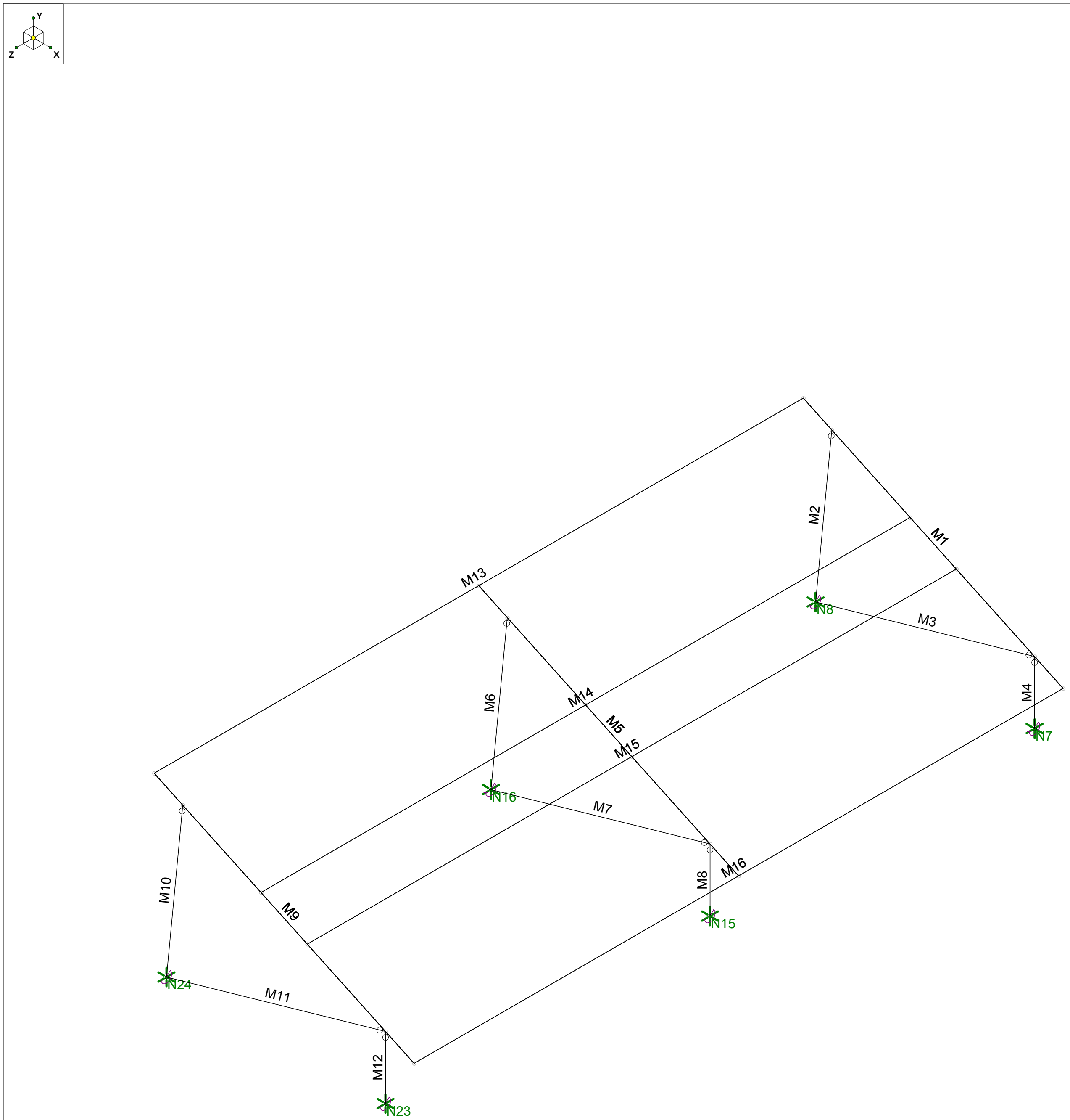


Schletter, Inc.		25° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-05	

1. INTRODUCTION

1.1 Project Description

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

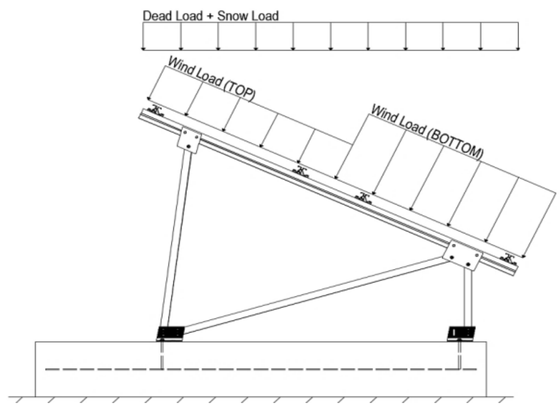
1.2 Construction

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

PV modules are required to meet the following specifications:

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

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



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

1.3 Technical Codes

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

2. LOAD ACTIONS

2.1 Permanent Loads

g_{MAX} = 3.00 psf
g_{MIN} = 1.75 psf

Self-weight of the PV modules.

2.2 Snow Loads

Ground Snow Load, P_g = 30.00 psf
Sloped Roof Snow Load, P_s = 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 = 110 mph
Height < 15 ft

Exposure Category = C
Importance Category = II

Peak Velocity Pressure, q_z = 19.00 psf *Including the gust factor, G=0.85. (ASCE 7-05, Eq. 6-15)*

Pressure Coefficients

$Cf+_{TOP}$	=	1.100	*(Pressure)*
$Cf+_{BOTTOM}$	=	1.700	
$Cf-_{TOP, OUTER PURLIN}$	=	-2.500	
$Cf-_{TOP, INNER PURLIN}$	=	-1.900	*(Suction)*
$Cf-_{BOTTOM}$	=	-1.000	

Provided pressure coefficients are the result of wind tunnel testing done by Ruscheweyh Consult. Coefficients are located in test report # 1127/0611-1e. 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 =	0.06	C_d =	1.25

ASCE 7, Section 12.8.1.3: A maximum S_s of 1.5 may be used to calculate the base shear, C_s, of structures under five stories and with a period, T, of 0.5 or less. Therefore, a S_{ds} of 1.0 was used to calculate C_s.

2.5 Combination of Loads

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

Strength Design, LRFD

Component stresses are checked using the following LRFD load combinations:

1.2D + 1.6S + 0.8W
1.2D + 1.6W + 0.5S
0.9D + 1.6W ^{M}
1.54D + 1.3E + 0.2S ^{R}
0.56D + 1.3E ^{R}
1.54D + 1.25E + 0.2S ^{O}
0.56D + 1.25E ^{O}

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

Allowable Stress Design, ASD

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

1.0D + 1.0S
1.0D + 1.0W
1.0D + 0.75L + 0.75W + 0.75S
0.6D + 1.0W ^{M}
1.238D + 0.875E ^{O}
1.1785D + 0.65625E + 0.75S ^{O}
0.362D + 0.875E ^{O}

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

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

3. STRUCTURAL ANALYSIS

3.1 RISA Results

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

3.2 RISA Components

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

Purlins	Location	**Diagonal Struts**	Location	**Front Reactions**	Location
M13	Top	M3	Outer	N7	Outer
M14	Mid-Top	M7	Inner	N15	Inner
M15	Mid-Bottom	M11	Outer	N23	Outer
M16	Bottom				

Girders	Location	**Rear Struts**	Location	**Rear Reactions**	Location
M1	Outer	M2	Outer	N8	Outer
M5	Inner	M6	Inner	N16	Inner
M9	Outer	M10	Outer	N24	Outer

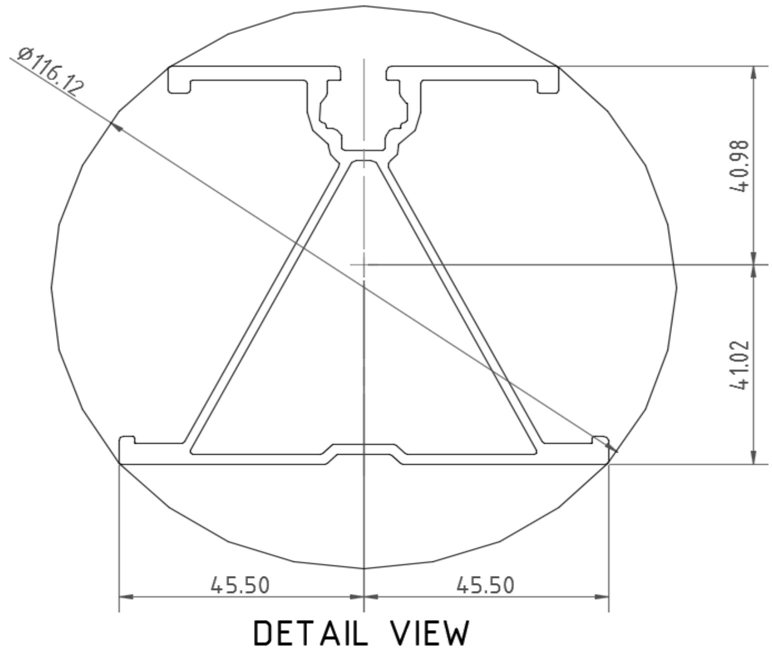
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

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).

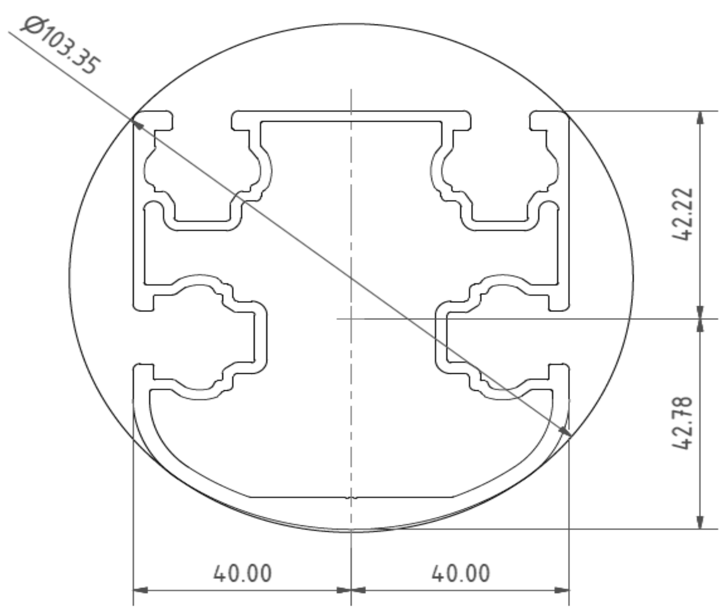
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	120	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	1.933	k-ft
M_z =	0.330	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	98%	



4.2 Girder Design

Loads from purlins are transferred using an inclined girder, which is connected to a set of aluminum struts. 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).

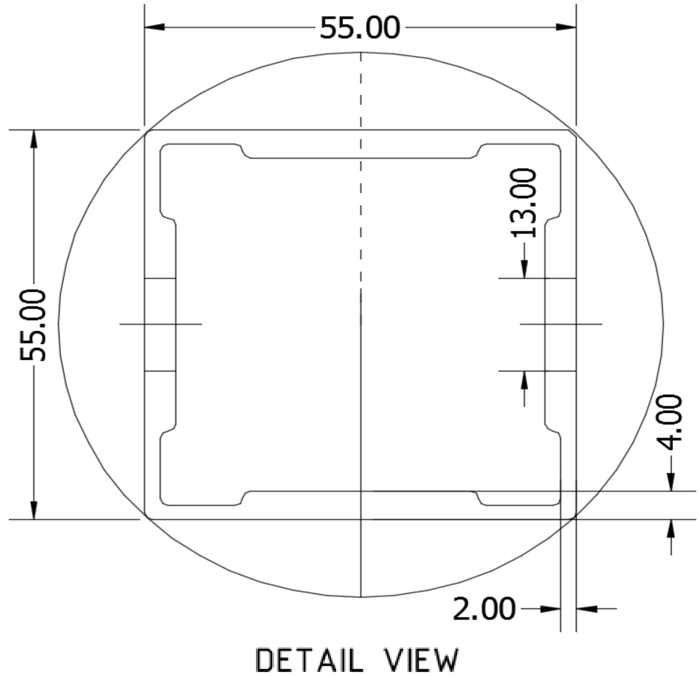
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	88.90	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.35	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.257	k-ft
M_z =	0.000	k-ft
P_n =	-0.815	k
$M_{y\ allowable}$ =	3.464	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	95%	



4.3 Front Strut Design

The front aluminum strut connects a portion of the girder to the foundation. Vertical girder forces are then transferred down through the strut into the foundation. The strut is attached with single M12 bolts at each end. See Appendix A.3 for detailed member calculations. Section units are in (mm).

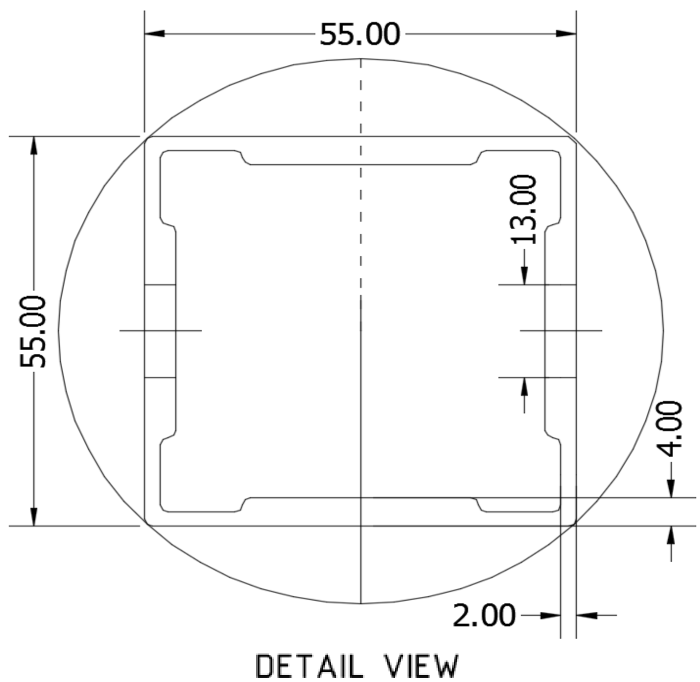
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.530	k-ft
P_n =	0.622	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	40%	



4.4 Diagonal Strut Design

A diagonal aluminum strut braces the support structure. It connects at a front portion of the girder and transfers horizontal forces to the rear foundation connection. The strut is attached with single M12 bolts at each end. See Appendix A.4 for detailed member calculations. Section units are in (mm).

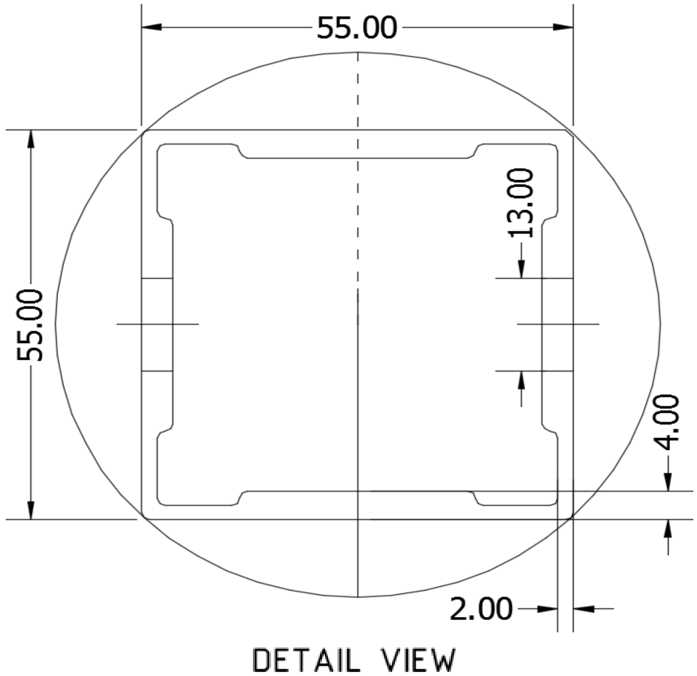
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	86.60	in
$\Phi F_{ty\ AXIAL}$ =	7.50	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.011	k-ft
M_z =	0.000	k-ft
P_n =	2.330	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	7.371	k
Utilization =	32%	



4.5 Rear Strut Design

An aluminum strut connects the rear portion of the girder to the rear foundation connection. Both vertical and horizontal forces are transferred from the girder. The strut is attached with single M12 bolts at each end. See Appendix A.5 for detailed member calculations. Section units are in (mm).

Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	63.42	in
$\Phi F_{ty\ AXIAL}$ =	12.77	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 =	-0.011	k-ft
M_z =	0.000	k-ft
P_n =	3.462	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	12.545	k
Utilization =	28%	



5. FOUNDATION DESIGN CALCULATIONS

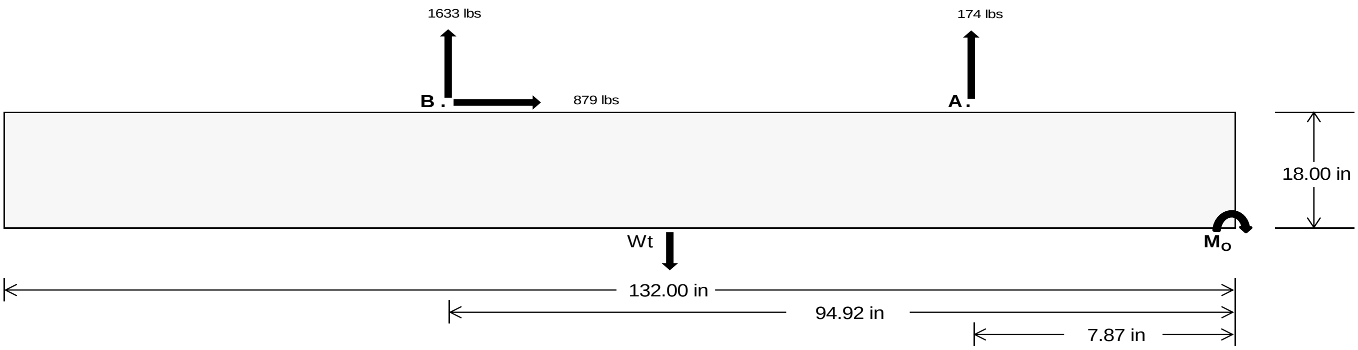
5.1 Helical Pile Foundations

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 foundation design.

Maximum	Front	Rear	
Tensile Load =	736.82	6802.89	k
Compressive Load =	4114.59	5315.44	k
Lateral Load =	360.09	3657.33	k
Moment (Weak Axis) =	0.71	0.31	k

5.2 Design of Ballast Foundations

Ballast foundations are used to secure the racking structure in place. The foundations are checked for potential overturning and sliding. Bearing pressures applied by the racking and ballast foundations are checked against the allowable bearing pressures provided by the IBC tables 1804.2 (2003, 2006) & 1806.2 (2009).



<u>Concrete Properties</u>
Weight of Concrete = 145 pcf
Compressive Strength = 2500 psi
Yield Strength = 60000 psi

<u>Footing Reinforcement</u>
Use fiber reinforcing with (3) #5 rebar.

<u>Overturning Check</u>
M_O = 172158.1 in-lbs
Resisting Force Required = 2608.46 lbs
S.F. = 1.67
Weight Required = 4347.43 lbs
Minimum Width = <u>36 in</u> in
Weight Provided = 7177.50 lbs

A minimum 132in long x 36in wide x 18in tall ballast foundation is required to resist overturning.

<u>Sliding</u>
Force = 878.96 lbs
Friction = 0.4
Weight Required = 2197.39 lbs
Resisting Weight = 7177.50 lbs
Additional Weight Required = 0 lbs

Use a 132in long x 36in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

<u>Cohesion</u>
Sliding Force = 878.96 lbs
Cohesion = 130 psf
Area = 33.00 ft^2
Resisting = 3588.75 lbs
Additional Weight Required = 0 lbs

Use a 132in long x 36in wide x 18in tall ballast foundation. Cohesion is OK.

<u>Shear Key</u>
Additional Force = 0 lbs
Lateral Bearing Pressure = 200 psf/ft
Required Depth = 0.00 ft
f'_c = 2500 psi
Length = 8 in

Shear key is not required.

<u>Bearing Pressure</u>

	Ballast Width			
	36 in	37 in	38 in	39 in
P_{ftg} = (145 pcf)(11 ft)(1.5 ft)(3 ft) =	7178 lbs	7377 lbs	7576 lbs	7776 lbs

ASD LC	1.0D + 1.0S				1.0D + 1.0W				1.0D + 0.75L + 0.75W + 0.75S				0.6D + 1.0W			
Width	36 in	37 in	38 in	39 in	36 in	37 in	38 in	39 in	36 in	37 in	38 in	39 in	36 in	37 in	38 in	39 in
F_A	1386 lbs	1386 lbs	1386 lbs	1386 lbs	1573 lbs	1573 lbs	1573 lbs	1573 lbs	2090 lbs	2090 lbs	2090 lbs	2090 lbs	-348 lbs	-348 lbs	-348 lbs	-348 lbs
F_B	1376 lbs	1376 lbs	1376 lbs	1376 lbs	2268 lbs	2268 lbs	2268 lbs	2268 lbs	2606 lbs	2606 lbs	2606 lbs	2606 lbs	-3265 lbs	-3265 lbs	-3265 lbs	-3265 lbs
F_V	187 lbs	187 lbs	187 lbs	187 lbs	1581 lbs	1581 lbs	1581 lbs	1581 lbs	1310 lbs	1310 lbs	1310 lbs	1310 lbs	-1758 lbs	-1758 lbs	-1758 lbs	-1758 lbs
P_{total}	9940 lbs	10139 lbs	10338 lbs	10538 lbs	11019 lbs	11218 lbs	11418 lbs	11617 lbs	11874 lbs	12073 lbs	12272 lbs	12472 lbs	693 lbs	813 lbs	933 lbs	1052 lbs
M	3679 lbs-ft	3679 lbs-ft	3679 lbs-ft	3679 lbs-ft	4525 lbs-ft	4525 lbs-ft	4525 lbs-ft	4525 lbs-ft	5810 lbs-ft	5810 lbs-ft	5810 lbs-ft	5810 lbs-ft	3547 lbs-ft	3547 lbs-ft	3547 lbs-ft	3547 lbs-ft
e	0.37 ft	0.36 ft	0.36 ft	0.35 ft	0.41 ft	0.40 ft	0.40 ft	0.39 ft	0.49 ft	0.48 ft	0.47 ft	0.47 ft	5.12 ft	4.36 ft	3.80 ft	3.37 ft
L/6	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft
f_{min}	240.4 psf	239.8 psf	239.2 psf	238.6 psf	259.1 psf	258.0 psf	256.9 psf	255.9 psf	263.8 psf	262.5 psf	261.3 psf	260.2 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	362.0 psf	358.1 psf	354.4 psf	350.9 psf	408.7 psf	403.5 psf	398.6 psf	394.0 psf	455.8 psf	449.4 psf	443.3 psf	437.5 psf	401.0 psf	154.6 psf	115.7 psf	101.4 psf

Maximum Bearing Pressure = 456 psf
Allowable Bearing Pressure = 1500 psf

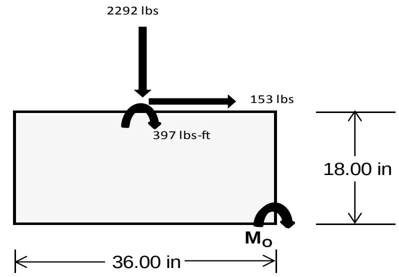
Use a 132in long x 36in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O = 2811.2 ft-lbs
Resisting Force Required = 1874.12 lbs
S.F. = 1.67
Weight Required = 3123.53 lbs
Minimum Width = 36 in in
Weight Provided = 7177.50 lbs

A minimum 132in long x 36in wide x 18in tall ballast foundation is required to resist overturning.



Bearing Pressure

ASD LC	1.238D + 0.875E			1.1785D + 0.65625E + 0.75S			0.362D + 0.875E		
Width	36 in			36 in			36 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	280 lbs	635 lbs	210 lbs	824 lbs	2292 lbs	770 lbs	106 lbs	186 lbs	37 lbs
F_V	212 lbs	208 lbs	216 lbs	157 lbs	153 lbs	168 lbs	213 lbs	209 lbs	214 lbs
P_{total}	9166 lbs	9521 lbs	9096 lbs	9283 lbs	10750 lbs	9229 lbs	2705 lbs	2784 lbs	2635 lbs
M	837 lbs-ft	827 lbs-ft	846 lbs-ft	626 lbs-ft	626 lbs-ft	663 lbs-ft	836 lbs-ft	825 lbs-ft	838 lbs-ft
e	0.09 ft	0.09 ft	0.09 ft	0.07 ft	0.06 ft	0.07 ft	0.31 ft	0.30 ft	0.32 ft
L/6	0.50 ft	0.50 ft	0.50 ft	0.50 ft	0.50 ft	0.50 ft	0.50 ft	0.50 ft	0.50 ft
f_{min}	227.1 psf	238.4 psf	224.3 psf	243.4 psf	287.8 psf	239.5 psf	31.3 psf	34.4 psf	29.1 psf
f_{max}	328.5 psf	338.6 psf	326.9 psf	319.2 psf	363.7 psf	319.8 psf	132.6 psf	134.4 psf	130.6 psf

Maximum Bearing Pressure = 364 psf
Allowable Bearing Pressure = 1500 psf

Use a 132in long x 36in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Foundation Requirements: 132in long x 36in wide x 18in tall ballast foundation and fiber reinforcing with (3) #5 rebar.

5.3 Foundation Anchors

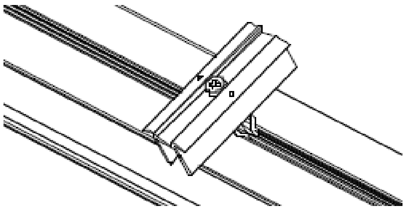
Threaded rods are anchored to the the ballast foundations using the Simpson AT-XP epoxy solution. LRFD load results are compared to the allowable strengths of the epoxy solution. Please see the supplementary calculations provided by the Simpson Anchor Designer software.

6. DESIGN OF JOINTS AND CONNECTIONS

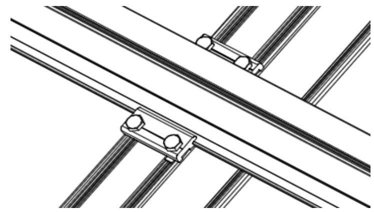
6.1 Anchorage of Modules to Purlins and Connection of Purlins to Girders

Modules are secured to the purlins with Schletter, Inc. Rapid2+ mounting clamps. Purlins are secured to the girders with the use of 80mm 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 =	0.715	k
Allowable Uplift =	1.214	k
Utilization =	59%	



Fastening of Purlins to Girders		
Maximum Uplifting Force =	2.550	k
Allowable Uplift =	4.357	k
Utilization =	59%	



6.2 Strut Connections

The aluminum struts connect the aluminum girder ends to custom brackets with mounting holes. Single M12 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.

Front Strut		
Maximum Axial Load =	3.165	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	43%	

Rear Strut		
Maximum Axial Load =	4.601	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	62%	

Diagonal Strut		
Maximum Axial Load =	2.432	k
M12 Bolt Shear Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	33%	

Bolt and bearing capacities are accounting for double shear. (ASCE 8-02, Eq. 5.3.4-1)

Struts under compression are shown to demonstrate the load transfer from the girder. Single M12 bolts are located at each end of the strut and are subjected to double shear.

7. SEISMIC DESIGN

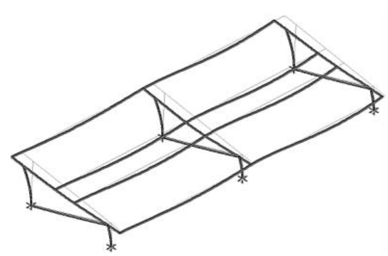
7.1 Seismic Drift

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} =	46.89	in
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$	
	0.938	in
Max Drift, Δ_{MAX} =	0.612	in

$0.612 \le 0.938$, OK.

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



APPENDIX A

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

Purlin = **S1.5**

Strong Axis:

3.4.14

L_b = 120 in

J = 0.432

331.976

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

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= 27.4 ksi

3.4.16

b/t = 32.195

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 25.1 ksi

3.4.16.1 Not Used

Rb/t =

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 37.0588

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

S1 = 36.9

m = 0.65

C_0 = 40.985

Cc = 41.015

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

S2 = 77.2

φF_L= φb[Bbr-mDbr*h/t]

φF_L= 43.2 ksi

$\varphi F_L St$= 25.1 ksi

Ix = 897074 mm^4

2.155 in^4

y = 41.015 mm

Sx = 1.335 in^3

$M_{max}St$ = 2.788 k-ft

Weak Axis:

3.4.14

L_b = 120

J = 0.432

211.117

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 28.6

3.4.16

b/t = 37.0588

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 23.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 32.195

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

S1 = 36.9

m = 0.65

C_0 = 45.5

Cc = 45.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

$\varphi F_L Wk$= 23.1 ksi

Iy = 446476 mm^4

1.073 in^4

x = 45.5 mm

Sy = 0.599 in^3

$M_{max}Wk$ = 1.152 k-ft

Compression

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

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

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

Girder = **BF0**

Strong Axis:

3.4.14

L_b = 88.9 in
J = 1.08
152.913

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

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= 29.4 ksi

3.4.16

b/t = 16.2

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

S1 = 12.2

$$S2=\frac{k_1Bp}{1.6Dp}$$

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

Weak Axis:

3.4.14

L_b = 88.9
J = 1.08
161.829

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

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= 29.2

3.4.16

b/t = 7.4

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

S1 = 12.2

$$S2=\frac{k_1Bp}{1.6Dp}$$

S2 = 46.7
φF_L= φyFcy
φF_L= 33.3 ksi

3.4.16.1 Used

Rb/t = 18.1

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

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

$\varphi F_L =$ 31.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 7.4

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

S1 = 35.2

m = 0.68

$C_0 =$ 41.067

Cc = 43.717

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

S2 = 73.8

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St =$ 29.4 ksi

Ix = 984962 mm^4

2.366 in^4

y = 43.717 mm

Sx = 1.375 in^3

$M_{max}St =$ 3.363 k-ft

3.4.18

h/t = 16.2

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

S1 = 36.9

m = 0.65

$C_0 =$ 40

Cc = 40

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

S2 = 77.3

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L Wk =$ 33.3 ksi

Iy = 923544 mm^4

2.219 in^4

x = 40 mm

Sy = 1.409 in^3

$M_{max}Wk =$ 3.904 k-ft

Compression

3.4.9

b/t = 16.2

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

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

$\varphi F_L =$ 31.6 ksi

b/t = 7.4

S1 = 12.21

S2 = 32.70

$\varphi F_L = \varphi yFcy$

$\varphi F_L =$ 33.3 ksi

3.4.10

Rb/t = 18.1

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

S1 = 6.87

S2 = 131.3

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

$\varphi F_L =$ 31.09 ksi

$\varphi F_L =$ 31.09 ksi

A = 1215.13 mm^2

1.88 in^2

$P_{max} =$ 58.55 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 24.8 in

J = 0.942

38.7028

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

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= 31.4 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 = 24.8

J = 0.942

38.7028

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

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= 31.4

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 = 0.57371

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.87952

φF_L= φcc(Bc-Dc*λ)

φF_L= 28.0279 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

φF_L= φyFcy

φF_L= 33.25 ksi

φF_L= 28.03 ksi

A = 663.99 mm^2

1.03 in^2

P_{max} = 28.85 kips

A.4 Design of Aluminum Struts (Diagonal) - Aluminum Design Manual, 2005 Edition

Strut = **<u>55x55</u>**

Strong Axis:

3.4.14

L_b = 86.60 in

J = 0.942

135.148

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.6 ksi

Weak Axis:

3.4.14

L_b = 86.6

J = 0.942

135.148

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.6

3.4.16

b/t = 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

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

$\varphi F_L =$ 28.2 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

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

$\varphi F_L =$ 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

$\varphi F_L = 1.17\varphi yFcy$

$\varphi F_L =$ 38.9 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

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 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

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St$ = 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

$\varphi F_L Wk$ = 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 = 2.00335

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.86047

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

$\varphi F_L =$ 7.50396 ksi

3.4.9

b/t = 24.5
S1 = 12.21 (See 3.4.16 above for formula)
S2 = 32.70 (See 3.4.16 above for formula)
φF_L= φc[Bp-1.6Dp*b/t]
φF_L= 28.2 ksi

b/t = 24.5
S1 = 12.21
S2 = 32.70
φF_L= φc[Bp-1.6Dp*b/t]
φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

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

φF_L= 7.50 ksi
A = 663.99 mm^2
1.03 in^2
P_{max} = 7.72 kips

A.5 Design of Aluminum Struts (Rear) - Aluminum Design Manual, 2005 Edition

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 63.42 in
J = 0.942
98.9729

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

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= 30.2 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

Weak Axis:

3.4.14

L_b = 63.42
J = 0.942
98.9729

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

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= 30.2

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

3.4.16.1

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_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

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 = 1.46712

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.7854

φF_L= (φccFcy)/(λ²)

φF_L= 12.7711 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

$\varphi F_L = \varphi y Fcy$

$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 12.77 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 13.14 kips

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	M13	Y	-8.366	-8.366	0	0
2	M14	Y	-8.366	-8.366	0	0
3	M15	Y	-8.366	-8.366	0	0
4	M16	Y	-8.366	-8.366	0	0

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

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Y	-4.45	-4.45	0	0
2	M14	Y	-4.45	-4.45	0	0
3	M15	Y	-4.45	-4.45	0	0
4	M16	Y	-4.45	-4.45	0	0

Member Distributed Loads (BLC 3 : Snow Load)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Y	-46.9	-46.9	0	0
2	M14	Y	-46.9	-46.9	0	0
3	M15	Y	-46.9	-46.9	0	0
4	M16	Y	-46.9	-46.9	0	0

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

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	y	-58.278	-58.278	0	0
2	M14	y	-58.278	-58.278	0	0
3	M15	y	-90.067	-90.067	0	0
4	M16	y	-90.067	-90.067	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	M13	y	132.451	132.451	0	0
2	M14	y	100.663	100.663	0	0
3	M15	y	52.98	52.98	0	0
4	M16	y	52.98	52.98	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	M13	Z	6.693	6.693	0	0
2	M14	Z	6.693	6.693	0	0
3	M15	Z	6.693	6.693	0	0
4	M16	Z	6.693	6.693	0	0
5	M13	Z	0	0	0	0
6	M14	Z	0	0	0	0
7	M15	Z	0	0	0	0
8	M16	Z	0	0	0	0

Load Combinations

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

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N8	max	710.217	2	1253.798	2	.73	1	.004	1	0	1	0	1
2		min	-885.826	3	-1601.382	3	-46.295	5	-.24	4	0	1	0	1
3	N7	max	.037	9	1162.664	1	-.566	12	-.001	12	0	1	0	1
4		min	-.199	2	-147.5	3	-276.993	4	-.546	4	0	1	0	1
5	N15	max	.028	9	3165.066	1	0	10	0	10	0	1	0	1
6		min	-2.287	2	-566.781	3	-265.018	4	-.53	4	0	1	0	1
7	N16	max	2594.623	2	4088.802	2	0	11	0	2	0	1	0	1
8		min	-2813.334	3	-5232.996	3	-46.107	5	-.242	4	0	1	0	1
9	N23	max	.04	14	1162.664	1	10.643	1	.022	1	0	1	0	1
10		min	-.199	2	-147.5	3	-269.392	4	-.534	4	0	1	0	1
11	N24	max	710.217	2	1253.798	2	-.047	12	0	12	0	1	0	1
12		min	-885.826	3	-1601.382	3	-46.903	5	-.242	4	0	1	0	1
13	Totals:	max	4012.372	2	11571.472	2	0	2						
14		min	-4585.564	3	-9297.54	3	-945.479	4						

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	M13	1	max	108.107	1	465.003	1	-8.013	12	0	3	.258	1	0	4
2			min	5.952	12	-776.817	3	-176.271	1	-.015	2	.014	12	0	3
3		2	max	108.107	1	325.707	1	-6.336	12	0	3	.111	4	.735	3
4			min	5.952	12	-546.745	3	-135.472	1	-.015	2	.006	12	-.439	1
5		3	max	108.107	1	186.412	1	-4.658	12	0	3	.059	5	1.215	3
6			min	5.952	12	-316.672	3	-94.674	1	-.015	2	-.043	1	-.724	1
7		4	max	108.107	1	47.116	1	-2.98	12	0	3	.031	5	1.439	3
8			min	5.952	12	-86.6	3	-53.875	1	-.015	2	-.126	1	-.854	1
9		5	max	108.107	1	143.472	3	-.981	10	0	3	.005	5	1.407	3
10			min	5.952	12	-92.681	2	-25.012	4	-.015	2	-.163	1	-.828	1
11		6	max	108.107	1	373.544	3	27.722	1	0	3	-.007	12	1.12	3
12			min	3.111	15	-231.828	2	-19.054	5	-.015	2	-.155	1	-.649	1
13		7	max	108.107	1	603.616	3	68.521	1	0	3	-.006	12	.577	3
14			min	-6.494	5	-370.975	2	-16.459	5	-.015	2	-.101	1	-.314	1
15		8	max	108.107	1	833.688	3	109.32	1	0	3	.001	10	.18	2
16			min	-17.9	5	-510.122	2	-13.863	5	-.015	2	-.056	4	-.221	3
17		9	max	108.107	1	1063.761	3	150.119	1	0	3	.142	1	.824	2
18			min	-29.306	5	-649.363	1	-11.268	5	-.015	2	-.068	5	-1.275	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
19		10	max	108.107	1	788.659	1	-7.085	12	.015	2	.331	1	1.623	2
20			min	5.952	12	-1293.833	3	-190.917	1	0	3	.01	12	-2.585	3
21		11	max	108.107	1	649.363	1	-5.407	12	.015	2	.142	1	.824	2
22			min	5.952	12	-1063.761	3	-150.119	1	0	3	.003	12	-1.275	3
23		12	max	108.107	1	510.122	2	-3.73	12	.015	2	.054	4	.18	2
24			min	5.952	12	-833.688	3	-109.32	1	0	3	-.004	3	-.221	3
25		13	max	108.107	1	370.975	2	-2.052	12	.015	2	.024	5	.577	3
26			min	5.952	12	-603.616	3	-68.521	1	0	3	-.101	1	-.314	1
27		14	max	108.107	1	231.828	2	-.375	12	.015	2	-.001	15	1.12	3
28			min	5.796	15	-373.544	3	-28.902	4	0	3	-.155	1	-.649	1
29		15	max	108.107	1	92.681	2	13.076	1	.015	2	-.006	12	1.407	3
30			min	-2.579	5	-143.472	3	-19.929	5	0	3	-.163	1	-.828	1
31		16	max	108.107	1	86.6	3	53.875	1	.015	2	-.004	12	1.439	3
32			min	-13.985	5	-47.116	1	-17.334	5	0	3	-.126	1	-.854	1
33		17	max	108.107	1	316.672	3	94.674	1	.015	2	0	3	1.215	3
34			min	-25.391	5	-186.412	1	-14.738	5	0	3	-.075	4	-.724	1
35		18	max	108.107	1	546.745	3	135.472	1	.015	2	.085	1	.735	3
36			min	-36.797	5	-325.707	1	-12.143	5	0	3	-.079	5	-.439	1
37		19	max	108.107	1	776.817	3	176.271	1	.015	2	.258	1	0	1
38			min	-48.202	5	-465.003	1	-9.547	5	0	3	-.091	5	0	3
39	M14	1	max	58.444	4	493.95	2	-8.229	12	.009	3	.294	1	0	1
40			min	2.508	12	-603.073	3	-181.737	1	-.011	2	.016	12	0	3
41		2	max	50.195	1	354.803	2	-6.551	12	.009	3	.158	4	.574	3
42			min	2.508	12	-429.513	3	-140.938	1	-.011	2	.008	12	-.472	2
43		3	max	50.195	1	215.656	2	-4.873	12	.009	3	.087	5	.954	3
44			min	2.508	12	-255.953	3	-100.139	1	-.011	2	-.019	1	-.788	2
45		4	max	50.195	1	76.509	2	-3.196	12	.009	3	.047	5	1.142	3
46			min	2.508	12	-82.393	3	-59.341	1	-.011	2	-.107	1	-.951	2
47		5	max	50.195	1	91.168	3	-1.518	12	.009	3	.009	5	1.138	3
48			min	1.134	15	-64.442	1	-37.264	4	-.011	2	-.151	1	-.958	2
49		6	max	50.195	1	264.728	3	22.257	1	.009	3	-.007	12	.94	3
50			min	-9.663	5	-203.738	1	-29.89	5	-.011	2	-.149	1	-.812	2
51		7	max	50.195	1	438.288	3	63.056	1	.009	3	-.005	12	.549	3
52			min	-21.069	5	-343.034	1	-27.294	5	-.011	2	-.101	1	-.51	2
53		8	max	50.195	1	611.848	3	103.854	1	.009	3	0	10	0	15
54			min	-32.475	5	-482.33	1	-24.699	5	-.011	2	-.09	4	-.054	2
55		9	max	50.195	1	785.408	3	144.653	1	.009	3	.13	1	.573	1
56			min	-43.881	5	-621.626	1	-22.103	5	-.011	2	-.112	5	-.81	3
57		10	max	72.451	4	760.921	1	-6.869	12	.011	2	.313	1	1.341	1
58			min	2.508	12	-958.968	3	-185.452	1	-.009	3	.009	12	-1.779	3
59		11	max	61.045	4	621.626	1	-5.192	12	.011	2	.159	4	.573	1
60			min	2.508	12	-785.408	3	-144.653	1	-.009	3	.002	12	-.81	3
61		12	max	50.195	1	482.33	1	-3.514	12	.011	2	.085	5	0	15
62			min	2.508	12	-611.848	3	-103.854	1	-.009	3	-.008	1	-.054	2
63		13	max	50.195	1	343.034	1	-1.837	12	.011	2	.044	5	.549	3
64			min	2.508	12	-438.288	3	-63.056	1	-.009	3	-.101	1	-.51	2
65		14	max	50.195	1	203.738	1	-.159	12	.011	2	.007	5	.94	3
66			min	2.508	12	-264.728	3	-38.059	4	-.009	3	-.149	1	-.812	2
67		15	max	50.195	1	64.442	1	18.542	1	.011	2	-.006	12	1.138	3
68			min	2.508	12	-91.168	3	-30.069	5	-.009	3	-.151	1	-.958	2
69		16	max	50.195	1	82.393	3	59.341	1	.011	2	-.003	12	1.142	3
70			min	-7.099	5	-76.509	2	-27.474	5	-.009	3	-.107	1	-.951	2
71		17	max	50.195	1	255.953	3	100.139	1	.011	2	.002	3	.954	3
72			min	-18.504	5	-215.656	2	-24.878	5	-.009	3	-.095	4	-.788	2
73		18	max	50.195	1	429.513	3	140.938	1	.011	2	.115	1	.574	3
74			min	-29.91	5	-354.803	2	-22.283	5	-.009	3	-.115	5	-.472	2
75		19	max	50.195	1	603.073	3	181.737	1	.011	2	.294	1	0	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
76			min	-41.316	5	-493.95	2	-19.687	5	-.009	3	-.139	5	0	3
77	M15	1	max	83.592	5	684.714	2	-8.17	12	.012	2	.294	1	0	2
78			min	-52.737	1	-317.224	3	-181.716	1	-.008	3	.016	12	0	12
79		2	max	72.186	5	489.053	2	-6.493	12	.012	2	.195	4	.303	3
80			min	-52.737	1	-228.434	3	-140.917	1	-.008	3	.007	12	-.652	2
81		3	max	60.78	5	293.392	2	-4.815	12	.012	2	.114	5	.508	3
82			min	-52.737	1	-139.644	3	-100.118	1	-.008	3	-.019	1	-1.087	2
83		4	max	49.374	5	97.732	2	-3.137	12	.012	2	.063	5	.613	3
84			min	-52.737	1	-50.853	3	-59.32	1	-.008	3	-.108	1	-1.304	2
85		5	max	37.968	5	37.937	3	-1.46	12	.012	2	.015	5	.621	3
86			min	-52.737	1	-97.929	2	-46.633	4	-.008	3	-.151	1	-1.304	2
87		6	max	26.563	5	126.728	3	22.278	1	.012	2	-.007	12	.529	3
88			min	-52.737	1	-293.59	2	-39.232	5	-.008	3	-.149	1	-1.086	2
89		7	max	15.157	5	215.518	3	63.076	1	.012	2	-.005	12	.339	3
90			min	-52.737	1	-489.25	2	-36.637	5	-.008	3	-.101	1	-.652	2
91		8	max	3.751	5	304.308	3	103.875	1	.012	2	0	10	.05	3
92			min	-52.737	1	-684.911	2	-34.041	5	-.008	3	-.115	4	-.013	1
93		9	max	-2.991	12	393.099	3	144.674	1	.012	2	.13	1	.87	2
94			min	-52.737	1	-880.571	2	-31.446	5	-.008	3	-.148	5	-.337	3
95		10	max	-2.991	12	1076.232	2	-6.928	12	.008	3	.313	1	1.958	2
96			min	-52.737	1	-481.889	3	-185.473	1	-.012	2	.009	12	-.823	3
97		11	max	.518	15	880.571	2	-5.25	12	.008	3	.195	4	.87	2
98			min	-52.737	1	-393.099	3	-144.674	1	-.012	2	.003	12	-.337	3
99		12	max	-2.991	12	684.911	2	-3.573	12	.008	3	.11	5	.05	3
100			min	-52.737	1	-304.308	3	-103.875	1	-.012	2	-.009	1	-.013	1
101		13	max	-2.991	12	489.25	2	-1.895	12	.008	3	.059	5	.339	3
102			min	-52.737	1	-215.518	3	-63.076	1	-.012	2	-.101	1	-.652	2
103		14	max	-2.991	12	293.59	2	-.218	12	.008	3	.011	5	.529	3
104			min	-52.737	1	-126.728	3	-47.452	4	-.012	2	-.149	1	-1.086	2
105		15	max	-2.991	12	97.929	2	18.521	1	.008	3	-.006	12	.621	3
106			min	-57.386	4	-37.937	3	-39.415	5	-.012	2	-.151	1	-1.304	2
107		16	max	-2.991	12	50.853	3	59.32	1	.008	3	-.003	12	.613	3
108			min	-68.792	4	-97.732	2	-36.819	5	-.012	2	-.108	1	-1.304	2
109		17	max	-2.991	12	139.644	3	100.118	1	.008	3	.002	3	.508	3
110			min	-80.198	4	-293.392	2	-34.224	5	-.012	2	-.122	4	-1.087	2
111		18	max	-2.991	12	228.434	3	140.917	1	.008	3	.115	1	.303	3
112			min	-91.604	4	-489.053	2	-31.628	5	-.012	2	-.152	5	-.652	2
113		19	max	-2.991	12	317.224	3	181.716	1	.008	3	.294	1	0	2
114			min	-103.009	4	-684.714	2	-29.033	5	-.012	2	-.186	5	0	5
115	M16	1	max	81.934	5	655.673	2	-7.818	12	.011	1	.26	1	0	2
116			min	-115.477	1	-294.788	3	-176.529	1	-.012	3	.013	12	0	3
117		2	max	70.528	5	460.012	2	-6.14	12	.011	1	.148	4	.278	3
118			min	-115.477	1	-205.998	3	-135.73	1	-.012	3	.006	12	-.62	2
119		3	max	59.122	5	264.352	2	-4.463	12	.011	1	.085	5	.458	3
120			min	-115.477	1	-117.207	3	-94.931	1	-.012	3	-.042	1	-1.022	2
121		4	max	47.716	5	68.691	2	-2.785	12	.011	1	.047	5	.539	3
122			min	-115.477	1	-28.417	3	-54.133	1	-.012	3	-.125	1	-1.207	2
123		5	max	36.311	5	60.373	3	-1.107	12	.011	1	.011	5	.521	3
124			min	-115.477	1	-126.969	2	-34.102	4	-.012	3	-.162	1	-1.175	2
125		6	max	24.905	5	149.164	3	27.465	1	.011	1	-.007	12	.405	3
126			min	-115.477	1	-322.63	2	-28.025	5	-.012	3	-.155	1	-.925	2
127		7	max	13.499	5	237.954	3	68.263	1	.011	1	-.005	12	.189	3
128			min	-115.477	1	-518.291	2	-25.429	5	-.012	3	-.101	1	-.458	2
129		8	max	2.093	5	326.744	3	109.062	1	.011	1	0	10	.227	2
130			min	-115.477	1	-713.951	2	-22.834	5	-.012	3	-.08	4	-.124	3
131		9	max	-5.988	12	415.535	3	149.861	1	.011	1	.141	1	1.129	2
132			min	-115.477	1	-909.612	2	-20.238	5	-.012	3	-.102	5	-.537	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
133		10	max	-5.988	12	1105.273	2	-7.28	12	.012	3	.33	1	2.248	2
134			min	-115.477	1	-504.325	3	-190.66	1	-.011	1	.011	12	-1.048	3
135		11	max	-3.434	15	909.612	2	-5.603	12	.012	3	.152	4	1.129	2
136			min	-115.477	1	-415.535	3	-149.861	1	-.011	1	.004	12	-.537	3
137		12	max	-5.988	12	713.951	2	-3.925	12	.012	3	.078	4	.227	2
138			min	-115.477	1	-326.744	3	-109.062	1	-.011	1	-.003	3	-.124	3
139		13	max	-5.988	12	518.291	2	-2.248	12	.012	3	.038	5	.189	3
140			min	-115.477	1	-237.954	3	-68.263	1	-.011	1	-.101	1	-.458	2
141		14	max	-5.988	12	322.63	2	-.57	12	.012	3	.001	5	.405	3
142			min	-115.477	1	-149.164	3	-37.902	4	-.011	1	-.155	1	-.925	2
143		15	max	-5.988	12	126.969	2	13.334	1	.012	3	-.006	12	.521	3
144			min	-115.477	1	-60.373	3	-28.884	5	-.011	1	-.162	1	-1.175	2
145		16	max	-5.988	12	28.417	3	54.133	1	.012	3	-.004	12	.539	3
146			min	-115.477	1	-68.691	2	-26.288	5	-.011	1	-.125	1	-1.207	2
147		17	max	-5.988	12	117.207	3	94.931	1	.012	3	0	12	.458	3
148			min	-115.477	1	-264.352	2	-23.693	5	-.011	1	-.101	4	-1.022	2
149		18	max	-5.988	12	205.998	3	135.73	1	.012	3	.086	1	.278	3
150			min	-115.477	1	-460.012	2	-21.097	5	-.011	1	-.115	5	-.62	2
151		19	max	-5.988	12	294.788	3	176.529	1	.012	3	.26	1	0	2
152			min	-123.089	4	-655.673	2	-18.502	5	-.011	1	-.137	5	0	5
153	M2	1	max	1074.889	2	1.958	4	.697	1	0	12	0	3	0	1
154			min	-1407.797	3	.477	15	-44.237	4	0	4	0	1	0	1
155		2	max	1075.317	2	1.901	4	.697	1	0	12	0	1	0	15
156			min	-1407.476	3	.463	15	-44.61	4	0	4	-.013	4	0	4
157		3	max	1075.746	2	1.844	4	.697	1	0	12	0	1	0	15
158			min	-1407.155	3	.45	15	-44.983	4	0	4	-.026	4	-.001	4
159		4	max	1076.174	2	1.788	4	.697	1	0	12	0	1	0	15
160			min	-1406.833	3	.437	15	-45.357	4	0	4	-.039	4	-.002	4
161		5	max	1076.602	2	1.731	4	.697	1	0	12	0	1	0	15
162			min	-1406.512	3	.423	15	-45.73	4	0	4	-.052	4	-.002	4
163		6	max	1077.031	2	1.674	4	.697	1	0	12	0	1	0	15
164			min	-1406.191	3	.41	15	-46.103	4	0	4	-.066	4	-.003	4
165		7	max	1077.459	2	1.617	4	.697	1	0	12	.001	1	0	15
166			min	-1405.869	3	.393	12	-46.477	4	0	4	-.079	4	-.003	4
167		8	max	1077.888	2	1.56	4	.697	1	0	12	.001	1	0	15
168			min	-1405.548	3	.371	12	-46.85	4	0	4	-.093	4	-.004	4
169		9	max	1078.316	2	1.504	4	.697	1	0	12	.002	1	0	15
170			min	-1405.226	3	.349	12	-47.223	4	0	4	-.106	4	-.004	4
171		10	max	1078.745	2	1.447	4	.697	1	0	12	.002	1	-.001	15
172			min	-1404.905	3	.327	12	-47.597	4	0	4	-.12	4	-.004	4
173		11	max	1079.173	2	1.39	4	.697	1	0	12	.002	1	-.001	15
174			min	-1404.584	3	.305	12	-47.97	4	0	4	-.134	4	-.005	4
175		12	max	1079.602	2	1.333	4	.697	1	0	12	.002	1	-.001	15
176			min	-1404.262	3	.283	12	-48.343	4	0	4	-.148	4	-.005	4
177		13	max	1080.03	2	1.276	4	.697	1	0	12	.002	1	-.001	12
178			min	-1403.941	3	.261	12	-48.717	4	0	4	-.162	4	-.006	4
179		14	max	1080.459	2	1.22	4	.697	1	0	12	.003	1	-.001	12
180			min	-1403.62	3	.238	12	-49.09	4	0	4	-.176	4	-.006	4
181		15	max	1080.887	2	1.163	4	.697	1	0	12	.003	1	-.002	12
182			min	-1403.298	3	.216	12	-49.463	4	0	4	-.19	4	-.006	4
183		16	max	1081.316	2	1.106	4	.697	1	0	12	.003	1	-.002	12
184			min	-1402.977	3	.194	12	-49.837	4	0	4	-.205	4	-.007	4
185		17	max	1081.744	2	1.051	2	.697	1	0	12	.003	1	-.002	12
186			min	-1402.656	3	.172	12	-50.21	4	0	4	-.219	4	-.007	4
187		18	max	1082.173	2	1.007	2	.697	1	0	12	.003	1	-.002	12
188			min	-1402.334	3	.15	12	-50.583	4	0	4	-.234	4	-.007	4
189		19	max	1082.601	2	.962	2	.697	1	0	12	.004	1	-.002	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
190			min	-1402.013	3	.128	12	-50.957	4	0	4	-.249	4	-.008	4
191	M3	1	max	623.779	2	7.908	4	3.524	4	0	12	0	1	.008	4
192			min	-769.989	3	1.87	15	.008	12	0	4	-.027	4	.002	12
193		2	max	623.609	2	7.14	4	4.063	4	0	12	0	1	.005	2
194			min	-770.116	3	1.69	15	.008	12	0	4	-.025	4	0	12
195		3	max	623.438	2	6.373	4	4.602	4	0	12	0	1	.002	2
196			min	-770.244	3	1.51	15	.008	12	0	4	-.023	4	0	3
197		4	max	623.268	2	5.606	4	5.141	4	0	12	0	1	0	2
198			min	-770.372	3	1.329	15	.008	12	0	4	-.021	4	-.002	3
199		5	max	623.098	2	4.839	4	5.679	4	0	12	0	1	0	15
200			min	-770.5	3	1.149	15	.008	12	0	4	-.019	4	-.003	3
201		6	max	622.927	2	4.071	4	6.218	4	0	12	0	1	-.001	15
202			min	-770.627	3	.968	15	.008	12	0	4	-.016	4	-.005	6
203		7	max	622.757	2	3.304	4	6.757	4	0	12	0	1	-.001	15
204			min	-770.755	3	.788	15	.008	12	0	4	-.014	5	-.007	6
205		8	max	622.587	2	2.537	4	7.296	4	0	12	0	1	-.002	15
206			min	-770.883	3	.608	15	.008	12	0	4	-.011	5	-.008	6
207		9	max	622.416	2	1.77	4	7.834	4	0	12	0	1	-.002	15
208			min	-771.011	3	.427	15	.008	12	0	4	-.008	5	-.009	6
209		10	max	622.246	2	1.003	4	8.373	4	0	12	0	1	-.002	15
210			min	-771.138	3	.227	12	.008	12	0	4	-.004	5	-.009	6
211		11	max	622.076	2	.345	2	8.912	4	0	12	.001	1	-.002	15
212			min	-771.266	3	-.124	3	.008	12	0	4	0	5	-.01	6
213		12	max	621.905	2	-.114	15	9.451	4	0	12	.003	4	-.002	15
214			min	-771.394	3	-.572	3	.008	12	0	4	0	12	-.009	6
215		13	max	621.735	2	-.294	15	9.989	4	0	12	.007	4	-.002	15
216			min	-771.522	3	-1.3	6	.008	12	0	4	0	12	-.009	6
217		14	max	621.565	2	-.474	15	10.528	4	0	12	.012	4	-.002	15
218			min	-771.649	3	-2.067	6	.008	12	0	4	0	12	-.008	6
219		15	max	621.394	2	-.655	15	11.067	4	0	12	.016	4	-.002	15
220			min	-771.777	3	-2.834	6	.008	12	0	4	0	12	-.007	6
221		16	max	621.224	2	-.835	15	11.606	4	0	12	.021	4	-.001	15
222			min	-771.905	3	-3.602	6	.008	12	0	4	0	12	-.006	6
223		17	max	621.054	2	-1.015	15	12.144	4	0	12	.026	4	-.001	15
224			min	-772.033	3	-4.369	6	.008	12	0	4	0	12	-.004	6
225		18	max	620.883	2	-1.196	15	12.683	4	0	12	.031	4	0	15
226			min	-772.161	3	-5.136	6	.008	12	0	4	0	12	-.002	6
227		19	max	620.713	2	-1.376	15	13.222	4	0	12	.037	4	0	1
228			min	-772.288	3	-5.903	6	.008	12	0	4	0	12	0	1
229	M4	1	max	1159.597	1	0	1	-.565	12	0	1	.026	4	0	1
230			min	-149.799	3	0	1	-275.749	4	0	1	0	12	0	1
231		2	max	1159.768	1	0	1	-.565	12	0	1	0	3	0	1
232			min	-149.672	3	0	1	-275.897	4	0	1	-.005	4	0	1
233		3	max	1159.938	1	0	1	-.565	12	0	1	0	12	0	1
234			min	-149.544	3	0	1	-276.045	4	0	1	-.037	4	0	1
235		4	max	1160.108	1	0	1	-.565	12	0	1	0	12	0	1
236			min	-149.416	3	0	1	-276.192	4	0	1	-.069	4	0	1
237		5	max	1160.279	1	0	1	-.565	12	0	1	0	12	0	1
238			min	-149.288	3	0	1	-276.34	4	0	1	-.1	4	0	1
239		6	max	1160.449	1	0	1	-.565	12	0	1	0	12	0	1
240			min	-149.161	3	0	1	-276.488	4	0	1	-.132	4	0	1
241		7	max	1160.619	1	0	1	-.565	12	0	1	0	12	0	1
242			min	-149.033	3	0	1	-276.635	4	0	1	-.164	4	0	1
243		8	max	1160.79	1	0	1	-.565	12	0	1	0	12	0	1
244			min	-148.905	3	0	1	-276.783	4	0	1	-.196	4	0	1
245		9	max	1160.96	1	0	1	-.565	12	0	1	0	12	0	1
246			min	-148.777	3	0	1	-276.931	4	0	1	-.227	4	0	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
247		10	max	1161.13	1	0	1	-.565	12	0	1	0	12	0	1
248			min	-148.65	3	0	1	-277.078	4	0	1	-.259	4	0	1
249		11	max	1161.301	1	0	1	-.565	12	0	1	0	12	0	1
250			min	-148.522	3	0	1	-277.226	4	0	1	-.291	4	0	1
251		12	max	1161.471	1	0	1	-.565	12	0	1	0	12	0	1
252			min	-148.394	3	0	1	-277.373	4	0	1	-.323	4	0	1
253		13	max	1161.641	1	0	1	-.565	12	0	1	0	12	0	1
254			min	-148.266	3	0	1	-277.521	4	0	1	-.355	4	0	1
255		14	max	1161.812	1	0	1	-.565	12	0	1	0	12	0	1
256			min	-148.138	3	0	1	-277.669	4	0	1	-.387	4	0	1
257		15	max	1161.982	1	0	1	-.565	12	0	1	0	12	0	1
258			min	-148.011	3	0	1	-277.816	4	0	1	-.419	4	0	1
259		16	max	1162.152	1	0	1	-.565	12	0	1	0	12	0	1
260			min	-147.883	3	0	1	-277.964	4	0	1	-.45	4	0	1
261		17	max	1162.323	1	0	1	-.565	12	0	1	0	12	0	1
262			min	-147.755	3	0	1	-278.112	4	0	1	-.482	4	0	1
263		18	max	1162.493	1	0	1	-.565	12	0	1	-.001	12	0	1
264			min	-147.627	3	0	1	-278.259	4	0	1	-.514	4	0	1
265		19	max	1162.664	1	0	1	-.565	12	0	1	-.001	12	0	1
266			min	-147.5	3	0	1	-278.407	4	0	1	-.546	4	0	1
267	M6	1	max	3454.488	2	2.428	2	0	1	0	1	0	4	0	1
268			min	-4601.367	3	-.023	3	-44.689	4	0	4	0	1	0	1
269		2	max	3454.916	2	2.384	2	0	1	0	1	0	1	0	3
270			min	-4601.046	3	-.057	3	-45.063	4	0	4	-.013	4	0	2
271		3	max	3455.345	2	2.34	2	0	1	0	1	0	1	0	3
272			min	-4600.724	3	-.09	3	-45.436	4	0	4	-.026	4	-.001	2
273		4	max	3455.773	2	2.296	2	0	1	0	1	0	1	0	3
274			min	-4600.403	3	-.123	3	-45.809	4	0	4	-.039	4	-.002	2
275		5	max	3456.202	2	2.251	2	0	1	0	1	0	1	0	3
276			min	-4600.082	3	-.156	3	-46.183	4	0	4	-.053	4	-.003	2
277		6	max	3456.63	2	2.207	2	0	1	0	1	0	1	0	3
278			min	-4599.76	3	-.189	3	-46.556	4	0	4	-.066	4	-.003	2
279		7	max	3457.059	2	2.163	2	0	1	0	1	0	1	0	3
280			min	-4599.439	3	-.222	3	-46.929	4	0	4	-.08	4	-.004	2
281		8	max	3457.487	2	2.119	2	0	1	0	1	0	1	0	3
282			min	-4599.118	3	-.256	3	-47.303	4	0	4	-.093	4	-.005	2
283		9	max	3457.916	2	2.074	2	0	1	0	1	0	1	0	3
284			min	-4598.796	3	-.289	3	-47.676	4	0	4	-.107	4	-.005	2
285		10	max	3458.344	2	2.03	2	0	1	0	1	0	1	0	3
286			min	-4598.475	3	-.322	3	-48.049	4	0	4	-.121	4	-.006	2
287		11	max	3458.773	2	1.986	2	0	1	0	1	0	1	0	3
288			min	-4598.153	3	-.355	3	-48.423	4	0	4	-.135	4	-.006	2
289		12	max	3459.201	2	1.942	2	0	1	0	1	0	1	0	3
290			min	-4597.832	3	-.388	3	-48.796	4	0	4	-.149	4	-.007	2
291		13	max	3459.63	2	1.897	2	0	1	0	1	0	1	0	3
292			min	-4597.511	3	-.422	3	-49.169	4	0	4	-.164	4	-.008	2
293		14	max	3460.058	2	1.853	2	0	1	0	1	0	1	0	3
294			min	-4597.189	3	-.455	3	-49.543	4	0	4	-.178	4	-.008	2
295		15	max	3460.487	2	1.809	2	0	1	0	1	0	1	.001	3
296			min	-4596.868	3	-.488	3	-49.916	4	0	4	-.192	4	-.009	2
297		16	max	3460.915	2	1.765	2	0	1	0	1	0	1	.001	3
298			min	-4596.547	3	-.521	3	-50.289	4	0	4	-.207	4	-.009	2
299		17	max	3461.344	2	1.72	2	0	1	0	1	0	1	.001	3
300			min	-4596.225	3	-.554	3	-50.663	4	0	4	-.221	4	-.01	2
301		18	max	3461.772	2	1.676	2	0	1	0	1	0	1	.002	3
302			min	-4595.904	3	-.588	3	-51.036	4	0	4	-.236	4	-.01	2
303		19	max	3462.201	2	1.632	2	0	1	0	1	0	1	.002	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
304			min	-4595.583	3	-.621	3	-51.409	4	0	4	-.251	4	-.011	2
305	M7	1	max	2329.83	2	7.918	6	3.31	4	0	1	0	1	.011	2
306			min	-2429.849	3	1.858	15	0	1	0	4	-.027	4	-.002	3
307		2	max	2329.66	2	7.15	6	3.848	4	0	1	0	1	.008	2
308			min	-2429.976	3	1.678	15	0	1	0	4	-.025	4	-.003	3
309		3	max	2329.49	2	6.383	6	4.387	4	0	1	0	1	.005	2
310			min	-2430.104	3	1.498	15	0	1	0	4	-.024	4	-.005	3
311		4	max	2329.319	2	5.616	6	4.926	4	0	1	0	1	.003	2
312			min	-2430.232	3	1.317	15	0	1	0	4	-.022	4	-.006	3
313		5	max	2329.149	2	4.849	6	5.465	4	0	1	0	1	.001	2
314			min	-2430.36	3	1.137	15	0	1	0	4	-.019	4	-.007	3
315		6	max	2328.979	2	4.081	6	6.003	4	0	1	0	1	0	2
316			min	-2430.487	3	.957	15	0	1	0	4	-.017	4	-.007	3
317		7	max	2328.808	2	3.314	6	6.542	4	0	1	0	1	-.002	15
318			min	-2430.615	3	.776	15	0	1	0	4	-.014	4	-.008	3
319		8	max	2328.638	2	2.603	2	7.081	4	0	1	0	1	-.002	15
320			min	-2430.743	3	.482	12	0	1	0	4	-.012	4	-.008	3
321		9	max	2328.468	2	2.005	2	7.62	4	0	1	0	1	-.002	15
322			min	-2430.871	3	.183	12	0	1	0	4	-.009	4	-.009	4
323		10	max	2328.297	2	1.407	2	8.158	4	0	1	0	1	-.002	15
324			min	-2430.999	3	-.223	3	0	1	0	4	-.005	4	-.009	4
325		11	max	2328.127	2	.809	2	8.697	4	0	1	0	1	-.002	15
326			min	-2431.126	3	-.672	3	0	1	0	4	-.002	5	-.009	4
327		12	max	2327.957	2	.211	2	9.236	4	0	1	.002	4	-.002	15
328			min	-2431.254	3	-1.12	3	0	1	0	4	0	1	-.009	4
329		13	max	2327.786	2	-.306	15	9.775	4	0	1	.006	4	-.002	15
330			min	-2431.382	3	-1.568	3	0	1	0	4	0	1	-.009	4
331		14	max	2327.616	2	-.486	15	10.313	4	0	1	.01	4	-.002	15
332			min	-2431.51	3	-2.056	4	0	1	0	4	0	1	-.008	4
333		15	max	2327.446	2	-.666	15	10.852	4	0	1	.015	4	-.002	15
334			min	-2431.637	3	-2.824	4	0	1	0	4	0	1	-.007	4
335		16	max	2327.275	2	-.847	15	11.391	4	0	1	.019	4	-.001	15
336			min	-2431.765	3	-3.591	4	0	1	0	4	0	1	-.006	4
337		17	max	2327.105	2	-1.027	15	11.93	4	0	1	.024	4	-.001	15
338			min	-2431.893	3	-4.358	4	0	1	0	4	0	1	-.004	4
339		18	max	2326.935	2	-1.207	15	12.468	4	0	1	.029	4	0	15
340			min	-2432.021	3	-5.125	4	0	1	0	4	0	1	-.002	4
341		19	max	2326.764	2	-1.388	15	13.007	4	0	1	.035	4	0	1
342			min	-2432.148	3	-5.892	4	0	1	0	4	0	1	0	1
343	M8	1	max	3161.999	1	0	1	0	1	0	1	.025	4	0	1
344			min	-569.08	3	0	1	-267.242	4	0	1	0	1	0	1
345		2	max	3162.17	1	0	1	0	1	0	1	0	1	0	1
346			min	-568.952	3	0	1	-267.39	4	0	1	-.006	4	0	1
347		3	max	3162.34	1	0	1	0	1	0	1	0	1	0	1
348			min	-568.825	3	0	1	-267.538	4	0	1	-.036	4	0	1
349		4	max	3162.51	1	0	1	0	1	0	1	0	1	0	1
350			min	-568.697	3	0	1	-267.685	4	0	1	-.067	4	0	1
351		5	max	3162.681	1	0	1	0	1	0	1	0	1	0	1
352			min	-568.569	3	0	1	-267.833	4	0	1	-.098	4	0	1
353		6	max	3162.851	1	0	1	0	1	0	1	0	1	0	1
354			min	-568.441	3	0	1	-267.981	4	0	1	-.129	4	0	1
355		7	max	3163.022	1	0	1	0	1	0	1	0	1	0	1
356			min	-568.314	3	0	1	-268.128	4	0	1	-.159	4	0	1
357		8	max	3163.192	1	0	1	0	1	0	1	0	1	0	1
358			min	-568.186	3	0	1	-268.276	4	0	1	-.19	4	0	1
359		9	max	3163.362	1	0	1	0	1	0	1	0	1	0	1
360			min	-568.058	3	0	1	-268.424	4	0	1	-.221	4	0	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
361		10	max	3163.533	1	0	1	0	1	0	1	0	1	0	1
362			min	-567.93	3	0	1	-268.571	4	0	1	-.252	4	0	1
363		11	max	3163.703	1	0	1	0	1	0	1	0	1	0	1
364			min	-567.803	3	0	1	-268.719	4	0	1	-.283	4	0	1
365		12	max	3163.873	1	0	1	0	1	0	1	0	1	0	1
366			min	-567.675	3	0	1	-268.866	4	0	1	-.313	4	0	1
367		13	max	3164.044	1	0	1	0	1	0	1	0	1	0	1
368			min	-567.547	3	0	1	-269.014	4	0	1	-.344	4	0	1
369		14	max	3164.214	1	0	1	0	1	0	1	0	1	0	1
370			min	-567.419	3	0	1	-269.162	4	0	1	-.375	4	0	1
371		15	max	3164.384	1	0	1	0	1	0	1	0	1	0	1
372			min	-567.292	3	0	1	-269.309	4	0	1	-.406	4	0	1
373		16	max	3164.555	1	0	1	0	1	0	1	0	1	0	1
374			min	-567.164	3	0	1	-269.457	4	0	1	-.437	4	0	1
375		17	max	3164.725	1	0	1	0	1	0	1	0	1	0	1
376			min	-567.036	3	0	1	-269.605	4	0	1	-.468	4	0	1
377		18	max	3164.895	1	0	1	0	1	0	1	0	1	0	1
378			min	-566.908	3	0	1	-269.752	4	0	1	-.499	4	0	1
379		19	max	3165.066	1	0	1	0	1	0	1	0	1	0	1
380			min	-566.781	3	0	1	-269.9	4	0	1	-.53	4	0	1
381	M10	1	max	1074.889	2	1.885	6	-.034	12	0	1	0	1	0	1
382			min	-1407.797	3	.428	15	-44.634	4	0	5	0	3	0	1
383		2	max	1075.317	2	1.829	6	-.034	12	0	1	0	10	0	15
384			min	-1407.476	3	.415	15	-45.007	4	0	5	-.013	4	0	6
385		3	max	1075.746	2	1.772	6	-.034	12	0	1	0	10	0	15
386			min	-1407.155	3	.401	15	-45.38	4	0	5	-.026	4	-.001	6
387		4	max	1076.174	2	1.715	6	-.034	12	0	1	0	12	0	15
388			min	-1406.833	3	.388	15	-45.754	4	0	5	-.039	4	-.002	6
389		5	max	1076.602	2	1.658	6	-.034	12	0	1	0	12	0	15
390			min	-1406.512	3	.375	15	-46.127	4	0	5	-.053	4	-.002	6
391		6	max	1077.031	2	1.602	6	-.034	12	0	1	0	12	0	15
392			min	-1406.191	3	.361	15	-46.5	4	0	5	-.066	4	-.003	6
393		7	max	1077.459	2	1.545	6	-.034	12	0	1	0	12	0	15
394			min	-1405.869	3	.348	15	-46.874	4	0	5	-.08	4	-.003	6
395		8	max	1077.888	2	1.488	6	-.034	12	0	1	0	12	0	15
396			min	-1405.548	3	.335	15	-47.247	4	0	5	-.093	4	-.003	6
397		9	max	1078.316	2	1.431	6	-.034	12	0	1	0	12	0	15
398			min	-1405.226	3	.321	15	-47.62	4	0	5	-.107	4	-.004	6
399		10	max	1078.745	2	1.374	6	-.034	12	0	1	0	12	0	15
400			min	-1404.905	3	.308	15	-47.994	4	0	5	-.121	4	-.004	6
401		11	max	1079.173	2	1.318	6	-.034	12	0	1	0	12	-.001	15
402			min	-1404.584	3	.294	15	-48.367	4	0	5	-.135	4	-.005	6
403		12	max	1079.602	2	1.272	2	-.034	12	0	1	0	12	-.001	15
404			min	-1404.262	3	.281	15	-48.74	4	0	5	-.149	4	-.005	6
405		13	max	1080.03	2	1.228	2	-.034	12	0	1	0	12	-.001	15
406			min	-1403.941	3	.261	12	-49.114	4	0	5	-.163	4	-.005	6
407		14	max	1080.459	2	1.184	2	-.034	12	0	1	0	12	-.001	15
408			min	-1403.62	3	.238	12	-49.487	4	0	5	-.178	4	-.006	6
409		15	max	1080.887	2	1.139	2	-.034	12	0	1	0	12	-.001	15
410			min	-1403.298	3	.216	12	-49.86	4	0	5	-.192	4	-.006	6
411		16	max	1081.316	2	1.095	2	-.034	12	0	1	0	12	-.001	15
412			min	-1402.977	3	.194	12	-50.234	4	0	5	-.207	4	-.006	6
413		17	max	1081.744	2	1.051	2	-.034	12	0	1	0	12	-.001	15
414			min	-1402.656	3	.172	12	-50.607	4	0	5	-.221	4	-.007	6
415		18	max	1082.173	2	1.007	2	-.034	12	0	1	0	12	-.002	15
416			min	-1402.334	3	.15	12	-50.98	4	0	5	-.236	4	-.007	6
417		19	max	1082.601	2	.962	2	-.034	12	0	1	0	12	-.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
418			min	-1402.013	3	.128	12	-51.354	4	0	5	-.251	4	-.007	6
419	M11	1	max	623.779	2	7.857	6	3.433	4	0	1	0	12	.007	6
420			min	-769.989	3	1.836	15	-.161	1	0	4	-.027	4	.002	15
421		2	max	623.609	2	7.09	6	3.972	4	0	1	0	12	.005	2
422			min	-770.116	3	1.656	15	-.161	1	0	4	-.025	4	0	12
423		3	max	623.438	2	6.323	6	4.511	4	0	1	0	12	.002	2
424			min	-770.244	3	1.476	15	-.161	1	0	4	-.023	4	0	3
425		4	max	623.268	2	5.556	6	5.049	4	0	1	0	12	0	2
426			min	-770.372	3	1.295	15	-.161	1	0	4	-.021	4	-.002	3
427		5	max	623.098	2	4.788	6	5.588	4	0	1	0	12	0	15
428			min	-770.5	3	1.115	15	-.161	1	0	4	-.019	4	-.003	4
429		6	max	622.927	2	4.021	6	6.127	4	0	1	0	12	-.001	15
430			min	-770.627	3	.935	15	-.161	1	0	4	-.017	4	-.005	4
431		7	max	622.757	2	3.254	6	6.666	4	0	1	0	12	-.002	15
432			min	-770.755	3	.754	15	-.161	1	0	4	-.014	4	-.007	4
433		8	max	622.587	2	2.487	6	7.204	4	0	1	0	12	-.002	15
434			min	-770.883	3	.574	15	-.161	1	0	4	-.011	4	-.008	4
435		9	max	622.416	2	1.72	6	7.743	4	0	1	0	12	-.002	15
436			min	-771.011	3	.394	15	-.161	1	0	4	-.008	4	-.009	4
437		10	max	622.246	2	.952	6	8.282	4	0	1	0	12	-.002	15
438			min	-771.138	3	.213	15	-.161	1	0	4	-.005	4	-.009	4
439		11	max	622.076	2	.345	2	8.82	4	0	1	0	12	-.002	15
440			min	-771.266	3	-.124	3	-.161	1	0	4	-.001	4	-.01	4
441		12	max	621.905	2	-.147	15	9.359	4	0	1	.003	5	-.002	15
442			min	-771.394	3	-.583	4	-.161	1	0	4	-.001	1	-.01	4
443		13	max	621.735	2	-.328	15	9.898	4	0	1	.007	5	-.002	15
444			min	-771.522	3	-1.35	4	-.161	1	0	4	-.001	1	-.009	4
445		14	max	621.565	2	-.508	15	10.437	4	0	1	.011	5	-.002	15
446			min	-771.649	3	-2.117	4	-.161	1	0	4	-.001	1	-.008	4
447		15	max	621.394	2	-.688	15	10.975	4	0	1	.016	5	-.002	15
448			min	-771.777	3	-2.885	4	-.161	1	0	4	-.001	1	-.007	4
449		16	max	621.224	2	-.869	15	11.514	4	0	1	.02	5	-.001	15
450			min	-771.905	3	-3.652	4	-.161	1	0	4	-.001	1	-.006	4
451		17	max	621.054	2	-1.049	15	12.053	4	0	1	.025	4	-.001	15
452			min	-772.033	3	-4.419	4	-.161	1	0	4	-.001	1	-.004	4
453		18	max	620.883	2	-1.229	15	12.592	4	0	1	.03	4	0	15
454			min	-772.161	3	-5.186	4	-.161	1	0	4	-.002	1	-.002	4
455		19	max	620.713	2	-1.41	15	13.13	4	0	1	.036	4	0	1
456			min	-772.288	3	-5.954	4	-.161	1	0	4	-.002	1	0	1
457	M12	1	max	1159.597	1	0	1	11.016	1	0	1	.026	4	0	1
458			min	-149.799	3	0	1	-269.461	4	0	1	-.001	1	0	1
459		2	max	1159.768	1	0	1	11.016	1	0	1	0	1	0	1
460			min	-149.672	3	0	1	-269.609	4	0	1	-.005	4	0	1
461		3	max	1159.938	1	0	1	11.016	1	0	1	.001	1	0	1
462			min	-149.544	3	0	1	-269.756	4	0	1	-.036	4	0	1
463		4	max	1160.108	1	0	1	11.016	1	0	1	.003	1	0	1
464			min	-149.416	3	0	1	-269.904	4	0	1	-.067	4	0	1
465		5	max	1160.279	1	0	1	11.016	1	0	1	.004	1	0	1
466			min	-149.288	3	0	1	-270.052	4	0	1	-.098	4	0	1
467		6	max	1160.449	1	0	1	11.016	1	0	1	.005	1	0	1
468			min	-149.161	3	0	1	-270.199	4	0	1	-.129	4	0	1
469		7	max	1160.619	1	0	1	11.016	1	0	1	.006	1	0	1
470			min	-149.033	3	0	1	-270.347	4	0	1	-.16	4	0	1
471		8	max	1160.79	1	0	1	11.016	1	0	1	.008	1	0	1
472			min	-148.905	3	0	1	-270.495	4	0	1	-.191	4	0	1
473		9	max	1160.96	1	0	1	11.016	1	0	1	.009	1	0	1
474			min	-148.777	3	0	1	-270.642	4	0	1	-.222	4	0	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
475		10	max	1161.13	1	0	1	11.016	1	0	1	.01	1	0	1
476			min	-148.65	3	0	1	-270.79	4	0	1	-.253	4	0	1
477		11	max	1161.301	1	0	1	11.016	1	0	1	.012	1	0	1
478			min	-148.522	3	0	1	-270.938	4	0	1	-.284	4	0	1
479		12	max	1161.471	1	0	1	11.016	1	0	1	.013	1	0	1
480			min	-148.394	3	0	1	-271.085	4	0	1	-.316	4	0	1
481		13	max	1161.641	1	0	1	11.016	1	0	1	.014	1	0	1
482			min	-148.266	3	0	1	-271.233	4	0	1	-.347	4	0	1
483		14	max	1161.812	1	0	1	11.016	1	0	1	.015	1	0	1
484			min	-148.138	3	0	1	-271.38	4	0	1	-.378	4	0	1
485		15	max	1161.982	1	0	1	11.016	1	0	1	.017	1	0	1
486			min	-148.011	3	0	1	-271.528	4	0	1	-.409	4	0	1
487		16	max	1162.152	1	0	1	11.016	1	0	1	.018	1	0	1
488			min	-147.883	3	0	1	-271.676	4	0	1	-.44	4	0	1
489		17	max	1162.323	1	0	1	11.016	1	0	1	.019	1	0	1
490			min	-147.755	3	0	1	-271.823	4	0	1	-.471	4	0	1
491		18	max	1162.493	1	0	1	11.016	1	0	1	.02	1	0	1
492			min	-147.627	3	0	1	-271.971	4	0	1	-.503	4	0	1
493		19	max	1162.664	1	0	1	11.016	1	0	1	.022	1	0	1
494			min	-147.5	3	0	1	-272.119	4	0	1	-.534	4	0	1
495	M1	1	max	176.278	1	776.788	3	48.175	5	0	1	.258	1	0	3
496			min	-9.547	5	-463.556	1	-107.974	1	0	3	-.091	5	-.015	2
497		2	max	176.883	1	775.814	3	49.417	5	0	1	.201	1	.232	1
498			min	-9.265	5	-464.854	1	-107.974	1	0	3	-.065	5	-.409	3
499		3	max	474.224	3	546.751	2	7.444	5	0	3	.144	1	.466	1
500			min	-278.133	2	-558.326	3	-107.508	1	0	2	-.04	5	-.802	3
501		4	max	474.678	3	545.453	2	8.686	5	0	3	.087	1	.189	1
502			min	-277.528	2	-559.3	3	-107.508	1	0	2	-.035	5	-.508	3
503		5	max	475.132	3	544.155	2	9.927	5	0	3	.031	1	-.003	15
504			min	-276.922	2	-560.273	3	-107.508	1	0	2	-.03	5	-.212	3
505		6	max	475.586	3	542.856	2	11.169	5	0	3	-.001	12	.084	3
506			min	-276.317	2	-561.247	3	-107.508	1	0	2	-.031	4	-.399	2
507		7	max	476.04	3	541.558	2	12.41	5	0	3	-.004	12	.38	3
508			min	-275.711	2	-562.221	3	-107.508	1	0	2	-.083	1	-.685	2
509		8	max	476.494	3	540.26	2	13.652	5	0	3	-.008	12	.677	3
510			min	-275.106	2	-563.194	3	-107.508	1	0	2	-.14	1	-.97	2
511		9	max	489.363	3	48.044	2	56.113	5	0	9	.082	1	.792	3
512			min	-201.396	2	.392	15	-157.744	1	0	3	-.13	5	-1.111	2
513		10	max	489.817	3	46.746	2	57.354	5	0	9	0	10	.77	3
514			min	-200.79	2	0	5	-157.744	1	0	3	-.101	4	-1.136	2
515		11	max	490.271	3	45.448	2	58.595	5	0	9	-.005	12	.749	3
516			min	-200.185	2	-1.613	4	-157.744	1	0	3	-.088	4	-1.16	2
517		12	max	503.047	3	359.792	3	150.359	5	0	2	.138	1	.652	3
518			min	-126.447	2	-639.35	2	-105.058	1	0	3	-.205	5	-1.028	2
519		13	max	503.501	3	358.819	3	151.601	5	0	2	.082	1	.463	3
520			min	-125.842	2	-640.648	2	-105.058	1	0	3	-.126	5	-.69	2
521		14	max	503.956	3	357.845	3	152.842	5	0	2	.027	1	.274	3
522			min	-125.236	2	-641.946	2	-105.058	1	0	3	-.045	5	-.352	2
523		15	max	504.41	3	356.871	3	154.084	5	0	2	.036	5	.085	3
524			min	-124.631	2	-643.244	2	-105.058	1	0	3	-.029	1	-.036	1
525		16	max	504.864	3	355.898	3	155.325	5	0	2	.117	5	.327	2
526			min	-124.026	2	-644.543	2	-105.058	1	0	3	-.084	1	-.103	3
527		17	max	505.318	3	354.924	3	156.567	5	0	2	.2	5	.667	2
528			min	-123.42	2	-645.841	2	-105.058	1	0	3	-.139	1	-.291	3
529		18	max	18.219	5	657.536	2	-5.988	12	0	5	.189	5	.336	2
530			min	-177.129	1	-293.885	3	-124.424	4	0	2	-.199	1	-.144	3
531		19	max	18.502	5	656.238	2	-5.988	12	0	5	.137	5	.012	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
532			min	-176.523	1	-294.859	3	-123.183	4	0	2	-.26	1	-.011	1
533	M5	1	max	381.821	1	2587.574	3	95.226	5	0	1	0	1	.029	2
534			min	14.171	12	-1572.973	2	0	1	0	4	-.204	4	0	3
535		2	max	382.427	1	2586.6	3	96.467	5	0	1	0	1	.859	2
536			min	14.474	12	-1574.271	2	0	1	0	4	-.154	4	-1.366	3
537		3	max	1525.357	3	1657.476	2	57.685	4	0	4	0	1	1.652	2
538			min	-971.948	2	-1792.048	3	0	1	0	1	-.103	4	-2.678	3
539		4	max	1525.811	3	1656.178	2	58.926	4	0	4	0	1	.803	1
540			min	-971.343	2	-1793.021	3	0	1	0	1	-.072	4	-1.732	3
541		5	max	1526.265	3	1654.88	2	60.167	4	0	4	0	1	.008	9
542			min	-970.737	2	-1793.995	3	0	1	0	1	-.041	4	-.785	3
543		6	max	1526.719	3	1653.582	2	61.409	4	0	4	0	1	.161	3
544			min	-970.132	2	-1794.969	3	0	1	0	1	-.009	5	-.969	2
545		7	max	1527.173	3	1652.283	2	62.65	4	0	4	.024	4	1.109	3
546			min	-969.527	2	-1795.942	3	0	1	0	1	0	1	-1.841	2
547		8	max	1527.627	3	1650.985	2	63.892	4	0	4	.057	4	2.057	3
548			min	-968.921	2	-1796.916	3	0	1	0	1	0	1	-2.713	2
549		9	max	1548.545	3	160.556	2	182.196	4	0	1	0	1	2.369	3
550			min	-816.207	2	.392	15	0	1	0	1	-.188	4	-3.088	2
551		10	max	1548.999	3	159.257	2	183.437	4	0	1	0	1	2.291	3
552			min	-815.601	2	0	15	0	1	0	1	-.092	4	-3.173	2
553		11	max	1549.453	3	157.959	2	184.679	4	0	1	.005	4	2.214	3
554			min	-814.996	2	-1.449	6	0	1	0	1	0	1	-3.257	2
555		12	max	1570.556	3	1141.509	3	216.393	4	0	1	0	1	1.944	3
556			min	-662.336	2	-1976.503	2	0	1	0	4	-.299	4	-2.914	2
557		13	max	1571.01	3	1140.536	3	217.635	4	0	1	0	1	1.342	3
558			min	-661.731	2	-1977.801	2	0	1	0	4	-.185	4	-1.871	2
559		14	max	1571.464	3	1139.562	3	218.876	4	0	1	0	1	.74	3
560			min	-661.125	2	-1979.099	2	0	1	0	4	-.069	4	-.827	2
561		15	max	1571.918	3	1138.588	3	220.117	4	0	1	.046	4	.218	2
562			min	-660.52	2	-1980.398	2	0	1	0	4	0	1	-.004	13
563		16	max	1572.372	3	1137.615	3	221.359	4	0	1	.163	4	1.263	2
564			min	-659.914	2	-1981.696	2	0	1	0	4	0	1	-.461	3
565		17	max	1572.826	3	1136.641	3	222.6	4	0	1	.28	4	2.309	2
566			min	-659.309	2	-1982.994	2	0	1	0	4	0	1	-1.062	3
567		18	max	-14.862	12	2215.03	2	0	1	0	4	.305	4	1.19	2
568			min	-381.935	1	-1008.089	3	-27.99	5	0	1	0	1	-.556	3
569		19	max	-14.56	12	2213.732	2	0	1	0	4	.292	4	.022	1
570			min	-381.33	1	-1009.063	3	-26.748	5	0	1	0	1	-.023	3
571	M9	1	max	176.278	1	776.788	3	107.974	1	0	3	-.014	12	0	3
572			min	8.013	12	-463.556	1	5.952	12	0	4	-.258	1	-.015	2
573		2	max	176.883	1	775.814	3	107.974	1	0	3	-.011	12	.232	1
574			min	8.315	12	-464.854	1	5.952	12	0	4	-.201	1	-.409	3
575		3	max	474.224	3	546.751	2	107.508	1	0	2	-.008	12	.466	1
576			min	-278.133	2	-558.326	3	5.915	12	0	3	-.144	1	-.802	3
577		4	max	474.678	3	545.453	2	107.508	1	0	2	-.005	12	.189	1
578			min	-277.528	2	-559.3	3	5.915	12	0	3	-.087	1	-.508	3
579		5	max	475.132	3	544.155	2	107.508	1	0	2	-.002	12	-.003	15
580			min	-276.922	2	-560.273	3	5.915	12	0	3	-.042	4	-.212	3
581		6	max	475.586	3	542.856	2	107.508	1	0	2	.026	1	.084	3
582			min	-276.317	2	-561.247	3	5.915	12	0	3	-.021	5	-.399	2
583		7	max	476.04	3	541.558	2	107.508	1	0	2	.083	1	.38	3
584			min	-275.711	2	-562.221	3	5.915	12	0	3	-.008	5	-.685	2
585		8	max	476.494	3	540.26	2	107.508	1	0	2	.14	1	.677	3
586			min	-275.106	2	-563.194	3	5.915	12	0	3	.004	15	-.97	2
587		9	max	489.363	3	48.044	2	157.744	1	0	3	-.004	12	.792	3
588			min	-201.396	2	.399	15	8.418	12	0	9	-.16	4	-1.111	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
589		10	max	489.817	3	46.746	2	157.744	1	0	3	.001	1	.77	3
590			min	-200.79	2	.007	15	8.418	12	0	9	-.1	4	-1.136	2
591		11	max	490.271	3	45.448	2	157.744	1	0	3	.084	1	.749	3
592			min	-200.185	2	-1.563	6	8.418	12	0	9	-.059	5	-1.16	2
593		12	max	503.047	3	359.792	3	189.207	4	0	3	-.007	12	.652	3
594			min	-126.447	2	-639.35	2	5.432	12	0	2	-.256	4	-1.028	2
595		13	max	503.501	3	358.819	3	190.448	4	0	3	-.004	12	.463	3
596			min	-125.842	2	-640.648	2	5.432	12	0	2	-.156	4	-.69	2
597		14	max	503.956	3	357.845	3	191.69	4	0	3	-.001	12	.274	3
598			min	-125.236	2	-641.946	2	5.432	12	0	2	-.055	4	-.352	2
599		15	max	504.41	3	356.871	3	192.931	4	0	3	.047	4	.085	3
600			min	-124.631	2	-643.244	2	5.432	12	0	2	.001	12	-.036	1
601		16	max	504.864	3	355.898	3	194.173	4	0	3	.149	4	.327	2
602			min	-124.026	2	-644.543	2	5.432	12	0	2	.004	12	-.103	3
603		17	max	505.318	3	354.924	3	195.414	4	0	3	.251	4	.667	2
604			min	-123.42	2	-645.841	2	5.432	12	0	2	.007	12	-.291	3
605		18	max	-8.121	12	657.536	2	115.606	1	0	2	.261	4	.336	2
606			min	-177.129	1	-293.885	3	-83.349	5	0	3	.01	12	-.144	3
607		19	max	-7.818	12	656.238	2	115.606	1	0	2	.26	1	.012	3
608			min	-176.523	1	-294.859	3	-82.108	5	0	3	.013	12	-.011	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	M13	1	max	.001	1	.115	2	.008	3	9.484e-3	2	NC	1	NC	1
2			min	-.636	4	-.017	3	-.004	2	-1.552e-3	3	NC	1	NC	1
3		2	max	0	1	.351	3	.04	1	1.091e-2	2	NC	5	NC	2
4			min	-.636	4	-.095	1	-.02	5	-1.581e-3	3	652.183	3	6094.732	1
5		3	max	0	1	.649	3	.097	1	1.233e-2	2	NC	5	NC	3
6			min	-.636	4	-.252	1	-.024	5	-1.61e-3	3	360.338	3	2494.648	1
7		4	max	0	1	.83	3	.146	1	1.376e-2	2	NC	5	NC	3
8			min	-.636	4	-.34	1	-.017	5	-1.638e-3	3	283.305	3	1651.597	1
9		5	max	0	1	.873	3	.171	1	1.518e-2	2	NC	5	NC	3
10			min	-.636	4	-.346	1	-.003	5	-1.667e-3	3	269.858	3	1407.984	1
11		6	max	0	1	.779	3	.165	1	1.66e-2	2	NC	5	NC	3
12			min	-.636	4	-.272	1	.008	15	-1.695e-3	3	301.594	3	1460.636	1
13		7	max	0	1	.578	3	.129	1	1.803e-2	2	NC	5	NC	3
14			min	-.636	4	-.135	1	.006	10	-1.724e-3	3	403.678	3	1867.966	1
15		8	max	0	1	.322	3	.074	1	1.945e-2	2	NC	4	NC	2
16			min	-.636	4	0	15	-.002	10	-1.752e-3	3	708.34	3	3265.668	1
17		9	max	0	1	.204	2	.027	3	2.087e-2	2	NC	4	NC	1
18			min	-.636	4	.005	15	-.008	10	-1.781e-3	3	2245.833	3	8824.274	4
19		10	max	0	1	.271	2	.026	3	2.23e-2	2	NC	3	NC	1
20			min	-.636	4	-.015	3	-.018	2	-1.809e-3	3	1545.403	2	NC	1
21		11	max	0	12	.204	2	.027	3	2.087e-2	2	NC	4	NC	1
22			min	-.636	4	.005	15	-.016	5	-1.781e-3	3	2245.833	3	NC	1
23		12	max	0	12	.322	3	.074	1	1.945e-2	2	NC	4	NC	2
24			min	-.636	4	0	15	-.016	5	-1.752e-3	3	708.34	3	3265.668	1
25		13	max	0	12	.578	3	.129	1	1.803e-2	2	NC	5	NC	3
26			min	-.636	4	-.135	1	-.005	5	-1.724e-3	3	403.678	3	1867.966	1
27		14	max	0	12	.779	3	.165	1	1.66e-2	2	NC	5	NC	3
28			min	-.636	4	-.272	1	.007	15	-1.695e-3	3	301.594	3	1460.636	1
29		15	max	0	12	.873	3	.171	1	1.518e-2	2	NC	5	NC	3
30			min	-.636	4	-.346	1	.013	10	-1.667e-3	3	269.858	3	1407.984	1
31		16	max	0	12	.83	3	.146	1	1.376e-2	2	NC	5	NC	3
32			min	-.636	4	-.34	1	.011	10	-1.638e-3	3	283.305	3	1651.597	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
33		17	max	0	12	.649	3	.097	1	1.233e-2	2	NC	5	NC	3
34			min	-.636	4	-.252	1	.006	10	-1.61e-3	3	360.338	3	2494.648	1
35		18	max	0	12	.351	3	.04	1	1.091e-2	2	NC	5	NC	2
36			min	-.636	4	-.095	1	0	10	-1.581e-3	3	652.183	3	6094.732	1
37		19	max	0	12	.115	2	.008	3	9.484e-3	2	NC	1	NC	1
38			min	-.636	4	-.017	3	-.004	2	-1.552e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.235	3	.008	3	5.624e-3	2	NC	1	NC	1
40			min	-.479	4	-.371	2	-.004	2	-4.212e-3	3	NC	1	NC	1
41		2	max	0	1	.588	3	.028	1	6.743e-3	2	NC	5	NC	2
42			min	-.479	4	-.699	2	-.03	5	-5.134e-3	3	680.709	3	7699.29	5
43		3	max	0	1	.886	3	.078	1	7.862e-3	2	NC	5	NC	3
44			min	-.479	4	-.983	2	-.035	5	-6.056e-3	3	368.934	3	3116.873	1
45		4	max	0	1	1.092	3	.125	1	8.981e-3	2	NC	15	NC	3
46			min	-.479	4	-1.191	2	-.024	5	-6.978e-3	3	280.198	3	1931.611	1
47		5	max	0	1	1.188	3	.152	1	1.01e-2	2	NC	15	NC	3
48			min	-.479	4	-1.307	2	-.003	5	-7.9e-3	3	252.047	3	1588.353	1
49		6	max	0	1	1.173	3	.15	1	1.122e-2	2	NC	15	NC	3
50			min	-.479	4	-1.33	2	.01	10	-8.822e-3	3	250.29	2	1610.34	1
51		7	max	0	1	1.069	3	.12	1	1.234e-2	2	NC	15	NC	3
52			min	-.479	4	-1.275	2	.005	10	-9.744e-3	3	265.545	2	2025.902	1
53		8	max	0	1	.912	3	.07	1	1.346e-2	2	NC	15	NC	2
54			min	-.479	4	-1.171	2	-.001	10	-1.067e-2	3	299.998	2	3492.614	1
55		9	max	0	1	.76	3	.04	4	1.458e-2	2	NC	5	NC	1
56			min	-.479	4	-1.063	2	-.008	10	-1.159e-2	3	346.726	2	6022.838	4
57		10	max	0	1	.689	3	.024	3	1.569e-2	2	NC	5	NC	1
58			min	-.479	4	-1.011	2	-.016	2	-1.251e-2	3	374.894	2	NC	1
59		11	max	0	12	.76	3	.024	3	1.458e-2	2	NC	5	NC	1
60			min	-.48	4	-1.063	2	-.029	5	-1.159e-2	3	346.726	2	8154.725	5
61		12	max	0	12	.912	3	.07	1	1.346e-2	2	NC	15	NC	2
62			min	-.48	4	-1.171	2	-.034	5	-1.067e-2	3	299.998	2	3492.614	1
63		13	max	0	12	1.069	3	.12	1	1.234e-2	2	NC	15	NC	3
64			min	-.48	4	-1.275	2	-.021	5	-9.744e-3	3	265.545	2	2025.902	1
65		14	max	0	12	1.173	3	.15	1	1.122e-2	2	NC	15	NC	3
66			min	-.48	4	-1.33	2	0	15	-8.822e-3	3	250.29	2	1610.34	1
67		15	max	0	12	1.188	3	.152	1	1.01e-2	2	NC	15	NC	3
68			min	-.48	4	-1.307	2	.011	10	-7.9e-3	3	252.047	3	1588.353	1
69		16	max	0	12	1.092	3	.125	1	8.981e-3	2	NC	15	NC	3
70			min	-.48	4	-1.191	2	.009	10	-6.978e-3	3	280.198	3	1931.611	1
71		17	max	0	12	.886	3	.078	1	7.862e-3	2	NC	5	NC	3
72			min	-.48	4	-.983	2	.005	10	-6.056e-3	3	368.934	3	3116.873	1
73		18	max	0	12	.588	3	.041	4	6.743e-3	2	NC	5	NC	2
74			min	-.48	4	-.699	2	0	10	-5.134e-3	3	680.709	3	5809.001	4
75		19	max	0	12	.235	3	.008	3	5.624e-3	2	NC	1	NC	1
76			min	-.48	4	-.371	2	-.004	2	-4.212e-3	3	NC	1	NC	1
77	M15	1	max	0	12	.241	3	.007	3	3.566e-3	3	NC	1	NC	1
78			min	-.393	4	-.37	2	-.004	2	-5.846e-3	2	NC	1	NC	1
79		2	max	0	12	.459	3	.028	1	4.352e-3	3	NC	5	NC	2
80			min	-.393	4	-.789	2	-.04	5	-7.013e-3	2	573.111	2	5819.333	5
81		3	max	0	12	.649	3	.078	1	5.138e-3	3	NC	5	NC	3
82			min	-.393	4	-1.145	2	-.048	5	-8.181e-3	2	309.508	2	3107.598	1
83		4	max	0	12	.79	3	.126	1	5.924e-3	3	NC	15	NC	3
84			min	-.393	4	-1.397	2	-.034	5	-9.348e-3	2	233.602	2	1926.952	1
85		5	max	0	12	.871	3	.153	1	6.709e-3	3	NC	15	NC	3
86			min	-.393	4	-1.523	2	-.008	5	-1.051e-2	2	208.086	2	1584.707	1
87		6	max	0	12	.893	3	.151	1	7.495e-3	3	NC	15	NC	3
88			min	-.393	4	-1.523	2	.01	10	-1.168e-2	2	208.085	2	1606.288	1
89		7	max	0	12	.863	3	.12	1	8.281e-3	3	NC	15	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
90			min	-.393	4	-1.419	2	.006	10	-1.285e-2	2	228.851	2	2019.255	1
91		8	max	0	12	.801	3	.072	4	9.067e-3	3	NC	15	NC	2
92			min	-.393	4	-1.252	2	0	10	-1.402e-2	2	272.106	2	3309.799	4
93		9	max	0	12	.735	3	.049	4	9.853e-3	3	NC	5	NC	1
94			min	-.393	4	-1.087	2	-.007	10	-1.518e-2	2	334.659	2	4916.918	4
95		10	max	0	1	.703	3	.022	3	1.064e-2	3	NC	5	NC	1
96			min	-.393	4	-1.009	2	-.015	2	-1.635e-2	2	375.385	2	NC	1
97		11	max	0	1	.735	3	.023	3	9.853e-3	3	NC	5	NC	1
98			min	-.393	4	-1.087	2	-.038	5	-1.518e-2	2	334.659	2	6245.879	5
99		12	max	0	1	.801	3	.07	1	9.067e-3	3	NC	15	NC	2
100			min	-.393	4	-1.252	2	-.044	5	-1.402e-2	2	272.106	2	3472.689	1
101		13	max	0	1	.863	3	.12	1	8.281e-3	3	NC	15	NC	3
102			min	-.393	4	-1.419	2	-.029	5	-1.285e-2	2	228.851	2	2019.255	1
103		14	max	0	1	.893	3	.151	1	7.495e-3	3	NC	15	NC	3
104			min	-.393	4	-1.523	2	-.002	5	-1.168e-2	2	208.085	2	1606.288	1
105		15	max	0	1	.871	3	.153	1	6.709e-3	3	NC	15	NC	3
106			min	-.393	4	-1.523	2	.012	10	-1.051e-2	2	208.086	2	1584.707	1
107		16	max	0	1	.79	3	.126	1	5.924e-3	3	NC	15	NC	3
108			min	-.393	4	-1.397	2	.01	10	-9.348e-3	2	233.602	2	1926.952	1
109		17	max	0	1	.649	3	.078	1	5.138e-3	3	NC	5	NC	3
110			min	-.393	4	-1.145	2	.005	10	-8.181e-3	2	309.508	2	3088.482	4
111		18	max	0	1	.459	3	.051	4	4.352e-3	3	NC	5	NC	2
112			min	-.392	4	-.789	2	0	10	-7.013e-3	2	573.111	2	4660.974	4
113		19	max	0	1	.241	3	.007	3	3.566e-3	3	NC	1	NC	1
114			min	-.392	4	-.37	2	-.004	2	-5.846e-3	2	NC	1	NC	1
115	M16	1	max	0	12	.103	2	.006	3	6.364e-3	3	NC	1	NC	1
116			min	-.145	4	-.079	3	-.003	2	-7.974e-3	2	NC	1	NC	1
117		2	max	0	12	.041	3	.04	1	7.509e-3	3	NC	5	NC	2
118			min	-.145	4	-.188	2	-.031	5	-9.04e-3	2	824.231	2	6132.255	1
119		3	max	0	12	.134	3	.097	1	8.654e-3	3	NC	5	NC	3
120			min	-.145	4	-.42	2	-.038	5	-1.011e-2	2	458.528	2	2500.949	1
121		4	max	0	12	.184	3	.146	1	9.8e-3	3	NC	5	NC	3
122			min	-.145	4	-.554	2	-.028	5	-1.117e-2	2	365.144	2	1652.287	1
123		5	max	0	12	.181	3	.172	1	1.095e-2	3	NC	5	NC	3
124			min	-.145	4	-.572	2	-.009	5	-1.224e-2	2	355.748	2	1405.939	1
125		6	max	0	12	.129	3	.166	1	1.209e-2	3	NC	5	NC	3
126			min	-.145	4	-.476	2	.008	15	-1.33e-2	2	414.744	2	1455.085	1
127		7	max	0	12	.037	3	.13	1	1.324e-2	3	NC	5	NC	3
128			min	-.145	4	-.291	2	.008	10	-1.437e-2	2	609.373	2	1853.256	1
129		8	max	0	12	.008	9	.076	1	1.438e-2	3	NC	3	NC	2
130			min	-.145	4	-.072	3	0	10	-1.544e-2	2	1446.332	2	3205.88	1
131		9	max	0	12	.154	1	.035	4	1.553e-2	3	NC	4	NC	1
132			min	-.145	4	-.168	3	-.006	10	-1.65e-2	2	2700.536	3	6826.169	4
133		10	max	0	1	.232	2	.019	3	1.667e-2	3	NC	4	NC	1
134			min	-.145	4	-.211	3	-.014	2	-1.757e-2	2	1821.62	1	NC	1
135		11	max	0	1	.154	1	.021	1	1.553e-2	3	NC	4	NC	1
136			min	-.145	4	-.168	3	-.024	5	-1.65e-2	2	2700.536	3	9760.83	5
137		12	max	0	1	.008	9	.076	1	1.438e-2	3	NC	3	NC	2
138			min	-.145	4	-.072	3	-.026	5	-1.544e-2	2	1446.332	2	3205.88	1
139		13	max	0	1	.037	3	.13	1	1.324e-2	3	NC	5	NC	3
140			min	-.145	4	-.291	2	-.012	5	-1.437e-2	2	609.373	2	1853.256	1
141		14	max	0	1	.129	3	.166	1	1.209e-2	3	NC	5	NC	3
142			min	-.145	4	-.476	2	.006	15	-1.33e-2	2	414.744	2	1455.085	1
143		15	max	0	1	.181	3	.172	1	1.095e-2	3	NC	5	NC	3
144			min	-.145	4	-.572	2	.014	10	-1.224e-2	2	355.748	2	1405.939	1
145		16	max	0	1	.184	3	.146	1	9.8e-3	3	NC	5	NC	3
146			min	-.145	4	-.554	2	.012	10	-1.117e-2	2	365.144	2	1652.287	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
147		17	max	0	1	.134	3	.097	1	8.654e-3	3	NC	5	NC	3
148			min	-.145	4	-.42	2	.007	10	-1.011e-2	2	458.528	2	2500.949	1
149		18	max	0	1	.041	3	.046	4	7.509e-3	3	NC	5	NC	2
150			min	-.145	4	-.188	2	.002	10	-9.04e-3	2	824.231	2	5181.555	4
151		19	max	.001	1	.103	2	.006	3	6.364e-3	3	NC	1	NC	1
152			min	-.145	4	-.079	3	-.003	2	-7.974e-3	2	NC	1	NC	1
153	M2	1	max	.007	2	.007	2	.008	1	1.478e-3	5	NC	1	NC	2
154			min	-.008	3	-.012	3	-.597	4	-2.298e-4	1	9039.916	2	105.113	4
155		2	max	.006	2	.006	2	.008	1	1.573e-3	5	NC	1	NC	2
156			min	-.008	3	-.011	3	-.548	4	-2.156e-4	1	NC	1	114.434	4
157		3	max	.006	2	.005	2	.007	1	1.667e-3	5	NC	1	NC	2
158			min	-.008	3	-.011	3	-.5	4	-2.014e-4	1	NC	1	125.499	4
159		4	max	.005	2	.004	2	.006	1	1.761e-3	5	NC	1	NC	2
160			min	-.007	3	-.01	3	-.452	4	-1.872e-4	1	NC	1	138.763	4
161		5	max	.005	2	.003	2	.006	1	1.855e-3	5	NC	1	NC	1
162			min	-.007	3	-.01	3	-.405	4	-1.73e-4	1	NC	1	154.839	4
163		6	max	.005	2	.003	2	.005	1	1.95e-3	5	NC	1	NC	1
164			min	-.006	3	-.009	3	-.359	4	-1.588e-4	1	NC	1	174.579	4
165		7	max	.004	2	.002	2	.004	1	2.044e-3	5	NC	1	NC	1
166			min	-.006	3	-.009	3	-.315	4	-1.445e-4	1	NC	1	199.191	4
167		8	max	.004	2	.001	2	.004	1	2.138e-3	5	NC	1	NC	1
168			min	-.005	3	-.008	3	-.272	4	-1.303e-4	1	NC	1	230.433	4
169		9	max	.004	2	0	2	.003	1	2.233e-3	4	NC	1	NC	1
170			min	-.005	3	-.008	3	-.231	4	-1.161e-4	1	NC	1	270.944	4
171		10	max	.003	2	0	2	.003	1	2.332e-3	4	NC	1	NC	1
172			min	-.004	3	-.007	3	-.193	4	-1.019e-4	1	NC	1	324.843	4
173		11	max	.003	2	0	2	.002	1	2.431e-3	4	NC	1	NC	1
174			min	-.004	3	-.007	3	-.157	4	-8.773e-5	1	NC	1	398.849	4
175		12	max	.003	2	0	15	.002	1	2.531e-3	4	NC	1	NC	1
176			min	-.003	3	-.006	3	-.124	4	-7.352e-5	1	NC	1	504.547	4
177		13	max	.002	2	0	15	.001	1	2.63e-3	4	NC	1	NC	1
178			min	-.003	3	-.005	3	-.095	4	-5.932e-5	1	NC	1	663.353	4
179		14	max	.002	2	0	15	0	1	2.73e-3	4	NC	1	NC	1
180			min	-.002	3	-.004	3	-.068	4	-4.511e-5	1	NC	1	918.606	4
181		15	max	.001	2	0	15	0	1	2.829e-3	4	NC	1	NC	1
182			min	-.002	3	-.004	3	-.046	4	-3.091e-5	1	NC	1	1369.514	4
183		16	max	.001	2	0	15	0	1	2.928e-3	4	NC	1	NC	1
184			min	-.001	3	-.003	3	-.027	4	-1.67e-5	1	NC	1	2287.553	4
185		17	max	0	2	0	15	0	1	3.028e-3	4	NC	1	NC	1
186			min	0	3	-.002	3	-.013	4	-2.497e-6	1	NC	1	4663.292	4
187		18	max	0	2	0	15	0	1	3.127e-3	4	NC	1	NC	1
188			min	0	3	0	3	-.004	4	3.407e-7	12	NC	1	NC	1
189		19	max	0	1	0	1	0	1	3.226e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	1.146e-6	12	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	-3.94e-7	12	NC	1	NC	1
192			min	0	1	0	1	0	1	-7.884e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.015	4	1.555e-5	1	NC	1	NC	1
194			min	0	2	-.002	6	0	12	-1.211e-4	5	NC	1	NC	1
195		3	max	0	3	0	15	.029	4	5.514e-4	4	NC	1	NC	1
196			min	0	2	-.003	6	0	12	2.025e-6	12	NC	1	NC	1
197		4	max	.001	3	-.001	15	.043	4	1.221e-3	4	NC	1	NC	1
198			min	0	2	-.005	6	0	12	3.235e-6	12	NC	1	9911.366	5
199		5	max	.001	3	-.002	15	.055	4	1.891e-3	4	NC	1	NC	1
200			min	-.001	2	-.007	6	0	12	4.445e-6	12	NC	1	8888.794	5
201		6	max	.002	3	-.002	15	.066	4	2.561e-3	4	NC	1	NC	1
202			min	-.002	2	-.009	6	0	12	5.654e-6	12	NC	1	8709.165	5
203		7	max	.002	3	-.002	15	.077	4	3.231e-3	4	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
204			min	-.002	2	-.01	6	0	12	6.864e-6	12	8744.875	6	9169.39	5
205		8	max	.003	3	-.003	15	.087	4	3.901e-3	4	NC	1	NC	1
206			min	-.002	2	-.012	6	0	12	8.074e-6	12	7842.087	6	NC	1
207		9	max	.003	3	-.003	15	.096	4	4.571e-3	4	NC	2	NC	1
208			min	-.002	2	-.013	6	0	12	9.283e-6	12	7307.259	6	NC	1
209		10	max	.003	3	-.003	15	.105	4	5.241e-3	4	NC	2	NC	1
210			min	-.003	2	-.013	6	0	12	1.049e-5	12	7046.951	6	NC	1
211		11	max	.004	3	-.003	15	.114	4	5.911e-3	4	NC	2	NC	1
212			min	-.003	2	-.013	6	0	12	1.17e-5	12	7022.725	6	NC	1
213		12	max	.004	3	-.003	15	.123	4	6.58e-3	4	NC	2	NC	1
214			min	-.003	2	-.013	6	0	12	1.291e-5	12	7236.388	6	NC	1
215		13	max	.004	3	-.003	15	.133	4	7.25e-3	4	NC	1	NC	1
216			min	-.004	2	-.012	6	0	12	1.412e-5	12	7732.564	6	NC	1
217		14	max	.005	3	-.002	15	.142	4	7.92e-3	4	NC	1	NC	1
218			min	-.004	2	-.011	6	0	12	1.533e-5	12	8621.934	6	NC	1
219		15	max	.005	3	-.002	15	.152	4	8.59e-3	4	NC	1	NC	1
220			min	-.004	2	-.009	6	0	12	1.654e-5	12	NC	1	NC	1
221		16	max	.006	3	-.001	15	.163	4	9.26e-3	4	NC	1	NC	1
222			min	-.005	2	-.007	1	0	12	1.775e-5	12	NC	1	NC	1
223		17	max	.006	3	0	15	.174	4	9.93e-3	4	NC	1	NC	1
224			min	-.005	2	-.006	1	0	12	1.896e-5	12	NC	1	NC	1
225		18	max	.006	3	0	15	.187	4	1.06e-2	4	NC	1	NC	1
226			min	-.005	2	-.004	1	0	12	2.017e-5	12	NC	1	NC	1
227		19	max	.007	3	0	5	.201	4	1.127e-2	4	NC	1	NC	1
228			min	-.005	2	-.003	1	0	12	2.138e-5	12	NC	1	NC	1
229	M4	1	max	.003	1	.005	2	0	12	6.039e-5	1	NC	1	NC	3
230			min	0	3	-.007	3	-.201	4	-2.289e-4	5	NC	1	123.142	4
231		2	max	.003	1	.005	2	0	12	6.039e-5	1	NC	1	NC	3
232			min	0	3	-.006	3	-.185	4	-2.289e-4	5	NC	1	133.903	4
233		3	max	.002	1	.004	2	0	12	6.039e-5	1	NC	1	NC	3
234			min	0	3	-.006	3	-.169	4	-2.289e-4	5	NC	1	146.71	4
235		4	max	.002	1	.004	2	0	12	6.039e-5	1	NC	1	NC	2
236			min	0	3	-.006	3	-.153	4	-2.289e-4	5	NC	1	162.093	4
237		5	max	.002	1	.004	2	0	12	6.039e-5	1	NC	1	NC	2
238			min	0	3	-.005	3	-.137	4	-2.289e-4	5	NC	1	180.775	4
239		6	max	.002	1	.004	2	0	12	6.039e-5	1	NC	1	NC	2
240			min	0	3	-.005	3	-.122	4	-2.289e-4	5	NC	1	203.757	4
241		7	max	.002	1	.003	2	0	12	6.039e-5	1	NC	1	NC	2
242			min	0	3	-.005	3	-.107	4	-2.289e-4	5	NC	1	232.46	4
243		8	max	.002	1	.003	2	0	12	6.039e-5	1	NC	1	NC	2
244			min	0	3	-.004	3	-.092	4	-2.289e-4	5	NC	1	268.958	4
245		9	max	.002	1	.003	2	0	12	6.039e-5	1	NC	1	NC	2
246			min	0	3	-.004	3	-.078	4	-2.289e-4	5	NC	1	316.371	4
247		10	max	.001	1	.002	2	0	12	6.039e-5	1	NC	1	NC	2
248			min	0	3	-.003	3	-.065	4	-2.289e-4	5	NC	1	379.577	4
249		11	max	.001	1	.002	2	0	12	6.039e-5	1	NC	1	NC	1
250			min	0	3	-.003	3	-.053	4	-2.289e-4	5	NC	1	466.556	4
251		12	max	.001	1	.002	2	0	12	6.039e-5	1	NC	1	NC	1
252			min	0	3	-.003	3	-.042	4	-2.289e-4	5	NC	1	591.109	4
253		13	max	0	1	.002	2	0	12	6.039e-5	1	NC	1	NC	1
254			min	0	3	-.002	3	-.032	4	-2.289e-4	5	NC	1	778.855	4
255		14	max	0	1	.001	2	0	12	6.039e-5	1	NC	1	NC	1
256			min	0	3	-.002	3	-.023	4	-2.289e-4	5	NC	1	1081.905	4
257		15	max	0	1	.001	2	0	12	6.039e-5	1	NC	1	NC	1
258			min	0	3	-.002	3	-.015	4	-2.289e-4	5	NC	1	1620.377	4
259		16	max	0	1	0	2	0	12	6.039e-5	1	NC	1	NC	1
260			min	0	3	-.001	3	-.009	4	-2.289e-4	5	NC	1	2726.278	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
261		17	max	0	1	0	2	0	12	6.039e-5	1	NC	1	NC	1
262			min	0	3	0	3	-.004	4	-2.289e-4	5	NC	1	5630.399	4
263		18	max	0	1	0	2	0	12	6.039e-5	1	NC	1	NC	1
264			min	0	3	0	3	-.001	4	-2.289e-4	5	NC	1	NC	1
265		19	max	0	1	0	1	0	1	6.039e-5	1	NC	1	NC	1
266			min	0	1	0	1	0	1	-2.289e-4	5	NC	1	NC	1
267	M6	1	max	.021	2	.026	2	0	1	1.562e-3	4	NC	4	NC	1
268			min	-.028	3	-.037	3	-.602	4	0	1	1676.308	3	104.144	4
269		2	max	.02	2	.024	2	0	1	1.654e-3	4	NC	4	NC	1
270			min	-.026	3	-.035	3	-.553	4	0	1	1777.845	3	113.381	4
271		3	max	.019	2	.022	2	0	1	1.747e-3	4	NC	4	NC	1
272			min	-.025	3	-.033	3	-.504	4	0	1	1892.461	3	124.347	4
273		4	max	.017	2	.02	2	0	1	1.839e-3	4	NC	4	NC	1
274			min	-.023	3	-.031	3	-.456	4	0	1	2022.827	3	137.491	4
275		5	max	.016	2	.018	2	0	1	1.932e-3	4	NC	4	NC	1
276			min	-.022	3	-.029	3	-.409	4	0	1	2172.378	3	153.423	4
277		6	max	.015	2	.016	2	0	1	2.024e-3	4	NC	4	NC	1
278			min	-.02	3	-.027	3	-.363	4	0	1	2345.609	3	172.988	4
279		7	max	.014	2	.014	2	0	1	2.116e-3	4	NC	1	NC	1
280			min	-.019	3	-.025	3	-.318	4	0	1	2548.516	3	197.382	4
281		8	max	.013	2	.012	2	0	1	2.209e-3	4	NC	1	NC	1
282			min	-.017	3	-.022	3	-.275	4	0	1	2789.278	3	228.347	4
283		9	max	.012	2	.01	2	0	1	2.301e-3	4	NC	1	NC	1
284			min	-.015	3	-.02	3	-.234	4	0	1	3079.35	3	268.502	4
285		10	max	.01	2	.008	2	0	1	2.393e-3	4	NC	1	NC	1
286			min	-.014	3	-.018	3	-.195	4	0	1	3435.285	3	321.931	4
287		11	max	.009	2	.007	2	0	1	2.486e-3	4	NC	1	NC	1
288			min	-.012	3	-.016	3	-.159	4	0	1	3881.917	3	395.298	4
289		12	max	.008	2	.005	2	0	1	2.578e-3	4	NC	1	NC	1
290			min	-.011	3	-.014	3	-.125	4	0	1	4458.283	3	500.091	4
291		13	max	.007	2	.004	2	0	1	2.67e-3	4	NC	1	NC	1
292			min	-.009	3	-.012	3	-.095	4	0	1	5229.455	3	657.556	4
293		14	max	.006	2	.003	2	0	1	2.763e-3	4	NC	1	NC	1
294			min	-.008	3	-.01	3	-.069	4	0	1	6312.582	3	910.693	4
295		15	max	.005	2	.002	2	0	1	2.855e-3	4	NC	1	NC	1
296			min	-.006	3	-.008	3	-.046	4	0	1	7941.986	3	1357.954	4
297		16	max	.003	2	.001	2	0	1	2.947e-3	4	NC	1	NC	1
298			min	-.005	3	-.006	3	-.028	4	0	1	NC	1	2268.853	4
299		17	max	.002	2	0	2	0	1	3.04e-3	4	NC	1	NC	1
300			min	-.003	3	-.004	3	-.014	4	0	1	NC	1	4627.34	4
301		18	max	.001	2	0	2	0	1	3.132e-3	4	NC	1	NC	1
302			min	-.002	3	-.002	3	-.004	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	3.224e-3	4	NC	1	NC	1
304			min	0	1	0	1	0	1	0	1	NC	1	NC	1
305	M7	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
306			min	0	1	0	1	0	1	-7.869e-4	4	NC	1	NC	1
307		2	max	.001	3	0	2	.015	4	0	1	NC	1	NC	1
308			min	-.001	2	-.003	3	0	1	-1.337e-4	4	NC	1	NC	1
309		3	max	.002	3	0	2	.029	4	5.195e-4	4	NC	1	NC	1
310			min	-.002	2	-.005	3	0	1	0	1	NC	1	NC	1
311		4	max	.004	3	-.001	15	.043	4	1.173e-3	4	NC	1	NC	1
312			min	-.003	2	-.008	3	0	1	0	1	NC	1	9122.576	4
313		5	max	.005	3	-.002	15	.055	4	1.826e-3	4	NC	1	NC	1
314			min	-.005	2	-.01	3	0	1	0	1	NC	1	8098.639	4
315		6	max	.006	3	-.002	15	.066	4	2.479e-3	4	NC	1	NC	1
316			min	-.006	2	-.012	3	0	1	0	1	8801.616	3	7830.781	4
317		7	max	.007	3	-.003	15	.076	4	3.132e-3	4	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
318			min	-.007	2	-.013	3	0	1	0	1	7858.56	3	8098.518	4
319		8	max	.008	3	-.003	15	.086	4	3.786e-3	4	NC	1	NC	1
320			min	-.008	2	-.014	3	0	1	0	1	7300.058	3	8919.47	4
321		9	max	.009	3	-.003	15	.096	4	4.439e-3	4	NC	1	NC	1
322			min	-.009	2	-.015	3	0	1	0	1	7010.879	3	NC	1
323		10	max	.011	3	-.003	15	.104	4	5.092e-3	4	NC	1	NC	1
324			min	-.01	2	-.015	3	0	1	0	1	6939.278	3	NC	1
325		11	max	.012	3	-.003	15	.113	4	5.745e-3	4	NC	1	NC	1
326			min	-.011	2	-.015	3	0	1	0	1	7061.86	4	NC	1
327		12	max	.013	3	-.003	15	.122	4	6.398e-3	4	NC	1	NC	1
328			min	-.012	2	-.015	3	0	1	0	1	7274.833	4	NC	1
329		13	max	.014	3	-.003	15	.13	4	7.052e-3	4	NC	1	NC	1
330			min	-.014	2	-.014	3	0	1	0	1	7771.961	4	NC	1
331		14	max	.015	3	-.003	15	.139	4	7.705e-3	4	NC	1	NC	1
332			min	-.015	2	-.013	3	0	1	0	1	8664.303	4	NC	1
333		15	max	.016	3	-.002	15	.149	4	8.358e-3	4	NC	1	NC	1
334			min	-.016	2	-.012	3	0	1	0	1	NC	1	NC	1
335		16	max	.018	3	-.002	15	.159	4	9.011e-3	4	NC	1	NC	1
336			min	-.017	2	-.01	3	0	1	0	1	NC	1	NC	1
337		17	max	.019	3	-.001	15	.17	4	9.664e-3	4	NC	1	NC	1
338			min	-.018	2	-.009	3	0	1	0	1	NC	1	NC	1
339		18	max	.02	3	0	15	.182	4	1.032e-2	4	NC	1	NC	1
340			min	-.019	2	-.007	3	0	1	0	1	NC	1	NC	1
341		19	max	.021	3	0	15	.196	4	1.097e-2	4	NC	1	NC	1
342			min	-.02	2	-.005	1	0	1	0	1	NC	1	NC	1
343	M8	1	max	.008	1	.019	2	0	1	0	1	NC	1	NC	1
344			min	-.001	3	-.022	3	-.196	4	-3.012e-4	4	NC	1	126.853	4
345		2	max	.007	1	.018	2	0	1	0	1	NC	1	NC	1
346			min	-.001	3	-.02	3	-.18	4	-3.012e-4	4	NC	1	137.944	4
347		3	max	.007	1	.017	2	0	1	0	1	NC	1	NC	1
348			min	-.001	3	-.019	3	-.164	4	-3.012e-4	4	NC	1	151.143	4
349		4	max	.006	1	.016	2	0	1	0	1	NC	1	NC	1
350			min	-.001	3	-.018	3	-.149	4	-3.012e-4	4	NC	1	166.998	4
351		5	max	.006	1	.015	2	0	1	0	1	NC	1	NC	1
352			min	-.001	3	-.017	3	-.133	4	-3.012e-4	4	NC	1	186.252	4
353		6	max	.005	1	.014	2	0	1	0	1	NC	1	NC	1
354			min	0	3	-.016	3	-.118	4	-3.012e-4	4	NC	1	209.937	4
355		7	max	.005	1	.013	2	0	1	0	1	NC	1	NC	1
356			min	0	3	-.014	3	-.104	4	-3.012e-4	4	NC	1	239.519	4
357		8	max	.005	1	.012	2	0	1	0	1	NC	1	NC	1
358			min	0	3	-.013	3	-.089	4	-3.012e-4	4	NC	1	277.134	4
359		9	max	.004	1	.011	2	0	1	0	1	NC	1	NC	1
360			min	0	3	-.012	3	-.076	4	-3.012e-4	4	NC	1	325.998	4
361		10	max	.004	1	.01	2	0	1	0	1	NC	1	NC	1
362			min	0	3	-.011	3	-.063	4	-3.012e-4	4	NC	1	391.138	4
363		11	max	.003	1	.008	2	0	1	0	1	NC	1	NC	1
364			min	0	3	-.01	3	-.052	4	-3.012e-4	4	NC	1	480.778	4
365		12	max	.003	1	.007	2	0	1	0	1	NC	1	NC	1
366			min	0	3	-.008	3	-.041	4	-3.012e-4	4	NC	1	609.144	4
367		13	max	.003	1	.006	2	0	1	0	1	NC	1	NC	1
368			min	0	3	-.007	3	-.031	4	-3.012e-4	4	NC	1	802.638	4
369		14	max	.002	1	.005	2	0	1	0	1	NC	1	NC	1
370			min	0	3	-.006	3	-.022	4	-3.012e-4	4	NC	1	1114.969	4
371		15	max	.002	1	.004	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.005	3	-.015	4	-3.012e-4	4	NC	1	1669.938	4
373		16	max	.001	1	.003	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.004	3	-.009	4	-3.012e-4	4	NC	1	2809.737	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
375		17	max	0	1	.002	2	0	1	0	1	NC	1	NC	1
376			min	0	3	-.002	3	-.004	4	-3.012e-4	4	NC	1	5802.941	4
377		18	max	0	1	.001	2	0	1	0	1	NC	1	NC	1
378			min	0	3	-.001	3	-.001	4	-3.012e-4	4	NC	1	NC	1
379		19	max	0	1	0	1	0	1	0	1	NC	1	NC	1
380			min	0	1	0	1	0	1	-3.012e-4	4	NC	1	NC	1
381	M10	1	max	.007	2	.007	2	0	12	1.569e-3	4	NC	1	NC	2
382			min	-.008	3	-.012	3	-.601	4	1.334e-5	12	9039.916	2	104.279	4
383		2	max	.006	2	.006	2	0	12	1.66e-3	4	NC	1	NC	2
384			min	-.008	3	-.011	3	-.552	4	1.254e-5	12	NC	1	113.528	4
385		3	max	.006	2	.005	2	0	12	1.751e-3	4	NC	1	NC	2
386			min	-.008	3	-.011	3	-.504	4	1.173e-5	12	NC	1	124.509	4
387		4	max	.005	2	.004	2	0	12	1.843e-3	4	NC	1	NC	2
388			min	-.007	3	-.01	3	-.456	4	1.093e-5	12	NC	1	137.67	4
389		5	max	.005	2	.003	2	0	12	1.934e-3	4	NC	1	NC	1
390			min	-.007	3	-.01	3	-.408	4	1.012e-5	12	NC	1	153.623	4
391		6	max	.005	2	.003	2	0	12	2.025e-3	4	NC	1	NC	1
392			min	-.006	3	-.009	3	-.362	4	9.317e-6	12	NC	1	173.214	4
393		7	max	.004	2	.002	2	0	12	2.116e-3	4	NC	1	NC	1
394			min	-.006	3	-.009	3	-.317	4	8.512e-6	12	NC	1	197.641	4
395		8	max	.004	2	.001	2	0	12	2.208e-3	4	NC	1	NC	1
396			min	-.005	3	-.008	3	-.274	4	7.707e-6	12	NC	1	228.649	4
397		9	max	.004	2	0	2	0	12	2.299e-3	4	NC	1	NC	1
398			min	-.005	3	-.008	3	-.233	4	6.902e-6	12	NC	1	268.859	4
399		10	max	.003	2	0	2	0	12	2.39e-3	4	NC	1	NC	1
400			min	-.004	3	-.007	3	-.195	4	6.098e-6	12	NC	1	322.362	4
401		11	max	.003	2	0	2	0	12	2.481e-3	4	NC	1	NC	1
402			min	-.004	3	-.007	3	-.158	4	5.293e-6	12	NC	1	395.832	4
403		12	max	.003	2	0	2	0	12	2.573e-3	4	NC	1	NC	1
404			min	-.003	3	-.006	3	-.125	4	4.488e-6	12	NC	1	500.775	4
405		13	max	.002	2	-.001	2	0	12	2.664e-3	4	NC	1	NC	1
406			min	-.003	3	-.005	3	-.095	4	3.683e-6	12	NC	1	658.47	4
407		14	max	.002	2	-.001	15	0	12	2.755e-3	4	NC	1	NC	1
408			min	-.002	3	-.004	3	-.069	4	2.878e-6	12	NC	1	911.986	4
409		15	max	.001	2	0	15	0	12	2.846e-3	4	NC	1	NC	1
410			min	-.002	3	-.004	3	-.046	4	2.074e-6	12	NC	1	1359.942	4
411		16	max	.001	2	0	15	0	12	2.938e-3	4	NC	1	NC	1
412			min	-.001	3	-.003	3	-.028	4	1.269e-6	12	NC	1	2272.335	4
413		17	max	0	2	0	15	0	12	3.029e-3	4	NC	1	NC	1
414			min	0	3	-.002	4	-.014	4	1.257e-7	10	NC	1	4635.029	4
415		18	max	0	2	0	15	0	12	3.12e-3	4	NC	1	NC	1
416			min	0	3	-.001	4	-.004	4	-1.171e-5	1	NC	1	NC	1
417		19	max	0	1	0	1	0	1	3.211e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-2.591e-5	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	8.603e-6	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-7.835e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.015	4	-8.156e-7	12	NC	1	NC	1
422			min	0	2	-.002	4	0	1	-1.274e-4	4	NC	1	NC	1
423		3	max	0	3	0	15	.029	4	5.287e-4	4	NC	1	NC	1
424			min	0	2	-.004	4	0	1	-3.971e-5	1	NC	1	NC	1
425		4	max	.001	3	-.001	15	.042	4	1.185e-3	4	NC	1	NC	1
426			min	0	2	-.006	4	0	1	-6.386e-5	1	NC	1	9502.498	4
427		5	max	.001	3	-.002	15	.054	4	1.841e-3	4	NC	1	NC	1
428			min	-.001	2	-.008	4	0	1	-8.802e-5	1	NC	1	8490.075	4
429		6	max	.002	3	-.002	15	.066	4	2.497e-3	4	NC	1	NC	1
430			min	-.002	2	-.01	4	0	1	-1.122e-4	1	9855.691	4	8277.053	4
431		7	max	.002	3	-.003	15	.076	4	3.153e-3	4	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
432			min	-.002	2	-.011	4	-.001	1	-1.363e-4	1	8466.995	4	8654.604	4
433		8	max	.003	3	-.003	15	.086	4	3.809e-3	4	NC	1	NC	1
434			min	-.002	2	-.012	4	-.001	1	-1.605e-4	1	7610.532	4	9680.467	4
435		9	max	.003	3	-.003	15	.095	4	4.465e-3	4	NC	2	NC	1
436			min	-.002	2	-.013	4	-.002	1	-1.846e-4	1	7105.19	4	NC	1
437		10	max	.003	3	-.003	15	.104	4	5.122e-3	4	NC	2	NC	1
438			min	-.003	2	-.014	4	-.002	1	-2.088e-4	1	6863.173	4	NC	1
439		11	max	.004	3	-.003	15	.113	4	5.778e-3	4	NC	2	NC	1
440			min	-.003	2	-.014	4	-.003	1	-2.329e-4	1	6848.901	4	NC	1
441		12	max	.004	3	-.003	15	.122	4	6.434e-3	4	NC	2	NC	1
442			min	-.003	2	-.014	4	-.003	1	-2.571e-4	1	7065.383	4	NC	1
443		13	max	.004	3	-.003	15	.131	4	7.09e-3	4	NC	1	NC	1
444			min	-.004	2	-.013	4	-.004	1	-2.813e-4	1	7557.118	4	NC	1
445		14	max	.005	3	-.003	15	.14	4	7.746e-3	4	NC	1	NC	1
446			min	-.004	2	-.012	4	-.004	1	-3.054e-4	1	8433.069	4	NC	1
447		15	max	.005	3	-.003	15	.149	4	8.402e-3	4	NC	1	NC	1
448			min	-.004	2	-.01	4	-.005	1	-3.296e-4	1	9934.363	4	NC	1
449		16	max	.006	3	-.002	15	.16	4	9.058e-3	4	NC	1	NC	1
450			min	-.005	2	-.008	4	-.006	1	-3.537e-4	1	NC	1	NC	1
451		17	max	.006	3	-.002	15	.171	4	9.714e-3	4	NC	1	NC	1
452			min	-.005	2	-.006	4	-.006	1	-3.779e-4	1	NC	1	NC	1
453		18	max	.006	3	-.001	15	.183	4	1.037e-2	4	NC	1	NC	1
454			min	-.005	2	-.004	1	-.007	1	-4.02e-4	1	NC	1	NC	1
455		19	max	.007	3	0	10	.197	4	1.103e-2	4	NC	1	NC	1
456			min	-.005	2	-.003	1	-.008	1	-4.262e-4	1	NC	1	NC	1
457	M12	1	max	.003	1	.005	2	.008	1	-3.33e-6	12	NC	1	NC	3
458			min	0	3	-.007	3	-.197	4	-2.519e-4	4	NC	1	125.987	4
459		2	max	.003	1	.005	2	.007	1	-3.33e-6	12	NC	1	NC	3
460			min	0	3	-.006	3	-.181	4	-2.519e-4	4	NC	1	136.997	4
461		3	max	.002	1	.004	2	.007	1	-3.33e-6	12	NC	1	NC	3
462			min	0	3	-.006	3	-.165	4	-2.519e-4	4	NC	1	150.1	4
463		4	max	.002	1	.004	2	.006	1	-3.33e-6	12	NC	1	NC	2
464			min	0	3	-.006	3	-.15	4	-2.519e-4	4	NC	1	165.839	4
465		5	max	.002	1	.004	2	.005	1	-3.33e-6	12	NC	1	NC	2
466			min	0	3	-.005	3	-.134	4	-2.519e-4	4	NC	1	184.953	4
467		6	max	.002	1	.004	2	.005	1	-3.33e-6	12	NC	1	NC	2
468			min	0	3	-.005	3	-.119	4	-2.519e-4	4	NC	1	208.466	4
469		7	max	.002	1	.003	2	.004	1	-3.33e-6	12	NC	1	NC	2
470			min	0	3	-.005	3	-.104	4	-2.519e-4	4	NC	1	237.834	4
471		8	max	.002	1	.003	2	.004	1	-3.33e-6	12	NC	1	NC	2
472			min	0	3	-.004	3	-.09	4	-2.519e-4	4	NC	1	275.176	4
473		9	max	.002	1	.003	2	.003	1	-3.33e-6	12	NC	1	NC	2
474			min	0	3	-.004	3	-.077	4	-2.519e-4	4	NC	1	323.686	4
475		10	max	.001	1	.002	2	.003	1	-3.33e-6	12	NC	1	NC	2
476			min	0	3	-.003	3	-.064	4	-2.519e-4	4	NC	1	388.353	4
477		11	max	.001	1	.002	2	.002	1	-3.33e-6	12	NC	1	NC	1
478			min	0	3	-.003	3	-.052	4	-2.519e-4	4	NC	1	477.343	4
479		12	max	.001	1	.002	2	.002	1	-3.33e-6	12	NC	1	NC	1
480			min	0	3	-.003	3	-.041	4	-2.519e-4	4	NC	1	604.777	4
481		13	max	0	1	.002	2	.001	1	-3.33e-6	12	NC	1	NC	1
482			min	0	3	-.002	3	-.031	4	-2.519e-4	4	NC	1	796.865	4
483		14	max	0	1	.001	2	0	1	-3.33e-6	12	NC	1	NC	1
484			min	0	3	-.002	3	-.022	4	-2.519e-4	4	NC	1	1106.923	4
485		15	max	0	1	.001	2	0	1	-3.33e-6	12	NC	1	NC	1
486			min	0	3	-.002	3	-.015	4	-2.519e-4	4	NC	1	1657.847	4
487		16	max	0	1	0	2	0	1	-3.33e-6	12	NC	1	NC	1
488			min	0	3	-.001	3	-.009	4	-2.519e-4	4	NC	1	2789.324	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
489		17	max	0	1	0	2	0	1	-3.33e-6	12	NC	1	NC	1
490			min	0	3	0	3	-.004	4	-2.519e-4	4	NC	1	5760.611	4
491		18	max	0	1	0	2	0	1	-3.33e-6	12	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-2.519e-4	4	NC	1	NC	1
493		19	max	0	1	0	1	0	1	-3.33e-6	12	NC	1	NC	1
494			min	0	1	0	1	0	1	-2.519e-4	4	NC	1	NC	1
495	M1	1	max	.008	3	.115	2	.636	4	1.558e-2	1	NC	1	NC	1
496			min	-.004	2	-.017	3	0	12	-2.863e-2	3	NC	1	NC	1
497		2	max	.008	3	.055	2	.616	4	8.29e-3	4	NC	4	NC	1
498			min	-.004	2	-.006	3	-.006	1	-1.416e-2	3	1911.484	2	NC	1
499		3	max	.008	3	.012	3	.596	4	1.361e-2	4	NC	5	NC	1
500			min	-.004	2	-.01	2	-.008	1	-1.588e-4	1	920.072	2	6872.773	5
501		4	max	.008	3	.046	3	.576	4	1.189e-2	4	NC	5	NC	1
502			min	-.004	2	-.083	2	-.008	1	-5.158e-3	3	579.753	2	4895.122	5
503		5	max	.008	3	.09	3	.555	4	1.016e-2	4	NC	5	NC	1
504			min	-.004	2	-.16	2	-.005	1	-1.018e-2	3	417.774	2	3899.814	5
505		6	max	.008	3	.138	3	.534	4	1.406e-2	2	NC	15	NC	1
506			min	-.004	2	-.235	2	-.002	1	-1.52e-2	3	328.649	2	3301.987	5
507		7	max	.008	3	.185	3	.512	4	1.874e-2	2	NC	15	NC	1
508			min	-.004	2	-.302	2	0	12	-2.022e-2	3	276.092	2	2887.723	4
509		8	max	.008	3	.223	3	.489	4	2.343e-2	2	9186.617	15	NC	1
510			min	-.004	2	-.355	2	0	12	-2.524e-2	3	245.028	2	2588.288	4
511		9	max	.007	3	.248	3	.465	4	2.661e-2	2	8585.626	15	NC	1
512			min	-.004	2	-.388	2	0	1	-2.528e-2	3	228.868	2	2404.061	4
513		10	max	.007	3	.258	3	.439	4	2.881e-2	2	8402.569	15	NC	1
514			min	-.004	2	-.399	2	0	12	-2.203e-2	3	224.121	2	2350.932	4
515		11	max	.007	3	.252	3	.41	4	3.1e-2	2	8585.338	15	NC	1
516			min	-.004	2	-.388	2	0	12	-1.877e-2	3	229.602	2	2405.135	4
517		12	max	.007	3	.23	3	.38	4	2.995e-2	2	9185.958	15	NC	1
518			min	-.004	2	-.353	2	-.001	1	-1.557e-2	3	247.27	2	2580.532	4
519		13	max	.007	3	.196	3	.346	4	2.402e-2	2	NC	15	NC	1
520			min	-.004	2	-.298	2	0	1	-1.247e-2	3	281.563	2	3030.391	4
521		14	max	.007	3	.153	3	.31	4	1.809e-2	2	NC	15	NC	1
522			min	-.004	2	-.229	2	0	12	-9.359e-3	3	340.362	2	3968.521	4
523		15	max	.006	3	.104	3	.273	4	1.217e-2	2	NC	5	NC	1
524			min	-.004	2	-.152	2	0	12	-6.252e-3	3	441.925	2	6004.923	4
525		16	max	.006	3	.053	3	.236	4	9.305e-3	4	NC	5	NC	1
526			min	-.004	2	-.076	2	0	12	-3.144e-3	3	630.778	2	NC	1
527		17	max	.006	3	.004	3	.202	4	1.045e-2	4	NC	5	NC	1
528			min	-.003	2	-.006	2	0	12	-3.682e-5	3	1036.059	2	NC	1
529		18	max	.006	3	.052	2	.172	4	1.131e-2	2	NC	4	NC	1
530			min	-.003	2	-.039	3	0	12	-4.626e-3	3	2207.309	2	NC	1
531		19	max	.006	3	.103	2	.145	4	2.271e-2	2	NC	1	NC	1
532			min	-.003	2	-.079	3	-.001	1	-9.396e-3	3	NC	1	NC	1
533	M5	1	max	.026	3	.271	2	.636	4	0	1	NC	1	NC	1
534			min	-.018	2	-.015	3	0	1	-4.513e-6	4	NC	1	NC	1
535		2	max	.026	3	.128	2	.62	4	6.986e-3	4	NC	5	NC	1
536			min	-.018	2	-.001	3	0	1	0	1	809.914	2	9603.925	4
537		3	max	.026	3	.04	3	.602	4	1.376e-2	4	NC	5	NC	1
538			min	-.018	2	-.032	2	0	1	0	1	381.577	2	5576.749	4
539		4	max	.026	3	.131	3	.581	4	1.121e-2	4	9975.77	15	NC	1
540			min	-.018	2	-.223	2	0	1	0	1	233.973	2	4259.848	4
541		5	max	.025	3	.257	3	.558	4	8.661e-3	4	6981.387	15	NC	1
542			min	-.017	2	-.429	2	0	1	0	1	164.918	2	3616.091	4
543		6	max	.025	3	.398	3	.535	4	6.112e-3	4	5375.235	15	NC	1
544			min	-.017	2	-.633	2	0	1	0	1	127.61	2	3219.312	4
545		7	max	.024	3	.537	3	.511	4	3.563e-3	4	4447.637	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
546			min	-.017	2	-.818	2	0	1	0	1	105.94	2	2915.15	4
547		8	max	.024	3	.653	3	.488	4	1.014e-3	4	3908.269	15	NC	1
548			min	-.016	2	-.966	2	0	1	0	1	93.288	2	2631.996	4
549		9	max	.023	3	.727	3	.465	4	0	1	3631.662	15	NC	1
550			min	-.016	2	-1.06	2	0	1	-3.054e-6	5	86.781	2	2399.823	4
551		10	max	.023	3	.754	3	.439	4	0	1	3548.328	15	NC	1
552			min	-.016	2	-1.091	2	0	1	-2.948e-6	5	84.874	2	2366.684	4
553		11	max	.022	3	.736	3	.41	4	0	1	3631.765	15	NC	1
554			min	-.016	2	-1.06	2	0	1	-2.841e-6	5	87.069	2	2432.401	4
555		12	max	.022	3	.672	3	.381	4	7.436e-4	4	3908.514	15	NC	1
556			min	-.015	2	-.962	2	0	1	0	1	94.231	2	2534.763	4
557		13	max	.021	3	.57	3	.347	4	2.613e-3	4	4448.14	15	NC	1
558			min	-.015	2	-.806	2	0	1	0	1	108.38	2	2980.887	4
559		14	max	.021	3	.441	3	.309	4	4.483e-3	4	5376.223	15	NC	1
560			min	-.015	2	-.613	2	0	1	0	1	133.094	2	4138.016	4
561		15	max	.02	3	.297	3	.27	4	6.352e-3	4	6983.349	15	NC	1
562			min	-.015	2	-.404	2	0	1	0	1	176.828	2	7419.21	4
563		16	max	.02	3	.151	3	.231	4	8.222e-3	4	9979.886	15	NC	1
564			min	-.014	2	-.198	2	0	1	0	1	260.757	2	NC	1
565		17	max	.019	3	.013	3	.196	4	1.009e-2	4	NC	5	NC	1
566			min	-.014	2	-.018	2	0	1	0	1	447.172	2	NC	1
567		18	max	.019	3	.119	1	.167	4	5.124e-3	4	NC	5	NC	1
568			min	-.014	2	-.105	3	0	1	0	1	986.783	2	NC	1
569		19	max	.019	3	.232	2	.145	4	0	1	NC	1	NC	1
570			min	-.014	2	-.211	3	0	1	-2.503e-6	4	NC	1	NC	1
571	M9	1	max	.008	3	.115	2	.636	4	2.863e-2	3	NC	1	NC	1
572			min	-.004	2	-.017	3	-.001	1	-1.558e-2	1	NC	1	NC	1
573		2	max	.008	3	.055	2	.62	4	1.416e-2	3	NC	4	NC	1
574			min	-.004	2	-.006	3	0	12	-7.566e-3	1	1911.484	2	9948.942	4
575		3	max	.008	3	.012	3	.601	4	1.373e-2	4	NC	5	NC	1
576			min	-.004	2	-.01	2	0	12	-3.078e-5	10	920.072	2	5710.085	4
577		4	max	.008	3	.046	3	.58	4	1.079e-2	5	NC	5	NC	1
578			min	-.004	2	-.083	2	0	12	-4.688e-3	2	579.753	2	4307.317	4
579		5	max	.008	3	.09	3	.558	4	1.018e-2	3	NC	5	NC	1
580			min	-.004	2	-.16	2	0	12	-9.373e-3	2	417.774	2	3615.291	4
581		6	max	.008	3	.138	3	.535	4	1.52e-2	3	NC	15	NC	1
582			min	-.004	2	-.235	2	0	12	-1.406e-2	2	328.649	2	3192.599	4
583		7	max	.008	3	.185	3	.512	4	2.022e-2	3	NC	15	NC	1
584			min	-.004	2	-.302	2	0	1	-1.874e-2	2	276.092	2	2882.635	4
585		8	max	.008	3	.223	3	.488	4	2.524e-2	3	9167.554	15	NC	1
586			min	-.004	2	-.355	2	0	1	-2.343e-2	2	245.028	2	2613.326	4
587		9	max	.007	3	.248	3	.465	4	2.528e-2	3	8568.037	15	NC	1
588			min	-.004	2	-.388	2	0	12	-2.661e-2	2	228.868	2	2397.022	4
589		10	max	.007	3	.258	3	.439	4	2.203e-2	3	8385.411	15	NC	1
590			min	-.004	2	-.399	2	0	1	-2.881e-2	2	224.121	2	2352.135	4
591		11	max	.007	3	.252	3	.41	4	1.877e-2	3	8567.756	15	NC	1
592			min	-.004	2	-.388	2	0	1	-3.1e-2	2	229.602	2	2414.154	4
593		12	max	.007	3	.23	3	.38	4	1.557e-2	3	9167.012	15	NC	1
594			min	-.004	2	-.353	2	0	12	-2.995e-2	2	247.27	2	2556.222	4
595		13	max	.007	3	.196	3	.346	4	1.247e-2	3	NC	15	NC	1
596			min	-.004	2	-.298	2	0	12	-2.402e-2	2	281.563	2	3031.612	4
597		14	max	.007	3	.153	3	.309	4	9.359e-3	3	NC	15	NC	1
598			min	-.004	2	-.229	2	-.002	1	-1.809e-2	2	340.362	2	4110.32	5
599		15	max	.006	3	.104	3	.27	4	6.252e-3	3	NC	5	NC	1
600			min	-.004	2	-.152	2	-.005	1	-1.217e-2	2	441.925	2	6705.617	5
601		16	max	.006	3	.053	3	.232	4	8.062e-3	5	NC	5	NC	1
602			min	-.004	2	-.076	2	-.007	1	-6.238e-3	2	630.778	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
603		17	max	.006	3	.004	3	.198	4	1.016e-2	4	NC	5	NC	1
604			min	-.003	2	-.006	2	-.008	1	-5.596e-4	1	1036.059	2	NC	1
605		18	max	.006	3	.052	2	.169	4	4.829e-3	5	NC	4	NC	1
606			min	-.003	2	-.039	3	-.006	1	-1.131e-2	2	2207.309	2	NC	1
607		19	max	.006	3	.103	2	.145	4	9.396e-3	3	NC	1	NC	1
608			min	-.003	2	-.079	3	0	12	-2.271e-2	2	NC	1	NC	1

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-05
Units: Imperial units

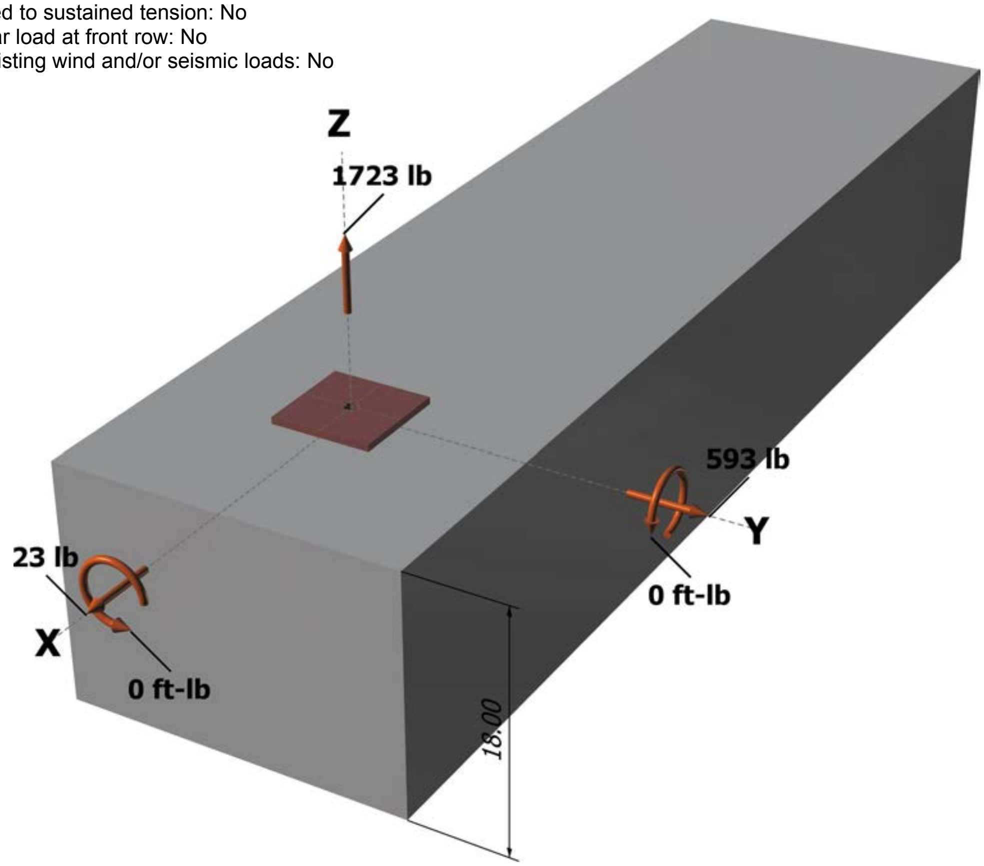
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Load and Geometry
Load factor source: ACI 318 Section 9.2
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: No
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout in tension: No
Do not evaluate concrete breakout in shear: No
Hole condition: Dry concrete
Inspection: Periodic
Temperature range, Short/Long: 110/75°F
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 4.00 x 4.00 x 0.28

<Figure 1>



<Figure 2>

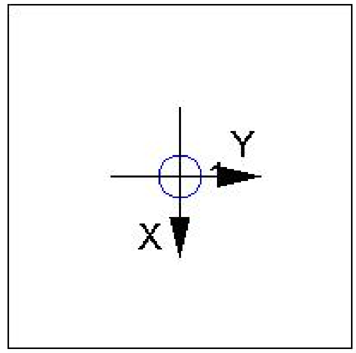
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	1723.0	23.0	593.0	593.4
Sum	1723.0	23.0	593.0	593.4

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 1723
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



4. Steel Strength of Anchor in Tension(Sec. D.5.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
8095	0.75	6071

5. Concrete Breakout Strength of Anchor in Tension (Sec. D.5.2)

$N_b = k_c \lambda \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. D-7)

k_c	λ	f'_c (psi)	h_{ef} (in)	N_b (lb)
17.0	1.00	2500	5.247	10215

$\phi N_{cb} = \phi\,(A_{Nc} / A_{Nco})\,\Psi_{ed,N}\,\Psi_{c,N}\,\Psi_{cp,N} N_b$ (Sec. D.4.1 & Eq. D-4)

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cb} (lb)
220.36	247.75	0.967	1.00	1.000	10215	0.65	5710

6. Adhesive Strength of Anchor in Tension (AC308 Sec. 3.3)

$\tau_{k,cr} = \tau_{k,cr} f_{short\text{-}term} K_{sat}$

$\tau_{k,cr}$ (psi)	$f_{short\text{-}term}$	K_{sat}	$\tau_{k,cr}$ (psi)
1035	1.00	1.00	1035

$N_{a0} = \tau_{k,cr} \pi d_a h_{ef}$ (Eq. D-16f)

$\tau_{k,cr}$ (psi)	d_a (in)	h_{ef} (in)	N_{a0} (lb)
1035	0.50	6.000	9755

$\phi N_a = \phi\,(A_{Na} / A_{Na0})\,\Psi_{ed,Na}\,\Psi_{p,Na} N_{a0}$ (Sec. D.4.1 & Eq. D-16a)

A_{Na} (in^2)	A_{Na0} (in^2)	$\Psi_{ed,Na}$	$\Psi_{p,Na}$	N_{a0} (lb)	ϕ	ϕN_a (lb)
109.66	109.66	1.000	1.000	9755	0.55	5365

8. Steel Strength of Anchor in Shear (Sec. D.6.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
4855	1.0	0.65	3156

9. Concrete Breakout Strength of Anchor in Shear (Sec. D.6.2)

Shear perpendicular to edge in y-direction:

$V_{by} = 7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda\sqrt{f'_c}c_{a1}^{1.5}$ (Eq. D-24)

l_e (in)	d_a (in)	λ	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
4.00	0.50	1.00	2500	7.00	6947

$\phi V_{cby} = \phi\,(A_{Vc} / A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (Sec. D.4.1 & Eq. D-21)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cby} (lb)
192.89	220.50	0.925	1.000	1.000	6947	0.70	3934

Shear perpendicular to edge in x-direction:

$V_{bx} = 7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda\sqrt{f'_c}c_{a1}^{1.5}$ (Eq. D-24)

l_e (in)	d_a (in)	λ	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
4.00	0.50	1.00	2500	7.87	8282

$\phi V_{cbx} = \phi\,(A_{Vc} / A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. D.4.1 & Eq. D-21)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbx} (lb)
165.27	278.72	0.878	1.000	1.000	8282	0.70	3018

Shear parallel to edge in x-direction:

$V_{by} = 7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda\sqrt{f'_c}c_{a1}^{1.5}$ (Eq. D-24)

l_e (in)	d_a (in)	λ	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
4.00	0.50	1.00	2500	7.00	6947

$\phi V_{cbx} = \phi\,(2)(A_{Vc} / A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (Sec. D.4.1, D.6.2.1(c) & Eq. D-21)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cbx} (lb)
192.89	220.50	1.000	1.000	1.000	6947	0.70	8508

Shear parallel to edge in y-direction:

$V_{bx} = 7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda\sqrt{f'_c}c_{a1}^{1.5}$ (Eq. D-24)

l_e (in)	d_a (in)	λ	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
4.00	0.50	1.00	2500	7.87	8282

$\phi V_{cby} = \phi\,(2)(A_{Vc} / A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. D.4.1, D.6.2.1(c) & Eq. D-21)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cby} (lb)
165.27	278.72	1.000	1.000	1.000	8282	0.70	6875

10. Concrete Pryout Strength of Anchor in Shear (Sec. D.6.3)

$\phi V_{cp} = \phi\,\min|k_{cp}N_a\,;\,k_{cp}N_{cb}| = \phi\,\min|k_{cp}(A_{Na} / A_{Na0})\Psi_{ed,Na}\Psi_{p,Na}N_{a0}\,;\,k_{cp}(A_{Nc} / A_{Nco})\Psi_{ed,N}\Psi_{c,N}\Psi_{cp,N}N_b|$ (Eq. D-30a)

k_{cp}	A_{Na} (in^2)	A_{Na0} (in^2)	$\Psi_{ed,Na}$	$\Psi_{p,Na}$	N_{a0} (lb)	N_a (lb)
2.0	109.66	109.66	1.000	1.000	9755	9755

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	N_{cb} (lb)	ϕ	ϕV_{cp} (lb)
220.36	247.75	0.967	1.000	1.000	10215	8785	0.70	12298

11. Results

Interaction of Tensile and Shear Forces (Sec. D.7)

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	1723	6071	0.28	Pass
Concrete breakout	1723	5710	0.30	Pass
Adhesive	**1723**	**5365**	**0.32**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status
Steel	**593**	**3156**	**0.19**	**Pass (Governs)**
T Concrete breakout y+	593	3934	0.15	Pass
T Concrete breakout x+	23	3018	0.01	Pass
|| Concrete breakout y+	23	8508	0.00	Pass
|| Concrete breakout x+	593	6875	0.09	Pass
Concrete breakout, combined	-	-	0.15	Pass
Pryout	593	12298	0.05	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. D.7.1	0.32	0.00	32.1 %	1.0	Pass

AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS) with hef = 6.000 inch meets the selected design criteria.

12. Warnings

- This temperature range is currently outside the scope of ACI 318-11 and ACI 355.4, and is provided for historical purposes.

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer’s product literature for hole cleaning and installation instructions.

Company:	Schletter, Inc.	Date:	11/17/2015
Engineer:	HCV	Page:	1/5
Project:	Standard PVMax - Worst Case, 36 Inch Width		
Address:			
Phone:			
E-mail:			

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-05
Units: Imperial units

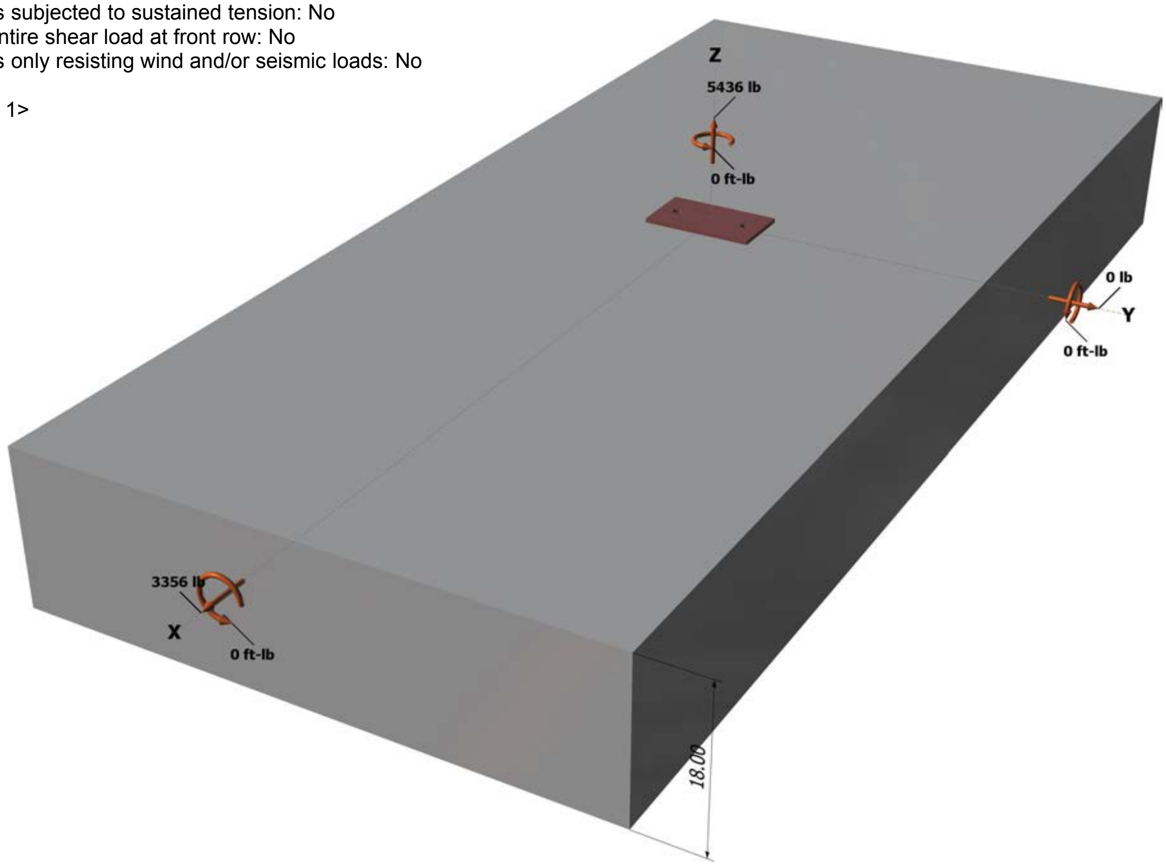
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Load and Geometry
Load factor source: ACI 318 Section 9.2
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: No
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

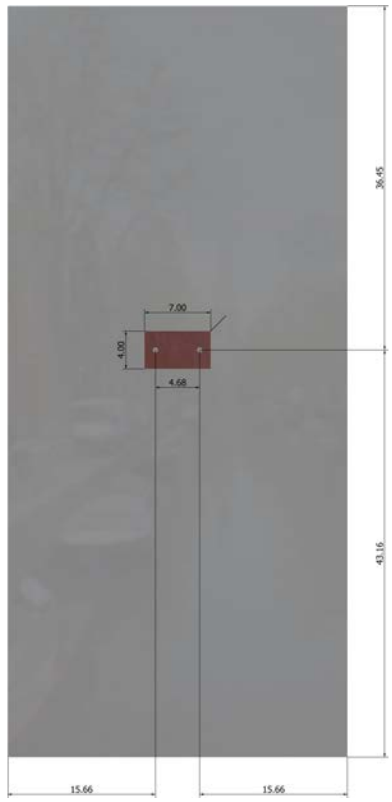
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout in tension: No
Do not evaluate concrete breakout in shear: No
Hole condition: Dry concrete
Inspection: Periodic
Temperature range, Short/Long: 110/75°F
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 4.00 x 7.00 x 0.28

<Figure 1>



<Figure 2>



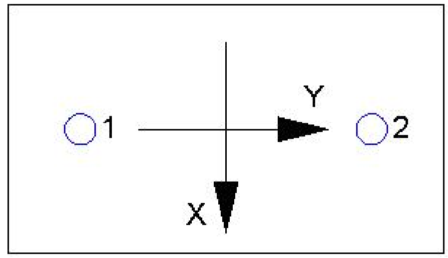
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	2718.0	1678.0	0.0	1678.0
2	2718.0	1678.0	0.0	1678.0
Sum	5436.0	3356.0	0.0	3356.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 5436
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



4. Steel Strength of Anchor in Tension(Sec. D.5.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
8095	0.75	6071

5. Concrete Breakout Strength of Anchor in Tension (Sec. D.5.2)

$N_b = k_c \lambda \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. D-7)

k_c	λ	f'_c (psi)	h_{ef} (in)	N_b (lb)
17.0	1.00	2500	6.000	12492

$\phi N_{cbg} = \phi\,(A_{Nc} / A_{Nco})\,\Psi_{ec,N}\,\Psi_{ed,N}\,\Psi_{c,N}\,\Psi_{cp,N} N_b$ (Sec. D.4.1 & Eq. D-5)

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cbg} (lb)
408.24	324.00	1.000	1.000	1.00	1.000	12492	0.65	10231

6. Adhesive Strength of Anchor in Tension (AC308 Sec. 3.3)

$\tau_{k,cr} = \tau_{k,cr} f_{short\text{-}term} K_{sat}$

$\tau_{k,cr}$ (psi)	$f_{short\text{-}term}$	K_{sat}	$\tau_{k,cr}$ (psi)
1035	1.00	1.00	1035

$N_{a0} = \tau_{k,cr} \pi d_a h_{ef}$ (Eq. D-16f)

$\tau_{k,cr}$ (psi)	d_a (in)	h_{ef} (in)	N_{a0} (lb)
1035	0.50	6.000	9755

$\phi N_{ag} = \phi\,(A_{Na} / A_{Na0})\,\Psi_{ed,Na}\,\Psi_{g,Na}\,\Psi_{ec,Na}\,\Psi_{p,Na} N_{a0}$ (Sec. D.4.1 & Eq. D-16b)

A_{Na} (in^2)	A_{Na0} (in^2)	$\Psi_{ed,Na}$	$\Psi_{g,Na}$	$\Psi_{ec,Na}$	$\Psi_{p,Na}$	N_{a0}(lb)	ϕ	ϕN_{ag} (lb)
158.66	109.66	1.000	1.043	1.000	1.000	9755	0.55	8093

8. Steel Strength of Anchor in Shear (Sec. D.6.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
4855	1.0	0.65	3156

9. Concrete Breakout Strength of Anchor in Shear (Sec. D.6.2)

Shear perpendicular to edge in x-direction:

$V_{bx} = 7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda\sqrt{f'_c}c_{a1}^{1.5}$ (Eq. D-24)

l_e (in)	d_a (in)	λ	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
4.00	0.50	1.00	2500	12.00	15593

$\phi V_{cbgx} = \phi\,(A_{Vc}/A_{Vco})\Psi_{ec,V}\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. D.4.1 & Eq. D-22)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgx} (lb)
648.00	648.00	1.000	0.961	1.000	1.000	15593	0.70	10490

Shear parallel to edge in x-direction:

$V_{by} = 7(l_e/d_a)^{0.2}\sqrt{d_a}\lambda\sqrt{f'_c}c_{a1}^{1.5}$ (Eq. D-24)

l_e (in)	d_a (in)	λ	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
4.00	0.50	1.00	2500	15.66	23247

$\phi V_{cbx} = \phi\,(2)(A_{Vc}/A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (Sec. D.4.1, D.6.2.1(c) & Eq. D-21)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cbx} (lb)
845.64	1103.56	1.000	1.000	1.000	23247	0.70	24939

10. Concrete Pryout Strength of Anchor in Shear (Sec. D.6.3)

$\phi V_{cpg} = \phi\min|k_{cp}N_{ag}\,;\,k_{cp}N_{cbg}| = \phi\min|k_{cp}(A_{Na}/A_{Na0})\Psi_{ed,Na}\Psi_{g,Na}\Psi_{ec,Na}\Psi_{p,Na}N_{a0}\,;\,k_{cp}(A_{Nc}/A_{Nco})\Psi_{ec,N}\Psi_{ed,N}\Psi_{c,N}\Psi_{cp,N}N_b|$ (Eq. D-30b)

k_{cp}	A_{Na} (in^2)	A_{Na0} (in^2)	$\Psi_{ed,Na}$	$\Psi_{g,Na}$	$\Psi_{ec,Na}$	$\Psi_{p,Na}$	N_{a0} (lb)	N_a (lb)
2.0	158.66	109.66	1.000	1.043	1.000	1.000	9755	14715

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	N_{cb} (lb)	ϕ
408.24	324.00	1.000	1.000	1.000	1.000	12492	15740	0.70

ϕV_{cpg} (lb)
20601

11. Results

Interaction of Tensile and Shear Forces (Sec. D.7)

Tension	Factored Load, N_{ua} (lb)	Design Strength, $øN_n$ (lb)	Ratio	Status
Steel	2718	6071	0.45	Pass
Concrete breakout	5436	10231	0.53	Pass
Adhesive	**5436**	**8093**	**0.67**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, $øV_n$ (lb)	Ratio	Status
Steel	**1678**	**3156**	**0.53**	**Pass (Governs)**
T Concrete breakout x+	3356	10490	0.32	Pass
|| Concrete breakout y-	1678	24939	0.07	Pass
Pryout	3356	20601	0.16	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status

Sec. D.7.3	0.67	0.53	120.3 %	1.2	Pass

AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS) with hef = 6.000 inch meets the selected design criteria.

12. Warnings

- This temperature range is currently outside the scope of ACI 318-11 and ACI 355.4, and is provided for historical purposes.

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer’s product literature for hole cleaning and installation instructions.