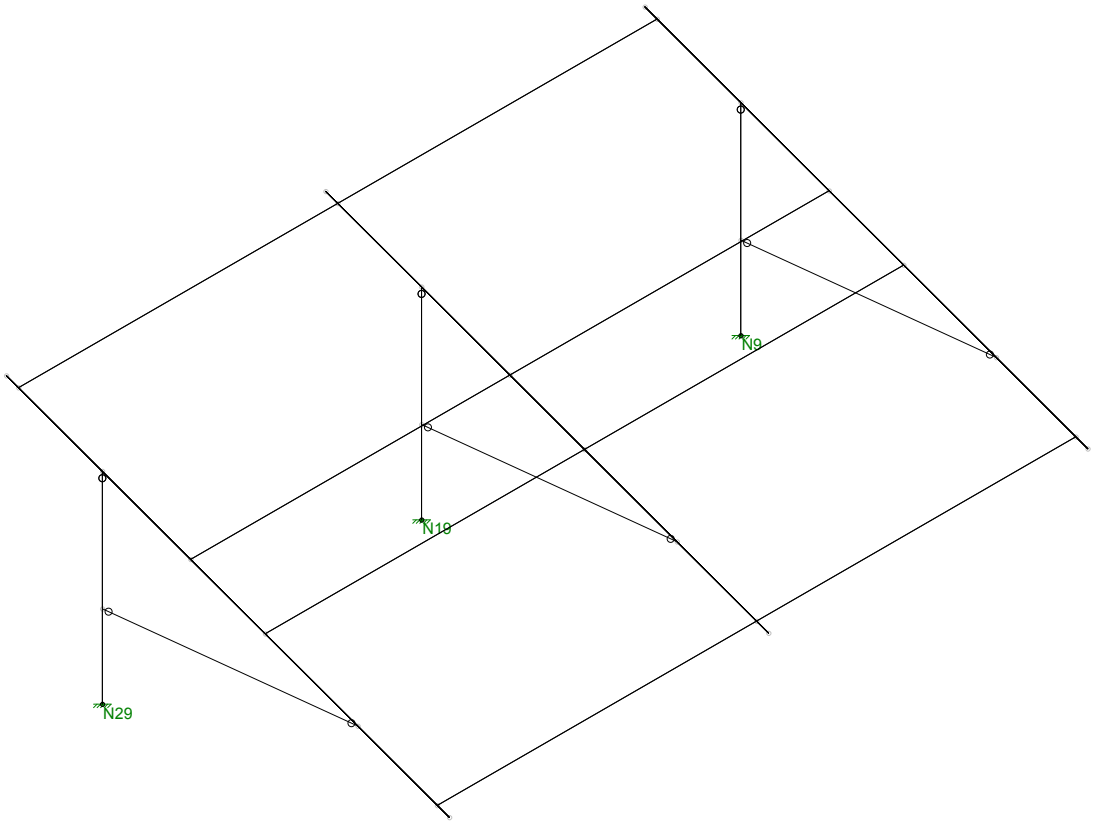


Schletter, Inc.		20° Tilt w/ Seismic Design
HCV	Standard FS Racking System	
	Representative Calculations - ASCE 7-10	

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.

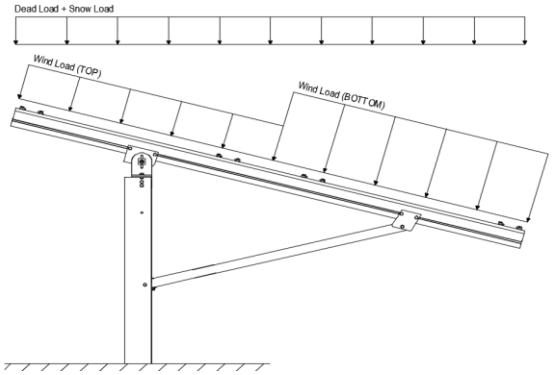
1.2 Construction

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 7-10 - Chapter 26-31, Wind Loads
- ASCE 7-10 - Chapter 7, Snow Loads
- ASCE 7-10 - Chapter 2, Combination of Loads
- International Building Code, IBC, 2012, 2015
- Aluminum Design Manual, Eighth Edition, 2005

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 =	20.62 psf	*(ASCE 7-10, Eq. 7.4-1)*
I_s =	1.00	
C_s =	0.91	
C_e =	0.90	
C_t =	1.20	

2.3 Wind Loads

Design Wind Speed, V =	140 mph	Exposure Category = C
Height <	15 ft	Importance Category = II

Peak Velocity Pressure, q_z = 30.77 psf *Including the gust factor, G=0.85. (ASCE 7-10, Eq. 27.3-1)*

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 + 0.5W		
1.2D + 1.0W + 0.5S		
0.9D + 1.0W	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 + 0.6W		
1.0D + 0.75L + 0.45W + 0.75S		
0.6D + 0.6W	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

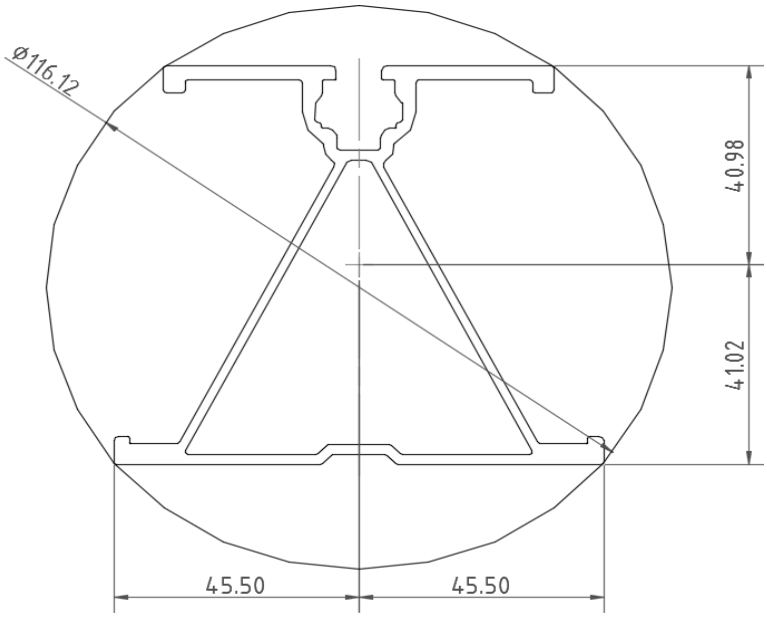
Struts	Location
M3	Outer
M6	Inner
M9	Outer

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 =	84	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 =	0.921	k-ft
M_z =	0.208	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	51%	

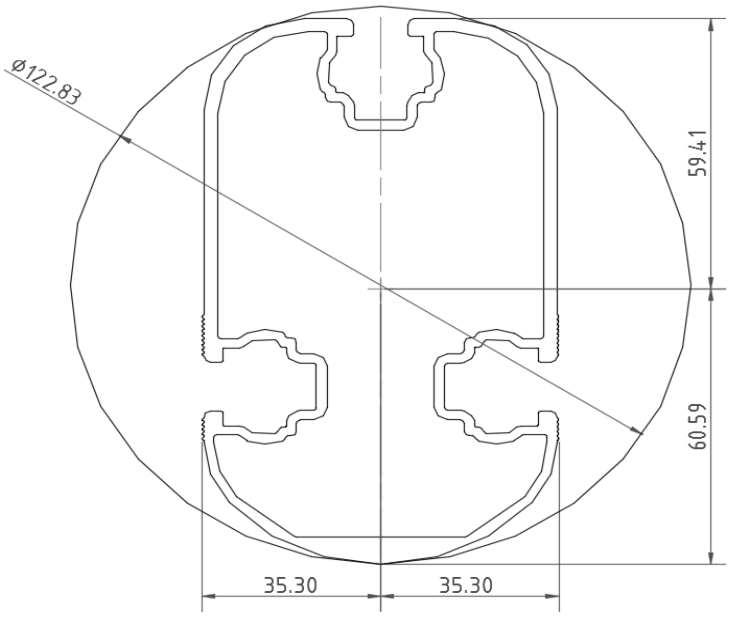


DETAIL VIEW

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 =	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 =	3.614	k-ft
M_z =	0.000	k-ft
P_n =	2.934	k
$M_{y\ allowable}$ =	4.960	k-ft
$M_{z\ allowable}$ =	3.472	k-ft
$P_{n\ allowable}$ =	59.439	k
Utilization =	78%	

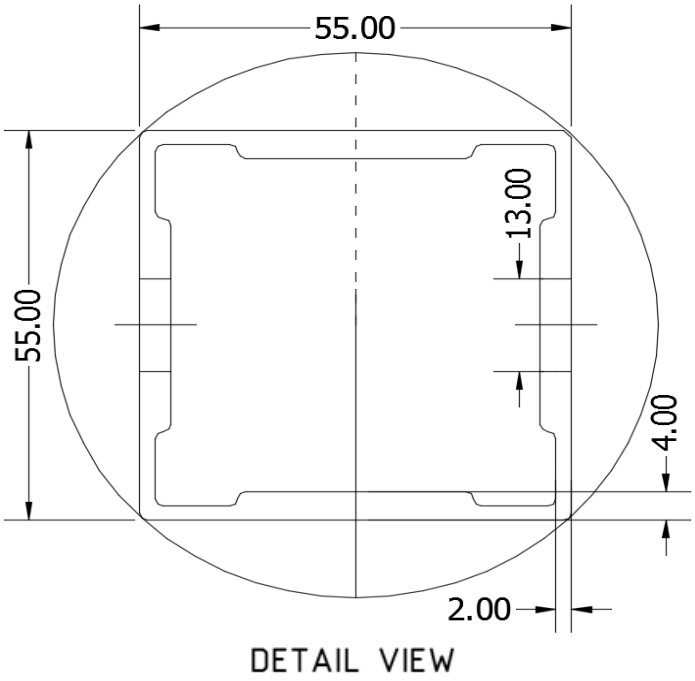


DETAIL VIEW

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).

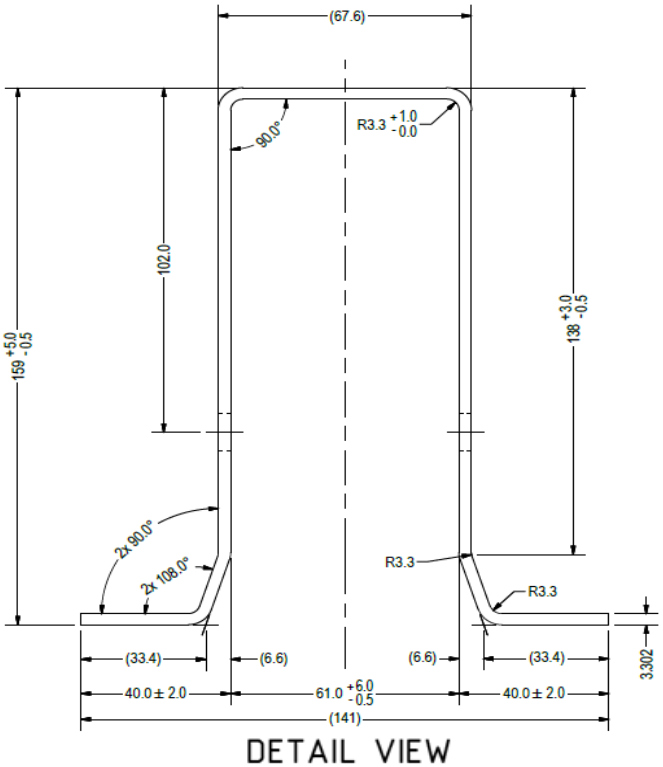
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	74.80	in
$\Phi F_{ty\ AXIAL}$ =	9.61	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.008	k-ft
M_z =	0.000	k-ft
P_n =	7.084	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	9.441	k
Utilization =	76%	



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 =	15.109	k-ft
M_z =	0.000	k-ft
P_r =	5.600	k
$M_{y\ allowable}$ =	19.207	k-ft
$M_{z\ allowable}$ =	14.389	k-ft
P_c =	38.013	k
Utilization =	96%	



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 =	5.88	k
Maximum Lateral Load =	2.69	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 =	1.57	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

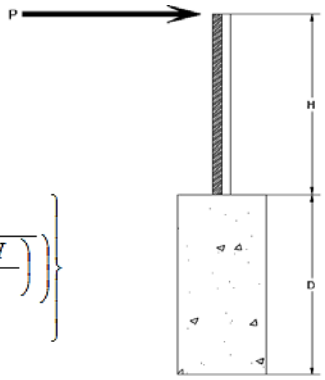
Lateral Bearing @ Bottom =	S_3
Lateral Bearing @ D/3 =	S_1
Required Depth =	D

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

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

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

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



Non-Constrained

Lateral Force @ Top of Pole, P =	1.57	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 =	8.50	
Required Footing Depth, D =	12.31	ft

2nd Trial @ D_2 =	7.78	ft
Lateral Soil Bearing @ D/3, S_1 =	0.52	ksf
Lateral Soil Bearing @ D, S_3 =	1.56	ksf
Constant 2.34P/(S_1B), A =	3.55	
Required Footing Depth, D =	6.54	ft

3rd Trial @ D_3 =	7.16	ft
Lateral Soil Bearing @ D/3, S_1 =	0.48	ksf
Lateral Soil Bearing @ D, S_3 =	1.43	ksf
Constant 2.34P/(S_1B), A =	3.86	
Required Footing Depth, D =	6.93	ft

4th Trial @ D_4 =	7.04	ft
Lateral Soil Bearing @ D/3, S_1 =	0.47	ksf
Lateral Soil Bearing @ D, S_3 =	1.41	ksf
Constant 2.34P/(S_1B), A =	3.92	
Required Footing Depth, D =	7.01	ft

5th Trial @ D_5 =	7.02	ft
Lateral Soil Bearing @ D/3, S_1 =	0.47	ksf
Lateral Soil Bearing @ D, S_3 =	1.40	ksf
Constant 2.34P/(S_1B), A =	3.93	
Required Footing Depth, D =	7.25	ft

A 2ft diameter x 7.25ft deep footing unrestrained at ground level is required for the racking structure.

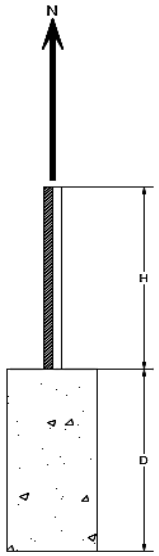
5.4 Uplifting Force Resistance

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 =	2.70	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 =	1.75	k
Required Concrete Volume, V =	12.08	ft^3
Required Footing Depth, D =	4.00	ft

Iteration	z	dz	Qs	Side
1	0.2	0.2	118.10	5.82
2	0.4	0.2	118.10	5.71
3	0.6	0.2	118.10	5.61
4	0.8	0.2	118.10	5.50
5	1	0.2	118.10	5.40
6	1.2	0.2	118.10	5.30
7	1.4	0.2	118.10	5.19
8	1.6	0.2	118.10	5.09
9	1.8	0.2	118.10	4.99
10	2	0.2	118.10	4.88
11	2.2	0.2	118.10	4.78
12	2.4	0.2	118.10	4.67
13	2.6	0.2	118.10	4.57
14	2.8	0.2	118.10	4.47
15	3	0.2	118.10	4.36
16	3.2	0.2	118.10	4.26
17	3.4	0.2	118.10	4.16
18	3.6	0.2	118.10	4.05
19	3.8	0.2	118.10	3.95
20	4	0.2	118.10	3.85
21	0	0.0	0.00	3.85
22	0	0.0	0.00	3.85
23	0	0.0	0.00	3.85
24	0	0.0	0.00	3.85
25	0	0.0	0.00	3.85
26	0	0.0	0.00	3.85
27	0	0.0	0.00	3.85
28	0	0.0	0.00	3.85
29	0	0.0	0.00	3.85
30	0	0.0	0.00	3.85
31	0	0.0	0.00	3.85
32	0	0.0	0.00	3.85
33	0	0.0	0.00	3.85
34	0	0.0	0.00	3.85
Max	4	Sum	0.94	

A 2ft diameter x 4ft deep footing unrestrained at ground level is required for the racking structure.



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 =	7.25	ft
Footing Diameter, B =	2.00	ft
Compressive Force, P =	3.70	k
Footing Area =	3.14	ft^2
Circumference =	6.28	ft
Skin Friction Area =	26.70	ft^2
Concrete Weight =	0.145	kcf

Bearing Pressure

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

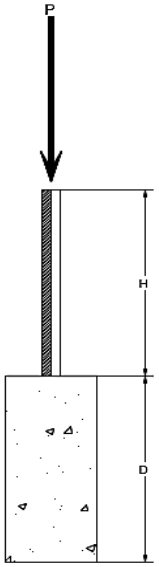
Weight of Concrete

Footing Volume	22.78	ft^3
Weight	3.30	k

Skin Friction Resistance

Skin Friction =	0.15	ksf
Resistance =	4.01	k
1/3 Increase for Wind =	1.33	
Total Resistance =	11.62	k
Applied Force =	7.00	k
Utilization =	60%	

A 2ft diameter footing passes at a depth of 7.25ft.



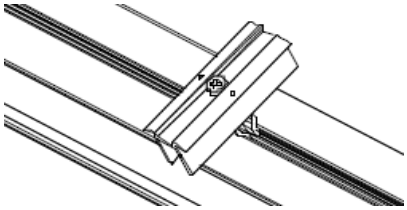
6. DESIGN OF JOINTS AND CONNECTIONS

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.

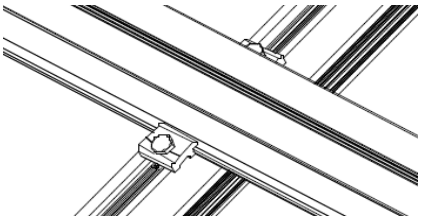
Fastening of Modules to Purlins

Maximum Uplifting Force	=	0.720 k
Allowable Uplift	=	1.214 k
Utilization	=	59%



Fastening of Purlins to Girders

Maximum Uplifting Force	=	1.788 k
Allowable Uplift	=	2.180 k
Utilization	=	82%

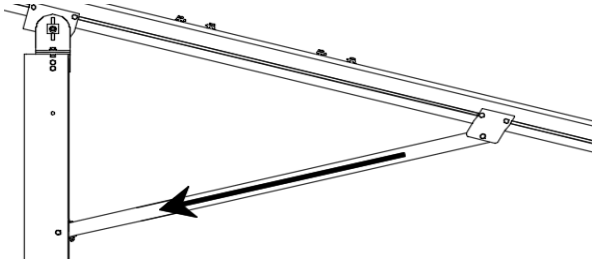


6.2 Strut Connections

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	=	7.084 k
M10 Bolt Shear Capacity	=	8.894 k
Utilization	=	80%

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

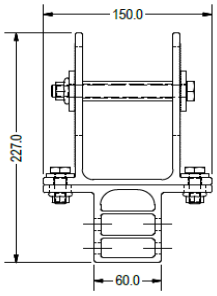


A strut under compression is shown to demonstrate the load transfer from the girder. Single M10 bolts are located at each end of the strut and are subjected to double shear.

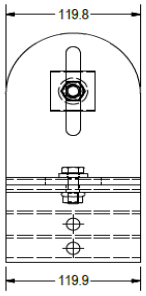
6.3 Girder to Post Connection

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.

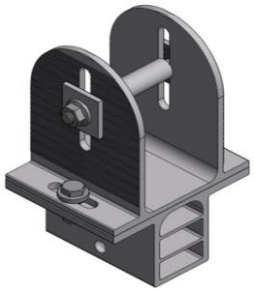
Maximum Tensile Load	=	3.693 k
Allowable Load	=	5.649 k
Utilization	=	65%



FRONT VIEW



SIDE VIEW



7. SEISMIC DESIGN

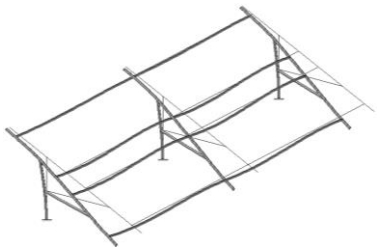
7.1 Seismic Drift

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}	=	57.36 in
Allowable Story Drift for All Other Structures, Δ	= {	$0.020h_{sx}$
		1.147 in
Max Drift, Δ_{MAX}	=	0.562 in

0.562 ≤ 1.147, 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:		Weak Axis:	
3.4.14		**3.4.14**	
L_b =	84 in	L_b =	84
J =	0.432	J =	0.432
	232.383		147.782
$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$		$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$	
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=	28.4 ksi	φF_L=	29.4
3.4.16		**3.4.16**	
b/t =	32.195	b/t =	37.0588
$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$		$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$	
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=	25.1 ksi	φF_L=	23.1 ksi
3.4.16.1	Not Used	**3.4.16.1**	
Rb/t =		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 =	37.0588	h/t =	32.195
$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$		$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$	
S1 =	36.9	S1 =	36.9
m =	0.65	m =	0.65
C_0 =	40.985	C_0 =	45.5
Cc =	41.015	Cc =	45.5
$S2 = \frac{k_1 Bbr}{mDbr}$		$S2 = \frac{k_1 Bbr}{mDbr}$	
S2 =	77.2	S2 =	77.3
φF_L=	φb[Bbr-mDbr*h/t]	φF_L=	1.3φyFcy
φF_L=	43.2 ksi	φF_L=	43.2 ksi
φF_LSt=	25.1 ksi	φF_LWk=	23.1 ksi
Ix =	897074 mm^4	Iy =	446476 mm^4
	2.155 in^4		1.073 in^4
y =	41.015 mm	x =	45.5 mm
Sx =	1.335 in^3	Sy =	0.599 in^3
M_{max}St =	2.788 k-ft	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

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

$\varphi F_L St$= 30.1 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

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:

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

λ = 1.73045

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.82226

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

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 =	5.60	k	(LRFD Factored Load)
Mr (Strong) =	15.11	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 =	0.1637	<	0.2	
Utilization =	0.96	<	1.0	OK

Bending (Weak Axis):

Yielding:

Mn =	14.65	k-ft

Flange Local Buckling:

Mn =	14.39	k-ft

Pr/Pc =	0.164	<	0.2	
Utilization =	0.00	<	1.0	OK

Combined Forces

Utilization =	96%

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	-106.012	-106.012	0	0
2	M11	y	-106.012	-106.012	0	0
3	M12	y	-166.591	-166.591	0	0
4	M13	y	-166.591	-166.591	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	214.044	214.044	0	0
2	M11	y	214.044	214.044	0	0
3	M12	y	100.964	100.964	0	0
4	M13	y	100.964	100.964	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 + 0.5W	Yes	Y		1	1.2	3	1.6	4	.5														
2	LRFD 1.2D + 1.0W + 0.5S	Yes	Y		1	1.2	3	.5	4	1														
3	LRFD 0.9D + 1.0W	Yes	Y		2	.9					5	1												
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 + 0.6W	Yes	Y		1	1			4	.6														
11	ASD 1.0D + 0.75L + 0.45W + 0....	Yes	Y		1	1	3	.75	4	.45														
12	ASD 0.6D + 0.6W	Yes	Y		2	.6					5	.6												
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	293.39	2	2333.299	1	126.426	1	.198	1	.003	5	8.758	1
2		min	-568.248	3	-1607.465	3	-289.047	5	-1.179	5	-.002	2	-.864	3
3	N19	max	2023.821	2	5643.18	1	0	12	0	3	.003	4	12.683	1
4		min	-1880.198	3	-4523.501	3	-303.95	5	-1.222	4	0	1	-.641	3
5	N29	max	293.39	2	2333.299	1	118.698	3	.134	3	.003	4	8.758	1
6		min	-568.248	3	-1607.465	3	-316.079	4	-1.234	4	0	3	-.864	3
7	Totals:	max	2610.6	2	10309.778	1	0	1						
8		min	-3016.694	3	-7738.431	3	-890.966	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	.003	2	0	4	0	1	0	1	0	1
2			min	0	1	0	3	0	1	0	1	0	1	0	1
3		2	max	8.154	3	300.39	3	22.839	3	.06	3	.268	1	.263	2
4			min	-190.057	1	-704.13	2	-131.212	1	-.188	2	-.036	3	-.111	3
5		3	max	7.684	3	299.101	3	22.839	3	.06	3	.182	1	.726	2
6			min	-190.682	1	-705.849	2	-131.212	1	-.188	2	-.021	3	-.308	3
7		4	max	7.215	3	297.812	3	22.839	3	.06	3	.096	1	1.189	2
8			min	-191.308	1	-707.569	2	-131.212	1	-.188	2	-.006	3	-.504	3
9		5	max	1140.554	3	643.559	2	33.669	3	.005	3	.129	1	1.406	2
10			min	-2928.535	2	-256.106	3	-155.608	1	-.057	2	-.041	3	-.597	3
11		6	max	1140.084	3	641.84	2	33.669	3	.005	3	.033	2	.984	2
12			min	-2929.161	2	-257.395	3	-155.608	1	-.057	2	-.019	3	-.429	3
13		7	max	1139.615	3	640.12	2	33.669	3	.005	3	.003	3	.563	2
14			min	-2929.786	2	-258.685	3	-155.608	1	-.057	2	-.075	1	-.259	3
15		8	max	1139.146	3	638.401	2	33.669	3	.005	3	.025	3	.144	2
16			min	-2930.412	2	-259.974	3	-155.608	1	-.057	2	-.177	1	-.089	3
17		9	max	1150.606	3	21.91	1	54.804	3	.013	5	.104	1	-.002	15
18			min	-3055.117	2	-4.63	3	-209.254	1	-.16	2	-.005	3	-.053	2
19		10	max	1150.137	3	20.19	1	54.804	3	.013	5	.031	3	-.002	15
20			min	-3055.742	2	-5.919	3	-209.254	1	-.16	2	-.034	1	-.065	2
21		11	max	1149.668	3	18.471	1	54.804	3	.013	5	.067	3	0	12
22			min	-3056.368	2	-7.209	3	-209.254	1	-.16	2	-.171	1	-.076	2
23		12	max	1156.448	3	584.739	3	.028	10	.166	3	.134	4	.079	1
24			min	-3212.008	1	-435.841	1	-179.467	4	-.196	1	.013	12	-.192	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	1155.979	3	583.45	3	.028	10	.166	3	.107	1	.366	1
26			min	-3212.633	1	-437.561	1	-181.053	4	-.196	1	-.032	3	-.575	3
27		14	max	1155.51	3	582.161	3	.028	10	.166	3	.089	1	.653	1
28			min	-3213.259	1	-439.28	1	-182.639	4	-.196	1	-.116	5	-.958	3
29		15	max	1155.041	3	580.871	3	.028	10	.166	3	.074	2	.942	1
30			min	-3213.885	1	-440.999	1	-184.224	4	-.196	1	-.232	5	-1.339	3
31		16	max	191.411	1	434.853	1	60.799	5	.09	1	.011	3	.717	1
32			min	-9.302	3	-609.166	3	-128.359	1	-.219	3	-.176	4	-1.022	3
33		17	max	190.785	1	433.134	1	59.213	5	.09	1	.028	3	.432	1
34			min	-9.771	3	-610.455	3	-128.359	1	-.219	3	-.193	1	-.622	3
35		18	max	190.16	1	431.415	1	57.628	5	.09	1	.046	3	.148	1
36			min	-10.24	3	-611.744	3	-128.359	1	-.219	3	-.277	1	-.221	3
37		19	max	0	1	0	15	0	1	0	1	0	1	0	1
38			min	0	1	-.001	1	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	29.974	10	725.952	3	0	1	.019	4	.219	4	.454	2
42			min	-173.951	1	-1521.841	2	-83.171	5	0	1	0	1	-.221	3
43		3	max	29.453	10	724.663	3	0	1	.019	4	.164	4	1.454	2
44			min	-174.577	1	-1523.56	2	-84.757	5	0	1	0	1	-.697	3
45		4	max	28.931	10	723.373	3	0	1	.019	4	.108	4	2.454	2
46			min	-175.203	1	-1525.279	2	-86.342	5	0	1	0	1	-1.172	3
47		5	max	3037.283	3	1559.663	2	0	1	0	1	.03	4	2.888	2
48			min	-6444.665	2	-779.168	3	-88.466	4	-.007	4	0	1	-1.371	3
49		6	max	3036.813	3	1557.944	2	0	1	0	1	0	1	1.865	2
50			min	-6445.29	2	-780.457	3	-90.052	4	-.007	4	-.029	5	-.859	3
51		7	max	3036.344	3	1556.225	2	0	1	0	1	0	1	.844	2
52			min	-6445.916	2	-781.746	3	-91.637	4	-.007	4	-.088	4	-.347	3
53		8	max	3035.875	3	1554.505	2	0	1	0	1	0	1	.167	3
54			min	-6446.542	2	-783.036	3	-93.223	4	-.007	4	-.149	4	-.19	1
55		9	max	2981.558	3	32.801	3	0	1	.011	4	.148	4	.412	3
56			min	-6416.394	2	-149.645	2	-207.342	4	0	1	0	1	-.647	2
57		10	max	2981.089	3	31.512	3	0	1	.011	4	.012	5	.391	3
58			min	-6417.019	2	-151.364	2	-208.927	4	0	1	0	1	-.549	2
59		11	max	2980.619	3	30.223	3	0	1	.011	4	0	1	.371	3
60			min	-6417.645	2	-153.083	2	-210.513	4	0	1	-.126	4	-.449	2
61		12	max	2935.663	3	1746.518	3	0	1	.094	4	.165	5	.055	1
62			min	-6399.755	2	-1501.093	1	-202.254	5	0	1	0	1	-.18	3
63		13	max	2935.194	3	1745.228	3	0	1	.094	4	.032	5	1.041	1
64			min	-6400.381	2	-1502.812	1	-203.839	5	0	1	0	1	-1.325	3
65		14	max	2934.724	3	1743.939	3	0	1	.094	4	0	1	2.027	1
66			min	-6401.007	2	-1504.531	1	-205.425	5	0	1	-.102	4	-2.47	3
67		15	max	2934.255	3	1742.65	3	0	1	.094	4	0	1	3.015	1
68			min	-6401.633	2	-1506.25	1	-207.01	5	0	1	-.238	5	-3.614	3
69		16	max	174.997	1	1400.74	1	46.525	5	0	1	0	1	2.296	1
70			min	-29.068	10	-1684.86	3	0	1	-.086	4	-.16	5	-2.745	3
71		17	max	174.371	1	1399.021	1	44.939	5	0	1	0	1	1.377	1
72			min	-29.589	10	-1686.15	3	0	1	-.086	4	-.13	4	-1.639	3
73		18	max	173.745	1	1397.302	1	43.354	5	0	1	0	1	.46	1
74			min	-30.111	10	-1687.439	3	0	1	-.086	4	-.101	4	-.532	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	.003	2	0	4	0	1	0	1	0	1
78			min	0	1	0	3	0	3	0	1	0	1	0	1
79		2	max	28.155	5	300.39	3	131.212	1	.188	2	.114	5	.263	2
80			min	-190.057	1	-704.13	2	-37.959	5	-.06	3	-.268	1	-.111	3
81		3	max	27.863	5	299.101	3	131.212	1	.188	2	.089	5	.726	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	-190.682	1	-705.849	2	-39.544	5	-.06	3	-.182	1	-.308	3
83		4	max	27.571	5	297.812	3	131.212	1	.188	2	.063	5	1.189	2
84			min	-191.308	1	-707.569	2	-41.13	5	-.06	3	-.096	1	-.504	3
85		5	max	1140.554	3	643.559	2	155.608	1	.057	2	.041	3	1.406	2
86			min	-2928.535	2	-256.106	3	-41.004	5	-.005	3	-.129	1	-.597	3
87		6	max	1140.084	3	641.84	2	155.608	1	.057	2	.019	3	.984	2
88			min	-2929.161	2	-257.395	3	-42.589	5	-.005	3	-.033	2	-.429	3
89		7	max	1139.615	3	640.12	2	155.608	1	.057	2	.075	1	.563	2
90			min	-2929.786	2	-258.685	3	-44.175	5	-.005	3	-.047	5	-.259	3
91		8	max	1139.146	3	638.401	2	155.608	1	.057	2	.177	1	.144	2
92			min	-2930.412	2	-259.974	3	-45.761	5	-.005	3	-.077	5	-.089	3
93		9	max	1150.606	3	21.91	1	209.254	1	.16	2	.071	5	-.003	15
94			min	-3055.117	2	-4.63	3	-70.936	5	.014	15	-.104	1	-.053	2
95		10	max	1150.137	3	20.19	1	209.254	1	.16	2	.034	1	-.003	12
96			min	-3055.742	2	-5.919	3	-72.521	5	.014	15	-.031	3	-.065	2
97		11	max	1149.668	3	18.471	1	209.254	1	.16	2	.171	1	0	12
98			min	-3056.368	2	-7.209	3	-74.107	5	.014	15	-.067	3	-.076	2
99		12	max	1156.448	3	584.739	3	81.346	3	.196	1	.102	5	.079	1
100			min	-3212.008	1	-435.841	1	-170.18	5	-.166	3	-.125	1	-.192	3
101		13	max	1155.979	3	583.45	3	81.346	3	.196	1	.032	3	.366	1
102			min	-3212.633	1	-437.561	1	-171.766	5	-.166	3	-.107	1	-.575	3
103		14	max	1155.51	3	582.161	3	81.346	3	.196	1	.085	3	.653	1
104			min	-3213.259	1	-439.28	1	-173.351	5	-.166	3	-.137	4	-.958	3
105		15	max	1155.041	3	580.871	3	81.346	3	.196	1	.139	3	.942	1
106			min	-3213.885	1	-440.999	1	-174.937	5	-.166	3	-.247	4	-1.339	3
107		16	max	191.411	1	434.853	1	128.359	1	.219	3	.109	1	.717	1
108			min	-9.302	3	-609.166	3	-27.003	3	-.09	1	-.149	5	-1.022	3
109		17	max	190.785	1	433.134	1	128.359	1	.219	3	.193	1	.432	1
110			min	-9.771	3	-610.455	3	-27.003	3	-.09	1	-.102	5	-.622	3
111		18	max	190.16	1	431.415	1	128.359	1	.219	3	.277	1	.148	1
112			min	-10.24	3	-611.744	3	-27.003	3	-.09	1	-.056	5	-.221	3
113		19	max	0	1	0	5	0	3	0	1	0	1	0	1
114			min	0	1	-.001	1	0	1	0	1	0	1	0	1
115	M10	1	max	128.385	1	430.991	1	10.683	3	.004	1	.32	1	.09	1
116			min	-27.006	3	-613.026	3	-190.032	1	-.016	3	-.055	3	-.219	3
117		2	max	128.385	1	305.479	1	12.349	3	.004	1	.185	1	.195	3
118			min	-27.006	3	-451.125	3	-159.355	1	-.016	3	-.046	3	-.196	1
119		3	max	128.385	1	179.968	1	14.015	3	.004	1	.09	2	.483	3
120			min	-27.006	3	-289.223	3	-128.678	1	-.016	3	-.036	3	-.385	1
121		4	max	128.385	1	54.456	1	15.681	3	.004	1	.028	2	.645	3
122			min	-27.006	3	-127.322	3	-98.001	1	-.016	3	-.028	14	-.476	1
123		5	max	128.385	1	34.579	3	17.347	3	.004	1	-.004	10	.681	3
124			min	-27.006	3	-71.055	1	-67.324	1	-.016	3	-.08	1	-.47	1
125		6	max	128.385	1	196.481	3	19.013	3	.004	1	.003	3	.591	3
126			min	-27.006	3	-196.567	1	-49.76	2	-.016	3	-.12	1	-.366	1
127		7	max	128.385	1	358.382	3	20.679	3	.004	1	.018	3	.376	3
128			min	-27.006	3	-322.078	1	-37.683	2	-.016	3	-.137	1	-.164	1
129		8	max	128.385	1	520.284	3	31.54	14	.004	1	.035	3	.141	2
130			min	-27.006	3	-447.59	1	-25.607	2	-.016	3	-.13	1	-.013	5
131		9	max	128.385	1	682.185	3	55.384	1	.004	1	.053	3	.532	1
132			min	-27.006	3	-573.101	1	-18.421	10	-.016	3	-.142	2	-.434	3
133		10	max	128.385	1	698.613	1	15.402	10	.016	3	.072	3	1.027	1
134			min	-27.006	3	-844.087	3	-86.061	1	-.003	14	-.148	2	-1.027	3
135		11	max	128.385	1	573.101	1	18.421	10	.016	3	.053	3	.532	1
136			min	-27.006	3	-682.185	3	-55.384	1	-.004	1	-.142	2	-.434	3
137		12	max	128.385	1	447.59	1	25.607	2	.016	3	.035	3	.141	2
138			min	-27.006	3	-520.284	3	-30.604	9	-.004	1	-.13	1	.015	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	128.385	1	322.078	1	37.683	2	.016	3	.018	3	.376	3
140			min	-27.006	3	-358.382	3	-20.679	3	-.004	1	-.137	1	-.164	1
141		14	max	128.385	1	196.567	1	49.76	2	.016	3	.003	3	.591	3
142			min	-27.006	3	-196.481	3	-19.013	3	-.004	1	-.12	1	-.366	1
143		15	max	128.385	1	71.055	1	67.324	1	.016	3	.002	5	.681	3
144			min	-27.006	3	-34.579	3	-17.347	3	-.004	1	-.08	1	-.47	1
145		16	max	128.385	1	127.322	3	98.001	1	.016	3	.028	2	.645	3
146			min	-28.553	5	-54.456	1	-15.681	3	-.004	1	-.024	3	-.476	1
147		17	max	128.385	1	289.223	3	128.678	1	.016	3	.09	2	.483	3
148			min	-37.732	5	-179.968	1	-14.015	3	-.004	1	-.036	3	-.385	1
149		18	max	128.385	1	451.125	3	159.355	1	.016	3	.185	1	.195	3
150			min	-46.91	5	-305.479	1	-12.349	3	-.004	1	-.046	3	-.196	1
151		19	max	128.385	1	613.026	3	190.032	1	.016	3	.32	1	.09	1
152			min	-56.088	5	-430.991	1	-10.683	3	-.004	1	-.055	3	-.219	3
153	M11	1	max	180.883	1	453.165	1	52.295	5	.008	3	.376	1	.079	4
154			min	-135.867	3	-594.941	3	-202.168	1	-.018	1	-.206	5	-.196	3
155		2	max	180.883	1	327.654	1	53.985	5	.008	3	.231	1	.204	3
156			min	-135.867	3	-433.039	3	-171.491	1	-.018	1	-.165	5	-.245	2
157		3	max	180.883	1	202.142	1	55.676	5	.008	3	.115	2	.477	3
158			min	-135.867	3	-271.138	3	-140.814	1	-.018	1	-.122	5	-.451	1
159		4	max	180.883	1	76.631	1	57.366	5	.008	3	.046	2	.625	3
160			min	-135.867	3	-109.236	3	-110.137	1	-.018	1	-.081	4	-.56	1
161		5	max	180.883	1	52.665	3	59.057	5	.008	3	.001	10	.647	3
162			min	-135.867	3	-48.881	1	-79.46	1	-.018	1	-.062	1	-.57	1
163		6	max	180.883	1	214.566	3	60.747	5	.008	3	.014	5	.543	3
164			min	-135.867	3	-174.392	1	-58.146	2	-.018	1	-.112	1	-.483	1
165		7	max	180.883	1	376.468	3	64.065	4	.008	3	.062	5	.314	3
166			min	-135.867	3	-299.903	1	-46.069	2	-.018	1	-.138	1	-.299	1
167		8	max	180.883	1	538.369	3	72.095	4	.008	3	.111	5	-.004	9
168			min	-135.867	3	-425.415	1	-33.992	2	-.018	1	-.14	1	-.042	3
169		9	max	180.883	1	700.271	3	80.125	4	.008	3	.162	5	.363	1
170			min	-135.867	3	-550.926	1	-22.022	10	-.018	1	-.157	2	-.524	3
171		10	max	180.883	1	676.438	1	56.587	5	.018	1	.218	4	.84	1
172			min	-135.867	3	-862.172	3	-73.925	1	-.008	3	-.169	2	-1.132	3
173		11	max	180.883	1	550.926	1	58.277	5	.018	1	.048	3	.363	1
174			min	-135.867	3	-700.271	3	-44.151	9	-.008	3	-.177	4	-.524	3
175		12	max	180.883	1	425.415	1	59.967	5	.018	1	.033	3	.017	5
176			min	-135.867	3	-538.369	3	-24.224	9	-.008	3	-.14	1	-.042	3
177		13	max	180.883	1	299.903	1	61.658	5	.018	1	.019	3	.314	3
178			min	-135.867	3	-376.468	3	-17.109	3	-.008	3	-.138	1	-.299	1
179		14	max	180.883	1	174.392	1	68.518	4	.018	1	.006	3	.543	3
180			min	-135.867	3	-214.566	3	-15.443	3	-.008	3	-.112	1	-.483	1
181		15	max	180.883	1	48.881	1	79.46	1	.018	1	.025	5	.647	3
182			min	-135.867	3	-52.665	3	-13.777	3	-.008	3	-.062	1	-.57	1
183		16	max	180.883	1	109.236	3	110.137	1	.018	1	.076	5	.625	3
184			min	-135.867	3	-76.631	1	-12.111	3	-.008	3	-.015	3	-.56	1
185		17	max	180.883	1	271.138	3	140.814	1	.018	1	.142	4	.477	3
186			min	-135.867	3	-202.142	1	-10.445	3	-.008	3	-.024	3	-.451	1
187		18	max	180.883	1	433.039	3	171.491	1	.018	1	.231	1	.204	3
188			min	-135.867	3	-327.654	1	-8.779	3	-.008	3	-.032	3	-.245	2
189		19	max	180.883	1	594.941	3	202.168	1	.018	1	.376	1	.059	1
190			min	-135.867	3	-453.165	1	-7.113	3	-.008	3	-.038	3	-.196	3
191	M12	1	max	23.387	5	614.498	2	47.267	5	.004	3	.401	1	.103	2
192			min	-51.767	1	-257.55	3	-207.798	1	-.013	1	-.186	5	.016	15
193		2	max	21.334	3	451.746	2	48.957	5	.004	3	.252	1	.207	3
194			min	-51.767	1	-183.6	3	-177.121	1	-.013	1	-.149	5	-.311	2
195		3	max	21.334	3	288.994	2	50.648	5	.004	3	.131	2	.321	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	-51.767	1	-109.65	3	-146.444	1	-.013	1	-.11	5	-.599	2
197		4	max	21.334	3	126.243	2	52.338	5	.004	3	.058	2	.378	3
198			min	-51.767	1	-35.699	3	-115.767	1	-.013	1	-.072	4	-.761	2
199		5	max	21.334	3	38.251	3	54.028	5	.004	3	.005	10	.377	3
200			min	-51.767	1	-36.509	2	-85.09	1	-.013	1	-.054	1	-.796	2
201		6	max	21.334	3	112.201	3	55.719	5	.004	3	.014	5	.318	3
202			min	-51.767	1	-199.261	2	-63.59	2	-.013	1	-.109	1	-.704	2
203		7	max	21.334	3	186.152	3	58.377	4	.004	3	.058	5	.202	3
204			min	-51.767	1	-362.012	2	-51.513	2	-.013	1	-.139	1	-.486	2
205		8	max	21.334	3	260.102	3	66.408	4	.004	3	.103	5	.029	3
206			min	-51.767	1	-524.764	2	-39.436	2	-.013	1	-.146	1	-.145	1
207		9	max	21.334	3	334.052	3	74.438	4	.004	3	.15	5	.33	2
208			min	-60.02	4	-687.516	2	-27.359	2	-.013	1	-.166	2	-.202	3
209		10	max	21.334	3	850.267	2	82.468	4	.013	1	.2	4	.928	2
210			min	-69.199	4	-408.003	3	-68.296	1	-.005	14	-.183	2	-.491	3
211		11	max	43.895	5	687.516	2	53.678	5	.013	1	.056	3	.33	2
212			min	-51.767	1	-334.052	3	-41.794	9	-.004	3	-.168	4	-.202	3
213		12	max	34.717	5	524.764	2	55.368	5	.013	1	.037	3	.029	3
214			min	-51.767	1	-260.102	3	-23.614	3	-.004	3	-.146	1	-.145	1
215		13	max	25.539	5	362.012	2	57.058	5	.013	1	.019	3	.202	3
216			min	-51.767	1	-186.152	3	-21.948	3	-.004	3	-.139	1	-.486	2
217		14	max	21.334	3	199.261	2	64.761	4	.013	1	.003	3	.318	3
218			min	-51.767	1	-112.201	3	-20.282	3	-.004	3	-.109	1	-.704	2
219		15	max	21.334	3	36.509	2	85.09	1	.013	1	.022	5	.377	3
220			min	-51.767	1	-38.251	3	-18.616	3	-.004	3	-.054	1	-.796	2
221		16	max	21.334	3	35.699	3	115.767	1	.013	1	.069	5	.378	3
222			min	-51.767	1	-126.243	2	-16.95	3	-.004	3	-.026	3	-.761	2
223		17	max	21.334	3	109.65	3	146.444	1	.013	1	.134	4	.321	3
224			min	-51.767	1	-288.994	2	-15.284	3	-.004	3	-.039	3	-.599	2
225		18	max	21.334	3	183.6	3	177.121	1	.013	1	.252	1	.207	3
226			min	-51.767	1	-451.746	2	-13.618	3	-.004	3	-.05	3	-.311	2
227		19	max	21.334	3	257.55	3	207.798	1	.013	1	.401	1	.103	2
228			min	-51.767	1	-614.498	2	-11.952	3	-.004	3	-.06	3	-.02	5
229	M13	1	max	36.267	5	703.441	2	28.45	5	.011	3	.312	1	.188	2
230			min	-131.074	1	-301.725	3	-188.901	1	-.027	2	-.127	5	-.06	3
231		2	max	27.089	5	540.689	2	30.141	5	.011	3	.177	1	.146	3
232			min	-131.074	1	-227.774	3	-158.224	1	-.027	2	-.104	5	-.295	2
233		3	max	22.841	3	377.938	2	31.831	5	.011	3	.084	2	.294	3
234			min	-131.074	1	-153.824	3	-127.547	1	-.027	2	-.08	5	-.653	2
235		4	max	22.841	3	215.186	2	33.521	5	.011	3	.022	2	.385	3
236			min	-131.074	1	-79.874	3	-96.87	1	-.027	2	-.064	4	-.883	2
237		5	max	22.841	3	55.871	1	35.212	5	.011	3	-.004	12	.419	3
238			min	-131.074	1	-5.923	3	-66.193	1	-.027	2	-.085	1	-.987	2
239		6	max	22.841	3	68.027	3	36.902	5	.011	3	.006	3	.395	3
240			min	-131.074	1	-110.317	2	-49.123	2	-.027	2	-.125	1	-.965	2
241		7	max	22.841	3	141.977	3	42.361	4	.011	3	.029	5	.313	3
242			min	-131.074	1	-273.069	2	-37.046	2	-.027	2	-.14	1	-.816	2
243		8	max	22.841	3	215.928	3	50.392	4	.011	3	.06	5	.174	3
244			min	-131.074	1	-435.821	2	-24.969	2	-.027	2	-.132	1	-.54	2
245		9	max	22.841	3	289.878	3	60.878	14	.011	3	.092	5	-.009	15
246			min	-131.074	1	-598.572	2	-18.169	10	-.027	2	-.145	2	-.168	1
247		10	max	22.841	3	363.828	3	87.192	1	.027	2	.134	4	.391	2
248			min	-131.074	1	-761.324	2	-15.15	10	-.011	3	-.15	2	-.277	3
249		11	max	26.117	5	598.572	2	33.27	5	.027	2	.052	3	0	15
250			min	-131.074	1	-289.878	3	-56.515	1	-.011	3	-.145	2	-.168	1
251		12	max	22.841	3	435.821	2	34.96	5	.027	2	.035	3	.174	3
252			min	-131.074	1	-215.928	3	-31.266	9	-.011	3	-.132	1	-.54	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	22.841	3	273.069	2	37.046	2	.027	2	.02	3	.313	3
254			min	-131.074	1	-141.977	3	-18.643	3	-.011	3	-.14	1	-.816	2
255		14	max	22.841	3	110.317	2	49.123	2	.027	2	.006	3	.395	3
256			min	-131.074	1	-68.027	3	-16.977	3	-.011	3	-.125	1	-.965	2
257		15	max	22.841	3	5.923	3	66.193	1	.027	2	.018	5	.419	3
258			min	-131.074	1	-55.871	1	-15.311	3	-.011	3	-.085	1	-.987	2
259		16	max	22.841	3	79.874	3	96.87	1	.027	2	.05	5	.385	3
260			min	-131.074	1	-215.186	2	-13.645	3	-.011	3	-.027	9	-.883	2
261		17	max	22.841	3	153.824	3	127.547	1	.027	2	.09	4	.294	3
262			min	-131.074	1	-377.938	2	-11.979	3	-.011	3	-.028	3	-.653	2
263		18	max	22.841	3	227.774	3	158.224	1	.027	2	.177	1	.146	3
264			min	-131.074	1	-540.689	2	-10.313	3	-.011	3	-.036	3	-.295	2
265		19	max	22.841	3	301.725	3	188.901	1	.027	2	.312	1	.188	2
266			min	-131.074	1	-703.441	2	-8.647	3	-.011	3	-.044	3	-.06	3
267	M2	1	max	2333.299	1	569.164	3	126.743	1	.003	5	1.179	5	8.758	1
268			min	-1607.465	3	-284.974	2	-289.209	5	-.002	2	-.198	1	-.864	3
269		2	max	2330.742	1	569.164	3	126.743	1	.003	5	1.098	5	8.749	1
270			min	-1609.383	3	-284.974	2	-286.993	5	-.002	2	-.162	1	-1.024	3
271		3	max	2328.184	1	569.164	3	126.743	1	.003	5	1.018	5	8.74	1
272			min	-1611.301	3	-284.974	2	-284.776	5	-.002	2	-.127	1	-1.184	3
273		4	max	2325.627	1	569.164	3	126.743	1	.003	5	.938	5	8.731	1
274			min	-1613.219	3	-284.974	2	-282.56	5	-.002	2	-.091	1	-1.344	3
275		5	max	2323.069	1	569.164	3	126.743	1	.003	5	.86	4	8.722	1
276			min	-1615.138	3	-284.974	2	-280.343	5	-.002	2	-.056	1	-1.504	3
277		6	max	2320.512	1	569.164	3	126.743	1	.003	5	.786	4	8.713	1
278			min	-1617.056	3	-284.974	2	-278.127	5	-.002	2	-.032	3	-1.664	3
279		7	max	2317.954	1	569.164	3	126.743	1	.003	5	.713	4	8.705	1
280			min	-1618.974	3	-284.974	2	-275.911	5	-.002	2	-.066	3	-1.824	3
281		8	max	2315.397	1	569.164	3	126.743	1	.003	5	.64	4	8.696	1
282			min	-1620.892	3	-284.974	2	-273.694	5	-.002	2	-.099	3	-1.983	3
283		9	max	2053.233	1	2911.476	1	100.174	1	.002	2	.571	4	8.177	1
284			min	-1494.489	3	-684.156	3	-263.58	5	0	3	-.104	3	-1.922	3
285		10	max	2050.675	1	2911.476	1	100.174	1	.002	2	.501	4	7.36	1
286			min	-1496.408	3	-684.156	3	-261.364	5	0	3	-.135	3	-1.729	3
287		11	max	2048.118	1	2911.476	1	100.174	1	.002	2	.43	4	6.542	1
288			min	-1498.326	3	-684.156	3	-259.147	5	0	3	-.165	3	-1.537	3
289		12	max	2045.56	1	2911.476	1	100.174	1	.002	2	.361	4	5.724	1
290			min	-1500.244	3	-684.156	3	-256.931	5	0	3	-.195	3	-1.345	3
291		13	max	2043.003	1	2911.476	1	100.174	1	.002	2	.292	4	4.906	1
292			min	-1502.162	3	-684.156	3	-254.714	5	0	3	-.226	3	-1.153	3
293		14	max	2040.445	1	2911.476	1	100.174	1	.002	2	.224	4	4.089	1
294			min	-1504.08	3	-684.156	3	-252.498	5	0	3	-.256	3	-.961	3
295		15	max	2037.888	1	2911.476	1	100.174	1	.002	2	.191	1	3.271	1
296			min	-1505.998	3	-684.156	3	-250.281	5	0	3	-.287	3	-.769	3
297		16	max	2035.33	1	2911.476	1	100.174	1	.002	2	.219	1	2.453	1
298			min	-1507.916	3	-684.156	3	-248.065	5	0	3	-.317	3	-.576	3
299		17	max	2032.773	1	2911.476	1	100.174	1	.002	2	.248	1	1.635	1
300			min	-1509.834	3	-684.156	3	-245.848	5	0	3	-.348	3	-.384	3
301		18	max	2030.215	1	2911.476	1	100.174	1	.002	2	.276	1	.818	1
302			min	-1511.752	3	-684.156	3	-243.632	5	0	3	-.378	3	-.192	3
303		19	max	2027.658	1	2911.476	1	100.174	1	.002	2	.304	1	0	1
304			min	-1513.671	3	-684.156	3	-241.415	5	0	3	-.409	3	0	1
305	M5	1	max	5643.18	1	1883.985	3	0	1	.003	4	1.222	4	12.683	1
306			min	-4523.501	3	-1991.871	2	-304.232	5	0	1	0	1	-.641	3
307		2	max	5640.622	1	1883.985	3	0	1	.003	4	1.137	4	13.052	1
308			min	-4525.419	3	-1991.871	2	-302.015	5	0	1	0	1	-1.17	3
309		3	max	5638.065	1	1883.985	3	0	1	.003	4	1.053	4	13.421	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	-4527.337	3	-1991.871	2	-299.799	5	0	1	0	1	-1.699	3
311		4	max	5635.507	1	1883.985	3	0	1	.003	4	.969	4	13.79	1
312			min	-4529.255	3	-1991.871	2	-297.582	5	0	1	0	1	-2.229	3
313		5	max	5632.95	1	1883.985	3	0	1	.003	4	.886	4	14.159	1
314			min	-4531.173	3	-1991.871	2	-295.366	5	0	1	0	1	-2.758	3
315		6	max	5630.392	1	1883.985	3	0	1	.003	4	.804	4	14.528	1
316			min	-4533.091	3	-1991.871	2	-293.149	5	0	1	0	1	-3.287	3
317		7	max	5627.835	1	1883.985	3	0	1	.003	4	.722	4	14.897	1
318			min	-4535.01	3	-1991.871	2	-290.933	5	0	1	0	1	-3.816	3
319		8	max	5625.277	1	1883.985	3	0	1	.003	4	.64	4	15.266	1
320			min	-4536.928	3	-1991.871	2	-288.716	5	0	1	0	1	-4.345	3
321		9	max	5107.766	1	5158.91	1	0	1	0	1	.574	4	14.489	1
322			min	-4173.163	3	-1520.967	3	-283.686	4	0	4	0	1	-4.272	3
323		10	max	5105.209	1	5158.91	1	0	1	0	1	.495	4	13.04	1
324			min	-4175.082	3	-1520.967	3	-281.47	4	0	4	0	1	-3.845	3
325		11	max	5102.651	1	5158.91	1	0	1	0	1	.416	4	11.592	1
326			min	-4177	3	-1520.967	3	-279.253	4	0	4	0	1	-3.417	3
327		12	max	5100.094	1	5158.91	1	0	1	0	1	.338	4	10.143	1
328			min	-4178.918	3	-1520.967	3	-277.037	4	0	4	0	1	-2.99	3
329		13	max	5097.536	1	5158.91	1	0	1	0	1	.26	4	8.694	1
330			min	-4180.836	3	-1520.967	3	-274.821	4	0	4	0	1	-2.563	3
331		14	max	5094.979	1	5158.91	1	0	1	0	1	.183	4	7.245	1
332			min	-4182.754	3	-1520.967	3	-272.604	4	0	4	0	1	-2.136	3
333		15	max	5092.421	1	5158.91	1	0	1	0	1	.107	4	5.796	1
334			min	-4184.672	3	-1520.967	3	-270.388	4	0	4	0	1	-1.709	3
335		16	max	5089.864	1	5158.91	1	0	1	0	1	.031	4	4.347	1
336			min	-4186.59	3	-1520.967	3	-268.171	4	0	4	0	1	-1.282	3
337		17	max	5087.306	1	5158.91	1	0	1	0	1	0	1	2.898	1
338			min	-4188.508	3	-1520.967	3	-265.955	4	0	4	-.044	5	-.854	3
339		18	max	5084.749	1	5158.91	1	0	1	0	1	0	1	1.449	1
340			min	-4190.426	3	-1520.967	3	-263.738	4	0	4	-.118	4	-.427	3
341		19	max	5082.191	1	5158.91	1	0	1	0	1	0	1	0	1
342			min	-4192.345	3	-1520.967	3	-261.522	4	0	4	-.192	4	0	1
343	M8	1	max	2333.299	1	569.164	3	118.59	3	.003	4	1.234	4	8.758	1
344			min	-1607.465	3	-284.974	2	-316.644	4	0	3	-.134	3	-.864	3
345		2	max	2330.742	1	569.164	3	118.59	3	.003	4	1.145	4	8.749	1
346			min	-1609.383	3	-284.974	2	-314.428	4	0	3	-.101	3	-1.024	3
347		3	max	2328.184	1	569.164	3	118.59	3	.003	4	1.057	4	8.74	1
348			min	-1611.301	3	-284.974	2	-312.211	4	0	3	-.068	3	-1.184	3
349		4	max	2325.627	1	569.164	3	118.59	3	.003	4	.97	4	8.731	1
350			min	-1613.219	3	-284.974	2	-309.995	4	0	3	-.034	3	-1.344	3
351		5	max	2323.069	1	569.164	3	118.59	3	.003	4	.883	4	8.722	1
352			min	-1615.138	3	-284.974	2	-307.778	4	0	3	-.001	3	-1.504	3
353		6	max	2320.512	1	569.164	3	118.59	3	.003	4	.797	4	8.713	1
354			min	-1617.056	3	-284.974	2	-305.562	4	0	3	-.001	10	-1.664	3
355		7	max	2317.954	1	569.164	3	118.59	3	.003	4	.712	4	8.705	1
356			min	-1618.974	3	-284.974	2	-303.345	4	0	3	-.03	2	-1.824	3
357		8	max	2315.397	1	569.164	3	118.59	3	.003	4	.627	4	8.696	1
358			min	-1620.892	3	-284.974	2	-301.129	4	0	3	-.063	2	-1.983	3
359		9	max	2053.233	1	2911.476	1	108.469	3	0	3	.566	4	8.177	1
360			min	-1494.489	3	-684.156	3	-288.815	4	-.002	2	-.029	2	-1.922	3
361		10	max	2050.675	1	2911.476	1	108.469	3	0	3	.485	4	7.36	1
362			min	-1496.408	3	-684.156	3	-286.598	4	-.002	2	-.054	2	-1.729	3
363		11	max	2048.118	1	2911.476	1	108.469	3	0	3	.408	5	6.542	1
364			min	-1498.326	3	-684.156	3	-284.382	4	-.002	2	-.08	2	-1.537	3
365		12	max	2045.56	1	2911.476	1	108.469	3	0	3	.333	5	5.724	1
366			min	-1500.244	3	-684.156	3	-282.165	4	-.002	2	-.107	1	-1.345	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	2043.003	1	2911.476	1	108.469	3	0	3	.259	5	4.906	1
368			min	-1502.162	3	-684.156	3	-279.949	4	-.002	2	-.135	1	-1.153	3
369		14	max	2040.445	1	2911.476	1	108.469	3	0	3	.256	3	4.089	1
370			min	-1504.08	3	-684.156	3	-277.732	4	-.002	2	-.163	1	-.961	3
371		15	max	2037.888	1	2911.476	1	108.469	3	0	3	.287	3	3.271	1
372			min	-1505.998	3	-684.156	3	-275.516	4	-.002	2	-.191	1	-.769	3
373		16	max	2035.33	1	2911.476	1	108.469	3	0	3	.317	3	2.453	1
374			min	-1507.916	3	-684.156	3	-273.299	4	-.002	2	-.219	1	-.576	3
375		17	max	2032.773	1	2911.476	1	108.469	3	0	3	.348	3	1.635	1
376			min	-1509.834	3	-684.156	3	-271.083	4	-.002	2	-.248	1	-.384	3
377		18	max	2030.215	1	2911.476	1	108.469	3	0	3	.378	3	.818	1
378			min	-1511.752	3	-684.156	3	-268.866	4	-.002	2	-.276	1	-.192	3
379		19	max	2027.658	1	2911.476	1	108.469	3	0	3	.409	3	0	1
380			min	-1513.671	3	-684.156	3	-266.65	4	-.002	2	-.304	1	0	1
381	M3	1	max	3108.697	2	6.095	4	26.324	2	.026	3	.003	4	0	1
382			min	-1262.423	3	1.433	15	-10.768	3	-.063	2	-.001	3	0	1
383		2	max	3108.643	2	5.418	4	26.324	2	.026	3	.012	2	0	15
384			min	-1262.464	3	1.274	15	-10.768	3	-.063	2	-.005	3	-.002	4
385		3	max	3108.589	2	4.741	4	26.324	2	.026	3	.022	2	0	15
386			min	-1262.504	3	1.114	15	-10.768	3	-.063	2	-.009	3	-.004	4
387		4	max	3108.535	2	4.064	4	26.324	2	.026	3	.031	2	-.001	15
388			min	-1262.545	3	.955	15	-10.768	3	-.063	2	-.013	3	-.005	4
389		5	max	3108.481	2	3.386	4	26.324	2	.026	3	.041	2	-.002	15
390			min	-1262.585	3	.796	15	-10.768	3	-.063	2	-.017	3	-.007	4
391		6	max	3108.427	2	2.709	4	26.324	2	.026	3	.05	2	-.002	15
392			min	-1262.626	3	.637	15	-10.768	3	-.063	2	-.02	3	-.008	4
393		7	max	3108.373	2	2.032	4	26.324	2	.026	3	.059	2	-.002	15
394			min	-1262.666	3	.478	15	-10.768	3	-.063	2	-.024	3	-.009	4
395		8	max	3108.319	2	1.355	4	26.324	2	.026	3	.069	2	-.002	15
396			min	-1262.707	3	.318	15	-10.768	3	-.063	2	-.028	3	-.009	4
397		9	max	3108.265	2	.677	4	26.324	2	.026	3	.078	2	-.002	15
398			min	-1262.747	3	.159	15	-10.768	3	-.063	2	-.032	3	-.01	4
399		10	max	3108.211	2	0	1	26.324	2	.026	3	.088	2	-.002	15
400			min	-1262.788	3	0	1	-10.768	3	-.063	2	-.036	3	-.01	4
401		11	max	3108.157	2	-.159	15	26.324	2	.026	3	.097	2	-.002	15
402			min	-1262.828	3	-.677	6	-10.768	3	-.063	2	-.04	3	-.01	4
403		12	max	3108.103	2	-.318	15	26.324	2	.026	3	.106	2	-.002	15
404			min	-1262.869	3	-1.355	6	-10.768	3	-.063	2	-.043	3	-.009	4
405		13	max	3108.049	2	-.478	15	26.324	2	.026	3	.116	2	-.002	15
406			min	-1262.909	3	-2.032	6	-10.768	3	-.063	2	-.047	3	-.009	4
407		14	max	3107.995	2	-.637	15	26.324	2	.026	3	.125	2	-.002	15
408			min	-1262.95	3	-2.709	6	-10.768	3	-.063	2	-.051	3	-.008	4
409		15	max	3107.941	2	-.796	15	26.324	2	.026	3	.135	2	-.002	15
410			min	-1262.99	3	-3.386	6	-10.768	3	-.063	2	-.055	3	-.007	4
411		16	max	3107.887	2	-.955	15	26.324	2	.026	3	.144	2	-.001	15
412			min	-1263.031	3	-4.064	6	-10.768	3	-.063	2	-.059	3	-.005	4
413		17	max	3107.833	2	-1.114	15	26.324	2	.026	3	.154	2	0	15
414			min	-1263.071	3	-4.741	6	-10.768	3	-.063	2	-.063	3	-.004	4
415		18	max	3107.779	2	-1.274	15	26.324	2	.026	3	.163	2	0	15
416			min	-1263.112	3	-5.418	6	-10.768	3	-.063	2	-.067	3	-.002	4
417		19	max	3107.725	2	-1.433	15	26.324	2	.026	3	.172	2	0	1
418			min	-1263.152	3	-6.095	6	-10.768	3	-.063	2	-.07	3	0	1
419	M6	1	max	7084.328	2	6.095	4	0	1	.014	4	.002	4	0	1
420			min	-3439.632	3	1.433	15	-9.225	4	0	1	0	1	0	1
421		2	max	7084.274	2	5.418	4	0	1	.014	4	0	1	0	15
422			min	-3439.673	3	1.274	15	-8.765	4	0	1	0	4	-.002	4
423		3	max	7084.22	2	4.741	4	0	1	.014	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	-3439.713	3	1.114	15	-8.305	4	0	1	-.004	4	-.004	4
425		4	max	7084.167	2	4.064	4	0	1	.014	4	0	1	-.001	15
426			min	-3439.754	3	.955	15	-7.846	4	0	1	-.007	4	-.005	4
427		5	max	7084.113	2	3.386	4	0	1	.014	4	0	1	-.002	15
428			min	-3439.794	3	.796	15	-7.386	4	0	1	-.01	4	-.007	4
429		6	max	7084.059	2	2.709	4	0	1	.014	4	0	1	-.002	15
430			min	-3439.835	3	.637	15	-6.926	4	0	1	-.012	4	-.008	4
431		7	max	7084.005	2	2.032	4	0	1	.014	4	0	1	-.002	15
432			min	-3439.875	3	.478	15	-6.466	4	0	1	-.014	4	-.009	4
433		8	max	7083.951	2	1.355	4	0	1	.014	4	0	1	-.002	15
434			min	-3439.916	3	.318	15	-6.007	4	0	1	-.017	4	-.009	4
435		9	max	7083.897	2	.677	4	0	1	.014	4	0	1	-.002	15
436			min	-3439.956	3	.159	15	-5.547	4	0	1	-.019	4	-.01	4
437		10	max	7083.843	2	0	1	0	1	.014	4	0	1	-.002	15
438			min	-3439.997	3	0	1	-5.087	4	0	1	-.021	4	-.01	4
439		11	max	7083.789	2	-.159	15	0	1	.014	4	0	1	-.002	15
440			min	-3440.037	3	-.677	6	-4.627	4	0	1	-.022	4	-.01	4
441		12	max	7083.735	2	-.318	15	0	1	.014	4	0	1	-.002	15
442			min	-3440.078	3	-1.355	6	-4.168	4	0	1	-.024	4	-.009	4
443		13	max	7083.681	2	-.478	15	0	1	.014	4	0	1	-.002	15
444			min	-3440.118	3	-2.032	6	-3.708	4	0	1	-.025	4	-.009	4
445		14	max	7083.627	2	-.637	15	0	1	.014	4	0	1	-.002	15
446			min	-3440.159	3	-2.709	6	-3.248	4	0	1	-.027	4	-.008	4
447		15	max	7083.573	2	-.796	15	0	1	.014	4	0	1	-.002	15
448			min	-3440.199	3	-3.386	6	-2.788	4	0	1	-.028	4	-.007	4
449		16	max	7083.519	2	-.955	15	0	1	.014	4	0	1	-.001	15
450			min	-3440.24	3	-4.064	6	-2.329	4	0	1	-.029	4	-.005	4
451		17	max	7083.465	2	-1.114	15	0	1	.014	4	0	1	0	15
452			min	-3440.28	3	-4.741	6	-1.869	4	0	1	-.029	4	-.004	4
453		18	max	7083.411	2	-1.274	15	0	1	.014	4	0	1	0	15
454			min	-3440.321	3	-5.418	6	-1.409	4	0	1	-.03	4	-.002	4
455		19	max	7083.357	2	-1.433	15	0	1	.014	4	0	1	0	1
456			min	-3440.361	3	-6.095	6	-.949	4	0	1	-.03	4	0	1
457	M9	1	max	3108.697	2	6.095	6	10.768	3	.063	2	.002	5	0	1
458			min	-1262.423	3	1.433	15	-26.324	2	-.026	3	-.003	2	0	1
459		2	max	3108.643	2	5.418	6	10.768	3	.063	2	.005	3	0	15
460			min	-1262.464	3	1.274	15	-26.324	2	-.026	3	-.012	2	-.002	6
461		3	max	3108.589	2	4.741	6	10.768	3	.063	2	.009	3	0	15
462			min	-1262.504	3	1.114	15	-26.324	2	-.026	3	-.022	2	-.004	6
463		4	max	3108.535	2	4.064	6	10.768	3	.063	2	.013	3	-.001	15
464			min	-1262.545	3	.955	15	-26.324	2	-.026	3	-.031	2	-.005	6
465		5	max	3108.481	2	3.386	6	10.768	3	.063	2	.017	3	-.002	15
466			min	-1262.585	3	.796	15	-26.324	2	-.026	3	-.041	2	-.007	6
467		6	max	3108.427	2	2.709	6	10.768	3	.063	2	.02	3	-.002	15
468			min	-1262.626	3	.637	15	-26.324	2	-.026	3	-.05	2	-.008	6
469		7	max	3108.373	2	2.032	6	10.768	3	.063	2	.024	3	-.002	15
470			min	-1262.666	3	.478	15	-26.324	2	-.026	3	-.059	2	-.009	6
471		8	max	3108.319	2	1.355	6	10.768	3	.063	2	.028	3	-.002	15
472			min	-1262.707	3	.318	15	-26.324	2	-.026	3	-.069	2	-.009	6
473		9	max	3108.265	2	.677	6	10.768	3	.063	2	.032	3	-.002	15
474			min	-1262.747	3	.159	15	-26.324	2	-.026	3	-.078	2	-.01	6
475		10	max	3108.211	2	0	1	10.768	3	.063	2	.036	3	-.002	15
476			min	-1262.788	3	0	1	-26.324	2	-.026	3	-.088	2	-.01	6
477		11	max	3108.157	2	-.159	15	10.768	3	.063	2	.04	3	-.002	15
478			min	-1262.828	3	-.677	4	-26.324	2	-.026	3	-.097	2	-.01	6
479		12	max	3108.103	2	-.318	15	10.768	3	.063	2	.043	3	-.002	15
480			min	-1262.869	3	-1.355	4	-26.324	2	-.026	3	-.106	2	-.009	6

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	3108.049	2	-.478	15	10.768	3	.063	2	.047	3	-.002	15
482			min	-1262.909	3	-2.032	4	-26.324	2	-.026	3	-.116	2	-.009	6
483		14	max	3107.995	2	-.637	15	10.768	3	.063	2	.051	3	-.002	15
484			min	-1262.95	3	-2.709	4	-26.324	2	-.026	3	-.125	2	-.008	6
485		15	max	3107.941	2	-.796	15	10.768	3	.063	2	.055	3	-.002	15
486			min	-1262.99	3	-3.386	4	-26.324	2	-.026	3	-.135	2	-.007	6
487		16	max	3107.887	2	-.955	15	10.768	3	.063	2	.059	3	-.001	15
488			min	-1263.031	3	-4.064	4	-26.324	2	-.026	3	-.144	2	-.005	6
489		17	max	3107.833	2	-1.114	15	10.768	3	.063	2	.063	3	0	15
490			min	-1263.071	3	-4.741	4	-26.324	2	-.026	3	-.154	2	-.004	6
491		18	max	3107.779	2	-1.274	15	10.768	3	.063	2	.067	3	0	15
492			min	-1263.112	3	-5.418	4	-26.324	2	-.026	3	-.163	2	-.002	6
493		19	max	3107.725	2	-1.433	15	10.768	3	.063	2	.07	3	0	1
494			min	-1263.152	3	-6.095	4	-26.324	2	-.026	3	-.172	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	.097	3	.391	3	.011	1	1.017e-2	3	1077.561	15	NC	1
2			min	-.521	1	-1.51	1	-.58	4	-2.614e-2	2	73.665	1	278.396	5
3		2	max	.097	3	.332	3	.001	3	9.78e-3	3	1220.092	12	NC	2
4			min	-.521	1	-1.334	1	-.56	4	-2.492e-2	2	81.082	1	290.23	4
5		3	max	.097	3	.274	3	.003	3	9.017e-3	3	1723.572	12	NC	3
6			min	-.521	1	-1.161	1	-.534	4	-2.252e-2	2	89.959	1	306.565	4
7		4	max	.097	3	.222	3	.003	3	8.255e-3	3	2771.762	12	NC	3
8			min	-.521	1	-.999	1	-.503	4	-2.013e-2	2	100.276	1	328.928	4
9		5	max	.096	3	.177	3	.004	3	7.687e-3	3	5723.218	12	NC	3
10			min	-.521	1	-.855	1	-.468	4	-1.82e-2	2	111.716	1	357.979	4
11		6	max	.096	3	.142	3	.003	3	7.617e-3	3	NC	3	NC	2
12			min	-.52	1	-.73	1	-.431	4	-1.747e-2	2	123.866	1	394.289	4
13		7	max	.095	3	.114	3	.002	3	7.547e-3	3	NC	12	NC	1
14			min	-.519	1	-.62	1	-.395	4	-1.675e-2	2	137.085	1	437.987	4
15		8	max	.095	3	.089	3	0	1	7.478e-3	3	5168.086	12	NC	1
16			min	-.517	1	-.518	1	-.362	4	-1.603e-2	2	152.127	1	487.144	5
17		9	max	.095	3	.066	3	0	10	7.643e-3	3	3445.124	12	NC	1
18			min	-.516	1	-.417	1	-.332	4	-1.462e-2	2	170.475	1	542.964	5
19		10	max	.094	3	.042	3	.001	1	8.03e-3	3	2584.759	12	NC	1
20			min	-.515	1	-.316	1	-.3	4	-1.259e-2	2	194.094	1	619.049	5
21		11	max	.094	3	.019	3	.001	1	8.417e-3	3	2500.971	15	NC	1
22			min	-.514	1	-.214	1	-.267	4	-1.06e-2	1	225.636	1	723.044	5
23		12	max	.093	3	-.003	12	.003	3	7.593e-3	3	2859.246	15	NC	1
24			min	-.513	1	-.111	1	-.235	4	-8.493e-3	1	270.044	1	866.748	5
25		13	max	.093	3	-.001	15	.007	3	5.482e-3	3	3339.666	15	NC	1
26			min	-.511	1	-.025	3	-.199	4	-5.999e-3	1	335.387	1	1109.371	5
27		14	max	.092	3	.088	1	.01	3	3.372e-3	3	4015.295	15	NC	1
28			min	-.51	1	-.036	3	-.163	4	-3.72e-3	4	434.769	1	1539.976	5
29		15	max	.092	3	.175	1	.009	3	1.262e-3	3	5031.073	15	NC	1
30			min	-.509	1	-.033	3	-.131	4	-4.346e-3	4	591.775	1	2324.964	5
31		16	max	.092	3	.247	1	.009	1	3.53e-3	3	6721.733	15	NC	2
32			min	-.509	1	-.01	3	-.107	5	-3.808e-3	4	846.867	1	3744.673	5
33		17	max	.092	3	.308	1	.011	1	6.312e-3	3	NC	15	NC	2
34			min	-.509	1	.019	12	-.09	5	-3.134e-3	4	1332.039	1	6717.806	5
35		18	max	.092	3	.362	1	.006	1	9.093e-3	3	NC	5	NC	1
36			min	-.509	1	.034	15	-.078	4	-4.067e-3	1	2708.932	3	NC	1
37		19	max	.092	3	.414	1	0	3	1.051e-2	3	NC	1	NC	1
38			min	-.509	1	.041	15	-.072	4	-4.652e-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	.186	3	.772	3	0	1	8.712e-4	4	1866.884	15	NC	1
40			min	-.861	1	-2.574	1	-.579	4	0	1	45.877	1	278.902	4
41		2	max	.186	3	.661	3	0	1	7.463e-4	4	2053.557	15	NC	1
42			min	-.861	1	-2.274	1	-.561	4	0	1	50.817	1	288.908	4
43		3	max	.186	3	.553	3	0	1	5.019e-4	5	2277.27	15	NC	1
44			min	-.861	1	-1.979	1	-.536	4	0	1	56.813	1	304.55	4
45		4	max	.186	3	.456	3	0	1	2.589e-4	5	2536.706	15	NC	1
46			min	-.861	1	-1.705	1	-.504	4	0	1	63.826	1	326.871	4
47		5	max	.186	3	.377	3	0	1	1.068e-4	5	9610.803	12	NC	1
48			min	-.86	1	-1.466	1	-.468	4	0	1	71.531	1	356.543	4
49		6	max	.185	3	.32	3	0	1	1.889e-4	5	7400.24	12	NC	1
50			min	-.858	1	-1.267	1	-.431	4	0	1	79.5	1	393.679	4
51		7	max	.184	3	.276	3	0	1	2.71e-4	5	3445.202	15	NC	1
52			min	-.855	1	-1.095	1	-.394	4	0	1	88.033	1	437.876	4
53		8	max	.182	3	.237	3	0	1	3.536e-4	4	3823.626	15	NC	1
54			min	-.853	1	-.933	1	-.361	4	0	1	97.84	1	487.23	4
55		9	max	.181	3	.196	3	0	1	3.242e-4	4	4308.438	15	NC	1
56			min	-.85	1	-.768	1	-.333	4	0	1	110.407	1	541.006	4
57		10	max	.18	3	.148	3	0	1	1.89e-4	5	4975.375	15	NC	1
58			min	-.848	1	-.593	1	-.3	4	0	1	127.827	1	618.933	4
59		11	max	.179	3	.094	3	0	1	5.434e-5	5	5936.254	15	NC	1
60			min	-.845	1	-.41	1	-.266	4	0	1	152.776	2	724.793	4
61		12	max	.178	3	.033	3	0	1	0	1	7427.153	15	NC	1
62			min	-.843	1	-.223	2	-.236	4	-5.991e-4	4	190.709	2	858.224	4
63		13	max	.176	3	0	15	0	1	0	1	9914.026	15	NC	1
64			min	-.84	1	-.038	2	-.201	4	-1.799e-3	4	253.732	2	1086.921	4
65		14	max	.175	3	.144	1	0	1	0	1	NC	15	NC	1
66			min	-.838	1	-.063	3	-.165	4	-3.e-3	4	345.882	3	1501.731	4
67		15	max	.174	3	.286	1	0	1	0	1	NC	5	NC	1
68			min	-.835	1	-.062	3	-.133	4	-4.2e-3	4	346.325	3	2268.673	4
69		16	max	.174	3	.383	1	0	1	0	1	NC	5	NC	1
70			min	-.835	1	-.006	3	-.109	4	-3.345e-3	4	400.737	3	3681.438	4
71		17	max	.174	3	.443	1	0	1	0	1	NC	4	NC	1
72			min	-.835	1	.011	15	-.092	4	-2.25e-3	4	555.221	3	6758.699	4
73		18	max	.174	3	.483	1	0	1	0	1	NC	4	NC	1
74			min	-.835	1	.013	15	-.079	4	-1.154e-3	4	1077.768	3	NC	1
75		19	max	.174	3	.52	2	0	1	0	1	NC	1	NC	1
76			min	-.835	1	.014	15	-.071	4	-5.948e-4	4	NC	1	NC	1
77	M7	1	max	.097	3	.391	3	.002	3	2.614e-2	2	NC	5	NC	1
78			min	-.521	1	-1.51	1	-.584	4	-1.017e-2	3	73.665	1	274.642	4
79		2	max	.097	3	.332	3	.008	1	2.492e-2	2	NC	5	NC	2
80			min	-.521	1	-1.334	1	-.557	4	-9.78e-3	3	81.082	1	289.898	4
81		3	max	.097	3	.274	3	.017	1	2.252e-2	2	NC	5	NC	3
82			min	-.521	1	-1.161	1	-.527	4	-9.017e-3	3	89.959	1	308.632	4
83		4	max	.097	3	.222	3	.019	1	2.013e-2	2	NC	5	NC	3
84			min	-.521	1	-.999	1	-.495	4	-8.255e-3	3	100.276	1	331.815	4
85		5	max	.096	3	.177	3	.017	1	1.82e-2	2	NC	5	NC	3
86			min	-.521	1	-.855	1	-.461	4	-7.687e-3	3	111.716	1	360.416	4
87		6	max	.096	3	.142	3	.011	1	1.747e-2	2	NC	3	NC	2
88			min	-.52	1	-.73	1	-.427	4	-7.617e-3	3	123.866	1	394.502	4
89		7	max	.095	3	.114	3	.003	2	1.675e-2	2	NC	5	NC	1
90			min	-.519	1	-.62	1	-.394	4	-7.547e-3	3	137.085	1	434.547	4
91		8	max	.095	3	.089	3	0	10	1.603e-2	2	NC	5	NC	1
92			min	-.517	1	-.518	1	-.362	4	-7.478e-3	3	152.127	1	481.315	4
93		9	max	.095	3	.066	3	0	3	1.462e-2	2	NC	5	NC	1
94			min	-.516	1	-.417	1	-.332	4	-7.643e-3	3	170.475	1	536.628	4
95		10	max	.094	3	.042	3	.001	3	1.259e-2	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	-.515	1	-.316	1	-.3	4	-8.03e-3	3	194.094	1	610.414	4
97		11	max	.094	3	.019	3	0	3	1.06e-2	1	NC	5	NC	1
98			min	-.514	1	-.214	1	-.267	4	-8.417e-3	3	225.636	1	711.749	4
99		12	max	.093	3	.003	5	.004	1	8.493e-3	1	NC	5	NC	1
100			min	-.513	1	-.111	1	-.233	4	-7.593e-3	3	270.044	1	857.365	4
101		13	max	.093	3	0	5	.006	1	5.999e-3	1	NC	5	NC	1
102			min	-.511	1	-.025	3	-.197	4	-5.482e-3	3	335.387	1	1098.751	4
103		14	max	.092	3	.088	1	.004	2	3.504e-3	1	NC	5	NC	1
104			min	-.51	1	-.036	3	-.162	4	-3.372e-3	3	434.769	1	1511.707	4
105		15	max	.092	3	.175	1	0	10	1.009e-3	1	NC	5	NC	1
106			min	-.509	1	-.033	3	-.132	4	-4.092e-3	5	591.775	1	2214.575	4
107		16	max	.092	3	.247	1	-.002	10	1.774e-3	1	NC	4	NC	2
108			min	-.509	1	-.01	3	-.11	4	-3.53e-3	3	846.867	1	3341.255	4
109		17	max	.092	3	.308	1	-.002	12	2.92e-3	1	NC	4	NC	2
110			min	-.509	1	-.014	5	-.094	4	-6.312e-3	3	1332.039	1	5415.912	4
111		18	max	.092	3	.362	1	0	12	4.067e-3	1	NC	4	NC	1
112			min	-.509	1	-.019	5	-.081	4	-9.093e-3	3	2708.932	3	NC	1
113		19	max	.092	3	.414	1	.009	1	4.652e-3	1	NC	1	NC	1
114			min	-.509	1	-.025	5	-.068	4	-1.051e-2	3	4086.405	7	NC	1
115	M10	1	max	0	1	.389	1	.509	1	6.637e-3	1	NC	1	NC	1
116			min	-.074	4	-.022	5	-.092	3	-7.175e-4	5	NC	1	NC	1
117		2	max	0	1	.346	1	.542	1	7.735e-3	3	NC	4	NC	3
118			min	-.074	4	-.014	5	-.094	3	-6.164e-4	5	1687.326	3	5104.448	1
119		3	max	0	1	.312	1	.593	1	8.846e-3	3	NC	4	NC	3
120			min	-.074	4	-.009	5	-.101	3	-5.153e-4	5	883.001	3	2004.442	1
121		4	max	0	1	.364	3	.651	1	9.957e-3	3	NC	4	NC	5
122			min	-.074	4	-.004	5	-.111	3	-4.141e-4	5	650.502	3	1183.935	1
123		5	max	0	1	.402	3	.708	1	1.107e-2	3	NC	4	NC	5
124			min	-.074	4	-.001	15	-.124	3	-3.13e-4	5	567.961	3	845.636	1
125		6	max	0	1	.407	3	.757	1	1.218e-2	3	NC	4	NC	5
126			min	-.074	4	.001	15	-.137	3	-2.119e-4	5	557.902	3	677.653	1
127		7	max	0	1	.385	2	.795	1	1.329e-2	3	NC	1	NC	5
128			min	-.074	4	.004	15	-.151	3	-1.108e-4	5	603.071	3	587.944	1
129		8	max	0	1	.437	2	.819	1	1.44e-2	3	NC	4	NC	5
130			min	-.074	4	.006	15	-.162	3	-1.227e-5	15	704.426	3	540.975	1
131		9	max	0	1	.481	2	.832	1	1.551e-2	3	NC	4	NC	5
132			min	-.075	4	.01	15	-.171	3	5.608e-5	15	851.558	3	520.055	1
133		10	max	0	1	.501	2	.835	1	1.662e-2	3	NC	4	NC	5
134			min	-.075	4	.013	15	-.174	3	1.244e-4	15	947	3	514.983	1
135		11	max	0	3	.481	2	.832	1	1.551e-2	3	NC	4	NC	5
136			min	-.075	4	.016	15	-.171	3	2.095e-4	15	851.558	3	520.055	1
137		12	max	0	3	.437	2	.819	1	1.44e-2	3	NC	4	NC	5
138			min	-.075	4	.017	15	-.162	3	2.945e-4	15	704.426	3	540.975	1
139		13	max	0	3	.385	2	.795	1	1.329e-2	3	NC	1	NC	5
140			min	-.075	4	.017	15	-.151	3	3.796e-4	15	603.071	3	587.944	1
141		14	max	0	3	.407	3	.757	1	1.218e-2	3	NC	5	NC	5
142			min	-.075	4	.017	15	-.137	3	4.646e-4	15	557.902	3	677.653	1
143		15	max	0	3	.402	3	.708	1	1.107e-2	3	NC	5	NC	5
144			min	-.075	4	.018	15	-.124	3	5.496e-4	15	567.961	3	845.636	1
145		16	max	0	3	.364	3	.651	1	9.957e-3	3	NC	5	NC	5
146			min	-.075	4	.02	15	-.111	3	6.347e-4	15	650.502	3	1183.935	1
147		17	max	0	3	.312	1	.593	1	8.846e-3	3	NC	5	NC	3
148			min	-.075	4	.024	15	-.101	3	7.197e-4	15	883.001	3	2004.442	1
149		18	max	0	3	.346	1	.542	1	7.735e-3	3	NC	4	NC	3
150			min	-.075	4	.03	15	-.094	3	8.048e-4	15	1687.326	3	5104.448	1
151		19	max	0	3	.389	1	.509	1	6.637e-3	1	NC	1	NC	1
152			min	-.075	4	.038	15	-.092	3	8.898e-4	15	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
153	M11	1	max	.001	1	.007	3	.513	1	1.311e-2	1	NC	1	NC	1
154			min	-.25	4	-.161	1	-.093	3	-2.942e-3	3	NC	1	NC	1
155		2	max	.001	1	.089	3	.537	1	1.433e-2	1	NC	4	NC	3
156			min	-.25	4	-.25	1	-.099	3	-3.46e-3	3	1884.965	1	5917.54	4
157		3	max	0	1	.161	3	.584	1	1.555e-2	1	NC	5	NC	3
158			min	-.25	4	-.328	1	-.108	3	-3.979e-3	3	1006.718	1	2376.697	1
159		4	max	0	1	.211	3	.641	1	1.678e-2	1	NC	5	NC	12
160			min	-.25	4	-.384	1	-.119	3	-4.498e-3	3	752.124	1	1312.833	1
161		5	max	0	1	.231	3	.7	1	1.8e-2	1	NC	5	NC	15
162			min	-.25	4	-.414	1	-.132	3	-5.017e-3	3	663.016	1	900.536	1
163		6	max	0	1	.22	3	.753	1	1.922e-2	1	NC	5	NC	5
164			min	-.25	4	-.417	1	-.145	3	-5.536e-3	3	655.173	1	701.934	1
165		7	max	0	1	.184	3	.795	1	2.044e-2	1	NC	5	NC	5
166			min	-.25	4	-.398	1	-.157	3	-6.054e-3	3	709.951	1	596.79	1
167		8	max	0	1	.134	3	.824	1	2.167e-2	1	NC	5	NC	5
168			min	-.25	4	-.364	1	-.168	3	-6.573e-3	3	824.284	2	540.978	1
169		9	max	0	1	.086	3	.84	1	2.289e-2	1	NC	5	NC	5
170			min	-.25	4	-.33	1	-.175	3	-7.092e-3	3	973.2	2	514.928	1
171		10	max	0	1	.064	3	.844	1	2.411e-2	1	NC	5	NC	5
172			min	-.25	4	-.314	2	-.178	3	-7.611e-3	3	1065.865	2	507.965	1
173		11	max	0	3	.086	3	.84	1	2.289e-2	1	NC	5	8100.316	15
174			min	-.25	4	-.33	1	-.175	3	-7.092e-3	3	973.2	2	514.928	1
175		12	max	0	3	.134	3	.824	1	2.167e-2	1	NC	5	7207.461	15
176			min	-.25	4	-.364	1	-.168	3	-6.573e-3	3	824.284	2	540.978	1
177		13	max	0	3	.184	3	.795	1	2.044e-2	1	NC	5	9305.228	15
178			min	-.25	4	-.398	1	-.157	3	-6.054e-3	3	709.951	1	596.79	1
179		14	max	0	3	.22	3	.753	1	1.922e-2	1	NC	5	NC	5
180			min	-.25	4	-.417	1	-.145	3	-5.536e-3	3	655.173	1	701.934	1
181		15	max	0	3	.231	3	.7	1	1.8e-2	1	NC	5	NC	5
182			min	-.25	4	-.414	1	-.132	3	-5.017e-3	3	663.016	1	900.536	1
183		16	max	0	3	.211	3	.641	1	1.678e-2	1	NC	5	NC	4
184			min	-.25	4	-.384	1	-.119	3	-4.498e-3	3	752.124	1	1312.833	1
185		17	max	0	3	.161	3	.584	1	1.555e-2	1	NC	5	NC	3
186			min	-.25	4	-.328	1	-.108	3	-3.979e-3	3	1006.718	1	2376.697	1
187		18	max	0	3	.089	3	.537	1	1.433e-2	1	NC	5	NC	3
188			min	-.25	4	-.25	1	-.099	3	-3.46e-3	3	1884.965	1	6963.578	1
189		19	max	0	3	.007	3	.513	1	1.311e-2	1	NC	1	NC	1
190			min	-.25	4	-.161	1	-.093	3	-2.942e-3	3	NC	1	NC	1
191	M12	1	max	0	3	.078	3	.517	1	1.276e-2	1	NC	1	NC	1
192			min	-.348	4	-.469	1	-.095	3	-2.971e-3	3	NC	1	NC	1
193		2	max	0	3	.145	3	.537	1	1.367e-2	1	NC	5	NC	2
194			min	-.348	4	-.608	1	-.097	3	-3.228e-3	3	1158.878	2	6615.756	4
195		3	max	0	3	.202	3	.582	1	1.459e-2	1	NC	5	NC	3
196			min	-.348	4	-.732	1	-.104	3	-3.484e-3	3	609.816	2	2573.082	1
197		4	max	0	3	.244	3	.639	1	1.55e-2	1	NC	5	NC	12
198			min	-.348	4	-.831	1	-.115	3	-3.741e-3	3	444.742	2	1371.636	1
199		5	max	0	3	.268	3	.699	1	1.641e-2	1	NC	5	NC	7
200			min	-.348	4	-.896	1	-.128	3	-3.997e-3	3	378.397	2	922.302	1
201		6	max	0	3	.274	3	.754	1	1.732e-2	1	NC	5	NC	5
202			min	-.348	4	-.925	1	-.143	3	-4.254e-3	3	355.548	2	709.545	1
203		7	max	0	3	.266	3	.798	1	1.823e-2	1	NC	5	NC	5
204			min	-.348	4	-.923	1	-.157	3	-4.51e-3	3	359.169	2	597.643	1
205		8	max	0	3	.247	3	.829	1	1.914e-2	1	NC	5	NC	5
206			min	-.348	4	-.9	1	-.17	3	-4.767e-3	3	381.676	2	538.083	1
207		9	max	0	3	.228	3	.846	1	2.006e-2	1	NC	5	NC	5
208			min	-.348	4	-.87	1	-.178	3	-5.023e-3	3	413.47	2	509.882	1
209		10	max	0	1	.218	3	.852	1	2.097e-2	1	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	-.348	4	-.855	1	-.182	3	-5.28e-3	3	432.056	2	502.121	1
211		11	max	0	1	.228	3	.846	1	2.006e-2	1	NC	5	8351.535	15
212			min	-.348	4	-.87	1	-.178	3	-5.023e-3	3	413.47	2	509.882	1
213		12	max	0	1	.247	3	.829	1	1.914e-2	1	NC	5	7401.043	15
214			min	-.348	4	-.9	1	-.17	3	-4.767e-3	3	381.676	2	538.083	1
215		13	max	0	1	.266	3	.798	1	1.823e-2	1	NC	15	9362.576	15
216			min	-.348	4	-.923	1	-.157	3	-4.51e-3	3	359.169	2	597.643	1
217		14	max	0	1	.274	3	.754	1	1.732e-2	1	NC	15	NC	5
218			min	-.348	4	-.925	1	-.143	3	-4.254e-3	3	355.548	2	709.545	1
219		15	max	0	1	.268	3	.699	1	1.641e-2	1	NC	15	NC	5
220			min	-.348	4	-.896	1	-.128	3	-3.997e-3	3	378.397	2	922.302	1
221		16	max	0	1	.244	3	.639	1	1.55e-2	1	NC	5	NC	4
222			min	-.348	4	-.831	1	-.115	3	-3.741e-3	3	444.742	2	1371.636	1
223		17	max	0	1	.202	3	.582	1	1.459e-2	1	NC	5	NC	3
224			min	-.348	4	-.732	1	-.104	3	-3.484e-3	3	609.816	2	2573.082	1
225		18	max	0	1	.145	3	.537	1	1.367e-2	1	NC	5	NC	2
226			min	-.348	4	-.608	1	-.097	3	-3.228e-3	3	1158.878	2	8227.85	1
227		19	max	0	1	.078	3	.517	1	1.276e-2	1	NC	1	NC	1
228			min	-.348	4	-.469	1	-.095	3	-2.971e-3	3	NC	1	NC	1
229	M13	1	max	0	3	.362	3	.521	1	2.237e-2	2	NC	1	NC	1
230			min	-.571	4	-1.424	1	-.097	3	-7.468e-3	3	NC	1	NC	1
231		2	max	0	3	.456	3	.558	1	2.425e-2	2	NC	5	NC	3
232			min	-.571	4	-1.657	1	-.102	3	-8.203e-3	3	687.539	2	4590.742	1
233		3	max	0	3	.544	3	.612	1	2.612e-2	2	NC	5	NC	3
234			min	-.571	4	-1.877	1	-.111	3	-8.939e-3	3	353.668	2	1857.823	1
235		4	max	0	3	.618	3	.672	1	2.8e-2	2	NC	15	NC	12
236			min	-.571	4	-2.069	1	-.123	3	-9.675e-3	3	248.937	2	1114.21	1
237		5	max	0	3	.673	3	.731	1	2.987e-2	2	NC	15	NC	15
238			min	-.571	4	-2.222	1	-.136	3	-1.041e-2	3	201.725	2	802.942	1
239		6	max	0	3	.709	3	.781	1	3.175e-2	2	9454.95	15	NC	5
240			min	-.571	4	-2.331	1	-.15	3	-1.115e-2	3	177.991	2	646.988	1
241		7	max	0	3	.726	3	.82	1	3.363e-2	2	8530.233	15	NC	5
242			min	-.571	4	-2.397	1	-.164	3	-1.188e-2	3	166.484	2	563.254	1
243		8	max	0	3	.728	3	.845	1	3.55e-2	2	8056.612	15	NC	5
244			min	-.571	4	-2.426	1	-.175	3	-1.262e-2	3	162.212	2	519.282	1
245		9	max	0	3	.722	3	.858	1	3.738e-2	2	7861.786	15	NC	5
246			min	-.571	4	-2.431	1	-.183	3	-1.335e-2	3	162.031	2	499.67	1
247		10	max	0	1	.718	3	.861	1	3.925e-2	2	7819.636	15	NC	5
248			min	-.571	4	-2.427	1	-.186	3	-1.409e-2	3	162.809	2	494.917	1
249		11	max	0	1	.722	3	.858	1	3.738e-2	2	7746.233	15	NC	15
250			min	-.571	4	-2.431	1	-.183	3	-1.335e-2	3	162.031	2	499.67	1
251		12	max	0	1	.728	3	.845	1	3.55e-2	2	7672.048	15	NC	15
252			min	-.571	4	-2.426	1	-.175	3	-1.262e-2	3	162.212	2	519.282	1
253		13	max	0	1	.726	3	.82	1	3.363e-2	2	7754.383	15	NC	5
254			min	-.571	4	-2.397	1	-.164	3	-1.188e-2	3	166.484	2	563.254	1
255		14	max	0	1	.709	3	.781	1	3.175e-2	2	8133.941	15	NC	5
256			min	-.571	4	-2.331	1	-.15	3	-1.115e-2	3	177.991	2	646.988	1
257		15	max	0	1	.673	3	.731	1	2.987e-2	2	9012.588	15	NC	5
258			min	-.571	4	-2.222	1	-.136	3	-1.041e-2	3	201.725	2	802.942	1
259		16	max	0	1	.618	3	.672	1	2.8e-2	2	NC	15	NC	4
260			min	-.571	4	-2.069	1	-.123	3	-9.675e-3	3	248.937	2	1114.21	1
261		17	max	0	1	.544	3	.612	1	2.612e-2	2	NC	15	NC	3
262			min	-.571	4	-1.877	1	-.111	3	-8.939e-3	3	353.668	2	1857.823	1
263		18	max	0	1	.456	3	.558	1	2.425e-2	2	NC	5	NC	3
264			min	-.571	4	-1.657	1	-.102	3	-8.203e-3	3	687.539	2	4590.742	1
265		19	max	0	1	.362	3	.521	1	2.237e-2	2	NC	1	NC	1
266			min	-.571	4	-1.424	1	-.097	3	-7.468e-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	5.209e-4	2	NC	1	NC	1
270			min	0	1	-.002	1	0	1	-8.572e-4	5	NC	1	NC	1
271		3	max	0	3	0	3	.003	5	1.042e-3	2	NC	3	NC	1
272			min	0	1	-.008	1	0	1	-1.714e-3	5	8054.487	1	NC	1
273		4	max	0	3	.002	3	.006	5	1.563e-3	2	NC	3	NC	1
274			min	0	1	-.017	1	0	1	-2.572e-3	5	3583.179	1	NC	1
275		5	max	0	3	.003	3	.009	5	2.083e-3	2	NC	3	NC	1
276			min	0	1	-.03	1	-.001	1	-3.429e-3	5	2016.838	1	6387.851	5
277		6	max	0	3	.006	3	.014	5	2.604e-3	2	NC	3	NC	1
278			min	0	1	-.047	1	-.002	1	-4.286e-3	5	1291.41	1	4204.604	5
279		7	max	0	3	.009	3	.02	5	3.125e-3	2	NC	12	NC	1
280			min	0	1	-.068	1	-.003	1	-5.143e-3	5	897.163	1	3001.574	5
281		8	max	0	3	.012	3	.027	5	3.646e-3	2	8350.621	12	NC	1
282			min	0	1	-.092	1	-.003	1	-6.e-3	5	659.4	1	2267.028	5
283		9	max	0	3	.017	3	.034	5	3.554e-3	2	6177.106	15	NC	1
284			min	0	1	-.12	1	-.004	1	-6.214e-3	5	504.068	1	1784.761	5
285		10	max	0	3	.023	3	.042	5	3.102e-3	2	4968.247	15	NC	1
286			min	-.001	1	-.152	1	-.004	1	-6.049e-3	5	398.19	1	1450.287	5
287		11	max	0	3	.029	3	.05	5	2.65e-3	2	4099.843	15	NC	1
288			min	-.001	1	-.188	1	-.005	1	-5.884e-3	5	323.517	1	1208.47	5
289		12	max	0	3	.036	3	.059	5	2.197e-3	2	3455.119	15	NC	1
290			min	-.001	1	-.225	1	-.005	1	-5.719e-3	5	269.034	1	1027.855	5
291		13	max	0	3	.044	3	.068	5	1.745e-3	2	2963.316	15	NC	1
292			min	-.001	1	-.266	1	-.005	1	-5.553e-3	5	228.127	1	889.333	5
293		14	max	.001	3	.052	3	.078	4	1.293e-3	2	2579.605	15	NC	1
294			min	-.001	1	-.308	1	-.006	1	-5.388e-3	5	196.665	1	780.457	4
295		15	max	.001	3	.061	3	.088	4	8.407e-4	2	2274.53	15	NC	1
296			min	-.002	1	-.353	1	-.005	1	-5.223e-3	5	171.969	1	692.932	4
297		16	max	.001	3	.069	3	.098	4	3.885e-4	2	2028.03	15	NC	1
298			min	-.002	1	-.398	1	-.005	1	-5.088e-3	4	152.244	1	621.971	4
299		17	max	.001	3	.078	3	.108	4	3.391e-4	3	1826.133	15	NC	1
300			min	-.002	1	-.445	1	-.005	1	-4.979e-3	4	136.255	1	563.686	4
301		18	max	.001	3	.088	3	.118	4	5.623e-4	3	1658.805	15	NC	1
302			min	-.002	1	-.493	1	-.007	3	-4.87e-3	4	123.13	1	515.282	4
303		19	max	.001	3	.097	3	.128	4	7.855e-4	3	1518.739	15	NC	1
304			min	-.002	1	-.541	1	-.009	3	-4.761e-3	4	112.238	1	474.708	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	12	0	4	0	1	NC	1	NC	1
308			min	0	1	-.003	1	0	1	-8.818e-4	4	NC	1	NC	1
309		3	max	0	3	0	3	.003	4	0	1	NC	3	NC	1
310			min	0	1	-.011	1	0	1	-1.764e-3	4	5638.83	1	NC	1
311		4	max	0	3	.001	3	.006	4	0	1	NC	3	NC	1
312			min	0	1	-.025	1	0	1	-2.645e-3	4	2455.553	1	NC	1
313		5	max	0	3	.004	3	.01	4	0	1	NC	3	NC	1
314			min	-.001	1	-.045	1	0	1	-3.527e-3	4	1360.968	1	6167.737	4
315		6	max	.001	3	.007	3	.015	4	0	1	NC	5	NC	1
316			min	-.001	1	-.071	1	0	1	-4.409e-3	4	860.152	1	4061.399	4
317		7	max	.001	3	.012	3	.021	4	0	1	NC	5	NC	1
318			min	-.002	1	-.103	1	0	1	-5.291e-3	4	590.54	1	2900.57	4
319		8	max	.002	3	.018	3	.028	4	0	1	NC	5	NC	1
320			min	-.002	1	-.141	1	0	1	-6.172e-3	4	429.256	1	2191.706	4
321		9	max	.002	3	.026	3	.035	4	0	1	NC	15	NC	1
322			min	-.002	1	-.187	1	0	1	-6.391e-3	4	324.402	1	1726.203	4
323		10	max	.002	3	.037	3	.043	4	0	1	9714.499	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	-.003	1	-.239	1	0	1	-6.219e-3	4	253.594	1	1403.284	4
325		11	max	.002	3	.049	3	.052	4	0	1	7861.242	15	NC	1
326			min	-.003	1	-.297	1	0	1	-6.048e-3	4	204.23	1	1169.84	4
327		12	max	.003	3	.063	3	.061	4	0	1	6515.391	15	NC	1
328			min	-.003	1	-.36	1	0	1	-5.877e-3	4	168.587	1	995.528	4
329		13	max	.003	3	.078	3	.07	4	0	1	5509.127	15	NC	1
330			min	-.003	1	-.427	1	0	1	-5.705e-3	4	142.072	1	861.895	4
331		14	max	.003	3	.094	3	.08	4	0	1	4738.005	15	NC	1
332			min	-.004	1	-.498	1	0	1	-5.534e-3	4	121.843	1	757.199	4
333		15	max	.003	3	.11	3	.09	4	0	1	4134.689	15	NC	1
334			min	-.004	1	-.572	1	0	1	-5.363e-3	4	106.076	1	673.686	4
335		16	max	.003	3	.128	3	.1	4	0	1	3654.178	15	NC	1
336			min	-.004	1	-.648	1	0	1	-5.191e-3	4	93.561	1	606.056	4
337		17	max	.004	3	.146	3	.11	4	0	1	3265.684	15	NC	1
338			min	-.004	1	-.727	1	0	1	-5.02e-3	4	83.473	1	550.595	4
339		18	max	.004	3	.165	3	.12	4	0	1	2947.476	15	NC	1
340			min	-.005	1	-.806	1	0	1	-4.849e-3	4	75.232	1	504.633	4
341		19	max	.004	3	.184	3	.13	4	0	1	2683.968	15	NC	1
342			min	-.005	1	-.887	1	0	1	-4.677e-3	4	68.424	1	466.212	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	2.153e-4	3	NC	1	NC	1
346			min	0	1	-.002	1	0	3	-9.543e-4	4	NC	1	NC	1
347		3	max	0	3	0	3	.003	4	4.306e-4	3	NC	3	NC	1
348			min	0	1	-.008	1	0	3	-1.909e-3	4	8054.487	1	NC	1
349		4	max	0	3	.002	3	.006	4	6.459e-4	3	NC	3	NC	1
350			min	0	1	-.017	1	0	3	-2.863e-3	4	3583.179	1	NC	1
351		5	max	0	3	.003	3	.01	4	8.613e-4	3	NC	3	NC	1
352			min	0	1	-.03	1	0	3	-3.817e-3	4	2016.838	1	6125.705	4
353		6	max	0	3	.006	3	.015	4	1.077e-3	3	NC	3	NC	1
354			min	0	1	-.047	1	-.001	3	-4.772e-3	4	1291.41	1	4037.983	4
355		7	max	0	3	.009	3	.021	4	1.292e-3	3	NC	5	NC	1
356			min	0	1	-.068	1	-.001	3	-5.726e-3	4	897.163	1	2886.952	4
357		8	max	0	3	.012	3	.028	4	1.507e-3	3	NC	5	NC	1
358			min	0	1	-.092	1	-.002	3	-6.68e-3	4	659.4	1	2183.845	4
359		9	max	0	3	.017	3	.035	4	1.446e-3	3	NC	5	NC	1
360			min	0	1	-.12	1	-.002	3	-6.872e-3	4	504.068	1	1721.958	4
361		10	max	0	3	.023	3	.043	4	1.223e-3	3	NC	5	NC	1
362			min	-.001	1	-.152	1	-.002	3	-6.617e-3	4	398.19	1	1401.221	4
363		11	max	0	3	.029	3	.052	4	9.999e-4	3	NC	7	NC	1
364			min	-.001	1	-.188	1	-.002	3	-6.362e-3	4	323.517	1	1169.164	4
365		12	max	0	3	.036	3	.061	4	7.767e-4	3	NC	15	NC	1
366			min	-.001	1	-.225	1	-.001	3	-6.106e-3	4	269.034	1	995.787	4
367		13	max	0	3	.044	3	.07	4	5.536e-4	3	NC	15	NC	1
368			min	-.001	1	-.266	1	0	3	-5.851e-3	4	228.127	1	862.82	4
369		14	max	.001	3	.052	3	.08	4	3.304e-4	3	9432.667	15	NC	1
370			min	-.001	1	-.308	1	0	12	-5.596e-3	4	196.665	1	758.624	4
371		15	max	.001	3	.061	3	.09	4	1.072e-4	3	8477.377	15	NC	1
372			min	-.002	1	-.353	1	0	12	-5.34e-3	4	171.969	1	675.504	4
373		16	max	.001	3	.069	3	.1	4	3.031e-6	9	7686.372	15	NC	1
374			min	-.002	1	-.398	1	.001	10	-5.085e-3	4	152.244	1	608.2	4
375		17	max	.001	3	.078	3	.11	4	2.606e-4	1	7023.266	15	NC	1
376			min	-.002	1	-.445	1	0	10	-4.862e-3	5	136.255	1	553.02	4
377		18	max	.001	3	.088	3	.12	4	7.123e-4	1	6461.454	15	NC	1
378			min	-.002	1	-.493	1	0	10	-4.666e-3	5	123.13	1	507.314	4
379		19	max	.001	3	.097	3	.129	4	1.164e-3	1	5981.147	15	NC	1
380			min	-.002	1	-.541	1	0	10	-4.47e-3	5	112.238	1	469.134	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	1	.002	3	.029	5	1.496e-3	4	NC	1	NC	1
382			min	-.014	3	-.011	1	-.003	1	-1.341e-4	3	NC	1	NC	1
383		2	max	.1	1	.013	3	.057	5	1.448e-3	4	NC	1	NC	3
384			min	-.013	3	-.069	1	-.019	2	-5.135e-4	3	7321.425	3	4464.606	2
385		3	max	.099	1	.023	3	.085	5	2.082e-3	2	NC	1	NC	4
386			min	-.013	3	-.127	1	-.035	2	-8.928e-4	3	3653.996	3	2258.471	2
387		4	max	.098	1	.034	3	.113	5	2.984e-3	2	NC	1	NC	4
388			min	-.012	3	-.185	1	-.05	2	-1.272e-3	3	2428.894	3	1532.771	2
389		5	max	.097	1	.045	3	.141	5	3.885e-3	2	NC	1	NC	4
390			min	-.012	3	-.243	1	-.065	2	-1.651e-3	3	1814.604	3	1177.963	2
391		6	max	.095	1	.056	3	.168	5	4.786e-3	2	NC	1	NC	4
392			min	-.011	3	-.301	1	-.077	2	-2.031e-3	3	1444.827	3	972.441	2
393		7	max	.094	1	.067	3	.195	5	5.688e-3	2	NC	1	NC	4
394			min	-.011	3	-.358	1	-.089	2	-2.41e-3	3	1197.464	3	842.676	2
395		8	max	.093	1	.078	3	.222	5	6.589e-3	2	NC	5	NC	6
396			min	-.01	3	-.416	1	-.098	2	-2.789e-3	3	1020.185	3	757.562	2
397		9	max	.092	1	.089	3	.248	5	7.49e-3	2	NC	5	9938.606	6
398			min	-.01	3	-.473	1	-.105	2	-3.169e-3	3	886.821	3	702.072	2
399		10	max	.091	1	.101	3	.273	5	8.392e-3	2	NC	5	9579.231	6
400			min	-.009	3	-.529	1	-.11	2	-3.548e-3	3	782.833	3	668.573	2
401		11	max	.089	1	.112	3	.298	5	9.293e-3	2	NC	5	9510.631	6
402			min	-.009	3	-.586	1	-.112	2	-3.927e-3	3	699.49	3	653.527	2
403		12	max	.088	1	.124	3	.322	5	1.019e-2	2	NC	5	9733.289	6
404			min	-.008	3	-.642	1	-.11	2	-4.307e-3	3	631.235	3	639.77	14
405		13	max	.087	1	.137	3	.346	5	1.11e-2	2	NC	1	NC	6
406			min	-.008	3	-.698	1	-.105	2	-4.686e-3	3	574.36	3	574.697	14
407		14	max	.086	1	.149	3	.369	5	1.2e-2	2	NC	1	NC	6
408			min	-.007	3	-.754	1	-.097	2	-5.065e-3	3	526.292	3	519.12	14
409		15	max	.085	1	.161	3	.391	5	1.29e-2	2	NC	1	NC	4
410			min	-.007	3	-.81	1	-.084	2	-5.445e-3	3	485.193	3	471.061	14
411		16	max	.084	1	.174	3	.413	5	1.38e-2	2	NC	1	NC	4
412			min	-.006	3	-.865	1	-.067	2	-5.824e-3	3	449.711	3	429.074	14
413		17	max	.082	1	.186	3	.433	5	1.47e-2	2	NC	1	NC	4
414			min	-.006	3	-.92	1	-.045	2	-6.203e-3	3	418.83	3	392.076	14
415		18	max	.081	1	.199	3	.455	4	1.56e-2	2	NC	1	NC	4
416			min	-.005	3	-.975	1	-.018	2	-6.583e-3	3	391.772	3	359.235	14
417		19	max	.08	1	.212	3	.478	4	1.65e-2	2	NC	1	NC	1
418			min	-.005	3	-1.031	1	-.004	3	-6.962e-3	3	367.929	3	329.907	14
419	M6	1	max	.156	1	.004	3	.03	4	1.506e-3	4	NC	1	NC	1
420			min	-.02	3	-.018	1	0	1	0	1	NC	1	NC	1
421		2	max	.154	1	.027	3	.059	4	1.305e-3	4	NC	1	NC	1
422			min	-.019	3	-.116	1	0	1	0	1	3354.763	3	NC	1
423		3	max	.151	1	.05	3	.088	4	1.104e-3	4	NC	1	NC	1
424			min	-.018	3	-.214	1	0	1	0	1	1675.97	3	NC	1
425		4	max	.148	1	.073	3	.116	4	9.034e-4	4	NC	1	NC	1
426			min	-.016	3	-.311	1	0	1	0	1	1115.816	3	6837.623	4
427		5	max	.146	1	.096	3	.145	4	7.027e-4	4	NC	1	NC	1
428			min	-.015	3	-.409	1	0	1	0	1	835.368	3	5237.393	4
429		6	max	.143	1	.12	3	.173	4	5.019e-4	4	NC	1	NC	1
430			min	-.013	3	-.506	1	0	1	0	1	666.838	3	4317.484	4
431		7	max	.14	1	.143	3	.2	4	3.012e-4	4	NC	1	NC	1
432			min	-.012	3	-.603	1	0	1	0	1	554.297	3	3742.289	4
433		8	max	.138	1	.167	3	.228	4	1.005e-4	4	NC	5	NC	1
434			min	-.011	3	-.7	1	0	1	0	1	473.776	3	3370.128	4
435		9	max	.135	1	.191	3	.254	4	0	1	NC	5	NC	1
436			min	-.009	3	-.796	1	0	1	-1.099e-4	5	413.29	3	3132.813	4
437		10	max	.132	1	.215	3	.28	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	-.008	3	-.893	1	0	1	-3.09e-4	5	366.18	3	2996.011	4
439		11	max	.13	1	.239	3	.306	4	0	1	NC	5	NC	1
440			min	-.006	3	-.989	1	0	1	-5.081e-4	5	328.451	3	2944.215	4
441		12	max	.127	1	.263	3	.33	4	0	1	NC	5	NC	1
442			min	-.005	3	-1.085	1	0	1	-7.071e-4	5	297.559	3	2975.434	4
443		13	max	.124	1	.288	3	.354	4	0	1	NC	1	NC	1
444			min	-.003	3	-1.18	1	0	1	-9.062e-4	5	271.809	3	3101.511	4
445		14	max	.122	1	.313	3	.377	4	0	1	NC	1	NC	1
446			min	-.002	3	-1.276	1	0	1	-1.105e-3	5	250.027	3	3354.92	4
447		15	max	.119	1	.338	3	.399	4	0	1	NC	1	NC	1
448			min	0	3	-1.371	1	0	1	-1.305e-3	4	231.374	3	3809.527	4
449		16	max	.116	1	.363	3	.42	4	0	1	NC	1	NC	1
450			min	0	12	-1.466	1	0	1	-1.505e-3	4	215.233	3	4645.57	4
451		17	max	.114	1	.388	3	.441	4	0	1	NC	1	NC	1
452			min	.002	12	-1.561	1	0	1	-1.706e-3	4	201.143	3	6411.85	4
453		18	max	.111	1	.413	3	.46	4	0	1	NC	1	NC	1
454			min	.002	12	-1.656	1	0	1	-1.907e-3	4	188.751	3	NC	1
455		19	max	.108	1	.438	3	.478	4	0	1	NC	1	NC	1
456			min	.003	15	-1.751	1	0	1	-2.107e-3	4	177.782	3	NC	1
457	M9	1	max	.101	1	.002	3	.03	4	1.447e-3	4	NC	1	NC	1
458			min	-.014	3	-.011	1	-.002	3	-2.796e-4	2	NC	1	NC	1
459		2	max	.1	1	.013	3	.061	4	1.238e-3	5	NC	1	NC	3
460			min	-.013	3	-.069	1	-.008	3	-1.181e-3	2	7321.425	3	4464.606	2
461		3	max	.099	1	.023	3	.092	4	1.031e-3	5	NC	1	NC	13
462			min	-.013	3	-.127	1	-.015	3	-2.082e-3	2	3653.996	3	2258.471	2
463		4	max	.098	1	.034	3	.123	4	1.272e-3	3	NC	1	8804.403	15
464			min	-.012	3	-.185	1	-.021	3	-2.984e-3	2	2428.894	3	1532.771	2
465		5	max	.097	1	.045	3	.153	4	1.651e-3	3	NC	1	6743.879	15
466			min	-.012	3	-.243	1	-.027	3	-3.885e-3	2	1814.604	3	1177.963	2
467		6	max	.095	1	.056	3	.183	4	2.031e-3	3	NC	1	5558.164	15
468			min	-.011	3	-.301	1	-.033	3	-4.786e-3	2	1444.827	3	972.441	2
469		7	max	.094	1	.067	3	.212	4	2.41e-3	3	NC	1	4815.722	15
470			min	-.011	3	-.358	1	-.037	3	-5.688e-3	2	1197.464	3	842.676	2
471		8	max	.093	1	.078	3	.241	4	2.789e-3	3	NC	5	4334.313	15
472			min	-.01	3	-.416	1	-.041	3	-6.589e-3	2	1020.185	3	757.562	2
473		9	max	.092	1	.089	3	.268	4	3.169e-3	3	NC	5	4026.164	15
474			min	-.01	3	-.473	1	-.044	3	-7.49e-3	2	886.821	3	702.072	2
475		10	max	.091	1	.101	3	.295	4	3.548e-3	3	NC	5	3846.998	15
476			min	-.009	3	-.529	1	-.046	3	-8.392e-3	2	782.833	3	668.573	2
477		11	max	.089	1	.112	3	.32	4	3.927e-3	3	NC	5	3776.703	15
478			min	-.009	3	-.586	1	-.047	3	-9.293e-3	2	699.49	3	653.527	2
479		12	max	.088	1	.124	3	.344	4	4.307e-3	3	NC	7	3812.453	15
480			min	-.008	3	-.642	1	-.046	3	-1.019e-2	2	631.235	3	656.299	2
481		13	max	.087	1	.137	3	.367	4	4.686e-3	3	NC	1	3969.058	15
482			min	-.008	3	-.698	1	-.045	3	-1.11e-2	2	574.36	3	679.179	2
483		14	max	.086	1	.149	3	.388	4	5.065e-3	3	NC	1	4287.529	15
484			min	-.007	3	-.754	1	-.041	3	-1.2e-2	2	526.292	3	728.756	2
485		15	max	.085	1	.161	3	.408	4	5.445e-3	3	NC	1	4861.375	15
486			min	-.007	3	-.81	1	-.036	3	-1.29e-2	2	485.193	3	820.186	2
487		16	max	.084	1	.174	3	.426	4	5.824e-3	3	NC	1	5918.935	15
488			min	-.006	3	-.865	1	-.029	3	-1.38e-2	2	449.711	3	990.589	2
489		17	max	.082	1	.186	3	.443	4	6.203e-3	3	NC	1	8155.647	15
490			min	-.006	3	-.92	1	-.02	3	-1.47e-2	2	418.83	3	1353.13	2
491		18	max	.081	1	.199	3	.458	4	6.583e-3	3	NC	1	NC	5
492			min	-.005	3	-.975	1	-.009	3	-1.56e-2	2	391.772	3	2476.167	2
493		19	max	.08	1	.212	3	.471	4	6.962e-3	3	NC	1	NC	1
494			min	-.005	5	-1.031	1	-.017	1	-1.65e-2	2	367.929	3	NC	1