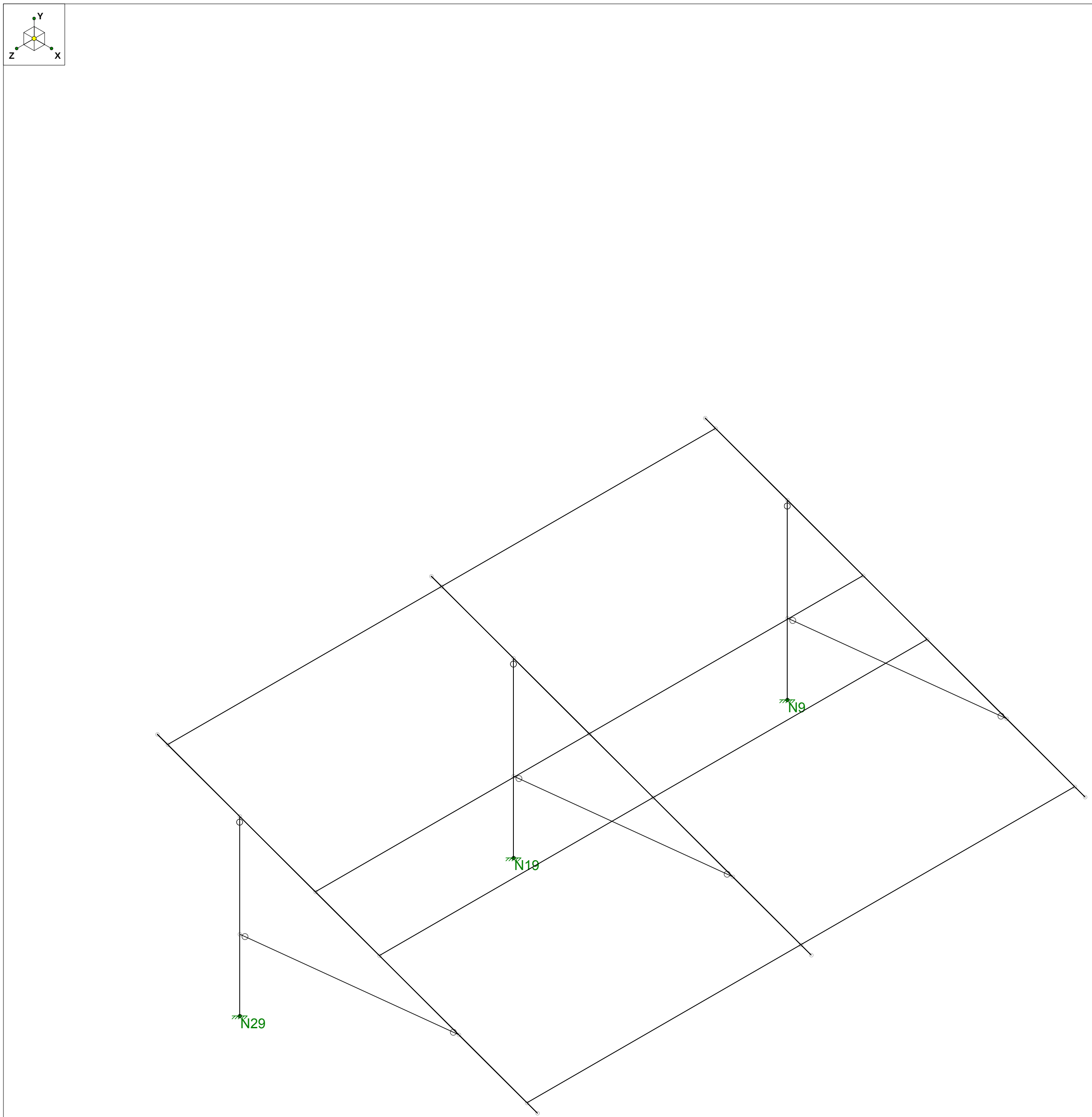


Schletter, Inc.	Standard FS Racking System	20° Tilt w/ Seismic Design
HCV	Representative Calculations - ASCE 7-05	

1. INTRODUCTION

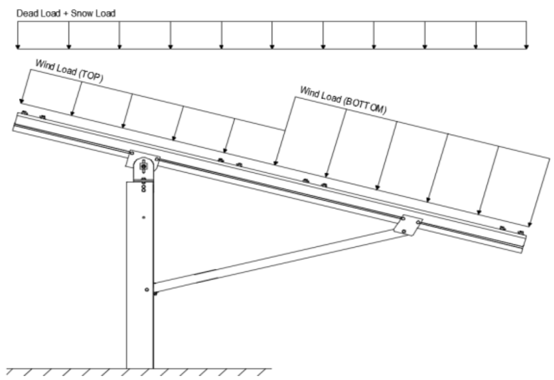
1.1 Project Description
The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. FS ground mount system.

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 =	2000	mm	Height =	1900	mm
Width =	1050	mm	Width =	970	mm
Dead Load =	3.00	psf	Dead Load =	1.75	psf

Modules Per Row = 2
Module Tilt = 20°
Maximum Height Above Grade = 3 ft



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

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

2. LOAD ACTIONS

2.1 Permanent Loads
g_{MAX} = 3.00 psf
g_{MIN} = 1.75 psf

Self-weight of the PV modules.

2.2 Snow Loads
Ground Snow Load, P_g = 30.00 psf
Sloped Roof Snow Load, P_s = 20.62 psf *(ASCE 7-05, Eq. 7-2)*
I_s = 1.00
C_s = 0.91
C_e = 0.90
C_t = 1.20

2.3 Wind Loads
Design Wind Speed, V = 130 mph
Height < 15 ft

Exposure Category = C
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

$Cf+_{TOP}$	=	1.05	*(Pressure)*
$Cf+_{BOTTOM}$	=	1.65	
$Cf-_{TOP}$	=	-2.12	*(Suction)*
$Cf-_{BOTTOM}$	=	-1	

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.

2.4 Seismic Loads

S_S =	2.50	R =	1.25
S_{DS} =	1.67	C_S =	0.8
S_1 =	1.00	ρ =	1.3
S_{D1} =	1.00	Ω =	1.25
T_a =	0.07	C_d =	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.

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]
0.56D + 1.3E [R]
1.54D + 1.25E + 0.2S [O]
0.56D + 1.25E [O]

(ASCE 7, Eq 2.3.2-1 through 2.3.2-7) & (ASCE 7, Section 12.4.3.2)

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]
1.238D + 0.875E [O]
1.1785D + 0.65625E + 0.75S [O]
0.362D + 0.875E [O]

(ASCE 7, Eq 2.4.1-1 through 2.4.1-8) & (ASCE 7, Section 12.4.3.2)

[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	**Posts**	Location
M10	Top	M2	Outer
M11	Mid-Top	M5	Inner
M12	Mid-Bottom	M8	Outer
M13	Bottom		

Girders	Location	**Reactions**	Location
M1	Outer	N9	Outer
M4	Inner	N19	Inner
M7	Outer	N29	Outer

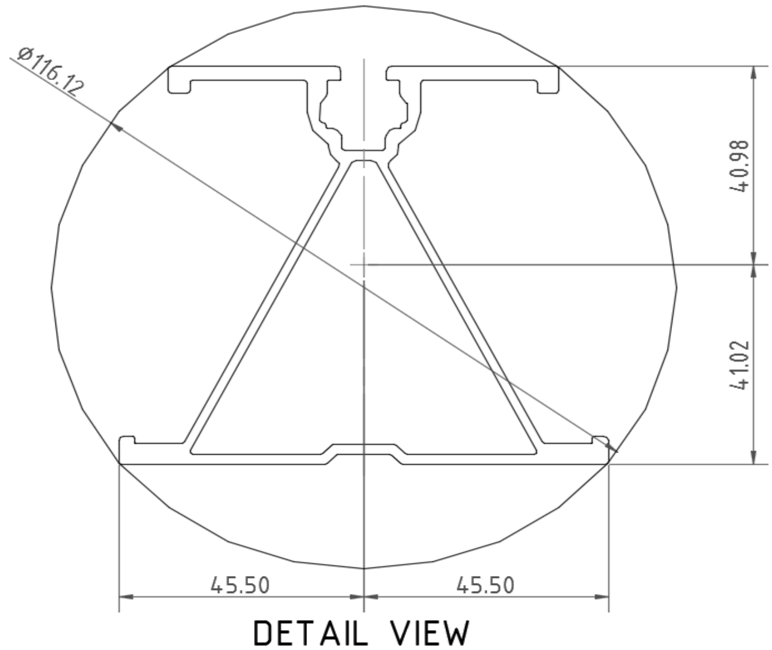
Struts	Location
M3	Outer
M6	Inner
M9	Outer

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).

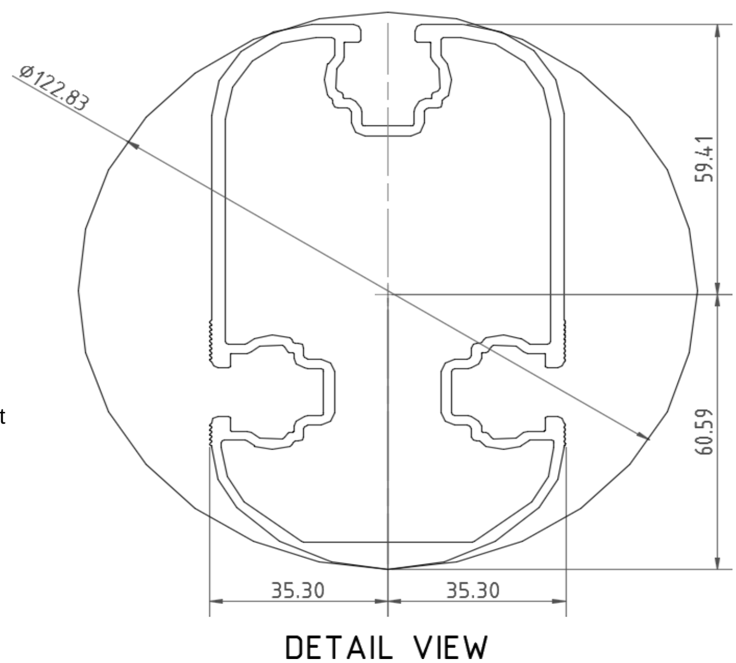
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	66	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.6	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	0.723	k-ft
M_z =	0.176	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	41%	



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).

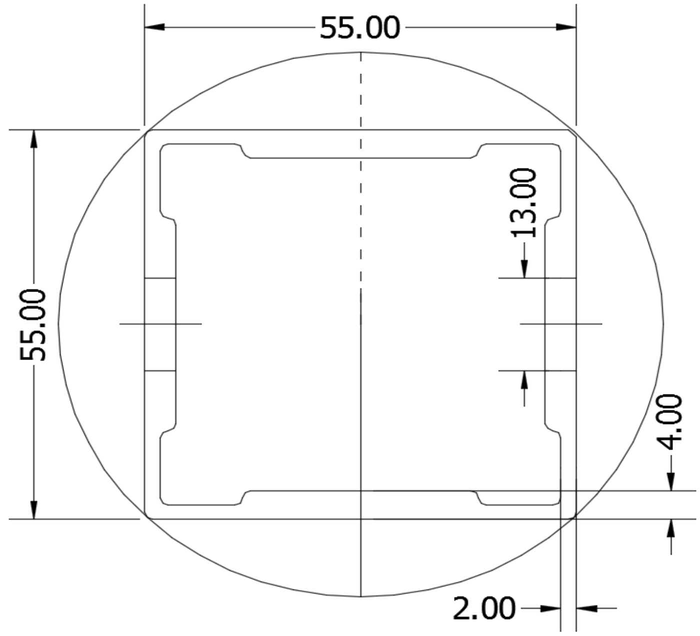
Girder Type =	**T5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	81.77	in
$\Phi F_{ty\ AXIAL}$ =	30.80	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	30.06	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	31.56	ksi
S_y =	1.98	in^3
S_x =	1.32	in^3
E =	10100	ksi
I_y =	4.74	in^4
I_x =	1.83	in^4
A =	1.93	in^2
g =	2.32	lbs/ft
M_y =	3.843	k-ft
M_z =	0.000	k-ft
P_n =	3.088	k
$M_{y\ allowable}$ =	4.960	k-ft
$M_{z\ allowable}$ =	3.472	k-ft
$P_{n\ allowable}$ =	59.439	k
Utilization =	83%	



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 =	74.80	in
$\Phi F_{ty\ AXIAL}$ =	9.61	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 =	0.008	k-ft
M_z =	0.000	k-ft
P_n =	6.904	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	9.441	k
Utilization =	74%	

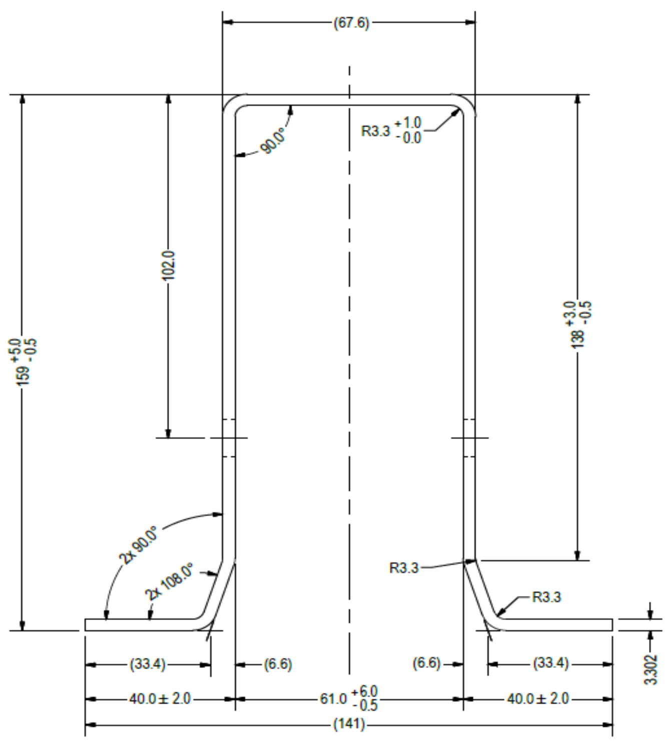


DETAIL VIEW

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 =	72.67	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 =	14.282	k-ft
M_z =	0.000	k-ft
P_r =	5.302	k
$M_{y\ allowable}$ =	19.207	k-ft
$M_{z\ allowable}$ =	14.389	k-ft
P_c =	38.013	k
Utilization =	90%	



DETAIL VIEW

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 =	6.29 k
Maximum Lateral Load =	2.88 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)

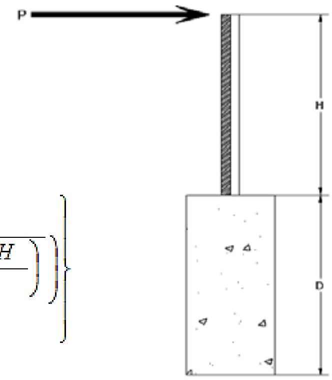
Lateral Force @ Top of Pole, P =	1.29 k
Height of Pole Above Grade, H =	5.06 ft
Diameter of Pole Footing, B =	2.00 ft
Lateral Soil Bearing Capacity, S =	0.10 ksf/ft
Isolated Pole Factor, F =	2
First Trial Depth, D =	3.25 ft

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

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

$$A = 2.34\,{}^{P}\!/_{S_1 B}$$

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



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

	Non-Constrained
Lateral Force @ Top of Pole, P =	1.29 k
Height of Pole Above Grade, H =	5.06 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 =	6.99
Required Footing Depth, D =	10.62 ft
2nd Trial @ D_2 =	6.93 ft
Lateral Soil Bearing @ D/3, S_1 =	0.46 ksf
Lateral Soil Bearing @ D, S_3 =	1.39 ksf
Constant $2.34P/(S_1B)$, A =	3.28
Required Footing Depth, D =	6.19 ft
3rd Trial @ D_3 =	6.56 ft
Lateral Soil Bearing @ D/3, S_1 =	0.44 ksf
Lateral Soil Bearing @ D, S_3 =	1.31 ksf
Constant $2.34P/(S_1B)$, A =	3.46
Required Footing Depth, D =	6.43 ft

4th Trial @ D_4 =	6.50 ft
Lateral Soil Bearing @ D/3, S_1 =	0.43 ksf
Lateral Soil Bearing @ D, S_3 =	1.30 ksf
Constant $2.34P/(S_1B)$, A =	3.50
Required Footing Depth, D =	6.47 ft
5th Trial @ D_5 =	6.49 ft
Lateral Soil Bearing @ D/3, S_1 =	0.43 ksf
Lateral Soil Bearing @ D, S_3 =	1.30 ksf
Constant $2.34P/(S_1B)$, A =	3.50
Required Footing Depth, D =	6.50 ft

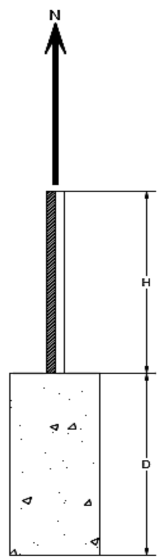
A 2ft diameter x 6.5ft deep footing unrestrained at ground level is required for the racking structure.

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 =	3.01	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 =	1.98	k
Required Concrete Volume, V =	13.62	ft^3
Required Footing Depth, D =	4.50	ft

A 2ft diameter x 4.5ft deep footing unrestrained at ground level is required for the racking structure.



Iteration	z	dz	Qs	Side
1	0.2	0.2	118.10	6.51
2	0.4	0.2	118.10	6.41
3	0.6	0.2	118.10	6.31
4	0.8	0.2	118.10	6.20
5	1	0.2	118.10	6.10
6	1.2	0.2	118.10	6.00
7	1.4	0.2	118.10	5.89
8	1.6	0.2	118.10	5.79
9	1.8	0.2	118.10	5.68
10	2	0.2	118.10	5.58
11	2.2	0.2	118.10	5.48
12	2.4	0.2	118.10	5.37
13	2.6	0.2	118.10	5.27
14	2.8	0.2	118.10	5.17
15	3	0.2	118.10	5.06
16	3.2	0.2	118.10	4.96
17	3.4	0.2	118.10	4.86
18	3.6	0.2	118.10	4.75
19	3.8	0.2	118.10	4.65
20	4	0.2	118.10	4.54
21	4.2	0.2	118.10	4.44
22	4.4	0.2	118.10	4.34
23	0	0.0	0.00	4.34
24	0	0.0	0.00	4.34
25	0	0.0	0.00	4.34
26	0	0.0	0.00	4.34
27	0	0.0	0.00	4.34
28	0	0.0	0.00	4.34
29	0	0.0	0.00	4.34
30	0	0.0	0.00	4.34
31	0	0.0	0.00	4.34
32	0	0.0	0.00	4.34
33	0	0.0	0.00	4.34
34	0	0.0	0.00	4.34
Max	4.4	Sum	1.04	

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 =	6.50	ft
Footing Diameter, B =	2.00	ft
Compressive Force, P =	3.41	k
Footing Area =	3.14	ft^2
Circumference =	6.28	ft
Skin Friction Area =	21.99	ft^2
Concrete Weight =	0.145	kcf

Bearing Pressure

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

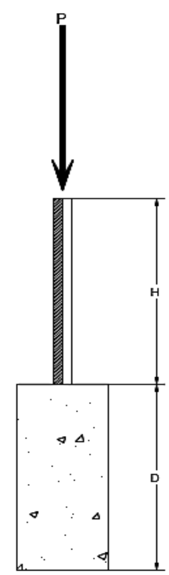
Weight of Concrete

Footing Volume	20.42	ft^3
Weight	2.96	k

Skin Friction Resistance

Skin Friction =	0.15	ksf
Resistance =	3.30	k
1/3 Increase for Wind =	1.33	
Total Resistance =	10.68	k
Applied Force =	6.37	k
Utilization =	60%	

A 2ft diameter footing passes at a depth of 6.5ft.



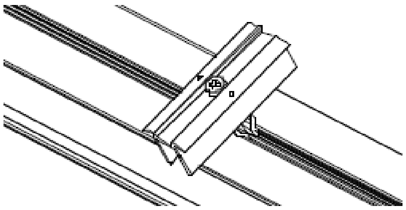
6. DESIGN OF JOINTS AND CONNECTIONS

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.

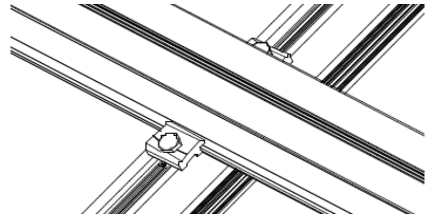
Fastening of Modules to Purlins

Maximum Uplifting Force =	0.999	k
Allowable Uplift =	1.214	k
Utilization =	82%	



Fastening of Purlins to Girders

Maximum Uplifting Force =	1.963	k
Allowable Uplift =	2.180	k
Utilization =	90%	

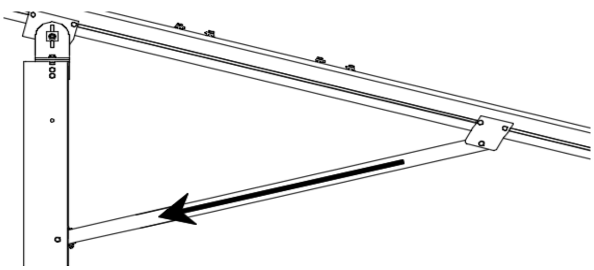


6.2 Strut Connections

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 =	6.904	k
M10 Bolt Shear Capacity =	8.894	k
Utilization =	78%	

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

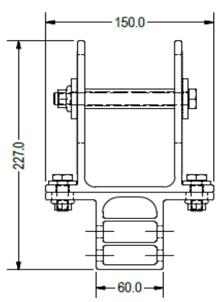


A strut under compression is shown to demonstrate the load transfer from the girder. Single M10 bolts are located at each end of the strut and are subjected to double shear.

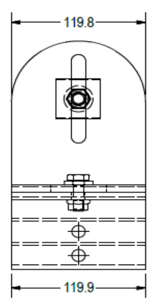
6.3 Girder to Post Connection

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.

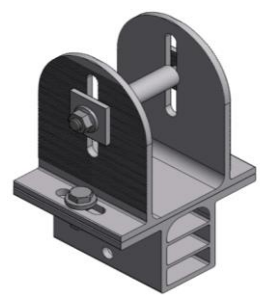
Maximum Tensile Load =	4.030	k
Allowable Load =	5.649	k
Utilization =	71%	



FRONT VIEW



SIDE VIEW



7. SEISMIC DESIGN

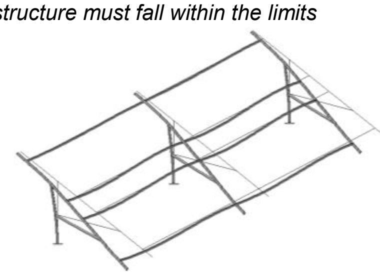
7.1 Seismic Drift

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} =	69.36	in
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$	
	1.387	in
Max Drift, Δ_{MAX} =	0.538	in

$0.538 \leq 1.387$, 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

$L_b =$ 66 in

J = 0.432

182.587

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

S1 = 0.51461

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

S2 = 1701.56

$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)/2}))}]$

$\varphi F_L =$ 29.0 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

$\varphi F_L = \varphi b[Bp-1.6Dp*b/t]$

$\varphi F_L =$ 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

$\varphi F_L = 1.17\varphi yFcy$

$\varphi F_L =$ 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

$\varphi F_L = \varphi b[Bbr-mDbr*h/t]$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St =$ 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

Weak Axis:

3.4.14

$L_b =$ 66

J = 0.432

116.114

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

S1 = 0.51461

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

S2 = 1701.56

$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)/2}))}]$

$\varphi F_L =$ 29.9

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

$\varphi F_L = \varphi b[Bp-1.6Dp*b/t]$

$\varphi F_L =$ 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

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L Wk =$ 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

Compression

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 = 81.7717 in
J = 1.98
105.231

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

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= 30.1 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 = 81.7717
J = 1.98
114.202

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

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= 29.9

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

$\varphi F_L = \varphi b[Bt-Dt*\sqrt{(Rb/t)}]$

$\varphi F_L =$ 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

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

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

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St$= 30.1 ksi

Ix = 1970917 mm^4

4.735 in^4

y = 61.046 mm

Sx = 1.970 in^3

$M_{max}St$ = 4.935 k-ft

$\varphi F_L Wk$= 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)

$\varphi F_L = \varphi yFcy$

$\varphi F_L =$ 33.3 ksi

b/t = 16.3333

S1 = 12.21

S2 = 32.70

$\varphi F_L = \varphi c[Bp-1.6Dp*b/t]$

$\varphi F_L =$ 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

$\varphi F_L = \varphi c[Bt-Dt*\sqrt{(Rb/t)}]$

$\varphi F_L =$ 30.80 ksi

$\varphi F_L =$ 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:

3.4.14

L_b = 74.8031 in

J = 0.942

116.737

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

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= 29.9 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

Weak Axis:

3.4.14

L_b = 74.8031

J = 0.942

116.737

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

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= 29.9

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

$\lambda =$ 1.73045

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 0.82226 → 1.23671

φcc = 0.82226

$\varphi F_L = (\varphi ccFcy)/(\lambda^2)$

φF_L = 9.61085 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)

$\varphi F_L = \varphi c[Bp-1.6Dp*b/t]$

φF_L = 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

$\varphi F_L = \varphi c[Bp-1.6Dp*b/t]$

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

$\varphi F_L = \varphi yFcy$

φF_L = 33.25 ksi

φF_L = 9.61 ksi

A = 663.99 mm^2

1.03 in^2

P_{max} = 9.89 kips

A.4 Design of Galvanized Steel Posts

Post Type = **FG8**

Unbraced Length =	72.67 in	
Pr =	5.30 k	(LRFD Factored Load)
Mr (Strong) =	14.28 k-ft	(LRFD Factored Load)
Mr (Weak) =	0.00 k-ft	(LRFD Factored Load)

Flexural Buckling:

kL/r =	104.56		
4.71√(E/Fy) =	103.55 =>	kL/r	> 4.71√(E/Fy)
Fcr =	22.96 ksi		
Fe =	26.18 ksi		
Pn =	51.204 k		

Torsional/Flexural Torsional Buckling:

Fcr =	17.0464 ksi
Fey =	66.785 ksi
Fez =	21.7259 ksi
Pn =	38.0134 k

Bending (Strong Axis):

Yielding:			
Mn =	21.95 k-ft		
Flange Local Buckling:			
Mn =	19.207 k-ft		
Pr/Pc =	0.155 <	0.2	
Utilization =	0.90 <	1.0	OK

Bending (Weak Axis):

Yielding:			
Mn =	14.65 k-ft		
Flange Local Buckling:			
Mn =	14.39 k-ft		
Pr/Pc =	0.155 <	0.2	
Utilization =	0.00 <	1.0	OK

Combined Forces

Utilization = 90%

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	-9.843	-9.843	0	0
2	M11	Y	-9.843	-9.843	0	0
3	M12	Y	-9.843	-9.843	0	0
4	M13	Y	-9.843	-9.843	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	-5.454	-5.454	0	0
2	M11	Y	-5.454	-5.454	0	0
3	M12	Y	-5.454	-5.454	0	0
4	M13	Y	-5.454	-5.454	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	-63.565	-63.565	0	0
2	M11	Y	-63.565	-63.565	0	0
3	M12	Y	-63.565	-63.565	0	0
4	M13	Y	-63.565	-63.565	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	-91.409	-91.409	0	0
2	M11	y	-91.409	-91.409	0	0
3	M12	y	-143.642	-143.642	0	0
4	M13	y	-143.642	-143.642	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	184.558	184.558	0	0
2	M11	y	184.558	184.558	0	0
3	M12	y	87.056	87.056	0	0
4	M13	y	87.056	87.056	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	7.874	7.874	0	0
2	M11	Z	7.874	7.874	0	0
3	M12	Z	7.874	7.874	0	0
4	M13	Z	7.874	7.874	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	308.44	2	2363.384	2	93.479	2	.143	1	.002	5	8.506	2
2		min	-614.692	3	-1837.616	3	-244.296	5	-.978	5	-.001	2	-1.233	3
3	N19	max	2212.924	2	5311.16	2	0	9	0	3	.002	4	9.83	1
4		min	-2040.606	3	-4834.276	3	-255.292	5	-1.012	4	0	2	-.449	3
5	N29	max	308.44	2	2363.384	2	101.563	3	.119	3	.003	4	8.506	2
6		min	-614.692	3	-1837.616	3	-260.949	4	-1.014	4	0	3	-1.233	3
7	Totals:	max	2829.805	2	10037.927	2	0	1						
8		min	-3269.991	3	-8509.509	3	-749.36	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	.004	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	16.459	3	352.468	3	24.899	3	.054	3	.205	1	.282	2
4			min	-169.548	1	-767.627	2	-100.16	1	-.156	2	-.043	3	-.128	3
5		3	max	15.989	3	351.179	3	24.899	3	.054	3	.139	1	.786	2
6			min	-170.174	1	-769.346	2	-100.16	1	-.156	2	-.027	3	-.359	3
7		4	max	15.52	3	349.889	3	24.899	3	.054	3	.074	1	1.291	2
8			min	-170.799	1	-771.065	2	-100.16	1	-.156	2	-.01	3	-.589	3
9		5	max	1332.789	3	687.146	2	34.414	3	.007	3	.098	2	1.529	2
10			min	-3155.391	2	-292.911	3	-117.691	1	-.051	2	-.038	3	-.701	3
11		6	max	1332.32	3	685.427	2	34.414	3	.007	3	.023	2	1.079	2
12			min	-3156.017	2	-294.201	3	-117.691	1	-.051	2	-.017	5	-.508	3
13		7	max	1331.851	3	683.708	2	34.414	3	.007	3	.007	3	.63	2
14			min	-3156.643	2	-295.49	3	-117.691	1	-.051	2	-.061	1	-.315	3
15		8	max	1331.381	3	681.989	2	34.414	3	.007	3	.03	3	.182	2
16			min	-3157.268	2	-296.779	3	-117.691	1	-.051	2	-.138	1	-.12	3
17		9	max	1353.205	3	24.581	2	56.755	3	.012	5	.088	1	-.002	15
18			min	-3291.863	2	-.046	15	-169.205	1	-.132	2	-.012	3	-.033	2
19		10	max	1352.736	3	22.862	2	56.755	3	.012	5	.025	3	-.001	15
20			min	-3292.488	2	-.822	5	-169.205	1	-.132	2	-.024	2	-.048	2
21		11	max	1352.267	3	21.143	2	56.755	3	.012	5	.062	3	0	15
22			min	-3293.114	2	-1.624	5	-169.205	1	-.132	2	-.134	1	-.063	2
23		12	max	1367.525	3	647.676	3	-5.518	10	.132	3	.115	4	.082	1
24			min	-3420.076	2	-404.645	2	-145.84	4	-.146	2	.008	12	-.245	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	1367.056	3	646.387	3	-5.518	10	.132	3	.081	1	.342	2
26			min	-3420.701	2	-406.365	2	-147.425	4	-.146	2	-.03	3	-.67	3
27		14	max	1366.586	3	645.097	3	-5.518	10	.132	3	.064	2	.609	2
28			min	-3421.327	2	-408.084	2	-149.011	4	-.146	2	-.086	5	-1.094	3
29		15	max	1366.117	3	643.808	3	-5.518	10	.132	3	.054	2	.878	2
30			min	-3421.953	2	-409.803	2	-150.596	4	-.146	2	-.181	5	-1.517	3
31		16	max	170.356	1	403.516	2	49.041	5	.064	1	.014	3	.668	2
32			min	-17.229	3	-688.304	3	-97.293	1	-.192	3	-.132	4	-1.157	3
33		17	max	169.73	1	401.797	2	47.456	5	.064	1	.033	3	.404	2
34			min	-17.698	3	-689.593	3	-97.293	1	-.192	3	-.147	1	-.705	3
35		18	max	169.105	1	400.078	2	45.87	5	.064	1	.051	3	.141	2
36			min	-18.167	3	-690.883	3	-97.293	1	-.192	3	-.211	1	-.252	3
37		19	max	0	1	0	15	0	1	0	1	0	1	0	1
38			min	0	1	-.001	2	0	4	0	1	0	1	0	1
39	M4	1	max	0	1	.006	2	0	4	0	1	0	1	0	1
40			min	0	1	-.002	3	0	1	0	1	0	1	0	1
41		2	max	57.745	10	758.173	3	0	1	.019	4	.171	4	.441	2
42			min	-102.201	9	-1463.92	2	-65.172	5	0	1	0	1	-.233	3
43		3	max	57.223	10	756.884	3	0	1	.019	4	.128	4	1.402	2
44			min	-102.723	9	-1465.639	2	-66.757	5	0	1	0	1	-.73	3
45		4	max	56.702	10	755.594	3	0	1	.019	4	.083	4	2.364	2
46			min	-103.244	9	-1467.358	2	-68.343	5	0	1	0	1	-1.226	3
47		5	max	3215.506	3	1537.372	2	0	1	0	1	.021	4	2.775	2
48			min	-6219.744	2	-839.449	3	-70.822	4	-.003	4	0	1	-1.429	3
49		6	max	3215.037	3	1535.653	2	0	1	0	1	0	1	1.767	2
50			min	-6220.37	2	-840.739	3	-72.407	4	-.003	4	-.026	5	-.877	3
51		7	max	3214.568	3	1533.934	2	0	1	0	1	0	1	.76	2
52			min	-6220.996	2	-842.028	3	-73.993	4	-.003	4	-.074	4	-.325	3
53		8	max	3214.099	3	1532.215	2	0	1	0	1	0	1	.228	3
54			min	-6221.622	2	-843.317	3	-75.578	4	-.003	4	-.123	4	-.246	2
55		9	max	3145.481	3	22.42	3	0	1	.011	4	.122	4	.494	3
56			min	-6125.112	2	-163.531	2	-171.212	4	0	1	0	1	-.7	2
57		10	max	3145.012	3	21.13	3	0	1	.011	4	.01	5	.48	3
58			min	-6125.737	2	-165.25	2	-172.797	4	0	1	0	1	-.592	2
59		11	max	3144.543	3	19.841	3	0	1	.011	4	0	1	.467	3
60			min	-6126.363	2	-166.969	2	-174.383	4	0	1	-.105	4	-.483	2
61		12	max	3089.057	3	1891.468	3	0	1	.079	4	.142	5	.017	9
62			min	-6045.119	2	-1404.713	2	-162.723	5	0	1	0	1	-.123	3
63		13	max	3088.587	3	1890.178	3	0	1	.079	4	.035	5	.908	2
64			min	-6045.745	2	-1406.432	2	-164.309	5	0	1	0	1	-1.364	3
65		14	max	3088.118	3	1888.889	3	0	1	.079	4	0	1	1.832	2
66			min	-6046.37	2	-1408.152	2	-165.894	5	0	1	-.073	4	-2.604	3
67		15	max	3087.649	3	1887.6	3	0	1	.079	4	0	1	2.756	2
68			min	-6046.996	2	-1409.871	2	-167.48	5	0	1	-.183	4	-3.843	3
69		16	max	102.82	9	1284.981	2	38.203	5	0	1	0	1	2.098	2
70			min	-55.667	10	-1795.899	3	0	1	-.065	4	-.12	5	-2.919	3
71		17	max	102.298	9	1283.262	2	36.618	5	0	1	0	1	1.256	2
72			min	-56.188	10	-1797.189	3	0	1	-.065	4	-.095	4	-1.74	3
73		18	max	101.777	9	1281.543	2	35.032	5	0	1	0	1	.414	2
74			min	-56.71	10	-1798.478	3	0	1	-.065	4	-.072	4	-.56	3
75		19	max	0	1	0	5	0	1	0	1	0	1	0	1
76			min	0	1	-.002	3	0	4	0	1	0	1	0	1
77	M7	1	max	0	1	.004	2	0	4	0	1	0	1	0	1
78			min	0	1	-.001	3	0	3	0	1	0	1	0	1
79		2	max	29.983	5	352.468	3	100.16	1	.156	2	.093	5	.282	2
80			min	-169.548	1	-767.627	2	-30.984	5	-.054	3	-.205	1	-.128	3
81		3	max	29.691	5	351.179	3	100.16	1	.156	2	.072	5	.786	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	-170.174	1	-769.346	2	-32.569	5	-.054	3	-.139	1	-.359	3
83		4	max	29.399	5	349.889	3	100.16	1	.156	2	.05	5	1.291	2
84			min	-170.799	1	-771.065	2	-34.155	5	-.054	3	-.074	1	-.589	3
85		5	max	1332.789	3	687.146	2	117.691	1	.051	2	.038	3	1.529	2
86			min	-3155.391	2	-292.911	3	-35.177	5	-.007	3	-.098	2	-.701	3
87		6	max	1332.32	3	685.427	2	117.691	1	.051	2	.015	3	1.079	2
88			min	-3156.017	2	-294.201	3	-36.763	5	-.007	3	-.023	2	-.508	3
89		7	max	1331.851	3	683.708	2	117.691	1	.051	2	.061	1	.63	2
90			min	-3156.643	2	-295.49	3	-38.348	5	-.007	3	-.042	5	-.315	3
91		8	max	1331.381	3	681.989	2	117.691	1	.051	2	.138	1	.182	2
92			min	-3157.268	2	-296.779	3	-39.934	5	-.007	3	-.068	5	-.12	3
93		9	max	1353.205	3	24.581	2	169.205	1	.132	2	.057	5	-.002	15
94			min	-3291.863	2	1.139	12	-57.09	5	.008	12	-.088	1	-.033	2
95		10	max	1352.736	3	22.862	2	169.205	1	.132	2	.024	2	-.003	15
96			min	-3292.488	2	.28	12	-58.676	5	.008	12	-.025	3	-.048	2
97		11	max	1352.267	3	21.143	2	169.205	1	.132	2	.134	1	-.004	15
98			min	-3293.114	2	-.636	3	-60.261	5	.008	12	-.062	3	-.063	2
99		12	max	1367.525	3	647.676	3	64.471	3	.146	2	.093	5	.082	1
100			min	-3420.076	2	-404.645	2	-138.341	5	-.132	3	-.099	1	-.245	3
101		13	max	1367.056	3	646.387	3	64.471	3	.146	2	.03	3	.342	2
102			min	-3420.701	2	-406.365	2	-139.926	5	-.132	3	-.081	1	-.67	3
103		14	max	1366.586	3	645.097	3	64.471	3	.146	2	.072	3	.609	2
104			min	-3421.327	2	-408.084	2	-141.512	5	-.132	3	-.099	4	-1.094	3
105		15	max	1366.117	3	643.808	3	64.471	3	.146	2	.115	3	.878	2
106			min	-3421.953	2	-409.803	2	-143.097	5	-.132	3	-.19	4	-1.517	3
107		16	max	170.356	1	403.516	2	97.293	1	.192	3	.083	1	.668	2
108			min	-17.229	3	-688.304	3	-28.056	3	-.066	4	-.114	5	-1.157	3
109		17	max	169.73	1	401.797	2	97.293	1	.192	3	.147	1	.404	2
110			min	-17.698	3	-689.593	3	-28.056	3	-.066	4	-.077	5	-.705	3
111		18	max	169.105	1	400.078	2	97.293	1	.192	3	.211	1	.141	2
112			min	-18.167	3	-690.883	3	-28.056	3	-.066	4	-.051	3	-.252	3
113		19	max	0	1	0	5	0	3	0	1	0	1	0	1
114			min	0	1	-.001	2	0	4	0	1	0	1	0	1
115	M10	1	max	97.313	1	399.268	2	18.612	3	.008	1	.243	1	.066	4
116			min	-28.06	3	-692.192	3	-168.755	1	-.021	3	-.061	3	-.192	3
117		2	max	97.313	1	283.82	2	19.921	3	.008	1	.149	2	.177	3
118			min	-28.06	3	-515.332	3	-144.652	1	-.021	3	-.049	3	-.149	2
119		3	max	97.313	1	168.371	2	21.23	3	.008	1	.088	2	.438	3
120			min	-28.06	3	-338.472	3	-120.548	1	-.021	3	-.036	3	-.287	2
121		4	max	97.313	1	55.846	1	22.539	3	.008	1	.033	2	.591	3
122			min	-28.06	3	-161.612	3	-96.445	1	-.021	3	-.023	3	-.355	2
123		5	max	97.313	1	15.249	3	23.848	3	.008	1	-.002	10	.635	3
124			min	-28.06	3	-62.526	2	-75.74	2	-.021	3	-.052	1	-.352	2
125		6	max	97.313	1	192.109	3	25.157	3	.008	1	.006	3	.572	3
126			min	-28.06	3	-177.974	2	-66.251	2	-.021	3	-.088	1	-.278	2
127		7	max	97.313	1	368.969	3	26.466	3	.008	1	.022	3	.401	3
128			min	-28.06	3	-293.422	2	-56.762	2	-.021	3	-.111	1	-.141	1
129		8	max	97.313	1	545.83	3	27.775	3	.008	1	.039	3	.121	3
130			min	-28.06	3	-408.871	2	-47.273	2	-.021	3	-.129	2	-.012	5
131		9	max	97.313	1	722.69	3	34.925	9	.008	1	.056	3	.365	2
132			min	-28.06	3	-524.319	2	-37.784	2	-.021	3	-.155	2	-.266	3
133		10	max	97.313	1	899.55	3	50.583	9	.021	3	.074	3	.721	2
134			min	-28.06	3	-639.768	2	-35.417	14	-.008	1	-.175	2	-.762	3
135		11	max	97.313	1	524.319	2	37.784	2	.021	3	.056	3	.365	2
136			min	-28.06	3	-722.69	3	-34.925	9	-.008	1	-.155	2	-.266	3
137		12	max	97.313	1	408.871	2	47.273	2	.021	3	.039	3	.121	3
138			min	-28.06	3	-545.83	3	-27.775	3	-.008	1	-.129	2	.01	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
139		13	max	97.313	1	293.422	2	56.762	2	.021	3	.022	3	.401	3
140			min	-28.06	3	-368.969	3	-26.466	3	-.008	1	-.111	1	-.141	1
141		14	max	97.313	1	177.974	2	66.251	2	.021	3	.006	3	.572	3
142			min	-28.06	3	-192.109	3	-25.157	3	-.008	1	-.088	1	-.278	2
143		15	max	97.313	1	62.526	2	75.74	2	.021	3	.002	5	.635	3
144			min	-28.06	3	-15.249	3	-23.848	3	-.008	1	-.052	1	-.352	2
145		16	max	97.313	1	161.612	3	96.445	1	.021	3	.033	2	.591	3
146			min	-28.06	3	-55.846	1	-22.539	3	-.008	1	-.023	3	-.355	2
147		17	max	97.313	1	338.472	3	120.548	1	.021	3	.088	2	.438	3
148			min	-29.893	5	-168.371	2	-21.23	3	-.008	1	-.036	3	-.287	2
149		18	max	97.313	1	515.332	3	144.652	1	.021	3	.149	2	.177	3
150			min	-37.104	5	-283.82	2	-19.921	3	-.008	1	-.049	3	-.149	2
151		19	max	97.313	1	692.192	3	168.755	1	.021	3	.243	1	.064	1
152			min	-44.315	5	-399.268	2	-18.612	3	-.008	1	-.061	3	-.192	3
153	M11	1	max	141.564	1	423.597	2	58.418	5	.009	3	.299	1	.061	4
154			min	-120.964	3	-652.066	3	-184.252	1	-.017	2	-.177	5	-.145	3
155		2	max	141.564	1	308.149	2	59.746	5	.009	3	.193	1	.2	3
156			min	-120.964	3	-475.206	3	-160.148	1	-.017	2	-.141	5	-.209	2
157		3	max	141.564	1	192.7	2	61.074	5	.009	3	.118	2	.436	3
158			min	-120.964	3	-298.345	3	-136.045	1	-.017	2	-.104	5	-.362	2
159		4	max	141.564	1	77.252	2	62.402	5	.009	3	.055	2	.564	3
160			min	-120.964	3	-121.485	3	-111.941	1	-.017	2	-.067	4	-.445	2
161		5	max	141.564	1	55.375	3	63.73	5	.009	3	.005	10	.585	3
162			min	-120.964	3	-38.197	2	-88.803	2	-.017	2	-.036	4	-.457	2
163		6	max	141.564	1	232.236	3	65.059	5	.009	3	.012	5	.497	3
164			min	-120.964	3	-153.645	2	-79.314	2	-.017	2	-.08	1	-.398	2
165		7	max	141.564	1	409.096	3	66.387	5	.009	3	.052	5	.301	3
166			min	-120.964	3	-269.093	2	-69.825	2	-.017	2	-.112	1	-.269	2
167		8	max	141.564	1	585.956	3	71.771	4	.009	3	.093	5	-.002	12
168			min	-120.964	3	-384.542	2	-60.336	2	-.017	2	-.138	2	-.069	2
169		9	max	141.564	1	762.817	3	78.081	4	.009	3	.135	5	.203	1
170			min	-120.964	3	-499.99	2	-50.847	2	-.017	2	-.172	2	-.415	3
171		10	max	141.564	1	615.439	2	62.968	5	.017	2	.07	3	.542	2
172			min	-120.964	3	-939.677	3	-43.364	9	-.009	3	-.201	2	-.936	3
173		11	max	141.564	1	499.99	2	64.296	5	.017	2	.053	3	.203	1
174			min	-120.964	3	-762.817	3	-27.707	9	-.009	3	-.172	2	-.415	3
175		12	max	141.564	1	384.542	2	65.624	5	.017	2	.038	3	.013	5
176			min	-120.964	3	-585.956	3	-24.78	3	-.009	3	-.138	2	-.069	2
177		13	max	141.564	1	269.093	2	69.825	2	.017	2	.023	3	.301	3
178			min	-120.964	3	-409.096	3	-23.471	3	-.009	3	-.112	1	-.269	2
179		14	max	141.564	1	153.645	2	79.314	2	.017	2	.009	3	.497	3
180			min	-120.964	3	-232.236	3	-22.162	3	-.009	3	-.08	1	-.398	2
181		15	max	141.564	1	38.197	2	88.803	2	.017	2	.023	5	.585	3
182			min	-120.964	3	-55.375	3	-20.853	3	-.009	3	-.034	1	-.457	2
183		16	max	141.564	1	121.485	3	111.941	1	.017	2	.066	5	.564	3
184			min	-120.964	3	-77.252	2	-19.544	3	-.009	3	-.016	3	-.445	2
185		17	max	141.564	1	298.345	3	136.045	1	.017	2	.121	4	.436	3
186			min	-120.964	3	-192.7	2	-18.235	3	-.009	3	-.028	3	-.362	2
187		18	max	141.564	1	475.206	3	160.148	1	.017	2	.193	1	.2	3
188			min	-120.964	3	-308.149	2	-16.926	3	-.009	3	-.039	3	-.209	2
189		19	max	141.564	1	652.066	3	184.252	1	.017	2	.299	1	.027	1
190			min	-120.964	3	-423.597	2	-15.617	3	-.009	3	-.049	3	-.145	3
191	M12	1	max	22.56	3	651.84	2	51.929	5	.003	3	.321	1	.081	2
192			min	-50.191	1	-301.375	3	-190.709	1	-.011	2	-.157	5	.012	12
193		2	max	22.56	3	485.319	2	53.257	5	.003	3	.212	1	.179	3
194			min	-50.191	1	-219.85	3	-166.606	1	-.011	2	-.125	5	-.266	2
195		3	max	22.56	3	318.799	2	54.586	5	.003	3	.134	2	.288	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	-50.191	1	-138.325	3	-142.503	1	-.011	2	-.092	5	-.512	2
197		4	max	22.56	3	152.278	2	55.914	5	.003	3	.067	2	.348	3
198			min	-50.191	1	-56.8	3	-118.399	1	-.011	2	-.058	5	-.656	2
199		5	max	22.56	3	24.725	3	57.242	5	.003	3	.009	10	.358	3
200			min	-50.191	1	-14.243	2	-95.9	2	-.011	2	-.031	4	-.698	2
201		6	max	22.56	3	106.25	3	58.57	5	.003	3	.012	5	.318	3
202			min	-50.191	1	-180.763	2	-86.411	2	-.011	2	-.077	1	-.639	2
203		7	max	22.56	3	187.775	3	59.898	5	.003	3	.048	5	.228	3
204			min	-50.191	1	-347.284	2	-76.922	2	-.011	2	-.113	1	-.477	2
205		8	max	22.56	3	269.3	3	64.616	4	.003	3	.085	5	.088	3
206			min	-50.191	1	-513.805	2	-67.433	2	-.011	2	-.144	2	-.214	2
207		9	max	22.56	3	350.825	3	70.925	4	.003	3	.123	5	.151	2
208			min	-50.725	4	-680.325	2	-57.944	2	-.011	2	-.183	2	-.101	3
209		10	max	22.56	3	846.846	2	77.235	4	.011	2	.083	3	.617	2
210			min	-57.937	4	-432.35	3	-41.006	9	-.004	14	-.215	2	-.341	3
211		11	max	37.139	5	680.325	2	58.242	5	.011	2	.062	3	.151	2
212			min	-50.191	1	-350.825	3	-32.786	3	-.003	3	-.183	2	-.101	3
213		12	max	29.927	5	513.805	2	67.433	2	.011	2	.043	3	.088	3
214			min	-50.191	1	-269.3	3	-31.477	3	-.003	3	-.144	2	-.214	2
215		13	max	22.716	5	347.284	2	76.922	2	.011	2	.024	3	.228	3
216			min	-50.191	1	-187.775	3	-30.168	3	-.003	3	-.113	1	-.477	2
217		14	max	22.56	3	180.763	2	86.411	2	.011	2	.006	3	.318	3
218			min	-50.191	1	-106.25	3	-28.859	3	-.003	3	-.077	1	-.639	2
219		15	max	22.56	3	14.243	2	95.9	2	.011	2	.02	5	.358	3
220			min	-50.191	1	-24.725	3	-27.55	3	-.003	3	-.027	1	-.698	2
221		16	max	22.56	3	56.8	3	118.399	1	.011	2	.067	2	.348	3
222			min	-50.191	1	-152.278	2	-26.241	3	-.003	3	-.028	3	-.656	2
223		17	max	22.56	3	138.325	3	142.503	1	.011	2	.134	2	.288	3
224			min	-50.191	1	-318.799	2	-24.932	3	-.003	3	-.043	3	-.512	2
225		18	max	22.56	3	219.85	3	166.606	1	.011	2	.212	1	.179	3
226			min	-50.191	1	-485.319	2	-23.623	3	-.003	3	-.058	3	-.266	2
227		19	max	22.56	3	301.375	3	190.709	1	.011	2	.321	1	.081	2
228			min	-50.191	1	-651.84	2	-22.314	3	-.003	3	-.072	3	-.016	5
229	M13	1	max	29.313	5	767.525	2	30.277	5	.011	3	.239	1	.156	2
230			min	-100.069	1	-353.731	3	-168.623	1	-.025	2	-.103	5	-.054	3
231		2	max	24.901	3	601.004	2	31.605	5	.011	3	.145	2	.137	3
232			min	-100.069	1	-272.206	3	-144.52	1	-.025	2	-.084	5	-.262	2
233		3	max	24.901	3	434.484	2	32.933	5	.011	3	.084	2	.278	3
234			min	-100.069	1	-190.681	3	-120.416	1	-.025	2	-.065	5	-.579	2
235		4	max	24.901	3	267.963	2	34.261	5	.011	3	.029	2	.37	3
236			min	-100.069	1	-109.156	3	-96.313	1	-.025	2	-.049	4	-.793	2
237		5	max	24.901	3	101.442	2	35.589	5	.011	3	-.002	12	.412	3
238			min	-100.069	1	-27.631	3	-76.222	2	-.025	2	-.056	1	-.906	2
239		6	max	24.901	3	53.894	3	36.917	5	.011	3	.01	3	.404	3
240			min	-100.069	1	-65.078	2	-66.733	2	-.025	2	-.093	1	-.917	2
241		7	max	24.901	3	135.419	3	39.621	4	.011	3	.025	3	.346	3
242			min	-100.069	1	-231.599	2	-57.244	2	-.025	2	-.115	1	-.826	2
243		8	max	24.901	3	216.944	3	45.931	4	.011	3	.046	5	.238	3
244			min	-100.069	1	-398.12	2	-47.755	2	-.025	2	-.134	2	-.634	2
245		9	max	24.901	3	298.469	3	52.24	4	.011	3	.071	5	.081	3
246			min	-100.069	1	-564.64	2	-38.266	2	-.025	2	-.16	2	-.34	2
247		10	max	24.901	3	379.994	3	60.737	14	.025	2	.074	3	.056	2
248			min	-100.069	1	-731.161	2	-29.049	10	-.011	3	-.181	2	-.126	3
249		11	max	24.901	3	564.64	2	38.266	2	.025	2	.057	3	.081	3
250			min	-100.069	1	-298.469	3	-35.229	9	-.011	3	-.16	2	-.34	2
251		12	max	24.901	3	398.12	2	47.755	2	.025	2	.041	3	.238	3
252			min	-100.069	1	-216.944	3	-26.115	3	-.011	3	-.134	2	-.634	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	24.901	3	231.599	2	57.244	2	.025	2	.025	3	.346	3
254			min	-100.069	1	-135.419	3	-24.806	3	-.011	3	-.115	1	-.826	2
255		14	max	24.901	3	65.078	2	66.733	2	.025	2	.01	3	.404	3
256			min	-100.069	1	-53.894	3	-23.497	3	-.011	3	-.093	1	-.917	2
257		15	max	24.901	3	27.631	3	76.222	2	.025	2	.017	5	.412	3
258			min	-100.069	1	-101.442	2	-22.188	3	-.011	3	-.056	1	-.906	2
259		16	max	24.901	3	109.156	3	96.313	1	.025	2	.042	5	.37	3
260			min	-100.069	1	-267.963	2	-20.879	3	-.011	3	-.017	3	-.793	2
261		17	max	24.901	3	190.681	3	120.416	1	.025	2	.084	2	.278	3
262			min	-100.069	1	-434.484	2	-19.57	3	-.011	3	-.029	3	-.579	2
263		18	max	24.901	3	272.206	3	144.52	1	.025	2	.145	2	.137	3
264			min	-100.069	1	-601.004	2	-18.261	3	-.011	3	-.041	3	-.262	2
265		19	max	24.901	3	353.731	3	168.623	1	.025	2	.239	1	.156	2
266			min	-100.069	1	-767.525	2	-16.953	3	-.011	3	-.051	3	-.054	3
267	M2	1	max	2363.384	2	616.083	3	93.698	2	.002	5	.978	5	8.506	2
268			min	-1837.616	3	-298.837	2	-244.417	5	-.001	2	-.143	1	-1.233	3
269		2	max	2360.826	2	616.083	3	93.698	2	.002	5	.91	5	8.59	2
270			min	-1839.535	3	-298.837	2	-242.201	5	-.001	2	-.118	1	-1.406	3
271		3	max	2358.269	2	616.083	3	93.698	2	.002	5	.842	5	8.674	2
272			min	-1841.453	3	-298.837	2	-239.984	5	-.001	2	-.093	1	-1.579	3
273		4	max	2355.711	2	616.083	3	93.698	2	.002	5	.775	5	8.758	2
274			min	-1843.371	3	-298.837	2	-237.768	5	-.001	2	-.068	1	-1.752	3
275		5	max	2353.154	2	616.083	3	93.698	2	.002	5	.709	4	8.842	2
276			min	-1845.289	3	-298.837	2	-235.552	5	-.001	2	-.043	1	-1.925	3
277		6	max	2350.596	2	616.083	3	93.698	2	.002	5	.646	4	8.926	2
278			min	-1847.207	3	-298.837	2	-233.335	5	-.001	2	-.023	3	-2.098	3
279		7	max	2348.039	2	616.083	3	93.698	2	.002	5	.583	4	9.01	2
280			min	-1849.125	3	-298.837	2	-231.119	5	-.001	2	-.052	3	-2.271	3
281		8	max	2345.481	2	616.083	3	93.698	2	.002	5	.522	4	9.094	2
282			min	-1851.043	3	-298.837	2	-228.902	5	-.001	2	-.08	3	-2.444	3
283		9	max	2042.478	2	3056.263	2	71.624	2	.001	2	.466	4	8.584	2
284			min	-1702.23	3	-840.082	3	-219.135	5	0	3	-.084	3	-2.359	3
285		10	max	2039.92	2	3056.263	2	71.624	2	.001	2	.407	4	7.725	2
286			min	-1704.148	3	-840.082	3	-216.918	5	0	3	-.11	3	-2.124	3
287		11	max	2037.363	2	3056.263	2	71.624	2	.001	2	.348	4	6.867	2
288			min	-1706.066	3	-840.082	3	-214.702	5	0	3	-.136	3	-1.888	3
289		12	max	2034.805	2	3056.263	2	71.624	2	.001	2	.29	4	6.009	2
290			min	-1707.985	3	-840.082	3	-212.485	5	0	3	-.162	3	-1.652	3
291		13	max	2032.248	2	3056.263	2	71.624	2	.001	2	.232	4	5.15	2
292			min	-1709.903	3	-840.082	3	-210.269	5	0	3	-.188	3	-1.416	3
293		14	max	2029.69	2	3056.263	2	71.624	2	.001	2	.175	4	4.292	2
294			min	-1711.821	3	-840.082	3	-208.052	5	0	3	-.214	3	-1.18	3
295		15	max	2027.133	2	3056.263	2	71.624	2	.001	2	.138	2	3.434	2
296			min	-1713.739	3	-840.082	3	-205.836	5	0	3	-.24	3	-.944	3
297		16	max	2024.575	2	3056.263	2	71.624	2	.001	2	.158	2	2.575	2
298			min	-1715.657	3	-840.082	3	-203.619	5	0	3	-.266	3	-.708	3
299		17	max	2022.018	2	3056.263	2	71.624	2	.001	2	.178	2	1.717	2
300			min	-1717.575	3	-840.082	3	-201.403	5	0	3	-.292	3	-.472	3
301		18	max	2019.46	2	3056.263	2	71.624	2	.001	2	.198	2	.858	2
302			min	-1719.493	3	-840.082	3	-199.186	5	0	3	-.318	3	-.236	3
303		19	max	2016.903	2	3056.263	2	71.624	2	.001	2	.218	2	0	1
304			min	-1721.411	3	-840.082	3	-196.97	5	0	3	-.344	3	0	1
305	M5	1	max	5311.16	2	2044.436	3	0	1	.002	4	1.012	4	9.83	1
306			min	-4834.276	3	-2185.567	2	-255.477	5	0	1	0	1	-.449	3
307		2	max	5308.602	2	2044.436	3	0	1	.002	4	.941	4	10.28	2
308			min	-4836.194	3	-2185.567	2	-253.26	5	0	1	0	1	-1.023	3
309		3	max	5306.045	2	2044.436	3	0	1	.002	4	.87	4	10.894	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
310			min	-4838.113	3	-2185.567	2	-251.044	5	0	1	0	1	-1.598	3
311		4	max	5303.487	2	2044.436	3	0	1	.002	4	.8	4	11.508	2
312			min	-4840.031	3	-2185.567	2	-248.827	5	0	1	0	1	-2.172	3
313		5	max	5300.93	2	2044.436	3	0	1	.002	4	.73	4	12.122	2
314			min	-4841.949	3	-2185.567	2	-246.611	5	0	1	0	1	-2.746	3
315		6	max	5298.372	2	2044.436	3	0	1	.002	4	.662	4	12.736	2
316			min	-4843.867	3	-2185.567	2	-244.394	5	0	1	0	1	-3.32	3
317		7	max	5295.815	2	2044.436	3	0	1	.002	4	.593	4	13.349	2
318			min	-4845.785	3	-2185.567	2	-242.178	5	0	1	0	1	-3.894	3
319		8	max	5293.257	2	2044.436	3	0	1	.002	4	.526	4	13.963	2
320			min	-4847.703	3	-2185.567	2	-239.961	5	0	1	0	1	-4.469	3
321		9	max	4720.628	2	4753.033	2	0	1	0	1	.471	4	13.349	2
322			min	-4461.006	3	-1567.916	3	-233.337	4	0	4	0	1	-4.404	3
323		10	max	4718.071	2	4753.033	2	0	1	0	1	.406	4	12.015	2
324			min	-4462.924	3	-1567.916	3	-231.12	4	0	4	0	1	-3.963	3
325		11	max	4715.513	2	4753.033	2	0	1	0	1	.341	4	10.68	2
326			min	-4464.842	3	-1567.916	3	-228.904	4	0	4	0	1	-3.523	3
327		12	max	4712.956	2	4753.033	2	0	1	0	1	.277	4	9.345	2
328			min	-4466.76	3	-1567.916	3	-226.687	4	0	4	0	1	-3.083	3
329		13	max	4710.398	2	4753.033	2	0	1	0	1	.214	4	8.01	2
330			min	-4468.678	3	-1567.916	3	-224.471	4	0	4	0	1	-2.642	3
331		14	max	4707.841	2	4753.033	2	0	1	0	1	.151	4	6.675	2
332			min	-4470.596	3	-1567.916	3	-222.254	4	0	4	0	1	-2.202	3
333		15	max	4705.283	2	4753.033	2	0	1	0	1	.089	4	5.34	2
334			min	-4472.514	3	-1567.916	3	-220.038	4	0	4	0	1	-1.761	3
335		16	max	4702.726	2	4753.033	2	0	1	0	1	.028	4	4.005	2
336			min	-4474.432	3	-1567.916	3	-217.821	4	0	4	0	1	-1.321	3
337		17	max	4700.168	2	4753.033	2	0	1	0	1	0	1	2.67	2
338			min	-4476.351	3	-1567.916	3	-215.605	4	0	4	-.033	5	-.881	3
339		18	max	4697.611	2	4753.033	2	0	1	0	1	0	1	1.335	2
340			min	-4478.269	3	-1567.916	3	-213.389	4	0	4	-.093	4	-.44	3
341		19	max	4695.053	2	4753.033	2	0	1	0	1	0	1	0	1
342			min	-4480.187	3	-1567.916	3	-211.172	4	0	4	-.153	4	0	1
343	M8	1	max	2363.384	2	616.083	3	101.447	3	.003	4	1.014	4	8.506	2
344			min	-1837.616	3	-298.837	2	-261.343	4	0	3	-.119	3	-1.233	3
345		2	max	2360.826	2	616.083	3	101.447	3	.003	4	.941	4	8.59	2
346			min	-1839.535	3	-298.837	2	-259.127	4	0	3	-.091	3	-1.406	3
347		3	max	2358.269	2	616.083	3	101.447	3	.003	4	.868	4	8.674	2
348			min	-1841.453	3	-298.837	2	-256.91	4	0	3	-.062	3	-1.579	3
349		4	max	2355.711	2	616.083	3	101.447	3	.003	4	.796	4	8.758	2
350			min	-1843.371	3	-298.837	2	-254.694	4	0	3	-.034	3	-1.752	3
351		5	max	2353.154	2	616.083	3	101.447	3	.003	4	.725	4	8.842	2
352			min	-1845.289	3	-298.837	2	-252.477	4	0	3	-.005	3	-1.925	3
353		6	max	2350.596	2	616.083	3	101.447	3	.003	4	.654	4	8.926	2
354			min	-1847.207	3	-298.837	2	-250.261	4	0	3	.002	10	-2.098	3
355		7	max	2348.039	2	616.083	3	101.447	3	.003	4	.584	4	9.01	2
356			min	-1849.125	3	-298.837	2	-248.044	4	0	3	-.018	2	-2.271	3
357		8	max	2345.481	2	616.083	3	101.447	3	.003	4	.515	4	9.094	2
358			min	-1851.043	3	-298.837	2	-245.828	4	0	3	-.045	2	-2.444	3
359		9	max	2042.478	2	3056.263	2	92.632	3	0	3	.464	4	8.584	2
360			min	-1702.23	3	-840.082	3	-234.816	4	-.001	2	-.017	2	-2.359	3
361		10	max	2039.92	2	3056.263	2	92.632	3	0	3	.399	4	7.725	2
362			min	-1704.148	3	-840.082	3	-232.6	4	-.001	2	-.037	2	-2.124	3
363		11	max	2037.363	2	3056.263	2	92.632	3	0	3	.335	5	6.867	2
364			min	-1706.066	3	-840.082	3	-230.383	4	-.001	2	-.057	2	-1.888	3
365		12	max	2034.805	2	3056.263	2	92.632	3	0	3	.274	5	6.009	2
366			min	-1707.985	3	-840.082	3	-228.167	4	-.001	2	-.077	2	-1.652	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
367		13	max	2032.248	2	3056.263	2	92.632	3	0	3	.213	5	5.15	2
368			min	-1709.903	3	-840.082	3	-225.95	4	-.001	2	-.098	2	-1.416	3
369		14	max	2029.69	2	3056.263	2	92.632	3	0	3	.214	3	4.292	2
370			min	-1711.821	3	-840.082	3	-223.734	4	-.001	2	-.118	2	-1.18	3
371		15	max	2027.133	2	3056.263	2	92.632	3	0	3	.24	3	3.434	2
372			min	-1713.739	3	-840.082	3	-221.517	4	-.001	2	-.138	2	-.944	3
373		16	max	2024.575	2	3056.263	2	92.632	3	0	3	.266	3	2.575	2
374			min	-1715.657	3	-840.082	3	-219.301	4	-.001	2	-.158	2	-.708	3
375		17	max	2022.018	2	3056.263	2	92.632	3	0	3	.292	3	1.717	2
376			min	-1717.575	3	-840.082	3	-217.084	4	-.001	2	-.178	2	-.472	3
377		18	max	2019.46	2	3056.263	2	92.632	3	0	3	.318	3	.858	2
378			min	-1719.493	3	-840.082	3	-214.868	4	-.001	2	-.198	2	-.236	3
379		19	max	2016.903	2	3056.263	2	92.632	3	0	3	.344	3	0	1
380			min	-1721.411	3	-840.082	3	-212.651	4	-.001	2	-.218	2	0	1
381	M3	1	max	3352.523	2	6.095	6	21.176	2	.023	3	.002	2	0	1
382			min	-1467.537	3	1.433	15	-9.439	3	-.05	2	0	3	0	1
383		2	max	3352.469	2	5.418	6	21.176	2	.023	3	.01	2	0	15
384			min	-1467.578	3	1.274	15	-9.439	3	-.05	2	-.004	3	-.002	6
385		3	max	3352.415	2	4.741	6	21.176	2	.023	3	.017	2	0	15
386			min	-1467.618	3	1.114	15	-9.439	3	-.05	2	-.008	3	-.004	6
387		4	max	3352.361	2	4.064	6	21.176	2	.023	3	.025	2	-.001	15
388			min	-1467.659	3	.955	15	-9.439	3	-.05	2	-.011	3	-.005	6
389		5	max	3352.307	2	3.386	6	21.176	2	.023	3	.033	2	-.002	15
390			min	-1467.699	3	.796	15	-9.439	3	-.05	2	-.014	3	-.007	6
391		6	max	3352.253	2	2.709	6	21.176	2	.023	3	.04	2	-.002	15
392			min	-1467.739	3	.637	15	-9.439	3	-.05	2	-.018	3	-.008	6
393		7	max	3352.199	2	2.032	6	21.176	2	.023	3	.048	2	-.002	15
394			min	-1467.78	3	.478	15	-9.439	3	-.05	2	-.021	3	-.009	6
395		8	max	3352.145	2	1.355	6	21.176	2	.023	3	.055	2	-.002	15
396			min	-1467.82	3	.318	15	-9.439	3	-.05	2	-.025	3	-.009	6
397		9	max	3352.091	2	.677	6	21.176	2	.023	3	.063	2	-.002	15
398			min	-1467.861	3	.159	15	-9.439	3	-.05	2	-.028	3	-.01	6
399		10	max	3352.037	2	0	1	21.176	2	.023	3	.07	2	-.002	15
400			min	-1467.901	3	0	1	-9.439	3	-.05	2	-.031	3	-.01	6
401		11	max	3351.983	2	-.159	15	21.176	2	.023	3	.078	2	-.002	15
402			min	-1467.942	3	-.677	4	-9.439	3	-.05	2	-.035	3	-.01	6
403		12	max	3351.929	2	-.318	15	21.176	2	.023	3	.086	2	-.002	15
404			min	-1467.982	3	-1.355	4	-9.439	3	-.05	2	-.038	3	-.009	6
405		13	max	3351.875	2	-.478	15	21.176	2	.023	3	.093	2	-.002	15
406			min	-1468.023	3	-2.032	4	-9.439	3	-.05	2	-.041	3	-.009	6
407		14	max	3351.822	2	-.637	15	21.176	2	.023	3	.101	2	-.002	15
408			min	-1468.063	3	-2.709	4	-9.439	3	-.05	2	-.045	3	-.008	6
409		15	max	3351.768	2	-.796	15	21.176	2	.023	3	.108	2	-.002	15
410			min	-1468.104	3	-3.386	4	-9.439	3	-.05	2	-.048	3	-.007	6
411		16	max	3351.714	2	-.955	15	21.176	2	.023	3	.116	2	-.001	15
412			min	-1468.144	3	-4.064	4	-9.439	3	-.05	2	-.052	3	-.005	6
413		17	max	3351.66	2	-1.114	15	21.176	2	.023	3	.123	2	0	15
414			min	-1468.185	3	-4.741	4	-9.439	3	-.05	2	-.055	3	-.004	6
415		18	max	3351.606	2	-1.274	15	21.176	2	.023	3	.131	2	0	15
416			min	-1468.225	3	-5.418	4	-9.439	3	-.05	2	-.058	3	-.002	6
417		19	max	3351.552	2	-1.433	15	21.176	2	.023	3	.139	2	0	1
418			min	-1468.266	3	-6.095	4	-9.439	3	-.05	2	-.062	3	0	1
419	M6	1	max	6904.444	2	6.095	4	0	1	.012	4	.002	4	0	1
420			min	-3649.729	3	1.433	15	-8.311	4	0	1	0	1	0	1
421		2	max	6904.39	2	5.418	4	0	1	.012	4	0	1	0	15
422			min	-3649.769	3	1.274	15	-7.852	4	0	1	-.001	4	-.002	4
423		3	max	6904.336	2	4.741	4	0	1	.012	4	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	-3649.81	3	1.114	15	-7.392	4	0	1	-.004	4	-.004	4
425		4	max	6904.282	2	4.064	4	0	1	.012	4	0	1	-.001	15
426			min	-3649.85	3	.955	15	-6.932	4	0	1	-.006	4	-.005	4
427		5	max	6904.228	2	3.386	4	0	1	.012	4	0	1	-.002	15
428			min	-3649.89	3	.796	15	-6.472	4	0	1	-.009	4	-.007	4
429		6	max	6904.174	2	2.709	4	0	1	.012	4	0	1	-.002	15
430			min	-3649.931	3	.637	15	-6.013	4	0	1	-.011	4	-.008	4
431		7	max	6904.12	2	2.032	4	0	1	.012	4	0	1	-.002	15
432			min	-3649.971	3	.478	15	-5.553	4	0	1	-.013	4	-.009	4
433		8	max	6904.066	2	1.355	4	0	1	.012	4	0	1	-.002	15
434			min	-3650.012	3	.318	15	-5.093	4	0	1	-.015	4	-.009	4
435		9	max	6904.012	2	.677	4	0	1	.012	4	0	1	-.002	15
436			min	-3650.052	3	.159	15	-4.633	4	0	1	-.017	4	-.01	4
437		10	max	6903.958	2	0	1	0	1	.012	4	0	1	-.002	15
438			min	-3650.093	3	0	1	-4.174	4	0	1	-.018	4	-.01	4
439		11	max	6903.904	2	-.159	15	0	1	.012	4	0	1	-.002	15
440			min	-3650.133	3	-.677	6	-3.714	4	0	1	-.02	4	-.01	4
441		12	max	6903.85	2	-.318	15	0	1	.012	4	0	1	-.002	15
442			min	-3650.174	3	-1.355	6	-3.254	4	0	1	-.021	4	-.009	4
443		13	max	6903.796	2	-.478	15	0	1	.012	4	0	1	-.002	15
444			min	-3650.214	3	-2.032	6	-2.794	4	0	1	-.022	4	-.009	4
445		14	max	6903.742	2	-.637	15	0	1	.012	4	0	1	-.002	15
446			min	-3650.255	3	-2.709	6	-2.335	4	0	1	-.023	4	-.008	4
447		15	max	6903.688	2	-.796	15	0	1	.012	4	0	1	-.002	15
448			min	-3650.295	3	-3.386	6	-1.875	4	0	1	-.024	4	-.007	4
449		16	max	6903.634	2	-.955	15	0	1	.012	4	0	1	-.001	15
450			min	-3650.336	3	-4.064	6	-1.415	4	0	1	-.024	4	-.005	4
451		17	max	6903.58	2	-1.114	15	0	1	.012	4	0	1	0	15
452			min	-3650.376	3	-4.741	6	-.955	4	0	1	-.025	4	-.004	4
453		18	max	6903.526	2	-1.274	15	0	1	.012	4	0	1	0	15
454			min	-3650.417	3	-5.418	6	-.496	4	0	1	-.025	4	-.002	4
455		19	max	6903.472	2	-1.433	15	.001	15	.012	4	0	1	0	1
456			min	-3650.457	3	-6.095	6	-.038	14	0	1	-.025	4	0	1
457	M9	1	max	3352.523	2	6.095	4	9.439	3	.05	2	.002	5	0	1
458			min	-1467.537	3	1.433	15	-21.176	2	-.023	3	-.002	2	0	1
459		2	max	3352.469	2	5.418	4	9.439	3	.05	2	.004	3	0	15
460			min	-1467.578	3	1.274	15	-21.176	2	-.023	3	-.01	2	-.002	4
461		3	max	3352.415	2	4.741	4	9.439	3	.05	2	.008	3	0	15
462			min	-1467.618	3	1.114	15	-21.176	2	-.023	3	-.017	2	-.004	4
463		4	max	3352.361	2	4.064	4	9.439	3	.05	2	.011	3	-.001	15
464			min	-1467.659	3	.955	15	-21.176	2	-.023	3	-.025	2	-.005	4
465		5	max	3352.307	2	3.386	4	9.439	3	.05	2	.014	3	-.002	15
466			min	-1467.699	3	.796	15	-21.176	2	-.023	3	-.033	2	-.007	4
467		6	max	3352.253	2	2.709	4	9.439	3	.05	2	.018	3	-.002	15
468			min	-1467.739	3	.637	15	-21.176	2	-.023	3	-.04	2	-.008	4
469		7	max	3352.199	2	2.032	4	9.439	3	.05	2	.021	3	-.002	15
470			min	-1467.78	3	.478	15	-21.176	2	-.023	3	-.048	2	-.009	4
471		8	max	3352.145	2	1.355	4	9.439	3	.05	2	.025	3	-.002	15
472			min	-1467.82	3	.318	15	-21.176	2	-.023	3	-.055	2	-.009	4
473		9	max	3352.091	2	.677	4	9.439	3	.05	2	.028	3	-.002	15
474			min	-1467.861	3	.159	15	-21.176	2	-.023	3	-.063	2	-.01	4
475		10	max	3352.037	2	0	1	9.439	3	.05	2	.031	3	-.002	15
476			min	-1467.901	3	0	1	-21.176	2	-.023	3	-.07	2	-.01	4
477		11	max	3351.983	2	-.159	15	9.439	3	.05	2	.035	3	-.002	15
478			min	-1467.942	3	-.677	6	-21.176	2	-.023	3	-.078	2	-.01	4
479		12	max	3351.929	2	-.318	15	9.439	3	.05	2	.038	3	-.002	15
480			min	-1467.982	3	-1.355	6	-21.176	2	-.023	3	-.086	2	-.009	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	3351.875	2	-.478	15	9.439	3	.05	2	.041	3	-.002	15
482			min	-1468.023	3	-2.032	6	-21.176	2	-.023	3	-.093	2	-.009	4
483		14	max	3351.822	2	-.637	15	9.439	3	.05	2	.045	3	-.002	15
484			min	-1468.063	3	-2.709	6	-21.176	2	-.023	3	-.101	2	-.008	4
485		15	max	3351.768	2	-.796	15	9.439	3	.05	2	.048	3	-.002	15
486			min	-1468.104	3	-3.386	6	-21.176	2	-.023	3	-.108	2	-.007	4
487		16	max	3351.714	2	-.955	15	9.439	3	.05	2	.052	3	-.001	15
488			min	-1468.144	3	-4.064	6	-21.176	2	-.023	3	-.116	2	-.005	4
489		17	max	3351.66	2	-1.114	15	9.439	3	.05	2	.055	3	0	15
490			min	-1468.185	3	-4.741	6	-21.176	2	-.023	3	-.123	2	-.004	4
491		18	max	3351.606	2	-1.274	15	9.439	3	.05	2	.058	3	0	15
492			min	-1468.225	3	-5.418	6	-21.176	2	-.023	3	-.131	2	-.002	4
493		19	max	3351.552	2	-1.433	15	9.439	3	.05	2	.062	3	0	1
494			min	-1468.266	3	-6.095	6	-21.176	2	-.023	3	-.139	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	.122	3	.481	3	.008	1	8.944e-3	3	1125.726	15	NC	1
2			min	-.532	2	-1.594	2	-.445	4	-2.113e-2	2	69.796	2	367.844	5
3		2	max	.122	3	.409	3	.001	3	8.592e-3	3	1198.56	15	NC	1
4			min	-.532	2	-1.402	2	-.431	4	-2.011e-2	2	77.091	2	383.449	4
5		3	max	.122	3	.34	3	.003	3	7.901e-3	3	1281.113	15	NC	3
6			min	-.532	2	-1.214	2	-.411	4	-1.813e-2	2	85.877	2	404.991	4
7		4	max	.122	3	.276	3	.004	3	7.211e-3	3	1692.013	12	NC	3
8			min	-.531	2	-1.038	2	-.387	4	-1.614e-2	2	96.125	2	434.565	4
9		5	max	.122	3	.221	3	.004	3	6.69e-3	3	2852.559	12	NC	3
10			min	-.531	2	-.883	2	-.361	4	-1.453e-2	2	107.464	2	473.048	4
11		6	max	.122	3	.177	3	.003	3	6.604e-3	3	6322.821	12	NC	1
12			min	-.53	2	-.751	2	-.333	4	-1.389e-2	2	119.387	2	520.974	4
13		7	max	.121	3	.141	3	.001	3	6.519e-3	3	NC	3	NC	1
14			min	-.529	2	-.636	2	-.306	4	-1.324e-2	2	132.196	2	578.218	4
15		8	max	.12	3	.11	3	0	1	6.434e-3	3	7337.954	12	NC	1
16			min	-.527	2	-.531	2	-.281	4	-1.26e-2	2	146.59	2	641.612	5
17		9	max	.12	3	.08	3	0	10	6.477e-3	3	3772.012	12	NC	1
18			min	-.526	2	-.428	2	-.259	4	-1.142e-2	2	164.004	2	712.713	5
19		10	max	.119	3	.051	3	0	2	6.641e-3	3	2547.905	12	NC	1
20			min	-.525	2	-.324	2	-.235	4	-9.746e-3	2	186.294	2	809.414	5
21		11	max	.119	3	.023	3	0	1	6.805e-3	3	2581.49	15	NC	1
22			min	-.523	2	-.22	2	-.211	4	-8.07e-3	2	215.841	2	940.868	5
23		12	max	.118	3	-.003	12	.002	3	6.076e-3	3	2946.652	15	NC	1
24			min	-.522	2	-.115	2	-.187	4	-6.307e-3	2	257.032	2	1121.019	5
25		13	max	.118	3	-.001	15	.006	3	4.398e-3	3	3433.909	15	NC	1
26			min	-.521	2	-.03	3	-.16	4	-4.45e-3	2	316.941	2	1427.816	5
27		14	max	.117	3	.088	2	.008	3	2.721e-3	3	4117.194	15	NC	1
28			min	-.519	2	-.045	3	-.132	4	-2.827e-3	4	406.984	2	1974.107	5
29		15	max	.117	3	.178	2	.007	3	1.043e-3	3	5143.976	15	NC	1
30			min	-.518	2	-.042	3	-.107	4	-3.469e-3	4	547.779	2	2966.085	5
31		16	max	.117	3	.254	2	.007	1	3.053e-3	3	6858.065	15	NC	1
32			min	-.518	2	-.017	3	-.089	5	-3.037e-3	4	776.213	2	4736.541	5
33		17	max	.117	3	.319	2	.009	1	5.496e-3	3	NC	15	NC	1
34			min	-.518	2	.017	12	-.076	5	-2.479e-3	4	1212.633	2	8389.48	5
35		18	max	.117	3	.379	2	.005	1	7.939e-3	3	NC	5	NC	1
36			min	-.518	2	.033	15	-.067	4	-2.855e-3	1	2433.149	3	NC	1
37		19	max	.117	3	.436	2	0	3	9.185e-3	3	NC	1	NC	1
38			min	-.518	2	.04	15	-.061	4	-3.269e-3	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
39	M4	1	max	.188	3	.781	3	0	1	1.121e-3	4	2507.056	15	NC	1
40			min	-.747	2	-2.358	2	-.445	4	0	1	50.414	2	368.701	4
41		2	max	.188	3	.669	3	0	1	9.987e-4	4	2754.073	15	NC	1
42			min	-.747	2	-2.071	2	-.431	4	0	1	56.134	2	381.654	4
43		3	max	.188	3	.561	3	0	1	7.587e-4	4	3049.165	15	NC	1
44			min	-.747	2	-1.791	2	-.412	4	0	1	63.137	2	402.201	4
45		4	max	.188	3	.464	3	0	1	5.195e-4	5	3390.003	15	NC	1
46			min	-.747	2	-1.533	2	-.388	4	0	1	71.349	2	431.715	4
47		5	max	.187	3	.386	3	0	1	3.579e-4	5	NC	12	NC	1
48			min	-.747	2	-1.312	2	-.361	4	0	1	80.28	2	471.046	4
49		6	max	.186	3	.331	3	0	1	3.949e-4	5	6228.984	12	NC	1
50			min	-.744	2	-1.134	2	-.333	4	0	1	89.263	2	520.178	4
51		7	max	.185	3	.289	3	0	1	4.319e-4	5	4571.038	15	NC	1
52			min	-.742	2	-.984	2	-.305	4	0	1	98.598	2	578.24	4
53		8	max	.183	3	.252	3	0	1	4.695e-4	4	5061.733	15	NC	1
54			min	-.739	2	-.845	2	-.281	4	0	1	109.117	2	642.083	4
55		9	max	.182	3	.211	3	0	1	4.186e-4	4	5693.209	15	NC	1
56			min	-.737	2	-.702	2	-.26	4	0	1	122.614	2	710.151	4
57		10	max	.181	3	.163	3	0	1	2.843e-4	4	6566.453	15	NC	1
58			min	-.734	2	-.548	2	-.235	4	0	1	141.505	2	809.575	4
59		11	max	.18	3	.107	3	0	1	1.505e-4	5	7831.273	15	NC	1
60			min	-.732	2	-.385	2	-.21	4	0	1	169.105	2	943.672	4
61		12	max	.178	3	.043	3	0	1	0	1	9806.095	15	NC	1
62			min	-.729	2	-.213	2	-.188	4	-4.038e-4	4	212.581	2	1108.79	4
63		13	max	.177	3	0	15	0	1	0	1	NC	15	NC	1
64			min	-.727	2	-.041	2	-.162	4	-1.403e-3	4	286.464	2	1394.202	4
65		14	max	.176	3	.117	2	0	1	0	1	NC	5	NC	1
66			min	-.724	2	-.061	3	-.134	4	-2.402e-3	4	331.724	3	1912.888	4
67		15	max	.175	3	.246	2	0	1	0	1	NC	5	NC	1
68			min	-.722	2	-.062	3	-.11	4	-3.402e-3	4	330.875	3	2864.592	4
69		16	max	.174	3	.334	2	0	1	0	1	NC	5	NC	1
70			min	-.722	2	-.004	3	-.091	4	-2.761e-3	4	382.098	3	4585.913	4
71		17	max	.174	3	.389	2	0	1	0	1	NC	4	NC	1
72			min	-.722	2	.009	15	-.077	4	-1.929e-3	4	528.947	3	8250.679	4
73		18	max	.174	3	.424	2	0	1	0	1	NC	4	NC	1
74			min	-.722	2	.009	15	-.067	4	-1.097e-3	4	1026.659	3	NC	1
75		19	max	.174	3	.454	2	0	1	0	1	NC	1	NC	1
76			min	-.722	2	.01	15	-.06	4	-6.72e-4	4	NC	1	NC	1
77	M7	1	max	.122	3	.481	3	.002	3	2.113e-2	2	NC	5	NC	1
78			min	-.532	2	-1.594	2	-.448	4	-8.944e-3	3	69.796	2	363.587	4
79		2	max	.122	3	.409	3	.006	1	2.011e-2	2	NC	5	NC	1
80			min	-.532	2	-1.402	2	-.428	4	-8.592e-3	3	77.091	2	383.114	4
81		3	max	.122	3	.34	3	.013	1	1.813e-2	2	NC	5	NC	3
82			min	-.532	2	-1.214	2	-.406	4	-7.901e-3	3	85.877	2	407.457	4
83		4	max	.122	3	.276	3	.014	1	1.614e-2	2	NC	5	NC	3
84			min	-.531	2	-1.038	2	-.382	4	-7.211e-3	3	96.125	2	437.921	4
85		5	max	.122	3	.221	3	.012	1	1.453e-2	2	NC	5	NC	3
86			min	-.531	2	-.883	2	-.356	4	-6.69e-3	3	107.464	2	475.744	4
87		6	max	.122	3	.177	3	.008	1	1.389e-2	2	NC	5	NC	1
88			min	-.53	2	-.751	2	-.331	4	-6.604e-3	3	119.387	2	520.943	4
89		7	max	.121	3	.141	3	.003	2	1.324e-2	2	NC	3	NC	1
90			min	-.529	2	-.636	2	-.305	4	-6.519e-3	3	132.196	2	573.871	4
91		8	max	.12	3	.11	3	0	12	1.26e-2	2	NC	5	NC	1
92			min	-.527	2	-.531	2	-.282	4	-6.434e-3	3	146.59	2	634.93	4
93		9	max	.12	3	.08	3	0	3	1.142e-2	2	NC	5	NC	1
94			min	-.526	2	-.428	2	-.259	4	-6.477e-3	3	164.004	2	705.689	4
95		10	max	.119	3	.051	3	0	3	9.746e-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	-.525	2	-.324	2	-.236	4	-6.641e-3	3	186.294	2	799.77	4
97		11	max	.119	3	.023	3	0	3	8.07e-3	2	NC	5	NC	1
98			min	-.523	2	-.22	2	-.211	4	-6.805e-3	3	215.841	2	928.081	4
99		12	max	.118	3	.004	5	.003	1	6.307e-3	2	NC	5	NC	1
100			min	-.522	2	-.115	2	-.186	4	-6.076e-3	3	257.032	2	1110.423	4
101		13	max	.118	3	0	5	.004	2	4.45e-3	2	NC	5	NC	1
102			min	-.521	2	-.03	3	-.159	4	-4.398e-3	3	316.941	2	1415.292	4
103		14	max	.117	3	.088	2	.003	2	2.593e-3	2	NC	5	NC	1
104			min	-.519	2	-.045	3	-.131	4	-2.721e-3	3	406.984	2	1940.067	4
105		15	max	.117	3	.178	2	0	10	7.355e-4	2	NC	4	NC	1
106			min	-.518	2	-.042	3	-.108	4	-3.315e-3	5	547.779	2	2837.05	4
107		16	max	.117	3	.254	2	-.003	12	1.234e-3	1	NC	4	NC	1
108			min	-.518	2	-.017	3	-.092	4	-3.053e-3	3	776.213	2	4279.645	4
109		17	max	.117	3	.319	2	0	12	2.044e-3	1	NC	4	NC	1
110			min	-.518	2	-.016	5	-.079	4	-5.496e-3	3	1212.633	2	6945.752	4
111		18	max	.117	3	.379	2	0	12	2.855e-3	1	NC	4	NC	1
112			min	-.518	2	-.022	5	-.068	4	-7.939e-3	3	2433.149	3	NC	1
113		19	max	.117	3	.436	2	.007	1	3.269e-3	1	NC	1	NC	1
114			min	-.518	2	-.028	5	-.058	5	-9.185e-3	3	NC	1	NC	1
115	M10	1	max	0	1	.408	2	.518	2	7.375e-3	3	NC	1	NC	1
116			min	-.063	4	-.025	5	-.117	3	-7.534e-4	5	NC	1	NC	1
117		2	max	0	1	.386	2	.534	2	8.494e-3	3	NC	4	NC	3
118			min	-.063	4	-.018	5	-.119	3	-6.541e-4	5	1938.878	3	7256.059	1
119		3	max	0	1	.367	2	.559	2	9.613e-3	3	NC	4	NC	3
120			min	-.063	4	-.013	5	-.124	3	-5.548e-4	5	1006.244	3	2918.348	1
121		4	max	0	1	.357	2	.589	2	1.073e-2	3	NC	4	NC	5
122			min	-.063	4	-.009	5	-.132	3	-4.556e-4	5	726.994	3	1730.176	1
123		5	max	0	1	.358	2	.621	2	1.185e-2	3	NC	4	NC	5
124			min	-.063	4	-.005	5	-.141	3	-3.563e-4	5	614.76	3	1228.722	1
125		6	max	0	1	.369	2	.652	2	1.297e-2	3	NC	13	NC	5
126			min	-.063	4	-.002	5	-.15	3	-2.57e-4	5	575.663	3	973.683	1
127		7	max	0	1	.387	2	.68	2	1.409e-2	3	NC	10	NC	5
128			min	-.063	4	0	15	-.159	3	-1.578e-4	5	580.997	3	813.575	2
129		8	max	0	1	.41	2	.702	2	1.521e-2	3	NC	1	NC	5
130			min	-.063	4	.004	15	-.167	3	-5.85e-5	5	618.314	3	716.524	2
131		9	max	0	1	.43	2	.716	2	1.633e-2	3	NC	1	NC	5
132			min	-.063	4	.007	15	-.172	3	2.339e-5	15	671.933	3	664.812	2
133		10	max	0	1	.439	2	.722	2	1.745e-2	3	NC	9	NC	5
134			min	-.064	4	.01	15	-.174	3	9.057e-5	15	703.713	3	648.048	2
135		11	max	0	3	.43	2	.716	2	1.633e-2	3	NC	1	NC	5
136			min	-.064	4	.013	15	-.172	3	1.775e-4	15	671.933	3	664.812	2
137		12	max	0	3	.41	2	.702	2	1.521e-2	3	NC	1	NC	5
138			min	-.064	4	.015	15	-.167	3	2.645e-4	15	618.314	3	716.524	2
139		13	max	0	3	.387	2	.68	2	1.409e-2	3	NC	10	NC	5
140			min	-.064	4	.017	15	-.159	3	3.515e-4	15	580.997	3	813.575	2
141		14	max	0	3	.369	2	.652	2	1.297e-2	3	NC	14	NC	5
142			min	-.064	4	.019	15	-.15	3	4.384e-4	15	575.663	3	973.683	1
143		15	max	0	3	.358	2	.621	2	1.185e-2	3	NC	14	NC	5
144			min	-.064	4	.021	15	-.141	3	5.254e-4	15	614.76	3	1228.722	1
145		16	max	0	3	.357	2	.589	2	1.073e-2	3	NC	14	NC	4
146			min	-.064	4	.023	15	-.132	3	6.123e-4	15	726.994	3	1730.176	1
147		17	max	0	3	.367	2	.559	2	9.613e-3	3	7071.385	9	NC	3
148			min	-.064	4	.027	15	-.124	3	6.993e-4	15	1006.244	3	2918.348	1
149		18	max	0	3	.386	2	.534	2	8.494e-3	3	NC	9	NC	3
150			min	-.064	4	.031	15	-.119	3	7.863e-4	15	1840.662	5	7256.059	1
151		19	max	0	3	.408	2	.518	2	7.375e-3	3	NC	1	NC	1
152			min	-.064	4	.037	15	-.117	3	8.732e-4	15	1652.085	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	.008	3	.523	2	1.335e-2	2	NC	1	NC	1
154			min	-.199	4	-.166	2	-.119	3	-3.569e-3	3	NC	1	NC	1
155		2	max	0	1	.059	3	.534	2	1.428e-2	2	NC	4	NC	1
156			min	-.199	4	-.218	2	-.123	3	-4.065e-3	3	2551.841	2	8899.978	4
157		3	max	0	1	.104	3	.557	2	1.521e-2	2	NC	4	NC	3
158			min	-.199	4	-.264	2	-.129	3	-4.562e-3	3	1354.878	2	3538.735	1
159		4	max	0	1	.136	3	.587	2	1.614e-2	2	NC	5	NC	12
160			min	-.199	4	-.299	2	-.137	3	-5.058e-3	3	995.776	2	1942.655	1
161		5	max	0	1	.152	3	.621	2	1.707e-2	2	NC	5	NC	5
162			min	-.199	4	-.321	2	-.146	3	-5.554e-3	3	853.346	2	1316.263	1
163		6	max	0	1	.151	3	.654	2	1.8e-2	2	NC	5	NC	5
164			min	-.199	4	-.33	2	-.156	3	-6.051e-3	3	807.596	2	1004.796	2
165		7	max	0	1	.135	3	.684	2	1.892e-2	2	NC	5	NC	5
166			min	-.199	4	-.327	2	-.164	3	-6.547e-3	3	821.991	2	817.278	2
167		8	max	0	1	.111	3	.708	2	1.985e-2	2	NC	5	NC	5
168			min	-.199	4	-.316	2	-.172	3	-7.043e-3	3	880.434	2	710.421	2
169		9	max	0	1	.087	3	.725	2	2.078e-2	2	NC	5	NC	5
170			min	-.199	4	-.304	2	-.177	3	-7.539e-3	3	960.783	2	653.846	2
171		10	max	0	1	.075	3	.73	2	2.171e-2	2	NC	5	NC	5
172			min	-.199	4	-.297	2	-.179	3	-8.036e-3	3	1007.777	2	635.471	2
173		11	max	0	3	.087	3	.725	2	2.078e-2	2	NC	5	NC	15
174			min	-.199	4	-.304	2	-.177	3	-7.539e-3	3	960.783	2	653.846	2
175		12	max	0	3	.111	3	.708	2	1.985e-2	2	NC	5	NC	15
176			min	-.199	4	-.316	2	-.172	3	-7.043e-3	3	880.434	2	710.421	2
177		13	max	0	3	.135	3	.684	2	1.892e-2	2	NC	5	NC	7
178			min	-.199	4	-.327	2	-.164	3	-6.547e-3	3	821.991	2	817.278	2
179		14	max	0	3	.151	3	.654	2	1.8e-2	2	NC	5	NC	5
180			min	-.199	4	-.33	2	-.156	3	-6.051e-3	3	807.596	2	1004.796	2
181		15	max	0	3	.152	3	.621	2	1.707e-2	2	NC	5	NC	4
182			min	-.199	4	-.321	2	-.146	3	-5.554e-3	3	853.346	2	1316.263	1
183		16	max	0	3	.136	3	.587	2	1.614e-2	2	NC	5	NC	4
184			min	-.199	4	-.299	2	-.137	3	-5.058e-3	3	995.776	2	1942.655	1
185		17	max	0	3	.104	3	.557	2	1.521e-2	2	NC	5	NC	3
186			min	-.199	4	-.264	2	-.129	3	-4.562e-3	3	1354.878	2	3538.735	1
187		18	max	0	3	.059	3	.534	2	1.428e-2	2	NC	4	NC	1
188			min	-.199	4	-.218	2	-.123	3	-4.065e-3	3	2551.841	2	NC	1
189		19	max	0	3	.008	3	.523	2	1.335e-2	2	NC	1	NC	1
190			min	-.199	4	-.166	2	-.119	3	-3.569e-3	3	NC	1	NC	1
191	M12	1	max	0	3	.095	3	.527	2	1.307e-2	2	NC	1	NC	1
192			min	-.271	4	-.481	2	-.12	3	-3.747e-3	3	NC	1	NC	1
193		2	max	0	3	.141	3	.536	2	1.364e-2	2	NC	4	NC	1
194			min	-.271	4	-.57	2	-.122	3	-3.906e-3	3	1478.3	2	NC	1
195		3	max	0	3	.182	3	.558	2	1.421e-2	2	NC	5	NC	3
196			min	-.271	4	-.652	2	-.128	3	-4.065e-3	3	772.208	2	3816.762	1
197		4	max	0	3	.214	3	.589	2	1.478e-2	2	NC	5	NC	12
198			min	-.271	4	-.719	2	-.136	3	-4.224e-3	3	555.418	2	2021.54	1
199		5	max	0	3	.235	3	.623	2	1.534e-2	2	NC	5	NC	5
200			min	-.271	4	-.766	2	-.145	3	-4.382e-3	3	462.855	2	1342.36	1
201		6	max	0	3	.247	3	.657	2	1.591e-2	2	NC	5	NC	5
202			min	-.271	4	-.793	2	-.156	3	-4.541e-3	3	422.708	2	1010.109	2
203		7	max	0	3	.249	3	.689	2	1.648e-2	2	NC	5	NC	5
204			min	-.271	4	-.802	2	-.166	3	-4.7e-3	3	411.624	2	813.603	2
205		8	max	0	3	.244	3	.715	2	1.705e-2	2	NC	5	NC	5
206			min	-.271	4	-.796	2	-.174	3	-4.858e-3	3	418.787	2	702.604	2
207		9	max	0	3	.237	3	.732	2	1.762e-2	2	NC	5	NC	5
208			min	-.271	4	-.785	2	-.18	3	-5.017e-3	3	434.764	2	644.072	2
209		10	max	0	1	.233	3	.738	2	1.819e-2	2	NC	5	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	-.271	4	-.778	2	-.183	3	-5.176e-3	3	444.825	2	625.058	2
211		11	max	0	1	.237	3	.732	2	1.762e-2	2	NC	5	NC	15
212			min	-.271	4	-.785	2	-.18	3	-5.017e-3	3	434.764	2	644.072	2
213		12	max	0	1	.244	3	.715	2	1.705e-2	2	NC	5	NC	15
214			min	-.271	4	-.796	2	-.174	3	-4.858e-3	3	418.787	2	702.604	2
215		13	max	0	1	.249	3	.689	2	1.648e-2	2	NC	5	NC	7
216			min	-.271	4	-.802	2	-.166	3	-4.7e-3	3	411.624	2	813.603	2
217		14	max	0	1	.247	3	.657	2	1.591e-2	2	NC	5	NC	5
218			min	-.271	4	-.793	2	-.156	3	-4.541e-3	3	422.708	2	1010.109	2
219		15	max	0	1	.235	3	.623	2	1.534e-2	2	NC	5	NC	4
220			min	-.271	4	-.766	2	-.145	3	-4.382e-3	3	462.855	2	1342.36	1
221		16	max	0	1	.214	3	.589	2	1.478e-2	2	NC	5	NC	4
222			min	-.271	4	-.719	2	-.136	3	-4.224e-3	3	555.418	2	2021.54	1
223		17	max	0	1	.182	3	.558	2	1.421e-2	2	NC	5	NC	3
224			min	-.271	4	-.652	2	-.128	3	-4.065e-3	3	772.208	2	3816.762	1
225		18	max	0	1	.141	3	.536	2	1.364e-2	2	NC	4	NC	1
226			min	-.271	4	-.57	2	-.122	3	-3.906e-3	3	1478.3	2	NC	1
227		19	max	0	1	.095	3	.527	2	1.307e-2	2	NC	1	NC	1
228			min	-.271	4	-.481	2	-.12	3	-3.747e-3	3	NC	1	NC	1
229	M13	1	max	0	3	.446	3	.532	2	2.438e-2	2	NC	1	NC	1
230			min	-.439	4	-1.5	2	-.122	3	-9.071e-3	3	NC	1	NC	1
231		2	max	0	3	.511	3	.55	2	2.57e-2	2	NC	5	NC	3
232			min	-.439	4	-1.655	2	-.127	3	-9.637e-3	3	851.224	2	6495.449	1
233		3	max	0	3	.573	3	.577	2	2.703e-2	2	NC	5	NC	3
234			min	-.439	4	-1.803	2	-.134	3	-1.02e-2	3	436.183	2	2681.678	1
235		4	max	0	3	.626	3	.609	2	2.836e-2	2	NC	5	NC	7
236			min	-.439	4	-1.934	2	-.143	3	-1.077e-2	3	304.648	2	1612.067	1
237		5	max	0	3	.668	3	.643	2	2.968e-2	2	NC	5	NC	5
238			min	-.439	4	-2.041	2	-.153	3	-1.133e-2	3	244.13	2	1154.279	1
239		6	max	0	3	.699	3	.675	2	3.101e-2	2	NC	15	NC	5
240			min	-.439	4	-2.122	2	-.163	3	-1.19e-2	3	212.388	2	917.649	2
241		7	max	0	3	.717	3	.704	2	3.233e-2	2	NC	15	NC	5
242			min	-.439	4	-2.176	2	-.172	3	-1.246e-2	3	195.444	2	764.415	2
243		8	max	0	3	.726	3	.727	2	3.366e-2	2	NC	15	NC	5
244			min	-.439	4	-2.205	2	-.18	3	-1.303e-2	3	187.228	2	675.299	2
245		9	max	0	3	.727	3	.742	2	3.498e-2	2	NC	15	NC	5
246			min	-.439	4	-2.216	2	-.185	3	-1.36e-2	3	184.325	2	627.677	2
247		10	max	0	1	.726	3	.747	2	3.631e-2	2	NC	15	NC	5
248			min	-.439	4	-2.218	2	-.188	3	-1.416e-2	3	183.997	2	612.226	2
249		11	max	0	1	.727	3	.742	2	3.498e-2	2	NC	15	NC	5
250			min	-.439	4	-2.216	2	-.185	3	-1.36e-2	3	184.325	2	627.677	2
251		12	max	0	1	.726	3	.727	2	3.366e-2	2	NC	15	NC	5
252			min	-.439	4	-2.205	2	-.18	3	-1.303e-2	3	187.228	2	675.299	2
253		13	max	0	1	.717	3	.704	2	3.233e-2	2	NC	15	NC	5
254			min	-.439	4	-2.176	2	-.172	3	-1.246e-2	3	195.444	2	764.415	2
255		14	max	0	1	.699	3	.675	2	3.101e-2	2	NC	15	NC	5
256			min	-.439	4	-2.122	2	-.163	3	-1.19e-2	3	212.388	2	917.649	2
257		15	max	0	1	.668	3	.643	2	2.968e-2	2	NC	15	NC	4
258			min	-.439	4	-2.041	2	-.153	3	-1.133e-2	3	244.13	2	1154.279	1
259		16	max	0	1	.626	3	.609	2	2.836e-2	2	NC	5	NC	4
260			min	-.439	4	-1.934	2	-.143	3	-1.077e-2	3	304.648	2	1612.067	1
261		17	max	0	1	.573	3	.577	2	2.703e-2	2	NC	5	NC	3
262			min	-.439	4	-1.803	2	-.134	3	-1.02e-2	3	436.183	2	2681.678	1
263		18	max	0	1	.511	3	.55	2	2.57e-2	2	NC	5	NC	3
264			min	-.439	4	-1.655	2	-.127	3	-9.637e-3	3	851.224	2	6495.449	1
265		19	max	0	1	.446	3	.532	2	2.438e-2	2	NC	1	NC	1
266			min	-.439	4	-1.5	2	-.122	3	-9.071e-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	3	0	5	4.169e-4	2	NC	1	NC	1
270			min	0	2	-.002	2	0	1	-6.764e-4	5	NC	1	NC	1
271		3	max	0	3	0	3	.002	5	8.339e-4	2	NC	3	NC	1
272			min	0	2	-.007	2	0	1	-1.353e-3	5	8333.95	2	NC	1
273		4	max	0	3	.002	3	.005	5	1.251e-3	2	NC	3	NC	1
274			min	0	2	-.016	2	0	1	-2.029e-3	5	3679.069	2	NC	1
275		5	max	0	3	.005	3	.008	5	1.668e-3	2	NC	3	NC	1
276			min	0	2	-.029	2	-.001	1	-2.706e-3	5	2059.178	2	7706.88	5
277		6	max	0	3	.008	3	.012	5	2.085e-3	2	NC	5	NC	1
278			min	0	2	-.046	2	-.001	1	-3.382e-3	5	1312.201	2	5075.138	5
279		7	max	0	3	.012	3	.017	5	2.502e-3	2	NC	15	NC	1
280			min	0	2	-.067	2	-.002	1	-4.059e-3	5	907.618	2	3624.649	5
281		8	max	0	3	.017	3	.022	5	2.919e-3	2	8158.342	15	NC	1
282			min	0	2	-.091	2	-.002	1	-4.735e-3	5	664.327	2	2738.831	5
283		9	max	0	3	.023	3	.028	5	2.843e-3	2	6364.399	15	NC	1
284			min	0	2	-.12	2	-.003	1	-4.902e-3	5	505.65	2	2157.151	5
285		10	max	0	3	.03	3	.035	5	2.478e-3	2	5124.696	15	NC	1
286			min	-.001	2	-.152	2	-.003	1	-4.769e-3	5	397.858	2	1753.603	5
287		11	max	0	3	.038	3	.042	5	2.113e-3	2	4233.169	15	NC	1
288			min	-.001	2	-.188	2	-.004	1	-4.637e-3	5	322.163	2	1461.758	5
289		12	max	.001	3	.047	3	.049	5	1.748e-3	2	3570.577	15	NC	1
290			min	-.001	2	-.227	2	-.004	1	-4.504e-3	5	267.151	2	1243.721	5
291		13	max	.001	3	.057	3	.056	5	1.383e-3	2	3064.641	15	NC	1
292			min	-.001	2	-.268	2	-.004	1	-4.371e-3	5	225.993	2	1076.462	5
293		14	max	.001	3	.067	3	.064	5	1.018e-3	2	2669.543	15	NC	1
294			min	-.001	2	-.312	2	-.004	1	-4.239e-3	5	194.434	2	945.326	5
295		15	max	.001	3	.078	3	.072	4	6.527e-4	2	2355.152	15	NC	1
296			min	-.002	2	-.357	2	-.004	1	-4.106e-3	5	169.729	2	840.296	4
297		16	max	.001	3	.089	3	.08	4	2.877e-4	2	2100.933	15	NC	1
298			min	-.002	2	-.404	2	-.004	1	-3.995e-3	4	150.045	2	754.728	4
299		17	max	.001	3	.1	3	.089	4	2.958e-4	3	1892.565	15	NC	1
300			min	-.002	2	-.452	2	-.004	1	-3.898e-3	4	134.124	2	684.444	4
301		18	max	.002	3	.112	3	.097	4	4.9e-4	3	1719.765	15	NC	1
302			min	-.002	2	-.501	2	-.005	3	-3.801e-3	4	121.078	2	626.078	4
303		19	max	.002	3	.123	3	.105	4	6.843e-4	3	1575.031	15	NC	1
304			min	-.002	2	-.55	2	-.007	3	-3.704e-3	4	110.271	2	577.16	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	-.002	1	0	1	-6.906e-4	4	NC	1	NC	1
309		3	max	0	3	0	3	.002	4	0	1	NC	3	NC	1
310			min	0	2	-.008	1	0	1	-1.381e-3	4	7310.553	1	NC	1
311		4	max	0	3	.001	3	.005	4	0	1	NC	3	NC	1
312			min	0	2	-.019	1	0	1	-2.072e-3	4	3160.151	1	NC	1
313		5	max	.001	3	.003	3	.008	4	0	1	NC	3	NC	1
314			min	-.001	2	-.035	2	0	1	-2.762e-3	4	1740.466	2	7455.451	4
315		6	max	.001	3	.006	3	.012	4	0	1	NC	5	NC	1
316			min	-.001	2	-.056	2	0	1	-3.453e-3	4	1084.69	2	4911.148	4
317		7	max	.002	3	.011	3	.017	4	0	1	NC	5	NC	1
318			min	-.002	2	-.082	2	0	1	-4.143e-3	4	735.538	2	3508.691	4
319		8	max	.002	3	.017	3	.023	4	0	1	NC	5	NC	1
320			min	-.002	2	-.115	2	0	1	-4.834e-3	4	528.627	2	2652.129	4
321		9	max	.002	3	.025	3	.029	4	0	1	NC	5	NC	1
322			min	-.002	2	-.154	2	0	1	-5.005e-3	4	394.951	2	2089.571	4
323		10	max	.002	3	.036	3	.036	4	0	1	NC	15	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	-.199	2	0	1	-4.872e-3	4	305.598	2	1699.222	4
325		11	max	.002	3	.048	3	.043	4	0	1	NC	15	NC	1
326			min	-.003	2	-.249	2	0	1	-4.739e-3	4	244.037	2	1416.941	4
327		12	max	.003	3	.062	3	.05	4	0	1	8727.537	15	NC	1
328			min	-.003	2	-.303	2	0	1	-4.605e-3	4	200.048	2	1206.094	4
329		13	max	.003	3	.077	3	.058	4	0	1	7376.051	15	NC	1
330			min	-.003	2	-.362	2	0	1	-4.472e-3	4	167.615	2	1044.402	4
331		14	max	.003	3	.093	3	.066	4	0	1	6341.033	15	NC	1
332			min	-.003	2	-.424	2	0	1	-4.338e-3	4	143.06	2	917.684	4
333		15	max	.003	3	.11	3	.074	4	0	1	5531.697	15	NC	1
334			min	-.004	2	-.489	2	0	1	-4.205e-3	4	124.05	2	816.571	4
335		16	max	.004	3	.128	3	.083	4	0	1	4887.416	15	NC	1
336			min	-.004	2	-.556	2	0	1	-4.071e-3	4	109.047	2	734.66	4
337		17	max	.004	3	.146	3	.091	4	0	1	4366.738	15	NC	1
338			min	-.004	2	-.625	2	0	1	-3.938e-3	4	97.014	2	667.462	4
339		18	max	.004	3	.165	3	.099	4	0	1	3940.424	15	NC	1
340			min	-.004	2	-.695	2	0	1	-3.804e-3	4	87.228	2	611.749	4
341		19	max	.004	3	.184	3	.107	4	0	1	3587.519	15	NC	1
342			min	-.005	2	-.766	2	0	1	-3.671e-3	4	79.177	2	565.154	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	3	0	4	1.874e-4	3	NC	1	NC	1
346			min	0	2	-.002	2	0	3	-7.368e-4	4	NC	1	NC	1
347		3	max	0	3	0	3	.002	4	3.747e-4	3	NC	3	NC	1
348			min	0	2	-.007	2	0	3	-1.474e-3	4	8333.95	2	NC	1
349		4	max	0	3	.002	3	.005	4	5.621e-4	3	NC	3	NC	1
350			min	0	2	-.016	2	0	3	-2.211e-3	4	3679.069	2	NC	1
351		5	max	0	3	.005	3	.008	4	7.495e-4	3	NC	3	NC	1
352			min	0	2	-.029	2	0	3	-2.947e-3	4	2059.178	2	7459.518	4
353		6	max	0	3	.008	3	.012	4	9.369e-4	3	NC	4	NC	1
354			min	0	2	-.046	2	-.001	3	-3.684e-3	4	1312.201	2	4917.422	4
355		7	max	0	3	.012	3	.017	4	1.124e-3	3	NC	4	NC	1
356			min	0	2	-.067	2	-.001	3	-4.421e-3	4	907.618	2	3515.791	4
357		8	max	0	3	.017	3	.023	4	1.312e-3	3	NC	5	NC	1
358			min	0	2	-.091	2	-.002	3	-5.158e-3	4	664.327	2	2659.544	4
359		9	max	0	3	.023	3	.029	4	1.259e-3	3	NC	5	NC	1
360			min	0	2	-.12	2	-.002	3	-5.311e-3	4	505.65	2	2097.05	4
361		10	max	0	3	.03	3	.036	4	1.064e-3	3	NC	7	NC	1
362			min	-.001	2	-.152	2	-.002	3	-5.122e-3	4	397.858	2	1706.456	4
363		11	max	0	3	.038	3	.043	4	8.7e-4	3	NC	13	NC	1
364			min	-.001	2	-.188	2	-.002	3	-4.932e-3	4	322.163	2	1423.828	4
365		12	max	.001	3	.047	3	.05	4	6.757e-4	3	9924.635	15	NC	1
366			min	-.001	2	-.227	2	-.001	3	-4.742e-3	4	267.151	2	1212.634	4
367		13	max	.001	3	.057	3	.058	4	4.814e-4	3	8679.584	15	NC	1
368			min	-.001	2	-.268	2	0	3	-4.553e-3	4	225.993	2	1050.629	4
369		14	max	.001	3	.067	3	.066	4	2.871e-4	3	7686.454	15	NC	1
370			min	-.001	2	-.312	2	0	3	-4.363e-3	4	194.434	2	923.644	4
371		15	max	.001	3	.078	3	.074	4	9.282e-5	3	6880.183	15	NC	1
372			min	-.002	2	-.357	2	0	12	-4.174e-3	4	169.729	2	822.312	4
373		16	max	.001	3	.089	3	.082	4	1.411e-5	9	6215.828	15	NC	1
374			min	-.002	2	-.404	2	.001	12	-3.984e-3	4	150.045	2	740.226	4
375		17	max	.001	3	.1	3	.09	4	1.983e-4	1	5661.554	15	NC	1
376			min	-.002	2	-.452	2	.001	10	-3.819e-3	5	134.124	2	672.895	4
377		18	max	.002	3	.112	3	.098	4	5.228e-4	1	5194.136	15	NC	1
378			min	-.002	2	-.501	2	0	10	-3.667e-3	5	121.078	2	617.088	4
379		19	max	.002	3	.123	3	.106	4	8.474e-4	1	4796.359	15	NC	1
380			min	-.002	2	-.55	2	0	10	-3.515e-3	5	110.271	2	570.433	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	.101	2	.003	3	.024	5	1.25e-3	4	NC	1	NC	1
382			min	-.019	3	-.011	2	-.003	1	-1.064e-4	3	NC	1	NC	1
383		2	max	.099	2	.016	3	.046	5	1.173e-3	4	NC	1	NC	3
384			min	-.018	3	-.071	2	-.015	2	-4.367e-4	3	5743.74	3	5553.557	2
385		3	max	.098	2	.03	3	.068	5	1.652e-3	2	NC	1	NC	4
386			min	-.017	3	-.131	2	-.028	2	-7.671e-4	3	2867.735	3	2809.238	2
387		4	max	.097	2	.043	3	.09	5	2.371e-3	2	NC	1	NC	4
388			min	-.017	3	-.191	2	-.04	2	-1.097e-3	3	1907.445	3	1906.508	2
389		5	max	.095	2	.057	3	.112	5	3.091e-3	2	NC	1	NC	4
390			min	-.016	3	-.25	2	-.052	2	-1.428e-3	3	1426.222	3	1465.147	2
391		6	max	.094	2	.071	3	.134	5	3.811e-3	2	NC	1	NC	13
392			min	-.016	3	-.31	2	-.062	2	-1.758e-3	3	1136.738	3	1209.49	2
393		7	max	.092	2	.085	3	.155	5	4.531e-3	2	NC	1	8930.98	13
394			min	-.015	3	-.369	2	-.071	2	-2.089e-3	3	943.217	3	1048.069	2
395		8	max	.091	2	.099	3	.175	5	5.251e-3	2	NC	5	8068.312	13
396			min	-.014	3	-.428	2	-.079	2	-2.419e-3	3	804.612	3	942.19	2
397		9	max	.09	2	.113	3	.196	5	5.971e-3	2	NC	5	7529.027	13
398			min	-.014	3	-.487	2	-.084	2	-2.749e-3	3	700.398	3	873.16	2
399		10	max	.088	2	.127	3	.215	5	6.691e-3	2	NC	5	7232.539	13
400			min	-.013	3	-.545	2	-.088	2	-3.08e-3	3	619.17	3	831.483	2
401		11	max	.087	2	.142	3	.235	5	7.411e-3	2	NC	5	7143.678	13
402			min	-.013	3	-.604	2	-.089	2	-3.41e-3	3	554.083	3	812.757	2
403		12	max	.086	2	.157	3	.253	5	8.131e-3	2	NC	5	7260.394	13
404			min	-.012	3	-.662	2	-.088	2	-3.74e-3	3	500.78	3	782.997	14
405		13	max	.084	2	.172	3	.271	5	8.85e-3	2	NC	1	7615.318	13
406			min	-.011	3	-.719	2	-.084	2	-4.071e-3	3	456.355	3	709.779	14
407		14	max	.083	2	.187	3	.289	5	9.57e-3	2	NC	1	8293.663	13
408			min	-.011	3	-.777	2	-.077	2	-4.401e-3	3	418.794	3	647.217	14
409		15	max	.081	2	.202	3	.305	5	1.029e-2	2	NC	1	9487.013	13
410			min	-.01	3	-.834	2	-.067	2	-4.731e-3	3	386.656	3	593.029	14
411		16	max	.08	2	.218	3	.321	5	1.101e-2	2	NC	1	NC	4
412			min	-.009	3	-.892	2	-.053	2	-5.062e-3	3	358.885	3	545.55	14
413		17	max	.079	2	.233	3	.336	5	1.173e-2	2	NC	1	NC	4
414			min	-.009	3	-.949	2	-.035	2	-5.392e-3	3	334.686	3	503.537	14
415		18	max	.077	2	.249	3	.352	4	1.245e-2	2	NC	1	NC	4
416			min	-.008	3	-1.006	2	-.014	2	-5.723e-3	3	313.45	3	466.041	14
417		19	max	.076	1	.265	3	.368	4	1.317e-2	2	NC	1	NC	1
418			min	-.008	3	-1.063	2	-.004	3	-6.053e-3	3	294.705	3	432.331	14
419	M6	1	max	.127	2	.004	3	.025	4	1.27e-3	4	NC	1	NC	1
420			min	-.019	3	-.015	2	0	1	0	1	NC	1	NC	1
421		2	max	.124	2	.027	3	.048	4	1.096e-3	4	NC	1	NC	1
422			min	-.018	3	-.102	2	0	1	0	1	3290.487	3	NC	1
423		3	max	.122	2	.051	3	.07	4	9.224e-4	4	NC	1	NC	1
424			min	-.016	3	-.189	2	0	1	0	1	1643.886	3	NC	1
425		4	max	.119	2	.074	3	.092	4	7.486e-4	4	NC	1	NC	1
426			min	-.015	3	-.276	2	0	1	0	1	1094.484	3	7658.598	4
427		5	max	.116	2	.098	3	.115	4	5.749e-4	4	NC	1	NC	1
428			min	-.013	3	-.363	2	0	1	0	1	819.425	3	5877.523	4
429		6	max	.113	2	.122	3	.136	4	4.011e-4	4	NC	1	NC	1
430			min	-.012	3	-.45	2	0	1	0	1	654.138	3	4854.663	4
431		7	max	.11	2	.146	3	.158	4	2.274e-4	4	NC	1	NC	1
432			min	-.01	3	-.537	2	0	1	0	1	543.767	3	4216.3	4
433		8	max	.107	1	.17	3	.179	4	5.365e-5	4	NC	5	NC	1
434			min	-.009	3	-.623	2	0	1	0	1	464.8	3	3804.744	4
435		9	max	.105	1	.194	3	.2	4	0	1	NC	5	NC	1
436			min	-.007	3	-.709	2	0	1	-1.26e-4	5	405.484	3	3544.209	4
437		10	max	.103	1	.219	3	.22	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
438			min	-.006	3	-.795	2	0	1	-2.987e-4	5	359.286	3	3396.699	4
439		11	max	.1	1	.244	3	.239	4	0	1	NC	5	NC	1
440			min	-.004	3	-.88	2	0	1	-4.714e-4	5	322.287	3	3345.317	4
441		12	max	.098	1	.268	3	.258	4	0	1	NC	5	NC	1
442			min	-.003	3	-.966	2	0	1	-6.441e-4	5	291.994	3	3388.434	4
443		13	max	.096	1	.293	3	.276	4	0	1	NC	1	NC	1
444			min	-.001	3	-1.051	2	0	1	-8.168e-4	5	266.743	3	3540.235	4
445		14	max	.094	1	.319	3	.294	4	0	1	NC	1	NC	1
446			min	0	12	-1.136	2	0	1	-9.895e-4	5	245.383	3	3838.682	4
447		15	max	.091	1	.344	3	.31	4	0	1	NC	1	NC	1
448			min	.001	12	-1.22	2	0	1	-1.163e-3	4	227.091	3	4369.636	4
449		16	max	.089	1	.369	3	.326	4	0	1	NC	1	NC	1
450			min	.002	12	-1.305	2	0	1	-1.336e-3	4	211.262	3	5342.232	4
451		17	max	.087	1	.395	3	.341	4	0	1	NC	1	NC	1
452			min	.002	15	-1.389	2	0	1	-1.51e-3	4	197.444	3	7392.891	4
453		18	max	.084	1	.421	3	.355	4	0	1	NC	1	NC	1
454			min	.002	15	-1.473	2	0	1	-1.684e-3	4	185.289	3	NC	1
455		19	max	.082	1	.446	3	.369	4	0	1	NC	1	NC	1
456			min	.002	15	-1.557	2	0	1	-1.858e-3	4	174.53	3	NC	1
457	M9	1	max	.101	2	.003	3	.025	4	1.223e-3	4	NC	1	NC	1
458			min	-.019	3	-.011	2	-.002	3	-2.117e-4	2	NC	1	NC	1
459		2	max	.099	2	.016	3	.049	4	1.045e-3	5	NC	1	NC	3
460			min	-.018	3	-.071	2	-.007	3	-9.316e-4	2	5743.74	3	5553.557	2
461		3	max	.098	2	.03	3	.073	4	8.699e-4	5	NC	1	NC	5
462			min	-.017	3	-.131	2	-.013	3	-1.652e-3	2	2867.735	3	2809.238	2
463		4	max	.097	2	.043	3	.097	4	1.097e-3	3	NC	1	NC	15
464			min	-.017	3	-.191	2	-.019	3	-2.371e-3	2	1907.445	3	1906.508	2
465		5	max	.095	2	.057	3	.12	4	1.428e-3	3	NC	1	7796.865	15
466			min	-.016	3	-.25	2	-.024	3	-3.091e-3	2	1426.222	3	1465.147	2
467		6	max	.094	2	.071	3	.143	4	1.758e-3	3	NC	1	6437.012	15
468			min	-.016	3	-.31	2	-.028	3	-3.811e-3	2	1136.738	3	1209.49	2
469		7	max	.092	2	.085	3	.165	4	2.089e-3	3	NC	1	5587.147	15
470			min	-.015	3	-.369	2	-.033	3	-4.531e-3	2	943.217	3	1048.069	2
471		8	max	.091	2	.099	3	.187	4	2.419e-3	3	NC	5	5037.988	15
472			min	-.014	3	-.428	2	-.036	3	-5.251e-3	2	804.612	3	942.19	2
473		9	max	.09	2	.113	3	.208	4	2.749e-3	3	NC	7	4688.877	15
474			min	-.014	3	-.487	2	-.039	3	-5.971e-3	2	700.398	3	873.16	2
475		10	max	.088	2	.127	3	.229	4	3.08e-3	3	NC	9	4489.235	15
476			min	-.013	3	-.545	2	-.04	3	-6.691e-3	2	619.17	3	831.483	2
477		11	max	.087	2	.142	3	.248	4	3.41e-3	3	NC	9	4416.407	15
478			min	-.013	3	-.604	2	-.041	3	-7.411e-3	2	554.083	3	812.757	2
479		12	max	.086	2	.157	3	.267	4	3.74e-3	3	NC	9	4467.864	15
480			min	-.012	3	-.662	2	-.04	3	-8.131e-3	2	500.78	3	816.191	2
481		13	max	.084	2	.172	3	.284	4	4.071e-3	3	NC	1	4661.828	15
482			min	-.011	3	-.719	2	-.039	3	-8.85e-3	2	456.355	3	844.633	2
483		14	max	.083	2	.187	3	.3	4	4.401e-3	3	NC	1	5047.592	15
484			min	-.011	3	-.777	2	-.036	3	-9.57e-3	2	418.794	3	906.275	2
485		15	max	.081	2	.202	3	.316	4	4.731e-3	3	NC	1	5736.945	15
486			min	-.01	3	-.834	2	-.031	3	-1.029e-2	2	386.656	3	1019.963	2
487		16	max	.08	2	.218	3	.33	4	5.062e-3	3	NC	1	7002.4	15
488			min	-.009	3	-.892	2	-.025	3	-1.101e-2	2	358.885	3	1231.858	2
489		17	max	.079	2	.233	3	.342	4	5.392e-3	3	NC	1	9673.465	15
490			min	-.009	3	-.949	2	-.017	3	-1.173e-2	2	334.686	3	1682.68	2
491		18	max	.077	2	.249	3	.354	4	5.723e-3	3	NC	1	NC	5
492			min	-.008	3	-1.006	2	-.008	3	-1.245e-2	2	313.45	3	3079.196	2
493		19	max	.076	1	.265	3	.364	4	6.053e-3	3	NC	1	NC	1
494			min	-.008	3	-1.063	2	-.013	1	-1.317e-2	2	294.705	3	NC	1