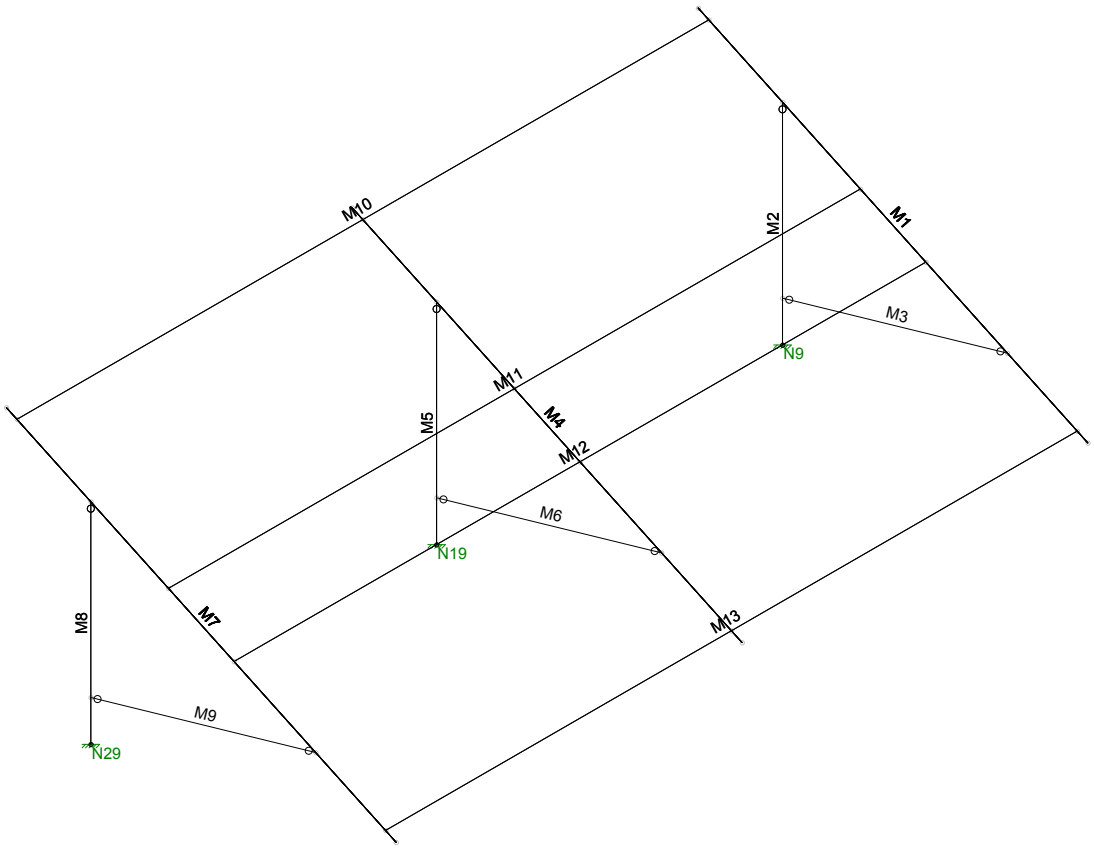


Schletter, Inc.		25° Tilt w/o Seismic Design
HCV	Standard FS Racking System	
	Representative Calculations - ASCE 7-05	

1. INTRODUCTION

1.1 Project Description

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

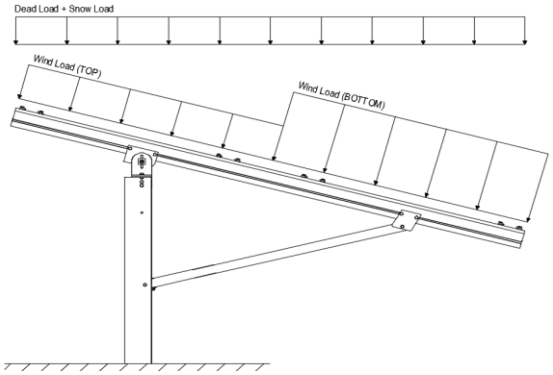
1.2 Construction

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

PV modules are required to meet the following specifications:

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

Modules Per Row =	2
Module Tilt =	25°
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	*Self-weight of the PV modules.*
g_{MIN} =	1.75	psf	

2.2 Snow Loads

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

2.3 Wind Loads

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

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

Pressure Coefficients

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

2.4 Seismic Loads - N/A

S_S =	0.00		R =	1.25	*ASCE 7, Section 12.8.1.3: A maximum S_s of 1.5 may be used to calculate the base shear, C_s, of structures under five stories and with a period, T, of 0.5 or less. Therefore, a S_{ds} of 1.0 was used to calculate C_s.*
S_{DS} =	0.00		C_S =	0	
S_1 =	0.00		ρ =	1.3	
S_{D1} =	0.00		Ω =	1.25	
T_a =	0.00		C_d =	1.25	

2.5 Combination of Loads

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

Strength Design, LRFD

Component stresses are checked using the following LRFD load combinations:

1.2D + 1.6S + 0.8W
1.2D + 1.6W + 0.5S
0.9D + 1.6W [M]
1.54D + 1.3E + 0.2S [R]
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
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

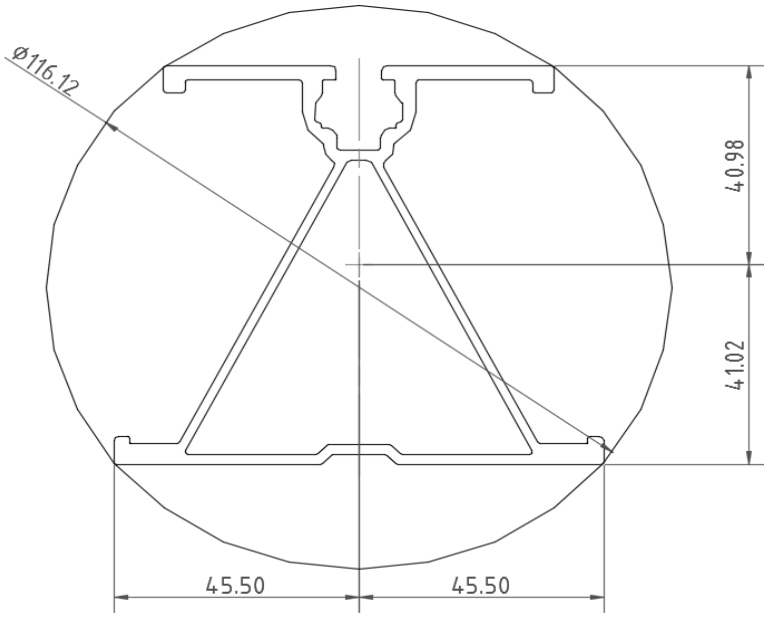
Struts	Location
M3	Outer
M6	Inner
M9	Outer

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 =	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 =	0.799	k-ft
M_z =	0.169	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	43%	

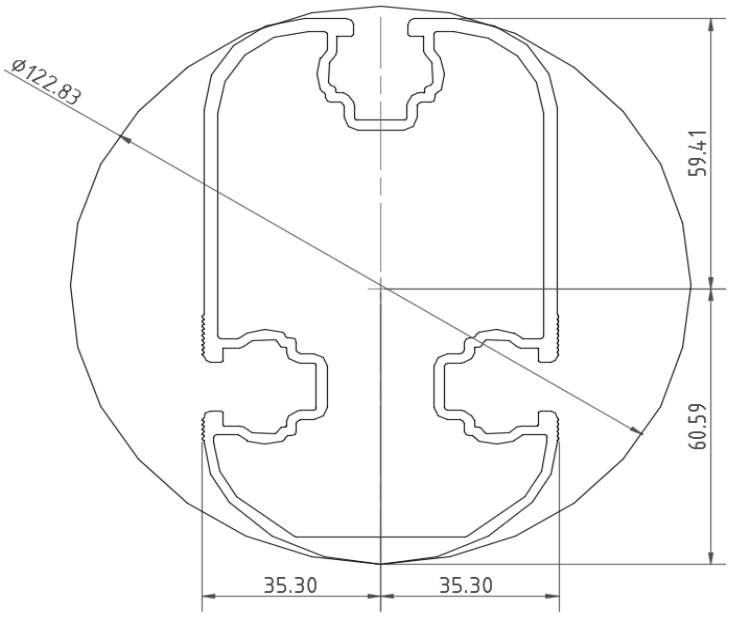


DETAIL VIEW

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 =	3.922	k-ft
M_z =	0.000	k-ft
P_n =	1.909	k
$M_{y\ allowable}$ =	4.960	k-ft
$M_{z\ allowable}$ =	3.472	k-ft
$P_{n\ allowable}$ =	59.439	k
Utilization =	82%	

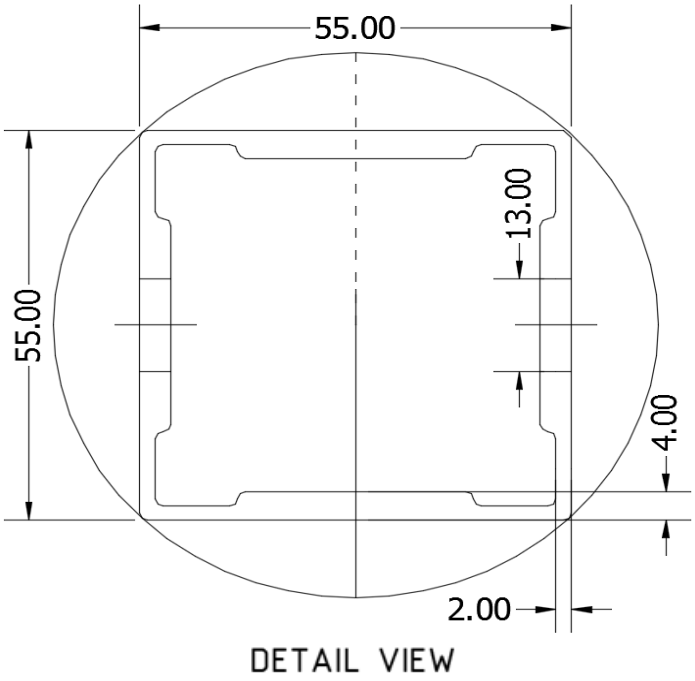


DETAIL VIEW

4.3 Strut Design

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

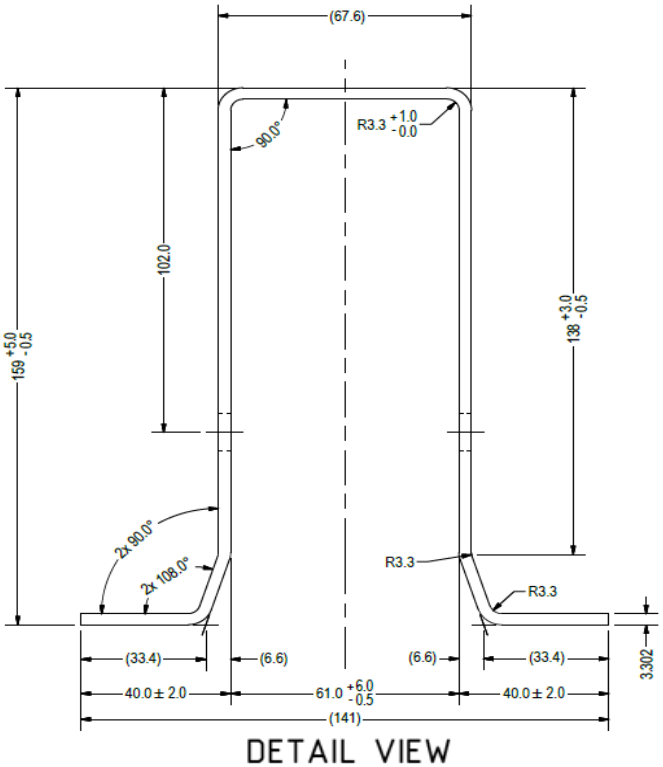
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	74.80	in
$\Phi F_{ty\ AXIAL}$ =	9.61	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.007	k-ft
M_z =	0.000	k-ft
P_n =	4.943	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	9.441	k
Utilization =	53%	



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 =	81.31	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 =	10.382	k-ft
M_z =	0.000	k-ft
P_r =	5.385	k
$M_{y\ allowable}$ =	19.207	k-ft
$M_{z\ allowable}$ =	14.389	k-ft
P_c =	30.879	k
Utilization =	70%	



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 =	6.39	k
Maximum Lateral Load =	3.41	k

5.2 Design of Drilled Shaft Foundations

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

5.3 Lateral Force Resistance

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

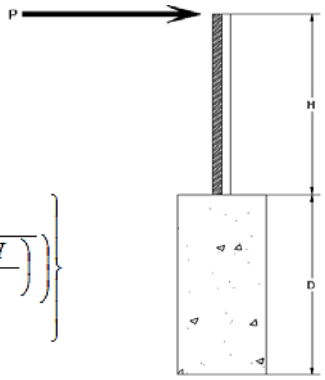
Lateral Force @ Top of Pole, P =	0.89	k
Height of Pole Above Grade, H =	5.78	ft
Diameter of Pole Footing, B =	2.00	ft
Lateral Soil Bearing Capacity, S =	0.10	ksf/ft
Isolated Pole Factor, F =	2	
First Trial Depth, D =	3.25	ft

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

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

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

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



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

Non-Constrained

Lateral Force @ Top of Pole, P =	0.89	k
Height of Pole Above Grade, H =	5.78	ft
Diameter of Pole Footing, B =	2.00	ft
Lateral Soil Bearing Capacity, S =	0.20	ksf/ft

1st Trial @ D_1 =	3.25	ft	
Lateral Soil Bearing @ D/3, S_1 =	0.22	ksf	
Lateral Soil Bearing @ D, S_3 =	0.65	ksf	
Constant 2.34P/(S_1B), A =	4.81		
Required Footing Depth, D =	8.41	ft	
2nd Trial @ D_2 =	5.83	ft	
Lateral Soil Bearing @ D/3, S_1 =	0.39	ksf	
Lateral Soil Bearing @ D, S_3 =	1.17	ksf	
Constant 2.34P/(S_1B), A =	2.68		
Required Footing Depth, D =	5.66	ft	
3rd Trial @ D_3 =	5.75	ft	
Lateral Soil Bearing @ D/3, S_1 =	0.38	ksf	
Lateral Soil Bearing @ D, S_3 =	1.15	ksf	
Constant 2.34P/(S_1B), A =	2.72		
Required Footing Depth, D =	5.72	ft	
4th Trial @ D_4 =	5.73	ft	
Lateral Soil Bearing @ D/3, S_1 =	0.38	ksf	
Lateral Soil Bearing @ D, S_3 =	1.15	ksf	
Constant 2.34P/(S_1B), A =	2.73		
Required Footing Depth, D =	5.73	ft	
5th Trial @ D_5 =	5.73	ft	
Lateral Soil Bearing @ D/3, S_1 =	0.38	ksf	
Lateral Soil Bearing @ D, S_3 =	1.15	ksf	
Constant 2.34P/(S_1B), A =	2.73		
Required Footing Depth, D =	5.75	ft	

A 2ft diameter x 5.75ft deep footing unrestrained at ground level is required for the racking structure.

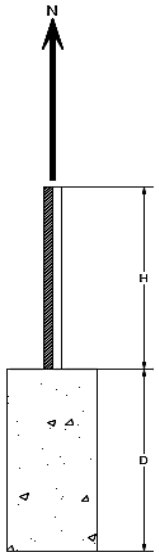
5.4 Uplifting Force Resistance

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 =	3.06	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 =	13.64	ft^3
Required Footing Depth, D =	4.50	ft

Iteration	z	dz	Qs	Side
1	0.2	0.2	118.10	6.62
2	0.4	0.2	118.10	6.52
3	0.6	0.2	118.10	6.42
4	0.8	0.2	118.10	6.31
5	1	0.2	118.10	6.21
6	1.2	0.2	118.10	6.11
7	1.4	0.2	118.10	6.00
8	1.6	0.2	118.10	5.90
9	1.8	0.2	118.10	5.79
10	2	0.2	118.10	5.69
11	2.2	0.2	118.10	5.59
12	2.4	0.2	118.10	5.48
13	2.6	0.2	118.10	5.38
14	2.8	0.2	118.10	5.28
15	3	0.2	118.10	5.17
16	3.2	0.2	118.10	5.07
17	3.4	0.2	118.10	4.96
18	3.6	0.2	118.10	4.86
19	3.8	0.2	118.10	4.76
20	4	0.2	118.10	4.65
21	4.2	0.2	118.10	4.55
22	4.4	0.2	118.10	4.45
23	4.6	0.2	118.10	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	4.6	Sum	1.09	

A 2ft diameter x 4.5ft 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 =	5.75	ft
Footing Diameter, B =	2.00	ft
Compressive Force, P =	3.35	k
Footing Area =	3.14	ft^2
Circumference =	6.28	ft
Skin Friction Area =	17.28	ft^2
Concrete Weight =	0.145	kcf

Bearing Pressure

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

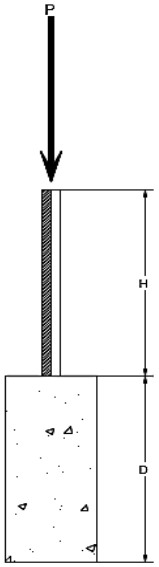
Weight of Concrete

Footing Volume	18.06	ft^3
Weight	2.62	k

Skin Friction Resistance

Skin Friction =	0.15	ksf
Resistance =	2.59	k
1/3 Increase for Wind =	1.33	
Total Resistance =	9.74	k
Applied Force =	5.97	k
Utilization =	61%	

A 2ft diameter footing passes at a depth of 5.75ft.



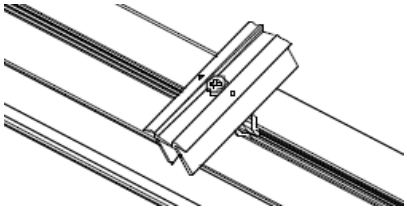
6. DESIGN OF JOINTS AND CONNECTIONS

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.

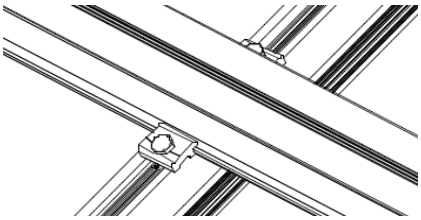
Fastening of Modules to Purlins

Maximum Uplifting Force	=	1.038 k
Allowable Uplift	=	1.214 k
Utilization	=	85%



Fastening of Purlins to Girders

Maximum Uplifting Force	=	2.042 k
Allowable Uplift	=	2.180 k
Utilization	=	94%

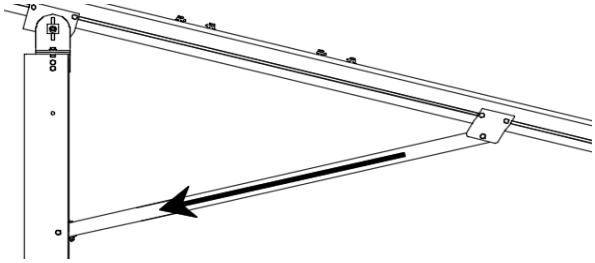


6.2 Strut Connections

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

Maximum Axial Load	=	4.943 k
M10 Bolt Shear Capacity	=	8.894 k
Utilization	=	56%

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

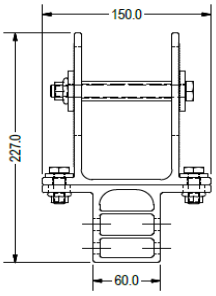


A strut under compression is shown to demonstrate the load transfer from the girder. Single M10 bolts are located at each end of the strut and are subjected to double shear.

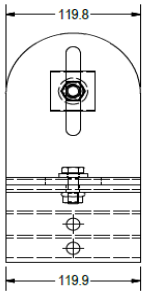
6.3 Girder to Post Connection

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.

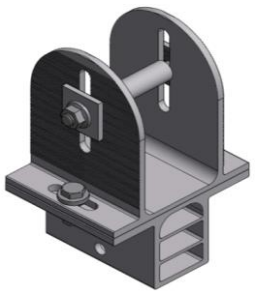
Maximum Tensile Load	=	4.185 k
Allowable Load	=	5.649 k
Utilization	=	74%



FRONT VIEW



SIDE VIEW



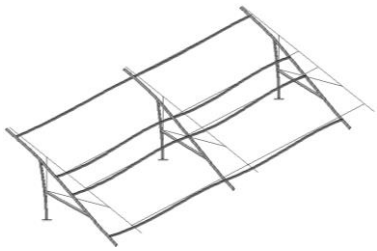
7. SEISMIC DESIGN

7.1 Seismic Drift - N/A

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}	=	74.39 in
Allowable Story Drift for All Other Structures, Δ	= {	$0.020h_{sx}$
		1.488 in
Max Drift, Δ_{MAX}	=	0 in
N/A		

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 =	66 in	L_b =	66
J =	0.432	J =	0.432
	182.587		116.114
$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$		$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$	
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=	29.0 ksi	φF_L=	29.9
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

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

$\varphi F_L St$= 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)

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 =	81.31 in	
Pr =	5.38 k	(LRFD Factored Load)
Mr (Strong) =	10.38 k-ft	(LRFD Factored Load)
Mr (Weak) =	0.00 k-ft	(LRFD Factored Load)

Flexural Buckling:

kL/r =	116.99		
4.71√(E/Fy) =	103.55	=> kL/r	> 4.71√(E/Fy)
Fcr =	18.34 ksi		
Fe =	20.91 ksi		
Pn =	40.9 k		

Torsional/Flexural Torsional Buckling:

Fcr =	13.8471 ksi
Fey =	53.3447 ksi
Fez =	17.7356 ksi
Pn =	30.879 k

Bending (Strong Axis):

Yielding:

Mn = 21.95 k-ft

Flange Local Buckling:

Mn = 19.207 k-ft

Pr/Pc = 0.1938 < 0.2

Utilization = 0.70 < 1.0 OK

Bending (Weak Axis):

Yielding:

Mn = 14.65 k-ft

Flange Local Buckling:

Mn = 14.39 k-ft

Pr/Pc = 0.194 < 0.2

Utilization = 0.00 < 1.0 OK

Combined Forces

Utilization = 70%

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								

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	-55.176	-55.176	0	0
2	M11	Y	-55.176	-55.176	0	0
3	M12	Y	-55.176	-55.176	0	0
4	M13	Y	-55.176	-55.176	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	-95.761	-95.761	0	0
2	M11	y	-95.761	-95.761	0	0
3	M12	y	-147.995	-147.995	0	0
4	M13	y	-147.995	-147.995	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	191.523	191.523	0	0
2	M11	y	191.523	191.523	0	0
3	M12	y	87.056	87.056	0	0
4	M13	y	87.056	87.056	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...	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														

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
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	502.01	2	2248.666	2	79.06	2	.12	2	.001	3	6.687	1
2		min	-854.027	3	-1744.241	3	-95.534	3	-.132	3	-.003	2	.209	15
3	N19	max	2622.133	2	5377.152	2	0	15	0	2	0	15	7.893	1
4		min	-2436.132	3	-4909.318	3	0	2	0	3	0	2	.248	15
5	N29	max	502.01	2	2248.666	2	95.534	3	.132	3	.003	2	6.687	1
6		min	-854.027	3	-1744.241	3	-79.06	2	-.12	2	-.001	3	.209	15
7	Totals:	max	3626.154	2	9874.483	2	0	2						
8		min	-4144.187	3	-8397.801	3	0	3						

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	3	0	1	0	1	0	1
2			min	0	1	0	3	0	1	0	1	0	1	0	1
3		2	max	-1.596	12	315.981	3	7.448	3	.038	3	.188	1	.263	2
4			min	-168.257	1	-714.275	2	-90.02	1	-.139	2	-.006	3	-.115	3
5		3	max	-1.983	12	314.738	3	7.448	3	.038	3	.129	1	.732	2
6			min	-169.03	1	-715.933	2	-90.02	1	-.139	2	0	3	-.322	3
7		4	max	-2.37	12	313.494	3	7.448	3	.038	3	.07	1	1.202	2
8			min	-169.803	1	-717.591	2	-90.02	1	-.139	2	.002	15	-.528	3
9		5	max	650.711	3	637.375	2	16.444	3	0	15	.089	2	1.425	2
10			min	-1683.772	2	-261.573	3	-107.932	1	-.023	2	-.026	3	-.628	3
11		6	max	650.131	3	635.717	2	16.444	3	0	15	.022	2	1.007	2
12			min	-1684.545	2	-262.817	3	-107.932	1	-.023	2	-.016	3	-.456	3
13		7	max	649.551	3	634.059	2	16.444	3	0	15	-.002	15	.59	2
14			min	-1685.319	2	-264.06	3	-107.932	1	-.023	2	-.057	1	-.283	3
15		8	max	648.971	3	632.401	2	16.444	3	0	15	.006	3	.175	2
16			min	-1686.092	2	-265.304	3	-107.932	1	-.023	2	-.128	1	-.11	3
17		9	max	648.853	3	14.607	3	29.761	3	-.001	15	.082	1	-.002	15
18			min	-1811.257	2	.657	15	-153.403	1	-.095	2	.003	15	-.029	3
19		10	max	648.273	3	13.364	3	29.761	3	-.001	15	.025	3	-.002	15
20			min	-1812.03	2	.157	15	-153.403	1	-.095	2	-.022	2	-.038	3
21		11	max	647.693	3	12.12	3	29.761	3	-.001	15	.044	3	-.002	15
22			min	-1812.804	2	-1.175	13	-153.403	1	-.095	2	-.12	1	-.047	3
23		12	max	641.185	3	682.106	3	-1.225	15	.116	3	.097	1	.109	2
24			min	-1931.567	2	-409.592	2	-85.946	3	-.11	2	.003	15	-.273	3
25		13	max	640.605	3	680.862	3	-1.225	15	.116	3	.077	1	.378	2
26			min	-1932.34	2	-411.25	2	-85.946	3	-.11	2	-.022	3	-.721	3
27		14	max	640.025	3	679.619	3	-1.225	15	.116	3	.06	2	.649	2
28			min	-1933.113	2	-412.908	2	-85.946	3	-.11	2	-.078	3	-1.167	3
29		15	max	639.445	3	678.375	3	-1.225	15	.116	3	.052	2	.92	2
30			min	-1933.886	2	-414.566	2	-85.946	3	-.11	2	-.135	3	-1.612	3
31		16	max	169.57	1	421.233	2	.799	3	.077	2	.015	3	.701	2
32			min	1.461	12	-731.036	3	-81.718	1	-.217	3	-.087	1	-1.23	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
33		17	max	168.797	1	419.574	2	.799	3	.077	2	.015	3	.425	2
34			min	1.065	3	-732.28	3	-81.718	1	-.217	3	-.141	1	-.75	3
35		18	max	168.024	1	417.916	2	.799	3	.077	2	.016	3	.151	2
36			min	.485	3	-733.523	3	-81.718	1	-.217	3	-.195	1	-.269	3
37		19	max	0	1	0	5	0	1	0	1	0	1	0	1
38			min	0	1	-.002	3	0	3	0	1	0	1	0	1
39	M4	1	max	0	1	.006	2	0	1	0	1	0	1	0	1
40			min	0	1	-.001	3	0	1	0	1	0	1	0	1
41		2	max	38.472	10	833.811	3	0	1	0	1	0	1	.484	2
42			min	-139.51	1	-1588.701	2	0	1	0	1	0	1	-.26	3
43		3	max	37.828	10	832.568	3	0	1	0	1	0	1	1.527	2
44			min	-140.284	1	-1590.359	2	0	1	0	1	0	1	-.806	3
45		4	max	37.183	10	831.324	3	0	1	0	1	0	1	2.571	2
46			min	-141.057	1	-1592.017	2	0	1	0	1	0	1	-1.352	3
47		5	max	1962.139	3	1649.691	2	0	1	0	1	0	1	3.02	2
48			min	-3749.882	2	-909.473	3	0	1	0	1	0	1	-1.578	3
49		6	max	1961.559	3	1648.033	2	0	1	0	1	0	1	1.938	2
50			min	-3750.655	2	-910.717	3	0	1	0	1	0	1	-.981	3
51		7	max	1960.979	3	1646.375	2	0	1	0	1	0	1	.857	2
52			min	-3751.429	2	-911.96	3	0	1	0	1	0	1	-.383	3
53		8	max	1960.399	3	1644.717	2	0	1	0	1	0	1	.216	3
54			min	-3752.202	2	-913.204	3	0	1	0	1	0	1	-.222	2
55		9	max	1929.782	3	-1.423	15	0	1	0	1	0	1	.507	3
56			min	-3695.742	2	-129.746	2	0	1	0	1	0	1	-.711	2
57		10	max	1929.203	3	-1.923	15	0	1	0	1	0	1	.512	3
58			min	-3696.516	2	-131.404	2	0	1	0	1	0	1	-.625	2
59		11	max	1928.623	3	-2.423	15	0	1	0	1	0	1	.517	3
60			min	-3697.289	2	-133.062	2	0	1	0	1	0	1	-.539	2
61		12	max	1910.785	3	1949.295	3	0	1	0	1	0	1	.004	9
62			min	-3653.634	2	-1409.754	2	0	1	0	1	0	1	-.089	3
63		13	max	1910.205	3	1948.051	3	0	1	0	1	0	1	.857	2
64			min	-3654.407	2	-1411.412	2	0	1	0	1	0	1	-1.367	3
65		14	max	1909.625	3	1946.808	3	0	1	0	1	0	1	1.784	2
66			min	-3655.18	2	-1413.07	2	0	1	0	1	0	1	-2.645	3
67		15	max	1909.045	3	1945.564	3	0	1	0	1	0	1	2.711	2
68			min	-3655.953	2	-1414.728	2	0	1	0	1	0	1	-3.922	3
69		16	max	141.522	1	1267.952	2	0	1	0	1	0	1	2.064	2
70			min	-36.732	10	-1835.707	3	0	1	0	1	0	1	-2.978	3
71		17	max	140.749	1	1266.294	2	0	1	0	1	0	1	1.232	2
72			min	-37.376	10	-1836.951	3	0	1	0	1	0	1	-1.774	3
73		18	max	139.976	1	1264.636	2	0	1	0	1	0	1	.402	2
74			min	-38.021	10	-1838.194	3	0	1	0	1	0	1	-.568	3
75		19	max	0	1	0	2	0	1	0	1	0	1	0	1
76			min	0	1	-.003	3	0	1	0	1	0	1	0	1
77	M7	1	max	0	1	.004	2	0	1	0	1	0	1	0	1
78			min	0	1	0	3	0	3	0	1	0	1	0	1
79		2	max	-1.596	12	315.981	3	90.02	1	.139	2	.006	3	.263	2
80			min	-168.257	1	-714.275	2	-7.448	3	-.038	3	-.188	1	-.115	3
81		3	max	-1.983	12	314.738	3	90.02	1	.139	2	0	3	.732	2
82			min	-169.03	1	-715.933	2	-7.448	3	-.038	3	-.129	1	-.322	3
83		4	max	-2.37	12	313.494	3	90.02	1	.139	2	-.002	15	1.202	2
84			min	-169.803	1	-717.591	2	-7.448	3	-.038	3	-.07	1	-.528	3
85		5	max	650.711	3	637.375	2	107.932	1	.023	2	.026	3	1.425	2
86			min	-1683.772	2	-261.573	3	-16.444	3	0	15	-.089	2	-.628	3
87		6	max	650.131	3	635.717	2	107.932	1	.023	2	.016	3	1.007	2
88			min	-1684.545	2	-262.817	3	-16.444	3	0	15	-.022	2	-.456	3
89		7	max	649.551	3	634.059	2	107.932	1	.023	2	.057	1	.59	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
90			min	-1685.319	2	-264.06	3	-16.444	3	0	15	.002	15	-.283	3
91		8	max	648.971	3	632.401	2	107.932	1	.023	2	.128	1	.175	2
92			min	-1686.092	2	-265.304	3	-16.444	3	0	15	-.006	3	-.11	3
93		9	max	648.853	3	14.607	3	153.403	1	.095	2	-.003	15	-.002	15
94			min	-1811.257	2	.657	15	-29.761	3	.001	15	-.082	1	-.029	3
95		10	max	648.273	3	13.364	3	153.403	1	.095	2	.022	2	-.002	15
96			min	-1812.03	2	.157	15	-29.761	3	.001	15	-.025	3	-.038	3
97		11	max	647.693	3	12.12	3	153.403	1	.095	2	.12	1	-.002	15
98			min	-1812.804	2	-1.175	13	-29.761	3	.001	15	-.044	3	-.047	3
99		12	max	641.185	3	682.106	3	85.946	3	.11	2	-.003	15	.109	2
100			min	-1931.567	2	-409.592	2	1.225	15	-.116	3	-.097	1	-.273	3
101		13	max	640.605	3	680.862	3	85.946	3	.11	2	.022	3	.378	2
102			min	-1932.34	2	-411.25	2	1.225	15	-.116	3	-.077	1	-.721	3
103		14	max	640.025	3	679.619	3	85.946	3	.11	2	.078	3	.649	2
104			min	-1933.113	2	-412.908	2	1.225	15	-.116	3	-.06	2	-1.167	3
105		15	max	639.445	3	678.375	3	85.946	3	.11	2	.135	3	.92	2
106			min	-1933.886	2	-414.566	2	1.225	15	-.116	3	-.052	2	-1.612	3
107		16	max	169.57	1	421.233	2	81.718	1	.217	3	.087	1	.701	2
108			min	1.461	12	-731.036	3	-.799	3	-.077	2	-.015	3	-1.23	3
109		17	max	168.797	1	419.574	2	81.718	1	.217	3	.141	1	.425	2
110			min	1.065	3	-732.28	3	-.799	3	-.077	2	-.015	3	-.75	3
111		18	max	168.024	1	417.916	2	81.718	1	.217	3	.195	1	.151	2
112			min	.485	3	-733.523	3	-.799	3	-.077	2	-.016	3	-.269	3
113		19	max	0	1	0	5	0	3	0	1	0	1	0	1
114			min	0	1	-.002	3	0	1	0	1	0	1	0	1
115	M10	1	max	81.745	1	416.61	2	.094	3	.011	2	.222	1	.077	2
116			min	-.798	3	-734.752	3	-167.45	1	-.024	3	-.016	3	-.217	3
117		2	max	81.745	1	300.155	2	1.712	3	.011	2	.128	1	.176	3
118			min	-.798	3	-550.954	3	-141.133	1	-.024	3	-.015	3	-.143	2
119		3	max	81.745	1	183.701	2	3.329	3	.011	2	.07	2	.457	3
120			min	-.798	3	-367.156	3	-114.816	1	-.024	3	-.014	3	-.29	2
121		4	max	81.745	1	67.247	2	4.947	3	.011	2	.021	2	.625	3
122			min	-.798	3	-183.357	3	-88.499	1	-.024	3	-.019	9	-.367	2
123		5	max	81.745	1	.441	3	6.564	3	.011	2	-.002	15	.681	3
124			min	-.798	3	-49.208	2	-63.748	2	-.024	3	-.059	1	-.373	2
125		6	max	81.745	1	184.239	3	8.181	3	.011	2	-.002	12	.624	3
126			min	-.798	3	-165.662	2	-53.106	2	-.024	3	-.089	1	-.307	2
127		7	max	81.745	1	368.038	3	9.799	3	.011	2	.002	3	.456	3
128			min	-.798	3	-282.116	2	-42.465	2	-.024	3	-.103	1	-.17	2
129		8	max	81.745	1	551.836	3	26.918	9	.011	2	.009	3	.175	3
130			min	-.798	3	-398.571	2	-31.823	2	-.024	3	-.108	2	0	15
131		9	max	81.745	1	735.634	3	44.099	9	.011	2	.016	3	.317	2
132			min	-.798	3	-515.025	2	-22.311	10	-.024	3	-.125	2	-.219	3
133		10	max	81.745	1	631.479	2	19.38	10	.011	2	.025	3	.667	2
134			min	-.798	3	-919.433	3	-69.402	1	-.024	3	-.134	2	-.725	3
135		11	max	81.745	1	515.025	2	22.311	10	.024	3	.016	3	.317	2
136			min	-.798	3	-735.634	3	-44.099	9	-.011	2	-.125	2	-.219	3
137		12	max	81.745	1	398.571	2	31.823	2	.024	3	.009	3	.175	3
138			min	-.798	3	-551.836	3	-26.918	9	-.011	2	-.108	2	0	15
139		13	max	81.745	1	282.116	2	42.465	2	.024	3	.002	3	.456	3
140			min	-.798	3	-368.038	3	-9.799	3	-.011	2	-.103	1	-.17	2
141		14	max	81.745	1	165.662	2	53.106	2	.024	3	-.002	12	.624	3
142			min	-.798	3	-184.239	3	-8.181	3	-.011	2	-.089	1	-.307	2
143		15	max	81.745	1	49.208	2	63.748	2	.024	3	-.002	15	.681	3
144			min	-.798	3	-.441	3	-6.564	3	-.011	2	-.059	1	-.373	2
145		16	max	81.745	1	183.357	3	88.499	1	.024	3	.021	2	.625	3
146			min	-.798	3	-67.247	2	-4.947	3	-.011	2	-.019	9	-.367	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
147		17	max	81.745	1	367.156	3	114.816	1	.024	3	.07	2	.457	3
148			min	-.798	3	-183.701	2	-3.329	3	-.011	2	-.014	3	-.29	2
149		18	max	81.745	1	550.954	3	141.133	1	.024	3	.128	1	.176	3
150			min	-.798	3	-300.155	2	-1.712	3	-.011	2	-.015	3	-.143	2
151		19	max	81.745	1	734.752	3	167.45	1	.024	3	.222	1	.077	2
152			min	-.798	3	-416.61	2	-.094	3	-.011	2	-.016	3	-.217	3
153	M11	1	max	122.629	1	411.267	2	-4.109	12	.006	3	.278	1	.022	1
154			min	-115.56	3	-672.521	3	-182.884	1	-.012	2	.005	12	-.157	3
155		2	max	122.629	1	294.813	2	-3.03	12	.006	3	.174	1	.197	3
156			min	-115.56	3	-488.723	3	-156.567	1	-.012	2	.003	12	-.201	2
157		3	max	122.629	1	178.358	2	-1.952	12	.006	3	.098	2	.44	3
158			min	-115.56	3	-304.924	3	-130.25	1	-.012	2	.001	12	-.345	2
159		4	max	122.629	1	61.904	2	-.874	12	.006	3	.042	2	.57	3
160			min	-115.56	3	-121.126	3	-103.933	1	-.012	2	-.005	9	-.419	2
161		5	max	122.629	1	62.672	3	.519	3	.006	3	.002	10	.588	3
162			min	-115.56	3	-54.55	2	-77.616	1	-.012	2	-.041	1	-.421	2
163		6	max	122.629	1	246.47	3	2.136	3	.006	3	.001	3	.493	3
164			min	-115.56	3	-171.004	2	-65.093	2	-.012	2	-.08	1	-.352	2
165		7	max	122.629	1	430.269	3	3.754	3	.006	3	.003	3	.287	3
166			min	-115.56	3	-287.459	2	-54.452	2	-.012	2	-.103	1	-.212	2
167		8	max	122.629	1	614.067	3	19.228	9	.006	3	.006	3	.004	1
168			min	-115.56	3	-403.913	2	-43.81	2	-.012	2	-.117	2	-.032	3
169		9	max	122.629	1	797.865	3	36.409	9	.006	3	.01	3	.282	2
170			min	-115.56	3	-520.367	2	-33.168	2	-.012	2	-.14	2	-.464	3
171		10	max	122.629	1	981.664	3	53.968	1	.012	2	.014	3	.635	2
172			min	-115.56	3	-636.822	2	-25.101	10	0	15	-.157	2	-1.008	3
173		11	max	122.629	1	520.367	2	33.168	2	.012	2	.01	3	.282	2
174			min	-115.56	3	-797.865	3	-36.409	9	-.006	3	-.14	2	-.464	3
175		12	max	122.629	1	403.913	2	43.81	2	.012	2	.006	3	.004	1
176			min	-115.56	3	-614.067	3	-19.228	9	-.006	3	-.117	2	-.032	3
177		13	max	122.629	1	287.459	2	54.452	2	.012	2	.003	3	.287	3
178			min	-115.56	3	-430.269	3	-3.754	3	-.006	3	-.103	1	-.212	2
179		14	max	122.629	1	171.004	2	65.093	2	.012	2	.001	3	.493	3
180			min	-115.56	3	-246.47	3	-2.136	3	-.006	3	-.08	1	-.352	2
181		15	max	122.629	1	54.55	2	77.616	1	.012	2	.002	10	.588	3
182			min	-115.56	3	-62.672	3	-.519	3	-.006	3	-.041	1	-.421	2
183		16	max	122.629	1	121.126	3	103.933	1	.012	2	.042	2	.57	3
184			min	-115.56	3	-61.904	2	.874	12	-.006	3	-.005	9	-.419	2
185		17	max	122.629	1	304.924	3	130.25	1	.012	2	.098	2	.44	3
186			min	-115.56	3	-178.358	2	1.952	12	-.006	3	.001	12	-.345	2
187		18	max	122.629	1	488.723	3	156.567	1	.012	2	.174	1	.197	3
188			min	-115.56	3	-294.813	2	3.03	12	-.006	3	.003	12	-.201	2
189		19	max	122.629	1	672.521	3	182.884	1	.012	2	.278	1	.022	1
190			min	-115.56	3	-411.267	2	4.109	12	-.006	3	.005	12	-.157	3
191	M12	1	max	13.377	3	621.666	2	.464	3	0	15	.296	1	.072	2
192			min	-44.833	1	-281.793	3	-188.031	1	-.005	1	-.016	3	0	15
193		2	max	13.377	3	454.138	2	2.082	3	0	15	.189	1	.178	3
194			min	-44.833	1	-200.14	3	-161.714	1	-.005	1	-.015	3	-.257	2
195		3	max	13.377	3	286.61	2	3.699	3	0	15	.112	2	.275	3
196			min	-44.833	1	-118.487	3	-135.397	1	-.005	1	-.013	3	-.483	2
197		4	max	13.377	3	119.083	2	5.317	3	0	15	.053	2	.323	3
198			min	-44.833	1	-36.835	3	-109.08	1	-.005	1	-.01	3	-.607	2
199		5	max	13.377	3	44.818	3	6.934	3	0	15	.006	10	.32	3
200			min	-44.833	1	-48.445	2	-82.764	1	-.005	1	-.035	1	-.629	2
201		6	max	13.377	3	126.471	3	8.552	3	0	15	-.001	12	.268	3
202			min	-44.833	1	-215.972	2	-71.11	2	-.005	1	-.078	1	-.548	2
203		7	max	13.377	3	208.124	3	10.169	3	0	15	.004	3	.166	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
204			min	-44.833	1	-383.5	2	-60.468	2	-.005	1	-.104	1	-.365	2
205		8	max	13.377	3	289.777	3	17.476	9	0	15	.01	3	.014	3
206			min	-44.833	1	-551.027	2	-49.826	2	-.005	1	-.121	2	-.079	2
207		9	max	13.377	3	371.429	3	34.656	9	0	15	.018	3	.309	2
208			min	-44.833	1	-718.555	2	-39.185	2	-.005	1	-.149	2	-.188	3
209		10	max	13.377	3	453.082	3	51.837	9	.005	1	.027	3	.799	2
210			min	-44.833	1	-886.083	2	-28.543	2	0	15	-.169	2	-.44	3
211		11	max	13.377	3	718.555	2	39.185	2	.005	1	.018	3	.309	2
212			min	-44.833	1	-371.429	3	-34.656	9	0	15	-.149	2	-.188	3
213		12	max	13.377	3	551.027	2	49.826	2	.005	1	.01	3	.014	3
214			min	-44.833	1	-289.777	3	-17.476	9	0	15	-.121	2	-.079	2
215		13	max	13.377	3	383.5	2	60.468	2	.005	1	.004	3	.166	3
216			min	-44.833	1	-208.124	3	-10.169	3	0	15	-.104	1	-.365	2
217		14	max	13.377	3	215.972	2	71.11	2	.005	1	-.001	12	.268	3
218			min	-44.833	1	-126.471	3	-8.552	3	0	15	-.078	1	-.548	2
219		15	max	13.377	3	48.445	2	82.764	1	.005	1	.006	10	.32	3
220			min	-44.833	1	-44.818	3	-6.934	3	0	15	-.035	1	-.629	2
221		16	max	13.377	3	36.835	3	109.08	1	.005	1	.053	2	.323	3
222			min	-44.833	1	-119.083	2	-5.317	3	0	15	-.01	3	-.607	2
223		17	max	13.377	3	118.487	3	135.397	1	.005	1	.112	2	.275	3
224			min	-44.833	1	-286.61	2	-3.699	3	0	15	-.013	3	-.483	2
225		18	max	13.377	3	200.14	3	161.714	1	.005	1	.189	1	.178	3
226			min	-44.833	1	-454.138	2	-2.082	3	0	15	-.015	3	-.257	2
227		19	max	13.377	3	281.793	3	188.031	1	.005	1	.296	1	.072	2
228			min	-44.833	1	-621.666	2	-.464	3	0	15	-.016	3	0	15
229	M13	1	max	7.448	3	713.913	2	-1.209	12	.01	3	.219	1	.139	2
230			min	-89.937	1	-317.252	3	-167.256	1	-.024	2	-.008	3	-.038	3
231		2	max	7.448	3	546.386	2	.258	3	.01	3	.124	1	.131	3
232			min	-89.937	1	-235.599	3	-140.939	1	-.024	2	-.009	3	-.246	2
233		3	max	7.448	3	378.858	2	1.875	3	.01	3	.067	2	.25	3
234			min	-89.937	1	-153.946	3	-114.622	1	-.024	2	-.008	3	-.529	2
235		4	max	7.448	3	211.331	2	3.493	3	.01	3	.018	2	.319	3
236			min	-89.937	1	-72.293	3	-88.305	1	-.024	2	-.021	9	-.709	2
237		5	max	7.448	3	43.803	2	5.11	3	.01	3	-.002	12	.339	3
238			min	-89.937	1	1.039	15	-63.874	2	-.024	2	-.062	1	-.787	2
239		6	max	7.448	3	91.012	3	6.728	3	.01	3	0	3	.308	3
240			min	-89.937	1	-123.724	2	-53.232	2	-.024	2	-.092	1	-.763	2
241		7	max	7.448	3	172.665	3	9.95	9	.01	3	.005	3	.227	3
242			min	-89.937	1	-291.252	2	-42.591	2	-.024	2	-.105	1	-.636	2
243		8	max	7.448	3	254.318	3	27.131	9	.01	3	.01	3	.097	3
244			min	-89.937	1	-458.78	2	-31.949	2	-.024	2	-.112	2	-.407	2
245		9	max	7.448	3	335.971	3	44.311	9	.01	3	.017	3	-.003	15
246			min	-89.937	1	-626.307	2	-22.429	10	-.024	2	-.128	2	-.096	1
247		10	max	7.448	3	417.624	3	69.597	1	.024	2	.024	3	.359	2
248			min	-89.937	1	-793.835	2	-19.498	10	0	15	-.138	2	-.314	3
249		11	max	7.448	3	626.307	2	22.429	10	.024	2	.017	3	-.003	15
250			min	-89.937	1	-335.971	3	-44.311	9	-.01	3	-.128	2	-.096	1
251		12	max	7.448	3	458.78	2	31.949	2	.024	2	.01	3	.097	3
252			min	-89.937	1	-254.318	3	-27.131	9	-.01	3	-.112	2	-.407	2
253		13	max	7.448	3	291.252	2	42.591	2	.024	2	.005	3	.227	3
254			min	-89.937	1	-172.665	3	-9.95	9	-.01	3	-.105	1	-.636	2
255		14	max	7.448	3	123.724	2	53.232	2	.024	2	0	3	.308	3
256			min	-89.937	1	-91.012	3	-6.728	3	-.01	3	-.092	1	-.763	2
257		15	max	7.448	3	-1.039	15	63.874	2	.024	2	-.002	12	.339	3
258			min	-89.937	1	-43.803	2	-5.11	3	-.01	3	-.062	1	-.787	2
259		16	max	7.448	3	72.293	3	88.305	1	.024	2	.018	2	.319	3
260			min	-89.937	1	-211.331	2	-3.493	3	-.01	3	-.021	9	-.709	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
261		17	max	7.448	3	153.946	3	114.622	1	.024	2	.067	2	.25	3
262			min	-89.937	1	-378.858	2	-1.875	3	-.01	3	-.008	3	-.529	2
263		18	max	7.448	3	235.599	3	140.939	1	.024	2	.124	1	.131	3
264			min	-89.937	1	-546.386	2	-.258	3	-.01	3	-.009	3	-.246	2
265		19	max	7.448	3	317.252	3	167.256	1	.024	2	.219	1	.139	2
266			min	-89.937	1	-713.913	2	1.209	12	-.01	3	-.008	3	-.038	3
267	M2	1	max	2248.666	2	853.649	3	79.198	2	.001	3	.132	3	6.687	1
268			min	-1744.241	3	-498.279	2	-95.419	3	-.003	2	-.12	2	.209	15
269		2	max	2245.744	2	853.649	3	79.198	2	.001	3	.101	3	6.721	1
270			min	-1746.433	3	-498.279	2	-95.419	3	-.003	2	-.096	1	.207	15
271		3	max	2242.822	2	853.649	3	79.198	2	.001	3	.071	3	6.776	2
272			min	-1748.624	3	-498.279	2	-95.419	3	-.003	2	-.073	1	.204	15
273		4	max	2239.9	2	853.649	3	79.198	2	.001	3	.04	3	6.936	2
274			min	-1750.815	3	-498.279	2	-95.419	3	-.003	2	-.051	1	.148	12
275		5	max	1676.974	2	1505.367	2	56.477	2	0	2	.023	3	6.762	2
276			min	-1515.964	3	14.125	12	-86.82	3	0	3	-.053	1	.063	12
277		6	max	1674.053	2	1505.367	2	56.477	2	0	2	-.001	15	6.279	2
278			min	-1518.155	3	14.125	12	-86.82	3	0	3	-.037	1	.059	12
279		7	max	1671.131	2	1505.367	2	56.477	2	0	2	0	15	5.796	2
280			min	-1520.346	3	14.125	12	-86.82	3	0	3	-.033	3	.054	12
281		8	max	1668.209	2	1505.367	2	56.477	2	0	2	.006	2	5.313	2
282			min	-1522.537	3	14.125	12	-86.82	3	0	3	-.061	3	.05	12
283		9	max	1665.287	2	1505.367	2	56.477	2	0	2	.024	2	4.83	2
284			min	-1524.729	3	14.125	12	-86.82	3	0	3	-.089	3	.045	12
285		10	max	1662.366	2	1505.367	2	56.477	2	0	2	.042	2	4.347	2
286			min	-1526.92	3	14.125	12	-86.82	3	0	3	-.117	3	.041	12
287		11	max	1659.444	2	1505.367	2	56.477	2	0	2	.06	2	3.864	2
288			min	-1529.111	3	14.125	12	-86.82	3	0	3	-.145	3	.036	12
289		12	max	1656.522	2	1505.367	2	56.477	2	0	2	.078	2	3.381	2
290			min	-1531.303	3	14.125	12	-86.82	3	0	3	-.172	3	.032	12
291		13	max	1653.6	2	1505.367	2	56.477	2	0	2	.096	2	2.898	2
292			min	-1533.494	3	14.125	12	-86.82	3	0	3	-.2	3	.027	12
293		14	max	1650.679	2	1505.367	2	56.477	2	0	2	.114	2	2.415	2
294			min	-1535.685	3	14.125	12	-86.82	3	0	3	-.228	3	.023	12
295		15	max	1647.757	2	1505.367	2	56.477	2	0	2	.133	2	1.932	2
296			min	-1537.877	3	14.125	12	-86.82	3	0	3	-.256	3	.018	12
297		16	max	1644.835	2	1505.367	2	56.477	2	0	2	.151	2	1.449	2
298			min	-1540.068	3	14.125	12	-86.82	3	0	3	-.284	3	.014	12
299		17	max	1641.914	2	1505.367	2	56.477	2	0	2	.169	2	.966	2
300			min	-1542.259	3	14.125	12	-86.82	3	0	3	-.312	3	.009	12
301		18	max	1638.992	2	1505.367	2	56.477	2	0	2	.187	2	.483	2
302			min	-1544.45	3	14.125	12	-86.82	3	0	3	-.34	3	.005	12
303		19	max	1636.07	2	1505.367	2	56.477	2	0	2	.205	2	0	1
304			min	-1546.642	3	14.125	12	-86.82	3	0	3	-.367	3	0	1
305	M5	1	max	5377.152	2	2434	3	0	1	0	1	0	1	7.893	1
306			min	-4909.318	3	-2611.447	2	0	1	0	1	0	1	.248	15
307		2	max	5374.23	2	2434	3	0	1	0	1	0	1	8.4	1
308			min	-4911.51	3	-2611.447	2	0	1	0	1	0	1	.253	15
309		3	max	5371.308	2	2434	3	0	1	0	1	0	1	8.967	2
310			min	-4913.701	3	-2611.447	2	0	1	0	1	0	1	.257	15
311		4	max	5368.386	2	2434	3	0	1	0	1	0	1	9.805	2
312			min	-4915.892	3	-2611.447	2	0	1	0	1	0	1	-.11	3
313		5	max	4052.69	2	2190.976	2	0	1	0	1	0	1	9.842	2
314			min	-4188.958	3	-104.263	3	0	1	0	1	0	1	-.468	3
315		6	max	4049.769	2	2190.976	2	0	1	0	1	0	1	9.139	2
316			min	-4191.149	3	-104.263	3	0	1	0	1	0	1	-.435	3
317		7	max	4046.847	2	2190.976	2	0	1	0	1	0	1	8.436	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
318			min	-4193.341	3	-104.263	3	0	1	0	1	0	1	-.401	3
319		8	max	4043.925	2	2190.976	2	0	1	0	1	0	1	7.733	2
320			min	-4195.532	3	-104.263	3	0	1	0	1	0	1	-.368	3
321		9	max	4041.003	2	2190.976	2	0	1	0	1	0	1	7.03	2
322			min	-4197.723	3	-104.263	3	0	1	0	1	0	1	-.335	3
323		10	max	4038.082	2	2190.976	2	0	1	0	1	0	1	6.327	2
324			min	-4199.914	3	-104.263	3	0	1	0	1	0	1	-.301	3
325		11	max	4035.16	2	2190.976	2	0	1	0	1	0	1	5.624	2
326			min	-4202.106	3	-104.263	3	0	1	0	1	0	1	-.268	3
327		12	max	4032.238	2	2190.976	2	0	1	0	1	0	1	4.921	2
328			min	-4204.297	3	-104.263	3	0	1	0	1	0	1	-.234	3
329		13	max	4029.316	2	2190.976	2	0	1	0	1	0	1	4.218	2
330			min	-4206.488	3	-104.263	3	0	1	0	1	0	1	-.201	3
331		14	max	4026.395	2	2190.976	2	0	1	0	1	0	1	3.515	2
332			min	-4208.68	3	-104.263	3	0	1	0	1	0	1	-.167	3
333		15	max	4023.473	2	2190.976	2	0	1	0	1	0	1	2.812	2
334			min	-4210.871	3	-104.263	3	0	1	0	1	0	1	-.134	3
335		16	max	4020.551	2	2190.976	2	0	1	0	1	0	1	2.109	2
336			min	-4213.062	3	-104.263	3	0	1	0	1	0	1	-.1	3
337		17	max	4017.63	2	2190.976	2	0	1	0	1	0	1	1.406	2
338			min	-4215.253	3	-104.263	3	0	1	0	1	0	1	-.067	3
339		18	max	4014.708	2	2190.976	2	0	1	0	1	0	1	.703	2
340			min	-4217.445	3	-104.263	3	0	1	0	1	0	1	-.033	3
341		19	max	4011.786	2	2190.976	2	0	1	0	1	0	1	0	1
342			min	-4219.636	3	-104.263	3	0	1	0	1	0	1	0	1
343	M8	1	max	2248.666	2	853.649	3	95.419	3	.003	2	.12	2	6.687	1
344			min	-1744.241	3	-498.279	2	-79.198	2	-.001	3	-.132	3	.209	15
345		2	max	2245.744	2	853.649	3	95.419	3	.003	2	.096	1	6.721	1
346			min	-1746.433	3	-498.279	2	-79.198	2	-.001	3	-.101	3	.207	15
347		3	max	2242.822	2	853.649	3	95.419	3	.003	2	.073	1	6.776	2
348			min	-1748.624	3	-498.279	2	-79.198	2	-.001	3	-.071	3	.204	15
349		4	max	2239.9	2	853.649	3	95.419	3	.003	2	.051	1	6.936	2
350			min	-1750.815	3	-498.279	2	-79.198	2	-.001	3	-.04	3	.148	12
351		5	max	1676.974	2	1505.367	2	86.82	3	0	3	.053	1	6.762	2
352			min	-1515.964	3	14.125	12	-56.477	2	0	2	-.023	3	.063	12
353		6	max	1674.053	2	1505.367	2	86.82	3	0	3	.037	1	6.279	2
354			min	-1518.155	3	14.125	12	-56.477	2	0	2	.001	15	.059	12
355		7	max	1671.131	2	1505.367	2	86.82	3	0	3	.033	3	5.796	2
356			min	-1520.346	3	14.125	12	-56.477	2	0	2	0	15	.054	12
357		8	max	1668.209	2	1505.367	2	86.82	3	0	3	.061	3	5.313	2
358			min	-1522.537	3	14.125	12	-56.477	2	0	2	-.006	2	.05	12
359		9	max	1665.287	2	1505.367	2	86.82	3	0	3	.089	3	4.83	2
360			min	-1524.729	3	14.125	12	-56.477	2	0	2	-.024	2	.045	12
361		10	max	1662.366	2	1505.367	2	86.82	3	0	3	.117	3	4.347	2
362			min	-1526.92	3	14.125	12	-56.477	2	0	2	-.042	2	.041	12
363		11	max	1659.444	2	1505.367	2	86.82	3	0	3	.145	3	3.864	2
364			min	-1529.111	3	14.125	12	-56.477	2	0	2	-.06	2	.036	12
365		12	max	1656.522	2	1505.367	2	86.82	3	0	3	.172	3	3.381	2
366			min	-1531.303	3	14.125	12	-56.477	2	0	2	-.078	2	.032	12
367		13	max	1653.6	2	1505.367	2	86.82	3	0	3	.2	3	2.898	2
368			min	-1533.494	3	14.125	12	-56.477	2	0	2	-.096	2	.027	12
369		14	max	1650.679	2	1505.367	2	86.82	3	0	3	.228	3	2.415	2
370			min	-1535.685	3	14.125	12	-56.477	2	0	2	-.114	2	.023	12
371		15	max	1647.757	2	1505.367	2	86.82	3	0	3	.256	3	1.932	2
372			min	-1537.877	3	14.125	12	-56.477	2	0	2	-.133	2	.018	12
373		16	max	1644.835	2	1505.367	2	86.82	3	0	3	.284	3	1.449	2
374			min	-1540.068	3	14.125	12	-56.477	2	0	2	-.151	2	.014	12

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
375		17	max	1641.914	2	1505.367	2	86.82	3	0	3	.312	3	.966	2
376			min	-1542.259	3	14.125	12	-56.477	2	0	2	-.169	2	.009	12
377		18	max	1638.992	2	1505.367	2	86.82	3	0	3	.34	3	.483	2
378			min	-1544.45	3	14.125	12	-56.477	2	0	2	-.187	2	.005	12
379		19	max	1636.07	2	1505.367	2	86.82	3	0	3	.367	3	0	1
380			min	-1546.642	3	14.125	12	-56.477	2	0	2	-.205	2	0	1
381	M3	1	max	2070.549	2	5.879	4	22.301	2	.012	3	.003	2	0	1
382			min	-868.864	3	1.382	15	-8.986	3	-.027	2	-.002	3	0	1
383		2	max	2070.402	2	5.226	4	22.301	2	.012	3	.011	2	0	15
384			min	-868.973	3	1.228	15	-8.986	3	-.027	2	-.005	3	-.002	4
385		3	max	2070.256	2	4.572	4	22.301	2	.012	3	.019	2	0	15
386			min	-869.083	3	1.075	15	-8.986	3	-.027	2	-.008	3	-.004	4
387		4	max	2070.109	2	3.919	4	22.301	2	.012	3	.027	2	-.001	15
388			min	-869.193	3	.921	15	-8.986	3	-.027	2	-.011	3	-.005	4
389		5	max	2069.962	2	3.266	4	22.301	2	.012	3	.035	2	-.002	15
390			min	-869.303	3	.768	15	-8.986	3	-.027	2	-.014	3	-.007	4
391		6	max	2069.816	2	2.613	4	22.301	2	.012	3	.043	2	-.002	15
392			min	-869.413	3	.614	15	-8.986	3	-.027	2	-.018	3	-.008	4
393		7	max	2069.669	2	1.96	4	22.301	2	.012	3	.051	2	-.002	15
394			min	-869.523	3	.461	15	-8.986	3	-.027	2	-.021	3	-.008	4
395		8	max	2069.522	2	1.306	4	22.301	2	.012	3	.059	2	-.002	15
396			min	-869.633	3	.307	15	-8.986	3	-.027	2	-.024	3	-.009	4
397		9	max	2069.376	2	.653	4	22.301	2	.012	3	.067	2	-.002	15
398			min	-869.743	3	.154	15	-8.986	3	-.027	2	-.027	3	-.009	4
399		10	max	2069.229	2	0	1	22.301	2	.012	3	.075	2	-.002	15
400			min	-869.853	3	0	1	-8.986	3	-.027	2	-.03	3	-.009	4
401		11	max	2069.083	2	-.154	15	22.301	2	.012	3	.083	2	-.002	15
402			min	-869.963	3	-.653	4	-8.986	3	-.027	2	-.034	3	-.009	4
403		12	max	2068.936	2	-.307	15	22.301	2	.012	3	.091	2	-.002	15
404			min	-870.073	3	-1.306	4	-8.986	3	-.027	2	-.037	3	-.009	4
405		13	max	2068.789	2	-.461	15	22.301	2	.012	3	.099	2	-.002	15
406			min	-870.183	3	-1.96	4	-8.986	3	-.027	2	-.04	3	-.008	4
407		14	max	2068.643	2	-.614	15	22.301	2	.012	3	.107	2	-.002	15
408			min	-870.293	3	-2.613	4	-8.986	3	-.027	2	-.043	3	-.008	4
409		15	max	2068.496	2	-.768	15	22.301	2	.012	3	.115	2	-.002	15
410			min	-870.403	3	-3.266	4	-8.986	3	-.027	2	-.046	3	-.007	4
411		16	max	2068.35	2	-.921	15	22.301	2	.012	3	.123	2	-.001	15
412			min	-870.513	3	-3.919	4	-8.986	3	-.027	2	-.05	3	-.005	4
413		17	max	2068.203	2	-1.075	15	22.301	2	.012	3	.131	2	0	15
414			min	-870.623	3	-4.572	4	-8.986	3	-.027	2	-.053	3	-.004	4
415		18	max	2068.056	2	-1.228	15	22.301	2	.012	3	.139	2	0	15
416			min	-870.733	3	-5.226	4	-8.986	3	-.027	2	-.056	3	-.002	4
417		19	max	2067.91	2	-1.382	15	22.301	2	.012	3	.147	2	0	1
418			min	-870.843	3	-5.879	4	-8.986	3	-.027	2	-.059	3	0	1
419	M6	1	max	4943.016	2	5.879	4	0	1	0	1	0	1	0	1
420			min	-2642.569	3	1.382	15	0	1	0	1	0	1	0	1
421		2	max	4942.869	2	5.226	4	0	1	0	1	0	1	0	15
422			min	-2642.679	3	1.228	15	0	1	0	1	0	1	-.002	4
423		3	max	4942.722	2	4.572	4	0	1	0	1	0	1	0	15
424			min	-2642.789	3	1.075	15	0	1	0	1	0	1	-.004	4
425		4	max	4942.576	2	3.919	4	0	1	0	1	0	1	-.001	15
426			min	-2642.899	3	.921	15	0	1	0	1	0	1	-.005	4
427		5	max	4942.429	2	3.266	4	0	1	0	1	0	1	-.002	15
428			min	-2643.009	3	.768	15	0	1	0	1	0	1	-.007	4
429		6	max	4942.283	2	2.613	4	0	1	0	1	0	1	-.002	15
430			min	-2643.119	3	.614	15	0	1	0	1	0	1	-.008	4
431		7	max	4942.136	2	1.96	4	0	1	0	1	0	1	-.002	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
432			min	-2643.229	3	.461	15	0	1	0	1	0	1	-.008	4
433		8	max	4941.989	2	1.306	4	0	1	0	1	0	1	-.002	15
434			min	-2643.339	3	.307	15	0	1	0	1	0	1	-.009	4
435		9	max	4941.843	2	.653	4	0	1	0	1	0	1	-.002	15
436			min	-2643.449	3	.154	15	0	1	0	1	0	1	-.009	4
437		10	max	4941.696	2	0	1	0	1	0	1	0	1	-.002	15
438			min	-2643.559	3	0	1	0	1	0	1	0	1	-.009	4
439		11	max	4941.55	2	-.154	15	0	1	0	1	0	1	-.002	15
440			min	-2643.669	3	-.653	4	0	1	0	1	0	1	-.009	4
441		12	max	4941.403	2	-.307	15	0	1	0	1	0	1	-.002	15
442			min	-2643.779	3	-1.306	4	0	1	0	1	0	1	-.009	4
443		13	max	4941.256	2	-.461	15	0	1	0	1	0	1	-.002	15
444			min	-2643.889	3	-1.96	4	0	1	0	1	0	1	-.008	4
445		14	max	4941.11	2	-.614	15	0	1	0	1	0	1	-.002	15
446			min	-2643.998	3	-2.613	4	0	1	0	1	0	1	-.008	4
447		15	max	4940.963	2	-.768	15	0	1	0	1	0	1	-.002	15
448			min	-2644.108	3	-3.266	4	0	1	0	1	0	1	-.007	4
449		16	max	4940.816	2	-.921	15	0	1	0	1	0	1	-.001	15
450			min	-2644.218	3	-3.919	4	0	1	0	1	0	1	-.005	4
451		17	max	4940.67	2	-1.075	15	0	1	0	1	0	1	0	15
452			min	-2644.328	3	-4.572	4	0	1	0	1	0	1	-.004	4
453		18	max	4940.523	2	-1.228	15	0	1	0	1	0	1	0	15
454			min	-2644.438	3	-5.226	4	0	1	0	1	0	1	-.002	4
455		19	max	4940.377	2	-1.382	15	0	1	0	1	0	1	0	1
456			min	-2644.548	3	-5.879	4	0	1	0	1	0	1	0	1
457	M9	1	max	2070.549	2	5.879	4	8.986	3	.027	2	.002	3	0	1
458			min	-868.864	3	1.382	15	-22.301	2	-.012	3	-.003	2	0	1
459		2	max	2070.402	2	5.226	4	8.986	3	.027	2	.005	3	0	15
460			min	-868.973	3	1.228	15	-22.301	2	-.012	3	-.011	2	-.002	4
461		3	max	2070.256	2	4.572	4	8.986	3	.027	2	.008	3	0	15
462			min	-869.083	3	1.075	15	-22.301	2	-.012	3	-.019	2	-.004	4
463		4	max	2070.109	2	3.919	4	8.986	3	.027	2	.011	3	-.001	15
464			min	-869.193	3	.921	15	-22.301	2	-.012	3	-.027	2	-.005	4
465		5	max	2069.962	2	3.266	4	8.986	3	.027	2	.014	3	-.002	15
466			min	-869.303	3	.768	15	-22.301	2	-.012	3	-.035	2	-.007	4
467		6	max	2069.816	2	2.613	4	8.986	3	.027	2	.018	3	-.002	15
468			min	-869.413	3	.614	15	-22.301	2	-.012	3	-.043	2	-.008	4
469		7	max	2069.669	2	1.96	4	8.986	3	.027	2	.021	3	-.002	15
470			min	-869.523	3	.461	15	-22.301	2	-.012	3	-.051	2	-.008	4
471		8	max	2069.522	2	1.306	4	8.986	3	.027	2	.024	3	-.002	15
472			min	-869.633	3	.307	15	-22.301	2	-.012	3	-.059	2	-.009	4
473		9	max	2069.376	2	.653	4	8.986	3	.027	2	.027	3	-.002	15
474			min	-869.743	3	.154	15	-22.301	2	-.012	3	-.067	2	-.009	4
475		10	max	2069.229	2	0	1	8.986	3	.027	2	.03	3	-.002	15
476			min	-869.853	3	0	1	-22.301	2	-.012	3	-.075	2	-.009	4
477		11	max	2069.083	2	-.154	15	8.986	3	.027	2	.034	3	-.002	15
478			min	-869.963	3	-.653	4	-22.301	2	-.012	3	-.083	2	-.009	4
479		12	max	2068.936	2	-.307	15	8.986	3	.027	2	.037	3	-.002	15
480			min	-870.073	3	-1.306	4	-22.301	2	-.012	3	-.091	2	-.009	4
481		13	max	2068.789	2	-.461	15	8.986	3	.027	2	.04	3	-.002	15
482			min	-870.183	3	-1.96	4	-22.301	2	-.012	3	-.099	2	-.008	4
483		14	max	2068.643	2	-.614	15	8.986	3	.027	2	.043	3	-.002	15
484			min	-870.293	3	-2.613	4	-22.301	2	-.012	3	-.107	2	-.008	4
485		15	max	2068.496	2	-.768	15	8.986	3	.027	2	.046	3	-.002	15
486			min	-870.403	3	-3.266	4	-22.301	2	-.012	3	-.115	2	-.007	4
487		16	max	2068.35	2	-.921	15	8.986	3	.027	2	.05	3	-.001	15
488			min	-870.513	3	-3.919	4	-22.301	2	-.012	3	-.123	2	-.005	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
489		17	max	2068.203	2	-1.075	15	8.986	3	.027	2	.053	3	0	15
490			min	-870.623	3	-4.572	4	-22.301	2	-.012	3	-.131	2	-.004	4
491		18	max	2068.056	2	-1.228	15	8.986	3	.027	2	.056	3	0	15
492			min	-870.733	3	-5.226	4	-22.301	2	-.012	3	-.139	2	-.002	4
493		19	max	2067.91	2	-1.382	15	8.986	3	.027	2	.059	3	0	1
494			min	-870.843	3	-5.879	4	-22.301	2	-.012	3	-.147	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	-.011	12	.126	3	.007	1	5.863e-3	3	NC	3	NC	1
2			min	-.455	2	-1.029	2	0	3	-1.608e-2	2	106.656	2	NC	1
3		2	max	-.011	12	.086	3	0	3	5.619e-3	3	5719.362	12	NC	1
4			min	-.455	2	-.88	2	-.006	1	-1.518e-2	2	120.201	2	NC	1
5		3	max	-.011	12	.048	3	0	3	5.141e-3	3	4698.216	15	NC	3
6			min	-.455	2	-.734	2	-.012	1	-1.341e-2	2	137.181	2	8016.573	1
7		4	max	-.011	12	.014	3	.001	3	4.662e-3	3	5206.87	15	NC	3
8			min	-.455	2	-.599	2	-.013	1	-1.164e-2	2	157.734	2	7839.971	1
9		5	max	-.011	12	-.008	12	.002	3	4.354e-3	3	5769.543	15	NC	2
10			min	-.455	2	-.483	2	-.011	1	-1.029e-2	2	181.038	2	9124.731	1
11		6	max	-.012	12	-.012	15	.002	3	4.484e-3	3	6368.927	15	NC	1
12			min	-.454	2	-.39	2	-.007	1	-1.e-2	2	203.7	1	NC	1
13		7	max	-.012	12	-.01	15	.001	3	4.613e-3	3	7026.537	15	NC	1
14			min	-.454	2	-.312	2	-.002	2	-9.715e-3	2	228.196	1	NC	1
15		8	max	-.012	12	-.008	15	0	1	4.743e-3	3	7782.846	15	NC	1
16			min	-.453	2	-.243	2	0	15	-9.428e-3	2	256.033	1	NC	1
17		9	max	-.012	12	-.006	15	0	15	5.074e-3	3	8712.176	15	NC	1
18			min	-.452	2	-.177	2	0	3	-8.669e-3	2	290.406	1	NC	1
19		10	max	-.012	12	-.004	15	0	2	5.596e-3	3	9916.071	15	NC	1
20			min	-.451	2	-.111	1	0	3	-7.465e-3	2	335.762	1	NC	1
21		11	max	-.012	12	-.002	15	0	1	6.118e-3	3	NC	15	NC	1
22			min	-.451	2	-.045	1	0	3	-6.261e-3	2	398.264	1	NC	1
23		12	max	-.012	12	.025	2	.002	3	5.668e-3	3	NC	15	NC	1
24			min	-.45	2	-.044	3	-.002	1	-4.964e-3	2	490.18	1	NC	1
25		13	max	-.013	12	.091	2	.006	3	4.185e-3	3	NC	5	NC	1
26			min	-.449	2	-.041	3	-.004	2	-3.568e-3	2	633.29	1	NC	1
27		14	max	-.013	12	.152	2	.009	3	2.702e-3	3	NC	5	NC	1
28			min	-.448	2	-.026	3	-.002	2	-2.171e-3	2	865.926	1	NC	1
29		15	max	-.013	12	.202	2	.008	3	1.219e-3	3	NC	5	NC	1
30			min	-.448	2	.004	12	0	15	-7.745e-4	2	1179.646	3	NC	1
31		16	max	-.013	12	.238	2	.008	1	3.533e-3	3	NC	5	NC	1
32			min	-.448	2	.007	15	0	15	-1.499e-3	2	1923.737	1	NC	1
33		17	max	-.013	12	.267	1	.009	1	6.291e-3	3	NC	3	NC	1
34			min	-.448	2	.009	15	0	15	-2.473e-3	2	3178.872	1	NC	1
35		18	max	-.013	12	.29	1	.005	1	9.05e-3	3	NC	4	NC	1
36			min	-.448	2	.01	15	0	15	-3.447e-3	2	1404.156	3	NC	1
37		19	max	-.013	12	.319	3	0	15	1.046e-2	3	NC	1	NC	1
38			min	-.448	2	.011	15	-.006	1	-3.944e-3	2	735.728	3	NC	1
39	M4	1	max	0	3	.282	3	0	1	0	1	NC	3	NC	1
40			min	-.635	2	-1.56	2	0	1	0	1	77.478	2	NC	1
41		2	max	0	3	.205	3	0	1	0	1	3522.518	15	NC	1
42			min	-.635	2	-1.319	2	0	1	0	1	89.246	2	NC	1
43		3	max	0	3	.131	3	0	1	0	1	3949.227	15	NC	1
44			min	-.635	2	-1.085	2	0	1	0	1	104.68	2	NC	1
45		4	max	0	3	.07	3	0	1	0	1	4448.839	15	NC	1
46			min	-.635	2	-.874	2	0	1	0	1	123.955	2	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
47		5	max	0	3	.031	3	0	1	0	1	4994.189	15	NC	1
48			min	-.635	2	-.704	2	0	1	0	1	145.589	2	NC	1
49		6	max	-.001	3	.016	3	0	1	0	1	5549.565	15	NC	1
50			min	-.633	2	-.582	2	0	1	0	1	166.592	2	NC	1
51		7	max	-.002	3	.016	3	0	1	0	1	6138.699	15	NC	1
52			min	-.632	2	-.489	2	0	1	0	1	186.976	2	NC	1
53		8	max	-.003	3	.022	3	0	1	0	1	6818.312	15	NC	1
54			min	-.63	2	-.409	2	0	1	0	1	208.88	2	NC	1
55		9	max	-.003	12	.024	3	0	1	0	1	7706.171	15	NC	1
56			min	-.629	2	-.326	2	0	1	0	1	238.197	2	NC	1
57		10	max	-.004	12	.019	3	0	1	0	1	8972.917	15	NC	1
58			min	-.627	2	-.231	2	0	1	0	1	283.497	2	NC	1
59		11	max	-.004	12	.005	3	0	1	0	1	NC	15	NC	1
60			min	-.626	2	-.126	2	0	1	0	1	356.564	1	NC	1
61		12	max	-.005	12	0	9	0	1	0	1	NC	15	NC	1
62			min	-.624	2	-.017	3	0	1	0	1	473.742	3	NC	1
63		13	max	-.005	12	.103	1	0	1	0	1	NC	5	NC	1
64			min	-.623	2	-.039	3	0	1	0	1	441.991	3	NC	1
65		14	max	-.006	12	.204	2	0	1	0	1	NC	5	NC	1
66			min	-.621	2	-.039	3	0	1	0	1	441.522	3	NC	1
67		15	max	-.006	12	.278	2	0	1	0	1	NC	2	NC	1
68			min	-.62	2	.001	12	0	1	0	1	505.408	3	NC	1
69		16	max	-.006	12	.311	2	0	1	0	1	NC	4	NC	1
70			min	-.62	2	.009	15	0	1	0	1	786.806	3	NC	1
71		17	max	-.006	12	.312	2	0	1	0	1	NC	4	NC	1
72			min	-.62	2	.01	15	0	1	0	1	3320.783	2	NC	1
73		18	max	-.006	12	.423	3	0	1	0	1	NC	4	NC	1
74			min	-.62	2	.01	15	0	1	0	1	1006.086	3	NC	1
75		19	max	-.006	12	.605	3	0	1	0	1	NC	1	NC	1
76			min	-.62	2	.01	15	0	1	0	1	438.302	3	NC	1
77	M7	1	max	-.011	12	.126	3	0	3	1.608e-2	2	NC	3	NC	1
78			min	-.455	2	-1.029	2	-.007	1	-5.863e-3	3	106.656	2	NC	1
79		2	max	-.011	12	.086	3	.006	1	1.518e-2	2	5719.362	12	NC	1
80			min	-.455	2	-.88	2	0	3	-5.619e-3	3	120.201	2	NC	1
81		3	max	-.011	12	.048	3	.012	1	1.341e-2	2	4698.216	15	NC	3
82			min	-.455	2	-.734	2	0	3	-5.141e-3	3	137.181	2	8016.573	1
83		4	max	-.011	12	.014	3	.013	1	1.164e-2	2	5206.87	15	NC	3
84			min	-.455	2	-.599	2	-.001	3	-4.662e-3	3	157.734	2	7839.971	1
85		5	max	-.011	12	-.008	12	.011	1	1.029e-2	2	5769.543	15	NC	2
86			min	-.455	2	-.483	2	-.002	3	-4.354e-3	3	181.038	2	9124.731	1
87		6	max	-.012	12	-.012	15	.007	1	1.e-2	2	6368.927	15	NC	1
88			min	-.454	2	-.39	2	-.002	3	-4.484e-3	3	203.7	1	NC	1
89		7	max	-.012	12	-.01	15	.002	2	9.715e-3	2	7026.537	15	NC	1
90			min	-.454	2	-.312	2	-.001	3	-4.613e-3	3	228.196	1	NC	1
91		8	max	-.012	12	-.008	15	0	15	9.428e-3	2	7782.846	15	NC	1
92			min	-.453	2	-.243	2	0	1	-4.743e-3	3	256.033	1	NC	1
93		9	max	-.012	12	-.006	15	0	3	8.669e-3	2	8712.176	15	NC	1
94			min	-.452	2	-.177	2	0	15	-5.074e-3	3	290.406	1	NC	1
95		10	max	-.012	12	-.004	15	0	3	7.465e-3	2	9916.071	15	NC	1
96			min	-.451	2	-.111	1	0	2	-5.596e-3	3	335.762	1	NC	1
97		11	max	-.012	12	-.002	15	0	3	6.261e-3	2	NC	15	NC	1
98			min	-.451	2	-.045	1	0	1	-6.118e-3	3	398.264	1	NC	1
99		12	max	-.012	12	.025	2	.002	1	4.964e-3	2	NC	15	NC	1
100			min	-.45	2	-.044	3	-.002	3	-5.668e-3	3	490.18	1	NC	1
101		13	max	-.013	12	.091	2	.004	2	3.568e-3	2	NC	5	NC	1
102			min	-.449	2	-.041	3	-.006	3	-4.185e-3	3	633.29	1	NC	1
103		14	max	-.013	12	.152	2	.002	2	2.171e-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
104			min	-.448	2	-.026	3	-.009	3	-2.702e-3	3	865.926	1	NC	1
105		15	max	-.013	12	.202	2	0	15	7.745e-4	2	NC	5	NC	1
106			min	-.448	2	.004	12	-.008	3	-1.219e-3	3	1179.646	3	NC	1
107		16	max	-.013	12	.238	2	0	15	1.499e-3	2	NC	5	NC	1
108			min	-.448	2	.007	15	-.008	1	-3.533e-3	3	1923.737	1	NC	1
109		17	max	-.013	12	.267	1	0	15	2.473e-3	2	NC	3	NC	1
110			min	-.448	2	.009	15	-.009	1	-6.291e-3	3	3178.872	1	NC	1
111		18	max	-.013	12	.29	1	0	15	3.447e-3	2	NC	4	NC	1
112			min	-.448	2	.01	15	-.005	1	-9.05e-3	3	1404.156	3	NC	1
113		19	max	-.013	12	.319	3	.006	1	3.944e-3	2	NC	1	NC	1
114			min	-.448	2	.011	15	0	15	-1.046e-2	3	735.728	3	NC	1
115	M10	1	max	0	1	.301	1	.448	2	1.162e-2	3	NC	1	NC	1
116			min	0	3	.01	15	.013	12	1.254e-4	15	NC	1	NC	1
117		2	max	0	1	.352	3	.462	2	1.29e-2	3	NC	4	NC	3
118			min	0	3	.009	15	.013	12	1.135e-4	15	1699.448	3	7660.838	1
119		3	max	0	1	.424	3	.484	2	1.417e-2	3	NC	4	NC	3
120			min	0	3	.009	15	.013	12	1.017e-4	15	877.646	3	3132.575	1
121		4	max	0	1	.484	3	.511	1	1.544e-2	3	NC	4	NC	3
122			min	0	3	.009	15	.013	12	8.274e-5	10	628.941	3	1883.963	1
123		5	max	0	1	.525	3	.538	1	1.672e-2	3	NC	4	NC	3
124			min	0	3	.009	15	.012	12	-2.35e-4	10	525.667	3	1356.45	1
125		6	max	0	1	.546	3	.564	2	1.799e-2	3	NC	4	NC	3
126			min	0	3	.009	15	.011	12	-7.297e-4	2	484.501	3	1089.654	1
127		7	max	0	1	.55	3	.587	2	1.927e-2	3	NC	4	NC	3
128			min	0	3	.009	15	.009	12	-1.303e-3	2	479.031	3	944.47	1
129		8	max	0	1	.539	3	.604	2	2.054e-2	3	NC	4	NC	3
130			min	0	3	.009	15	.008	12	-1.877e-3	2	497.282	3	842.258	2
131		9	max	0	1	.524	3	.616	2	2.182e-2	3	NC	4	NC	3
132			min	0	3	.01	15	.007	12	-2.45e-3	2	527.082	3	785.181	2
133		10	max	0	1	.516	3	.62	2	2.309e-2	3	NC	1	NC	3
134			min	0	1	.01	15	.006	12	-3.024e-3	2	545.022	3	766.9	2
135		11	max	0	3	.524	3	.616	2	2.182e-2	3	NC	4	NC	3
136			min	0	1	.01	15	.007	12	-2.45e-3	2	527.082	3	785.181	2
137		12	max	0	3	.539	3	.604	2	2.054e-2	3	NC	4	NC	3
138			min	0	1	.009	15	.008	12	-1.877e-3	2	497.282	3	842.258	2
139		13	max	0	3	.55	3	.587	2	1.927e-2	3	NC	4	NC	3
140			min	0	1	.009	15	.009	12	-1.303e-3	2	479.031	3	944.47	1
141		14	max	0	3	.546	3	.564	2	1.799e-2	3	NC	4	NC	3
142			min	0	1	.009	15	.011	12	-7.297e-4	2	484.501	3	1089.654	1
143		15	max	0	3	.525	3	.538	1	1.672e-2	3	NC	4	NC	3
144			min	0	1	.009	15	.012	12	-2.35e-4	10	525.667	3	1356.45	1
145		16	max	0	3	.484	3	.511	1	1.544e-2	3	NC	4	NC	3
146			min	0	1	.009	15	.013	12	8.274e-5	10	628.941	3	1883.963	1
147		17	max	0	3	.424	3	.484	2	1.417e-2	3	NC	4	NC	3
148			min	0	1	.009	15	.013	12	1.017e-4	15	877.646	3	3132.575	1
149		18	max	0	3	.352	3	.462	2	1.29e-2	3	NC	4	NC	3
150			min	0	1	.009	15	.013	12	1.135e-4	15	1699.448	3	7660.838	1
151		19	max	0	3	.301	1	.448	2	1.162e-2	3	NC	1	NC	1
152			min	0	1	.01	15	.013	12	1.254e-4	15	NC	1	NC	1
153	M11	1	max	0	1	0	15	.45	2	8.605e-3	2	NC	1	NC	1
154			min	0	3	-.044	3	.012	12	-6.605e-5	3	NC	1	NC	1
155		2	max	0	1	.003	3	.461	2	9.245e-3	2	NC	4	NC	1
156			min	0	3	-.048	2	.011	12	-3.652e-4	3	2806.131	3	NC	1
157		3	max	0	1	.045	3	.48	2	9.885e-3	2	NC	4	NC	3
158			min	0	3	-.083	2	.01	12	-6.644e-4	3	1491.371	3	3909.223	1
159		4	max	0	1	.074	3	.506	2	1.052e-2	2	NC	4	NC	3
160			min	0	3	-.107	2	.009	12	-9.635e-4	3	1126.077	3	2160.827	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
161		5	max	0	1	.086	3	.535	2	1.116e-2	2	NC	5	NC	3
162			min	0	3	-.12	2	.008	12	-1.263e-3	3	1020.741	3	1477.048	1
163		6	max	0	1	.081	3	.563	2	1.18e-2	2	NC	5	NC	3
164			min	0	3	-.12	2	.007	12	-1.562e-3	3	1062.205	3	1144.818	1
165		7	max	0	1	.061	3	.588	2	1.244e-2	2	NC	4	NC	3
166			min	0	3	-.109	2	.006	12	-1.861e-3	3	1258.622	3	961.289	2
167		8	max	0	1	.034	3	.607	2	1.309e-2	2	NC	4	NC	3
168			min	0	3	-.093	2	.005	12	-2.16e-3	3	1561.136	2	839.739	2
169		9	max	0	1	.007	3	.62	2	1.373e-2	2	NC	4	NC	3
170			min	0	3	-.076	2	.005	12	-2.459e-3	3	1933.478	2	775.789	2
171		10	max	0	1	-.002	15	.625	2	1.437e-2	2	NC	4	NC	3
172			min	0	1	-.069	2	.005	12	-2.759e-3	3	2181.264	2	755.201	2
173		11	max	0	3	.007	3	.62	2	1.373e-2	2	NC	4	NC	3
174			min	0	1	-.076	2	.005	12	-2.459e-3	3	1933.478	2	775.789	2
175		12	max	0	3	.034	3	.607	2	1.309e-2	2	NC	4	NC	3
176			min	0	1	-.093	2	.005	12	-2.16e-3	3	1561.136	2	839.739	2
177		13	max	0	3	.061	3	.588	2	1.244e-2	2	NC	4	NC	3
178			min	0	1	-.109	2	.006	12	-1.861e-3	3	1258.622	3	961.289	2
179		14	max	0	3	.081	3	.563	2	1.18e-2	2	NC	5	NC	3
180			min	0	1	-.12	2	.007	12	-1.562e-3	3	1062.205	3	1144.818	1
181		15	max	0	3	.086	3	.535	2	1.116e-2	2	NC	5	NC	3
182			min	0	1	-.12	2	.008	12	-1.263e-3	3	1020.741	3	1477.048	1
183		16	max	0	3	.074	3	.506	2	1.052e-2	2	NC	4	NC	3
184			min	0	1	-.107	2	.009	12	-9.635e-4	3	1126.077	3	2160.827	1
185		17	max	0	3	.045	3	.48	2	9.885e-3	2	NC	4	NC	3
186			min	0	1	-.083	2	.01	12	-6.644e-4	3	1491.371	3	3909.223	1
187		18	max	0	3	.003	3	.461	2	9.245e-3	2	NC	4	NC	1
188			min	0	1	-.048	2	.011	12	-3.652e-4	3	2806.131	3	NC	1
189		19	max	0	3	0	15	.45	2	8.605e-3	2	NC	1	NC	1
190			min	0	1	-.044	3	.012	12	-6.605e-5	3	NC	1	NC	1
191	M12	1	max	0	3	-.007	15	.453	2	8.437e-3	2	NC	1	NC	1
192			min	0	1	-.211	2	.012	12	-2.921e-4	3	NC	1	NC	1
193		2	max	0	3	-.004	12	.461	2	8.682e-3	2	NC	4	NC	1
194			min	0	1	-.279	2	.012	12	-2.275e-4	3	1963.267	2	NC	1
195		3	max	0	3	.024	3	.48	2	8.928e-3	2	NC	5	NC	3
196			min	0	1	-.338	2	.012	12	-1.629e-4	3	1038.415	2	4200.395	1
197		4	max	0	3	.044	3	.506	2	9.173e-3	2	NC	5	NC	3
198			min	0	1	-.384	2	.011	12	-9.831e-5	3	763.279	2	2247.639	1
199		5	max	0	3	.055	3	.535	2	9.418e-3	2	NC	5	NC	3
200			min	0	1	-.412	2	.009	12	-3.372e-5	3	656.635	2	1508.446	1
201		6	max	0	3	.057	3	.564	2	9.664e-3	2	NC	5	NC	3
202			min	0	1	-.422	2	.008	12	3.087e-5	3	626.371	2	1155.139	1
203		7	max	0	3	.051	3	.59	2	9.909e-3	2	NC	5	NC	3
204			min	0	1	-.416	2	.006	12	8.189e-5	12	645.568	2	960.891	2
205		8	max	0	3	.041	3	.611	2	1.015e-2	2	NC	5	NC	3
206			min	0	1	-.399	2	.005	12	1.227e-4	12	703.426	2	833.63	2
207		9	max	0	3	.03	3	.625	2	1.04e-2	2	NC	5	NC	5
208			min	0	1	-.38	2	.004	12	1.635e-4	12	782.239	2	766.896	2
209		10	max	0	1	.024	3	.63	2	1.065e-2	2	NC	5	NC	5
210			min	0	1	-.371	2	.003	3	2.043e-4	12	828.899	2	745.386	2
211		11	max	0	1	.03	3	.625	2	1.04e-2	2	NC	5	NC	5
212			min	0	3	-.38	2	.004	12	1.635e-4	12	782.239	2	766.896	2
213		12	max	0	1	.041	3	.611	2	1.015e-2	2	NC	5	NC	3
214			min	0	3	-.399	2	.005	12	1.227e-4	12	703.426	2	833.63	2
215		13	max	0	1	.051	3	.59	2	9.909e-3	2	NC	5	NC	3
216			min	0	3	-.416	2	.006	12	8.189e-5	12	645.568	2	960.891	2
217		14	max	0	1	.057	3	.564	2	9.664e-3	2	NC	5	NC	3

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
218			min	0	3	-.422	2	.008	12	3.087e-5	3	626.371	2	1155.139	1
219		15	max	0	1	.055	3	.535	2	9.418e-3	2	NC	5	NC	3
220			min	0	3	-.412	2	.009	12	-3.372e-5	3	656.635	2	1508.446	1
221		16	max	0	1	.044	3	.506	2	9.173e-3	2	NC	5	NC	3
222			min	0	3	-.384	2	.011	12	-9.831e-5	3	763.279	2	2247.639	1
223		17	max	0	1	.024	3	.48	2	8.928e-3	2	NC	5	NC	3
224			min	0	3	-.338	2	.012	12	-1.629e-4	3	1038.415	2	4200.395	1
225		18	max	0	1	-.004	12	.461	2	8.682e-3	2	NC	4	NC	1
226			min	0	3	-.279	2	.012	12	-2.275e-4	3	1963.267	2	NC	1
227		19	max	0	1	-.007	15	.453	2	8.437e-3	2	NC	1	NC	1
228			min	0	3	-.211	2	.012	12	-2.921e-4	3	NC	1	NC	1
229	M13	1	max	0	3	.107	3	.455	2	1.899e-2	2	NC	1	NC	1
230			min	0	1	-.956	2	.011	12	-5.075e-3	3	NC	1	NC	1
231		2	max	0	3	.149	3	.471	2	2.028e-2	2	NC	4	NC	3
232			min	0	1	-1.074	2	.011	12	-5.597e-3	3	1119.54	2	7080.018	1
233		3	max	0	3	.188	3	.495	2	2.156e-2	2	NC	5	NC	3
234			min	0	1	-1.185	2	.01	12	-6.119e-3	3	576.998	2	2948.267	1
235		4	max	0	3	.22	3	.522	2	2.285e-2	2	NC	5	NC	3
236			min	0	1	-1.28	2	.009	12	-6.641e-3	3	407.136	2	1790.214	1
237		5	max	0	3	.242	3	.55	2	2.413e-2	2	NC	5	NC	3
238			min	0	1	-1.355	2	.007	12	-7.164e-3	3	330.911	2	1296.174	1
239		6	max	0	3	.254	3	.578	2	2.542e-2	2	NC	5	NC	3
240			min	0	1	-1.407	2	.006	12	-7.686e-3	3	293.003	2	1044.722	1
241		7	max	0	3	.257	3	.601	2	2.67e-2	2	NC	5	NC	3
242			min	0	1	-1.436	2	.004	12	-8.208e-3	3	275.134	2	904.596	2
243		8	max	0	3	.254	3	.619	2	2.799e-2	2	NC	5	NC	5
244			min	0	1	-1.446	2	.002	3	-8.73e-3	3	269.15	2	803.68	2
245		9	max	0	3	.248	3	.631	2	2.927e-2	2	NC	5	NC	5
246			min	0	1	-1.445	2	0	3	-9.252e-3	3	269.773	2	750.229	2
247		10	max	0	1	.244	3	.635	2	3.056e-2	2	NC	5	NC	5
248			min	0	1	-1.442	2	0	3	-9.774e-3	3	271.498	2	733.097	2
249		11	max	0	1	.248	3	.631	2	2.927e-2	2	NC	5	NC	5
250			min	0	3	-1.445	2	0	3	-9.252e-3	3	269.773	2	750.229	2
251		12	max	0	1	.254	3	.619	2	2.799e-2	2	NC	5	NC	5
252			min	0	3	-1.446	2	.002	3	-8.73e-3	3	269.15	2	803.68	2
253		13	max	0	1	.257	3	.601	2	2.67e-2	2	NC	5	NC	3
254			min	0	3	-1.436	2	.004	12	-8.208e-3	3	275.134	2	904.596	2
255		14	max	0	1	.254	3	.578	2	2.542e-2	2	NC	5	NC	3
256			min	0	3	-1.407	2	.006	12	-7.686e-3	3	293.003	2	1044.722	1
257		15	max	0	1	.242	3	.55	2	2.413e-2	2	NC	5	NC	3
258			min	0	3	-1.355	2	.007	12	-7.164e-3	3	330.911	2	1296.174	1
259		16	max	0	1	.22	3	.522	2	2.285e-2	2	NC	5	NC	3
260			min	0	3	-1.28	2	.009	12	-6.641e-3	3	407.136	2	1790.214	1
261		17	max	0	1	.188	3	.495	2	2.156e-2	2	NC	5	NC	3
262			min	0	3	-1.185	2	.01	12	-6.119e-3	3	576.998	2	2948.267	1
263		18	max	0	1	.149	3	.471	2	2.028e-2	2	NC	4	NC	3
264			min	0	3	-1.074	2	.011	12	-5.597e-3	3	1119.54	2	7080.018	1
265		19	max	0	1	.107	3	.455	2	1.899e-2	2	NC	1	NC	1
266			min	0	3	-.956	2	.011	12	-5.075e-3	3	NC	1	NC	1
267	M2	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
268			min	0	1	0	1	0	1	0	1	NC	1	NC	1
269		2	max	0	3	0	15	0	3	9.891e-4	2	NC	1	NC	1
270			min	0	2	-.002	1	0	2	-4.044e-4	3	NC	1	NC	1
271		3	max	0	3	0	15	0	3	1.978e-3	2	NC	3	NC	1
272			min	0	2	-.007	1	0	2	-8.088e-4	3	9250.304	1	NC	1
273		4	max	0	3	0	15	0	3	2.967e-3	2	NC	3	NC	1
274			min	0	2	-.017	1	0	1	-1.213e-3	3	4098.322	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
275		5	max	0	3	0	15	.001	3	3.289e-3	2	NC	3	NC	1
276			min	0	2	-.03	1	-.001	1	-1.327e-3	3	2290.075	1	NC	1
277		6	max	0	3	-.001	15	.002	3	2.993e-3	2	NC	3	NC	1
278			min	0	2	-.047	1	-.002	1	-1.173e-3	3	1462.058	1	NC	1
279		7	max	0	3	-.002	15	.002	3	2.698e-3	2	NC	3	NC	1
280			min	0	2	-.068	1	-.002	1	-1.019e-3	3	1019.866	1	NC	1
281		8	max	0	3	-.003	15	.002	3	2.402e-3	2	NC	5	NC	1
282			min	0	2	-.092	2	-.003	1	-8.645e-4	3	755.235	2	NC	1
283		9	max	0	3	-.004	15	.003	3	2.107e-3	2	NC	5	NC	1
284			min	0	2	-.119	2	-.003	1	-7.102e-4	3	583.642	2	NC	1
285		10	max	0	3	-.004	15	.003	3	1.811e-3	2	NC	5	NC	1
286			min	-.001	2	-.148	2	-.004	1	-5.559e-4	3	466.877	2	NC	1
287		11	max	0	3	-.005	15	.003	3	1.515e-3	2	NC	15	NC	1
288			min	-.001	2	-.181	2	-.004	1	-4.016e-4	3	383.799	2	NC	1
289		12	max	.001	3	-.006	15	.003	3	1.22e-3	2	NC	15	NC	1
290			min	-.001	2	-.215	2	-.005	1	-2.473e-4	3	322.539	2	NC	1
291		13	max	.001	3	-.007	15	.002	3	9.243e-4	2	9285.723	15	NC	1
292			min	-.001	2	-.251	2	-.005	1	-9.301e-5	3	276.045	2	NC	1
293		14	max	.001	3	-.009	15	.001	3	6.287e-4	2	8085.659	15	NC	1
294			min	-.001	2	-.289	2	-.005	1	3.686e-6	15	239.909	2	NC	1
295		15	max	.001	3	-.01	15	0	3	3.331e-4	2	7131.555	15	NC	1
296			min	-.002	2	-.328	2	-.005	1	-2.363e-5	9	211.26	2	NC	1
297		16	max	.001	3	-.011	15	0	15	3.699e-4	3	6360.695	15	NC	1
298			min	-.002	2	-.368	2	-.005	1	-1.124e-4	1	188.169	2	NC	1
299		17	max	.002	3	-.012	15	0	15	5.242e-4	3	5729.183	15	NC	1
300			min	-.002	2	-.409	2	-.005	1	-3.624e-4	1	169.293	2	NC	1
301		18	max	.002	3	-.013	15	0	15	6.785e-4	3	5205.665	15	NC	1
302			min	-.002	2	-.451	2	-.005	3	-6.124e-4	1	153.673	2	NC	1
303		19	max	.002	3	-.015	15	0	15	8.328e-4	3	4767.258	15	NC	1
304			min	-.002	2	-.493	2	-.008	3	-8.624e-4	1	140.615	2	8733.188	3
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	1	0	1	NC	1	NC	1
308			min	0	2	-.002	1	0	1	0	1	NC	1	NC	1
309		3	max	0	3	0	15	0	1	0	1	NC	3	NC	1
310			min	0	2	-.009	1	0	1	0	1	7927.958	1	NC	1
311		4	max	0	3	0	15	0	1	0	1	NC	3	NC	1
312			min	0	2	-.02	1	0	1	0	1	3386.858	1	NC	1
313		5	max	.001	3	-.001	15	0	1	0	1	NC	3	NC	1
314			min	-.001	2	-.038	1	0	1	0	1	1835.752	1	NC	1
315		6	max	.001	3	-.002	15	0	1	0	1	NC	3	NC	1
316			min	-.001	2	-.061	1	0	1	0	1	1145.187	1	NC	1
317		7	max	.002	3	-.003	15	0	1	0	1	NC	3	NC	1
318			min	-.002	2	-.088	1	0	1	0	1	786.407	1	NC	1
319		8	max	.002	3	-.003	15	0	1	0	1	NC	3	NC	1
320			min	-.002	2	-.121	2	0	1	0	1	574.954	2	NC	1
321		9	max	.002	3	-.005	15	0	1	0	1	NC	3	NC	1
322			min	-.002	2	-.158	2	0	1	0	1	439.33	2	NC	1
323		10	max	.002	3	-.006	15	0	1	0	1	NC	3	NC	1
324			min	-.002	2	-.199	2	0	1	0	1	348.406	2	NC	1
325		11	max	.003	3	-.007	15	0	1	0	1	NC	3	NC	1
326			min	-.003	2	-.244	2	0	1	0	1	284.466	2	NC	1
327		12	max	.003	3	-.008	15	0	1	0	1	NC	3	NC	1
328			min	-.003	2	-.291	2	0	1	0	1	237.758	2	NC	1
329		13	max	.003	3	-.008	12	0	1	0	1	NC	3	NC	1
330			min	-.003	2	-.342	2	0	1	0	1	202.58	2	NC	1
331		14	max	.003	3	-.008	12	0	1	0	1	NC	3	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
332			min	-.003	2	-.395	2	0	1	0	1	175.414	2	NC	1
333		15	max	.004	3	-.008	12	0	1	0	1	NC	3	NC	1
334			min	-.004	2	-.45	2	0	1	0	1	153.992	2	NC	1
335		16	max	.004	3	-.008	12	0	1	0	1	NC	3	NC	1
336			min	-.004	2	-.507	2	0	1	0	1	136.806	2	NC	1
337		17	max	.004	3	-.008	12	0	1	0	1	NC	3	NC	1
338			min	-.004	2	-.564	2	0	1	0	1	122.814	2	NC	1
339		18	max	.004	3	-.008	12	0	1	0	1	NC	3	NC	1
340			min	-.004	2	-.623	2	0	1	0	1	111.277	2	NC	1
341		19	max	.005	3	-.008	12	0	1	0	1	NC	3	NC	1
342			min	-.005	2	-.682	2	0	1	0	1	101.663	2	NC	1
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	15	0	2	4.044e-4	3	NC	1	NC	1
346			min	0	2	-.002	1	0	3	-9.891e-4	2	NC	1	NC	1
347		3	max	0	3	0	15	0	2	8.088e-4	3	NC	3	NC	1
348			min	0	2	-.007	1	0	3	-1.978e-3	2	9250.304	1	NC	1
349		4	max	0	3	0	15	0	1	1.213e-3	3	NC	3	NC	1
350			min	0	2	-.017	1	0	3	-2.967e-3	2	4098.322	1	NC	1
351		5	max	0	3	0	15	.001	1	1.327e-3	3	NC	3	NC	1
352			min	0	2	-.03	1	-.001	3	-3.289e-3	2	2290.075	1	NC	1
353		6	max	0	3	-.001	15	.002	1	1.173e-3	3	NC	3	NC	1
354			min	0	2	-.047	1	-.002	3	-2.993e-3	2	1462.058	1	NC	1
355		7	max	0	3	-.002	15	.002	1	1.019e-3	3	NC	3	NC	1
356			min	0	2	-.068	1	-.002	3	-2.698e-3	2	1019.866	1	NC	1
357		8	max	0	3	-.003	15	.003	1	8.645e-4	3	NC	5	NC	1
358			min	0	2	-.092	2	-.002	3	-2.402e-3	2	755.235	2	NC	1
359		9	max	0	3	-.004	15	.003	1	7.102e-4	3	NC	5	NC	1
360			min	0	2	-.119	2	-.003	3	-2.107e-3	2	583.642	2	NC	1
361		10	max	0	3	-.004	15	.004	1	5.559e-4	3	NC	5	NC	1
362			min	-.001	2	-.148	2	-.003	3	-1.811e-3	2	466.877	2	NC	1
363		11	max	0	3	-.005	15	.004	1	4.016e-4	3	NC	15	NC	1
364			min	-.001	2	-.181	2	-.003	3	-1.515e-3	2	383.799	2	NC	1
365		12	max	.001	3	-.006	15	.005	1	2.473e-4	3	NC	15	NC	1
366			min	-.001	2	-.215	2	-.003	3	-1.22e-3	2	322.539	2	NC	1
367		13	max	.001	3	-.007	15	.005	1	9.301e-5	3	9285.723	15	NC	1
368			min	-.001	2	-.251	2	-.002	3	-9.243e-4	2	276.045	2	NC	1
369		14	max	.001	3	-.009	15	.005	1	-3.686e-6	15	8085.659	15	NC	1
370			min	-.001	2	-.289	2	-.001	3	-6.287e-4	2	239.909	2	NC	1
371		15	max	.001	3	-.01	15	.005	1	2.363e-5	9	7131.555	15	NC	1
372			min	-.002	2	-.328	2	0	3	-3.331e-4	2	211.26	2	NC	1
373		16	max	.001	3	-.011	15	.005	1	1.124e-4	1	6360.695	15	NC	1
374			min	-.002	2	-.368	2	0	15	-3.699e-4	3	188.169	2	NC	1
375		17	max	.002	3	-.012	15	.005	1	3.624e-4	1	5729.183	15	NC	1
376			min	-.002	2	-.409	2	0	15	-5.242e-4	3	169.293	2	NC	1
377		18	max	.002	3	-.013	15	.005	3	6.124e-4	1	5205.665	15	NC	1
378			min	-.002	2	-.451	2	0	15	-6.785e-4	3	153.673	2	NC	1
379		19	max	.002	3	-.015	15	.008	3	8.624e-4	1	4767.258	15	NC	1
380			min	-.002	2	-.493	2	0	15	-8.328e-4	3	140.615	2	8733.188	3
381	M3	1	max	.022	1	0	15	0	3	8.592e-4	2	NC	1	NC	1
382			min	0	15	-.007	1	0	1	-2.924e-4	3	NC	1	NC	1
383		2	max	.021	1	-.002	12	.007	3	1.241e-3	2	NC	1	NC	3
384			min	0	15	-.046	2	-.015	2	-4.604e-4	3	NC	1	5187.204	2
385		3	max	.02	1	-.003	12	.012	3	1.623e-3	2	NC	1	NC	4
386			min	0	15	-.085	2	-.029	2	-6.283e-4	3	NC	1	2626.35	2
387		4	max	.02	1	-.004	12	.018	3	2.005e-3	2	NC	1	NC	4
388			min	0	15	-.124	2	-.042	2	-7.963e-4	3	NC	1	1783.891	2

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
389		5	max	.019	1	-.005	12	.023	3	2.386e-3	2	NC	1	NC	4
390			min	0	15	-.163	2	-.054	2	-9.643e-4	3	NC	1	1371.971	2
391		6	max	.018	1	-.006	12	.028	3	2.768e-3	2	NC	1	NC	4
392			min	0	15	-.202	2	-.066	2	-1.132e-3	3	9670.313	4	1133.372	2
393		7	max	.018	1	-.007	12	.032	3	3.15e-3	2	NC	1	NC	5
394			min	0	15	-.24	2	-.075	2	-1.3e-3	3	8575.823	4	982.747	2
395		8	max	.017	1	-.008	12	.035	3	3.532e-3	2	NC	1	NC	5
396			min	0	15	-.278	2	-.083	2	-1.468e-3	3	7918.965	4	883.997	2
397		9	max	.016	1	-.009	12	.038	3	3.914e-3	2	NC	3	NC	5
398			min	0	15	-.316	2	-.09	2	-1.636e-3	3	7565.404	4	819.685	2
399		10	max	.016	1	-.009	12	.04	3	4.296e-3	2	NC	3	NC	5
400			min	0	15	-.354	2	-.094	2	-1.804e-3	3	7453.555	4	780.963	2
401		11	max	.015	1	-.01	12	.04	3	4.677e-3	2	NC	3	NC	5
402			min	0	15	-.392	2	-.095	2	-1.972e-3	3	7565.404	4	763.741	2
403		12	max	.014	1	-.01	12	.04	3	5.059e-3	2	NC	1	NC	5
404			min	0	15	-.429	2	-.094	2	-2.14e-3	3	7918.965	4	767.312	2
405		13	max	.014	1	-.011	12	.038	3	5.441e-3	2	NC	1	NC	5
406			min	0	15	-.466	2	-.09	2	-2.308e-3	3	8575.823	4	794.384	2
407		14	max	.013	1	-.011	12	.036	3	5.823e-3	2	NC	1	NC	5
408			min	0	15	-.503	2	-.083	2	-2.476e-3	3	9670.313	4	852.694	2
409		15	max	.012	1	-.011	12	.031	3	6.205e-3	2	NC	1	NC	5
410			min	0	15	-.54	2	-.072	2	-2.644e-3	3	NC	1	960.016	2
411		16	max	.012	1	-.011	12	.026	3	6.587e-3	2	NC	1	NC	4
412			min	0	15	-.577	2	-.058	2	-2.812e-3	3	NC	1	1159.86	2
413		17	max	.011	1	-.011	12	.018	3	6.968e-3	2	NC	1	NC	4
414			min	0	15	-.613	2	-.039	2	-2.98e-3	3	NC	1	1584.852	2
415		18	max	.01	1	-.011	12	.009	3	7.35e-3	2	NC	1	NC	4
416			min	0	15	-.65	2	-.016	2	-3.148e-3	3	NC	1	2901.076	2
417		19	max	.01	1	-.01	12	.012	1	7.732e-3	2	NC	1	NC	1
418			min	0	15	-.686	2	-.002	3	-3.316e-3	3	NC	1	NC	1
419	M6	1	max	.027	1	0	15	0	1	0	1	NC	1	NC	1
420			min	0	15	-.009	1	0	1	0	1	NC	1	NC	1
421		2	max	.025	1	0	3	0	1	0	1	NC	1	NC	1
422			min	0	15	-.064	2	0	1	0	1	NC	1	NC	1
423		3	max	.023	1	0	3	0	1	0	1	NC	1	NC	1
424			min	0	15	-.119	2	0	1	0	1	NC	1	NC	1
425		4	max	.022	1	.001	3	0	1	0	1	NC	1	NC	1
426			min	0	15	-.174	2	0	1	0	1	NC	1	NC	1
427		5	max	.02	1	.002	3	0	1	0	1	NC	1	NC	1
428			min	0	15	-.23	2	0	1	0	1	NC	1	NC	1
429		6	max	.019	1	.003	3	0	1	0	1	NC	1	NC	1
430			min	0	15	-.285	2	0	1	0	1	9670.313	4	NC	1
431		7	max	.017	1	.004	3	0	1	0	1	NC	1	NC	1
432			min	0	15	-.339	2	0	1	0	1	8575.823	4	NC	1
433		8	max	.016	1	.005	3	0	1	0	1	NC	1	NC	1
434			min	0	15	-.394	2	0	1	0	1	7918.965	4	NC	1
435		9	max	.015	3	.007	3	0	1	0	1	NC	3	NC	1
436			min	0	15	-.448	2	0	1	0	1	7565.404	4	NC	1
437		10	max	.016	3	.008	3	0	1	0	1	NC	5	NC	1
438			min	0	15	-.502	2	0	1	0	1	7453.555	4	NC	1
439		11	max	.017	3	.01	3	0	1	0	1	NC	5	NC	1
440			min	0	15	-.556	2	0	1	0	1	7292.194	3	NC	1
441		12	max	.018	3	.012	3	0	1	0	1	NC	1	NC	1
442			min	0	10	-.61	2	0	1	0	1	6172.077	3	NC	1
443		13	max	.019	3	.014	3	0	1	0	1	NC	1	NC	1
444			min	0	10	-.663	2	0	1	0	1	5287.907	3	NC	1
445		14	max	.02	3	.016	3	0	1	0	1	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
446			min	-.002	10	-.716	2	0	1	0	1	4581.654	3	NC	1
447		15	max	.021	3	.019	3	0	1	0	1	NC	1	NC	1
448			min	-.003	10	-.769	2	0	1	0	1	4011.677	3	NC	1
449		16	max	.022	3	.021	3	0	1	0	1	NC	1	NC	1
450			min	-.005	2	-.822	2	0	1	0	1	3547.556	3	NC	1
451		17	max	.023	3	.024	3	0	1	0	1	NC	1	NC	1
452			min	-.007	2	-.875	2	0	1	0	1	3166.741	3	NC	1
453		18	max	.024	3	.026	3	0	1	0	1	NC	1	NC	1
454			min	-.009	2	-.928	2	0	1	0	1	2852.312	3	NC	1
455		19	max	.025	3	.029	3	0	1	0	1	NC	1	NC	1
456			min	-.011	2	-.98	2	0	1	0	1	2591.436	3	NC	1
457	M9	1	max	.022	1	0	15	0	1	2.924e-4	3	NC	1	NC	1
458			min	0	15	-.007	1	0	3	-8.592e-4	2	NC	1	NC	1
459		2	max	.021	1	-.002	12	.015	2	4.604e-4	3	NC	1	NC	3
460			min	0	15	-.046	2	-.007	3	-1.241e-3	2	NC	1	5187.204	2
461		3	max	.02	1	-.003	12	.029	2	6.283e-4	3	NC	1	NC	4
462			min	0	15	-.085	2	-.012	3	-1.623e-3	2	NC	1	2626.35	2
463		4	max	.02	1	-.004	12	.042	2	7.963e-4	3	NC	1	NC	4
464			min	0	15	-.124	2	-.018	3	-2.005e-3	2	NC	1	1783.891	2
465		5	max	.019	1	-.005	12	.054	2	9.643e-4	3	NC	1	NC	4
466			min	0	15	-.163	2	-.023	3	-2.386e-3	2	NC	1	1371.971	2
467		6	max	.018	1	-.006	12	.066	2	1.132e-3	3	NC	1	NC	4
468			min	0	15	-.202	2	-.028	3	-2.768e-3	2	9670.313	4	1133.372	2
469		7	max	.018	1	-.007	12	.075	2	1.3e-3	3	NC	1	NC	5
470			min	0	15	-.24	2	-.032	3	-3.15e-3	2	8575.823	4	982.747	2
471		8	max	.017	1	-.008	12	.083	2	1.468e-3	3	NC	1	NC	5
472			min	0	15	-.278	2	-.035	3	-3.532e-3	2	7918.965	4	883.997	2
473		9	max	.016	1	-.009	12	.09	2	1.636e-3	3	NC	3	NC	5
474			min	0	15	-.316	2	-.038	3	-3.914e-3	2	7565.404	4	819.685	2
475		10	max	.016	1	-.009	12	.094	2	1.804e-3	3	NC	3	NC	5
476			min	0	15	-.354	2	-.04	3	-4.296e-3	2	7453.555	4	780.963	2
477		11	max	.015	1	-.01	12	.095	2	1.972e-3	3	NC	3	NC	5
478			min	0	15	-.392	2	-.04	3	-4.677e-3	2	7565.404	4	763.741	2
479		12	max	.014	1	-.01	12	.094	2	2.14e-3	3	NC	1	NC	5
480			min	0	15	-.429	2	-.04	3	-5.059e-3	2	7918.965	4	767.312	2
481		13	max	.014	1	-.011	12	.09	2	2.308e-3	3	NC	1	NC	5
482			min	0	15	-.466	2	-.038	3	-5.441e-3	2	8575.823	4	794.384	2
483		14	max	.013	1	-.011	12	.083	2	2.476e-3	3	NC	1	NC	5
484			min	0	15	-.503	2	-.036	3	-5.823e-3	2	9670.313	4	852.694	2
485		15	max	.012	1	-.011	12	.072	2	2.644e-3	3	NC	1	NC	5
486			min	0	15	-.54	2	-.031	3	-6.205e-3	2	NC	1	960.016	2
487		16	max	.012	1	-.011	12	.058	2	2.812e-3	3	NC	1	NC	4
488			min	0	15	-.577	2	-.026	3	-6.587e-3	2	NC	1	1159.86	2
489		17	max	.011	1	-.011	12	.039	2	2.98e-3	3	NC	1	NC	4
490			min	0	15	-.613	2	-.018	3	-6.968e-3	2	NC	1	1584.852	2
491		18	max	.01	1	-.011	12	.016	2	3.148e-3	3	NC	1	NC	4
492			min	0	15	-.65	2	-.009	3	-7.35e-3	2	NC	1	2901.076	2
493		19	max	.01	1	-.01	12	.002	3	3.316e-3	3	NC	1	NC	1
494			min	0	15	-.686	2	-.012	1	-7.732e-3	2	NC	1	NC	1