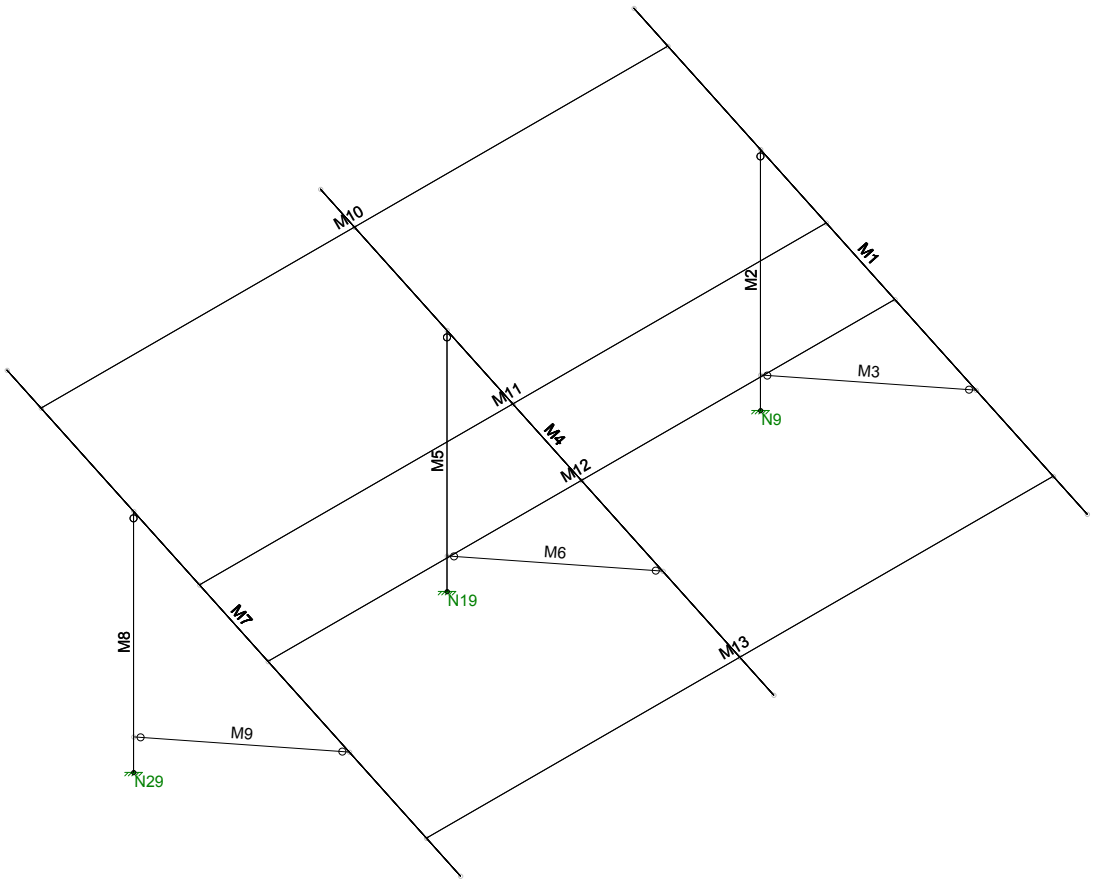


Schletter, Inc.		25° Tilt w/ Seismic Design
HCV	Standard FS Racking System	
	Representative Calculations - ASCE 7-05	

1. INTRODUCTION

1.1 Project Description

The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. FS ground mount system.

1.2 Construction

Photovoltaic modules are attached to aluminum purlins using clamp fasteners. Purlins are clamped to inclined aluminum girders, which are then connected to galvanized steel posts. Each support structure is equally spaced.

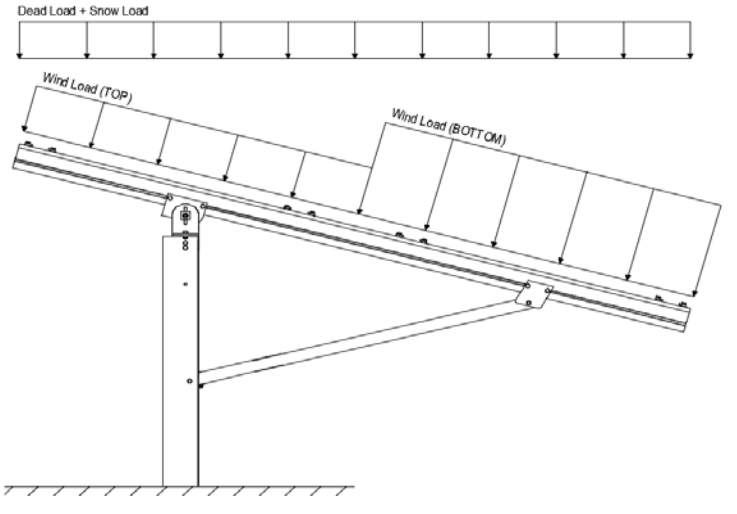
PV modules are required to meet the following specifications:

	Maximum			Minimum	
Height =	1700	mm	Height =	1550	mm
Width =	1050	mm	Width =	970	mm
Dead Load =	3.00	psf	Dead Load =	1.75	psf

Modules Per Row =	2
Module Tilt =	25°
Maximum Height Above Grade =	3 ft

1.3 Technical Codes

- ASCE 7-05 - Chapter 6, Wind Loads
- ASCE 7-05 - Chapter 7, Snow Loads
- ASCE 7-05 - Chapter 2, Combination of Loads
- International Building Code, IBC, 2003, 2006, 2009
- Aluminum Design Manual, Eighth Edition, 2005



Typical loading conditions of the module dead loads, snow loads, and wind loads are shown on the left.

2. LOAD ACTIONS

2.1 Permanent Loads

g_{MAX} =	3.00	psf	*Self-weight of the PV modules.*
g_{MIN} =	1.75	psf	

2.2 Snow Loads

Ground Snow Load, P_g =	30.00	psf	
Sloped Roof Snow Load, P_s =	18.56	psf	*(ASCE 7-05, Eq. 7-2)*
I_s =	1.00		
C_s =	0.82		
C_e =	0.90		
C_t =	1.20		

2.3 Wind Loads

Design Wind Speed, V =	130	mph	Exposure Category = C
Height <	15	ft	Importance Category = II

Peak Velocity Pressure, q_z =	26.53	psf	*Including the gust factor, G=0.85. (ASCE 7-05, Eq. 6-15)*

Pressure Coefficients

$Cf+_{TOP}$ =	1.1	*(Pressure)*	*Provided pressure coefficients are the result of wind tunnel testing done by Ruscheweyh Consult. Coefficients are located in test report # 1127/0510-e. Negative forces are applied away from the surface.*
$Cf+_{BOTTOM}$ =	1.7		
$Cf-_{TOP}$ =	-2.2	*(Suction)*	
$Cf-_{BOTTOM}$ =	-1		

2.4 Seismic Loads

S_S =	2.50	R =	1.25	*ASCE 7, Section 12.8.1.3: A maximum S_s of 1.5 may be used to calculate the base shear, C_s, of structures under five stories and with a period, T, of 0.5 or less. Therefore, a S_{ds} of 1.0 was used to calculate C_s.*
S_{DS} =	1.67	C_S =	0.8	
S_1 =	1.00	ρ =	1.3	
S_{D1} =	1.00	Ω =	1.25	
T_a =	0.08	C_d =	1.25	

2.5 Combination of Loads

ASCE 7 requires that all structures be checked by specified combinations of loads. Applicable load combinations are provided below.

Strength Design, LRFD

Component stresses are checked using the following LRFD load combinations:

1.2D + 1.6S + 0.8W	
1.2D + 1.6W + 0.5S	
0.9D + 1.6W [M]	
1.54D + 1.3E + 0.2S [R]	*(ASCE 7, Eq 2.3.2-1 through 2.3.2-7) & (ASCE 7, Section 12.4.3.2)*
0.56D + 1.3E [R]	
1.54D + 1.25E + 0.2S [O]	
0.56D + 1.25E [O]	

Allowable Stress Design, ASD

Member deflection checks and foundation designs are done according to the following ASD load combinations:

1.0D + 1.0S	
1.0D + 1.0W	
1.0D + 0.75L + 0.75W + 0.75S	
0.6D + 1.0W [M]	*(ASCE 7, Eq 2.4.1-1 through 2.4.1-8) & (ASCE 7, Section 12.4.3.2)*
1.238D + 0.875E [O]	
1.1785D + 0.65625E + 0.75S [O]	
0.362D + 0.875E [O]	

[M] *Uses the minimum allowable module dead load.*
[R] *Include redundancy factor of 1.3.*
[O] *Includes overstrength factor of 1.25. Used to check seismic drift.*

3. STRUCTURAL ANALYSIS

3.1 RISA Results

Appendix B.1 contains outputs from the structural analysis software package, RISA. These outputs are used to accurately determine resultant member and reaction forces from the loads seen throughout Section 2.

3.2 RISA Components

A member and node list has been provided below to correlate the RISA components with the design calculations in Section 4. Items of significance have been listed.

Purlins	Location
M10	Top
M11	Mid-Top
M12	Mid-Bottom
M13	Bottom

Posts	Location
M2	Outer
M5	Inner
M8	Outer

Girders	Location
M1	Outer
M4	Inner
M7	Outer

Reactions	Location
N9	Outer
N19	Inner
N29	Outer

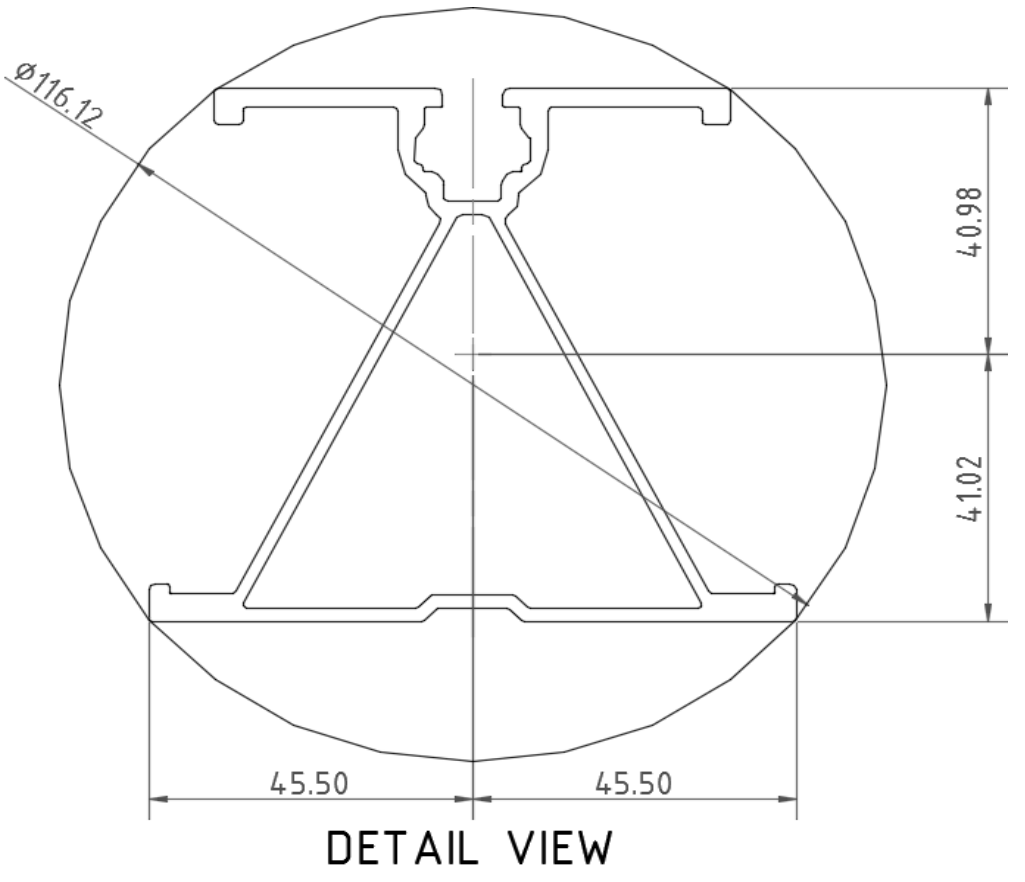
Struts	Location
M3	Outer
M6	Inner
M9	Outer

4. MEMBER DESIGN CALCULATIONS

4.1 Purlin Design

Aluminum purlins are used to transfer loads to the support structure. Purlins are designed as continous beams with cantilevers. These are considered beams with internal hinges that can be joined with splices at 25% of the support respective span. See Appendix A.1 for detailed member calculations. Section units are in (mm).

Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	78	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.6	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	1.244	k-ft
M_z =	0.047	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	49%	

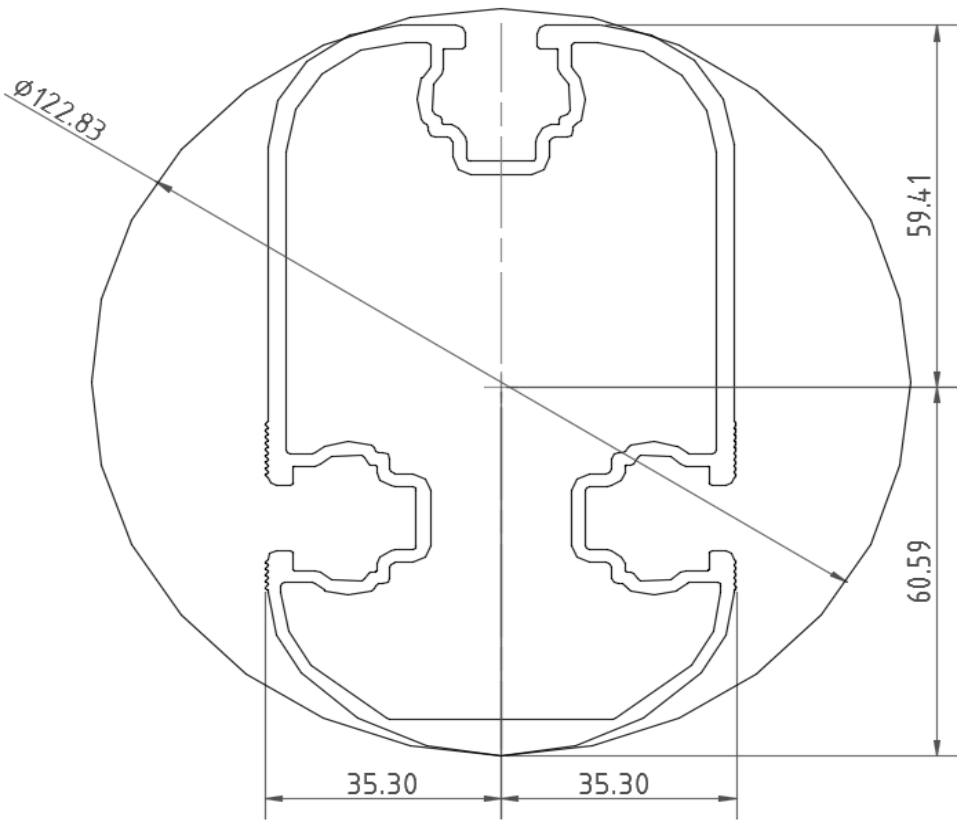


DETAIL VIEW

4.2 Girder Design

Loads from purlins are transferred to the posts using an inclined girder, which is connected to the steel post. Loads on the girder result from the support reactions of the purlins. See Appendix A.2 for detailed member calculations. Section units are in (mm).

Girder Type =	**T5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	63.82	in
$\Phi F_{ty\ AXIAL}$ =	30.80	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	30.46	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	31.56	ksi
S_y =	1.98	in^3
S_x =	1.32	in^3
E =	10100	ksi
I_y =	4.74	in^4
I_x =	1.83	in^4
A =	1.93	in^2
g =	2.32	lbs/ft
M_y =	4.134	k-ft
M_z =	0.000	k-ft
P_n =	0.006	k
$M_{y\ allowable}$ =	5.026	k-ft
$M_{z\ allowable}$ =	3.472	k-ft
$P_{n\ allowable}$ =	59.439	k
Utilization =	82%	

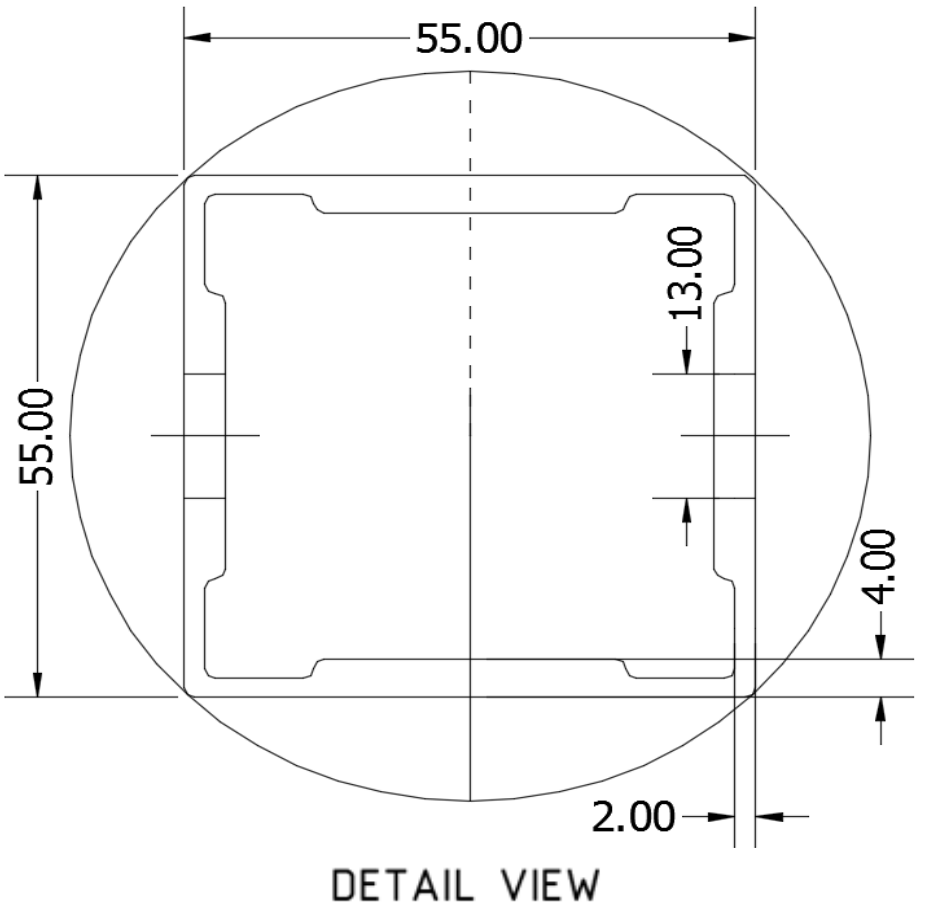


DETAIL VIEW

4.3 Strut Design

The aluminum strut connects a portion of the girder to the galvanized steel post. Girder forces are then transferred down through the strut into the post. The strut is attached with single M10 bolts at each end. See Appendix A.3 for detailed member calculations. Section units are in (mm).

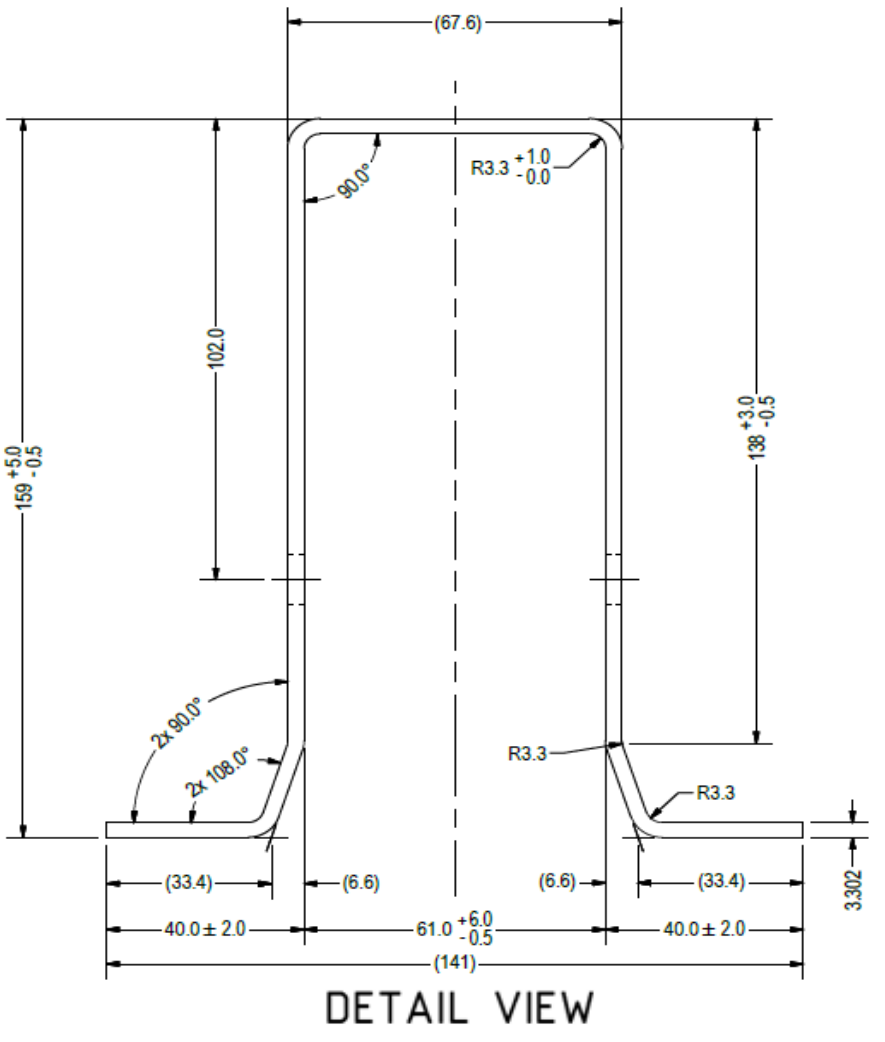
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	61.00	in
$\Phi F_{ty\ AXIAL}$ =	13.67	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.005	k-ft
M_z =	0.000	k-ft
P_n =	4.439	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	13.425	k
Utilization =	33%	



4.4 Post Design

Galvanized steel posts are a roll formed steel section, that are either ram driven into the ground or placed in a concrete foundation at a defined depth. Embedment depths will be provided on the structural drawings or through a geotechnical testing report. See Appendix A.4 for detailed member calculations. Section units are in (mm).

Post Type =	**FG8**	
Steel Type =	J2340	
F_{ty} =	60	ksi
L_b =	72.60	in
Φ =	0.90	
ΦF_{ty} =	54.00	ksi
S_y =	3.46	in^3
S_x =	1.55	in^3
E =	29000	ksi
I_y =	10.94	in^4
I_x =	4.31	in^4
A =	2.23	in^2
g =	7.59	lbs/ft
M_y =	8.910	k-ft
M_z =	0.000	k-ft
P_r =	-5.087	k
$M_{y\ allowable}$ =	19.207	k-ft
$M_{z\ allowable}$ =	14.389	k-ft
P_c =	38.073	k
Utilization =	56%	



5. FOUNDATION DESIGN CALCULATIONS

5.1 Rammed Post Foundations

The following LRFD loads include a safety factor of 1.3, and are to be used in conjunction with a Schletter, Inc. Geotechnical Investigation Report. The forces below should fall within the guidelines provided in the Geotechnical Investigation Report. If a Geotechnical Investigation Report is not present, please proceed to Section 5.2 for a concrete footing design.

Maximum Tensile Load =	6.59	k
Maximum Lateral Load =	3.23	k

5.2 Design of Drilled Shaft Foundations

The galvanized steel post is to be embedded into a cylindrical drilled shaft foundation. For the purpose of design, the post is considered to be fixed to the ground. The applicable lateral force, uplift, and compression resistance checks are seen below.

5.3 Lateral Force Resistance

The equivalent lateral force is applied at the top of the post to determine the required embedment depth. A lateral soil bearing capacity for clay is assumed. Footing is unrestrained at ground level. (IBC, Eq. 18-1)

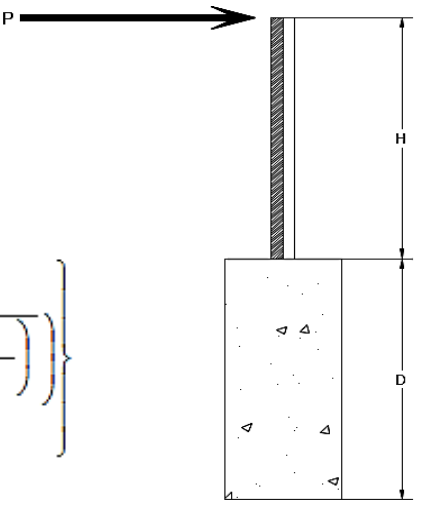
Lateral Force @ Top of Pole, P =	0.80	k
Height of Pole Above Grade, H =	5.05	ft
Diameter of Pole Footing, B =	2.00	ft
Lateral Soil Bearing Capacity, S =	0.10	ksf/ft
Isolated Pole Factor, F =	2	
First Trial Depth, D =	3.25	ft

$$S_3 = Min\ (D, 12')$$

$$S_1 = Min\left(\frac{D}{3}, 12'\right)$$

$$A = 2.34\ P/S_1 B$$

$$D = \left\{0.5A\left(1 + \sqrt{1 + \left(\frac{4.36\ H}{A}\right)}\right)\right\}$$



Lateral Bearing @ Bottom =	S_3
Lateral Bearing @ D/3 =	S_1
Required Depth =	D

Non-Constrained

Lateral Force @ Top of Pole, P =	0.80	k
Height of Pole Above Grade, H =	5.05	ft
Diameter of Pole Footing, B =	2.00	ft
Lateral Soil Bearing Capacity, S =	0.20	ksf/ft

1st Trial @ D_1 =	3.25	ft
Lateral Soil Bearing @ D/3, S_1 =	0.22	ksf
Lateral Soil Bearing @ D, S_3 =	0.65	ksf
Constant 2.34P/(S_1B), A =	4.30	
Required Footing Depth, D =	7.47	ft

2nd Trial @ D_2 =	5.36	ft
Lateral Soil Bearing @ D/3, S_1 =	0.36	ksf
Lateral Soil Bearing @ D, S_3 =	1.07	ksf
Constant 2.34P/(S_1B), A =	2.61	
Required Footing Depth, D =	5.31	ft

3rd Trial @ D_3 =	5.34	ft
Lateral Soil Bearing @ D/3, S_1 =	0.36	ksf
Lateral Soil Bearing @ D, S_3 =	1.07	ksf
Constant 2.34P/(S_1B), A =	2.62	
Required Footing Depth, D =	5.33	ft

4th Trial @ D_4 =	5.33	ft
Lateral Soil Bearing @ D/3, S_1 =	0.36	ksf
Lateral Soil Bearing @ D, S_3 =	1.07	ksf
Constant 2.34P/(S_1B), A =	2.62	
Required Footing Depth, D =	5.33	ft

5th Trial @ D_5 =	5.33	ft
Lateral Soil Bearing @ D/3, S_1 =	0.36	ksf
Lateral Soil Bearing @ D, S_3 =	1.07	ksf
Constant 2.34P/(S_1B), A =	2.62	
Required Footing Depth, D =	5.50	ft

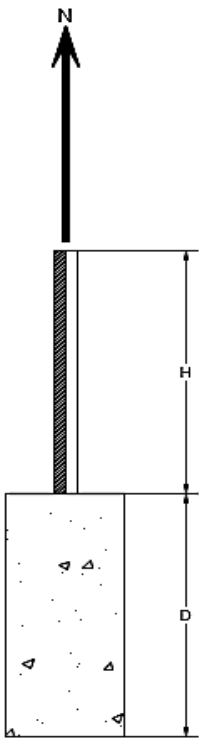
A 2ft diameter x 5.5ft deep footing unrestrained at ground level is required for the racking structure.

5.4 Uplifting Force Resistance

Uplifting forces of the racking system are checked against the uplift resistance of the soil. Clay soils are assumed.

Weight of Concrete, g_{con} =	145	pcf
Uplifting Force, N =	3.16	k
Footing Diameter, B =	2.00	ft
Factor of Safety =	2.50	
Cohesion =	208.85	psf
γ_s =	120.43	pcf
α =	0.45	
Required Concrete Weight, g =	2.07	k
Required Concrete Volume, V =	14.29	ft^3
Required Footing Depth, D =	4.75	ft

A 2ft diameter x 4.75ft deep footing unrestrained at ground level is required for the racking structure.



Iteration	z	dz	Qs	Side
1	0.2	0.2	118.10	6.83
2	0.4	0.2	118.10	6.73
3	0.6	0.2	118.10	6.62
4	0.8	0.2	118.10	6.52
5	1	0.2	118.10	6.41
6	1.2	0.2	118.10	6.31
7	1.4	0.2	118.10	6.21
8	1.6	0.2	118.10	6.10
9	1.8	0.2	118.10	6.00
10	2	0.2	118.10	5.90
11	2.2	0.2	118.10	5.79
12	2.4	0.2	118.10	5.69
13	2.6	0.2	118.10	5.58
14	2.8	0.2	118.10	5.48
15	3	0.2	118.10	5.38
16	3.2	0.2	118.10	5.27
17	3.4	0.2	118.10	5.17
18	3.6	0.2	118.10	5.07
19	3.8	0.2	118.10	4.96
20	4	0.2	118.10	4.86
21	4.2	0.2	118.10	4.76
22	4.4	0.2	118.10	4.65
23	4.6	0.2	118.10	4.55
24	0	0.0	0.00	4.55
25	0	0.0	0.00	4.55
26	0	0.0	0.00	4.55
27	0	0.0	0.00	4.55
28	0	0.0	0.00	4.55
29	0	0.0	0.00	4.55
30	0	0.0	0.00	4.55
31	0	0.0	0.00	4.55
32	0	0.0	0.00	4.55
33	0	0.0	0.00	4.55
34	0	0.0	0.00	4.55
Max	4.6	Sum	1.09	

5.5 Compressive Force Resistance

Skin friction of the soil is checked against the compression force from the racking and the weight of the drilled shaft foundation. Skin friction starts at 3ft below grade. Clay soils are again assumed.

Depth Below Grade, D =	5.50	ft
Footing Diameter, B =	2.00	ft
Compressive Force, P =	3.51	k
Footing Area =	3.14	ft^2
Circumference =	6.28	ft
Skin Friction Area =	15.71	ft^2
Concrete Weight =	0.145	kcf

Bearing Pressure

Bearing Area =	3.14	ft^2
Bearing Capacity =	1.5	ksf
Resistance =	4.71	k

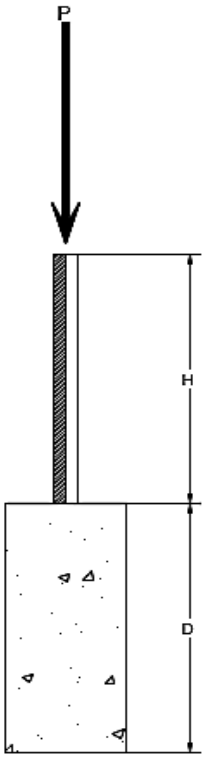
Weight of Concrete

Footing Volume	17.28	ft^3
Weight	2.51	k

Skin Friction Resistance

Skin Friction =	0.15	ksf
Resistance =	2.36	k
1/3 Increase for Wind =	1.33	
Total Resistance =	9.42	k
Applied Force =	6.02	k
Utilization =	64%	

A 2ft diameter footing passes at a depth of 5.5ft.



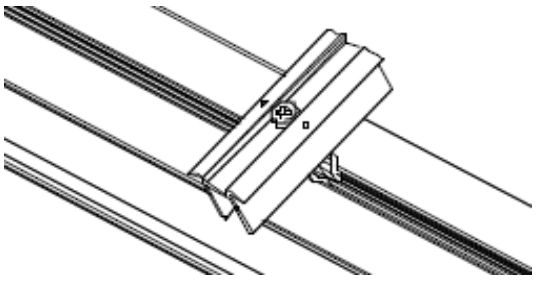
6. DESIGN OF JOINTS AND CONNECTIONS

6.1 Anchorage of Modules to Purlins and Connection of Purlins to Girders

Modules are secured to the purlins with Schletter, Inc. Rapid2+ mounting clamps. Purlins are secured to the girders with the use of 40mm mounting clamps. The reliability of calculations is uncertain due to limited standards, therefore the strength of the clamp fasteners has been evaluated by load testing.

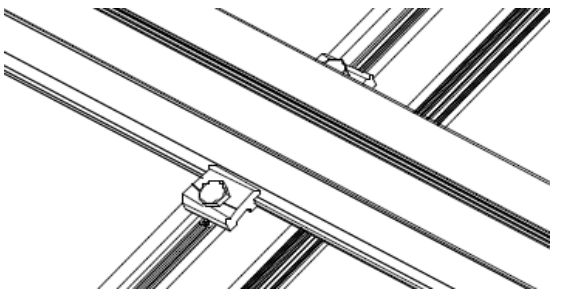
Fastening of Modules to Purlins

Maximum Uplifting Force	=	0.882 k
Allowable Uplift	=	1.214 k
Utilization	=	73%



Fastening of Purlins to Girders

Maximum Uplifting Force	=	2.052 k
Allowable Uplift	=	2.180 k
Utilization	=	94%

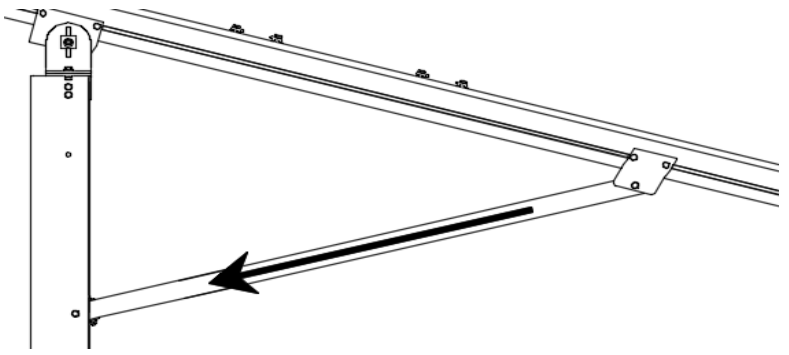


6.2 Strut Connections

The aluminum struts connect the front end of girder to a center section of the steel post. Single M10 bolts are used to attach each end of the strut to the girder and post. ASTM A193/A193M-86 equivalent stainless steel bolts are used.

Maximum Axial Load	=	4.439 k
M10 Bolt Shear Capacity	=	8.894 k
Utilization	=	50%

Bolt capacity is accounting for double shear. (ASCE 8-02, Eq. 5.3.4-1)

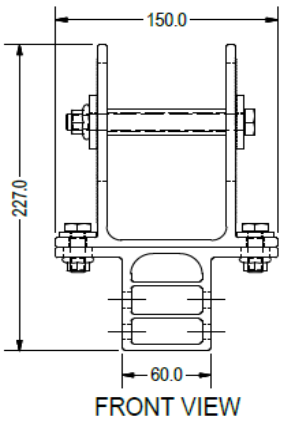


A strut under compression is shown to demonstrate the load transfer from the girder. Single M10 bolts are located at each end of the strut and are subjected to double shear.

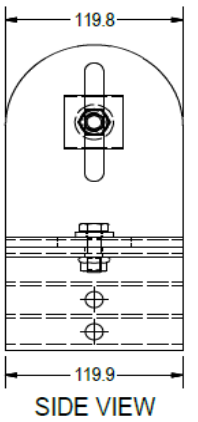
6.3 Girder to Post Connection

In order to connect the girder to the post, custom extruded sections are assembled to create a post head piece. The reliability of calculations is uncertain due to limited standards, therefore the strength of the head piece has been evaluated by load testing.

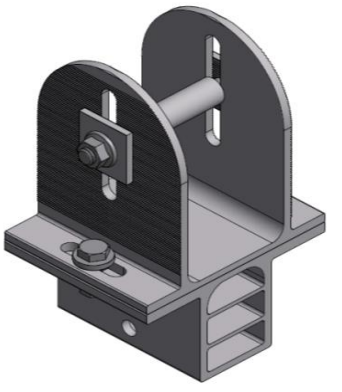
Maximum Tensile Load	=	4.328 k
Allowable Load	=	5.649 k
Utilization	=	77%



FRONT VIEW



SIDE VIEW



7. SEISMIC DESIGN

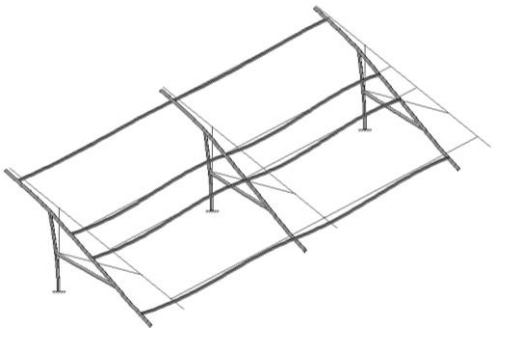
7.1 Seismic Drift

The racking structure has been analyzed under seismic loading. The allowable story drift of the structure must fall within the limits provided by (ASCE 7, Table 12.12-1).

Mean Height, h_{sx}	=	70.15 in
Allowable Story Drift for All Other Structures, Δ	= {	$0.020h_{sx}$
		1.403 in
Max Drift, Δ_{MAX}	=	0.389 in

0.389 ≤ 1.403, OK.

The racking structure's reaction to seismic loads is shown to the right. The deflections have been magnified to provide a clear portrayal of potential story drift.



APPENDIX A

A.1 Design of Aluminum Purlins - Aluminum Design Manual, 2005 Edition

Purlin = **S1.5**

Strong Axis:

3.4.14

L_b = 78 in

J = 0.432

215.785

$$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc}\right)^2$$

S1 = 0.51461

$$S2 = \left(\frac{C_c}{1.6}\right)^2$$

S2 = 1701.56

φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]

φF_L= 28.6 ksi

3.4.16

b/t = 32.195

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp}$$

S1 = 12.2

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 25.1 ksi

3.4.16.1 Not Used

Rb/t =

$$S1 = \left(\frac{Bt - 1.17\frac{\theta_y}{\theta_b} Fcy}{1.6Dt}\right)^2$$

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 37.0588

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b} 1.3Fcy}{mDbr}$$

S1 = 36.9

m = 0.65

C_0 = 40.985

Cc = 41.015

$$S2 = \frac{k_1 Bbr}{mDbr}$$

S2 = 77.2

φF_L= φb[Bbr-mDbr*h/t]

φF_L= 43.2 ksi

φF_LSt= 25.1 ksi

Ix = 897074 mm^4

2.155 in^4

y = 41.015 mm

Sx = 1.335 in^3

M_{max}St = 2.788 k-ft

Compression

Weak Axis:

3.4.14

L_b = 78

J = 0.432

137.226

$$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc}\right)^2$$

S1 = 0.51461

$$S2 = \left(\frac{C_c}{1.6}\right)^2$$

S2 = 1701.56

φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]

φF_L= 29.6

3.4.16

b/t = 37.0588

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp}$$

S1 = 12.2

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 23.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 32.195

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b} 1.3Fcy}{mDbr}$$

S1 = 36.9

m = 0.65

C_0 = 45.5

Cc = 45.5

$$S2 = \frac{k_1 Bbr}{mDbr}$$

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 23.1 ksi

Iy = 446476 mm^4

1.073 in^4

x = 45.5 mm

Sy = 0.599 in^3

M_{max}Wk = 1.152 k-ft

3.4.9

b/t = 32.195
S1 = 12.21 (See 3.4.16 above for formula)
S2 = 32.70 (See 3.4.16 above for formula)
φF_L = φc[Bp-1.6Dp*b/t]
φF_L = 25.1 ksi

b/t = 37.0588
S1 = 12.21
S2 = 32.70
φF_L = (φck2*√(BpE))/(1.6b/t)
φF_L = 21.9 ksi

3.4.10

Rb/t = 0.0

$$S1 = \left(\frac{Bt - \frac{\theta_y}{\theta_b} Fcy}{Dt}\right)^2$$

S1 = 6.87
S2 = 131.3
φF_L = φyFcy
φF_L = 33.25 ksi

φF_L = 21.94 ksi
A = 1215.13 mm^2
1.88 in^2
P_{max} = 41.32 kips

A.2 Design of Aluminum Girders - Aluminum Design Manual, 2005 Edition

Girder = **T5**

Strong Axis:

3.4.14

L_b = 63.8189 in
J = 1.98
82.1278

$$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc}\right)^2$$

S1 = 0.51461

$$S2 = \left(\frac{C_c}{1.6}\right)^2$$

S2 = 1701.56
φF_L = φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L = 30.5 ksi

3.4.16

b/t = 4.5

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp}$$

S1 = 12.2

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

S2 = 46.7
φF_L = φyFcy
φF_L = 33.3 ksi

Weak Axis:

3.4.14

L_b = 63.8189
J = 1.98
89.1294

$$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc}\right)^2$$

S1 = 0.51461

$$S2 = \left(\frac{C_c}{1.6}\right)^2$$

S2 = 1701.56
φF_L = φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L = 30.3

3.4.16

b/t = 16.3333

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp}$$

S1 = 12.2

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

S2 = 46.7
φF_L = φb[Bp-1.6Dp*b/t]
φF_L = 31.6 ksi

3.4.16.1 Used

Rb/t = 20.0

$$S1 = \left(\frac{Bt - 1.17\frac{\theta_y}{\theta_b}Fcy}{1.6Dt}\right)^2$$

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= φb[Bt-Dt*√(Rb/t)]

φF_L= 30.8 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 16.3333

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$$

S1 = 37.9

m = 0.63

C_0 = 61.046

Cc = 58.954

$$S2 = \frac{k_1 Bbr}{mDbr}$$

S2 = 79.4

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

$\varphi F_L St$= 30.5 ksi

Ix = 1970917 mm^4

4.735 in^4

y = 61.046 mm

Sx = 1.970 in^3

$M_{max}St$ = 5.001 k-ft

3.4.18

h/t = 4.5

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$$

S1 = 36.9

m = 0.65

C_0 = 35

Cc = 35

$$S2 = \frac{k_1 Bbr}{mDbr}$$

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

$\varphi F_L Wk$= 31.6 ksi

Iy = 763048 mm^4

1.833 in^4

x = 35 mm

Sy = 1.330 in^3

$M_{max}Wk$ = 3.499 k-ft

Compression

3.4.9

b/t = 4.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φyFcy

φF_L= 33.3 ksi

b/t = 16.3333

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 31.6 ksi

3.4.10

Rb/t = 20.0

$$S1 = \left(\frac{Bt - \frac{\theta_y}{\theta_b}Fcy}{Dt}\right)^2$$

S1 = 6.87

S2 = 131.3

φF_L= φc[Bt-Dt*√(Rb/t)]

φF_L= 30.80 ksi

φF_L= 30.80 ksi

A = 1215.13 mm^2

1.88 in^2

P_{max} = 58.01 kips

A.3 Design of Aluminum Struts - Aluminum Design Manual, 2005 Edition

Strut = **55x55**

Strong Axis:		Weak Axis:	
3.4.14		**3.4.14**	
L_b =	61 in	L_b =	61
J =	0.942	J =	0.942
	95.1963		95.1963
$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc}\right)^2$		$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc}\right)^2$	
S1 =	0.51461	S1 =	0.51461
$S2 = \left(\frac{C_c}{1.6}\right)^2$		$S2 = \left(\frac{C_c}{1.6}\right)^2$	
S2 =	1701.56	S2 =	1701.56
φF_L=	φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]	φF_L=	φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L=	30.2 ksi	φF_L=	30.2
3.4.16		**3.4.16**	
b/t =	24.5	b/t =	24.5
$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp}$		$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp}$	
S1 =	12.2	S1 =	12.2
$S2 = \frac{k_1 Bp}{1.6Dp}$		$S2 = \frac{k_1 Bp}{1.6Dp}$	
S2 =	46.7	S2 =	46.7
φF_L=	φb[Bp-1.6Dp*b/t]	φF_L=	φb[Bp-1.6Dp*b/t]
φF_L=	28.2 ksi	φF_L=	28.2 ksi
3.4.16.1	Not Used	**3.4.16.1**	
Rb/t =	0.0	N/A for Weak Direction	
$S1 = \left(\frac{Bt - 1.17\frac{\theta_y}{\theta_b} Fcy}{1.6Dt}\right)^2$			
S1 =	1.1		
$S2 = C_t$			
S2 =	141.0		
φF_L=	1.17φyFcy		
φF_L=	38.9 ksi		
3.4.18		**3.4.18**	
h/t =	24.5	h/t =	24.5
$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b} 1.3Fcy}{mDbr}$		$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b} 1.3Fcy}{mDbr}$	
S1 =	36.9	S1 =	36.9
m =	0.65	m =	0.65
C_0 =	27.5	C_0 =	27.5
Cc =	27.5	Cc =	27.5
$S2 = \frac{k_1 Bbr}{mDbr}$		$S2 = \frac{k_1 Bbr}{mDbr}$	
S2 =	77.3	S2 =	77.3
φF_L=	1.3φyFcy	φF_L=	1.3φyFcy
φF_L=	43.2 ksi	φF_L=	43.2 ksi
φF_LSt=	28.2 ksi	φF_LWk=	28.2 ksi
Ix =	279836 mm^4	Iy =	279836 mm^4
	0.672 in^4		0.672 in^4
y =	27.5 mm	x =	27.5 mm
Sx =	0.621 in^3	Sy =	0.621 in^3
M_{max}St =	1.460 k-ft	M_{max}Wk =	1.460 k-ft

Compression

3.4.7

λ = 1.41113

r = 0.81 in

$$S1^* = \frac{Bc - Fcy}{1.6Dc^*}$$

S1* = 0.33515

$$S2^* = \frac{Cc}{\pi}\sqrt{Fcy/E}$$

S2* = 1.23671

φcc = 0.77756

φF_L = (φccFcy)/(λ²)

φF_L = 13.6667 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L = φc[Bp-1.6Dp*b/t]

φF_L = 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L = φc[Bp-1.6Dp*b/t]

φF_L = 28.2 ksi

3.4.10

Rb/t = 0.0

$$S1 = \left(\frac{Bt - \frac{\theta_y}{\theta_b}Fcy}{Dt}\right)^2$$

S1 = 6.87

S2 = 131.3

φF_L = φyFcy

φF_L = 33.25 ksi

φF_L = 13.67 ksi

A = 663.99 mm^2

1.03 in^2

P_{max} = 14.07 kips

A.4 Design of Galvanized Steel Posts

Post Type = **FG8**

Unbraced Length =	72.60	in	
Pr =	-5.09	k	(LRFD Factored Load)
Mr (Strong) =	8.91	k-ft	(LRFD Factored Load)
Mr (Weak) =	0.00	k-ft	(LRFD Factored Load)

Flexural Buckling:

kL/r =	104.47		
4.71√(E/Fy) =	103.55	=> kL/r	> 4.71√(E/Fy)
Fcr =	23.00	ksi	
Fe =	26.23	ksi	
Pn =	51.291	k	

Torsional/Flexural Torsional Buckling:

Fcr =	17.0733	ksi
Fey =	66.8981	ksi
Fez =	21.7595	ksi
Pn =	38.0734	k

Bending (Strong Axis):

Yielding:

Mn =	21.95	k-ft

Flange Local Buckling:

Mn =	19.207	k-ft

Pr/Pc =	0.0992	<	0.2	
Utilization =	0.56	<	1.0	OK

Bending (Weak Axis):

Yielding:

Mn =	14.65	k-ft

Flange Local Buckling:

Mn =	14.39	k-ft

Pr/Pc =	0.099	<	0.2	
Utilization =	0.00	<	1.0	OK

Combined Forces

Utilization = 56%

APPENDIX B

B.1

The following pages will contain the results from RISA. Please refer back to Section 2 for load information and Section 4-5 for member and foundation design.

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Dead Load, Max	DL		-1				4		
2	Dead Load, Min	DL		-1				4		
3	Snow Load	SL						4		
4	Wind Load - Pressure	WL						4		
5	Wind Load - Suction	WL						4		
6	Seismic - Lateral	EL			.8			8		

Member Distributed Loads (BLC 1 : Dead Load, Max)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M10	Y	-8.366	-8.366	0	0
2	M11	Y	-8.366	-8.366	0	0
3	M12	Y	-8.366	-8.366	0	0
4	M13	Y	-8.366	-8.366	0	0

Member Distributed Loads (BLC 2 : Dead Load, Min)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M10	Y	-4.45	-4.45	0	0
2	M11	Y	-4.45	-4.45	0	0
3	M12	Y	-4.45	-4.45	0	0
4	M13	Y	-4.45	-4.45	0	0

Member Distributed Loads (BLC 3 : Snow Load)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M10	Y	-46.9	-46.9	0	0
2	M11	Y	-46.9	-46.9	0	0
3	M12	Y	-46.9	-46.9	0	0
4	M13	Y	-46.9	-46.9	0	0

Member Distributed Loads (BLC 4 : Wind Load - Pressure)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M10	y	-81.397	-81.397	0	0
2	M11	y	-81.397	-81.397	0	0
3	M12	y	-125.796	-125.796	0	0
4	M13	y	-125.796	-125.796	0	0

Member Distributed Loads (BLC 5 : Wind Load - Suction)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M10	y	162.794	162.794	0	0
2	M11	y	162.794	162.794	0	0
3	M12	y	73.997	73.997	0	0
4	M13	y	73.997	73.997	0	0

Member Distributed Loads (BLC 6 : Seismic - Lateral)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M10	Z	6.693	6.693	0	0
2	M11	Z	6.693	6.693	0	0
3	M12	Z	6.693	6.693	0	0
4	M13	Z	6.693	6.693	0	0
5	M10	Z	0	0	0	0
6	M11	Z	0	0	0	0
7	M12	Z	0	0	0	0
8	M13	Z	0	0	0	0

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	LRFD 1.2D + 1.6S + 0.8W	Yes	Y		1	1.2	3	1.6	4	.8														
2	LRFD 1.2D + 1.6W + 0.5S	Yes	Y		1	1.2	3	.5	4	1.6														
3	LRFD 0.9D + 1.6W	Yes	Y		2	.9					5	1.6												
4	LATERAL - LRFD 1.54D + 1.3E ...	Yes	Y		1	1.54	3	.2			6	1.3												
5	LATERAL - LRFD 0.56D + 1.3E	Yes	Y		1	.56					6	1.3												
6	LATERAL - LRFD 1.54D + 1.25...	Yes	Y		1	1.54	3	.2			6	1.25												
7	LATERAL - LRFD 0.56D + 1.25E	Yes	Y		1	.56					6	1.25												
8																								
9	ASD 1.0D + 1.0S	Yes	Y		1	1	3	1																
10	ASD 1.0D + 1.0W	Yes	Y		1	1			4	1														
11	ASD 1.0D + 0.75L + 0.75W + 0....	Yes	Y		1	1	3	.75	4	.75														
12	ASD 0.6D + 1.0W	Yes	Y		2	.6					5	1												
13	LATERAL - ASD 1.238D + 0.875E	Yes	Y		1	1.2...					6	.875												
14	LATERAL - ASD 1.1785D + 0.65...	Yes	Y		1	1.1...	3	.75			6	.656												
15	LATERAL - ASD 0.362D + 0.875E	Yes	Y		1	.362					6	.875												

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N9	max	591.006	2	2123.98	2	121.31	2	.145	2	.007	5	4.145	1
2		min	-887.689	3	-1701.052	3	-244.423	5	-.954	5	-.005	2	.477	15
3	N19	max	2460.632	2	5653.844	2	0	12	0	1	.007	4	6.293	1
4		min	-2387.626	3	-5055.708	3	-258.923	5	-.991	4	0	3	.206	15
5	N29	max	591.006	2	2123.98	2	151.751	3	.197	3	.007	4	4.145	1
6		min	-887.689	3	-1701.052	3	-263.679	4	-.986	4	-.002	3	-.269	5
7	Totals:	max	3642.643	2	9901.804	2	0	3						
8		min	-4163.004	3	-8457.811	3	-754.646	5						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
1	M1	1	max	0	1	.006	2	0	4	0	1	0	1	0	1
2			min	0	1	-.001	3	0	1	0	1	0	1	0	1
3		2	max	-.221	15	-.473	15	0	12	0	1	0	12	0	6
4			min	-.939	6	-2.011	6	-1.499	5	0	1	0	5	0	15
5		3	max	-9.416	12	300.214	3	-3.397	12	.05	3	.155	1	.293	2
6			min	-145.309	1	-665.851	2	-94.023	1	-.161	2	.015	12	-.131	3
7		4	max	-9.781	12	299.038	3	-3.397	12	.05	3	.096	1	.707	2
8			min	-146.04	1	-667.419	2	-94.023	1	-.161	2	.013	12	-.317	3
9		5	max	-10.147	12	297.861	3	-3.397	12	.05	3	.044	4	1.122	2
10			min	-146.772	1	-668.987	2	-94.023	1	-.161	2	.005	10	-.502	3
11		6	max	376.88	3	556.329	2	8.866	3	-.004	9	.062	2	1.087	2
12			min	-1168.118	2	-153.025	3	-121.359	1	-.013	4	-.023	3	-.522	3
13		7	max	376.331	3	554.761	2	8.866	3	-.004	9	0	10	.742	2
14			min	-1168.849	2	-154.201	3	-121.359	1	-.013	4	-.044	4	-.426	3
15		8	max	375.783	3	553.193	2	8.866	3	-.004	9	-.007	12	.399	2
16			min	-1169.581	2	-155.378	3	-121.359	1	-.013	4	-.097	1	-.33	3
17		9	max	361.176	3	103.139	3	9.683	3	.012	5	.067	1	.195	2
18			min	-1257.439	2	-47.595	2	-143.332	1	-.105	2	.014	12	-.292	3
19		10	max	360.627	3	101.963	3	9.683	3	.012	5	.029	3	.225	2
20			min	-1258.17	2	-49.163	2	-143.332	1	-.105	2	-.025	2	-.355	3
21		11	max	360.079	3	100.787	3	9.683	3	.012	5	.035	3	.256	2
22			min	-1258.901	2	-50.731	2	-143.332	1	-.105	2	-.11	1	-.418	3
23		12	max	341.127	3	773.892	3	35.553	2	.174	3	.088	1	.455	2
24			min	-1342.489	2	-456.423	2	-161.774	3	-.145	2	0	15	-.747	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
25		13	max	340.578	3	772.715	3	35.553	2	.174	3	.088	1	.738	2
26			min	-1343.22	2	-457.991	2	-161.774	3	-.145	2	-.087	5	-1.227	3
27		14	max	147.033	1	443.037	2	50.177	5	.125	2	.031	3	1.011	2
28			min	6.435	15	-730.584	3	-76.622	1	-.279	3	-.12	4	-1.686	3
29		15	max	146.302	1	441.469	2	48.677	5	.125	2	.016	3	.736	2
30			min	6.215	15	-731.76	3	-76.622	1	-.279	3	-.098	4	-1.232	3
31		16	max	145.57	1	439.9	2	47.177	5	.125	2	.001	3	.463	2
32			min	5.994	15	-732.937	3	-76.622	1	-.279	3	-.115	1	-.778	3
33		17	max	144.839	1	438.332	2	45.678	5	.125	2	-.009	12	.19	2
34			min	5.773	15	-734.113	3	-76.622	1	-.279	3	-.162	1	-.322	3
35		18	max	.939	6	2.012	6	1.5	4	0	1	0	12	0	6
36			min	.221	15	.473	15	0	12	0	1	0	4	0	15
37		19	max	0	1	.002	2	0	1	0	1	0	1	0	1
38			min	0	1	-.005	3	0	5	0	1	0	1	0	1
39	M4	1	max	0	1	.013	2	0	4	0	1	0	1	0	1
40			min	0	1	-.004	3	0	1	0	1	0	1	0	1
41		2	max	-.221	15	-.473	15	0	1	0	1	0	1	0	4
42			min	-.939	4	-2.011	4	-1.499	5	0	1	0	5	0	15
43		3	max	5.141	10	868.384	3	0	1	.02	4	.143	4	.645	2
44			min	-191.115	1	-1707.365	2	-68.829	5	0	1	0	1	-.331	3
45		4	max	4.532	10	867.208	3	0	1	.02	4	.1	4	1.705	2
46			min	-191.846	1	-1708.933	2	-70.329	5	0	1	0	1	-.869	3
47		5	max	3.922	10	866.032	3	0	1	.02	4	.056	4	2.767	2
48			min	-192.577	1	-1710.501	2	-71.829	5	0	1	0	1	-1.407	3
49		6	max	1383.686	3	1626.379	2	0	1	0	1	0	1	2.604	2
50			min	-2995.873	2	-712.702	3	-68.038	4	-.014	4	-.014	5	-1.365	3
51		7	max	1383.138	3	1624.811	2	0	1	0	1	0	1	1.595	2
52			min	-2996.604	2	-713.878	3	-69.538	4	-.014	4	-.056	4	-.923	3
53		8	max	1382.589	3	1623.242	2	0	1	0	1	0	1	.587	2
54			min	-2997.336	2	-715.054	3	-71.038	4	-.014	4	-.1	4	-.479	3
55		9	max	1380.717	3	235.23	3	0	1	.008	4	.082	4	.019	9
56			min	-3017.721	2	-225.287	2	-152.535	4	0	1	0	1	-.249	3
57		10	max	1380.169	3	234.054	3	0	1	.008	4	0	1	.135	1
58			min	-3018.452	2	-226.855	2	-154.035	4	0	1	-.013	4	-.394	3
59		11	max	1379.62	3	232.877	3	0	1	.008	4	0	1	.265	2
60			min	-3019.183	2	-228.424	2	-155.535	4	0	1	-.109	4	-.539	3
61		12	max	1386.438	3	2196.893	3	0	1	.093	4	.019	5	.916	2
62			min	-3048.109	2	-1543.99	2	-156.146	4	0	1	0	1	-1.463	3
63		13	max	1385.89	3	2195.717	3	0	1	.093	4	0	1	1.875	2
64			min	-3048.841	2	-1545.559	2	-157.645	4	0	1	-.079	4	-2.826	3
65		14	max	194.248	1	1247.007	2	47.383	5	0	1	0	1	2.796	2
66			min	-2.818	10	-1844.629	3	0	1	-.061	4	-.103	5	-4.134	3
67		15	max	193.517	1	1245.438	2	45.884	5	0	1	0	1	2.023	2
68			min	-3.427	10	-1845.805	3	0	1	-.061	4	-.074	5	-2.988	3
69		16	max	192.786	1	1243.87	2	44.384	5	0	1	0	1	1.251	2
70			min	-4.036	10	-1846.982	3	0	1	-.061	4	-.046	5	-1.842	3
71		17	max	192.055	1	1242.302	2	42.884	5	0	1	0	1	.479	2
72			min	-4.646	10	-1848.158	3	0	1	-.061	4	-.019	4	-.696	3
73		18	max	.939	6	2.013	6	1.5	5	0	1	0	1	0	6
74			min	.221	15	.473	15	0	1	0	1	0	5	0	15
75		19	max	0	1	.005	2	0	1	0	1	0	1	0	1
76			min	0	1	-.01	3	0	4	0	1	0	1	0	1
77	M7	1	max	0	1	.006	2	.001	4	0	1	0	1	0	1
78			min	0	1	-.001	3	0	12	0	1	0	1	0	1
79		2	max	-.221	15	-.473	15	0	1	0	1	0	1	0	4
80			min	-.939	6	-2.012	4	-1.499	5	0	1	0	5	0	15
81		3	max	19.011	5	300.214	3	94.023	1	.161	2	.073	5	.293	2

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
82			min	-145.309	1	-665.851	2	-32.211	5	-.05	3	-.155	1	-.131	3
83		4	max	18.67	5	299.038	3	94.023	1	.161	2	.053	5	.707	2
84			min	-146.04	1	-667.419	2	-33.71	5	-.05	3	-.096	1	-.317	3
85		5	max	18.328	5	297.861	3	94.023	1	.161	2	.031	5	1.122	2
86			min	-146.772	1	-668.987	2	-35.21	5	-.05	3	-.038	1	-.502	3
87		6	max	376.88	3	556.329	2	121.359	1	.013	3	.023	3	1.087	2
88			min	-1168.118	2	-153.025	3	-30.393	5	-.011	5	-.062	2	-.522	3
89		7	max	376.331	3	554.761	2	121.359	1	.013	3	.022	1	.742	2
90			min	-1168.849	2	-154.201	3	-31.893	5	-.011	5	-.036	5	-.426	3
91		8	max	375.783	3	553.193	2	121.359	1	.013	3	.097	1	.399	2
92			min	-1169.581	2	-155.378	3	-33.393	5	-.011	5	-.056	5	-.33	3
93		9	max	361.176	3	103.139	3	143.332	1	.105	2	.03	5	.195	2
94			min	-1257.439	2	-47.595	2	-59.696	5	.01	15	-.067	1	-.292	3
95		10	max	360.627	3	101.963	3	143.332	1	.105	2	.025	2	.225	2
96			min	-1258.17	2	-49.163	2	-61.196	5	.01	15	-.029	3	-.355	3
97		11	max	360.079	3	100.787	3	143.332	1	.105	2	.11	1	.256	2
98			min	-1258.901	2	-50.731	2	-62.695	5	.01	15	-.046	5	-.418	3
99		12	max	341.127	3	773.892	3	161.774	3	.145	2	-.006	15	.455	2
100			min	-1342.489	2	-456.423	2	-137.15	5	-.174	3	-.088	1	-.747	3
101		13	max	340.578	3	772.715	3	161.774	3	.145	2	.081	3	.738	2
102			min	-1343.22	2	-457.991	2	-138.65	5	-.174	3	-.108	4	-1.227	3
103		14	max	147.033	1	443.037	2	76.622	1	.279	3	.021	2	1.011	2
104			min	6.546	15	-730.584	3	15.116	12	-.125	2	-.116	5	-1.686	3
105		15	max	146.302	1	441.469	2	76.622	1	.279	3	.067	1	.736	2
106			min	6.326	15	-731.76	3	15.116	12	-.125	2	-.08	5	-1.232	3
107		16	max	145.57	1	439.9	2	76.622	1	.279	3	.115	1	.463	2
108			min	6.105	15	-732.937	3	15.116	12	-.125	2	-.045	5	-.778	3
109		17	max	144.839	1	438.332	2	76.622	1	.279	3	.162	1	.19	2
110			min	5.885	15	-734.113	3	15.116	12	-.125	2	-.011	5	-.322	3
111		18	max	.939	6	2.013	4	1.5	5	0	1	0	1	0	4
112			min	.221	15	.473	15	0	1	0	1	0	5	0	15
113		19	max	0	1	.002	2	0	15	0	1	0	1	0	1
114			min	0	1	-.005	3	0	1	0	1	0	1	0	1
115	M10	1	max	76.628	1	435.065	2	-5.446	15	.012	2	.193	1	.125	2
116			min	15.117	12	-736.405	3	-143.511	1	-.026	3	.007	15	-.279	3
117		2	max	76.628	1	317.904	2	-4.355	15	.012	2	.099	1	.186	3
118			min	15.117	12	-551.795	3	-116.992	1	-.026	3	.004	15	-.147	2
119		3	max	76.628	1	200.743	2	-3.265	15	.012	2	.041	2	.518	3
120			min	15.117	12	-367.185	3	-90.473	1	-.026	3	0	15	-.334	2
121		4	max	76.628	1	83.583	2	-2.174	15	.012	2	.008	10	.716	3
122			min	15.117	12	-182.575	3	-63.954	1	-.026	3	-.031	1	-.437	2
123		5	max	76.628	1	11.281	5	-1.084	15	.012	2	-.002	15	.781	3
124			min	14.152	15	-33.578	2	-37.435	1	-.026	3	-.068	1	-.455	2
125		6	max	76.628	1	186.645	3	.993	9	.012	2	-.003	15	.713	3
126			min	9.162	15	-150.739	2	-24.018	2	-.026	3	-.085	1	-.388	2
127		7	max	76.628	1	371.255	3	18.321	9	.012	2	-.002	15	.512	3
128			min	4.172	15	-267.9	2	-13.246	2	-.026	3	-.084	1	-.237	2
129		8	max	76.628	1	555.865	3	42.123	1	.012	2	-.001	15	.177	3
130			min	-1.026	5	-385.06	2	-8.98	10	-.026	3	-.065	2	-.012	5
131		9	max	76.628	1	740.475	3	68.642	1	.012	2	.007	9	.319	2
132			min	-8.44	5	-502.221	2	-5.967	10	-.026	3	-.063	2	-.291	3
133		10	max	76.628	1	619.382	2	2.955	10	.026	3	.052	9	.724	2
134			min	15.117	12	-925.084	3	-95.161	1	-.004	14	-.053	2	-.893	3
135		11	max	76.628	1	502.221	2	5.967	10	.026	3	.007	9	.319	2
136			min	11.076	15	-740.475	3	-68.642	1	-.012	2	-.063	2	-.291	3
137		12	max	76.628	1	385.06	2	8.98	10	.026	3	-.002	15	.177	3
138			min	6.086	15	-555.865	3	-42.123	1	-.012	2	-.065	2	-.002	10

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
139		13	max	76.628	1	267.9	2	13.246	2	.026	3	-.003	15	.512	3
140			min	1.096	15	-371.255	3	-18.321	9	-.012	2	-.084	1	-.237	2
141		14	max	76.628	1	150.739	2	24.018	2	.026	3	-.004	15	.713	3
142			min	-5.615	5	-186.645	3	-.993	9	-.012	2	-.085	1	-.388	2
143		15	max	76.628	1	33.578	2	37.435	1	.026	3	-.003	12	.781	3
144			min	-13.028	5	-2.035	3	.971	15	-.012	2	-.068	1	-.455	2
145		16	max	76.628	1	182.575	3	63.954	1	.026	3	.008	10	.716	3
146			min	-20.442	5	-83.583	2	2.061	15	-.012	2	-.031	1	-.437	2
147		17	max	76.628	1	367.185	3	90.473	1	.026	3	.041	2	.518	3
148			min	-27.856	5	-200.743	2	3.152	15	-.012	2	0	5	-.334	2
149		18	max	76.628	1	551.795	3	116.992	1	.026	3	.099	1	.186	3
150			min	-35.27	5	-317.904	2	4.243	15	-.012	2	.002	15	-.147	2
151		19	max	76.628	1	736.405	3	143.511	1	.026	3	.193	1	.125	2
152			min	-42.683	5	-435.065	2	5.333	15	-.012	2	.006	15	-.279	3
153	M11	1	max	143.27	1	401.974	2	26.348	5	0	12	.23	1	.074	4
154			min	-171.389	3	-675.327	3	-152.104	1	-.006	2	-.105	5	-.241	3
155		2	max	143.27	1	284.813	2	28.035	5	0	12	.13	1	.18	3
156			min	-171.389	3	-490.718	3	-125.585	1	-.006	2	-.085	5	-.208	2
157		3	max	143.27	1	167.652	2	29.722	5	0	12	.056	2	.468	3
158			min	-171.389	3	-306.108	3	-99.066	1	-.006	2	-.064	5	-.371	2
159		4	max	143.27	1	50.491	2	31.409	5	0	12	.015	2	.622	3
160			min	-171.389	3	-121.498	3	-72.546	1	-.006	2	-.048	4	-.45	2
161		5	max	143.27	1	63.112	3	33.096	5	0	12	.003	3	.643	3
162			min	-171.389	3	-66.669	2	-46.027	1	-.006	2	-.056	1	-.444	2
163		6	max	143.27	1	247.722	3	34.783	5	0	12	.006	5	.531	3
164			min	-171.389	3	-183.83	2	-29.25	2	-.006	2	-.08	1	-.354	2
165		7	max	143.27	1	432.332	3	41.073	4	0	12	.031	5	.285	3
166			min	-171.389	3	-300.991	2	-18.477	2	-.006	2	-.084	1	-.179	2
167		8	max	143.27	1	616.942	3	48.576	4	0	12	.058	5	.081	2
168			min	-171.389	3	-418.152	2	-11.162	10	-.006	2	-.069	1	-.094	3
169		9	max	143.27	1	801.552	3	60.049	1	0	12	.087	4	.425	2
170			min	-171.389	3	-535.312	2	-8.149	10	-.006	2	-.071	2	-.606	3
171		10	max	143.27	1	652.473	2	28.775	5	0	3	.13	4	.854	2
172			min	-171.389	3	-986.162	3	-86.569	1	-.006	2	-.065	2	-1.251	3
173		11	max	143.27	1	535.312	2	30.462	5	.006	2	0	9	.425	2
174			min	-171.389	3	-801.552	3	-60.049	1	0	5	-.086	4	-.606	3
175		12	max	143.27	1	418.152	2	32.149	5	.006	2	-.011	12	.081	2
176			min	-171.389	3	-616.942	3	-33.53	1	0	5	-.073	4	-.094	3
177		13	max	143.27	1	300.991	2	33.836	5	.006	2	-.007	12	.285	3
178			min	-171.389	3	-432.332	3	-13.435	9	0	5	-.084	1	-.179	2
179		14	max	143.27	1	183.83	2	36.9	4	.006	2	-.003	12	.531	3
180			min	-171.389	3	-247.722	3	3.892	9	0	5	-.08	1	-.354	2
181		15	max	143.27	1	66.669	2	46.027	1	.006	2	.011	5	.643	3
182			min	-171.389	3	-63.112	3	7.51	12	0	5	-.056	1	-.444	2
183		16	max	143.27	1	121.498	3	72.546	1	.006	2	.039	5	.622	3
184			min	-171.389	3	-50.491	2	8.6	12	0	5	-.017	9	-.45	2
185		17	max	143.27	1	306.108	3	99.066	1	.006	2	.073	4	.468	3
186			min	-171.389	3	-167.652	2	9.691	12	0	5	.014	12	-.371	2
187		18	max	143.27	1	490.718	3	125.585	1	.006	2	.13	1	.18	3
188			min	-171.389	3	-284.813	2	10.781	12	0	5	.022	12	-.208	2
189		19	max	143.27	1	675.327	3	152.104	1	.006	2	.23	1	.048	1
190			min	-171.389	3	-401.974	2	11.872	12	0	5	.03	12	-.241	3
191	M12	1	max	24.735	5	597.111	2	29.135	5	0	12	.245	1	.094	2
192			min	-21.598	1	-260.39	3	-155.521	1	-.005	2	-.113	5	.014	9
193		2	max	17.321	5	428.644	2	30.822	5	0	12	.142	1	.214	3
194			min	-21.598	1	-178.39	3	-129.002	1	-.005	2	-.091	5	-.276	2
195		3	max	9.908	5	260.178	2	32.509	5	0	12	.067	2	.313	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
196			min	-21.598	1	-96.39	3	-102.483	1	-.005	2	-.068	5	-.525	2
197		4	max	6.213	10	91.712	2	34.196	5	0	12	.023	2	.353	3
198			min	-21.598	1	-14.39	3	-75.964	1	-.005	2	-.049	4	-.652	2
199		5	max	6.213	10	67.61	3	35.883	5	0	12	0	10	.334	3
200			min	-21.598	1	-76.755	2	-49.445	1	-.005	2	-.051	1	-.657	2
201		6	max	6.213	10	149.61	3	37.57	5	0	12	.007	5	.255	3
202			min	-21.598	1	-245.221	2	-33.27	2	-.005	2	-.078	1	-.541	2
203		7	max	6.213	10	231.61	3	43.505	4	0	12	.035	5	.118	3
204			min	-26.138	4	-413.687	2	-22.497	2	-.005	2	-.085	1	-.303	2
205		8	max	6.213	10	313.61	3	51.007	4	0	12	.064	5	.056	2
206			min	-33.552	4	-582.153	2	-13.427	10	-.005	2	-.073	2	-.079	3
207		9	max	6.213	10	395.61	3	58.51	4	0	12	.094	5	.538	2
208			min	-40.965	4	-750.62	2	-10.414	10	-.005	2	-.077	2	-.335	3
209		10	max	6.213	10	919.086	2	72.323	14	0	3	.139	4	1.141	2
210			min	-48.379	4	-477.61	3	-83.151	1	-.005	2	-.074	2	-.651	3
211		11	max	30.573	5	750.62	2	33.481	5	.005	2	-.002	9	.538	2
212			min	-21.598	1	-395.61	3	-56.632	1	0	5	-.095	4	-.335	3
213		12	max	23.159	5	582.153	2	35.168	5	.005	2	-.009	12	.056	2
214			min	-21.598	1	-313.61	3	-30.113	1	0	5	-.08	4	-.079	3
215		13	max	15.745	5	413.687	2	36.855	5	.005	2	-.007	12	.118	3
216			min	-21.598	1	-231.61	3	-12.281	9	0	5	-.085	1	-.303	2
217		14	max	8.332	5	245.221	2	40.339	4	.005	2	-.005	12	.255	3
218			min	-21.598	1	-149.61	3	3.75	12	0	5	-.078	1	-.541	2
219		15	max	6.213	10	76.755	2	49.445	1	.005	2	.012	5	.334	3
220			min	-21.598	1	-67.61	3	4.84	12	0	5	-.051	1	-.657	2
221		16	max	6.213	10	14.39	3	75.964	1	.005	2	.042	5	.353	3
222			min	-21.598	1	-91.712	2	5.931	12	0	5	-.015	9	-.652	2
223		17	max	6.213	10	96.39	3	102.483	1	.005	2	.079	4	.313	3
224			min	-21.748	14	-260.178	2	7.021	12	0	5	.007	12	-.525	2
225		18	max	6.213	10	178.39	3	129.002	1	.005	2	.142	1	.214	3
226			min	-27.711	4	-428.644	2	8.112	12	0	5	.012	12	-.276	2
227		19	max	6.213	10	260.39	3	155.521	1	.005	2	.245	1	.094	2
228			min	-35.124	4	-597.111	2	9.202	12	0	5	.018	12	-.024	5
229	M13	1	max	29.167	5	663.236	2	19.695	5	.01	3	.193	1	.161	2
230			min	-93.971	1	-302.608	3	-143.675	1	-.023	2	-.087	5	-.05	3
231		2	max	21.753	5	494.77	2	21.382	5	.01	3	.099	1	.139	3
232			min	-93.971	1	-220.607	3	-117.156	1	-.023	2	-.072	5	-.257	2
233		3	max	14.339	5	326.304	2	23.069	5	.01	3	.04	2	.268	3
234			min	-93.971	1	-138.607	3	-90.637	1	-.023	2	-.056	5	-.553	2
235		4	max	6.925	5	157.837	2	24.756	5	.01	3	.008	10	.339	3
236			min	-93.971	1	-56.607	3	-64.118	1	-.023	2	-.048	4	-.728	2
237		5	max	-.191	15	25.393	3	26.443	5	.01	3	-.002	12	.35	3
238			min	-93.971	1	-10.629	2	-37.599	1	-.023	2	-.069	1	-.781	2
239		6	max	-3.397	12	107.393	3	28.516	4	.01	3	0	15	.302	3
240			min	-93.971	1	-179.095	2	-24.328	2	-.023	2	-.087	1	-.713	2
241		7	max	-3.397	12	189.393	3	36.019	4	.01	3	.02	5	.195	3
242			min	-93.971	1	-347.561	2	-13.555	2	-.023	2	-.085	1	-.523	2
243		8	max	-3.397	12	271.393	3	43.589	14	.01	3	.042	5	.029	3
244			min	-93.971	1	-516.028	2	-9.169	10	-.023	2	-.067	2	-.211	2
245		9	max	-3.397	12	353.393	3	68.478	1	.01	3	.068	4	.223	2
246			min	-93.971	1	-684.494	2	-6.156	10	-.023	2	-.065	2	-.197	3
247		10	max	-3.397	12	852.96	2	72.165	14	0	15	.108	4	.778	2
248			min	-93.971	1	-435.393	3	-94.997	1	-.023	2	-.055	2	-.482	3
249		11	max	20.893	5	684.494	2	22.87	5	.023	2	.007	9	.223	2
250			min	-93.971	1	-353.393	3	-68.478	1	-.01	3	-.065	2	-.197	3
251		12	max	13.479	5	516.028	2	24.557	5	.023	2	-.008	12	.029	3
252			min	-93.971	1	-271.393	3	-41.959	1	-.01	3	-.067	2	-.211	2

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
253		13	max	6.065	5	347.561	2	26.244	5	.023	2	-.007	12	.195	3
254			min	-93.971	1	-189.393	3	-18.314	9	-.01	3	-.085	1	-.523	2
255		14	max	-.767	15	179.095	2	27.931	5	.023	2	-.005	12	.302	3
256			min	-93.971	1	-107.393	3	-.986	9	-.01	3	-.087	1	-.713	2
257		15	max	-3.397	12	10.629	2	37.599	1	.023	2	.011	5	.35	3
258			min	-93.971	1	-25.393	3	4.322	12	-.01	3	-.069	1	-.781	2
259		16	max	-3.397	12	56.607	3	64.118	1	.023	2	.033	5	.339	3
260			min	-93.971	1	-157.837	2	5.412	12	-.01	3	-.032	1	-.728	2
261		17	max	-3.397	12	138.607	3	90.637	1	.023	2	.057	4	.268	3
262			min	-93.971	1	-326.304	2	6.503	12	-.01	3	.003	9	-.553	2
263		18	max	-3.397	12	220.607	3	117.156	1	.023	2	.099	1	.139	3
264			min	-93.971	1	-494.77	2	7.593	12	-.01	3	.011	12	-.257	2
265		19	max	-3.397	12	302.608	3	143.675	1	.023	2	.193	1	.161	2
266			min	-93.971	1	-663.236	2	8.684	12	-.01	3	.016	12	-.05	3
267	M2	1	max	2123.98	2	887.127	3	121.418	2	.007	5	.954	5	4.145	1
268			min	-1701.052	3	-589.826	2	-244.463	5	-.005	2	-.145	2	.477	15
269		2	max	2121.425	2	887.127	3	121.418	2	.007	5	.885	5	4.197	1
270			min	-1702.968	3	-589.826	2	-242.248	5	-.005	2	-.111	2	.455	15
271		3	max	2118.87	2	887.127	3	121.418	2	.007	5	.818	5	4.249	1
272			min	-1704.884	3	-589.826	2	-240.034	5	-.005	2	-.077	1	.433	15
273		4	max	1461.086	2	979.152	1	87.21	2	.001	2	.751	5	4.121	1
274			min	-1470.871	3	96.881	15	-226.541	5	0	3	-.069	2	.408	15
275		5	max	1458.531	2	979.152	1	87.21	2	.001	2	.688	5	3.846	1
276			min	-1472.787	3	96.881	15	-224.327	5	0	3	-.047	1	.381	15
277		6	max	1455.976	2	979.152	1	87.21	2	.001	2	.625	5	3.571	1
278			min	-1474.704	3	96.881	15	-222.112	5	0	3	-.026	1	.353	15
279		7	max	1453.422	2	979.152	1	87.21	2	.001	2	.565	4	3.297	1
280			min	-1476.62	3	96.881	15	-219.898	5	0	3	-.035	3	.326	15
281		8	max	1450.867	2	979.152	1	87.21	2	.001	2	.506	4	3.022	1
282			min	-1478.536	3	96.881	15	-217.684	5	0	3	-.074	3	.299	15
283		9	max	1448.312	2	979.152	1	87.21	2	.001	2	.447	4	2.747	1
284			min	-1480.452	3	96.881	15	-215.47	5	0	3	-.112	3	.272	15
285		10	max	1445.757	2	979.152	1	87.21	2	.001	2	.389	4	2.473	1
286			min	-1482.368	3	96.881	15	-213.255	5	0	3	-.151	3	.245	15
287		11	max	1443.202	2	979.152	1	87.21	2	.001	2	.332	4	2.198	1
288			min	-1484.284	3	96.881	15	-211.041	5	0	3	-.19	3	.217	15
289		12	max	1440.647	2	979.152	1	87.21	2	.001	2	.275	4	1.923	1
290			min	-1486.201	3	96.881	15	-208.827	5	0	3	-.228	3	.19	15
291		13	max	1438.092	2	979.152	1	87.21	2	.001	2	.219	4	1.648	1
292			min	-1488.117	3	96.881	15	-206.613	5	0	3	-.267	3	.163	15
293		14	max	1435.537	2	979.152	1	87.21	2	.001	2	.175	2	1.374	1
294			min	-1490.033	3	96.881	15	-204.398	5	0	3	-.306	3	.136	15
295		15	max	1432.982	2	979.152	1	87.21	2	.001	2	.2	2	1.099	1
296			min	-1491.949	3	96.881	15	-202.184	5	0	3	-.345	3	.109	15
297		16	max	1430.428	2	979.152	1	87.21	2	.001	2	.224	2	.824	1
298			min	-1493.865	3	96.881	15	-199.97	5	0	3	-.383	3	.082	15
299		17	max	1427.873	2	979.152	1	87.21	2	.001	2	.249	2	.549	1
300			min	-1495.781	3	96.881	15	-197.756	5	0	3	-.422	3	.054	15
301		18	max	1425.318	2	979.152	1	87.21	2	.001	2	.273	2	.275	1
302			min	-1497.698	3	96.881	15	-195.541	5	0	3	-.461	3	.027	15
303		19	max	1422.763	2	979.152	1	87.21	2	.001	2	.298	2	0	1
304			min	-1499.614	3	96.881	15	-193.327	5	0	3	-.5	3	0	1
305	M5	1	max	5653.844	2	2384.726	3	0	1	.007	4	.991	4	6.293	1
306			min	-5055.708	3	-2455.872	2	-258.998	5	0	1	0	1	.206	15
307		2	max	5651.289	2	2384.726	3	0	1	.007	4	.919	4	6.698	1
308			min	-5057.624	3	-2455.872	2	-256.784	5	0	1	0	1	.209	15
309		3	max	5648.734	2	2384.726	3	0	1	.007	4	.847	4	7.102	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
310			min	-5059.541	3	-2455.872	2	-254.57	5	0	1	0	1	.212	15
311		4	max	3888.499	2	1669.229	1	0	1	0	1	.778	4	7.025	1
312			min	-4222.915	3	48.975	15	-241.614	4	0	4	0	1	.206	15
313		5	max	3885.944	2	1669.229	1	0	1	0	1	.71	4	6.557	1
314			min	-4224.831	3	48.975	15	-239.4	4	0	4	0	1	.192	15
315		6	max	3883.389	2	1669.229	1	0	1	0	1	.643	4	6.089	1
316			min	-4226.748	3	48.975	15	-237.186	4	0	4	0	1	.179	15
317		7	max	3880.835	2	1669.229	1	0	1	0	1	.577	4	5.62	1
318			min	-4228.664	3	48.975	15	-234.971	4	0	4	0	1	.165	15
319		8	max	3878.28	2	1669.229	1	0	1	0	1	.512	4	5.152	1
320			min	-4230.58	3	48.975	15	-232.757	4	0	4	0	1	.151	15
321		9	max	3875.725	2	1669.229	1	0	1	0	1	.447	4	4.683	1
322			min	-4232.496	3	48.975	15	-230.543	4	0	4	0	1	.137	15
323		10	max	3873.17	2	1669.229	1	0	1	0	1	.382	4	4.215	1
324			min	-4234.412	3	48.975	15	-228.329	4	0	4	0	1	.124	15
325		11	max	3870.615	2	1669.229	1	0	1	0	1	.318	4	3.747	1
326			min	-4236.328	3	48.975	15	-226.114	4	0	4	0	1	.11	15
327		12	max	3868.06	2	1669.229	1	0	1	0	1	.255	4	3.278	1
328			min	-4238.245	3	48.975	15	-223.9	4	0	4	0	1	.096	15
329		13	max	3865.505	2	1669.229	1	0	1	0	1	.193	4	2.81	1
330			min	-4240.161	3	48.975	15	-221.686	4	0	4	0	1	.082	15
331		14	max	3862.95	2	1669.229	1	0	1	0	1	.131	4	2.342	1
332			min	-4242.077	3	48.975	15	-219.472	4	0	4	0	1	.069	15
333		15	max	3860.395	2	1669.229	1	0	1	0	1	.07	4	1.873	1
334			min	-4243.993	3	48.975	15	-217.258	4	0	4	0	1	.055	15
335		16	max	3857.841	2	1669.229	1	0	1	0	1	.009	4	1.405	1
336			min	-4245.909	3	48.975	15	-215.043	4	0	4	0	1	.041	15
337		17	max	3855.286	2	1669.229	1	0	1	0	1	0	1	.937	1
338			min	-4247.825	3	48.975	15	-212.829	4	0	4	-.051	4	.027	15
339		18	max	3852.731	2	1669.229	1	0	1	0	1	0	1	.468	1
340			min	-4249.742	3	48.975	15	-210.615	4	0	4	-.11	4	.014	15
341		19	max	3850.176	2	1669.229	1	0	1	0	1	0	1	0	1
342			min	-4251.658	3	48.975	15	-208.401	4	0	4	-.169	4	0	1
343	M8	1	max	2123.98	2	887.127	3	151.631	3	.007	4	.986	4	4.145	1
344			min	-1701.052	3	-589.826	2	-263.821	4	-.002	3	-.197	3	-.269	5
345		2	max	2121.425	2	887.127	3	151.631	3	.007	4	.912	4	4.197	1
346			min	-1702.968	3	-589.826	2	-261.607	4	-.002	3	-.154	3	-.241	5
347		3	max	2118.87	2	887.127	3	151.631	3	.007	4	.839	4	4.249	1
348			min	-1704.884	3	-589.826	2	-259.393	4	-.002	3	-.112	3	-.213	5
349		4	max	1461.086	2	979.152	1	138.035	3	0	3	.77	4	4.121	1
350			min	-1470.871	3	-45.939	5	-242.114	4	-.001	2	-.081	3	-.193	5
351		5	max	1458.531	2	979.152	1	138.035	3	0	3	.702	4	3.846	1
352			min	-1472.787	3	-45.939	5	-239.9	4	-.001	2	-.043	3	-.18	5
353		6	max	1455.976	2	979.152	1	138.035	3	0	3	.635	4	3.571	1
354			min	-1474.704	3	-45.939	5	-237.685	4	-.001	2	-.004	3	-.168	5
355		7	max	1453.422	2	979.152	1	138.035	3	0	3	.569	4	3.297	1
356			min	-1476.62	3	-45.939	5	-235.471	4	-.001	2	-.004	2	-.155	5
357		8	max	1450.867	2	979.152	1	138.035	3	0	3	.503	4	3.022	1
358			min	-1478.536	3	-45.939	5	-233.257	4	-.001	2	-.029	2	-.142	5
359		9	max	1448.312	2	979.152	1	138.035	3	0	3	.439	5	2.747	1
360			min	-1480.452	3	-45.939	5	-231.043	4	-.001	2	-.053	2	-.129	5
361		10	max	1445.757	2	979.152	1	138.035	3	0	3	.377	5	2.473	1
362			min	-1482.368	3	-45.939	5	-228.829	4	-.001	2	-.077	2	-.116	5
363		11	max	1443.202	2	979.152	1	138.035	3	0	3	.316	5	2.198	1
364			min	-1484.284	3	-45.939	5	-226.614	4	-.001	2	-.102	2	-.103	5
365		12	max	1440.647	2	979.152	1	138.035	3	0	3	.256	5	1.923	1
366			min	-1486.201	3	-45.939	5	-224.4	4	-.001	2	-.126	2	-.09	5

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
367		13	max	1438.092	2	979.152	1	138.035	3	0	3	.267	3	1.648	1
368			min	-1488.117	3	-45.939	5	-222.186	4	-.001	2	-.151	2	-.077	5
369		14	max	1435.537	2	979.152	1	138.035	3	0	3	.306	3	1.374	1
370			min	-1490.033	3	-45.939	5	-219.972	4	-.001	2	-.175	2	-.064	5
371		15	max	1432.982	2	979.152	1	138.035	3	0	3	.345	3	1.099	1
372			min	-1491.949	3	-45.939	5	-217.757	4	-.001	2	-.2	2	-.052	5
373		16	max	1430.428	2	979.152	1	138.035	3	0	3	.383	3	.824	1
374			min	-1493.865	3	-45.939	5	-215.543	4	-.001	2	-.224	2	-.039	5
375		17	max	1427.873	2	979.152	1	138.035	3	0	3	.422	3	.549	1
376			min	-1495.781	3	-45.939	5	-213.329	4	-.001	2	-.249	2	-.026	5
377		18	max	1425.318	2	979.152	1	138.035	3	0	3	.461	3	.275	1
378			min	-1497.698	3	-45.939	5	-211.115	4	-.001	2	-.273	2	-.013	5
379		19	max	1422.763	2	979.152	1	138.035	3	0	3	.5	3	0	1
380			min	-1499.614	3	-45.939	5	-208.9	4	-.001	2	-.298	2	0	1
381	M3	1	max	1637.146	2	4.588	4	33.888	2	.01	3	.007	4	0	1
382			min	-595.029	3	1.079	15	-13.911	3	-.022	2	-.002	3	0	1
383		2	max	1636.972	2	4.078	4	33.888	2	.01	3	.013	2	0	15
384			min	-595.16	3	.959	15	-13.911	3	-.022	2	-.006	3	-.001	4
385		3	max	1636.798	2	3.569	4	33.888	2	.01	3	.023	2	0	15
386			min	-595.291	3	.839	15	-13.911	3	-.022	2	-.01	3	-.002	4
387		4	max	1636.623	2	3.059	4	33.888	2	.01	3	.032	2	0	15
388			min	-595.421	3	.719	15	-13.911	3	-.022	2	-.014	3	-.003	4
389		5	max	1636.449	2	2.549	4	33.888	2	.01	3	.042	2	0	15
390			min	-595.552	3	.599	15	-13.911	3	-.022	2	-.018	3	-.004	4
391		6	max	1636.274	2	2.039	4	33.888	2	.01	3	.052	2	-.001	15
392			min	-595.683	3	.479	15	-13.911	3	-.022	2	-.022	3	-.005	4
393		7	max	1636.1	2	1.529	4	33.888	2	.01	3	.062	2	-.001	15
394			min	-595.814	3	.36	15	-13.911	3	-.022	2	-.026	3	-.005	4
395		8	max	1635.926	2	1.02	4	33.888	2	.01	3	.072	2	-.001	15
396			min	-595.945	3	.24	15	-13.911	3	-.022	2	-.03	3	-.006	4
397		9	max	1635.751	2	.51	4	33.888	2	.01	3	.082	2	-.001	15
398			min	-596.075	3	.12	15	-13.911	3	-.022	2	-.034	3	-.006	4
399		10	max	1635.577	2	0	1	33.888	2	.01	3	.092	2	-.001	15
400			min	-596.206	3	0	1	-13.911	3	-.022	2	-.038	3	-.006	4
401		11	max	1635.403	2	-.12	15	33.888	2	.01	3	.102	2	-.001	15
402			min	-596.337	3	-.51	6	-13.911	3	-.022	2	-.042	3	-.006	4
403		12	max	1635.228	2	-.24	15	33.888	2	.01	3	.112	2	-.001	15
404			min	-596.468	3	-1.02	6	-13.911	3	-.022	2	-.046	3	-.006	4
405		13	max	1635.054	2	-.36	15	33.888	2	.01	3	.122	2	-.001	15
406			min	-596.598	3	-1.529	6	-13.911	3	-.022	2	-.05	3	-.005	4
407		14	max	1634.879	2	-.479	15	33.888	2	.01	3	.132	2	-.001	15
408			min	-596.729	3	-2.039	6	-13.911	3	-.022	2	-.054	3	-.005	4
409		15	max	1634.705	2	-.599	15	33.888	2	.01	3	.141	2	0	15
410			min	-596.86	3	-2.549	6	-13.911	3	-.022	2	-.058	3	-.004	4
411		16	max	1634.531	2	-.719	15	33.888	2	.01	3	.151	2	0	15
412			min	-596.991	3	-3.059	6	-13.911	3	-.022	2	-.063	3	-.003	4
413		17	max	1634.356	2	-.839	15	33.888	2	.01	3	.161	2	0	15
414			min	-597.122	3	-3.569	6	-13.911	3	-.022	2	-.067	3	-.002	4
415		18	max	1634.182	2	-.959	15	33.888	2	.01	3	.171	2	0	15
416			min	-597.252	3	-4.078	6	-13.911	3	-.022	2	-.071	3	-.001	4
417		19	max	1634.007	2	-1.079	15	33.888	2	.01	3	.181	2	0	1
418			min	-597.383	3	-4.588	6	-13.911	3	-.022	2	-.075	3	0	1
419	M6	1	max	4439.125	2	4.588	6	0	1	.003	5	.007	4	0	1
420			min	-2101.236	3	1.079	15	-12.779	4	0	1	0	1	0	1
421		2	max	4438.951	2	4.078	6	0	1	.003	5	.003	4	0	15
422			min	-2101.367	3	.959	15	-12.403	4	0	1	0	1	-.001	6
423		3	max	4438.776	2	3.569	6	0	1	.003	5	0	1	0	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
424			min	-2101.498	3	.839	15	-12.027	4	0	1	0	5	-.002	6
425		4	max	4438.602	2	3.059	6	0	1	.003	5	0	1	0	15
426			min	-2101.628	3	.719	15	-11.651	4	0	1	-.004	4	-.003	6
427		5	max	4438.428	2	2.549	6	0	1	.003	5	0	1	0	15
428			min	-2101.759	3	.599	15	-11.275	4	0	1	-.007	4	-.004	6
429		6	max	4438.253	2	2.039	6	0	1	.003	5	0	1	-.001	15
430			min	-2101.89	3	.479	15	-10.899	4	0	1	-.011	4	-.005	6
431		7	max	4438.079	2	1.529	6	0	1	.003	5	0	1	-.001	15
432			min	-2102.021	3	.36	15	-10.523	4	0	1	-.014	4	-.005	6
433		8	max	4437.904	2	1.02	6	0	1	.003	5	0	1	-.001	15
434			min	-2102.152	3	.24	15	-10.147	4	0	1	-.017	4	-.006	6
435		9	max	4437.73	2	.51	6	0	1	.003	5	0	1	-.001	15
436			min	-2102.282	3	.12	15	-9.771	4	0	1	-.02	4	-.006	6
437		10	max	4437.556	2	0	1	0	1	.003	5	0	1	-.001	15
438			min	-2102.413	3	0	1	-9.395	4	0	1	-.023	4	-.006	6
439		11	max	4437.381	2	-.12	15	0	1	.003	5	0	1	-.001	15
440			min	-2102.544	3	-.51	4	-9.019	4	0	1	-.025	4	-.006	6
441		12	max	4437.207	2	-.24	15	0	1	.003	5	0	1	-.001	15
442			min	-2102.675	3	-1.02	4	-8.643	4	0	1	-.028	4	-.006	6
443		13	max	4437.032	2	-.36	15	0	1	.003	5	0	1	-.001	15
444			min	-2102.805	3	-1.529	4	-8.267	4	0	1	-.03	4	-.005	6
445		14	max	4436.858	2	-.479	15	0	1	.003	5	0	1	-.001	15
446			min	-2102.936	3	-2.039	4	-7.891	4	0	1	-.033	4	-.005	6
447		15	max	4436.684	2	-.599	15	0	1	.003	5	0	1	0	15
448			min	-2103.067	3	-2.549	4	-7.515	4	0	1	-.035	4	-.004	6
449		16	max	4436.509	2	-.719	15	0	1	.003	5	0	1	0	15
450			min	-2103.198	3	-3.059	4	-7.139	4	0	1	-.037	4	-.003	6
451		17	max	4436.335	2	-.839	15	0	1	.003	5	0	1	0	15
452			min	-2103.329	3	-3.569	4	-6.763	4	0	1	-.039	4	-.002	6
453		18	max	4436.161	2	-.959	15	0	1	.003	5	0	1	0	15
454			min	-2103.459	3	-4.078	4	-6.387	4	0	1	-.041	4	-.001	6
455		19	max	4435.986	2	-1.079	15	0	1	.003	5	0	1	0	1
456			min	-2103.59	3	-4.588	4	-6.011	4	0	1	-.043	4	0	1
457	M9	1	max	1637.146	2	4.588	4	13.911	3	.022	2	.007	5	0	1
458			min	-595.029	3	1.079	15	-33.888	2	-.01	3	-.003	2	0	1
459		2	max	1636.972	2	4.078	4	13.911	3	.022	2	.006	3	0	15
460			min	-595.16	3	.959	15	-33.888	2	-.01	3	-.013	2	-.001	4
461		3	max	1636.798	2	3.569	4	13.911	3	.022	2	.01	3	0	15
462			min	-595.291	3	.839	15	-33.888	2	-.01	3	-.023	2	-.002	4
463		4	max	1636.623	2	3.059	4	13.911	3	.022	2	.014	3	0	15
464			min	-595.421	3	.719	15	-33.888	2	-.01	3	-.032	2	-.003	4
465		5	max	1636.449	2	2.549	4	13.911	3	.022	2	.018	3	0	15
466			min	-595.552	3	.599	15	-33.888	2	-.01	3	-.042	2	-.004	4
467		6	max	1636.274	2	2.039	4	13.911	3	.022	2	.022	3	-.001	15
468			min	-595.683	3	.479	15	-33.888	2	-.01	3	-.052	2	-.005	4
469		7	max	1636.1	2	1.529	4	13.911	3	.022	2	.026	3	-.001	15
470			min	-595.814	3	.36	15	-33.888	2	-.01	3	-.062	2	-.005	4
471		8	max	1635.926	2	1.02	4	13.911	3	.022	2	.03	3	-.001	15
472			min	-595.945	3	.24	15	-33.888	2	-.01	3	-.072	2	-.006	4
473		9	max	1635.751	2	.51	4	13.911	3	.022	2	.034	3	-.001	15
474			min	-596.075	3	.12	15	-33.888	2	-.01	3	-.082	2	-.006	4
475		10	max	1635.577	2	0	1	13.911	3	.022	2	.038	3	-.001	15
476			min	-596.206	3	0	1	-33.888	2	-.01	3	-.092	2	-.006	4
477		11	max	1635.403	2	-.12	15	13.911	3	.022	2	.042	3	-.001	15
478			min	-596.337	3	-.51	4	-33.888	2	-.01	3	-.102	2	-.006	4
479		12	max	1635.228	2	-.24	15	13.911	3	.022	2	.046	3	-.001	15
480			min	-596.468	3	-1.02	4	-33.888	2	-.01	3	-.112	2	-.006	4

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
481		13	max	1635.054	2	-.36	15	13.911	3	.022	2	.05	3	-.001	15
482			min	-596.598	3	-1.529	4	-33.888	2	-.01	3	-.122	2	-.005	4
483		14	max	1634.879	2	-.479	15	13.911	3	.022	2	.054	3	-.001	15
484			min	-596.729	3	-2.039	4	-33.888	2	-.01	3	-.132	2	-.005	4
485		15	max	1634.705	2	-.599	15	13.911	3	.022	2	.058	3	0	15
486			min	-596.86	3	-2.549	4	-33.888	2	-.01	3	-.141	2	-.004	4
487		16	max	1634.531	2	-.719	15	13.911	3	.022	2	.063	3	0	15
488			min	-596.991	3	-3.059	4	-33.888	2	-.01	3	-.151	2	-.003	4
489		17	max	1634.356	2	-.839	15	13.911	3	.022	2	.067	3	0	15
490			min	-597.122	3	-3.569	4	-33.888	2	-.01	3	-.161	2	-.002	4
491		18	max	1634.182	2	-.959	15	13.911	3	.022	2	.071	3	0	15
492			min	-597.252	3	-4.078	4	-33.888	2	-.01	3	-.171	2	-.001	4
493		19	max	1634.007	2	-1.079	15	13.911	3	.022	2	.075	3	0	1
494			min	-597.383	3	-4.588	4	-33.888	2	-.01	3	-.181	2	0	1

Envelope Member Section Deflections

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
1	M1	1	max	-.021	15	.054	3	.014	1	5.745e-3	3	NC	3	NC	3
2			min	-.207	1	-.561	2	-.315	5	-1.512e-2	2	236.325	1	581.318	5
3		2	max	-.021	15	.026	3	.004	1	5.745e-3	3	7771.809	12	NC	2
4			min	-.207	1	-.468	2	-.302	4	-1.512e-2	2	276.584	1	616.419	5
5		3	max	-.021	15	-.002	3	0	12	5.35e-3	3	3882.032	12	NC	1
6			min	-.207	1	-.374	2	-.29	4	-1.385e-2	2	333.44	1	658.553	5
7		4	max	-.021	15	-.018	12	0	12	4.744e-3	3	2883.386	15	NC	1
8			min	-.207	1	-.285	2	-.274	4	-1.191e-2	2	415.81	1	718.147	5
9		5	max	-.021	15	-.019	15	0	12	4.138e-3	3	3143.341	15	NC	1
10			min	-.207	1	-.212	1	-.254	4	-9.971e-3	2	535.402	1	800.268	5
11		6	max	-.021	15	-.016	15	0	3	3.981e-3	3	3438.795	15	NC	1
12			min	-.207	1	-.152	1	-.234	4	-9.102e-3	2	702.732	1	910.692	5
13		7	max	-.021	15	-.012	15	0	3	4.132e-3	3	4034.665	10	NC	1
14			min	-.206	1	-.105	1	-.213	4	-8.973e-3	2	936.012	1	1053.252	5
15		8	max	-.021	15	-.009	15	0	3	4.284e-3	3	NC	10	NC	1
16			min	-.206	1	-.073	3	-.194	4	-8.845e-3	2	1049.045	3	1232.777	5
17		9	max	-.021	15	-.006	15	0	10	4.676e-3	3	NC	2	NC	1
18			min	-.206	1	-.071	3	-.178	4	-8.307e-3	2	1073.989	3	1453.446	5
19		10	max	-.021	15	.01	2	0	2	5.491e-3	3	NC	11	NC	1
20			min	-.205	1	-.064	3	-.161	4	-7.045e-3	2	1137.162	3	1778.45	5
21		11	max	-.021	15	.037	2	0	3	6.307e-3	3	NC	1	NC	1
22			min	-.205	1	-.052	3	-.144	4	-5.783e-3	2	1264.252	3	2278.583	5
23		12	max	-.021	15	.061	2	.003	3	5.267e-3	3	NC	9	NC	1
24			min	-.204	1	-.034	3	-.129	4	-4.211e-3	2	1513.317	3	3090.397	5
25		13	max	-.021	15	.081	1	.006	3	3.178e-3	3	NC	9	NC	1
26			min	-.204	1	-.007	3	-.114	4	-2.485e-3	4	1515.913	2	4751.106	5
27		14	max	-.021	15	.093	1	.006	3	1.209e-3	3	NC	9	NC	2
28			min	-.203	1	.01	15	-.101	4	-3.184e-3	4	1397.877	2	8280.246	5
29		15	max	-.021	15	.105	3	.005	1	4.573e-3	3	NC	6	NC	2
30			min	-.203	1	.012	15	-.093	5	-2.766e-3	4	1494.505	2	7513.522	1
31		16	max	-.021	15	.19	3	.007	1	7.937e-3	3	NC	4	NC	2
32			min	-.203	1	.015	15	-.089	5	-3.805e-3	2	989.26	3	6858.375	1
33		17	max	-.021	15	.285	3	.004	1	1.13e-2	3	NC	4	NC	2
34			min	-.204	1	.016	10	-.087	5	-5.312e-3	2	580.98	3	7825.907	1
35		18	max	-.021	15	.384	3	0	12	1.349e-2	3	NC	4	NC	1
36			min	-.204	1	0	10	-.087	4	-6.295e-3	2	405.989	3	NC	1
37		19	max	-.021	15	.484	3	-.002	12	1.349e-2	3	NC	1	NC	1
38			min	-.204	1	-.014	10	-.087	4	-6.295e-3	2	312.101	3	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
39	M4	1	max	-.01	15	.215	3	0	1	3.315e-4	4	NC	3	NC	1
40			min	-.349	1	-1.11	2	-.312	4	0	1	140.615	2	586.864	4
41		2	max	-.01	15	.144	3	0	1	3.315e-4	4	6265.271	15	NC	1
42			min	-.349	1	-.918	2	-.302	4	0	1	176.059	2	613.722	4
43		3	max	-.01	15	.073	3	0	1	1.713e-4	4	7577.693	15	NC	1
44			min	-.349	1	-.725	2	-.291	4	0	1	230.195	1	647.082	4
45		4	max	-.01	15	.006	3	0	1	0	1	9503.524	15	NC	1
46			min	-.349	1	-.541	2	-.275	4	-7.45e-5	4	314.033	1	701.311	4
47		5	max	-.01	15	-.011	15	0	1	0	1	NC	15	NC	1
48			min	-.349	1	-.381	2	-.255	4	-3.203e-4	4	463.345	1	781.388	4
49		6	max	-.01	15	-.008	15	0	1	0	1	NC	5	NC	1
50			min	-.348	1	-.265	1	-.234	4	-3.226e-4	4	448.783	3	892.873	4
51		7	max	-.01	15	-.006	15	0	1	0	1	NC	5	NC	1
52			min	-.348	1	-.186	1	-.213	4	-1.566e-4	4	426.66	3	1038.195	4
53		8	max	-.01	15	-.004	15	0	1	9.653e-6	5	NC	5	NC	1
54			min	-.347	1	-.123	1	-.194	4	0	1	422.997	3	1217.314	4
55		9	max	-.01	15	-.002	15	0	1	7.872e-5	4	NC	5	NC	1
56			min	-.346	1	-.099	3	-.178	4	0	1	427.897	3	1424.362	4
57		10	max	-.01	15	0	15	0	1	0	1	NC	4	NC	1
58			min	-.345	1	-.092	3	-.161	4	-2.294e-5	4	437.402	3	1741.727	4
59		11	max	-.01	15	.049	2	0	1	0	1	NC	4	NC	1
60			min	-.344	1	-.08	3	-.144	4	-1.246e-4	4	455.635	3	2223.998	4
61		12	max	-.01	15	.099	2	0	1	0	1	NC	5	NC	1
62			min	-.343	1	-.06	3	-.13	4	-8.743e-4	4	487.42	3	2923.814	4
63		13	max	-.01	15	.138	1	0	1	0	1	NC	5	NC	1
64			min	-.342	1	-.022	3	-.115	4	-1.99e-3	4	456.437	2	4285.841	4
65		14	max	-.01	15	.155	1	0	1	0	1	NC	5	NC	1
66			min	-.341	1	.005	15	-.103	4	-3.066e-3	4	438.759	2	6860.722	4
67		15	max	-.01	15	.19	3	0	1	0	1	NC	5	NC	1
68			min	-.341	1	.005	15	-.096	4	-2.333e-3	4	479.372	2	NC	1
69		16	max	-.01	15	.366	3	0	1	0	1	NC	5	NC	1
70			min	-.341	1	.004	15	-.091	4	-1.601e-3	4	593.806	2	NC	1
71		17	max	-.01	15	.566	3	0	1	0	1	NC	5	NC	1
72			min	-.341	1	-.01	10	-.088	4	-8.684e-4	4	381.215	3	NC	1
73		18	max	-.01	15	.776	3	0	1	0	1	NC	4	NC	1
74			min	-.341	1	-.079	2	-.086	4	-3.908e-4	4	238.748	3	NC	1
75		19	max	-.01	15	.985	3	0	1	0	1	NC	1	NC	1
76			min	-.341	1	-.157	2	-.084	4	-3.908e-4	4	173.943	3	NC	1
77	M7	1	max	.01	5	.054	3	-.001	12	1.512e-2	2	NC	3	NC	3
78			min	-.207	1	-.561	2	-.32	4	-5.745e-3	3	236.325	1	561.348	4
79		2	max	.01	5	.026	3	0	12	1.512e-2	2	NC	5	NC	2
80			min	-.207	1	-.468	2	-.304	4	-5.745e-3	3	276.584	1	601.517	4
81		3	max	.01	5	.007	5	.005	1	1.385e-2	2	NC	5	NC	1
82			min	-.207	1	-.374	2	-.288	4	-5.35e-3	3	333.44	1	649.081	4
83		4	max	.01	5	.008	5	.008	1	1.191e-2	2	NC	5	NC	1
84			min	-.207	1	-.285	2	-.27	5	-4.744e-3	3	415.81	1	710.532	4
85		5	max	.01	5	.008	5	.008	1	9.971e-3	2	NC	4	NC	1
86			min	-.207	1	-.212	1	-.251	5	-4.138e-3	3	535.402	1	790.662	4
87		6	max	.01	5	.008	5	.006	1	9.102e-3	2	NC	4	NC	1
88			min	-.207	1	-.152	1	-.231	4	-3.981e-3	3	702.732	1	894.821	4
89		7	max	.01	5	.007	5	.003	2	8.973e-3	2	NC	4	NC	1
90			min	-.206	1	-.105	1	-.212	4	-4.132e-3	3	936.012	1	1025.071	4
91		8	max	.01	5	.006	5	0	2	8.845e-3	2	NC	4	NC	1
92			min	-.206	1	-.073	3	-.194	4	-4.284e-3	3	1049.045	3	1188.057	4
93		9	max	.01	5	.004	5	0	3	8.307e-3	2	NC	2	NC	1
94			min	-.206	1	-.071	3	-.178	4	-4.676e-3	3	1073.989	3	1394.425	4
95		10	max	.01	5	.01	2	0	3	7.045e-3	2	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
96			min	-.205	1	-.064	3	-.161	4	-5.491e-3	3	1137.162	3	1689.749	4
97		11	max	.01	5	.037	2	0	2	5.783e-3	2	NC	1	NC	1
98			min	-.205	1	-.052	3	-.144	4	-6.307e-3	3	1264.252	3	2137.954	4
99		12	max	.01	5	.061	2	.003	1	4.211e-3	2	NC	5	NC	1
100			min	-.204	1	-.034	3	-.128	4	-5.267e-3	3	1513.317	3	2875.059	4
101		13	max	.01	5	.081	1	.003	2	2.465e-3	2	NC	5	NC	1
102			min	-.204	1	-.007	3	-.113	4	-3.178e-3	3	1515.913	2	4245.781	4
103		14	max	.01	5	.093	1	0	2	7.91e-4	2	NC	5	NC	2
104			min	-.203	1	-.005	5	-.102	4	-3.027e-3	5	1397.877	2	6574.568	4
105		15	max	.01	5	.105	3	-.001	10	2.298e-3	2	NC	7	NC	2
106			min	-.203	1	-.008	5	-.096	4	-4.573e-3	3	1494.505	2	7513.522	1
107		16	max	.01	5	.19	3	-.002	12	3.805e-3	2	NC	9	NC	2
108			min	-.203	1	-.012	5	-.092	4	-7.937e-3	3	989.26	3	6858.375	1
109		17	max	.01	5	.285	3	0	12	5.312e-3	2	NC	4	NC	2
110			min	-.204	1	-.017	5	-.089	4	-1.13e-2	3	580.98	3	7825.907	1
111		18	max	.01	5	.384	3	.004	1	6.295e-3	2	NC	4	NC	1
112			min	-.204	1	-.021	5	-.085	5	-1.349e-2	3	405.989	3	NC	1
113		19	max	.01	5	.484	3	.013	1	6.295e-3	2	NC	1	NC	1
114			min	-.204	1	-.026	5	-.083	5	-1.349e-2	3	312.101	3	NC	1
115	M10	1	max	0	1	.35	3	.204	1	1.334e-2	3	NC	1	NC	1
116			min	-.087	4	-.02	5	-.01	5	-3.385e-3	2	NC	1	NC	1
117		2	max	0	1	.469	3	.221	1	1.498e-2	3	NC	4	NC	2
118			min	-.087	4	-.031	2	-.007	5	-4.159e-3	2	1309.581	3	8901.128	1
119		3	max	0	1	.581	3	.247	1	1.662e-2	3	NC	4	NC	3
120			min	-.087	4	-.08	2	-.004	5	-4.933e-3	2	675.28	3	3590.629	1
121		4	max	0	1	.672	3	.275	1	1.826e-2	3	NC	4	NC	3
122			min	-.087	4	-.116	2	0	15	-5.707e-3	2	484.557	3	2180.879	1
123		5	max	0	1	.734	3	.301	1	1.989e-2	3	NC	4	NC	5
124			min	-.087	4	-.134	2	.001	15	-6.48e-3	2	406.578	3	1605.914	1
125		6	max	0	1	.763	3	.321	1	2.153e-2	3	NC	4	NC	5
126			min	-.087	4	-.133	2	.004	15	-7.254e-3	2	377.216	3	1330.696	1
127		7	max	0	1	.764	3	.334	1	2.317e-2	3	NC	4	NC	5
128			min	-.087	4	-.117	2	.005	15	-8.028e-3	2	376.483	3	1196.764	1
129		8	max	0	1	.744	3	.34	1	2.481e-2	3	NC	4	NC	5
130			min	-.087	4	-.091	2	.007	15	-8.802e-3	2	395.492	3	1141.681	1
131		9	max	0	1	.718	3	.341	1	2.645e-2	3	NC	4	NC	5
132			min	-.087	4	-.065	2	.009	15	-9.576e-3	2	424.299	3	1122.873	2
133		10	max	0	1	.703	3	.341	1	2.809e-2	3	NC	13	NC	5
134			min	-.087	4	-.053	2	.01	15	-1.035e-2	2	441.429	3	1103.63	2
135		11	max	0	12	.718	3	.341	1	2.645e-2	3	NC	13	NC	5
136			min	-.087	4	-.065	2	.012	15	-9.576e-3	2	424.299	3	1122.873	2
137		12	max	0	12	.744	3	.34	1	2.481e-2	3	NC	6	NC	5
138			min	-.087	4	-.091	2	.014	15	-8.802e-3	2	395.492	3	1141.681	1
139		13	max	0	12	.764	3	.334	1	2.317e-2	3	NC	4	NC	5
140			min	-.087	4	-.117	2	.016	15	-8.028e-3	2	376.483	3	1196.764	1
141		14	max	0	12	.763	3	.321	1	2.153e-2	3	NC	4	NC	5
142			min	-.087	4	-.133	2	.017	15	-7.254e-3	2	377.216	3	1330.696	1
143		15	max	0	12	.734	3	.301	1	1.989e-2	3	NC	4	NC	5
144			min	-.087	4	-.134	2	.018	15	-6.48e-3	2	406.578	3	1605.914	1
145		16	max	0	12	.672	3	.275	1	1.826e-2	3	NC	13	NC	3
146			min	-.087	4	-.116	2	.019	15	-5.707e-3	2	484.557	3	2180.879	1
147		17	max	0	12	.581	3	.247	1	1.662e-2	3	NC	14	NC	3
148			min	-.087	4	-.08	2	.019	15	-4.933e-3	2	675.28	3	3590.629	1
149		18	max	0	12	.469	3	.221	1	1.498e-2	3	NC	14	NC	2
150			min	-.087	4	-.031	2	.02	15	-4.159e-3	2	1309.581	3	8901.128	1
151		19	max	0	12	.35	3	.204	1	1.334e-2	3	NC	1	NC	1
152			min	-.087	4	.006	10	.021	15	-3.385e-3	2	3154.302	4	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
153	M11	1	max	0	1	.046	2	.205	1	3.672e-3	1	NC	1	NC	1
154			min	-.138	4	-.046	3	-.01	5	-2.211e-4	5	NC	1	NC	1
155		2	max	0	1	.013	3	.217	1	4.037e-3	1	NC	4	NC	1
156			min	-.138	4	0	10	.002	15	-1.611e-4	5	2653.595	3	NC	1
157		3	max	0	1	.065	3	.24	1	4.403e-3	1	NC	4	NC	3
158			min	-.138	4	-.036	2	.006	15	-1.011e-4	5	1410.558	3	4388.372	1
159		4	max	0	1	.097	3	.268	1	4.769e-3	1	NC	4	NC	3
160			min	-.138	4	-.057	2	.007	15	-4.107e-5	5	1087.04	3	2476.513	1
161		5	max	0	1	.105	3	.294	1	5.135e-3	1	NC	4	NC	3
162			min	-.139	4	-.06	2	.005	15	6.097e-6	15	1032.156	3	1743.445	1
163		6	max	0	1	.087	3	.316	1	5.501e-3	1	NC	4	NC	5
164			min	-.139	4	-.045	2	.003	15	4.611e-5	15	1176.34	3	1399.781	1
165		7	max	0	1	.046	3	.332	1	5.866e-3	1	NC	4	NC	5
166			min	-.139	4	-.016	2	0	15	8.613e-5	15	1685.039	3	1229.048	1
167		8	max	0	1	.023	1	.34	1	6.232e-3	1	NC	4	NC	4
168			min	-.139	4	-.005	3	0	15	1.261e-4	15	3786.502	3	1150.891	1
169		9	max	0	1	.053	2	.343	1	6.598e-3	1	NC	1	NC	4
170			min	-.139	4	-.052	3	.003	15	1.662e-4	15	NC	1	1112.401	2
171		10	max	0	1	.068	2	.343	1	6.964e-3	1	NC	4	NC	5
172			min	-.139	4	-.073	3	.01	15	2.062e-4	15	5704.942	3	1090.081	2
173		11	max	0	3	.053	2	.343	1	6.598e-3	1	NC	1	NC	5
174			min	-.139	4	-.052	3	.018	15	2.287e-4	15	NC	1	1112.401	2
175		12	max	0	3	.023	1	.34	1	6.232e-3	1	NC	4	NC	15
176			min	-.139	4	-.005	3	.021	15	2.512e-4	15	3786.502	3	1150.891	1
177		13	max	0	3	.046	3	.332	1	5.866e-3	1	NC	4	NC	5
178			min	-.139	4	-.016	2	.02	15	2.738e-4	15	1685.039	3	1229.048	1
179		14	max	0	3	.087	3	.316	1	5.501e-3	1	NC	4	NC	5
180			min	-.139	4	-.045	2	.017	15	2.963e-4	15	1176.34	3	1399.781	1
181		15	max	0	3	.105	3	.294	1	5.135e-3	1	NC	5	NC	3
182			min	-.139	4	-.06	2	.013	15	3.188e-4	15	1032.156	3	1743.445	1
183		16	max	0	3	.097	3	.268	1	4.769e-3	1	NC	5	NC	3
184			min	-.139	4	-.057	2	.01	15	3.413e-4	15	1087.04	3	2476.513	1
185		17	max	0	3	.065	3	.24	1	4.403e-3	1	NC	5	NC	3
186			min	-.139	4	-.036	2	.01	15	3.639e-4	15	1410.558	3	4388.372	1
187		18	max	0	3	.013	3	.217	1	4.037e-3	1	NC	4	NC	1
188			min	-.139	4	-.003	5	.012	15	3.864e-4	15	2653.595	3	NC	1
189		19	max	.001	3	.046	2	.205	1	3.672e-3	1	NC	1	NC	1
190			min	-.139	4	-.046	3	.021	15	4.089e-4	15	NC	1	NC	1
191	M12	1	max	0	10	.005	5	.206	1	4.677e-3	1	NC	1	NC	1
192			min	-.184	4	-.072	3	-.01	5	-1.821e-4	5	NC	1	NC	1
193		2	max	0	10	.004	5	.216	1	5.007e-3	1	NC	4	NC	1
194			min	-.184	4	-.107	2	.002	15	-1.224e-4	5	2084.522	2	NC	1
195		3	max	0	10	.003	5	.239	1	5.337e-3	1	NC	4	NC	3
196			min	-.184	4	-.171	2	.007	15	-6.277e-5	5	1125.045	2	4758.526	1
197		4	max	0	10	.004	3	.266	1	5.667e-3	1	NC	5	NC	3
198			min	-.184	4	-.214	2	.007	15	-9.41e-6	15	861.044	2	2594.623	1
199		5	max	0	10	.004	3	.293	1	5.997e-3	1	NC	5	NC	3
200			min	-.184	4	-.23	2	.005	15	3.038e-5	15	791.394	2	1791.286	1
201		6	max	0	10	0	15	.316	1	6.327e-3	1	NC	5	NC	5
202			min	-.184	4	-.219	2	.002	15	7.018e-5	15	837.48	2	1419.362	1
203		7	max	0	10	-.001	15	.332	1	6.657e-3	1	NC	4	NC	4
204			min	-.183	4	-.186	2	0	15	1.1e-4	15	1016.648	2	1234.063	1
205		8	max	0	10	-.002	15	.342	1	6.987e-3	1	NC	3	NC	4
206			min	-.183	4	-.141	2	0	15	1.498e-4	15	1437.968	2	1146.916	1
207		9	max	0	10	-.002	15	.346	1	7.317e-3	1	NC	4	NC	4
208			min	-.183	4	-.102	1	.002	15	1.896e-4	15	2353.617	2	1100.815	2
209		10	max	0	1	-.003	15	.346	1	7.647e-3	1	NC	4	NC	5

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
210			min	-.183	4	-.1	3	.01	15	2.294e-4	15	3336.895	2	1076.339	2
211		11	max	0	1	-.004	15	.346	1	7.317e-3	1	NC	4	NC	5
212			min	-.183	4	-.102	1	.019	15	2.523e-4	15	2353.617	2	1100.815	2
213		12	max	0	1	-.005	15	.342	1	6.987e-3	1	NC	3	NC	15
214			min	-.183	4	-.141	2	.022	15	2.753e-4	15	1437.968	2	1146.916	1
215		13	max	0	1	-.007	15	.332	1	6.657e-3	1	NC	5	NC	5
216			min	-.183	4	-.186	2	.021	15	2.982e-4	15	1016.648	2	1234.063	1
217		14	max	0	1	-.007	12	.316	1	6.327e-3	1	NC	5	NC	5
218			min	-.183	4	-.219	2	.018	15	3.212e-4	15	837.48	2	1419.362	1
219		15	max	0	1	.004	3	.293	1	5.997e-3	1	NC	5	NC	3
220			min	-.183	4	-.23	2	.014	15	3.279e-4	12	791.394	2	1791.286	1
221		16	max	0	1	.004	3	.266	1	5.667e-3	1	NC	5	NC	3
222			min	-.183	4	-.214	2	.01	15	3.227e-4	12	861.044	2	2594.623	1
223		17	max	0	1	-.006	12	.239	1	5.337e-3	1	NC	5	NC	3
224			min	-.183	4	-.171	2	.009	15	3.175e-4	12	1125.045	2	4758.526	1
225		18	max	0	1	-.009	15	.216	1	5.007e-3	1	NC	4	NC	1
226			min	-.183	4	-.107	2	.012	15	3.124e-4	12	2084.522	2	NC	1
227		19	max	0	1	-.007	15	.206	1	4.677e-3	1	NC	1	NC	1
228			min	-.183	4	-.072	3	.021	15	3.072e-4	12	NC	1	NC	1
229	M13	1	max	0	12	.017	3	.207	1	1.254e-2	2	NC	1	NC	1
230			min	-.299	4	-.435	2	-.01	5	-3.75e-3	3	NC	1	NC	1
231		2	max	0	12	.066	3	.226	1	1.401e-2	2	NC	4	NC	2
232			min	-.299	4	-.566	2	.002	15	-4.392e-3	3	1189.934	2	8469.698	1
233		3	max	0	12	.11	3	.252	1	1.548e-2	2	NC	5	NC	3
234			min	-.299	4	-.687	2	.006	15	-5.033e-3	3	619.086	2	3454.093	1
235		4	max	0	12	.143	3	.281	1	1.695e-2	2	NC	5	NC	3
236			min	-.299	4	-.786	2	.008	15	-5.674e-3	3	445.23	2	2108.254	1
237		5	max	0	12	.162	3	.308	1	1.842e-2	2	NC	5	NC	3
238			min	-.299	4	-.854	2	.007	15	-6.316e-3	3	372.268	2	1555.893	1
239		6	max	0	12	.166	3	.328	1	1.989e-2	2	NC	5	NC	5
240			min	-.299	4	-.891	2	.005	15	-6.957e-3	3	342.255	2	1290.149	1
241		7	max	0	12	.159	3	.342	1	2.136e-2	2	NC	5	NC	5
242			min	-.299	4	-.899	2	.004	15	-7.598e-3	3	336.599	2	1159.941	1
243		8	max	0	12	.143	3	.348	1	2.283e-2	2	NC	5	NC	5
244			min	-.299	4	-.885	2	.003	15	-8.239e-3	3	346.743	2	1105.48	1
245		9	max	0	12	.127	3	.35	1	2.43e-2	2	NC	5	NC	5
246			min	-.299	4	-.863	2	.005	15	-8.881e-3	3	364.457	2	1078.692	2
247		10	max	0	1	.119	3	.349	1	2.577e-2	2	NC	5	NC	5
248			min	-.299	4	-.851	2	.01	15	-9.522e-3	3	375.178	2	1060.224	2
249		11	max	0	1	.127	3	.35	1	2.43e-2	2	NC	5	NC	5
250			min	-.299	4	-.863	2	.016	15	-8.881e-3	3	364.457	2	1078.692	2
251		12	max	0	1	.143	3	.348	1	2.283e-2	2	NC	5	NC	5
252			min	-.299	4	-.885	2	.018	15	-8.239e-3	3	346.743	2	1105.48	1
253		13	max	0	1	.159	3	.342	1	2.136e-2	2	NC	5	NC	5
254			min	-.299	4	-.899	2	.018	15	-7.598e-3	3	336.599	2	1159.941	1
255		14	max	0	1	.166	3	.328	1	1.989e-2	2	NC	5	NC	5
256			min	-.299	4	-.891	2	.015	15	-6.957e-3	3	342.255	2	1290.149	1
257		15	max	0	1	.162	3	.308	1	1.842e-2	2	NC	5	NC	3
258			min	-.299	4	-.854	2	.013	15	-6.316e-3	3	372.268	2	1555.893	1
259		16	max	0	1	.143	3	.281	1	1.695e-2	2	NC	5	NC	3
260			min	-.299	4	-.786	2	.011	15	-5.674e-3	3	445.23	2	2108.254	1
261		17	max	0	1	.11	3	.252	1	1.548e-2	2	NC	5	NC	3
262			min	-.299	4	-.687	2	.01	15	-5.033e-3	3	619.086	2	3454.093	1
263		18	max	0	1	.066	3	.226	1	1.401e-2	2	NC	5	NC	2
264			min	-.299	4	-.566	2	.013	15	-4.392e-3	3	1189.934	2	8469.698	1
265		19	max	0	1	.017	3	.207	1	1.254e-2	2	NC	1	NC	1
266			min	-.299	4	-.435	2	.021	15	-3.75e-3	3	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
267	M2	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
268			min	0	1	0	1	0	1	0	1	NC	1	NC	1
269		2	max	0	3	0	15	0	5	1.483e-3	2	NC	1	NC	1
270			min	0	2	0	1	0	2	-1.831e-3	5	NC	1	NC	1
271		3	max	0	3	0	15	.002	5	2.966e-3	2	NC	1	NC	1
272			min	0	2	-.004	1	0	2	-3.662e-3	5	NC	1	NC	1
273		4	max	0	3	0	15	.004	5	3.473e-3	2	NC	3	NC	1
274			min	0	2	-.008	1	0	2	-4.411e-3	5	7473.191	1	NC	1
275		5	max	0	3	-.002	15	.008	5	3.187e-3	2	NC	4	NC	1
276			min	0	2	-.015	1	0	2	-4.28e-3	5	4175.824	1	7935.645	5
277		6	max	0	3	-.002	15	.012	5	2.901e-3	2	NC	5	NC	1
278			min	0	2	-.023	1	-.001	2	-4.149e-3	5	2684.798	1	5228.01	5
279		7	max	0	3	-.003	15	.016	5	2.616e-3	2	NC	5	NC	1
280			min	0	2	-.032	1	-.002	2	-4.019e-3	5	1884.345	1	3734.889	5
281		8	max	0	3	-.005	15	.021	5	2.33e-3	2	NC	15	NC	1
282			min	0	2	-.043	1	-.002	2	-3.888e-3	5	1404.098	1	2822.39	5
283		9	max	0	3	-.006	15	.027	5	2.045e-3	2	NC	15	NC	1
284			min	0	2	-.055	1	-.003	2	-3.758e-3	5	1092.814	1	2222.854	5
285		10	max	0	3	-.007	15	.034	5	1.759e-3	2	8490.659	15	NC	1
286			min	0	2	-.069	1	-.003	1	-3.627e-3	5	879.197	1	1807.131	5
287		11	max	0	3	-.009	15	.04	5	1.474e-3	2	7038.034	15	NC	1
288			min	0	2	-.083	1	-.003	1	-3.496e-3	5	726.076	1	1506.688	5
289		12	max	0	3	-.01	15	.047	5	1.188e-3	2	5954.873	15	NC	1
290			min	0	2	-.099	1	-.004	1	-3.366e-3	5	612.499	1	1282.365	5
291		13	max	0	3	-.012	15	.055	5	9.025e-4	2	5125.085	15	NC	1
292			min	0	2	-.115	1	-.004	1	-3.235e-3	5	525.864	1	1110.351	5
293		14	max	.001	3	-.014	15	.062	5	6.169e-4	2	4475.061	15	NC	1
294			min	-.001	2	-.132	1	-.004	1	-3.107e-3	4	458.24	1	975.528	5
295		15	max	.001	3	-.015	15	.07	5	3.314e-4	2	3956.208	15	NC	1
296			min	-.001	2	-.15	1	-.003	1	-3.003e-3	4	404.426	1	867.91	5
297		16	max	.001	3	-.017	15	.078	5	3.482e-4	3	3535.528	15	NC	1
298			min	-.001	2	-.168	1	-.003	1	-2.899e-3	4	360.907	1	780.698	5
299		17	max	.001	3	-.019	15	.085	4	4.964e-4	3	3189.845	15	NC	1
300			min	-.001	2	-.186	1	-.002	1	-2.795e-3	4	325.227	1	708.864	4
301		18	max	.001	3	-.021	15	.093	4	6.447e-4	3	2902.498	15	NC	1
302			min	-.001	2	-.205	1	-.003	3	-2.691e-3	4	295.628	1	648.685	4
303		19	max	.001	3	-.023	15	.101	4	7.929e-4	3	2661.276	15	NC	1
304			min	-.001	2	-.224	1	-.006	3	-2.586e-3	4	270.824	1	598.256	4
305	M5	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
306			min	0	1	0	1	0	1	0	1	NC	1	NC	1
307		2	max	0	3	0	15	0	4	0	1	NC	1	NC	1
308			min	0	2	-.001	1	0	1	-1.909e-3	4	NC	1	NC	1
309		3	max	0	3	0	15	.002	4	0	1	NC	1	NC	1
310			min	0	2	-.005	1	0	1	-3.817e-3	4	NC	1	NC	1
311		4	max	0	3	0	15	.005	4	0	1	NC	4	NC	1
312			min	0	2	-.013	1	0	1	-4.592e-3	4	4822.535	1	NC	1
313		5	max	0	3	0	15	.008	4	0	1	NC	4	NC	1
314			min	-.001	2	-.023	1	0	1	-4.447e-3	4	2626.051	1	7647.431	4
315		6	max	.001	3	-.001	15	.012	4	0	1	NC	5	NC	1
316			min	-.001	2	-.036	1	0	1	-4.302e-3	4	1664.352	1	5040.438	4
317		7	max	.001	3	-.002	15	.017	4	0	1	NC	5	NC	1
318			min	-.001	2	-.052	1	0	1	-4.157e-3	4	1157.575	1	3602.802	4
319		8	max	.002	3	-.002	15	.022	4	0	1	NC	5	NC	1
320			min	-.002	2	-.071	1	0	1	-4.012e-3	4	857.175	1	2724.221	4
321		9	max	.002	3	-.003	15	.028	4	0	1	NC	5	NC	1
322			min	-.002	2	-.091	1	0	1	-3.866e-3	4	664.109	1	2146.986	4
323		10	max	.002	3	-.003	15	.035	4	0	1	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
324			min	-.002	2	-.114	1	0	1	-3.721e-3	4	532.45	1	1746.749	4
325		11	max	.002	3	-.004	15	.042	4	0	1	NC	15	NC	1
326			min	-.002	2	-.138	1	0	1	-3.576e-3	4	438.531	1	1457.526	4
327		12	max	.003	3	-.005	15	.049	4	0	1	NC	15	NC	1
328			min	-.002	2	-.164	1	0	1	-3.431e-3	4	369.136	1	1241.613	4
329		13	max	.003	3	-.006	15	.056	4	0	1	NC	15	NC	1
330			min	-.003	2	-.192	1	0	1	-3.286e-3	4	316.367	1	1076.087	4
331		14	max	.003	3	-.007	15	.064	4	0	1	9173.255	15	NC	1
332			min	-.003	2	-.22	1	0	1	-3.14e-3	4	275.285	1	946.393	4
333		15	max	.003	3	-.007	15	.072	4	0	1	8095.458	15	NC	1
334			min	-.003	2	-.25	1	0	1	-2.995e-3	4	242.663	1	842.918	4
335		16	max	.003	3	-.008	15	.08	4	0	1	7223.951	15	NC	1
336			min	-.003	2	-.28	1	0	1	-2.85e-3	4	216.331	1	759.119	4
337		17	max	.004	3	-.009	15	.088	4	0	1	6509.492	15	NC	1
338			min	-.003	2	-.311	1	0	1	-2.705e-3	4	194.778	1	690.399	4
339		18	max	.004	3	-.01	15	.096	4	0	1	5916.827	15	NC	1
340			min	-.004	2	-.343	1	0	1	-2.559e-3	4	176.923	1	633.454	4
341		19	max	.004	3	-.011	15	.103	4	0	1	5420.211	15	NC	1
342			min	-.004	2	-.374	1	0	1	-2.414e-3	4	161.979	1	585.864	4
343	M8	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
344			min	0	1	0	1	0	1	0	1	NC	1	NC	1
345		2	max	0	3	0	5	0	4	6.179e-4	3	NC	1	NC	1
346			min	0	2	0	1	0	3	-2.029e-3	4	NC	1	NC	1
347		3	max	0	3	0	5	.002	4	1.236e-3	3	NC	1	NC	1
348			min	0	2	-.004	1	0	3	-4.058e-3	4	NC	1	NC	1
349		4	max	0	3	0	5	.005	4	1.431e-3	3	NC	3	NC	1
350			min	0	2	-.008	1	0	3	-4.871e-3	4	7473.191	1	NC	1
351		5	max	0	3	0	5	.008	4	1.283e-3	3	NC	4	NC	1
352			min	0	2	-.015	1	-.001	3	-4.697e-3	4	4175.824	1	7702.54	4
353		6	max	0	3	.001	5	.012	4	1.134e-3	3	NC	4	NC	1
354			min	0	2	-.023	1	-.002	3	-4.523e-3	4	2684.798	1	5079.436	4
355		7	max	0	3	.002	5	.017	4	9.861e-4	3	NC	4	NC	1
356			min	0	2	-.032	1	-.002	3	-4.349e-3	4	1884.345	1	3632.316	4
357		8	max	0	3	.002	5	.022	4	8.378e-4	3	NC	4	NC	1
358			min	0	2	-.043	1	-.003	3	-4.176e-3	4	1404.098	1	2747.682	4
359		9	max	0	3	.003	5	.028	4	6.896e-4	3	NC	5	NC	1
360			min	0	2	-.055	1	-.003	3	-4.002e-3	4	1092.814	1	2166.347	4
361		10	max	0	3	.004	5	.034	4	5.413e-4	3	NC	5	NC	1
362			min	0	2	-.069	1	-.004	3	-3.828e-3	4	879.197	1	1763.206	4
363		11	max	0	3	.004	5	.041	4	3.931e-4	3	NC	5	NC	1
364			min	0	2	-.083	1	-.004	3	-3.654e-3	4	726.076	1	1471.855	4
365		12	max	0	3	.005	5	.048	4	2.448e-4	3	NC	5	NC	1
366			min	0	2	-.099	1	-.004	3	-3.48e-3	4	612.499	1	1254.341	4
367		13	max	0	3	.006	5	.056	4	9.658e-5	3	NC	5	NC	1
368			min	0	2	-.115	1	-.003	3	-3.306e-3	4	525.864	1	1087.585	4
369		14	max	.001	3	.007	5	.063	4	-2.865e-5	9	NC	13	NC	1
370			min	-.001	2	-.132	1	-.003	3	-3.132e-3	4	458.24	1	956.934	4
371		15	max	.001	3	.008	5	.071	4	5.189e-5	9	NC	15	NC	1
372			min	-.001	2	-.15	1	-.002	3	-2.964e-3	5	404.426	1	852.707	4
373		16	max	.001	3	.008	5	.079	4	1.389e-4	1	NC	15	NC	1
374			min	-.001	2	-.168	1	0	3	-2.818e-3	5	360.907	1	768.315	4
375		17	max	.001	3	.009	5	.087	4	3.8e-4	1	9239.725	15	NC	1
376			min	-.001	2	-.186	1	0	10	-2.671e-3	5	325.227	1	699.128	4
377		18	max	.001	3	.01	5	.094	4	6.211e-4	1	8417.689	15	NC	1
378			min	-.001	2	-.205	1	0	10	-2.525e-3	5	295.628	1	641.818	4
379		19	max	.001	3	.011	5	.102	4	8.622e-4	1	7726.142	15	NC	1
380			min	-.001	2	-.224	1	0	2	-2.379e-3	5	270.824	1	593.949	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
381	M3	1	max	.005	1	0	15	.003	5	1.384e-3	2	NC	1	NC	1
382			min	0	15	-.002	1	0	2	-1.171e-3	5	NC	1	NC	1
383		2	max	.004	1	-.002	15	.018	5	1.643e-3	2	NC	1	NC	3
384			min	0	15	-.018	1	-.012	2	-1.189e-3	5	NC	1	5211.713	2
385		3	max	.004	1	-.004	15	.034	5	1.902e-3	2	NC	1	NC	4
386			min	0	15	-.034	1	-.024	2	-1.207e-3	5	NC	1	2635.766	2
387		4	max	.003	1	-.005	15	.05	5	2.161e-3	2	NC	1	NC	4
388			min	0	15	-.05	1	-.035	2	-1.225e-3	5	NC	1	1788.44	2
389		5	max	.003	3	-.007	15	.065	5	2.419e-3	2	NC	1	NC	4
390			min	0	15	-.066	1	-.045	2	-1.243e-3	5	NC	1	1374.174	2
391		6	max	.004	3	-.009	15	.08	5	2.678e-3	2	NC	1	NC	4
392			min	0	10	-.082	1	-.054	2	-1.261e-3	5	NC	1	1134.211	2
393		7	max	.004	3	-.01	15	.096	5	2.937e-3	2	NC	1	NC	6
394			min	0	10	-.097	1	-.062	2	-1.279e-3	5	NC	1	982.693	2
395		8	max	.004	3	-.012	15	.11	5	3.196e-3	2	NC	1	9575.732	13
396			min	0	10	-.113	1	-.069	2	-1.349e-3	3	NC	1	883.299	2
397		9	max	.004	3	-.013	15	.125	5	3.454e-3	2	NC	1	8742.563	13
398			min	0	10	-.128	1	-.075	2	-1.47e-3	3	NC	1	818.481	2
399		10	max	.004	3	-.015	15	.139	5	3.713e-3	2	NC	1	8223.846	13
400			min	0	2	-.144	1	-.078	2	-1.591e-3	3	NC	1	779.324	2
401		11	max	.005	3	-.016	15	.153	5	3.972e-3	2	NC	1	7959.26	13
402			min	-.001	2	-.159	1	-.08	2	-1.712e-3	3	NC	1	761.69	2
403		12	max	.005	3	-.018	15	.167	5	4.23e-3	2	NC	1	7930.204	13
404			min	-.002	2	-.174	1	-.079	2	-1.832e-3	3	NC	1	764.832	2
405		13	max	.005	3	-.019	15	.18	5	4.489e-3	2	NC	1	8156.953	13
406			min	-.003	2	-.189	1	-.076	2	-1.953e-3	3	NC	1	791.41	2
407		14	max	.005	3	-.021	15	.192	5	4.748e-3	2	NC	1	8713.433	13
408			min	-.003	2	-.204	1	-.07	2	-2.074e-3	3	NC	1	755.955	14
409		15	max	.005	3	-.022	15	.204	5	5.007e-3	2	NC	1	9777.183	13
410			min	-.004	2	-.219	1	-.061	2	-2.195e-3	3	NC	1	691.66	14
411		16	max	.006	3	-.023	15	.215	5	5.265e-3	2	NC	1	NC	6
412			min	-.004	2	-.234	1	-.05	2	-2.316e-3	3	NC	1	635.632	14
413		17	max	.006	3	-.025	15	.225	5	5.524e-3	2	NC	1	NC	4
414			min	-.005	2	-.249	1	-.034	2	-2.437e-3	3	NC	1	586.332	14
415		18	max	.006	3	-.026	15	.235	4	5.783e-3	2	NC	1	NC	4
416			min	-.005	2	-.263	1	-.016	2	-2.558e-3	3	NC	1	542.587	14
417		19	max	.006	3	-.027	15	.246	4	6.042e-3	2	NC	1	NC	1
418			min	-.006	2	-.278	1	0	3	-2.678e-3	3	NC	1	503.486	14
419	M6	1	max	.007	1	0	15	.003	4	0	1	NC	1	NC	1
420			min	0	15	-.004	1	0	1	-1.224e-3	4	NC	1	NC	1
421		2	max	.006	1	-.001	15	.019	4	0	1	NC	1	NC	1
422			min	0	15	-.031	1	0	1	-1.261e-3	4	NC	1	NC	1
423		3	max	.006	3	-.002	15	.035	4	0	1	NC	1	NC	1
424			min	0	15	-.058	1	0	1	-1.298e-3	4	NC	1	NC	1
425		4	max	.007	3	-.003	15	.052	4	0	1	NC	1	NC	1
426			min	0	15	-.084	1	0	1	-1.335e-3	4	NC	1	8090.194	4
427		5	max	.007	3	-.004	15	.068	4	0	1	NC	1	NC	1
428			min	0	10	-.111	1	0	1	-1.372e-3	4	NC	1	6111.228	4
429		6	max	.008	3	-.005	15	.083	4	0	1	NC	1	NC	1
430			min	-.001	2	-.138	1	0	1	-1.408e-3	4	NC	1	4972.281	4
431		7	max	.009	3	-.006	15	.099	4	0	1	NC	1	NC	1
432			min	-.003	2	-.164	1	0	1	-1.445e-3	4	NC	1	4256.515	4
433		8	max	.01	3	-.006	15	.114	4	0	1	NC	1	NC	1
434			min	-.004	2	-.191	1	0	1	-1.482e-3	4	NC	1	3787.727	4
435		9	max	.01	3	-.007	15	.129	4	0	1	NC	1	NC	1
436			min	-.006	2	-.217	1	0	1	-1.519e-3	4	NC	1	3480.646	4
437		10	max	.011	3	-.008	15	.144	4	0	1	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
438			min	-.007	2	-.244	1	0	1	-1.556e-3	4	NC	1	3291.56	4
439		11	max	.012	3	-.009	15	.158	4	0	1	NC	1	NC	1
440			min	-.009	2	-.27	1	0	1	-1.593e-3	4	NC	1	3199.41	4
441		12	max	.012	3	-.01	15	.172	4	0	1	NC	1	NC	1
442			min	-.01	2	-.296	1	0	1	-1.629e-3	4	NC	1	3198.714	4
443		13	max	.013	3	-.01	15	.185	4	0	1	NC	1	NC	1
444			min	-.012	2	-.322	1	0	1	-1.666e-3	4	NC	1	3299.009	4
445		14	max	.014	3	-.011	15	.197	4	0	1	NC	1	NC	1
446			min	-.013	2	-.348	1	0	1	-1.703e-3	4	NC	1	3531.168	4
447		15	max	.015	3	-.012	15	.208	4	0	1	NC	1	NC	1
448			min	-.015	2	-.374	1	0	1	-1.74e-3	4	NC	1	3967.871	4
449		16	max	.015	3	-.012	15	.219	4	0	1	NC	1	NC	1
450			min	-.016	2	-.399	1	0	1	-1.777e-3	4	NC	1	4788.339	4
451		17	max	.016	3	-.013	15	.229	4	0	1	NC	1	NC	1
452			min	-.018	2	-.425	1	0	1	-1.814e-3	4	NC	1	6540.098	4
453		18	max	.017	3	-.013	15	.238	4	0	1	NC	1	NC	1
454			min	-.019	2	-.451	1	0	1	-1.85e-3	4	NC	1	NC	1
455		19	max	.017	3	-.014	15	.247	4	0	1	NC	1	NC	1
456			min	-.021	2	-.476	1	0	1	-1.887e-3	4	NC	1	NC	1
457	M9	1	max	.005	1	0	5	.003	4	5.031e-4	3	NC	1	NC	1
458			min	0	5	-.002	1	0	3	-1.384e-3	2	NC	1	NC	1
459		2	max	.004	1	0	5	.02	4	6.24e-4	3	NC	1	NC	3
460			min	0	5	-.018	1	-.006	3	-1.643e-3	2	NC	1	5211.713	2
461		3	max	.004	1	0	5	.037	4	7.448e-4	3	NC	1	NC	5
462			min	0	5	-.034	1	-.01	3	-1.902e-3	2	NC	1	2635.766	2
463		4	max	.003	1	.001	5	.054	4	8.657e-4	3	NC	1	NC	15
464			min	0	5	-.05	1	-.015	3	-2.161e-3	2	NC	1	1788.44	2
465		5	max	.003	3	.002	5	.071	4	9.865e-4	3	NC	1	8773.975	15
466			min	0	5	-.066	1	-.02	3	-2.419e-3	2	NC	1	1374.174	2
467		6	max	.004	3	.002	5	.088	4	1.107e-3	3	NC	1	7137.544	15
468			min	0	5	-.082	1	-.023	3	-2.678e-3	2	NC	1	1134.211	2
469		7	max	.004	3	.003	5	.104	4	1.228e-3	3	NC	1	6108.944	15
470			min	0	5	-.097	1	-.027	3	-2.937e-3	2	NC	1	982.693	2
471		8	max	.004	3	.004	5	.12	4	1.349e-3	3	NC	1	5435.053	15
472			min	0	5	-.113	1	-.03	3	-3.196e-3	2	NC	1	883.299	2
473		9	max	.004	3	.004	5	.135	4	1.47e-3	3	NC	1	4993.362	15
474			min	0	5	-.128	1	-.032	3	-3.454e-3	2	NC	1	818.481	2
475		10	max	.004	3	.005	5	.15	4	1.591e-3	3	NC	1	4721.047	15
476			min	0	2	-.144	1	-.034	3	-3.713e-3	2	NC	1	779.324	2
477		11	max	.005	3	.006	5	.164	4	1.712e-3	3	NC	1	4587.812	15
478			min	-.001	2	-.159	1	-.035	3	-3.972e-3	2	NC	1	761.69	2
479		12	max	.005	3	.006	5	.177	4	1.832e-3	3	NC	1	4585.705	15
480			min	-.002	2	-.174	1	-.034	3	-4.23e-3	2	NC	1	764.832	2
481		13	max	.005	3	.007	5	.19	4	1.953e-3	3	NC	1	4728.303	15
482			min	-.003	2	-.189	1	-.033	3	-4.489e-3	2	8880.148	5	791.41	2
483		14	max	.005	3	.008	5	.201	4	2.074e-3	3	NC	1	5059.736	15
484			min	-.003	2	-.204	1	-.031	3	-4.748e-3	2	7914.05	5	849.092	2
485		15	max	.005	3	.009	5	.212	4	2.195e-3	3	NC	1	5683.958	15
486			min	-.004	2	-.219	1	-.027	3	-5.007e-3	2	7106.809	5	955.528	2
487		16	max	.006	3	.01	5	.221	4	2.316e-3	3	NC	1	6857.388	15
488			min	-.004	2	-.234	1	-.023	3	-5.265e-3	2	6427.381	5	1153.947	2
489		17	max	.006	3	.011	5	.23	4	2.437e-3	3	NC	1	9363.435	15
490			min	-.005	2	-.249	1	-.016	3	-5.524e-3	2	5852.145	5	1576.14	2
491		18	max	.006	3	.012	5	.237	4	2.558e-3	3	NC	1	NC	5
492			min	-.005	2	-.263	1	-.009	3	-5.783e-3	2	5362.848	5	2884.034	2
493		19	max	.006	3	.013	5	.243	5	2.678e-3	3	NC	1	NC	1
494			min	-.006	2	-.278	1	-.008	1	-6.042e-3	2	4945.209	5	NC	1