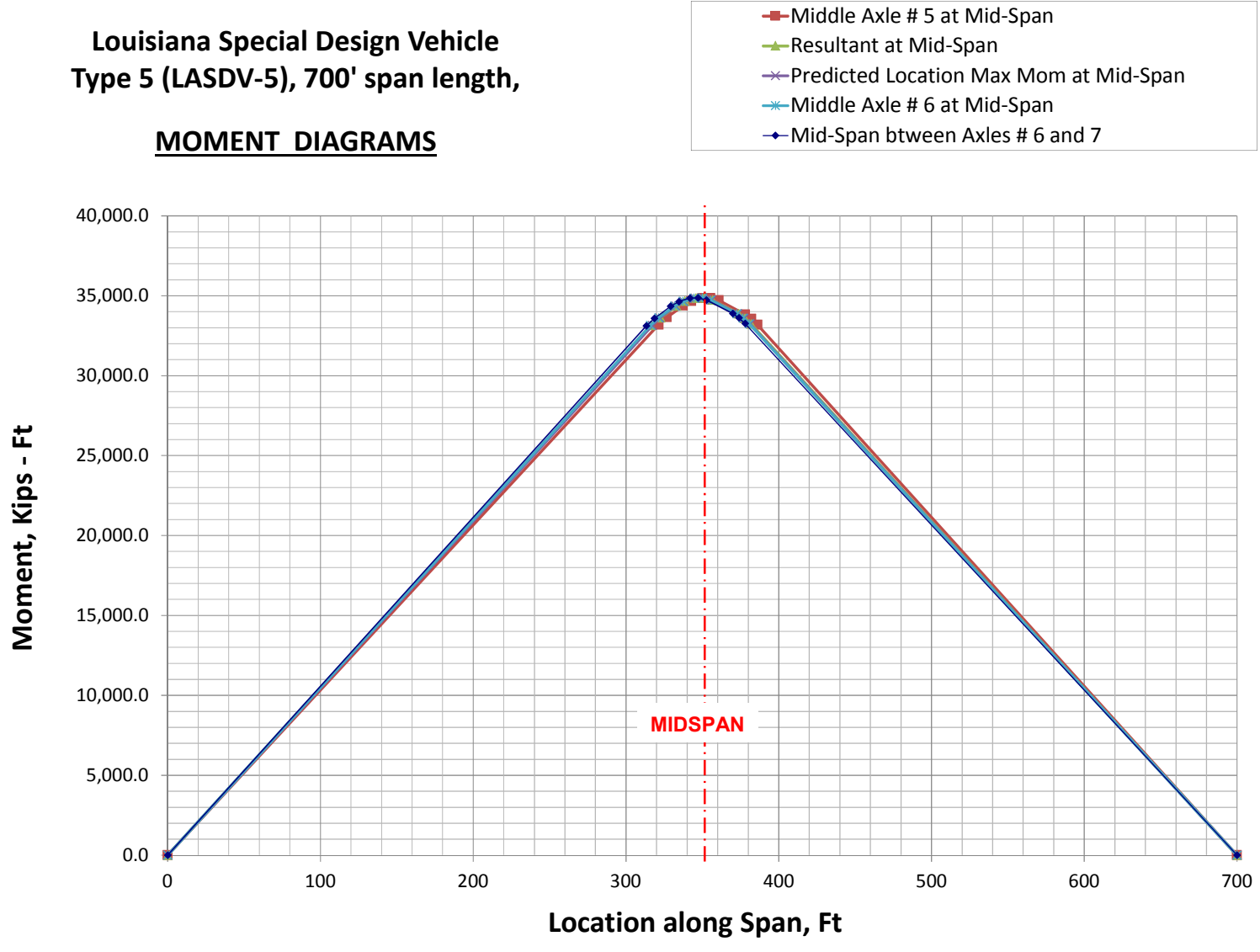


TEN (10) AXLE

Louisiana Special Design Vehicle Type 5 (LASDV-5), 700' span length

### Louisiana Special Design Vehicle Type 5 (LASDV-5), 700' span length,

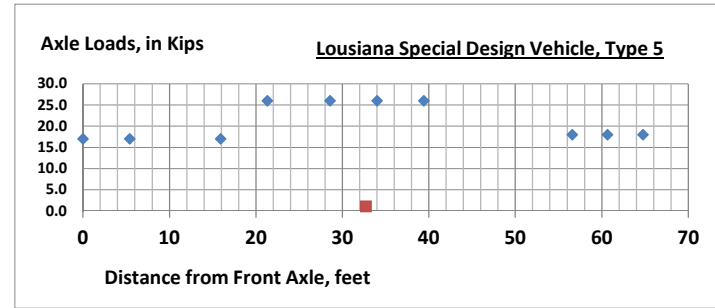
#### MOMENT DIAGRAMS



**TEN (10) AXLE Louisiana Special Design Vehicle Type 5 (LASDV-5), 800' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	8.5	17.0		0.000	75.62	0
2	8.5	17.0	5.42	5.417	75.62	165
3	8.5	17.0	10.50	15.917	75.62	485
4	13.0	26.0	5.42	21.333	115.65	650
5	13.0	26.0	7.25	28.583	115.65	871
6	13.0	26.0	5.4	34.000	115.65	1036
7	13.0	26.0	5.42	39.417	115.65	1201
8	9.0	18.0	17.17	56.583	80.07	1725
9	9.0	18.0	4.08	60.667	80.07	1849
(Rear) 10	9.0	18.0	4.08	64.750	80.07	1974
<b>Totals</b>	<b>104.5</b>	<b>209.0</b>	<b>64.75</b>		<b>9956.80</b>	<b>485</b>

Resultant of Axle Load is: **32.753 ft, from First (Forward) axle**



**800 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
<b>FROM LEFT BEAM SUPPORT</b>											
Front Axle # 1 at Front Support	0.00	5.42	15.92	21.33	28.58	34.00	39.42	56.58	60.67	64.75	735.25
Middle Axle # 5 at Mid-Span	371.42	376.83	387.33	392.75	400.00	405.42	410.83	428.00	432.08	436.17	363.83
Resultant at Mid-Span	367.25	372.66	383.16	388.58	395.83	401.25	406.66	423.83	427.91	432.00	368.00
Predicted Location Max Mom at Mid-Span	366.62	372.04	382.54	387.96	395.21	400.62	406.04	423.21	427.29	431.37	368.63
Middle Axle # 6 at Mid-Span	366.00	371.42	381.92	387.33	394.58	400.00	405.42	422.58	426.67	430.75	369.25
Mid-Span between Axles # 6 and 7	363.29	368.71	379.21	384.63	391.88	397.29	402.71	419.88	423.96	428.04	371.96
Rear Axle #10 at Rear Support (Max V)	735.25	740.67	751.17	756.58	763.83	769.25	774.67	791.83	795.92	800.00	0

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	200.44	183.44	166.44	149.44	123.44	97.44	71.44	45.44	27.44	9.44	-8.56	8.56
Middle Axle # 5 at Mid-Span	103.41	86.41	69.41	52.41	26.41	0.41	-25.59	-51.59	-69.59	-87.59	-105.59	105.59
Resultant at Mid-Span	104.50	87.50	70.50	53.50	27.50	1.50	-24.50	-50.50	-68.50	-86.50	-104.50	104.49
Predicted Location Max Mom at Mid-Span	104.66	87.66	70.66	53.66	27.66	1.66	-24.34	-50.34	-68.34	-86.34	-104.34	104.35
Middle Axle # 6 at Mid-Span	104.83	87.83	70.83	53.83	27.83	1.83	-24.17	-50.17	-68.17	-86.17	-104.17	104.17
Mid-Span between Axles # 6 and 7	105.53	88.53	71.53	54.53	28.53	2.53	-23.47	-49.47	-67.47	-85.47	-103.47	103.47
Rear Axle #10 at Rear Support (Max V)	8.36	-8.64	-25.64	-42.64	-68.64	-94.64	-120.64	-146.64	-164.64	-182.64	-200.64	<b>200.64</b>

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Middle Axle # 5 at Mid-Span	0.0	38,408.5	38,876.5	39,605.3	39,889.2	40,080.7	40,082.9	39,944.3	39,058.7	38,774.6	38,416.9	0.0
Resultant at Mid-Span	0.0	38,377.3	38,851.3	39,591.5	39,881.3	40,080.7	40,088.8	39,956.1	39,089.2	38,809.5	38,456.3	0.0
Predicted Location Max Mom at Mid-Span	0.0	38,371.9	38,846.7	39,588.7	39,879.4	40,079.9	<b>40,088.9</b>	39,957.1	39,093.0	38,813.9	38,461.4	0.0
Middle Axle # 6 at Mid-Span	0.0	38,366.3	38,842.0	39,585.6	39,877.2	40,078.9	40,088.8	39,957.9	39,096.6	38,818.2	38,466.3	0.0
Mid-Span between Axles # 6 and 7	0.0	38,339.4	38,819.0	39,570.1	39,865.4	40,072.3	40,086.0	39,958.9	39,109.7	38,834.3	38,485.3	0.0

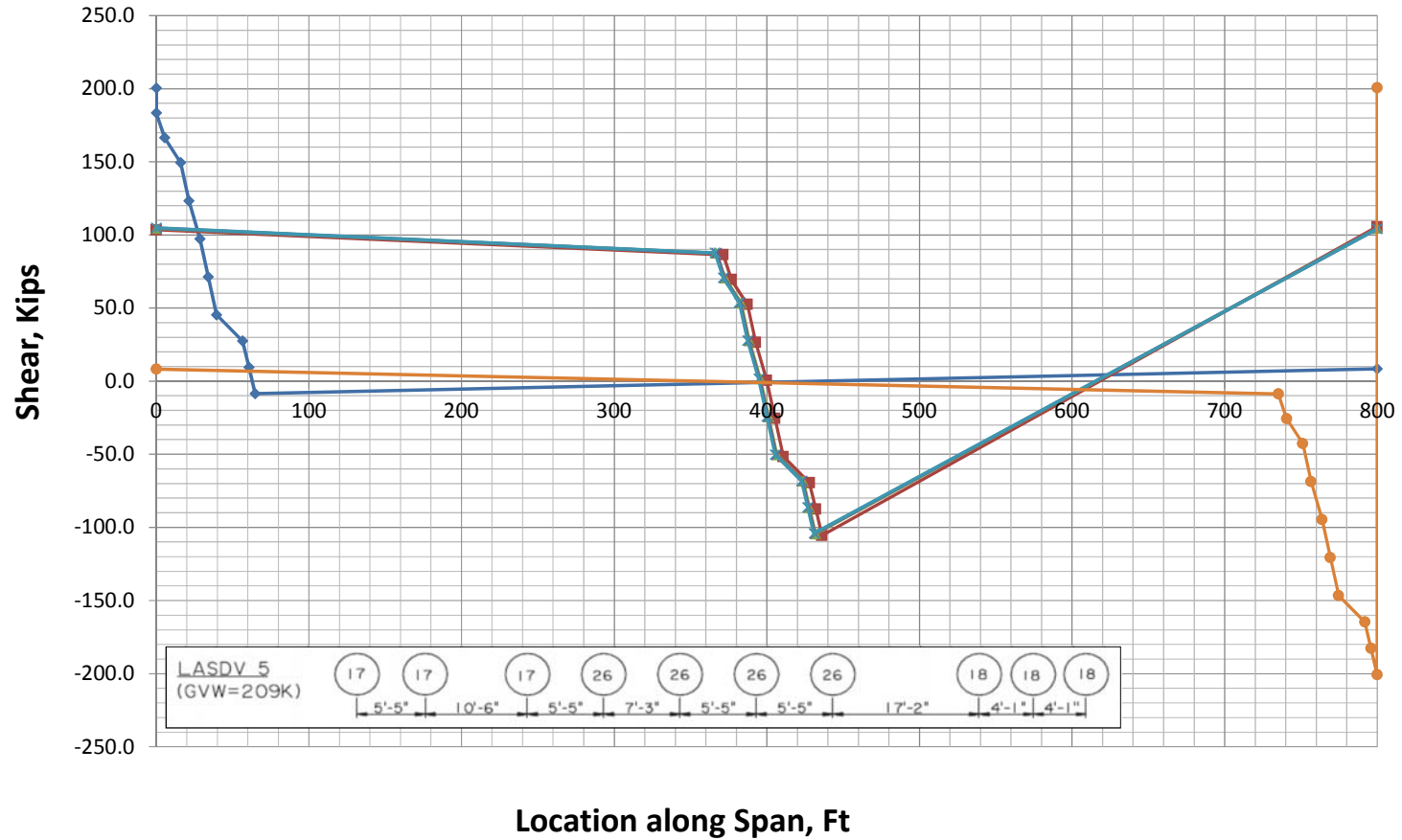
TEN (10) AXLE

Louisiana Special Design Vehicle Type 5 (LASDV-5), 800' span length

### Louisiana Special Design Vehicle Type 5 (LASDV-5), 800' span length,

#### SHEAR DIAGRAMS

- ◆ Front Axle # 1 at Front Support
- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✕ Predicted Location Max Mom at Mid-Span
- ✦ Middle Axle # 6 at Mid-Span
- Rear Axle #10 at Rear Support (Max V)

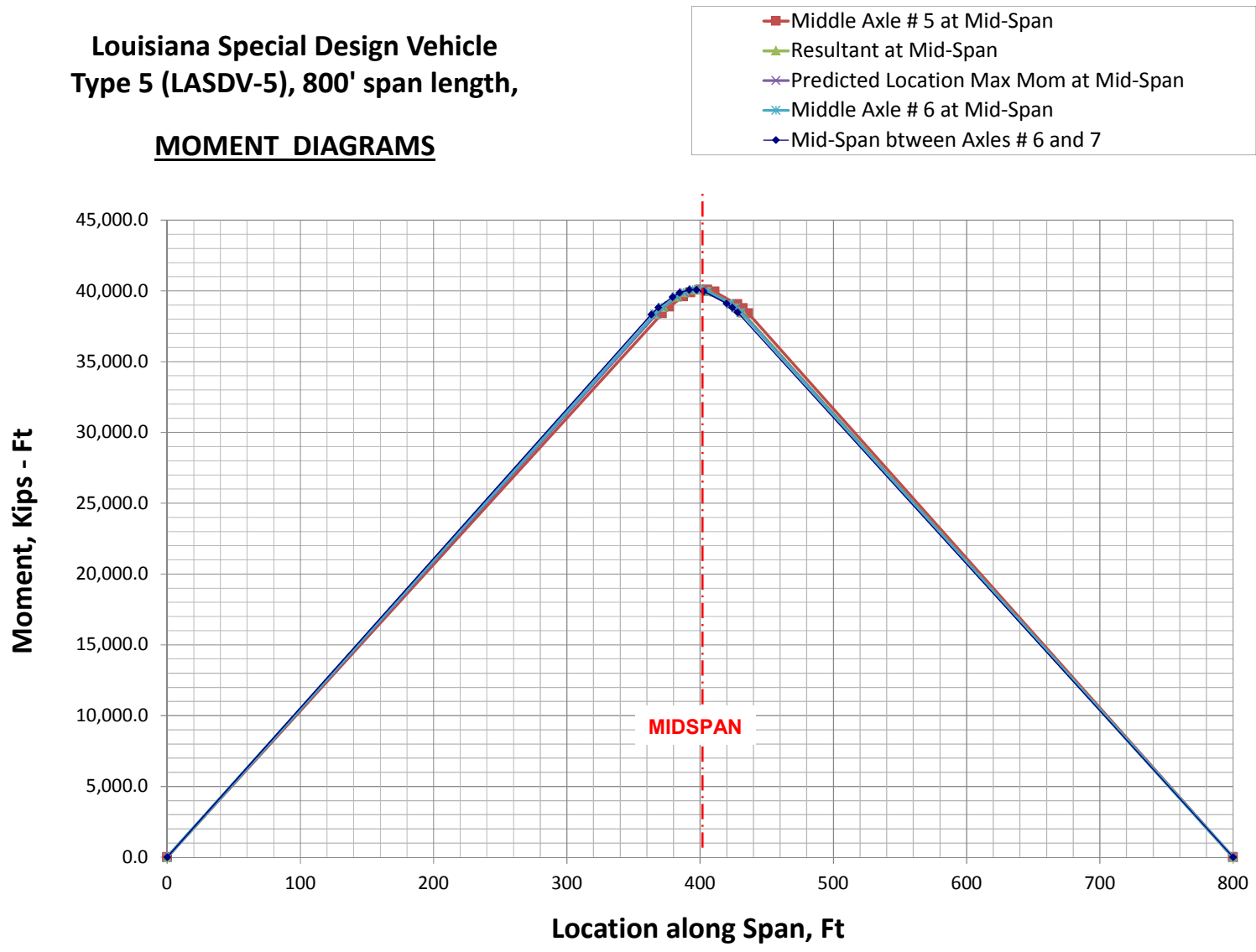


TEN (10) AXLE

Louisiana Special Design Vehicle Type 5 (LASDV-5), 800' span length

### Louisiana Special Design Vehicle Type 5 (LASDV-5), 800' span length,

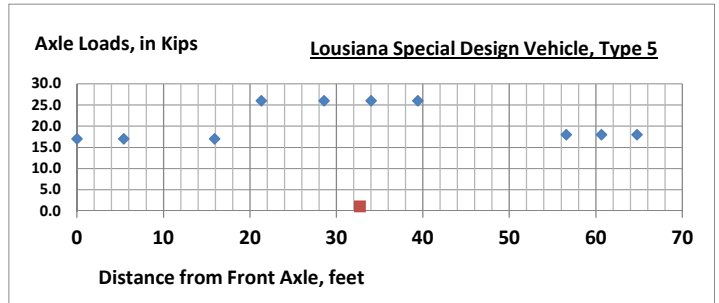
#### MOMENT DIAGRAMS



**TEN (10) AXLE Louisiana Special Design Vehicle Type 5 (LASDV-5), 900' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	8.5	17.0		0.000	75.62	0
2	8.5	17.0	5.42	5.417	75.62	165
3	8.5	17.0	10.50	15.917	75.62	485
4	13.0	26.0	5.42	21.333	115.65	650
5	13.0	26.0	7.25	28.583	115.65	871
6	13.0	26.0	5.4	34.000	115.65	1036
7	13.0	26.0	5.42	39.417	115.65	1201
8	9.0	18.0	17.17	56.583	80.07	1725
9	9.0	18.0	4.08	60.667	80.07	1849
(Rear) 10	9.0	18.0	4.08	64.750	80.07	1974
<b>Totals</b>	<b>104.5</b>	<b>209.0</b>	<b>64.75</b>		<b>9956.80</b>	<b>485</b>

Resultant of Axle Load is: 32.753 ft, from First (Forward) axle



**900 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
<b>FROM LEFT BEAM SUPPORT</b>	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Front Axle # 1 at Front Support	0.00	5.42	15.92	21.33	28.58	34.00	39.42	56.58	60.67	64.75	835.25
Middle Axle # 5 at Mid-Span	421.42	426.83	437.33	442.75	450.00	455.42	460.83	478.00	482.08	486.17	413.83
Resultant at Mid-Span	417.25	422.66	433.16	438.58	445.83	451.25	456.66	473.83	477.91	482.00	418.00
Predicted Location Max Mom at Mid-Span	416.62	422.04	432.54	437.96	445.21	450.62	456.04	473.21	477.29	481.37	418.63
Middle Axle # 6 at Mid-Span	416.00	421.42	431.92	437.33	444.58	450.00	455.42	472.58	476.67	480.75	419.25
Mid-Span between Axles # 6 and 7	413.29	418.71	429.21	434.63	441.88	447.29	452.71	469.88	473.96	478.04	421.96
Rear Axle #10 at Rear Support (Max V)	835.25	840.67	851.17	856.58	863.83	869.25	874.67	891.83	895.92	900.00	0

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	201.39	184.39	167.39	150.39	124.39	98.39	72.39	46.39	28.39	10.39	-7.61	7.61
Middle Axle # 5 at Mid-Span	103.53	86.53	69.53	52.53	26.53	0.53	-25.47	-51.47	-69.47	-87.47	-105.47	105.47
Resultant at Mid-Span	104.50	87.50	70.50	53.50	27.50	1.50	-24.50	-50.50	-68.50	-86.50	-104.50	104.49
Predicted Location Max Mom at Mid-Span	104.64	87.64	70.64	53.64	27.64	1.64	-24.36	-50.36	-68.36	-86.36	-104.36	104.37
Middle Axle # 6 at Mid-Span	104.79	87.79	70.79	53.79	27.79	1.79	-24.21	-50.21	-68.21	-86.21	-104.21	104.21
Mid-Span between Axles # 6 and 7	105.42	88.42	71.42	54.42	28.42	2.42	-23.58	-49.58	-67.58	-85.58	-103.58	103.58
Rear Axle #10 at Rear Support (Max V)	7.43	-9.57	-26.57	-43.57	-69.57	-95.57	-121.57	-147.57	-165.57	-183.57	-201.57	<b>201.57</b>

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Middle Axle # 5 at Mid-Span	0.0	43,630.0	44,098.7	44,828.8	45,113.4	45,305.7	45,308.6	45,170.6	44,287.1	44,003.4	43,646.3	0.0
Resultant at Mid-Span	0.0	43,602.3	44,076.3	44,816.5	45,106.3	45,305.7	45,313.8	45,181.1	44,314.2	44,034.5	43,681.3	0.0
Predicted Location Max Mom at Mid-Span	0.0	43,597.5	44,072.2	44,814.0	45,104.6	45,305.0	<b>45,313.9</b>	45,182.0	44,317.6	44,038.5	43,685.8	0.0
Middle Axle # 6 at Mid-Span	0.0	43,592.5	44,068.0	44,811.3	45,102.7	45,304.1	45,313.8	45,182.7	44,320.7	44,042.2	43,690.2	0.0
Mid-Span between Axles # 6 and 7	0.0	43,568.6	44,047.5	44,797.4	45,092.2	45,298.2	45,311.3	45,183.6	44,332.5	44,056.5	43,707.0	0.0

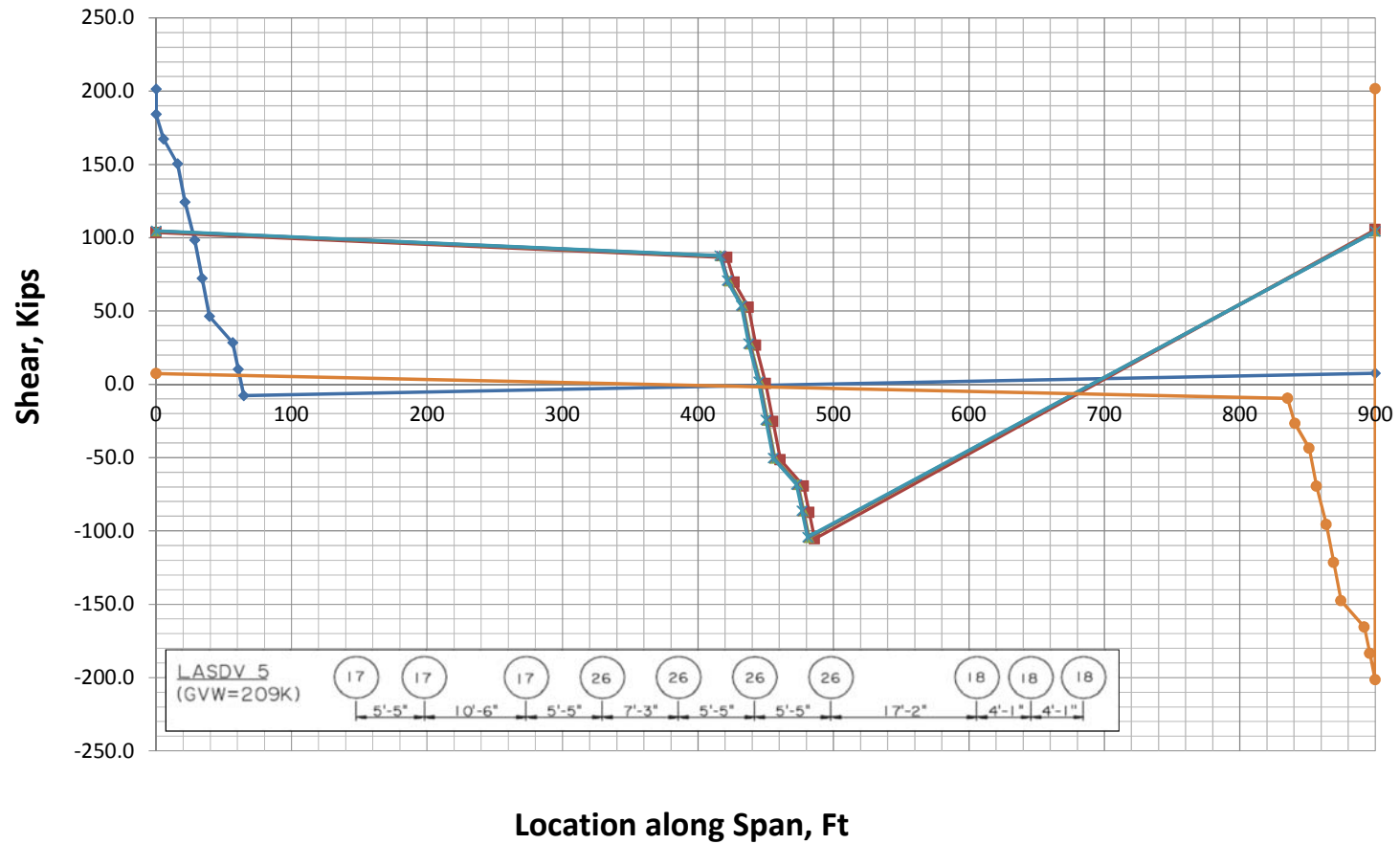
**TEN (10) AXLE**

**Louisiana Special Design Vehicle Type 5 (LASDV-5), 900' span length**

**Louisiana Special Design Vehicle  
 Type 5 (LASDV-5), 900' span length,**

**SHEAR DIAGRAMS**

- ◆ Front Axle # 1 at Front Support
- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✕ Predicted Location Max Mom at Mid-Span
- ✱ Middle Axle # 6 at Mid-Span
- Rear Axle #10 at Rear Support (Max V)

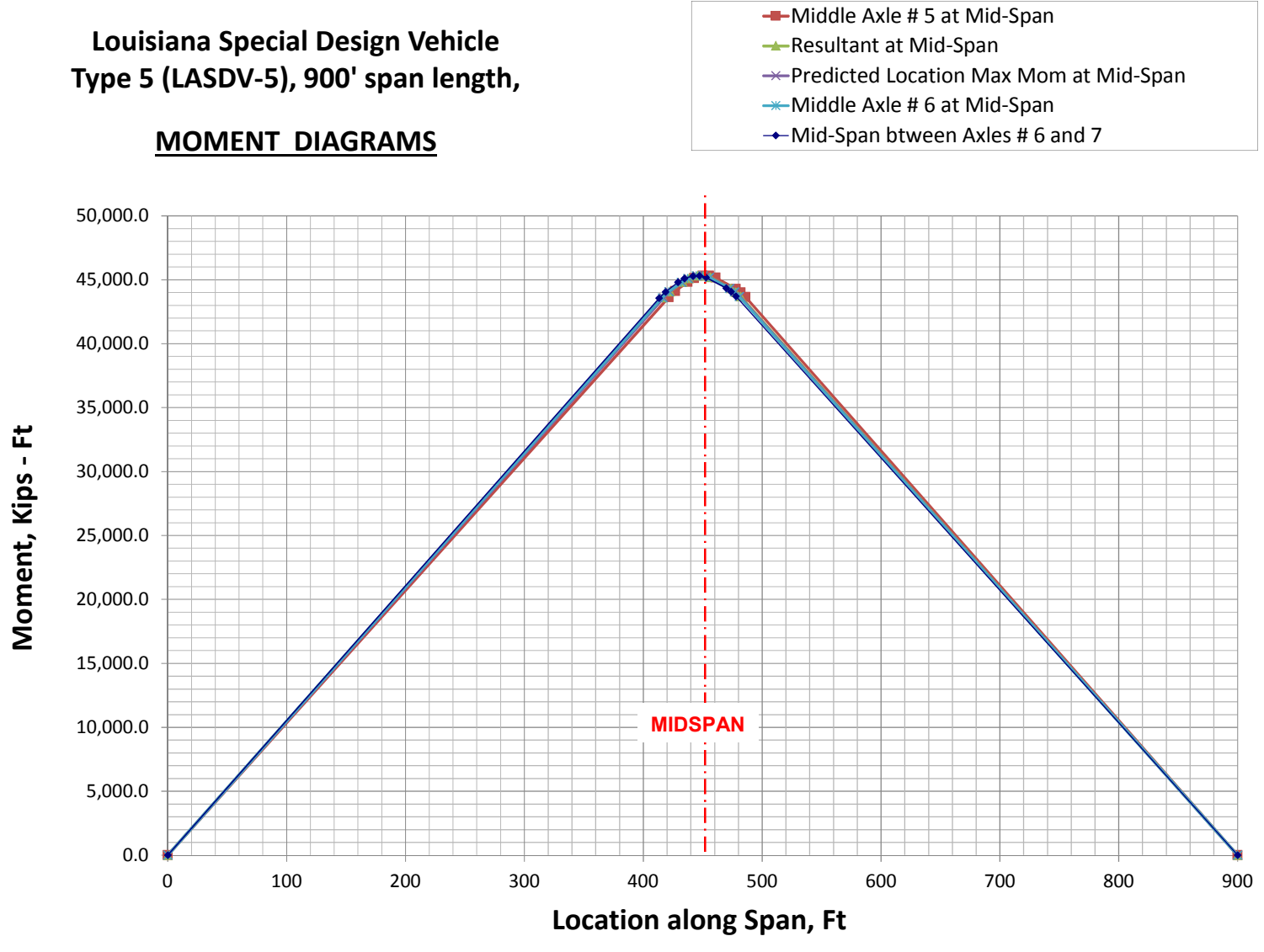


**TEN (10) AXLE**

**Louisiana Special Design Vehicle Type 5 (LASDV-5), 900' span length**

**Louisiana Special Design Vehicle  
Type 5 (LASDV-5), 900' span length,**

**MOMENT DIAGRAMS**

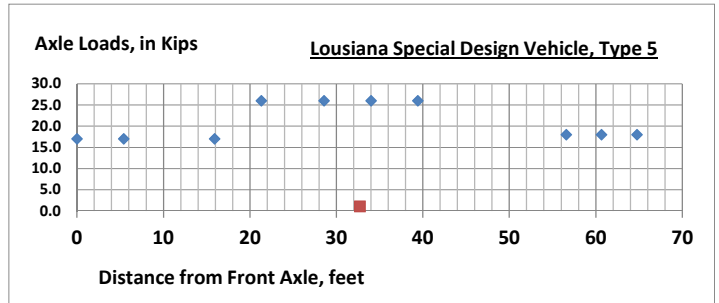




**TEN (10) AXLE Louisiana Special Design Vehicle Type 5 (LASDV-5), 1,000' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	8.5	17.0		0.000	75.62	0
2	8.5	17.0	5.42	5.417	75.62	165
3	8.5	17.0	10.50	15.917	75.62	485
4	13.0	26.0	5.42	21.333	115.65	650
5	13.0	26.0	7.25	28.583	115.65	871
6	13.0	26.0	5.4	34.000	115.65	1036
7	13.0	26.0	5.42	39.417	115.65	1201
8	9.0	18.0	17.17	56.583	80.07	1725
9	9.0	18.0	4.08	60.667	80.07	1849
(Rear) 10	9.0	18.0	4.08	64.750	80.07	1974
<b>Totals</b>	<b>104.5</b>	<b>209.0</b>	<b>64.75</b>		<b>9956.80</b>	<b>485</b>

Resultant of Axle Load is: **32.753 ft, from First (Forward) axle**



**1,000 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
<b>FROM LEFT BEAM SUPPORT</b>	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Front Axle # 1 at Front Support	0.00	5.42	15.92	21.33	28.58	34.00	39.42	56.58	60.67	64.75	935.25
Middle Axle # 5 at Mid-Span	471.42	476.83	487.33	492.75	500.00	505.42	510.83	528.00	532.08	536.17	463.83
Resultant at Mid-Span	467.25	472.66	483.16	488.58	495.83	501.25	506.66	523.83	527.91	532.00	468.00
Predicted Location Max Mom at Mid-Span	466.62	472.04	482.54	487.96	495.21	500.62	506.04	523.21	527.29	531.37	468.63
Middle Axle # 6 at Mid-Span	466.00	471.42	481.92	487.33	494.58	500.00	505.42	522.58	526.67	530.75	469.25
Mid-Span between Axles # 6 and 7	463.29	468.71	479.21	484.63	491.88	497.29	502.71	519.88	523.96	528.04	471.96
Rear Axle #10 at Rear Support (Max V)	935.25	940.67	951.17	956.58	963.83	969.25	974.67	991.83	995.92	1000.00	0

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	202.15	185.15	168.15	151.15	125.15	99.15	73.15	47.15	29.15	11.15	-6.85	6.85
Middle Axle # 5 at Mid-Span	103.63	86.63	69.63	52.63	26.63	0.63	-25.37	-51.37	-69.37	-87.37	-105.37	105.37
Resultant at Mid-Span	104.50	87.50	70.50	53.50	27.50	1.50	-24.50	-50.50	-68.50	-86.50	-104.50	104.49
Predicted Location Max Mom at Mid-Span	104.63	87.63	70.63	53.63	27.63	1.63	-24.37	-50.37	-68.37	-86.37	-104.37	104.38
Middle Axle # 6 at Mid-Span	104.76	87.76	70.76	53.76	27.76	1.76	-24.24	-50.24	-68.24	-86.24	-104.24	104.24
Mid-Span between Axles # 6 and 7	105.33	88.33	71.33	54.33	28.33	2.33	-23.67	-49.67	-67.67	-85.67	-103.67	103.67
Rear Axle #10 at Rear Support (Max V)	6.69	-10.31	-27.31	-44.31	-70.31	-96.31	-122.31	-148.31	-166.31	-184.31	-202.31	<b>202.31</b>

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Middle Axle # 5 at Mid-Span	0.0	48,852.2	49,321.5	50,052.6	50,337.7	50,530.7	50,534.1	50,396.7	49,514.8	49,231.5	48,874.8	0.0
Resultant at Mid-Span	0.0	48,827.3	49,301.3	50,041.5	50,331.3	50,530.7	50,538.8	50,406.1	49,539.2	49,259.5	48,906.3	0.0
Predicted Location Max Mom at Mid-Span	0.0	48,823.0	49,297.6	50,039.3	50,329.8	50,530.1	<b>50,538.9</b>	50,406.9	49,542.2	49,263.1	48,910.4	0.0
Middle Axle # 6 at Mid-Span	0.0	48,818.5	49,293.8	50,036.8	50,328.0	50,529.3	<b>50,538.8</b>	50,407.5	49,545.1	49,266.5	48,914.3	0.0
Mid-Span between Axles # 6 and 7	0.0	48,797.0	49,275.4	50,024.4	50,318.6	50,524.0	50,536.6	50,408.4	49,555.6	49,279.3	48,929.5	0.0

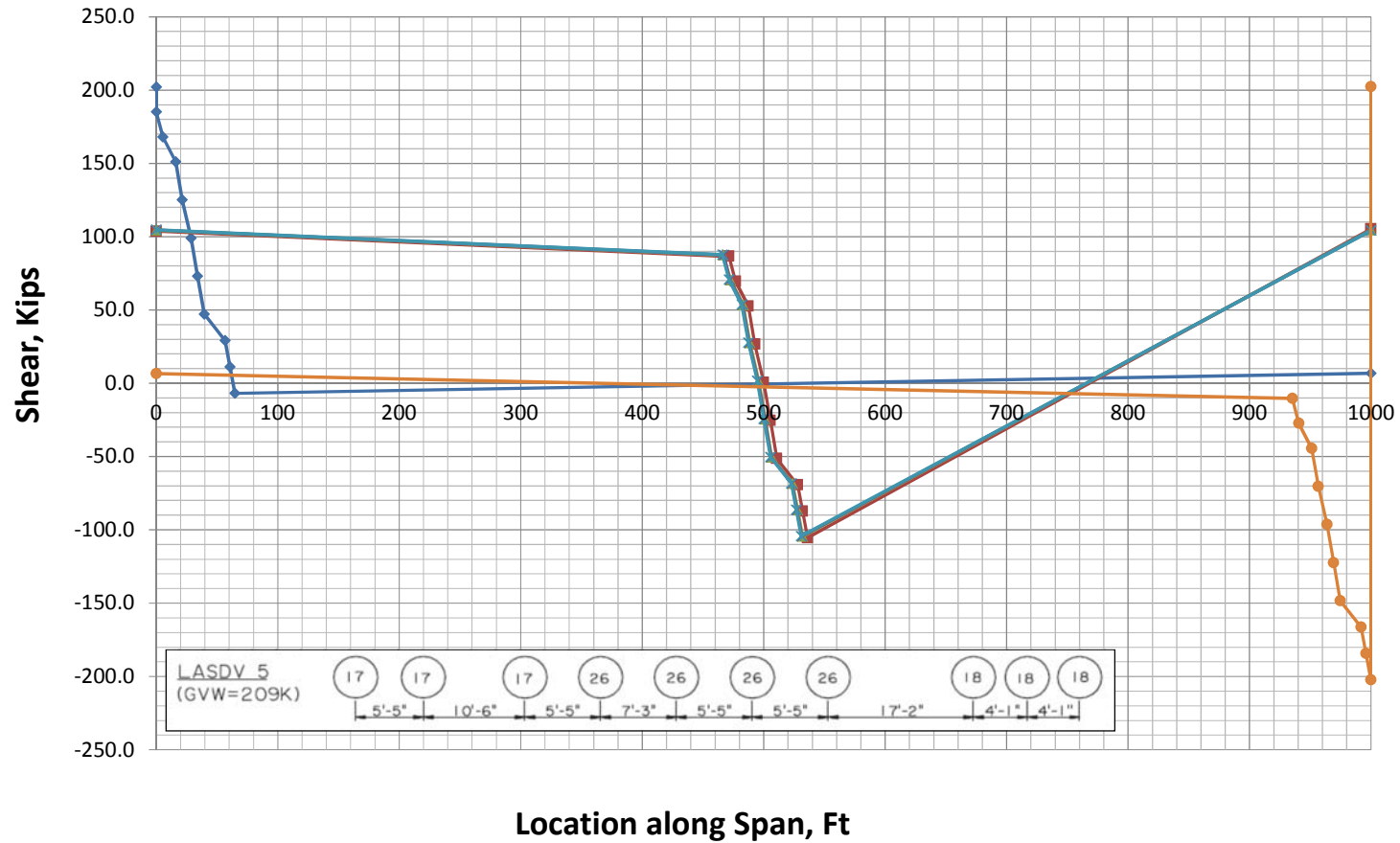
TEN (10) AXLE

Louisiana Special Design Vehicle Type 5 (LASDV-5), 1,000' span length

### Louisiana Special Design Vehicle Type 5 (LASDV-5), 1,000' span length,

#### SHEAR DIAGRAMS

- ◆ Front Axle # 1 at Front Support
- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✕ Predicted Location Max Mom at Mid-Span
- ✱ Middle Axle # 6 at Mid-Span
- Rear Axle #10 at Rear Support (Max V)

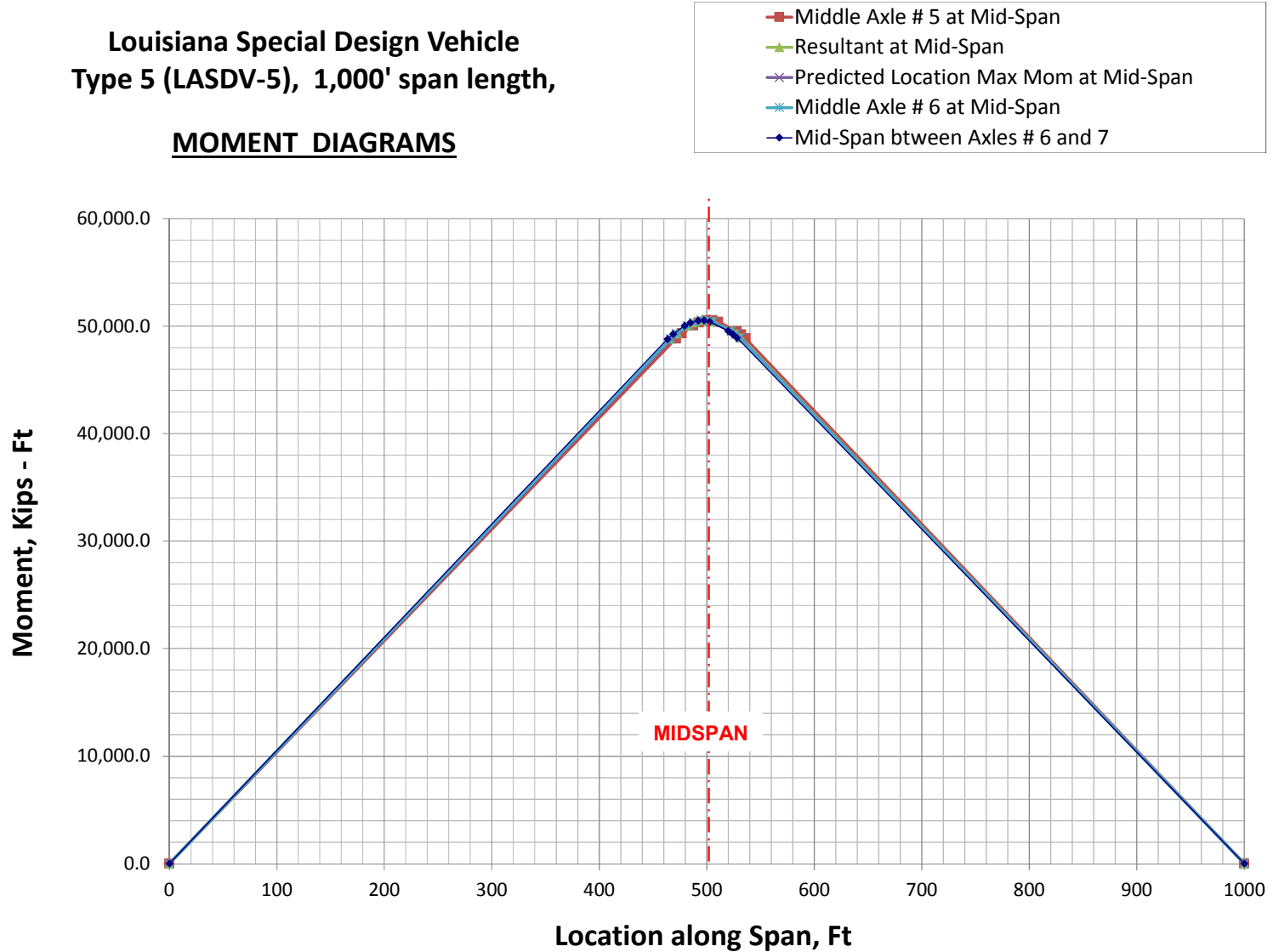


TEN (10) AXLE

Louisiana Special Design Vehicle Type 5 (LASDV-5), 1,000' span length

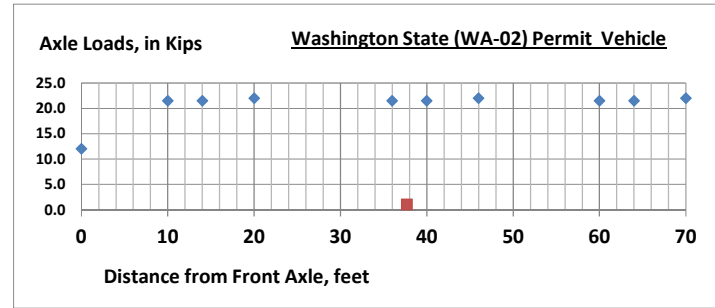
### Louisiana Special Design Vehicle Type 5 (LASDV-5), 1,000' span length,

#### MOMENT DIAGRAMS



**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 100' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	6.0	12.0		0.000	53.38	0
2	10.8	21.5	10.00	10.000	95.64	305
3	10.8	21.5	4.00	14.000	95.64	427
4	11.0	22.0	6.00	20.000	97.86	610
5	10.8	21.5	16.00	36.000	95.64	1097
6	10.8	21.5	4.00	40.000	95.64	1219
7	11.0	22.0	6.00	46.000	97.86	1402
8	10.8	21.5	14.00	60.000	95.64	1829
9	10.8	21.5	4.00	64.000	95.64	1951
(Rear) 10	11.0	22.0	6.00	70.000	97.86	2134
<b>Totals</b>	<b>103.5</b>	<b>207.0</b>	<b>70.00</b>		<b>10972.80</b>	<b>427</b>



Resultant of Axle Load is: **37.720 ft, from First (Forward) axle**

**Max Moment predicted at location 1.140 ft, to forward of Axle # 6**

**100 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Front Axle # 1 at Front Support	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	30.00
Middle Axle # 5 at Mid-Span	14.00	24.00	28.00	34.00	50.00	54.00	60.00	74.00	78.00	84.00	16.00
Resultant at Mid-Span	12.28	22.28	26.28	32.28	48.28	52.28	58.28	72.28	76.28	82.28	17.72
Predicted Location Max Mom at Mid-Span	11.14	21.14	25.14	31.14	47.14	51.14	57.14	71.14	75.14	81.14	18.86
Middle Axle # 6 at Mid-Span	10.00	20.00	24.00	30.00	46.00	50.00	56.00	70.00	74.00	80.00	20.00
Mid-Span between Axles # 6 and 7	7.00	17.00	21.00	27.00	43.00	47.00	53.00	67.00	71.00	77.00	23.00
<b>Iterative Calculation of Maximum Moment Location</b>	11.12	21.12	25.12	31.12	47.12	51.12	57.12	71.12	75.12	81.12	18.88
	11.13	21.13	25.13	31.13	47.13	51.13	57.13	71.13	75.13	81.13	18.87
	11.14	21.14	25.14	31.14	47.14	51.14	57.14	71.14	75.14	81.14	18.86
	11.15	21.15	25.15	31.15	47.15	51.15	57.15	71.15	75.15	81.15	18.85
	11.16	21.16	25.16	31.16	47.16	51.16	57.16	71.16	75.16	81.16	18.84
Rear Axle #10 at Rear Support (Max V)	30.00	40.00	44.00	50.00	66.00	70.00	76.00	90.00	94.00	100.00	0

**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 100' span length**

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	128.92	116.92	95.42	73.92	51.92	30.42	8.92	-13.08	-34.58	-56.08	-78.08	78.08
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	100.00
Middle Axle # 5 at Mid-Span	99.94	87.94	66.44	44.94	22.94	1.44	-20.06	-42.06	-63.56	-85.06	-107.06	107.06
Axle Locations along Span	0.00	14.00	24.00	28.00	34.00	50.00	54.00	60.00	74.00	78.00	84.00	100.00
Resultant at Mid-Span	103.50	91.50	70.00	48.50	26.50	5.00	-16.50	-38.50	-60.00	-81.50	-103.50	103.36
Axle Locations along Span	0.00	11.14	22.28	26.28	32.28	48.28	52.28	58.28	72.28	76.28	82.28	100.00
Predicted Location Max Mom at Mid-Span	105.86	93.86	72.36	50.86	28.86	7.36	-14.14	-36.14	-57.64	-79.14	-101.14	101.28
Axle Locations along Span	0.00	12.28	21.14	25.14	31.14	47.14	51.14	57.14	71.14	75.14	81.14	100.00
Middle Axle # 6 at Mid-Span	108.22	96.22	74.72	53.22	31.22	9.72	-11.78	-33.78	-55.28	-76.78	-98.78	98.78
Axle Locations along Span	0.00	10.00	20.00	24.00	30.00	46.00	50.00	56.00	70.00	74.00	80.00	100.00
Mid-Span between Axles # 6 and 7	114.43	102.43	80.93	59.43	37.43	15.93	-5.57	-27.57	-49.07	-70.57	-92.57	92.57
Axle Locations along Span	0.00	7.00	17.00	21.00	27.00	43.00	47.00	53.00	67.00	71.00	77.00	100.00
Iterative Max Moment Analysis, #1	105.90	93.90	72.40	50.90	28.90	7.40	-14.10	-36.10	-57.60	-79.10	-101.10	101.10
Axle Locations along Span	0.00	11.12	21.12	25.12	31.12	47.12	51.12	57.12	71.12	75.12	81.12	100.00
Iterative Max Moment Analysis, #2	105.88	93.88	72.38	50.88	28.88	7.38	-14.12	-36.12	-57.62	-79.12	-101.12	101.12
Axle Locations along Span	0.00	11.13	21.13	25.13	31.13	47.13	51.13	57.13	71.13	75.13	81.13	100.00
Iterative Max Moment Analysis, #3	105.86	93.86	72.36	50.86	28.86	7.36	-14.14	-36.14	-57.64	-79.14	-101.14	101.14
Axle Locations along Span	0.00	11.14	21.14	25.14	31.14	47.14	51.14	57.14	71.14	75.14	81.14	100.00
Iterative Max Moment Analysis, #4	105.84	93.84	72.34	50.84	28.84	7.34	-14.16	-36.16	-57.66	-79.16	-101.16	101.16
Axle Locations along Span	0.00	11.15	21.15	25.15	31.15	47.15	51.15	57.15	71.15	75.15	81.15	100.00
Iterative Max Moment Analysis, #5	105.82	93.82	72.32	50.82	28.82	7.32	-14.18	-36.18	-57.68	-79.18	-101.18	101.18
Axle Locations along Span	0.00	11.16	21.16	25.16	31.16	47.16	51.16	57.16	71.16	75.16	81.16	100.00
Rear Axle #10 at Rear Support (Max V)	66.82	54.82	33.32	11.82	-10.18	-31.68	-53.18	-75.18	-96.68	-118.18	-140.18	140.18
Axle Locations along Span	0.00	30.00	40.00	44.00	50.00	66.00	70.00	76.00	90.00	94.00	100.00	100.00

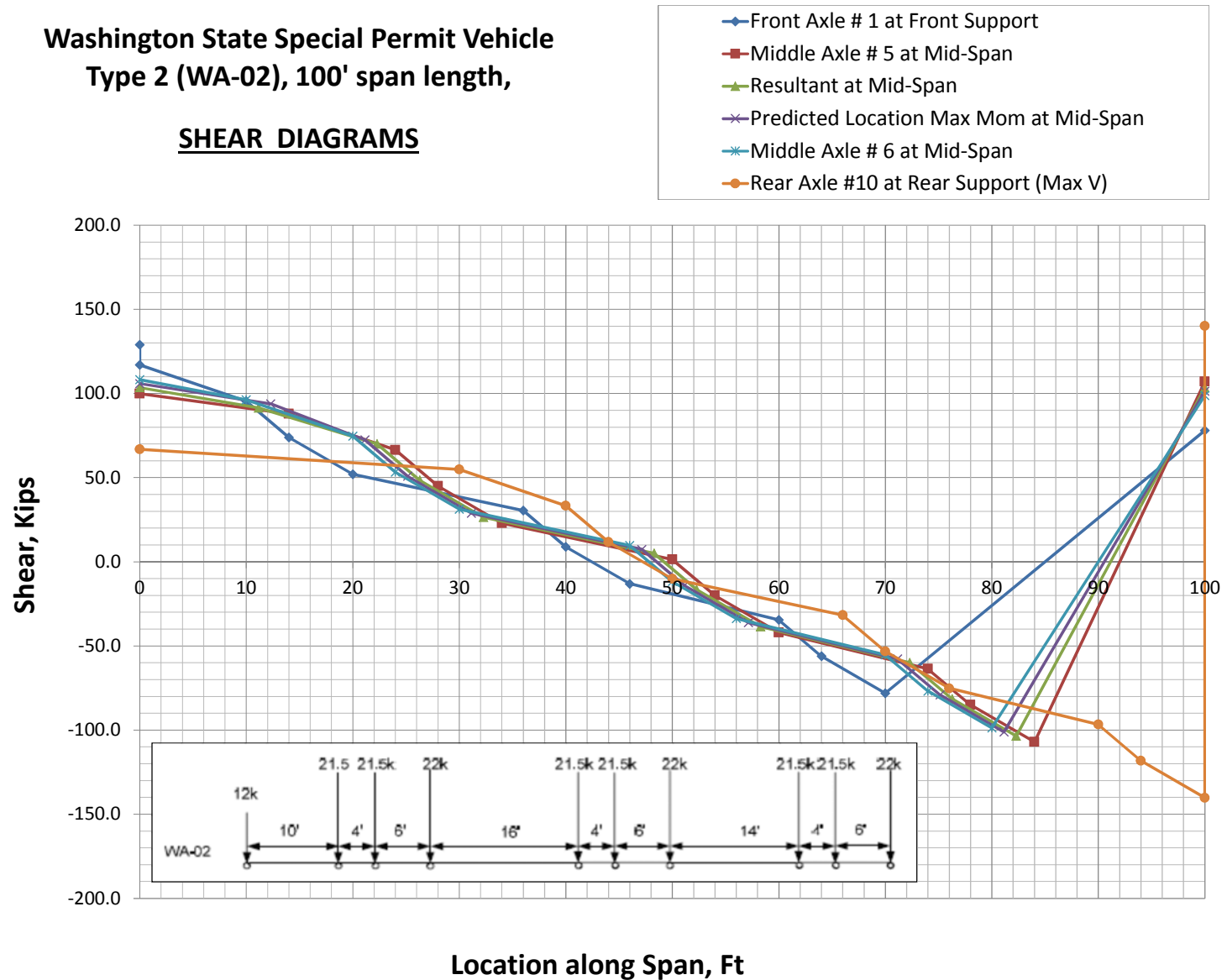
MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Front Axle # 1 at Front Support	0.0	0.0	1,169.2	1,550.9	1,994.4	2,825.12	2,946.80	3,000.3	2,817.2	2,678.9	2,342.4	0.0
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	100.00
Middle Axle # 5 at Mid-Span	0.0	1,399.2	2,278.6	2,544.3	2,814.0	3,181.00	3,186.76	3,066.4	2,477.6	2,223.3	1,713.0	0.0
Axle Locations along Span	0.00	14.00	24.00	28.00	34.00	50.00	54.00	60.00	74.00	78.00	84.00	100.00
Resultant at Mid-Span	0.0	1,271.0	2,186.0	2,466.0	2,757.0	3,181.00	3,201.00	3,102.0	2,563.0	2,323.0	1,834.0	0.0
Axle Locations along Span	0.00	11.14	22.28	26.28	32.28	48.28	52.28	58.28	72.28	76.28	82.28	100.00
Predicted Location Max Mom at Mid-Span	0.0	1,179.3	2,117.9	2,407.3	2,712.5	3,174.25	3,203.69	3,118.9	2,612.9	2,382.3	1,907.5	0.0
Axle Locations along Span	0.00	12.28	21.14	25.14	31.14	47.14	51.14	57.14	71.14	75.14	81.14	100.00
Middle Axle # 6 at Mid-Span	0.0	1,082.2	2,044.4	2,343.3	2,662.6	3,162.12	3,201.00	3,130.3	2,657.4	2,436.3	1,975.6	0.0
Axle Locations along Span	0.00	10.00	20.00	24.00	30.00	46.00	50.00	56.00	70.00	74.00	80.00	100.00
Mid-Span between Axles # 6 and 7	0.0	801.01	1,825.31	2,149.03	2,505.61	3,104.49	3,168.21	3,134.79	2,748.81	2,552.53	2,129.11	0.0
Axle Locations along Span	0.00	7.00	17.00	21.00	27.00	43.00	47.00	53.00	67.00	71.00	77.00	100.00
Iterative Max Moment Analysis, #1	0.0	1,177.63	2,116.65	2,406.25	2,711.66	3,174.08	3,203.69	3,119.10	2,613.72	2,383.32	1,908.73	0.0
Axle Locations along Span	0.00	11.12	21.12	25.12	31.12	47.12	51.12	57.12	71.12	75.12	81.12	100.00
Iterative Max Moment Analysis, #2	0.0	1,178.46	2,117.27	2,406.79	2,712.08	3,174.17	3,203.69	3,118.97	2,613.30	2,382.83	1,908.11	0.0
Axle Locations along Span	0.00	11.13	21.13	25.13	31.13	47.13	51.13	57.13	71.13	75.13	81.13	100.00
Iterative Max Moment Analysis, #3	0.0	1,179.29	2,117.89	2,407.33	2,712.49	3,174.25	3,203.69	3,118.85	2,612.89	2,382.33	1,907.49	0.0
Axle Locations along Span	0.00	11.14	21.14	25.14	31.14	47.14	51.14	57.14	71.14	75.14	81.14	100.00
Iterative Max Moment Analysis, #4	0.0	1,180.12	2,118.51	2,407.87	2,712.90	3,174.33	3,203.69	3,118.73	2,612.48	2,381.83	1,906.87	0.0
Axle Locations along Span	0.00	11.15	21.15	25.15	31.15	47.15	51.15	57.15	71.15	75.15	81.15	100.00
Iterative Max Moment Analysis, #5	0.0	1,180.95	2,119.13	2,408.41	2,713.32	3,174.42	3,203.69	3,118.60	2,612.06	2,381.34	1,906.25	0.0
Axle Locations along Span	0.00	11.16	21.16	25.16	31.16	47.16	51.16	57.16	71.16	75.16	81.16	100.00

TEN (10) AXLE

Washington State Permit Vehicle Type 2 (WA-02), 100' span length

### Washington State Special Permit Vehicle Type 2 (WA-02), 100' span length,

### SHEAR DIAGRAMS

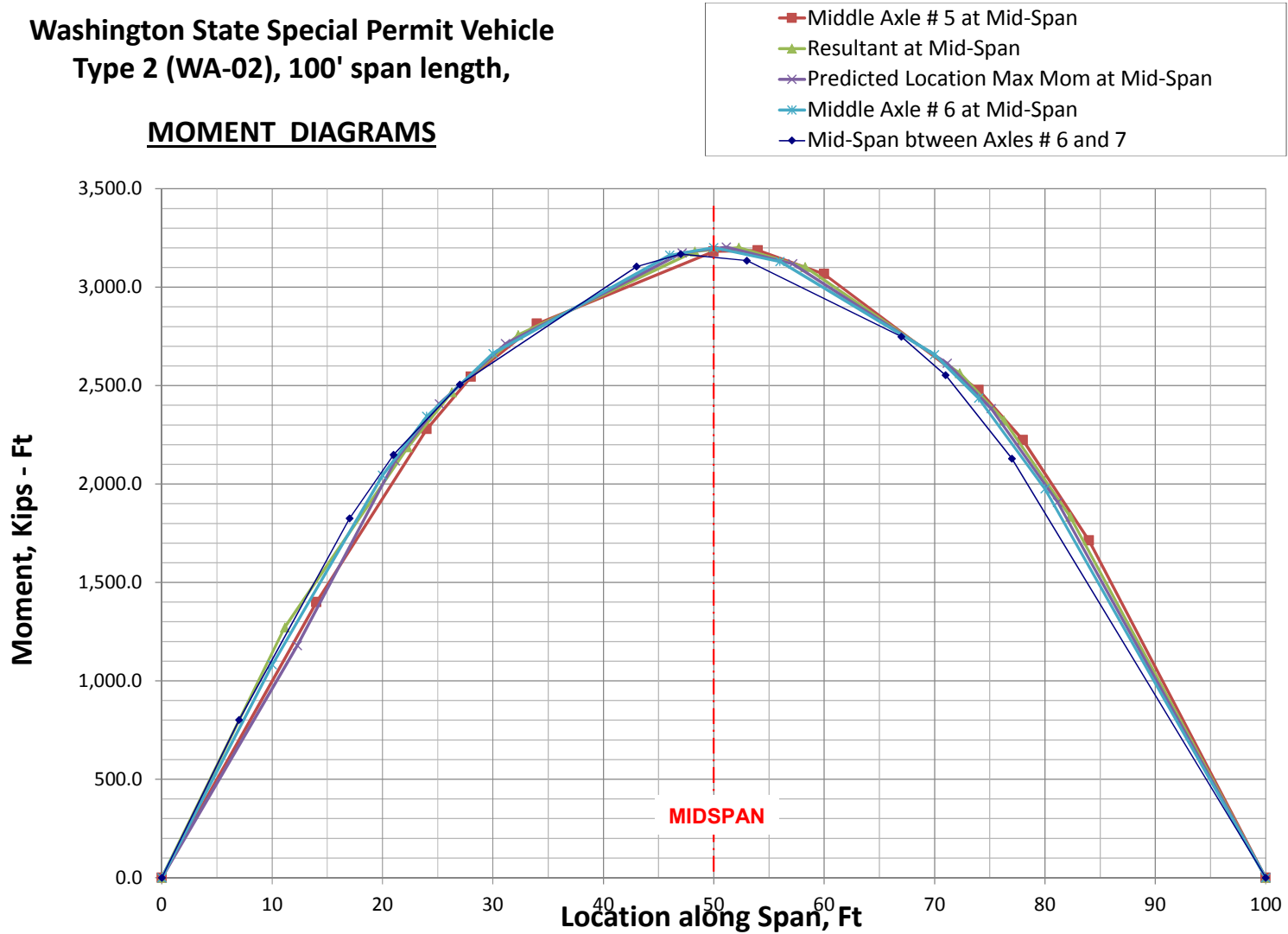


TEN (10) AXLE

Washington State Permit Vehicle Type 2 (WA-02), 100' span length

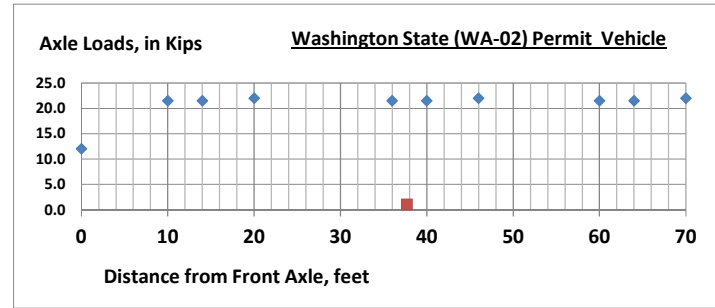
### Washington State Special Permit Vehicle Type 2 (WA-02), 100' span length,

#### MOMENT DIAGRAMS



**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 200' span length**

Axle	Load (ST)	Load (kips)	Distance between axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	6.0	12.0		0.000	53.38	0
2	10.8	21.5	10.00	10.000	95.64	305
3	10.8	21.5	4.00	14.000	95.64	427
4	11.0	22.0	6.00	20.000	97.86	610
5	10.8	21.5	16.00	36.000	95.64	1097
6	10.8	21.5	4.00	40.000	95.64	1219
7	11.0	22.0	6.00	46.000	97.86	1402
8	10.8	21.5	14.00	60.000	95.64	1829
9	10.8	21.5	4.00	64.000	95.64	1951
(Rear) 10	11.0	22.0	6.00	70.000	97.86	2134
<b>Totals</b>	<b>103.5</b>	<b>207.0</b>	<b>70.00</b>		<b>10972.80</b>	<b>427</b>



Resultant of Axle Load is: 37.720 ft, from First (Forward) axle

Max Moment predicted at location 1.140 ft, to forward of Axle # 6

**200 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Front Axle # 1 at Front Support	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	130.00
Middle Axle # 5 at Mid-Span	64.00	74.00	78.00	84.00	100.00	104.00	110.00	124.00	128.00	134.00	66.00
Resultant at Mid-Span	62.28	72.28	76.28	82.28	98.28	102.28	108.28	122.28	126.28	132.28	67.72
Predicted Location Max Mom at Mid-Span	61.14	71.14	75.14	81.14	97.14	101.14	107.14	121.14	125.14	131.14	68.86
Middle Axle # 6 at Mid-Span	60.00	70.00	74.00	80.00	96.00	100.00	106.00	120.00	124.00	130.00	70.00
Mid-Span between Axles # 6 and 7	57.00	67.00	71.00	77.00	93.00	97.00	103.00	117.00	121.00	127.00	73.00
<b>Iterative Calculation of Maximum Moment Location</b>	61.12	71.12	75.12	81.12	97.12	101.12	107.12	121.12	125.12	131.12	68.88
	61.13	71.13	75.13	81.13	97.13	101.13	107.13	121.13	125.13	131.13	68.87
	61.14	71.14	75.14	81.14	97.14	101.14	107.14	121.14	125.14	131.14	68.86
	61.15	71.15	75.15	81.15	97.15	101.15	107.15	121.15	125.15	131.15	68.85
	61.16	71.16	75.16	81.16	97.16	101.16	107.16	121.16	125.16	131.16	68.84
Rear Axle #10 at Rear Support (Max V)	130.00	140.00	144.00	150.00	166.00	170.00	176.00	190.00	194.00	200.00	0



**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 200' span length**

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	167.96	155.96	134.46	112.96	90.96	69.46	47.96	25.96	4.46	-17.04	-39.04	39.04
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	200.00
Middle Axle # 5 at Mid-Span	101.72	89.72	68.22	46.72	24.72	3.22	-18.28	-40.28	-61.78	-83.28	-105.28	105.28
Axle Locations along Span	0.00	64.00	74.00	78.00	84.00	100.00	104.00	110.00	124.00	128.00	134.00	200.00
Resultant at Mid-Span	103.50	91.50	70.00	48.50	26.50	5.00	-16.50	-38.50	-60.00	-81.50	-103.50	103.43
Axle Locations along Span	0.00	61.14	72.28	76.28	82.28	98.28	102.28	108.28	122.28	126.28	132.28	200.00
Predicted Location Max Mom at Mid-Span	104.68	92.68	71.18	49.68	27.68	6.18	-15.32	-37.32	-58.82	-80.32	-102.32	102.39
Axle Locations along Span	0.00	62.28	71.14	75.14	81.14	97.14	101.14	107.14	121.14	125.14	131.14	200.00
Middle Axle # 6 at Mid-Span	105.86	93.86	72.36	50.86	28.86	7.36	-14.14	-36.14	-57.64	-79.14	-101.14	101.14
Axle Locations along Span	0.00	60.00	70.00	74.00	80.00	96.00	100.00	106.00	120.00	124.00	130.00	200.00
Mid-Span between Axles # 6 and 7	108.97	96.97	75.47	53.97	31.97	10.47	-11.04	-33.04	-54.54	-76.04	-98.04	98.04
Axle Locations along Span	0.00	57.00	67.00	71.00	77.00	93.00	97.00	103.00	117.00	121.00	127.00	200.00
Iterative Max Moment Analysis, #1	104.70	92.70	71.20	49.70	27.70	6.20	-15.30	-37.30	-58.80	-80.30	-102.30	102.30
Axle Locations along Span	0.00	61.12	71.12	75.12	81.12	97.12	101.12	107.12	121.12	125.12	131.12	200.00
Iterative Max Moment Analysis, #2	104.69	92.69	71.19	49.69	27.69	6.19	-15.31	-37.31	-58.81	-80.31	-102.31	102.31
Axle Locations along Span	0.00	61.13	71.13	75.13	81.13	97.13	101.13	107.13	121.13	125.13	131.13	200.00
Iterative Max Moment Analysis, #3	104.68	92.68	71.18	49.68	27.68	6.18	-15.32	-37.32	-58.82	-80.32	-102.32	102.32
Axle Locations along Span	0.00	61.14	71.14	75.14	81.14	97.14	101.14	107.14	121.14	125.14	131.14	200.00
Iterative Max Moment Analysis, #4	104.67	92.67	71.17	49.67	27.67	6.17	-15.33	-37.33	-58.83	-80.33	-102.33	102.33
Axle Locations along Span	0.00	61.15	71.15	75.15	81.15	97.15	101.15	107.15	121.15	125.15	131.15	200.00
Iterative Max Moment Analysis, #5	104.66	92.66	71.16	49.66	27.66	6.16	-15.34	-37.34	-58.84	-80.34	-102.34	102.34
Axle Locations along Span	0.00	61.16	71.16	75.16	81.16	97.16	101.16	107.16	121.16	125.16	131.16	200.00
Rear Axle #10 at Rear Support (Max V)	33.41	21.41	-0.09	-21.59	-43.59	-65.09	-86.59	-108.59	-130.09	-151.59	-173.59	173.59
Axle Locations along Span	0.00	130.00	140.00	144.00	150.00	166.00	170.00	176.00	190.00	194.00	200.00	200.00

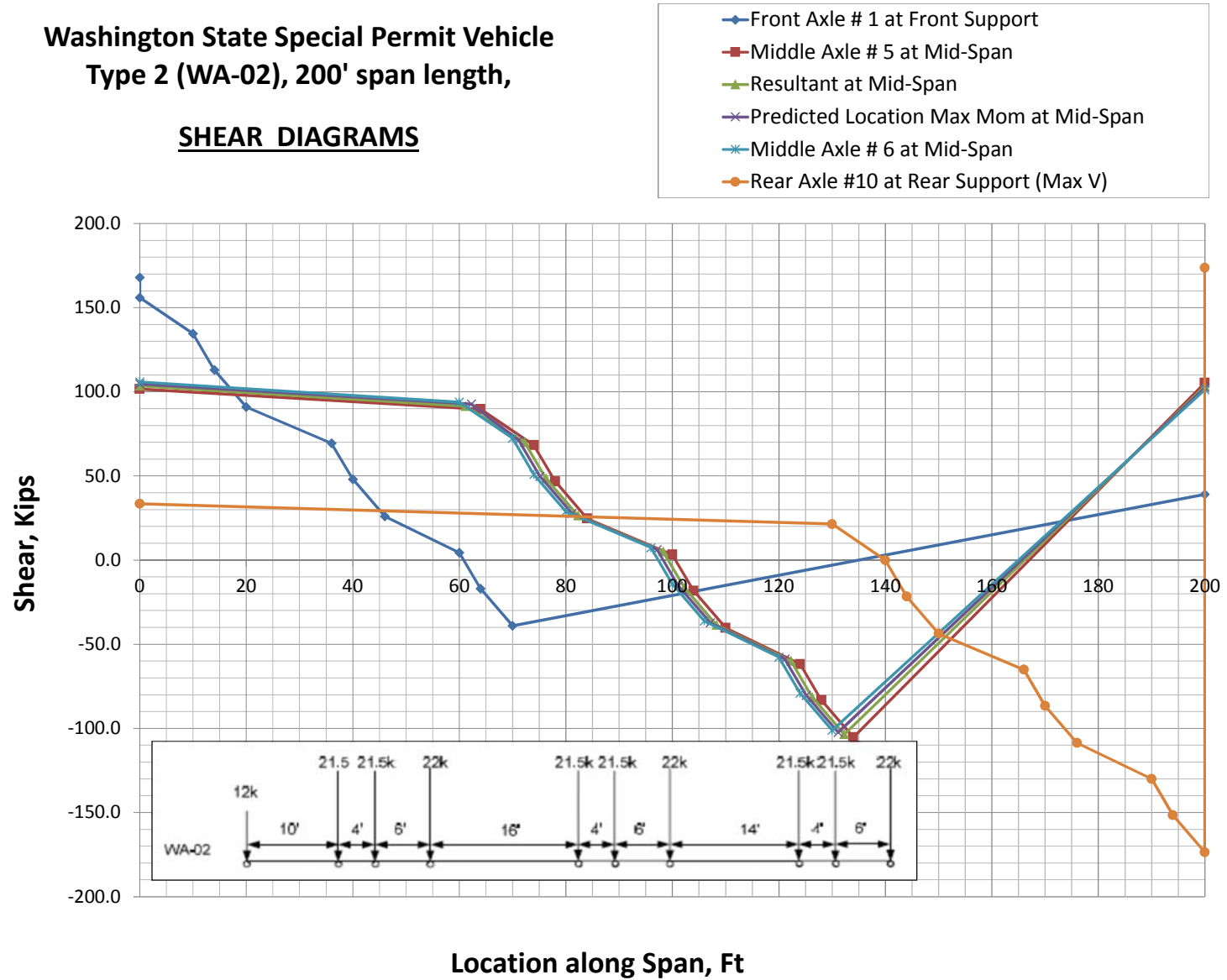
MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Front Axle # 1 at Front Support	0.0	0.0	1,559.6	2,097.4	2,775.2	4,230.56	4,508.40	4,796.2	5,159.6	5,177.4	5,075.2	0.0
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	200.00
Middle Axle # 5 at Mid-Span	0.0	6,510.1	7,407.3	7,680.2	7,960.5	8,356.00	8,368.88	8,259.2	7,695.3	7,448.2	6,948.5	0.0
Axle Locations along Span	0.00	64.00	74.00	78.00	84.00	100.00	104.00	110.00	124.00	128.00	134.00	200.00
Resultant at Mid-Span	0.0	6,446.0	7,361.0	7,641.0	7,932.0	8,356.00	8,376.00	8,277.0	7,738.0	7,498.0	7,009.0	0.0
Axle Locations along Span	0.00	61.14	72.28	76.28	82.28	98.28	102.28	108.28	122.28	126.28	132.28	200.00
Predicted Location Max Mom at Mid-Span	0.0	6,400.1	7,326.9	7,611.7	7,909.7	8,352.63	8,377.35	8,285.4	7,762.9	7,527.7	7,045.7	0.0
Axle Locations along Span	0.00	62.28	71.14	75.14	81.14	97.14	101.14	107.14	121.14	125.14	131.14	200.00
Middle Axle # 6 at Mid-Span	0.0	6,351.6	7,290.2	7,579.6	7,884.8	8,346.56	8,376.00	8,291.2	7,785.2	7,554.6	7,079.8	0.0
Axle Locations along Span	0.00	60.00	70.00	74.00	80.00	96.00	100.00	106.00	120.00	124.00	130.00	200.00
Mid-Span between Axles # 6 and 7	0.0	6,211.01	7,180.66	7,482.52	7,806.31	8,317.75	8,359.61	8,293.40	7,830.91	7,612.77	7,156.56	0.0
Axle Locations along Span	0.00	57.00	67.00	71.00	77.00	93.00	97.00	103.00	117.00	121.00	127.00	200.00
Iterative Max Moment Analysis, #1	0.0	6,399.32	7,326.32	7,611.13	7,909.33	8,352.54	8,377.34	8,285.55	7,763.36	7,528.16	7,046.37	0.0
Axle Locations along Span	0.00	61.12	71.12	75.12	81.12	97.12	101.12	107.12	121.12	125.12	131.12	200.00
Iterative Max Moment Analysis, #2	0.0	6,399.73	7,326.63	7,611.40	7,909.54	8,352.58	8,377.35	8,285.49	7,763.15	7,527.91	7,046.06	0.0
Axle Locations along Span	0.00	61.13	71.13	75.13	81.13	97.13	101.13	107.13	121.13	125.13	131.13	200.00
Iterative Max Moment Analysis, #3	0.0	6,400.15	7,326.95	7,611.67	7,909.75	8,352.63	8,377.35	8,285.43	7,762.95	7,527.67	7,045.75	0.0
Axle Locations along Span	0.00	61.14	71.14	75.14	81.14	97.14	101.14	107.14	121.14	125.14	131.14	200.00
Iterative Max Moment Analysis, #4	0.0	6,400.56	7,327.26	7,611.93	7,909.95	8,352.67	8,377.35	8,285.36	7,762.74	7,527.42	7,045.43	0.0
Axle Locations along Span	0.00	61.15	71.15	75.15	81.15	97.15	101.15	107.15	121.15	125.15	131.15	200.00
Iterative Max Moment Analysis, #5	0.0	6,400.97	7,327.57	7,612.20	7,910.16	8,352.71	8,377.34	8,285.30	7,762.53	7,527.17	7,045.12	0.0
Axle Locations along Span	0.00	61.16	71.16	75.16	81.16	97.16	101.16	107.16	121.16	125.16	131.16	200.00

TEN (10) AXLE

Washington State Permit Vehicle Type 2 (WA-02), 200' span length

### Washington State Special Permit Vehicle Type 2 (WA-02), 200' span length,

#### SHEAR DIAGRAMS

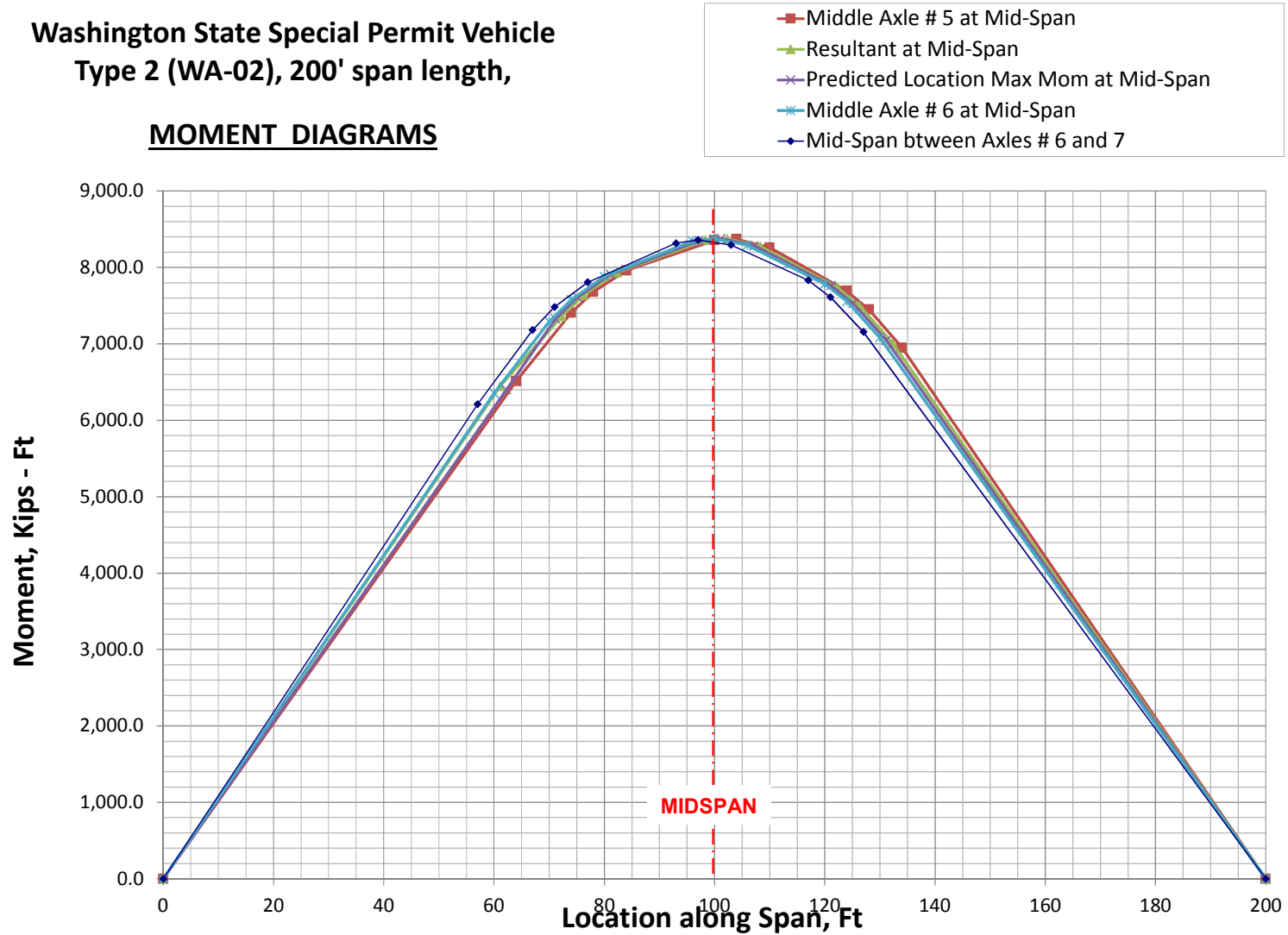


TEN (10) AXLE

Washington State Permit Vehicle Type 2 (WA-02), 200' span length

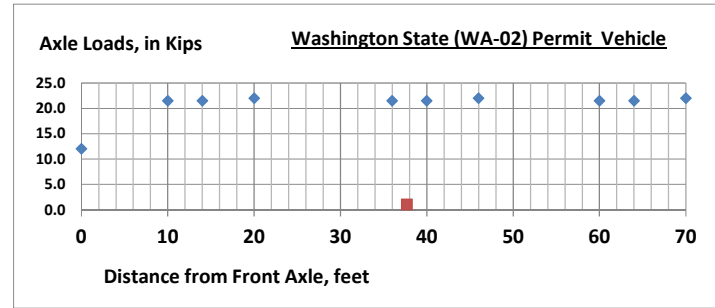
### Washington State Special Permit Vehicle Type 2 (WA-02), 200' span length,

#### MOMENT DIAGRAMS



**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 300' span length**

Axle	Load (ST)	Load (kips)	Distance between axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	6.0	12.0		0.000	53.38	0
2	10.8	21.5	10.00	10.000	95.64	305
3	10.8	21.5	4.00	14.000	95.64	427
4	11.0	22.0	6.00	20.000	97.86	610
5	10.8	21.5	16.00	36.000	95.64	1097
6	10.8	21.5	4.00	40.000	95.64	1219
7	11.0	22.0	6.00	46.000	97.86	1402
8	10.8	21.5	14.00	60.000	95.64	1829
9	10.8	21.5	4.00	64.000	95.64	1951
(Rear) 10	11.0	22.0	6.00	70.000	97.86	2134
<b>Totals</b>	<b>103.5</b>	<b>207.0</b>	<b>70.00</b>		<b>10972.80</b>	<b>427</b>



Resultant of Axle Load is: 37.720 ft, from First (Forward) axle

Max Moment predicted at location 1.140 ft, to forward of Axle # 6

**300 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Front Axle # 1 at Front Support	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	230.00
Middle Axle # 5 at Mid-Span	114.00	124.00	128.00	134.00	150.00	154.00	160.00	174.00	178.00	184.00	116.00
Resultant at Mid-Span	112.28	122.28	126.28	132.28	148.28	152.28	158.28	172.28	176.28	182.28	117.72
Predicted Location Max Mom at Mid-Span	111.14	121.14	125.14	131.14	147.14	151.14	157.14	171.14	175.14	181.14	118.86
Middle Axle # 6 at Mid-Span	110.00	120.00	124.00	130.00	146.00	150.00	156.00	170.00	174.00	180.00	120.00
Mid-Span between Axles # 6 and 7	107.00	117.00	121.00	127.00	143.00	147.00	153.00	167.00	171.00	177.00	123.00
<i>Iterative Calculation of Maximum Moment Location</i>	111.12	121.12	125.12	131.12	147.12	151.12	157.12	171.12	175.12	181.12	118.88
	111.13	121.13	125.13	131.13	147.13	151.13	157.13	171.13	175.13	181.13	118.87
	111.14	121.14	125.14	131.14	147.14	151.14	157.14	171.14	175.14	181.14	118.86
	111.15	121.15	125.15	131.15	147.15	151.15	157.15	171.15	175.15	181.15	118.85
	111.16	121.16	125.16	131.16	147.16	151.16	157.16	171.16	175.16	181.16	118.84
Rear Axle #10 at Rear Support (Max V)	230.00	240.00	244.00	250.00	266.00	270.00	276.00	290.00	294.00	300.00	0

**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 300' span length**

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	180.97	168.97	147.47	125.97	103.97	82.47	60.97	38.97	17.47	-4.03	-26.03	26.03
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	300.00
Middle Axle # 5 at Mid-Span	102.31	90.31	68.81	47.31	25.31	3.81	-17.69	-39.69	-61.19	-82.69	-104.69	104.69
Axle Locations along Span	0.00	114.00	124.00	128.00	134.00	150.00	154.00	160.00	174.00	178.00	184.00	300.00
Resultant at Mid-Span	103.50	91.50	70.00	48.50	26.50	5.00	-16.50	-38.50	-60.00	-81.50	-103.50	103.45
Axle Locations along Span	0.00	111.14	122.28	126.28	132.28	148.28	152.28	158.28	172.28	176.28	182.28	300.00
Predicted Location Max Mom at Mid-Span	104.29	92.29	70.79	49.29	27.29	5.79	-15.71	-37.71	-59.21	-80.71	-102.71	102.76
Axle Locations along Span	0.00	112.28	121.14	125.14	131.14	147.14	151.14	157.14	171.14	175.14	181.14	300.00
Middle Axle # 6 at Mid-Span	105.07	93.07	71.57	50.07	28.07	6.57	-14.93	-36.93	-58.43	-79.93	-101.93	101.93
Axle Locations along Span	0.00	110.00	120.00	124.00	130.00	146.00	150.00	156.00	170.00	174.00	180.00	300.00
Mid-Span between Axles # 6 and 7	107.14	95.14	73.64	52.14	30.14	8.64	-12.86	-34.86	-56.36	-77.86	-99.86	99.86
Axle Locations along Span	0.00	107.00	117.00	121.00	127.00	143.00	147.00	153.00	167.00	171.00	177.00	300.00
Iterative Max Moment Analysis, #1	104.30	92.30	70.80	49.30	27.30	5.80	-15.70	-37.70	-59.20	-80.70	-102.70	102.70
Axle Locations along Span	0.00	111.12	121.12	125.12	131.12	147.12	151.12	157.12	171.12	175.12	181.12	300.00
Iterative Max Moment Analysis, #2	104.29	92.29	70.79	49.29	27.29	5.79	-15.71	-37.71	-59.21	-80.71	-102.71	102.71
Axle Locations along Span	0.00	111.13	121.13	125.13	131.13	147.13	151.13	157.13	171.13	175.13	181.13	300.00
Iterative Max Moment Analysis, #3	104.29	92.29	70.79	49.29	27.29	5.79	-15.71	-37.71	-59.21	-80.71	-102.71	102.71
Axle Locations along Span	0.00	111.14	121.14	125.14	131.14	147.14	151.14	157.14	171.14	175.14	181.14	300.00
Iterative Max Moment Analysis, #4	104.28	92.28	70.78	49.28	27.28	5.78	-15.72	-37.72	-59.22	-80.72	-102.72	102.72
Axle Locations along Span	0.00	111.15	121.15	125.15	131.15	147.15	151.15	157.15	171.15	175.15	181.15	300.00
Iterative Max Moment Analysis, #5	104.27	92.27	70.77	49.27	27.27	5.77	-15.73	-37.73	-59.23	-80.73	-102.73	102.73
Axle Locations along Span	0.00	111.16	121.16	125.16	131.16	147.16	151.16	157.16	171.16	175.16	181.16	300.00
Rear Axle #10 at Rear Support (Max V)	22.27	10.27	-11.23	-32.73	-54.73	-76.23	-97.73	-119.73	-141.23	-162.73	-184.73	184.73
Axle Locations along Span	0.00	230.00	240.00	244.00	250.00	266.00	270.00	276.00	290.00	294.00	300.00	300.00

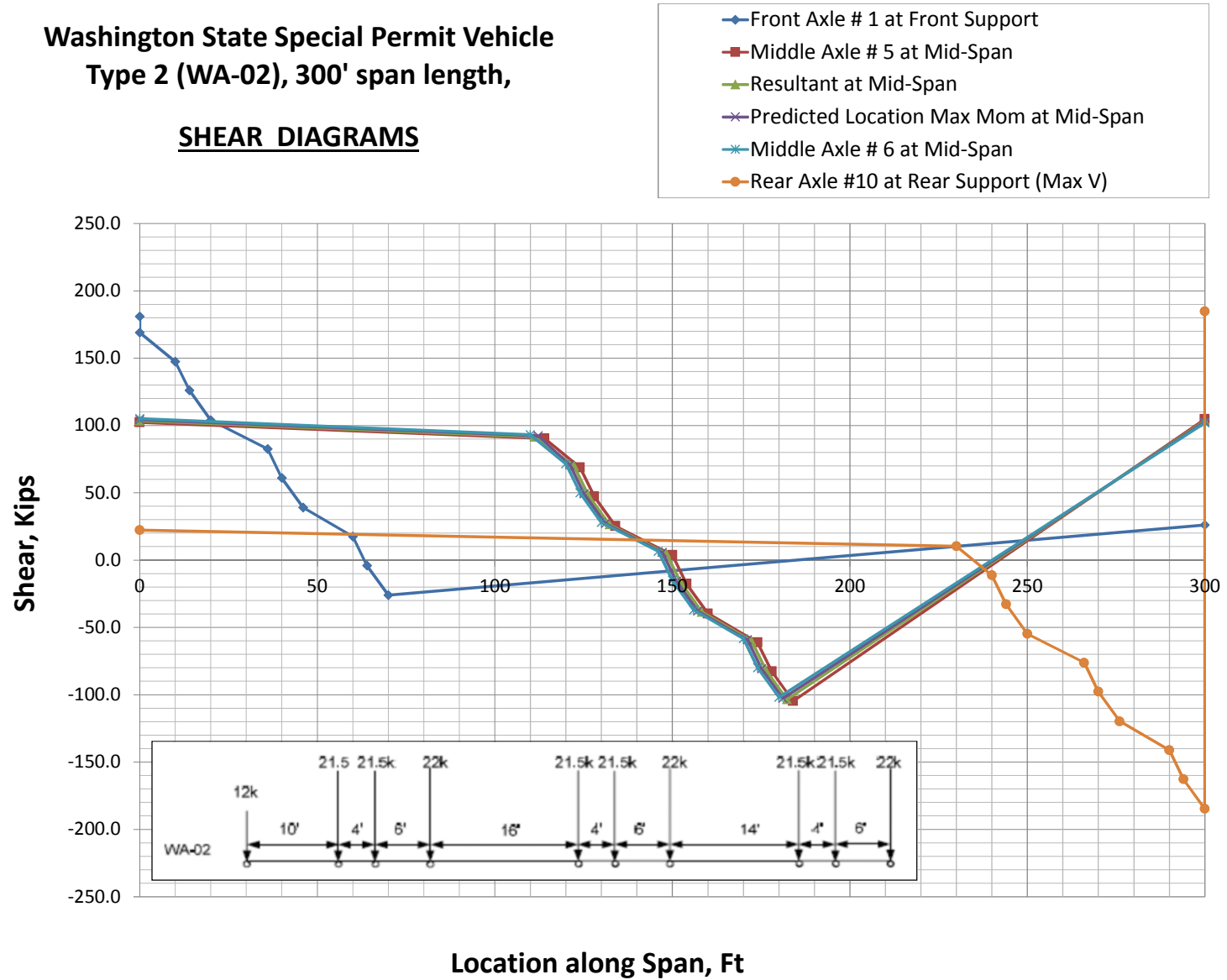
MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Front Axle # 1 at Front Support	0.0	0.0	1,689.7	2,279.6	3,035.5	4,699.04	5,028.93	5,394.8	5,940.4	6,010.3	5,986.1	0.0
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	300.00
Middle Axle # 5 at Mid-Span	0.0	11,663.7	12,566.9	12,842.1	13,126.0	13,531.00	13,546.25	13,440.1	12,884.5	12,639.8	12,143.7	0.0
Axle Locations along Span	0.00	114.00	124.00	128.00	134.00	150.00	154.00	160.00	174.00	178.00	184.00	300.00
Resultant at Mid-Span	0.0	11,621.0	12,536.0	12,816.0	13,107.0	13,531.00	13,551.00	13,452.0	12,913.0	12,673.0	12,184.0	0.0
Axle Locations along Span	0.00	111.14	122.28	126.28	132.28	148.28	152.28	158.28	172.28	176.28	182.28	300.00
Predicted Location Max Mom at Mid-Span	0.0	11,590.4	12,513.3	12,796.4	13,092.2	13,528.75	13,551.90	13,457.6	12,929.6	12,692.8	12,208.5	0.0
Axle Locations along Span	0.00	112.28	121.14	125.14	131.14	147.14	151.14	157.14	171.14	175.14	181.14	300.00
Middle Axle # 6 at Mid-Span	0.0	11,558.1	12,488.8	12,775.1	13,075.5	13,524.71	13,551.00	13,461.4	12,944.5	12,710.8	12,231.2	0.0
Axle Locations along Span	0.00	110.00	120.00	124.00	130.00	146.00	150.00	156.00	170.00	174.00	180.00	300.00
Mid-Span between Axles # 6 and 7	0.0	11,464.34	12,415.77	12,710.34	13,023.20	13,505.50	13,540.07	13,462.93	12,974.94	12,749.51	12,282.37	0.0
Axle Locations along Span	0.00	107.00	117.00	121.00	127.00	143.00	147.00	153.00	167.00	171.00	177.00	300.00
Iterative Max Moment Analysis, #1	0.0	11,589.88	12,512.88	12,796.08	13,091.89	13,528.69	13,551.90	13,457.70	12,929.91	12,693.11	12,208.91	0.0
Axle Locations along Span	0.00	111.12	121.12	125.12	131.12	147.12	151.12	157.12	171.12	175.12	181.12	300.00
Iterative Max Moment Analysis, #2	0.0	11,590.15	12,513.09	12,796.26	13,092.03	13,528.72	13,551.90	13,457.66	12,929.77	12,692.94	12,208.70	0.0
Axle Locations along Span	0.00	111.13	121.13	125.13	131.13	147.13	151.13	157.13	171.13	175.13	181.13	300.00
Iterative Max Moment Analysis, #3	0.0	11,590.43	12,513.30	12,796.44	13,092.16	13,528.75	13,551.90	13,457.62	12,929.63	12,692.78	12,208.50	0.0
Axle Locations along Span	0.00	111.14	121.14	125.14	131.14	147.14	151.14	157.14	171.14	175.14	181.14	300.00
Iterative Max Moment Analysis, #4	0.0	11,590.71	12,513.50	12,796.62	13,092.30	13,528.78	13,551.90	13,457.58	12,929.49	12,692.61	12,208.29	0.0
Axle Locations along Span	0.00	111.15	121.15	125.15	131.15	147.15	151.15	157.15	171.15	175.15	181.15	300.00
Iterative Max Moment Analysis, #5	0.0	11,590.98	12,513.71	12,796.80	13,092.44	13,528.81	13,551.90	13,457.53	12,929.35	12,692.45	12,208.08	0.0
Axle Locations along Span	0.00	111.16	121.16	125.16	131.16	147.16	151.16	157.16	171.16	175.16	181.16	300.00

TEN (10) AXLE

Washington State Permit Vehicle Type 2 (WA-02), 300' span length

### Washington State Special Permit Vehicle Type 2 (WA-02), 300' span length,

#### SHEAR DIAGRAMS

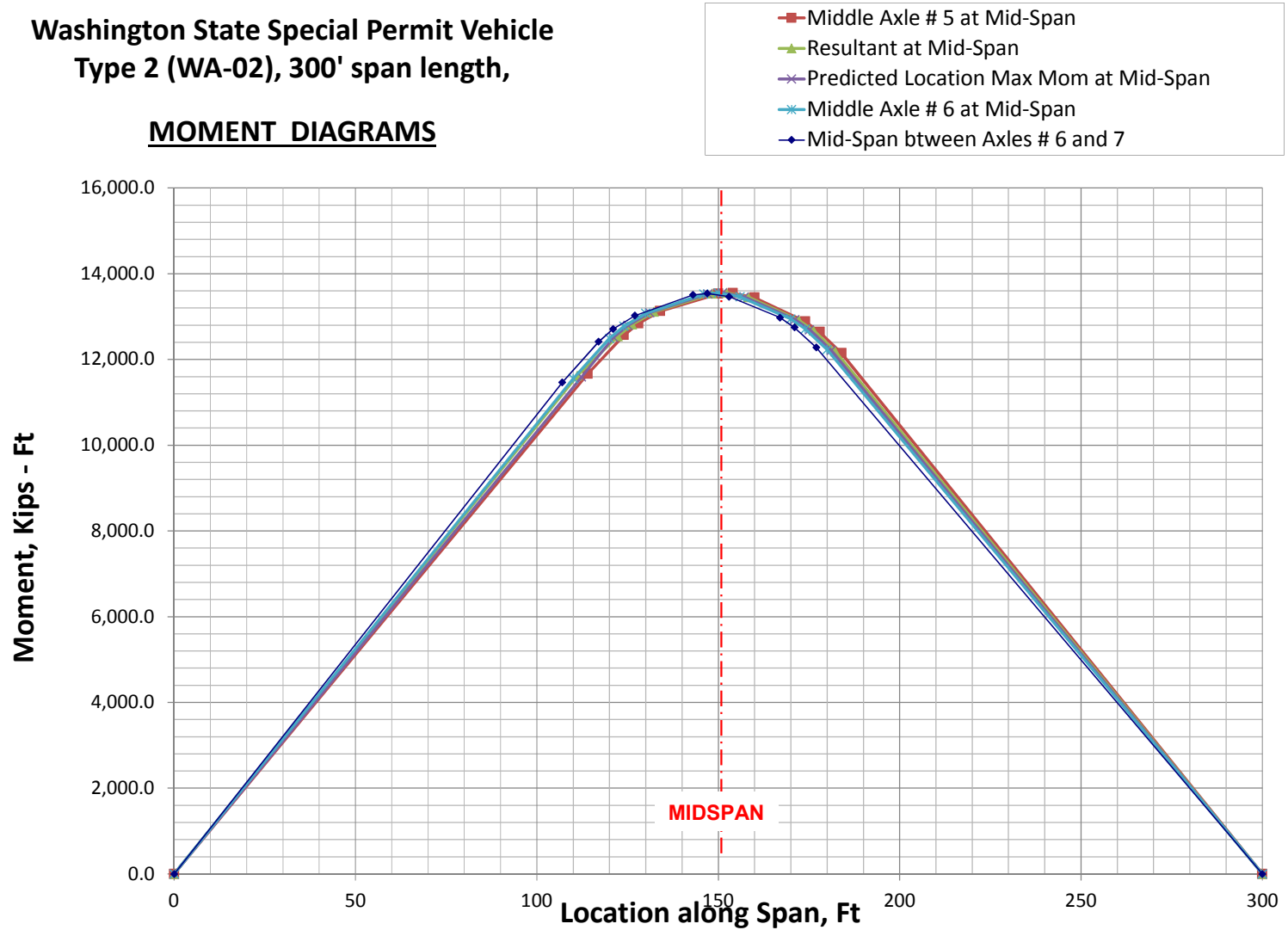


TEN (10) AXLE

Washington State Permit Vehicle Type 2 (WA-02), 300' span length

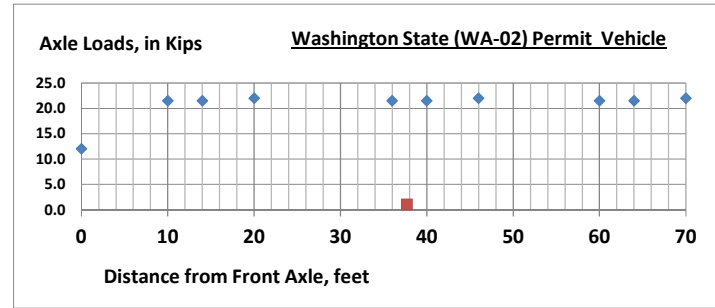
### Washington State Special Permit Vehicle Type 2 (WA-02), 300' span length,

#### MOMENT DIAGRAMS



**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 400' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	6.0	12.0		0.000	53.38	0
2	10.8	21.5	10.00	10.000	95.64	305
3	10.8	21.5	4.00	14.000	95.64	427
4	11.0	22.0	6.00	20.000	97.86	610
5	10.8	21.5	16.00	36.000	95.64	1097
6	10.8	21.5	4.00	40.000	95.64	1219
7	11.0	22.0	6.00	46.000	97.86	1402
8	10.8	21.5	14.00	60.000	95.64	1829
9	10.8	21.5	4.00	64.000	95.64	1951
(Rear) 10	11.0	22.0	6.00	70.000	97.86	2134
<b>Totals</b>	<b>103.5</b>	<b>207.0</b>	<b>70.00</b>		<b>10972.80</b>	<b>427</b>



Resultant of Axle Load is: **37.720 ft, from First (Forward) axle**

**Max Moment predicted at location 1.140 ft, to forward of Axle # 6**

**400 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Front Axle # 1 at Front Support	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	330.00
Middle Axle # 5 at Mid-Span	164.00	174.00	178.00	184.00	200.00	204.00	210.00	224.00	228.00	234.00	166.00
Resultant at Mid-Span	162.28	172.28	176.28	182.28	198.28	202.28	208.28	222.28	226.28	232.28	167.72
Predicted Location Max Mom at Mid-Span	161.14	171.14	175.14	181.14	197.14	201.14	207.14	221.14	225.14	231.14	168.86
Middle Axle # 6 at Mid-Span	160.00	170.00	174.00	180.00	196.00	200.00	206.00	220.00	224.00	230.00	170.00
Mid-Span between Axles # 6 and 7	157.00	167.00	171.00	177.00	193.00	197.00	203.00	217.00	221.00	227.00	173.00
<b>Iterative Calculation of Maximum Moment Location</b>	161.12	171.12	175.12	181.12	197.12	201.12	207.12	221.12	225.12	231.12	168.88
	161.13	171.13	175.13	181.13	197.13	201.13	207.13	221.13	225.13	231.13	168.87
	161.14	171.14	175.14	181.14	197.14	201.14	207.14	221.14	225.14	231.14	168.86
	161.15	171.15	175.15	181.15	197.15	201.15	207.15	221.15	225.15	231.15	168.85
	161.16	171.16	175.16	181.16	197.16	201.16	207.16	221.16	225.16	231.16	168.84
Rear Axle #10 at Rear Support (Max V)	330.00	340.00	344.00	350.00	366.00	370.00	376.00	390.00	394.00	400.00	0



**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 400' span length**

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	187.48	175.48	153.98	132.48	110.48	88.98	67.48	45.48	23.98	2.48	-19.52	19.52
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	400.00
Middle Axle # 5 at Mid-Span	102.61	90.61	69.11	47.61	25.61	4.11	-17.39	-39.39	-60.89	-82.39	-104.39	104.39
Axle Locations along Span	0.00	164.00	174.00	178.00	184.00	200.00	204.00	210.00	224.00	228.00	234.00	400.00
Resultant at Mid-Span	103.50	91.50	70.00	48.50	26.50	5.00	-16.50	-38.50	-60.00	-81.50	-103.50	103.47
Axle Locations along Span	0.00	161.14	172.28	176.28	182.28	198.28	202.28	208.28	222.28	226.28	232.28	400.00
Predicted Location Max Mom at Mid-Span	104.09	92.09	70.59	49.09	27.09	5.59	-15.91	-37.91	-59.41	-80.91	-102.91	102.94
Axle Locations along Span	0.00	162.28	171.14	175.14	181.14	197.14	201.14	207.14	221.14	225.14	231.14	400.00
Middle Axle # 6 at Mid-Span	104.68	92.68	71.18	49.68	27.68	6.18	-15.32	-37.32	-58.82	-80.32	-102.32	102.32
Axle Locations along Span	0.00	160.00	170.00	174.00	180.00	196.00	200.00	206.00	220.00	224.00	230.00	400.00
Mid-Span between Axles # 6 and 7	106.23	94.23	72.73	51.23	29.23	7.73	-13.77	-35.77	-57.27	-78.77	-100.77	100.77
Axle Locations along Span	0.00	157.00	167.00	171.00	177.00	193.00	197.00	203.00	217.00	221.00	227.00	400.00
Iterative Max Moment Analysis, #1	104.10	92.10	70.60	49.10	27.10	5.60	-15.90	-37.90	-59.40	-80.90	-102.90	102.90
Axle Locations along Span	0.00	161.12	171.12	175.12	181.12	197.12	201.12	207.12	221.12	225.12	231.12	400.00
Iterative Max Moment Analysis, #2	104.10	92.10	70.60	49.10	27.10	5.60	-15.90	-37.90	-59.40	-80.90	-102.90	102.90
Axle Locations along Span	0.00	161.13	171.13	175.13	181.13	197.13	201.13	207.13	221.13	225.13	231.13	400.00
Iterative Max Moment Analysis, #3	104.09	92.09	70.59	49.09	27.09	5.59	-15.91	-37.91	-59.41	-80.91	-102.91	102.91
Axle Locations along Span	0.00	161.14	171.14	175.14	181.14	197.14	201.14	207.14	221.14	225.14	231.14	400.00
Iterative Max Moment Analysis, #4	104.08	92.08	70.58	49.08	27.08	5.58	-15.92	-37.92	-59.42	-80.92	-102.92	102.92
Axle Locations along Span	0.00	161.15	171.15	175.15	181.15	197.15	201.15	207.15	221.15	225.15	231.15	400.00
Iterative Max Moment Analysis, #5	104.08	92.08	70.58	49.08	27.08	5.58	-15.92	-37.92	-59.42	-80.92	-102.92	102.92
Axle Locations along Span	0.00	161.16	171.16	175.16	181.16	197.16	201.16	207.16	221.16	225.16	231.16	400.00
Rear Axle #10 at Rear Support (Max V)	16.71	4.71	-16.80	-38.30	-60.30	-81.80	-103.30	-125.30	-146.80	-168.30	-190.30	190.30
Axle Locations along Span	0.00	330.00	340.00	344.00	350.00	366.00	370.00	376.00	390.00	394.00	400.00	400.00

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Front Axle # 1 at Front Support	0.0	0.0	1,754.8	2,370.7	3,165.6	4,933.28	5,289.20	5,694.1	6,330.8	6,426.7	6,441.6	0.0
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	400.00
Middle Axle # 5 at Mid-Span	0.0	16,828.0	17,734.1	18,010.6	18,296.2	18,706.00	18,722.44	18,618.1	18,066.6	17,823.1	17,328.7	0.0
Axle Locations along Span	0.00	164.00	174.00	178.00	184.00	200.00	204.00	210.00	224.00	228.00	234.00	400.00
Resultant at Mid-Span	0.0	16,796.0	17,711.0	17,991.0	18,282.0	18,706.00	18,726.00	18,627.0	18,088.0	17,848.0	17,359.0	0.0
Axle Locations along Span	0.00	161.14	172.28	176.28	182.28	198.28	202.28	208.28	222.28	226.28	232.28	400.00
Predicted Location Max Mom at Mid-Span	0.0	16,773.1	17,694.0	17,976.3	18,270.9	18,704.31	18,726.67	18,631.2	18,100.5	17,862.8	17,377.4	0.0
Axle Locations along Span	0.00	162.28	171.14	175.14	181.14	197.14	201.14	207.14	221.14	225.14	231.14	400.00
Middle Axle # 6 at Mid-Span	0.0	16,748.8	17,675.6	17,960.3	18,258.4	18,701.28	18,726.00	18,634.1	18,111.6	17,876.3	17,394.4	0.0
Axle Locations along Span	0.00	160.00	170.00	174.00	180.00	196.00	200.00	206.00	220.00	224.00	230.00	400.00
Mid-Span between Axles # 6 and 7	0.0	16,678.50	17,620.83	17,911.76	18,219.15	18,686.87	18,717.80	18,635.20	18,134.45	17,905.38	17,432.78	0.0
Axle Locations along Span	0.00	157.00	167.00	171.00	177.00	193.00	197.00	203.00	217.00	221.00	227.00	400.00
Iterative Max Moment Analysis, #1	0.0	16,772.66	17,693.66	17,976.06	18,270.67	18,704.27	18,726.67	18,631.27	18,100.68	17,863.08	17,377.68	0.0
Axle Locations along Span	0.00	161.12	171.12	175.12	181.12	197.12	201.12	207.12	221.12	225.12	231.12	400.00
Iterative Max Moment Analysis, #2	0.0	16,772.87	17,693.82	17,976.20	18,270.77	18,704.29	18,726.67	18,631.24	18,100.58	17,862.96	17,377.53	0.0
Axle Locations along Span	0.00	161.13	171.13	175.13	181.13	197.13	201.13	207.13	221.13	225.13	231.13	400.00
Iterative Max Moment Analysis, #3	0.0	16,773.07	17,693.97	17,976.33	18,270.87	18,704.31	18,726.67	18,631.21	18,100.47	17,862.83	17,377.37	0.0
Axle Locations along Span	0.00	161.14	171.14	175.14	181.14	197.14	201.14	207.14	221.14	225.14	231.14	400.00
Iterative Max Moment Analysis, #4	0.0	16,773.28	17,694.13	17,976.47	18,270.98	18,704.33	18,726.67	18,631.18	18,100.37	17,862.71	17,377.22	0.0
Axle Locations along Span	0.00	161.15	171.15	175.15	181.15	197.15	201.15	207.15	221.15	225.15	231.15	400.00
Iterative Max Moment Analysis, #5	0.0	16,773.49	17,694.28	17,976.60	18,271.08	18,704.35	18,726.67	18,631.15	18,100.27	17,862.58	17,377.06	0.0
Axle Locations along Span	0.00	161.16	171.16	175.16	181.16	197.16	201.16	207.16	221.16	225.16	231.16	400.00

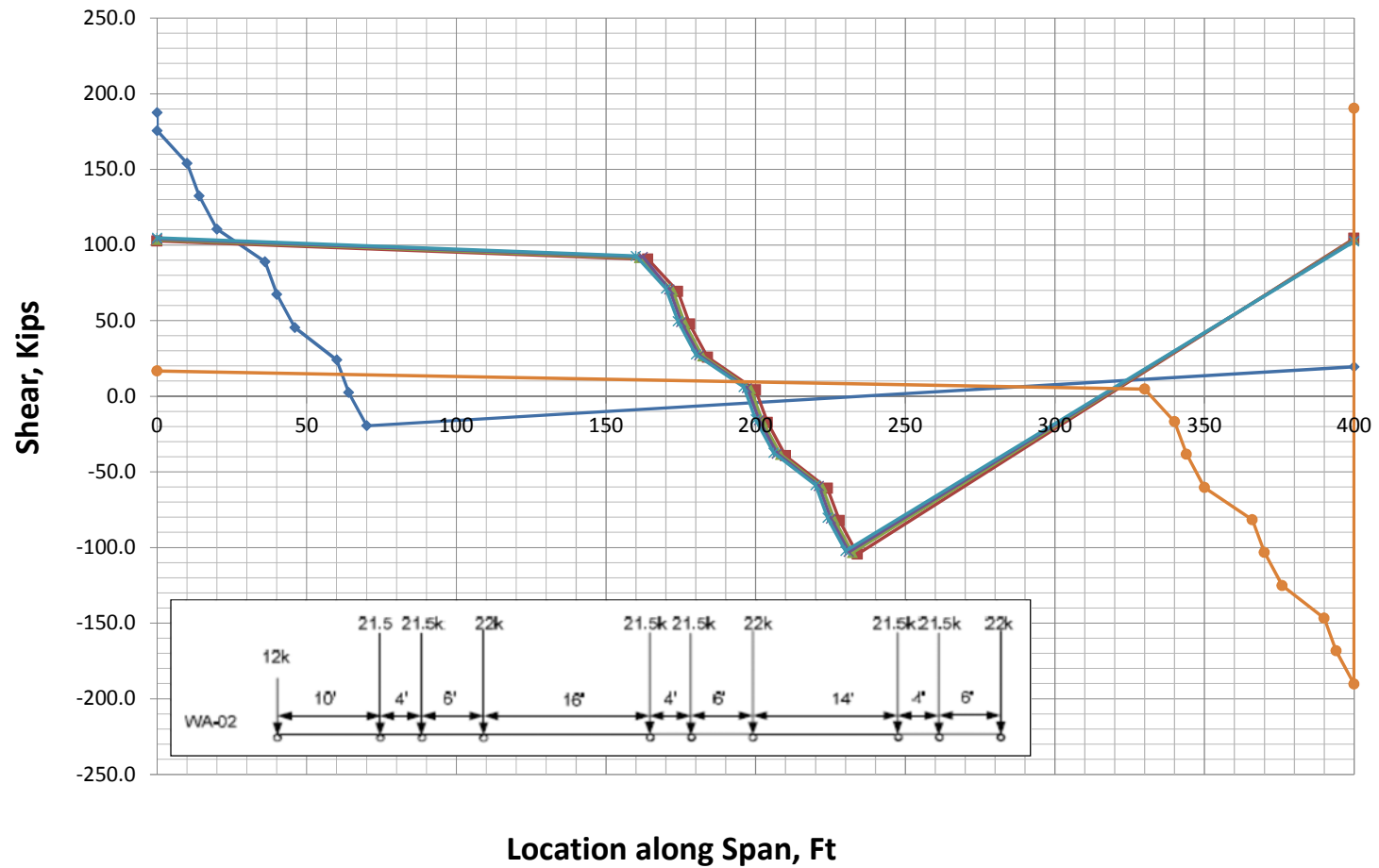
TEN (10) AXLE

Washington State Permit Vehicle Type 2 (WA-02), 400' span length

### Washington State Special Permit Vehicle Type 2 (WA-02), 400' span length,

#### SHEAR DIAGRAMS

- ◆ Front Axle # 1 at Front Support
- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✱ Predicted Location Max Mom at Mid-Span
- ✱ Middle Axle # 6 at Mid-Span
- Rear Axle #10 at Rear Support (Max V)

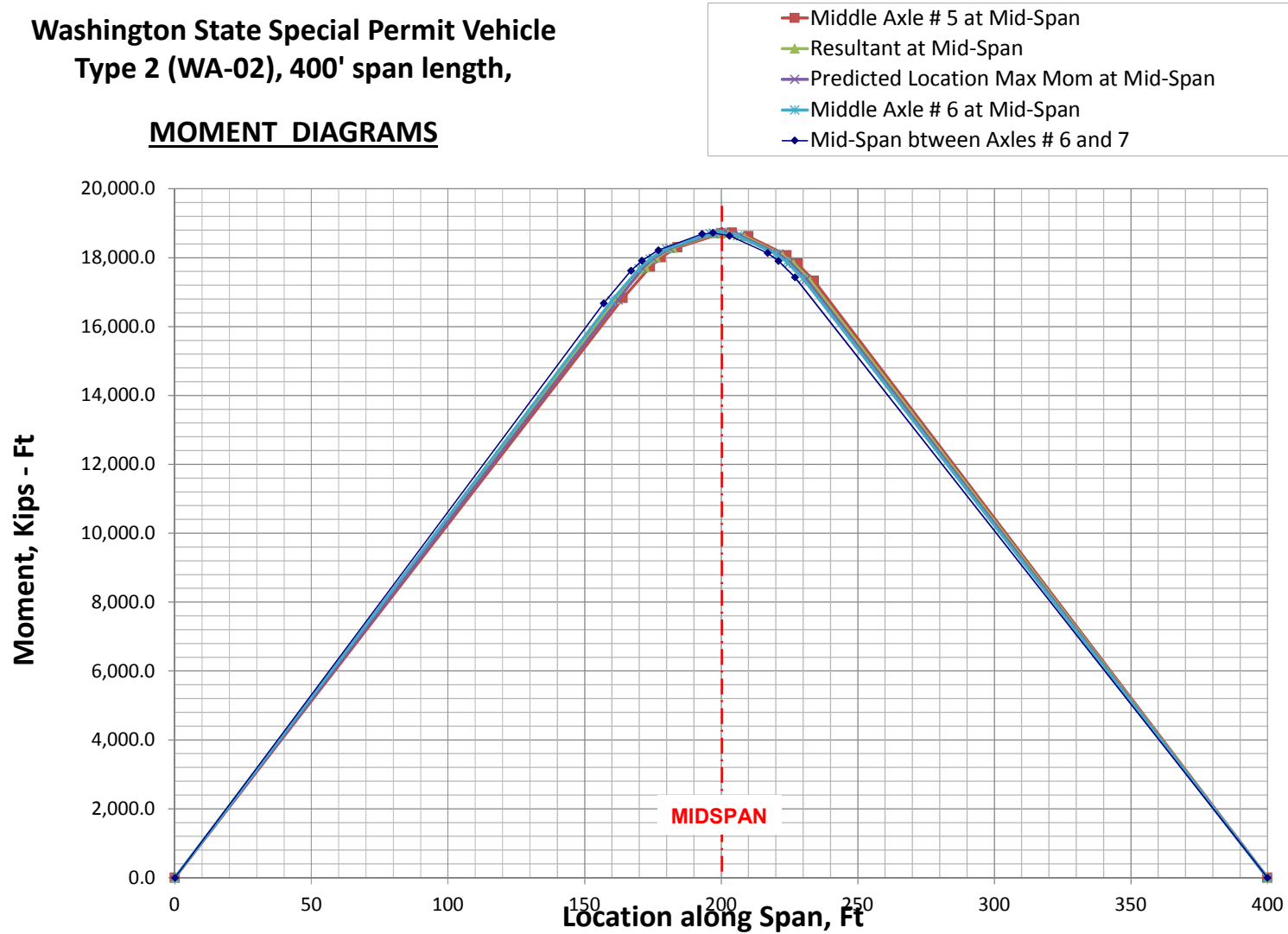


TEN (10) AXLE

Washington State Permit Vehicle Type 2 (WA-02), 400' span length

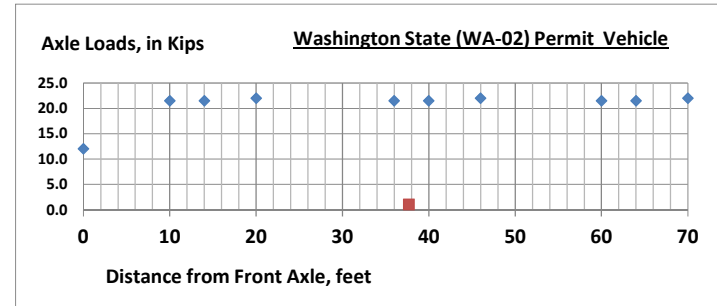
### Washington State Special Permit Vehicle Type 2 (WA-02), 400' span length,

#### MOMENT DIAGRAMS



**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 500' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	6.0	12.0		0.000	53.38	0
2	10.8	21.5	10.00	10.000	95.64	305
3	10.8	21.5	4.00	14.000	95.64	427
4	11.0	22.0	6.00	20.000	97.86	610
5	10.8	21.5	16.00	36.000	95.64	1097
6	10.8	21.5	4.00	40.000	95.64	1219
7	11.0	22.0	6.00	46.000	97.86	1402
8	10.8	21.5	14.00	60.000	95.64	1829
9	10.8	21.5	4.00	64.000	95.64	1951
(Rear) 10	11.0	22.0	6.00	70.000	97.86	2134
<b>Totals</b>	<b>103.5</b>	<b>207.0</b>	<b>70.00</b>		<b>10972.80</b>	<b>427</b>



Resultant of Axle Load is: 37.720 ft, from First (Forward) axle

Max Moment predicted at location 1.140 ft, to forward of Axle # 6

**500 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Front Axle # 1 at Front Support	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	430.00
Middle Axle # 5 at Mid-Span	214.00	224.00	228.00	234.00	250.00	254.00	260.00	274.00	278.00	284.00	216.00
Resultant at Mid-Span	212.28	222.28	226.28	232.28	248.28	252.28	258.28	272.28	276.28	282.28	217.72
Predicted Location Max Mom at Mid-Span	211.14	221.14	225.14	231.14	247.14	251.14	257.14	271.14	275.14	281.14	218.86
Middle Axle # 6 at Mid-Span	210.00	220.00	224.00	230.00	246.00	250.00	256.00	270.00	274.00	280.00	220.00
Mid-Span between Axles # 6 and 7	207.00	217.00	221.00	227.00	243.00	247.00	253.00	267.00	271.00	277.00	223.00
<b>Iterative Calculation of Maximum Moment Location</b>	211.12	221.12	225.12	231.12	247.12	251.12	257.12	271.12	275.12	281.12	218.88
	211.13	221.13	225.13	231.13	247.13	251.13	257.13	271.13	275.13	281.13	218.87
	211.14	221.14	225.14	231.14	247.14	251.14	257.14	271.14	275.14	281.14	218.86
	211.15	221.15	225.15	231.15	247.15	251.15	257.15	271.15	275.15	281.15	218.85
	211.16	221.16	225.16	231.16	247.16	251.16	257.16	271.16	275.16	281.16	218.84
Rear Axle #10 at Rear Support (Max V)	430.00	440.00	444.00	450.00	466.00	470.00	476.00	490.00	494.00	500.00	0

**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 500' span length**

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	191.38	179.38	157.88	136.38	114.38	92.88	71.38	49.38	27.88	6.38	-15.62	15.62
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	500.00
Middle Axle # 5 at Mid-Span	102.79	90.79	69.29	47.79	25.79	4.29	-17.21	-39.21	-60.71	-82.21	-104.21	104.21
Axle Locations along Span	0.00	214.00	224.00	228.00	234.00	250.00	254.00	260.00	274.00	278.00	284.00	500.00
Resultant at Mid-Span	103.50	91.50	70.00	48.50	26.50	5.00	-16.50	-38.50	-60.00	-81.50	-103.50	103.47
Axle Locations along Span	0.00	211.14	222.28	226.28	232.28	248.28	252.28	258.28	272.28	276.28	282.28	500.00
Predicted Location Max Mom at Mid-Span	103.97	91.97	70.47	48.97	26.97	5.47	-16.03	-38.03	-59.53	-81.03	-103.03	103.06
Axle Locations along Span	0.00	212.28	221.14	225.14	231.14	247.14	251.14	257.14	271.14	275.14	281.14	500.00
Middle Axle # 6 at Mid-Span	104.44	92.44	70.94	49.44	27.44	5.94	-15.56	-37.56	-59.06	-80.56	-102.56	102.56
Axle Locations along Span	0.00	210.00	220.00	224.00	230.00	246.00	250.00	256.00	270.00	274.00	280.00	500.00
Mid-Span between Axles # 6 and 7	105.69	93.69	72.19	50.69	28.69	7.19	-14.31	-36.31	-57.81	-79.31	-101.31	101.31
Axle Locations along Span	0.00	207.00	217.00	221.00	227.00	243.00	247.00	253.00	267.00	271.00	277.00	500.00
Iterative Max Moment Analysis, #1	103.98	91.98	70.48	48.98	26.98	5.48	-16.02	-38.02	-59.52	-81.02	-103.02	103.02
Axle Locations along Span	0.00	211.12	221.12	225.12	231.12	247.12	251.12	257.12	271.12	275.12	281.12	500.00
Iterative Max Moment Analysis, #2	103.98	91.98	70.48	48.98	26.98	5.48	-16.02	-38.02	-59.52	-81.02	-103.02	103.02
Axle Locations along Span	0.00	211.13	221.13	225.13	231.13	247.13	251.13	257.13	271.13	275.13	281.13	500.00
Iterative Max Moment Analysis, #3	103.97	91.97	70.47	48.97	26.97	5.47	-16.03	-38.03	-59.53	-81.03	-103.03	103.03
Axle Locations along Span	0.00	211.14	221.14	225.14	231.14	247.14	251.14	257.14	271.14	275.14	281.14	500.00
Iterative Max Moment Analysis, #4	103.97	91.97	70.47	48.97	26.97	5.47	-16.03	-38.03	-59.53	-81.03	-103.03	103.03
Axle Locations along Span	0.00	211.15	221.15	225.15	231.15	247.15	251.15	257.15	271.15	275.15	281.15	500.00
Iterative Max Moment Analysis, #5	103.96	91.96	70.46	48.96	26.96	5.46	-16.04	-38.04	-59.54	-81.04	-103.04	103.04
Axle Locations along Span	0.00	211.16	221.16	225.16	231.16	247.16	251.16	257.16	271.16	275.16	281.16	500.00
Rear Axle #10 at Rear Support (Max V)	13.36	1.36	-20.14	-41.64	-63.64	-85.14	-106.64	-128.64	-150.14	-171.64	-193.64	193.64
Axle Locations along Span	0.00	430.00	440.00	444.00	450.00	466.00	470.00	476.00	490.00	494.00	500.00	500.00

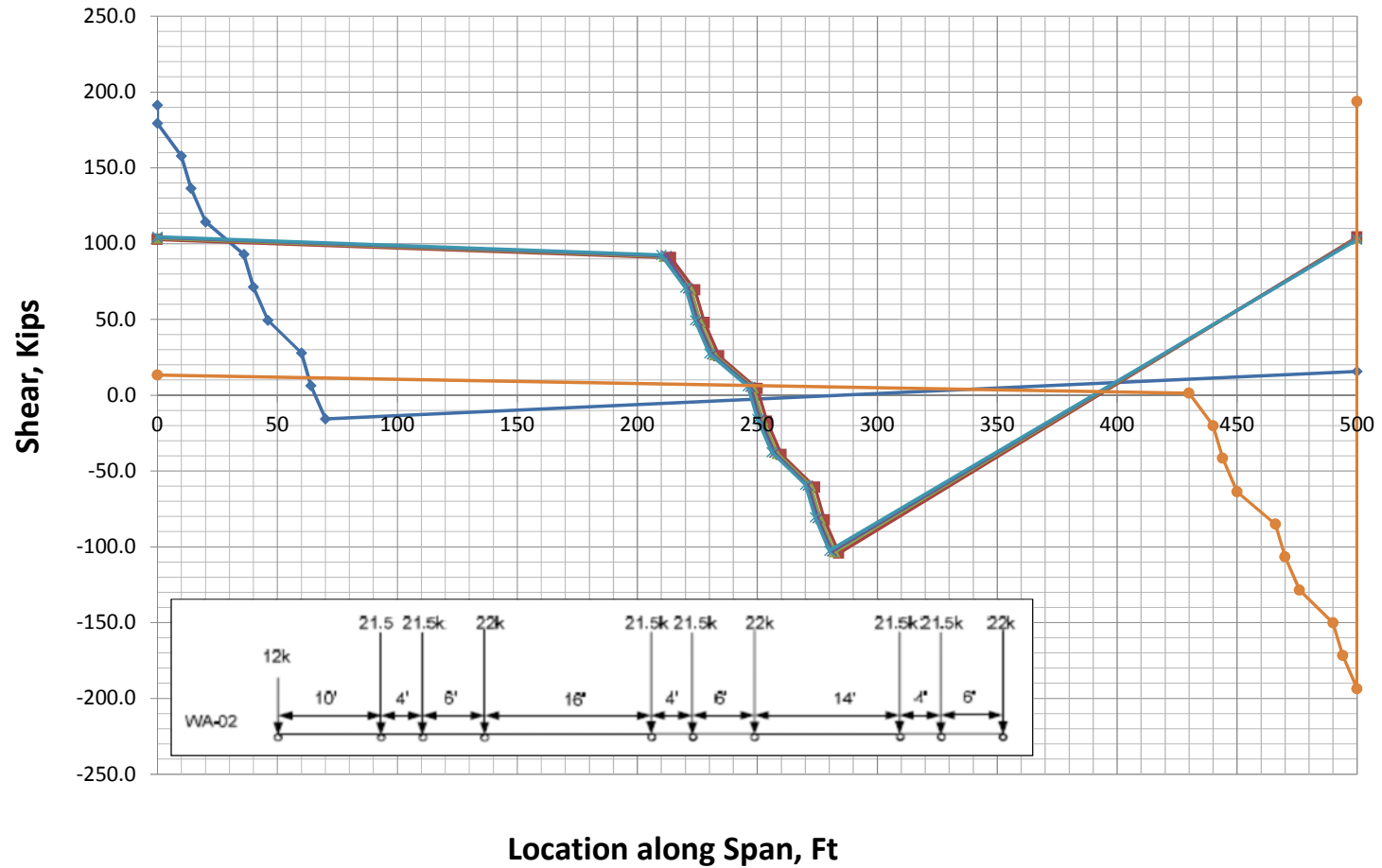
MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Front Axle # 1 at Front Support	0.0	0.0	1,793.8	2,425.4	3,243.7	5,073.82	5,445.36	5,873.7	6,565.0	6,676.6	6,714.9	0.0
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	500.00
Middle Axle # 5 at Mid-Span	0.0	21,996.6	22,904.5	23,181.7	23,468.4	23,881.00	23,898.15	23,794.9	23,245.9	23,003.1	22,509.8	0.0
Axle Locations along Span	0.00	214.00	224.00	228.00	234.00	250.00	254.00	260.00	274.00	278.00	284.00	500.00
Resultant at Mid-Span	0.0	21,971.0	22,886.0	23,166.0	23,457.0	23,881.00	23,901.00	23,802.0	23,263.0	23,023.0	22,534.0	0.0
Axle Locations along Span	0.00	211.14	222.28	226.28	232.28	248.28	252.28	258.28	272.28	276.28	282.28	500.00
Predicted Location Max Mom at Mid-Span	0.0	21,952.7	22,872.4	23,154.3	23,448.1	23,879.65	23,901.54	23,805.4	23,273.0	23,034.9	22,548.7	0.0
Axle Locations along Span	0.00	212.28	221.14	225.14	231.14	247.14	251.14	257.14	271.14	275.14	281.14	500.00
Middle Axle # 6 at Mid-Span	0.0	21,933.2	22,857.7	23,141.5	23,438.1	23,877.22	23,901.00	23,807.7	23,281.9	23,045.7	22,562.3	0.0
Axle Locations along Span	0.00	210.00	220.00	224.00	230.00	246.00	250.00	256.00	270.00	274.00	280.00	500.00
Mid-Span between Axles # 6 and 7	0.0	21,877.00	22,813.86	23,102.61	23,406.72	23,865.70	23,894.44	23,808.56	23,300.16	23,068.91	22,593.02	0.0
Axle Locations along Span	0.00	207.00	217.00	221.00	227.00	243.00	247.00	253.00	267.00	271.00	277.00	500.00
Iterative Max Moment Analysis, #1	0.0	21,952.33	22,872.13	23,154.05	23,447.93	23,879.62	23,901.54	23,805.42	23,273.14	23,035.06	22,548.95	0.0
Axle Locations along Span	0.00	211.12	221.12	225.12	231.12	247.12	251.12	257.12	271.12	275.12	281.12	500.00
Iterative Max Moment Analysis, #2	0.0	21,952.49	22,872.25	23,154.16	23,448.02	23,879.63	23,901.54	23,805.39	23,273.06	23,034.97	22,548.82	0.0
Axle Locations along Span	0.00	211.13	221.13	225.13	231.13	247.13	251.13	257.13	271.13	275.13	281.13	500.00
Iterative Max Moment Analysis, #3	0.0	21,952.66	22,872.38	23,154.27	23,448.10	23,879.65	23,901.54	23,805.37	23,272.98	23,034.87	22,548.70	0.0
Axle Locations along Span	0.00	211.14	221.14	225.14	231.14	247.14	251.14	257.14	271.14	275.14	281.14	500.00
Iterative Max Moment Analysis, #4	0.0	21,952.82	22,872.50	23,154.37	23,448.18	23,879.67	23,901.54	23,805.35	23,272.90	23,034.77	22,548.57	0.0
Axle Locations along Span	0.00	211.15	221.15	225.15	231.15	247.15	251.15	257.15	271.15	275.15	281.15	500.00
Iterative Max Moment Analysis, #5	0.0	21,952.99	22,872.63	23,154.48	23,448.26	23,879.68	23,901.54	23,805.32	23,272.81	23,034.67	22,548.45	0.0
Axle Locations along Span	0.00	211.16	221.16	225.16	231.16	247.16	251.16	257.16	271.16	275.16	281.16	500.00

**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 500' span length**

**Washington State Special Permit Vehicle  
 Type 2 (WA-02), 500' span length,**

**SHEAR DIAGRAMS**

- ◆ Front Axle # 1 at Front Support
- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✕ Predicted Location Max Mom at Mid-Span
- ✧ Middle Axle # 6 at Mid-Span
- Rear Axle #10 at Rear Support (Max V)

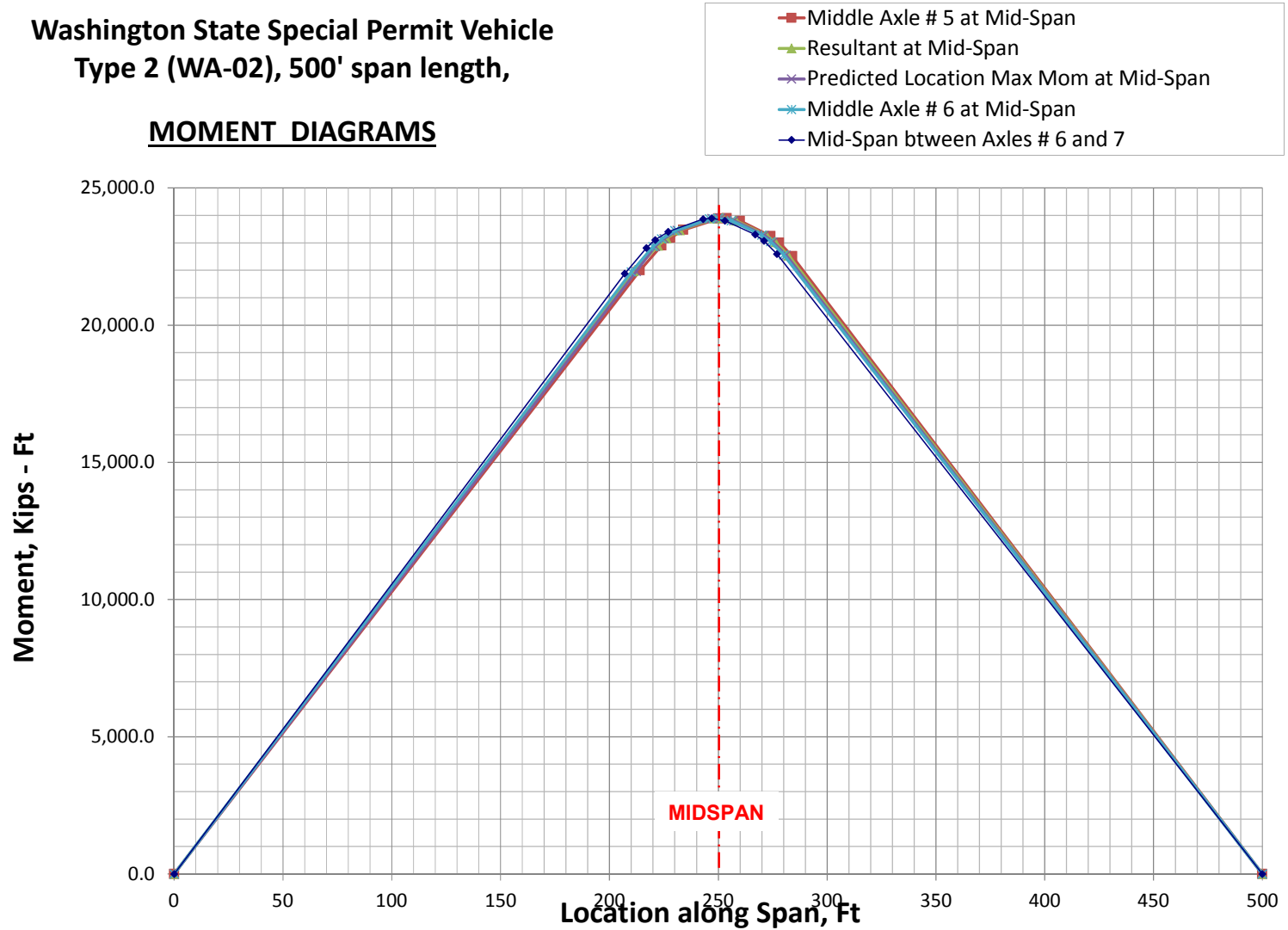


TEN (10) AXLE

Washington State Permit Vehicle Type 2 (WA-02), 500' span length

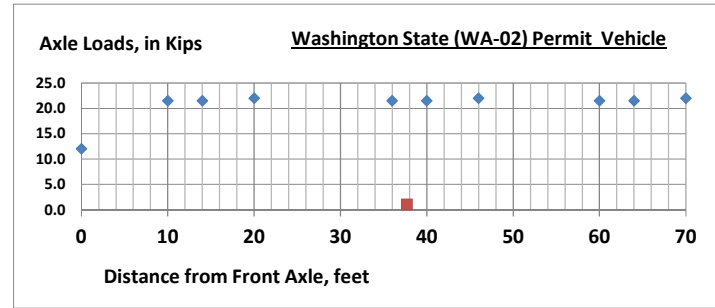
### Washington State Special Permit Vehicle Type 2 (WA-02), 500' span length,

#### MOMENT DIAGRAMS



**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 600' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	6.0	12.0		0.000	53.38	0
2	10.8	21.5	10.00	10.000	95.64	305
3	10.8	21.5	4.00	14.000	95.64	427
4	11.0	22.0	6.00	20.000	97.86	610
5	10.8	21.5	16.00	36.000	95.64	1097
6	10.8	21.5	4.00	40.000	95.64	1219
7	11.0	22.0	6.00	46.000	97.86	1402
8	10.8	21.5	14.00	60.000	95.64	1829
9	10.8	21.5	4.00	64.000	95.64	1951
(Rear) 10	11.0	22.0	6.00	70.000	97.86	2134
<b>Totals</b>	<b>103.5</b>	<b>207.0</b>	<b>70.00</b>		<b>10972.80</b>	<b>427</b>



Resultant of Axle Load is: 37.720 ft, from First (Forward) axle

Max Moment predicted at location 1.140 ft, to forward of Axle # 6

**600 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Front Axle # 1 at Front Support	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	530.00
Middle Axle # 5 at Mid-Span	264.00	274.00	278.00	284.00	300.00	304.00	310.00	324.00	328.00	334.00	266.00
Resultant at Mid-Span	262.28	272.28	276.28	282.28	298.28	302.28	308.28	322.28	326.28	332.28	267.72
Predicted Location Max Mom at Mid-Span	261.14	271.14	275.14	281.14	297.14	301.14	307.14	321.14	325.14	331.14	268.86
Middle Axle # 6 at Mid-Span	260.00	270.00	274.00	280.00	296.00	300.00	306.00	320.00	324.00	330.00	270.00
Mid-Span between Axles # 6 and 7	257.00	267.00	271.00	277.00	293.00	297.00	303.00	317.00	321.00	327.00	273.00
<i>Iterative Calculation of Maximum Moment Location</i>	261.12	271.12	275.12	281.12	297.12	301.12	307.12	321.12	325.12	331.12	268.88
	261.13	271.13	275.13	281.13	297.13	301.13	307.13	321.13	325.13	331.13	268.87
	261.14	271.14	275.14	281.14	297.14	301.14	307.14	321.14	325.14	331.14	268.86
	261.15	271.15	275.15	281.15	297.15	301.15	307.15	321.15	325.15	331.15	268.85
	261.16	271.16	275.16	281.16	297.16	301.16	307.16	321.16	325.16	331.16	268.84
Rear Axle #10 at Rear Support (Max V)	530.00	540.00	544.00	550.00	566.00	570.00	576.00	590.00	594.00	600.00	0



**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 600' span length**

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	193.99	181.99	160.49	138.99	116.99	95.49	73.99	51.99	30.49	8.99	-13.01	13.01
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	600.00
Middle Axle # 5 at Mid-Span	102.91	90.91	69.41	47.91	25.91	4.41	-17.09	-39.09	-60.59	-82.09	-104.09	104.09
Axle Locations along Span	0.00	264.00	274.00	278.00	284.00	300.00	304.00	310.00	324.00	328.00	334.00	600.00
Resultant at Mid-Span	103.50	91.50	70.00	48.50	26.50	5.00	-16.50	-38.50	-60.00	-81.50	-103.50	103.48
Axle Locations along Span	0.00	261.14	272.28	276.28	282.28	298.28	302.28	308.28	322.28	326.28	332.28	600.00
Predicted Location Max Mom at Mid-Span	103.89	91.89	70.39	48.89	26.89	5.39	-16.11	-38.11	-59.61	-81.11	-103.11	103.13
Axle Locations along Span	0.00	262.28	271.14	275.14	281.14	297.14	301.14	307.14	321.14	325.14	331.14	600.00
Middle Axle # 6 at Mid-Span	104.29	92.29	70.79	49.29	27.29	5.79	-15.71	-37.71	-59.21	-80.71	-102.71	102.71
Axle Locations along Span	0.00	260.00	270.00	274.00	280.00	296.00	300.00	306.00	320.00	324.00	330.00	600.00
Mid-Span between Axles # 6 and 7	105.32	93.32	71.82	50.32	28.32	6.82	-14.68	-36.68	-58.18	-79.68	-101.68	101.68
Axle Locations along Span	0.00	257.00	267.00	271.00	277.00	293.00	297.00	303.00	317.00	321.00	327.00	600.00
Iterative Max Moment Analysis, #1	103.90	91.90	70.40	48.90	26.90	5.40	-16.10	-38.10	-59.60	-81.10	-103.10	103.10
Axle Locations along Span	0.00	261.12	271.12	275.12	281.12	297.12	301.12	307.12	321.12	325.12	331.12	600.00
Iterative Max Moment Analysis, #2	103.90	91.90	70.40	48.90	26.90	5.40	-16.10	-38.10	-59.60	-81.10	-103.10	103.10
Axle Locations along Span	0.00	261.13	271.13	275.13	281.13	297.13	301.13	307.13	321.13	325.13	331.13	600.00
Iterative Max Moment Analysis, #3	103.89	91.89	70.39	48.89	26.89	5.39	-16.11	-38.11	-59.61	-81.11	-103.11	103.11
Axle Locations along Span	0.00	261.14	271.14	275.14	281.14	297.14	301.14	307.14	321.14	325.14	331.14	600.00
Iterative Max Moment Analysis, #4	103.89	91.89	70.39	48.89	26.89	5.39	-16.11	-38.11	-59.61	-81.11	-103.11	103.11
Axle Locations along Span	0.00	261.15	271.15	275.15	281.15	297.15	301.15	307.15	321.15	325.15	331.15	600.00
Iterative Max Moment Analysis, #5	103.89	91.89	70.39	48.89	26.89	5.39	-16.11	-38.11	-59.61	-81.11	-103.11	103.11
Axle Locations along Span	0.00	261.16	271.16	275.16	281.16	297.16	301.16	307.16	321.16	325.16	331.16	600.00
Rear Axle #10 at Rear Support (Max V)	11.14	-0.86	-22.36	-43.86	-65.86	-87.36	-108.86	-130.86	-152.36	-173.86	-195.86	195.86
Axle Locations along Span	0.00	530.00	540.00	544.00	550.00	566.00	570.00	576.00	590.00	594.00	600.00	600.00

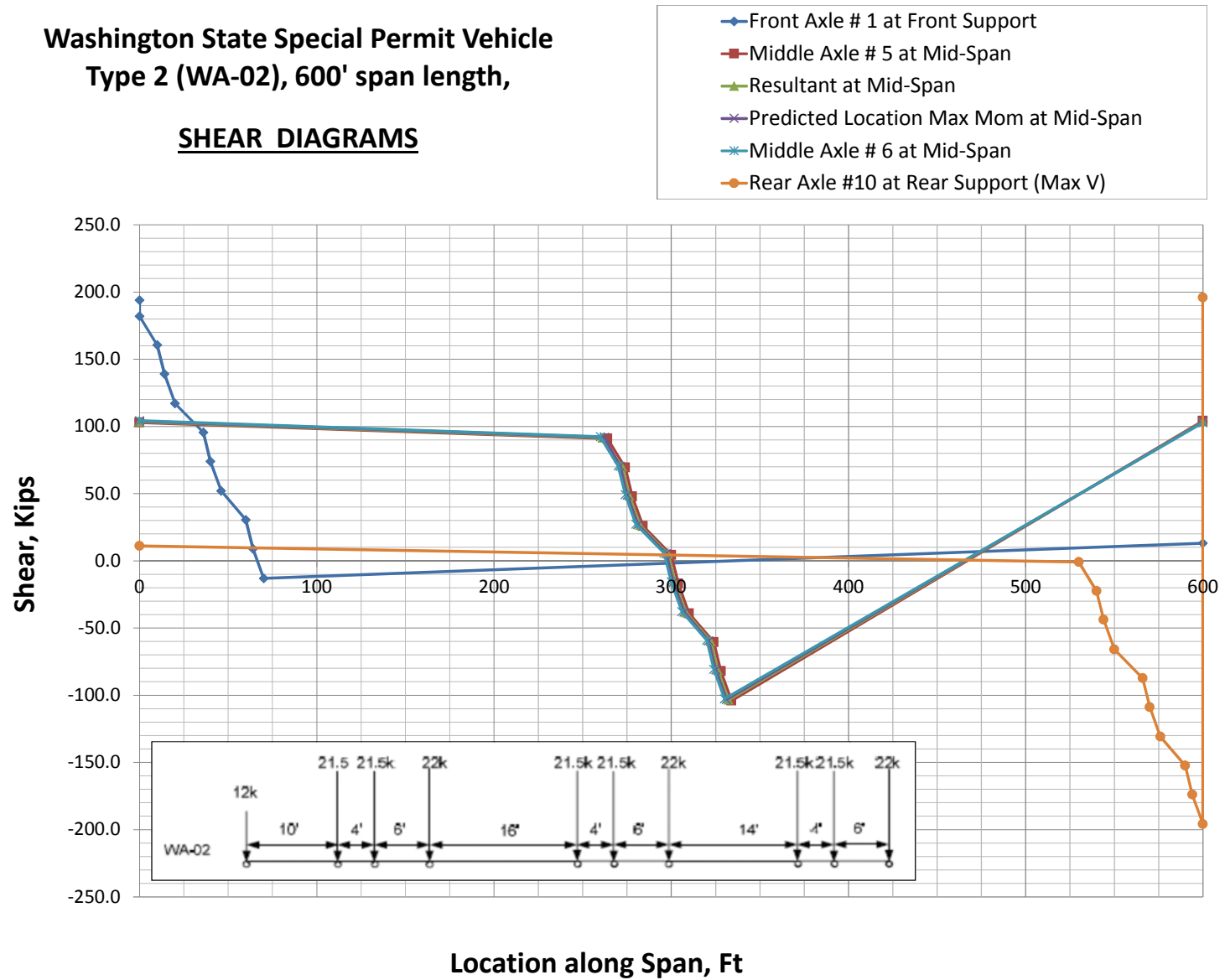
MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Front Axle # 1 at Front Support	0.0	0.0	1,819.9	2,461.8	3,295.7	5,167.52	5,549.47	5,993.4	6,721.2	6,843.1	6,897.1	0.0
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	600.00
Middle Axle # 5 at Mid-Span	0.0	27,167.4	28,076.4	28,354.1	28,641.5	29,056.00	29,073.63	28,971.1	28,423.8	28,181.4	27,688.8	0.0
Axle Locations along Span	0.00	264.00	274.00	278.00	284.00	300.00	304.00	310.00	324.00	328.00	334.00	600.00
Resultant at Mid-Span	0.0	27,146.0	28,061.0	28,341.0	28,632.0	29,056.00	29,076.00	28,977.0	28,438.0	28,198.0	27,709.0	0.0
Axle Locations along Span	0.00	261.14	272.28	276.28	282.28	298.28	302.28	308.28	322.28	326.28	332.28	600.00
Predicted Location Max Mom at Mid-Span	0.0	27,130.7	28,049.6	28,331.2	28,624.6	29,054.88	29,076.45	28,979.8	28,446.3	28,207.9	27,721.2	0.0
Axle Locations along Span	0.00	262.28	271.14	275.14	281.14	297.14	301.14	307.14	321.14	325.14	331.14	600.00
Middle Axle # 6 at Mid-Span	0.0	27,114.5	28,037.4	28,320.5	28,616.3	29,052.85	29,076.00	28,981.7	28,453.7	28,216.9	27,732.6	0.0
Axle Locations along Span	0.00	260.00	270.00	274.00	280.00	296.00	300.00	306.00	320.00	324.00	330.00	600.00
Mid-Span between Axles # 6 and 7	0.0	27,067.67	28,000.89	28,288.17	28,590.10	29,043.25	29,070.54	28,982.47	28,468.97	28,236.26	27,758.19	0.0
Axle Locations along Span	0.00	257.00	267.00	271.00	277.00	293.00	297.00	303.00	317.00	321.00	327.00	600.00
Iterative Max Moment Analysis, #1	0.0	27,130.44	28,049.44	28,331.04	28,624.44	29,054.85	29,076.45	28,979.85	28,446.45	28,208.05	27,721.46	0.0
Axle Locations along Span	0.00	261.12	271.12	275.12	281.12	297.12	301.12	307.12	321.12	325.12	331.12	600.00
Iterative Max Moment Analysis, #2	0.0	27,130.58	28,049.54	28,331.13	28,624.51	29,054.86	29,076.45	28,979.83	28,446.38	28,207.97	27,721.35	0.0
Axle Locations along Span	0.00	261.13	271.13	275.13	281.13	297.13	301.13	307.13	321.13	325.13	331.13	600.00
Iterative Max Moment Analysis, #3	0.0	27,130.72	28,049.65	28,331.22	28,624.58	29,054.88	29,076.45	28,979.81	28,446.32	28,207.89	27,721.25	0.0
Axle Locations along Span	0.00	261.14	271.14	275.14	281.14	297.14	301.14	307.14	321.14	325.14	331.14	600.00
Iterative Max Moment Analysis, #4	0.0	27,130.85	28,049.75	28,331.31	28,624.65	29,054.89	29,076.45	28,979.79	28,446.25	28,207.81	27,721.14	0.0
Axle Locations along Span	0.00	261.15	271.15	275.15	281.15	297.15	301.15	307.15	321.15	325.15	331.15	600.00
Iterative Max Moment Analysis, #5	0.0	27,130.99	28,049.86	28,331.40	28,624.72	29,054.90	29,076.45	28,979.77	28,446.18	28,207.72	27,721.04	0.0
Axle Locations along Span	0.00	261.16	271.16	275.16	281.16	297.16	301.16	307.16	321.16	325.16	331.16	600.00

TEN (10) AXLE

Washington State Permit Vehicle Type 2 (WA-02), 600' span length

### Washington State Special Permit Vehicle Type 2 (WA-02), 600' span length,

#### SHEAR DIAGRAMS



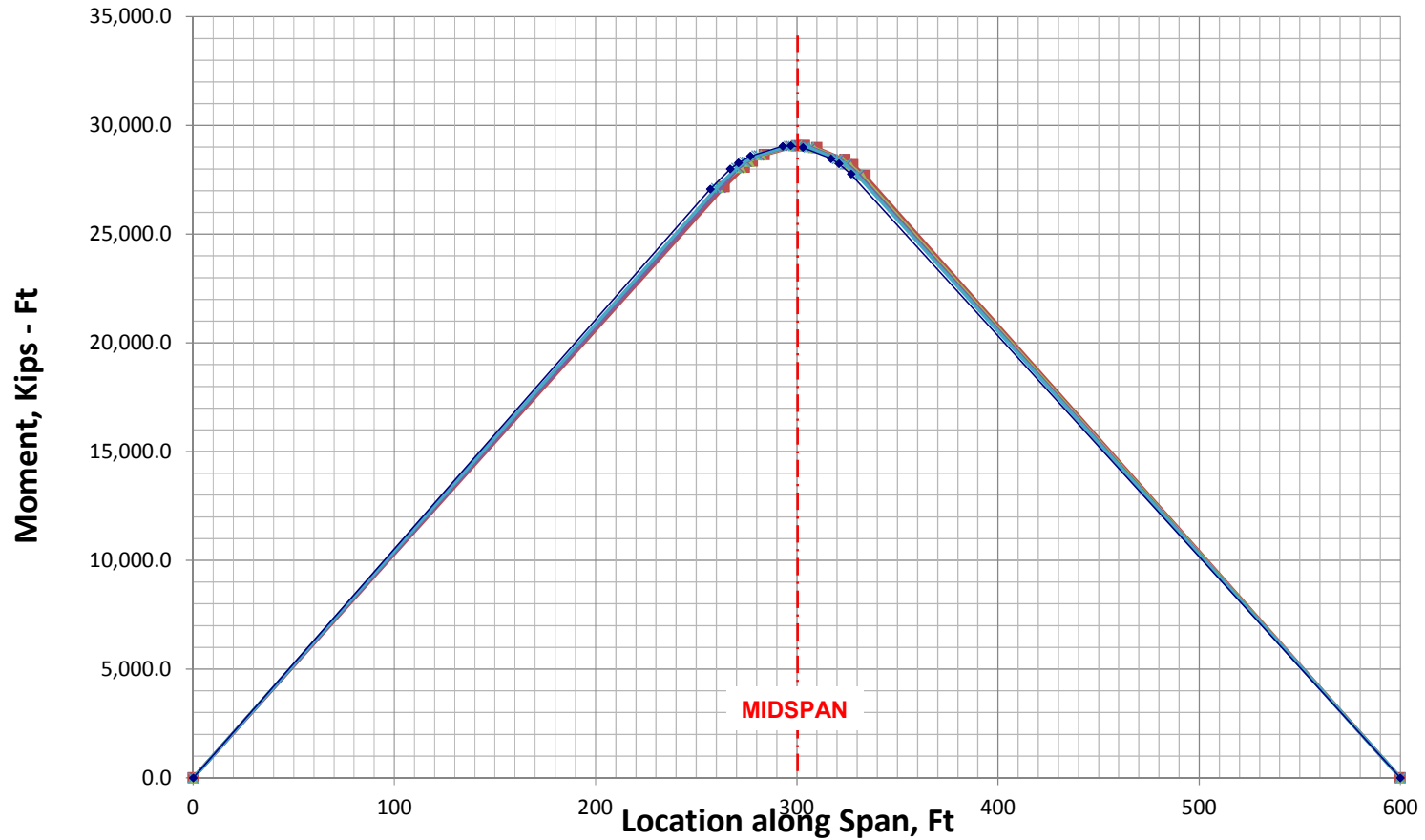
TEN (10) AXLE

Washington State Permit Vehicle Type 2 (WA-02), 600' span length

### Washington State Special Permit Vehicle Type 2 (WA-02), 600' span length,

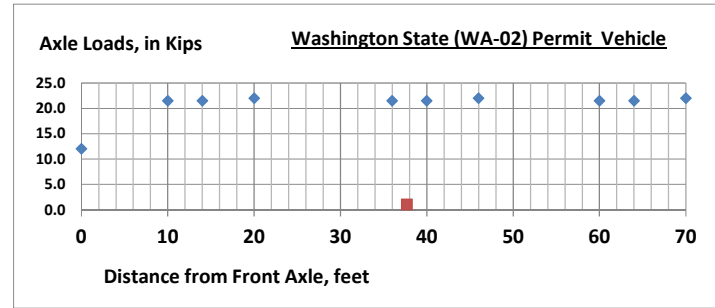
#### MOMENT DIAGRAMS

- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✕ Predicted Location Max Mom at Mid-Span
- ✧ Middle Axle # 6 at Mid-Span
- ◆ Mid-Span between Axles # 6 and 7



**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 700' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	6.0	12.0		0.000	53.38	0
2	10.8	21.5	10.00	10.000	95.64	305
3	10.8	21.5	4.00	14.000	95.64	427
4	11.0	22.0	6.00	20.000	97.86	610
5	10.8	21.5	16.00	36.000	95.64	1097
6	10.8	21.5	4.00	40.000	95.64	1219
7	11.0	22.0	6.00	46.000	97.86	1402
8	10.8	21.5	14.00	60.000	95.64	1829
9	10.8	21.5	4.00	64.000	95.64	1951
(Rear) 10	11.0	22.0	6.00	70.000	97.86	2134
<b>Totals</b>	<b>103.5</b>	<b>207.0</b>	<b>70.00</b>		<b>10972.80</b>	<b>427</b>



Resultant of Axle Load is: **37.720 ft, from First (Forward) axle**

**Max Moment predicted at location 1.140 ft, to forward of Axle # 6**

**700 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Front Axle # 1 at Front Support	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	630.00
Middle Axle # 5 at Mid-Span	314.00	324.00	328.00	334.00	350.00	354.00	360.00	374.00	378.00	384.00	316.00
Resultant at Mid-Span	312.28	322.28	326.28	332.28	348.28	352.28	358.28	372.28	376.28	382.28	317.72
Predicted Location Max Mom at Mid-Span	311.14	321.14	325.14	331.14	347.14	351.14	357.14	371.14	375.14	381.14	318.86
Middle Axle # 6 at Mid-Span	310.00	320.00	324.00	330.00	346.00	350.00	356.00	370.00	374.00	380.00	320.00
Mid-Span between Axles # 6 and 7	307.00	317.00	321.00	327.00	343.00	347.00	353.00	367.00	371.00	377.00	323.00
<b>Iterative Calculation of Maximum Moment Location</b>	311.12	321.12	325.12	331.12	347.12	351.12	357.12	371.12	375.12	381.12	318.88
	311.13	321.13	325.13	331.13	347.13	351.13	357.13	371.13	375.13	381.13	318.87
	311.14	321.14	325.14	331.14	347.14	351.14	357.14	371.14	375.14	381.14	318.86
	311.15	321.15	325.15	331.15	347.15	351.15	357.15	371.15	375.15	381.15	318.85
	311.16	321.16	325.16	331.16	347.16	351.16	357.16	371.16	375.16	381.16	318.84
Rear Axle #10 at Rear Support (Max V)	630.00	640.00	644.00	650.00	666.00	670.00	676.00	690.00	694.00	700.00	0

**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 700' span length**

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	195.85	183.85	162.35	140.85	118.85	97.35	75.85	53.85	32.35	10.85	-11.15	11.15
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	700.00
Middle Axle # 5 at Mid-Span	102.99	90.99	69.49	47.99	25.99	4.49	-17.01	-39.01	-60.51	-82.01	-104.01	104.01
Axle Locations along Span	0.00	314.00	324.00	328.00	334.00	350.00	354.00	360.00	374.00	378.00	384.00	700.00
Resultant at Mid-Span	103.50	91.50	70.00	48.50	26.50	5.00	-16.50	-38.50	-60.00	-81.50	-103.50	103.48
Axle Locations along Span	0.00	311.14	322.28	326.28	332.28	348.28	352.28	358.28	372.28	376.28	382.28	700.00
Predicted Location Max Mom at Mid-Span	103.84	91.84	70.34	48.84	26.84	5.34	-16.16	-38.16	-59.66	-81.16	-103.16	103.18
Axle Locations along Span	0.00	312.28	321.14	325.14	331.14	347.14	351.14	357.14	371.14	375.14	381.14	700.00
Middle Axle # 6 at Mid-Span	104.17	92.17	70.67	49.17	27.17	5.67	-15.83	-37.83	-59.33	-80.83	-102.83	102.83
Axle Locations along Span	0.00	310.00	320.00	324.00	330.00	346.00	350.00	356.00	370.00	374.00	380.00	700.00
Mid-Span between Axles # 6 and 7	105.06	93.06	71.56	50.06	28.06	6.56	-14.94	-36.94	-58.44	-79.94	-101.94	101.94
Axle Locations along Span	0.00	307.00	317.00	321.00	327.00	343.00	347.00	353.00	367.00	371.00	377.00	700.00
Iterative Max Moment Analysis, #1	103.84	91.84	70.34	48.84	26.84	5.34	-16.16	-38.16	-59.66	-81.16	-103.16	103.16
Axle Locations along Span	0.00	311.12	321.12	325.12	331.12	347.12	351.12	357.12	371.12	375.12	381.12	700.00
Iterative Max Moment Analysis, #2	103.84	91.84	70.34	48.84	26.84	5.34	-16.16	-38.16	-59.66	-81.16	-103.16	103.16
Axle Locations along Span	0.00	311.13	321.13	325.13	331.13	347.13	351.13	357.13	371.13	375.13	381.13	700.00
Iterative Max Moment Analysis, #3	103.84	91.84	70.34	48.84	26.84	5.34	-16.16	-38.16	-59.66	-81.16	-103.16	103.16
Axle Locations along Span	0.00	311.14	321.14	325.14	331.14	347.14	351.14	357.14	371.14	375.14	381.14	700.00
Iterative Max Moment Analysis, #4	103.83	91.83	70.33	48.83	26.83	5.33	-16.17	-38.17	-59.67	-81.17	-103.17	103.17
Axle Locations along Span	0.00	311.15	321.15	325.15	331.15	347.15	351.15	357.15	371.15	375.15	381.15	700.00
Iterative Max Moment Analysis, #5	103.83	91.83	70.33	48.83	26.83	5.33	-16.17	-38.17	-59.67	-81.17	-103.17	103.17
Axle Locations along Span	0.00	311.16	321.16	325.16	331.16	347.16	351.16	357.16	371.16	375.16	381.16	700.00
Rear Axle #10 at Rear Support (Max V)	9.55	-2.45	-23.95	-45.45	-67.45	-88.95	-110.45	-132.45	-153.95	-175.45	-197.45	197.45
Axle Locations along Span	0.00	630.00	640.00	644.00	650.00	666.00	670.00	676.00	690.00	694.00	700.00	700.00

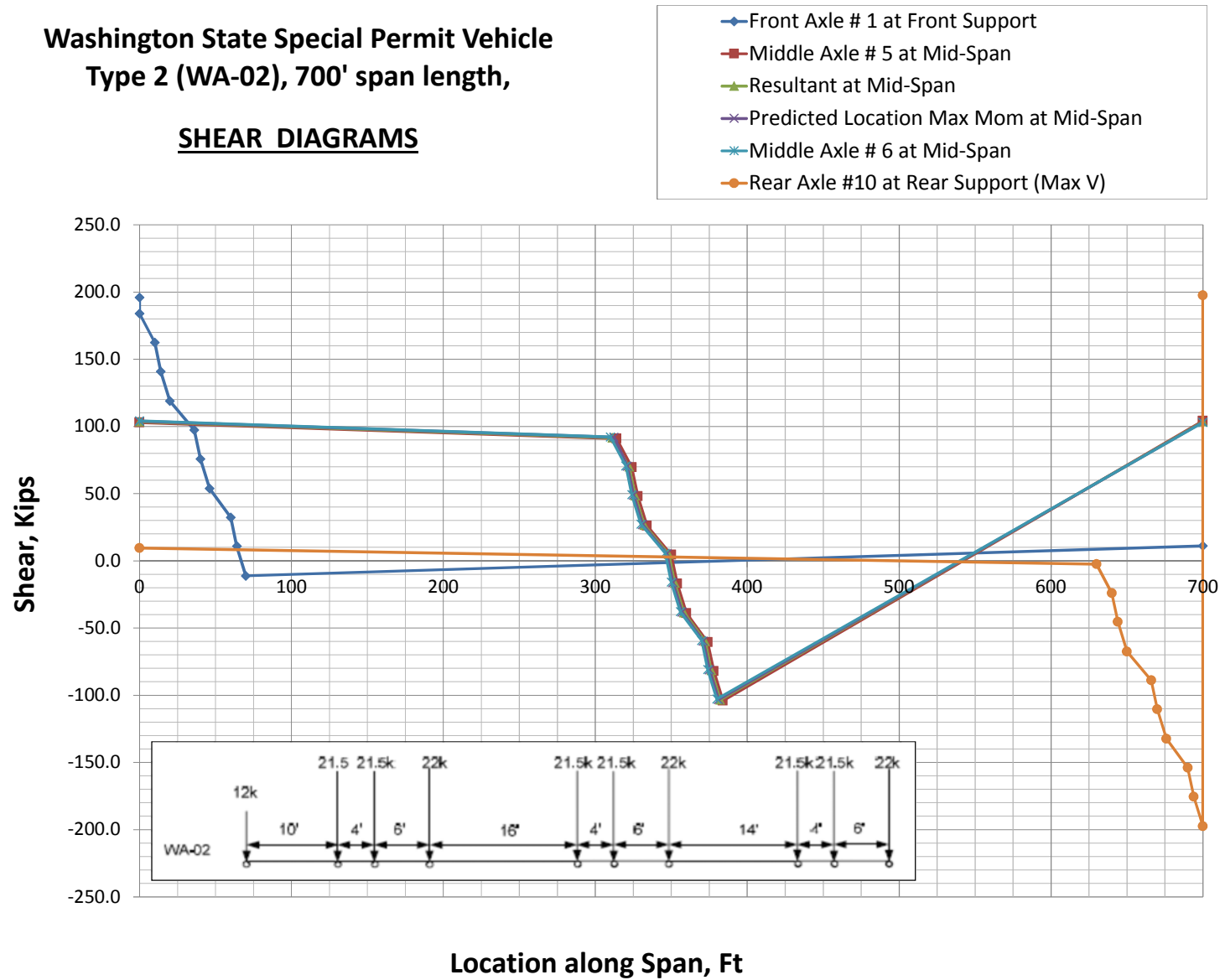
MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Front Axle # 1 at Front Support	0.0	0.0	1,838.5	2,487.8	3,332.9	5,234.45	5,623.83	6,078.9	6,832.7	6,962.1	7,027.2	0.0
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	700.00
Middle Axle # 5 at Mid-Span	0.0	32,339.3	33,249.2	33,527.2	33,815.1	34,231.00	34,248.97	34,146.9	33,600.8	33,358.8	32,866.7	0.0
Axle Locations along Span	0.00	314.00	324.00	328.00	334.00	350.00	354.00	360.00	374.00	378.00	384.00	700.00
Resultant at Mid-Span	0.0	32,321.0	33,236.0	33,516.0	33,807.0	34,231.00	34,251.00	34,152.0	33,613.0	33,373.0	32,884.0	0.0
Axle Locations along Span	0.00	311.14	322.28	326.28	332.28	348.28	352.28	358.28	372.28	376.28	382.28	700.00
Predicted Location Max Mom at Mid-Span	0.0	32,307.9	33,226.3	33,507.6	33,800.6	34,230.04	34,251.38	34,154.4	33,620.1	33,381.5	32,894.5	0.0
Axle Locations along Span	0.00	312.28	321.14	325.14	331.14	347.14	351.14	357.14	371.14	375.14	381.14	700.00
Middle Axle # 6 at Mid-Span	0.0	32,294.0	33,215.8	33,498.5	33,793.5	34,228.30	34,251.00	34,156.0	33,626.5	33,389.2	32,904.2	0.0
Axle Locations along Span	0.00	310.00	320.00	324.00	330.00	346.00	350.00	356.00	370.00	374.00	380.00	700.00
Mid-Span between Axles # 6 and 7	0.0	32,253.86	33,184.47	33,470.72	33,771.09	34,220.07	34,246.32	34,156.68	33,639.54	33,405.79	32,926.16	0.0
Axle Locations along Span	0.00	307.00	317.00	321.00	327.00	343.00	347.00	353.00	367.00	371.00	377.00	700.00
Iterative Max Moment Analysis, #1	0.0	32,307.66	33,226.09	33,507.46	33,800.52	34,230.01	34,251.38	34,154.44	33,620.25	33,381.62	32,894.68	0.0
Axle Locations along Span	0.00	311.12	321.12	325.12	331.12	347.12	351.12	357.12	371.12	375.12	381.12	700.00
Iterative Max Moment Analysis, #2	0.0	32,307.78	33,226.18	33,507.54	33,800.58	34,230.02	34,251.38	34,154.42	33,620.19	33,381.55	32,894.59	0.0
Axle Locations along Span	0.00	311.13	321.13	325.13	331.13	347.13	351.13	357.13	371.13	375.13	381.13	700.00
Iterative Max Moment Analysis, #3	0.0	32,307.90	33,226.27	33,507.62	33,800.64	34,230.04	34,251.38	34,154.41	33,620.13	33,381.48	32,894.50	0.0
Axle Locations along Span	0.00	311.14	321.14	325.14	331.14	347.14	351.14	357.14	371.14	375.14	381.14	700.00
Iterative Max Moment Analysis, #4	0.0	32,308.02	33,226.36	33,507.70	33,800.70	34,230.05	34,251.38	34,154.39	33,620.07	33,381.40	32,894.41	0.0
Axle Locations along Span	0.00	311.15	321.15	325.15	331.15	347.15	351.15	357.15	371.15	375.15	381.15	700.00
Iterative Max Moment Analysis, #5	0.0	32,308.14	33,226.45	33,507.77	33,800.76	34,230.06	34,251.38	34,154.37	33,620.01	33,381.33	32,894.32	0.0
Axle Locations along Span	0.00	311.16	321.16	325.16	331.16	347.16	351.16	357.16	371.16	375.16	381.16	700.00

TEN (10) AXLE

Washington State Permit Vehicle Type 2 (WA-02), 700' span length

### Washington State Special Permit Vehicle Type 2 (WA-02), 700' span length,

### SHEAR DIAGRAMS

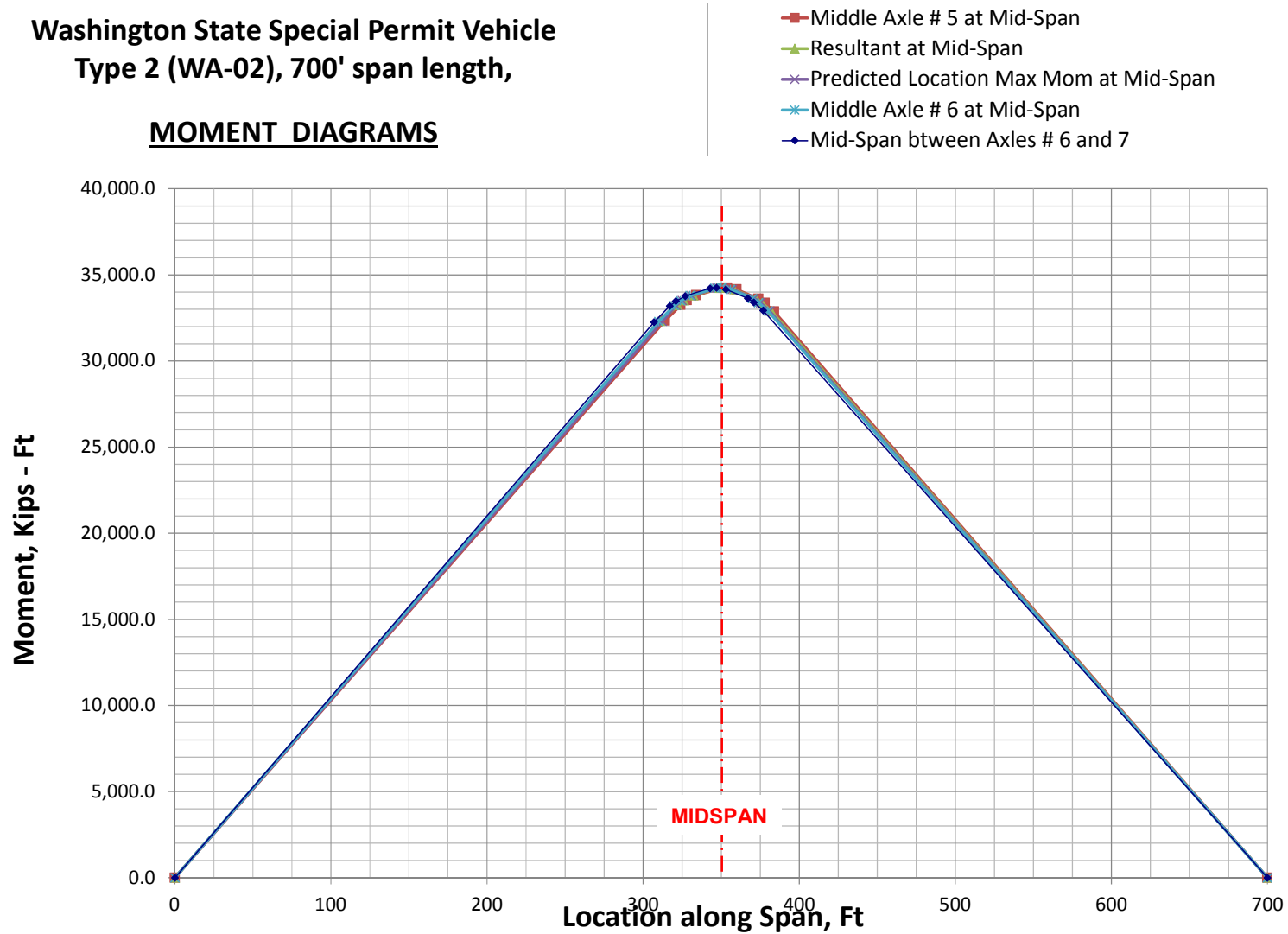


TEN (10) AXLE

Washington State Permit Vehicle Type 2 (WA-02), 700' span length

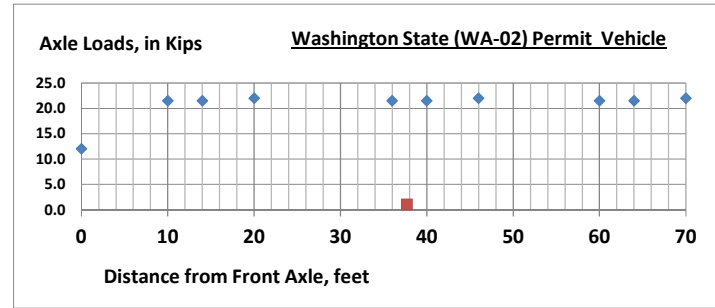
### Washington State Special Permit Vehicle Type 2 (WA-02), 700' span length,

#### MOMENT DIAGRAMS



**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 800' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	6.0	12.0		0.000	53.38	0
2	10.8	21.5	10.00	10.000	95.64	305
3	10.8	21.5	4.00	14.000	95.64	427
4	11.0	22.0	6.00	20.000	97.86	610
5	10.8	21.5	16.00	36.000	95.64	1097
6	10.8	21.5	4.00	40.000	95.64	1219
7	11.0	22.0	6.00	46.000	97.86	1402
8	10.8	21.5	14.00	60.000	95.64	1829
9	10.8	21.5	4.00	64.000	95.64	1951
(Rear) 10	11.0	22.0	6.00	70.000	97.86	2134
<b>Totals</b>	<b>103.5</b>	<b>207.0</b>	<b>70.00</b>		<b>10972.80</b>	<b>427</b>



Resultant of Axle Load is: 37.720 ft, from First (Forward) axle

Max Moment predicted at location 1.140 ft, to forward of Axle # 6

**800 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Front Axle # 1 at Front Support	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	730.00
Middle Axle # 5 at Mid-Span	364.00	374.00	378.00	384.00	400.00	404.00	410.00	424.00	428.00	434.00	366.00
Resultant at Mid-Span	362.28	372.28	376.28	382.28	398.28	402.28	408.28	422.28	426.28	432.28	367.72
Predicted Location Max Mom at Mid-Span	361.14	371.14	375.14	381.14	397.14	401.14	407.14	421.14	425.14	431.14	368.86
Middle Axle # 6 at Mid-Span	360.00	370.00	374.00	380.00	396.00	400.00	406.00	420.00	424.00	430.00	370.00
Mid-Span between Axles # 6 and 7	357.00	367.00	371.00	377.00	393.00	397.00	403.00	417.00	421.00	427.00	373.00
<b>Iterative Calculation of Maximum Moment Location</b>	361.12	371.12	375.12	381.12	397.12	401.12	407.12	421.12	425.12	431.12	368.88
	361.13	371.13	375.13	381.13	397.13	401.13	407.13	421.13	425.13	431.13	368.87
	361.14	371.14	375.14	381.14	397.14	401.14	407.14	421.14	425.14	431.14	368.86
	361.15	371.15	375.15	381.15	397.15	401.15	407.15	421.15	425.15	431.15	368.85
	361.16	371.16	375.16	381.16	397.16	401.16	407.16	421.16	425.16	431.16	368.84
Rear Axle #10 at Rear Support (Max V)	730.00	740.00	744.00	750.00	766.00	770.00	776.00	790.00	794.00	800.00	0



**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 800' span length**

SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	197.24	185.24	163.74	142.24	120.24	98.74	77.24	55.24	33.74	12.24	-9.76	9.76
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	800.00
Middle Axle # 5 at Mid-Span	103.06	91.06	69.56	48.06	26.06	4.56	-16.95	-38.95	-60.45	-81.95	-103.95	103.95
Axle Locations along Span	0.00	364.00	374.00	378.00	384.00	400.00	404.00	410.00	424.00	428.00	434.00	800.00
Resultant at Mid-Span	103.50	91.50	70.00	48.50	26.50	5.00	-16.50	-38.50	-60.00	-81.50	-103.50	103.48
Axle Locations along Span	0.00	361.14	372.28	376.28	382.28	398.28	402.28	408.28	422.28	426.28	432.28	800.00
Predicted Location Max Mom at Mid-Span	103.80	91.80	70.30	48.80	26.80	5.30	-16.21	-38.21	-59.71	-81.21	-103.21	103.22
Axle Locations along Span	0.00	362.28	371.14	375.14	381.14	397.14	401.14	407.14	421.14	425.14	431.14	800.00
Middle Axle # 6 at Mid-Span	104.09	92.09	70.59	49.09	27.09	5.59	-15.91	-37.91	-59.41	-80.91	-102.91	102.91
Axle Locations along Span	0.00	360.00	370.00	374.00	380.00	396.00	400.00	406.00	420.00	424.00	430.00	800.00
Mid-Span between Axles # 6 and 7	104.87	92.87	71.37	49.87	27.87	6.37	-15.13	-37.13	-58.63	-80.13	-102.13	102.13
Axle Locations along Span	0.00	357.00	367.00	371.00	377.00	393.00	397.00	403.00	417.00	421.00	427.00	800.00
Iterative Max Moment Analysis, #1	103.80	91.80	70.30	48.80	26.80	5.30	-16.20	-38.20	-59.70	-81.20	-103.20	103.20
Axle Locations along Span	0.00	361.12	371.12	375.12	381.12	397.12	401.12	407.12	421.12	425.12	431.12	800.00
Iterative Max Moment Analysis, #2	103.80	91.80	70.30	48.80	26.80	5.30	-16.20	-38.20	-59.70	-81.20	-103.20	103.20
Axle Locations along Span	0.00	361.13	371.13	375.13	381.13	397.13	401.13	407.13	421.13	425.13	431.13	800.00
Iterative Max Moment Analysis, #3	103.80	91.80	70.30	48.80	26.80	5.30	-16.21	-38.21	-59.71	-81.21	-103.21	103.21
Axle Locations along Span	0.00	361.14	371.14	375.14	381.14	397.14	401.14	407.14	421.14	425.14	431.14	800.00
Iterative Max Moment Analysis, #4	103.79	91.79	70.29	48.79	26.79	5.29	-16.21	-38.21	-59.71	-81.21	-103.21	103.21
Axle Locations along Span	0.00	361.15	371.15	375.15	381.15	397.15	401.15	407.15	421.15	425.15	431.15	800.00
Iterative Max Moment Analysis, #5	103.79	91.79	70.29	48.79	26.79	5.29	-16.21	-38.21	-59.71	-81.21	-103.21	103.21
Axle Locations along Span	0.00	361.16	371.16	375.16	381.16	397.16	401.16	407.16	421.16	425.16	431.16	800.00
Rear Axle #10 at Rear Support (Max V)	8.35	-3.65	-25.15	-46.65	-68.65	-90.15	-111.65	-133.65	-155.15	-176.65	-198.65	198.65
Axle Locations along Span	0.00	730.00	740.00	744.00	750.00	766.00	770.00	776.00	790.00	794.00	800.00	800.00

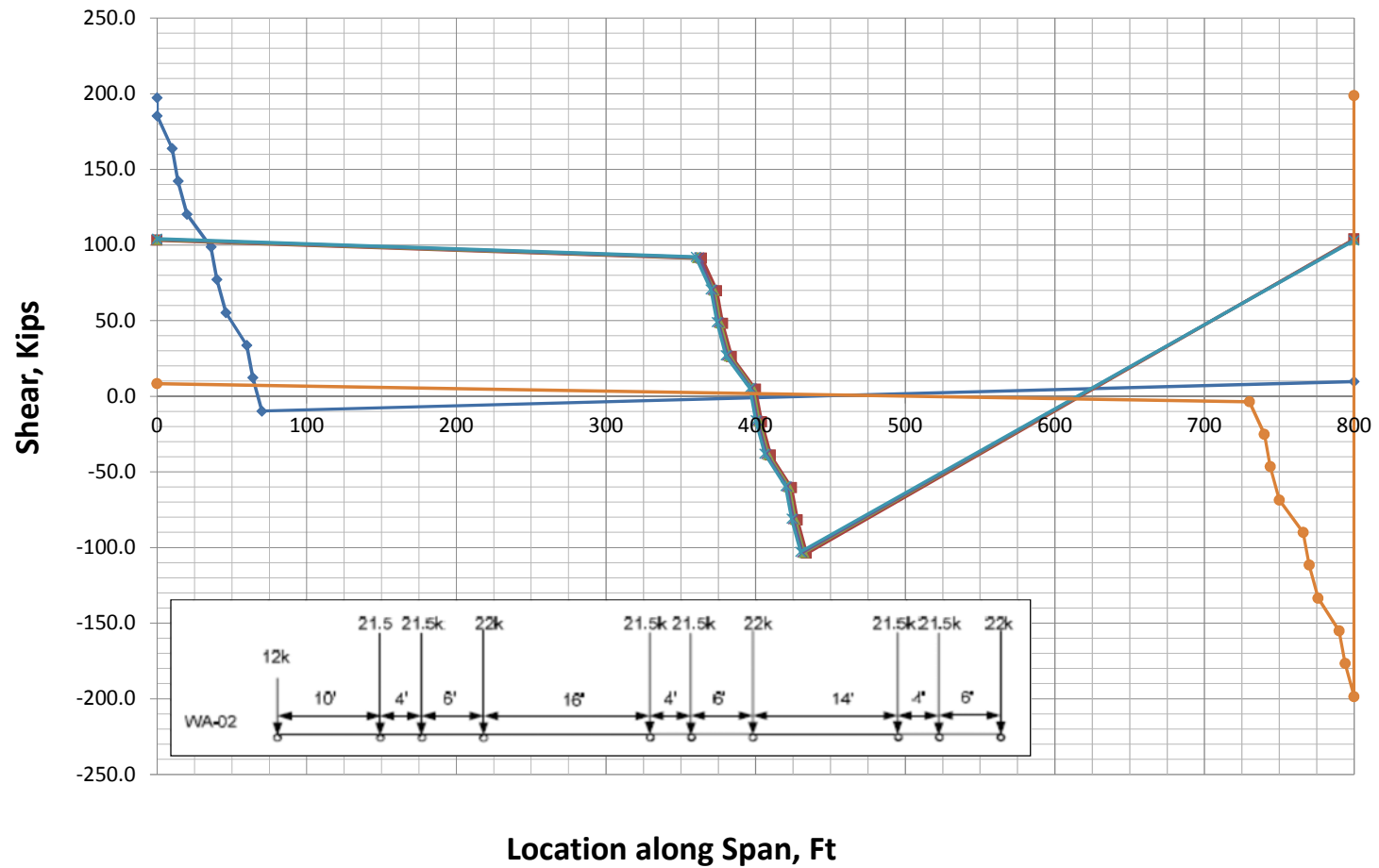
MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Front Axle # 1 at Front Support	0.0	0.0	1,852.4	2,507.4	3,360.8	5,284.64	5,679.60	6,143.0	6,916.4	7,051.4	7,124.8	0.0
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	800.00
Middle Axle # 5 at Mid-Span	0.0	37,512.0	38,422.6	38,700.8	38,989.1	39,406.00	39,424.22	39,322.6	38,777.3	38,535.5	38,043.9	0.0
Axle Locations along Span	0.00	364.00	374.00	378.00	384.00	400.00	404.00	410.00	424.00	428.00	434.00	800.00
Resultant at Mid-Span	0.0	37,496.0	38,411.0	38,691.0	38,982.0	39,406.00	39,426.00	39,327.0	38,788.0	38,548.0	38,059.0	0.0
Axle Locations along Span	0.00	361.14	372.28	376.28	382.28	398.28	402.28	408.28	422.28	426.28	432.28	800.00
Predicted Location Max Mom at Mid-Span	0.0	37,484.5	38,402.5	38,683.7	38,976.4	39,405.16	39,426.34	39,329.1	38,794.2	38,555.4	38,068.2	0.0
Axle Locations along Span	0.00	362.28	371.14	375.14	381.14	397.14	401.14	407.14	421.14	425.14	431.14	800.00
Middle Axle # 6 at Mid-Span	0.0	37,472.4	38,393.3	38,675.7	38,970.2	39,403.64	39,426.00	39,330.5	38,799.8	38,562.2	38,076.7	0.0
Axle Locations along Span	0.00	360.00	370.00	374.00	380.00	396.00	400.00	406.00	420.00	424.00	430.00	800.00
Mid-Span between Axles # 6 and 7	0.0	37,437.25	38,365.91	38,651.38	38,950.58	39,396.44	39,421.90	39,331.10	38,811.23	38,576.69	38,095.89	0.0
Axle Locations along Span	0.00	357.00	367.00	371.00	377.00	393.00	397.00	403.00	417.00	421.00	427.00	800.00
Iterative Max Moment Analysis, #1	0.0	37,484.33	38,402.33	38,683.53	38,976.33	39,405.14	39,426.34	39,329.14	38,794.34	38,555.54	38,068.34	0.0
Axle Locations along Span	0.00	361.12	371.12	375.12	381.12	397.12	401.12	407.12	421.12	425.12	431.12	800.00
Iterative Max Moment Analysis, #2	0.0	37,484.43	38,402.41	38,683.60	38,976.38	39,405.15	39,426.34	39,329.12	38,794.29	38,555.48	38,068.26	0.0
Axle Locations along Span	0.00	361.13	371.13	375.13	381.13	397.13	401.13	407.13	421.13	425.13	431.13	800.00
Iterative Max Moment Analysis, #3	0.0	37,484.54	38,402.49	38,683.67	38,976.44	39,405.16	39,426.34	39,329.11	38,794.24	38,555.42	38,068.19	0.0
Axle Locations along Span	0.00	361.14	371.14	375.14	381.14	397.14	401.14	407.14	421.14	425.14	431.14	800.00
Iterative Max Moment Analysis, #4	0.0	37,484.64	38,402.56	38,683.73	38,976.49	39,405.17	39,426.34	39,329.09	38,794.18	38,555.35	38,068.11	0.0
Axle Locations along Span	0.00	361.15	371.15	375.15	381.15	397.15	401.15	407.15	421.15	425.15	431.15	800.00
Iterative Max Moment Analysis, #5	0.0	37,484.74	38,402.64	38,683.80	38,976.54	39,405.18	39,426.34	39,329.08	38,794.13	38,555.29	38,068.03	0.0
Axle Locations along Span	0.00	361.16	371.16	375.16	381.16	397.16	401.16	407.16	421.16	425.16	431.16	800.00

**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 800' span length**

**Washington State Special Permit Vehicle  
 Type 2 (WA-02), 800' span length,**

**SHEAR DIAGRAMS**

- ◆ Front Axle # 1 at Front Support
- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✕ Predicted Location Max Mom at Mid-Span
- ✧ Middle Axle # 6 at Mid-Span
- Rear Axle #10 at Rear Support (Max V)



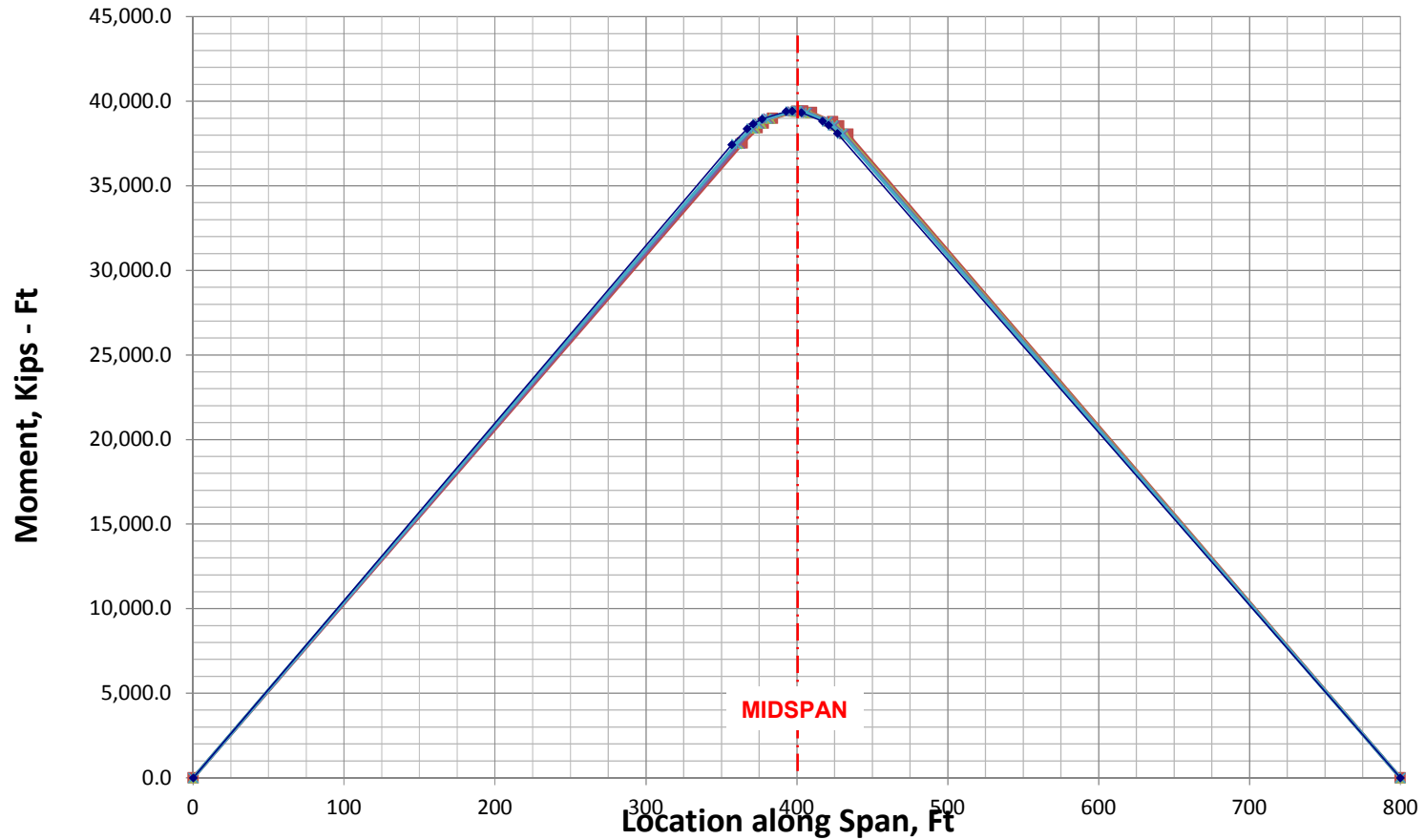
TEN (10) AXLE

Washington State Permit Vehicle Type 2 (WA-02), 800' span length

### Washington State Special Permit Vehicle Type 2 (WA-02), 800' span length,

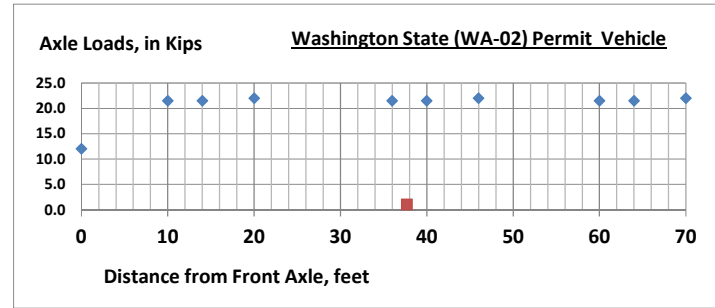
#### MOMENT DIAGRAMS

- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✕ Predicted Location Max Mom at Mid-Span
- ✱ Middle Axle # 6 at Mid-Span
- ◆ Mid-Span between Axles # 6 and 7



**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 900' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	6.0	12.0		0.000	53.38	0
2	10.8	21.5	10.00	10.000	95.64	305
3	10.8	21.5	4.00	14.000	95.64	427
4	11.0	22.0	6.00	20.000	97.86	610
5	10.8	21.5	16.00	36.000	95.64	1097
6	10.8	21.5	4.00	40.000	95.64	1219
7	11.0	22.0	6.00	46.000	97.86	1402
8	10.8	21.5	14.00	60.000	95.64	1829
9	10.8	21.5	4.00	64.000	95.64	1951
(Rear) 10	11.0	22.0	6.00	70.000	97.86	2134
<b>Totals</b>	<b>103.5</b>	<b>207.0</b>	<b>70.00</b>		<b>10972.80</b>	<b>427</b>



Resultant of Axle Load is: 37.720 ft, from First (Forward) axle

Max Moment predicted at location 1.140 ft, to forward of Axle # 6

**900 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Front Axle # 1 at Front Support	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	830.00
Middle Axle # 5 at Mid-Span	414.00	424.00	428.00	434.00	450.00	454.00	460.00	474.00	478.00	484.00	416.00
Resultant at Mid-Span	412.28	422.28	426.28	432.28	448.28	452.28	458.28	472.28	476.28	482.28	417.72
Predicted Location Max Mom at Mid-Span	411.14	421.14	425.14	431.14	447.14	451.14	457.14	471.14	475.14	481.14	418.86
Middle Axle # 6 at Mid-Span	410.00	420.00	424.00	430.00	446.00	450.00	456.00	470.00	474.00	480.00	420.00
Mid-Span between Axles # 6 and 7	407.00	417.00	421.00	427.00	443.00	447.00	453.00	467.00	471.00	477.00	423.00
<b>Iterative Calculation of Maximum Moment Location</b>	411.12	421.12	425.12	431.12	447.12	451.12	457.12	471.12	475.12	481.12	418.88
	411.13	421.13	425.13	431.13	447.13	451.13	457.13	471.13	475.13	481.13	418.87
	411.14	421.14	425.14	431.14	447.14	451.14	457.14	471.14	475.14	481.14	418.86
	411.15	421.15	425.15	431.15	447.15	451.15	457.15	471.15	475.15	481.15	418.85
	411.16	421.16	425.16	431.16	447.16	451.16	457.16	471.16	475.16	481.16	418.84
Rear Axle #10 at Rear Support (Max V)	830.00	840.00	844.00	850.00	866.00	870.00	876.00	890.00	894.00	900.00	0

<b>TEN (10) AXLE</b>		<b>Washington State Permit Vehicle Type 2 (WA-02), 900' span length</b>										
<b>SHEAR</b>	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips
Front Axle # 1 at Front Support	198.32	186.32	164.82	143.32	121.32	99.82	78.32	56.32	34.82	13.32	-8.68	8.68
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	900.00
Middle Axle # 5 at Mid-Span	103.10	91.10	69.60	48.10	26.10	4.60	-16.90	-38.90	-60.40	-81.90	-103.90	103.90
Axle Locations along Span	0.00	414.00	424.00	428.00	434.00	450.00	454.00	460.00	474.00	478.00	484.00	900.00
Resultant at Mid-Span	103.50	91.50	70.00	48.50	26.50	5.00	-16.50	-38.50	-60.00	-81.50	-103.50	103.48
Axle Locations along Span	0.00	411.14	422.28	426.28	432.28	448.28	452.28	458.28	472.28	476.28	482.28	900.00
Predicted Location Max Mom at Mid-Span	103.76	91.76	70.26	48.76	26.76	5.26	-16.24	-38.24	-59.74	-81.24	-103.24	103.25
Axle Locations along Span	0.00	412.28	421.14	425.14	431.14	447.14	451.14	457.14	471.14	475.14	481.14	900.00
Middle Axle # 6 at Mid-Span	104.02	92.02	70.52	49.02	27.02	5.52	-15.98	-37.98	-59.48	-80.98	-102.98	102.98
Axle Locations along Span	0.00	410.00	420.00	424.00	430.00	446.00	450.00	456.00	470.00	474.00	480.00	900.00
Mid-Span between Axles # 6 and 7	104.71	92.71	71.21	49.71	27.71	6.21	-15.29	-37.29	-58.79	-80.29	-102.29	102.29
Axle Locations along Span	0.00	407.00	417.00	421.00	427.00	443.00	447.00	453.00	467.00	471.00	477.00	900.00
Iterative Max Moment Analysis, #1	103.77	91.77	70.27	48.77	26.77	5.27	-16.23	-38.23	-59.73	-81.23	-103.23	103.23
Axle Locations along Span	0.00	411.12	421.12	425.12	431.12	447.12	451.12	457.12	471.12	475.12	481.12	900.00
Iterative Max Moment Analysis, #2	103.76	91.76	70.26	48.76	26.76	5.26	-16.24	-38.24	-59.74	-81.24	-103.24	103.24
Axle Locations along Span	0.00	411.13	421.13	425.13	431.13	447.13	451.13	457.13	471.13	475.13	481.13	900.00
Iterative Max Moment Analysis, #3	103.76	91.76	70.26	48.76	26.76	5.26	-16.24	-38.24	-59.74	-81.24	-103.24	103.24
Axle Locations along Span	0.00	411.14	421.14	425.14	431.14	447.14	451.14	457.14	471.14	475.14	481.14	900.00
Iterative Max Moment Analysis, #4	103.76	91.76	70.26	48.76	26.76	5.26	-16.24	-38.24	-59.74	-81.24	-103.24	103.24
Axle Locations along Span	0.00	411.15	421.15	425.15	431.15	447.15	451.15	457.15	471.15	475.15	481.15	900.00
Iterative Max Moment Analysis, #5	103.76	91.76	70.26	48.76	26.76	5.26	-16.24	-38.24	-59.74	-81.24	-103.24	103.24
Axle Locations along Span	0.00	411.16	421.16	425.16	431.16	447.16	451.16	457.16	471.16	475.16	481.16	900.00
Rear Axle #10 at Rear Support (Max V)	7.42	-4.58	-26.08	-47.58	-69.58	-91.08	-112.58	-134.58	-156.08	-177.58	-199.58	199.58
Axle Locations along Span	0.00	830.00	840.00	844.00	850.00	866.00	870.00	876.00	890.00	894.00	900.00	900.00

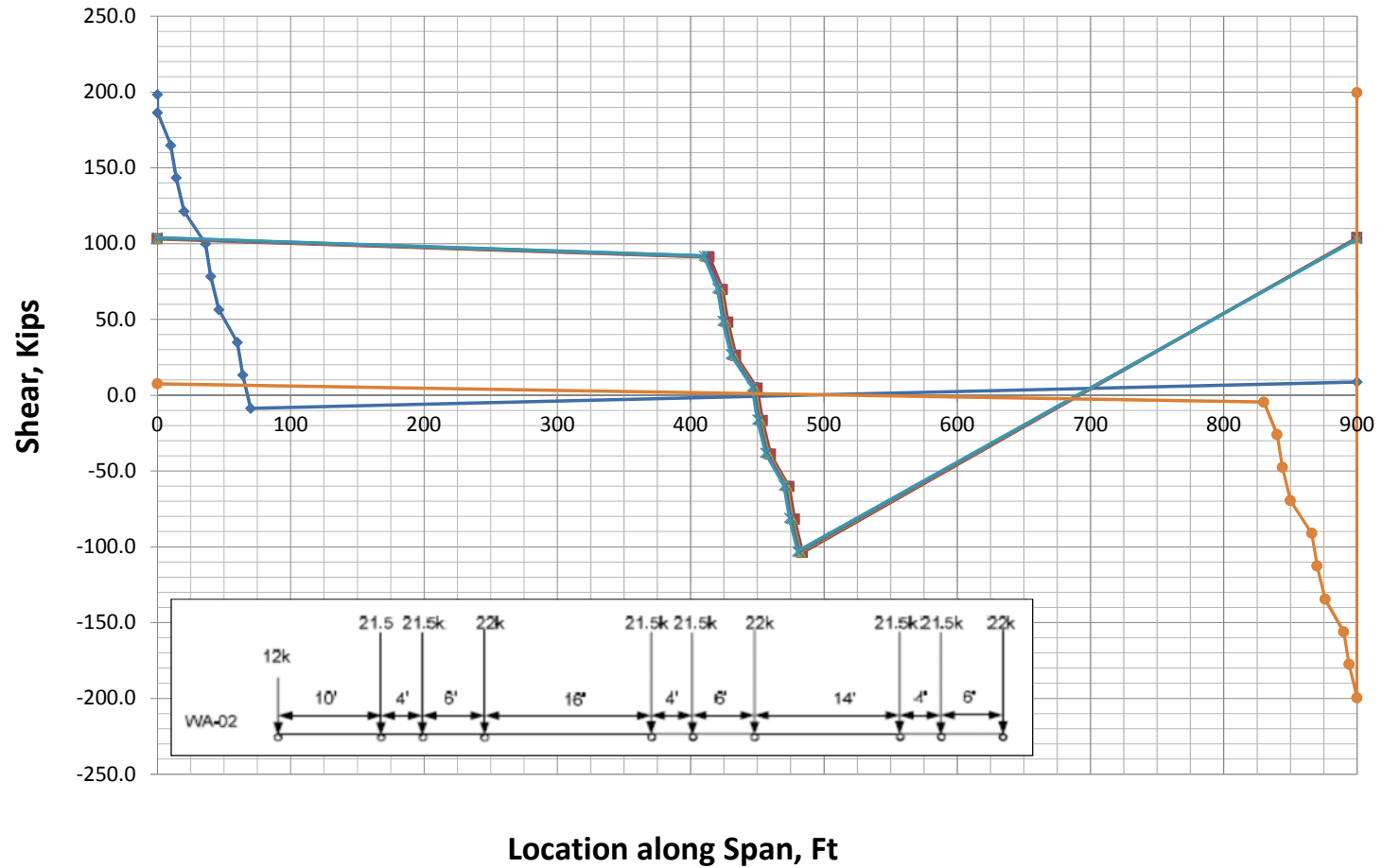
<b>MOMENT</b>	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Front Axle # 1 at Front Support	0.0	0.0	1,863.2	2,522.5	3,382.5	5,323.68	5,722.98	6,192.9	6,981.5	7,120.8	7,200.7	0.0
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	900.00
Middle Axle # 5 at Mid-Span	0.0	42,685.2	43,596.3	43,874.7	44,163.3	44,581.00	44,599.42	44,498.0	43,953.5	43,711.9	43,220.6	0.0
Axle Locations along Span	0.00	414.00	424.00	428.00	434.00	450.00	454.00	460.00	474.00	478.00	484.00	900.00
Resultant at Mid-Span	0.0	42,671.0	43,586.0	43,866.0	44,157.0	44,581.00	44,601.00	44,502.0	43,963.0	43,723.0	43,234.0	0.0
Axle Locations along Span	0.00	411.14	422.28	426.28	432.28	448.28	452.28	458.28	472.28	476.28	482.28	900.00
Predicted Location Max Mom at Mid-Span	0.0	42,660.8	43,578.4	43,859.5	44,152.1	44,580.25	44,601.30	44,503.9	43,968.5	43,729.6	43,242.2	0.0
Axle Locations along Span	0.00	412.28	421.14	425.14	431.14	447.14	451.14	457.14	471.14	475.14	481.14	900.00
Middle Axle # 6 at Mid-Span	0.0	42,650.0	43,570.3	43,852.4	44,146.5	44,578.90	44,601.00	44,505.1	43,973.5	43,735.6	43,249.7	0.0
Axle Locations along Span	0.00	410.00	420.00	424.00	430.00	446.00	450.00	456.00	470.00	474.00	480.00	900.00
Mid-Span between Axles # 6 and 7	0.0	42,618.78	43,545.92	43,830.78	44,129.07	44,572.50	44,597.36	44,505.64	43,983.65	43,748.50	43,266.79	0.0
Axle Locations along Span	0.00	407.00	417.00	421.00	427.00	443.00	447.00	453.00	467.00	471.00	477.00	900.00
Iterative Max Moment Analysis, #1	0.0	42,660.63	43,578.29	43,859.36	44,151.96	44,580.23	44,601.30	44,503.90	43,968.64	43,729.70	43,242.30	0.0
Axle Locations along Span	0.00	411.12	421.12	425.12	431.12	447.12	451.12	457.12	471.12	475.12	481.12	900.00
Iterative Max Moment Analysis, #2	0.0	42,660.72	43,578.36	43,859.42	44,152.01	44,580.24	44,601.30	44,503.89	43,968.59	43,729.65	43,242.23	0.0
Axle Locations along Span	0.00	411.13	421.13	425.13	431.13	447.13	451.13	457.13	471.13	475.13	481.13	900.00
Iterative Max Moment Analysis, #3	0.0	42,660.81	43,578.43	43,859.48	44,152.05	44,580.25	44,601.30	44,503.87	43,968.54	43,729.59	43,242.17	0.0
Axle Locations along Span	0.00	411.14	421.14	425.14	431.14	447.14	451.14	457.14	471.14	475.14	481.14	900.00
Iterative Max Moment Analysis, #4	0.0	42,660.90	43,578.50	43,859.54	44,152.10	44,580.26	44,601.30	44,503.86	43,968.50	43,729.54	43,242.10	0.0
Axle Locations along Span	0.00	411.15	421.15	425.15	431.15	447.15	451.15	457.15	471.15	475.15	481.15	900.00
Iterative Max Moment Analysis, #5	0.0	42,660.99	43,578.57	43,859.60	44,152.15	44,580.27	44,601.30	44,503.84	43,968.45	43,729.48	43,242.03	0.0
Axle Locations along Span	0.00	411.16	421.16	425.16	431.16	447.16	451.16	457.16	471.16	475.16	481.16	900.00

**TEN (10) AXLE** Washington State Permit Vehicle Type 2 (WA-02), 900' span length

**Washington State Special Permit Vehicle  
 Type 2 (WA-02), 900' span length,**

**SHEAR DIAGRAMS**

- ◆ Front Axle # 1 at Front Support
- Middle Axle # 5 at Mid-Span
- ▲ Resultant at Mid-Span
- ✕ Predicted Location Max Mom at Mid-Span
- ✧ Middle Axle # 6 at Mid-Span
- Rear Axle #10 at Rear Support (Max V)

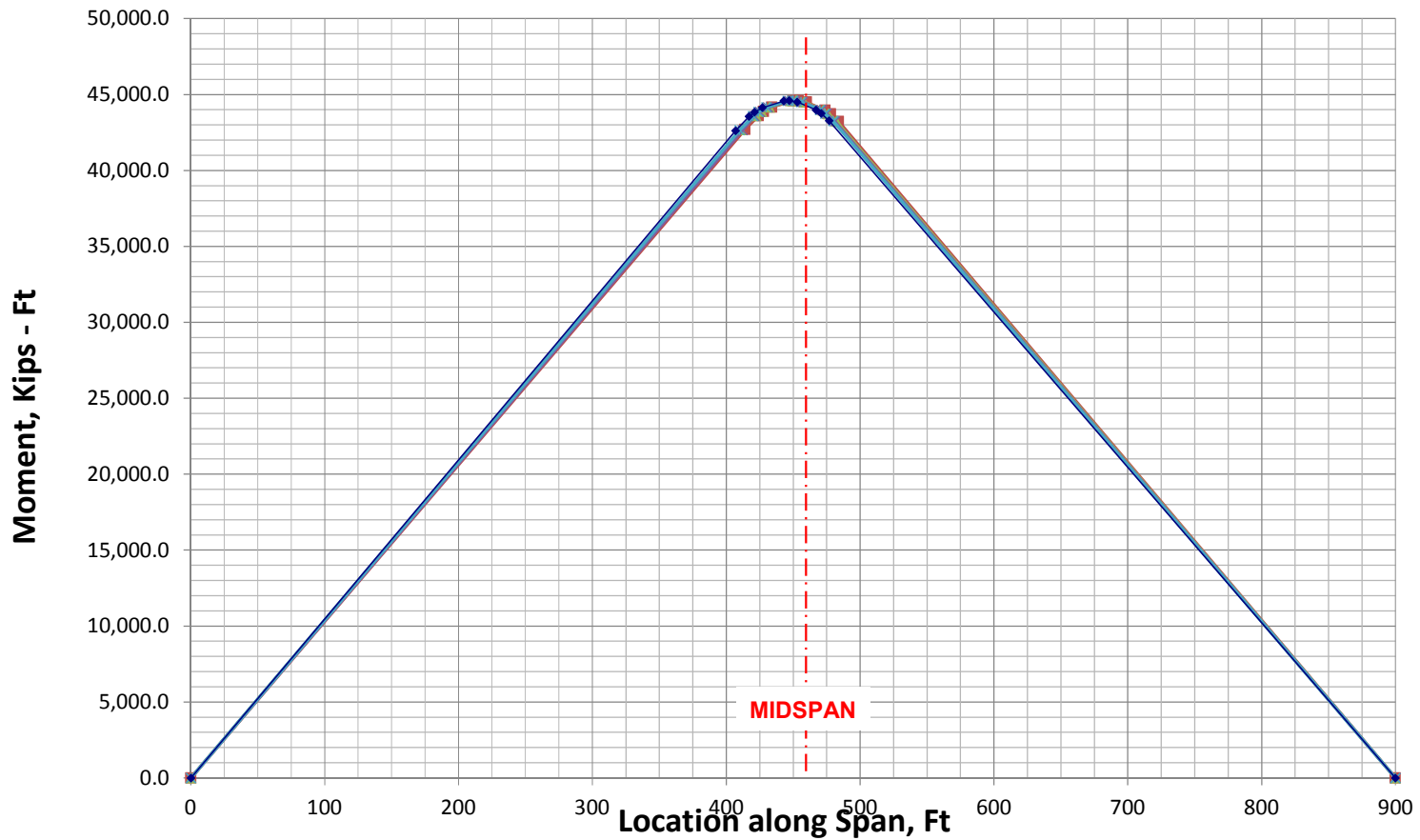


TEN (10) AXLE

Washington State Permit Vehicle Type 2 (WA-02), 900' span length

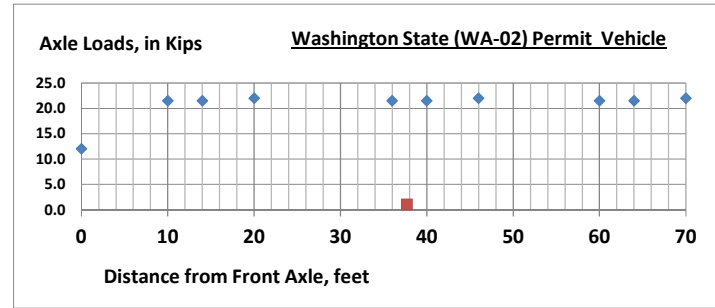
### Washington State Special Permit Vehicle Type 2 (WA-02), 900' span length,

#### MOMENT DIAGRAMS



**TEN (10) AXLE** **Washington State Permit Vehicle Type 2 (WA-02), 1,000' span length**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle, 1st vehicle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	6.0	12.0		0.000	53.38	0
2	10.8	21.5	10.00	10.000	95.64	305
3	10.8	21.5	4.00	14.000	95.64	427
4	11.0	22.0	6.00	20.000	97.86	610
5	10.8	21.5	16.00	36.000	95.64	1097
6	10.8	21.5	4.00	40.000	95.64	1219
7	11.0	22.0	6.00	46.000	97.86	1402
8	10.8	21.5	14.00	60.000	95.64	1829
9	10.8	21.5	4.00	64.000	95.64	1951
(Rear) 10	11.0	22.0	6.00	70.000	97.86	2134
<b>Totals</b>	<b>103.5</b>	<b>207.0</b>	<b>70.00</b>		<b>10972.80</b>	<b>427</b>



Resultant of Axle Load is: **37.720 ft, from First (Forward) axle**

**Max Moment predicted at location 1.140 ft, to forward of Axle # 6**

**1,000 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Middle #9 Axle Position	Rear #10 Axle Position	Dist to Beam End
	AX 1-1	AX 1-2	AX 1-3	AX 1-4	AX 1-5	AX 2-1	AX 2-2	AX 2-3	AX 2-4	AX 2-5	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Front Axle # 1 at Front Support	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	930.00
Middle Axle # 5 at Mid-Span	464.00	474.00	478.00	484.00	500.00	504.00	510.00	524.00	528.00	534.00	466.00
Resultant at Mid-Span	462.28	472.28	476.28	482.28	498.28	502.28	508.28	522.28	526.28	532.28	467.72
Predicted Location Max Mom at Mid-Span	461.14	471.14	475.14	481.14	497.14	501.14	507.14	521.14	525.14	531.14	468.86
Middle Axle # 6 at Mid-Span	460.00	470.00	474.00	480.00	496.00	500.00	506.00	520.00	524.00	530.00	470.00
Mid-Span between Axles # 6 and 7	457.00	467.00	471.00	477.00	493.00	497.00	503.00	517.00	521.00	527.00	473.00
<b>Iterative Calculation of Maximum Moment Location</b>	461.12	471.12	475.12	481.12	497.12	501.12	507.12	521.12	525.12	531.12	468.88
	461.13	471.13	475.13	481.13	497.13	501.13	507.13	521.13	525.13	531.13	468.87
	461.14	471.14	475.14	481.14	497.14	501.14	507.14	521.14	525.14	531.14	468.86
	461.15	471.15	475.15	481.15	497.15	501.15	507.15	521.15	525.15	531.15	468.85
	461.16	471.16	475.16	481.16	497.16	501.16	507.16	521.16	525.16	531.16	468.84
Rear Axle #10 at Rear Support (Max V)	930.00	940.00	944.00	950.00	966.00	970.00	976.00	990.00	994.00	1000.00	0



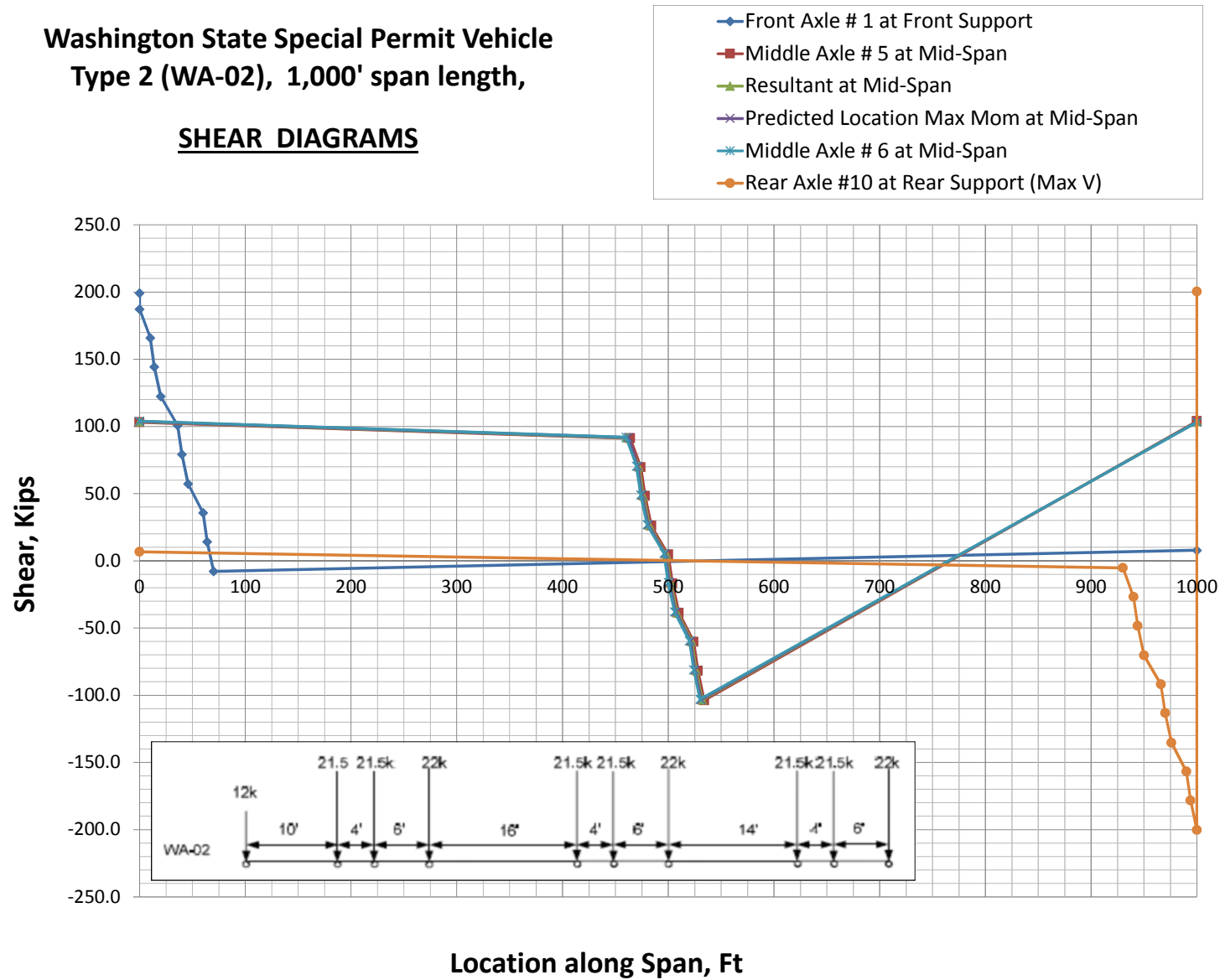
<b>TEN (10) AXLE</b>		<b>Washington State Permit Vehicle Type 2 (WA-02), 1,000' span length</b>											
<b>SHEAR</b>	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #10 Axle, kips	Shear at React B, kips	
Front Axle # 1 at Front Support	199.19	187.19	165.69	144.19	122.19	100.69	79.19	57.19	35.69	14.19	-7.81	7.81	
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	1000.00	
Middle Axle # 5 at Mid-Span	103.14	91.14	69.64	48.14	26.14	4.64	-16.86	-38.86	-60.36	-81.86	-103.86	103.86	
Axle Locations along Span	0.00	464.00	474.00	478.00	484.00	500.00	504.00	510.00	524.00	528.00	534.00	1000.00	
Resultant at Mid-Span	103.50	91.50	70.00	48.50	26.50	5.00	-16.50	-38.50	-60.00	-81.50	-103.50	103.49	
Axle Locations along Span	0.00	461.14	472.28	476.28	482.28	498.28	502.28	508.28	522.28	526.28	532.28	1000.00	
Predicted Location Max Mom at Mid-Span	103.74	91.74	70.24	48.74	26.74	5.24	-16.26	-38.26	-59.76	-81.26	-103.26	103.28	
Axle Locations along Span	0.00	462.28	471.14	475.14	481.14	497.14	501.14	507.14	521.14	525.14	531.14	1000.00	
Middle Axle # 6 at Mid-Span	103.97	91.97	70.47	48.97	26.97	5.47	-16.03	-38.03	-59.53	-81.03	-103.03	103.03	
Axle Locations along Span	0.00	460.00	470.00	474.00	480.00	496.00	500.00	506.00	520.00	524.00	530.00	1000.00	
Mid-Span between Axles # 6 and 7	104.59	92.59	71.09	49.59	27.59	6.09	-15.41	-37.41	-58.91	-80.41	-102.41	102.41	
Axle Locations along Span	0.00	457.00	467.00	471.00	477.00	493.00	497.00	503.00	517.00	521.00	527.00	1000.00	
Iterative Max Moment Analysis, #1	103.74	91.74	70.24	48.74	26.74	5.24	-16.26	-38.26	-59.76	-81.26	-103.26	103.26	
Axle Locations along Span	0.00	461.12	471.12	475.12	481.12	497.12	501.12	507.12	521.12	525.12	531.12	1000.00	
Iterative Max Moment Analysis, #2	103.74	91.74	70.24	48.74	26.74	5.24	-16.26	-38.26	-59.76	-81.26	-103.26	103.26	
Axle Locations along Span	0.00	461.13	471.13	475.13	481.13	497.13	501.13	507.13	521.13	525.13	531.13	1000.00	
Iterative Max Moment Analysis, #3	103.74	91.74	70.24	48.74	26.74	5.24	-16.26	-38.26	-59.76	-81.26	-103.26	103.26	
Axle Locations along Span	0.00	461.14	471.14	475.14	481.14	497.14	501.14	507.14	521.14	525.14	531.14	1000.00	
Iterative Max Moment Analysis, #4	103.73	91.73	70.23	48.73	26.73	5.23	-16.27	-38.27	-59.77	-81.27	-103.27	103.27	
Axle Locations along Span	0.00	461.15	471.15	475.15	481.15	497.15	501.15	507.15	521.15	525.15	531.15	1000.00	
Iterative Max Moment Analysis, #5	103.73	91.73	70.23	48.73	26.73	5.23	-16.27	-38.27	-59.77	-81.27	-103.27	103.27	
Axle Locations along Span	0.00	461.16	471.16	475.16	481.16	497.16	501.16	507.16	521.16	525.16	531.16	1000.00	
Rear Axle #10 at Rear Support (Max V)	6.68	-5.32	-26.82	-48.32	-70.32	-91.82	-113.32	-135.32	-156.82	-178.32	-200.32	200.32	
Axle Locations along Span	0.00	930.00	940.00	944.00	950.00	966.00	970.00	976.00	990.00	994.00	1000.00	1000.00	

<b>MOMENT</b>	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at Rear #10 Axle, ft-kips	Moment at React B, ft-kips
Front Axle # 1 at Front Support	0.0	0.0	1,871.9	2,534.7	3,399.8	5,354.91	5,757.68	6,232.8	7,033.5	7,176.3	7,261.4	0.0
Axle Locations along Span	0.00	0.00	10.00	14.00	20.00	36.00	40.00	46.00	60.00	64.00	70.00	1000.00
Middle Axle # 5 at Mid-Span	0.0	47,858.8	48,770.3	49,048.8	49,337.7	49,756.00	49,774.58	49,673.4	49,129.5	48,888.0	48,396.9	0.0
Axle Locations along Span	0.00	464.00	474.00	478.00	484.00	500.00	504.00	510.00	524.00	528.00	534.00	1000.00
Resultant at Mid-Span	0.0	47,846.0	48,761.0	49,041.0	49,332.0	49,756.00	49,776.00	49,677.0	49,138.0	48,898.0	48,409.0	0.0
Axle Locations along Span	0.00	461.14	472.28	476.28	482.28	498.28	502.28	508.28	522.28	526.28	532.28	1000.00
Predicted Location Max Mom at Mid-Span	0.0	47,836.8	48,754.2	49,035.1	49,327.5	49,755.33	49,776.27	49,678.7	49,143.0	48,903.9	48,416.3	0.0
Axle Locations along Span	0.00	462.28	471.14	475.14	481.14	497.14	501.14	507.14	521.14	525.14	531.14	1000.00
Middle Axle # 6 at Mid-Span	0.0	47,827.1	48,746.8	49,028.7	49,322.6	49,754.11	49,776.00	49,679.8	49,147.4	48,909.3	48,423.2	0.0
Axle Locations along Span	0.00	460.00	470.00	474.00	480.00	496.00	500.00	506.00	520.00	524.00	530.00	1000.00
Mid-Span between Axles # 6 and 7	0.0	47,799.00	48,724.93	49,009.30	49,306.86	49,748.35	49,772.72	49,680.28	49,156.58	48,920.95	48,438.51	0.0
Axle Locations along Span	0.00	457.00	467.00	471.00	477.00	493.00	497.00	503.00	517.00	521.00	527.00	1000.00
Iterative Max Moment Analysis, #1	0.0	47,836.66	48,754.06	49,035.03	49,327.47	49,755.31	49,776.27	49,678.71	49,143.07	48,904.03	48,416.47	0.0
Axle Locations along Span	0.00	461.12	471.12	475.12	481.12	497.12	501.12	507.12	521.12	525.12	531.12	1000.00
Iterative Max Moment Analysis, #2	0.0	47,836.75	48,754.13	49,035.08	49,327.51	49,755.32	49,776.27	49,678.70	49,143.03	48,903.98	48,416.41	0.0
Axle Locations along Span	0.00	461.13	471.13	475.13	481.13	497.13	501.13	507.13	521.13	525.13	531.13	1000.00
Iterative Max Moment Analysis, #3	0.0	47,836.83	48,754.19	49,035.13	49,327.55	49,755.33	49,776.27	49,678.69	49,142.99	48,903.93	48,416.35	0.0
Axle Locations along Span	0.00	461.14	471.14	475.14	481.14	497.14	501.14	507.14	521.14	525.14	531.14	1000.00
Iterative Max Moment Analysis, #4	0.0	47,836.91	48,754.25	49,035.19	49,327.59	49,755.33	49,776.27	49,678.67	49,142.95	48,903.88	48,416.29	0.0
Axle Locations along Span	0.00	461.15	471.15	475.15	481.15	497.15	501.15	507.15	521.15	525.15	531.15	1000.00
Iterative Max Moment Analysis, #5	0.0	47,836.99	48,754.31	49,035.24	49,327.63	49,755.34	49,776.27	49,678.66	49,142.91	48,903.83	48,416.22	0.0
Axle Locations along Span	0.00	461.16	471.16	475.16	481.16	497.16	501.16	507.16	521.16	525.16	531.16	1000.00

**TEN (10) AXLE** Washington State Permit Vehicle Type 2 (WA-02), 1,000' span length

**Washington State Special Permit Vehicle Type 2 (WA-02), 1,000' span length,**

**SHEAR DIAGRAMS**

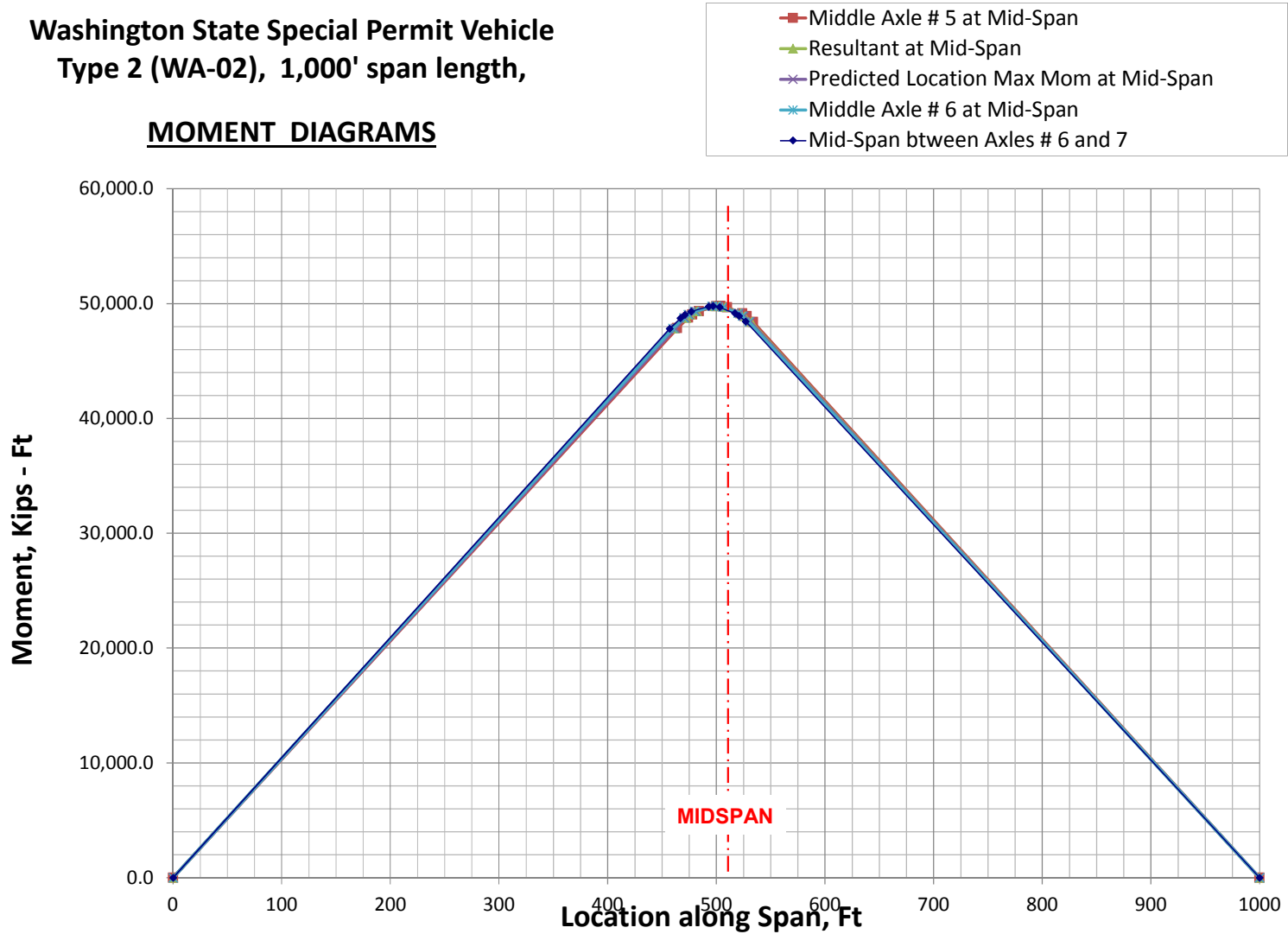


TEN (10) AXLE

Washington State Permit Vehicle Type 2 (WA-02), 1,000' span length

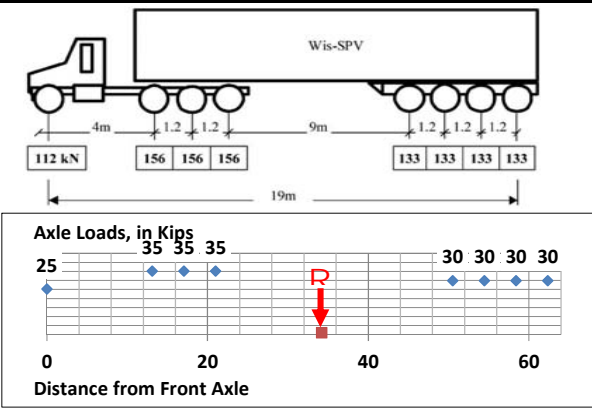
### Washington State Special Permit Vehicle Type 2 (WA-02), 1,000' span length,

#### MOMENT DIAGRAMS



**Wisconsin Special Permit Vehicle (Wis-SPV), on 100' Span**

Axle	Load (ST)	Load (kips)	Distance		SI / Metric Units	
			btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	12.59	25.18		0.00	112.00	0
2	17.54	35.07	13.12	13.12	156.00	400
3	17.54	35.07	3.94	17.06	156.00	520
4	17.54	35.07	3.94	21.00	156.00	640
5	14.95	29.90	29.53	50.53	133.00	1540
6	14.95	29.90	3.94	54.47	133.00	1660
7	14.95	29.90	3.94	58.41	133.00	1780
Rear (8)	14.95	29.90	3.94	62.35	133.00	1900
<b>Totals</b>	<b>124.99</b>	<b>249.99</b>	<b>62.35</b>		<b>1112.0</b>	
				Resultant at location:	34.182	1042
				Distance to Axle # 4, "xR":	13.182	(Rear of Axle # 4)



**100 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Rear #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Axle # 4 at Mid-span	29.00	42.12	46.06	50.00	79.53	83.47	87.41	91.35	91.35	8.65
"xR/4" to Rear of Axle # 4	25.70	38.82	42.76	46.70	76.23	80.17	84.11	88.05	88.05	11.95
Midway btwn Resultant & Axle # 4	22.41	35.53	39.47	43.41	72.94	76.88	80.82	84.76	84.76	15.24
"xR/4" Forward of Resultant Pos	19.11	32.23	36.17	40.11	69.64	73.58	77.52	81.46	81.46	18.54
Resultant at Mid-span	15.82	28.94	32.88	36.82	66.35	70.29	74.23	78.17	78.17	21.83

	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Middle #4 Axle	Shear at Middle #5 Axle	Shear at Middle #6 Axle	Shear at Middle #7 Axle	Shear at Rear #8 Axle	Shear at Rear #9 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	RB
	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips
Axle # 4 at Mid-span	92.04	66.86	31.79	-3.28	-38.35	-68.25	-98.15	-128.05	-157.95	-157.95	157.95
"xR/4" to Rear of Axle # 4	100.28	75.10	40.03	4.96	-30.11	-60.01	-89.91	-119.81	-149.71	-149.71	149.71
Midway btwn Resultant & Axle # 4	108.52	83.34	48.27	13.20	-21.87	-51.77	-81.67	-111.57	-141.47	-141.47	141.47
"xR/4" Forward of Resultant Pos	116.76	91.58	56.51	21.44	-13.63	-43.53	-73.43	-103.33	-133.23	-133.23	133.23
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99

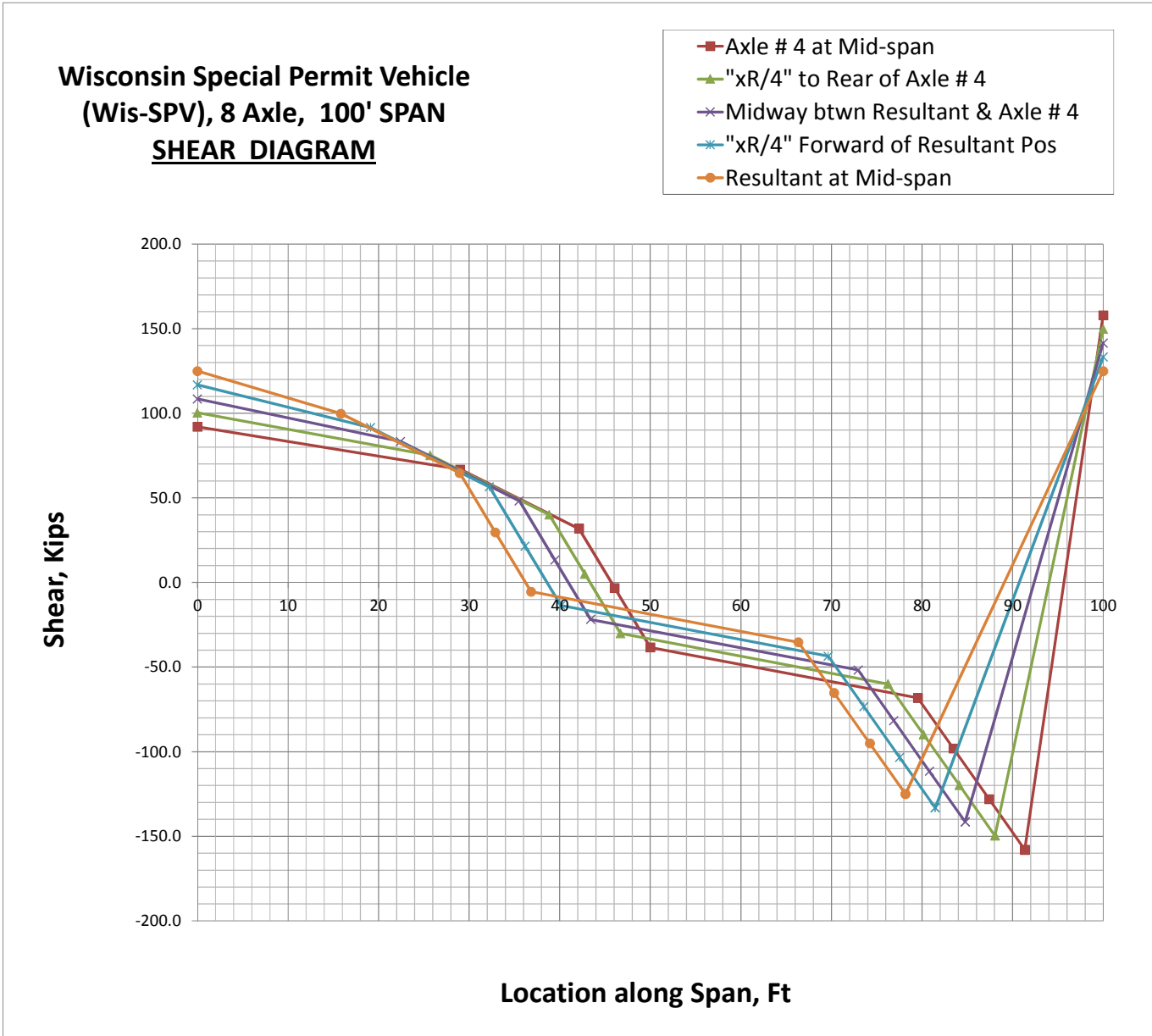
	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Middle #4 Axle	Mom Area to Middle #5 Axle	Mom Area to Middle #6 Axle	Mom Area to Middle #7 Axle	Mom Area to Rear #8 Axle	Mom Area to Rear #9 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-5	MA-6	MA-7	MA-8	MA-9	MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Axle # 4 at Mid-span	2,669.19	877.23	125.26	-12.91	-1,132.41	-268.90	-386.70	-504.51	0.00	-1,366.25
"xR/4" to Rear of Axle # 4	2,577.63	985.32	157.72	19.54	-889.13	-236.44	-354.24	-472.05	0.00	-1,788.35
Midway btwn Resultant & Axle # 4	2,431.77	1,093.41	190.18	52.00	-645.85	-203.98	-321.78	-439.59	0.00	-2,156.16
"xR/4" Forward of Resultant Pos	2,231.62	1,201.49	222.64	84.46	-402.57	-171.52	-289.33	-407.13	0.00	-2,469.66
Resultant at Mid-span	1,977.17	1,309.58	255.10	116.92	-159.30	-139.06	-256.87	-374.67	0.00	-2,728.87

Wisconsin Special Permit Vehicle (Wis-SPV), on 100' Span											
	Sum Moment at Beam End, ft- kips	Sum Moment to Front #1 Axle, ft-kips	Sum Moment to Mid #2 Axle, ft-kips	Sum Moment to Mid #3 Axle, ft-kips	Sum Moment to Mid #4 Axle, ft-kips	Sum Moment to Mid #5 Axle, ft-kips	Sum Moment to Mid #6 Axle, ft-kips	Sum Moment to Mid #7 Axle, ft-kips	Sum Moment to Rear #8 Axle, ft-kips	Sum Moment to Rear #9 Axle, ft-kips	Sum Moment to Beam End, ft- kips
	M-RA-End ft-kips	M-1 ft-kips	M-2 ft-kips	M-3 ft-kips	M-4 ft-kips	M-5 ft-kips	M-6 ft-kips	M-7 ft-kips	M-8 ft-kips	M-9 ft-kips	M-RB-End ft-kips
Axle # 4 at Mid-span	0.00	2,669.19	3,546.42	3,671.68	3,658.77	2,526.36	2,257.46	1,870.76	1,366.25	1,366.25	0.00
"xR/4" to Rear of Axle # 4	0.00	2,577.63	3,562.95	3,720.67	3,740.21	2,851.08	2,614.65	2,260.40	1,788.35	1,788.35	0.00
Midway btwn Resultant & Axle # 4	0.00	2,431.77	3,525.18	3,715.36	3,767.36	3,121.51	2,917.53	2,595.75	2,156.16	2,156.16	0.00
"xR/4" Forward of Resultant Pos	0.00	2,231.62	3,433.11	3,655.75	3,740.21	3,337.64	3,166.12	2,876.80	2,469.66	2,469.66	0.00
Resultant at Mid-span	0.00	1,977.17	3,286.75	3,541.84	3,658.77	3,499.47	3,360.41	3,103.54	2,728.87	2,728.87	0.00

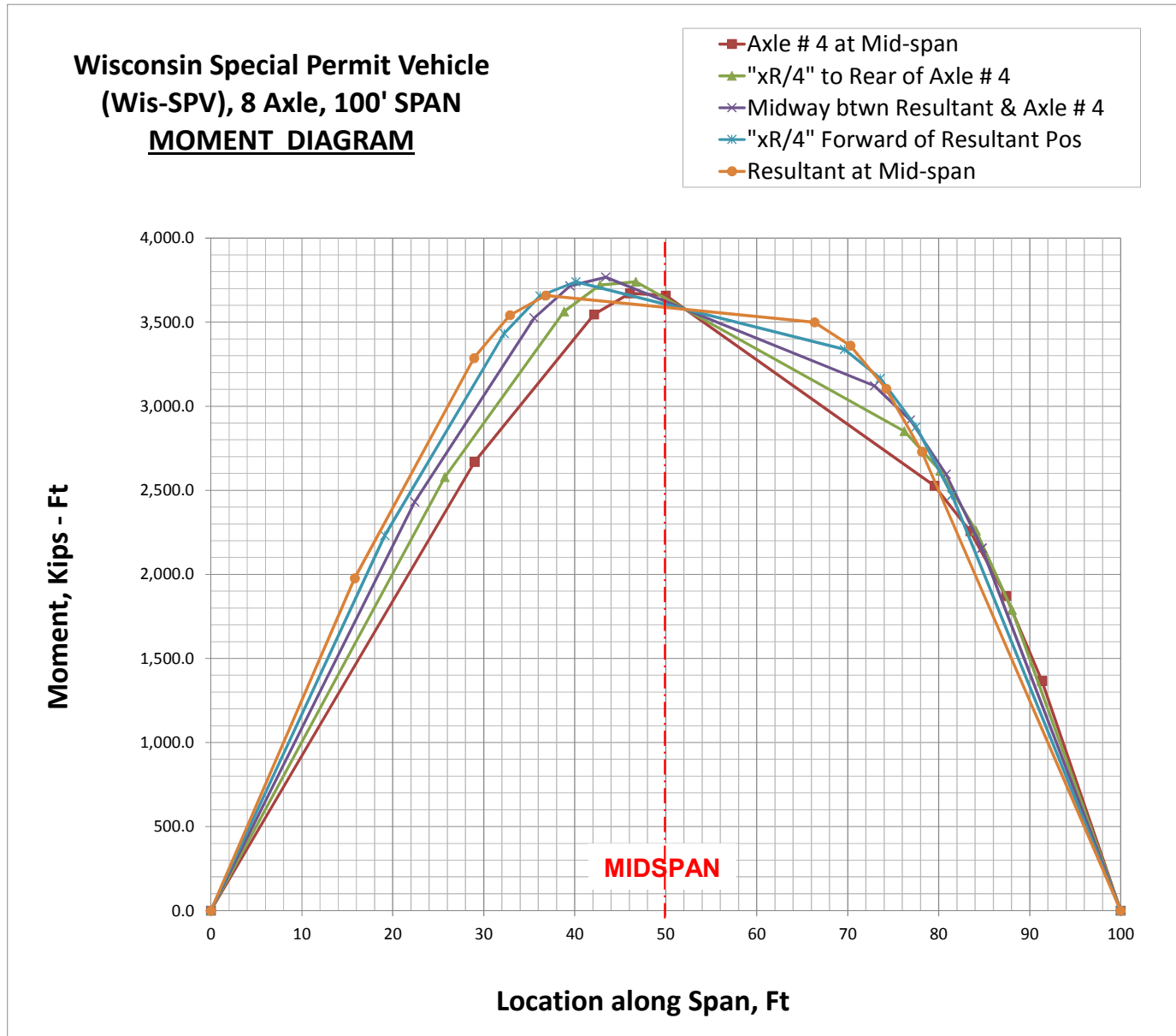
SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
Axle # 4 at Mid-span	92.04	66.86	31.79	-3.28	-38.35	-68.25	-98.15	-128.05	-157.95	-157.95	157.95
POS	0.00	29.00	42.12	46.06	50.00	79.53	83.47	87.41	91.35	91.35	100.00
"xR/4" to Rear of Axle # 4	100.28	75.10	40.03	4.96	-30.11	-60.01	-89.91	-119.81	-149.71	-149.71	149.71
POS	0.00	25.70	38.82	42.76	46.70	76.23	80.17	84.11	88.05	88.05	100.00
Midway btwn Resultant & Axle # 4	108.52	83.34	48.27	13.20	-21.87	-51.77	-81.67	-111.57	-141.47	-141.47	141.47
POS	0.00	22.41	35.53	39.47	43.41	72.94	76.88	80.82	84.76	84.76	100.00
"xR/4" Forward of Resultant Pos	116.76	91.58	56.51	21.44	-13.63	-43.53	-73.43	-103.33	-133.23	-133.23	133.23
POS	0.00	19.11	32.23	36.17	40.11	69.64	73.58	77.52	81.46	81.46	100.00
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99
POS	0.00	15.82	28.94	32.88	36.82	66.35	70.29	74.23	78.17	78.17	100.00

MOMENT	Moment at React A, ft- kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Rear #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft- kips
Axle # 4 at Mid-span	0.0	2,669.2	3,546.4	3,671.7	3,658.8	2,526.4	2,257.5	1,870.8	1,366.2	1,366.2	0.0
POS	0.00	29.00	42.12	46.06	50.00	79.53	83.47	87.41	91.35	91.35	100.00
"xR/4" to Rear of Axle # 4	0.0	2,577.6	3,562.9	3,720.7	3,740.2	2,851.1	2,614.6	2,260.4	1,788.4	1,788.4	0.0
POS	0.00	25.70	38.82	42.76	46.70	76.23	80.17	84.11	88.05	88.05	100.00
Midway btwn Resultant & Axle # 4	0.0	2,431.8	3,525.2	3,715.4	3,767.4	3,121.5	2,917.5	2,595.7	2,156.2	2,156.2	0.0
POS	0.00	22.41	35.53	39.47	43.41	72.94	76.88	80.82	84.76	84.76	100.00
"xR/4" Forward of Resultant Pos	0.0	2,231.62	3,433.11	3,655.75	3,740.21	3,337.64	3,166.12	2,876.80	2,469.66	2,469.66	0.00
POS	0.00	19.11	32.23	36.17	40.11	69.64	73.58	77.52	81.46	81.46	100.00
Resultant at Mid-span	0.0	1,977.17	3,286.75	3,541.84	3,658.77	3,499.47	3,360.41	3,103.54	2,728.87	2,728.87	0.00
POS	0.00	15.82	28.94	32.88	36.82	66.35	70.29	74.23	78.17	78.17	100.00

**Wisconsin Special Permit Vehicle (Wis-SPV), on 100' Span**

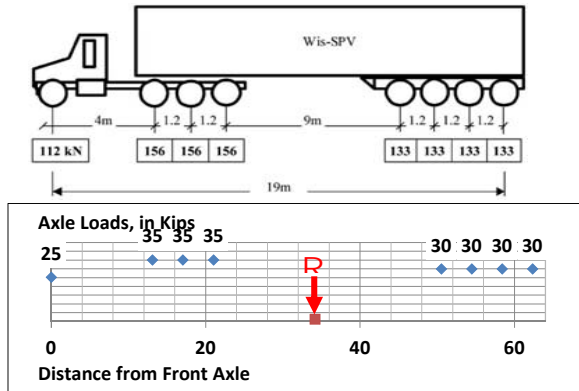


**Wisconsin Special Permit Vehicle (Wis-SPV), on 100' Span**



**EIGHT (8) AXLE** **Wisconsin Special Permit Vehicle (Wis-SPV), on 200' Span**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	12.59	25.18		0.00	112.00	0
2	17.54	35.07	13.12	13.12	156.00	400
3	17.54	35.07	3.94	17.06	156.00	520
4	17.54	35.07	3.94	21.00	156.00	640
5	14.95	29.90	29.53	50.53	133.00	1540
6	14.95	29.90	3.94	54.47	133.00	1660
7	14.95	29.90	3.94	58.41	133.00	1780
Rear (8)	14.95	29.90	3.94	62.35	133.00	1900
<b>Totals</b>	<b>124.99</b>	<b>249.99</b>	<b>62.35</b>		<b>1112.0</b>	
Resultant at location:				34.182		1042
Distance to Axle # 4, "xR":				13.182	(Rear of Axle # 4)	



**200 ft Span Length**

	Front #1 Axle Position AX 1	Middle #2 Axle Position AX 2	Middle #3 Axle Position AX 3	Middle #4 Axle Position AX 4	Middle #5 Axle Position AX 5	Middle #6 Axle Position AX 6	Middle #7 Axle Position AX 7	Rear #8 Axle Position AX 8	Rear #9 Axle Position AX 9	Dist to Beam End L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Axle # 4 at Mid-span	79.00	92.12	96.06	100.00	129.53	133.47	137.41	141.35	141.35	58.65
"xR/4" to Rear of Axle # 4	75.70	88.82	92.76	96.70	126.23	130.17	134.11	138.05	138.05	61.95
Midway btwn Resultant & Axle # 4	72.41	85.53	89.47	93.41	122.94	126.88	130.82	134.76	134.76	65.24
"xR/4" Forward of Resultant Pos	69.11	82.23	86.17	90.11	119.64	123.58	127.52	131.46	131.46	68.54
Resultant at Mid-span	65.82	78.94	82.88	86.82	116.35	120.29	124.23	128.17	128.17	71.83

	Reaction at Support "A"	Shear at Front #1 Axle R-1	Shear at Middle #2 Axle R-2	Shear at Middle #3 Axle R-3	Shear at Middle #4 Axle R-4	Shear at Middle #5 Axle R-5	Shear at Middle #6 Axle R-6	Shear at Middle #7 Axle R-7	Shear at Rear #8 Axle R-8	Shear at Rear #9 Axle R-9	Reaction at Support "B"
	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips
Axle # 4 at Mid-span	108.52	83.34	48.27	13.20	-21.87	-51.77	-81.67	-111.57	-141.47	-141.47	141.47
"xR/4" to Rear of Axle # 4	112.64	87.46	52.39	17.32	-17.75	-47.65	-77.55	-107.45	-137.35	-137.35	137.35
Midway btwn Resultant & Axle # 4	116.76	91.58	56.51	21.44	-13.63	-43.53	-73.43	-103.33	-133.23	-133.23	133.23
"xR/4" Forward of Resultant Pos	120.88	95.70	60.63	25.56	-9.51	-39.41	-69.31	-99.21	-129.11	-129.11	129.11
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99

	Mom Area to Front #1 Axle MA-1	Mom Area to Middle #2 Axle MA-2	Mom Area to Middle #3 Axle MA-3	Mom Area to Middle #4 Axle MA-4	Mom Area to Middle #5 Axle MA-5	Mom Area to Middle #6 Axle MA-6	Mom Area to Middle #7 Axle MA-7	Mom Area to Rear #8 Axle MA-8	Mom Area to Rear #9 Axle MA-9	Mom Area to Beam End MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Axle # 4 at Mid-span	8,572.90	1,093.41	190.18	52.00	-645.85	-203.98	-321.78	-439.59	0.00	-8,297.28
"xR/4" to Rear of Axle # 4	8,527.12	1,147.45	206.41	68.23	-524.21	-187.75	-305.55	-423.36	0.00	-8,508.33
Midway btwn Resultant & Axle # 4	8,454.19	1,201.49	222.64	84.46	-402.57	-171.52	-289.33	-407.13	0.00	-8,692.23
"xR/4" Forward of Resultant Pos	8,354.11	1,255.54	238.87	100.69	-280.94	-155.29	-273.10	-390.90	0.00	-8,848.99
Resultant at Mid-span	8,226.89	1,309.58	255.10	116.92	-159.30	-139.06	-256.87	-374.67	0.00	-8,978.59



<b>EIGHT (8) AXLE</b>												<b>Wisconsin Special Permit Vehicle (Wis-SPV), on 200' Span</b>											
	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum						
	Moment at	Moment to	Moment to	Moment to	Moment to	Moment to	Moment to	Moment to	Moment to	Moment to	Moment to	Moment to	Moment to	Moment to	Moment to	Moment to	Moment to						
	Beam End, ft-	Front #1	Mid #2 Axle,	Mid #3 Axle,	Mid #4 Axle,	Mid #5 Axle,	Mid #6 Axle,	Mid #7 Axle,	Mid #8 Axle,	Mid #9 Axle,	Beam End, ft-	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips						
	kips	Axle, ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	kips	M-RA-End	M-1	M-2	M-3	M-4	M-5						
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips						
Axle # 4 at Mid-span	0.00	8,572.90	9,666.30	9,856.48	9,908.49	9,262.63	9,058.65	8,736.87	8,297.28	8,297.28	0.00												
"xR/4" to Rear of Axle # 4	0.00	8,527.12	9,674.57	9,880.98	9,949.21	9,425.00	9,237.25	8,931.69	8,508.33	8,508.33	0.00												
Midway btwn Resultant & Axle # 4	0.00	8,454.19	9,655.68	9,878.32	9,962.78	9,560.21	9,388.69	9,099.37	8,692.23	8,692.23	0.00												
"xR/4" Forward of Resultant Pos	0.00	8,354.11	9,609.65	9,848.52	9,949.21	9,668.27	9,512.99	9,239.89	8,848.99	8,848.99	0.00												
Resultant at Mid-span	0.00	8,226.89	9,536.47	9,791.56	9,908.49	9,749.19	9,610.13	9,353.26	8,978.59	8,978.59	0.00												

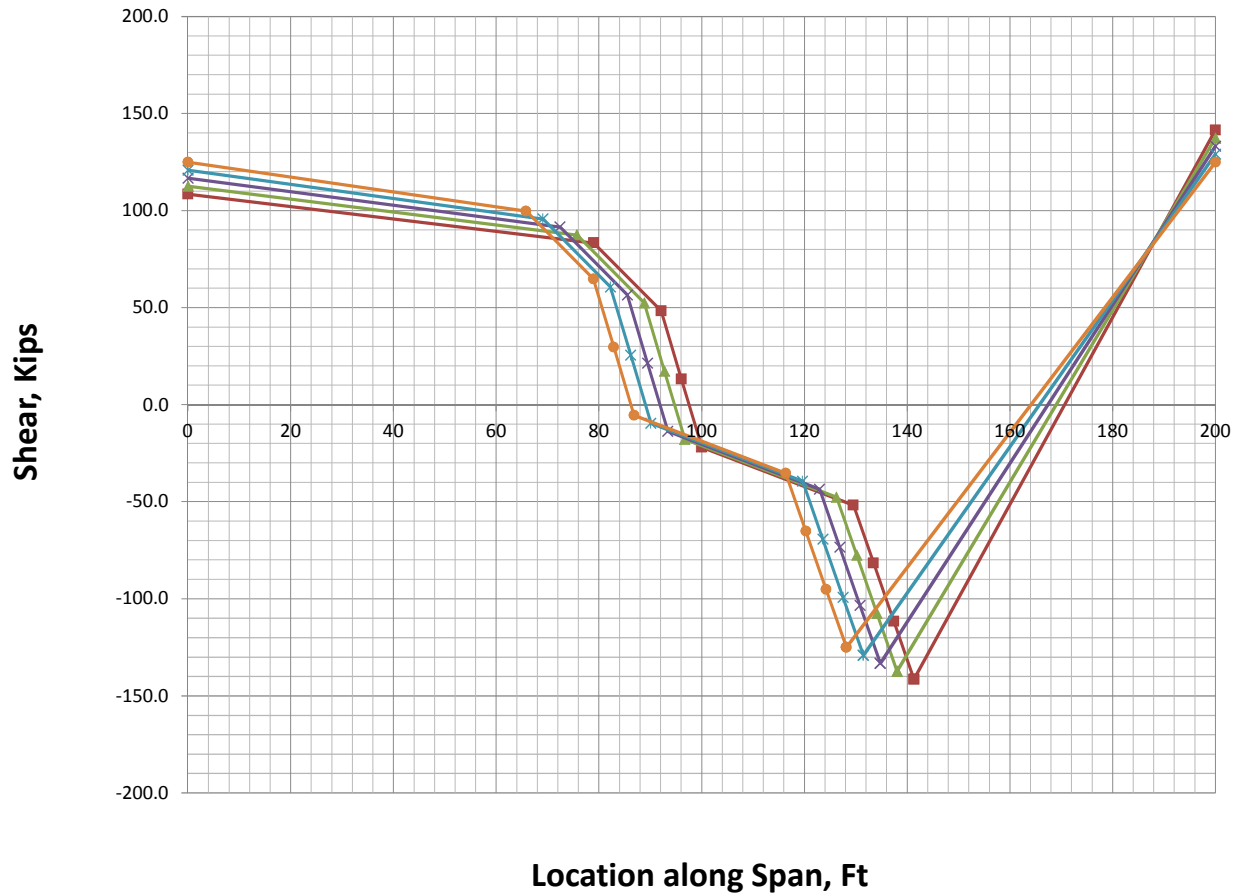
SHEAR	Shear at	Shear at	Shear at Mid	Shear at Mid	Shear at Mid	Shear at Mid	Shear at Mid	Shear at Mid	Shear at Mid	Shear at	Shear at	Shear at
	React A, kips	Front #1	Mid #2 Axle, kips	Mid #3 Axle, kips	Mid #4 Axle, kips	Mid #5 Axle, kips	Mid #6 Axle, kips	Mid #7 Axle, kips	Mid #8 Axle, kips	Rear #8 Axle, kips	Rear #9 Axle, kips	React B, kips
Axle # 4 at Mid-span	108.52	83.34	48.27	13.20	-21.87	-51.77	-81.67	-111.57	-141.47	-141.47	-141.47	141.47
POS	0.00	79.00	92.12	96.06	100.00	129.53	133.47	137.41	141.35	141.35	141.35	200.00
"xR/4" to Rear of Axle # 4	112.64	87.46	52.39	17.32	-17.75	-47.65	-77.55	-107.45	-137.35	-137.35	-137.35	137.35
POS	0.00	75.70	88.82	92.76	96.70	126.23	130.17	134.11	138.05	138.05	138.05	200.00
Midway btwn Resultant & Axle # 4	116.76	91.58	56.51	21.44	-13.63	-43.53	-73.43	-103.33	-133.23	-133.23	-133.23	133.23
POS	0.00	72.41	85.53	89.47	93.41	122.94	126.88	130.82	134.76	134.76	134.76	200.00
"xR/4" Forward of Resultant Pos	120.88	95.70	60.63	25.56	-9.51	-39.41	-69.31	-99.21	-129.11	-129.11	-129.11	129.11
POS	0.00	69.11	82.23	86.17	90.11	119.64	123.58	127.52	131.46	131.46	131.46	200.00
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	-124.99	124.99
POS	0.00	65.82	78.94	82.88	86.82	116.35	120.29	124.23	128.17	128.17	128.17	200.00

MOMENT	Moment at	Moment at	Moment at	Moment at	Moment at	Moment at	Moment at	Moment at	Moment at	Moment at	Moment at	Moment at
	React A, ft-	Front #1	Mid #2 Axle, ft-kips	Mid #3 Axle, ft-kips	Mid #4 Axle, ft-kips	Mid #5 Axle, ft-kips	Mid #6 Axle, ft-kips	Mid #7 Axle, ft-kips	Mid #8 Axle, ft-kips	Mid #9 Axle, ft-kips	React B, ft-	kips
Axle # 4 at Mid-span	0.0	8,572.9	9,666.3	9,856.5	9,908.5	9,262.6	9,058.7	8,736.9	8,297.3	8,297.3	0.0	0.0
POS	0.00	79.00	92.12	96.06	100.00	129.53	133.47	137.41	141.35	141.35	141.35	200.00
"xR/4" to Rear of Axle # 4	0.0	8,527.1	9,674.6	9,881.0	9,949.2	9,425.0	9,237.2	8,931.7	8,508.3	8,508.3	8,508.3	0.0
POS	0.00	75.70	88.82	92.76	96.70	126.23	130.17	134.11	138.05	138.05	138.05	200.00
Midway btwn Resultant & Axle # 4	0.0	8,454.2	9,655.7	9,878.3	9,962.8	9,560.2	9,388.7	9,099.4	8,692.2	8,692.2	8,692.2	0.0
POS	0.00	72.41	85.53	89.47	93.41	122.94	126.88	130.82	134.76	134.76	134.76	200.00
"xR/4" Forward of Resultant Pos	0.0	8,354.11	9,609.65	9,848.52	9,949.21	9,668.27	9,512.99	9,239.89	8,848.99	8,848.99	8,848.99	0.00
POS	0.00	69.11	82.23	86.17	90.11	119.64	123.58	127.52	131.46	131.46	131.46	200.00
Resultant at Mid-span	0.0	8,226.89	9,536.47	9,791.56	9,908.49	9,749.19	9,610.13	9,353.26	8,978.59	8,978.59	8,978.59	0.00
POS	0.00	65.82	78.94	82.88	86.82	116.35	120.29	124.23	128.17	128.17	128.17	200.00

**EIGHT (8) AXLE**      **Wisconsin Special Permit Vehicle (Wis-SPV), on 200' Span**

**Wisconsin Special Permit Vehicle  
 (Wis-SPV), 8 Axle, 200' SPAN  
SHEAR DIAGRAM**

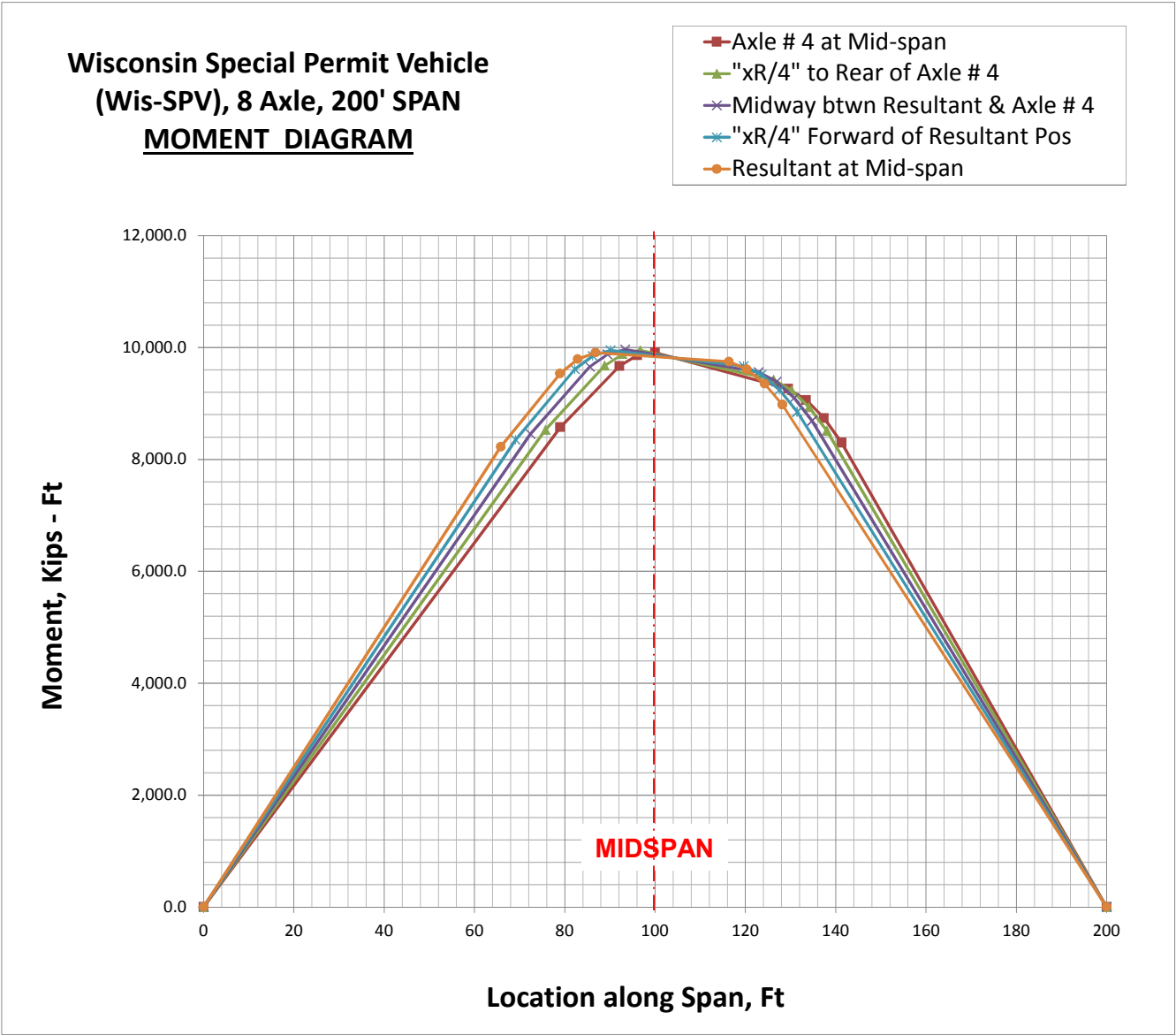
- Axle # 4 at Mid-span
- ▲ "xR/4" to Rear of Axle # 4
- ✕ Midway btwn Resultant & Axle # 4
- ✧ "xR/4" Forward of Resultant Pos
- Resultant at Mid-span



**EIGHT (8) AXLE**      **Wisconsin Special Permit Vehicle (Wis-SPV), on 200' Span**

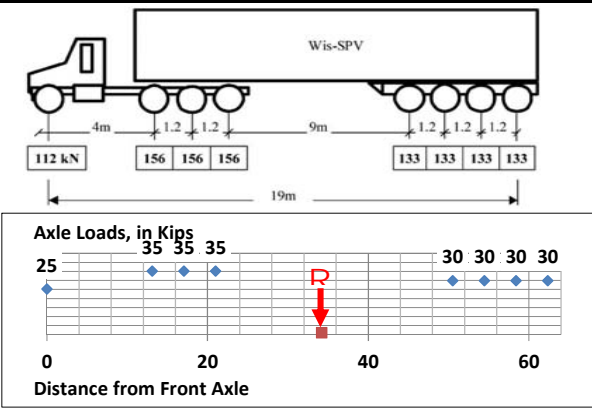
**Wisconsin Special Permit Vehicle  
(Wis-SPV), 8 Axle, 200' SPAN  
MOMENT DIAGRAM**

- Axle # 4 at Mid-span
- ▲ "xR/4" to Rear of Axle # 4
- ✕ Midway btwn Resultant & Axle # 4
- ✧ "xR/4" Forward of Resultant Pos
- Resultant at Mid-span



**EIGHT (8) AXLE Wisconsin Special Permit Vehicle (Wis-SPV), on 300' Span**

Axle	Load (ST)	Load (kips)	SI / Metric Units		
			Distance btwn axles (ft)	Distance from front axle (ft)	Distance from front axle (cm)
(Front) 1	12.59	25.18		0.00	112.00
2	17.54	35.07	13.12	13.12	156.00
3	17.54	35.07	3.94	17.06	156.00
4	17.54	35.07	3.94	21.00	156.00
5	14.95	29.90	29.53	50.53	133.00
6	14.95	29.90	3.94	54.47	133.00
7	14.95	29.90	3.94	58.41	133.00
Rear (8)	14.95	29.90	3.94	62.35	133.00
<b>Totals</b>	<b>124.99</b>	<b>249.99</b>	<b>62.35</b>		<b>1112.0</b>
Resultant at location:				34.182	1042
Distance to Axle # 4, "xR":				13.182	(Rear of Axle # 4)



**300 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Rear #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Axle # 4 at Mid-span	129.00	142.12	146.06	150.00	179.53	183.47	187.41	191.35	191.35	108.65
"xR/4" to Rear of Axle # 4	125.70	138.82	142.76	146.70	176.23	180.17	184.11	188.05	188.05	111.95
Midway btwn Resultant & Axle # 4	122.41	135.53	139.47	143.41	172.94	176.88	180.82	184.76	184.76	115.24
"xR/4" Forward of Resultant Pos	119.11	132.23	136.17	140.11	169.64	173.58	177.52	181.46	181.46	118.54
Resultant at Mid-span	115.82	128.94	132.88	136.82	166.35	170.29	174.23	178.17	178.17	121.83

	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Middle #4 Axle	Shear at Middle #5 Axle	Shear at Middle #6 Axle	Shear at Middle #7 Axle	Shear at Rear #8 Axle	Shear at Rear #9 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	RB
	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips
Axle # 4 at Mid-span	114.01	88.83	53.76	18.69	-16.38	-46.28	-76.18	-106.08	-135.98	-135.98	135.98
"xR/4" to Rear of Axle # 4	116.76	91.58	56.51	21.44	-13.63	-43.53	-73.43	-103.33	-133.23	-133.23	133.23
Midway btwn Resultant & Axle # 4	119.50	94.32	59.25	24.18	-10.89	-40.79	-70.69	-100.59	-130.49	-130.49	130.49
"xR/4" Forward of Resultant Pos	122.25	97.07	62.00	26.93	-8.14	-38.04	-67.94	-97.84	-127.74	-127.74	127.74
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Middle #4 Axle	Mom Area to Middle #5 Axle	Mom Area to Middle #6 Axle	Mom Area to Middle #7 Axle	Mom Area to Rear #8 Axle	Mom Area to Rear #9 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-5	MA-6	MA-7	MA-8	MA-9	MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Axle # 4 at Mid-span	14,707.28	1,165.46	211.82	73.64	-483.67	-182.34	-300.14	-417.95	0.00	-14,774.10
"xR/4" to Rear of Axle # 4	14,676.76	1,201.49	222.64	84.46	-402.57	-171.52	-289.33	-407.13	0.00	-14,914.81
Midway btwn Resultant & Axle # 4	14,628.14	1,237.52	233.46	95.28	-321.48	-160.70	-278.51	-396.31	0.00	-15,037.41
"xR/4" Forward of Resultant Pos	14,561.42	1,273.55	244.28	106.10	-240.39	-149.88	-267.69	-385.49	0.00	-15,141.91
Resultant at Mid-span	14,476.61	1,309.58	255.10	116.92	-159.30	-139.06	-256.87	-374.67	0.00	-15,228.31

<b>EIGHT (8) AXLE</b>		<b>Wisconsin Special Permit Vehicle (Wis-SPV), on 300' Span</b>									
	Sum Moment at Beam End, ft- kips	Sum Moment to Front #1 Axle, ft-kips	Sum Moment to Mid #2 Axle, ft-kips	Sum Moment to Mid #3 Axle, ft-kips	Sum Moment to Mid #4 Axle, ft-kips	Sum Moment to Mid #5 Axle, ft-kips	Sum Moment to Mid #6 Axle, ft-kips	Sum Moment to Mid #7 Axle, ft-kips	Sum Moment to Rear #8 Axle, ft-kips	Sum Moment to Rear #9 Axle, ft-kips	Sum Moment to Beam End, ft- kips
	M-RA-End ft-kips	M-1 ft-kips	M-2 ft-kips	M-3 ft-kips	M-4 ft-kips	M-5 ft-kips	M-6 ft-kips	M-7 ft-kips	M-8 ft-kips	M-9 ft-kips	M-RB-End ft-kips
Axle # 4 at Mid-span	0.00	14,707.28	15,872.74	16,084.56	16,158.21	15,674.54	15,492.20	15,192.05	14,774.10	14,774.10	0.00
"xR/4" to Rear of Axle # 4	0.00	14,676.76	15,878.25	16,100.89	16,185.36	15,782.78	15,611.26	15,321.94	14,914.81	14,914.81	0.00
Midway btwn Resultant & Axle # 4	0.00	14,628.14	15,865.66	16,099.12	16,194.40	15,872.92	15,712.22	15,433.72	15,037.41	15,037.41	0.00
"xR/4" Forward of Resultant Pos	0.00	14,561.42	15,834.97	16,079.25	16,185.36	15,944.97	15,795.09	15,527.40	15,141.91	15,141.91	0.00
Resultant at Mid-span	0.00	14,476.61	15,786.19	16,041.28	16,158.21	15,998.91	15,859.85	15,602.98	15,228.31	15,228.31	0.00

<b>SHEAR</b>	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
Axle # 4 at Mid-span	114.01	88.83	53.76	18.69	-16.38	-46.28	-76.18	-106.08	-135.98	-135.98	135.98
POS	0.00	129.00	142.12	146.06	150.00	179.53	183.47	187.41	191.35	191.35	300.00
"xR/4" to Rear of Axle # 4	116.76	91.58	56.51	21.44	-13.63	-43.53	-73.43	-103.33	-133.23	-133.23	133.23
POS	0.00	125.70	138.82	142.76	146.70	176.23	180.17	184.11	188.05	188.05	300.00
Midway btwn Resultant & Axle # 4	119.50	94.32	59.25	24.18	-10.89	-40.79	-70.69	-100.59	-130.49	-130.49	130.49
POS	0.00	122.41	135.53	139.47	143.41	172.94	176.88	180.82	184.76	184.76	300.00
"xR/4" Forward of Resultant Pos	122.25	97.07	62.00	26.93	-8.14	-38.04	-67.94	-97.84	-127.74	-127.74	127.74
POS	0.00	119.11	132.23	136.17	140.11	169.64	173.58	177.52	181.46	181.46	300.00
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99
POS	0.00	115.82	128.94	132.88	136.82	166.35	170.29	174.23	178.17	178.17	300.00

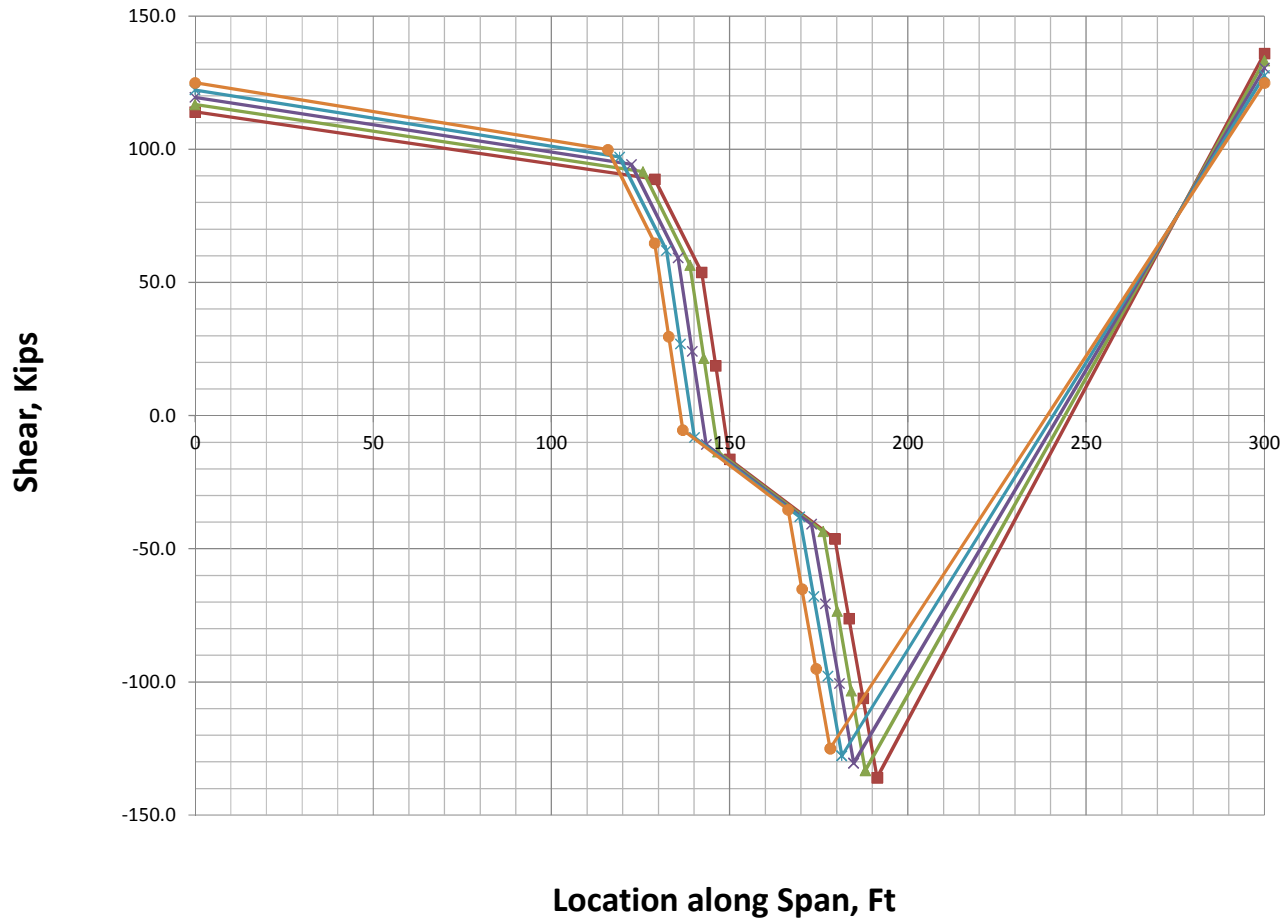
<b>MOMENT</b>	Moment at React A, ft- kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Rear #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft- kips
Axle # 4 at Mid-span	0.0	14,707.3	15,872.7	16,084.6	16,158.2	15,674.5	15,492.2	15,192.1	14,774.1	14,774.1	0.0
POS	0.00	129.00	142.12	146.06	150.00	179.53	183.47	187.41	191.35	191.35	300.00
"xR/4" to Rear of Axle # 4	0.0	14,676.8	15,878.3	16,100.9	16,185.4	15,782.8	15,611.3	15,321.9	14,914.8	14,914.8	0.0
POS	0.00	125.70	138.82	142.76	146.70	176.23	180.17	184.11	188.05	188.05	300.00
Midway btwn Resultant & Axle # 4	0.0	14,628.1	15,865.7	16,099.1	16,194.4	15,872.9	15,712.2	15,433.7	15,037.4	15,037.4	0.0
POS	0.00	122.41	135.53	139.47	143.41	172.94	176.88	180.82	184.76	184.76	300.00
"xR/4" Forward of Resultant Pos	0.0	14,561.42	15,834.97	16,079.25	16,185.36	15,944.97	15,795.09	15,527.40	15,141.91	15,141.91	0.00
POS	0.00	119.11	132.23	136.17	140.11	169.64	173.58	177.52	181.46	181.46	300.00
Resultant at Mid-span	0.0	14,476.61	15,786.19	16,041.28	16,158.21	15,998.91	15,859.85	15,602.98	15,228.31	15,228.31	0.00
POS	0.00	115.82	128.94	132.88	136.82	166.35	170.29	174.23	178.17	178.17	300.00

**EIGHT (8) AXLE**

**Wisconsin Special Permit Vehicle (Wis-SPV), on 300' Span**

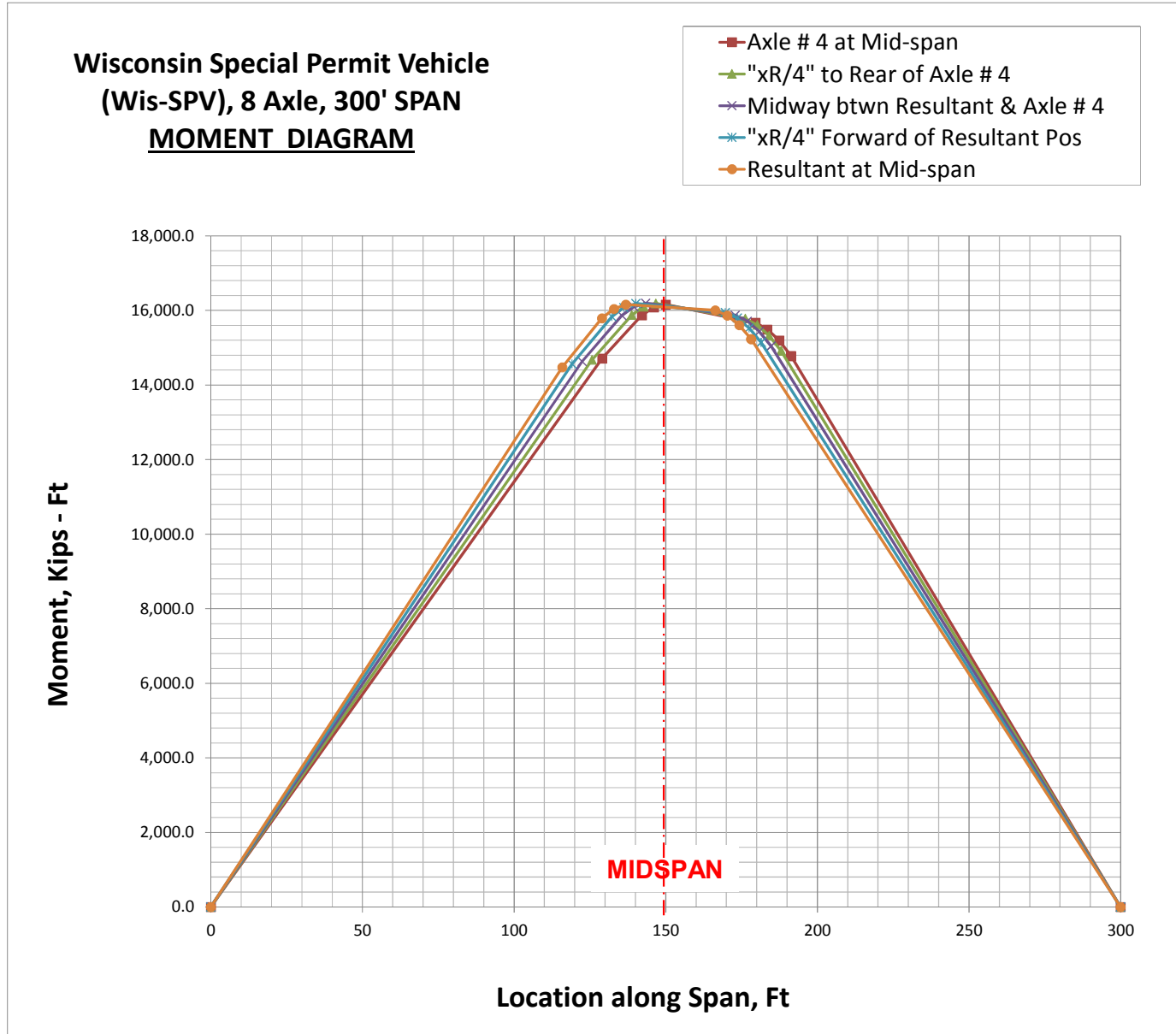
**Wisconsin Special Permit Vehicle  
(Wis-SPV), 8 Axle, 300' SPAN  
SHEAR DIAGRAM**

- Axle # 4 at Mid-span
- ▲ "xR/4" to Rear of Axle # 4
- × Midway btwn Resultant & Axle # 4
- ✦ "xR/4" Forward of Resultant Pos
- Resultant at Mid-span



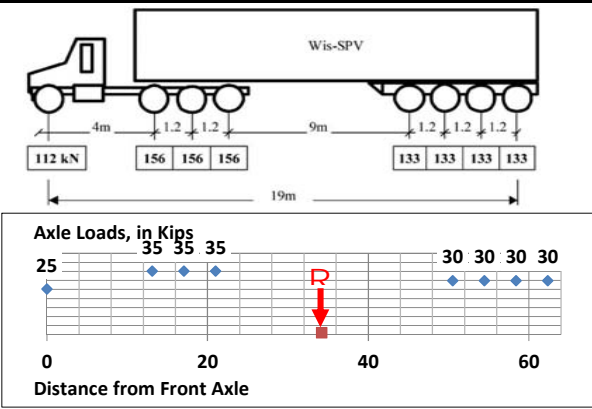
**EIGHT (8) AXLE**

**Wisconsin Special Permit Vehicle (Wis-SPV), on 300' Span**



**EIGHT (8) AXLE Wisconsin Special Permit Vehicle (Wis-SPV), on 400' Span**

Axle	Load (ST)	Load (kips)	SI / Metric Units			
			Distance btwn axles (ft)	Distance from front axle (ft)	Distance from front axle (cm)	Load (kN)
(Front) 1	12.59	25.18		0.00	112.00	0
2	17.54	35.07	13.12	13.12	156.00	400
3	17.54	35.07	3.94	17.06	156.00	520
4	17.54	35.07	3.94	21.00	156.00	640
5	14.95	29.90	29.53	50.53	133.00	1540
6	14.95	29.90	3.94	54.47	133.00	1660
7	14.95	29.90	3.94	58.41	133.00	1780
Rear (8)	14.95	29.90	3.94	62.35	133.00	1900
<b>Totals</b>	<b>124.99</b>	<b>249.99</b>	<b>62.35</b>		<b>1112.0</b>	
Resultant at location:				34.182		1042
Distance to Axle # 4, "xR":				13.182	(Rear of Axle # 4)	



**400 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Rear #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Axle # 4 at Mid-span	179.00	192.12	196.06	200.00	229.53	233.47	237.41	241.35	241.35	158.65
"xR/4" to Rear of Axle # 4	175.70	188.82	192.76	196.70	226.23	230.17	234.11	238.05	238.05	161.95
Midway btwn Resultant & Axle # 4	172.41	185.53	189.47	193.41	222.94	226.88	230.82	234.76	234.76	165.24
"xR/4" Forward of Resultant Pos	169.11	182.23	186.17	190.11	219.64	223.58	227.52	231.46	231.46	168.54
Resultant at Mid-span	165.82	178.94	182.88	186.82	216.35	220.29	224.23	228.17	228.17	171.83

	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Middle #4 Axle	Shear at Middle #5 Axle	Shear at Middle #6 Axle	Shear at Middle #7 Axle	Shear at Rear #8 Axle	Shear at Rear #9 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	RB
	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips
Axle # 4 at Mid-span	116.76	91.58	56.51	21.44	-13.63	-43.53	-73.43	-103.33	-133.23	-133.23	133.23
"xR/4" to Rear of Axle # 4	118.82	93.64	58.57	23.50	-11.57	-41.47	-71.37	-101.27	-131.17	-131.17	131.17
Midway btwn Resultant & Axle # 4	120.88	95.70	60.63	25.56	-9.51	-39.41	-69.31	-99.21	-129.11	-129.11	129.11
"xR/4" Forward of Resultant Pos	122.93	97.76	62.69	27.62	-7.45	-37.35	-67.25	-97.15	-127.05	-127.05	127.05
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Middle #4 Axle	Mom Area to Middle #5 Axle	Mom Area to Middle #6 Axle	Mom Area to Middle #7 Axle	Mom Area to Rear #8 Axle	Mom Area to Rear #9 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-5	MA-6	MA-7	MA-8	MA-9	MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Axle # 4 at Mid-span	20,899.33	1,201.49	222.64	84.46	-402.57	-171.52	-289.33	-407.13	0.00	-21,137.38
"xR/4" to Rear of Axle # 4	20,876.44	1,228.52	230.75	92.58	-341.76	-163.40	-281.21	-399.02	0.00	-21,242.90
Midway btwn Resultant & Axle # 4	20,839.98	1,255.54	238.87	100.69	-280.94	-155.29	-273.10	-390.90	0.00	-21,334.85
"xR/4" Forward of Resultant Pos	20,789.94	1,282.56	246.98	108.81	-220.12	-147.17	-264.98	-382.79	0.00	-21,413.23
Resultant at Mid-span	20,726.32	1,309.58	255.10	116.92	-159.30	-139.06	-256.87	-374.67	0.00	-21,478.03

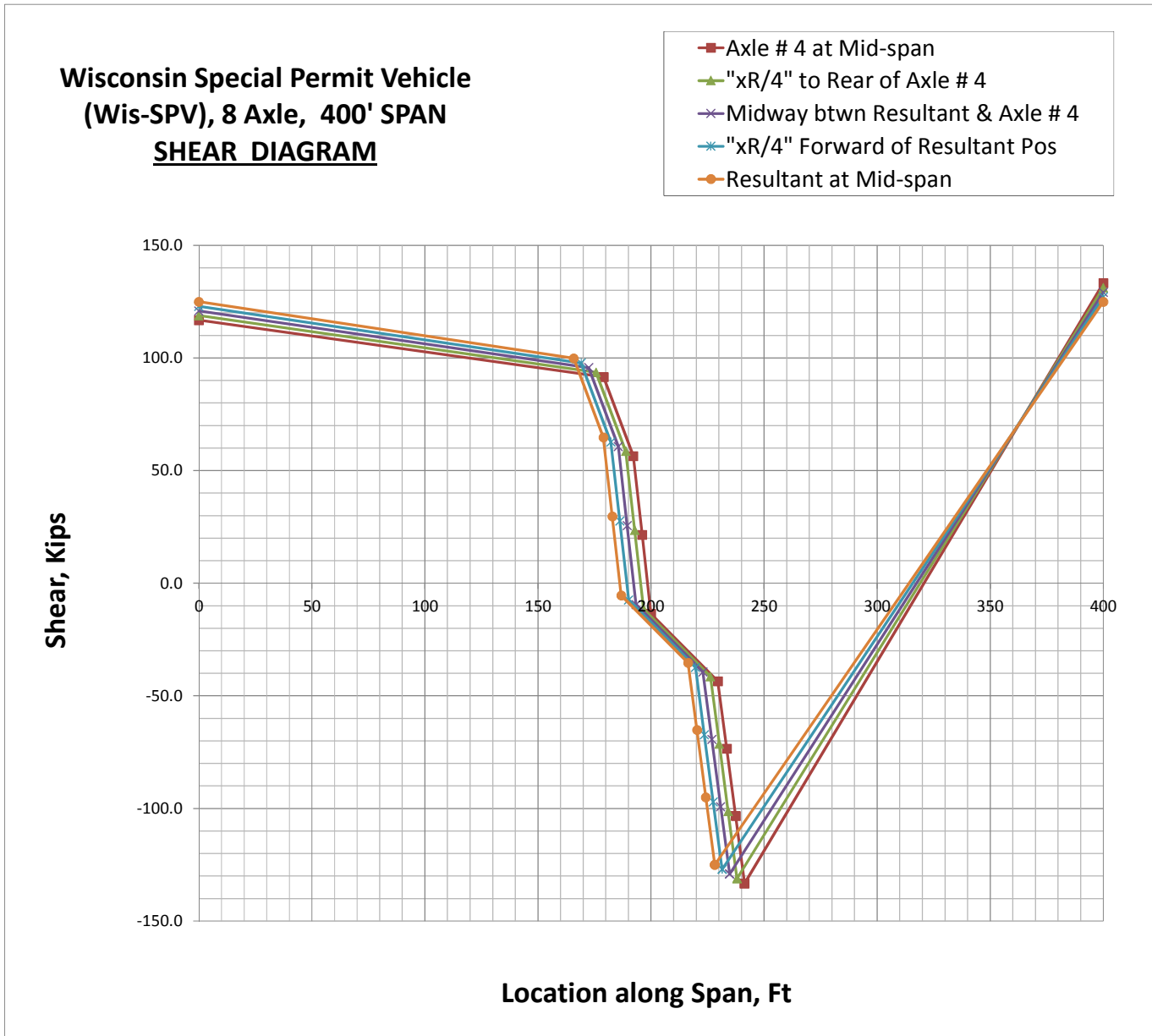


<b>EIGHT (8) AXLE</b>		<b>Wisconsin Special Permit Vehicle (Wis-SPV), on 400' Span</b>									
	Sum Moment at Beam End, ft- kips	Sum Moment to Front #1 Axle, ft-kips	Sum Moment to Mid #2 Axle, ft-kips	Sum Moment to Mid #3 Axle, ft-kips	Sum Moment to Mid #4 Axle, ft-kips	Sum Moment to Mid #5 Axle, ft-kips	Sum Moment to Mid #6 Axle, ft-kips	Sum Moment to Mid #7 Axle, ft-kips	Sum Moment to Rear #8 Axle, ft-kips	Sum Moment to Rear #9 Axle, ft-kips	Sum Moment to Beam End, ft- kips
	M-RA-End ft-kips	M-1 ft-kips	M-2 ft-kips	M-3 ft-kips	M-4 ft-kips	M-5 ft-kips	M-6 ft-kips	M-7 ft-kips	M-8 ft-kips	M-9 ft-kips	M-RB-End ft-kips
Axle # 4 at Mid-span	0.00	20,899.33	22,100.82	22,323.46	22,407.93	22,005.35	21,833.83	21,544.51	21,137.38	21,137.38	0.00
"xR/4" to Rear of Axle # 4	0.00	20,876.44	22,104.96	22,335.71	22,428.29	22,086.53	21,923.13	21,641.92	21,242.90	21,242.90	0.00
Midway btwn Resultant & Axle # 4	0.00	20,839.98	22,095.51	22,334.38	22,435.07	22,154.14	21,998.85	21,725.75	21,334.85	21,334.85	0.00
"xR/4" Forward of Resultant Pos	0.00	20,789.94	22,072.50	22,319.48	22,428.29	22,208.17	22,061.00	21,796.02	21,413.23	21,413.23	0.00
Resultant at Mid-span	0.00	20,726.32	22,035.91	22,291.00	22,407.93	22,248.63	22,109.57	21,852.70	21,478.03	21,478.03	0.00

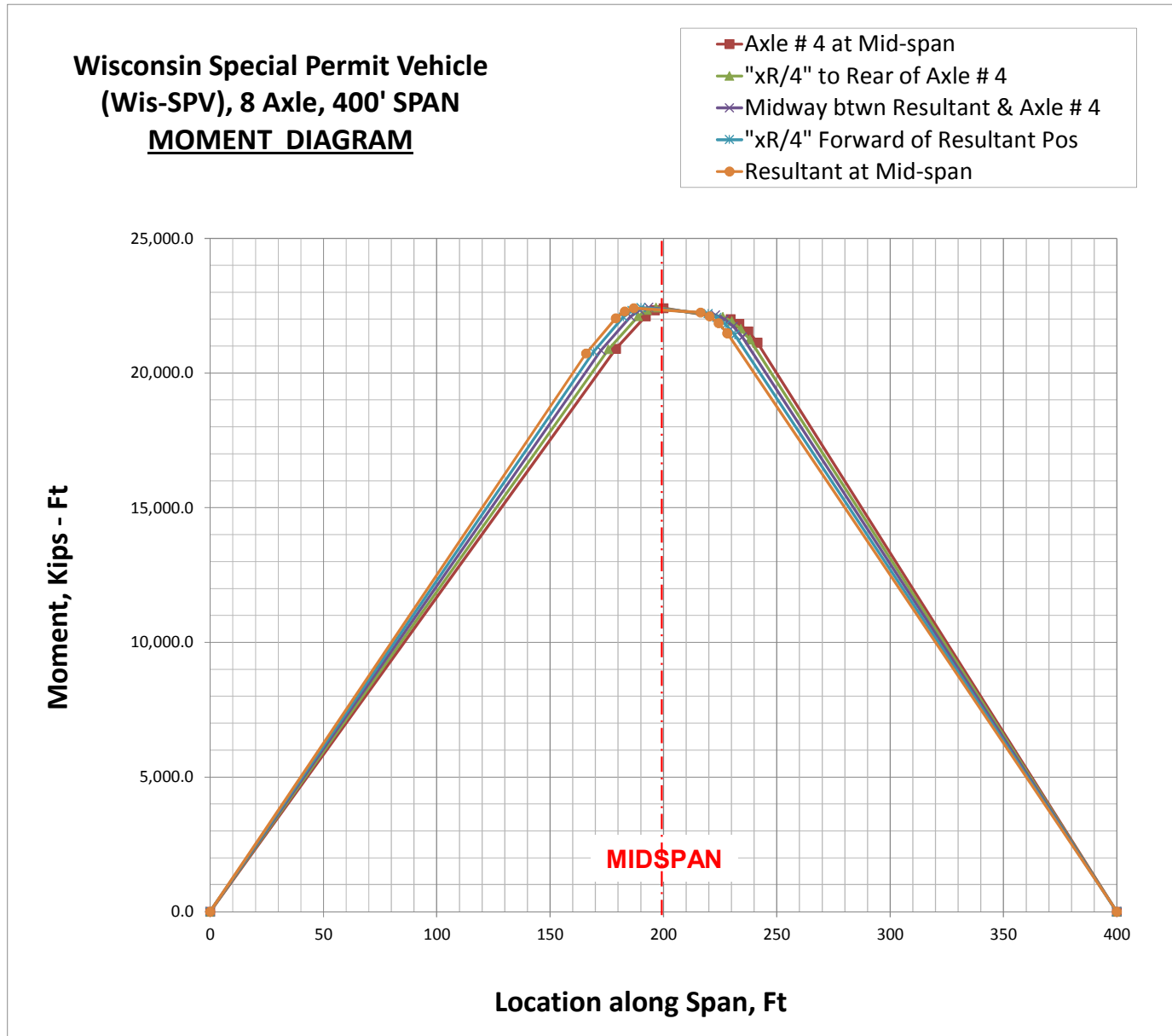
<b>SHEAR</b>	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
Axle # 4 at Mid-span	116.76	91.58	56.51	21.44	-13.63	-43.53	-73.43	-103.33	-133.23	-133.23	133.23
POS	0.00	179.00	192.12	196.06	200.00	229.53	233.47	237.41	241.35	241.35	400.00
"xR/4" to Rear of Axle # 4	118.82	93.64	58.57	23.50	-11.57	-41.47	-71.37	-101.27	-131.17	-131.17	131.17
POS	0.00	175.70	188.82	192.76	196.70	226.23	230.17	234.11	238.05	238.05	400.00
Midway btwn Resultant & Axle # 4	120.88	95.70	60.63	25.56	-9.51	-39.41	-69.31	-99.21	-129.11	-129.11	129.11
POS	0.00	172.41	185.53	189.47	193.41	222.94	226.88	230.82	234.76	234.76	400.00
"xR/4" Forward of Resultant Pos	122.93	97.76	62.69	27.62	-7.45	-37.35	-67.25	-97.15	-127.05	-127.05	127.05
POS	0.00	169.11	182.23	186.17	190.11	219.64	223.58	227.52	231.46	231.46	400.00
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99
POS	0.00	165.82	178.94	182.88	186.82	216.35	220.29	224.23	228.17	228.17	400.00

<b>MOMENT</b>	Moment at React A, ft- kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Rear #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft- kips
Axle # 4 at Mid-span	0.0	20,899.3	22,100.8	22,323.5	22,407.9	22,005.4	21,833.8	21,544.5	21,137.4	21,137.4	0.0
POS	0.00	179.00	192.12	196.06	200.00	229.53	233.47	237.41	241.35	241.35	400.00
"xR/4" to Rear of Axle # 4	0.0	20,876.4	22,105.0	22,335.7	22,428.3	22,086.5	21,923.1	21,641.9	21,242.9	21,242.9	0.0
POS	0.00	175.70	188.82	192.76	196.70	226.23	230.17	234.11	238.05	238.05	400.00
Midway btwn Resultant & Axle # 4	0.0	20,840.0	22,095.5	22,334.4	22,435.1	22,154.1	21,998.8	21,725.8	21,334.9	21,334.9	0.0
POS	0.00	172.41	185.53	189.47	193.41	222.94	226.88	230.82	234.76	234.76	400.00
"xR/4" Forward of Resultant Pos	0.0	20,789.94	22,072.50	22,319.48	22,428.29	22,208.17	22,061.00	21,796.02	21,413.23	21,413.23	0.00
POS	0.00	169.11	182.23	186.17	190.11	219.64	223.58	227.52	231.46	231.46	400.00
Resultant at Mid-span	0.0	20,726.32	22,035.91	22,291.00	22,407.93	22,248.63	22,109.57	21,852.70	21,478.03	21,478.03	0.00
POS	0.00	165.82	178.94	182.88	186.82	216.35	220.29	224.23	228.17	228.17	400.00

**EIGHT (8) AXLE**      **Wisconsin Special Permit Vehicle (Wis-SPV), on 400' Span**

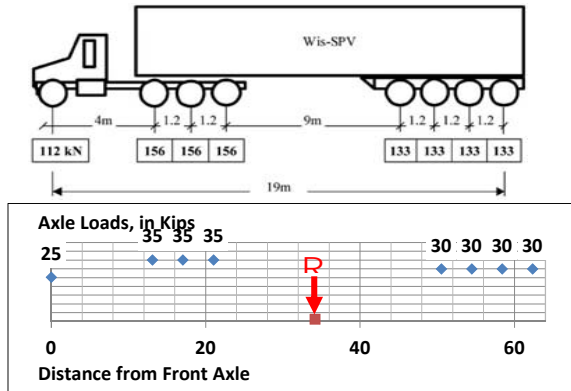


**EIGHT (8) AXLE**      **Wisconsin Special Permit Vehicle (Wis-SPV), on 400' Span**



**EIGHT (8) AXLE Wisconsin Special Permit Vehicle (Wis-SPV), on 500' Span**

Axle	Load (ST)	Load (kips)	Distance		SI / Metric Units	
			btwn axles (ft)	from front axle (ft)	Load (kN)	from front axle (cm)
(Front) 1	12.59	25.18		0.00	112.00	0
2	17.54	35.07	13.12	13.12	156.00	400
3	17.54	35.07	3.94	17.06	156.00	520
4	17.54	35.07	3.94	21.00	156.00	640
5	14.95	29.90	29.53	50.53	133.00	1540
6	14.95	29.90	3.94	54.47	133.00	1660
7	14.95	29.90	3.94	58.41	133.00	1780
Rear (8)	14.95	29.90	3.94	62.35	133.00	1900
<b>Totals</b>	<b>124.99</b>	<b>249.99</b>	<b>62.35</b>		<b>1112.0</b>	
Resultant at location:				34.182		1042
Distance to Axle # 4, "xR":				13.182	(Rear of Axle # 4)	



**500 ft Span Length**

	Front #1 Axle Position AX 1	Middle #2 Axle Position AX 2	Middle #3 Axle Position AX 3	Middle #4 Axle Position AX 4	Middle #5 Axle Position AX 5	Middle #6 Axle Position AX 6	Middle #7 Axle Position AX 7	Rear #8 Axle Position AX 8	Rear #9 Axle Position AX 9	Dist to Beam End L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Axle # 4 at Mid-span	229.00	242.12	246.06	250.00	279.53	283.47	287.41	291.35	291.35	208.65
"xR/4" to Rear of Axle # 4	225.70	238.82	242.76	246.70	276.23	280.17	284.11	288.05	288.05	211.95
Midway btwn Resultant & Axle # 4	222.41	235.53	239.47	243.41	272.94	276.88	280.82	284.76	284.76	215.24
"xR/4" Forward of Resultant Pos	219.11	232.23	236.17	240.11	269.64	273.58	277.52	281.46	281.46	218.54
Resultant at Mid-span	215.82	228.94	232.88	236.82	266.35	270.29	274.23	278.17	278.17	221.83

	Reaction at Support "A"	Shear at Front #1 Axle R-1	Shear at Middle #2 Axle R-2	Shear at Middle #3 Axle R-3	Shear at Middle #4 Axle R-4	Shear at Middle #5 Axle R-5	Shear at Middle #6 Axle R-6	Shear at Middle #7 Axle R-7	Shear at Rear #8 Axle R-8	Shear at Rear #9 Axle R-9	Reaction at Support "B"
	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips
Axle # 4 at Mid-span	118.40	93.22	58.15	23.08	-11.99	-41.89	-71.79	-101.69	-131.59	-131.59	131.59
"xR/4" to Rear of Axle # 4	120.05	94.87	59.80	24.73	-10.34	-40.24	-70.14	-100.04	-129.94	-129.94	129.94
Midway btwn Resultant & Axle # 4	121.70	96.52	61.45	26.38	-8.69	-38.59	-68.49	-98.39	-128.29	-128.29	128.29
"xR/4" Forward of Resultant Pos	123.35	98.17	63.10	28.03	-7.04	-36.94	-66.84	-96.74	-126.64	-126.64	126.64
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99

	Mom Area to Front #1 Axle MA-1	Mom Area to Middle #2 Axle MA-2	Mom Area to Middle #3 Axle MA-3	Mom Area to Middle #4 Axle MA-4	Mom Area to Middle #5 Axle MA-5	Mom Area to Middle #6 Axle MA-6	Mom Area to Middle #7 Axle MA-7	Mom Area to Rear #8 Axle MA-8	Mom Area to Rear #9 Axle MA-9	Mom Area to Beam End MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Axle # 4 at Mid-span	27,114.45	1,223.11	229.13	90.95	-353.92	-165.03	-282.83	-400.64	0.00	-27,455.23
"xR/4" to Rear of Axle # 4	27,096.14	1,244.73	235.62	97.45	-305.26	-158.54	-276.34	-394.15	0.00	-27,539.65
Midway btwn Resultant & Axle # 4	27,066.97	1,266.35	242.11	103.94	-256.61	-152.04	-269.85	-387.66	0.00	-27,613.21
"xR/4" Forward of Resultant Pos	27,026.93	1,287.96	248.61	110.43	-207.95	-145.55	-263.36	-381.16	0.00	-27,675.91
Resultant at Mid-span	26,976.04	1,309.58	255.10	116.92	-159.30	-139.06	-256.87	-374.67	0.00	-27,727.75

EIGHT (8) AXLE												Wisconsin Special Permit Vehicle (Wis-SPV), on 500' Span											
	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum						
	Moment at Beam End, ft-kips	Moment to Front #1 Axle, ft-kips	Moment to Mid #2 Axle, ft-kips	Moment to Mid #3 Axle, ft-kips	Moment to Mid #4 Axle, ft-kips	Moment to Mid #5 Axle, ft-kips	Moment to Mid #6 Axle, ft-kips	Moment to Mid #7 Axle, ft-kips	Moment to Rear #8 Axle, ft-kips	Moment to Rear #9 Axle, ft-kips	Moment to Beam End, ft-kips	Moment to Beam End, ft-kips	Moment to Front #1 Axle, ft-kips	Moment to Mid #2 Axle, ft-kips	Moment to Mid #3 Axle, ft-kips	Moment to Mid #4 Axle, ft-kips	Moment to Mid #5 Axle, ft-kips						
	M-RA-End	M-1	M-2	M-3	M-4	M-5	M-6	M-7	M-8	M-9	M-RB-End	M-RA-End	M-1	M-2	M-3	M-4	M-5						
Axle # 4 at Mid-span	0.00	27,114.45	28,337.56	28,566.69	28,657.64	28,303.73	28,138.70	27,855.86	27,455.23	27,455.23	0.00	0.00	27,114.45	28,337.56	28,566.69	28,657.64	28,303.73						
"xR/4" to Rear of Axle # 4	0.00	27,096.14	28,340.87	28,576.49	28,673.93	28,368.67	28,210.14	27,933.79	27,539.65	27,539.65	0.00	0.00	27,096.14	28,340.87	28,576.49	28,673.93	28,368.67						
Midway btwn Resultant & Axle # 4	0.00	27,066.97	28,333.31	28,575.43	28,679.36	28,422.76	28,270.71	28,000.86	27,613.21	27,613.21	0.00	0.00	27,066.97	28,333.31	28,575.43	28,679.36	28,422.76						
"xR/4" Forward of Resultant Pos	0.00	27,026.93	28,314.90	28,563.50	28,673.93	28,465.98	28,320.43	28,057.07	27,675.91	27,675.91	0.00	0.00	27,026.93	28,314.90	28,563.50	28,673.93	28,465.98						
Resultant at Mid-span	0.00	26,976.04	28,285.63	28,540.72	28,657.64	28,498.35	28,359.29	28,102.42	27,727.75	27,727.75	0.00	0.00	26,976.04	28,285.63	28,540.72	28,657.64	28,498.35						

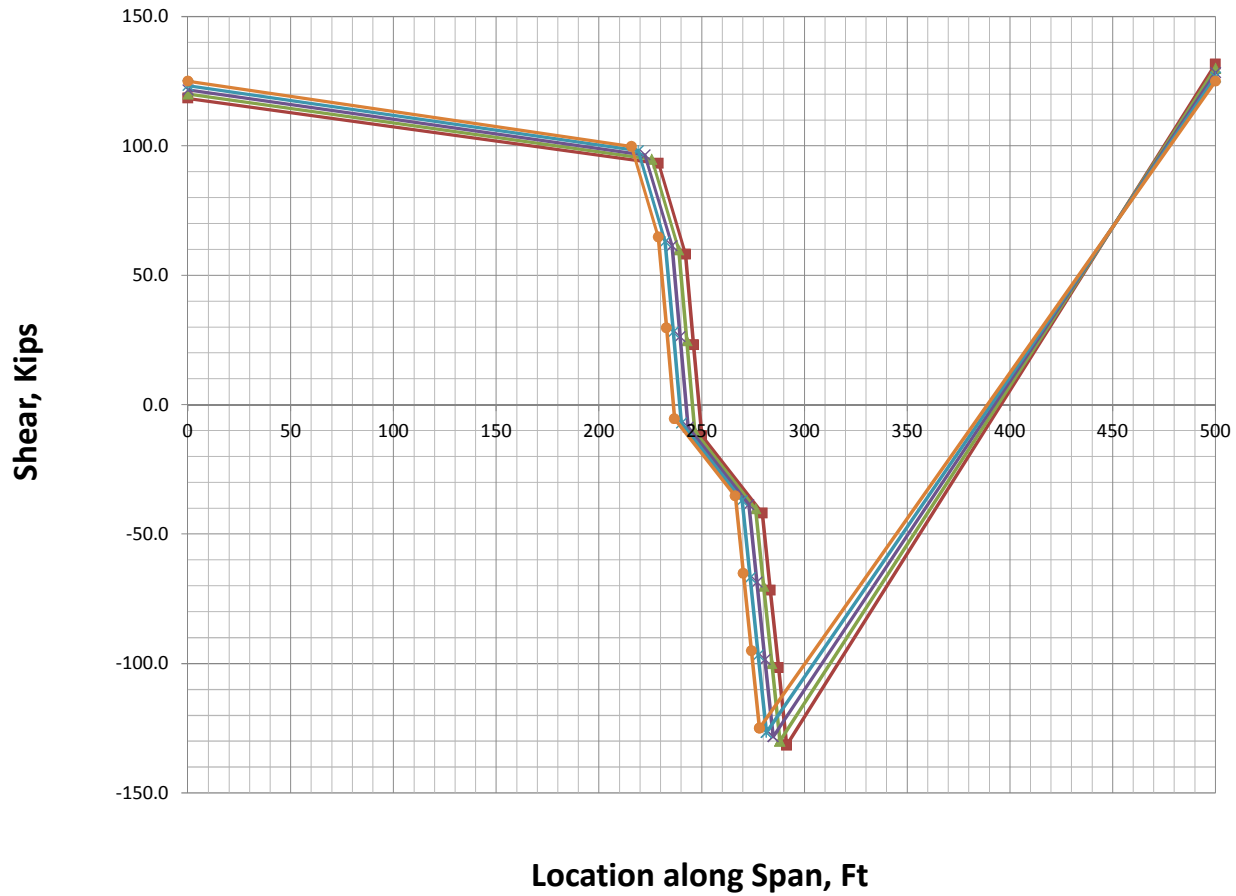
SHEAR	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Rear #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
	Axle # 4 at Mid-span	118.40	93.22	58.15	23.08	-11.99	-41.89	-71.79	-101.69	-131.59	-131.59
POS	0.00	229.00	242.12	246.06	250.00	279.53	283.47	287.41	291.35	291.35	500.00
"xR/4" to Rear of Axle # 4	120.05	94.87	59.80	24.73	-10.34	-40.24	-70.14	-100.04	-129.94	-129.94	129.94
POS	0.00	225.70	238.82	242.76	246.70	276.23	280.17	284.11	288.05	288.05	500.00
Midway btwn Resultant & Axle # 4	121.70	96.52	61.45	26.38	-8.69	-38.59	-68.49	-98.39	-128.29	-128.29	128.29
POS	0.00	222.41	235.53	239.47	243.41	272.94	276.88	280.82	284.76	284.76	500.00
"xR/4" Forward of Resultant Pos	123.35	98.17	63.10	28.03	-7.04	-36.94	-66.84	-96.74	-126.64	-126.64	126.64
POS	0.00	219.11	232.23	236.17	240.11	269.64	273.58	277.52	281.46	281.46	500.00
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99
POS	0.00	215.82	228.94	232.88	236.82	266.35	270.29	274.23	278.17	278.17	500.00

MOMENT	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Rear #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
	Axle # 4 at Mid-span	0.0	27,114.4	28,337.6	28,566.7	28,657.6	28,303.7	28,138.7	27,855.9	27,455.2	27,455.2
POS	0.00	229.00	242.12	246.06	250.00	279.53	283.47	287.41	291.35	291.35	500.00
"xR/4" to Rear of Axle # 4	0.0	27,096.1	28,340.9	28,576.5	28,673.9	28,368.7	28,210.1	27,933.8	27,539.6	27,539.6	0.0
POS	0.00	225.70	238.82	242.76	246.70	276.23	280.17	284.11	288.05	288.05	500.00
Midway btwn Resultant & Axle # 4	0.0	27,067.0	28,333.3	28,575.4	28,679.4	28,422.8	28,270.7	28,000.9	27,613.2	27,613.2	0.0
POS	0.00	222.41	235.53	239.47	243.41	272.94	276.88	280.82	284.76	284.76	500.00
"xR/4" Forward of Resultant Pos	0.0	27,026.93	28,314.90	28,563.50	28,673.93	28,465.98	28,320.43	28,057.07	27,675.91	27,675.91	0.00
POS	0.00	219.11	232.23	236.17	240.11	269.64	273.58	277.52	281.46	281.46	500.00
Resultant at Mid-span	0.0	26,976.04	28,285.63	28,540.72	28,657.64	28,498.35	28,359.29	28,102.42	27,727.75	27,727.75	0.00
POS	0.00	215.82	228.94	232.88	236.82	266.35	270.29	274.23	278.17	278.17	500.00

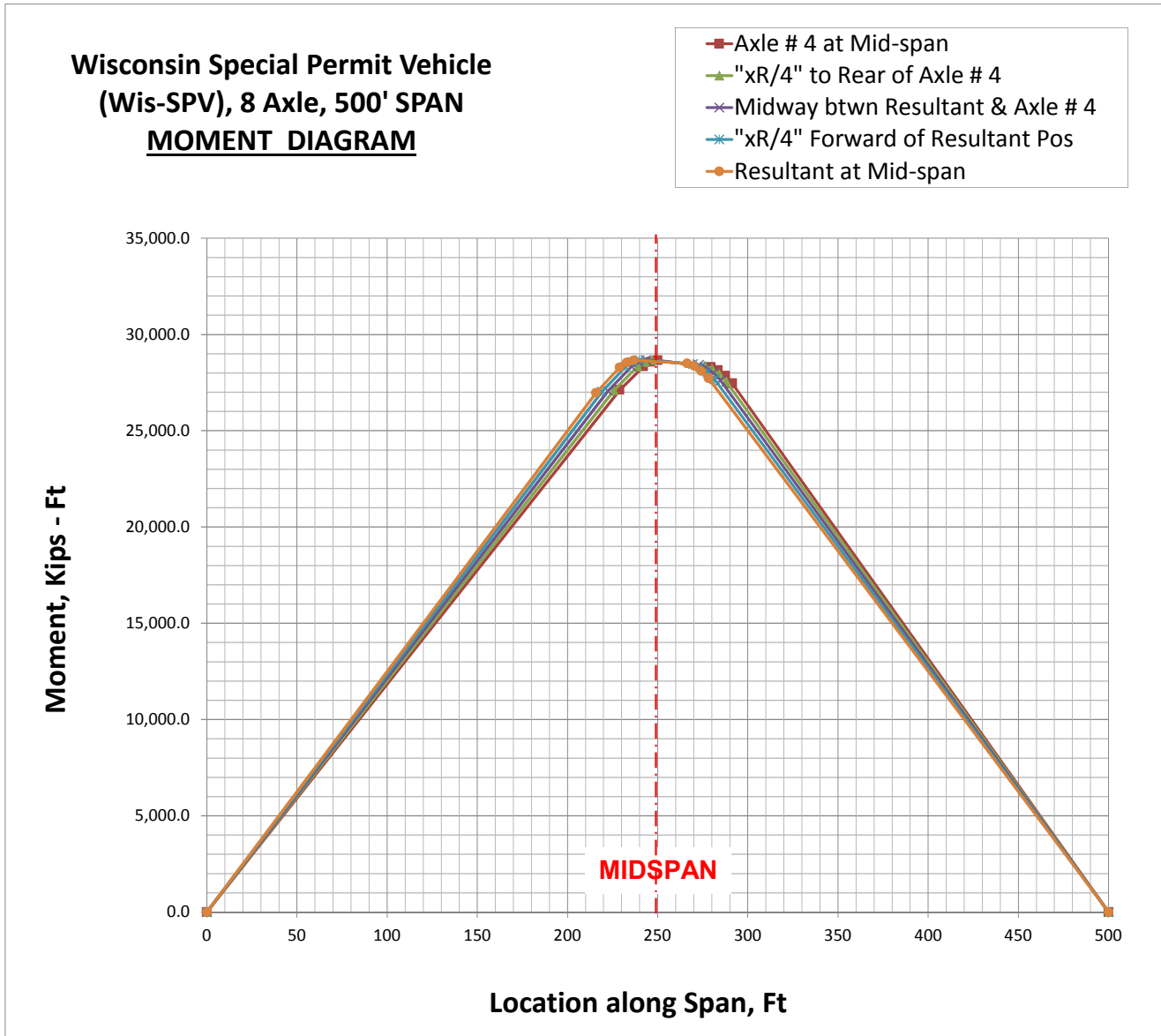
**EIGHT (8) AXLE**      **Wisconsin Special Permit Vehicle (Wis-SPV), on 500' Span**

**Wisconsin Special Permit Vehicle  
(Wis-SPV), 8 Axle, 500' SPAN  
SHEAR DIAGRAM**

- Axle # 4 at Mid-span
- ▲ "xR/4" to Rear of Axle # 4
- ✕ Midway btwn Resultant & Axle # 4
- ✧ "xR/4" Forward of Resultant Pos
- Resultant at Mid-span

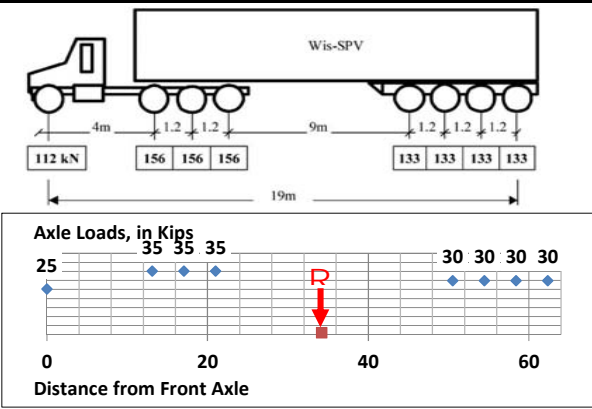


**EIGHT (8) AXLE**      **Wisconsin Special Permit Vehicle (Wis-SPV), on 500' Span**



**EIGHT (8) AXLE Wisconsin Special Permit Vehicle (Wis-SPV), on 600' Span**

Axle	Load (ST)	Load (kips)	Distance		SI / Metric Units	
			Distance btwn axles (ft)	Distance from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	12.59	25.18		0.00	112.00	0
2	17.54	35.07	13.12	13.12	156.00	400
3	17.54	35.07	3.94	17.06	156.00	520
4	17.54	35.07	3.94	21.00	156.00	640
5	14.95	29.90	29.53	50.53	133.00	1540
6	14.95	29.90	3.94	54.47	133.00	1660
7	14.95	29.90	3.94	58.41	133.00	1780
Rear (8)	14.95	29.90	3.94	62.35	133.00	1900
<b>Totals</b>	<b>124.99</b>	<b>249.99</b>	<b>62.35</b>		<b>1112.0</b>	
Resultant at location:				34.182	1042	
Distance to Axle # 4, "xR":				13.182	(Rear of Axle # 4)	



**600 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Rear #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Axle # 4 at Mid-span	279.00	292.12	296.06	300.00	329.53	333.47	337.41	341.35	341.35	258.65
"xR/4" to Rear of Axle # 4	275.70	288.82	292.76	296.70	326.23	330.17	334.11	338.05	338.05	261.95
Midway btwn Resultant & Axle # 4	272.41	285.53	289.47	293.41	322.94	326.88	330.82	334.76	334.76	265.24
"xR/4" Forward of Resultant Pos	269.11	282.23	286.17	290.11	319.64	323.58	327.52	331.46	331.46	268.54
Resultant at Mid-span	265.82	278.94	282.88	286.82	316.35	320.29	324.23	328.17	328.17	271.83

	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Middle #4 Axle	Shear at Middle #5 Axle	Shear at Middle #6 Axle	Shear at Middle #7 Axle	Shear at Rear #8 Axle	Shear at Rear #9 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	RB
	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips
Axle # 4 at Mid-span	119.50	94.32	59.25	24.18	-10.89	-40.79	-70.69	-100.59	-130.49	-130.49	130.49
"xR/4" to Rear of Axle # 4	120.88	95.70	60.63	25.56	-9.51	-39.41	-69.31	-99.21	-129.11	-129.11	129.11
Midway btwn Resultant & Axle # 4	122.25	97.07	62.00	26.93	-8.14	-38.04	-67.94	-97.84	-127.74	-127.74	127.74
"xR/4" Forward of Resultant Pos	123.62	98.44	63.37	28.30	-6.77	-36.67	-66.57	-96.47	-126.37	-126.37	126.37
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Middle #4 Axle	Mom Area to Middle #5 Axle	Mom Area to Middle #6 Axle	Mom Area to Middle #7 Axle	Mom Area to Rear #8 Axle	Mom Area to Rear #9 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-5	MA-6	MA-7	MA-8	MA-9	MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Axle # 4 at Mid-span	33,341.10	1,237.52	233.46	95.28	-321.48	-160.70	-278.51	-396.31	0.00	-33,750.37
"xR/4" to Rear of Axle # 4	33,325.84	1,255.54	238.87	100.69	-280.94	-155.29	-273.10	-390.90	0.00	-33,820.72
Midway btwn Resultant & Axle # 4	33,301.53	1,273.55	244.28	106.10	-240.39	-149.88	-267.69	-385.49	0.00	-33,882.02
"xR/4" Forward of Resultant Pos	33,268.17	1,291.57	249.69	111.51	-199.84	-144.47	-262.28	-380.08	0.00	-33,934.27
Resultant at Mid-span	33,225.76	1,309.58	255.10	116.92	-159.30	-139.06	-256.87	-374.67	0.00	-33,977.47



<b>EIGHT (8) AXLE</b>		<b>Wisconsin Special Permit Vehicle (Wis-SPV), on 600' Span</b>									
	Sum Moment at Beam End, ft- kips	Sum Moment to Front #1 Axle, ft-kips	Sum Moment to Mid #2 Axle, ft-kips	Sum Moment to Mid #3 Axle, ft-kips	Sum Moment to Mid #4 Axle, ft-kips	Sum Moment to Mid #5 Axle, ft-kips	Sum Moment to Mid #6 Axle, ft-kips	Sum Moment to Mid #7 Axle, ft-kips	Sum Moment to Rear #8 Axle, ft-kips	Sum Moment to Rear #9 Axle, ft-kips	Sum Moment to Beam End, ft- kips
	M-RA-End ft-kips	M-1 ft-kips	M-2 ft-kips	M-3 ft-kips	M-4 ft-kips	M-5 ft-kips	M-6 ft-kips	M-7 ft-kips	M-8 ft-kips	M-9 ft-kips	M-RB-End ft-kips
Axle # 4 at Mid-span	0.00	33,341.10	34,578.62	34,812.08	34,907.36	34,585.88	34,425.18	34,146.68	33,750.37	33,750.37	0.00
"xR/4" to Rear of Axle # 4	0.00	33,325.84	34,581.38	34,820.25	34,920.94	34,640.00	34,484.71	34,211.62	33,820.72	33,820.72	0.00
Midway btwn Resultant & Axle # 4	0.00	33,301.53	34,575.08	34,819.36	34,925.46	34,685.07	34,535.19	34,267.51	33,882.02	33,882.02	0.00
"xR/4" Forward of Resultant Pos	0.00	33,268.17	34,559.74	34,809.43	34,920.94	34,721.10	34,576.63	34,314.35	33,934.27	33,934.27	0.00
Resultant at Mid-span	0.00	33,225.76	34,535.34	34,790.44	34,907.36	34,748.07	34,609.01	34,352.14	33,977.47	33,977.47	0.00

<b>SHEAR</b>	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
Axle # 4 at Mid-span	119.50	94.32	59.25	24.18	-10.89	-40.79	-70.69	-100.59	-130.49	-130.49	130.49
POS	0.00	279.00	292.12	296.06	300.00	329.53	333.47	337.41	341.35	341.35	600.00
"xR/4" to Rear of Axle # 4	120.88	95.70	60.63	25.56	-9.51	-39.41	-69.31	-99.21	-129.11	-129.11	129.11
POS	0.00	275.70	288.82	292.76	296.70	326.23	330.17	334.11	338.05	338.05	600.00
Midway btwn Resultant & Axle # 4	122.25	97.07	62.00	26.93	-8.14	-38.04	-67.94	-97.84	-127.74	-127.74	127.74
POS	0.00	272.41	285.53	289.47	293.41	322.94	326.88	330.82	334.76	334.76	600.00
"xR/4" Forward of Resultant Pos	123.62	98.44	63.37	28.30	-6.77	-36.67	-66.57	-96.47	-126.37	-126.37	126.37
POS	0.00	269.11	282.23	286.17	290.11	319.64	323.58	327.52	331.46	331.46	600.00
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99
POS	0.00	265.82	278.94	282.88	286.82	316.35	320.29	324.23	328.17	328.17	600.00

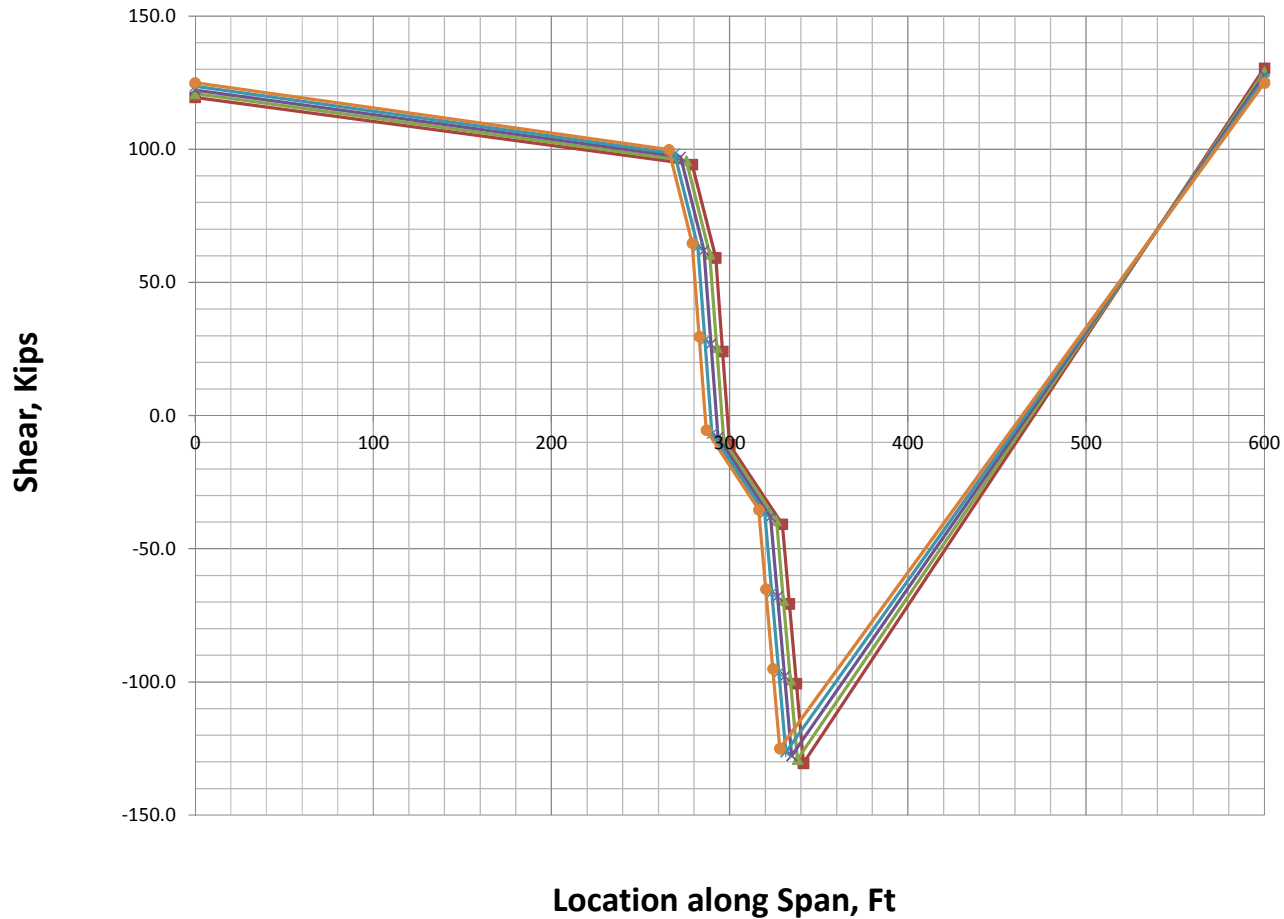
<b>MOMENT</b>	Moment at React A, ft- kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Rear #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft- kips
Axle # 4 at Mid-span	0.0	33,341.1	34,578.6	34,812.1	34,907.4	34,585.9	34,425.2	34,146.7	33,750.4	33,750.4	0.0
POS	0.00	279.00	292.12	296.06	300.00	329.53	333.47	337.41	341.35	341.35	600.00
"xR/4" to Rear of Axle # 4	0.0	33,325.8	34,581.4	34,820.2	34,920.9	34,640.0	34,484.7	34,211.6	33,820.7	33,820.7	0.0
POS	0.00	275.70	288.82	292.76	296.70	326.23	330.17	334.11	338.05	338.05	600.00
Midway btwn Resultant & Axle # 4	0.0	33,301.5	34,575.1	34,819.4	34,925.5	34,685.1	34,535.2	34,267.5	33,882.0	33,882.0	0.0
POS	0.00	272.41	285.53	289.47	293.41	322.94	326.88	330.82	334.76	334.76	600.00
"xR/4" Forward of Resultant Pos	0.0	33,268.17	34,559.74	34,809.43	34,920.94	34,721.10	34,576.63	34,314.35	33,934.27	33,934.27	0.00
POS	0.00	269.11	282.23	286.17	290.11	319.64	323.58	327.52	331.46	331.46	600.00
Resultant at Mid-span	0.0	33,225.76	34,535.34	34,790.44	34,907.36	34,748.07	34,609.01	34,352.14	33,977.47	33,977.47	0.00
POS	0.00	265.82	278.94	282.88	286.82	316.35	320.29	324.23	328.17	328.17	600.00

**EIGHT (8) AXLE**

**Wisconsin Special Permit Vehicle (Wis-SPV), on 600' Span**

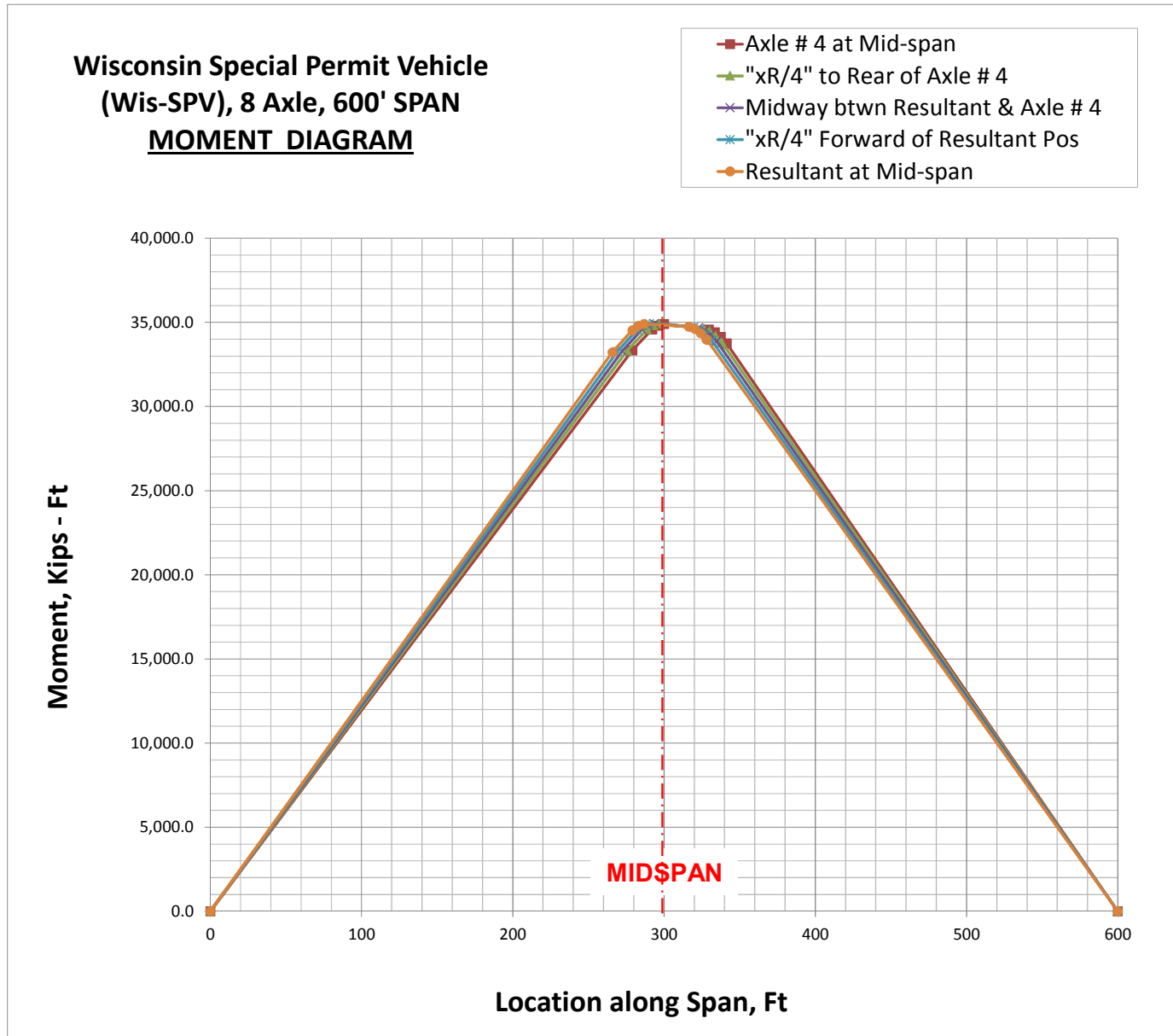
**Wisconsin Special Permit Vehicle  
(Wis-SPV), 8 Axle, 600' SPAN  
SHEAR DIAGRAM**

- Axle # 4 at Mid-span
- ▲ "xR/4" to Rear of Axle # 4
- ✕ Midway btwn Resultant & Axle # 4
- ✧ "xR/4" Forward of Resultant Pos
- Resultant at Mid-span



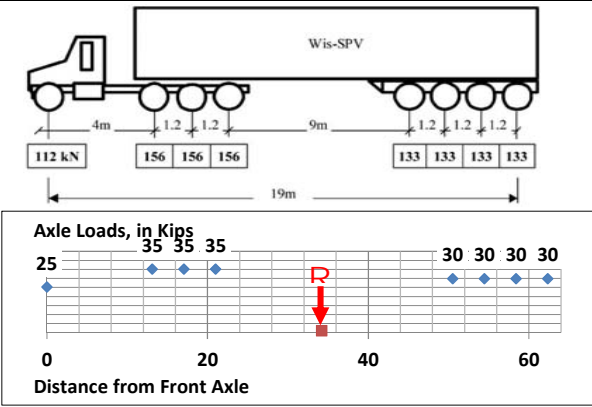
**EIGHT (8) AXLE**

**Wisconsin Special Permit Vehicle (Wis-SPV), on 600' Span**



**EIGHT (8) AXLE Wisconsin Special Permit Vehicle (Wis-SPV), on 700' Span**

Axle	Load (ST)	Load (kips)	SI / Metric Units		
			Distance btwn axles (ft)	Distance from front axle (ft)	Distance from front axle (cm)
(Front) 1	12.59	25.18		0.00	112.00
2	17.54	35.07	13.12	13.12	156.00
3	17.54	35.07	3.94	17.06	156.00
4	17.54	35.07	3.94	21.00	156.00
5	14.95	29.90	29.53	50.53	133.00
6	14.95	29.90	3.94	54.47	133.00
7	14.95	29.90	3.94	58.41	133.00
Rear (8)	14.95	29.90	3.94	62.35	133.00
<b>Totals</b>	<b>124.99</b>	<b>249.99</b>	<b>62.35</b>		<b>1112.0</b>
Resultant at location:				34.182	1042
Distance to Axle # 4, "xR":				13.182	(Rear of Axle # 4)



**700 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Rear #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Axle # 4 at Mid-span	329.00	342.12	346.06	350.00	379.53	383.47	387.41	391.35	391.35	308.65
"xR/4" to Rear of Axle # 4	325.70	338.82	342.76	346.70	376.23	380.17	384.11	388.05	388.05	311.95
Midway btwn Resultant & Axle # 4	322.41	335.53	339.47	343.41	372.94	376.88	380.82	384.76	384.76	315.24
"xR/4" Forward of Resultant Pos	319.11	332.23	336.17	340.11	369.64	373.58	377.52	381.46	381.46	318.54
Resultant at Mid-span	315.82	328.94	332.88	336.82	366.35	370.29	374.23	378.17	378.17	321.83

	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Middle #4 Axle	Shear at Middle #5 Axle	Shear at Middle #6 Axle	Shear at Middle #7 Axle	Shear at Rear #8 Axle	Shear at Rear #9 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	RB
	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips
Axle # 4 at Mid-span	120.29	95.11	60.04	24.97	-10.10	-40.00	-69.90	-99.80	-129.70	-129.70	129.70
"xR/4" to Rear of Axle # 4	121.46	96.28	61.21	26.14	-8.93	-38.83	-68.73	-98.63	-128.53	-128.53	128.53
Midway btwn Resultant & Axle # 4	122.64	97.46	62.39	27.32	-7.75	-37.65	-67.55	-97.45	-127.35	-127.35	127.35
"xR/4" Forward of Resultant Pos	123.82	98.64	63.57	28.50	-6.57	-36.47	-66.37	-96.27	-126.17	-126.17	126.17
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Middle #4 Axle	Mom Area to Middle #5 Axle	Mom Area to Middle #6 Axle	Mom Area to Middle #7 Axle	Mom Area to Rear #8 Axle	Mom Area to Rear #9 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-5	MA-6	MA-7	MA-8	MA-9	MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Axle # 4 at Mid-span	39,574.34	1,247.82	236.55	98.37	-298.31	-157.61	-275.41	-393.22	0.00	-40,032.53
"xR/4" to Rear of Axle # 4	39,561.26	1,263.26	241.19	103.01	-263.56	-152.97	-270.78	-388.58	0.00	-40,092.83
Midway btwn Resultant & Axle # 4	39,540.43	1,278.70	245.82	107.65	-228.80	-148.33	-266.14	-383.95	0.00	-40,145.37
"xR/4" Forward of Resultant Pos	39,511.83	1,294.14	250.46	112.28	-194.05	-143.70	-261.50	-379.31	0.00	-40,190.16
Resultant at Mid-span	39,475.48	1,309.58	255.10	116.92	-159.30	-139.06	-256.87	-374.67	0.00	-40,227.19

<b>EIGHT (8) AXLE</b>		<b>Wisconsin Special Permit Vehicle (Wis-SPV), on 700' Span</b>									
	Sum Moment at Beam End, ft- kips	Sum Moment to Front #1 Axle, ft-kips	Sum Moment to Mid #2 Axle, ft-kips	Sum Moment to Mid #3 Axle, ft-kips	Sum Moment to Mid #4 Axle, ft-kips	Sum Moment to Mid #5 Axle, ft-kips	Sum Moment to Mid #6 Axle, ft-kips	Sum Moment to Mid #7 Axle, ft-kips	Sum Moment to Rear #8 Axle, ft-kips	Sum Moment to Rear #9 Axle, ft-kips	Sum Moment to Beam End, ft- kips
	M-RA-End ft-kips	M-1 ft-kips	M-2 ft-kips	M-3 ft-kips	M-4 ft-kips	M-5 ft-kips	M-6 ft-kips	M-7 ft-kips	M-8 ft-kips	M-9 ft-kips	M-RB-End ft-kips
Axle # 4 at Mid-span	0.00	39,574.34	40,822.16	41,058.71	41,157.08	40,858.77	40,701.16	40,425.75	40,032.53	40,032.53	0.00
"xR/4" to Rear of Axle # 4	0.00	39,561.26	40,824.52	41,065.71	41,168.72	40,905.16	40,752.19	40,481.41	40,092.83	40,092.83	0.00
Midway btwn Resultant & Axle # 4	0.00	39,540.43	40,819.13	41,064.95	41,172.60	40,943.79	40,795.46	40,529.32	40,145.37	40,145.37	0.00
"xR/4" Forward of Resultant Pos	0.00	39,511.83	40,805.97	41,056.43	41,168.72	40,974.67	40,830.97	40,569.47	40,190.16	40,190.16	0.00
Resultant at Mid-span	0.00	39,475.48	40,785.06	41,040.16	41,157.08	40,997.79	40,858.73	40,601.86	40,227.19	40,227.19	0.00

<b>SHEAR</b>	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
Axle # 4 at Mid-span	120.29	95.11	60.04	24.97	-10.10	-40.00	-69.90	-99.80	-129.70	-129.70	129.70
POS	0.00	329.00	342.12	346.06	350.00	379.53	383.47	387.41	391.35	391.35	700.00
"xR/4" to Rear of Axle # 4	121.46	96.28	61.21	26.14	-8.93	-38.83	-68.73	-98.63	-128.53	-128.53	128.53
POS	0.00	325.70	338.82	342.76	346.70	376.23	380.17	384.11	388.05	388.05	700.00
Midway btwn Resultant & Axle # 4	122.64	97.46	62.39	27.32	-7.75	-37.65	-67.55	-97.45	-127.35	-127.35	127.35
POS	0.00	322.41	335.53	339.47	343.41	372.94	376.88	380.82	384.76	384.76	700.00
"xR/4" Forward of Resultant Pos	123.82	98.64	63.57	28.50	-6.57	-36.47	-66.37	-96.27	-126.17	-126.17	126.17
POS	0.00	319.11	332.23	336.17	340.11	369.64	373.58	377.52	381.46	381.46	700.00
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99
POS	0.00	315.82	328.94	332.88	336.82	366.35	370.29	374.23	378.17	378.17	700.00

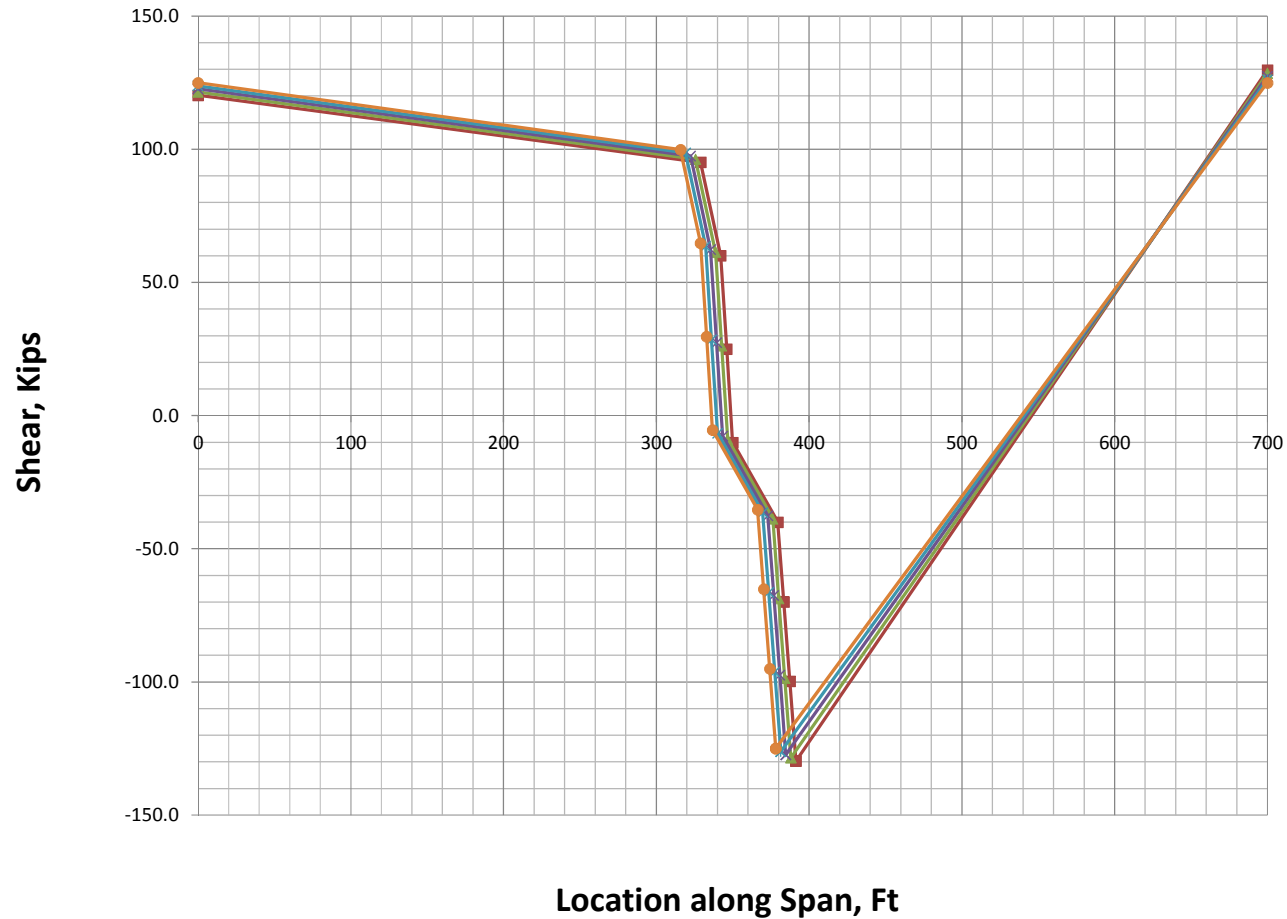
<b>MOMENT</b>	Moment at React A, ft- kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Rear #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft- kips
Axle # 4 at Mid-span	0.0	39,574.3	40,822.2	41,058.7	41,157.1	40,858.8	40,701.2	40,425.7	40,032.5	40,032.5	0.0
POS	0.00	329.00	342.12	346.06	350.00	379.53	383.47	387.41	391.35	391.35	700.00
"xR/4" to Rear of Axle # 4	0.0	39,561.3	40,824.5	41,065.7	41,168.7	40,905.2	40,752.2	40,481.4	40,092.8	40,092.8	0.0
POS	0.00	325.70	338.82	342.76	346.70	376.23	380.17	384.11	388.05	388.05	700.00
Midway btwn Resultant & Axle # 4	0.0	39,540.4	40,819.1	41,064.9	41,172.6	40,943.8	40,795.5	40,529.3	40,145.4	40,145.4	0.0
POS	0.00	322.41	335.53	339.47	343.41	372.94	376.88	380.82	384.76	384.76	700.00
"xR/4" Forward of Resultant Pos	0.0	39,511.83	40,805.97	41,056.43	41,168.72	40,974.67	40,830.97	40,569.47	40,190.16	40,190.16	0.00
POS	0.00	319.11	332.23	336.17	340.11	369.64	373.58	377.52	381.46	381.46	700.00
Resultant at Mid-span	0.0	39,475.48	40,785.06	41,040.16	41,157.08	40,997.79	40,858.73	40,601.86	40,227.19	40,227.19	0.00
POS	0.00	315.82	328.94	332.88	336.82	366.35	370.29	374.23	378.17	378.17	700.00

**EIGHT (8) AXLE**

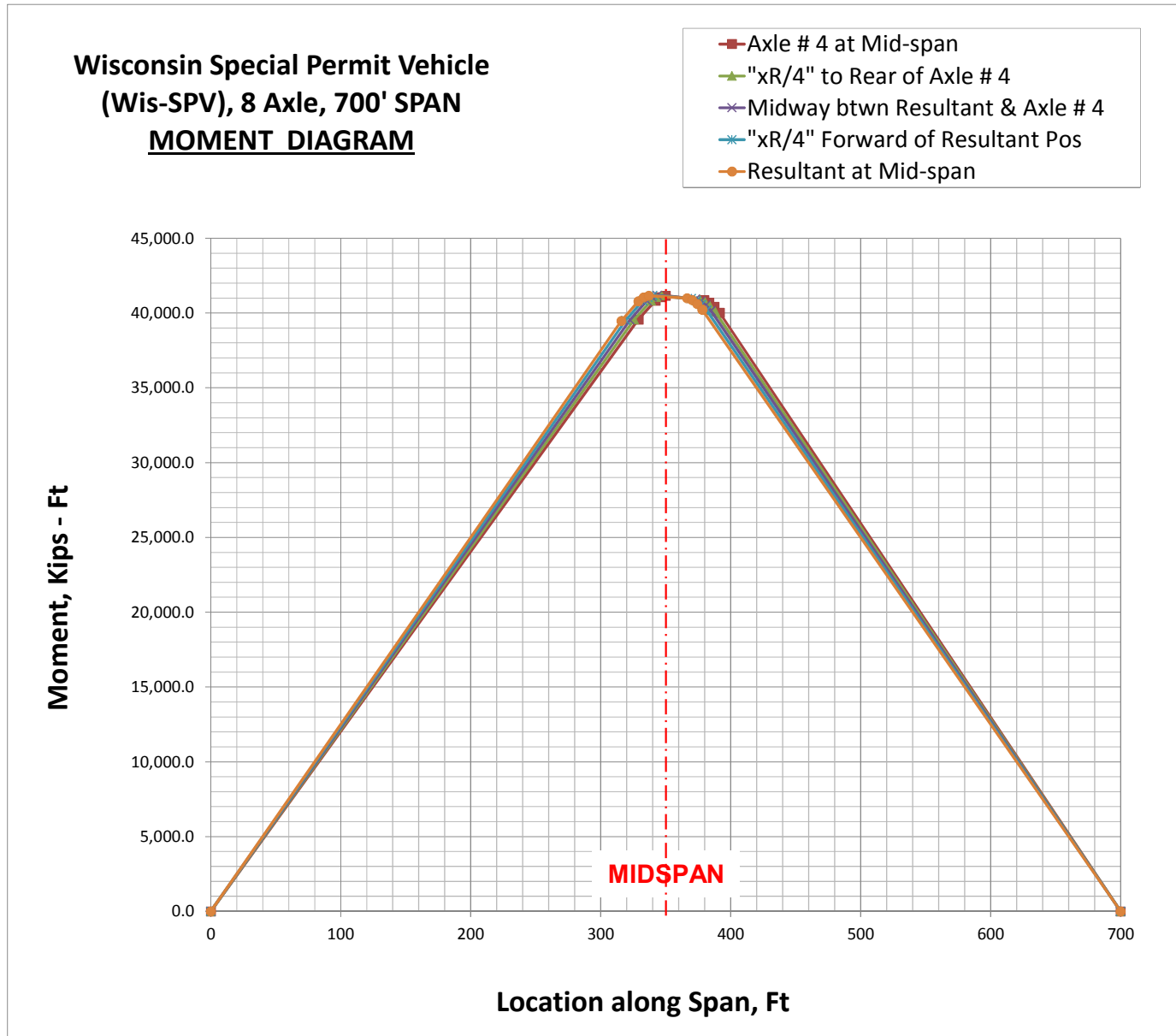
**Wisconsin Special Permit Vehicle (Wis-SPV), on 700' Span**

**Wisconsin Special Permit Vehicle  
(Wis-SPV), 8 Axle, 700' SPAN  
SHEAR DIAGRAM**

- Axle # 4 at Mid-span
- ▲ "xR/4" to Rear of Axle # 4
- ✕ Midway btwn Resultant & Axle # 4
- ✧ "xR/4" Forward of Resultant Pos
- Resultant at Mid-span

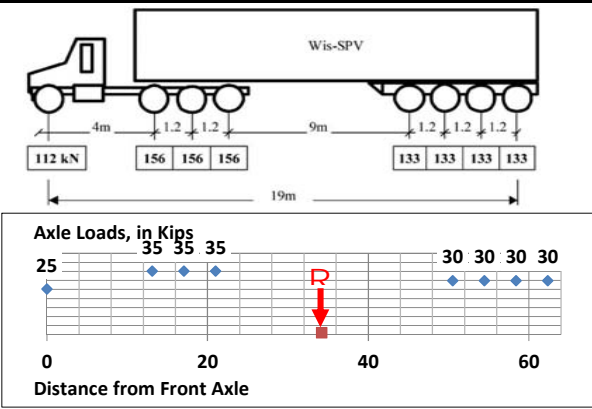


**EIGHT (8) AXLE**      **Wisconsin Special Permit Vehicle (Wis-SPV), on 700' Span**



**EIGHT (8) AXLE Wisconsin Special Permit Vehicle (Wis-SPV), on 800' Span**

Axle	Load (ST)	Load (kips)	SI / Metric Units		
			Distance btwn axles (ft)	Distance from front axle (ft)	Distance from front axle (cm)
(Front) 1	12.59	25.18		0.00	112.00
2	17.54	35.07	13.12	13.12	156.00
3	17.54	35.07	3.94	17.06	156.00
4	17.54	35.07	3.94	21.00	156.00
5	14.95	29.90	29.53	50.53	133.00
6	14.95	29.90	3.94	54.47	133.00
7	14.95	29.90	3.94	58.41	133.00
Rear (8)	14.95	29.90	3.94	62.35	133.00
<b>Totals</b>	<b>124.99</b>	<b>249.99</b>	<b>62.35</b>		<b>1112.0</b>
Resultant at location:				34.182	1042
Distance to Axle # 4, "xR":				13.182	(Rear of Axle # 4)



**800 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Rear #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Axle # 4 at Mid-span	379.00	392.12	396.06	400.00	429.53	433.47	437.41	441.35	441.35	358.65
"xR/4" to Rear of Axle # 4	375.70	388.82	392.76	396.70	426.23	430.17	434.11	438.05	438.05	361.95
Midway btwn Resultant & Axle # 4	372.41	385.53	389.47	393.41	422.94	426.88	430.82	434.76	434.76	365.24
"xR/4" Forward of Resultant Pos	369.11	382.23	386.17	390.11	419.64	423.58	427.52	431.46	431.46	368.54
Resultant at Mid-span	365.82	378.94	382.88	386.82	416.35	420.29	424.23	428.17	428.17	371.83

	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Middle #4 Axle	Shear at Middle #5 Axle	Shear at Middle #6 Axle	Shear at Middle #7 Axle	Shear at Rear #8 Axle	Shear at Rear #9 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	RB
	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips
Axle # 4 at Mid-span	120.88	95.70	60.63	25.56	-9.51	-39.41	-69.31	-99.21	-129.11	-129.11	129.11
"xR/4" to Rear of Axle # 4	121.91	96.73	61.66	26.59	-8.48	-38.38	-68.28	-98.18	-128.08	-128.08	128.08
Midway btwn Resultant & Axle # 4	122.93	97.76	62.69	27.62	-7.45	-37.35	-67.25	-97.15	-127.05	-127.05	127.05
"xR/4" Forward of Resultant Pos	123.96	98.79	63.72	28.65	-6.42	-36.32	-66.22	-96.12	-126.02	-126.02	126.02
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Middle #4 Axle	Mom Area to Middle #5 Axle	Mom Area to Middle #6 Axle	Mom Area to Middle #7 Axle	Mom Area to Rear #8 Axle	Mom Area to Rear #9 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-5	MA-6	MA-7	MA-8	MA-9	MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Axle # 4 at Mid-span	45,811.71	1,255.54	238.87	100.69	-280.94	-155.29	-273.10	-390.90	0.00	-46,306.58
"xR/4" to Rear of Axle # 4	45,800.26	1,269.05	242.93	104.75	-250.53	-151.23	-269.04	-386.84	0.00	-46,359.34
Midway btwn Resultant & Axle # 4	45,782.03	1,282.56	246.98	108.81	-220.12	-147.17	-264.98	-382.79	0.00	-46,405.32
"xR/4" Forward of Resultant Pos	45,757.01	1,296.07	251.04	112.86	-189.71	-143.12	-260.92	-378.73	0.00	-46,444.51
Resultant at Mid-span	45,725.20	1,309.58	255.10	116.92	-159.30	-139.06	-256.87	-374.67	0.00	-46,476.91

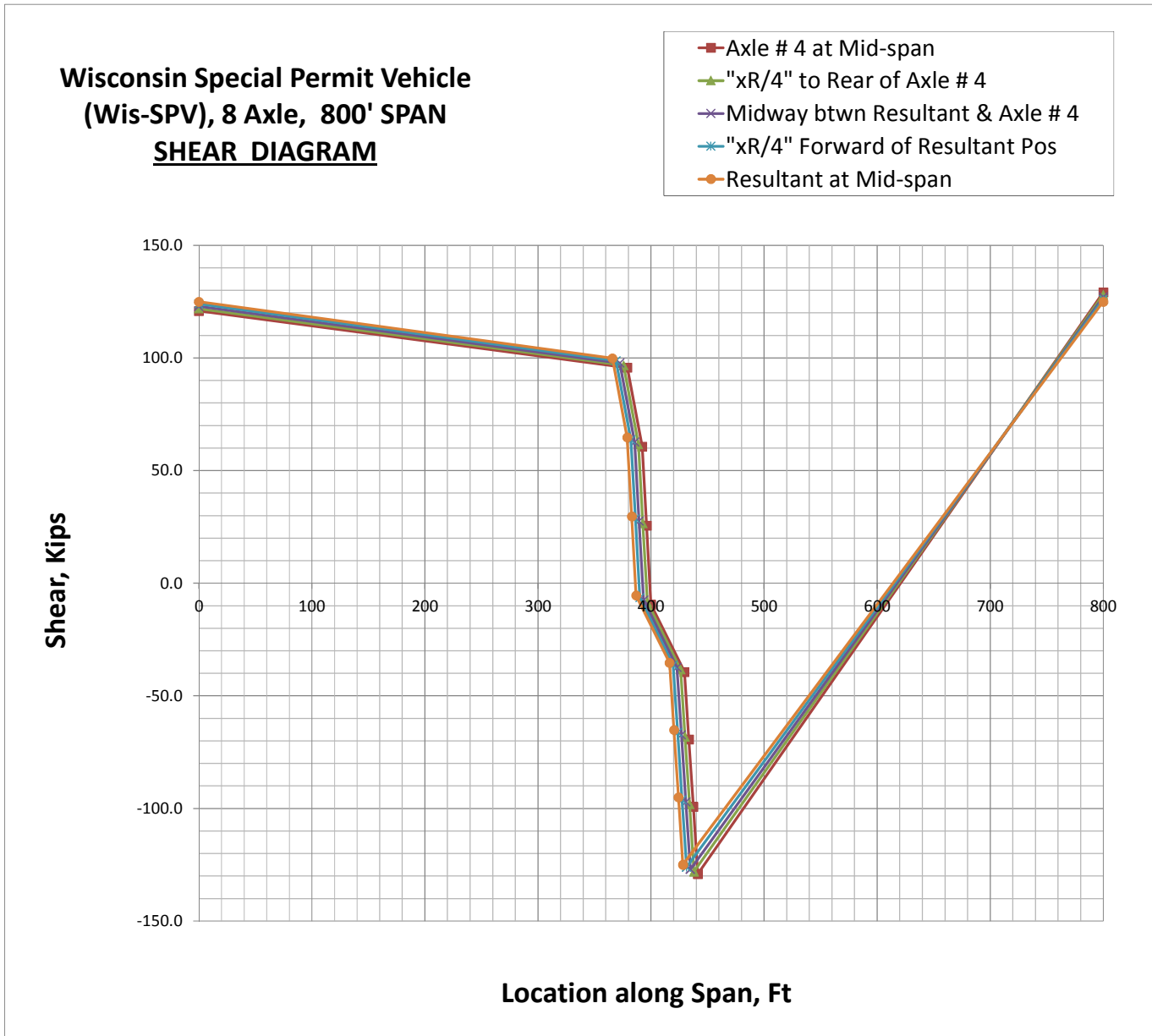


<b>EIGHT (8) AXLE</b>		<b>Wisconsin Special Permit Vehicle (Wis-SPV), on 800' Span</b>									
	Sum Moment at Beam End, ft- kips	Sum Moment to Front #1 Axle, ft-kips	Sum Moment to Mid #2 Axle, ft-kips	Sum Moment to Mid #3 Axle, ft-kips	Sum Moment to Mid #4 Axle, ft-kips	Sum Moment to Mid #5 Axle, ft-kips	Sum Moment to Mid #6 Axle, ft-kips	Sum Moment to Mid #7 Axle, ft-kips	Sum Moment to Rear #8 Axle, ft-kips	Sum Moment to Rear #9 Axle, ft-kips	Sum Moment to Beam End, ft- kips
	M-RA-End ft-kips	M-1 ft-kips	M-2 ft-kips	M-3 ft-kips	M-4 ft-kips	M-5 ft-kips	M-6 ft-kips	M-7 ft-kips	M-8 ft-kips	M-9 ft-kips	M-RB-End ft-kips
Axle # 4 at Mid-span	0.00	45,811.71	47,067.24	47,306.11	47,406.80	47,125.87	46,970.58	46,697.48	46,306.58	46,306.58	0.00
"xR/4" to Rear of Axle # 4	0.00	45,800.26	47,069.31	47,312.23	47,416.98	47,166.46	47,015.23	46,746.19	46,359.34	46,359.34	0.00
Midway btwn Resultant & Axle # 4	0.00	45,782.03	47,064.59	47,311.57	47,420.38	47,200.26	47,053.09	46,788.11	46,405.32	46,405.32	0.00
"xR/4" Forward of Resultant Pos	0.00	45,757.01	47,053.08	47,304.12	47,416.98	47,227.28	47,084.16	46,823.24	46,444.51	46,444.51	0.00
Resultant at Mid-span	0.00	45,725.20	47,034.78	47,289.88	47,406.80	47,247.51	47,108.45	46,851.58	46,476.91	46,476.91	0.00

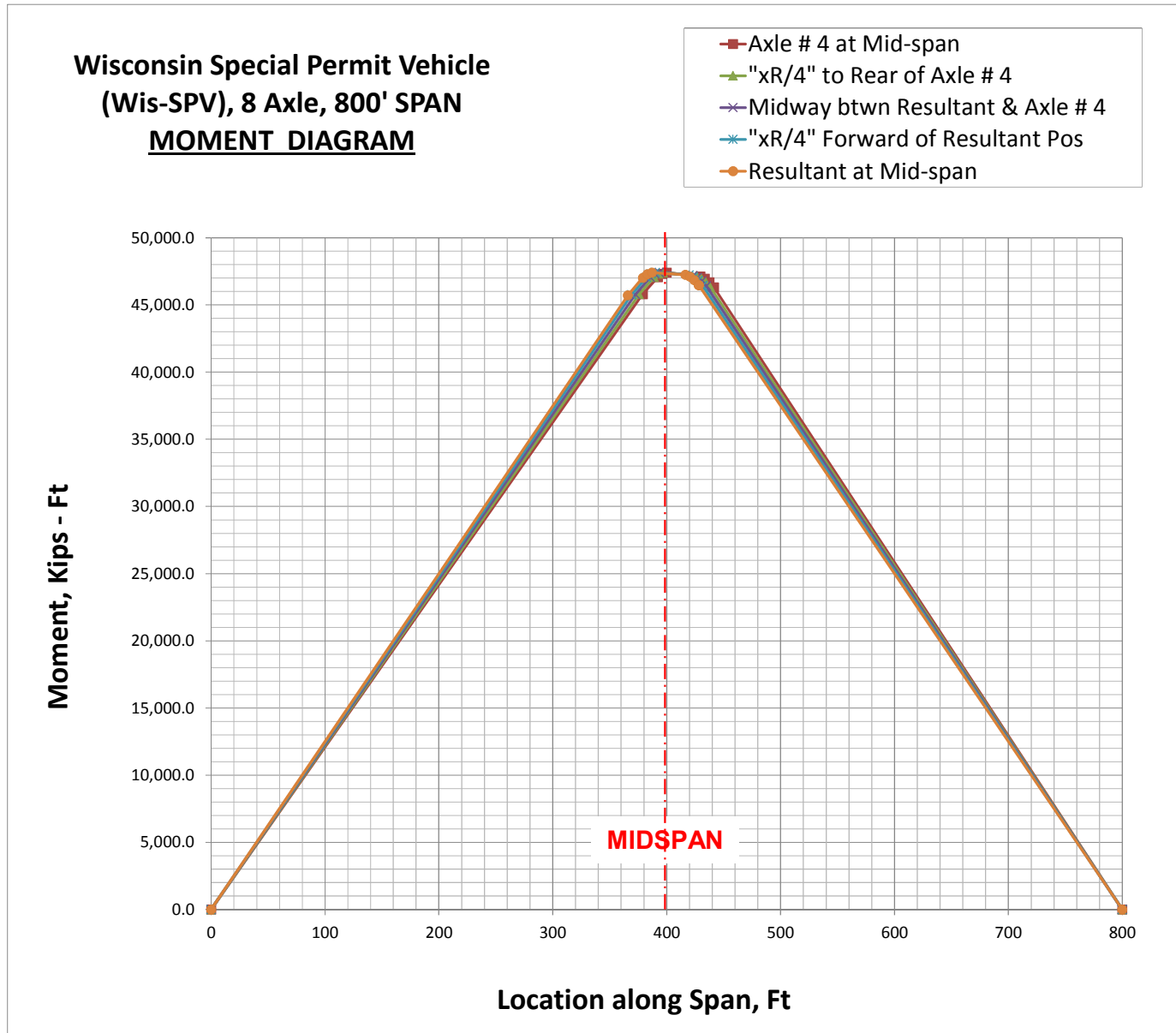
<b>SHEAR</b>	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
Axle # 4 at Mid-span	120.88	95.70	60.63	25.56	-9.51	-39.41	-69.31	-99.21	-129.11	-129.11	129.11
POS	0.00	379.00	392.12	396.06	400.00	429.53	433.47	437.41	441.35	441.35	800.00
"xR/4" to Rear of Axle # 4	121.91	96.73	61.66	26.59	-8.48	-38.38	-68.28	-98.18	-128.08	-128.08	128.08
POS	0.00	375.70	388.82	392.76	396.70	426.23	430.17	434.11	438.05	438.05	800.00
Midway btwn Resultant & Axle # 4	122.93	97.76	62.69	27.62	-7.45	-37.35	-67.25	-97.15	-127.05	-127.05	127.05
POS	0.00	372.41	385.53	389.47	393.41	422.94	426.88	430.82	434.76	434.76	800.00
"xR/4" Forward of Resultant Pos	123.96	98.79	63.72	28.65	-6.42	-36.32	-66.22	-96.12	-126.02	-126.02	126.02
POS	0.00	369.11	382.23	386.17	390.11	419.64	423.58	427.52	431.46	431.46	800.00
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99
POS	0.00	365.82	378.94	382.88	386.82	416.35	420.29	424.23	428.17	428.17	800.00

<b>MOMENT</b>	Moment at React A, ft- kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Rear #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft- kips
Axle # 4 at Mid-span	0.0	45,811.7	47,067.2	47,306.1	47,406.8	47,125.9	46,970.6	46,697.5	46,306.6	46,306.6	0.0
POS	0.00	379.00	392.12	396.06	400.00	429.53	433.47	437.41	441.35	441.35	800.00
"xR/4" to Rear of Axle # 4	0.0	45,800.3	47,069.3	47,312.2	47,417.0	47,166.5	47,015.2	46,746.2	46,359.3	46,359.3	0.0
POS	0.00	375.70	388.82	392.76	396.70	426.23	430.17	434.11	438.05	438.05	800.00
Midway btwn Resultant & Axle # 4	0.0	45,782.0	47,064.6	47,311.6	47,420.4	47,200.3	47,053.1	46,788.1	46,405.3	46,405.3	0.0
POS	0.00	372.41	385.53	389.47	393.41	422.94	426.88	430.82	434.76	434.76	800.00
"xR/4" Forward of Resultant Pos	0.0	45,757.01	47,053.08	47,304.12	47,416.98	47,227.28	47,084.16	46,823.24	46,444.51	46,444.51	0.00
POS	0.00	369.11	382.23	386.17	390.11	419.64	423.58	427.52	431.46	431.46	800.00
Resultant at Mid-span	0.0	45,725.20	47,034.78	47,289.88	47,406.80	47,247.51	47,108.45	46,851.58	46,476.91	46,476.91	0.00
POS	0.00	365.82	378.94	382.88	386.82	416.35	420.29	424.23	428.17	428.17	800.00

**EIGHT (8) AXLE**      **Wisconsin Special Permit Vehicle (Wis-SPV), on 800' Span**

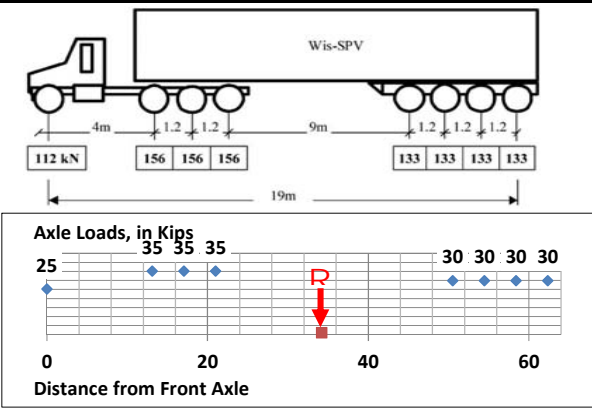


**EIGHT (8) AXLE**      **Wisconsin Special Permit Vehicle (Wis-SPV), on 800' Span**



**EIGHT (8) AXLE Wisconsin Special Permit Vehicle (Wis-SPV), on 900' Span**

Axle	Load (ST)	Load (kips)	SI / Metric Units		
			Distance btwn axles (ft)	Distance from front axle (ft)	Distance from front axle (cm)
(Front) 1	12.59	25.18		0.00	112.00
2	17.54	35.07	13.12	13.12	156.00
3	17.54	35.07	3.94	17.06	156.00
4	17.54	35.07	3.94	21.00	156.00
5	14.95	29.90	29.53	50.53	133.00
6	14.95	29.90	3.94	54.47	133.00
7	14.95	29.90	3.94	58.41	133.00
Rear (8)	14.95	29.90	3.94	62.35	133.00
<b>Totals</b>	<b>124.99</b>	<b>249.99</b>	<b>62.35</b>		<b>1112.0</b>
Resultant at location:				34.182	1042
Distance to Axle # 4, "xR":				13.182	(Rear of Axle # 4)



**900 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Rear #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Axle # 4 at Mid-span	429.00	442.12	446.06	450.00	479.53	483.47	487.41	491.35	491.35	408.65
"xR/4" to Rear of Axle # 4	425.70	438.82	442.76	446.70	476.23	480.17	484.11	488.05	488.05	411.95
Midway btwn Resultant & Axle # 4	422.41	435.53	439.47	443.41	472.94	476.88	480.82	484.76	484.76	415.24
"xR/4" Forward of Resultant Pos	419.11	432.23	436.17	440.11	469.64	473.58	477.52	481.46	481.46	418.54
Resultant at Mid-span	415.82	428.94	432.88	436.82	466.35	470.29	474.23	478.17	478.17	421.83

	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Middle #4 Axle	Shear at Middle #5 Axle	Shear at Middle #6 Axle	Shear at Middle #7 Axle	Shear at Rear #8 Axle	Shear at Rear #9 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	RB
	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips
Axle # 4 at Mid-span	121.33	96.15	61.08	26.01	-9.06	-38.96	-68.86	-98.76	-128.66	-128.66	128.66
"xR/4" to Rear of Axle # 4	122.25	97.07	62.00	26.93	-8.14	-38.04	-67.94	-97.84	-127.74	-127.74	127.74
Midway btwn Resultant & Axle # 4	123.16	97.98	62.91	27.84	-7.23	-37.13	-67.03	-96.93	-126.83	-126.83	126.83
"xR/4" Forward of Resultant Pos	124.08	98.90	63.83	28.76	-6.31	-36.21	-66.11	-96.01	-125.91	-125.91	125.91
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Middle #4 Axle	Mom Area to Middle #5 Axle	Mom Area to Middle #6 Axle	Mom Area to Middle #7 Axle	Mom Area to Rear #8 Axle	Mom Area to Rear #9 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-5	MA-6	MA-7	MA-8	MA-9	MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Axle # 4 at Mid-span	52,051.81	1,261.54	240.67	102.50	-267.42	-153.49	-271.29	-389.10	0.00	-52,575.23
"xR/4" to Rear of Axle # 4	52,041.64	1,273.55	244.28	106.10	-240.39	-149.88	-267.69	-385.49	0.00	-52,622.13
Midway btwn Resultant & Axle # 4	52,025.43	1,285.56	247.88	109.71	-213.36	-146.27	-264.08	-381.89	0.00	-52,662.99
"xR/4" Forward of Resultant Pos	52,003.19	1,297.57	251.49	113.32	-186.33	-142.67	-260.47	-378.28	0.00	-52,697.83
Resultant at Mid-span	51,974.92	1,309.58	255.10	116.92	-159.30	-139.06	-256.87	-374.67	0.00	-52,726.63

<b>EIGHT (8) AXLE</b>		<b>Wisconsin Special Permit Vehicle (Wis-SPV), on 900' Span</b>									
	Sum Moment at Beam End, ft- kips	Sum Moment to Front #1 Axle, ft-kips	Sum Moment to Mid #2 Axle, ft-kips	Sum Moment to Mid #3 Axle, ft-kips	Sum Moment to Mid #4 Axle, ft-kips	Sum Moment to Mid #5 Axle, ft-kips	Sum Moment to Mid #6 Axle, ft-kips	Sum Moment to Mid #7 Axle, ft-kips	Sum Moment to Rear #8 Axle, ft-kips	Sum Moment to Rear #9 Axle, ft-kips	Sum Moment to Beam End, ft- kips
	M-RA-End ft-kips	M-1 ft-kips	M-2 ft-kips	M-3 ft-kips	M-4 ft-kips	M-5 ft-kips	M-6 ft-kips	M-7 ft-kips	M-8 ft-kips	M-9 ft-kips	M-RB-End ft-kips
Axle # 4 at Mid-span	0.00	52,051.81	53,313.36	53,554.03	53,656.52	53,389.10	53,235.62	52,964.32	52,575.23	52,575.23	0.00
"xR/4" to Rear of Axle # 4	0.00	52,041.64	53,315.19	53,559.47	53,665.57	53,425.18	53,275.30	53,007.62	52,622.13	52,622.13	0.00
Midway btwn Resultant & Axle # 4	0.00	52,025.43	53,311.00	53,558.88	53,668.59	53,455.23	53,308.96	53,044.88	52,662.99	52,662.99	0.00
"xR/4" Forward of Resultant Pos	0.00	52,003.19	53,300.77	53,552.26	53,665.57	53,479.25	53,336.58	53,076.11	52,697.83	52,697.83	0.00
Resultant at Mid-span	0.00	51,974.92	53,284.50	53,539.60	53,656.52	53,497.23	53,358.17	53,101.30	52,726.63	52,726.63	0.00

<b>SHEAR</b>	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
Axle # 4 at Mid-span	121.33	96.15	61.08	26.01	-9.06	-38.96	-68.86	-98.76	-128.66	-128.66	128.66
POS	0.00	429.00	442.12	446.06	450.00	479.53	483.47	487.41	491.35	491.35	900.00
"xR/4" to Rear of Axle # 4	122.25	97.07	62.00	26.93	-8.14	-38.04	-67.94	-97.84	-127.74	-127.74	127.74
POS	0.00	425.70	438.82	442.76	446.70	476.23	480.17	484.11	488.05	488.05	900.00
Midway btwn Resultant & Axle # 4	123.16	97.98	62.91	27.84	-7.23	-37.13	-67.03	-96.93	-126.83	-126.83	126.83
POS	0.00	422.41	435.53	439.47	443.41	472.94	476.88	480.82	484.76	484.76	900.00
"xR/4" Forward of Resultant Pos	124.08	98.90	63.83	28.76	-6.31	-36.21	-66.11	-96.01	-125.91	-125.91	125.91
POS	0.00	419.11	432.23	436.17	440.11	469.64	473.58	477.52	481.46	481.46	900.00
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99
POS	0.00	415.82	428.94	432.88	436.82	466.35	470.29	474.23	478.17	478.17	900.00

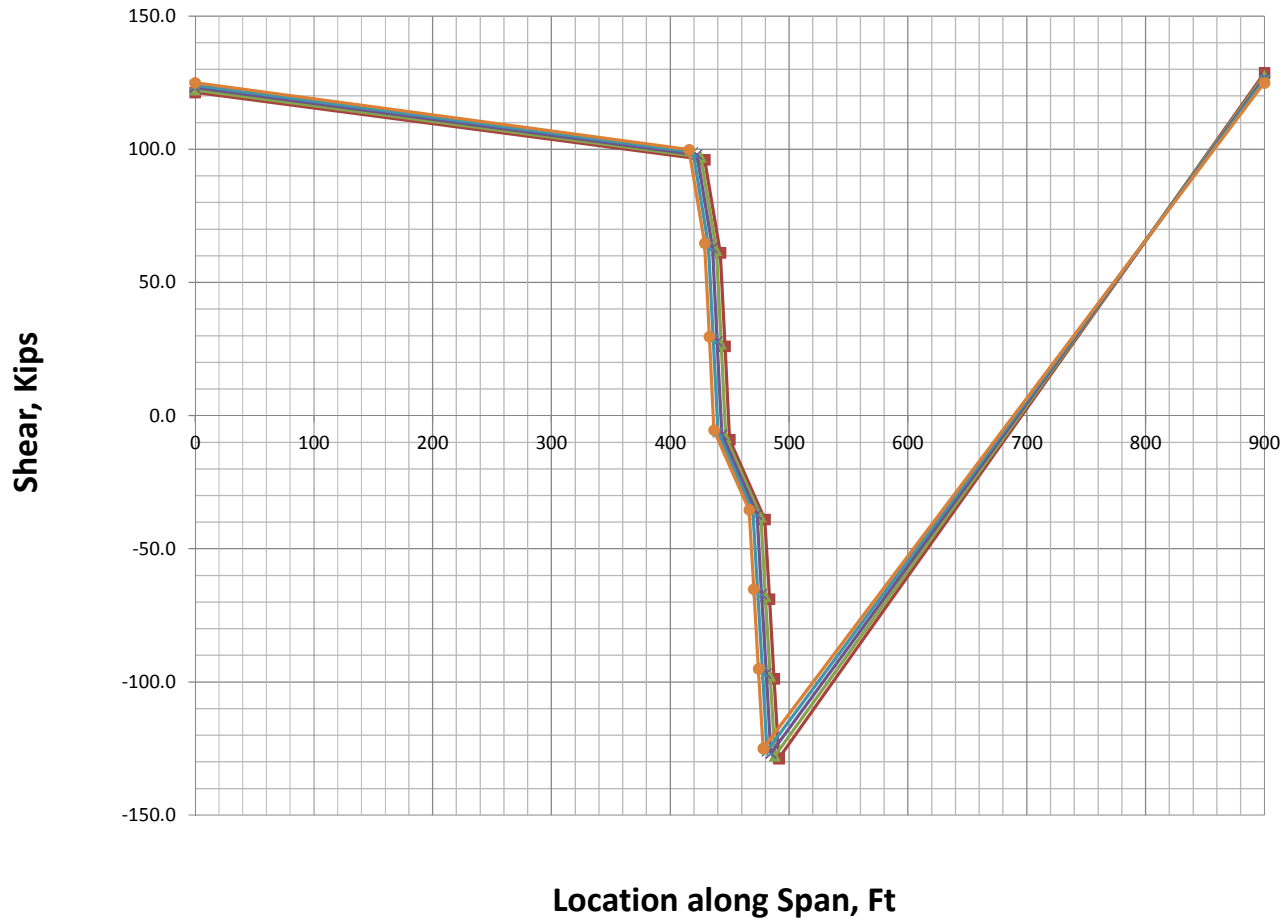
<b>MOMENT</b>	Moment at React A, ft- kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Rear #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft- kips
Axle # 4 at Mid-span	0.0	52,051.8	53,313.4	53,554.0	53,656.5	53,389.1	53,235.6	52,964.3	52,575.2	52,575.2	0.0
POS	0.00	429.00	442.12	446.06	450.00	479.53	483.47	487.41	491.35	491.35	900.00
"xR/4" to Rear of Axle # 4	0.0	52,041.6	53,315.2	53,559.5	53,665.6	53,425.2	53,275.3	53,007.6	52,622.1	52,622.1	0.0
POS	0.00	425.70	438.82	442.76	446.70	476.23	480.17	484.11	488.05	488.05	900.00
Midway btwn Resultant & Axle # 4	0.0	52,025.4	53,311.0	53,558.9	53,668.6	53,455.2	53,309.0	53,044.9	52,663.0	52,663.0	0.0
POS	0.00	422.41	435.53	439.47	443.41	472.94	476.88	480.82	484.76	484.76	900.00
"xR/4" Forward of Resultant Pos	0.0	52,003.19	53,300.77	53,552.26	53,665.57	53,479.25	53,336.58	53,076.11	52,697.83	52,697.83	0.00
POS	0.00	419.11	432.23	436.17	440.11	469.64	473.58	477.52	481.46	481.46	900.00
Resultant at Mid-span	0.0	51,974.92	53,284.50	53,539.60	53,656.52	53,497.23	53,358.17	53,101.30	52,726.63	52,726.63	0.00
POS	0.00	415.82	428.94	432.88	436.82	466.35	470.29	474.23	478.17	478.17	900.00

**EIGHT (8) AXLE**

**Wisconsin Special Permit Vehicle (Wis-SPV), on 900' Span**

**Wisconsin Special Permit Vehicle  
(Wis-SPV), 8 Axle, 900' SPAN  
SHEAR DIAGRAM**

- Axle # 4 at Mid-span
- ▲ "xR/4" to Rear of Axle # 4
- ✕ Midway btwn Resultant & Axle # 4
- ✱ "xR/4" Forward of Resultant Pos
- Resultant at Mid-span

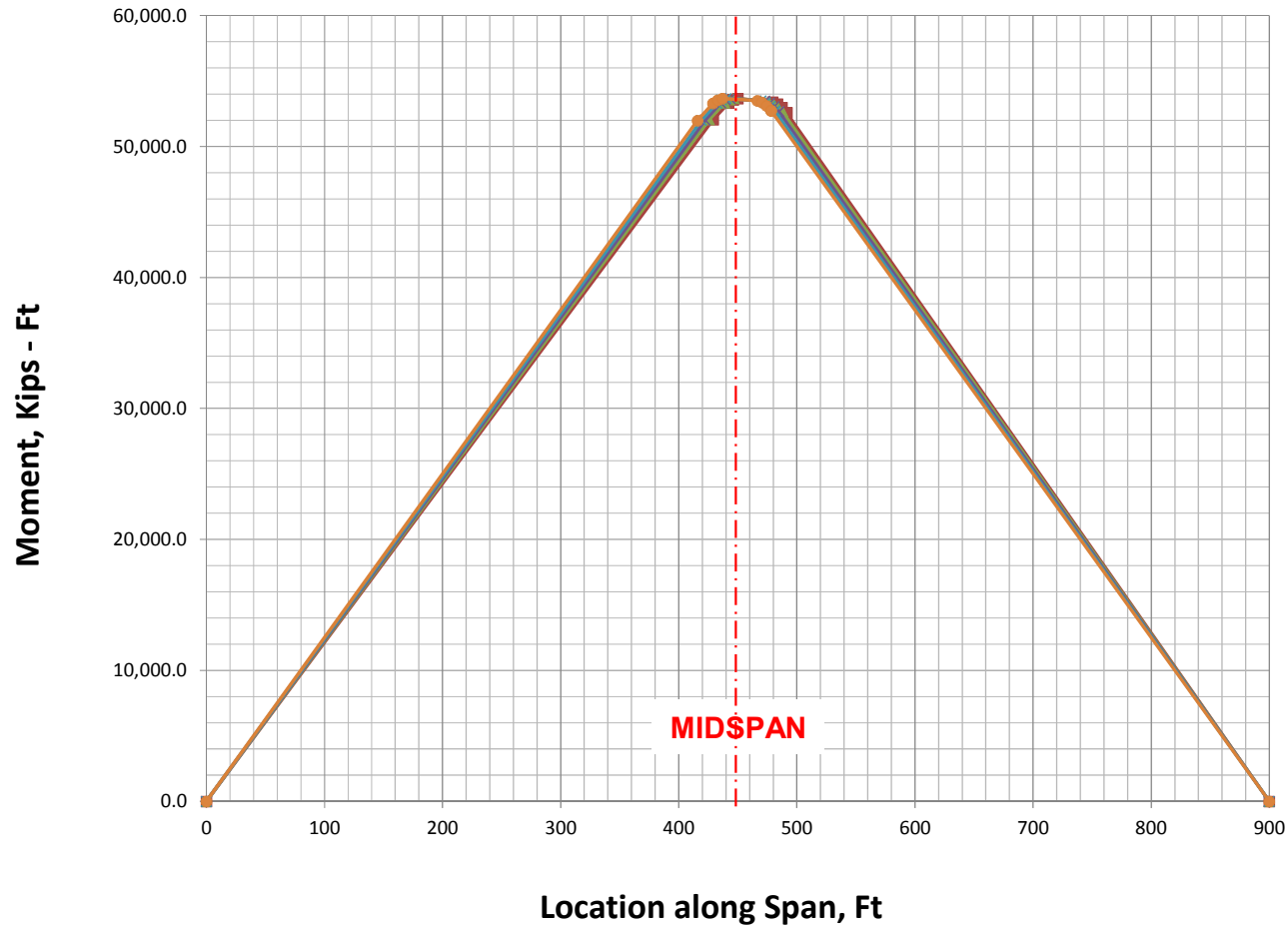


**EIGHT (8) AXLE**

**Wisconsin Special Permit Vehicle (Wis-SPV), on 900' Span**

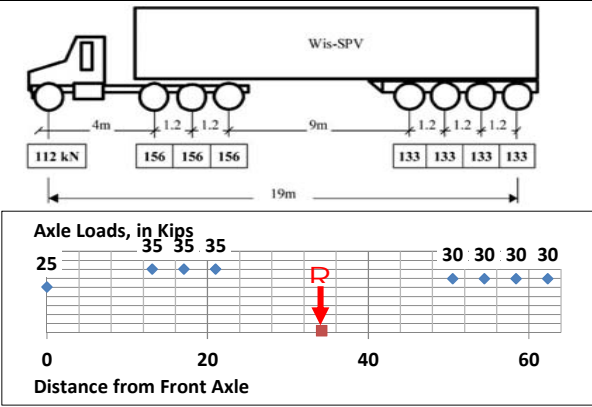
**Wisconsin Special Permit Vehicle  
(Wis-SPV), 8 Axle, 900' SPAN  
MOMENT DIAGRAM**

- Axle # 4 at Mid-span
- "xR/4" to Rear of Axle # 4
- Midway btwn Resultant & Axle # 4
- "xR/4" Forward of Resultant Pos
- Resultant at Mid-span



**EIGHT (8) AXLE Wisconsin Special Permit Vehicle (Wis-SPV), on 1,000' Span**

Axle	Load (ST)	Load (kips)	SI / Metric Units		
			Distance btwn axles (ft)	Distance from front axle (ft)	Distance from front axle (cm)
(Front) 1	12.59	25.18		0.00	112.00
2	17.54	35.07	13.12	13.12	156.00
3	17.54	35.07	3.94	17.06	156.00
4	17.54	35.07	3.94	21.00	156.00
5	14.95	29.90	29.53	50.53	133.00
6	14.95	29.90	3.94	54.47	133.00
7	14.95	29.90	3.94	58.41	133.00
Rear (8)	14.95	29.90	3.94	62.35	133.00
<b>Totals</b>	<b>124.99</b>	<b>249.99</b>	<b>62.35</b>		<b>1112.0</b>
Resultant at location:				34.182	1042
Distance to Axle # 4, "xR":				13.182 (Rear of Axle # 4)	



**1000 ft Span Length**

	Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Rear #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
Axle # 4 at Mid-span	479.00	492.12	496.06	500.00	529.53	533.47	537.41	541.35	541.35	458.65
"xR/4" to Rear of Axle # 4	475.70	488.82	492.76	496.70	526.23	530.17	534.11	538.05	538.05	461.95
Midway btwn Resultant & Axle # 4	472.41	485.53	489.47	493.41	522.94	526.88	530.82	534.76	534.76	465.24
"xR/4" Forward of Resultant Pos	469.11	482.23	486.17	490.11	519.64	523.58	527.52	531.46	531.46	468.54
Resultant at Mid-span	465.82	478.94	482.88	486.82	516.35	520.29	524.23	528.17	528.17	471.83

	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Middle #4 Axle	Shear at Middle #5 Axle	Shear at Middle #6 Axle	Shear at Middle #7 Axle	Shear at Rear #8 Axle	Shear at Rear #9 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	RB
	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips	kips
Axle # 4 at Mid-span	121.70	96.52	61.45	26.38	-8.69	-38.59	-68.49	-98.39	-128.29	-128.29	128.29
"xR/4" to Rear of Axle # 4	122.52	97.34	62.27	27.20	-7.87	-37.77	-67.67	-97.57	-127.47	-127.47	127.47
Midway btwn Resultant & Axle # 4	123.35	98.17	63.10	28.03	-7.04	-36.94	-66.84	-96.74	-126.64	-126.64	126.64
"xR/4" Forward of Resultant Pos	124.17	98.99	63.92	28.85	-6.22	-36.12	-66.02	-95.92	-125.82	-125.82	125.82
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Middle #4 Axle	Mom Area to Middle #5 Axle	Mom Area to Middle #6 Axle	Mom Area to Middle #7 Axle	Mom Area to Rear #8 Axle	Mom Area to Rear #9 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-5	MA-6	MA-7	MA-8	MA-9	MA-END
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Axle # 4 at Mid-span	58,293.84	1,266.35	242.11	103.94	-256.61	-152.04	-269.85	-387.66	0.00	-58,840.09
"xR/4" to Rear of Axle # 4	58,284.69	1,277.15	245.36	107.18	-232.28	-148.80	-266.60	-384.41	0.00	-58,882.30
Midway btwn Resultant & Axle # 4	58,270.10	1,287.96	248.61	110.43	-207.95	-145.55	-263.36	-381.16	0.00	-58,919.08
"xR/4" Forward of Resultant Pos	58,250.09	1,298.77	251.85	113.68	-183.62	-142.31	-260.11	-377.92	0.00	-58,950.43
Resultant at Mid-span	58,224.64	1,309.58	255.10	116.92	-159.30	-139.06	-256.87	-374.67	0.00	-58,976.35



<b>EIGHT (8) AXLE</b>		<b>Wisconsin Special Permit Vehicle (Wis-SPV), on 1,000' Span</b>									
	Sum Moment at Beam End, ft- kips	Sum Moment to Front #1 Axle, ft-kips	Sum Moment to Mid #2 Axle, ft-kips	Sum Moment to Mid #3 Axle, ft-kips	Sum Moment to Mid #4 Axle, ft-kips	Sum Moment to Mid #5 Axle, ft-kips	Sum Moment to Mid #6 Axle, ft-kips	Sum Moment to Mid #7 Axle, ft-kips	Sum Moment to Rear #8 Axle, ft-kips	Sum Moment to Rear #9 Axle, ft-kips	Sum Moment to Beam End, ft- kips
	M-RA-End ft-kips	M-1 ft-kips	M-2 ft-kips	M-3 ft-kips	M-4 ft-kips	M-5 ft-kips	M-6 ft-kips	M-7 ft-kips	M-8 ft-kips	M-9 ft-kips	M-RB-End ft-kips
Axle # 4 at Mid-span	0.00	58,293.84	59,560.19	59,802.30	59,906.24	59,649.63	59,497.59	59,227.74	58,840.09	58,840.09	0.00
"xR/4" to Rear of Axle # 4	0.00	58,284.69	59,561.84	59,807.20	59,914.39	59,682.11	59,533.31	59,266.71	58,882.30	58,882.30	0.00
Midway btwn Resultant & Axle # 4	0.00	58,270.10	59,558.07	59,806.67	59,917.10	59,709.15	59,563.60	59,300.24	58,919.08	58,919.08	0.00
"xR/4" Forward of Resultant Pos	0.00	58,250.09	59,548.86	59,800.71	59,914.39	59,730.76	59,588.46	59,328.35	58,950.43	58,950.43	0.00
Resultant at Mid-span	0.00	58,224.64	59,534.22	59,789.32	59,906.24	59,746.95	59,607.89	59,351.02	58,976.35	58,976.35	0.00

<b>SHEAR</b>	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
Axle # 4 at Mid-span	121.70	96.52	61.45	26.38	-8.69	-38.59	-68.49	-98.39	-128.29	-128.29	128.29
POS	0.00	479.00	492.12	496.06	500.00	529.53	533.47	537.41	541.35	541.35	1000.00
"xR/4" to Rear of Axle # 4	122.52	97.34	62.27	27.20	-7.87	-37.77	-67.67	-97.57	-127.47	-127.47	127.47
POS	0.00	475.70	488.82	492.76	496.70	526.23	530.17	534.11	538.05	538.05	1000.00
Midway btwn Resultant & Axle # 4	123.35	98.17	63.10	28.03	-7.04	-36.94	-66.84	-96.74	-126.64	-126.64	126.64
POS	0.00	472.41	485.53	489.47	493.41	522.94	526.88	530.82	534.76	534.76	1000.00
"xR/4" Forward of Resultant Pos	124.17	98.99	63.92	28.85	-6.22	-36.12	-66.02	-95.92	-125.82	-125.82	125.82
POS	0.00	469.11	482.23	486.17	490.11	519.64	523.58	527.52	531.46	531.46	1000.00
Resultant at Mid-span	124.99	99.82	64.75	29.68	-5.39	-35.29	-65.19	-95.09	-124.99	-124.99	124.99
POS	0.00	465.82	478.94	482.88	486.82	516.35	520.29	524.23	528.17	528.17	1000.00

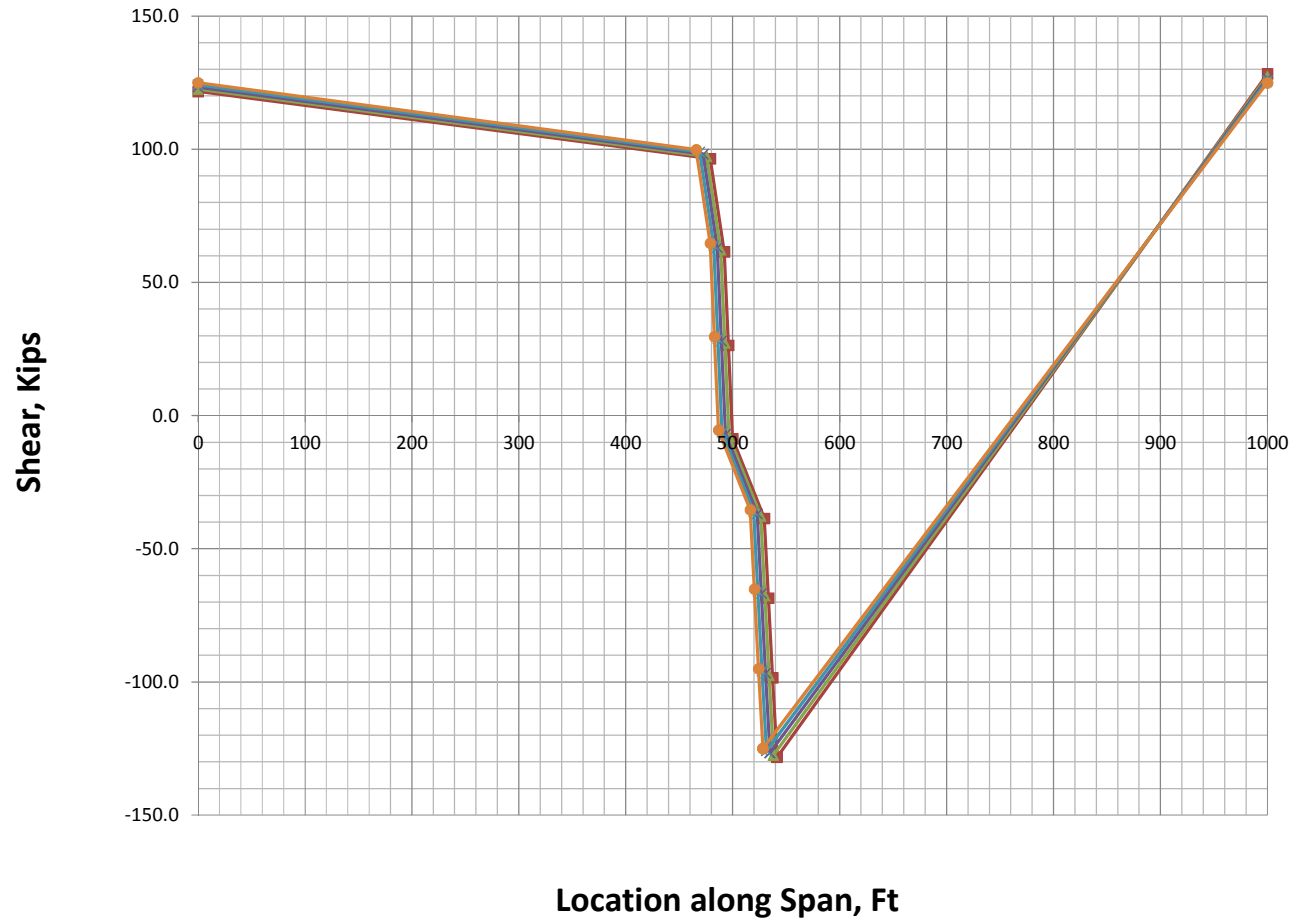
<b>MOMENT</b>	Moment at React A, ft- kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Rear #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft- kips
Axle # 4 at Mid-span	0.0	58,293.8	59,560.2	59,802.3	59,906.2	59,649.6	59,497.6	59,227.7	58,840.1	58,840.1	0.0
POS	0.00	479.00	492.12	496.06	500.00	529.53	533.47	537.41	541.35	541.35	1000.00
"xR/4" to Rear of Axle # 4	0.0	58,284.7	59,561.8	59,807.2	59,914.4	59,682.1	59,533.3	59,266.7	58,882.3	58,882.3	0.0
POS	0.00	475.70	488.82	492.76	496.70	526.23	530.17	534.11	538.05	538.05	1000.00
Midway btwn Resultant & Axle # 4	0.0	58,270.1	59,558.1	59,806.7	59,917.1	59,709.1	59,563.6	59,300.2	58,919.1	58,919.1	0.0
POS	0.00	472.41	485.53	489.47	493.41	522.94	526.88	530.82	534.76	534.76	1000.00
"xR/4" Forward of Resultant Pos	0.0	58,250.09	59,548.86	59,800.71	59,914.39	59,730.76	59,588.46	59,328.35	58,950.43	58,950.43	0.00
POS	0.00	469.11	482.23	486.17	490.11	519.64	523.58	527.52	531.46	531.46	1000.00
Resultant at Mid-span	0.0	58,224.64	59,534.22	59,789.32	59,906.24	59,746.95	59,607.89	59,351.02	58,976.35	58,976.35	0.00
POS	0.00	465.82	478.94	482.88	486.82	516.35	520.29	524.23	528.17	528.17	1000.00

**EIGHT (8) AXLE**

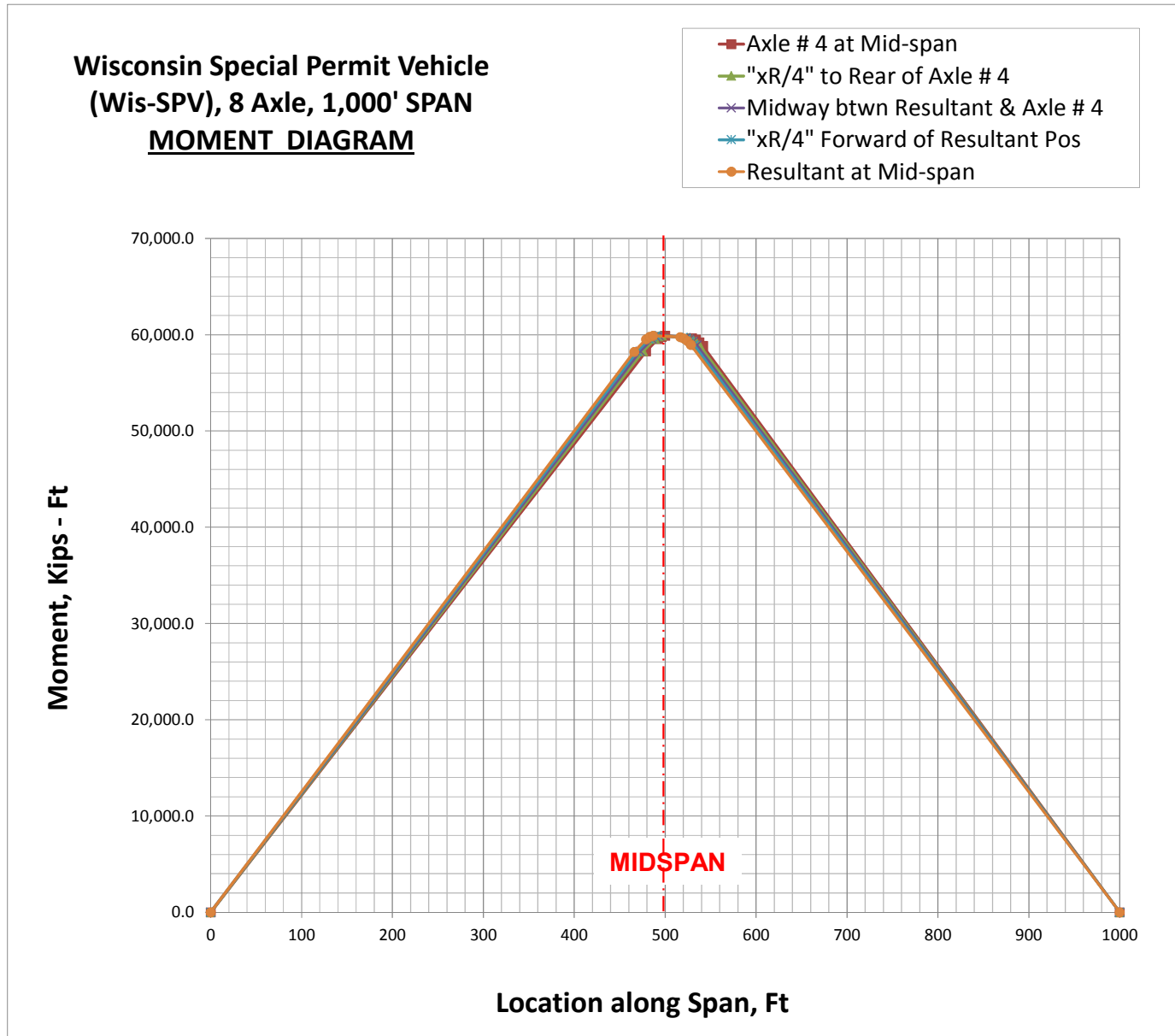
**Wisconsin Special Permit Vehicle (Wis-SPV), on 1,000' Span**

**Wisconsin Special Permit Vehicle  
(Wis-SPV), 8 Axle, 1,000' SPAN  
SHEAR DIAGRAM**

- Axle # 4 at Mid-span
- ▲ "xR/4" to Rear of Axle # 4
- ✕ Midway btwn Resultant & Axle # 4
- ✱ "xR/4" Forward of Resultant Pos
- Resultant at Mid-span



**EIGHT (8) AXLE**      **Wisconsin Special Permit Vehicle (Wis-SPV), on 1,000' Span**



**END OF APPENDIX H**

## APPENDIX I: RELIABILITY ANALYSIS CALCULATIONS

Filename: WP Parker UNO 2019 MSCE Thesis Data - Appendix I. Reliability Analysis.xlsx

Contents (worksheets/tab names included in the Excel workbook are):

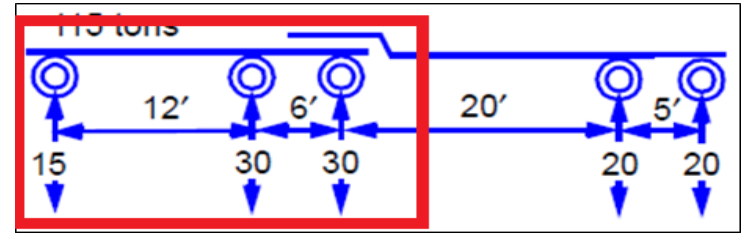
<u>Calculation Worksheets</u>	<u>Page</u>	<u>Page</u>	<u>Tables</u>	<u>Page</u>
	I-2			I-59
Locate Max M 100W Frt 3axles	I-3	Prop Std HET,MaxM, 52', Axs 2-9	6-1. Beta Database Calcs	I-60
Locate Max M 100W Rear 3axles	I-4	Prop Std HET,MaxM, 50', Axs 2-9		
Locate Max M 100W Frt 4axles	I-5	Prop Std HET,MaxM, 49', Axs 2-9	<u>Figures</u>	I-66
Locate Max M 100W Rear 4axles	I-6	Prop Std HET,MaxM, 60', Axs 3-9	6-4.Plot Probability of Failure	I-67
MaxM 100W Front 3axle, Var Span	I-7	Prop Std HET,MaxM, 55', Axs 3-9	6-5. AASHTO Std I-Beam Types	I-68
MaxM 100W Rear 3axles, Var Span	I-8	Prop Std HET,MaxM, 52', Axs 3-9	6-6. 230K HET MaxV-M 4-100 ft	I-69
Max M 100W Frt 4axles, Var Span	I-9	Prop Std HET,MaxM, 50', Axs 3-9	6-7. MLC 100W MaxV-M 4-180 ft	I-70
MaxM 100W Rear 4axles, Var Span	I-10	Prop Std HET,MaxM, 49', Axs 3-9	6-8. Max Shear, Var LL+Est DL	I-71
MLC 100W, <= 44', Full Vehicle	I-11	Prop Std HET,MaxM, 47', Axs 3-9	6-9. Max Moment, Var LL+Est DL	I-72
Prop Std HET, Full Veh,Var Span	I-12	Prop Std HET,MaxM, 45', Axs 3-9	6-10. Calc Beta, 1x Lane, Shear	I-73
Prop Std HET,MaxM,82', full veh	I-13	Prop Std HET,MaxM, 44', Axs 3-9	6-11. Calc Beta, 1x Lane,Moment	I-74
Prop Std HET,MaxM,80', full veh	I-14	Prop Std HET,MaxM, 60', Axs 4-9	6-12.Calc Beta,HET+Convoy,Shear	I-75
Prop Std HET,MaxM,75', full veh	I-15	Prop Std HET,MaxM, 55', Axs 4-9	6-13.Calc Beta,HET+Convoy,Moment	I-76
Prop Std HET,MaxM,72', full veh	I-16	Prop Std HET,MaxM, 52', Axs 4-9	6-14.Unfact Beta,1x Lane, Shear	I-77
Prop Std HET,MaxM,70', full veh	I-17	Prop Std HET,MaxM, 50', Axs 4-9	6-15.Unfact Beta,1x Lane,Moment	I-78
Prop Std HET,MaxM,65', full veh	I-18	Prop Std HET,MaxM, 49', Axs 4-9	6-16. NF Beta,HET+Convoy,Shear	I-79
Prop Std HET,MaxM,62', full veh	I-19	Prop Std HET,MaxM, 47', Axs 4-9	6-17.NF Beta,HET+Convoy,Moment	I-80
Prop Std HET,MaxM, 90', Axs 2-9	I-20	Prop Std HET,MaxM, 45', Axs 4-9	6-18.Trad FS,Shear,SR div UFTS	I-81
Prop Std HET,MaxM, 82', Axs 2-9	I-21	Prop Std HET,MaxM, 44', Axs 4-9	6-19.Trad FS,Moment,MR div UFTM	I-82
Prop Std HET,MaxM, 80', Axs 2-9	I-22	Prop Std HET,MaxM, 42', Axs 4-9	6-20. FS vs Beta,combined V & M	I-83
Prop Std HET,MaxM, 75', Axs 2-9	I-23	Prop Std HET,MaxM, 40',Axs 4-9	6-21. Betas vs Var Lane Loading	I-84
Prop Std HET,MaxM, 72', Axs 2-9	I-24	Prop Std HET,MaxM, 39', Axs 4-9		
Prop Std HET,MaxM, 70', Axs 2-9	I-25	HET, Ax 2-9, 13'offset, 65 ft		
Prop Std HET,MaxM, 65', Axs 2-9	I-26	HET, Ax 2-9, 13'offset,var span		
Prop Std HET,MaxM, 62', Axs 2-9	I-27	HET, Ax 3-9, 5'offset, 60 ft		
Prop Std HET,MaxM, 60', Axs 2-9	I-28	HET, Ax 3-9, 5'offset,var span		
Prop Std HET,MaxM, 55', Axs 2-9	I-29	HET, Ax 4-9, 5'offset, 60 ft		
Prop Std HET,MaxM, 53.25', 2-9	I-30	HET, Ax 4-9, 5'offset,var span		

## CALCULATION WORKSHEETS

Locate Max M 100W Frt 3axles	Prop Std HET,MaxM, 52', Axs 2-9
Locate Max M 100W Rear 3axles	Prop Std HET,MaxM, 50', Axs 2-9
Locate Max M 100W Frt 4axles	Prop Std HET,MaxM, 49', Axs 2-9
Locate Max M 100W Rear 4axles	Prop Std HET,MaxM, 60', Axs 3-9
MaxM 100W Front 3axle, Var Span	Prop Std HET,MaxM, 55', Axs 3-9
MaxM 100W Rear 3axles, Var Span	Prop Std HET,MaxM, 52', Axs 3-9
Max M 100W Frt 4axles, Var Span	Prop Std HET,MaxM, 50', Axs 3-9
MaxM 100W Rear 4axles, Var Span	Prop Std HET,MaxM, 49', Axs 3-9
MLC 100W, <= 44', Full Vehicle	Prop Std HET,MaxM, 47', Axs 3-9
Prop Std HET, Full Veh, Var	Prop Std HET,MaxM, 45', Axs 3-9
Prop Std HET,MaxM,82', full veh	Prop Std HET,MaxM, 44', Axs 3-9
Prop Std HET,MaxM,80', full veh	Prop Std HET,MaxM, 60', Axs 4-9
Prop Std HET,MaxM,75', full veh	Prop Std HET,MaxM, 55', Axs 4-9
Prop Std HET,MaxM,72', full veh	Prop Std HET,MaxM, 52', Axs 4-9
Prop Std HET,MaxM,70', full veh	Prop Std HET,MaxM, 50', Axs 4-9
Prop Std HET,MaxM,65', full veh	Prop Std HET,MaxM, 49', Axs 4-9
Prop Std HET,MaxM,62', full veh	Prop Std HET,MaxM, 47', Axs 4-9
Prop Std HET,MaxM, 90', Axs 2-9	Prop Std HET,MaxM, 45', Axs 4-9
Prop Std HET,MaxM, 82', Axs 2-9	Prop Std HET,MaxM, 44', Axs 4-9
Prop Std HET,MaxM, 80', Axs 2-9	Prop Std HET,MaxM, 42', Axs 4-9
Prop Std HET,MaxM, 75', Axs 2-9	Prop Std HET,MaxM, 40', Axs 4-9
Prop Std HET,MaxM, 72', Axs 2-9	Prop Std HET,MaxM, 39', Axs 4-9
Prop Std HET,MaxM, 70', Axs 2-9	HET, Ax 2-9, 13'offset, 65 ft
Prop Std HET,MaxM, 65', Axs 2-9	HET, Ax 2-9, 13'offset,var span
Prop Std HET,MaxM, 62', Axs 2-9	HET, Ax 3-9, 5'offset, 60 ft
Prop Std HET,MaxM, 60', Axs 2-9	HET, Ax 3-9, 5'offset,var span
Prop Std HET,MaxM, 55', Axs 2-9	HET, Ax 4-9, 5'offset, 60 ft
Prop Std HET,MaxM, 53.25', 2-9	HET, Ax 4-9, 5'offset,var span

**THREE (3) AXLE** **One (1x) Hypothetical MLC 100W Vehicle, Maximum Moment Calculation, Front 4 Axles**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
1	15.0	30.0		0.0	133.45	0
center	0.0	0.0	9.0	9.0	0.00	274
2	30.0	60.0	3.0	12.0	266.89	366
3	30.0	60.0	6.0	18.0	266.89	549
<b>Totals</b>			<b>18.0</b>		<b>533.79</b>	
			<b>Resultant at location:</b>	<b>12.000</b>		<b>366</b>



**70 ft Span Length**

	Front 15K Axle	"Center" of Axle Group	Middle 30K Axle	End 30K Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	L END
<b>Position of Midspan</b>	ft	ft	ft	ft	ft
15K Axle at Mid Span	35.000	44.000	47.000	53.000	17.000
"Center" of Axle Group at MidSpan	26.000	35.000	38.000	44.000	26.000
Mid 30K Axle at Midspan	23.000	32.000	35.000	41.000	29.000
Mid-span between 30K Axles	20.000	29.000	32.000	38.000	32.000
End 30K Axle at Midspan	17.000	26.000	29.000	35.000	35.000
15K Axle at Front Support	0.00	9.00	12.00	18.00	52.00
Rear 30K Axle at Rear Spt (Max Shear)	52.00	61.00	64.00	70.00	0.00

	Reaction at Support "A"	Shear at Front 15K Axle	Shear at Middle 30K Axle	Shear at Rear 30K Axle	Reaction at Support "B"
	RA	R-1	R-3	R-4	RB
	kips	kips	kips	kips	kips
18.00	49.29	19.29	-40.71	-100.71	100.71
18.00	68.57	38.57	-21.43	-81.43	81.43
18.00	75.00	45.00	-15.00	-75.00	75.00
18.00	81.43	51.43	-8.57	-68.57	68.57
18.00	87.86	57.86	-2.14	-62.14	62.14
18.00	124.29	94.29	34.29	-25.71	25.71
18.00	12.86	-17.14	-77.14	-137.14	137.14

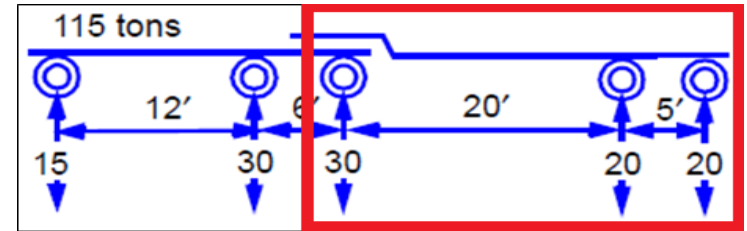
	Mom Area to Front 15K Axle	Mom Area to Middle 30K Axle	Mom Area to Rear 30K Axle	Mom Area to Beam End
	MA-1	MA-3	MA-4	MA-END
<b>Position of Midspan</b>	ft-kips	ft-kips	ft-kips	ft-kips
15K Axle at Mid Span	1,725.00	231.43	-244.29	-1,712.14
"Center" of Axle Group at MidSpan	1,782.86	462.86	-128.57	-2,117.14
Mid 30K Axle at Midspan	1,725.00	540.00	-90.00	-2,175.00
Mid-span between 30K Axles	1,628.57	617.14	-51.43	-2,194.29
End 30K Axle at Midspan	1,493.57	694.29	-12.86	-2,175.00

	Mom Area to Beam End, ft-kips	Mom Area to Front 15K Axle, ft-kips	Mom Area to Middle 30K Axle, ft-kips	Mom Area to Rear 30K Axle, ft-kips	Mom Area to Beam End, ft-kips
	M-RA-End	M-1	M-3	M-4	M-RB-End
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
	0.00	1,725.00	1,956.43	1,712.14	0.00
	0.00	1,782.86	2,245.71	2,117.14	0.00
	0.00	1,725.00	2,265.00	2,175.00	0.00
	0.00	1,628.57	2,245.71	2,194.29	0.00
	0.00	1,493.57	2,187.86	2,175.00	0.00

**THREE (3) AXLE** **One (1x) Hypothetical MLC 100W Vehicle, Maximum Moment Calculation, Rear 4 Axles**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
3	30.0	60.0		0.0	266.89	0
4	20.0	40.0	20.0	20.0	177.93	610
5	20.0	40.0	5.0	25.0	177.93	762
<b>Totals</b>			<b>70.0</b>	<b>140.0</b>	<b>25.0</b>	<b>355.86</b>
				<b>Resultant at location:</b>	<b>12.857</b>	<b>392</b>

70 ft Span Length



Position of Midspan	Front 30K Axle	Middle 20K Axle	End 20K Axle	Dist to Beam End
	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	
"Center" of Axle Group at MidSpan	22.500	42.500	47.500	22.500
Resultant at Midspan	22.143	42.143	47.143	22.857
Midspan btwn Resultant & Mid Axle	18.571	38.571	43.571	26.429
Middle 20K axle at midspan	15.000	35.000	40.000	30.000
2x 20K Axles centered over Midspan	12.500	32.500	37.500	32.500
30K Axle at Front Support	0.00	20.00	25.00	45.00
Rear 20K Axle at Rear Spt (Max Shear)	45.00	65.00	70.00	0.00

Position of Midspan	Mom Area to Front 30K Axle	Mom Area to Middle 20K Axle	Mom Area to Rear 20K Axle	Mom Area to Beam End
	MA-1	MA-3	MA-4	MA-END
ft-kips	ft-kips	ft-kips	ft-kips	
"Center" of Axle Group at MidSpan	1,558.93	185.71	-153.57	-1,591.07
Resultant at Midspan	1,550.00	200.00	-150.00	-1,600.00
Midspan btwn Resultant & Mid Axle	1,432.65	342.86	-114.29	-1,661.22
Middle 20K axle at midspan	1,264.29	485.71	-78.57	-1,671.43
2x 20K Axles centered over Midspan	1,116.07	585.71	-53.57	-1,648.21

Reaction at Support "A"	Shear at Front 30K Axle	Shear at Middle 20K Axle	Shear at Rear 20K Axle	Reaction at Support "B"
	RA	R-1	R-3	RB
kips	kips	kips	kips	kips
25.00	69.29	9.29	-30.71	-70.71
25.00	70.00	10.00	-30.00	-70.00
25.00	77.14	17.14	-22.86	-62.86
25.00	84.29	24.29	-15.71	-55.71
25.00	89.29	29.29	-10.71	-50.71
25.00	114.29	54.29	14.29	-25.71
25.00	24.29	-35.71	-75.71	-115.71

Mom Area to Beam End, ft-kips	Mom Area to Front 30K Axle, ft-kips	Mom Area to Middle 20K Axle, ft-kips	Mom Area to Rear 20K Axle, ft-kips	Mom Area to Beam End, ft-kips
	M-RA-End	M-1	M-3	M-RB-End
ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
0.00	1,558.93	1,744.64	1,591.07	0.00
0.00	1,550.00	1,750.00	1,600.00	0.00
0.00	1,432.65	1,775.51	1,661.22	0.00
0.00	1,264.29	1,750.00	1,671.43	0.00
0.00	1,116.07	1,701.79	1,648.21	0.00



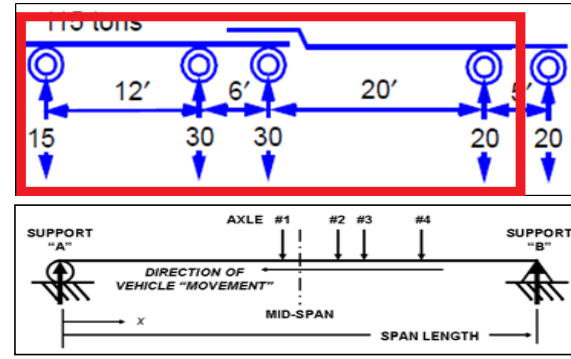
**FOUR (4) AXLE** **One (1x) Hypothetical MLC 100W Vehicle, Maximum Moment Calculation, Front 4 Axles**

Axle	Load		Distance	Distance	SI / Metric Units	
	Load (ST)	Load (kips)	btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
1	15.0	30.0		0.0	133.45	0
2	30.0	60.0	12.0	12.0	266.89	366
3	30.0	60.0	6.0	18.0	266.89	549
4	20.0	40.0	20.0	38.0	177.93	1158
<b>Totals</b>			<b>38.0</b>	<b>17.474</b>	<b>711.72</b>	<b>533</b>

**70 ft Span Length**

	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Rear #4 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	L END
<b>Position of Midspan</b>	ft	ft	ft	ft	ft
Midspan btwn Axles #1 #2	29.000	41.000	47.000	67.000	3.000
Resultant at Mid-span	17.526	29.526	35.526	55.526	14.474
Btwn Axle #3 & Resultant	17.263	29.263	35.263	55.263	14.737
Axle #3 at Mid-span	17.000	29.000	35.000	55.000	15.000
Midspan btwn Axles #3 #4	7.000	19.000	25.000	45.000	25.000
Front Axle #1 at Front Support	0.00	12.00	18.00	38.00	32.00
Rear Axle #5 at Rear Spt (Max Shear)	32.00	44.00	50.00	70.00	0.00

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Rear #4 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-END
<b>Position of Midspan</b>	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Midspan btwn Axles #1 #2	1,851.86	406.29	-156.86	-1,722.86	-378.43
Resultant at Mid-span	1,665.00	780.00	30.00	-1,100.00	-1,375.00
<b>Btwn Axle #3 &amp; Resultant</b>	1,652.33	788.57	34.29	-1,085.71	-1,389.47
Axle #3 at Mid-span	1,639.29	797.14	38.57	-1,071.43	-1,403.57
Midspan btwn Axles #3 #4	865.00	1,122.86	201.43	-528.57	-1,660.71



	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Rear #4 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	RB
	kips	kips	kips	kips	kips	kips
38.00	63.86	33.86	-26.14	-86.14	-126.14	126.14
38.00	95.00	65.00	5.00	-55.00	-95.00	95.00
38.00	95.71	65.71	5.71	-54.29	-94.29	94.29
38.00	96.43	66.43	6.43	-53.57	-93.57	93.57
38.00	123.57	93.57	33.57	-26.43	-66.43	66.43
38.00	142.57	112.57	52.57	-7.43	-47.43	47.43
38.00	55.71	25.71	-34.29	-94.29	-134.29	<b>134.29</b>

	Mom Area to Beam End, ft-kips	Mom Area to Front #1 Axle, ft-kips	Mom Area to Mid #2 Axle, ft-kips	Mom Area to Mid #3 Axle, ft-kips	Mom Area to Rear #4 Axle, ft-kips	Mom Area to Beam End, ft-kips
	M-RA-End	M-1	M-2	M-3	M-4	M-RB-End
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
	0.00	1,851.86	2,258.14	2,101.29	378.43	0.00
	0.00	1,665.00	2,445.00	2,475.00	1,375.00	0.00
	0.00	1,652.33	2,440.90	<b>2,475.19</b>	1,389.47	0.00
	0.00	1,639.29	2,436.43	2,475.00	1,403.57	0.00
	0.00	865.00	1,987.86	2,189.29	1,660.71	0.00

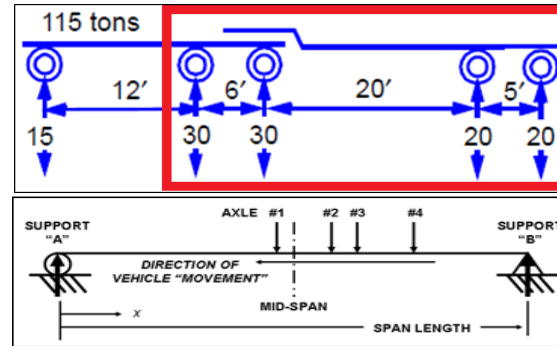
**FOUR (4) AXLE** **One (1x) Hypothetical MLC 100W Vehicle, Maximum Moment Calculation, Rear 4 Axles**

Axle	Load (ST)	Load (kips)	Distance	Distance	SI / Metric Units	
			btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
2	30.0	60.0		0.0	266.89	0
3	30.0	60.0	6.0	6.0	266.89	183
4	20.0	40.0	20.0	26.0	177.93	792
5	20.0	40.0	5.0	31.0	177.93	945
<b>Totals</b>			<b>31.0</b>		<b>622.75</b>	<b>402</b>
<b>Resultant at location:</b>				<b>13.200</b>		

**70 ft Span Length**

	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Rear #4 Axle	Dist to Beam End
	AX 1	AX 2	AX 3	AX 4	L END
<b>Position of Midspan</b>	ft	ft	ft	ft	ft
Axle #2 at Mid-span	29.000	35.000	55.000	60.000	10.000
Btwn Axle #2 & Resultant	25.400	31.400	51.400	56.400	13.600
Resultant at Mid-span	21.800	27.800	47.800	52.800	17.200
Btwn Axle #3 & Resultant	15.400	21.400	41.400	46.400	23.600
Axle #3 at Mid-span	9.000	15.000	35.000	40.000	30.000
Front Axle #1 at Front Support	0.00	6.00	26.00	31.00	39.00
Rear Axle #5 at Rear Spt (Max Shear)	39.00	45.00	65.00	70.00	0.00

	Mom Area to Front #1 Axle	Mom Area to Middle #2 Axle	Mom Area to Middle #3 Axle	Mom Area to Rear #4 Axle	Mom Area to Beam End
	MA-1	MA-2	MA-3	MA-4	MA-END
<b>Position of Midspan</b>	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
Axle #2 at Mid-span	2,303.43	116.57	-811.43	-402.86	-1,205.71
<b>Btwn Axle #2 &amp; Resultant</b>	2,278.74	178.29	-605.71	-351.43	-1,499.89
Resultant at Mid-span	2,180.00	240.00	-400.00	-300.00	-1,720.00
Btwn Axle #3 & Resultant	1,821.60	349.71	-34.29	-208.57	-1,928.46
Axle #3 at Mid-span	1,229.14	459.43	331.43	-117.14	-1,902.86

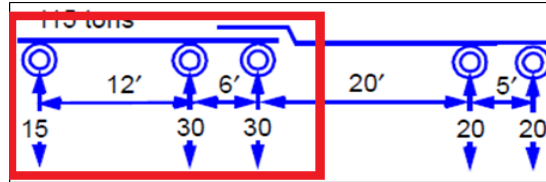


	Reaction at Support "A"	Shear at Front #1 Axle	Shear at Middle #2 Axle	Shear at Middle #3 Axle	Shear at Rear #4 Axle	Reaction at Support "B"
	RA	R-1	R-2	R-3	R-4	RB
	kips	kips	kips	kips	kips	kips
31.00	79.43	19.43	-40.57	-80.57	-120.57	120.57
31.00	89.71	29.71	-30.29	-70.29	-110.29	110.29
31.00	100.00	40.00	-20.00	-60.00	-100.00	100.00
31.00	118.29	58.29	-1.71	-41.71	-81.71	81.71
31.00	136.57	76.57	16.57	-23.43	-63.43	63.43
31.00	162.29	102.29	42.29	2.29	-37.71	37.71
31.00	50.86	-9.14	-69.14	-109.14	-149.14	149.14

	Mom Area to Beam End, ft-kips	Mom Area to Front #1 Axle, ft-kips	Mom Area to Mid #2 Axle, ft-kips	Mom Area to Mid #3 Axle, ft-kips	Mom Area to Rear #4 Axle, ft-kips	Mom Area to Beam End, ft-kips
	M-RA-End	M-1	M-2	M-3	M-4	M-RB-End
	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips	ft-kips
	0.00	2,303.43	2,420.00	1,608.57	1,205.71	0.00
	0.00	2,278.74	2,457.03	1,851.31	1,499.89	0.00
	0.00	2,180.00	2,420.00	2,020.00	1,720.00	0.00
	0.00	1,821.60	2,171.31	2,137.03	1,928.46	0.00
	0.00	1,229.14	1,688.57	2,020.00	1,902.86	0.00

**THREE (3) AXLE** **One (1x) Hypothetical MLC 100W Vehicle, Maximum Moment Calculation, Front 3 Axles**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	15.0	30.0		0.0	133.45	0
2	30.0	60.0	12.0	12.0	266.89	366
(Rear) 3	30.0	60.0	6.0	18.0	266.89	549
N/A	0.0	0.0		18.0	0.00	549
<b>Totals</b>	<b>75.0</b>	<b>150.0</b>	<b>18.0</b>		<b>533.79</b>	
<b>Resultant at location:</b>				<b>12.000</b>		<b>366</b>



Maximum Moment when Midspan is equidistance Axle #3 & Resultant

Span Length	Front #1 Axle	Middle #2 Axle	Rear #3 Axle	Not Used	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	L END
ft	ft	ft	ft	ft	ft
18.00	0.00	12.00	18.00	18.00	0.00
20.00	0.00	12.00	18.00	18.00	2.00
22.00	0.00	12.00	18.00	18.00	4.00
24.00	0.00	12.00	18.00	18.00	6.00
25.00	0.50	12.50	18.50	18.50	6.50
26.00	1.00	13.00	19.00	19.00	7.00
28.00	2.00	14.00	20.00	20.00	8.00
30.00	3.00	15.00	21.00	21.00	9.00
32.00	4.00	16.00	22.00	22.00	10.00
34.00	5.00	17.00	23.00	23.00	11.00
35.00	5.50	17.50	23.50	23.50	11.50

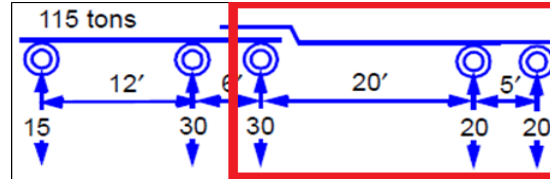
MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
50.00	100.00
45.00	105.00
40.91	109.09
37.50	112.50
36.00	114.00
34.62	115.38
32.14	117.86
30.00	120.00
28.13	121.88
26.47	123.53
25.71	124.29

SHEAR							
Span Length, ft	Calculated Result / Position	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Rear #3 Axle, kips	Not Used	Shear at React B, kips
18	Shear at Axle	50.00	20.00	-40.00	-100.00	-100.00	100.00
	Axle Location on Span	0.00	0.00	12.00	18.00	18.00	18.00
20	Shear at Axle	60.00	30.00	-30.00	-90.00	-90.00	90.00
	Axle Location on Span	0.00	0.00	12.00	18.00	18.00	20.00
22	Shear at Axle	68.18	38.18	-21.82	-81.82	-81.82	81.82
	Axle Location on Span	0.00	0.00	12.00	18.00	18.00	22.00
24	Shear at Axle	75.00	45.00	-15.00	-75.00	-75.00	75.00
	Axle Location on Span	0.00	0.00	12.00	18.00	18.00	24.00
25	Shear at Axle	75.00	45.00	-15.00	-75.00	-75.00	75.00
	Axle Location on Span	0.00	0.50	12.50	18.50	18.50	25.00
26	Shear at Axle	75.00	45.00	-15.00	-75.00	-75.00	75.00
	Axle Location on Span	0.00	1.00	13.00	19.00	19.00	26.00
28	Shear at Axle	75.00	45.00	-15.00	-75.00	-75.00	75.00
	Axle Location on Span	0.00	2.00	14.00	20.00	20.00	28.00
30	Shear at Axle	75.00	45.00	-15.00	-75.00	-75.00	75.00
	Axle Location on Span	0.00	3.00	15.00	21.00	21.00	30.00
32	Shear at Axle	75.00	45.00	-15.00	-75.00	-75.00	75.00
	Axle Location on Span	0.00	4.00	16.00	22.00	22.00	32.00
34	Shear at Axle	75.00	45.00	-15.00	-75.00	-75.00	75.00
	Axle Location on Span	0.00	5.00	17.00	23.00	23.00	34.00
35	Shear at Axle	75.00	45.00	-15.00	-75.00	-75.00	75.00
	Axle Location on Span	0.00	5.50	17.50	23.50	23.50	35.00

MOMENT							
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Rear #3 Axle, ft-kips	Not Used	Moment at React B, ft-kips
18	Moment	0.0	0.00	240.00	0.00	0.00	0.0
	Axle Location on Span	0.00	0.00	12.00	18.00	18.00	18.00
20	Moment	0.0	0.00	360.00	180.00	180.00	0.0
	Axle Location on Span	0.00	0.00	12.00	18.00	18.00	20.00
22	Moment	0.0	0.00	458.18	327.27	327.27	0.0
	Axle Location on Span	0.00	0.00	12.00	18.00	18.00	22.00
24	Moment	0.0	0.00	540.00	450.00	450.00	0.0
	Axle Location on Span	0.00	0.00	12.00	18.00	18.00	24.00
25	Moment	0.0	37.50	577.50	487.50	487.50	0.0
	Axle Location on Span	0.00	0.50	12.50	18.50	18.50	25.00
26	Moment	0.0	75.00	615.00	525.00	525.00	0.0
	Axle Location on Span	0.00	1.00	13.00	19.00	19.00	26.00
28	Moment	0.0	150.00	690.00	600.00	600.00	0.0
	Axle Location on Span	0.00	2.00	14.00	20.00	20.00	28.00
30	Moment	0.0	225.00	765.00	675.00	675.00	0.0
	Axle Location on Span	0.00	3.00	15.00	21.00	21.00	30.00
32	Moment	0.0	300.00	840.00	750.00	750.00	0.0
	Axle Location on Span	0.00	4.00	16.00	22.00	22.00	32.00
34	Moment	0.0	375.00	915.00	825.00	825.00	0.0
	Axle Location on Span	0.00	5.00	17.00	23.00	23.00	34.00
35	Moment	0.0	412.50	952.50	862.50	862.50	0.0
	Axle Location on Span	0.00	5.50	17.50	23.50	23.50	35.00

**THREE (3) AXLE** **One (1x) Hypothetical MLC 100W Vehicle, Maximum Moment Calculation, Rear 3 Axles**

Axle	Load (ST)	Load (kips)	Distance		SI / Metric Units	
			btwn axles (ft)	Distance from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	30.0	60.0		0.0	266.89	0
2	20.0	40.0	20.0	20.0	177.93	610
(Rear) 3	20.0	40.0	5.0	25.0	177.93	762
N/A	0.0	0.0	0.0	25.0	0.00	762
<b>Totals</b>	<b>70.0</b>	<b>140.0</b>	<b>25.0</b>		<b>355.86</b>	
<b>Resultant at location:</b>			<b>12.857</b>			<b>392</b>



Maximum Moment when Midspan is equidistance Axle #3 & Resultant

Span Length	Front #1 Axle	Middle #2 Axle	Rear #3 Axle	Not Used	Dist to Beam End
25.00	0.00	20.00	25.00	25.00	0.00
26.00	0.00	20.00	25.00	25.00	1.00
28.00	0.00	20.00	25.00	25.00	3.00
30.00	0.00	20.00	25.00	25.00	5.00
32.00	0.00	20.00	25.00	25.00	7.00
34.00	0.57	20.57	25.57	25.57	8.43
35.00	1.07	21.07	26.07	26.07	8.93
36.00	1.57	21.57	26.57	26.57	9.43
38.00	2.57	22.57	27.57	27.57	10.43
40.00	3.57	23.57	28.57	28.57	11.43
42.00	4.57	24.57	29.57	29.57	12.43

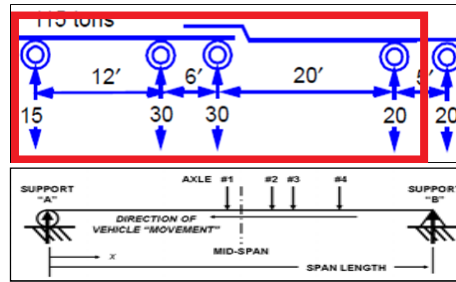
MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
68.00	72.00
65.38	74.62
60.71	79.29
56.67	83.33
53.13	86.88
50.00	90.00
48.57	91.43
47.22	92.78
44.74	95.26
42.50	97.50
40.48	99.52

SHEAR							
Span Length, ft	Calculated Result / Position	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Rear #3 Axle, kips	Not Used	Shear at React B, kips
25	Shear at Axle	68.00	8.00	-32.00	-72.00	-72.00	72.00
	Axle Location on Span	0.00	0.00	20.00	25.00	25.00	25.00
26	Shear at Axle	70.77	10.77	-29.23	-69.23	-69.23	69.23
	Axle Location on Span	0.00	0.00	20.00	25.00	25.00	26.00
28	Shear at Axle	75.71	15.71	-24.29	-64.29	-64.29	64.29
	Axle Location on Span	0.00	0.00	20.00	25.00	25.00	28.00
30	Shear at Axle	80.00	20.00	-20.00	-60.00	-60.00	60.00
	Axle Location on Span	0.00	0.00	20.00	25.00	25.00	30.00
32	Shear at Axle	83.75	23.75	-16.25	-56.25	-56.25	56.25
	Axle Location on Span	0.00	0.00	20.00	25.00	25.00	32.00
34	Shear at Axle	84.71	24.71	-15.29	-55.29	-55.29	55.29
	Axle Location on Span	0.00	0.57	20.57	25.57	25.57	34.00
35	Shear at Axle	84.29	24.29	-15.71	-55.71	-55.71	55.71
	Axle Location on Span	0.00	1.07	21.07	26.07	26.07	35.00
36	Shear at Axle	83.89	23.89	-16.11	-56.11	-56.11	56.11
	Axle Location on Span	0.00	1.57	21.57	26.57	26.57	36.00
38	Shear at Axle	83.16	23.16	-16.84	-56.84	-56.84	56.84
	Axle Location on Span	0.00	2.57	22.57	27.57	27.57	38.00
40	Shear at Axle	82.50	22.50	-17.50	-57.50	-57.50	57.50
	Axle Location on Span	0.00	3.57	23.57	28.57	28.57	40.00
42	Shear at Axle	81.90	21.90	-18.10	-58.10	-58.10	58.10
	Axle Location on Span	0.00	4.57	24.57	29.57	29.57	42.00

MOMENT							
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Rear #3 Axle, ft-kips	Not Used	Moment at React B, ft-kips
25	Moment	0.0	0.00	160.00	0.00	0.00	0.0
	Axle Location on Span	0.00	0.00	20.00	25.00	25.00	25.00
26	Moment	0.0	0.00	215.38	69.23	69.23	0.0
	Axle Location on Span	0.00	0.00	20.00	25.00	25.00	26.00
28	Moment	0.0	0.00	314.29	192.86	192.86	0.0
	Axle Location on Span	0.00	0.00	20.00	25.00	25.00	28.00
30	Moment	0.0	0.00	400.00	300.00	300.00	0.0
	Axle Location on Span	0.00	0.00	20.00	25.00	25.00	30.00
32	Moment	0.0	0.00	475.00	393.75	393.75	0.0
	Axle Location on Span	0.00	0.00	20.00	25.00	25.00	32.00
34	Moment	0.0	48.40	542.52	466.05	466.05	0.0
	Axle Location on Span	0.00	0.57	20.57	25.57	25.57	34.00
35	Moment	0.0	90.31	576.02	497.45	497.45	0.0
	Axle Location on Span	0.00	1.07	21.07	26.07	26.07	35.00
36	Moment	0.0	131.83	609.60	529.05	529.05	0.0
	Axle Location on Span	0.00	1.57	21.57	26.57	26.57	36.00
38	Moment	0.0	213.83	676.99	592.78	592.78	0.0
	Axle Location on Span	0.00	2.57	22.57	27.57	27.57	38.00
40	Moment	0.0	294.64	744.64	657.14	657.14	0.0
	Axle Location on Span	0.00	3.57	23.57	28.57	28.57	40.00
42	Moment	0.0	374.42	812.52	722.04	722.04	0.0
	Axle Location on Span	0.00	4.57	24.57	29.57	29.57	42.00

**FOUR (4) AXLE** **One (1x) Hypothetical MLC 100W Vehicle, Maximum Moment Calculation, Front 4 Axles**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	15.0	30.0		0.0	133.45	0
2	30.0	60.0	12.0	12.0	266.89	366
3	30.0	60.0	6.0	18.0	266.89	549
(Rear) 4	20.0	40.0	20.0	38.0	177.93	1158
<b>Totals</b>	<b>95.0</b>	<b>190.0</b>	<b>38.0</b>		<b>711.72</b>	
<b>Resultant at location:</b>				<b>17.474</b>		<b>533</b>



Maximum Moment when Midspan is equidistance Axle #3 & Resultant

Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Rear #4 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	L END
ft	ft	ft	ft	ft	ft
38.00	0.00	12.00	18.00	38.00	0.00
40.00	2.00	14.00	20.00	40.00	0.00
41.00	3.00	15.00	21.00	41.00	0.00
41.00	2.76	14.76	20.76	40.76	0.24
42.00	3.26	15.26	21.26	41.26	0.74
43.00	3.76	15.76	21.76	41.76	1.24
44.00	4.26	16.26	22.26	42.26	1.74
45.00	4.76	16.76	22.76	42.76	2.24
47.00	5.76	17.76	23.76	43.76	3.24
48.00	6.26	18.26	24.26	44.26	3.74
50.00	7.26	19.26	25.26	45.26	4.74

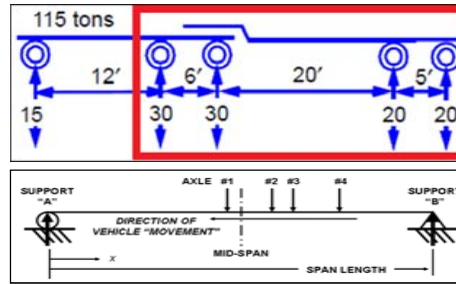
MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
102.63	87.37
97.50	92.50
95.12	94.88
95.12	94.88
92.86	97.14
90.70	99.30
88.64	101.36
86.67	103.33
82.98	107.02
81.25	108.75
78.00	112.00

SHEAR							
Span Length, ft	Calculated Result / Position	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at React B, kips
38	Shear at Axle	102.63	72.63	12.63	-47.37	-87.37	87.37
	Axle Location on Span	0.00	0.00	12.00	18.00	38.00	38.00
40	Shear at Axle	97.50	67.50	7.50	-52.50	-92.50	92.50
	Axle Location on Span	0.00	2.00	14.00	20.00	40.00	40.00
41	Shear at Axle	95.12	65.12	5.12	-54.88	-94.88	94.88
	Axle Location on Span	0.00	3.00	15.00	21.00	41.00	41.00
41	Shear at Axle	96.22	66.22	6.22	-53.78	-93.78	93.78
	Axle Location on Span	0.00	2.76	14.76	20.76	40.76	41.00
42	Shear at Axle	96.19	66.19	6.19	-53.81	-93.81	93.81
	Axle Location on Span	0.00	3.26	15.26	21.26	41.26	42.00
43	Shear at Axle	96.16	66.16	6.16	-53.84	-93.84	93.84
	Axle Location on Span	0.00	3.76	15.76	21.76	41.76	43.00
44	Shear at Axle	96.14	66.14	6.14	-53.86	-93.86	93.86
	Axle Location on Span	0.00	4.26	16.26	22.26	42.26	44.00
45	Shear at Axle	96.11	66.11	6.11	-53.89	-93.89	93.89
	Axle Location on Span	0.00	4.76	16.76	22.76	42.76	45.00
47	Shear at Axle	96.06	66.06	6.06	-53.94	-93.94	93.94
	Axle Location on Span	0.00	5.76	17.76	23.76	43.76	47.00
48	Shear at Axle	96.04	66.04	6.04	-53.96	-93.96	93.96
	Axle Location on Span	0.00	6.26	18.26	24.26	44.26	48.00
50	Shear at Axle	96.00	66.00	6.00	-54.00	-94.00	94.00
	Axle Location on Span	0.00	7.26	19.26	25.26	45.26	50.00

MOMENT							
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at React B, ft-kips
32	Moment	0.0	0.00	871.58	947.37	0.00	0.0
	Axle Location on Span	0.00	0.00	12.00	18.00	38.00	38.00
34	Moment	0.0	195.00	1,005.00	1,050.00	0.00	0.0
	Axle Location on Span	0.00	2.00	14.00	20.00	40.00	40.00
38	Moment	0.0	285.37	1,066.83	1,097.56	0.00	0.0
	Axle Location on Span	0.00	0.00	12.00	18.00	38.00	38.00
40	Moment	0.0	265.87	1,060.50	1,097.82	22.21	0.0
	Axle Location on Span	0.00	2.00	14.00	20.00	40.00	40.00
41	Moment	0.0	313.88	1,108.17	1,145.31	69.12	0.0
	Axle Location on Span	0.00	3.00	15.00	21.00	41.00	41.00
43	Moment	0.0	361.88	1,155.83	1,192.81	116.06	0.0
	Axle Location on Span	0.00	3.76	15.76	21.76	41.76	43.00
44	Moment	0.0	409.84	1,203.48	1,240.30	163.03	0.0
	Axle Location on Span	0.00	4.26	16.26	22.26	42.26	44.00
45	Moment	0.0	457.79	1,251.13	1,287.79	210.01	0.0
	Axle Location on Span	0.00	4.76	16.76	22.76	42.76	45.00
47	Moment	0.0	553.63	1,346.40	1,382.78	304.06	0.0
	Axle Location on Span	0.00	5.76	17.76	23.76	43.76	47.00
48	Moment	0.0	601.52	1,394.02	1,430.27	351.11	0.0
	Axle Location on Span	0.00	6.26	18.26	24.26	44.26	48.00
50	Moment	0.0	697.26	1,489.26	1,525.26	445.26	0.0
	Axle Location on Span	0.00	7.26	19.26	25.26	45.26	50.00

**FOUR (4) AXLE** **One (1x) Hypothetical MLC 100W Vehicle, Maximum Moment Calculation, Rear 4 Axles**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	30.0	60.0		0.0	266.89	0
2	30.0	60.0	6.0	6.0	266.89	183
3	20.0	40.0	20.0	26.0	177.93	792
(Rear) 4	20.0	40.0	5.0	31.0	177.93	945
<b>Totals</b>	<b>100.0</b>	<b>200.0</b>	<b>31.0</b>		<b>622.75</b>	
				<b>Resultant at location:</b>	<b>13.200</b>	<b>402</b>



Maximum Moment when Midspan is equidistance Axle #3 & Resultant

Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Rear #4 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	L END
ft	ft	ft	ft	ft	ft
32.00	1.00	7.00	27.00	32.00	0.00
34.00	3.00	9.00	29.00	34.00	0.00
35.00	4.00	10.00	30.00	35.00	0.00
36.00	5.00	11.00	31.00	36.00	0.00
38.00	7.00	13.00	33.00	38.00	0.00
40.00	9.00	15.00	35.00	40.00	0.00
42.00	11.00	17.00	37.00	42.00	0.00
43.00	11.90	17.90	37.90	42.90	0.10
44.00	12.40	18.40	38.40	43.40	0.60
45.00	12.90	18.90	38.90	43.90	1.10
47.00	13.90	19.90	39.90	44.90	2.10

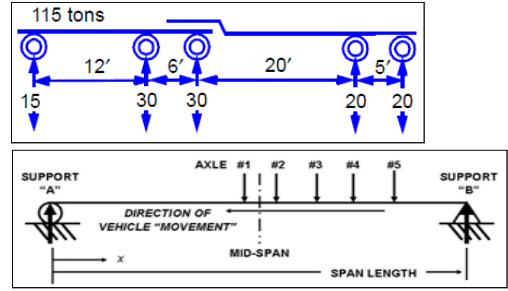
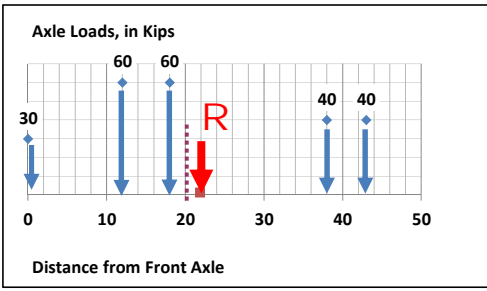
MAX SHEAR	
Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B
kips	kips
111.25	88.75
104.71	95.29
101.71	98.29
98.89	101.11
93.68	106.32
89.00	111.00
84.76	115.24
82.79	117.21
80.91	119.09
79.11	120.89
75.74	124.26

SHEAR							
Span Length, ft	Calculated Result / Position	Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at React B, kips
32	Shear at Axle	111.25	51.25	-8.75	-48.75	-88.75	88.75
	Axle Location on Span	0.00	1.00	7.00	27.00	32.00	32.00
34	Shear at Axle	104.71	44.71	-15.29	-55.29	-95.29	95.29
	Axle Location on Span	0.00	3.00	9.00	29.00	34.00	34.00
35	Shear at Axle	101.71	41.71	-18.29	-58.29	-98.29	98.29
	Axle Location on Span	0.00	4.00	10.00	30.00	35.00	35.00
36	Shear at Axle	98.89	38.89	-21.11	-61.11	-101.11	101.11
	Axle Location on Span	0.00	5.00	11.00	31.00	36.00	36.00
38	Shear at Axle	93.68	33.68	-26.32	-66.32	-106.32	106.32
	Axle Location on Span	0.00	7.00	13.00	33.00	38.00	38.00
40	Shear at Axle	89.00	29.00	-31.00	-71.00	-111.00	111.00
	Axle Location on Span	0.00	9.00	15.00	35.00	40.00	40.00
42	Shear at Axle	84.76	24.76	-35.24	-75.24	-115.24	115.24
	Axle Location on Span	0.00	11.00	17.00	37.00	42.00	42.00
43	Shear at Axle	83.26	23.26	-36.74	-76.74	-116.74	116.74
	Axle Location on Span	0.00	11.90	17.90	37.90	42.90	43.00
44	Shear at Axle	83.64	23.64	-36.36	-76.36	-116.36	116.36
	Axle Location on Span	0.00	12.40	18.40	38.40	43.40	44.00
45	Shear at Axle	84.00	24.00	-36.00	-76.00	-116.00	116.00
	Axle Location on Span	0.00	12.90	18.90	38.90	43.90	45.00
47	Shear at Axle	84.68	24.68	-35.32	-75.32	-115.32	115.32
	Axle Location on Span	0.00	13.90	19.90	39.90	44.90	47.00

MOMENT							
Span Length, ft	Calculated Result / Position	Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at React B, ft-kips
32	Moment	0.0	111.25	418.75	243.75	0.00	0.0
	Axle Location on Span	0.00	1.00	7.00	27.00	32.00	32.00
34	Moment	0.0	314.12	582.35	276.47	0.00	0.0
	Axle Location on Span	0.00	3.00	9.00	29.00	34.00	34.00
35	Moment	0.0	406.86	657.14	291.43	0.00	0.0
	Axle Location on Span	0.00	4.00	10.00	30.00	35.00	35.00
36	Moment	0.0	494.44	727.78	305.56	0.00	0.0
	Axle Location on Span	0.00	5.00	11.00	31.00	36.00	36.00
38	Moment	0.0	655.79	857.89	331.58	0.00	0.0
	Axle Location on Span	0.00	7.00	13.00	33.00	38.00	38.00
40	Moment	0.0	801.00	975.00	355.00	0.00	0.0
	Axle Location on Span	0.00	9.00	15.00	35.00	40.00	40.00
42	Moment	0.0	932.38	1,080.95	376.19	0.00	0.0
	Axle Location on Span	0.00	11.00	17.00	37.00	42.00	42.00
43	Moment	0.0	990.74	1,130.28	395.40	11.67	0.0
	Axle Location on Span	0.00	11.90	17.90	37.90	42.90	43.00
44	Moment	0.0	1,037.09	1,178.91	451.64	69.82	0.0
	Axle Location on Span	0.00	12.40	18.40	38.40	43.40	44.00
45	Moment	0.0	1,083.60	1,227.60	507.60	127.60	0.0
	Axle Location on Span	0.00	12.90	18.90	38.90	43.90	45.00
47	Moment	0.0	1,177.06	1,325.15	618.77	242.17	0.0
	Axle Location on Span	0.00	13.90	19.90	39.90	44.90	47.00

**FIVE (5) AXLE** **One (1x) Hypothetical MLC 100W Vehicle, Max Moment Calculation, Full Length, <= 44 ft (13.4 m)**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	15.0	30.0		0.0	133.45	0
2	30.0	60.0	12.0	12.0	266.89	366
3	30.0	60.0	6.0	18.0	266.89	549
4	20.0	40.0	20.0	38.0	177.93	1158
(Rear) 5	20.0	40.0	5.0	43.0	177.93	1311
<b>Totals</b>	<b>115.0</b>	<b>230.0</b>	<b>43.0</b>		<b>889.64</b>	
				Resultant at location:	21.913	668
				Distance to Nearest Axle, "xR":	3.913	(Rear of Axle # 3)



Span Length	Front #1 Axle	Middle #2 Axle	Middle #3 Axle	Middle #4 Axle	Rear #5 Axle	Dist to Beam End
L	AX 1	AX 2	AX 3	AX 4	AX 5	L END
ft	ft	ft	ft	ft	ft	ft
48.00	4.50	16.50	22.50	42.50	47.50	0.50
50.00	6.50	18.50	24.50	44.50	49.50	0.50
52.00	8.50	20.50	26.50	46.50	51.50	0.50
54.00	7.04	19.04	25.04	45.04	50.04	3.96
55.00	7.54	19.54	25.54	45.54	50.54	4.46
56.00	8.04	20.04	26.04	46.04	51.04	4.96
58.00	9.04	21.04	27.04	47.04	52.04	5.96
60.00	10.04	22.04	28.04	48.04	53.04	6.96
65.00	12.54	24.54	30.54	50.54	55.54	9.46
70.00	15.04	27.04	33.04	53.04	58.04	11.96
72.00	16.04	28.04	34.04	54.04	59.04	12.96

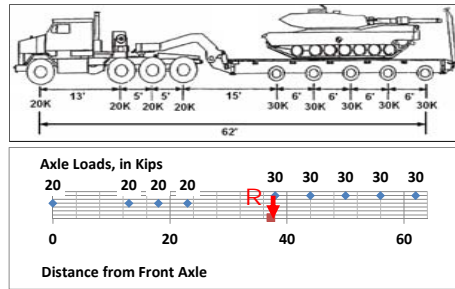
Span Length	Shear at Front Supt "A"	Shear at Rear Supt "B" (Max Shear)
Vmax A	Vmax B	
kips	kips	
48.00	101.04	128.96
50.00	97.00	133.00
52.00	93.27	136.73
54.00	89.81	140.19
55.00	88.18	141.82
56.00	86.61	143.39
58.00	83.62	146.38
60.00	80.83	149.17
65.00	74.62	155.38
70.00	69.29	160.71
72.00	67.36	162.64

Span Length, ft	Calculated Result / Position	SHEAR						
		Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Rear #5 Axle, kips	Shear at React B, kips
48	Shear at Axle	103.44	73.44	13.44	-46.56	-86.56	-126.56	126.56
	Axle Location on Span	0.00	4.50	16.50	22.50	42.50	47.50	48.00
50	Shear at Axle	99.30	69.30	9.30	-50.70	-90.70	-130.70	130.70
	Axle Location on Span	0.00	6.50	18.50	24.50	44.50	49.50	50.00
52	Shear at Axle	95.48	65.48	5.48	-54.52	-94.52	-134.52	134.52
	Axle Location on Span	0.00	8.50	20.50	26.50	46.50	51.50	52.00
54	Shear at Axle	106.67	76.67	16.67	-43.33	-83.33	-123.33	123.33
	Axle Location on Span	0.00	7.04	19.04	25.04	45.04	50.04	54.00
55	Shear at Axle	106.82	76.82	16.82	-43.18	-83.18	-123.18	123.18
	Axle Location on Span	0.00	7.54	19.54	25.54	45.54	50.54	55.00
56	Shear at Axle	106.96	76.96	16.96	-43.04	-83.04	-123.04	123.04
	Axle Location on Span	0.00	8.04	20.04	26.04	46.04	51.04	56.00
58	Shear at Axle	107.24	77.24	17.24	-42.76	-82.76	-122.76	122.76
	Axle Location on Span	0.00	9.04	21.04	27.04	47.04	52.04	58.00
60	Shear at Axle	107.50	77.50	17.50	-42.50	-82.50	-122.50	122.50
	Axle Location on Span	0.00	10.04	22.04	28.04	48.04	53.04	60.00
65	Shear at Axle	108.08	78.08	18.08	-41.92	-81.92	-121.92	121.92
	Axle Location on Span	0.00	12.54	24.54	30.54	50.54	55.54	65.00
70	Shear at Axle	108.57	78.57	18.57	-41.43	-81.43	-121.43	121.43
	Axle Location on Span	0.00	15.04	27.04	33.04	53.04	58.04	70.00
72	Shear at Axle	108.75	78.75	18.75	-41.25	-81.25	-121.25	121.25
	Axle Location on Span	0.00	16.04	28.04	34.04	54.04	59.04	72.00

Span Length, ft	Calculated Result / Position	MOMENT						
		Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Rear #5 Axle, ft-kips	Moment at React B, ft-kips
48	Moment	0.0	465.47	1,346.72	1,427.34	496.09	63.28	0.0
	Axle Location on Span	0.00	4.50	16.50	22.50	42.50	47.50	48.00
50	Moment	0.0	645.45	1,477.05	1,532.85	518.85	65.35	0.0
	Axle Location on Span	0.00	6.50	18.50	24.50	44.50	49.50	50.00
52	Moment	0.0	811.59	1,597.36	1,630.24	539.86	67.26	0.0
	Axle Location on Span	0.00	8.50	20.50	26.50	46.50	51.50	52.00
54	Moment	0.0	751.30	1,671.30	1,771.30	904.64	487.97	0.0
	Axle Location on Span	0.00	7.04	19.04	25.04	45.04	50.04	54.00
55	Moment	0.0	805.78	1,727.60	1,828.51	964.87	548.96	0.0
	Axle Location on Span	0.00	7.54	19.54	25.54	45.54	50.54	55.00
56	Moment	0.0	860.36	1,783.94	1,885.72	1,025.01	609.83	0.0
	Axle Location on Span	0.00	8.04	20.04	26.04	46.04	51.04	56.00
58	Moment	0.0	969.84	1,896.73	2,000.18	1,145.01	731.21	0.0
	Axle Location on Span	0.00	9.04	21.04	27.04	47.04	52.04	58.00
60	Moment	0.0	1,079.67	2,009.67	2,114.67	1,264.67	852.17	0.0
	Axle Location on Span	0.00	10.04	22.04	28.04	48.04	53.04	60.00
65	Moment	0.0	1,355.66	2,292.58	2,401.05	1,562.58	1,152.97	0.0
	Axle Location on Span	0.00	12.54	24.54	30.54	50.54	55.54	65.00
70	Moment	0.0	1,633.29	2,576.15	2,687.58	1,859.01	1,451.86	0.0
	Axle Location on Span	0.00	15.04	27.04	33.04	53.04	58.04	70.00
72	Moment	0.0	1,744.73	2,689.73	2,802.23	1,977.23	1,570.98	0.0
	Axle Location on Span	0.00	16.04	28.04	34.04	54.04	59.04	72.00

**NINE (9) AXLE One (1x) Proposed Standard HET (ALT-MIL-LL), Maximum SHEAR (V) Calculation, 50'- 1,000' Spans**

Axle	Load (ST)	Load (kips)	Distance		SI / Metric Units	
			btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	10.00	20.0		0.00	88.96	0
2	10.00	20.0	13.00	13.00	88.96	396
3	10.00	20.0	5.00	18.00	88.96	549
4	10.00	20.0	5.00	23.00	88.96	701
5	15.00	30.0	15.00	38.00	133.45	1158
6	15.00	30.0	6.00	44.00	133.45	1341
7	15.00	30.0	6.00	50.00	133.45	1524
8	15.00	30.0	6.00	56.00	133.45	1707
(Rear) 9	15.00	30.0	6.00	62.00	133.45	1890
Totals	115.0	230.0	62.00		1023.1	
		Resultant at location:		37.304		1137
		Distance to Nearest Axle, "xR":		0.696	(Forward of Axle #5)	



**MAXIMUM SHEAR (Calculated by positioning vehicle so that the rear axle is located at left-most ("rear") support "B")**

Span Length, ft	Calculated SHEARS and Locations	Reaction at Right Supt "A" (Vmax A)	Front Axle #1 (AX 1)	Middle Axle #2 (AX 2)	Middle Axle #3 (AX 3)	Middle Axle #4 (AX 4)	Middle Axle #5 (AX 5)	Middle Axle #6 (AX 6)	Middle Axle #7 (AX 7)	Middle Axle #8 (AX 8)	Rear Axle #9 (AX 9)	Reaction at Left Supt "B" (Vmax B)
85	Shear at Axle Location, kips	66.82	46.82	26.82	6.82	-13.18	-43.18	-73.18	-103.18	-133.18	-163.18	163.18
	Axle Location on Span, ft	0.00	23.00	36.00	41.00	46.00	61.00	67.00	73.00	79.00	85.00	85.00
90	Shear at Axle Location, kips	63.11	43.11	23.11	3.11	-16.89	-46.89	-76.89	-106.89	-136.89	-166.89	166.89
	Axle Location on Span, ft	0.00	28.00	41.00	46.00	51.00	66.00	72.00	78.00	84.00	90.00	90.00
100	Shear at Axle Location, kips	56.80	36.80	16.80	-3.20	-23.20	-53.20	-83.20	-113.20	-143.20	-173.20	173.20
	Axle Location on Span, ft	0.00	38.00	51.00	56.00	61.00	76.00	82.00	88.00	94.00	100.00	100.00
120	Shear at Axle Location, kips	47.33	27.33	7.33	-12.67	-32.67	-62.67	-92.67	-122.67	-152.67	-182.67	182.67
	Axle Location on Span, ft	0.00	58.00	71.00	76.00	81.00	96.00	102.00	108.00	114.00	120.00	120.00
125	Shear at Axle Location, kips	45.44	25.44	5.44	-14.56	-34.56	-64.56	-94.56	-124.56	-154.56	-184.56	184.56
	Axle Location on Span, ft	0.00	63.00	76.00	81.00	86.00	101.00	107.00	113.00	119.00	125.00	125.00
130	Shear at Axle Location, kips	43.69	23.69	3.69	-16.31	-36.31	-66.31	-96.31	-126.31	-156.31	-186.31	186.31
	Axle Location on Span, ft	0.00	68.00	81.00	86.00	91.00	106.00	112.00	118.00	124.00	130.00	130.00
134	Shear at Axle Location, kips	42.39	22.39	2.39	-17.61	-37.61	-67.61	-97.61	-127.61	-157.61	-187.61	187.61
	Axle Location on Span, ft	0.00	72.00	85.00	90.00	95.00	110.00	116.00	122.00	128.00	134.00	134.00
140	Shear at Axle Location, kips	40.57	20.57	0.57	-19.43	-39.43	-69.43	-99.43	-129.43	-159.43	-189.43	189.43
	Axle Location on Span, ft	0.00	78.00	91.00	96.00	101.00	116.00	122.00	128.00	134.00	140.00	140.00
160	Shear at Axle Location, kips	35.50	15.50	-4.50	-24.50	-44.50	-74.50	-104.50	-134.50	-164.50	-194.50	194.50
	Axle Location on Span, ft	0.00	98.00	111.00	116.00	121.00	136.00	142.00	148.00	154.00	160.00	160.00
180	Shear at Axle Location, kips	31.56	11.56	-8.44	-28.44	-48.44	-78.44	-108.44	-138.44	-168.44	-198.44	198.44
	Axle Location on Span, ft	0.00	118.00	131.00	136.00	141.00	156.00	162.00	168.00	174.00	180.00	180.00

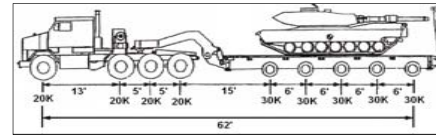
**MAXIMUM MOMENT (Calculated by positioning vehicle so that the midspan is equidistant from Resultant and Axle #6)**

Span Length, ft	Calculated MOMENTS and Locations	Moment at Right Support "A"	Front Axle #1 (AX 1)	Middle Axle #2 (AX 2)	Middle Axle #3 (AX 3)	Middle Axle #4 (AX 4)	Middle Axle #5 (AX 5)	Middle Axle #6 (AX 6)	Middle Axle #7 (AX 7)	Middle Axle #8 (AX 8)	Rear Axle #9 (AX 9)	Moment at Left Support "B"
85	Moment at Axle Pos, ft-kips	0.0	229.2	1,582.0	2,002.3	2,322.6	2,983.5	3,067.8	2,972.2	2,696.5	2,240.9	0.0
	Axle Location on Span, ft	0.00	1.85	14.85	19.85	24.85	39.85	45.85	51.85	57.85	63.85	85.00
90	Moment at Axle Pos, ft-kips	0.0	537.2	1,883.4	2,301.2	2,619.0	3,272.3	3,353.6	3,255.0	2,976.3	2,517.6	0.0
	Axle Location on Span, ft	0.00	4.35	17.35	22.35	27.35	42.35	48.35	54.35	60.35	66.35	90.00
100	Moment at Axle Pos, ft-kips	0.0	1,147.0	2,482.1	2,895.6	3,209.1	3,849.6	3,925.8	3,822.0	3,538.2	3,074.4	0.0
	Axle Location on Span, ft	0.00	9.35	22.35	27.35	32.35	47.35	53.35	59.35	65.35	71.35	100.00
120	Moment at Axle Pos, ft-kips	0.0	2,349.1	3,667.6	4,074.6	4,381.7	5,003.0	5,071.5	4,960.0	4,668.5	4,197.0	0.0
	Axle Location on Span, ft	0.00	19.35	32.35	37.35	42.35	57.35	63.35	69.35	75.35	81.35	120.00
125	Moment at Axle Pos, ft-kips	0.0	2,647.08	3,962.16	4,367.96	4,673.76	5,291.16	5,358.12	5,245.08	4,952.04	4,479.00	0.00
	Axle Location on Span, ft	0.00	21.85	34.85	39.85	44.85	59.85	65.85	71.85	77.85	83.85	125.00
130	Moment at Axle Pos, ft-kips	0.0	2,944.21	4,256.21	4,660.83	4,965.44	5,579.29	5,644.83	5,530.37	5,235.91	4,761.44	0.00
	Axle Location on Span, ft	0.00	24.35	37.35	42.35	47.35	62.35	68.35	74.35	80.35	86.35	130.00
134	Moment at Axle Pos, ft-kips	0.0	3,181.40	4,491.10	4,894.83	5,198.57	5,809.76	5,874.24	5,758.72	5,463.19	4,987.67	0.00
	Axle Location on Span, ft	0.00	26.35	39.35	44.35	49.35	64.35	70.35	76.35	82.35	88.35	134.00
140	Moment at Axle Pos, ft-kips	0.0	3,536.41	4,842.91	5,245.41	5,547.91	6,155.41	6,218.41	6,101.41	5,804.41	5,327.41	0.00
	Axle Location on Span, ft	0.00	29.35	42.35	47.35	52.35	67.35	73.35	79.35	85.35	91.35	140.00
160	Moment at Axle Pos, ft-kips	0.0	4,714.36	6,011.92	6,410.99	6,710.05	7,307.24	7,366.11	7,244.99	6,943.86	6,462.74	0.00
	Axle Location on Span, ft	0.00	39.35	52.35	57.35	62.35	77.35	83.35	89.35	95.35	101.35	160.00
180	Moment at Axle Pos, ft-kips	0.0	5,886.1	7,176.7	7,573.1	7,869.5	8,458.7	8,514.3	8,390.0	8,085.7	7,601.3	0.0
	Axle Location on Span, ft	0.00	49.35	62.35	67.35	72.35	87.35	93.35	99.35	105.35	111.35	180.00



**NINE (9) AXLE One (1x) Proposed Standard HET (Alternative Military Live Load), 82' Span, Full Vehicle**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.00	20.00	0.00	0.00	88.96	0
2	10.00	20.00	13.00	13.00	88.96	396
3	10.00	20.00	5.00	18.00	88.96	549
4	10.00	20.00	5.00	23.00	88.96	701
5	15.00	30.00	15.00	38.00	133.45	1158
6	15.00	30.00	6.00	44.00	133.45	1341
7	15.00	30.00	6.00	50.00	133.45	1524
8	15.00	30.00	6.00	56.00	133.45	1707
(Rear) 9	15.00	30.00	6.00	62.00	133.45	1890
<b>Totals</b>	<b>115.00</b>	<b>230.00</b>	<b>62.00</b>		<b>1023.1</b>	<b>1137</b>
				Resultant at location:	37.304	



**82 ft Span Length**

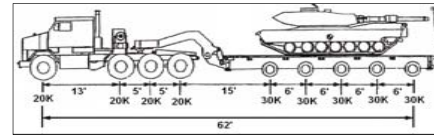
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	20.00
0.28	13.28	18.28	23.28	38.28	44.28	50.28	56.28	62.28	19.72
0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	19.70
0.32	13.32	18.32	23.32	38.32	44.32	50.32	56.32	62.32	19.68
0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	19.60
0.36	13.36	18.36	23.36	38.36	44.36	50.36	56.36	62.36	19.64
0.38	13.38	18.38	23.38	38.38	44.38	50.38	56.38	62.38	19.62
0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	19.60
20.00	33.00	38.00	43.00	58.00	64.00	70.00	76.00	82.00	0.00

Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
125.37	105.37	85.37	65.37	45.37	15.37	-14.63	-44.63	-74.63	-104.63	104.63
0.00	0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	82.00
124.58	104.58	84.58	64.58	44.58	14.58	-15.42	-45.42	-75.42	-105.42	105.42
0.00	0.28	13.28	18.28	23.28	38.28	44.28	50.28	56.28	62.28	82.00
124.52	104.52	84.52	64.52	44.52	14.52	-15.48	-45.48	-75.48	-105.48	105.48
0.00	0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	82.00
124.47	104.47	84.47	64.47	44.47	14.47	-15.53	-45.53	-75.53	-105.53	105.53
0.00	0.32	13.32	18.32	23.32	38.32	44.32	50.32	56.32	62.32	82.00
124.24	104.24	84.24	64.24	44.24	14.24	-15.76	-45.76	-75.76	-105.76	105.76
0.00	0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	82.00
124.36	104.36	84.36	64.36	44.36	14.36	-15.64	-45.64	-75.64	-105.64	105.64
0.00	0.36	13.36	18.36	23.36	38.36	44.36	50.36	56.36	62.36	82.00
124.30	104.30	84.30	64.30	44.30	14.30	-15.70	-45.70	-75.70	-105.70	105.70
0.00	0.38	13.38	18.38	23.38	38.38	44.38	50.38	56.38	62.38	82.00
124.24	104.24	84.24	64.24	44.24	14.24	-15.76	-45.76	-75.76	-105.76	105.76
0.00	0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	82.00
69.27	49.27	29.27	9.27	-10.73	-40.73	-70.73	-100.73	-130.73	-160.73	160.73
0.00	20.00	33.00	38.00	43.00	58.00	64.00	70.00	76.00	82.00	82.00

Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at React B, ft-kips
0.0	0.00	1369.76	1796.59	2123.41	2803.90	2896.10	2808.29	2540.49	2092.68	0.0
0.00	0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	82.00
0.0	34.88	1394.43	1817.33	2140.23	2808.94	2896.42	2803.91	2531.39	2078.87	0.0
0.00	0.28	13.28	18.28	23.28	38.28	44.28	50.28	56.28	62.28	82.00
0.0	37.36	1396.17	1818.80	2141.42	2809.28	2896.4305	2803.58	2530.72	2077.87	0.0
0.00	0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	82.00
0.0	39.83	1397.92	1820.26	2142.60	2809.62	2896.4347	2803.24	2530.05	2076.86	0.0
0.00	0.32	13.32	18.32	23.32	38.32	44.32	50.32	56.32	62.32	82.00
0.0	49.70	1,404.87	1,826.09	2,147.31	2,810.97	2,896.4293	2,801.89	2,527.36	2,072.82	0.00
0.00	0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	82.00
0.0	44.77	1,401.40	1,823.18	2,144.96	2,810.30	2,896.4365	2,802.57	2,528.71	2,074.85	0.00
0.00	0.36	13.36	18.36	23.36	38.36	44.36	50.36	56.36	62.36	82.00
0.0	47.23	1,403.13	1,824.63	2,146.13	2,810.63	2,896.4340	2,802.23	2,528.03	2,073.83	0.00
0.00	0.38	13.38	18.38	23.38	38.38	44.38	50.38	56.38	62.38	82.00
0.0	49.70	1,404.87	1,826.09	2,147.31	2,810.97	2,896.4293	2,801.89	2,527.36	2,072.82	0.00
0.00	0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	82.00
0.0	1,385.37	2,025.85	2,172.20	2,218.54	2,057.56	1,813.17	1,388.78	784.39	0.00	0.00
0.00	20.00	33.00	38.00	43.00	58.00	64.00	70.00	76.00	82.00	82.00

**NINE (9) AXLE One (1x) Proposed Standard HET (Alternative Military Live Load), 80' Span, Full Vehicle**

Axle	Load (ST)	Load (kips)	Distance		SI / Metric Units	
			btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	10.00	20.00		0.00	88.96	0
2	10.00	20.00	13.00	13.00	88.96	396
3	10.00	20.00	5.00	18.00	88.96	549
4	10.00	20.00	5.00	23.00	88.96	701
5	15.00	30.00	15.00	38.00	133.45	1158
6	15.00	30.00	6.00	44.00	133.45	1341
7	15.00	30.00	6.00	50.00	133.45	1524
8	15.00	30.00	6.00	56.00	133.45	1707
(Rear) 9	15.00	30.00	6.00	62.00	133.45	1890
<b>Totals</b>	<b>115.00</b>	<b>230.00</b>	<b>62.00</b>		<b>1023.1</b>	
Resultant at location:				37.304		1137



**80 ft Span Length**

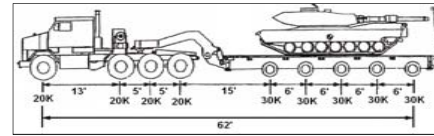
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	18.00
0.10	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	17.90
0.20	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	17.80
0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	17.70
0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	17.60
0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	17.50
1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	17.00
1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	16.50
18.00	31.00	36.00	41.00	56.00	62.00	68.00	74.00	80.00	0.00

Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
122.75	102.75	82.75	62.75	42.75	12.75	-17.25	-47.25	-77.25	-107.25	107.25
0.00	0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	80.00
122.46	102.46	82.46	62.46	42.46	12.46	-17.54	-47.54	-77.54	-107.54	107.54
0.00	0.10	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	80.00
122.18	102.18	82.18	62.18	42.18	12.18	-17.83	-47.83	-77.83	-107.83	107.83
0.00	0.20	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	80.00
121.89	101.89	81.89	61.89	41.89	11.89	-18.11	-48.11	-78.11	-108.11	108.11
0.00	0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	80.00
121.60	101.60	81.60	61.60	41.60	11.60	-18.40	-48.40	-78.40	-108.40	108.40
0.00	0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	80.00
121.31	101.31	81.31	61.31	41.31	11.31	-18.69	-48.69	-78.69	-108.69	108.69
0.00	0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	80.00
119.88	99.88	79.88	59.88	39.88	9.88	-20.13	-50.13	-80.13	-110.13	110.13
0.00	1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	80.00
118.44	98.44	78.44	58.44	38.44	8.44	-21.56	-51.56	-81.56	-111.56	111.56
0.00	1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	80.00
71.00	51.00	31.00	11.00	-9.00	-39.00	-69.00	-99.00	-129.00	-159.00	159.00
0.00	18.00	31.00	36.00	41.00	56.00	62.00	68.00	74.00	80.00	80.00

Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.0	0.00	1335.75	1749.50	2063.25	2704.50	2781.00	2677.50	2394.00	1930.50	0.0
0.00	0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	80.00
0.0	12.25	1344.26	1756.57	2068.88	2705.82	2780.60	2675.37	2390.15	1924.92	0.0
0.00	0.10	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	80.00
0.0	24.44	1352.71	1763.59	2074.46	2707.09	2780.14	2673.19	2386.24	1919.29	0.0
0.00	0.20	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	80.00
0.0	36.57	1361.10	1770.54	2079.98	2708.29	2779.62	2670.94	2382.27	1913.59	0.0
0.00	0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	80.00
0.0	48.64	1369.44	1777.44	2085.44	2709.44	2779.04	2668.64	2378.24	1907.84	0.0
0.00	0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	80.00
0.0	60.66	1377.72	1784.28	2090.84	2710.53	2778.41	2666.28	2374.16	1902.03	0.0
0.00	0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	80.00
0.0	119.88	1418.25	1817.63	2117.00	2715.13	2774.38	2653.63	2352.88	1872.13	0.0
0.00	1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	80.00
0.0	177.66	1457.34	1849.53	2141.72	2718.28	2768.91	2639.53	2330.16	1840.78	0.0
0.00	1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	80.00
0.0	1278.00	1941.00	2096.00	2151.00	2016.00	1782.00	1368.00	774.00	0.00	0.00
0.00	18.00	31.00	36.00	41.00	56.00	62.00	68.00	74.00	80.00	80.00

**NINE (9) AXLE One (1x) Proposed Standard HET (Alternative Military Live Load), 75' Span, Full Vehicle**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.00	20.00	0.00	0.00	88.96	0
2	10.00	20.00	13.00	13.00	88.96	396
3	10.00	20.00	5.00	18.00	88.96	549
4	10.00	20.00	5.00	23.00	88.96	701
5	15.00	30.00	15.00	38.00	133.45	1158
6	15.00	30.00	6.00	44.00	133.45	1341
7	15.00	30.00	6.00	50.00	133.45	1524
8	15.00	30.00	6.00	56.00	133.45	1707
(Rear) 9	15.00	30.00	6.00	62.00	133.45	1890
<b>Totals</b>	<b>115.00</b>	<b>230.00</b>	<b>62.00</b>		<b>1023.1</b>	<b>1137</b>
Resultant at location:				37.304		



**75 ft Span Length**

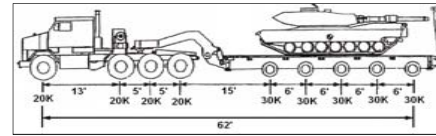
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	13.00
0.10	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	12.90
0.20	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	12.80
0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	12.70
0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	12.60
0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	12.50
1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	12.00
1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	11.50
13.00	26.00	31.00	36.00	51.00	57.00	63.00	69.00	75.00	0.00

Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
115.60	95.60	75.60	55.60	35.60	5.60	-24.40	-54.40	-84.40	-114.40	114.40
0.00	0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	75.00
115.29	95.29	75.29	55.29	35.29	5.29	-24.71	-54.71	-84.71	-114.71	114.71
0.00	0.10	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	75.00
114.99	94.99	74.99	54.99	34.99	4.99	-25.01	-55.01	-85.01	-115.01	115.01
0.00	0.20	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	75.00
114.68	94.68	74.68	54.68	34.68	4.68	-25.32	-55.32	-85.32	-115.32	115.32
0.00	0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	75.00
114.37	94.37	74.37	54.37	34.37	4.37	-25.63	-55.63	-85.63	-115.63	115.63
0.00	0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	75.00
114.07	94.07	74.07	54.07	34.07	4.07	-25.93	-55.93	-85.93	-115.93	115.93
0.00	0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	75.00
112.53	92.53	72.53	52.53	32.53	2.53	-27.47	-57.47	-87.47	-117.47	117.47
0.00	1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	75.00
111.00	91.00	71.00	51.00	31.00	1.00	-29.00	-59.00	-89.00	-119.00	119.00
0.00	1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	75.00
75.73	55.73	35.73	15.73	-4.27	-34.27	-64.27	-94.27	-124.27	-154.27	154.27
0.00	13.00	26.00	31.00	36.00	51.00	57.00	63.00	69.00	75.00	75.00

Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at React B, ft-kips
0.0	0.00	1242.80	1620.80	1898.80	2432.80	2466.40	2320.00	1993.60	1487.20	0.0
0.00	0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	75.00
0.0	11.53	1250.34	1626.81	1903.28	2432.68	2464.44	2316.20	1987.96	1479.72	0.0
0.00	0.10	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	75.00
0.0	23.00	1257.82	1632.76	1907.69	2432.49	2462.41	2312.33	1982.25	1472.17	0.0
0.00	0.20	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	75.00
0.0	34.40	1265.24	1638.64	1912.04	2432.24	2460.32	2308.40	1976.48	1464.56	0.0
0.00	0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	75.00
0.0	45.75	1272.60	1644.47	1916.34	2431.94	2458.18	2304.42	1970.66	1456.90	0.0
0.00	0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	75.00
0.0	57.03	1279.90	1650.23	1920.57	2431.57	2455.97	2300.37	1964.77	1449.17	0.0
0.00	0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	75.00
0.0	112.53	1315.47	1678.13	1940.80	2428.80	2444.00	2279.20	1934.40	1409.60	0.0
0.00	1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	75.00
0.0	166.50	1349.50	1704.50	1959.50	2424.50	2430.50	2256.50	1902.50	1368.50	0.0
0.00	1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	75.00
0.0	984.53	1709.07	1887.73	1966.40	1902.40	1696.80	1311.20	745.60	0.00	0.00
0.00	13.00	26.00	31.00	36.00	51.00	57.00	63.00	69.00	75.00	75.00

**NINE (9) AXLE One (1x) Proposed Standard HET (Alternative Military Live Load), 72' Span, Full Vehicle**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.00	20.00	0.00	0.00	88.96	0
2	10.00	20.00	13.00	13.00	88.96	396
3	10.00	20.00	5.00	18.00	88.96	549
4	10.00	20.00	5.00	23.00	88.96	701
5	15.00	30.00	15.00	38.00	133.45	1158
6	15.00	30.00	6.00	44.00	133.45	1341
7	15.00	30.00	6.00	50.00	133.45	1524
8	15.00	30.00	6.00	56.00	133.45	1707
(Rear) 9	15.00	30.00	6.00	62.00	133.45	1890
<b>Totals</b>	<b>115.00</b>	<b>230.00</b>	<b>62.00</b>		<b>1023.1</b>	
Resultant at location:				37.304		1137



72 ft Span Length

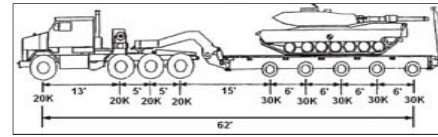
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	10.00
0.10	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	9.90
0.20	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	9.80
0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	9.70
0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	9.60
0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	9.50
1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	9.00
1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	8.50
10.00	23.00	28.00	33.00	48.00	54.00	60.00	66.00	72.00	0.00

Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
110.83	90.83	70.83	50.83	30.83	0.83	-29.17	-59.17	-89.17	-119.17	119.17
0.00	0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	72.00
110.51	90.51	70.51	50.51	30.51	0.51	-29.49	-59.49	-89.49	-119.49	119.49
0.00	0.10	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	72.00
110.19	90.19	70.19	50.19	30.19	0.19	-29.81	-59.81	-89.81	-119.81	119.81
0.00	0.20	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	72.00
109.88	89.88	69.88	49.88	29.88	-0.13	-30.13	-60.13	-90.13	-120.13	120.13
0.00	0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	72.00
109.56	89.56	69.56	49.56	29.56	-0.44	-30.44	-60.44	-90.44	-120.44	120.44
0.00	0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	72.00
109.24	89.24	69.24	49.24	29.24	-0.76	-30.76	-60.76	-90.76	-120.76	120.76
0.00	0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	72.00
107.64	87.64	67.64	47.64	27.64	-2.36	-32.36	-62.36	-92.36	-122.36	122.36
0.00	1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	72.00
106.04	86.04	66.04	46.04	26.04	-3.96	-33.96	-63.96	-93.96	-123.96	123.96
0.00	1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	72.00
78.89	58.89	38.89	18.89	-1.11	-31.11	-61.11	-91.11	-121.11	-151.11	151.11
0.00	10.00	23.00	28.00	33.00	48.00	54.00	60.00	66.00	72.00	72.00

Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at React B, ft-kips
0.0	0.00	1180.83	1535.00	1789.17	2251.67	2256.67	2081.67	1726.67	1191.67	0.0
0.00	0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	72.00
0.0	11.05	1187.73	1540.30	1792.87	2250.58	2253.66	2076.75	1719.83	1182.91	0.0
0.00	0.10	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	72.00
0.0	22.04	1194.57	1545.54	1796.51	2249.43	2250.59	2071.76	1712.93	1174.09	0.0
0.00	0.20	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	72.00
0.0	32.96	1201.34	1550.71	1800.09	2248.21	2247.46	2066.71	1705.96	1165.21	0.0
0.00	0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	72.00
0.0	43.82	1208.04	1555.82	1803.60	2246.93	2244.27	2061.60	1698.93	1156.27	0.0
0.00	0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	72.00
0.0	54.62	1214.69	1560.87	1807.05	2245.59	2241.01	2056.42	1691.84	1147.26	0.0
0.00	0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	72.00
0.0	107.64	1246.94	1585.14	1823.33	2237.92	2223.75	2029.58	1655.42	1101.25	0.0
0.00	1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	72.00
0.0	159.06	1277.60	1607.81	1838.02	2228.65	2204.90	2001.15	1617.40	1053.65	0.0
0.00	1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	72.00
0.0	788.89	1554.44	1748.89	1843.33	1826.67	1640.00	1273.33	726.67	0.00	0.00
0.00	10.00	23.00	28.00	33.00	48.00	54.00	60.00	66.00	72.00	72.00

**NINE (9) AXLE One (1x) Proposed Standard HET (Alternative Military Live Load), 70' Span, Full Vehicle**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.00	20.00	0.00	0.00	88.96	0
2	10.00	20.00	13.00	13.00	88.96	396
3	10.00	20.00	5.00	18.00	88.96	549
4	10.00	20.00	5.00	23.00	88.96	701
5	15.00	30.00	15.00	38.00	133.45	1158
6	15.00	30.00	6.00	44.00	133.45	1341
7	15.00	30.00	6.00	50.00	133.45	1524
8	15.00	30.00	6.00	56.00	133.45	1707
(Rear) 9	15.00	30.00	6.00	62.00	133.45	1890
<b>Totals</b>	<b>115.00</b>	<b>230.00</b>	<b>62.00</b>		<b>1023.1</b>	
Resultant at location:				37.304		1137



**70 ft Span Length**

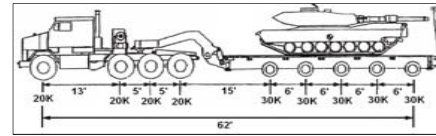
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	8.00
0.10	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	7.90
0.20	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	7.80
0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	7.70
0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	7.60
0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	7.50
1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	7.00
1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	6.50
8.00	21.00	26.00	31.00	46.00	52.00	58.00	64.00	70.00	0.00

Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
107.43	87.43	67.43	47.43	27.43	-2.57	-32.57	-62.57	-92.57	-122.57	122.57
0.00	0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	70.00
107.10	87.10	67.10	47.10	27.10	-2.90	-32.90	-62.90	-92.90	-122.90	122.90
0.00	0.10	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	70.00
106.77	86.77	66.77	46.77	26.77	-3.23	-33.23	-63.23	-93.23	-123.23	123.23
0.00	0.20	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	70.00
106.44	86.44	66.44	46.44	26.44	-3.56	-33.56	-63.56	-93.56	-123.56	123.56
0.00	0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	70.00
106.11	86.11	66.11	46.11	26.11	-3.89	-33.89	-63.89	-93.89	-123.89	123.89
0.00	0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	70.00
105.79	85.79	65.79	45.79	25.79	-4.21	-34.21	-64.21	-94.21	-124.21	124.21
0.00	0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	70.00
104.14	84.14	64.14	44.14	24.14	-5.86	-35.86	-65.86	-95.86	-125.86	125.86
0.00	1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	70.00
102.50	82.50	62.50	42.50	22.50	-7.50	-37.50	-67.50	-97.50	-127.50	127.50
0.00	1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	70.00
81.14	61.14	41.14	21.14	1.14	-28.86	-58.86	-88.86	-118.86	-148.86	148.86
0.00	8.00	21.00	26.00	31.00	46.00	52.00	58.00	64.00	70.00	70.00

Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at React B, ft-kips
0.0	0.00	1136.57	1473.71	1710.86	2122.29	2106.86	1911.43	1536.00	980.57	0.0
0.00	0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	70.00
0.0	10.71	1143.01	1478.51	1714.01	2120.51	2103.11	1905.71	1528.31	970.91	0.0
0.00	0.10	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	70.00
0.0	21.35	1149.38	1483.24	1717.10	2118.67	2099.30	1899.93	1520.55	961.18	0.0
0.00	0.20	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	70.00
0.0	31.93	1155.69	1487.90	1720.12	2116.76	2095.42	1894.08	1512.73	951.39	0.0
0.00	0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	70.00
0.0	42.45	1161.93	1492.50	1723.07	2114.79	2091.47	1888.16	1504.85	941.53	0.00
0.00	0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	70.00
0.0	52.89	1168.11	1497.04	1725.96	2112.75	2087.46	1882.18	1496.89	931.61	0.00
0.00	0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	70.00
0.0	104.14	1198.00	1518.71	1739.43	2101.57	2066.43	1851.29	1456.14	881.00	0.00
0.00	1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	70.00
0.0	153.75	1226.25	1538.75	1751.25	2088.75	2043.75	1818.75	1413.75	828.75	0.00
0.00	1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	70.00
0.0	649.14	1444.00	1649.71	1755.43	1772.57	1599.43	1246.29	713.14	0.00	0.00
0.00	8.00	21.00	26.00	31.00	46.00	52.00	58.00	64.00	70.00	70.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 65' Span, Full Vehicle**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.00	20.00	0.00	0.00	88.96	0
2	10.00	20.00	13.00	13.00	88.96	396
3	10.00	20.00	5.00	18.00	88.96	549
4	10.00	20.00	5.00	23.00	88.96	701
5	15.00	30.00	15.00	38.00	133.45	1158
6	15.00	30.00	6.00	44.00	133.45	1341
7	15.00	30.00	6.00	50.00	133.45	1524
8	15.00	30.00	6.00	56.00	133.45	1707
(Rear) 9	15.00	30.00	6.00	62.00	133.45	1890
<b>Totals</b>	<b>115.00</b>	<b>230.00</b>	<b>62.00</b>		<b>1023.1</b>	
Resultant at location:				37.304		1137



**65 ft Span Length**

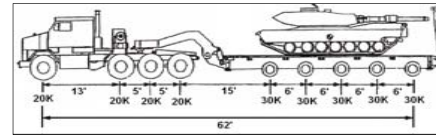
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	3.00
0.10	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	2.90
0.20	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	2.80
0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	2.70
0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	2.60
0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	2.50
1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	2.00
1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	1.50
3.00	16.00	21.00	26.00	41.00	47.00	53.00	59.00	65.00	0.00

Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
98.00	78.00	58.00	38.00	18.00	-12.00	-42.00	-72.00	-102.00	-132.00	132.00
0.00	0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	65.00
97.65	77.65	57.65	37.65	17.65	-12.35	-42.35	-72.35	-102.35	-132.35	132.35
0.00	0.10	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	65.00
97.29	77.29	57.29	37.29	17.29	-12.71	-42.71	-72.71	-102.71	-132.71	132.71
0.00	0.20	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	65.00
96.94	76.94	56.94	36.94	16.94	-13.06	-43.06	-73.06	-103.06	-133.06	133.06
0.00	0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	65.00
96.58	76.58	56.58	36.58	16.58	-13.42	-43.42	-73.42	-103.42	-133.42	133.42
0.00	0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	65.00
96.23	76.23	56.23	36.23	16.23	-13.77	-43.77	-73.77	-103.77	-133.77	133.77
0.00	0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	65.00
94.46	74.46	54.46	34.46	14.46	-15.54	-45.54	-75.54	-105.54	-135.54	135.54
0.00	1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	65.00
92.69	72.69	52.69	32.69	12.69	-17.31	-47.31	-77.31	-107.31	-137.31	137.31
0.00	1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	65.00
87.38	67.38	47.38	27.38	7.38	-22.62	-52.62	-82.62	-112.62	-142.62	142.62
0.00	3.00	16.00	21.00	26.00	41.00	47.00	53.00	59.00	65.00	65.00

Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at React B, ft-kips
0.0	0.00	1014.00	1304.00	1494.00	1764.00	1692.00	1440.00	1008.00	396.00	0.0
0.00	0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	65.00
0.0	9.76	1019.16	1307.40	1495.63	1760.32	1686.20	1432.07	997.95	383.83	0.0
0.00	0.10	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	65.00
0.0	19.46	1024.26	1310.72	1497.18	1756.57	1680.32	1424.07	987.83	371.58	0.0
0.00	0.20	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	65.00
0.0	29.08	1029.28	1313.97	1498.67	1752.74	1674.37	1416.00	977.64	359.27	0.0
0.00	0.30	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	65.00
0.0	38.63	1034.23	1317.16	1500.08	1748.85	1668.36	1407.86	967.37	346.88	0.0
0.00	0.40	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	65.00
0.0	48.12	1039.12	1320.27	1501.42	1744.88	1662.27	1399.65	957.04	334.42	0.0
0.00	0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	65.00
0.0	94.46	1062.46	1334.77	1507.08	1724.00	1630.77	1357.54	904.31	271.08	0.0
0.00	1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	65.00
0.0	139.04	1084.04	1347.50	1510.96	1701.35	1597.50	1313.65	849.81	205.96	0.0
0.00	1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	65.00
0.0	262.15	1138.15	1375.08	1512.00	1622.77	1487.08	1171.38	675.69	0.00	0.00
0.00	3.00	16.00	21.00	26.00	41.00	47.00	53.00	59.00	65.00	65.00

**NINE (9) AXLE One (1x) Proposed Standard HET (Alternative Military Live Load), 62' Span, Full Vehicle**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	10.00	20.00	0.00	0.00	88.96	0
2	10.00	20.00	13.00	13.00	88.96	396
3	10.00	20.00	5.00	18.00	88.96	549
4	10.00	20.00	5.00	23.00	88.96	701
5	15.00	30.00	15.00	38.00	133.45	1158
6	15.00	30.00	6.00	44.00	133.45	1341
7	15.00	30.00	6.00	50.00	133.45	1524
8	15.00	30.00	6.00	56.00	133.45	1707
(Rear) 9	15.00	30.00	6.00	62.00	133.45	1890
<b>Totals</b>	<b>115.00</b>	<b>230.00</b>	<b>62.00</b>		<b>1023.1</b>	
				Resultant at location:	37.304	1137



62 ft Span Length

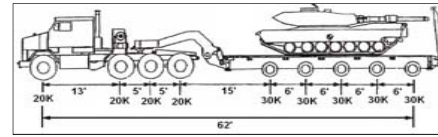
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	0.00
0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	-0.50
1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	-1.00
1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	-1.50
2.00	15.00	20.00	25.00	40.00	46.00	52.00	58.00	64.00	-2.00
2.50	15.50	20.50	25.50	40.50	46.50	52.50	58.50	64.50	-2.50
3.00	16.00	21.00	26.00	41.00	47.00	53.00	59.00	65.00	-3.00
3.50	16.50	21.50	26.50	41.50	47.50	53.50	59.50	65.50	-3.50
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	0.00

Shear at React A, kips	Shear at Front #1 Axle, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
91.61	71.61	51.61	31.61	11.61	-18.39	-48.39	-78.39	-108.39	-138.39	138.39
0.00	0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	62.00
89.76	69.76	49.76	29.76	9.76	-20.24	-50.24	-80.24	-110.24	-140.24	140.24
0.00	0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	62.00
87.90	67.90	47.90	27.90	7.90	-22.10	-52.10	-82.10	-112.10	-142.10	142.10
0.00	1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	62.00
86.05	66.05	46.05	26.05	6.05	-23.95	-53.95	-83.95	-113.95	-143.95	143.95
0.00	1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	62.00
84.19	64.19	44.19	24.19	4.19	-25.81	-55.81	-85.81	-115.81	-145.81	145.81
0.00	2.00	15.00	20.00	25.00	40.00	46.00	52.00	58.00	64.00	62.00
82.34	62.34	42.34	22.34	2.34	-27.66	-57.66	-87.66	-117.66	-147.66	147.66
0.00	2.50	15.50	20.50	25.50	40.50	46.50	52.50	58.50	64.50	62.00
80.48	60.48	40.48	20.48	0.48	-29.52	-59.52	-89.52	-119.52	-149.52	149.52
0.00	3.00	16.00	21.00	26.00	41.00	47.00	53.00	59.00	65.00	62.00
78.63	58.63	38.63	18.63	-1.37	-31.37	-61.37	-91.37	-121.37	-151.37	151.37
0.00	3.50	16.50	21.50	26.50	41.50	47.50	53.50	59.50	65.50	62.00
91.61	71.61	51.61	31.61	11.61	-18.39	-48.39	-78.39	-108.39	-138.39	138.39
0.00	0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	62.00

Moment at React A, ft-kips	Moment at Front #1 Axle, ft-kips	Moment at Mid #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at React B, ft-kips
0.0	0.00	930.97	1189.03	1347.10	1521.29	1410.97	1120.65	650.32	0.00	0.0
0.00	0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	62.00
0.0	44.88	951.73	1200.52	1349.31	1495.69	1374.23	1072.78	591.33	-70.12	0.0
0.00	0.50	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	62.00
0.0	87.90	970.65	1210.16	1349.68	1468.23	1335.65	1023.06	530.48	-142.10	0.0
0.00	1.00	14.00	19.00	24.00	39.00	45.00	51.00	57.00	63.00	62.00
0.0	129.07	987.70	1217.94	1348.19	1438.91	1295.20	971.49	467.78	-215.93	0.0
0.00	1.50	14.50	19.50	24.50	39.50	45.50	51.50	57.50	63.50	62.00
0.0	168.39	1,002.90	1,223.87	1,344.84	1,407.74	1,252.90	918.06	403.23	-291.61	0.00
0.00	2.00	15.00	20.00	25.00	40.00	46.00	52.00	58.00	64.00	62.00
0.0	205.85	1,016.25	1,227.94	1,339.64	1,374.72	1,208.75	862.78	336.81	-369.15	0.00
0.00	2.50	15.50	20.50	25.50	40.50	46.50	52.50	58.50	64.50	62.00
0.0	241.45	1,027.74	1,230.16	1,332.58	1,339.84	1,162.74	805.65	268.55	-448.55	0.00
0.00	3.00	16.00	21.00	26.00	41.00	47.00	53.00	59.00	65.00	62.00
0.0	275.20	1,037.38	1,230.52	1,323.67	1,303.10	1,114.88	746.65	198.43	-529.80	0.00
0.00	3.50	16.50	21.50	26.50	41.50	47.50	53.50	59.50	65.50	62.00
0.0	0.00	930.97	1,189.03	1,347.10	1,521.29	1,410.97	1,120.65	650.32	0.00	0.00
0.00	0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	62.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 62' Span, Axles 2-9**

Axle	Load (ST)	Load (kips)	Distance		SI / Metric Units	
			btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00	0.00	0.00	0.00	0
2	10.00	20.00		0.00	88.96	0
3	10.00	20.00	5.00	5.00	88.96	152
4	10.00	20.00	5.00	10.00	88.96	305
5	15.00	30.00	15.00	25.00	133.45	762
6	15.00	30.00	6.00	31.00	133.45	945
7	15.00	30.00	6.00	37.00	133.45	1128
8	15.00	30.00	6.00	43.00	133.45	1311
(Rear) 9	15.00	30.00	6.00	49.00	133.45	1494
<b>Totals</b>	<b>105.00</b>	<b>210.00</b>	<b>49.00</b>		<b>934.1</b>	
Resultant at location:				<b>27.857</b>		<b>849</b>



**90 ft Span Length**

Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	5.00	10.00	10.00	25.00	31.00	37.00	43.00	49.00	41.00
15.50	20.50	25.50	40.50	46.50	52.50	58.50	64.50	25.50	25.50
15.60	20.60	25.60	40.60	46.60	52.60	58.60	64.60	25.40	25.40
15.70	20.70	25.70	40.70	46.70	52.70	58.70	64.70	25.30	25.30
15.80	20.80	25.80	40.80	46.80	52.80	58.80	64.80	25.20	25.20
15.90	20.90	25.90	40.90	46.90	52.90	58.90	64.90	25.10	25.10
16.00	21.00	26.00	41.00	47.00	53.00	59.00	65.00	25.00	25.00
16.10	21.10	26.10	41.10	47.10	53.10	59.10	65.10	24.90	24.90
41.00	46.00	51.00	66.00	72.00	78.00	84.00	90.00	0.00	0.00

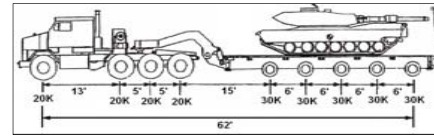
Shear at React A, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
145.00	125.00	105.00	85.00	55.00	25.00	-5.00	-35.00	-65.00	65.00
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	90.00
108.83	88.83	68.83	48.83	18.83	-11.17	-41.17	-71.17	-101.17	101.17
0.00	15.50	20.50	25.50	40.50	46.50	52.50	58.50	64.50	90.00
108.60	88.60	68.60	48.60	18.60	-11.40	-41.40	-71.40	-101.40	101.40
0.00	15.60	20.60	25.60	40.60	46.60	52.60	58.60	64.60	90.00
108.37	88.37	68.37	48.37	18.37	-11.63	-41.63	-71.63	-101.63	101.63
0.00	15.70	20.70	25.70	40.70	46.70	52.70	58.70	64.70	90.00
108.13	88.13	68.13	48.13	18.13	-11.87	-41.87	-71.87	-101.87	101.87
0.00	15.80	20.80	25.80	40.80	46.80	52.80	58.80	64.80	90.00
107.90	87.90	67.90	47.90	17.90	-12.10	-42.10	-72.10	-102.10	102.10
0.00	15.90	20.90	25.90	40.90	46.90	52.90	58.90	64.90	90.00
107.67	87.67	67.67	47.67	17.67	-12.33	-42.33	-72.33	-102.33	102.33
0.00	16.00	21.00	26.00	41.00	47.00	53.00	59.00	65.00	90.00
107.43	87.43	67.43	47.43	17.43	-12.57	-42.57	-72.57	-102.57	102.57
0.00	16.10	21.10	26.10	41.10	47.10	53.10	59.10	65.10	90.00
49.33	29.33	9.33	-10.67	-40.67	-70.67	-100.67	-130.67	-160.67	160.67
0.00	41.00	46.00	51.00	66.00	72.00	78.00	84.00	90.00	90.00

React A, ft-kips	Moment at #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	625.00	1150.00	2425.00	2755.00	2905.00	2875.00	2665.00	0.00
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	90.00
0.00	1686.92	2131.08	2475.25	3207.75	3320.75	3253.75	3006.75	2579.75	0.00
0.00	15.50	20.50	25.50	40.50	46.50	52.50	58.50	64.50	90.00
0.00	1694.16	2137.16	2480.16	3209.16	3320.76	3252.36	3003.96	2575.56	0.00
0.00	15.60	20.60	25.60	40.60	46.60	52.60	58.60	64.60	90.00
0.00	1701.36	2143.19	2485.02	3210.52	3320.72	3250.92	3001.12	2571.32	0.00
0.00	15.70	20.70	25.70	40.70	46.70	52.70	58.70	64.70	90.00
0.00	1708.51	2149.17	2489.84	3211.84	3320.64	3249.44	2998.24	2567.04	0.00
0.00	15.80	20.80	25.80	40.80	46.80	52.80	58.80	64.80	90.00
0.00	1715.61	2155.11	2494.61	3213.11	3320.51	3247.91	2995.31	2562.71	0.00
0.00	15.90	20.90	25.90	40.90	46.90	52.90	58.90	64.90	90.00
0.00	1722.67	2161.00	2499.33	3214.33	3320.33	3246.33	2992.33	2558.33	0.00
0.00	16.00	21.00	26.00	41.00	47.00	53.00	59.00	65.00	90.00
0.00	1729.68	2166.84	2504.01	3215.51	3320.11	3244.71	2989.31	2553.91	0.00
0.00	16.10	21.10	26.10	41.10	47.10	53.10	59.10	65.10	90.00
0.00	2022.67	2169.33	2216.00	2056.00	1812.00	1388.00	784.00	0.00	0.00
0.00	41.00	46.00	51.00	66.00	72.00	78.00	84.00	90.00	90.00



**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 62' Span, Axles 2-9**

Axle	Load (ST)		Distance		SI / Metric Units	
	Load (ST)	Load (kips)	btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	10.00	20.00		0.00	88.96	0
3	10.00	20.00	5.00	5.00	88.96	152
4	10.00	20.00	5.00	10.00	88.96	305
5	15.00	30.00	15.00	25.00	133.45	762
6	15.00	30.00	6.00	31.00	133.45	945
7	15.00	30.00	6.00	37.00	133.45	1128
8	15.00	30.00	6.00	43.00	133.45	1311
(Rear) 9	15.00	30.00	6.00	49.00	133.45	1494
<b>Totals</b>	<b>105.00</b>	<b>210.00</b>	<b>49.00</b>		<b>934.1</b>	
Resultant at location:				<b>27.857</b>		<b>849</b>



**82 ft Span Length**

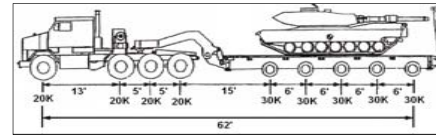
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	5.00	10.00	10.00	25.00	31.00	37.00	43.00	49.00	33.00
11.50	16.50	21.50	36.50	42.50	48.50	54.50	60.50	21.50	
11.60	16.60	21.60	36.60	42.60	48.60	54.60	60.60	21.40	
11.70	16.70	21.70	36.70	42.70	48.70	54.70	60.70	21.30	
11.80	16.80	21.80	36.80	42.80	48.80	54.80	60.80	21.20	
11.90	16.90	21.90	36.90	42.90	48.90	54.90	60.90	21.10	
12.00	17.00	22.00	37.00	43.00	49.00	55.00	61.00	21.00	
12.10	17.10	22.10	37.10	43.10	49.10	55.10	61.10	20.90	
33.00	38.00	43.00	58.00	64.00	70.00	76.00	82.00	0.00	

Shear at React A, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
138.66	118.66	98.66	78.66	48.66	18.66	-11.34	-41.34	-71.34	71.34
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	82.00
109.21	89.21	69.21	49.21	19.21	-10.79	-40.79	-70.79	-100.79	100.79
0.00	11.50	16.50	21.50	36.50	42.50	48.50	54.50	60.50	82.00
108.95	88.95	68.95	48.95	18.95	-11.05	-41.05	-71.05	-101.05	101.05
0.00	11.60	16.60	21.60	36.60	42.60	48.60	54.60	60.60	82.00
108.70	88.70	68.70	48.70	18.70	-11.30	-41.30	-71.30	-101.30	101.30
0.00	11.70	16.70	21.70	36.70	42.70	48.70	54.70	60.70	82.00
108.44	88.44	68.44	48.44	18.44	-11.56	-41.56	-71.56	-101.56	101.56
0.00	11.80	16.80	21.80	36.80	42.80	48.80	54.80	60.80	82.00
108.18	88.18	68.18	48.18	18.18	-11.82	-41.82	-71.82	-101.82	101.82
0.00	11.90	16.90	21.90	36.90	42.90	48.90	54.90	60.90	82.00
107.93	87.93	67.93	47.93	17.93	-12.07	-42.07	-72.07	-102.07	102.07
0.00	12.00	17.00	22.00	37.00	43.00	49.00	55.00	61.00	82.00
107.67	87.67	67.67	47.67	17.67	-12.33	-42.33	-72.33	-102.33	102.33
0.00	12.10	17.10	22.10	37.10	43.10	49.10	55.10	61.10	82.00
54.15	34.15	14.15	-5.85	-35.85	-65.85	-95.85	-125.85	-155.85	155.85
0.00	33.00	38.00	43.00	58.00	64.00	70.00	76.00	82.00	82.00

Moment at React A, ft-kips	Moment at #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	593.29	1086.59	2266.46	2558.41	2670.37	2602.32	2354.27	0.0
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	82.00
0.00	1255.88	1701.92	2047.96	2786.07	2901.31	2836.55	2591.80	2167.04	0.0
0.00	11.50	16.50	21.50	36.50	42.50	48.50	54.50	60.50	82.00
0.00	1263.83	1708.59	2053.35	2787.61	2901.32	2835.03	2588.74	2162.44	0.0
0.00	11.60	16.60	21.60	36.60	42.60	48.60	54.60	60.60	82.00
0.00	1271.73	1715.21	2058.68	2789.11	2901.28	2833.45	2585.62	2157.79	0.0
0.00	11.70	16.70	21.70	36.70	42.70	48.70	54.70	60.70	82.00
0.00	1279.58	1721.78	2063.97	2790.56	2901.19	2831.82	2582.46	2153.09	0.0
0.00	11.80	16.80	21.80	36.80	42.80	48.80	54.80	60.80	82.00
0.00	1287.38	1728.29	2069.21	2791.95	2901.05	2830.15	2579.24	2148.34	0.0
0.00	11.90	16.90	21.90	36.90	42.90	48.90	54.90	60.90	82.00
0.00	1295.12	1734.76	2074.39	2793.29	2900.85	2828.41	2575.98	2143.54	0.0
0.00	12.00	17.00	22.00	37.00	43.00	49.00	55.00	61.00	82.00
0.00	1302.82	1741.17	2079.52	2794.58	2900.61	2826.63	2572.66	2138.68	0.0
0.00	12.10	17.10	22.10	37.10	43.10	49.10	55.10	61.10	82.00
0.00	1786.83	1957.56	2028.29	1940.49	1725.37	1330.24	755.12	0.00	0.00
0.00	33.00	38.00	43.00	58.00	64.00	70.00	76.00	82.00	82.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 62' Span, Axles 2-9**

Axle	Load (ST)	Load (kips)	Distance		SI / Metric Units	
			btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00	0.00	0.00	0.00	0
2	10.00	20.00		0.00	88.96	0
3	10.00	20.00	5.00	5.00	88.96	152
4	10.00	20.00	5.00	10.00	88.96	305
5	15.00	30.00	15.00	25.00	133.45	762
6	15.00	30.00	6.00	31.00	133.45	945
7	15.00	30.00	6.00	37.00	133.45	1128
8	15.00	30.00	6.00	43.00	133.45	1311
(Rear) 9	15.00	30.00	6.00	49.00	133.45	1494
<b>Totals</b>	<b>105.00</b>	<b>210.00</b>	<b>49.00</b>		<b>934.1</b>	
			<b>Resultant at location:</b>	<b>27.857</b>		<b>849</b>



**80 ft Span Length**

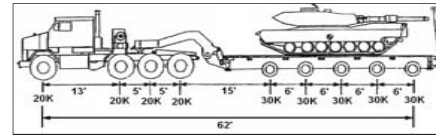
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	5.00	10.00	10.00	25.00	31.00	37.00	43.00	49.00	31.00
10.50	15.50	20.50	35.50	41.50	47.50	53.50	59.50	20.50	20.50
10.60	15.60	20.60	35.60	41.60	47.60	53.60	59.60	20.40	20.40
10.70	15.70	20.70	35.70	41.70	47.70	53.70	59.70	20.30	20.30
10.80	15.80	20.80	35.80	41.80	47.80	53.80	59.80	20.20	20.20
10.90	15.90	20.90	35.90	41.90	47.90	53.90	59.90	20.10	20.10
11.00	16.00	21.00	36.00	42.00	48.00	54.00	60.00	20.00	20.00
11.10	16.10	21.10	36.10	42.10	48.10	54.10	60.10	19.90	19.90
31.00	36.00	41.00	56.00	62.00	68.00	74.00	80.00	0.00	0.00

Shear at React A, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
136.88	116.88	96.88	76.88	46.88	16.88	-13.13	-43.13	-73.13	73.13
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	80.00
109.31	89.31	69.31	49.31	19.31	-10.69	-40.69	-70.69	-100.69	100.69
0.00	10.50	15.50	20.50	35.50	41.50	47.50	53.50	59.50	80.00
109.05	89.05	69.05	49.05	19.05	-10.95	-40.95	-70.95	-100.95	100.95
0.00	10.60	15.60	20.60	35.60	41.60	47.60	53.60	59.60	80.00
108.79	88.79	68.79	48.79	18.79	-11.21	-41.21	-71.21	-101.21	101.21
0.00	10.70	15.70	20.70	35.70	41.70	47.70	53.70	59.70	80.00
108.53	88.53	68.53	48.53	18.53	-11.48	-41.48	-71.48	-101.48	101.48
0.00	10.80	15.80	20.80	35.80	41.80	47.80	53.80	59.80	80.00
108.26	88.26	68.26	48.26	18.26	-11.74	-41.74	-71.74	-101.74	101.74
0.00	10.90	15.90	20.90	35.90	41.90	47.90	53.90	59.90	80.00
108.00	88.00	68.00	48.00	18.00	-12.00	-42.00	-72.00	-102.00	102.00
0.00	11.00	16.00	21.00	36.00	42.00	48.00	54.00	60.00	80.00
107.74	87.74	67.74	47.74	17.74	-12.26	-42.26	-72.26	-102.26	102.26
0.00	11.10	16.10	21.10	36.10	42.10	48.10	54.10	60.10	80.00
55.50	35.50	15.50	-4.50	-34.50	-64.50	-94.50	-124.50	-154.50	154.50
0.00	31.00	36.00	41.00	56.00	62.00	68.00	74.00	80.00	80.00

Moment at React A, ft-kips	Moment at #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	584.38	1068.75	2221.88	2503.13	2604.38	2525.63	2266.88	0.00
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	80.00
0.00	1147.78	1594.34	1940.91	2680.59	2796.47	2732.34	2488.22	2064.09	0.00
0.00	10.50	15.50	20.50	35.50	41.50	47.50	53.50	59.50	80.00
0.00	1155.93	1601.18	1946.43	2682.18	2796.48	2730.78	2485.08	2059.38	0.00
0.00	10.60	15.60	20.60	35.60	41.60	47.60	53.60	59.60	80.00
0.00	1164.03	1607.96	1951.90	2683.71	2796.44	2729.16	2481.89	2054.61	0.00
0.00	10.70	15.70	20.70	35.70	41.70	47.70	53.70	59.70	80.00
0.00	1172.07	1614.70	1957.32	2685.20	2796.35	2727.50	2478.65	2049.80	0.00
0.00	10.80	15.80	20.80	35.80	41.80	47.80	53.80	59.80	80.00
0.00	1180.06	1621.37	1962.69	2686.62	2796.20	2725.77	2475.35	2044.92	0.00
0.00	10.90	15.90	20.90	35.90	41.90	47.90	53.90	59.90	80.00
0.00	1188.00	1628.00	1968.00	2688.00	2796.00	2724.00	2472.00	2040.00	0.00
0.00	11.00	16.00	21.00	36.00	42.00	48.00	54.00	60.00	80.00
0.00	1195.89	1634.57	1973.26	2689.32	2795.75	2722.17	2468.60	2035.02	0.00
0.00	11.10	16.10	21.10	36.10	42.10	48.10	54.10	60.10	80.00
0.00	1220.50	1898.00	1975.50	1908.00	1701.00	1314.00	747.00	0.00	0.00
0.00	31.00	36.00	41.00	56.00	62.00	68.00	74.00	80.00	80.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 62' Span, Axles 2-9**

Axle	Load (ST)	Load (kips)	Distance		SI / Metric Units	
			btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00	0.00	0.00	0.00	0
2	10.00	20.00		0.00	88.96	0
3	10.00	20.00	5.00	5.00	88.96	152
4	10.00	20.00	5.00	10.00	88.96	305
5	15.00	30.00	15.00	25.00	133.45	762
6	15.00	30.00	6.00	31.00	133.45	945
7	15.00	30.00	6.00	37.00	133.45	1128
8	15.00	30.00	6.00	43.00	133.45	1311
(Rear) 9	15.00	30.00	6.00	49.00	133.45	1494
<b>Totals</b>	<b>105.00</b>	<b>210.00</b>	<b>49.00</b>		<b>934.1</b>	
			Resultant at location:		<b>27.857</b>	<b>849</b>



**75 ft Span Length**

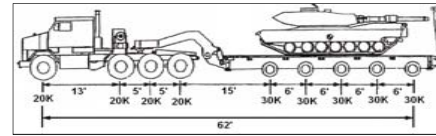
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	5.00	10.00	10.00	25.00	31.00	37.00	43.00	49.00	26.00
8.00	13.00	18.00	18.00	33.00	39.00	45.00	51.00	57.00	18.00
8.10	13.10	18.10	18.10	33.10	39.10	45.10	51.10	57.10	17.90
8.20	13.20	18.20	18.20	33.20	39.20	45.20	51.20	57.20	17.80
8.30	13.30	18.30	18.30	33.30	39.30	45.30	51.30	57.30	17.70
8.40	13.40	18.40	18.40	33.40	39.40	45.40	51.40	57.40	17.60
8.50	13.50	18.50	18.50	33.50	39.50	45.50	51.50	57.50	17.50
8.60	13.60	18.60	18.60	33.60	39.60	45.60	51.60	57.60	17.40
26.00	31.00	36.00	36.00	51.00	57.00	63.00	69.00	75.00	0.00

Shear at React A, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
132.00	112.00	92.00	72.00	42.00	12.00	-18.00	-48.00	-78.00	78.00
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	75.00
109.60	89.60	69.60	49.60	19.60	-10.40	-40.40	-70.40	-100.40	100.40
0.00	8.00	13.00	18.00	33.00	39.00	45.00	51.00	57.00	75.00
109.32	89.32	69.32	49.32	19.32	-10.68	-40.68	-70.68	-100.68	100.68
0.00	8.10	13.10	18.10	33.10	39.10	45.10	51.10	57.10	75.00
109.04	89.04	69.04	49.04	19.04	-10.96	-40.96	-70.96	-100.96	100.96
0.00	8.20	13.20	18.20	33.20	39.20	45.20	51.20	57.20	75.00
108.76	88.76	68.76	48.76	18.76	-11.24	-41.24	-71.24	-101.24	101.24
0.00	8.30	13.30	18.30	33.30	39.30	45.30	51.30	57.30	75.00
108.48	88.48	68.48	48.48	18.48	-11.52	-41.52	-71.52	-101.52	101.52
0.00	8.40	13.40	18.40	33.40	39.40	45.40	51.40	57.40	75.00
108.20	88.20	68.20	48.20	18.20	-11.80	-41.80	-71.80	-101.80	101.80
0.00	8.50	13.50	18.50	33.50	39.50	45.50	51.50	57.50	75.00
107.92	87.92	67.92	47.92	17.92	-12.08	-42.08	-72.08	-102.08	102.08
0.00	8.60	13.60	18.60	33.60	39.60	45.60	51.60	57.60	75.00
59.20	39.20	19.20	-0.80	-30.80	-60.80	-90.80	-120.80	-150.80	150.80
0.00	26.00	31.00	36.00	51.00	57.00	63.00	69.00	75.00	75.00

Moment at React A, ft-kips	Moment at #2 Axle, ft-kips	Moment at #3 Axle, ft-kips	Moment at #4 Axle, ft-kips	Moment at #5 Axle, ft-kips	Moment at #6 Axle, ft-kips	Moment at #7 Axle, ft-kips	Moment at #8 Axle, ft-kips	Moment at #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	560.00	1020.00	2100.00	2352.00	2424.00	2316.00	2028.00	0.00
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	75.00
0.00	876.80	1324.80	1672.80	2416.80	2534.40	2472.00	2229.60	1807.20	0.00
0.00	8.00	13.00	18.00	33.00	39.00	45.00	51.00	57.00	75.00
0.00	885.49	1332.09	1678.69	2418.49	2534.41	2470.33	2226.25	1802.17	0.00
0.00	8.10	13.10	18.10	33.10	39.10	45.10	51.10	57.10	75.00
0.00	894.13	1339.33	1684.53	2420.13	2534.37	2468.61	2222.85	1797.09	0.00
0.00	8.20	13.20	18.20	33.20	39.20	45.20	51.20	57.20	75.00
0.00	902.71	1346.51	1690.31	2421.71	2534.27	2466.83	2219.39	1791.95	0.00
0.00	8.30	13.30	18.30	33.30	39.30	45.30	51.30	57.30	75.00
0.00	911.23	1353.63	1696.03	2423.23	2534.11	2464.99	2215.87	1786.75	0.00
0.00	8.40	13.40	18.40	33.40	39.40	45.40	51.40	57.40	75.00
0.00	919.70	1360.70	1701.70	2424.70	2533.90	2463.10	2212.30	1781.50	0.00
0.00	8.50	13.50	18.50	33.50	39.50	45.50	51.50	57.50	75.00
0.00	928.11	1367.71	1707.31	2426.11	2533.63	2461.15	2208.67	1776.19	0.00
0.00	8.60	13.60	18.60	33.60	39.60	45.60	51.60	57.60	75.00
0.00	1,539.20	1,735.20	1831.20	1819.20	1634.40	1269.60	724.80	0.00	0.00
0.00	26.00	31.00	36.00	51.00	57.00	63.00	69.00	75.00	75.00

**NINE (9) AXLE One (1x) Proposed Standard HET (Alternative Military Live Load), 62' Span, Axles 2-9**

Axle	Load (ST)	Load (kips)	Distance		SI / Metric Units	
			btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00	0.00	0.00	0.00	0
2	10.00	20.00		0.00	88.96	0
3	10.00	20.00	5.00	5.00	88.96	152
4	10.00	20.00	5.00	10.00	88.96	305
5	15.00	30.00	15.00	25.00	133.45	762
6	15.00	30.00	6.00	31.00	133.45	945
7	15.00	30.00	6.00	37.00	133.45	1128
8	15.00	30.00	6.00	43.00	133.45	1311
(Rear) 9	15.00	30.00	6.00	49.00	133.45	1494
<b>Totals</b>	<b>105.00</b>	<b>210.00</b>	<b>49.00</b>		<b>934.1</b>	<b>849</b>
Resultant at location:				<b>27.857</b>		



72 ft Span Length

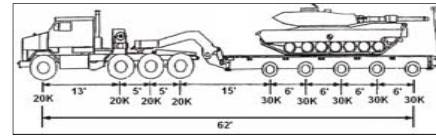
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	5.00	10.00	10.00	25.00	31.00	37.00	43.00	49.00	23.00
6.50	11.50	16.50	16.50	31.50	37.50	43.50	49.50	55.50	16.50
6.60	11.60	16.60	16.60	31.60	37.60	43.60	49.60	55.60	16.40
6.70	11.70	16.70	16.70	31.70	37.70	43.70	49.70	55.70	16.30
6.80	11.80	16.80	16.80	31.80	37.80	43.80	49.80	55.80	16.20
6.90	11.90	16.90	16.90	31.90	37.90	43.90	49.90	55.90	16.10
7.00	12.00	17.00	17.00	32.00	38.00	44.00	50.00	56.00	16.00
7.10	12.10	17.10	17.10	32.10	38.10	44.10	50.10	56.10	15.90
23.00	28.00	33.00	33.00	48.00	54.00	60.00	66.00	72.00	0.00

Shear at React A, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
128.75	108.75	88.75	68.75	38.75	8.75	-21.25	-51.25	-81.25	81.25
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	72.00
109.79	89.79	69.79	49.79	19.79	-10.21	-40.21	-70.21	-100.21	100.21
0.00	6.50	11.50	16.50	31.50	37.50	43.50	49.50	55.50	72.00
109.50	89.50	69.50	49.50	19.50	-10.50	-40.50	-70.50	-100.50	100.50
0.00	6.60	11.60	16.60	31.60	37.60	43.60	49.60	55.60	72.00
109.21	89.21	69.21	49.21	19.21	-10.79	-40.79	-70.79	-100.79	100.79
0.00	6.70	11.70	16.70	31.70	37.70	43.70	49.70	55.70	72.00
108.92	88.92	68.92	48.92	18.92	-11.08	-41.08	-71.08	-101.08	101.08
0.00	6.80	11.80	16.80	31.80	37.80	43.80	49.80	55.80	72.00
108.63	88.63	68.63	48.63	18.63	-11.38	-41.38	-71.38	-101.38	101.38
0.00	6.90	11.90	16.90	31.90	37.90	43.90	49.90	55.90	72.00
108.33	88.33	68.33	48.33	18.33	-11.67	-41.67	-71.67	-101.67	101.67
0.00	7.00	12.00	17.00	32.00	38.00	44.00	50.00	56.00	72.00
108.04	88.04	68.04	48.04	18.04	-11.96	-41.96	-71.96	-101.96	101.96
0.00	7.10	12.10	17.10	32.10	38.10	44.10	50.10	56.10	72.00
61.67	41.67	21.67	1.67	-28.33	-58.33	-88.33	-118.33	-148.33	148.33
0.00	23.00	28.00	33.00	48.00	54.00	60.00	66.00	72.00	72.00

Moment at React A, ft-kips	Moment at #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	543.75	987.50	2018.75	2251.25	2303.75	2176.25	1868.75	0.00
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	72.00
0.00	713.65	1162.60	1511.56	2258.44	2377.19	2315.94	2074.69	1653.44	0.00
0.00	6.50	11.50	16.50	31.50	37.50	43.50	49.50	55.50	72.00
0.00	722.70	1170.20	1517.70	2260.20	2377.20	2314.20	2071.20	1648.20	0.00
0.00	6.60	11.60	16.60	31.60	37.60	43.60	49.60	55.60	72.00
0.00	731.70	1177.74	1523.78	2261.90	2377.15	2312.40	2067.65	1642.90	0.00
0.00	6.70	11.70	16.70	31.70	37.70	43.70	49.70	55.70	72.00
0.00	740.63	1185.22	1529.80	2263.55	2377.05	2310.55	2064.05	1637.55	0.00
0.00	6.80	11.80	16.80	31.80	37.80	43.80	49.80	55.80	72.00
0.00	749.51	1192.64	1535.76	2265.14	2376.89	2308.64	2060.39	1632.14	0.00
0.00	6.90	11.90	16.90	31.90	37.90	43.90	49.90	55.90	72.00
0.00	758.33	1200.00	1541.67	2266.67	2376.67	2306.67	2056.67	1626.67	0.00
0.00	7.00	12.00	17.00	32.00	38.00	44.00	50.00	56.00	72.00
0.00	767.10	1207.30	1547.51	2268.14	2376.39	2304.64	2052.89	1621.14	0.00
0.00	7.10	12.10	17.10	32.10	38.10	44.10	50.10	56.10	72.00
0.00	1,418.33	1,626.67	1,735.00	1,760.00	1,590.00	1,240.00	710.00	0.00	0.00
0.00	23.00	28.00	33.00	48.00	54.00	60.00	66.00	72.00	72.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 62' Span, Axles 2-9**

Axle	Load (ST)	Load (kips)	Distance		SI / Metric Units	
			btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00	0.00	0.00	0.00	0
2	10.00	20.00		0.00	88.96	0
3	10.00	20.00	5.00	5.00	88.96	152
4	10.00	20.00	5.00	10.00	88.96	305
5	15.00	30.00	15.00	25.00	133.45	762
6	15.00	30.00	6.00	31.00	133.45	945
7	15.00	30.00	6.00	37.00	133.45	1128
8	15.00	30.00	6.00	43.00	133.45	1311
(Rear) 9	15.00	30.00	6.00	49.00	133.45	1494
<b>Totals</b>	<b>105.00</b>	<b>210.00</b>	<b>49.00</b>		<b>934.1</b>	
			Resultant at location:		<b>27.857</b>	<b>849</b>



**70 ft Span Length**

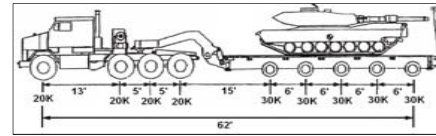
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	5.00	10.00	10.00	25.00	31.00	37.00	43.00	49.00	21.00
5.50	10.50	15.50	15.50	30.50	36.50	42.50	48.50	54.50	15.50
5.60	10.60	15.60	15.60	30.60	36.60	42.60	48.60	54.60	15.40
5.70	10.70	15.70	15.70	30.70	36.70	42.70	48.70	54.70	15.30
5.80	10.80	15.80	15.80	30.80	36.80	42.80	48.80	54.80	15.20
5.90	10.90	15.90	15.90	30.90	36.90	42.90	48.90	54.90	15.10
6.00	11.00	16.00	16.00	31.00	37.00	43.00	49.00	55.00	15.00
6.10	11.10	16.10	16.10	31.10	37.10	43.10	49.10	55.10	14.90
21.00	26.00	31.00	31.00	46.00	52.00	58.00	64.00	70.00	0.00

Shear at React A, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
126.43	106.43	86.43	66.43	36.43	6.43	-23.57	-53.57	-83.57	83.57
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	70.00
109.93	89.93	69.93	49.93	19.93	-10.07	-40.07	-70.07	-100.07	100.07
0.00	5.50	10.50	15.50	30.50	36.50	42.50	48.50	54.50	70.00
109.63	89.63	69.63	49.63	19.63	-10.37	-40.37	-70.37	-100.37	100.37
0.00	5.60	10.60	15.60	30.60	36.60	42.60	48.60	54.60	70.00
109.33	89.33	69.33	49.33	19.33	-10.67	-40.67	-70.67	-100.67	100.67
0.00	5.70	10.70	15.70	30.70	36.70	42.70	48.70	54.70	70.00
109.03	89.03	69.03	49.03	19.03	-10.97	-40.97	-70.97	-100.97	100.97
0.00	5.80	10.80	15.80	30.80	36.80	42.80	48.80	54.80	70.00
108.73	88.73	68.73	48.73	18.73	-11.27	-41.27	-71.27	-101.27	101.27
0.00	5.90	10.90	15.90	30.90	36.90	42.90	48.90	54.90	70.00
108.43	88.43	68.43	48.43	18.43	-11.57	-41.57	-71.57	-101.57	101.57
0.00	6.00	11.00	16.00	31.00	37.00	43.00	49.00	55.00	70.00
108.13	88.13	68.13	48.13	18.13	-11.87	-41.87	-71.87	-101.87	101.87
0.00	6.10	11.10	16.10	31.10	37.10	43.10	49.10	55.10	70.00
63.43	43.43	23.43	3.43	-26.57	-56.57	-86.57	-116.57	-146.57	146.57
0.00	21.00	26.00	31.00	46.00	52.00	58.00	64.00	70.00	70.00

React A, ft-kips	Moment at #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	532.14	964.29	1960.71	2179.29	2217.86	2076.43	1755.00	0.00
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	70.00
0.00	604.61	1054.25	1403.89	2152.82	2272.39	2211.96	1971.54	1551.11	0.00
0.00	5.50	10.50	15.50	30.50	36.50	42.50	48.50	54.50	70.00
0.00	613.92	1062.06	1410.21	2154.63	2272.41	2210.18	1967.95	1545.72	0.00
0.00	5.60	10.60	15.60	30.60	36.60	42.60	48.60	54.60	70.00
0.00	623.17	1069.82	1416.46	2156.39	2272.36	2208.33	1964.30	1540.27	0.00
0.00	5.70	10.70	15.70	30.70	36.70	42.70	48.70	54.70	70.00
0.00	632.37	1077.51	1422.65	2158.08	2272.25	2206.42	1960.59	1534.77	0.00
0.00	5.80	10.80	15.80	30.80	36.80	42.80	48.80	54.80	70.00
0.00	641.50	1085.14	1428.78	2159.71	2272.08	2204.46	1956.83	1529.20	0.00
0.00	5.90	10.90	15.90	30.90	36.90	42.90	48.90	54.90	70.00
0.00	650.57	1092.71	1434.86	2161.29	2271.86	2202.43	1953.00	1523.57	0.00
0.00	6.00	11.00	16.00	31.00	37.00	43.00	49.00	55.00	70.00
0.00	659.58	1100.23	1440.87	2162.80	2271.57	2200.34	1949.11	1517.88	0.00
0.00	6.10	11.10	16.10	31.10	37.10	43.10	49.10	55.10	70.00
0.00	1,332.00	1,549.14	1,666.29	1,717.71	1,558.29	1,218.86	699.43	0.00	0.00
0.00	21.00	26.00	31.00	46.00	52.00	58.00	64.00	70.00	70.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 62' Span, Axles 2-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00	0.00	0.00	0.00	0
2	10.00	20.00	0.00	0.00	88.96	0
3	10.00	20.00	5.00	5.00	88.96	152
4	10.00	20.00	5.00	10.00	88.96	305
5	15.00	30.00	15.00	25.00	133.45	762
6	15.00	30.00	6.00	31.00	133.45	945
7	15.00	30.00	6.00	37.00	133.45	1128
8	15.00	30.00	6.00	43.00	133.45	1311
(Rear) 9	15.00	30.00	6.00	49.00	133.45	1494
<b>Totals</b>	<b>105.00</b>	<b>210.00</b>	<b>49.00</b>			
Resultant at location:				<b>27.857</b>		<b>849</b>



**65 ft Span Length**

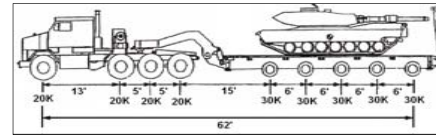
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	5.00	10.00	10.00	25.00	31.00	37.00	43.00	49.00	16.00
3.00	8.00	13.00	28.00	34.00	40.00	46.00	52.00	13.00	
3.10	8.10	13.10	28.10	34.10	40.10	46.10	52.10	12.90	
3.20	8.20	13.20	28.20	34.20	40.20	46.20	52.20	12.80	
3.30	8.30	13.30	28.30	34.30	40.30	46.30	52.30	12.70	
3.40	8.40	13.40	28.40	34.40	40.40	46.40	52.40	12.60	
3.50	8.50	13.50	28.50	34.50	40.50	46.50	52.50	12.50	
3.60	8.60	13.60	28.60	34.60	40.60	46.60	52.60	12.40	
16.00	21.00	26.00	41.00	47.00	53.00	59.00	65.00	0.00	

Shear at React A, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
120.00	100.00	80.00	60.00	30.00	0.00	-30.00	-60.00	-90.00	90.00
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	65.00
110.31	90.31	70.31	50.31	20.31	-9.69	-39.69	-69.69	-99.69	99.69
0.00	3.00	8.00	13.00	28.00	34.00	40.00	46.00	52.00	65.00
109.98	89.98	69.98	49.98	19.98	-10.02	-40.02	-70.02	-100.02	100.02
0.00	3.10	8.10	13.10	28.10	34.10	40.10	46.10	52.10	65.00
109.66	89.66	69.66	49.66	19.66	-10.34	-40.34	-70.34	-100.34	100.34
0.00	3.20	8.20	13.20	28.20	34.20	40.20	46.20	52.20	65.00
109.34	89.34	69.34	49.34	19.34	-10.66	-40.66	-70.66	-100.66	100.66
0.00	3.30	8.30	13.30	28.30	34.30	40.30	46.30	52.30	65.00
109.02	89.02	69.02	49.02	19.02	-10.98	-40.98	-70.98	-100.98	100.98
0.00	3.40	8.40	13.40	28.40	34.40	40.40	46.40	52.40	65.00
108.69	88.69	68.69	48.69	18.69	-11.31	-41.31	-71.31	-101.31	101.31
0.00	3.50	8.50	13.50	28.50	34.50	40.50	46.50	52.50	65.00
108.37	88.37	68.37	48.37	18.37	-11.63	-41.63	-71.63	-101.63	101.63
0.00	3.60	8.60	13.60	28.60	34.60	40.60	46.60	52.60	65.00
68.31	48.31	28.31	8.31	-21.69	-51.69	-81.69	-111.69	-141.69	141.69
0.00	16.00	21.00	26.00	41.00	47.00	53.00	59.00	65.00	65.00

Moment at React A, ft-kips	Moment at #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	500.00	900.00	1800.00	1980.00	1980.00	1800.00	1440.00	0.00
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	65.00
0.00	330.92	782.46	1134.00	1888.62	2010.46	1952.31	1714.15	1296.00	0.00
0.00	3.00	8.00	13.00	28.00	34.00	40.00	46.00	52.00	65.00
0.00	340.95	790.88	1140.80	1890.57	2010.48	1950.38	1710.29	1290.20	0.00
0.00	3.10	8.10	13.10	28.10	34.10	40.10	46.10	52.10	65.00
0.00	350.92	799.22	1147.53	1892.46	2010.42	1948.39	1706.36	1284.33	0.00
0.00	3.20	8.20	13.20	28.20	34.20	40.20	46.20	52.20	65.00
0.00	360.82	807.51	1154.20	1894.28	2010.31	1946.34	1702.37	1278.40	0.00
0.00	3.30	8.30	13.30	28.30	34.30	40.30	46.30	52.30	65.00
0.00	370.65	815.73	1160.81	1896.04	2010.13	1944.22	1698.31	1272.41	0.00
0.00	3.40	8.40	13.40	28.40	34.40	40.40	46.40	52.40	65.00
0.00	380.42	823.88	1167.35	1897.73	2009.88	1942.04	1694.19	1266.35	0.00
0.00	3.50	8.50	13.50	28.50	34.50	40.50	46.50	52.50	65.00
0.00	390.13	831.98	1173.82	1899.36	2009.58	1939.79	1690.01	1260.22	0.00
0.00	3.60	8.60	13.60	28.60	34.60	40.60	46.60	52.60	65.00
0.00	1,092.92	1,334.46	1,476.00	1,600.62	1,470.46	1,160.31	670.15	0.00	0.00
0.00	16.00	21.00	26.00	41.00	47.00	53.00	59.00	65.00	65.00

**NINE (9) AXLE One (1x) Proposed Standard HET (Alternative Military Live Load), 62' Span, Axles 2-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00	0.00	0.00	0.00	0
2	10.00	20.00	0.00	0.00	88.96	0
3	10.00	20.00	5.00	5.00	88.96	152
4	10.00	20.00	5.00	10.00	88.96	305
5	15.00	30.00	15.00	25.00	133.45	762
6	15.00	30.00	6.00	31.00	133.45	945
7	15.00	30.00	6.00	37.00	133.45	1128
8	15.00	30.00	6.00	43.00	133.45	1311
(Rear) 9	15.00	30.00	6.00	49.00	133.45	1494
<b>Totals</b>	<b>105.00</b>	<b>210.00</b>	<b>49.00</b>			
Resultant at location:				<b>27.857</b>		<b>849</b>



**62 ft Span Length**

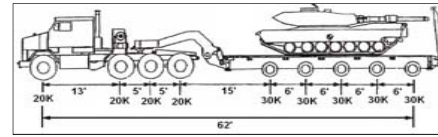
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	5.00	10.00	10.00	25.00	31.00	37.00	43.00	49.00	13.00
1.30	6.30	11.30	26.30	32.30	38.30	44.30	50.30	56.30	11.70
1.40	6.40	11.40	26.40	32.40	38.40	44.40	50.40	56.40	11.60
1.50	6.50	11.50	26.50	32.50	38.50	44.50	50.50	56.50	11.50
1.60	6.60	11.60	26.60	32.60	38.60	44.60	50.60	56.60	11.40
1.70	6.70	11.70	26.70	32.70	38.70	44.70	50.70	56.70	11.30
1.80	6.80	11.80	26.80	32.80	38.80	44.80	50.80	56.80	11.20
1.90	6.90	11.90	26.90	32.90	38.90	44.90	50.90	56.90	11.10
13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	0.00	

Shear at React A, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
115.65	95.65	75.65	55.65	25.65	-4.35	-34.35	-64.35	-94.35	94.35
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	62.00
111.24	91.24	71.24	51.24	21.24	-8.76	-38.76	-68.76	-98.76	98.76
0.00	1.30	6.30	11.30	26.30	32.30	38.30	44.30	50.30	62.00
110.90	90.90	70.90	50.90	20.90	-9.10	-39.10	-69.10	-99.10	99.10
0.00	1.40	6.40	11.40	26.40	32.40	38.40	44.40	50.40	62.00
110.56	90.56	70.56	50.56	20.56	-9.44	-39.44	-69.44	-99.44	99.44
0.00	1.50	6.50	11.50	26.50	32.50	38.50	44.50	50.50	62.00
110.23	90.23	70.23	50.23	20.23	-9.77	-39.77	-69.77	-99.77	99.77
0.00	1.60	6.60	11.60	26.60	32.60	38.60	44.60	50.60	62.00
109.89	89.89	69.89	49.89	19.89	-10.11	-40.11	-70.11	-100.11	100.11
0.00	1.70	6.70	11.70	26.70	32.70	38.70	44.70	50.70	62.00
109.55	89.55	69.55	49.55	19.55	-10.45	-40.45	-70.45	-100.45	100.45
0.00	1.80	6.80	11.80	26.80	32.80	38.80	44.80	50.80	62.00
109.21	89.21	69.21	49.21	19.21	-10.79	-40.79	-70.79	-100.79	100.79
0.00	1.90	6.90	11.90	26.90	32.90	38.90	44.90	50.90	62.00
71.61	51.61	31.61	11.61	-18.39	-48.39	-78.39	-108.39	-138.39	138.39
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	62.00

Moment at React A, ft-kips	Moment at #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	478.23	856.45	1691.13	1845.00	1818.87	1612.74	1226.61	0.0
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	62.00
0.00	144.61	600.82	957.03	1725.66	1853.11	1800.57	1568.02	1155.47	0.0
0.00	1.30	6.30	11.30	26.30	32.30	38.30	44.30	50.30	62.00
0.00	155.26	609.78	964.30	1727.85	1853.26	1798.68	1564.10	1149.52	0.0
0.00	1.40	6.40	11.40	26.40	32.40	38.40	44.40	50.40	62.00
0.00	165.85	618.67	971.49	1729.96	1853.35	1796.73	1560.12	1143.51	0.0
0.00	1.50	6.50	11.50	26.50	32.50	38.50	44.50	50.50	62.00
0.00	176.36	627.49	978.62	1732.01	1853.36	1794.72	1556.07	1137.43	0.00
0.00	1.60	6.60	11.60	26.60	32.60	38.60	44.60	50.60	62.00
0.00	186.81	636.24	985.68	1733.99	1853.31	1792.63	1551.95	1131.28	0.00
0.00	1.70	6.70	11.70	26.70	32.70	38.70	44.70	50.70	62.00
0.00	197.19	644.93	992.67	1735.90	1853.19	1790.48	1547.77	1125.06	0.00
0.00	1.80	6.80	11.80	26.80	32.80	38.80	44.80	50.80	62.00
0.00	207.50	653.55	999.60	1737.74	1853.00	1788.26	1543.51	1118.77	0.00
0.00	1.90	6.90	11.90	26.90	32.90	38.90	44.90	50.90	62.00
0.00	930.97	1189.03	1347.10	1521.29	1410.97	1120.65	650.32	0.00	0.00
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	62.00

**NINE (9) AXLE One (1x) Proposed Standard HET (Alternative Military Live Load), 60' Span, Axles 2-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00	0.00	0.00	0.00	0
2	10.00	20.00	0.00	0.00	88.96	0
3	10.00	20.00	5.00	5.00	88.96	152
4	10.00	20.00	5.00	10.00	88.96	305
5	15.00	30.00	15.00	25.00	133.45	762
6	15.00	30.00	6.00	31.00	133.45	945
7	15.00	30.00	6.00	37.00	133.45	1128
8	15.00	30.00	6.00	43.00	133.45	1311
(Rear) 9	15.00	30.00	6.00	49.00	133.45	1494
<b>Totals</b>	<b>105.00</b>	<b>210.00</b>	<b>49.00</b>			
Resultant at location:				<b>27.857</b>		<b>849</b>



**60 ft Span Length**

Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	5.00	10.00	10.00	25.00	31.00	37.00	43.00	49.00	11.00
0.40	5.40	10.40	10.40	25.40	31.40	37.40	43.40	49.40	10.60
0.50	5.50	10.50	10.50	25.50	31.50	37.50	43.50	49.50	10.50
0.60	5.60	10.60	10.60	25.60	31.60	37.60	43.60	49.60	10.40
0.70	5.70	10.70	10.70	25.70	31.70	37.70	43.70	49.70	10.30
0.80	5.80	10.80	10.80	25.80	31.80	37.80	43.80	49.80	10.20
0.90	5.90	10.90	10.90	25.90	31.90	37.90	43.90	49.90	10.10
1.00	6.00	11.00	11.00	26.00	32.00	38.00	44.00	50.00	10.00
11.00	16.00	21.00	21.00	36.00	42.00	48.00	54.00	60.00	0.00

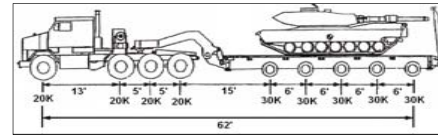
Shear at React A, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
112.50	92.50	72.50	52.50	22.50	-7.50	-37.50	-67.50	-97.50	97.50
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	60.00
111.10	91.10	71.10	51.10	21.10	-8.90	-38.90	-68.90	-98.90	98.90
0.00	0.40	5.40	10.40	25.40	31.40	37.40	43.40	49.40	60.00
110.75	90.75	70.75	50.75	20.75	-9.25	-39.25	-69.25	-99.25	99.25
0.00	0.50	5.50	10.50	25.50	31.50	37.50	43.50	49.50	60.00
110.40	90.40	70.40	50.40	20.40	-9.60	-39.60	-69.60	-99.60	99.60
0.00	0.60	5.60	10.60	25.60	31.60	37.60	43.60	49.60	60.00
110.05	90.05	70.05	50.05	20.05	-9.95	-39.95	-69.95	-99.95	99.95
0.00	0.70	5.70	10.70	25.70	31.70	37.70	43.70	49.70	60.00
109.70	89.70	69.70	49.70	19.70	-10.30	-40.30	-70.30	-100.30	100.30
0.00	0.80	5.80	10.80	25.80	31.80	37.80	43.80	49.80	60.00
109.35	89.35	69.35	49.35	19.35	-10.65	-40.65	-70.65	-100.65	100.65
0.00	0.90	5.90	10.90	25.90	31.90	37.90	43.90	49.90	60.00
109.00	89.00	69.00	49.00	19.00	-11.00	-41.00	-71.00	-101.00	101.00
0.00	1.00	6.00	11.00	26.00	32.00	38.00	44.00	50.00	60.00
74.00	54.00	34.00	14.00	-16.00	-46.00	-76.00	-106.00	-136.00	136.00
0.00	11.00	16.00	21.00	36.00	42.00	48.00	54.00	60.00	60.00

Moment at React A, ft-kips	Moment at #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	462.50	825.00	1612.50	1747.50	1702.50	1477.50	1072.50	0.0
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	60.00
0.00	44.44	499.94	855.44	1621.94	1748.54	1695.14	1461.74	1048.34	0.0
0.00	0.40	5.40	10.40	25.40	31.40	37.40	43.40	49.40	60.00
0.00	55.38	509.13	862.88	1624.13	1748.63	1693.13	1457.63	1042.13	0.0
0.00	0.50	5.50	10.50	25.50	31.50	37.50	43.50	49.50	60.00
0.00	66.24	518.24	870.24	1626.24	1748.64	1691.04	1453.44	1035.84	0.0
0.00	0.60	5.60	10.60	25.60	31.60	37.60	43.60	49.60	60.00
0.00	77.04	527.29	877.54	1628.29	1748.59	1688.89	1449.19	1029.49	0.00
0.00	0.70	5.70	10.70	25.70	31.70	37.70	43.70	49.70	60.00
0.00	87.76	536.26	884.76	1630.26	1748.46	1686.66	1444.86	1023.06	0.00
0.00	0.80	5.80	10.80	25.80	31.80	37.80	43.80	49.80	60.00
0.00	98.42	545.17	891.92	1632.17	1748.27	1684.37	1440.47	1016.57	0.00
0.00	0.90	5.90	10.90	25.90	31.90	37.90	43.90	49.90	60.00
0.00	109.00	554.00	899.00	1634.00	1748.00	1682.00	1436.00	1010.00	0.00
0.00	1.00	6.00	11.00	26.00	32.00	38.00	44.00	50.00	60.00
0.00	814.00	1,084.00	1,254.00	1,464.00	1,368.00	1,092.00	636.00	0.00	0.00
0.00	11.00	16.00	21.00	36.00	42.00	48.00	54.00	60.00	60.00



**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 55' Span, Axles 2-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00	0.00	0.00	0.00	0
2	10.00	20.00	0.00	0.00	88.96	0
3	10.00	20.00	5.00	5.00	88.96	152
4	10.00	20.00	5.00	10.00	88.96	305
5	15.00	30.00	15.00	25.00	133.45	762
6	15.00	30.00	6.00	31.00	133.45	945
7	15.00	30.00	6.00	37.00	133.45	1128
8	15.00	30.00	6.00	43.00	133.45	1311
(Rear) 9	15.00	30.00	6.00	49.00	133.45	1494
<b>Totals</b>	<b>105.00</b>	<b>210.00</b>	<b>49.00</b>			
Resultant at location:				<b>27.857</b>		<b>849</b>



**55 ft Span Length**

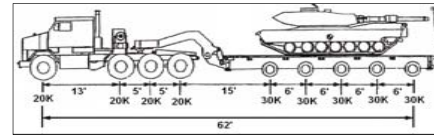
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	5.00	10.00	10.00	25.00	31.00	37.00	43.00	49.00	6.00
0.10	5.10	10.10	10.10	25.10	31.10	37.10	43.10	49.10	5.90
0.20	5.20	10.20	10.20	25.20	31.20	37.20	43.20	49.20	5.80
0.30	5.30	10.30	10.30	25.30	31.30	37.30	43.30	49.30	5.70
0.40	5.40	10.40	10.40	25.40	31.40	37.40	43.40	49.40	5.60
0.50	5.50	10.50	10.50	25.50	31.50	37.50	43.50	49.50	5.50
0.60	5.60	10.60	10.60	25.60	31.60	37.60	43.60	49.60	5.40
0.70	5.70	10.70	10.70	25.70	31.70	37.70	43.70	49.70	5.30
0.80	5.80	10.80	10.80	25.80	31.80	37.80	43.80	49.80	5.20
0.90	5.90	10.90	10.90	25.90	31.90	37.90	43.90	49.90	5.10
1.00	6.00	11.00	11.00	26.00	32.00	38.00	44.00	50.00	5.00

Shear at React A, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
103.64	83.64	63.64	43.64	13.64	-16.36	-46.36	-76.36	-106.36	106.36
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	55.00
103.25	83.25	63.25	43.25	13.25	-16.75	-46.75	-76.75	-106.75	106.75
0.00	0.10	5.10	10.10	25.10	31.10	37.10	43.10	49.10	55.00
102.87	82.87	62.87	42.87	12.87	-17.13	-47.13	-77.13	-107.13	107.13
0.00	0.20	5.20	10.20	25.20	31.20	37.20	43.20	49.20	55.00
102.49	82.49	62.49	42.49	12.49	-17.51	-47.51	-77.51	-107.51	107.51
0.00	0.30	5.30	10.30	25.30	31.30	37.30	43.30	49.30	55.00
102.11	82.11	62.11	42.11	12.11	-17.89	-47.89	-77.89	-107.89	107.89
0.00	0.40	5.40	10.40	25.40	31.40	37.40	43.40	49.40	55.00
101.73	81.73	61.73	41.73	11.73	-18.27	-48.27	-78.27	-108.27	108.27
0.00	0.50	5.50	10.50	25.50	31.50	37.50	43.50	49.50	55.00
101.35	81.35	61.35	41.35	11.35	-18.65	-48.65	-78.65	-108.65	108.65
0.00	0.60	5.60	10.60	25.60	31.60	37.60	43.60	49.60	55.00
100.96	80.96	60.96	40.96	10.96	-19.04	-49.04	-79.04	-109.04	109.04
0.00	0.70	5.70	10.70	25.70	31.70	37.70	43.70	49.70	55.00
80.73	60.73	40.73	20.73	-9.27	-39.27	-69.27	-99.27	-129.27	129.27
0.00	0.80	5.80	10.80	25.80	31.80	37.80	43.80	49.80	55.00
0.00	0.90	5.90	10.90	25.90	31.90	37.90	43.90	49.90	55.00

Moment at React A, ft-kips	Moment at #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	418.18	736.36	1390.91	1472.73	1374.55	1096.36	638.18	0.0
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	55.00
0.00	10.33	426.60	742.87	1391.69	1471.22	1370.74	1090.27	629.80	0.0
0.00	0.10	5.10	10.10	25.10	31.10	37.10	43.10	49.10	55.00
0.00	20.57	434.94	749.30	1392.39	1469.63	1366.87	1084.10	621.34	0.0
0.00	0.20	5.20	10.20	25.20	31.20	37.20	43.20	49.20	55.00
0.00	30.75	443.20	755.66	1393.02	1467.97	1362.91	1077.86	612.80	0.0
0.00	0.30	5.30	10.30	25.30	31.30	37.30	43.30	49.30	55.00
0.00	40.84	451.39	761.93	1393.57	1466.23	1358.88	1071.53	604.19	0.0
0.00	0.40	5.40	10.40	25.40	31.40	37.40	43.40	49.40	55.00
0.00	50.86	459.50	768.14	1394.05	1464.41	1354.77	1065.14	595.50	0.0
0.00	0.50	5.50	10.50	25.50	31.50	37.50	43.50	49.50	55.00
0.00	60.81	467.53	774.26	1394.44	1462.52	1350.59	1058.66	586.73	0.0
0.00	0.60	5.60	10.60	25.60	31.60	37.60	43.60	49.60	55.00
0.00	70.67	475.49	780.31	1394.77	1460.55	1346.33	1052.11	577.89	0.0
0.00	0.70	5.70	10.70	25.70	31.70	37.70	43.70	49.70	55.00
0.00	484.36	788.00	991.64	1302.55	1246.91	1011.27	595.64	0.00	0.00
0.00	6.00	11.00	16.00	31.00	37.00	43.00	49.00	55.00	55.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 53.25' Span, Axles 2-9**

Axle	Load (ST)	Load (kips)	Distance		SI / Metric Units	
			btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00	0.00	0.00	0.00	0
2	10.00	20.00		0.00	88.96	0
3	10.00	20.00	5.00	5.00	88.96	152
4	10.00	20.00	5.00	10.00	88.96	305
5	15.00	30.00	15.00	25.00	133.45	762
6	15.00	30.00	6.00	31.00	133.45	945
7	15.00	30.00	6.00	37.00	133.45	1128
8	15.00	30.00	6.00	43.00	133.45	1311
(Rear) 9	15.00	30.00	6.00	49.00	133.45	1494
<b>Totals</b>	<b>105.00</b>	<b>210.00</b>	<b>49.00</b>			
Resultant at location:				<b>27.857</b>		<b>849</b>



**53.25 ft Span Length**

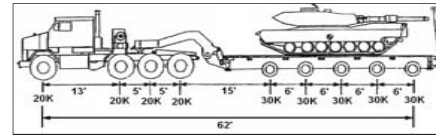
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	4.25	
0.10	5.10	10.10	25.10	31.10	37.10	43.10	49.10	4.15	
0.20	5.20	10.20	25.20	31.20	37.20	43.20	49.20	4.05	
0.30	5.30	10.30	25.30	31.30	37.30	43.30	49.30	3.95	
0.40	5.40	10.40	25.40	31.40	37.40	43.40	49.40	3.85	
0.50	5.50	10.50	25.50	31.50	37.50	43.50	49.50	3.75	
0.60	5.60	10.60	25.60	31.60	37.60	43.60	49.60	3.65	
0.70	5.70	10.70	25.70	31.70	37.70	43.70	49.70	3.55	
4.25	9.25	14.25	29.25	35.25	41.25	47.25	53.25	0.00	

Shear at React A, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
100.14	80.14	60.14	40.14	10.14	-19.86	-49.86	-79.86	-109.86	109.86
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	53.25
99.75	79.75	59.75	39.75	9.75	-20.25	-50.25	-80.25	-110.25	110.25
0.00	0.10	5.10	10.10	25.10	31.10	37.10	43.10	49.10	53.25
99.35	79.35	59.35	39.35	9.35	-20.65	-50.65	-80.65	-110.65	110.65
0.00	0.20	5.20	10.20	25.20	31.20	37.20	43.20	49.20	53.25
98.96	78.96	58.96	38.96	8.96	-21.04	-51.04	-81.04	-111.04	111.04
0.00	0.30	5.30	10.30	25.30	31.30	37.30	43.30	49.30	53.25
98.56	78.56	58.56	38.56	8.56	-21.44	-51.44	-81.44	-111.44	111.44
0.00	0.40	5.40	10.40	25.40	31.40	37.40	43.40	49.40	53.25
98.17	78.17	58.17	38.17	8.17	-21.83	-51.83	-81.83	-111.83	111.83
0.00	0.50	5.50	10.50	25.50	31.50	37.50	43.50	49.50	53.25
97.77	77.77	57.77	37.77	7.77	-22.23	-52.23	-82.23	-112.23	112.23
0.00	0.60	5.60	10.60	25.60	31.60	37.60	43.60	49.60	53.25
97.38	77.38	57.38	37.38	7.38	-22.62	-52.62	-82.62	-112.62	112.62
0.00	0.70	5.70	10.70	25.70	31.70	37.70	43.70	49.70	53.25
83.38	63.38	43.38	23.38	-6.62	-36.62	-66.62	-96.62	-126.62	126.62
0.00	4.25	9.25	14.25	29.25	35.25	41.25	47.25	53.25	53.25

Moment at React A, ft-kips	Moment at #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	400.70	701.41	1303.52	1364.37	1245.21	946.06	466.90	0.0
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	53.25
0.00	9.97	408.71	707.44	1303.64	1362.12	1240.59	939.07	457.55	0.0
0.00	0.10	5.10	10.10	25.10	31.10	37.10	43.10	49.10	53.25
0.00	19.87	416.63	713.39	1303.67	1359.79	1235.90	932.01	448.12	0.0
0.00	0.20	5.20	10.20	25.20	31.20	37.20	43.20	49.20	53.25
0.00	29.69	424.48	719.26	1303.63	1357.38	1231.12	924.87	438.62	0.0
0.00	0.30	5.30	10.30	25.30	31.30	37.30	43.30	49.30	53.25
0.00	39.43	432.24	725.06	1303.51	1354.89	1226.27	917.65	429.03	0.00
0.00	0.40	5.40	10.40	25.40	31.40	37.40	43.40	49.40	53.25
0.00	49.08	439.93	730.77	1303.31	1352.32	1221.34	910.35	419.37	0.00
0.00	0.50	5.50	10.50	25.50	31.50	37.50	43.50	49.50	53.25
0.00	58.66	447.54	736.41	1303.03	1349.68	1216.33	902.97	409.62	0.00
0.00	0.60	5.60	10.60	25.60	31.60	37.60	43.60	49.60	53.25
0.00	68.17	455.07	741.97	1302.67	1346.95	1211.24	895.52	399.80	0.00
0.00	0.70	5.70	10.70	25.70	31.70	37.70	43.70	49.70	53.25
0.00	354.37	671.27	888.17	1238.87	1199.15	979.44	579.72	0.00	0.00
0.00	4.25	9.25	14.25	29.25	35.25	41.25	47.25	53.25	53.25

**NINE (9) AXLE One (1x) Proposed Standard HET (Alternative Military Live Load), 52' Span, Axles 2-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00	0.00	0.00	0.00	0
2	10.00	20.00	0.00	0.00	88.96	0
3	10.00	20.00	5.00	5.00	88.96	152
4	10.00	20.00	5.00	10.00	88.96	305
5	15.00	30.00	15.00	25.00	133.45	762
6	15.00	30.00	6.00	31.00	133.45	945
7	15.00	30.00	6.00	37.00	133.45	1128
8	15.00	30.00	6.00	43.00	133.45	1311
(Rear) 9	15.00	30.00	6.00	49.00	133.45	1494
<b>Totals</b>	<b>105.00</b>	<b>210.00</b>	<b>49.00</b>			
Resultant at location:				<b>27.857</b>		<b>849</b>



**52 ft Span Length**

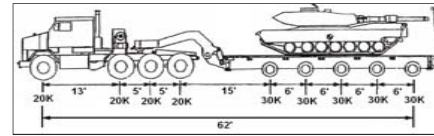
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	5.00	10.00	10.00	25.00	31.00	37.00	43.00	49.00	3.00
0.10	5.10	10.10	10.10	25.10	31.10	37.10	43.10	49.10	2.90
0.20	5.20	10.20	10.20	25.20	31.20	37.20	43.20	49.20	2.80
0.30	5.30	10.30	10.30	25.30	31.30	37.30	43.30	49.30	2.70
0.40	5.40	10.40	10.40	25.40	31.40	37.40	43.40	49.40	2.60
0.50	5.50	10.50	10.50	25.50	31.50	37.50	43.50	49.50	2.50
0.60	5.60	10.60	10.60	25.60	31.60	37.60	43.60	49.60	2.40
0.70	5.70	10.70	10.70	25.70	31.70	37.70	43.70	49.70	2.30
3.00	8.00	13.00	13.00	28.00	34.00	40.00	46.00	52.00	0.00

Shear at React A, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
97.50	77.50	57.50	37.50	7.50	-22.50	-52.50	-82.50	-112.50	112.50
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	52.00
97.10	77.10	57.10	37.10	7.10	-22.90	-52.90	-82.90	-112.90	112.90
0.00	0.10	5.10	10.10	25.10	31.10	37.10	43.10	49.10	52.00
96.69	76.69	56.69	36.69	6.69	-23.31	-53.31	-83.31	-113.31	113.31
0.00	0.20	5.20	10.20	25.20	31.20	37.20	43.20	49.20	52.00
96.29	76.29	56.29	36.29	6.29	-23.71	-53.71	-83.71	-113.71	113.71
0.00	0.30	5.30	10.30	25.30	31.30	37.30	43.30	49.30	52.00
95.88	75.88	55.88	35.88	5.88	-24.12	-54.12	-84.12	-114.12	114.12
0.00	0.40	5.40	10.40	25.40	31.40	37.40	43.40	49.40	52.00
95.48	75.48	55.48	35.48	5.48	-24.52	-54.52	-84.52	-114.52	114.52
0.00	0.50	5.50	10.50	25.50	31.50	37.50	43.50	49.50	52.00
95.08	75.08	55.08	35.08	5.08	-24.92	-54.92	-84.92	-114.92	114.92
0.00	0.60	5.60	10.60	25.60	31.60	37.60	43.60	49.60	52.00
94.67	74.67	54.67	34.67	4.67	-25.33	-55.33	-85.33	-115.33	115.33
0.00	0.70	5.70	10.70	25.70	31.70	37.70	43.70	49.70	52.00
85.38	65.38	45.38	25.38	-4.62	-34.62	-64.62	-94.62	-124.62	124.62
0.00	3.00	8.00	13.00	28.00	34.00	40.00	46.00	52.00	52.00

Moment at React A, ft-kips	Moment at #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	387.50	675.00	1237.50	1282.50	1147.50	832.50	337.50	0.0
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	52.00
0.00	9.71	395.19	680.67	1237.11	1279.69	1142.27	824.84	327.42	0.0
0.00	0.10	5.10	10.10	25.10	31.10	37.10	43.10	49.10	52.00
0.00	19.34	402.80	686.26	1236.65	1276.80	1136.95	817.11	317.26	0.0
0.00	0.20	5.20	10.20	25.20	31.20	37.20	43.20	49.20	52.00
0.00	28.89	410.33	691.77	1236.10	1273.83	1131.56	809.29	307.02	0.0
0.00	0.30	5.30	10.30	25.30	31.30	37.30	43.30	49.30	52.00
0.00	38.35	417.78	697.20	1235.47	1270.78	1126.08	801.39	296.70	0.0
0.00	0.40	5.40	10.40	25.40	31.40	37.40	43.40	49.40	52.00
0.00	47.74	425.14	702.55	1234.76	1267.64	1120.53	793.41	286.30	0.0
0.00	0.50	5.50	10.50	25.50	31.50	37.50	43.50	49.50	52.00
0.00	57.05	432.43	707.82	1233.97	1264.43	1114.89	785.35	275.82	0.0
0.00	0.60	5.60	10.60	25.60	31.60	37.60	43.60	49.60	52.00
0.00	66.27	439.64	713.00	1233.10	1261.14	1109.18	777.21	265.25	0.0
0.00	0.70	5.70	10.70	25.70	31.70	37.70	43.70	49.70	52.00
0.00	256.15	583.08	810.00	1190.77	1163.08	955.38	567.69	0.00	0.00
0.00	3.00	8.00	13.00	28.00	34.00	40.00	46.00	52.00	52.00

**NINE (9) AXLE One (1x) Proposed Standard HET (Alternative Military Live Load), 50' Span, Axles 2-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00	0.00	0.00	0.00	0
2	10.00	20.00	0.00	0.00	88.96	0
3	10.00	20.00	5.00	5.00	88.96	152
4	10.00	20.00	5.00	10.00	88.96	305
5	15.00	30.00	15.00	25.00	133.45	762
6	15.00	30.00	6.00	31.00	133.45	945
7	15.00	30.00	6.00	37.00	133.45	1128
8	15.00	30.00	6.00	43.00	133.45	1311
(Rear) 9	15.00	30.00	6.00	49.00	133.45	1494
<b>Totals</b>	<b>105.00</b>	<b>210.00</b>	<b>49.00</b>			
Resultant at location:				<b>27.857</b>		<b>849</b>



**50 ft Span Length**

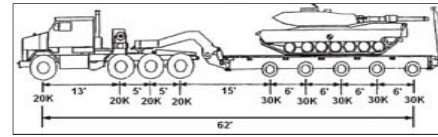
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	5.00	10.00	10.00	25.00	31.00	37.00	43.00	49.00	1.00
0.10	5.10	10.10	10.10	25.10	31.10	37.10	43.10	49.10	0.90
0.20	5.20	10.20	10.20	25.20	31.20	37.20	43.20	49.20	0.80
0.30	5.30	10.30	10.30	25.30	31.30	37.30	43.30	49.30	0.70
0.40	5.40	10.40	10.40	25.40	31.40	37.40	43.40	49.40	0.60
0.50	5.50	10.50	10.50	25.50	31.50	37.50	43.50	49.50	0.50
0.60	5.60	10.60	10.60	25.60	31.60	37.60	43.60	49.60	0.40
0.70	5.70	10.70	10.70	25.70	31.70	37.70	43.70	49.70	0.30
1.00	6.00	11.00	11.00	26.00	32.00	38.00	44.00	50.00	0.00

Shear at React A, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
93.00	73.00	53.00	33.00	3.00	-27.00	-57.00	-87.00	-117.00	117.00
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	50.00
92.58	72.58	52.58	32.58	2.58	-27.42	-57.42	-87.42	-117.42	117.42
0.00	0.10	5.10	10.10	25.10	31.10	37.10	43.10	49.10	50.00
92.16	72.16	52.16	32.16	2.16	-27.84	-57.84	-87.84	-117.84	117.84
0.00	0.20	5.20	10.20	25.20	31.20	37.20	43.20	49.20	50.00
91.74	71.74	51.74	31.74	1.74	-28.26	-58.26	-88.26	-118.26	118.26
0.00	0.30	5.30	10.30	25.30	31.30	37.30	43.30	49.30	50.00
91.32	71.32	51.32	31.32	1.32	-28.68	-58.68	-88.68	-118.68	118.68
0.00	0.40	5.40	10.40	25.40	31.40	37.40	43.40	49.40	50.00
90.90	70.90	50.90	30.90	0.90	-29.10	-59.10	-89.10	-119.10	119.10
0.00	0.50	5.50	10.50	25.50	31.50	37.50	43.50	49.50	50.00
90.48	70.48	50.48	30.48	0.48	-29.52	-59.52	-89.52	-119.52	119.52
0.00	0.60	5.60	10.60	25.60	31.60	37.60	43.60	49.60	50.00
90.06	70.06	50.06	30.06	0.06	-29.94	-59.94	-89.94	-119.94	119.94
0.00	0.70	5.70	10.70	25.70	31.70	37.70	43.70	49.70	50.00
88.80	68.80	48.80	28.80	-1.20	-31.20	-61.20	-91.20	-121.20	121.20
0.00	1.00	6.00	11.00	26.00	32.00	38.00	44.00	50.00	50.00

Moment at React A, ft-kips	Moment at #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	365.00	630.00	1125.00	1143.00	981.00	639.00	117.00	0.0
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	50.00
0.00	9.26	372.16	635.06	1123.76	1139.24	974.72	630.20	105.68	0.0
0.00	0.10	5.10	10.10	25.10	31.10	37.10	43.10	49.10	50.00
0.00	18.43	379.23	640.03	1122.43	1135.39	968.35	621.31	94.27	0.0
0.00	0.20	5.20	10.20	25.20	31.20	37.20	43.20	49.20	50.00
0.00	27.52	386.22	644.92	1121.02	1131.46	961.90	612.34	82.78	0.0
0.00	0.30	5.30	10.30	25.30	31.30	37.30	43.30	49.30	50.00
0.00	36.53	393.13	649.73	1119.53	1127.45	955.37	603.29	71.21	0.00
0.00	0.40	5.40	10.40	25.40	31.40	37.40	43.40	49.40	50.00
0.00	45.45	399.95	654.45	1117.95	1123.35	948.75	594.15	59.55	0.00
0.00	0.50	5.50	10.50	25.50	31.50	37.50	43.50	49.50	50.00
0.00	54.29	406.69	659.09	1116.29	1119.17	942.05	584.93	47.81	0.00
0.00	0.60	5.60	10.60	25.60	31.60	37.60	43.60	49.60	50.00
0.00	63.04	413.34	663.64	1114.54	1114.90	935.26	575.62	35.98	0.00
0.00	0.70	5.70	10.70	25.70	31.70	37.70	43.70	49.70	50.00
0.00	88.80	432.80	676.80	1108.80	1101.60	914.40	547.20	0.00	0.00
0.00	1.00	6.00	11.00	26.00	32.00	38.00	44.00	50.00	50.00

**NINE (9) AXLE One (1x) Proposed Standard HET (Alternative Military Live Load), 49' Span, Axles 2-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00	0.00	0.00	0.00	0
2	10.00	20.00	0.00	0.00	88.96	0
3	10.00	20.00	5.00	5.00	88.96	152
4	10.00	20.00	5.00	10.00	88.96	305
5	15.00	30.00	15.00	25.00	133.45	762
6	15.00	30.00	6.00	31.00	133.45	945
7	15.00	30.00	6.00	37.00	133.45	1128
8	15.00	30.00	6.00	43.00	133.45	1311
(Rear) 9	15.00	30.00	6.00	49.00	133.45	1494
<b>Totals</b>	<b>105.00</b>	<b>210.00</b>	<b>49.00</b>			
			<b>Resultant at location:</b>	<b>27.857</b>		<b>849</b>



**49 ft Span Length**

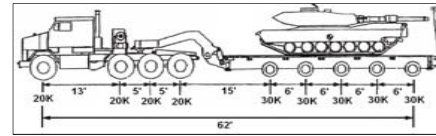
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
0.00	5.00	10.00	10.00	25.00	31.00	37.00	43.00	49.00	0.00
0.10	5.10	10.10	10.10	25.10	31.10	37.10	43.10	49.10	-0.10
0.20	5.20	10.20	10.20	25.20	31.20	37.20	43.20	49.20	-0.20
0.30	5.30	10.30	10.30	25.30	31.30	37.30	43.30	49.30	-0.30
0.40	5.40	10.40	10.40	25.40	31.40	37.40	43.40	49.40	-0.40
0.50	5.50	10.50	10.50	25.50	31.50	37.50	43.50	49.50	-0.50
0.60	5.60	10.60	10.60	25.60	31.60	37.60	43.60	49.60	-0.60
0.70	5.70	10.70	10.70	25.70	31.70	37.70	43.70	49.70	-0.70
0.00	5.00	10.00	10.00	25.00	31.00	37.00	43.00	49.00	0.00

Shear at React A, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
90.61	70.61	50.61	30.61	0.61	-29.39	-59.39	-89.39	-119.39	119.39
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	49.00
90.18	70.18	50.18	30.18	0.18	-29.82	-59.82	-89.82	-119.82	119.82
0.00	0.10	5.10	10.10	25.10	31.10	37.10	43.10	49.10	49.00
89.76	69.76	49.76	29.76	-0.24	-30.24	-60.24	-90.24	-120.24	120.24
0.00	0.20	5.20	10.20	25.20	31.20	37.20	43.20	49.20	49.00
89.33	69.33	49.33	29.33	-0.67	-30.67	-60.67	-90.67	-120.67	120.67
0.00	0.30	5.30	10.30	25.30	31.30	37.30	43.30	49.30	49.00
88.90	68.90	48.90	28.90	-1.10	-31.10	-61.10	-91.10	-121.10	121.10
0.00	0.40	5.40	10.40	25.40	31.40	37.40	43.40	49.40	49.00
88.47	68.47	48.47	28.47	-1.53	-31.53	-61.53	-91.53	-121.53	121.53
0.00	0.50	5.50	10.50	25.50	31.50	37.50	43.50	49.50	49.00
88.04	68.04	48.04	28.04	-1.96	-31.96	-61.96	-91.96	-121.96	121.96
0.00	0.60	5.60	10.60	25.60	31.60	37.60	43.60	49.60	49.00
87.61	67.61	47.61	27.61	-2.39	-32.39	-62.39	-92.39	-122.39	122.39
0.00	0.70	5.70	10.70	25.70	31.70	37.70	43.70	49.70	49.00
90.61	70.61	50.61	30.61	0.61	-29.39	-59.39	-89.39	-119.39	119.39
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	49.00

Moment at React A, ft-kips	Moment at #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	353.06	606.12	1065.31	1068.98	892.65	536.33	0.00	0.0
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	49.00
0.00	9.02	359.94	610.86	1063.61	1064.71	885.81	526.92	-11.98	0.0
0.00	0.10	5.10	10.10	25.10	31.10	37.10	43.10	49.10	49.00
0.00	17.95	366.73	615.50	1061.83	1060.36	878.89	517.42	-24.05	0.0
0.00	0.20	5.20	10.20	25.20	31.20	37.20	43.20	49.20	49.00
0.00	26.80	373.43	620.06	1059.96	1055.92	871.88	507.84	-36.20	0.0
0.00	0.30	5.30	10.30	25.30	31.30	37.30	43.30	49.30	49.00
0.00	35.56	380.05	624.54	1058.01	1051.40	864.78	498.17	-48.44	0.0
0.00	0.40	5.40	10.40	25.40	31.40	37.40	43.40	49.40	49.00
0.00	44.23	386.58	628.93	1055.97	1046.79	857.60	488.42	-60.77	0.0
0.00	0.50	5.50	10.50	25.50	31.50	37.50	43.50	49.50	49.00
0.00	52.82	393.03	633.23	1053.84	1042.09	850.33	478.58	-73.18	0.0
0.00	0.60	5.60	10.60	25.60	31.60	37.60	43.60	49.60	49.00
0.00	61.33	399.39	637.45	1051.63	1037.31	842.98	468.66	-85.67	0.0
0.00	0.70	5.70	10.70	25.70	31.70	37.70	43.70	49.70	49.00
0.00	0.00	353.06	606.12	1065.31	1068.98	892.65	536.33	0.00	0.00
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	49.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 49' Span, Axles 3-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	10.00	20.00		0.00	88.96	0
4	10.00	20.00	5.00	5.00	88.96	152
5	15.00	30.00	15.00	20.00	133.45	610
6	15.00	30.00	6.00	26.00	133.45	792
7	15.00	30.00	6.00	32.00	133.45	975
8	15.00	30.00	6.00	38.00	133.45	1158
(Rear) 9	15.00	30.00	6.00	44.00	133.45	1341
Totals	95.00	190.00	44.00		845.2	
			Resultant at location:	25.789		786



**60 ft Span Length**

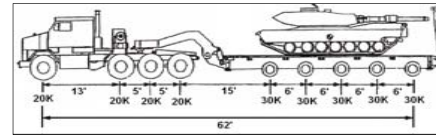
Front #1 Axle Position AX 1	Middle #2 Axle Position AX 2	Middle #3 Axle Position AX 3	Middle #4 Axle Position AX 4	Middle #5 Axle Position AX 5	Middle #6 Axle Position AX 6	Middle #7 Axle Position AX 7	Middle #8 Axle Position AX 8	Rear #9 Axle Position AX 9	Dist to Beam End L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
		0.00	5.00	20.00	26.00	32.00	38.00	44.00	16.00
		0.10	5.10	20.10	26.10	32.10	38.10	44.10	15.90
		0.20	5.20	20.20	26.20	32.20	38.20	44.20	15.80
		0.30	5.30	20.30	26.30	32.30	38.30	44.30	15.70
		0.40	5.40	20.40	26.40	32.40	38.40	44.40	15.60
		0.50	5.50	20.50	26.50	32.50	38.50	44.50	15.50
		0.60	5.60	20.60	26.60	32.60	38.60	44.60	15.40
		0.70	5.70	20.70	26.70	32.70	38.70	44.70	15.30
		16.00	21.00	36.00	42.00	48.00	54.00	60.00	0.00

Shear at React A, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear React B, kips
108.33	88.33	68.33	38.33	8.33	-21.67	-51.67	-81.67	81.67
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	60.00
108.02	88.02	68.02	38.02	8.02	-21.98	-51.98	-81.98	81.98
0.00	0.10	5.10	20.10	26.10	32.10	38.10	44.10	60.00
107.70	87.70	67.70	37.70	7.70	-22.30	-52.30	-82.30	82.30
0.00	0.20	5.20	20.20	26.20	32.20	38.20	44.20	60.00
107.38	87.38	67.38	37.38	7.38	-22.62	-52.62	-82.62	82.62
0.00	0.30	5.30	20.30	26.30	32.30	38.30	44.30	60.00
107.07	87.07	67.07	37.07	7.07	-22.93	-52.93	-82.93	82.93
0.00	0.40	5.40	20.40	26.40	32.40	38.40	44.40	60.00
106.75	86.75	66.75	36.75	6.75	-23.25	-53.25	-83.25	83.25
0.00	0.50	5.50	20.50	26.50	32.50	38.50	44.50	60.00
106.43	86.43	66.43	36.43	6.43	-23.57	-53.57	-83.57	83.57
0.00	0.60	5.60	20.60	26.60	32.60	38.60	44.60	60.00
106.12	86.12	66.12	36.12	6.12	-23.88	-53.88	-83.88	83.88
0.00	0.70	5.70	20.70	26.70	32.70	38.70	44.70	60.00
57.67	37.67	17.67	-12.33	-42.33	-72.33	-102.33	-132.33	132.33
0.00	16.00	21.00	36.00	42.00	48.00	54.00	60.00	60.00

Moment at React A, ft- kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft- kips
0.00	0.00	441.67	1466.67	1696.67	1746.67	1616.67	1306.67	0.0
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	60.00
0.00	10.80	450.89	1471.14	1699.24	1747.34	1615.44	1303.54	0.0
0.00	0.10	5.10	20.10	26.10	32.10	38.10	44.10	60.00
0.00	21.54	460.04	1475.54	1701.74	1747.94	1614.14	1300.34	0.0
0.00	0.20	5.20	20.20	26.20	32.20	38.20	44.20	60.00
0.00	32.22	469.13	1479.88	1704.18	1748.48	1612.78	1297.08	0.0
0.00	0.30	5.30	20.30	26.30	32.30	38.30	44.30	60.00
0.00	42.83	478.16	1484.16	1706.56	1748.96	1611.36	1293.76	0.00
0.00	0.40	5.40	20.40	26.40	32.40	38.40	44.40	60.00
0.00	53.38	487.13	1488.38	1708.88	1749.38	1609.88	1290.38	0.00
0.00	0.50	5.50	20.50	26.50	32.50	38.50	44.50	60.00
0.00	63.86	496.03	1492.53	1711.13	1749.73	1608.33	1286.93	0.00
0.00	0.60	5.60	20.60	26.60	32.60	38.60	44.60	60.00
0.00	74.28	504.87	1496.62	1713.32	1750.02	1606.72	1283.42	0.00
0.00	0.70	5.70	20.70	26.70	32.70	38.70	44.70	60.00
0.00	922.67	1111.00	1376.00	1302.00	1048.00	614.00	0.00	0.00
0.00	16.00	21.00	36.00	42.00	48.00	54.00	60.00	60.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 49' Span, Axles 3-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	10.00	20.00		0.00	88.96	0
4	10.00	20.00	5.00	5.00	88.96	152
5	15.00	30.00	15.00	20.00	133.45	610
6	15.00	30.00	6.00	26.00	133.45	792
7	15.00	30.00	6.00	32.00	133.45	975
8	15.00	30.00	6.00	38.00	133.45	1158
(Rear) 9	15.00	30.00	6.00	44.00	133.45	1341
<b>Totals</b>	<b>95.00</b>	<b>190.00</b>	<b>44.00</b>		<b>845.2</b>	
				Resultant at location:	25.789	786



**55 ft Span Length**

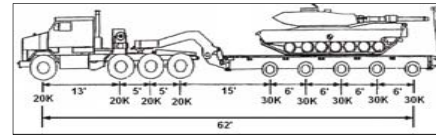
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
		0.00	5.00	20.00	26.00	32.00	38.00	44.00	11.00
		0.10	5.10	20.10	26.10	32.10	38.10	44.10	10.90
		0.20	5.20	20.20	26.20	32.20	38.20	44.20	10.80
		0.30	5.30	20.30	26.30	32.30	38.30	44.30	10.70
		0.40	5.40	20.40	26.40	32.40	38.40	44.40	10.60
		0.50	5.50	20.50	26.50	32.50	38.50	44.50	10.50
		0.60	5.60	20.60	26.60	32.60	38.60	44.60	10.40
		0.70	5.70	20.70	26.70	32.70	38.70	44.70	10.30
		11.00	16.00	31.00	37.00	43.00	49.00	55.00	0.00

Shear at React A, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
100.91	80.91	60.91	30.91	0.91	-29.09	-59.09	-89.09	89.09
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	55.00
100.56	80.56	60.56	30.56	0.56	-29.44	-59.44	-89.44	89.44
0.00	0.10	5.10	20.10	26.10	32.10	38.10	44.10	55.00
100.22	80.22	60.22	30.22	0.22	-29.78	-59.78	-89.78	89.78
0.00	0.20	5.20	20.20	26.20	32.20	38.20	44.20	55.00
99.87	79.87	59.87	29.87	-0.13	-30.13	-60.13	-90.13	90.13
0.00	0.30	5.30	20.30	26.30	32.30	38.30	44.30	55.00
99.53	79.53	59.53	29.53	-0.47	-30.47	-60.47	-90.47	90.47
0.00	0.40	5.40	20.40	26.40	32.40	38.40	44.40	55.00
99.18	79.18	59.18	29.18	-0.82	-30.82	-60.82	-90.82	90.82
0.00	0.50	5.50	20.50	26.50	32.50	38.50	44.50	55.00
98.84	78.84	58.84	28.84	-1.16	-31.16	-61.16	-91.16	91.16
0.00	0.60	5.60	20.60	26.60	32.60	38.60	44.60	55.00
98.49	78.49	58.49	28.49	-1.51	-31.51	-61.51	-91.51	91.51
0.00	0.70	5.70	20.70	26.70	32.70	38.70	44.70	55.00
62.91	42.91	22.91	-7.09	-37.09	-67.09	-97.09	-127.09	127.09
0.00	11.00	16.00	31.00	37.00	43.00	49.00	55.00	55.00

Moment at React A, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	404.55	1318.18	1503.64	1509.09	1334.55	980.00	0.0
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	55.00
0.00	10.06	412.87	1321.33	1504.71	1508.09	1331.47	974.86	0.0
0.00	0.10	5.10	20.10	26.10	32.10	38.10	44.10	55.00
0.00	20.04	421.13	1324.41	1505.72	1507.03	1328.33	969.64	0.0
0.00	0.20	5.20	20.20	26.20	32.20	38.20	44.20	55.00
0.00	29.96	429.33	1327.42	1506.65	1505.89	1325.13	964.36	0.0
0.00	0.30	5.30	20.30	26.30	32.30	38.30	44.30	55.00
0.00	39.81	437.45	1330.36	1507.52	1504.68	1321.85	959.01	0.00
0.00	0.40	5.40	20.40	26.40	32.40	38.40	44.40	55.00
0.00	49.59	445.50	1333.23	1508.32	1503.41	1318.50	953.59	0.00
0.00	0.50	5.50	20.50	26.50	32.50	38.50	44.50	55.00
0.00	59.30	453.48	1336.03	1509.05	1502.07	1315.08	948.10	0.00
0.00	0.60	5.60	20.60	26.60	32.60	38.60	44.60	55.00
0.00	68.94	461.40	1338.76	1509.71	1500.65	1311.60	942.54	0.00
0.00	0.70	5.70	20.70	26.70	32.70	38.70	44.70	55.00
0.00	692.00	906.55	1250.18	1207.64	985.09	582.55	0.00	0.00
0.00	11.00	16.00	31.00	37.00	43.00	49.00	55.00	55.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 49' Span, Axles 3-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	10.00	20.00		0.00	88.96	0
4	10.00	20.00	5.00	5.00	88.96	152
5	15.00	30.00	15.00	20.00	133.45	610
6	15.00	30.00	6.00	26.00	133.45	792
7	15.00	30.00	6.00	32.00	133.45	975
8	15.00	30.00	6.00	38.00	133.45	1158
(Rear) 9	15.00	30.00	6.00	44.00	133.45	1341
<b>Totals</b>	<b>95.00</b>	<b>190.00</b>	<b>44.00</b>		<b>845.2</b>	
Resultant at location:				25.789		786



**52 ft Span Length**

Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
		0.00	5.00	20.00	26.00	32.00	38.00	44.00	8.00
		0.10	5.10	20.10	26.10	32.10	38.10	44.10	7.90
		0.20	5.20	20.20	26.20	32.20	38.20	44.20	7.80
		0.30	5.30	20.30	26.30	32.30	38.30	44.30	7.70
		0.40	5.40	20.40	26.40	32.40	38.40	44.40	7.60
		0.50	5.50	20.50	26.50	32.50	38.50	44.50	7.50
		0.60	5.60	20.60	26.60	32.60	38.60	44.60	7.40
		0.70	5.70	20.70	26.70	32.70	38.70	44.70	7.30
		0.80	5.80	20.80	26.80	32.80	38.80	44.80	7.20
		0.90	5.90	20.90	26.90	32.90	38.90	44.90	7.10
		1.00	6.00	21.00	27.00	33.00	39.00	45.00	7.00
		1.10	6.10	21.10	27.10	33.10	39.10	45.10	6.90
		1.20	6.20	21.20	27.20	33.20	39.20	45.20	6.80
		1.30	6.30	21.30	27.30	33.30	39.30	45.30	6.70
		1.40	6.40	21.40	27.40	33.40	39.40	45.40	6.60
		1.50	6.50	21.50	27.50	33.50	39.50	45.50	6.50
		1.60	6.60	21.60	27.60	33.60	39.60	45.60	6.40
		1.70	6.70	21.70	27.70	33.70	39.70	45.70	6.30
		1.80	6.80	21.80	27.80	33.80	39.80	45.80	6.20
		1.90	6.90	21.90	27.90	33.90	39.90	45.90	6.10
		2.00	7.00	22.00	28.00	34.00	40.00	46.00	6.00

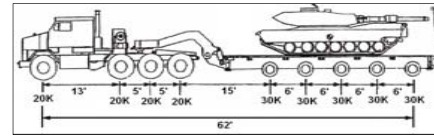
Shear at React A, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
95.77	75.77	55.77	25.77	-4.23	-34.23	-64.23	-94.23	94.23
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	52.00
95.40	75.40	55.40	25.40	-4.60	-34.60	-64.60	-94.60	94.60
0.00	0.10	5.10	20.10	26.10	32.10	38.10	44.10	52.00
95.04	75.04	55.04	25.04	-4.96	-34.96	-64.96	-94.96	94.96
0.00	0.20	5.20	20.20	26.20	32.20	38.20	44.20	52.00
94.67	74.67	54.67	24.67	-5.33	-35.33	-65.33	-95.33	95.33
0.00	0.30	5.30	20.30	26.30	32.30	38.30	44.30	52.00
94.31	74.31	54.31	24.31	-5.69	-35.69	-65.69	-95.69	95.69
0.00	0.40	5.40	20.40	26.40	32.40	38.40	44.40	52.00
93.94	73.94	53.94	23.94	-6.06	-36.06	-66.06	-96.06	96.06
0.00	0.50	5.50	20.50	26.50	32.50	38.50	44.50	52.00
93.58	73.58	53.58	23.58	-6.42	-36.42	-66.42	-96.42	96.42
0.00	0.60	5.60	20.60	26.60	32.60	38.60	44.60	52.00
93.21	73.21	53.21	23.21	-6.79	-36.79	-66.79	-96.79	96.79
0.00	0.70	5.70	20.70	26.70	32.70	38.70	44.70	52.00
66.54	46.54	26.54	-3.46	-33.46	-63.46	-93.46	-123.46	123.46
0.00	0.80	5.80	20.80	26.80	32.80	38.80	44.80	52.00

Moment at React A, ft-kips	Moment at #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	378.85	1215.38	1370.00	1344.62	1139.23	753.85	0.0
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	52.00
0.00	9.54	386.56	1217.62	1370.04	1342.46	1134.89	747.31	0.0
0.00	0.10	5.10	20.10	26.10	32.10	38.10	44.10	52.00
0.00	19.01	394.20	1219.78	1370.01	1340.24	1130.47	740.70	0.0
0.00	0.20	5.20	20.20	26.20	32.20	38.20	44.20	52.00
0.00	28.40	401.77	1221.86	1369.90	1337.94	1125.98	734.02	0.0
0.00	0.30	5.30	20.30	26.30	32.30	38.30	44.30	52.00
0.00	37.72	409.26	1223.88	1369.72	1335.57	1121.42	727.26	0.0
0.00	0.40	5.40	20.40	26.40	32.40	38.40	44.40	52.00
0.00	46.97	416.68	1225.82	1369.47	1333.13	1116.78	720.43	0.0
0.00	0.50	5.50	20.50	26.50	32.50	38.50	44.50	52.00
0.00	56.15	424.03	1227.68	1369.15	1330.61	1112.07	713.53	0.0
0.00	0.60	5.60	20.60	26.60	32.60	38.60	44.60	52.00
0.00	65.25	431.31	1229.48	1368.75	1328.02	1107.29	706.56	0.0
0.00	0.70	5.70	20.70	26.70	32.70	38.70	44.70	52.00
0.00	532.31	765.00	1163.08	1142.31	941.54	560.77	0.00	0.00
0.00	0.80	5.80	20.80	26.80	32.80	38.80	44.80	52.00



**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 49' Span, Axles 3-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	10.00	20.00		0.00	88.96	0
4	10.00	20.00	5.00	5.00	88.96	152
5	15.00	30.00	15.00	20.00	133.45	610
6	15.00	30.00	6.00	26.00	133.45	792
7	15.00	30.00	6.00	32.00	133.45	975
8	15.00	30.00	6.00	38.00	133.45	1158
(Rear) 9	15.00	30.00	6.00	44.00	133.45	1341
Totals	95.00	190.00	44.00		845.2	
Resultant at location:				25.789		786



**50 ft Span Length**

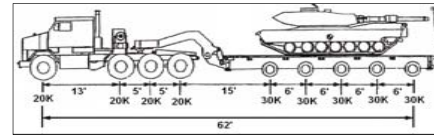
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
		0.00	5.00	20.00	26.00	32.00	38.00	44.00	6.00
		0.10	5.10	20.10	26.10	32.10	38.10	44.10	5.90
		0.20	5.20	20.20	26.20	32.20	38.20	44.20	5.80
		0.30	5.30	20.30	26.30	32.30	38.30	44.30	5.70
		0.40	5.40	20.40	26.40	32.40	38.40	44.40	5.60
		0.50	5.50	20.50	26.50	32.50	38.50	44.50	5.50
		0.60	5.60	20.60	26.60	32.60	38.60	44.60	5.40
		0.70	5.70	20.70	26.70	32.70	38.70	44.70	5.30
		6.00	11.00	26.00	32.00	38.00	44.00	50.00	0.00

Shear at React A, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
92.00	72.00	52.00	22.00	-8.00	-38.00	-68.00	-98.00	98.00
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	50.00
91.62	71.62	51.62	21.62	-8.38	-38.38	-68.38	-98.38	98.38
0.00	0.10	5.10	20.10	26.10	32.10	38.10	44.10	50.00
91.24	71.24	51.24	21.24	-8.76	-38.76	-68.76	-98.76	98.76
0.00	0.20	5.20	20.20	26.20	32.20	38.20	44.20	50.00
90.86	70.86	50.86	20.86	-9.14	-39.14	-69.14	-99.14	99.14
0.00	0.30	5.30	20.30	26.30	32.30	38.30	44.30	50.00
90.48	70.48	50.48	20.48	-9.52	-39.52	-69.52	-99.52	99.52
0.00	0.40	5.40	20.40	26.40	32.40	38.40	44.40	50.00
90.10	70.10	50.10	20.10	-9.90	-39.90	-69.90	-99.90	99.90
0.00	0.50	5.50	20.50	26.50	32.50	38.50	44.50	50.00
89.72	69.72	49.72	19.72	-10.28	-40.28	-70.28	-100.28	100.28
0.00	0.60	5.60	20.60	26.60	32.60	38.60	44.60	50.00
89.34	69.34	49.34	19.34	-10.66	-40.66	-70.66	-100.66	100.66
0.00	0.70	5.70	20.70	26.70	32.70	38.70	44.70	50.00
89.00	69.00	49.00	19.00	-11.00	-41.00	-71.00	-101.00	101.00
0.00	6.00	11.00	26.00	32.00	38.00	44.00	50.00	50.00

Moment at React A, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	360.00	1140.00	1272.00	1224.00	996.00	588.00	0.0
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	50.00
0.00	9.16	367.26	1141.56	1271.28	1221.00	990.72	580.44	0.0
0.00	0.10	5.10	20.10	26.10	32.10	38.10	44.10	50.00
0.00	18.25	374.45	1143.05	1270.49	1217.93	985.37	572.81	0.0
0.00	0.20	5.20	20.20	26.20	32.20	38.20	44.20	50.00
0.00	27.26	381.56	1144.46	1269.62	1214.78	979.94	565.10	0.0
0.00	0.30	5.30	20.30	26.30	32.30	38.30	44.30	50.00
0.00	36.19	388.59	1145.79	1268.67	1211.55	974.43	557.31	0.00
0.00	0.40	5.40	20.40	26.40	32.40	38.40	44.40	50.00
0.00	45.05	395.55	1147.05	1267.65	1208.25	968.85	549.45	0.00
0.00	0.50	5.50	20.50	26.50	32.50	38.50	44.50	50.00
0.00	53.83	402.43	1148.23	1266.55	1204.87	963.19	541.51	0.00
0.00	0.60	5.60	20.60	26.60	32.60	38.60	44.60	50.00
0.00	62.54	409.24	1149.34	1265.38	1201.42	957.46	533.50	0.00
0.00	0.70	5.70	20.70	26.70	32.70	38.70	44.70	50.00
0.00	415.20	661.20	1099.20	1094.40	909.60	544.80	0.00	0.00
0.00	6.00	11.00	26.00	32.00	38.00	44.00	50.00	50.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 49' Span, Axles 3-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	10.00	20.00		0.00	88.96	0
4	10.00	20.00	5.00	5.00	88.96	152
5	15.00	30.00	15.00	20.00	133.45	610
6	15.00	30.00	6.00	26.00	133.45	792
7	15.00	30.00	6.00	32.00	133.45	975
8	15.00	30.00	6.00	38.00	133.45	1158
(Rear) 9	15.00	30.00	6.00	44.00	133.45	1341
Totals	95.00	190.00	44.00		845.2	
		Resultant at location:	25.789			786



**49 ft Span Length**

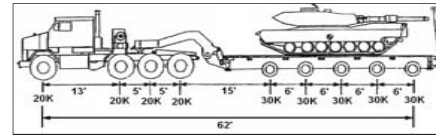
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
		0.00	5.00	20.00	26.00	32.00	38.00	44.00	5.00
		0.10	5.10	20.10	26.10	32.10	38.10	44.10	4.90
		0.20	5.20	20.20	26.20	32.20	38.20	44.20	4.80
		0.30	5.30	20.30	26.30	32.30	38.30	44.30	4.70
		0.40	5.40	20.40	26.40	32.40	38.40	44.40	4.60
		0.50	5.50	20.50	26.50	32.50	38.50	44.50	4.50
		0.60	5.60	20.60	26.60	32.60	38.60	44.60	4.40
		0.70	5.70	20.70	26.70	32.70	38.70	44.70	4.30
		5.00	10.00	25.00	31.00	37.00	43.00	49.00	0.00

Shear at React A, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
90.00	70.00	50.00	20.00	-10.00	-40.00	-70.00	-100.00	100.00
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	49.00
89.61	69.61	49.61	19.61	-10.39	-40.39	-70.39	-100.39	100.39
0.00	0.10	5.10	20.10	26.10	32.10	38.10	44.10	49.00
89.22	69.22	49.22	19.22	-10.78	-40.78	-70.78	-100.78	100.78
0.00	0.20	5.20	20.20	26.20	32.20	38.20	44.20	49.00
88.84	68.84	48.84	18.84	-11.16	-41.16	-71.16	-101.16	101.16
0.00	0.30	5.30	20.30	26.30	32.30	38.30	44.30	49.00
88.45	68.45	48.45	18.45	-11.55	-41.55	-71.55	-101.55	101.55
0.00	0.40	5.40	20.40	26.40	32.40	38.40	44.40	49.00
88.06	68.06	48.06	18.06	-11.94	-41.94	-71.94	-101.94	101.94
0.00	0.50	5.50	20.50	26.50	32.50	38.50	44.50	49.00
87.67	67.67	47.67	17.67	-12.33	-42.33	-72.33	-102.33	102.33
0.00	0.60	5.60	20.60	26.60	32.60	38.60	44.60	49.00
87.29	67.29	47.29	17.29	-12.71	-42.71	-72.71	-102.71	102.71
0.00	0.70	5.70	20.70	26.70	32.70	38.70	44.70	49.00
70.61	50.61	30.61	0.61	-29.39	-59.39	-89.39	-119.39	119.39
0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	49.00

Moment at React A, ft-kips	Moment at #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	350.00	1100.00	1220.00	1160.00	920.00	500.00	0.0
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	49.00
0.00	8.96	357.02	1101.21	1218.88	1156.55	914.23	491.90	0.0
0.00	0.10	5.10	20.10	26.10	32.10	38.10	44.10	49.00
0.00	17.84	363.97	1102.33	1217.68	1153.03	908.38	483.72	0.0
0.00	0.20	5.20	20.20	26.20	32.20	38.20	44.20	49.00
0.00	26.65	370.83	1103.39	1216.41	1149.43	902.45	475.47	0.0
0.00	0.30	5.30	20.30	26.30	32.30	38.30	44.30	49.00
0.00	35.38	377.62	1104.36	1215.05	1145.75	896.44	467.13	0.00
0.00	0.40	5.40	20.40	26.40	32.40	38.40	44.40	49.00
0.00	44.03	384.34	1105.26	1213.62	1141.99	890.36	458.72	0.00
0.00	0.50	5.50	20.50	26.50	32.50	38.50	44.50	49.00
0.00	52.60	390.97	1106.07	1212.11	1138.16	884.20	450.24	0.00
0.00	0.60	5.60	20.60	26.60	32.60	38.60	44.60	49.00
0.00	61.10	397.53	1106.81	1210.53	1134.24	877.96	441.67	0.00
0.00	0.70	5.70	20.70	26.70	32.70	38.70	44.70	49.00
0.00	353.06	606.12	1065.31	1068.98	892.65	536.33	0.00	0.00
0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	49.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 47' Span, Axles 3-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	10.00	20.00		0.00	88.96	0
4	10.00	20.00	5.00	5.00	88.96	152
5	15.00	30.00	15.00	20.00	133.45	610
6	15.00	30.00	6.00	26.00	133.45	792
7	15.00	30.00	6.00	32.00	133.45	975
8	15.00	30.00	6.00	38.00	133.45	1158
(Rear) 9	15.00	30.00	6.00	44.00	133.45	1341
Totals	95.00	190.00	44.00		845.2	
Resultant at location:				25.789		786



47 ft Span Length

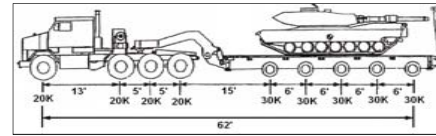
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
		0.00	5.00	20.00	26.00	32.00	38.00	44.00	3.00
		0.10	5.10	20.10	26.10	32.10	38.10	44.10	2.90
		0.20	5.20	20.20	26.20	32.20	38.20	44.20	2.80
		0.30	5.30	20.30	26.30	32.30	38.30	44.30	2.70
		0.40	5.40	20.40	26.40	32.40	38.40	44.40	2.60
		0.50	5.50	20.50	26.50	32.50	38.50	44.50	2.50
		0.60	5.60	20.60	26.60	32.60	38.60	44.60	2.40
		0.70	5.70	20.70	26.70	32.70	38.70	44.70	2.30
		3.00	8.00	23.00	29.00	35.00	41.00	47.00	0.00

Shear at React A, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
85.74	65.74	45.74	15.74	-14.26	-44.26	-74.26	-104.26	104.26
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	47.00
85.34	65.34	45.34	15.34	-14.66	-44.66	-74.66	-104.66	104.66
0.00	0.10	5.10	20.10	26.10	32.10	38.10	44.10	47.00
84.94	64.94	44.94	14.94	-15.06	-45.06	-75.06	-105.06	105.06
0.00	0.20	5.20	20.20	26.20	32.20	38.20	44.20	47.00
84.53	64.53	44.53	14.53	-15.47	-45.47	-75.47	-105.47	105.47
0.00	0.30	5.30	20.30	26.30	32.30	38.30	44.30	47.00
84.13	64.13	44.13	14.13	-15.87	-45.87	-75.87	-105.87	105.87
0.00	0.40	5.40	20.40	26.40	32.40	38.40	44.40	47.00
83.72	63.72	43.72	13.72	-16.28	-46.28	-76.28	-106.28	106.28
0.00	0.50	5.50	20.50	26.50	32.50	38.50	44.50	47.00
83.32	63.32	43.32	13.32	-16.68	-46.68	-76.68	-106.68	106.68
0.00	0.60	5.60	20.60	26.60	32.60	38.60	44.60	47.00
82.91	62.91	42.91	12.91	-17.09	-47.09	-77.09	-107.09	107.09
0.00	0.70	5.70	20.70	26.70	32.70	38.70	44.70	47.00
73.62	53.62	33.62	3.62	-26.38	-56.38	-86.38	-116.38	116.38
0.00	3.00	8.00	23.00	29.00	35.00	41.00	47.00	47.00

Moment at React A, ft-kips	Moment at #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	328.72	1014.89	1109.36	1023.83	758.30	312.77	0.0
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	47.00
0.00	8.53	335.24	1015.34	1107.39	1019.43	751.47	303.51	0.0
0.00	0.10	5.10	20.10	26.10	32.10	38.10	44.10	47.00
0.00	16.99	341.67	1015.71	1105.33	1014.94	744.56	294.18	0.0
0.00	0.20	5.20	20.20	26.20	32.20	38.20	44.20	47.00
0.00	25.36	348.02	1016.00	1103.19	1010.38	737.57	284.76	0.0
0.00	0.30	5.30	20.30	26.30	32.30	38.30	44.30	47.00
0.00	33.65	354.29	1016.20	1100.97	1005.74	730.50	275.27	0.0
0.00	0.40	5.40	20.40	26.40	32.40	38.40	44.40	47.00
0.00	41.86	360.48	1016.33	1098.67	1001.01	723.35	265.69	0.0
0.00	0.50	5.50	20.50	26.50	32.50	38.50	44.50	47.00
0.00	49.99	366.59	1016.37	1096.29	996.20	716.12	256.03	0.0
0.00	0.60	5.60	20.60	26.60	32.60	38.60	44.60	47.00
0.00	58.04	372.61	1016.34	1093.83	991.32	708.81	246.30	0.0
0.00	0.70	5.70	20.70	26.70	32.70	38.70	44.70	47.00
0.00	220.85	488.94	993.19	1014.89	856.60	518.30	0.00	0.00
0.00	3.00	8.00	23.00	29.00	35.00	41.00	47.00	47.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 45' Span, Axles 3-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	10.00	20.00		0.00	88.96	0
4	10.00	20.00	5.00	5.00	88.96	152
5	15.00	30.00	15.00	20.00	133.45	610
6	15.00	30.00	6.00	26.00	133.45	792
7	15.00	30.00	6.00	32.00	133.45	975
8	15.00	30.00	6.00	38.00	133.45	1158
(Rear) 9	15.00	30.00	6.00	44.00	133.45	1341
Totals	95.00	190.00	44.00		845.2	
Resultant at location:				25.789		786



**45 ft Span Length**

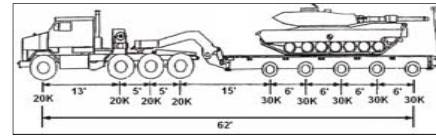
Front #1 Axle Position AX 1	Middle #2 Axle Position AX 2	Middle #3 Axle Position AX 3	Middle #4 Axle Position AX 4	Middle #5 Axle Position AX 5	Middle #6 Axle Position AX 6	Middle #7 Axle Position AX 7	Middle #8 Axle Position AX 8	Rear #9 Axle Position AX 9	Dist to Beam End L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
		0.00	5.00	20.00	26.00	32.00	38.00	44.00	1.00
		0.10	5.10	20.10	26.10	32.10	38.10	44.10	0.90
		0.20	5.20	20.20	26.20	32.20	38.20	44.20	0.80
		0.30	5.30	20.30	26.30	32.30	38.30	44.30	0.70
		0.40	5.40	20.40	26.40	32.40	38.40	44.40	0.60
		0.50	5.50	20.50	26.50	32.50	38.50	44.50	0.50
		0.60	5.60	20.60	26.60	32.60	38.60	44.60	0.40
		0.70	5.70	20.70	26.70	32.70	38.70	44.70	0.30
		1.00	6.00	21.00	27.00	33.00	39.00	45.00	0.00

Shear at React A, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear #9 Axle, kips	Shear at React B, kips
81.11	61.11	41.11	11.11	-18.89	-48.89	-78.89	-108.89	108.89	
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	45.00	
80.69	60.69	40.69	10.69	-19.31	-49.31	-79.31	-109.31	109.31	
0.00	0.10	5.10	20.10	26.10	32.10	38.10	44.10	45.00	
80.27	60.27	40.27	10.27	-19.73	-49.73	-79.73	-109.73	109.73	
0.00	0.20	5.20	20.20	26.20	32.20	38.20	44.20	45.00	
79.84	59.84	39.84	9.84	-20.16	-50.16	-80.16	-110.16	110.16	
0.00	0.30	5.30	20.30	26.30	32.30	38.30	44.30	45.00	
79.42	59.42	39.42	9.42	-20.58	-50.58	-80.58	-110.58	110.58	
0.00	0.40	5.40	20.40	26.40	32.40	38.40	44.40	45.00	
79.00	59.00	39.00	9.00	-21.00	-51.00	-81.00	-111.00	111.00	
0.00	0.50	5.50	20.50	26.50	32.50	38.50	44.50	45.00	
78.58	58.58	38.58	8.58	-21.42	-51.42	-81.42	-111.42	111.42	
0.00	0.60	5.60	20.60	26.60	32.60	38.60	44.60	45.00	
78.16	58.16	38.16	8.16	-21.84	-51.84	-81.84	-111.84	111.84	
0.00	0.70	5.70	20.70	26.70	32.70	38.70	44.70	45.00	
76.89	56.89	36.89	6.89	-23.11	-53.11	-83.11	-113.11	113.11	
0.00	1.00	6.00	21.00	27.00	33.00	39.00	45.00	45.00	

Moment at React A, ft- kips	Moment at # 3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft- kips
0.00	0.00	305.56	922.22	988.89	875.56	582.22	108.89	0.0
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	45.00
0.00	8.07	311.51	921.85	985.98	870.11	574.25	98.38	0.0
0.00	0.10	5.10	20.10	26.10	32.10	38.10	44.10	45.00
0.00	16.05	317.39	921.39	982.99	864.59	566.19	87.79	0.0
0.00	0.20	5.20	20.20	26.20	32.20	38.20	44.20	45.00
0.00	23.95	323.18	920.84	979.91	858.98	558.04	77.11	0.0
0.00	0.30	5.30	20.30	26.30	32.30	38.30	44.30	45.00
0.00	31.77	328.88	920.21	976.75	853.28	549.81	66.35	0.0
0.00	0.40	5.40	20.40	26.40	32.40	38.40	44.40	45.00
0.00	39.50	334.50	919.50	973.50	847.50	541.50	55.50	0.0
0.00	0.50	5.50	20.50	26.50	32.50	38.50	44.50	45.00
0.00	47.15	340.04	918.70	970.17	841.64	533.10	44.57	0.0
0.00	0.60	5.60	20.60	26.60	32.60	38.60	44.60	45.00
0.00	54.71	345.49	917.82	966.75	835.69	524.62	33.55	0.0
0.00	0.70	5.70	20.70	26.70	32.70	38.70	44.70	45.00
0.00	76.89	361.33	914.67	956.00	817.33	498.67	0.00	0.0
0.00	1.00	6.00	21.00	27.00	33.00	39.00	45.00	45.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 44' Span, Axles 3-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	10.00	20.00		0.00	88.96	0
4	10.00	20.00	5.00	5.00	88.96	152
5	15.00	30.00	15.00	20.00	133.45	610
6	15.00	30.00	6.00	26.00	133.45	792
7	15.00	30.00	6.00	32.00	133.45	975
8	15.00	30.00	6.00	38.00	133.45	1158
(Rear) 9	15.00	30.00	6.00	44.00	133.45	1341
Totals	95.00	190.00	44.00		845.2	
Resultant at location:				25.789		786



44 ft Span Length

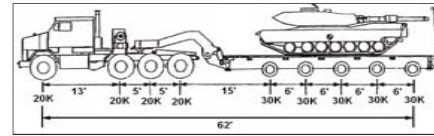
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
		0.00	5.00	20.00	26.00	32.00	38.00	44.00	0.00
		0.10	5.10	20.10	26.10	32.10	38.10	44.10	-0.10
		0.20	5.20	20.20	26.20	32.20	38.20	44.20	-0.20
		0.30	5.30	20.30	26.30	32.30	38.30	44.30	-0.30
		0.40	5.40	20.40	26.40	32.40	38.40	44.40	-0.40
		0.50	5.50	20.50	26.50	32.50	38.50	44.50	-0.50
		0.60	5.60	20.60	26.60	32.60	38.60	44.60	-0.60
		0.70	5.70	20.70	26.70	32.70	38.70	44.70	-0.70
		0.00	5.00	20.00	26.00	32.00	38.00	44.00	0.00

Shear at React A, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
78.64	58.64	38.64	8.64	-21.36	-51.36	-81.36	-111.36	111.36
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	44.00
78.20	58.20	38.20	8.20	-21.80	-51.80	-81.80	-111.80	111.80
0.00	0.10	5.10	20.10	26.10	32.10	38.10	44.10	44.00
77.77	57.77	37.77	7.77	-22.23	-52.23	-82.23	-112.23	112.23
0.00	0.20	5.20	20.20	26.20	32.20	38.20	44.20	44.00
77.34	57.34	37.34	7.34	-22.66	-52.66	-82.66	-112.66	112.66
0.00	0.30	5.30	20.30	26.30	32.30	38.30	44.30	44.00
76.91	56.91	36.91	6.91	-23.09	-53.09	-83.09	-113.09	113.09
0.00	0.40	5.40	20.40	26.40	32.40	38.40	44.40	44.00
76.48	56.48	36.48	6.48	-23.52	-53.52	-83.52	-113.52	113.52
0.00	0.50	5.50	20.50	26.50	32.50	38.50	44.50	44.00
76.05	56.05	36.05	6.05	-23.95	-53.95	-83.95	-113.95	113.95
0.00	0.60	5.60	20.60	26.60	32.60	38.60	44.60	44.00
75.61	55.61	35.61	5.61	-24.39	-54.39	-84.39	-114.39	114.39
0.00	0.70	5.70	20.70	26.70	32.70	38.70	44.70	44.00
78.64	58.64	38.64	8.64	-21.36	-51.36	-81.36	-111.36	111.36
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	44.00

Moment at React A, ft-kips	Moment at #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	293.18	872.73	924.55	796.36	488.18	0.00	0.00
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	44.00
0.00	7.82	298.84	871.91	921.14	790.37	479.59	-11.18	0.00
0.00	0.10	5.10	20.10	26.10	32.10	38.10	44.10	44.00
0.00	15.55	304.42	871.01	917.65	784.28	470.92	-22.45	0.00
0.00	0.20	5.20	20.20	26.20	32.20	38.20	44.20	44.00
0.00	23.20	309.91	870.02	914.07	778.11	462.16	-33.80	0.00
0.00	0.30	5.30	20.30	26.30	32.30	38.30	44.30	44.00
0.00	30.76	315.31	868.95	910.40	771.85	453.31	-45.24	0.00
0.00	0.40	5.40	20.40	26.40	32.40	38.40	44.40	44.00
0.00	38.24	320.63	867.78	906.65	765.51	444.38	-56.76	0.00
0.00	0.50	5.50	20.50	26.50	32.50	38.50	44.50	44.00
0.00	45.63	325.85	866.54	902.81	759.08	435.35	-68.37	0.00
0.00	0.60	5.60	20.60	26.60	32.60	38.60	44.60	44.00
0.00	52.93	331.00	865.20	898.88	752.57	426.25	-80.07	0.00
0.00	0.70	5.70	20.70	26.70	32.70	38.70	44.70	44.00
0.00	0.00	293.18	872.73	924.55	796.36	488.18	0.00	0.00
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	44.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 44' Span, Axles 4-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	0.00	0.00		0.00	0.00	0
4	10.00	20.00		0.00	88.96	0
5	15.00	30.00	15.00	15.00	133.45	457
6	15.00	30.00	6.00	21.00	133.45	640
7	15.00	30.00	6.00	27.00	133.45	823
8	15.00	30.00	6.00	33.00	133.45	1006
(Rear) 9	15.00	30.00	6.00	39.00	133.45	1189
<b>Totals</b>	<b>85.00</b>	<b>170.00</b>	<b>39.00</b>		<b>756.2</b>	
				Resultant at location:	23.824	726



**60 ft Span Length**

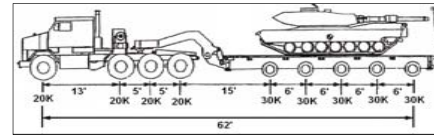
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
			0.00	15.00	21.00	27.00	33.00	39.00	21.00
			0.10	15.10	21.10	27.10	33.10	39.10	20.90
			0.20	15.20	21.20	27.20	33.20	39.20	20.80
			0.30	15.30	21.30	27.30	33.30	39.30	20.70
			0.40	15.40	21.40	27.40	33.40	39.40	20.60
			0.50	15.50	21.50	27.50	33.50	39.50	20.50
			0.60	15.60	21.60	27.60	33.60	39.60	20.40
			0.70	15.70	21.70	27.70	33.70	39.70	20.30
			21.00	36.00	42.00	48.00	54.00	60.00	0.00

Shear at React A, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
102.50	82.50	52.50	22.50	-7.50	-37.50	-67.50	67.50
0.00	0.00	15.00	21.00	27.00	33.00	39.00	60.00
102.22	82.22	52.22	22.22	-7.78	-37.78	-67.78	67.78
0.00	0.10	15.10	21.10	27.10	33.10	39.10	60.00
101.93	81.93	51.93	21.93	-8.07	-38.07	-68.07	68.07
0.00	0.20	15.20	21.20	27.20	33.20	39.20	60.00
101.65	81.65	51.65	21.65	-8.35	-38.35	-68.35	68.35
0.00	0.30	15.30	21.30	27.30	33.30	39.30	60.00
101.37	81.37	51.37	21.37	-8.63	-38.63	-68.63	68.63
0.00	0.40	15.40	21.40	27.40	33.40	39.40	60.00
101.08	81.08	51.08	21.08	-8.92	-38.92	-68.92	68.92
0.00	0.50	15.50	21.50	27.50	33.50	39.50	60.00
100.80	80.80	50.80	20.80	-9.20	-39.20	-69.20	69.20
0.00	0.60	15.60	21.60	27.60	33.60	39.60	60.00
100.52	80.52	50.52	20.52	-9.48	-39.48	-69.48	69.48
0.00	0.70	15.70	21.70	27.70	33.70	39.70	60.00
43.00	23.00	-7.00	-37.00	-67.00	-97.00	-127.00	127.00
0.00	21.00	36.00	42.00	48.00	54.00	60.00	60.00

Moment at React A, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	1237.50	1552.50	1687.50	1642.50	1417.50	0.0
0.00	0.00	15.00	21.00	27.00	33.00	39.00	60.00
0.00	10.22	1243.47	1556.77	1690.07	1643.37	1416.67	0.0
0.00	0.10	15.10	21.10	27.10	33.10	39.10	60.00
0.00	20.39	1249.39	1560.99	1692.59	1644.19	1415.79	0.0
0.00	0.20	15.20	21.20	27.20	33.20	39.20	60.00
0.00	30.50	1255.25	1565.15	1695.05	1644.95	1414.85	0.0
0.00	0.30	15.30	21.30	27.30	33.30	39.30	60.00
0.00	40.55	1,261.05	1569.25	1,697.45	1,645.65	1,413.85	0.00
0.00	0.40	15.40	21.40	27.40	33.40	39.40	60.00
0.00	50.54	1,266.79	1,573.29	1,699.79	1,646.29	1,412.79	0.00
0.00	0.50	15.50	21.50	27.50	33.50	39.50	60.00
0.00	60.48	1,272.48	1,577.28	1,702.08	1,646.88	1,411.68	0.00
0.00	0.60	15.60	21.60	27.60	33.60	39.60	60.00
0.00	70.36	1,278.11	1,581.21	1,704.31	1,647.41	1,410.51	0.00
0.00	0.70	15.70	21.70	27.70	33.70	39.70	60.00
0.00	903.00	1,248.00	1,206.00	984.00	582.00	0.00	0.00
0.00	21.00	36.00	42.00	48.00	54.00	60.00	60.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 44' Span, Axles 4-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	0.00	0.00		0.00	0.00	0
4	10.00	20.00		0.00	88.96	0
5	15.00	30.00	15.00	15.00	133.45	457
6	15.00	30.00	6.00	21.00	133.45	640
7	15.00	30.00	6.00	27.00	133.45	823
8	15.00	30.00	6.00	33.00	133.45	1006
(Rear) 9	15.00	30.00	6.00	39.00	133.45	1189
<b>Totals</b>	<b>85.00</b>	<b>170.00</b>	<b>39.00</b>		<b>756.2</b>	<b>726</b>
				Resultant at location:	23.824	



55 ft Span Length

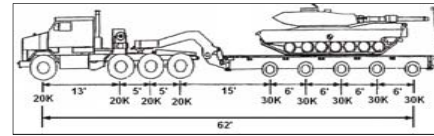
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
			0.00	15.00	21.00	27.00	33.00	39.00	16.00
			0.10	15.10	21.10	27.10	33.10	39.10	15.90
			0.20	15.20	21.20	27.20	33.20	39.20	15.80
			0.30	15.30	21.30	27.30	33.30	39.30	15.70
			0.40	15.40	21.40	27.40	33.40	39.40	15.60
			0.50	15.50	21.50	27.50	33.50	39.50	15.50
			0.60	15.60	21.60	27.60	33.60	39.60	15.40
			0.70	15.70	21.70	27.70	33.70	39.70	15.30
			16.00	31.00	37.00	43.00	49.00	55.00	0.00

Shear at React A, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
96.36	76.36	46.36	16.36	-13.64	-43.64	-73.64	73.64
0.00	0.00	15.00	21.00	27.00	33.00	39.00	55.00
96.05	76.05	46.05	16.05	-13.95	-43.95	-73.95	73.95
0.00	0.10	15.10	21.10	27.10	33.10	39.10	55.00
95.75	75.75	45.75	15.75	-14.25	-44.25	-74.25	74.25
0.00	0.20	15.20	21.20	27.20	33.20	39.20	55.00
95.44	75.44	45.44	15.44	-14.56	-44.56	-74.56	74.56
0.00	0.30	15.30	21.30	27.30	33.30	39.30	55.00
95.13	75.13	45.13	15.13	-14.87	-44.87	-74.87	74.87
0.00	0.40	15.40	21.40	27.40	33.40	39.40	55.00
94.82	74.82	44.82	14.82	-15.18	-45.18	-75.18	75.18
0.00	0.50	15.50	21.50	27.50	33.50	39.50	55.00
94.51	74.51	44.51	14.51	-15.49	-45.49	-75.49	75.49
0.00	0.60	15.60	21.60	27.60	33.60	39.60	55.00
94.20	74.20	44.20	14.20	-15.80	-45.80	-75.80	75.80
0.00	0.70	15.70	21.70	27.70	33.70	39.70	55.00
46.91	26.91	-3.09	-33.09	-63.09	-93.09	-123.09	123.09
0.00	16.00	31.00	37.00	43.00	49.00	55.00	55.00

Moment at React A, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	1145.45	1423.64	1521.82	1440.00	1178.18	0.0
0.00	0.00	15.00	21.00	27.00	33.00	39.00	55.00
0.00	9.61	1150.42	1426.75	1523.08	1439.41	1175.73	0.0
0.00	0.10	15.10	21.10	27.10	33.10	39.10	55.00
0.00	19.15	1155.33	1429.80	1524.28	1438.75	1173.22	0.0
0.00	0.20	15.20	21.20	27.20	33.20	39.20	55.00
0.00	28.63	1160.18	1432.79	1525.41	1438.03	1170.65	0.0
0.00	0.30	15.30	21.30	27.30	33.30	39.30	55.00
0.00	38.05	1,164.96	1435.72	1,526.49	1,437.25	1,168.01	0.00
0.00	0.40	15.40	21.40	27.40	33.40	39.40	55.00
0.00	47.41	1,169.68	1,438.59	1,527.50	1,436.41	1,165.32	0.00
0.00	0.50	15.50	21.50	27.50	33.50	39.50	55.00
0.00	56.71	1,174.34	1,441.40	1,528.45	1,435.51	1,162.56	0.00
0.00	0.60	15.60	21.60	27.60	33.60	39.60	55.00
0.00	65.94	1,178.94	1,444.14	1,529.34	1,434.54	1,159.74	0.00
0.00	0.70	15.70	21.70	27.70	33.70	39.70	55.00
0.00	750.55	1,154.18	1,135.64	937.09	558.55	0.00	0.00
0.00	16.00	31.00	37.00	43.00	49.00	55.00	55.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 44' Span, Axles 4-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	0.00	0.00		0.00	0.00	0
4	10.00	20.00		0.00	88.96	0
5	15.00	30.00	15.00	15.00	133.45	457
6	15.00	30.00	6.00	21.00	133.45	640
7	15.00	30.00	6.00	27.00	133.45	823
8	15.00	30.00	6.00	33.00	133.45	1006
(Rear) 9	15.00	30.00	6.00	39.00	133.45	1189
<b>Totals</b>	<b>85.00</b>	<b>170.00</b>	<b>39.00</b>		<b>756.2</b>	
				Resultant at location:	23.824	726



52 ft Span Length

Front #1 Axle Position AX 1	Middle #2 Axle Position AX 2	Middle #3 Axle Position AX 3	Middle #4 Axle Position AX 4	Middle #5 Axle Position AX 5	Middle #6 Axle Position AX 6	Middle #7 Axle Position AX 7	Middle #8 Axle Position AX 8	Rear #9 Axle Position AX 9	Dist to Beam End L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
			0.00	15.00	21.00	27.00	33.00	39.00	13.00
			0.10	15.10	21.10	27.10	33.10	39.10	12.90
			0.20	15.20	21.20	27.20	33.20	39.20	12.80
			0.30	15.30	21.30	27.30	33.30	39.30	12.70
			0.40	15.40	21.40	27.40	33.40	39.40	12.60
			0.50	15.50	21.50	27.50	33.50	39.50	12.50
			0.60	15.60	21.60	27.60	33.60	39.60	12.40
			0.70	15.70	21.70	27.70	33.70	39.70	12.30
			13.00	28.00	34.00	40.00	46.00	52.00	0.00

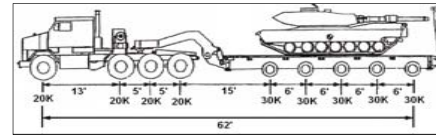
Shear at React A, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
92.12	72.12	42.12	12.12	-17.88	-47.88	-77.88	77.88
0.00	0.00	15.00	21.00	27.00	33.00	39.00	52.00
91.79	71.79	41.79	11.79	-18.21	-48.21	-78.21	78.21
0.00	0.10	15.10	21.10	27.10	33.10	39.10	52.00
91.46	71.46	41.46	11.46	-18.54	-48.54	-78.54	78.54
0.00	0.20	15.20	21.20	27.20	33.20	39.20	52.00
91.13	71.13	41.13	11.13	-18.87	-48.87	-78.87	78.87
0.00	0.30	15.30	21.30	27.30	33.30	39.30	52.00
90.81	70.81	40.81	10.81	-19.19	-49.19	-79.19	79.19
0.00	0.40	15.40	21.40	27.40	33.40	39.40	52.00
90.48	70.48	40.48	10.48	-19.52	-49.52	-79.52	79.52
0.00	0.50	15.50	21.50	27.50	33.50	39.50	52.00
90.15	70.15	40.15	10.15	-19.85	-49.85	-79.85	79.85
0.00	0.60	15.60	21.60	27.60	33.60	39.60	52.00
89.83	69.83	39.83	9.83	-20.17	-50.17	-80.17	80.17
0.00	0.70	15.70	21.70	27.70	33.70	39.70	52.00
49.62	29.62	-0.38	-30.38	-60.38	-90.38	-120.38	120.38
0.00	13.00	28.00	34.00	40.00	46.00	52.00	52.00

Moment at React A, ft- kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft- kips
0.00	0.00	1081.73	1334.42	1407.12	1299.81	1012.50	0.0
0.00	0.00	15.00	21.00	27.00	33.00	39.00	52.00
0.00	9.18	1086.01	1336.74	1407.47	1298.20	1008.93	0.0
0.00	0.10	15.10	21.10	27.10	33.10	39.10	52.00
0.00	18.29	1090.22	1338.98	1407.75	1296.52	1005.29	0.0
0.00	0.20	15.20	21.20	27.20	33.20	39.20	52.00
0.00	27.34	1094.36	1341.17	1407.98	1294.78	1001.59	0.0
0.00	0.30	15.30	21.30	27.30	33.30	39.30	52.00
0.00	36.32	1,098.44	1343.28	1,408.13	1,292.98	997.82	0.00
0.00	0.40	15.40	21.40	27.40	33.40	39.40	52.00
0.00	45.24	1,102.45	1,345.34	1,408.22	1,291.11	993.99	0.00
0.00	0.50	15.50	21.50	27.50	33.50	39.50	52.00
0.00	54.09	1,106.40	1,347.32	1,408.25	1,289.17	990.09	0.00
0.00	0.60	15.60	21.60	27.60	33.60	39.60	52.00
0.00	62.88	1,110.28	1,349.24	1,408.21	1,287.17	986.13	0.00
0.00	0.70	15.70	21.70	27.70	33.70	39.70	52.00
0.00	645.00	1,089.23	1,086.92	904.62	542.31	0.00	0.00
0.00	13.00	28.00	34.00	40.00	46.00	52.00	52.00



**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 44' Span, Axles 4-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	0.00	0.00		0.00	0.00	0
4	10.00	20.00		0.00	88.96	0
5	15.00	30.00	15.00	15.00	133.45	457
6	15.00	30.00	6.00	21.00	133.45	640
7	15.00	30.00	6.00	27.00	133.45	823
8	15.00	30.00	6.00	33.00	133.45	1006
(Rear) 9	15.00	30.00	6.00	39.00	133.45	1189
<b>Totals</b>	<b>85.00</b>	<b>170.00</b>	<b>39.00</b>		<b>756.2</b>	
				Resultant at location:	23.824	726



**50 ft Span Length**

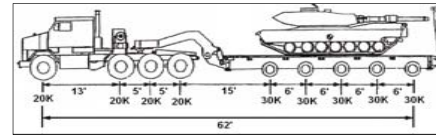
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
			0.00	15.00	21.00	27.00	33.00	39.00	11.00
			0.10	15.10	21.10	27.10	33.10	39.10	10.90
			0.20	15.20	21.20	27.20	33.20	39.20	10.80
			0.30	15.30	21.30	27.30	33.30	39.30	10.70
			0.40	15.40	21.40	27.40	33.40	39.40	10.60
			0.50	15.50	21.50	27.50	33.50	39.50	10.50
			0.60	15.60	21.60	27.60	33.60	39.60	10.40
			0.70	15.70	21.70	27.70	33.70	39.70	10.30
			11.00	26.00	32.00	38.00	44.00	50.00	0.00

Shear at React A, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
89.00	69.00	39.00	9.00	-21.00	-51.00	-81.00	81.00
0.00	0.00	15.00	21.00	27.00	33.00	39.00	50.00
88.66	68.66	38.66	8.66	-21.34	-51.34	-81.34	81.34
0.00	0.10	15.10	21.10	27.10	33.10	39.10	50.00
88.32	68.32	38.32	8.32	-21.68	-51.68	-81.68	81.68
0.00	0.20	15.20	21.20	27.20	33.20	39.20	50.00
87.98	67.98	37.98	7.98	-22.02	-52.02	-82.02	82.02
0.00	0.30	15.30	21.30	27.30	33.30	39.30	50.00
87.64	67.64	37.64	7.64	-22.36	-52.36	-82.36	82.36
0.00	0.40	15.40	21.40	27.40	33.40	39.40	50.00
87.30	67.30	37.30	7.30	-22.70	-52.70	-82.70	82.70
0.00	0.50	15.50	21.50	27.50	33.50	39.50	50.00
86.96	66.96	36.96	6.96	-23.04	-53.04	-83.04	83.04
0.00	0.60	15.60	21.60	27.60	33.60	39.60	50.00
86.62	66.62	36.62	6.62	-23.38	-53.38	-83.38	83.38
0.00	0.70	15.70	21.70	27.70	33.70	39.70	50.00
51.60	31.60	1.60	-28.40	-58.40	-88.40	-118.40	118.40
0.00	11.00	26.00	32.00	38.00	44.00	50.00	50.00

Moment at React A, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	1035.00	1269.00	1323.00	1197.00	891.00	0.0
0.00	0.00	15.00	21.00	27.00	33.00	39.00	50.00
0.00	8.87	1038.77	1270.73	1322.69	1194.65	886.61	0.0
0.00	0.10	15.10	21.10	27.10	33.10	39.10	50.00
0.00	17.66	1042.46	1272.38	1322.30	1192.22	882.14	0.0
0.00	0.20	15.20	21.20	27.20	33.20	39.20	50.00
0.00	26.39	1046.09	1273.97	1321.85	1189.73	877.61	0.0
0.00	0.30	15.30	21.30	27.30	33.30	39.30	50.00
0.00	35.06	1,049.66	1275.50	1,321.34	1,187.18	873.02	0.00
0.00	0.40	15.40	21.40	27.40	33.40	39.40	50.00
0.00	43.65	1,053.15	1,276.95	1,320.75	1,184.55	868.35	0.00
0.00	0.50	15.50	21.50	27.50	33.50	39.50	50.00
0.00	52.18	1,056.58	1,278.34	1,320.10	1,181.86	863.62	0.00
0.00	0.60	15.60	21.60	27.60	33.60	39.60	50.00
0.00	60.63	1,059.93	1,279.65	1,319.37	1,179.09	858.81	0.00
0.00	0.70	15.70	21.70	27.70	33.70	39.70	50.00
0.00	567.60	1,041.60	1,051.20	880.80	530.40	0.00	0.00
0.00	11.00	26.00	32.00	38.00	44.00	50.00	50.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 44' Span, Axles 4-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	0.00	0.00		0.00	0.00	0
4	10.00	20.00		0.00	88.96	0
5	15.00	30.00	15.00	15.00	133.45	457
6	15.00	30.00	6.00	21.00	133.45	640
7	15.00	30.00	6.00	27.00	133.45	823
8	15.00	30.00	6.00	33.00	133.45	1006
(Rear) 9	15.00	30.00	6.00	39.00	133.45	1189
<b>Totals</b>	<b>85.00</b>	<b>170.00</b>	<b>39.00</b>		<b>756.2</b>	<b>726</b>
				Resultant at location:	23.824	



49 ft Span Length

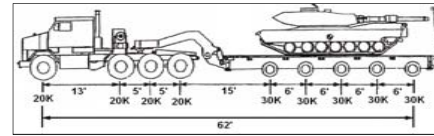
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
			0.00	15.00	21.00	27.00	33.00	39.00	10.00
			0.10	15.10	21.10	27.10	33.10	39.10	9.90
			0.20	15.20	21.20	27.20	33.20	39.20	9.80
			0.30	15.30	21.30	27.30	33.30	39.30	9.70
			0.40	15.40	21.40	27.40	33.40	39.40	9.60
			0.50	15.50	21.50	27.50	33.50	39.50	9.50
			0.60	15.60	21.60	27.60	33.60	39.60	9.40
			0.70	15.70	21.70	27.70	33.70	39.70	9.30
			10.00	25.00	31.00	37.00	43.00	49.00	0.00

Shear at React A, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
87.35	67.35	37.35	7.35	-22.65	-52.65	-82.65	82.65
0.00	0.00	15.00	21.00	27.00	33.00	39.00	49.00
87.00	67.00	37.00	7.00	-23.00	-53.00	-83.00	83.00
0.00	0.10	15.10	21.10	27.10	33.10	39.10	49.00
86.65	66.65	36.65	6.65	-23.35	-53.35	-83.35	83.35
0.00	0.20	15.20	21.20	27.20	33.20	39.20	49.00
86.31	66.31	36.31	6.31	-23.69	-53.69	-83.69	83.69
0.00	0.30	15.30	21.30	27.30	33.30	39.30	49.00
85.96	65.96	35.96	5.96	-24.04	-54.04	-84.04	84.04
0.00	0.40	15.40	21.40	27.40	33.40	39.40	49.00
85.61	65.61	35.61	5.61	-24.39	-54.39	-84.39	84.39
0.00	0.50	15.50	21.50	27.50	33.50	39.50	49.00
85.27	65.27	35.27	5.27	-24.73	-54.73	-84.73	84.73
0.00	0.60	15.60	21.60	27.60	33.60	39.60	49.00
84.92	64.92	34.92	4.92	-25.08	-55.08	-85.08	85.08
0.00	0.70	15.70	21.70	27.70	33.70	39.70	49.00
52.65	32.65	2.65	-27.35	-57.35	-87.35	-117.35	117.35
0.00	10.00	25.00	31.00	37.00	43.00	49.00	49.00

Moment at React A, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	1010.20	1234.29	1278.37	1142.45	826.53	0.0
0.00	0.00	15.00	21.00	27.00	33.00	39.00	49.00
0.00	8.70	1013.70	1235.70	1277.70	1139.70	821.70	0.0
0.00	0.10	15.10	21.10	27.10	33.10	39.10	49.00
0.00	17.33	1017.13	1237.04	1276.96	1136.88	816.80	0.0
0.00	0.20	15.20	21.20	27.20	33.20	39.20	49.00
0.00	25.89	1020.48	1238.32	1276.16	1133.99	811.83	0.0
0.00	0.30	15.30	21.30	27.30	33.30	39.30	49.00
0.00	34.38	1,023.77	1239.53	1,275.28	1,131.04	806.79	0.00
0.00	0.40	15.40	21.40	27.40	33.40	39.40	49.00
0.00	42.81	1,026.99	1,240.66	1,274.34	1,128.01	801.68	0.00
0.00	0.50	15.50	21.50	27.50	33.50	39.50	49.00
0.00	51.16	1,030.14	1,241.73	1,273.32	1,124.91	796.51	0.00
0.00	0.60	15.60	21.60	27.60	33.60	39.60	49.00
0.00	59.44	1,033.22	1,242.73	1,272.24	1,121.75	791.26	0.00
0.00	0.70	15.70	21.70	27.70	33.70	39.70	49.00
0.00	526.53	1,016.33	1,032.24	868.16	524.08	0.00	0.00
0.00	10.00	25.00	31.00	37.00	43.00	49.00	49.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 44' Span, Axles 4-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	0.00	0.00		0.00	0.00	0
4	10.00	20.00		0.00	88.96	0
5	15.00	30.00	15.00	15.00	133.45	457
6	15.00	30.00	6.00	21.00	133.45	640
7	15.00	30.00	6.00	27.00	133.45	823
8	15.00	30.00	6.00	33.00	133.45	1006
(Rear) 9	15.00	30.00	6.00	39.00	133.45	1189
<b>Totals</b>	<b>85.00</b>	<b>170.00</b>	<b>39.00</b>		<b>756.2</b>	
Resultant at location:				<b>23.824</b>		<b>726</b>



47 ft Span Length

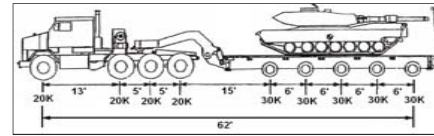
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
			0.00	15.00	21.00	27.00	33.00	39.00	8.00
			0.10	15.10	21.10	27.10	33.10	39.10	7.90
			0.20	15.20	21.20	27.20	33.20	39.20	7.80
			0.30	15.30	21.30	27.30	33.30	39.30	7.70
			0.40	15.40	21.40	27.40	33.40	39.40	7.60
			0.50	15.50	21.50	27.50	33.50	39.50	7.50
			0.60	15.60	21.60	27.60	33.60	39.60	7.40
			0.70	15.70	21.70	27.70	33.70	39.70	7.30
			0.80	23.00	29.00	35.00	41.00	47.00	0.00

Shear at React A, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
83.83	63.83	33.83	3.83	-26.17	-56.17	-86.17	86.17
0.00	0.00	15.00	21.00	27.00	33.00	39.00	47.00
83.47	63.47	33.47	3.47	-26.53	-56.53	-86.53	86.53
0.00	0.10	15.10	21.10	27.10	33.10	39.10	47.00
83.11	63.11	33.11	3.11	-26.89	-56.89	-86.89	86.89
0.00	0.20	15.20	21.20	27.20	33.20	39.20	47.00
82.74	62.74	32.74	2.74	-27.26	-57.26	-87.26	87.26
0.00	0.30	15.30	21.30	27.30	33.30	39.30	47.00
82.38	62.38	32.38	2.38	-27.62	-57.62	-87.62	87.62
0.00	0.40	15.40	21.40	27.40	33.40	39.40	47.00
82.02	62.02	32.02	2.02	-27.98	-57.98	-87.98	87.98
0.00	0.50	15.50	21.50	27.50	33.50	39.50	47.00
81.66	61.66	31.66	1.66	-28.34	-58.34	-88.34	88.34
0.00	0.60	15.60	21.60	27.60	33.60	39.60	47.00
81.30	61.30	31.30	1.30	-28.70	-58.70	-88.70	88.70
0.00	0.70	15.70	21.70	27.70	33.70	39.70	47.00
54.89	34.89	4.89	-25.11	-55.11	-85.11	-115.11	115.11
0.00	8.00	23.00	29.00	35.00	41.00	47.00	47.00

Moment at React A, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	957.45	1160.43	1183.40	1026.38	689.36	0.0
0.00	0.00	15.00	21.00	27.00	33.00	39.00	47.00
0.00	8.35	960.37	1161.18	1181.99	1022.79	683.60	0.0
0.00	0.10	15.10	21.10	27.10	33.10	39.10	47.00
0.00	16.62	963.22	1161.86	1180.49	1019.13	677.77	0.0
0.00	0.20	15.20	21.20	27.20	33.20	39.20	47.00
0.00	24.82	965.99	1162.46	1178.93	1015.40	671.87	0.0
0.00	0.30	15.30	21.30	27.30	33.30	39.30	47.00
0.00	32.95	968.70	1163.00	1177.29	1011.59	665.89	0.00
0.00	0.40	15.40	21.40	27.40	33.40	39.40	47.00
0.00	41.01	971.33	1163.46	1175.59	1007.71	659.84	0.00
0.00	0.50	15.50	21.50	27.50	33.50	39.50	47.00
0.00	49.00	973.89	1163.85	1173.80	1003.76	653.72	0.00
0.00	0.60	15.60	21.60	27.60	33.60	39.60	47.00
0.00	56.91	976.38	1164.16	1171.95	999.74	647.53	0.00
0.00	0.70	15.70	21.70	27.70	33.70	39.70	47.00
0.00	439.15	962.55	991.91	841.28	510.64	0.00	0.00
0.00	8.00	23.00	29.00	35.00	41.00	47.00	47.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 44' Span, Axles 4-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	0.00	0.00		0.00	0.00	0
4	10.00	20.00		0.00	88.96	0
5	15.00	30.00	15.00	15.00	133.45	457
6	15.00	30.00	6.00	21.00	133.45	640
7	15.00	30.00	6.00	27.00	133.45	823
8	15.00	30.00	6.00	33.00	133.45	1006
(Rear) 9	15.00	30.00	6.00	39.00	133.45	1189
Totals	85.00	170.00	39.00		756.2	
			Resultant at location:	23.824		726



**45 ft Span Length**

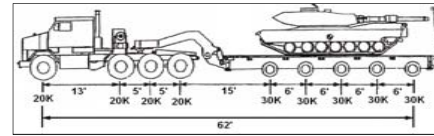
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
			0.00	15.00	21.00	27.00	33.00	39.00	6.00
			0.10	15.10	21.10	27.10	33.10	39.10	5.90
			0.20	15.20	21.20	27.20	33.20	39.20	5.80
			0.30	15.30	21.30	27.30	33.30	39.30	5.70
			0.40	15.40	21.40	27.40	33.40	39.40	5.60
			0.50	15.50	21.50	27.50	33.50	39.50	5.50
			0.60	15.60	21.60	27.60	33.60	39.60	5.40
			0.70	15.70	21.70	27.70	33.70	39.70	5.30
			0.80	15.80	21.80	27.80	33.80	39.80	5.20
			0.90	15.90	21.90	27.90	33.90	39.90	5.10
			1.00	16.00	22.00	28.00	34.00	40.00	5.00
			1.10	16.10	22.10	28.10	34.10	40.10	4.90
			1.20	16.20	22.20	28.20	34.20	40.20	4.80
			1.30	16.30	22.30	28.30	34.30	40.30	4.70
			1.40	16.40	22.40	28.40	34.40	40.40	4.60
			1.50	16.50	22.50	28.50	34.50	40.50	4.50
			1.60	16.60	22.60	28.60	34.60	40.60	4.40
			1.70	16.70	22.70	28.70	34.70	40.70	4.30
			1.80	16.80	22.80	28.80	34.80	40.80	4.20
			1.90	16.90	22.90	28.90	34.90	40.90	4.10
			2.00	17.00	23.00	29.00	35.00	41.00	4.00

Shear at React A, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
80.00	60.00	30.00	0.00	-30.00	-60.00	-90.00	90.00
0.00	0.00	15.00	21.00	27.00	33.00	39.00	45.00
79.62	59.62	29.62	-0.38	-30.38	-60.38	-90.38	90.38
0.00	0.10	15.10	21.10	27.10	33.10	39.10	45.00
79.24	59.24	29.24	-0.76	-30.76	-60.76	-90.76	90.76
0.00	0.20	15.20	21.20	27.20	33.20	39.20	45.00
78.87	58.87	28.87	-1.13	-31.13	-61.13	-91.13	91.13
0.00	0.30	15.30	21.30	27.30	33.30	39.30	45.00
78.49	58.49	28.49	-1.51	-31.51	-61.51	-91.51	91.51
0.00	0.40	15.40	21.40	27.40	33.40	39.40	45.00
78.11	58.11	28.11	-1.89	-31.89	-61.89	-91.89	91.89
0.00	0.50	15.50	21.50	27.50	33.50	39.50	45.00
77.73	57.73	27.73	-2.27	-32.27	-62.27	-92.27	92.27
0.00	0.60	15.60	21.60	27.60	33.60	39.60	45.00
77.36	57.36	27.36	-2.64	-32.64	-62.64	-92.64	92.64
0.00	0.70	15.70	21.70	27.70	33.70	39.70	45.00
57.33	37.33	7.33	-22.67	-52.67	-82.67	-112.67	112.67
0.00	6.00	21.00	27.00	33.00	39.00	45.00	45.00

Moment at React A, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	900.00	1080.00	1080.00	900.00	540.00	0.0
0.00	0.00	15.00	21.00	27.00	33.00	39.00	45.00
0.00	7.96	902.30	1080.03	1077.76	895.50	533.23	0.0
0.00	0.10	15.10	21.10	27.10	33.10	39.10	45.00
0.00	15.85	904.52	1079.98	1075.45	890.92	526.38	0.0
0.00	0.20	15.20	21.20	27.20	33.20	39.20	45.00
0.00	23.66	906.66	1079.86	1073.06	886.26	519.46	0.0
0.00	0.30	15.30	21.30	27.30	33.30	39.30	45.00
0.00	31.40	908.73	1079.66	1,070.60	881.53	512.46	0.00
0.00	0.40	15.40	21.40	27.40	33.40	39.40	45.00
0.00	39.06	910.72	1,079.39	1,068.06	876.72	505.39	0.00
0.00	0.50	15.50	21.50	27.50	33.50	39.50	45.00
0.00	46.64	912.64	1,079.04	1,065.44	871.84	498.24	0.00
0.00	0.60	15.60	21.60	27.60	33.60	39.60	45.00
0.00	54.15	914.48	1,078.62	1,062.75	866.88	491.02	0.00
0.00	0.70	15.70	21.70	27.70	33.70	39.70	45.00
0.00	344.00	904.00	948.00	812.00	496.00	0.00	0.00
0.00	6.00	21.00	27.00	33.00	39.00	45.00	45.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 44' Span, Axles 4-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	0.00	0.00		0.00	0.00	0
4	10.00	20.00		0.00	88.96	0
5	15.00	30.00	15.00	15.00	133.45	457
6	15.00	30.00	6.00	21.00	133.45	640
7	15.00	30.00	6.00	27.00	133.45	823
8	15.00	30.00	6.00	33.00	133.45	1006
(Rear) 9	15.00	30.00	6.00	39.00	133.45	1189
Totals	85.00	170.00	39.00		756.2	
			Resultant at location:	23.824		726



**44 ft Span Length**

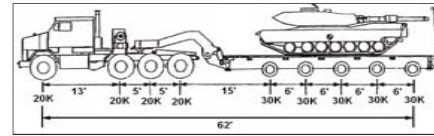
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
			0.00	15.00	21.00	27.00	33.00	39.00	5.00
			0.10	15.10	21.10	27.10	33.10	39.10	4.90
			0.20	15.20	21.20	27.20	33.20	39.20	4.80
			0.30	15.30	21.30	27.30	33.30	39.30	4.70
			0.40	15.40	21.40	27.40	33.40	39.40	4.60
			0.50	15.50	21.50	27.50	33.50	39.50	4.50
			0.60	15.60	21.60	27.60	33.60	39.60	4.40
			0.70	15.70	21.70	27.70	33.70	39.70	4.30
			0.80	15.80	21.80	27.80	33.80	39.80	4.20
			0.90	15.90	21.90	27.90	33.90	39.90	4.10
			1.00	16.00	22.00	28.00	34.00	40.00	4.00

Shear at React A, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
77.95	57.95	27.95	-2.05	-32.05	-62.05	-92.05	92.05
0.00	0.00	15.00	21.00	27.00	33.00	39.00	44.00
77.57	57.57	27.57	-2.43	-32.43	-62.43	-92.43	92.43
0.00	0.10	15.10	21.10	27.10	33.10	39.10	44.00
77.18	57.18	27.18	-2.82	-32.82	-62.82	-92.82	92.82
0.00	0.20	15.20	21.20	27.20	33.20	39.20	44.00
76.80	56.80	26.80	-3.20	-33.20	-63.20	-93.20	93.20
0.00	0.30	15.30	21.30	27.30	33.30	39.30	44.00
76.41	56.41	26.41	-3.59	-33.59	-63.59	-93.59	93.59
0.00	0.40	15.40	21.40	27.40	33.40	39.40	44.00
76.02	56.02	26.02	-3.98	-33.98	-63.98	-93.98	93.98
0.00	0.50	15.50	21.50	27.50	33.50	39.50	44.00
75.64	55.64	25.64	-4.36	-34.36	-64.36	-94.36	94.36
0.00	0.60	15.60	21.60	27.60	33.60	39.60	44.00
75.25	55.25	25.25	-4.75	-34.75	-64.75	-94.75	94.75
0.00	0.70	15.70	21.70	27.70	33.70	39.70	44.00
58.64	38.64	8.64	-21.36	-51.36	-81.36	-111.36	111.36
0.00	5.00	20.00	26.00	32.00	38.00	44.00	44.00

Moment at React A, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	869.32	1037.05	1024.77	832.50	460.23	0.0
0.00	0.00	15.00	21.00	27.00	33.00	39.00	44.00
0.00	7.76	871.28	1036.69	1022.10	827.51	452.92	0.0
0.00	0.10	15.10	21.10	27.10	33.10	39.10	44.00
0.00	15.44	873.16	1036.25	1019.35	822.44	445.53	0.0
0.00	0.20	15.20	21.20	27.20	33.20	39.20	44.00
0.00	23.04	874.97	1035.74	1016.52	817.29	438.06	0.0
0.00	0.30	15.30	21.30	27.30	33.30	39.30	44.00
0.00	30.56	876.70	1035.15	1,013.61	812.06	430.52	0.0
0.00	0.40	15.40	21.40	27.40	33.40	39.40	44.00
0.00	38.01	878.35	1,034.49	1,010.63	806.76	422.90	0.0
0.00	0.50	15.50	21.50	27.50	33.50	39.50	44.00
0.00	45.38	879.93	1,033.75	1,007.56	801.38	415.20	0.0
0.00	0.60	15.60	21.60	27.60	33.60	39.60	44.00
0.00	52.68	881.43	1,032.93	1,004.43	795.93	407.43	0.0
0.00	0.70	15.70	21.70	27.70	33.70	39.70	44.00
0.00	293.18	872.73	924.55	796.36	488.18	0.00	0.00
0.00	5.00	20.00	26.00	32.00	38.00	44.00	44.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 42' Span, Axles 4-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	0.00	0.00		0.00	0.00	0
4	10.00	20.00		0.00	88.96	0
5	15.00	30.00	15.00	15.00	133.45	457
6	15.00	30.00	6.00	21.00	133.45	640
7	15.00	30.00	6.00	27.00	133.45	823
8	15.00	30.00	6.00	33.00	133.45	1006
(Rear) 9	15.00	30.00	6.00	39.00	133.45	1189
<b>Totals</b>	<b>85.00</b>	<b>170.00</b>	<b>39.00</b>		<b>756.2</b>	<b>726</b>
				Resultant at location:	23.824	



**42 ft Span Length**

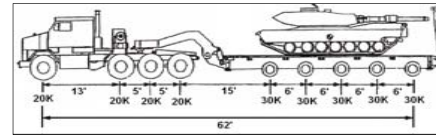
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
			0.00	15.00	21.00	27.00	33.00	39.00	3.00
			0.10	15.10	21.10	27.10	33.10	39.10	2.90
			0.20	15.20	21.20	27.20	33.20	39.20	2.80
			0.30	15.30	21.30	27.30	33.30	39.30	2.70
			0.40	15.40	21.40	27.40	33.40	39.40	2.60
			0.50	15.50	21.50	27.50	33.50	39.50	2.50
			0.60	15.60	21.60	27.60	33.60	39.60	2.40
			0.70	15.70	21.70	27.70	33.70	39.70	2.30
			3.00	18.00	24.00	30.00	36.00	42.00	0.00

Shear at React A, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
73.57	53.57	23.57	-6.43	-36.43	-66.43	-96.43	96.43
0.00	0.00	15.00	21.00	27.00	33.00	39.00	42.00
73.17	53.17	23.17	-6.83	-36.83	-66.83	-96.83	96.83
0.00	0.10	15.10	21.10	27.10	33.10	39.10	42.00
72.76	52.76	22.76	-7.24	-37.24	-67.24	-97.24	97.24
0.00	0.20	15.20	21.20	27.20	33.20	39.20	42.00
72.36	52.36	22.36	-7.64	-37.64	-67.64	-97.64	97.64
0.00	0.30	15.30	21.30	27.30	33.30	39.30	42.00
71.95	51.95	21.95	-8.05	-38.05	-68.05	-98.05	98.05
0.00	0.40	15.40	21.40	27.40	33.40	39.40	42.00
71.55	51.55	21.55	-8.45	-38.45	-68.45	-98.45	98.45
0.00	0.50	15.50	21.50	27.50	33.50	39.50	42.00
71.14	51.14	21.14	-8.86	-38.86	-68.86	-98.86	98.86
0.00	0.60	15.60	21.60	27.60	33.60	39.60	42.00
70.74	50.74	20.74	-9.26	-39.26	-69.26	-99.26	99.26
0.00	0.70	15.70	21.70	27.70	33.70	39.70	42.00
61.43	41.43	11.43	-18.57	-48.57	-78.57	-108.57	108.57
0.00	3.00	18.00	24.00	30.00	36.00	42.00	42.00

Moment at React A, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	803.57	945.00	906.43	687.86	289.29	0.0
0.00	0.00	15.00	21.00	27.00	33.00	39.00	42.00
0.00	7.32	804.82	943.82	902.82	681.82	280.82	0.0
0.00	0.10	15.10	21.10	27.10	33.10	39.10	42.00
0.00	14.55	805.98	942.55	899.12	675.70	272.27	0.0
0.00	0.20	15.20	21.20	27.20	33.20	39.20	42.00
0.00	21.71	807.06	941.21	895.35	669.49	263.64	0.0
0.00	0.30	15.30	21.30	27.30	33.30	39.30	42.00
0.00	28.78	808.07	939.78	891.50	663.21	254.92	0.00
0.00	0.40	15.40	21.40	27.40	33.40	39.40	42.00
0.00	35.77	808.99	938.27	887.56	656.85	246.13	0.00
0.00	0.50	15.50	21.50	27.50	33.50	39.50	42.00
0.00	42.69	809.83	936.69	883.54	650.40	237.26	0.00
0.00	0.60	15.60	21.60	27.60	33.60	39.60	42.00
0.00	49.52	810.59	935.02	879.45	643.87	228.30	0.00
0.00	0.70	15.70	21.70	27.70	33.70	39.70	42.00
0.00	184.29	805.71	874.29	762.86	471.43	0.00	0.00
0.00	3.00	18.00	24.00	30.00	36.00	42.00	42.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 40' Span, Axles 4-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	0.00	0.00		0.00	0.00	0
4	10.00	20.00		0.00	88.96	0
5	15.00	30.00	15.00	15.00	133.45	457
6	15.00	30.00	6.00	21.00	133.45	640
7	15.00	30.00	6.00	27.00	133.45	823
8	15.00	30.00	6.00	33.00	133.45	1006
(Rear) 9	15.00	30.00	6.00	39.00	133.45	1189
<b>Totals</b>	<b>85.00</b>	<b>170.00</b>	<b>39.00</b>		<b>756.2</b>	
				Resultant at location:	23.824	726



**40 ft Span Length**

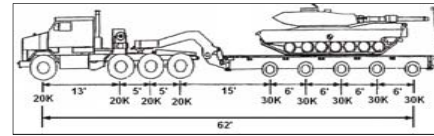
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
			0.00	15.00	21.00	27.00	33.00	39.00	1.00
			0.10	15.10	21.10	27.10	33.10	39.10	0.90
			0.20	15.20	21.20	27.20	33.20	39.20	0.80
			0.30	15.30	21.30	27.30	33.30	39.30	0.70
			0.40	15.40	21.40	27.40	33.40	39.40	0.60
			0.50	15.50	21.50	27.50	33.50	39.50	0.50
			0.60	15.60	21.60	27.60	33.60	39.60	0.40
			0.70	15.70	21.70	27.70	33.70	39.70	0.30
			1.00	16.00	22.00	28.00	34.00	40.00	0.00

Shear at React A, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
68.75	48.75	18.75	-11.25	-41.25	-71.25	-101.25	101.25
0.00	0.00	15.00	21.00	27.00	33.00	39.00	40.00
68.33	48.33	18.33	-11.68	-41.68	-71.68	-101.68	101.68
0.00	0.10	15.10	21.10	27.10	33.10	39.10	40.00
67.90	47.90	17.90	-12.10	-42.10	-72.10	-102.10	102.10
0.00	0.20	15.20	21.20	27.20	33.20	39.20	40.00
67.48	47.48	17.48	-12.53	-42.53	-72.53	-102.53	102.53
0.00	0.30	15.30	21.30	27.30	33.30	39.30	40.00
67.05	47.05	17.05	-12.95	-42.95	-72.95	-102.95	102.95
0.00	0.40	15.40	21.40	27.40	33.40	39.40	40.00
66.63	46.63	16.63	-13.38	-43.38	-73.38	-103.38	103.38
0.00	0.50	15.50	21.50	27.50	33.50	39.50	40.00
66.20	46.20	16.20	-13.80	-43.80	-73.80	-103.80	103.80
0.00	0.60	15.60	21.60	27.60	33.60	39.60	40.00
65.78	45.78	15.78	-14.23	-44.23	-74.23	-104.23	104.23
0.00	0.70	15.70	21.70	27.70	33.70	39.70	40.00
64.50	44.50	14.50	-15.50	-45.50	-75.50	-105.50	105.50
0.00	1.00	16.00	22.00	28.00	34.00	40.00	40.00

Moment at React A, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	731.25	843.75	776.25	528.75	101.25	0.0
0.00	0.00	15.00	21.00	27.00	33.00	39.00	40.00
0.00	6.83	731.71	841.66	771.61	521.56	91.51	0.0
0.00	0.10	15.10	21.10	27.10	33.10	39.10	40.00
0.00	13.58	732.08	839.48	766.88	514.28	81.68	0.0
0.00	0.20	15.20	21.20	27.20	33.20	39.20	40.00
0.00	20.24	732.37	837.22	762.07	506.92	71.77	0.0
0.00	0.30	15.30	21.30	27.30	33.30	39.30	40.00
0.00	26.82	732.57	834.87	757.17	499.47	61.77	0.00
0.00	0.40	15.40	21.40	27.40	33.40	39.40	40.00
0.00	33.31	732.69	832.44	752.19	491.94	51.69	0.00
0.00	0.50	15.50	21.50	27.50	33.50	39.50	40.00
0.00	39.72	732.72	829.92	747.12	484.32	41.52	0.00
0.00	0.60	15.60	21.60	27.60	33.60	39.60	40.00
0.00	46.04	732.67	827.32	741.97	476.62	31.27	0.00
0.00	0.70	15.70	21.70	27.70	33.70	39.70	40.00
0.00	64.50	732.00	819.00	726.00	453.00	0.00	0.00
0.00	1.00	16.00	22.00	28.00	34.00	40.00	40.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 39' Span, Axles 4-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	0.00	0.00		0.00	0.00	0
4	10.00	20.00		0.00	88.96	0
5	15.00	30.00	15.00	15.00	133.45	457
6	15.00	30.00	6.00	21.00	133.45	640
7	15.00	30.00	6.00	27.00	133.45	823
8	15.00	30.00	6.00	33.00	133.45	1006
(Rear) 9	15.00	30.00	6.00	39.00	133.45	1189
<b>Totals</b>	<b>85.00</b>	<b>170.00</b>	<b>39.00</b>		<b>756.2</b>	<b>726</b>
Resultant at location:				23.824		



**39 ft Span Length**

Front #1 Axle Position AX 1 ft	Middle #2 Axle Position AX 2 ft	Middle #3 Axle Position AX 3 ft	Middle #4 Axle Position AX 4 ft	Middle #5 Axle Position AX 5 ft	Middle #6 Axle Position AX 6 ft	Middle #7 Axle Position AX 7 ft	Middle #8 Axle Position AX 8 ft	Rear #9 Axle Position AX 9 ft	Dist to Beam End L END ft
			0.00	15.00	21.00	27.00	33.00	39.00	0.00
			0.10	15.10	21.10	27.10	33.10	39.10	-0.10
			0.20	15.20	21.20	27.20	33.20	39.20	-0.20
			0.30	15.30	21.30	27.30	33.30	39.30	-0.30
			0.40	15.40	21.40	27.40	33.40	39.40	-0.40
			0.50	15.50	21.50	27.50	33.50	39.50	-0.50
			0.60	15.60	21.60	27.60	33.60	39.60	-0.60
			0.70	15.70	21.70	27.70	33.70	39.70	-0.70
			0.00	15.00	21.00	27.00	33.00	39.00	0.00

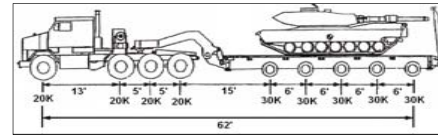
Shear at React A, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
66.15	46.15	16.15	-13.85	-43.85	-73.85	-103.85	103.85
0.00	0.00	15.00	21.00	27.00	33.00	39.00	39.00
65.72	45.72	15.72	-14.28	-44.28	-74.28	-104.28	104.28
0.00	0.10	15.10	21.10	27.10	33.10	39.10	39.00
65.28	45.28	15.28	-14.72	-44.72	-74.72	-104.72	104.72
0.00	0.20	15.20	21.20	27.20	33.20	39.20	39.00
64.85	44.85	14.85	-15.15	-45.15	-75.15	-105.15	105.15
0.00	0.30	15.30	21.30	27.30	33.30	39.30	39.00
64.41	44.41	14.41	-15.59	-45.59	-75.59	-105.59	105.59
0.00	0.40	15.40	21.40	27.40	33.40	39.40	39.00
63.97	43.97	13.97	-16.03	-46.03	-76.03	-106.03	106.03
0.00	0.50	15.50	21.50	27.50	33.50	39.50	39.00
63.54	43.54	13.54	-16.46	-46.46	-76.46	-106.46	106.46
0.00	0.60	15.60	21.60	27.60	33.60	39.60	39.00
63.10	43.10	13.10	-16.90	-46.90	-76.90	-106.90	106.90
0.00	0.70	15.70	21.70	27.70	33.70	39.70	39.00
66.15	46.15	16.15	-13.85	-43.85	-73.85	-103.85	103.85
0.00	0.00	15.00	21.00	27.00	33.00	39.00	39.00

Moment at React A, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	0.00	692.31	789.23	706.15	443.08	0.00	0.0
0.00	0.00	15.00	21.00	27.00	33.00	39.00	39.00
0.00	6.57	692.34	786.65	700.96	435.26	-10.43	0.0
0.00	0.10	15.10	21.10	27.10	33.10	39.10	39.00
0.00	13.06	692.29	783.98	695.67	427.36	-20.94	0.0
0.00	0.20	15.20	21.20	27.20	33.20	39.20	39.00
0.00	19.45	692.15	781.22	690.30	419.38	-31.55	0.0
0.00	0.30	15.30	21.30	27.30	33.30	39.30	39.00
0.00	25.76	691.92	778.38	684.84	411.30	-42.24	0.00
0.00	0.40	15.40	21.40	27.40	33.40	39.40	39.00
0.00	31.99	691.60	775.45	679.29	403.14	-53.01	0.00
0.00	0.50	15.50	21.50	27.50	33.50	39.50	39.00
0.00	38.12	691.20	772.43	673.66	394.89	-63.88	0.00
0.00	0.60	15.60	21.60	27.60	33.60	39.60	39.00
0.00	44.17	690.71	769.33	667.94	386.56	-74.83	0.00
0.00	0.70	15.70	21.70	27.70	33.70	39.70	39.00
0.00	0.00	692.31	789.23	706.15	443.08	0.00	0.00
0.00	0.00	15.00	21.00	27.00	33.00	39.00	39.00



**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 49' Span, Axles 2-9**

Axle	Load (ST)	Load (kips)	Distance		SI / Metric Units	
			btwn axles (ft)	from front axle (ft)	Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00	0.00	0.00	0.00	0
2	10.00	20.00		0.00	88.96	0
3	10.00	20.00	5.00	5.00	88.96	152
4	10.00	20.00	5.00	10.00	88.96	305
5	15.00	30.00	15.00	25.00	133.45	762
6	15.00	30.00	6.00	31.00	133.45	945
7	15.00	30.00	6.00	37.00	133.45	1128
8	15.00	30.00	6.00	43.00	133.45	1311
(Rear) 9	15.00	30.00	6.00	49.00	133.45	1494
<b>Totals</b>	<b>105.00</b>	<b>210.00</b>	<b>49.00</b>		<b>934.1</b>	<b>849</b>
Resultant at location:				<b>27.857</b>		



**65 ft Span Length**

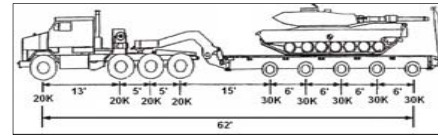
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	3.00
	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	2.90
	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	2.80
	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	2.70
	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	2.60
	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	2.50
	13.60	18.60	23.60	38.60	44.60	50.60	56.60	62.60	2.40
	13.70	18.70	23.70	38.70	44.70	50.70	56.70	62.70	2.30
	16.00	21.00	26.00	41.00	47.00	53.00	59.00	65.00	0.00

Shear at React A, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
78.00	58.00	38.00	18.00	-12.00	-42.00	-72.00	-102.00	-132.00	132.00
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	65.00
77.68	57.68	37.68	17.68	-12.32	-42.32	-72.32	-102.32	-132.32	132.32
0.00	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	65.00
77.35	57.35	37.35	17.35	-12.65	-42.65	-72.65	-102.65	-132.65	132.65
0.00	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	65.00
77.03	57.03	37.03	17.03	-12.97	-42.97	-72.97	-102.97	-132.97	132.97
0.00	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	65.00
76.71	56.71	36.71	16.71	-13.29	-43.29	-73.29	-103.29	-133.29	133.29
0.00	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	65.00
76.38	56.38	36.38	16.38	-13.62	-43.62	-73.62	-103.62	-133.62	133.62
0.00	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	65.00
76.06	56.06	36.06	16.06	-13.94	-43.94	-73.94	-103.94	-133.94	133.94
0.00	13.60	18.60	23.60	38.60	44.60	50.60	56.60	62.60	65.00
75.74	55.74	35.74	15.74	-14.26	-44.26	-74.26	-104.26	-134.26	134.26
0.00	13.70	18.70	23.70	38.70	44.70	50.70	56.70	62.70	65.00
68.31	48.31	28.31	8.31	-21.69	-51.69	-81.69	-111.69	-141.69	141.69
0.00	16.00	21.00	26.00	41.00	47.00	53.00	59.00	65.00	65.00

Moment at React A, ft-kips	Moment at #2 Axle, ft-kips	Moment at #3 Axle, ft-kips	Moment at #4 Axle, ft-kips	Moment at #5 Axle, ft-kips	Moment at #6 Axle, ft-kips	Moment at #7 Axle, ft-kips	Moment at #8 Axle, ft-kips	Moment at #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	1014.00	1304.00	1494.00	1764.00	1692.00	1440.00	1008.00	396.00	0.0
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	65.00
0.00	1017.57	1305.95	1494.34	1759.49	1685.55	1431.61	997.68	383.74	0.0
0.00	13.10	18.10	23.10	38.10	44.10	50.10	56.10	62.10	65.00
0.00	1021.07	1307.84	1494.61	1754.92	1679.04	1423.16	987.29	371.41	0.0
0.00	13.20	18.20	23.20	38.20	44.20	50.20	56.20	62.20	65.00
0.00	1024.51	1309.66	1494.82	1750.28	1672.46	1414.65	976.83	359.02	0.0
0.00	13.30	18.30	23.30	38.30	44.30	50.30	56.30	62.30	65.00
0.00	1,027.88	1,311.42	1494.96	1745.58	1665.82	1406.07	966.31	346.56	0.00
0.00	13.40	18.40	23.40	38.40	44.40	50.40	56.40	62.40	65.00
0.00	1,031.19	1,313.12	1495.04	1740.81	1659.12	1397.42	955.73	334.04	0.00
0.00	13.50	18.50	23.50	38.50	44.50	50.50	56.50	62.50	65.00
0.00	1,034.44	1,314.74	1495.05	1735.98	1652.34	1388.71	945.08	321.45	0.00
0.00	13.60	18.60	23.60	38.60	44.60	50.60	56.60	62.60	65.00
0.00	1,037.62	1,316.31	1495.00	1731.08	1645.51	1379.94	934.37	308.80	0.00
0.00	13.70	18.70	23.70	38.70	44.70	50.70	56.70	62.70	65.00
0.00	1,092.92	1,334.46	1476.00	1600.62	1470.46	1160.31	670.15	0.00	0.00
0.00	16.00	21.00	26.00	41.00	47.00	53.00	59.00	65.00	65.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 49' Span, Axles 2-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00	0.00	0.00	0.00	0
2	10.00	20.00	0.00	0.00	88.96	0
3	10.00	20.00	5.00	5.00	88.96	152
4	10.00	20.00	5.00	10.00	88.96	305
5	15.00	30.00	15.00	25.00	133.45	762
6	15.00	30.00	6.00	31.00	133.45	945
7	15.00	30.00	6.00	37.00	133.45	1128
8	15.00	30.00	6.00	43.00	133.45	1311
(Rear) 9	15.00	30.00	6.00	49.00	133.45	1494
<b>Totals</b>	<b>105.00</b>	<b>210.00</b>	<b>49.00</b>			
Resultant at location:				<b>27.857</b>		<b>849</b>



**49 ft Span Length**

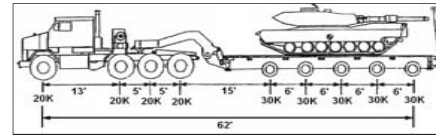
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	0.00
	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	3.00
	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	8.00
	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	10.00
	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	13.00
	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	18.00
	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	20.00
	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	28.00
	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	0.00

Shear at React A, kips	Shear at Mid #2 Axle, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
71.61	51.61	31.61	11.61	-18.39	-48.39	-78.39	-108.39	-138.39	138.39
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	49.00
78.00	58.00	38.00	18.00	-12.00	-42.00	-72.00	-102.00	-132.00	132.00
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	49.00
87.43	67.43	47.43	27.43	-2.57	-32.57	-62.57	-92.57	-122.57	122.57
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	49.00
90.83	70.83	50.83	30.83	0.83	-29.17	-59.17	-89.17	-119.17	119.17
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	49.00
95.60	75.60	55.60	35.60	5.60	-24.40	-54.40	-84.40	-114.40	114.40
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	49.00
102.75	82.75	62.75	42.75	12.75	-17.25	-47.25	-77.25	-107.25	107.25
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	49.00
105.37	85.37	65.37	45.37	15.37	-14.63	-44.63	-74.63	-104.63	104.63
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	49.00
114.67	94.67	74.67	54.67	24.67	-5.33	-35.33	-65.33	-95.33	95.33
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	49.00
90.61	70.61	50.61	30.61	0.61	-29.39	-59.39	-89.39	-119.39	119.39
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	49.00

Moment at React A, ft-kips	Moment at #2 Axle, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	930.97	1189.03	1347.10	1521.29	1410.97	1120.65	650.32	0.00	0.00
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	49.00
0.00	1014.00	1304.00	1494.00	1764.00	1692.00	1440.00	1008.00	396.00	0.00
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	49.00
0.00	1136.57	1473.71	1710.86	2122.29	2106.86	1911.43	1536.00	980.57	0.00
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	49.00
0.00	1180.83	1535.00	1789.17	2251.67	2256.67	2081.67	1726.67	1191.67	0.00
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	49.00
0.00	1242.80	1620.80	1898.80	2432.80	2466.40	2320.00	1993.60	1487.20	0.00
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	49.00
0.00	1335.75	1749.50	2063.25	2704.50	2781.00	2677.50	2394.00	1930.50	0.00
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	49.00
0.00	1369.76	1796.59	2123.41	2803.90	2896.10	2808.29	2540.49	2092.68	0.00
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	49.00
0.00	1490.67	1964.00	2337.33	3157.33	3305.33	3273.33	3061.33	2669.33	0.00
0.00	13.00	18.00	23.00	38.00	44.00	50.00	56.00	62.00	49.00
0.00	0.00	353.06	606.12	1065.31	1068.98	892.65	536.33	0.00	0.00
0.00	0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	49.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 44' Span, Axles 3-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	10.00	20.00		0.00	88.96	0
4	10.00	20.00	5.00	5.00	88.96	152
5	15.00	30.00	15.00	20.00	133.45	610
6	15.00	30.00	6.00	26.00	133.45	792
7	15.00	30.00	6.00	32.00	133.45	975
8	15.00	30.00	6.00	38.00	133.45	1158
(Rear) 9	15.00	30.00	6.00	44.00	133.45	1341
Totals	95.00	190.00	44.00		845.2	
Resultant at location:				25.789		786



**60 ft Span Length**

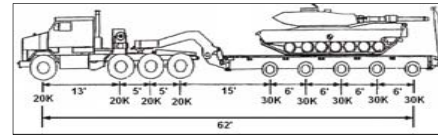
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
		5.00	10.00	25.00	31.00	37.00	43.00	49.00	11.00
		5.10	10.10	25.10	31.10	37.10	43.10	49.10	10.90
		5.20	10.20	25.20	31.20	37.20	43.20	49.20	10.80
		5.30	10.30	25.30	31.30	37.30	43.30	49.30	10.70
		5.40	10.40	25.40	31.40	37.40	43.40	49.40	10.60
		5.50	10.50	25.50	31.50	37.50	43.50	49.50	10.50
		5.60	10.60	25.60	31.60	37.60	43.60	49.60	10.40
		5.70	10.70	25.70	31.70	37.70	43.70	49.70	10.30
		16.00	21.00	36.00	42.00	48.00	54.00	60.00	0.00

Shear at React A, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
92.50	72.50	52.50	22.50	-7.50	-37.50	-67.50	-97.50	97.50
0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	60.00
92.18	72.18	52.18	22.18	-7.82	-37.82	-67.82	-97.82	97.82
0.00	5.10	10.10	25.10	31.10	37.10	43.10	49.10	60.00
91.87	71.87	51.87	21.87	-8.13	-38.13	-68.13	-98.13	98.13
0.00	5.20	10.20	25.20	31.20	37.20	43.20	49.20	60.00
91.55	71.55	51.55	21.55	-8.45	-38.45	-68.45	-98.45	98.45
0.00	5.30	10.30	25.30	31.30	37.30	43.30	49.30	60.00
91.23	71.23	51.23	21.23	-8.77	-38.77	-68.77	-98.77	98.77
0.00	5.40	10.40	25.40	31.40	37.40	43.40	49.40	60.00
90.92	70.92	50.92	20.92	-9.08	-39.08	-69.08	-99.08	99.08
0.00	5.50	10.50	25.50	31.50	37.50	43.50	49.50	60.00
90.60	70.60	50.60	20.60	-9.40	-39.40	-69.40	-99.40	99.40
0.00	5.60	10.60	25.60	31.60	37.60	43.60	49.60	60.00
90.28	70.28	50.28	20.28	-9.72	-39.72	-69.72	-99.72	99.72
0.00	5.70	10.70	25.70	31.70	37.70	43.70	49.70	60.00
57.67	37.67	17.67	-12.33	-42.33	-72.33	-102.33	-132.33	132.33
0.00	16.00	21.00	36.00	42.00	48.00	54.00	60.00	60.00

Moment at React A, ft-kips	Moment at Mid #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Mid #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	462.50	825.00	1612.50	1747.50	1702.50	1477.50	1072.50	0.00
0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	60.00
0.00	470.14	831.05	1613.80	1746.90	1700.00	1473.10	1066.20	0.00
0.00	5.10	10.10	25.10	31.10	37.10	43.10	49.10	60.00
0.00	477.71	837.04	1615.04	1746.24	1697.44	1468.64	1059.84	0.00
0.00	5.20	10.20	25.20	31.20	37.20	43.20	49.20	60.00
0.00	485.22	842.97	1616.22	1745.52	1694.82	1464.12	1053.42	0.00
0.00	5.30	10.30	25.30	31.30	37.30	43.30	49.30	60.00
0.00	492.66	848.83	1617.33	1744.73	1692.13	1459.53	1046.93	0.00
0.00	5.40	10.40	25.40	31.40	37.40	43.40	49.40	60.00
0.00	500.04	854.63	1618.38	1743.88	1689.38	1454.88	1040.38	0.00
0.00	5.50	10.50	25.50	31.50	37.50	43.50	49.50	60.00
0.00	507.36	860.36	1619.36	1742.96	1686.56	1450.16	1033.76	0.00
0.00	5.60	10.60	25.60	31.60	37.60	43.60	49.60	60.00
0.00	514.62	866.03	1620.28	1741.98	1683.68	1445.38	1027.08	0.00
0.00	5.70	10.70	25.70	31.70	37.70	43.70	49.70	60.00
0.00	922.67	1111.00	1376.00	1302.00	1048.00	614.00	0.00	0.00
0.00	16.00	21.00	36.00	42.00	48.00	54.00	60.00	60.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 44' Span, Axles 3-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	10.00	20.00		0.00	88.96	0
4	10.00	20.00	5.00	5.00	88.96	152
5	15.00	30.00	15.00	20.00	133.45	610
6	15.00	30.00	6.00	26.00	133.45	792
7	15.00	30.00	6.00	32.00	133.45	975
8	15.00	30.00	6.00	38.00	133.45	1158
(Rear) 9	15.00	30.00	6.00	44.00	133.45	1341
<b>Totals</b>	<b>95.00</b>	<b>190.00</b>	<b>44.00</b>		<b>845.2</b>	
			<b>Resultant at location:</b>	<b>25.789</b>		<b>786</b>



**44 ft Span Length**

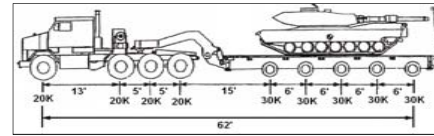
Front #1 Axle Position	Middle #2 Axle Position	Middle #3 Axle Position	Middle #4 Axle Position	Middle #5 Axle Position	Middle #6 Axle Position	Middle #7 Axle Position	Middle #8 Axle Position	Rear #9 Axle Position	Dist to Beam End
AX 1	AX 2	AX 3	AX 4	AX 5	AX 6	AX 7	AX 8	AX 9	L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
		5.00	10.00	25.00	31.00	37.00	43.00	49.00	6.00
		5.10	10.10	25.10	31.10	37.10	43.10	49.10	10.90
		5.20	10.20	25.20	31.20	37.20	43.20	49.20	12.80
		5.30	10.30	25.30	31.30	37.30	43.30	49.30	15.70
		5.40	10.40	25.40	31.40	37.40	43.40	49.40	20.60
		5.50	10.50	25.50	31.50	37.50	43.50	49.50	22.50
		5.60	10.60	25.60	31.60	37.60	43.60	49.60	25.40
		5.70	10.70	25.70	31.70	37.70	43.70	49.70	30.30
		0.00	5.00	20.00	26.00	32.00	38.00	44.00	0.00

Shear at React A, kips	Shear at Mid #3 Axle, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
83.64	63.64	43.64	13.64	-16.36	-46.36	-76.36	-106.36	106.36
0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	44.00
92.18	72.18	52.18	22.18	-7.82	-37.82	-67.82	-97.82	97.82
0.00	5.10	10.10	25.10	31.10	37.10	43.10	49.10	44.00
95.03	75.03	55.03	25.03	-4.97	-34.97	-64.97	-94.97	94.97
0.00	5.20	10.20	25.20	31.20	37.20	43.20	49.20	44.00
99.12	79.12	59.12	29.12	-0.88	-30.88	-60.88	-90.88	90.88
0.00	5.30	10.30	25.30	31.30	37.30	43.30	49.30	44.00
105.34	85.34	65.34	35.34	5.34	-24.66	-54.66	-84.66	84.66
0.00	5.40	10.40	25.40	31.40	37.40	43.40	49.40	44.00
107.43	87.43	67.43	37.43	7.43	-22.57	-52.57	-82.57	82.57
0.00	5.50	10.50	25.50	31.50	37.50	43.50	49.50	44.00
110.48	90.48	70.48	40.48	10.48	-19.52	-49.52	-79.52	79.52
0.00	5.60	10.60	25.60	31.60	37.60	43.60	49.60	44.00
115.21	95.21	75.21	45.21	15.21	-14.79	-44.79	-74.79	74.79
0.00	5.70	10.70	25.70	31.70	37.70	43.70	49.70	44.00
78.64	58.64	38.64	8.64	-21.36	-51.36	-81.36	-111.36	111.36
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	44.00

Moment at React A, ft-kips	Moment at #3 Axle, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	418.18	736.36	1390.91	1472.73	1374.55	1096.36	638.18	0.00
0.00	5.00	10.00	25.00	31.00	37.00	43.00	49.00	44.00
0.00	470.14	831.05	1613.80	1746.90	1700.00	1473.10	1066.20	0.00
0.00	5.10	10.10	25.10	31.10	37.10	43.10	49.10	44.00
0.00	494.17	869.33	1694.81	1845.01	1815.20	1605.39	1215.59	0.00
0.00	5.20	10.20	25.20	31.20	37.20	43.20	49.20	44.00
0.00	525.35	920.97	1807.81	1982.55	1977.29	1792.03	1426.77	0.00
0.00	5.30	10.30	25.30	31.30	37.30	43.30	49.30	44.00
0.00	568.85	995.57	1975.71	2187.77	2219.82	2071.88	1743.94	0.00
0.00	5.40	10.40	25.40	31.40	37.40	43.40	49.40	44.00
0.00	590.87	1028.02	2039.48	2264.06	2308.65	2173.23	1857.81	0.00
0.00	5.50	10.50	25.50	31.50	37.50	43.50	49.50	44.00
0.00	618.69	1071.09	2128.29	2371.17	2434.05	2316.93	2019.81	0.00
0.00	5.60	10.60	25.60	31.60	37.60	43.60	49.60	44.00
0.00	656.71	1132.77	2260.96	2532.24	2623.51	2534.79	2266.06	0.00
0.00	5.70	10.70	25.70	31.70	37.70	43.70	49.70	44.00
0.00	0.00	293.18	872.73	924.55	796.36	488.18	0.00	0.00
0.00	0.00	5.00	20.00	26.00	32.00	38.00	44.00	44.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 44' Span, Axles 4-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	0.00	0.00		0.00	0.00	0
4	10.00	20.00		0.00	88.96	0
5	15.00	30.00	15.00	15.00	133.45	457
6	15.00	30.00	6.00	21.00	133.45	640
7	15.00	30.00	6.00	27.00	133.45	823
8	15.00	30.00	6.00	33.00	133.45	1006
(Rear) 9	15.00	30.00	6.00	39.00	133.45	1189
Totals	85.00	170.00	39.00		756.2	
		Resultant at location:	23.824			726



**60 ft Span Length**

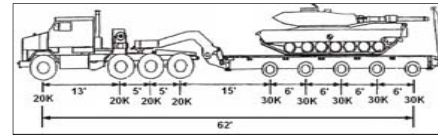
Front #1 Axle Position AX 1	Middle #2 Axle Position AX 2	Middle #3 Axle Position AX 3	Middle #4 Axle Position AX 4	Middle #5 Axle Position AX 5	Middle #6 Axle Position AX 6	Middle #7 Axle Position AX 7	Middle #8 Axle Position AX 8	Rear #9 Axle Position AX 9	Dist to Beam End L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
			5.00	20.00	26.00	32.00	38.00	44.00	16.00
			5.10	20.10	26.10	32.10	38.10	44.10	15.90
			5.20	20.20	26.20	32.20	38.20	44.20	15.80
			5.30	20.30	26.30	32.30	38.30	44.30	15.70
			5.40	20.40	26.40	32.40	38.40	44.40	15.60
			5.50	20.50	26.50	32.50	38.50	44.50	15.50
			5.60	20.60	26.60	32.60	38.60	44.60	15.40
			5.70	20.70	26.70	32.70	38.70	44.70	15.30
			21.00	36.00	42.00	48.00	54.00	60.00	0.00

Shear at React A, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at Rear React B, kips
88.33	68.33	38.33	8.33	-21.67	-51.67	-81.67	81.67
0.00	5.00	20.00	26.00	32.00	38.00	44.00	60.00
88.05	68.05	38.05	8.05	-21.95	-51.95	-81.95	81.95
0.00	5.10	20.10	26.10	32.10	38.10	44.10	60.00
87.77	67.77	37.77	7.77	-22.23	-52.23	-82.23	82.23
0.00	5.20	20.20	26.20	32.20	38.20	44.20	60.00
87.48	67.48	37.48	7.48	-22.52	-52.52	-82.52	82.52
0.00	5.30	20.30	26.30	32.30	38.30	44.30	60.00
87.20	67.20	37.20	7.20	-22.80	-52.80	-82.80	82.80
0.00	5.40	20.40	26.40	32.40	38.40	44.40	60.00
86.92	66.92	36.92	6.92	-23.08	-53.08	-83.08	83.08
0.00	5.50	20.50	26.50	32.50	38.50	44.50	60.00
86.63	66.63	36.63	6.63	-23.37	-53.37	-83.37	83.37
0.00	5.60	20.60	26.60	32.60	38.60	44.60	60.00
86.35	66.35	36.35	6.35	-23.65	-53.65	-83.65	83.65
0.00	5.70	20.70	26.70	32.70	38.70	44.70	60.00
43.00	23.00	-7.00	-37.00	-67.00	-97.00	-127.00	127.00
0.00	21.00	36.00	42.00	48.00	54.00	60.00	60.00

Moment at React A, ft- kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft- kips
0.00	441.67	1466.67	1696.67	1746.67	1616.67	1306.67	0.00
0.00	5.00	20.00	26.00	32.00	38.00	44.00	60.00
0.00	449.06	1469.81	1698.11	1746.41	1614.71	1303.01	0.00
0.00	5.10	20.10	26.10	32.10	38.10	44.10	60.00
0.00	456.39	1472.89	1699.49	1746.09	1612.69	1299.29	0.00
0.00	5.20	20.20	26.20	32.20	38.20	44.20	60.00
0.00	463.66	1475.91	1700.81	1745.71	1610.61	1295.51	0.00
0.00	5.30	20.30	26.30	32.30	38.30	44.30	60.00
0.00	470.88	1478.88	1702.08	1745.28	1608.48	1291.68	0.00
0.00	5.40	20.40	26.40	32.40	38.40	44.40	60.00
0.00	478.04	1481.79	1703.29	1744.79	1606.29	1287.79	0.00
0.00	5.50	20.50	26.50	32.50	38.50	44.50	60.00
0.00	485.15	1484.65	1704.45	1744.25	1604.05	1283.85	0.00
0.00	5.60	20.60	26.60	32.60	38.60	44.60	60.00
0.00	492.20	1487.45	1705.55	1743.65	1601.75	1279.85	0.00
0.00	5.70	20.70	26.70	32.70	38.70	44.70	60.00
0.00	903.00	1,248.00	1,206.00	984.00	582.00	0.00	0.00
0.00	21.00	36.00	42.00	48.00	54.00	60.00	60.00

**NINE (9) AXLE**      **One (1x) Proposed Standard HET (Alternative Military Live Load), 44' Span, Axles 4-9**

Axle	Load (ST)	Load (kips)	Distance btwn axles (ft)	Distance from front axle (ft)	SI / Metric Units	
					Load (kN)	Distance from front axle (cm)
(Front) 1	0.00	0.00		0.00	0.00	0
2	0.00	0.00		0.00	0.00	0
3	0.00	0.00		0.00	0.00	0
4	10.00	20.00		0.00	88.96	0
5	15.00	30.00	15.00	15.00	133.45	457
6	15.00	30.00	6.00	21.00	133.45	640
7	15.00	30.00	6.00	27.00	133.45	823
8	15.00	30.00	6.00	33.00	133.45	1006
(Rear) 9	15.00	30.00	6.00	39.00	133.45	1189
<b>Totals</b>	<b>85.00</b>	<b>170.00</b>	<b>39.00</b>		<b>756.2</b>	<b>726</b>
Resultant at location:				23.824		



**39 ft Span Length**

Front #1 Axle Position AX 1	Middle #2 Axle Position AX 2	Middle #3 Axle Position AX 3	Middle #4 Axle Position AX 4	Middle #5 Axle Position AX 5	Middle #6 Axle Position AX 6	Middle #7 Axle Position AX 7	Middle #8 Axle Position AX 8	Rear #9 Axle Position AX 9	Dist to Beam End L END
ft	ft	ft	ft	ft	ft	ft	ft	ft	ft
			5.00	20.00	26.00	32.00	38.00	44.00	11.00
			5.00	20.00	26.00	32.00	38.00	44.00	16.00
			5.00	20.00	26.00	32.00	38.00	44.00	18.00
			5.00	20.00	26.00	32.00	38.00	44.00	21.00
			5.00	20.00	26.00	32.00	38.00	44.00	26.00
			5.00	20.00	26.00	32.00	38.00	44.00	28.00
			5.00	20.00	26.00	32.00	38.00	44.00	31.00
			5.00	20.00	26.00	32.00	38.00	44.00	36.00
			0.00	15.00	21.00	27.00	33.00	39.00	0.00

Shear at React A, kips	Shear at Mid #4 Axle, kips	Shear at Mid #5 Axle, kips	Shear at Mid #6 Axle, kips	Shear at Mid #7 Axle, kips	Shear at Mid #8 Axle, kips	Shear at Mid #9 Axle, kips	Shear at React B, kips
80.91	60.91	30.91	0.91	-29.09	-59.09	-89.09	89.09
0.00	5.00	20.00	26.00	32.00	38.00	44.00	39.00
88.33	68.33	38.33	8.33	-21.67	-51.67	-81.67	81.67
0.00	5.00	20.00	26.00	32.00	38.00	44.00	39.00
90.97	70.97	40.97	10.97	-19.03	-49.03	-79.03	79.03
0.00	5.00	20.00	26.00	32.00	38.00	44.00	39.00
94.62	74.62	44.62	14.62	-15.38	-45.38	-75.38	75.38
0.00	5.00	20.00	26.00	32.00	38.00	44.00	39.00
100.00	80.00	50.00	20.00	-10.00	-40.00	-70.00	70.00
0.00	5.00	20.00	26.00	32.00	38.00	44.00	39.00
101.94	81.94	51.94	21.94	-8.06	-38.06	-68.06	68.06
0.00	5.00	20.00	26.00	32.00	38.00	44.00	39.00
104.67	84.67	54.67	24.67	-5.33	-35.33	-65.33	65.33
0.00	5.00	20.00	26.00	32.00	38.00	44.00	39.00
108.75	88.75	58.75	28.75	-1.25	-31.25	-61.25	61.25
0.00	5.00	20.00	26.00	32.00	38.00	44.00	39.00
66.15	46.15	16.15	-13.85	-43.85	-73.85	-103.85	103.85
0.00	0.00	15.00	21.00	27.00	33.00	39.00	39.00

Moment at React A, ft-kips	Moment at Mid #4 Axle, ft-kips	Moment at Mid #5 Axle, ft-kips	Moment at Mid #6 Axle, ft-kips	Moment at Mid #7 Axle, ft-kips	Moment at Mid #8 Axle, ft-kips	Moment at Rear #9 Axle, ft-kips	Moment at React B, ft-kips
0.00	404.55	1318.18	1503.64	1509.09	1334.55	980.00	0.00
0.00	5.00	20.00	26.00	32.00	38.00	44.00	39.00
0.00	441.67	1466.67	1696.67	1746.67	1616.67	1306.67	0.00
0.00	5.00	20.00	26.00	32.00	38.00	44.00	39.00
0.00	454.84	1519.35	1765.16	1830.97	1716.77	1422.58	0.00
0.00	5.00	20.00	26.00	32.00	38.00	44.00	39.00
0.00	473.08	1592.31	1860.00	1947.69	1855.38	1583.08	0.00
0.00	5.00	20.00	26.00	32.00	38.00	44.00	39.00
0.00	500.00	1,700.00	2000.00	2,120.00	2,060.00	1,820.00	0.00
0.00	5.00	20.00	26.00	32.00	38.00	44.00	39.00
0.00	509.72	1,738.89	2,050.56	2,182.22	2,133.89	1,905.56	0.00
0.00	5.00	20.00	26.00	32.00	38.00	44.00	39.00
0.00	523.33	1,793.33	2,121.33	2,269.33	2,237.33	2,025.33	0.00
0.00	5.00	20.00	26.00	32.00	38.00	44.00	39.00
0.00	543.75	1,875.00	2,227.50	2,400.00	2,392.50	2,205.00	0.00
0.00	5.00	20.00	26.00	32.00	38.00	44.00	39.00
0.00	0.00	692.31	789.23	706.15	443.08	0.00	0.00
0.00	0.00	15.00	21.00	27.00	33.00	39.00	39.00

## **TABLES (TABULATED RESULTS FROM CALCULATION WORKSHEETS)**

### 6-1. Beta Database Calcs

**Table 6-1. Bridge Inventory Used For Reliability Analysis**

Bridge	Identifier	Type	Span Length (FT)	Bridge Width, ft	Girder Spacing, ft	Overhang Width, ft	Probable AASHTO/ACI Type Girder Based on Span	Girder Area, sq in, based on Type	Estimated Dead Load, based on Type LF (w), kips/ft	Year Built	Design Load	Design Method	Beta, based on HL-93 Loading, from Literature
Slab #1	MM-Slab-L-01	Reinforced Concrete Slabs	15	31	N/A	N/A	N/A	N/A	6.975	2006 Design	HL-93	LRFD	4.08
Slab #2	MM-Slab-L-02	Reinforced Concrete Slabs	20	31	N/A	N/A	N/A	N/A	6.975	2006 Design	HL-93	LRFD	4.09
Slab #3	MM-Slab-L-03	Reinforced Concrete Slabs	25	31	N/A	N/A	N/A	N/A	6.975	2006 Design	HL-93	LRFD	4.02
Slab #4	MM-Slab-L-04	Reinforced Concrete Slabs	30	31	N/A	N/A	N/A	N/A	6.975	2006 Design	HL-93	LRFD	3.87
Slab #5	MM-Slab-L-05	Reinforced Concrete Slabs	35	31	N/A	N/A	N/A	N/A	6.975	2006 Design	HL-93	LRFD	3.85
Slab #6	MM-Slab-L-06	Reinforced Concrete Slabs	40	31	N/A	N/A	N/A	N/A	6.975	2006 Design	HL-93	LRFD	3.97
Slab #7	MM-Slab-L-07	Reinforced Concrete Slabs	45	31	N/A	N/A	N/A	N/A	6.975	2006 Design	HL-93	LRFD	3.91
Slab #8	MM-Slab-L-08	Reinforced Concrete Slabs	50	31	N/A	N/A	N/A	N/A	6.975	2006 Design	HL-93	LRFD	3.65
Slab #9	MM-Slab-L-09	Reinforced Concrete Slabs	55	31	N/A	N/A	N/A	N/A	6.975	2006 Design	HL-93	LRFD	3.85
P/S I #3	MM-IB-L-01	Prestressed Concrete I-Beams	60	31	7.75	3.875	II (2)	369	8.513	2006 Design	HS25	LFD	3.72
P/S I #8	MM-IB-L-12	Prestressed Concrete I-Beams	60	47	11.75	5.875	II (2)	369	12.113	2006 Design	HL-93	LRFD	3.93
Slab #10	MM-Slab-L-10	Reinforced Concrete Slabs	60	31	N/A	N/A	N/A	N/A	6.975	2006 Design	HL-93	LRFD	3.41
Slab #11	MM-Slab-L-11	Reinforced Concrete Slabs	65	31	N/A	N/A	N/A	N/A	6.975	2006 Design	HL-93	LRFD	3.40
P/S I #14	MM-IB-L-18	Prestressed Concrete I-Beams	80	31	7.75	3.875	III (3)	560	9.308	2006 Design	HL-93	LRFD	3.87
P/S I #19	MM-IB-L-29	Prestressed Concrete I-Beams	80	47	11.75	5.875	III (3)	560	12.908	2006 Design	HL-93	LRFD	3.77
P/S I #25	MM-IB-A-1	Prestressed Concrete I-Beams	80	31	7.75	3.875	III (3)	560	9.308	2006 Design	HS25	LFD	3.84
P/S I #30	MM-IB-A-12	Prestressed Concrete I-Beams	80	47	11.75	5.875	III (3)	560	12.908	2006 Design	HS25	LFD	3.78
P/S I #4	MM-IB-L-02	Prestressed Concrete I-Beams	80	31	7.75	3.875	III (3)	560	9.308	2006 Design	HL-93	LRFD	3.77
P/S I #9	MM-IB-L-13	Prestressed Concrete I-Beams	80	47	11.75	5.875	III (3)	560	12.908	2006 Design	HL-93	LRFD	3.87
P/S I #+Y23:AO2310	MM-IB-L-14	Prestressed Concrete I-Beams	100	47	11.75	5.875	IV (4)	789	13.863	2006 Design	HL-93	LRFD	3.82
P/S I #15	MM-IB-L-19	Prestressed Concrete I-Beams	100	31	7.75	3.875	IV (4)	789	10.263	2006 Design	HL-93	LRFD	3.74
P/S I #20	MM-IB-L-30	Prestressed Concrete I-Beams	100	47	11.75	5.875	IV (4)	789	13.863	2006 Design	HL-93	LRFD	3.83
P/S I #26	MM-IB-A-2	Prestressed Concrete I-Beams	100	31	7.75	3.875	IV (4)	789	10.263	2006 Design	HS25	LFD	3.80
P/S I #31	MM-IB-A-13	Prestressed Concrete I-Beams	100	47	11.75	5.875	IV (4)	789	13.863	2006 Design	HS25	LFD	3.70
P/S I #5	MM-IB-L-03	Prestressed Concrete I-Beams	100	31	7.75	3.875	IV (4)	789	10.263	2006 Design	HL-93	LRFD	3.76
P/S I #11	MM-IB-L-15	Prestressed Concrete I-Beams	120	47	11.75	5.875	V (5)	1013	14.796	2006 Design	HL-93	LRFD	3.83
P/S I #16	MM-IB-L-20	Prestressed Concrete I-Beams	120	31	7.75	3.875	V (5)	1013	11.196	2006 Design	HL-93	LRFD	3.69
P/S I #21	MM-IB-L-31	Prestressed Concrete I-Beams	120	47	11.75	5.875	V (5)	1013	14.796	2006 Design	HL-93	LRFD	3.73
P/S I #27	MM-IB-A-3	Prestressed Concrete I-Beams	120	31	7.75	3.875	V (5)	1013	11.196	2006 Design	HS25	LFD	3.71
P/S I #32	MM-IB-A-14	Prestressed Concrete I-Beams	120	47	11.75	5.875	V (5)	1013	14.796	2006 Design	HS25	LFD	3.77
P/S I #6	MM-IB-L-04	Prestressed Concrete I-Beams	120	31	7.75	3.875	V (5)	1013	11.196	2006 Design	HL-93	LRFD	3.65
P/S I #33	MM-IB-A-15	Prestressed Concrete I-Beams	130	47	9.4	4.7	V (5)	1013	15.851	2006 Design	HS25	LFD	3.67
P/S I #12	MM-IB-L-16	Prestressed Concrete I-Beams	140	47	11.75	5.875	V (5)	1013	14.796	2006 Design	HL-93	LRFD	3.69
P/S I #17	MM-IB-L-21	Prestressed Concrete I-Beams	140	31	7.75	3.875	V (5)	1013	11.196	2006 Design	HL-93	LRFD	3.63
P/S I #22	MM-IB-L-32	Prestressed Concrete I-Beams	140	47	11.75	5.875	V (5)	1013	14.796	2006 Design	HL-93	LRFD	3.72
P/S I #28	MM-IB-A-4	Prestressed Concrete I-Beams	140	31	7.75	3.875	V (5)	1013	11.196	2006 Design	HS25	LFD	3.59
P/S I #7	MM-IB-L-05	Prestressed Concrete I-Beams	140	31	7.75	3.875	V (5)	1013	11.196	2006 Design	HL-93	LRFD	3.64
P/S I #13	MM-IB-L-17	Prestressed Concrete I-Beams	160	47	9.4	4.7	VI (6)	1085	16.226	2006 Design	HL-93	LRFD	3.61
P/S I #18	MM-IB-L-22	Prestressed Concrete I-Beams	160	31	7.75	3.875	VI (6)	1085	11.496	2006 Design	HL-93	LRFD	3.58
P/S I #23	MM-IB-L-33	Prestressed Concrete I-Beams	160	47	9.4	4.7	VI (6)	1085	16.226	2006 Design	HL-93	LRFD	3.75
P/S I #29	MM-IB-A-5	Prestressed Concrete I-Beams	160	31	6.2	3.1	VI (6)	1085	12.626	2006 Design	HS25	LFD	3.49
P/S I #24	MM-IB-L-34	Prestressed Concrete I-Beams	180	47	7.833	3.9175	VI (6)	1085	17.356	2006 Design	HL-93	LRFD	3.61

Average Beta for Select Inventory 3.75

Average Beta (All 42 Bridges Considered) 3.75

Probability of failure 0.01%

Lowest Beta Value 3.40

Probability of failure 0.03%



RELIABILITY INDEX, $\beta$ , BASED ON SHEAR, V (MATERIAL VAR. $V_R = 15\%$ AND LOAD VAR. $V_S = 0\%$ )												
Dead Load Shear based on Est. Bridge Const., (VDL), kips	AASHTO HL93 (Design Truck) LL+I, Shear, kips, Single Lane	Proposed Standard 230K HET LL+I, Shear, kips, Single Lane	MLC 100W Hypothetical Vehicle LL+I, Shear, kips, Single Lane	Civilian Traffic Forced Flow (Lutomirska, 2009) Shear, kips, Single Lane	Proposed Logistic Convoy Shear, kips, Single Lane	Resistance, R, based on HL93 LL+I Shear (LRFD Strength I), 2x Lanes, $V_R=15\%$ , $V_S=0\%$	Beta, Proposed Standard 230K HET Shear (LRFD Strength II), Single Lane	Beta, MLC 100W Hypothetical Vehicle Shear (LRFD Strength II), Single Lane	Beta, Proposed Standard 230K HET with Civilian Traffic Forced Flow (LRFD Strength II), 2x Lanes, Shear, kips	Beta, MLC 100W Vehicle with Civilian Traffic Forced Flow (LRFD Strength II), 2x Lanes, Shear, kips	Beta, Proposed Standard 230K HET with Proposed Logistic Convoy (LRFD Strength II), 2x Lanes, Shear, kips	Beta, MLC 100W Vehicle with Proposed Logistic Convoy (LRFD Strength II), 2x Lanes, Shear, kips
52.31	62.43	71.82	127.68	6.08	7.24	499.4	8.05	5.33	7.69	5.09	7.63	5.04
69.75	66.25	87.78	139.65	8.10	9.65	557.1	7.23	5.12	6.86	4.85	6.79	4.80
87.19	69.29	103.74	151.62	10.13	12.06	602.5	6.50	4.83	6.11	4.53	6.04	4.47
104.63	72.73	119.70	159.60	12.15	14.48	641.8	5.87	4.64	5.47	4.31	5.39	4.24
122.06	81.43	131.10	165.30	14.18	16.89	725.2	5.91	4.95	5.49	4.59	5.42	4.52
139.50	86.22	140.32	169.58	16.20	19.30	800.4	5.93	5.17	5.50	4.79	5.42	4.72
156.94	90.30	150.44	172.90	18.23	21.71	850.3	5.73	5.19	5.29	4.78	5.21	4.71
174.38	93.89	161.20	176.89	20.25	24.13	869.6	5.31	4.96	4.86	4.53	4.78	4.46
191.81	97.11	171.93	188.62	22.28	26.54	947.3	5.36	5.02	4.90	4.58	4.82	4.50
255.38	100.06	180.88	198.39	24.30	28.95	1,058.1	5.00	4.70	4.58	4.29	4.50	4.21
363.38	100.06	180.88	198.39	24.30	28.95	1,286.7	5.00	4.75	4.65	4.41	4.59	4.35
209.25	100.06	180.88	198.39	24.30	28.95	933.1	4.81	4.47	4.35	4.03	4.26	3.95
226.69	102.81	189.68	206.66	26.33	31.36	976.7	4.70	4.39	4.22	3.94	4.14	3.85
372.33	110.19	211.47	225.27	32.40	38.60	1,354.5	4.81	4.63	4.39	4.21	4.31	4.13
516.33	110.19	211.47	225.27	32.40	38.60	1,587.8	4.55	4.40	4.20	4.06	4.14	3.99
372.33	110.19	211.47	225.27	32.40	38.60	1,348.4	4.78	4.60	4.36	4.18	4.28	4.10
516.33	110.19	211.47	225.27	32.40	38.60	1,590.2	4.56	4.41	4.21	4.07	4.15	4.00
372.33	110.19	211.47	225.27	32.40	38.60	1,334.3	4.71	4.53	4.29	4.11	4.21	4.03
516.33	110.19	211.47	225.27	32.40	38.60	1,611.8	4.65	4.50	4.30	4.16	4.24	4.09
693.13	118.82	230.36	241.40	40.50	48.25	1,966.9	4.48	4.38	4.13	4.04	4.06	3.97
513.13	118.82	230.36	241.40	40.50	48.25	1,628.0	4.54	4.42	4.11	4.00	4.03	3.92
693.13	118.82	230.36	241.40	40.50	48.25	1,969.9	4.49	4.39	4.14	4.05	4.07	3.98
513.13	118.82	230.36	241.40	40.50	48.25	1,642.7	4.60	4.48	4.17	4.06	4.09	3.98
693.13	118.82	230.36	241.40	40.50	48.25	1,931.8	4.36	4.26	4.01	3.92	3.94	3.85
513.13	118.82	230.36	241.40	40.50	48.25	1,632.9	4.56	4.44	4.13	4.02	4.05	3.94
887.75	126.71	242.95	252.15	48.60	57.90	2,364.6	4.44	4.37	4.08	4.02	4.02	3.96
671.75	126.71	242.95	252.15	48.60	57.90	1,939.8	4.42	4.34	4.00	3.92	3.92	3.84
887.75	126.71	242.95	252.15	48.60	57.90	2,329.4	4.34	4.27	3.98	3.92	3.92	3.86
671.75	126.71	242.95	252.15	48.60	57.90	1,945.6	4.44	4.36	4.02	3.94	3.94	3.86
887.75	126.71	242.95	252.15	48.60	57.90	2,343.4	4.38	4.31	4.02	3.96	3.96	3.90
671.75	126.71	242.95	252.15	48.60	57.90	1,928.2	4.38	4.30	3.96	3.88	3.88	3.80
1,030.32	130.49	247.79	256.28	52.65	62.73	2,578.7	4.24	4.19	3.90	3.85	3.84	3.79
1,035.71	134.18	251.94	259.83	56.70	67.55	2,618.3	4.29	4.24	3.93	3.88	3.86	3.81
783.71	134.18	251.94	259.83	56.70	67.55	2,160.4	4.36	4.29	3.92	3.86	3.84	3.78
1,035.71	134.18	251.94	259.83	56.70	67.55	2,630.1	4.32	4.27	3.96	3.91	3.89	3.84
783.71	134.18	251.94	259.83	56.70	67.55	2,147.5	4.32	4.25	3.88	3.82	3.80	3.74
783.71	134.18	251.94	259.83	56.70	67.55	2,163.7	4.37	4.30	3.93	3.87	3.85	3.79
1,298.08	141.37	258.69	265.58	64.80	77.20	3,081.2	4.17	4.14	3.83	3.79	3.77	3.73
919.67	141.37	258.69	265.58	64.80	77.20	2,420.0	4.30	4.26	3.86	3.81	3.78	3.73
1,298.08	141.37	258.69	265.58	64.80	77.20	3,146.6	4.31	4.28	3.97	3.93	3.91	3.87
1,010.08	141.37	258.69	265.58	64.80	77.20	2,540.1	4.17	4.12	3.75	3.71	3.68	3.63
1,562.06	148.39	263.93	270.06	72.90	86.85	3,577.1	4.15	4.13	3.82	3.79	3.76	3.73

Recalculated Beta Values, Based on on Proposed HET and MLC 100W Maximum Shear on Proposed HET and MLC 100W Maximum Shear on Proposed HET and MLC 100W Maximum Shear						
Average Beta (All 42 Bridges Considered)	4.86	4.51	4.46	4.13	4.38	4.06
Probability of failure	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Lowest Beta Value	4.15	4.12	3.75	3.71	3.68	3.63
Probability of failure	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%

RELIABILITY INDEX, $\beta$ , BASED ON MOMENT, M (MATERIAL VAR. $\xi_s = 10\%$ AND LOAD VAR. $V_s = 0\%$ )												
Dead Load Moment based on Est. Bridge Const., (VDL), ft-kips	AASHTO HL93 (Design Truck) LL+I, Moment, ft-kips, Single Lane	Proposed Standard 230K HET LL+I, Moment, ft-kips, Single Lane	MLC 100W Hypothetical Vehicle LL+I, Moment, ft-kips, Single Lane	Civilian Traffic Forced Flow (Lutomiraska, 2009) Moment, ft-kips, Single Lane	Proposed Logistic Convoy Moment (M), ft-kips, Single Lane	Resistance, R, based on HL93 LL+I Moment (LRFD Strength I), 2x Lanes, VR=15%, VS=0%	Beta, Proposed Standard 230K HET Moment (LRFD Strength II), Single Lane	Beta, MLC 100W Hypothetical Vehicle Moment (LRFD Strength II), Single Lane	Beta, Proposed Standard 230K HET with Civilian Traffic Forced Flow (LRFD Strength II), 2x Lanes, Moment, ft-kips	Beta, MLC 100W Vehicle with Civilian Traffic Forced Flow (LRFD Strength II), 2x Lanes, Moment, ft-kips	Beta, Proposed Standard 230K HET with Proposed Logistic Convoy (LRFD Strength II), 2x Lanes, Moment, ft-kips	Beta, MLC 100W Vehicle with Proposed Logistic Convoy (LRFD Strength II), 2x Lanes, Moment, ft-kips
196.2	200.9	209.5	359.1	22.8	27.1	1,352.4	10.38	6.86	9.76	6.42	9.64	6.34
348.8	298.0	319.2	558.6	40.5	48.3	2,095.0	9.88	6.42	9.21	5.93	9.08	5.84
544.9	399.1	528.7	768.1	63.3	75.4	2,902.6	8.36	6.07	7.70	5.54	7.58	5.45
784.7	504.3	778.1	1,017.5	91.1	108.6	3,754.6	7.16	5.54	6.51	4.98	6.39	4.88
1,068.0	613.4	1,027.4	1,266.8	124.0	147.8	4,724.7	6.55	5.31	5.89	4.72	5.77	4.62
1,395.0	726.5	1,276.8	1,516.2	162.0	193.0	5,856.8	6.30	5.32	5.62	4.70	5.50	4.59
1,765.5	866.9	1,526.2	1,765.6	205.0	244.3	7,096.3	6.18	5.37	5.48	4.72	5.35	4.60
2,179.7	1,024.6	1,759.6	2,028.6	253.1	301.6	8,305.7	6.01	5.24	5.28	4.57	5.15	4.44
2,637.4	1,186.3	2,024.0	2,431.9	306.3	364.9	9,978.0	6.20	5.22	5.45	4.54	5.32	4.42
3,830.6	1,352.0	2,325.7	2,812.5	364.5	434.3	12,421.2	5.78	4.88	5.10	4.25	4.97	4.14
5,450.6	1,352.0	2,325.7	2,812.5	364.5	434.3	15,084.7	5.63	4.89	5.07	4.37	4.97	4.28
3,138.8	1,352.0	2,325.7	2,812.5	364.5	434.3	11,069.1	5.67	4.67	4.92	3.99	4.78	3.86
3,683.7	1,521.7	2,673.9	3,193.4	427.8	509.6	12,658.2	5.51	4.60	4.75	3.90	4.61	3.77
7,446.7	2,054.8	3,719.3	4,337.1	648.0	772.0	21,556.0	5.48	4.83	4.80	4.19	4.67	4.07
10,326.7	2,054.8	3,719.3	4,337.1	648.0	772.0	25,540.2	5.09	4.56	4.54	4.04	4.44	3.94
7,446.7	2,054.8	3,719.3	4,337.1	648.0	772.0	21,491.4	5.45	4.80	4.77	4.16	4.64	4.04
10,326.7	2,054.8	3,719.3	4,337.1	648.0	772.0	25,565.8	5.10	4.57	4.55	4.05	4.45	3.95
7,446.7	2,054.8	3,719.3	4,337.1	648.0	772.0	21,341.5	5.38	4.73	4.70	4.09	4.57	3.97
10,326.7	2,054.8	3,719.3	4,337.1	648.0	772.0	25,796.9	5.19	4.66	4.64	4.14	4.54	4.04
17,328.1	2,821.6	5,221.3	5,863.7	1,012.5	1,206.3	39,859.2	4.92	4.57	4.37	4.04	4.27	3.94
12,828.1	2,821.6	5,221.3	5,863.7	1,012.5	1,206.3	33,000.7	5.07	4.64	4.40	4.00	4.28	3.89
17,328.1	2,821.6	5,221.3	5,863.7	1,012.5	1,206.3	39,899.1	4.93	4.58	4.38	4.05	4.28	3.95
12,828.1	2,821.6	5,221.3	5,863.7	1,012.5	1,206.3	33,199.3	5.13	4.70	4.46	4.06	4.34	3.95
17,328.1	2,821.6	5,221.3	5,863.7	1,012.5	1,206.3	39,383.8	4.80	4.45	4.25	3.92	4.15	3.82
12,828.1	2,821.6	5,221.3	5,863.7	1,012.5	1,206.3	33,066.8	5.09	4.66	4.42	4.02	4.30	3.91
26,632.5	3,652.4	6,745.1	7,391.3	1,458.0	1,737.0	57,810.4	4.81	4.57	4.27	4.04	4.17	3.95
20,152.5	3,652.4	6,745.1	7,391.3	1,458.0	1,737.0	47,634.8	4.87	4.58	4.22	3.95	4.10	3.83
26,632.5	3,652.4	6,745.1	7,391.3	1,458.0	1,737.0	57,235.2	4.71	4.47	4.17	3.94	4.07	3.85
20,152.5	3,652.4	6,745.1	7,391.3	1,458.0	1,737.0	47,730.1	4.89	4.60	4.24	3.97	4.12	3.85
26,632.5	3,652.4	6,745.1	7,391.3	1,458.0	1,737.0	57,464.6	4.75	4.51	4.21	3.98	4.11	3.89
20,152.5	3,652.4	6,745.1	7,391.3	1,458.0	1,737.0	47,444.6	4.83	4.54	4.18	3.91	4.06	3.79
33,485.3	4,091.8	7,507.6	8,155.3	1,711.1	2,038.6	69,004.0	4.59	4.39	4.07	3.88	3.97	3.79
36,249.8	4,547.2	8,270.5	8,919.4	1,984.5	2,364.3	75,445.6	4.64	4.46	4.10	3.92	3.99	3.82
27,429.8	4,547.2	8,270.5	8,919.4	1,984.5	2,364.3	62,314.3	4.79	4.57	4.12	3.91	4.00	3.79
36,249.8	4,547.2	8,270.5	8,919.4	1,984.5	2,364.3	75,672.3	4.67	4.49	4.13	3.95	4.02	3.85
27,429.8	4,547.2	8,270.5	8,919.4	1,984.5	2,364.3	62,065.6	4.75	4.53	4.08	3.87	3.96	3.75
27,429.8	4,547.2	8,270.5	8,919.4	1,984.5	2,364.3	62,376.7	4.80	4.58	4.13	3.92	4.01	3.80
51,923.3	5,506.0	9,796.9	10,447.8	2,592.0	3,088.0	102,147.0	4.50	4.36	3.97	3.85	3.88	3.75
36,786.7	5,506.0	9,796.9	10,447.8	2,592.0	3,088.0	80,188.6	4.72	4.55	4.04	3.88	3.92	3.76
51,923.3	5,506.0	9,796.9	10,447.8	2,592.0	3,088.0	103,587.1	4.64	4.50	4.11	3.99	4.02	3.89
40,403.3	5,506.0	9,796.9	10,447.8	2,592.0	3,088.0	84,597.3	4.56	4.40	3.93	3.77	3.81	3.66
70,292.8	6,528.8	11,324.0	11,976.5	3,280.5	3,908.3	133,639.1	4.46	4.35	3.95	3.85	3.86	3.76

Recalculated Beta Values, Based on Proposed HET and MLC 100W Maximum Moments on Proposed HET and MLC 100W Maximum Shear on Proposed HET and MLC 100W Maximum Shear						
Average Beta (All 42 Bridges Considered)	5.50	4.82	4.88	4.24	4.76	4.13
Probability of failure	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Lowest Beta Value	4.46	4.35	3.93	3.77	3.81	3.66
Probability of failure	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%

RELIABILITY INDEX, $\beta$ , BASED ON SHEAR, V (MATERIAL VAR. $V_R = 15\%$ AND LOAD VAR. $V_S = 0\%$ ) *** WITHOUT THE APPLICATION OF LRFD STRENGTH CONDITION FACTORS ***												
Dead Load Shear based on Est. Bridge Const., (VDL), kips	AASHTO HL93 (Design Truck) LL+1, Shear, kips, Single Lane	Proposed Standard 230K HET LL+1, Shear, kips, Single Lane	MLC 100W Hypothetical Vehicle LL+1, Shear, kips, Single Lane	Civilian Traffic Forced Flow (Lutomirska, 2009) Shear, kips, Single Lane	Proposed Logistic Convoy Shear, kips, Single Lane	Resistance, R, based on HL93 LL+1 Shear, Two Lanes, $V_R=15\%$ , $V_S=0\%$	Beta, Proposed Standard 230K HET Shear, Single Lane	Beta, MLC 100W Hypothetical Vehicle Shear, Single Lane	Beta, Proposed Standard 230K HET with Civilian Traffic Forced Flow, 2x Lanes, Shear, kips	Beta, MLC 100W Vehicle with Civilian Traffic Forced Flow, 2x Lanes, Shear, kips	Beta, Proposed Standard 230K HET with Proposed Logistic Convoy, 2x Lanes, Shear, kips	Beta, MLC 100W Vehicle with Proposed Logistic Convoy, 2x Lanes, Shear, kips
52.31	62.43	71.82	127.68	6.08	7.24	326.7	6.45	3.97	6.13	3.75	6.07	3.71
69.75	66.25	87.78	139.65	8.10	9.65	373.5	5.76	3.86	5.42	3.61	5.36	3.56
87.19	69.29	103.74	151.62	10.13	12.06	412.6	5.14	3.65	4.79	3.37	4.73	3.32
104.63	72.73	119.70	159.60	12.15	14.48	446.9	4.59	3.50	4.24	3.20	4.18	3.15
122.06	81.43	131.10	165.30	14.18	16.89	507.6	4.64	3.79	4.27	3.47	4.21	3.41
139.50	86.22	140.32	169.58	16.20	19.30	565.8	4.69	4.03	4.32	3.69	4.25	3.63
156.94	90.30	150.44	172.90	18.23	21.71	606.8	4.53	4.06	4.15	3.71	4.08	3.64
174.38	93.89	161.20	176.89	20.25	24.13	626.1	4.16	3.85	3.77	3.48	3.70	3.41
191.81	97.11	171.93	188.62	22.28	26.54	687.8	4.25	3.95	3.85	3.57	3.78	3.50
255.38	100.06	180.88	198.39	24.30	28.95	795.8	4.01	3.75	3.65	3.40	3.58	3.33
363.38	100.06	180.88	198.39	24.30	28.95	1,016.0	4.16	3.95	3.87	3.67	3.82	3.62
209.25	100.06	180.88	198.39	24.30	28.95	682.8	3.73	3.44	3.33	3.05	3.25	2.98
226.69	102.81	189.68	206.66	26.33	31.36	719.9	3.65	3.38	3.24	2.99	3.17	2.92
372.33	110.19	211.47	225.27	32.40	38.60	1,059.1	3.97	3.82	3.61	3.46	3.54	3.40
516.33	110.19	211.47	225.27	32.40	38.60	1,296.9	3.85	3.73	3.56	3.44	3.51	3.39
372.33	110.19	211.47	225.27	32.40	38.60	1,054.4	3.94	3.79	3.58	3.43	3.51	3.37
516.33	110.19	211.47	225.27	32.40	38.60	1,298.8	3.86	3.74	3.57	3.45	3.52	3.40
372.33	110.19	211.47	225.27	32.40	38.60	1,043.4	3.87	3.72	3.51	3.36	3.44	3.30
516.33	110.19	211.47	225.27	32.40	38.60	1,316.5	3.95	3.83	3.66	3.54	3.61	3.49
693.13	118.82	230.36	241.40	40.50	48.25	1,650.8	3.87	3.79	3.59	3.51	3.53	3.46
513.13	118.82	230.36	241.40	40.50	48.25	1,315.7	3.81	3.71	3.45	3.36	3.39	3.29
693.13	118.82	230.36	241.40	40.50	48.25	1,653.3	3.88	3.80	3.60	3.52	3.54	3.47
513.13	118.82	230.36	241.40	40.50	48.25	1,327.6	3.87	3.77	3.51	3.42	3.45	3.35
693.13	118.82	230.36	241.40	40.50	48.25	1,621.3	3.75	3.67	3.47	3.39	3.41	3.34
513.13	118.82	230.36	241.40	40.50	48.25	1,319.6	3.83	3.73	3.47	3.38	3.41	3.31
887.75	126.71	242.95	252.15	48.60	57.90	2,027.0	3.89	3.84	3.61	3.56	3.56	3.51
671.75	126.71	242.95	252.15	48.60	57.90	1,609.2	3.77	3.70	3.42	3.36	3.36	3.29
887.75	126.71	242.95	252.15	48.60	57.90	1,996.8	3.79	3.74	3.51	3.46	3.46	3.41
671.75	126.71	242.95	252.15	48.60	57.90	1,614.0	3.79	3.72	3.44	3.38	3.38	3.31
887.75	126.71	242.95	252.15	48.60	57.90	2,008.8	3.83	3.78	3.55	3.50	3.50	3.45
671.75	126.71	242.95	252.15	48.60	57.90	1,599.6	3.73	3.66	3.38	3.32	3.32	3.25
1,030.32	130.49	247.79	256.28	52.65	62.73	2,239.2	3.74	3.69	3.47	3.43	3.42	3.38
1,035.71	134.18	251.94	259.83	56.70	67.55	2,268.2	3.77	3.73	3.49	3.45	3.43	3.39
783.71	134.18	251.94	259.83	56.70	67.55	1,813.5	3.73	3.68	3.38	3.33	3.31	3.27
1,035.71	134.18	251.94	259.83	56.70	67.55	2,278.4	3.80	3.76	3.52	3.48	3.46	3.42
783.71	134.18	251.94	259.83	56.70	67.55	1,802.6	3.69	3.64	3.34	3.29	3.27	3.23
783.71	134.18	251.94	259.83	56.70	67.55	1,816.2	3.74	3.69	3.39	3.34	3.32	3.28
1,298.08	141.37	258.69	265.58	64.80	77.20	2,716.8	3.71	3.68	3.44	3.41	3.39	3.36
919.67	141.37	258.69	265.58	64.80	77.20	2,057.2	3.71	3.68	3.36	3.32	3.29	3.26
1,298.08	141.37	258.69	265.58	64.80	77.20	2,774.4	3.85	3.82	3.58	3.55	3.53	3.50
1,010.08	141.37	258.69	265.58	64.80	77.20	2,182.2	3.62	3.58	3.28	3.25	3.22	3.19
1,562.06	148.39	263.93	270.06	72.90	86.85	3,194.6	3.73	3.71	3.47	3.45	3.42	3.40

Standard 230K HET    Hypothetical Vehicle    230K HET with Civilian    with Civilian Traffic    230K HET with Proposed    with Proposed Logistic

Recalculated Beta Values, Based on on Proposed HET and MLC 100W Maximum Shear on Proposed HET and MLC 100W Maximum Shear on Proposed HET and MLC 100W Maximum Shear						
Average Beta (All 42 Bridges Considered)	4.05	3.75	3.72	3.43	3.66	3.37
Probability of failure	0.00%	0.01%	0.01%	0.03%	0.01%	0.04%
Lowest Beta Value	3.62	3.38	3.24	2.99	3.17	2.92
Probability of failure	0.02%	0.04%	0.06%	0.14%	0.08%	0.18%

RELIABILITY INDEX, $\beta$ , BASED ON MOMENT, M (MATERIAL VAR. $V_k = 10\%$ AND LOAD VAR. $V_s = 0\%$ ) *** WITHOUT THE APPLICATION OF LRFD STRENGTH CONDITION FACTORS ***												
Dead Load Moment based on Est. Bridge Const., (VDL), ft-kips	AASHTO HL93 (Design Truck) LL+I, Moment, ft-kips, Single Lane	Proposed Standard 230K HET LL+I, Moment, ft-kips, Single Lane	MLC 100W Hypothetical Vehicle LL+I, Moment, ft-kips, Single Lane	Civilian Traffic Forced Flow (Lutomiraska, 2009) Moment, ft-kips, Single Lane	Proposed Logistic Convoy Moment (M), ft-kips, Single Lane	Resistance, R, based on HL93 LL+I Moment, Two Lanes, VR=15%, VS=0%	Beta, Proposed Standard 230K HET Moment, Single Lane	Beta, MLC 100W Hypothetical Vehicle Moment, Single Lane	Beta, Proposed Standard 230K HET with Civilian Traffic Forced Flow, 2x Lanes, Moment, ft-kips	Beta, MLC 100W Vehicle with Civilian Traffic Forced Flow, 2x Lanes, Moment, ft-kips	Beta, Proposed Standard 230K HET with Proposed Logistic Convoy, 2x Lanes, Moment, ft-kips	Beta, MLC 100W Vehicle with Proposed Logistic Convoy, 2x Lanes, Moment, ft-kips
196.2	200.9	209.5	359.1	22.8	27.1	899.2	7.96	4.82	7.41	4.42	7.31	4.34
348.8	298.0	319.2	558.6	40.5	48.3	1,422.1	7.56	4.49	6.97	4.06	6.86	3.98
544.9	399.1	528.7	768.1	63.3	75.4	2,007.7	6.26	4.25	5.69	3.78	5.58	3.69
784.7	504.3	778.1	1,017.5	91.1	108.6	2,640.7	5.25	3.82	4.68	3.33	4.57	3.24
1,068.0	613.4	1,027.4	1,266.8	124.0	147.8	3,372.5	4.76	3.68	4.18	3.16	4.08	3.06
1,395.0	726.5	1,276.8	1,516.2	162.0	193.0	4,236.0	4.61	3.75	4.02	3.21	3.91	3.11
1,765.5	866.9	1,526.2	1,765.6	205.0	244.3	5,173.7	4.52	3.82	3.92	3.26	3.81	3.15
2,179.7	1,024.6	1,759.6	2,028.6	253.1	301.6	6,091.8	4.36	3.70	3.74	3.11	3.62	3.01
2,637.4	1,186.3	2,024.0	2,431.9	306.3	364.9	7,362.9	4.57	3.73	3.93	3.15	3.82	3.04
3,830.6	1,352.0	2,325.7	2,812.5	364.5	434.3	9,479.3	4.32	3.56	3.74	3.02	3.63	2.92
5,450.6	1,352.0	2,325.7	2,812.5	364.5	434.3	12,080.4	4.41	3.80	3.95	3.37	3.86	3.29
3,138.8	1,352.0	2,325.7	2,812.5	364.5	434.3	8,217.0	4.08	3.23	3.43	2.63	3.31	2.52
3,683.7	1,521.7	2,673.9	3,193.4	427.8	509.6	9,451.2	3.96	3.18	3.31	2.58	3.19	2.46
7,446.7	2,054.8	3,719.3	4,337.1	648.0	772.0	17,017.3	4.21	3.68	3.65	3.14	3.55	3.04
10,326.7	2,054.8	3,719.3	4,337.1	648.0	772.0	21,046.7	4.04	3.61	3.59	3.18	3.51	3.10
7,446.7	2,054.8	3,719.3	4,337.1	648.0	772.0	16,966.3	4.18	3.65	3.62	3.11	3.52	3.01
10,326.7	2,054.8	3,719.3	4,337.1	648.0	772.0	21,067.8	4.05	3.62	3.60	3.19	3.52	3.11
7,446.7	2,054.8	3,719.3	4,337.1	648.0	772.0	16,847.9	4.11	3.58	3.55	3.04	3.45	2.94
10,326.7	2,054.8	3,719.3	4,337.1	648.0	772.0	21,258.2	4.14	3.71	3.69	3.28	3.61	3.20
17,328.1	2,821.6	5,221.3	5,863.7	1,012.5	1,206.3	33,657.9	4.01	3.72	3.57	3.30	3.48	3.22
12,828.1	2,821.6	5,221.3	5,863.7	1,012.5	1,206.3	26,848.8	3.97	3.62	3.43	3.09	3.32	3.00
17,328.1	2,821.6	5,221.3	5,863.7	1,012.5	1,206.3	33,691.5	4.02	3.73	3.58	3.31	3.49	3.23
12,828.1	2,821.6	5,221.3	5,863.7	1,012.5	1,206.3	27,010.3	4.03	3.68	3.49	3.15	3.38	3.06
17,328.1	2,821.6	5,221.3	5,863.7	1,012.5	1,206.3	33,256.4	3.89	3.60	3.45	3.18	3.36	3.10
12,828.1	2,821.6	5,221.3	5,863.7	1,012.5	1,206.3	26,902.5	3.99	3.64	3.45	3.11	3.34	3.02
26,632.5	3,652.4	6,745.1	7,391.3	1,458.0	1,737.0	49,775.1	4.00	3.80	3.57	3.38	3.49	3.31
20,152.5	3,652.4	6,745.1	7,391.3	1,458.0	1,737.0	39,711.2	3.90	3.66	3.37	3.14	3.27	3.05
26,632.5	3,652.4	6,745.1	7,391.3	1,458.0	1,737.0	49,279.8	3.90	3.70	3.47	3.28	3.39	3.21
20,152.5	3,652.4	6,745.1	7,391.3	1,458.0	1,737.0	39,790.7	3.92	3.68	3.39	3.16	3.29	3.07
26,632.5	3,652.4	6,745.1	7,391.3	1,458.0	1,737.0	49,477.3	3.94	3.74	3.51	3.32	3.43	3.25
20,152.5	3,652.4	6,745.1	7,391.3	1,458.0	1,737.0	39,552.6	3.86	3.62	3.33	3.10	3.23	3.01
33,485.3	4,091.8	7,507.6	8,155.3	1,711.1	2,038.6	60,144.8	3.83	3.68	3.42	3.27	3.35	3.20
36,249.8	4,547.2	8,270.5	8,919.4	1,984.5	2,364.3	65,580.7	3.87	3.73	3.44	3.30	3.36	3.22
27,429.8	4,547.2	8,270.5	8,919.4	1,984.5	2,364.3	52,508.5	3.86	3.68	3.32	3.15	3.22	3.05
36,249.8	4,547.2	8,270.5	8,919.4	1,984.5	2,364.3	65,777.8	3.90	3.76	3.47	3.33	3.39	3.25
27,429.8	4,547.2	8,270.5	8,919.4	1,984.5	2,364.3	52,998.9	3.82	3.64	3.28	3.11	3.18	3.01
27,429.8	4,547.2	8,270.5	8,919.4	1,984.5	2,364.3	52,561.0	3.87	3.69	3.33	3.16	3.23	3.06
51,923.3	5,506.0	9,796.9	10,447.8	2,592.0	3,088.0	90,297.3	3.80	3.70	3.39	3.29	3.32	3.22
36,786.7	5,506.0	9,796.9	10,447.8	2,592.0	3,088.0	68,374.3	3.84	3.70	3.30	3.16	3.20	3.07
51,923.3	5,506.0	9,796.9	10,447.8	2,592.0	3,088.0	91,570.4	3.94	3.84	3.53	3.43	3.46	3.36
40,403.3	5,506.0	9,796.9	10,447.8	2,592.0	3,088.0	72,888.9	3.73	3.60	3.23	3.10	3.13	3.01
70,292.8	6,528.8	11,324.0	11,976.5	3,280.5	3,908.3	119,588.1	3.82	3.74	3.43	3.35	3.35	3.28

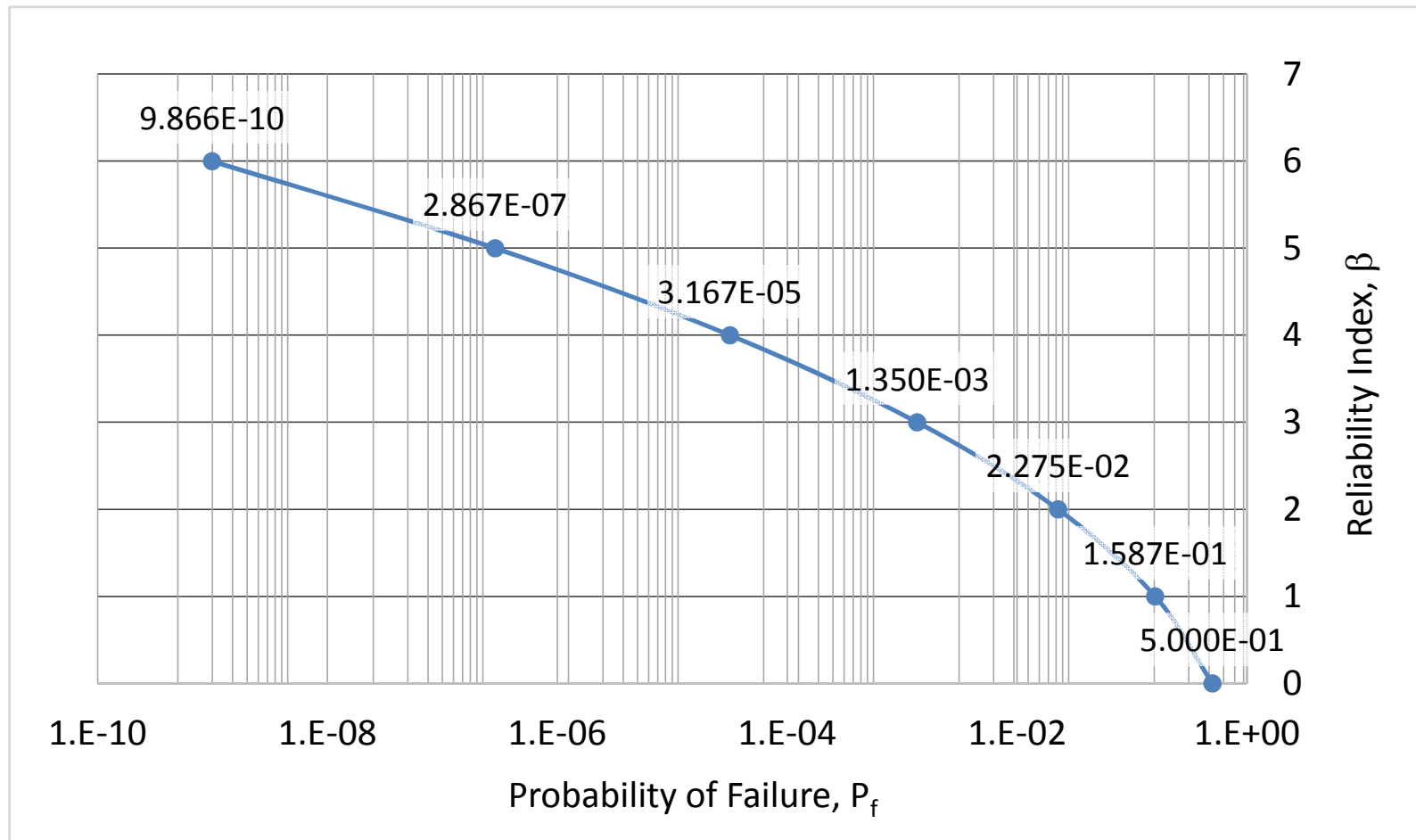
Standard 230K HET Hypothetical Vehicle 230K HET with Civilian with Civilian Traffic 230K HET with Proposed with Proposed Logistic

Recalculated Beta Values, Based on Proposed HET and MLC 100W Maximum Moments on Proposed HET and MLC 100W Maximum Shear on Proposed HET and MLC 100W Maximum Shear						
Average Beta (All 42 Bridges Considered)	4.31	3.73	3.79	3.24	3.70	3.15
Probability of failure	0.00%	0.01%	0.01%	0.06%	0.01%	0.08%
Lowest Beta Value	3.73	3.18	3.23	2.58	3.13	2.46
Probability of failure	0.01%	0.07%	0.06%	0.50%	0.09%	0.69%

Traditional Factor Safety, F.S. (equals Nominal Bridge Resistance / Total Load, with No LRFD Factors Applied to Loads or Nominal Bridge Resistance)													
Trad F.S., AASHTO HL93 Live Load with Impact, 2x Lanes, Shear, kips	Trad F.S., Proposed Standard 230K HET, Single Lane, Shear, kips	Trad F.S., MLC 100W Vehicle, Single Lane, Shear, Kips	Trad F.S., Prop Std 230K HET with Civilian Traffic Forced Flow, Shear, kips	Trad F.S., MLC 100W Vehicle with Civilian Traffic Forced Flow, Shear, kips	Trad F.S., Prop Std 230K HET with Proposed Logistic Convoy, Shear, kips	Trad F.S., MLC 100W Vehicle with Proposed Logistic Convoy, Shear, kips	Trad F.S., AASHTO HL93 Live Load with Impact, 2x Lanes, Moment, ft-kips	Trad F.S., Proposed Standard 230K HET, Single Lane, Moment, ft-kips	Trad F.S., MLC 100W Vehicle, Single Lane, Moment, ft-kips	Trad F.S., Prop Std 230K HET with Civilian Traffic Forced Flow, Moment, ft-kips	Trad F.S., MLC 100W Vehicle with Civilian Traffic Forced Flow, Moment, ft-kips	Trad F.S., Prop Std 230K HET with Proposed Logistic Convoy, Moment, ft-kips	Trad F.S., MLC 100W Vehicle with Proposed Logistic Convoy, Moment, ft-kips
1.84	2.63	1.82	2.51	1.76	2.49	1.75	1.50	2.22	1.62	2.10	1.56	2.08	1.54
1.85	2.37	1.78	2.26	1.72	2.23	1.71	1.51	2.13	1.57	2.01	1.50	1.99	1.49
1.83	2.16	1.73	2.05	1.66	2.03	1.64	1.49	1.87	1.53	1.77	1.46	1.75	1.45
1.79	1.99	1.69	1.89	1.62	1.87	1.60	1.47	1.69	1.47	1.60	1.39	1.58	1.38
1.78	2.01	1.77	1.90	1.68	1.88	1.67	1.47	1.61	1.44	1.52	1.37	1.50	1.36
1.81	2.02	1.83	1.91	1.74	1.89	1.72	1.49	1.59	1.46	1.49	1.38	1.48	1.36
1.80	1.97	1.84	1.86	1.74	1.84	1.73	1.48	1.57	1.47	1.48	1.38	1.46	1.37
1.73	1.87	1.78	1.76	1.69	1.74	1.67	1.44	1.55	1.45	1.45	1.37	1.44	1.35
1.78	1.89	1.81	1.78	1.71	1.76	1.69	1.47	1.58	1.45	1.48	1.37	1.46	1.35
1.75	1.82	1.75	1.73	1.66	1.71	1.65	1.45	1.54	1.43	1.45	1.35	1.44	1.34
1.80	1.87	1.81	1.79	1.73	1.77	1.72	1.48	1.55	1.46	1.48	1.40	1.47	1.39
1.67	1.75	1.67	1.65	1.58	1.63	1.56	1.41	1.50	1.38	1.41	1.30	1.39	1.29
1.67	1.73	1.66	1.63	1.57	1.61	1.55	1.40	1.49	1.37	1.39	1.29	1.38	1.28
1.79	1.81	1.77	1.72	1.68	1.70	1.66	1.47	1.52	1.44	1.44	1.37	1.43	1.36
1.76	1.78	1.75	1.71	1.68	1.69	1.66	1.46	1.50	1.44	1.43	1.37	1.42	1.36
1.78	1.81	1.76	1.71	1.67	1.69	1.66	1.47	1.52	1.44	1.44	1.36	1.42	1.35
1.76	1.78	1.75	1.71	1.68	1.69	1.66	1.46	1.50	1.44	1.43	1.38	1.42	1.36
1.76	1.79	1.75	1.69	1.66	1.68	1.64	1.46	1.51	1.43	1.43	1.36	1.41	1.34
1.79	1.81	1.78	1.73	1.70	1.72	1.69	1.47	1.51	1.45	1.45	1.39	1.43	1.38
1.77	1.79	1.77	1.71	1.69	1.70	1.68	1.47	1.49	1.45	1.43	1.39	1.42	1.38
1.75	1.77	1.74	1.68	1.65	1.66	1.64	1.45	1.49	1.44	1.41	1.36	1.39	1.35
1.78	1.79	1.77	1.72	1.70	1.70	1.68	1.47	1.49	1.45	1.43	1.39	1.42	1.38
1.77	1.79	1.76	1.69	1.67	1.68	1.65	1.46	1.50	1.45	1.42	1.37	1.40	1.36
1.74	1.76	1.73	1.68	1.66	1.67	1.65	1.45	1.47	1.43	1.41	1.37	1.40	1.36
1.76	1.77	1.75	1.68	1.66	1.67	1.64	1.46	1.49	1.44	1.41	1.37	1.40	1.35
1.78	1.79	1.78	1.72	1.71	1.71	1.69	1.47	1.49	1.46	1.43	1.40	1.42	1.39
1.74	1.76	1.74	1.67	1.65	1.65	1.64	1.45	1.48	1.44	1.40	1.37	1.39	1.36
1.75	1.77	1.75	1.69	1.68	1.68	1.67	1.45	1.48	1.45	1.41	1.39	1.40	1.38
1.74	1.76	1.75	1.68	1.66	1.66	1.64	1.45	1.48	1.44	1.40	1.37	1.39	1.36
1.76	1.78	1.76	1.70	1.69	1.69	1.68	1.46	1.48	1.45	1.42	1.39	1.41	1.38
1.73	1.75	1.73	1.66	1.64	1.64	1.63	1.44	1.47	1.44	1.39	1.36	1.38	1.35
1.73	1.75	1.74	1.68	1.67	1.67	1.66	1.44	1.47	1.44	1.41	1.39	1.40	1.38
1.74	1.76	1.75	1.69	1.68	1.67	1.66	1.45	1.47	1.45	1.41	1.39	1.40	1.38
1.72	1.75	1.74	1.66	1.65	1.64	1.63	1.44	1.47	1.44	1.39	1.37	1.38	1.36
1.75	1.77	1.76	1.69	1.68	1.68	1.67	1.45	1.48	1.46	1.41	1.39	1.40	1.38
1.71	1.74	1.73	1.65	1.64	1.63	1.62	1.43	1.46	1.44	1.39	1.36	1.37	1.35
1.73	1.75	1.74	1.66	1.65	1.65	1.63	1.44	1.47	1.45	1.39	1.37	1.38	1.36
1.72	1.75	1.74	1.68	1.67	1.66	1.66	1.43	1.46	1.45	1.40	1.39	1.39	1.38
1.71	1.75	1.74	1.65	1.65	1.64	1.63	1.43	1.47	1.45	1.39	1.37	1.38	1.36
1.76	1.78	1.77	1.71	1.70	1.70	1.69	1.45	1.48	1.47	1.42	1.41	1.41	1.40
1.69	1.72	1.71	1.64	1.63	1.62	1.61	1.42	1.45	1.43	1.38	1.36	1.37	1.35
1.72	1.75	1.74	1.68	1.68	1.67	1.66	1.43	1.47	1.45	1.41	1.40	1.40	1.39

## **FIGURES**

- 6-4. Plot Probability of Failure
- 6-5. AASHTO Std I-Beam Types
- 6-6. 230K HET MaxV-M 4-100 ft
- 6-7. MLC 100W MaxV-M 4-180 ft
- 6-8. Max Shear, Var LL+Est DL
- 6-9. Max Moment, Var LL+Est DL
- 6-10. Calc Beta, 1x Lane, Shear
- 6-11. Calc Beta, 1x Lane, Moment
- 6-12. Calc Beta, HET+Convoy, Shear
- 6-13. Calc Beta, HET+Convoy, Moment
- 6-14. Unfact Beta, 1x Lane, Shear
- 6-15. Unfact Beta, 1x Lane, Moment
- 6-16. NF Beta, HET+Convoy, Shear
- 6-17. NF Beta, HET+Convoy, Moment
- 6-18. Trad FS, Shear, SR div UFTS
- 6-19. Trad FS, Moment, MR div UFTM
- 6-20. FS vs Beta, combined V & M
- 6-21. Betas vs Var Lane Loading

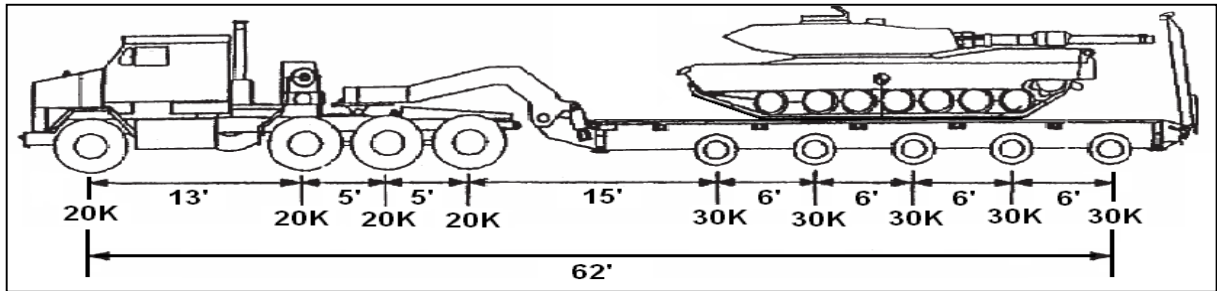


AASHTO Type I (1) girder	35 - 55 ft (10.7 - 16.8 m)
AASHTO Type II (2) girder	45 - 75 ft (13.7 - 22.9 m)
AASHTO Type III (3) girder	65 - 95 ft (19.8 - 29.0 m)
AASHTO Type IV (4) girder	85 - 120 ft (25.9 - 36.6 m)
AASHTO Type V (5) girder	110 - 145 ft (33.5 - 44.2 m)
AASHTO Type VI (6) girder	120 - 160 ft (36.6 - 48.8 m)



**NINE (9) AXLE One (1x) Proposed Standard HET (Alternative Military Live Load), Various Span Less than Vehicle Length**

Span	Maximum Values (No Impact)			1x 30K Axle			2x 30K Axle			3x 30K Axle			4x 30K Axle			5x 30K Axle			
	L	Vmax	Mmax	Front Shear	Max Shear (F Max M)	Mid-span	Front Shear	Max Shear (F Max M)	Mid-span	Front Shear	Max Shear (F Max M)	Mid-span	Front Shear	Max Shear (F Max M)	Mid-span	Front Shear	Max Shear (F Max M)	Mid-span	
ft	kips	ft-kips	kips	kips	ft-kips	kips	kips	ft-kips	kips	kips	ft-kips	kips	kips	ft-kips	kips	kips	ft-kips	kips	
4.00	1x 30K axle	4.0	30.00	30.0	0.00	30.00	30.0	30.00	30.00	0.0	18.00	42.00	60.0	45.00	45.00	90.0	60.00	60.00	180.0
6.00	1-2 30K axle	6.0	30.00	45.0	0.00	30.00	45.0	30.00	30.00	0.0	18.00	42.00	60.0	36.00	54.00	157.5	54.00	66.00	240.0
10.00		10.0	45.00	75.0	0.00	30.00	75.0	18.00	42.00	60.0	18.00	42.00	60.0	36.00	54.00	157.5	45.00	75.00	360.0
12.00	2-3 30K axle	12.0	51.43	90.0	0.00	30.00	90.0	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
14.00		14.0	54.00	135.0	0.00	30.00	135.0	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
15.00		15.0	60.00	157.5	0.00	30.00	157.5	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
18.00	3-4 30K axle	18.0	60.00	225.0	0.00	30.00	225.0	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
20.00		20.0	66.00	240.0	0.00	30.00	240.0	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
24.00	4-5 30K axle	24.0	75.00	360.0	0.00	30.00	360.0	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
25.00		25.0	78.00	397.5	0.00	30.00	397.5	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
28.00		28.0	85.71	510.0	0.00	30.00	510.0	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
30.00		30.0	90.00	585.0	0.00	30.00	585.0	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
32.67		32.7	94.90	685.1	0.00	30.00	685.1	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
35.00		35.0	98.57	772.5	0.00	30.00	772.5	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
39.00	5x 30K + 1x 20K	39.0	103.85	922.5	0.00	30.00	922.5	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
40.00		40.0	105.50	960.0	0.00	30.00	960.0	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
42.00		42.0	113.11	1,035.0	0.00	30.00	1,035.0	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
45.00	5x 30K + 1-2 20K	45.0	116.38	1,147.5	0.00	30.00	1,147.5	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
47.00		47.0	119.39	1,222.5	0.00	30.00	1,222.5	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
49.00	5x 30K + 2-3 20K	49.0	120.80	1,297.5	0.00	30.00	1,297.5	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
50.00		50.0	123.46	1,323.0	0.00	30.00	1,323.0	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
52.00		52.0	127.09	1,407.1	0.00	30.00	1,407.1	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
55.00		55.0	132.33	1,521.8	0.00	30.00	1,521.8	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
60.00		60.0	136.00	1,748.6	0.00	30.00	1,748.6	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
62.00	ALL 9 AXLES	62.0	138.39	1,853.4	0.00	30.00	1,853.4	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
65.00		65.0	142.62	2,010.5	0.00	30.00	2,010.5	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
70.00		70.0	148.86	2,272.4	0.00	30.00	2,272.4	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
72.00		72.0	151.11	2,377.2	0.00	30.00	2,377.2	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
75.00		75.0	154.27	2,534.4	0.00	30.00	2,534.4	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
80.00		80.0	159.00	2,796.5	0.00	30.00	2,796.5	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
82.00		82.0	160.73	2,901.3	0.00	30.00	2,901.3	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
90.00		90.0	166.89	3,353.6	0.00	30.00	3,353.6	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0
100.00		100.0	173.20	3,925.8	0.00	30.00	3,925.8	15.00	45.00	90.0	15.00	45.00	90.0	30.00	60.00	225.0	60.00	60.00	180.0

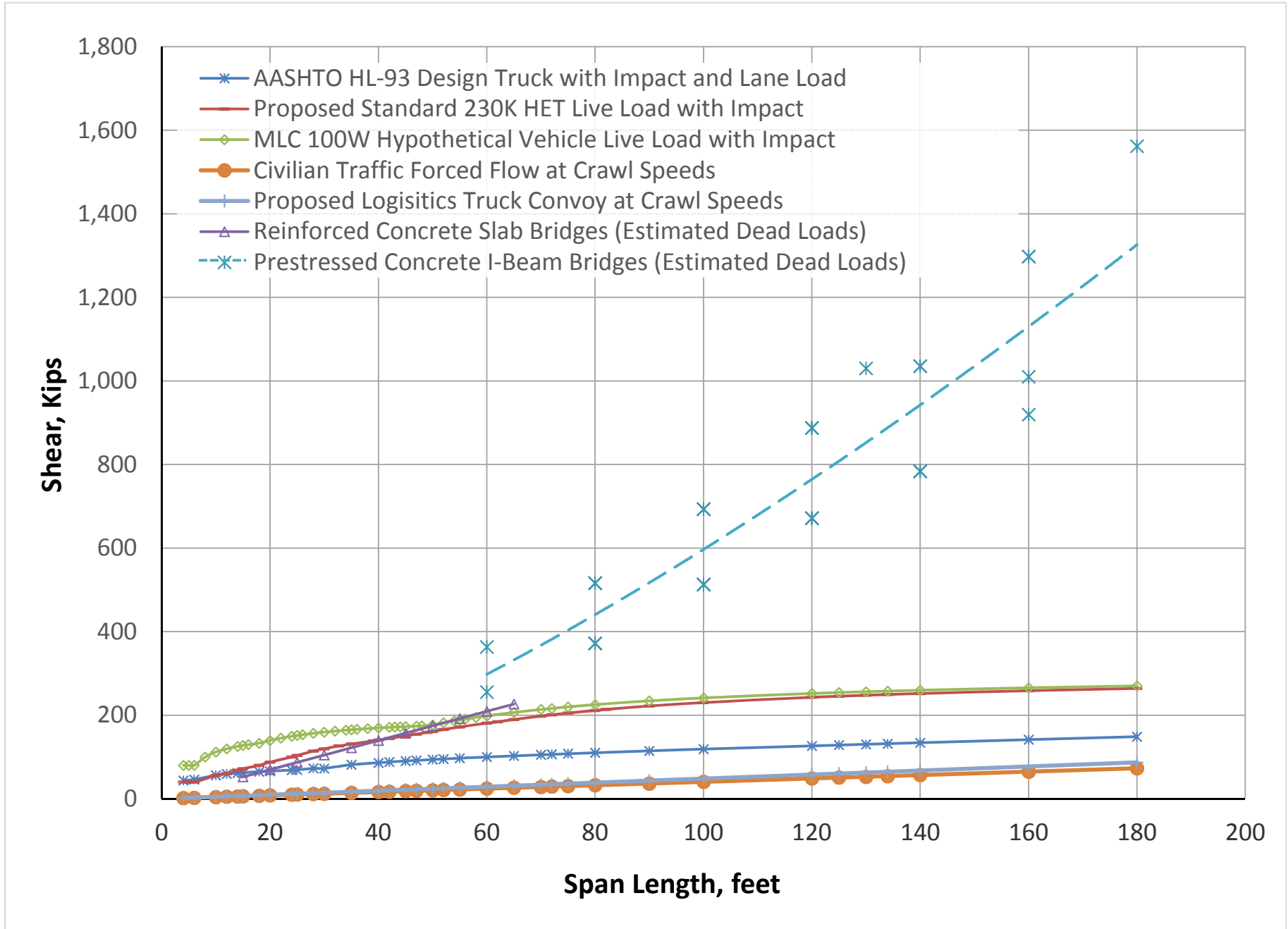


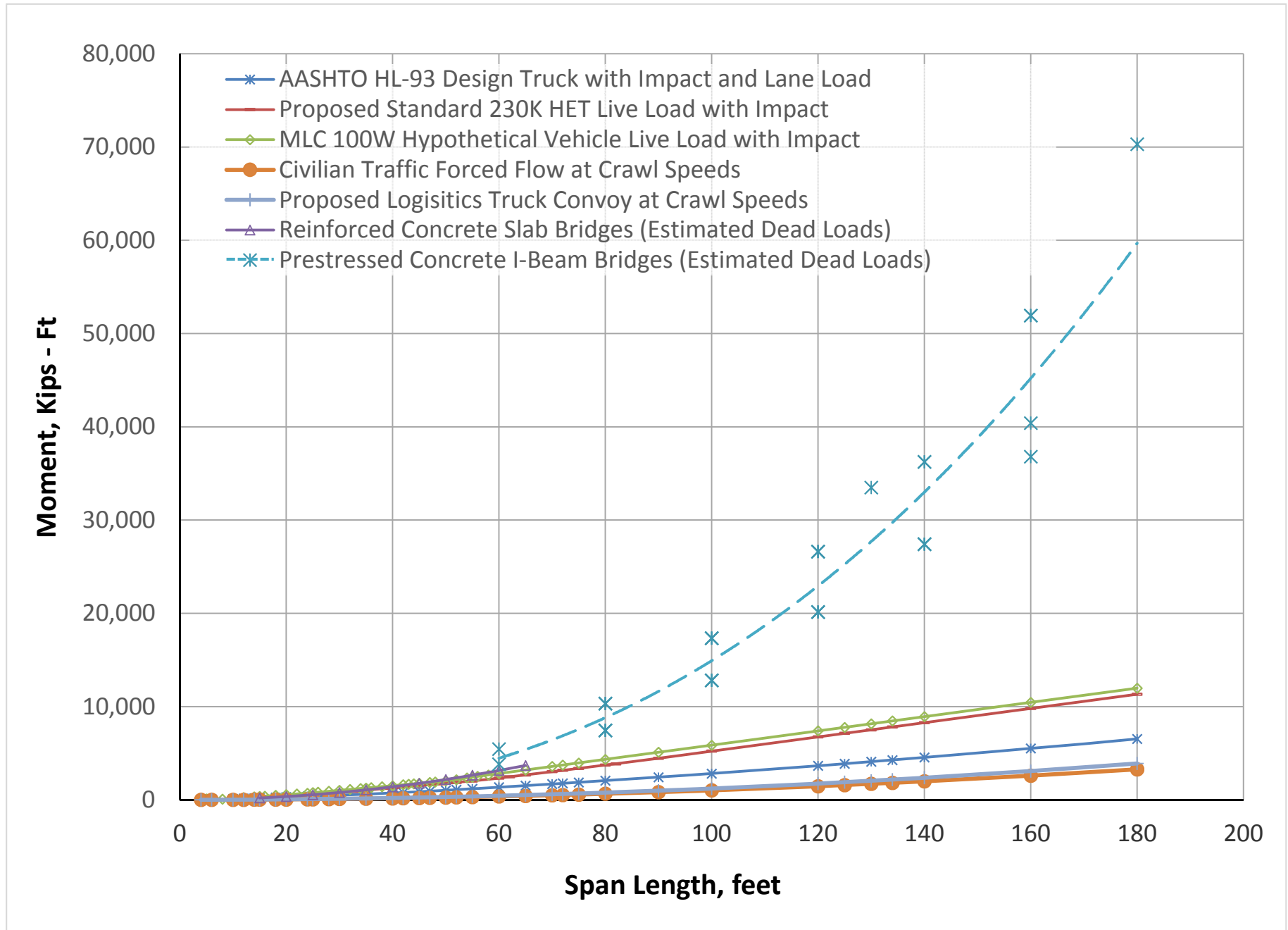
**NINE (9) AXLE** **One (1x) MLC 100W, Various Span Less than Vehicle Length**

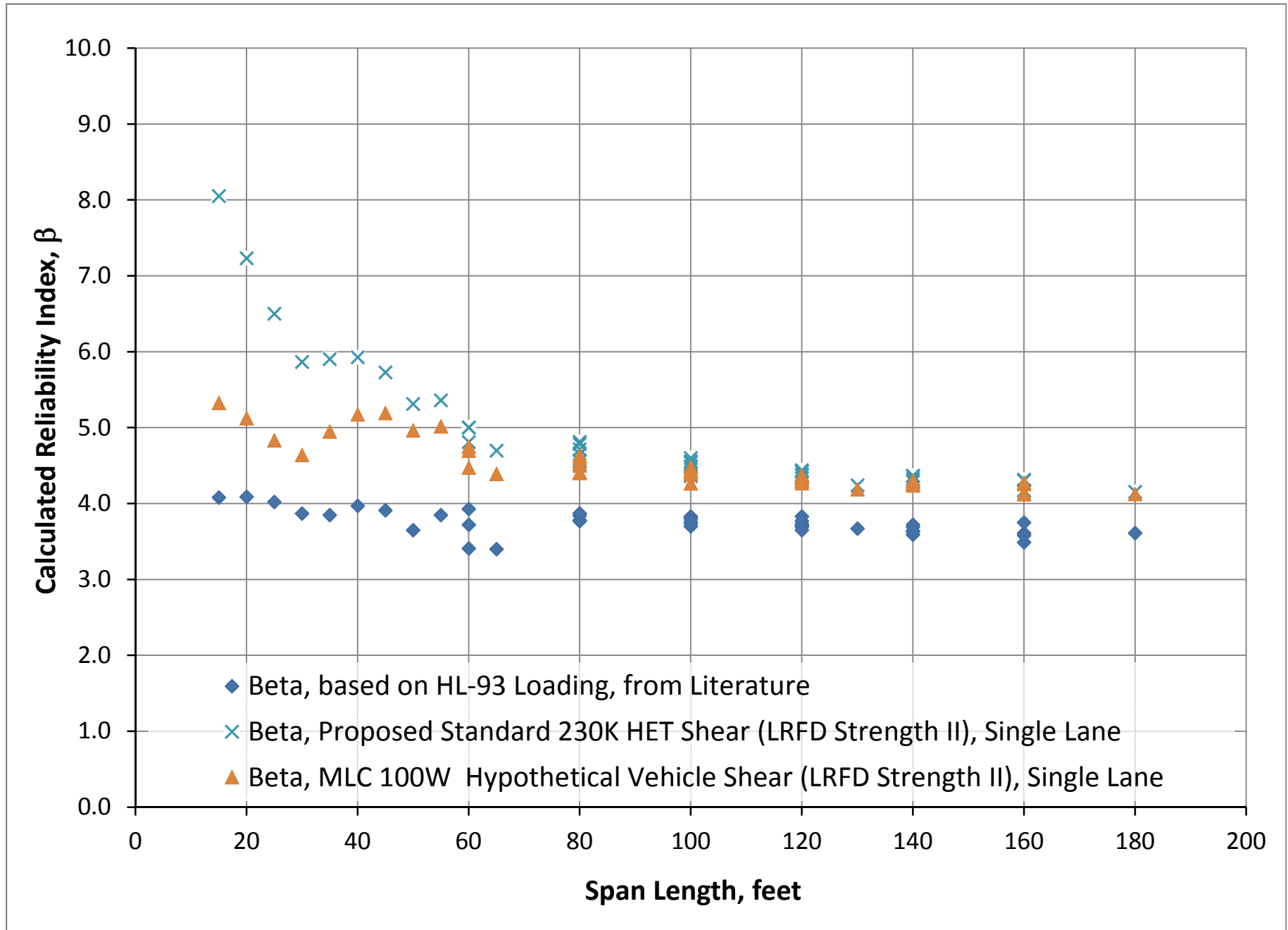
	Maximum Values (No Impact)			1x Middle 60K Axle			2x Rear 40K Axles, 5' sep			2x Middle 60K Axles, 6' sep			
	Span	Max Shear	Max Moment	Front Shear	Max Shear (Max M, Vmax A	Mid-span	Front Shear	Max Shear (Max M, Vmax A	Mid-span	Front Shear	Max Shear (Max M, Vmax A	Mid-span	
	ft	kips	ft-kips	kips	kips	ft-kips	kips	kips	ft-kips	kips	kips	ft-kips	
4.00	1x Middle 60K axle	4.00	60.00	60.0	0.00	60.00	60.0	40.00	40.00	0.0	60.00	60.00	0.0
5.00	2x Rear 40K Axles	5.00	60.00	75.0	0.00	60.00	75.0	33.33	46.67	20.0	45.00	75.00	60.0
6.00	2x Middle 60K Axles	6.00	60.00	90.0	0.00	60.00	90.0	25.00	55.00	60.0	36.00	84.00	120.0
8.00		8.00	75.00	120.0	0.00	60.00	120.0	16.67	63.33	140.0	30.00	90.00	180.0
10.00		10.00	84.00	150.0	0.00	60.00	150.0	20.00	60.00	100.0	25.71	94.29	240.0
12.00		12.00	90.00	180.0	0.00	60.00	180.0	13.33	66.67	200.0	24.00	96.00	270.0
14.00		14.00	94.29	240.0	0.00	60.00	240.0	12.50	67.50	220.0	22.50	97.50	300.0
15.00		15.00	96.00	270.0	0.00	60.00	270.0	11.11	68.89	260.0	20.00	100.00	360.0
16.00		16.00	97.50	300.0	0.00	60.00	300.0	10.00	70.00	300.0	18.00	102.00	420.0
18.00	Front 30K +2x Mid 60K	18.00	100.00	360.0	0.00	60.00	360.0	9.09	70.91	340.0	16.36	103.64	480.0
20.00		20.00	105.00	420.0	0.00	60.00	420.0	8.33	71.67	380.0	15.00	105.00	540.0
22.00		22.00	109.09	480.0	0.00	60.00	480.0	8.00	72.00	400.0	14.40	105.60	570.0
24.00		24.00	112.50	540.0	0.00	60.00	540.0	0.00	72.00	400.0	13.85	106.15	600.0
25.00		25.00	114.00	577.5	0.00	60.00	577.5	0.00	72.00	400.0	12.86	107.14	660.0
26.00		26.00	115.38	615.0	0.00	60.00	615.0	0.00	72.00	400.0	12.00	108.00	720.0
28.00		28.00	117.86	690.0	0.00	60.00	690.0	0.00	72.00	400.0	0.00	108.00	720.0
30.00		30.00	120.00	765.0	0.00	60.00	765.0	0.00	72.00	400.0	0.00	108.00	720.0
32.00		32.00	121.88	840.0	0.00	60.00	840.0	0.00	72.00	400.0	0.00	108.00	720.0
34.00		34.00	123.53	915.0	0.00	60.00	915.0	0.00	72.00	400.0	0.00	108.00	720.0
35.00		35.00	124.29	952.5	0.00	60.00	952.5	0.00	72.00	400.0	0.00	108.00	720.0
36.00		36.00	125.00	990.0	0.00	60.00	990.0	0.00	72.00	400.0	0.00	108.00	720.0
38.00	30K+2x Mid 60K+1x Rear 40K	38.00	126.32	1,065.0	0.00	60.00	1,065.0	0.00	72.00	400.0	0.00	108.00	720.0
40.00		40.00	127.50	1,140.0	0.00	60.00	1,140.0	0.00	72.00	400.0	0.00	108.00	720.0
42.00		42.00	128.57	1,215.0	0.00	60.00	1,215.0	0.00	72.00	400.0	0.00	108.00	720.0
43.00	Full Vehicle (230K)	43.00	129.07	1,252.5	0.00	60.00	1,252.5	0.00	72.00	400.0	0.00	108.00	720.0
44.00		44.00	129.55	1,290.0	0.00	60.00	1,290.0	0.00	72.00	400.0	0.00	108.00	720.0
45.00		45.00	130.00	1,327.5	0.00	60.00	1,327.5	0.00	72.00	400.0	0.00	108.00	720.0
47.00		47.00	130.85	1,402.5	0.00	60.00	1,402.5	0.00	72.00	400.0	0.00	108.00	720.0
48.00	Full Vehicle (230K), Max Moment	48.00	131.25	1,440.0	0.00	60.00	1,440.0	0.00	72.00	400.0	0.00	108.00	720.0
50.00		50.00	133.00	1,525.3	0.00	60.00	1,525.3	0.00	72.00	400.0	0.00	108.00	720.0
52.00		52.00	136.73	1,621.5	0.00	60.00	1,621.5	0.00	72.00	400.0	0.00	108.00	720.0
54.00		54.00	140.19	1,771.3	0.00	60.00	1,771.3	0.00	72.00	400.0	0.00	108.00	720.0
55.00		55.00	141.82	1,828.5	0.00	60.00	1,828.5	0.00	72.00	400.0	0.00	108.00	720.0
56.00		56.00	143.39	1,885.7	0.00	60.00	1,885.7	0.00	72.00	400.0	0.00	108.00	720.0
58.00		58.00	146.38	2,000.2	0.00	60.00	2,000.2	0.00	72.00	400.0	0.00	108.00	720.0
60.00		60.00	149.17	2,114.7	0.00	60.00	2,114.7	0.00	72.00	400.0	0.00	108.00	720.0
65.00		65.00	155.38	2,401.0	0.00	60.00	2,401.0	0.00	72.00	400.0	0.00	108.00	720.0
70.00		70.00	160.71	2,687.6	0.00	60.00	2,687.6	0.00	72.00	400.0	0.00	108.00	720.0
72.00		72.00	162.64	2,802.2	0.00	60.00	2,802.2	0.00	72.00	400.0	0.00	108.00	720.0
75.00		75.00	165.33	2,974.2	0.00	60.00	2,974.2	0.00	72.00	400.0	0.00	108.00	720.0
80.00		80.00	169.38	3,261.0	0.00	60.00	3,261.0	0.00	72.00	400.0	0.00	108.00	720.0
90.00		90.00	176.11	3,834.8	0.00	60.00	3,834.8	0.00	72.00	400.0	0.00	108.00	720.0
100.00		100.00	181.50	4,408.8	0.00	60.00	4,408.8	0.00	72.00	400.0	0.00	108.00	720.0
120.00		120.00	189.58	5,557.3	0.00	60.00	5,557.3	0.00	72.00	400.0	0.00	108.00	720.0
125.00		125.00	191.20	5,844.5	0.00	60.00	5,844.5	0.00	72.00	400.0	0.00	108.00	720.0
130.00		130.00	192.69	6,131.8	0.00	60.00	6,131.8	0.00	72.00	400.0	0.00	108.00	720.0
134.00		134.00	193.81	6,361.6	0.00	60.00	6,361.6	0.00	72.00	400.0	0.00	108.00	720.0
140.00		140.00	195.36	6,706.3	0.00	60.00	6,706.3	0.00	72.00	400.0	0.00	108.00	720.0
160.00		160.00	199.69	7,855.5	0.00	60.00	7,855.5	0.00	72.00	400.0	0.00	108.00	720.0
180.00		180.00	203.06	9,004.9	0.00	60.00	9,004.9	0.00	72.00	400.0	0.00	108.00	720.0

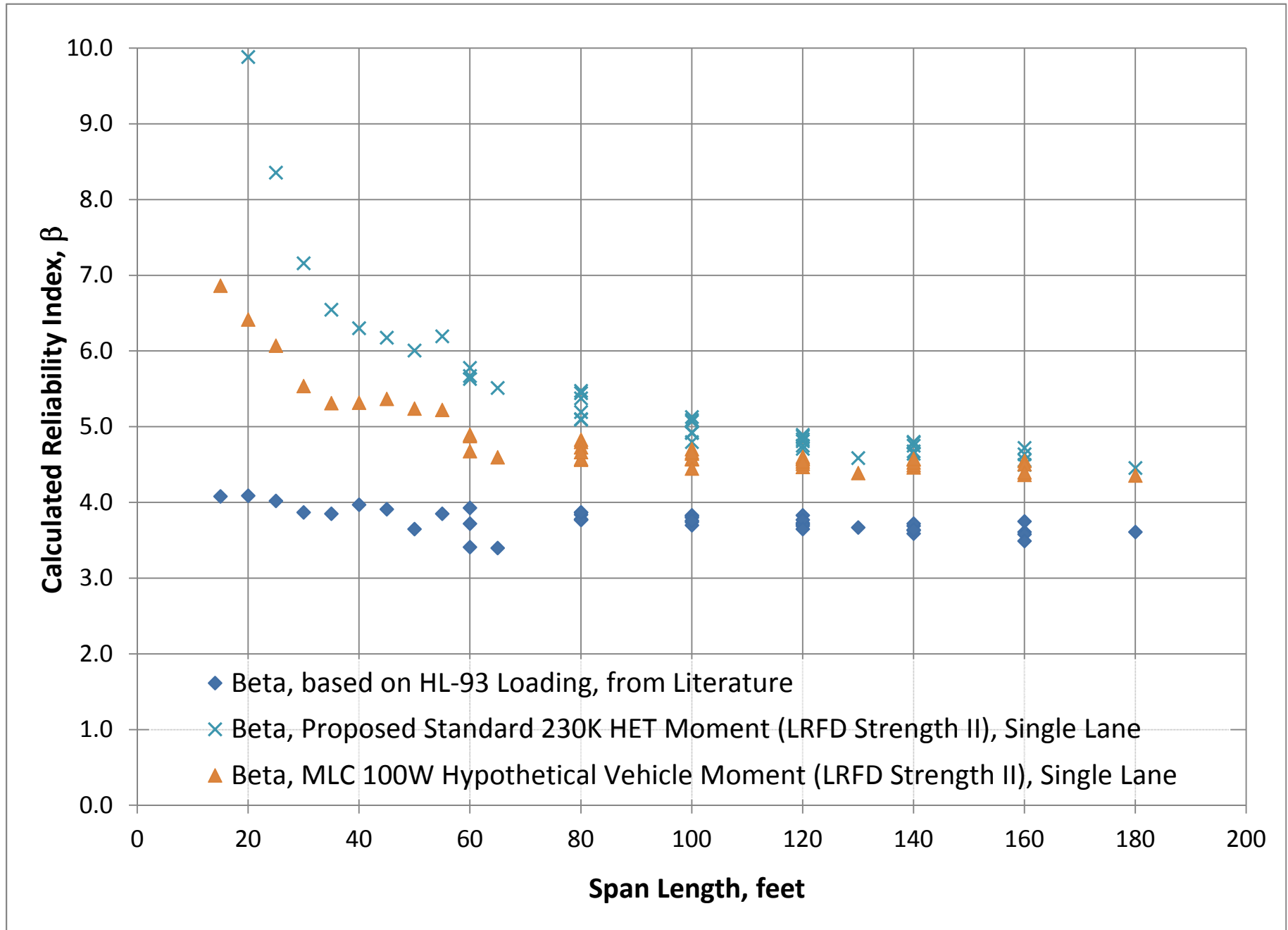
  

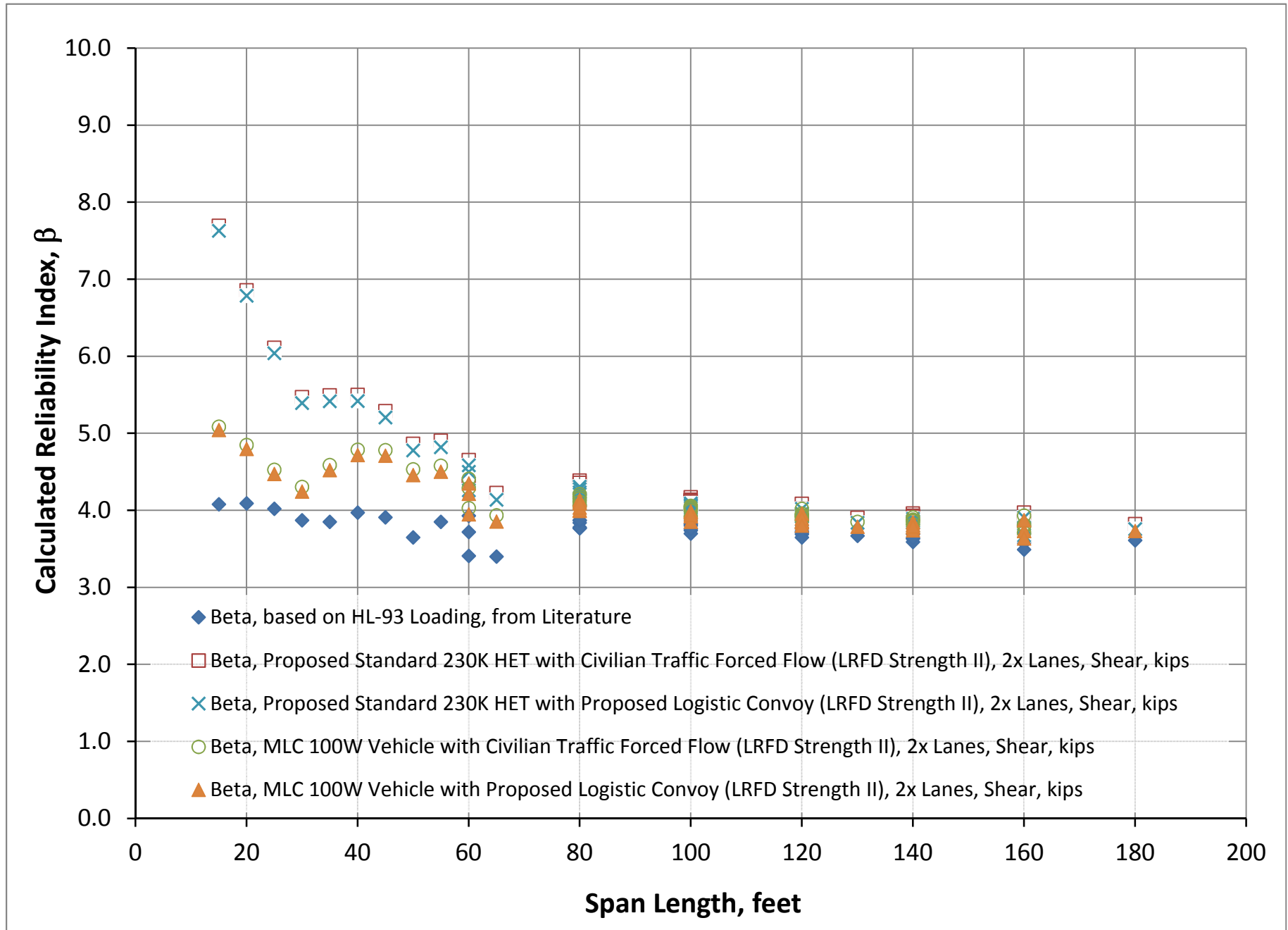
1x Middle 60K Axle			2x Rear 40K Axles, 5' sep			2x Middle 60K Axles, 6' sep			
Span	Max Shear	Max Moment	Front Shear	Max Shear (Max M, Vmax A	Mid-span	Front Shear	Max Shear (Max M, Vmax A	Mid-span	
ft	kips	ft-kips	kips	kips	ft-kips	kips	kips	ft-kips	
4.00	0.00	60.00	60.0	40.00	40.00	0.0	60.00	60.00	0.0
5.00	0.00	60.00	75.0	33.33	46.67	20.0	45.00	75.00	60.0
6.00	0.00	60.00	90.0	25.00	55.00	60.0	36.00	84.00	120.0
8.00	0.00	60.00	120.0	16.67	63.33	140.0	30.00	90.00	180.0
10.00	0.00	60.00	150.0	20.00	60.00	100.0	25.71	94.29	240.0
12.00	0.00	60.00	180.0	13.33	66.67	200.0	24.00	96.00	270.0
14.00	0.00	60.00	240.0	12.50	67.50	220.0	22.50	97.50	300.0
15.00	0.00	60.00	270.0	11.11	68.89	260.0	20.00	100.00	360.0
16.00	0.00	60.00	300.0	10.00	70.00	300.0	18.00	102.00	420.0
18.00	0.00	60.00	360.0	9.09	70.91	340.0	16.36	103.64	480.0
20.00	0.00	60.00	420.0	8.33	71.67	380.0	15.00	105.00	540.0
22.00	0.00	60.00	480.0	8.00	72.00	400.0	14.40	105.60	570.0
24.00	0.00	60.00	540.0	0.00	72.00	400.0	13.85	106.15	600.0
25.00	0.00	60.00	577.5	0.00	72.00	400.0	12.86	107.14	660.0
26.00	0.00	60.00	615.0	0.00	72.00	400.0	12.00	108.00	720.0
28.00	0.00	60.00	690.0	0.00	72.00	400.0	0.00	108.00	720.0
30.00	0.00	60.00	765.0	0.00	72.00	400.0	0.00	108.00	720.0
32.00	0.00	60.00	840.0	0.00	72.00	400.0	0.00	108.00	720.0
34.00	0.00	60.00	915.0	0.00	72.00	400.0	0.00	108.00	720.0
35.00	0.00	60.00	952.5	0.00	72.00	400.0	0.00	108.00	720.0
36.00	0.00	60.00	990.0	0.00	72.00	400.0	0.00	108.00	720.0
38.00	0.00	60.00	1,065.0	0.00	72.00	400.0	0.00	108.00	720.0
40.00	0.00	60.00	1,140.0	0.00	72.00	400.0	0.00	108.00	720.0
42.00	0.00	60.00	1,215.0	0.00	72.00	400.0	0.00	108.00	720.0
43.00	0.00	60.00	1,252.5	0.00	72.00	400.0	0.00	108.00	720.0
44.00	0.00	60.00	1,290.0	0.00	72.00	400.0	0.00	108.00	720.0
45.00	0.00	60.00	1,327.5	0.00	72.00	400.0	0.00	108.00	720.0
47.00	0.00	60.00	1,402.5	0.00	72.00	400.0	0.00	108.00	720.0
48.00	0.00	60.00	1,440.0	0.00	72.00	400.0	0.00	108.00	720.0
50.00	0.00	60.00	1,525.3	0.00	72.00	400.0	0.00	108.00	720.0
52.00	0.00	60.00	1,621.5	0.00	72.00	400.0	0.00	108.00	720.0
54.00	0.00	60.00	1,771.3	0.00	72.00	400.0	0.00	108.00	720.0
55.00	0.00	60.00	1,828.5	0.00	72.00	400.0	0.00	108.00	720.0
56.00	0.00	60.00	1,885.7	0.00	72.00	400.0	0.00	108.00	720.0
58.00	0.00	60.00	2,000.2	0.00	72.00	400.0	0.00	108.00	720.0
60.00	0.00	60.00	2,114.7	0.00	72.00	400.0	0.00	108.00	720.0
65.00	0.00	60.00	2,401.0	0.00	72.00	400.0	0.00	108.00	720.0
70.00	0.00	60.00	2,687.6	0.00	72.00	400.0	0.00	108.00	720.0
72.00	0.00	60.00	2,802.2	0.00	72.00	400.0	0.00	108.00	720.0
75.00	0.00	60.00	2,974.2	0.00	72.00	400.0	0.00	108.00	720.0
80.00	0.00	60.00	3,261.0	0.00	72.00	400.0	0.00	108.00	720.0
90.00	0.00	60.00	3,834.8	0.00	72.00	400.0	0.00	108.00	720.0

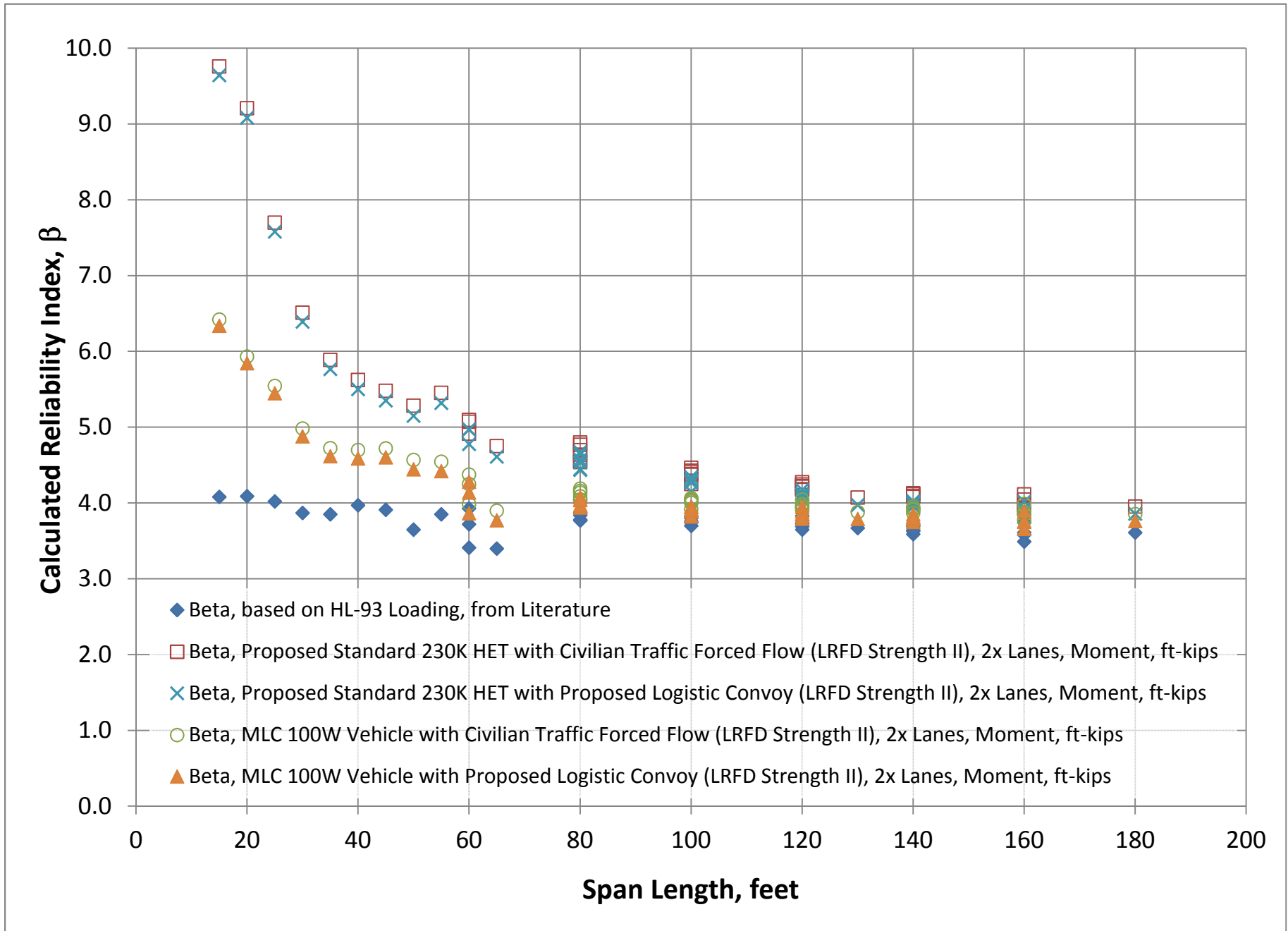




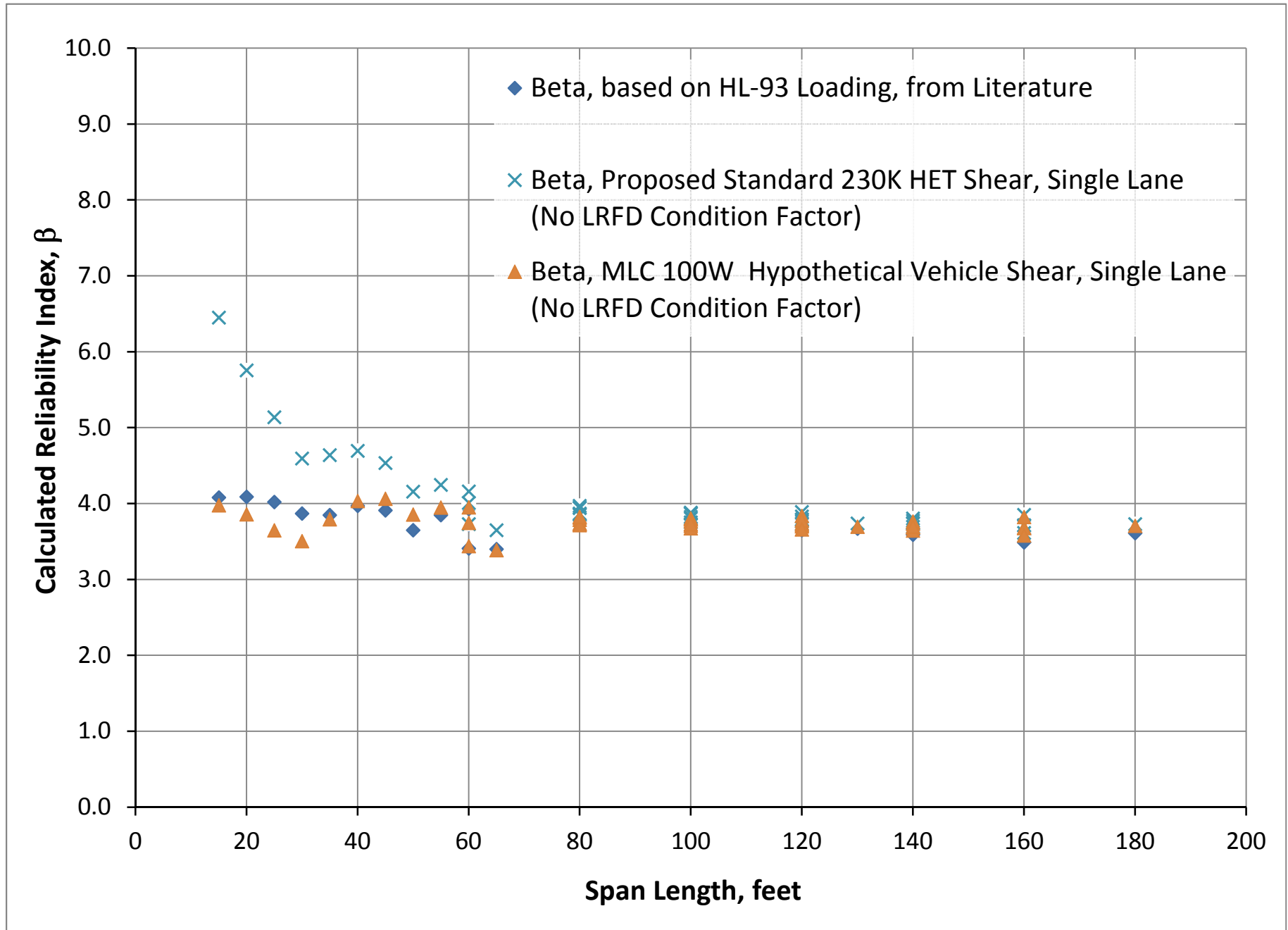


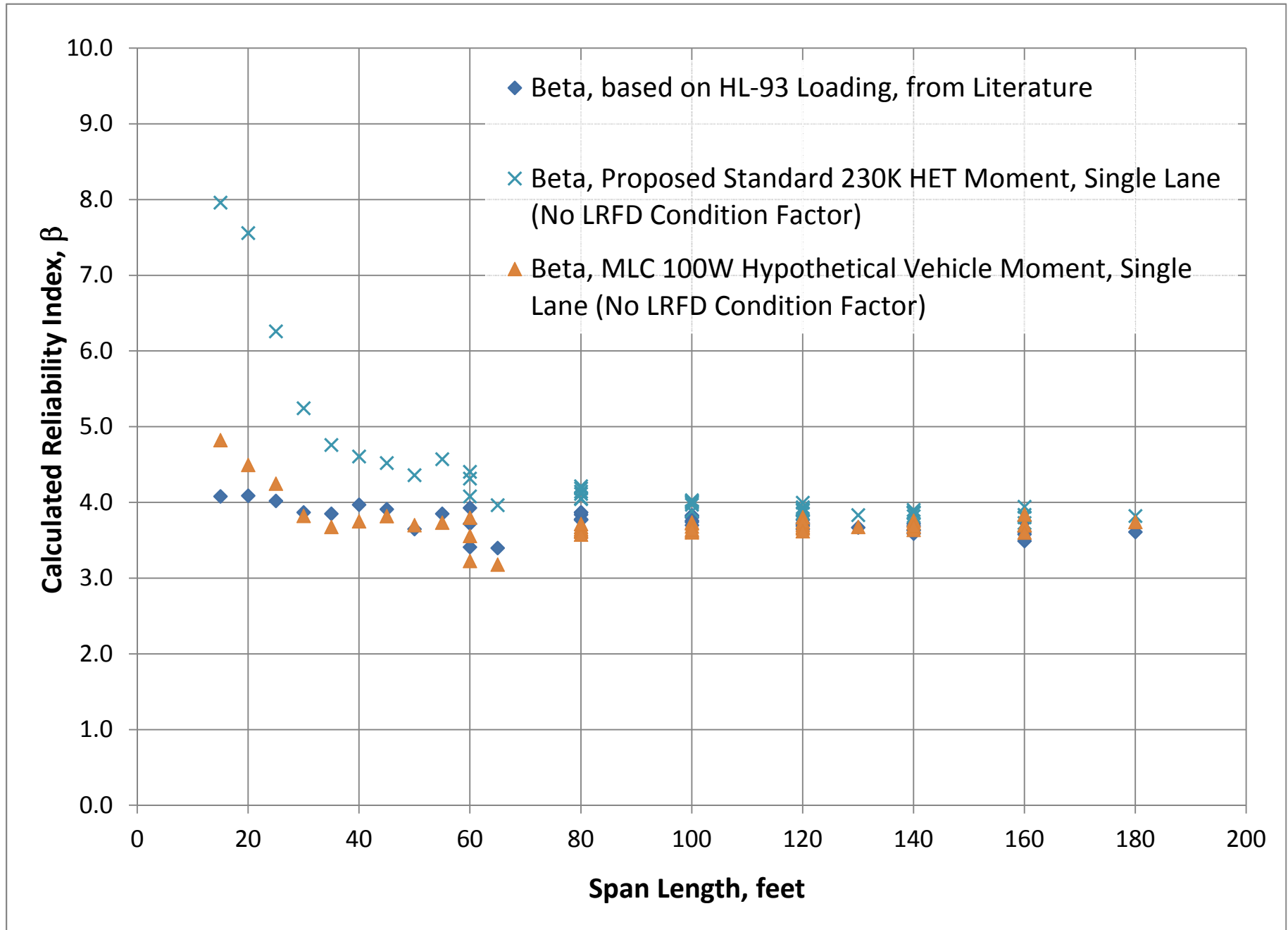


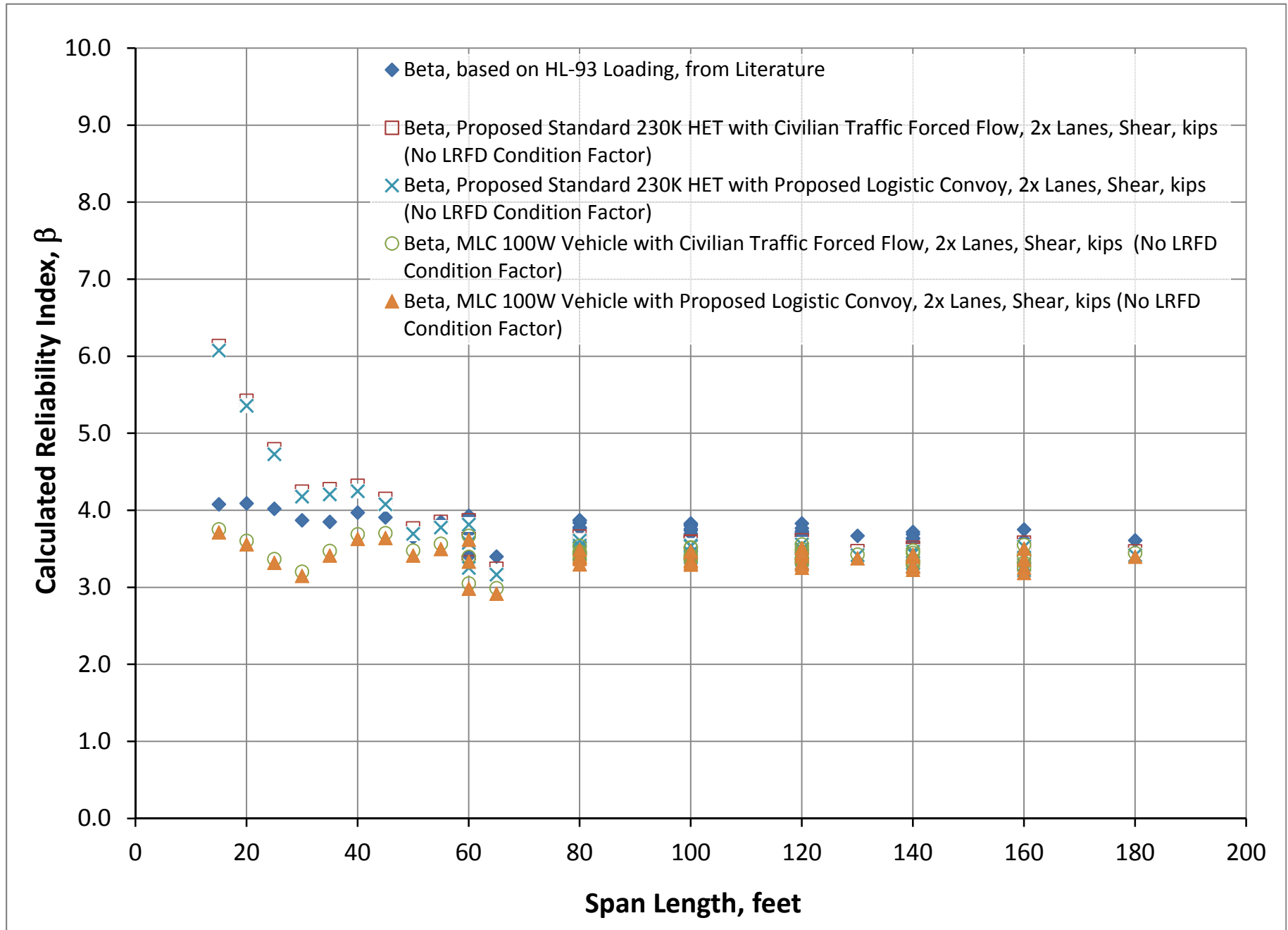


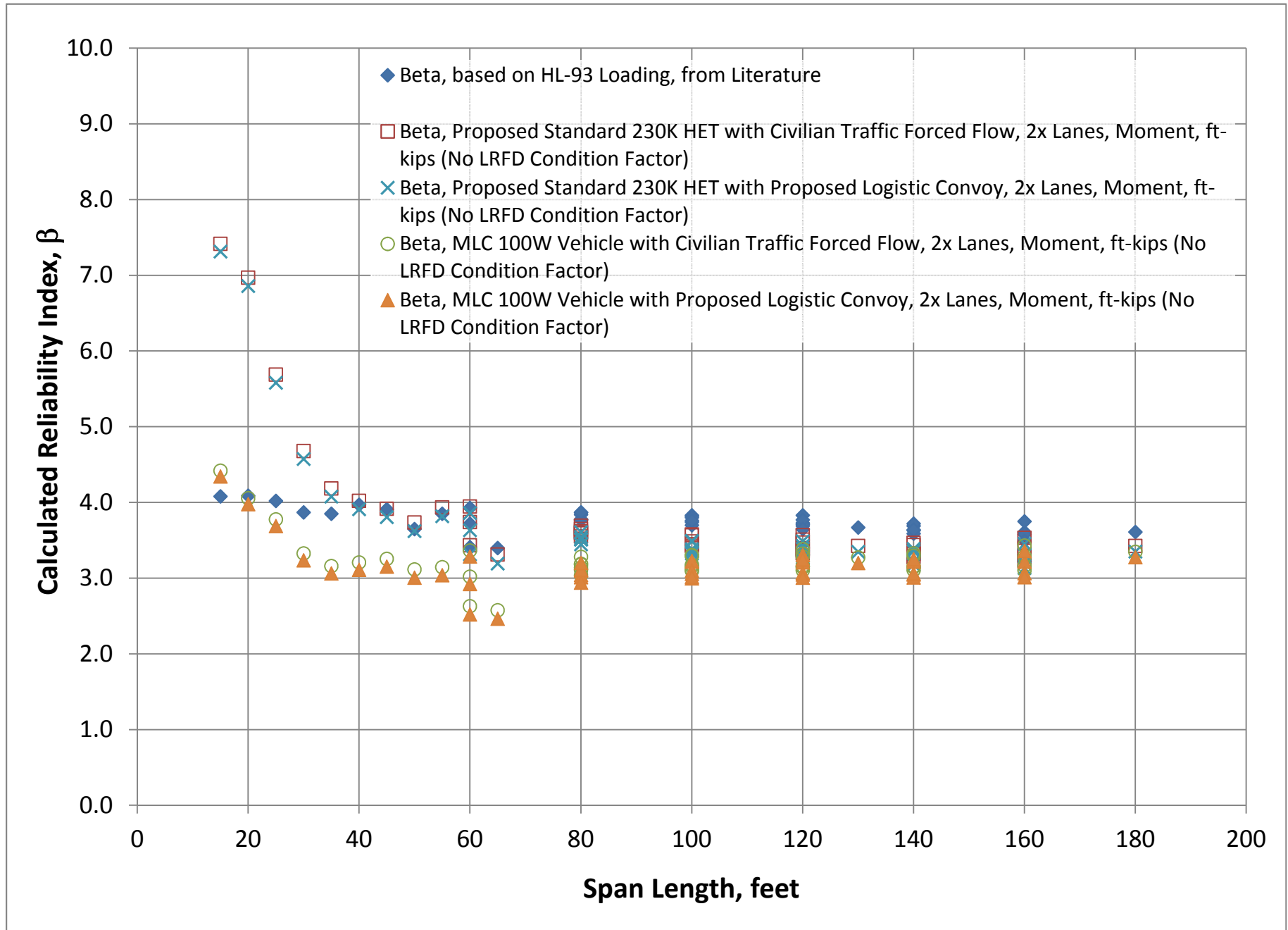


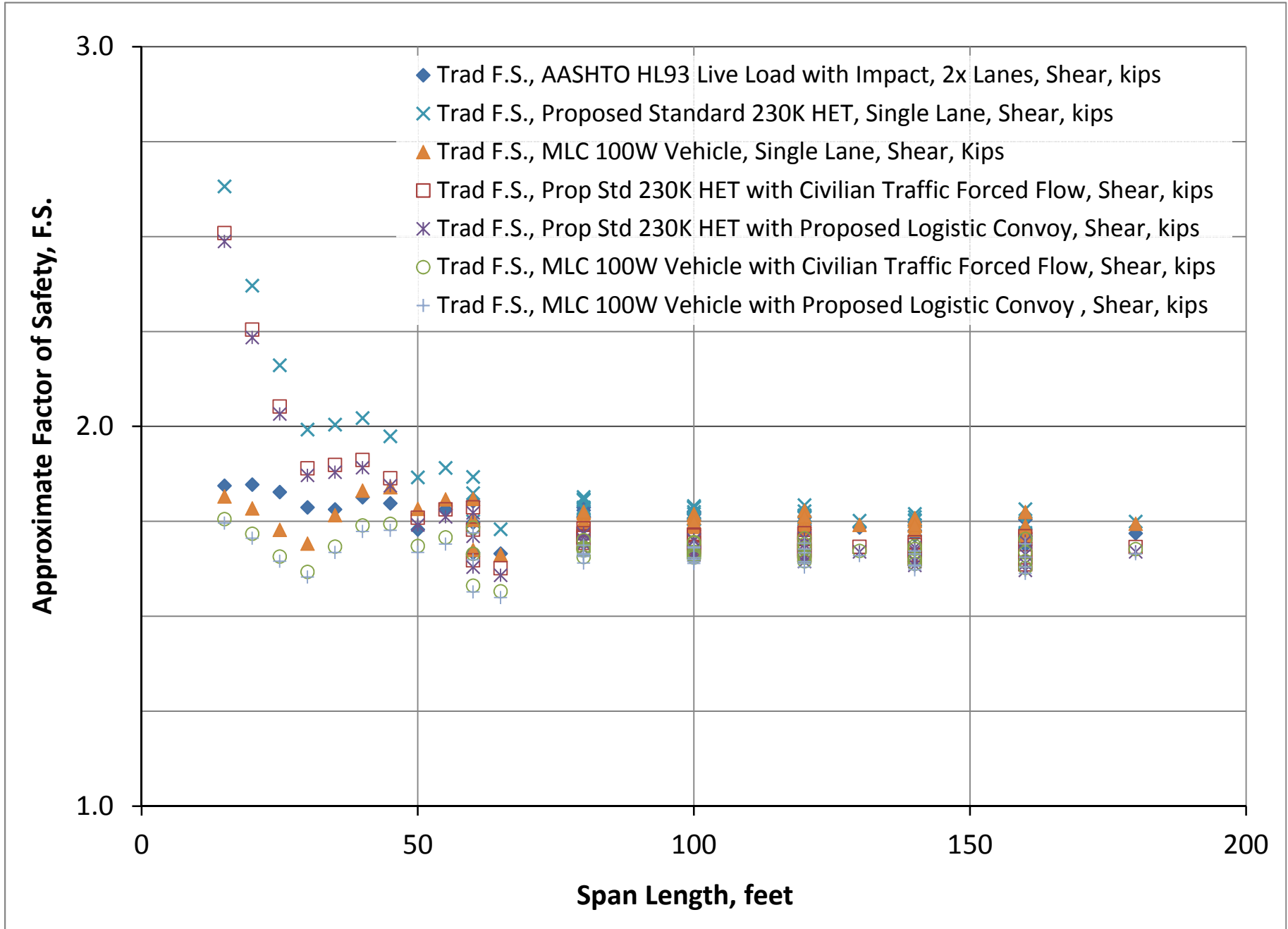


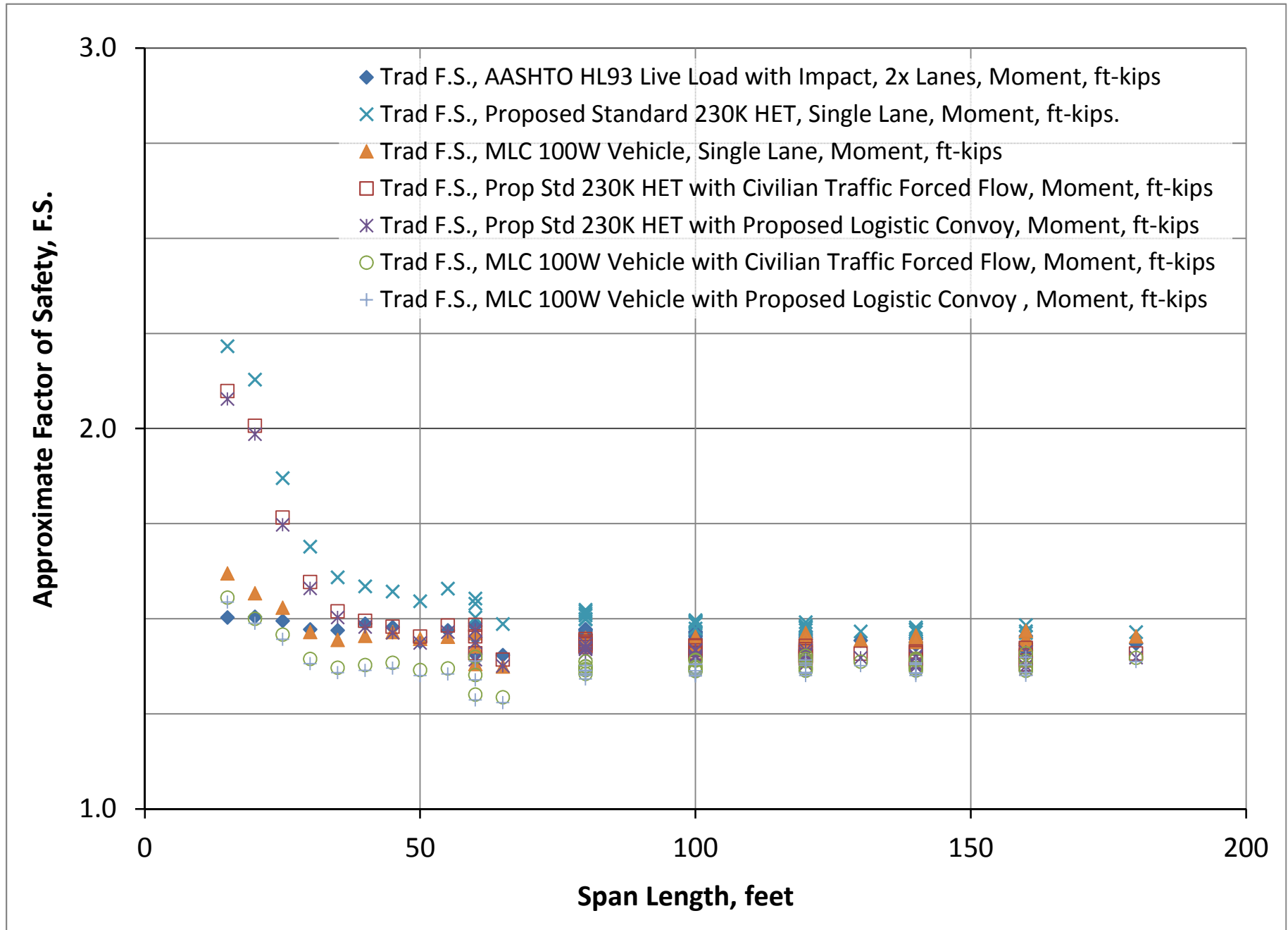


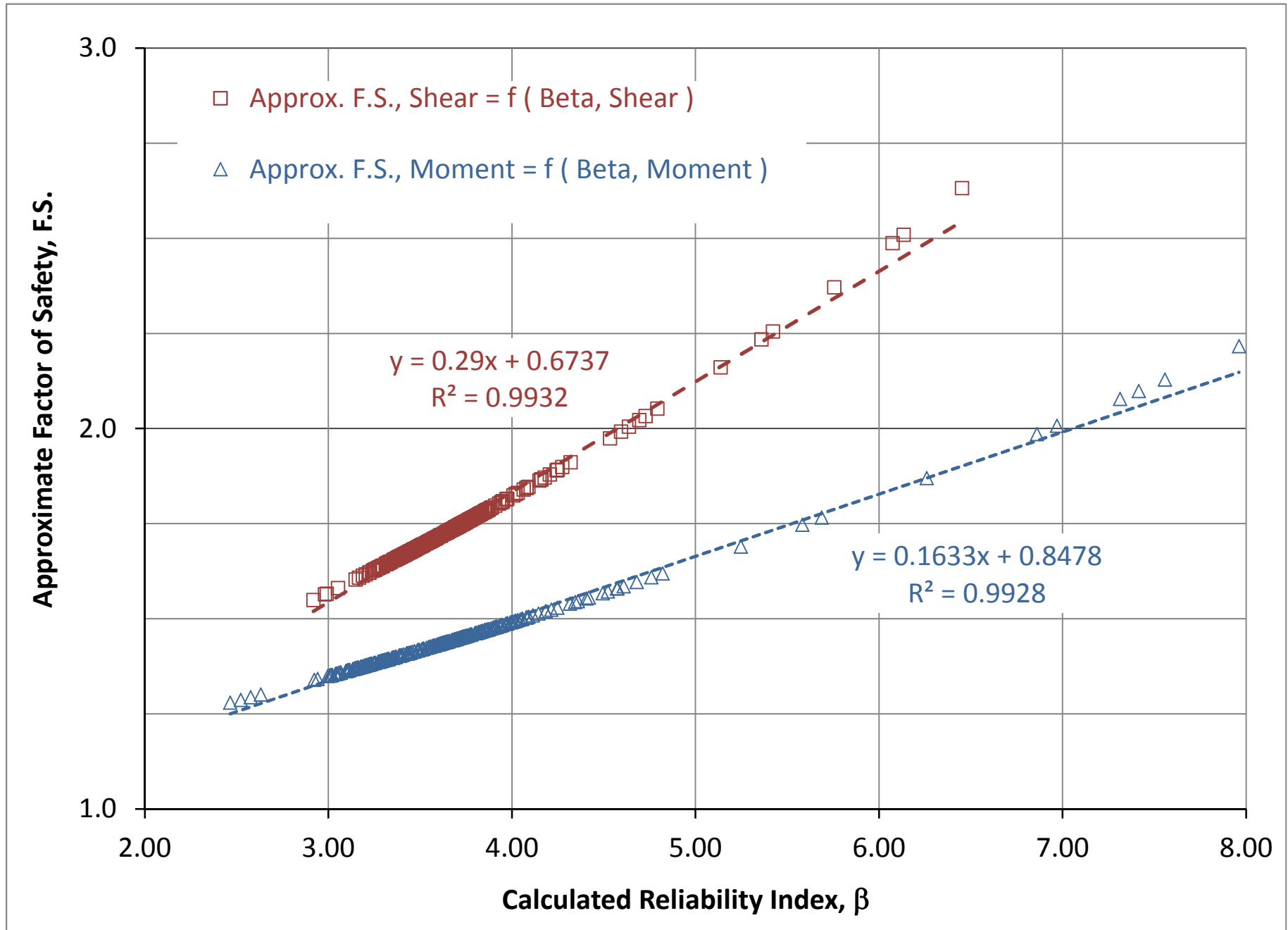


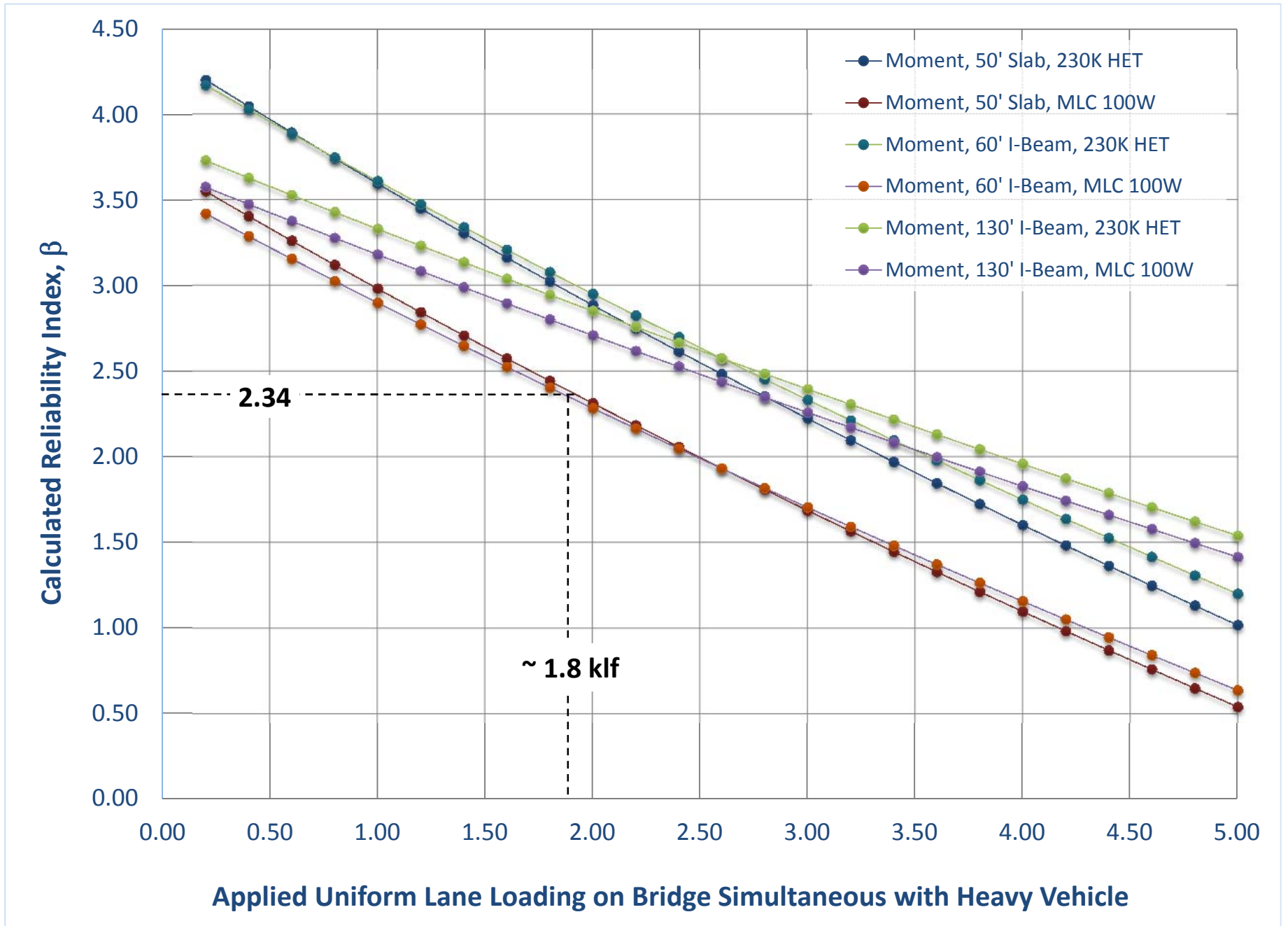














**END OF APPENDIX I**

## APPENDIX J: CONSOLIDATED TABLES 5-1 THROUGH 5-11

Filename: WP Parker UNO 2019 MSCE Thesis Data - Appendix J. Consolidated Tables 5-1 thru 5-14.xlsx

Contents (worksheets/tab names included in the Excel workbook are):

<u>Table</u>	<u>Table Designation in Thesis</u>	<u>Source Files (All Files Names begin with prefix: "WP Parker UNO 2019 MSCE Thesis Data")</u>	<u>Page</u>
5-1	Maximum Moments for AASHTO HL-93 Design Truck and Lane Load	Appendix C. Max Moment Location Calculations.xlsx	J-2
5-2	Maximum End Shear and Mid-span Moment for AASHTO HL-93 Design Truck and Lane Load of Span Lengths for Various Span Lengths	Appendix C. Max Moment Location Calculations.xlsx	J-3
5-3	Variations in Maximum Moment Magnitude and Location for AASHTO HL-93 Design Truck and Lane Load for Various Span Lengths	Appendix C. Max Moment Location Calculations.xlsx	J-4
5-4	Maximum End Shear for MLC 40 to 120 Hypothetical Wheeled and Tracked Vehicles on 50 to 1,000 ft (15.2 – 304.8 m) Spans	Appendix D. STANAG vs. Calculations Comparison.xlsx Appendix E. Axle at Midspan Calculations.xlsx	J-5
5-5	Maximum Mid-span Moments for MLC 40 to 120 Hypothetical Wheeled and Tracked Vehicles on 50 to 1,000 ft (15.2 – 304.8 m) Spans	Appendix D. STANAG vs. Calculations Comparison.xlsx Appendix E. Axle at Midspan Calculations.xlsx	J-7
5-6	Maximum End Shear and Mid-span Moments for HET systems and Single MLC100W Hypothetical Wheeled Vehicle, Various Span Lengths	Appendix E. Axle at Midspan Calculations.xlsx Appendix F. Various HET Vehicles.xlsx	J-9
5-7	Maximum End Shears for 1-3 MLC100W Hypothetical Vehicles	Appendix G. Multiple MLC100W Vehicles Single Span.xlsx	J-11
5-8	Maximum Moments for 1-3 MLC100W Hypothetical Vehicles	Appendix G. Multiple MLC100W Vehicles Single Span.xlsx	J-12
5-9	Maximum End Shear and Mid-span Moments for Various Uniform Loads and 1-3 MLC100W Hypothetical Wheeled Vehicles, Various Span Lengths	Appendix E. Axle at Midspan Calculations.xlsx Appendix G. Multiple MLC100W Vehicles Single Span.xlsx	J-13
5-10	Maximum Shear and Mid-span Moments for State Permit Vehicles and 1-3 MLC100W Hypothetical Wheeled Vehicles on 50 to 1,000 ft (15.2 – 304.8 m) Span Length Simple Beams	Appendix E. Axle at Midspan Calculations.xlsx Appendix H. Special Permit Vehicles.xlsx	J-15
5-11	Maximum Shear and Mid-span Moments per Louisiana DOTD BDEM and 1-3 MLC100W Hypothetical Wheeled Vehicles on 50 to 1,000 ft (15.2 – 304.8 m) Span Length Simple Beams	Appendix E. Axle at Midspan Calculations.xlsx Appendix H. Special Permit Vehicles.xlsx	J-17
7-1	Proposed New Military Live Load Magnification Factors	Appendix E. Axle at Midspan Calculations.xlsx	J-19

**Table 5-1: Maximum Moments for AASHTO HL-93 Design Truck and Lane Load**

Data Source File(s): Appendix C. Max Moment Location Calculations.xlsx

Maximum Moments for AASHTO HL-93 Design Truck and Lane Load, with Impact					
Span Length	CALTRANS Design Values	Calculated Maximum Mid-span Moment	Calculated Absolute Maximum Moment on Span	Location of Calculated Absolute Maximum Moment on Span	Calculated Mid-span Moment for Max Absolute Moment Condition
L, ft ( m )	Mmax, ft-kips	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )	ft ( m )	Mmax, ft-kips ( kN-m )
50 (15.2)	1,024.6 (1,389.2)	1,024.6 (1,389.2)	1,033.3 (1,401.0)	22.667 (6.909)	1,012.2 (1,372.4)
100 (30.5)	2,821.6 (3,825.6)	2,821.6 (3,825.6)	2,825.1 (3,830.3)	47.667 (14.529)	2,809.2 (3,808.7)
200 (61.0)	7,615.6 (10,325.3)	7,615.6 (10,325.3)	7,616.5 (10,326.4)	97.667 (29.769)	7,603.2 (10,308.4)
300 (91.4)	14,009.6 (18,994.2)	14,009.6 (18,994.2)	14,009.6 (18,994.2)	147.667 (45.009)	13,997.2 (18,977.4)
400 (121.9)		22,003.6 (29,832.5)	22,003.2 (29,831.9)	197.667 (60.250)	21,991.2 (29,815.7)
500 (152.4)		31,597.6 (42,840.1)	31,596.9 (42,839.1)	247.667 (75.490)	31,585.2 (42,823.2)
600 (182.9)		42,791.6 (58,016.9)	42,790.7 (58,015.7)	297.667 (90.730)	42,779.2 (58,000.1)
700 (213.4)		55,585.6 (75,363.0)	55,584.6 (75,361.6)	347.667 (105.970)	55,573.2 (75,346.2)
800 (243.8)		69,979.6 (94,878.4)	69,978.5 (94,876.9)	397.667 (121.210)	69,967.2 (94,861.5)
900 (274.3)		85,973.6 (116,563.0)	85,972.5 (116,561.5)	447.667 (136.451)	85,961.2 (116,546.2)
1,000 (304.8)		103,567.6 (140,417.0)	103,566.4 (140,415.3)	497.667 (151.691)	103,555.2 (140,400.2)

**Table 5-2: Maximum End Shear and Mid-span Moment for AASHTO HL-93 Design Truck and Lane Load of Span Lengths for Various Span Lengths**

Data Source File(s): Appendix C. Max Moment Location Calculations.xlsx

Maximum End Shear (Vmax, kips)				Maximum Mid-Span Moment (Mmax, ft-kips)			
Span Length	AASHTO HL-93 Design Truck and Lane Load, No Impact	AASHTO HL-93 Design Truck and Lane Load, with Impact	AASHTO Alternative Military Tandem (AMT) and Lane Load, with Impact	Span Length	AASHTO HL-93 Design Truck and Lane Load, No Impact	AASHTO HL-93 Design Truck and Lane Load, with Impact	AASHTO Alternative Military Tandem (AMT) and Lane Load, with Impact
L, ft ( m )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )	L, ft ( m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )
50 (15.2)	74.6 (331.6)	93.9 (417.6)	49.3 (219.1)	50 (15.2)	820.0 (1,111.8)	1,024.6 (1,389.2)	964.8 (1,308.0)
100 (30.5)	97.3 (432.7)	118.8 (528.5)	65.3 (290.2)	100 (30.5)	2,320.0 (3,145.5)	2,821.6 (3,825.6)	2,396.0 (3,248.5)
200 (61.0)	132.6 (590.0)	155.3 (690.7)	97.3 (432.6)	200 (61.0)	6,520.0 (8,839.8)	7,615.6 (10,325.3)	6,458.5 (8,756.4)
300 (91.4)	165.8 (737.3)	188.8 (839.7)	129.3 (574.9)	300 (91.4)	12,320.0 (16,703.5)	14,009.6 (18,994.2)	12,121.0 (16,433.7)
400 (121.9)	198.3 (882.1)	221.5 (985.3)	161.3 (717.2)	400 (121.9)	19,720.0 (26,736.4)	22,003.6 (29,832.5)	19,383.5 (26,280.1)
500 (152.4)	230.7 (1,026.0)	254.0 (1,129.7)	193.3 (859.6)	500 (152.4)	28,720.0 (38,938.6)	31,597.6 (42,840.1)	28,246.0 (38,295.9)
600 (182.9)	262.9 (1,169.3)	286.3 (1,273.3)	225.3 (1,001.9)	600 (182.9)	39,320.0 (53,310.1)	42,791.6 (58,016.9)	38,708.5 (52,481.0)
700 (213.4)	295.0 (1,312.3)	318.5 (1,416.6)	257.3 (1,144.2)	700 (213.4)	51,520.0 (69,850.8)	55,585.6 (75,363.0)	50,771.0 (68,835.3)
800 (243.8)	327.2 (1,455.2)	350.6 (1,559.7)	289.3 (1,286.6)	800 (243.8)	65,320.0 (88,560.9)	69,979.6 (94,878.4)	64,433.5 (87,358.9)
900 (274.3)	359.3 (1,598.0)	382.8 (1,702.5)	321.3 (1,428.9)	900 (274.3)	80,720.0 (109,440.2)	85,973.6 (116,563.0)	79,696.0 (108,051.8)
1,000 (304.8)	391.3 (1,740.6)	414.9 (1,845.3)	353.3 (1,571.3)	1,000 (304.8)	97,720.0 (132,488.8)	103,567.6 (140,417.0)	96,558.5 (130,914.0)

**Table 5-3: Variations in Maximum Moment Magnitude and Location for AASHTO HL-93 Design Truck and Lane Load for Various Span Lengths**

Data Source ita Source File(s): **Appendix C. Max Moment Location Calculations.xlsx**

Variations in Maximum Moments for AASHTO HL-93 Design Truck and Lane Load			
Span Length	Difference in Span Length between the Location of Maximum Absolute and Mid-span Moments	Percent (%) Difference between Maximum Mid-span and Absolute Moment, No Impact	Percent (%) Difference between Max Mid-span and Absolute Moment, with Dynamic Impact
ft ( m)	%	%	%
50 (15.2)	9.332%	-0.738%	-0.840%
100 (30.5)	4.666%	-0.094%	-0.123%
200 (61.0)	2.333%	-0.003%	-0.011%
300 (91.4)	1.555%	0.004%	0.000%
400 (121.9)	1.167%	0.004%	0.002%
500 (152.4)	0.933%	0.003%	0.002%
600 (182.9)	0.778%	0.003%	0.002%
700 (213.4)	0.667%	0.002%	0.002%
800 (243.8)	0.583%	0.002%	0.002%
900 (274.3)	0.518%	0.002%	0.001%
1,000 (304.8)	0.467%	0.001%	0.001%

**Table 5-4: Maximum End Shear for MLC 40 to 120 Hypothetical Wheeled and Tracked Vehicles on 50 to 1,000 ft (15.2 – 304.8 m) Spans**

Data Source File(s): Appendix D. STANAG vs. Calculations Comparison.xlsx  
Appendix E. Axle at Midspan Calculations.xlsx

Maximum End Shear (Vmax, kips)								
Span Length	MLC 40T	MLC 50T	MLC 60T	MLC 70T	MLC 80T	MLC 90T	MLC 100T	MLC 120T
L, ft ( m )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )
50 (15.2)	70.4 (313.1)	87.0 (387.0)	103.2 (459.0)	119.0 (529.3)	134.4 (597.8)	149.4 (664.5)	164.0 (729.5)	192.0 (854.0)
100 (30.5)	75.2 (334.5)	93.5 (415.9)	111.6 (496.4)	129.5 (576.0)	147.2 (654.7)	164.7 (732.6)	182.0 (809.5)	216.0 (960.8)
200 (61.0)	77.6 (345.2)	96.8 (430.3)	115.8 (515.1)	134.8 (599.4)	153.6 (683.2)	172.4 (766.6)	191.0 (849.6)	228.0 (1,014.1)
300 (91.4)	78.4 (348.7)	97.8 (435.2)	117.2 (521.3)	136.5 (607.2)	155.7 (692.7)	174.9 (778.0)	194.0 (862.9)	232.0 (1,031.9)
400 (121.9)	78.8 (350.5)	98.4 (437.6)	117.9 (524.4)	137.4 (611.0)	156.8 (697.4)	176.2 (783.6)	195.5 (869.6)	234.0 (1,040.8)
500 (152.4)	79.0 (351.6)	98.7 (439.0)	118.3 (526.3)	137.9 (613.4)	157.4 (700.3)	176.9 (787.0)	196.4 (873.6)	235.2 (1,046.2)
600 (182.9)	79.2 (352.3)	98.9 (440.0)	118.6 (527.5)	138.3 (614.9)	157.9 (702.2)	177.5 (789.3)	197.0 (876.3)	236.0 (1,049.7)
700 (213.4)	79.3 (352.8)	99.1 (440.7)	118.8 (528.4)	138.5 (616.0)	158.2 (703.5)	177.8 (790.9)	197.4 (878.2)	236.6 (1,052.3)
800 (243.8)	79.4 (353.2)	99.2 (441.2)	119.0 (529.1)	138.7 (616.9)	158.4 (704.6)	178.1 (792.1)	197.8 (879.6)	237.0 (1,054.2)
900 (274.3)	79.5 (353.5)	99.3 (441.6)	119.1 (529.6)	138.8 (617.5)	158.6 (705.4)	178.3 (793.1)	198.0 (880.7)	237.3 (1,055.7)
1,000 (304.8)	79.5 (353.7)	99.4 (441.9)	119.2 (530.0)	139.0 (618.0)	158.7 (706.0)	178.5 (793.8)	198.2 (881.6)	237.6 (1,056.8)

**Table 5-4: Maximum End Shear for MLC 40 to 120 Hypothetical Wheeled and Tracked Vehicles on 50 to 1,000 ft (15.2 – 304.8 m) Spans**

Data Source File(s): Appendix D. STANAG vs. Calculations Comparison.xlsx  
Appendix E. Axle at Midspan Calculations.xlsx

Maximum End Shear (Vmax, kips)								
Span Length	MLC 40W	MLC 50W	MLC 60W	MLC 70W	MLC 80W	MLC 90W	MLC 100W	MLC 120W
L, ft ( m )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )
50 (15.2)	66.3 (295.0)	84.2 (374.3)	95.4 (424.5)	107.5 (478.2)	112.6 (501.0)	126.7 (563.7)	133.0 (591.6)	159.6 (709.9)
100 (30.5)	80.2 (356.6)	100.1 (445.2)	117.7 (523.6)	134.3 (597.2)	148.3 (659.7)	166.9 (742.2)	181.5 (807.3)	217.8 (968.8)
200 (61.0)	87.1 (387.3)	108.0 (480.6)	128.9 (573.2)	147.6 (656.7)	166.2 (739.1)	186.9 (831.5)	205.8 (915.2)	246.9 (1,098.2)
300 (91.4)	89.4 (397.6)	110.7 (492.4)	132.6 (589.7)	152.1 (676.5)	172.1 (765.5)	193.6 (861.2)	213.8 (951.1)	256.6 (1,141.4)
400 (121.9)	90.5 (402.7)	112.0 (498.3)	134.4 (597.9)	154.3 (686.4)	175.1 (778.8)	197.0 (876.1)	217.9 (969.1)	261.5 (1,162.9)
500 (152.4)	91.2 (405.8)	112.8 (501.8)	135.5 (602.9)	155.7 (692.3)	176.9 (786.7)	199.0 (885.0)	220.3 (979.9)	264.4 (1,175.9)
600 (182.9)	91.7 (407.9)	113.3 (504.2)	136.3 (606.2)	156.5 (696.3)	178.1 (792.0)	200.3 (891.0)	221.9 (987.1)	266.3 (1,184.5)
700 (213.4)	92.0 (409.3)	113.7 (505.9)	136.8 (608.6)	157.2 (699.1)	178.9 (795.8)	201.3 (895.2)	223.1 (992.2)	267.7 (1,190.7)
800 (243.8)	92.3 (410.4)	114.0 (507.1)	137.2 (610.3)	157.7 (701.3)	179.5 (798.6)	202.0 (898.4)	223.9 (996.1)	268.7 (1,195.3)
900 (274.3)	92.5 (411.3)	114.2 (508.1)	137.5 (611.7)	158.0 (702.9)	180.0 (800.8)	202.5 (900.9)	224.6 (999.1)	269.5 (1,198.9)
1,000 (304.8)	92.6 (412.0)	114.4 (508.9)	137.8 (612.8)	158.3 (704.2)	180.4 (802.6)	203.0 (902.9)	225.2 (1,001.5)	270.2 (1,201.8)

**Table 5-5: Maximum Mid-span Moments for MLC 40 to 120 Hypothetical Wheeled and Tracked Vehicles on 50 to 1,000 ft (15.2 – 304.8 m) Spans**

Data Source File(s): Appendix D. STANAG vs. Calculations Comparison.xlsx  
Appendix E. Axle at Midspan Calculations.xlsx

Maximum Mid-Span Moment (Mmax, ft-kips)								
Span Length	MLC 40T	MLC 50T	MLC 60T	MLC 70T	MLC 80T	MLC 90T	MLC 100T	MLC 120T
L, ft ( m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )
50 (15.2)	880.0 (1,193.1)	1,087.5 (1,474.4)	1,290.0 (1,749.0)	1,487.5 (2,016.8)	1,680.0 (2,277.7)	1,867.5 (2,532.0)	2,050.0 (2,779.4)	2,400.0 (3,253.9)
100 (30.5)	1,880.0 (2,548.9)	2,337.5 (3,169.2)	2,790.0 (3,782.7)	3,237.5 (4,389.4)	3,680.0 (4,989.3)	4,117.5 (5,582.5)	4,550.0 (6,168.9)	5,400.0 (7,321.3)
200 (61.0)	3,880.0 (5,260.5)	4,837.5 (6,558.7)	5,790.0 (7,850.1)	6,737.5 (9,134.7)	7,680.0 (10,412.5)	8,617.5 (11,683.6)	9,550.0 (12,947.9)	11,400.0 (15,456.1)
300 (91.4)	5,880.0 (7,972.1)	7,337.5 (9,948.2)	8,790.0 (11,917.5)	10,237.5 (13,880.0)	11,680.0 (15,835.7)	13,117.5 (17,784.7)	14,550.0 (19,726.9)	17,400.0 (23,590.9)
400 (121.9)	7,880.0 (10,683.7)	9,837.5 (13,337.7)	11,790.0 (15,984.9)	13,737.5 (18,625.3)	15,680.0 (21,258.9)	17,617.5 (23,885.8)	19,550.0 (26,505.9)	23,400.0 (31,725.7)
500 (152.4)	9,880.0 (13,395.3)	12,337.5 (16,727.2)	14,790.0 (20,052.3)	17,237.5 (23,370.6)	19,680.0 (26,682.1)	22,117.5 (29,986.9)	24,550.0 (33,284.9)	29,400.0 (39,860.5)
600 (182.9)	11,880.0 (16,106.9)	14,837.5 (20,116.7)	17,790.0 (24,119.7)	20,737.5 (28,115.9)	23,680.0 (32,105.3)	26,617.5 (36,088.0)	29,550.0 (40,063.9)	35,400.0 (47,995.3)
700 (213.4)	13,880.0 (18,818.5)	17,337.5 (23,506.2)	20,790.0 (28,187.1)	24,237.5 (32,861.2)	27,680.0 (37,528.5)	31,117.5 (42,189.1)	34,550.0 (46,842.9)	41,400.0 (56,130.1)
800 (243.8)	15,880.0 (21,530.1)	19,837.5 (26,895.7)	23,790.0 (32,254.5)	27,737.5 (37,606.5)	31,680.0 (42,951.7)	35,617.5 (48,290.2)	39,550.0 (53,621.9)	47,400.0 (64,264.9)
900 (274.3)	17,880.0 (24,241.7)	22,337.5 (30,285.2)	26,790.0 (36,321.9)	31,237.5 (42,351.8)	35,680.0 (48,374.9)	40,117.5 (54,391.3)	44,550.0 (60,400.9)	53,400.0 (72,399.7)
1,000 (304.8)	19,880.0 (26,953.3)	24,837.5 (33,674.7)	29,790.0 (40,389.3)	34,737.5 (47,097.1)	39,680.0 (53,798.1)	44,617.5 (60,492.4)	49,550.0 (67,179.9)	59,400.0 (80,534.5)



**Table 5-5: Maximum Mid-span Moments for MLC 40 to 120 Hypothetical Wheeled and Tracked Vehicles on 50 to 1,000 ft (15.2 – 304.8 m) Spans**

Data Source File(s): Appendix D. STANAG vs. Calculations Comparison.xlsx  
Appendix E. Axle at Midspan Calculations.xlsx

Maximum Mid-Span Moment (Mmax, ft-kips)								
Span Length	MLC 40W	MLC 50W	MLC 60W	MLC 70W	MLC 80W	MLC 90W	MLC 100W	MLC 120W
L, ft (m)	Mmax, ft-kips (kN-m)	Mmax, ft-kips (kN-m)	Mmax, ft-kips (kN-m)	Mmax, ft-kips (kN-m)	Mmax, ft-kips (kN-m)	Mmax, ft-kips (kN-m)	Mmax, ft-kips (kN-m)	Mmax, ft-kips (kN-m)
50 (15.2)	787.0 (1,067.0)	942.0 (1,277.2)	1,082.0 (1,467.0)	1,253.0 (1,698.8)	1,320.0 (1,789.7)	1,485.0 (2,013.4)	1,525.0 (2,067.6)	1,830.0 (2,481.1)
100 (30.5)	1,962.0 (2,660.1)	2,392.0 (3,243.1)	2,832.0 (3,839.6)	3,265.5 (4,427.4)	3,620.0 (4,908.0)	4,072.5 (5,521.5)	4,400.0 (5,965.5)	5,280.0 (7,158.6)
200 (61.0)	4,312.0 (5,846.2)	5,292.0 (7,174.9)	6,332.0 (8,584.9)	7,290.5 (9,884.5)	8,220.0 (11,144.7)	9,247.5 (12,537.8)	10,150.0 (13,761.4)	12,180.0 (16,513.6)
300 (91.4)	6,662.0 (9,032.3)	8,192.0 (11,106.7)	9,832.0 (13,330.2)	11,315.5 (15,341.6)	12,820.0 (17,381.4)	14,422.5 (19,554.0)	15,900.0 (21,557.2)	19,080.0 (25,868.7)
400 (121.9)	9,012.0 (12,218.5)	11,092.0 (15,038.5)	13,332.0 (18,075.5)	15,340.5 (20,798.6)	17,420.0 (23,618.0)	19,597.5 (26,570.3)	21,650.0 (29,353.1)	25,980.0 (35,223.7)
500 (152.4)	11,362.0 (15,404.6)	13,992.0 (18,970.4)	16,832.0 (22,820.8)	19,365.5 (26,255.7)	22,020.0 (29,854.7)	24,772.5 (33,586.6)	27,400.0 (37,148.9)	32,880.0 (44,578.7)
600 (182.9)	13,712.0 (18,590.7)	16,892.0 (22,902.2)	20,332.0 (27,566.1)	23,390.5 (31,712.8)	26,620.0 (36,091.4)	29,947.5 (40,602.8)	33,150.0 (44,944.8)	39,780.0 (53,933.7)
700 (213.4)	16,062.0 (21,776.9)	19,792.0 (26,834.0)	23,832.0 (32,311.4)	27,415.5 (37,169.9)	31,220.0 (42,328.1)	35,122.5 (47,619.1)	38,900.0 (52,740.6)	46,680.0 (63,288.7)
800 (243.8)	18,412.0 (24,963.0)	22,692.0 (30,765.8)	27,332.0 (37,056.7)	31,440.5 (42,627.0)	35,820.0 (48,564.8)	40,297.5 (54,635.4)	44,650.0 (60,536.5)	53,580.0 (72,643.8)
900 (274.3)	20,762.0 (28,149.1)	25,592.0 (34,697.6)	30,832.0 (41,802.0)	35,465.5 (48,084.1)	40,420.0 (54,801.4)	45,472.5 (61,651.6)	50,400.0 (68,332.3)	60,480.0 (81,998.8)
1,000 (304.8)	23,112.0 (31,335.2)	28,492.0 (38,629.5)	34,332.0 (46,547.3)	39,490.5 (53,541.2)	45,020.0 (61,038.1)	50,647.5 (68,667.9)	56,150.0 (76,128.2)	67,380.0 (91,353.8)

**Table 5-6: Maximum End Shear and Mid-span Moments for HET systems and Single MLC100W Hypothetical Wheeled Vehicle, Various Span Lengths**

Data Source File(s): Appendix E. Axle at Midspan Calculations.xlsx  
Appendix F. Various HET Vehicles.xlsx

Maximum End Shear (Vmax, kips)				
Span Length	MLC 100W Hypothetical Wheeled Vehicle	Kansas DOT (US Army) Heavy Equipment Transporter (HET)	STANAG 21 (US Army) Heavy Equipment Transporter (HET)	Proposed Standard Heavy Equipment Transporter (HET)
L, ft ( m )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )
50 (15.2)	133.0 (591.6)			
100 (30.5)	181.5 (807.3)	163.6 (727.9)	171.7 (763.7)	173.2 (770.4)
200 (61.0)	205.8 (915.2)	191.7 (852.8)	200.9 (893.4)	201.6 (896.7)
300 (91.4)	213.8 (951.1)	201.1 (894.4)	210.6 (936.7)	211.1 (938.8)
400 (121.9)	217.9 (969.1)	205.8 (915.2)	215.4 (958.3)	215.8 (959.9)
500 (152.4)	220.3 (979.9)	208.6 (927.7)	218.4 (971.3)	218.6 (972.5)
600 (182.9)	221.9 (987.1)	210.4 (936.0)	220.3 (979.9)	220.5 (980.9)
700 (213.4)	223.1 (992.2)	211.8 (942.0)	221.7 (986.1)	221.9 (986.9)
800 (243.8)	223.9 (996.1)	212.8 (946.4)	222.7 (990.7)	222.9 (991.5)
900 (274.3)	224.6 (999.1)	213.6 (949.9)	223.5 (994.3)	223.7 (995.0)
1,000 (304.8)	225.2 (1,001.5)	214.2 (952.7)	224.2 (997.2)	224.3 (997.8)

**Table 5-6: Maximum End Shear and Mid-span Moments for HET systems and Single MLC100W Hypothetical Wheeled Vehicle, Various Span Lengths**

Data Source File(s): Appendix E. Axle at Midspan Calculations.xlsx  
Appendix F. Various HET Vehicles.xlsx

Maximum Mid-Span Moment (Mmax, ft-kips)				
Span Length	MLC 100W Hypothetical Wheeled Vehicle	Kansas DOT (US Army) Heavy Equipment Transporter (HET)	STANAG 21 (US Army) Heavy Equipment Transporter (HET)	Proposed Standard Heavy Equipment Transporter (HET)
L, ft ( m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )
50 (15.2)	1,525.0 (2,067.6)			
100 (30.5)	4,400.0 (5,965.5)	3,633.2 (4,925.9)	3,818.9 (5,177.6)	3,900.0 (5,287.6)
200 (61.0)	10,150.0 (13,761.4)	9,128.2 (12,376.0)	9,569.5 (12,974.3)	9,650.0 (13,083.5)
300 (91.4)	15,900.0 (21,557.2)	14,623.2 (19,826.1)	15,320.1 (20,771.0)	15,400.0 (20,879.3)
400 (121.9)	21,650.0 (29,353.1)	20,118.2 (27,276.2)	21,070.8 (28,567.8)	21,150.0 (28,675.2)
500 (152.4)	27,400.0 (37,148.9)	25,613.2 (34,726.3)	26,821.4 (36,364.5)	26,900.0 (36,471.0)
600 (182.9)	33,150.0 (44,944.8)	31,108.2 (42,176.5)	32,572.1 (44,161.2)	32,650.0 (44,266.9)
700 (213.4)	38,900.0 (52,740.6)	36,603.2 (49,626.6)	38,322.7 (51,957.9)	38,400.0 (52,062.7)
800 (243.8)	44,650.0 (60,536.5)	42,098.2 (57,076.7)	44,073.3 (59,754.6)	44,150.0 (59,858.6)
900 (274.3)	50,400.0 (68,332.3)	47,593.2 (64,526.8)	49,824.0 (67,551.4)	49,900.0 (67,654.4)
1,000 (304.8)	56,150.0 (76,128.2)	53,088.2 (71,976.9)	55,574.6 (75,348.1)	55,650.0 (75,450.3)

**Table 5-7: Maximum End Shears for 1-3 MLC100W Hypothetical Vehicles**

Data Source File(s): Appendix G. Multiple MLC100W Vehicles Single Span.xlsx

Maximum End Shear (Vmax, kips), with Dynamic Load Allowance (Impact)				
Span Length	MLC 100W, 1 Vehicle	MLC 100W, 2 Vehicle, 300' separation	MLC 100W, 3 Vehicle, 300' separation	Multiple MLC 100W Vehicles on span, with Impact
L, ft (m)	Vmax, kips (kN)	Vmax, kips (kN)	Vmax, kips (kN)	Vmax, kips (kN)
50 (15.2)	176.9 (786.8)			176.9 (786.8)
100 (30.5)	241.4 (1,073.7)			241.4 (1,073.7)
150 (45.7)	262.9 (1,169.4)			262.9 (1,169.4)
200 (61.0)	273.6 (1,217.2)			273.6 (1,217.2)
250 (76.2)	280.1 (1,245.9)			280.1 (1,245.9)
300 (91.4)	284.4 (1,265.0)			284.4 (1,265.0)
350 (106.7)	287.5 (1,278.7)			287.5 (1,278.7)
387 (118.0)	289.2 (1,286.5)	307.3 (1,367.1)		307.3 (1,367.1)
400 (121.9)	289.8 (1,288.9)	317.2 (1,411.1)		317.2 (1,411.1)
450 (137.2)	291.6 (1,296.9)	350.0 (1,556.7)		350.0 (1,556.7)
500 (152.4)	293.0 (1,303.3)	376.2 (1,673.1)		376.2 (1,673.1)
550 (167.6)	294.2 (1,308.5)	397.6 (1,768.4)		397.6 (1,768.4)
600 (182.9)	295.1 (1,312.8)	415.4 (1,847.8)		415.4 (1,847.8)
650 (198.1)	296.0 (1,316.5)	430.5 (1,915.0)		430.5 (1,915.0)
700 (213.4)	296.7 (1,319.7)	443.5 (1,972.6)		443.5 (1,972.6)
730 (222.5)	297.1 (1,321.3)	450.4 (2,003.4)	460.0 (2,046.1)	460.0 (2,046.1)
800 (243.8)	297.8 (1,324.8)	464.5 (2,066.2)	500.0 (2,224.2)	500.0 (2,224.2)
900 (274.3)	298.7 (1,328.8)	480.9 (2,139.0)	546.5 (2,430.6)	546.5 (2,430.6)
1,000 (304.8)	299.4 (1,332.0)	494.0 (2,197.2)	583.6 (2,595.8)	583.6 (2,595.8)

**Table 5-8: Maximum Moments for 1-3 MLC100W Hypothetical Vehicles**

Data Source File(s): Appendix G. Multiple MLC100W Vehicles Single Span.xlsx

Maximum Mid-Span / Absolute Moment (Mmax, ft-kips), with Dynamic Load Allowance (Impact)					
Span Length	Maximum Mid-span Moment, 1x MLC 100W Vehicles	Maximum Mid-span Moment, 2x MLC 100W Vehicles	Maximum Absolute Moment, 2x MLC 100W Vehicles	Maximum Mid-span Moment, 3x MLC 100W Vehicles	Maximum Possible Moment, 1-3x MLC 100W Vehicles
L, ft ( m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )
50 (15.2)	2,028.3 (2,749.9)				2,028.3 (2,749.9)
100 (30.5)	5,852.0 (7,934.1)				5,852.0 (7,934.1)
150 (45.7)	9,675.8 (13,118.4)				9,675.8 (13,118.4)
200 (61.0)	13,499.5 (18,302.6)				13,499.5 (18,302.6)
250 (76.2)	17,323.3 (23,486.9)				17,323.3 (23,486.9)
300 (91.4)	21,147.0 (28,671.1)				21,147.0 (28,671.1)
350 (106.7)	24,970.8 (33,855.3)				24,970.8 (33,855.3)
387 (118.0)	27,800.3 (37,691.7)	6,729.8 (9,124.3)	6,945.6 (9,416.8)		27,800.3 (37,691.7)
400 (121.9)	28,794.5 (39,039.6)	8,718.2 (11,820.1)	10,339.5 (14,018.3)		28,794.5 (39,039.6)
450 (137.2)	32,618.3 (44,223.8)	16,365.7 (22,188.5)	21,565.6 (29,238.6)		32,618.3 (44,223.8)
500 (152.4)	36,442.0 (49,408.1)	24,013.2 (32,557.0)	30,804.5 (41,764.8)		36,442.0 (49,408.1)
550 (167.6)	40,265.8 (54,592.3)	31,660.7 (42,925.5)	38,442.2 (52,119.9)		40,265.8 (54,592.3)
600 (182.9)	44,089.5 (59,776.5)	39,308.2 (53,294.0)	45,481.2 (61,663.4)		44,089.5 (59,776.5)
650 (198.1)	47,913.3 (64,960.8)	46,955.7 (63,662.5)	52,562.5 (71,264.2)		47,913.3 (64,960.8)
700 (213.4)	51,737.0 (70,145.0)	54,603.2 (74,031.0)	59,797.8 (81,073.9)		54,603.2 (74,031.0)
730 (222.5)	54,031.3 (73,255.6)	59,191.7 (80,252.0)	64,010.9 (86,786.0)	60,764.5 (82,384.5)	60,764.5 (82,384.5)
800 (243.8)	59,384.5 (80,513.5)	69,898.2 (94,767.9)	74,297.4 (100,732.4)	76,820.8 (104,153.6)	76,820.8 (104,153.6)
900 (274.3)	67,032.0 (90,882.0)	85,193.2 (115,504.9)	89,138.1 (120,853.5)	99,763.3 (135,259.1)	99,763.3 (135,259.1)
1,000 (304.8)	74,679.5 (101,250.5)	100,488.2 (136,241.8)	103,729.9 (140,636.9)	122,705.8 (166,364.5)	122,705.8 (166,364.5)

**Table 5-9: Maximum End Shear and Mid-span Moments for Various Uniform Loads and 1-3 MLC100W Hypothetical Wheeled Vehicles, Various Span Lengths**

Data Source File(s): Appendix E. Axle at Midspan Calculations.xlsx  
Appendix G. Multiple MLC100W Vehicles Single Span.xlsx

Maximum End Shear (Vmax, kips), No Impact					
Span Length	Maximum Mid-span Moment, 1-3x MLC 100W Vehicles	Ontario Hwy Bridge Design	CAN/CSA-06-00, CL-W Load	Saturated Flow (Lutomirska, 2009)	Proposed Logistic Truck Convoy Lane Load
L, ft (m)	Vmax, kips (kN)	Vmax, kips (kN)	Vmax, kips (kN)	Vmax, kips (kN)	Vmax, kips (kN)
50 (15.2)	133.0 (591.6)	94.7 (421.0)	91.6 (407.4)	20.3 (90.1)	24.1 (107.3)
100 (30.5)	181.5 (807.3)	114.4 (508.7)	110.3 (490.7)	40.5 (180.1)	48.3 (214.6)
200 (61.0)	205.8 (915.2)	166.8 (742.0)	157.7 (701.4)	81.0 (360.3)	96.5 (429.2)
300 (91.4)	213.8 (951.1)	207.1 (921.3)	194.0 (863.1)	121.5 (540.4)	144.8 (643.8)
400 (121.9)	238.5 (1,061.0)	244.4 (1,087.1)	227.6 (1,012.6)	162.0 (720.6)	193.0 (858.5)
500 (152.4)	282.8 (1,258.0)	280.5 (1,247.5)	260.1 (1,157.1)	202.5 (900.7)	241.3 (1,073.1)
600 (182.9)	312.4 (1,389.3)	315.9 (1,405.3)	292.1 (1,299.2)	243.0 (1,080.9)	289.5 (1,287.7)
700 (213.4)	333.4 (1,483.2)	351.1 (1,561.5)	323.7 (1,440.0)	283.5 (1,261.0)	337.8 (1,502.3)
800 (243.8)	376.0 (1,672.3)	386.0 (1,716.7)	355.2 (1,579.8)	324.0 (1,441.2)	386.0 (1,716.9)
900 (274.3)	410.9 (1,827.5)	420.7 (1,871.3)	386.5 (1,719.1)	364.5 (1,621.3)	434.3 (1,931.5)
1,000 (304.8)	438.8 (1,951.7)	455.4 (2,025.4)	417.7 (1,857.9)	405.0 (1,801.4)	482.5 (2,146.2)

**Table 5-9: Maximum End Shear and Mid-span Moments for Various Uniform Loads and 1-3 MLC100W Hypothetical Wheeled Vehicles, Various Span Lengths**

Data Source File(s): Appendix E. Axle at Midspan Calculations.xlsx  
Appendix G. Multiple MLC100W Vehicles Single Span.xlsx

Maximum Mid-Span Moment (Mmax, ft-kips), No Impact					
Span Length	Maximum Mid-span Moment, 1-3x MLC 100W Vehicles	Ontario Hwy Bridge Design	CAN/CSA-06-00, CL-W Load	Saturated Flow (Lutomirska, 2009)	Proposed Logistic Truck Convoy Lane Load
L, ft (m)	Mmax, ft-kips (kN-m)	Mmax, ft-kips (kN-m)	Mmax, ft-kips (kN-m)	Mmax, ft-kips (kN-m)	Mmax, ft-kips (kN-m)
50 (15.2)	1,525.0 (2,067.6)	1,761.6 (2,388.4)	1,551.3 (2,103.3)	253.1 (343.2)	301.6 (408.9)
100 (30.5)	4,400.0 (5,965.5)	2,807.3 (3,806.1)	2,586.8 (3,507.2)	1,012.5 (1,372.7)	1,206.3 (1,635.4)
200 (61.0)	10,150.0 (13,761.4)	8,264.8 (11,205.4)	7,705.4 (10,447.0)	4,050.0 (5,491.0)	4,825.0 (6,541.7)
300 (91.4)	15,900.0 (21,557.2)	15,450.6 (20,947.9)	14,371.7 (19,485.1)	9,112.5 (12,354.7)	10,856.3 (14,718.9)
400 (121.9)	21,650.0 (29,353.1)	24,352.9 (33,017.7)	22,581.6 (30,616.2)	16,200.0 (21,964.0)	19,300.0 (26,166.9)
500 (152.4)	27,400.0 (37,148.9)	34,969.3 (47,411.4)	32,334.6 (43,839.3)	25,312.5 (34,318.7)	30,156.3 (40,885.8)
600 (182.9)	34,199.5 (46,367.7)	47,299.0 (64,127.9)	43,630.4 (59,154.0)	36,450.0 (49,418.9)	43,425.0 (58,875.6)
700 (213.4)	44,984.6 (60,990.1)	61,341.6 (83,166.9)	56,468.7 (76,560.3)	49,612.5 (67,264.6)	59,106.3 (80,136.3)
800 (243.8)	57,763.3 (78,315.5)	77,097.0 (104,528.1)	70,849.7 (96,058.1)	64,800.0 (87,855.8)	77,200.0 (104,667.8)
900 (274.3)	75,012.9 (101,702.5)	94,565.1 (128,211.3)	86,773.3 (117,647.2)	82,012.5 (111,192.5)	97,706.3 (132,470.1)
1,000 (304.8)	92,262.6 (125,089.7)	113,745.8 (154,216.5)	104,239.3 (141,327.7)	101,250.0 (137,274.8)	120,625.0 (163,543.4)

**Table 5-10: Maximum Shear and Mid-span Moments for State Permit Vehicles and 1-3 MLC100W Hypothetical Wheeled Vehicles on 50 to 1,000 ft (15.2 – 304.8 m) Span Length Simple Beams**

Data Source File(s): Appendix E. Axle at Midspan Calculations.xlsx  
Appendix H. Special Permit Vehicles.xlsx

Maximum End Shear (Vmax, kips), with Dynamic Impact				
Span Length	Maximum Mid-span Moment, 1-3x MLC 100W Vehicles	Washington State Permit Veh Type 3 (WA-03)	Wisconsin Special Permit Vehicle (Wis-SPV)	Hypothetical 5-axle permit vehicle (Zhao Tabatabai, 2012)
L, ft (m)	Vmax, kips (kN)	Vmax, kips (kN)	Vmax, kips (kN)	Vmax, kips (kN)
50 (15.2)	176.9 (786.8)			189.7 (843.8)
100 (30.5)	241.4 (1,073.7)	248.0 (1,102.9)	238.8 (1,062.3)	194.6 (865.5)
200 (61.0)	273.6 (1,217.2)	307.1 (1,365.8)	285.7 (1,270.6)	197.0 (876.3)
300 (91.4)	284.4 (1,265.0)	326.8 (1,453.4)	301.3 (1,340.0)	197.8 (879.9)
400 (121.9)	317.2 (1,411.1)	336.6 (1,497.3)	309.1 (1,374.7)	198.2 (881.7)
500 (152.4)	376.2 (1,673.1)	342.5 (1,523.5)	313.8 (1,395.6)	198.5 (882.7)
600 (182.9)	415.4 (1,847.8)	346.5 (1,541.1)	316.9 (1,409.5)	198.6 (883.5)
700 (213.4)	443.5 (1,972.6)	349.3 (1,553.6)	319.1 (1,419.4)	198.7 (884.0)
800 (243.8)	500.0 (2,224.2)	351.4 (1,563.0)	320.8 (1,426.8)	198.8 (884.4)
900 (274.3)	546.5 (2,430.6)	353.0 (1,570.3)	322.1 (1,432.6)	198.9 (884.7)
1,000 (304.8)	583.6 (2,595.8)	354.3 (1,576.1)	323.1 (1,437.2)	198.9 (884.9)



**Table 5-10: Maximum Shear and Mid-span Moments for State Permit Vehicles and 1-3 MLC100W Hypothetical Wheeled Vehicles on 50 to 1,000 ft (15.2 – 304.8 m) Span Length Simple Beams**

Data Source File(s): Appendix E. Axle at Midspan Calculations.xlsx  
Appendix H. Special Permit Vehicles.xlsx

Maximum Mid-Span Moment (Mmax, ft-kips), with Dynamic Impact				
Span Length	Maximum Mid-span Moment, 1-3x MLC 100W Vehicles	Washington State Permit Veh Type 3 (WA-03)	Wisconsin Special Permit Vehicle (Wis-SPV)	Hypothetical 5-axle permit vehicle (Zhao Tabatabai, 2012)
L, ft ( m )	Mmax, ft-kips ( kN-m )	Vmax, kips ( kN-m )	Vmax, kips ( kN-m )	Vmax, kips ( kN-m )
50 (15.2)	2,028.3 (2,749.9)			2,321.4 (3,147.3)
100 (30.5)	5,852.0 (7,934.1)	5,667.0 (7,683.3)	5,010.6 (6,793.4)	4,814.2 (6,527.2)
200 (61.0)	13,499.5 (18,302.6)	14,818.7 (20,091.2)	13,250.5 (17,965.0)	9,800.0 (13,286.8)
300 (91.4)	21,147.0 (28,671.1)	23,972.0 (32,501.2)	21,538.6 (29,202.0)	14,785.8 (20,046.5)
400 (121.9)	28,794.5 (39,039.6)	33,125.6 (44,911.7)	29,838.6 (40,455.2)	19,771.5 (26,806.2)
500 (152.4)	36,442.0 (49,408.1)	42,279.4 (57,322.5)	38,143.6 (51,715.0)	24,757.3 (33,565.9)
600 (182.9)	45,485.3 (61,669.0)	51,433.3 (69,733.3)	46,450.9 (62,978.1)	29,743.0 (40,325.6)
700 (213.4)	59,829.5 (81,116.9)	60,587.3 (82,144.2)	54,759.6 (74,243.0)	34,728.8 (47,085.3)
800 (243.8)	76,825.2 (104,159.6)	69,741.2 (94,555.2)	63,069.1 (85,509.1)	39,714.6 (53,845.0)
900 (274.3)	99,767.2 (135,264.4)	78,895.2 (106,966.2)	71,379.2 (96,776.0)	44,700.3 (60,604.7)
1,000 (304.8)	122,709.3 (166,369.3)	88,049.2 (119,377.2)	79,689.7 (108,043.4)	49,686.1 (67,364.4)

**Table 5-11: Maximum Shear and Mid-span Moments per Louisiana DOTD BDEM and 1-3 MLC100W Hypothetical Wheeled Vehicles on 50 to 1,000 ft (15.2 – 304.8 m) Span Length Simple Beams**

Data Source File(s): Appendix E. Axle at Midspan Calculations.xlsx  
Appendix H. Special Permit Vehicles.xlsx

Maximum End Shear (Vmax, kips), With Dynamic Impact				
Span Length	AASHTO HL-93 Design Truck and Lane Load	Maximum Mid-span Moment, 1-3x MLC 100W Vehicles	Louisiana Special Design Veh Type 5 (LASDV-5)	One MLC 70T Hypothetical Tracked Vehicle
L, ft ( m )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )	Vmax, kips ( kN )
50 (15.2)	93.9 (417.6)	176.9 (786.8)		210.5 (936.3)
100 (30.5)	118.8 (528.5)	241.4 (1,073.7)	189.0 (840.8)	229.1 (1,018.9)
200 (61.0)	155.3 (690.7)	273.6 (1,217.2)	233.5 (1,038.6)	238.4 (1,060.2)
300 (91.4)	188.8 (839.7)	284.4 (1,265.0)	248.3 (1,104.5)	241.5 (1,074.0)
400 (121.9)	221.5 (985.3)	317.2 (1,411.1)	255.7 (1,137.5)	243.0 (1,080.9)
500 (152.4)	254.0 (1,129.7)	376.2 (1,673.1)	260.2 (1,157.3)	243.9 (1,085.0)
600 (182.9)	286.3 (1,273.3)	415.4 (1,847.8)	263.1 (1,170.5)	244.6 (1,087.8)
700 (213.4)	318.5 (1,416.6)	443.5 (1,972.6)	265.3 (1,179.9)	245.0 (1,089.7)
800 (243.8)	350.6 (1,559.7)	500.0 (2,224.2)	266.9 (1,187.0)	245.3 (1,091.2)
900 (274.3)	382.8 (1,702.5)	546.5 (2,430.6)	268.1 (1,192.5)	245.6 (1,092.3)
1,000 (304.8)	414.9 (1,845.3)	583.6 (2,595.8)	269.1 (1,196.8)	245.8 (1,093.3)

**Table 5-11: Maximum Shear and Mid-span Moments per Louisiana DOTD BDEM and 1-3 MLC100W Hypothetical Wheeled Vehicles on 50 to 1,000 ft (15.2 – 304.8 m) Span Length Simple Beams**

Data Source File(s): Appendix E. Axle at Midspan Calculations.xlsx  
Appendix H. Special Permit Vehicles.xlsx

Maximum Mid-Span Moment (Mmax, ft-kips), With Dynamic Impact				
Span Length	AASHTO HL-93 Design Truck and Lane Load	Maximum Mid-span Moment, 1-3x MLC 100W Vehicles	Louisiana Special Design Veh Type 5 (LASDV-5)	One MLC 70T Hypothetical Tracked Vehicle
L, ft ( m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )	Mmax, ft-kips ( kN-m )
50 (15.2)	1,024.6 (1,389.2)	2,028.3 (2,749.9)		1,978.4 (2,682.3)
100 (30.5)	2,821.6 (3,825.6)	5,852.0 (7,934.1)	4,674.5 (6,337.7)	4,305.9 (5,837.9)
200 (61.0)	7,615.6 (10,325.3)	13,499.5 (18,302.6)	11,623.2 (15,758.7)	8,960.9 (12,149.2)
300 (91.4)	14,009.6 (18,994.2)	21,147.0 (28,671.1)	18,572.3 (25,180.3)	13,615.9 (18,460.4)
400 (121.9)	22,003.6 (29,832.5)	28,794.5 (39,039.6)	25,521.4 (34,601.9)	18,270.9 (24,771.7)
500 (152.4)	31,597.6 (42,840.1)	36,442.0 (49,408.1)	32,470.6 (44,023.7)	22,925.9 (31,082.9)
600 (182.9)	42,791.6 (58,016.9)	45,485.3 (61,669.0)	39,419.8 (53,445.4)	27,580.9 (37,394.2)
700 (213.4)	55,585.6 (75,363.0)	59,829.5 (81,116.9)	46,369.1 (62,867.2)	32,235.9 (43,705.4)
800 (243.8)	69,979.6 (94,878.4)	76,825.2 (104,159.6)	53,318.3 (72,288.9)	36,890.9 (50,016.6)
900 (274.3)	85,973.6 (116,563.0)	99,767.2 (135,264.4)	60,267.5 (81,710.7)	41,545.9 (56,327.9)
1,000 (304.8)	103,567.6 (140,417.0)	122,709.3 (166,369.3)	67,216.8 (91,132.5)	46,200.9 (62,639.1)

**Table 7-1: Proposed New Military Live Load Magnification Factors**

Data Source File(s): Appendix E. Axle at Midspan Calculations.xlsx

Proposed New Military Live Loading Magnification Factors		
Load Effect	Range of Applicability	Magnification Factor (MF)
Maximum End Shear, V	L ≤ 100 ft ( L ≤ 30.5 m )	1.51
	100 ft < L < 300 ft ( 30.5 m < L < 91.4 m )	$1.51 - ((0.36 / 200 \text{ ft}) \times (L - 100 \text{ ft}))$ $( 1.51 - ((0.36 / 61 \text{ m}) \times (L - 30.5 \text{ m})) )$
	L ≥ 300 ft ( L ≥ 91.4 m )	1.15
Maximum Positive Mid-span Moment, M+	L ≤ 50 ft ( L ≤ 15.2 m )	1.63
	50 ft < L < 400 ft ( 15.2 m < L < 121.9 m )	$1.63 - ((0.63 / 350 \text{ ft}) \times (L - 50 \text{ ft}))$ $( 1.63 - ((0.63 / 106.7 \text{ m}) \times (L - 15.2 \text{ m})) )$
	L ≥ 400 ft ( L ≥ 121.9 m )	1.00

**END OF APPENDIX J**