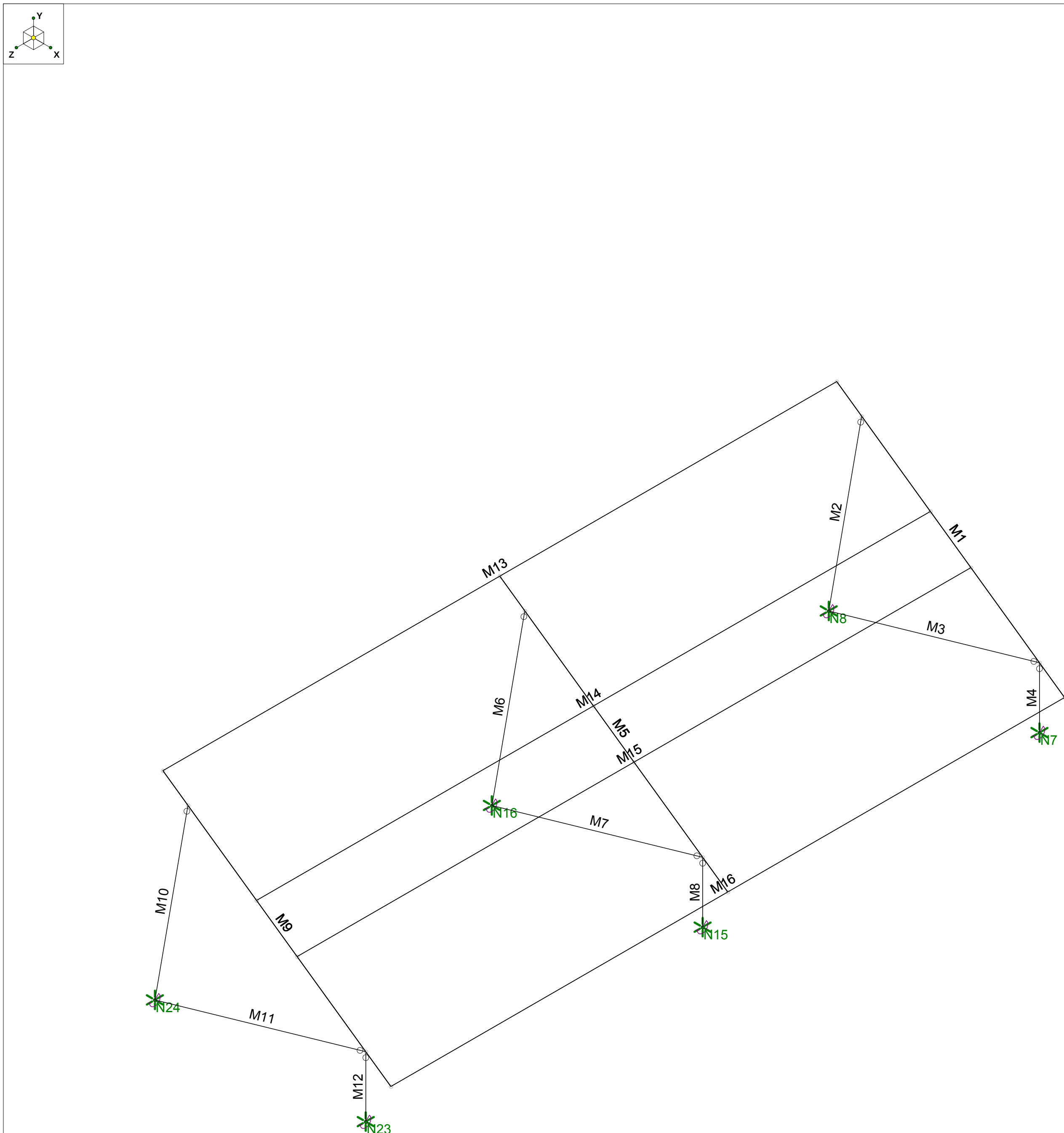


Schletter, Inc.		35° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-05	

1. INTRODUCTION

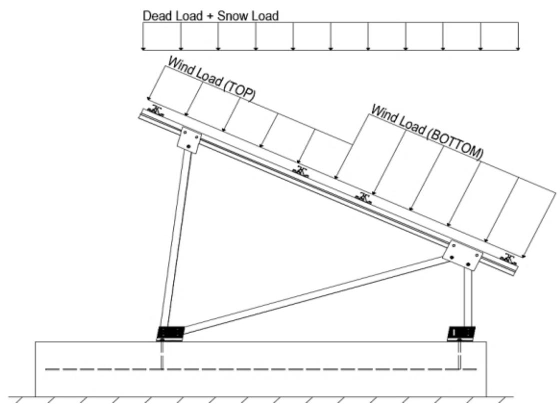
1.1 Project Description
The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. PVMax ground mount system.

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 = 35°
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 = 14.43 psf *(ASCE 7-05, Eq. 7-2)*
I_s = 1.00
C_s = 0.64
C_e = 0.90
C_t = 1.20

2.3 Wind Loads
Design Wind Speed, V = 100 mph — Exposure Category = C
Height < 15 ft — Importance Category = II

Peak Velocity Pressure, q_z = 15.70 psf *Including the gust factor, G=0.85. (ASCE 7-05, Eq. 6-15)*

Pressure Coefficients

$Cf+_{TOP}$	=	1.200	*(Pressure)*
$Cf+_{BOTTOM}$	=	2.000	
$Cf-_{TOP, OUTER PURLIN}$	=	-2.700	*(Suction)*
$Cf-_{TOP, INNER PURLIN}$	=	-2.100	
$Cf-_{BOTTOM}$	=	-1.200	

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

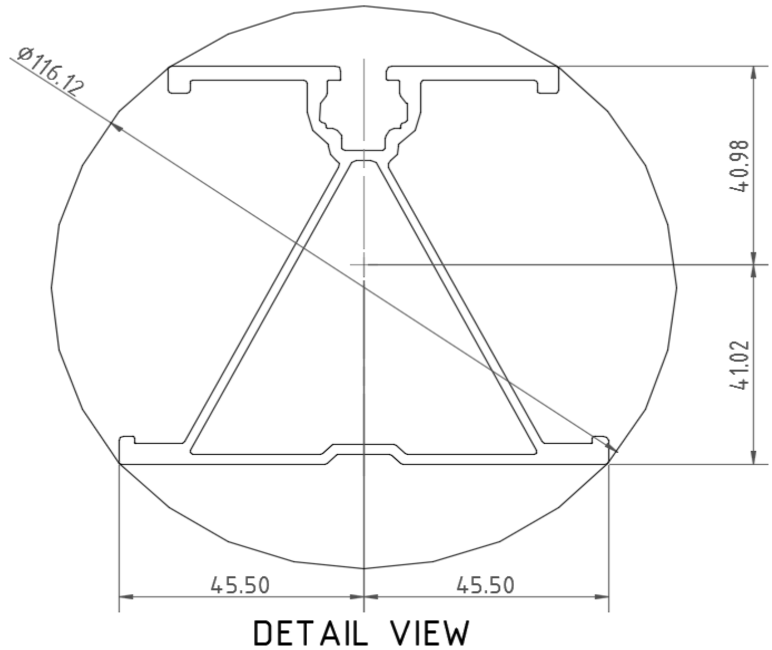
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

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).

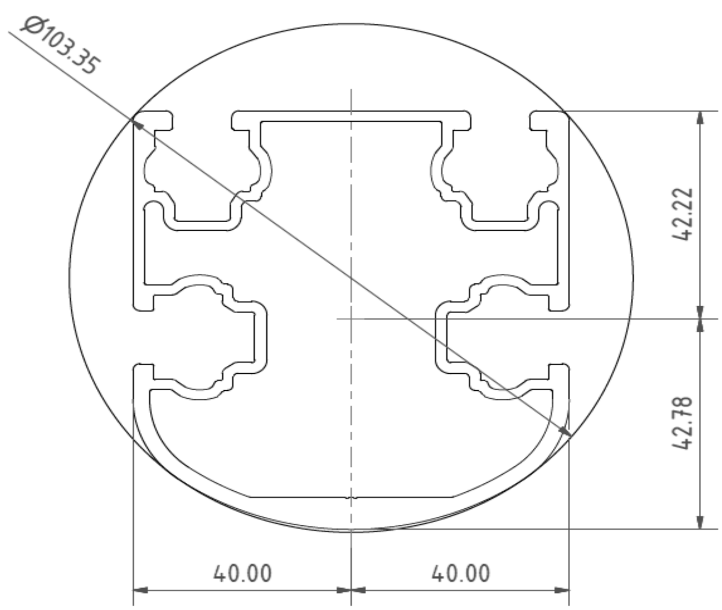
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	120	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	2.080	k-ft
M_z =	0.150	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	88%	



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).

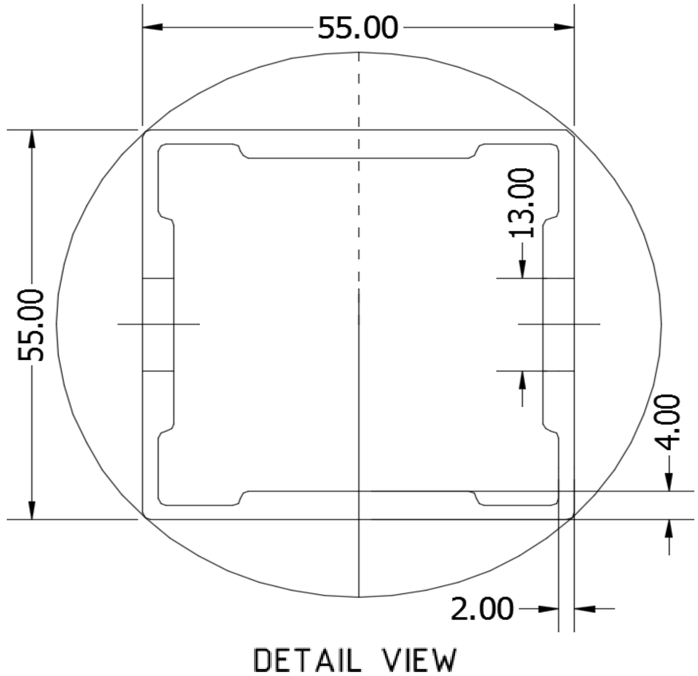
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	88.90	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.35	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-2.931	k-ft
M_z =	0.000	k-ft
P_n =	-0.970	k
$M_{y\ allowable}$ =	3.464	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	86%	



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).

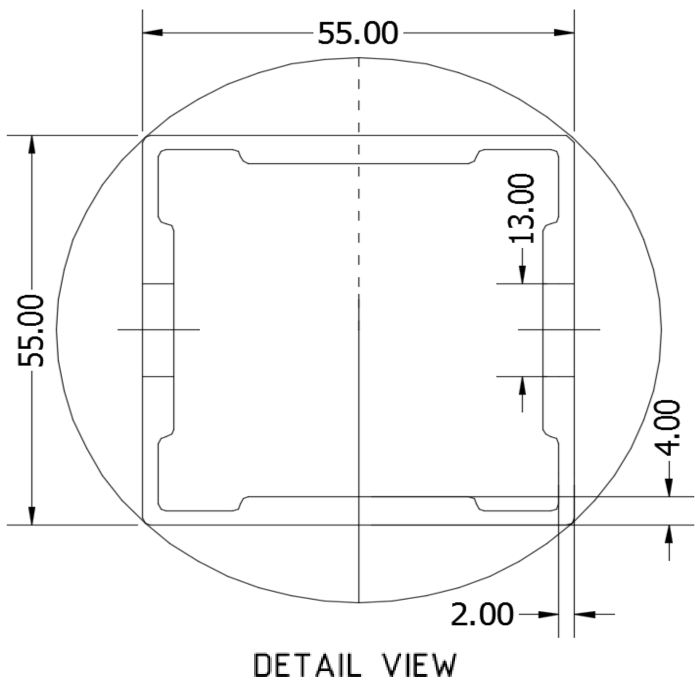
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.549	k-ft
P_n =	0.568	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	41%	



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).

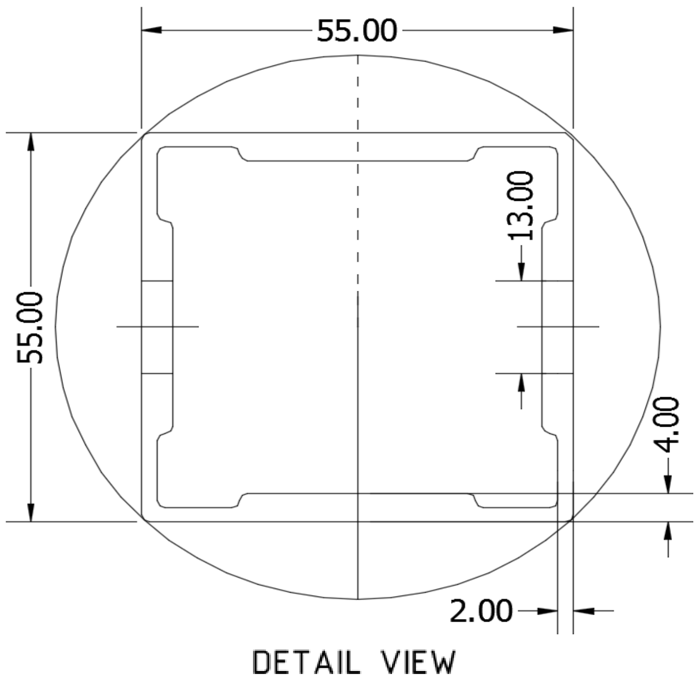
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	86.60	in
$\Phi F_{ty\ AXIAL}$ =	7.50	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.009	k-ft
M_z =	0.000	k-ft
P_n =	2.856	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	7.371	k
Utilization =	39%	



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 =	78.03	in
$\Phi F_{ty\ AXIAL}$ =	8.94	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 =	-0.009	k-ft
M_z =	0.000	k-ft
P_n =	3.133	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	8.786	k
Utilization =	36%	



5. FOUNDATION DESIGN CALCULATIONS

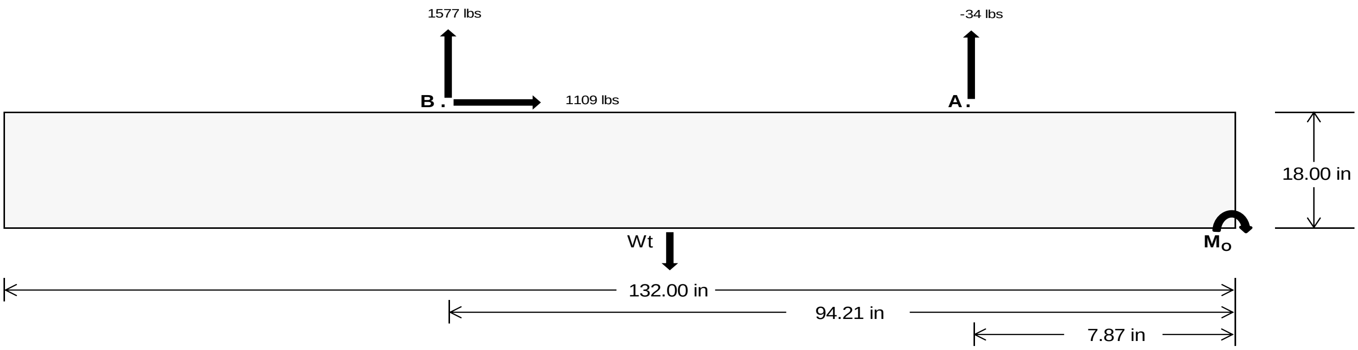
5.1 Helical Pile Foundations

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 =	62.43	6570.54	k
Compressive Load =	2951.53	5044.00	k
Lateral Load =	391.23	4616.60	k
Moment (Weak Axis) =	0.74	0.23	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).



Concrete Properties	
Weight of Concrete =	145 pcf
Compressive Strength =	2500 psi
Yield Strength =	60000 psi

Footing Reinforcement

Use fiber reinforcing with (2) #5 rebar.

Overturning Check	
M_O =	168271.7 in-lbs
Resisting Force Required =	2549.57 lbs
S.F. =	1.67
Weight Required =	4249.29 lbs
Minimum Width =	33 in in
Weight Provided =	6579.38 lbs

A minimum 132in long x 33in wide x 18in tall ballast foundation is required to resist overturning.

Sliding	
Force =	1109.44 lbs
Friction =	0.4
Weight Required =	2773.61 lbs
Resisting Weight =	6579.38 lbs
Additional Weight Required =	0 lbs

Use a 132in long x 33in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

Cohesion	
Sliding Force =	1109.44 lbs
Cohesion =	130 psf
Area =	30.25 ft^2
Resisting =	3289.69 lbs
Additional Weight Required =	0 lbs

Use a 132in long x 33in wide x 18in tall ballast foundation. Cohesion is OK.

Shear Key	
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.

Bearing Pressure

	Ballast Width			
	33 in	34 in	35 in	36 in
P_{ftg} = (145 pcf)(11 ft)(1.5 ft)(2.75 ft) =	6579 lbs	6779 lbs	6978 lbs	7178 lbs

ASD LC	1.0D + 1.0S				1.0D + 1.0W				1.0D + 0.75L + 0.75W + 0.75S				0.6D + 1.0W			
Width	33 in	34 in	35 in	36 in	33 in	34 in	35 in	36 in	33 in	34 in	35 in	36 in	33 in	34 in	35 in	36 in
F_A	1074 lbs	1074 lbs	1074 lbs	1074 lbs	1088 lbs	1088 lbs	1088 lbs	1088 lbs	1489 lbs	1489 lbs	1489 lbs	1489 lbs	68 lbs	68 lbs	68 lbs	68 lbs
F_B	966 lbs	966 lbs	966 lbs	966 lbs	2256 lbs	2256 lbs	2256 lbs	2256 lbs	2298 lbs	2298 lbs	2298 lbs	2298 lbs	-3154 lbs	-3154 lbs	-3154 lbs	-3154 lbs
F_V	173 lbs	173 lbs	173 lbs	173 lbs	2024 lbs	2024 lbs	2024 lbs	2024 lbs	1628 lbs	1628 lbs	1628 lbs	1628 lbs	-2219 lbs	-2219 lbs	-2219 lbs	-2219 lbs
P_{total}	8619 lbs	8819 lbs	9018 lbs	9217 lbs	9923 lbs	10123 lbs	10322 lbs	10521 lbs	10366 lbs	10566 lbs	10765 lbs	10964 lbs	862 lbs	982 lbs	1101 lbs	1221 lbs
M	3192 lbs-ft	3192 lbs-ft	3192 lbs-ft	3192 lbs-ft	3003 lbs-ft	3003 lbs-ft	3003 lbs-ft	3003 lbs-ft	4254 lbs-ft	4254 lbs-ft	4254 lbs-ft	4254 lbs-ft	4418 lbs-ft	4418 lbs-ft	4418 lbs-ft	4418 lbs-ft
e	0.37 ft	0.36 ft	0.35 ft	0.35 ft	0.30 ft	0.30 ft	0.29 ft	0.29 ft	0.41 ft	0.40 ft	0.40 ft	0.39 ft	5.12 ft	4.50 ft	4.01 ft	3.62 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}	227.4 psf	227.1 psf	226.8 psf	226.6 psf	273.9 psf	272.2 psf	270.7 psf	269.2 psf	266.0 psf	264.6 psf	263.2 psf	261.9 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	342.5 psf	338.8 psf	335.3 psf	332.1 psf	382.2 psf	377.4 psf	372.8 psf	368.5 psf	419.4 psf	413.5 psf	407.9 psf	402.6 psf	557.3 psf	231.1 psf	169.2 psf	144.2 psf

Maximum Bearing Pressure = 557 psf
Allowable Bearing Pressure = 1500 psf

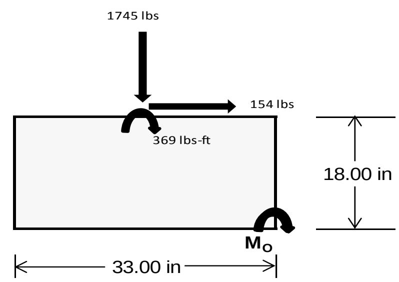
Use a 132in long x 33in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O = 1799.1 ft-lbs
Resisting Force Required = 1308.47 lbs
S.F. = 1.67
Weight Required = 2180.78 lbs
Minimum Width = 33 in in
Weight Provided = 6579.38 lbs

A minimum 132in long x 33in 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	33 in			33 in			33 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	312 lbs	621 lbs	198 lbs	699 lbs	1745 lbs	611 lbs	131 lbs	182 lbs	18 lbs
F_V	213 lbs	209 lbs	218 lbs	156 lbs	154 lbs	169 lbs	214 lbs	210 lbs	216 lbs
P_{total}	8457 lbs	8766 lbs	8343 lbs	8452 lbs	9499 lbs	8365 lbs	2513 lbs	2563 lbs	2399 lbs
M	807 lbs-ft	797 lbs-ft	823 lbs-ft	598 lbs-ft	600 lbs-ft	641 lbs-ft	809 lbs-ft	794 lbs-ft	814 lbs-ft
e	0.10 ft	0.09 ft	0.10 ft	0.07 ft	0.06 ft	0.08 ft	0.32 ft	0.31 ft	0.34 ft
L/6	0.46 ft	0.46 ft	0.46 ft	0.46 ft	0.46 ft	0.46 ft	0.46 ft	0.46 ft	0.46 ft
f_{min}	221.4 psf	232.3 psf	216.5 psf	236.3 psf	270.7 psf	230.3 psf	24.7 psf	27.4 psf	20.6 psf
f_{max}	337.8 psf	347.3 psf	335.1 psf	322.5 psf	357.3 psf	322.7 psf	141.4 psf	142.0 psf	138.0 psf

Maximum Bearing Pressure = 357 psf
Allowable Bearing Pressure = 1500 psf

Use a 132in long x 33in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Foundation Requirements: 132in long x 33in wide x 18in tall ballast foundation and fiber reinforcing with (2) #5 rebar.

5.3 Foundation Anchors

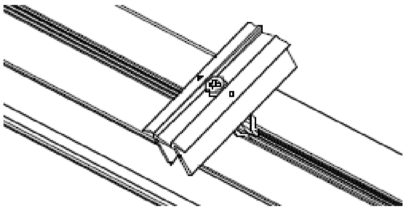
Threaded rods are anchored to the the ballast foundations using the Simpson AT-XP epoxy solution. LRFD load results are compared to the allowable strengths of the epoxy solution. Please see the supplementary calculations provided by the Simpson Anchor Designer software.

6. DESIGN OF JOINTS AND CONNECTIONS

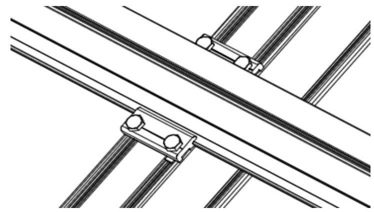
6.1 Anchorage of Modules to Purlins and Connection of Purlins to Girders

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 =	0.636	k
Allowable Uplift =	1.214	k
Utilization =	52%	



Fastening of Purlins to Girders		
Maximum Uplifting Force =	2.274	k
Allowable Uplift =	4.357	k
Utilization =	52%	



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 =	2.270	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	31%	

Rear Strut		
Maximum Axial Load =	4.331	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	58%	

Diagonal Strut		
Maximum Axial Load =	2.904	k
M12 Bolt Shear Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	39%	

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

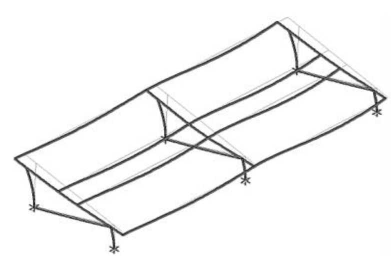
7.1 Seismic Drift

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} =	53.78	in
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$	
	1.076	in
Max Drift, Δ_{MAX} =	0.698	in

$0.698 \leq 1.076$, 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

φF_LSt= 25.1 ksi

Ix = 897074 mm^4

2.155 in^4

y = 41.015 mm

Sx = 1.335 in^3

M_{max}St = 2.788 k-ft

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

φF_LWk= 23.1 ksi

Iy = 446476 mm^4

1.073 in^4

x = 45.5 mm

Sy = 0.599 in^3

M_{max}Wk = 1.152 k-ft

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

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

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

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

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

φF_L = φb[Bt-Dt*√(Rb/t)]

φF_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

φF_L = 1.3φyFcy

φF_L = 43.2 ksi

φF_LSt = 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

φF_L = 1.3φyFcy

φF_L = 43.2 ksi

φF_LWk = 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)

φF_L = φc[Bp-1.6Dp*b/t]

φF_L = 31.6 ksi

b/t = 7.4

S1 = 12.21

S2 = 32.70

φF_L = φyFcy

φF_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

φF_L = φc[Bt-Dt*√(Rb/t)]

φF_L = 31.09 ksi

φF_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 = **55x55**

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

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16 (weak direction)

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

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

$\varphi F_L St$= 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

φF_L= (φccFcy)/(λ²)

φF_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 = 78.03 in
J = 0.942
121.773

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

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= 29.8 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 = 78.03
J = 0.942
121.773

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

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= 29.8

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 = 1.80509

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.83271

φF_L= (φccFcy)/(λ^2)

φF_L= 8.94465 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

$\varphi F_L = \varphi yFcy$

$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 8.94 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 9.21 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	-32.97	-32.97	0	0
2	M14	Y	-32.97	-32.97	0	0
3	M15	Y	-32.97	-32.97	0	0
4	M16	Y	-32.97	-32.97	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	-52.543	-52.543	0	0
2	M14	y	-52.543	-52.543	0	0
3	M15	y	-87.571	-87.571	0	0
4	M16	y	-87.571	-87.571	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	118.221	118.221	0	0
2	M14	y	91.95	91.95	0	0
3	M15	y	52.543	52.543	0	0
4	M16	y	52.543	52.543	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	927.355	2	1190.941	2	.624	1	.002	1	0	1	0	1
2		min	-1117.722	3	-1549.984	3	-25.364	5	-.174	4	0	1	0	1
3	N7	max	.035	3	921.637	1	-.816	12	-.001	12	0	1	0	1
4		min	-.193	2	-48.025	5	-300.945	4	-.57	4	0	1	0	1
5	N15	max	.234	3	2270.41	1	0	2	0	2	0	1	0	1
6		min	-1.994	2	95.298	15	-286.031	4	-.549	4	0	1	0	1
7	N16	max	3291.099	2	3880.001	2	0	3	0	3	0	1	0	1
8		min	-3551.227	3	-5054.264	3	-25.349	5	-.175	4	0	1	0	1
9	N23	max	.039	14	921.637	1	11.918	1	.023	1	0	1	0	1
10		min	-.193	2	68.475	12	-291.672	5	-.554	4	0	1	0	1
11	N24	max	927.355	2	1190.941	2	-.048	12	0	12	0	1	0	1
12		min	-1117.722	3	-1549.984	3	-26.042	5	-.175	4	0	1	0	1
13	Totals:	max	5143.43	2	9760.337	2	0	2						
14		min	-5786.368	3	-7723.773	3	-949.851	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	108.804	1	397.339	2	-10.732	12	.002	3	.26	1	0	4
2			min	7.777	12	-692.945	3	-177.817	1	-.013	2	.019	12	0	3
3		2	max	108.804	1	278.145	2	-8.455	12	.002	3	.134	4	.656	3
4			min	7.777	12	-487.651	3	-136.65	1	-.013	2	.008	12	-.375	2
5		3	max	108.804	1	158.95	2	-6.178	12	.002	3	.071	5	1.084	3
6			min	7.777	12	-282.358	3	-95.482	1	-.013	2	-.044	1	-.618	2
7		4	max	108.804	1	39.756	2	-3.901	12	.002	3	.036	5	1.283	3
8			min	7.777	12	-77.065	3	-54.314	1	-.013	2	-.127	1	-.728	2
9		5	max	108.804	1	128.229	3	-1.423	10	.002	3	.005	5	1.255	3
10			min	7.777	12	-79.438	2	-30.253	4	-.013	2	-.164	1	-.706	2
11		6	max	108.804	1	333.522	3	28.021	1	.002	3	-.009	12	.998	3
12			min	2.697	15	-198.632	2	-22.914	5	-.013	2	-.156	1	-.552	2
13		7	max	108.804	1	538.815	3	69.188	1	.002	3	-.007	12	.514	3
14			min	-7.033	5	-317.826	2	-19.392	5	-.013	2	-.102	1	-.265	2
15		8	max	108.804	1	744.109	3	110.356	1	.002	3	.002	2	.154	2
16			min	-18.439	5	-437.02	2	-15.869	5	-.013	2	-.068	4	-.199	3
17		9	max	108.804	1	949.402	3	151.524	1	.002	3	.143	1	.706	2
18			min	-29.845	5	-556.214	2	-12.347	5	-.013	2	-.082	5	-1.14	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	108.804	1	675.408	2	-9.759	12	.013	2	.335	1	1.39	2
20			min	7.777	12	-1154.695	3	-192.691	1	-.002	3	.014	12	-2.309	3
21		11	max	108.804	1	556.214	2	-7.483	12	.013	2	.143	1	.706	2
22			min	7.777	12	-949.402	3	-151.524	1	-.002	3	.004	12	-1.14	3
23		12	max	108.804	1	437.02	2	-5.206	12	.013	2	.065	5	.154	2
24			min	7.777	12	-744.109	3	-110.356	1	-.002	3	-.004	3	-.199	3
25		13	max	108.804	1	317.826	2	-2.929	12	.013	2	.029	5	.514	3
26			min	7.777	12	-538.815	3	-69.188	1	-.002	3	-.102	1	-.265	2
27		14	max	108.804	1	198.632	2	-.652	12	.013	2	-.002	15	.998	3
28			min	7.777	12	-333.522	3	-34.909	4	-.002	3	-.156	1	-.552	2
29		15	max	108.804	1	79.438	2	13.147	1	.013	2	-.009	12	1.255	3
30			min	1.688	15	-128.229	3	-24.096	5	-.002	3	-.164	1	-.706	2
31		16	max	108.804	1	77.065	3	54.314	1	.013	2	-.006	12	1.283	3
32			min	-8.583	5	-39.756	2	-20.573	5	-.002	3	-.127	1	-.728	2
33		17	max	108.804	1	282.358	3	95.482	1	.013	2	0	3	1.084	3
34			min	-19.989	5	-158.95	2	-17.05	5	-.002	3	-.09	4	-.618	2
35		18	max	108.804	1	487.651	3	136.65	1	.013	2	.085	1	.656	3
36			min	-31.395	5	-278.145	2	-13.528	5	-.002	3	-.095	5	-.375	2
37		19	max	108.804	1	692.945	3	177.817	1	.013	2	.26	1	0	2
38			min	-42.801	5	-397.339	2	-10.005	5	-.002	3	-.108	5	0	3
39	M14	1	max	56.98	4	424.208	2	-11.022	12	.009	3	.297	1	0	4
40			min	3.293	12	-552.412	3	-183.335	1	-.01	2	.021	12	0	3
41		2	max	50.432	1	305.014	2	-8.745	12	.009	3	.192	4	.526	3
42			min	3.293	12	-393.822	3	-142.168	1	-.01	2	.01	12	-.405	2
43		3	max	50.432	1	185.82	2	-6.468	12	.009	3	.106	5	.875	3
44			min	3.293	12	-235.233	3	-101	1	-.01	2	-.019	1	-.678	2
45		4	max	50.432	1	66.626	2	-4.192	12	.009	3	.056	5	1.048	3
46			min	3.293	12	-76.644	3	-59.833	1	-.01	2	-.108	1	-.818	2
47		5	max	50.432	1	81.946	3	-1.915	12	.009	3	.01	5	1.045	3
48			min	-1.363	5	-52.568	2	-45.149	4	-.01	2	-.152	1	-.826	2
49		6	max	50.432	1	240.535	3	22.503	1	.009	3	-.009	12	.866	3
50			min	-12.768	5	-171.763	2	-36.211	5	-.01	2	-.15	1	-.701	2
51		7	max	50.432	1	399.124	3	63.67	1	.009	3	-.007	12	.511	3
52			min	-24.174	5	-290.957	2	-32.689	5	-.01	2	-.102	1	-.444	2
53		8	max	50.432	1	557.714	3	104.838	1	.009	3	0	10	0	15
54			min	-35.58	5	-410.151	2	-29.166	5	-.01	2	-.109	4	-.055	2
55		9	max	50.432	1	716.303	3	146.005	1	.009	3	.131	1	.467	2
56			min	-46.986	5	-529.345	2	-25.644	5	-.01	2	-.136	5	-.728	3
57		10	max	79.468	4	648.539	2	-9.469	12	.01	2	.316	1	1.122	2
58			min	3.293	12	-874.892	3	-187.173	1	-.009	3	.013	12	-1.612	3
59		11	max	68.062	4	529.345	2	-7.192	12	.01	2	.192	4	.467	2
60			min	3.293	12	-716.303	3	-146.005	1	-.009	3	.004	12	-.728	3
61		12	max	56.656	4	410.151	2	-4.915	12	.01	2	.103	5	0	15
62			min	3.293	12	-557.714	3	-104.838	1	-.009	3	-.008	1	-.055	2
63		13	max	50.432	1	290.957	2	-2.639	12	.01	2	.053	5	.511	3
64			min	3.293	12	-399.124	3	-63.67	1	-.009	3	-.102	1	-.444	2
65		14	max	50.432	1	171.763	2	-.362	12	.01	2	.007	5	.866	3
66			min	3.293	12	-240.535	3	-46.077	4	-.009	3	-.15	1	-.701	2
67		15	max	50.432	1	52.568	2	18.665	1	.01	2	-.008	12	1.045	3
68			min	3.293	12	-81.946	3	-36.447	5	-.009	3	-.152	1	-.826	2
69		16	max	50.432	1	76.644	3	59.833	1	.01	2	-.005	12	1.048	3
70			min	-1.865	5	-66.626	2	-32.925	5	-.009	3	-.108	1	-.818	2
71		17	max	50.432	1	235.233	3	101	1	.01	2	.002	3	.875	3
72			min	-13.271	5	-185.82	2	-29.402	5	-.009	3	-.115	4	-.678	2
73		18	max	50.432	1	393.822	3	142.168	1	.01	2	.116	1	.526	3
74			min	-24.676	5	-305.014	2	-25.88	5	-.009	3	-.14	5	-.405	2
75		19	max	50.432	1	552.412	3	183.335	1	.01	2	.297	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	-36.082	5	-424.208	2	-22.357	5	-.009	3	-.166	5	0	3
77	M15	1	max	85.608	5	634.394	2	-10.951	12	.011	2	.346	4	0	2
78			min	-52.892	1	-316.106	3	-183.316	1	-.008	3	.02	12	0	3
79		2	max	74.202	5	452.928	2	-8.674	12	.011	2	.231	4	.302	3
80			min	-52.892	1	-227.573	3	-142.148	1	-.008	3	.01	12	-.604	2
81		3	max	62.796	5	271.462	2	-6.397	12	.011	2	.134	5	.506	3
82			min	-52.892	1	-139.041	3	-100.98	1	-.008	3	-.019	1	-1.006	2
83		4	max	51.39	5	89.996	2	-4.12	12	.011	2	.073	5	.611	3
84			min	-52.892	1	-50.508	3	-68.899	4	-.008	3	-.109	1	-1.207	2
85		5	max	39.985	5	38.024	3	-1.844	12	.011	2	.016	5	.618	3
86			min	-52.892	1	-91.47	2	-55.01	4	-.008	3	-.152	1	-1.206	2
87		6	max	28.579	5	126.557	3	22.522	1	.011	2	-.009	12	.527	3
88			min	-52.892	1	-272.936	2	-46.025	5	-.008	3	-.15	1	-1.004	2
89		7	max	17.173	5	215.089	3	63.69	1	.011	2	-.007	12	.337	3
90			min	-52.892	1	-454.402	2	-42.502	5	-.008	3	-.113	4	-.6	2
91		8	max	5.767	5	303.622	3	104.858	1	.011	2	0	10	.049	3
92			min	-52.892	1	-635.868	2	-38.98	5	-.008	3	-.136	4	-.007	9
93		9	max	-3.654	15	392.154	3	146.025	1	.011	2	.131	1	.813	2
94			min	-52.892	1	-817.334	2	-35.457	5	-.008	3	-.173	5	-.338	3
95		10	max	-3.887	12	998.801	2	-9.54	12	.008	3	.346	4	1.822	2
96			min	-52.892	1	-480.686	3	-187.193	1	-.011	2	.013	12	-.823	3
97		11	max	-2.526	15	817.334	2	-7.263	12	.008	3	.23	4	.813	2
98			min	-52.892	1	-392.154	3	-146.025	1	-.011	2	.004	12	-.338	3
99		12	max	-3.887	12	635.868	2	-4.987	12	.008	3	.13	5	.049	3
100			min	-52.892	1	-303.622	3	-104.858	1	-.011	2	-.008	1	-.007	9
101		13	max	-3.887	12	454.402	2	-2.71	12	.008	3	.069	5	.337	3
102			min	-52.892	1	-215.089	3	-69.859	4	-.011	2	-.102	1	-.6	2
103		14	max	-3.887	12	272.936	2	-.433	12	.008	3	.012	5	.527	3
104			min	-52.892	1	-126.557	3	-55.97	4	-.011	2	-.15	1	-1.004	2
105		15	max	-3.887	12	91.47	2	18.645	1	.008	3	-.008	12	.618	3
106			min	-63.743	4	-38.024	3	-46.267	5	-.011	2	-.152	1	-1.206	2
107		16	max	-3.887	12	50.508	3	59.813	1	.008	3	-.005	12	.611	3
108			min	-75.148	4	-89.996	2	-42.744	5	-.011	2	-.119	4	-1.207	2
109		17	max	-3.887	12	139.041	3	100.98	1	.008	3	.002	3	.506	3
110			min	-86.554	4	-271.462	2	-39.222	5	-.011	2	-.143	4	-1.006	2
111		18	max	-3.887	12	227.573	3	142.148	1	.008	3	.116	1	.302	3
112			min	-97.96	4	-452.928	2	-35.699	5	-.011	2	-.178	5	-.604	2
113		19	max	-3.887	12	316.106	3	183.316	1	.008	3	.297	1	0	2
114			min	-109.366	4	-634.394	2	-32.177	5	-.011	2	-.216	5	0	5
115	M16	1	max	83.566	5	608.564	2	-10.495	12	.009	2	.278	4	0	2
116			min	-117.639	1	-294.192	3	-178.09	1	-.011	3	.018	12	0	3
117		2	max	72.161	5	427.097	2	-8.219	12	.009	2	.178	4	.278	3
118			min	-117.639	1	-205.659	3	-136.923	1	-.011	3	.007	12	-.575	2
119		3	max	60.755	5	245.631	2	-5.942	12	.009	2	.103	5	.457	3
120			min	-117.639	1	-117.127	3	-95.755	1	-.011	3	-.043	1	-.949	2
121		4	max	49.349	5	64.165	2	-3.665	12	.009	2	.056	5	.538	3
122			min	-117.639	1	-28.594	3	-55.035	4	-.011	3	-.126	1	-1.121	2
123		5	max	37.943	5	59.938	3	-1.388	12	.009	2	.012	5	.521	3
124			min	-117.639	1	-117.301	2	-41.145	4	-.011	3	-.164	1	-1.092	2
125		6	max	26.538	5	148.471	3	27.748	1	.009	2	-.009	12	.405	3
126			min	-117.639	1	-298.767	2	-33.651	5	-.011	3	-.156	1	-.861	2
127		7	max	15.132	5	237.003	3	68.915	1	.009	2	-.007	12	.191	3
128			min	-117.639	1	-480.233	2	-30.129	5	-.011	3	-.102	1	-.428	2
129		8	max	3.726	5	325.535	3	110.083	1	.009	2	0	10	.207	2
130			min	-117.639	1	-661.699	2	-26.606	5	-.011	3	-.096	4	-.122	3
131		9	max	-4.948	15	414.068	3	151.25	1	.009	2	.142	1	1.043	2
132			min	-117.639	1	-843.165	2	-23.083	5	-.011	3	-.121	5	-.533	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	-7.951	12	1024.631	2	-9.996	12	.011	3	.333	1	2.08	2
134			min	-117.639	1	-502.6	3	-192.418	1	-.009	2	.015	12	-1.042	3
135		11	max	-7.951	12	843.165	2	-7.719	12	.011	3	.183	4	1.043	2
136			min	-117.639	1	-414.068	3	-151.25	1	-.009	2	.005	12	-.533	3
137		12	max	-7.951	12	661.699	2	-5.442	12	.011	3	.094	4	.207	2
138			min	-117.639	1	-325.535	3	-110.083	1	-.009	2	-.003	3	-.122	3
139		13	max	-7.951	12	480.233	2	-3.165	12	.011	3	.045	5	.191	3
140			min	-117.639	1	-237.003	3	-68.915	1	-.009	2	-.102	1	-.428	2
141		14	max	-7.951	12	298.767	2	-.888	12	.011	3	0	15	.405	3
142			min	-117.639	1	-148.471	3	-45.696	4	-.009	2	-.156	1	-.861	2
143		15	max	-7.951	12	117.301	2	13.42	1	.011	3	-.009	12	.521	3
144			min	-117.639	1	-59.938	3	-34.81	5	-.009	2	-.164	1	-1.092	2
145		16	max	-7.951	12	28.594	3	54.588	1	.011	3	-.006	12	.538	3
146			min	-117.639	1	-64.165	2	-31.287	5	-.009	2	-.126	1	-1.121	2
147		17	max	-7.951	12	117.127	3	95.755	1	.011	3	0	12	.457	3
148			min	-117.639	1	-245.631	2	-27.765	5	-.009	2	-.122	4	-.949	2
149		18	max	-7.951	12	205.659	3	136.923	1	.011	3	.087	1	.278	3
150			min	-123.194	4	-427.097	2	-24.242	5	-.009	2	-.139	5	-.575	2
151		19	max	-7.951	12	294.192	3	178.09	1	.011	3	.262	1	0	2
152			min	-134.6	4	-608.564	2	-20.719	5	-.009	2	-.164	5	0	3
153	M2	1	max	973.395	2	2.04	4	.369	1	0	12	0	3	0	1
154			min	-1327.477	3	.49	15	-24.852	4	0	4	0	2	0	1
155		2	max	973.916	2	1.921	4	.369	1	0	12	0	1	0	15
156			min	-1327.087	3	.462	15	-25.31	4	0	4	-.009	4	0	4
157		3	max	974.436	2	1.802	4	.369	1	0	12	0	1	0	15
158			min	-1326.696	3	.434	15	-25.768	4	0	4	-.018	4	-.001	4
159		4	max	974.957	2	1.684	4	.369	1	0	12	0	1	0	15
160			min	-1326.306	3	.406	15	-26.227	4	0	4	-.027	4	-.002	4
161		5	max	975.478	2	1.565	4	.369	1	0	12	0	1	0	15
162			min	-1325.915	3	.378	15	-26.685	4	0	4	-.037	4	-.003	4
163		6	max	975.998	2	1.446	4	.369	1	0	12	0	1	0	15
164			min	-1325.525	3	.35	15	-27.143	4	0	4	-.046	4	-.003	4
165		7	max	976.519	2	1.327	4	.369	1	0	12	0	1	0	15
166			min	-1325.134	3	.322	15	-27.602	4	0	4	-.056	4	-.004	4
167		8	max	977.04	2	1.208	4	.369	1	0	12	0	1	0	15
168			min	-1324.744	3	.294	15	-28.06	4	0	4	-.066	4	-.004	4
169		9	max	977.56	2	1.089	4	.369	1	0	12	.001	1	-.001	15
170			min	-1324.353	3	.248	12	-28.518	4	0	4	-.076	4	-.004	4
171		10	max	978.081	2	.97	4	.369	1	0	12	.001	1	-.001	15
172			min	-1323.963	3	.202	12	-28.977	4	0	4	-.086	4	-.005	4
173		11	max	978.602	2	.852	4	.369	1	0	12	.001	1	-.001	15
174			min	-1323.572	3	.156	12	-29.435	4	0	4	-.097	4	-.005	4
175		12	max	979.123	2	.748	2	.369	1	0	12	.001	1	-.001	15
176			min	-1323.182	3	.11	12	-29.894	4	0	4	-.107	4	-.005	4
177		13	max	979.643	2	.655	2	.369	1	0	12	.002	1	-.001	15
178			min	-1322.791	3	.063	12	-30.352	4	0	4	-.118	4	-.006	4
179		14	max	980.164	2	.563	2	.369	1	0	12	.002	1	-.001	15
180			min	-1322.401	3	.008	3	-30.81	4	0	4	-.129	4	-.006	4
181		15	max	980.685	2	.47	2	.369	1	0	12	.002	1	-.001	15
182			min	-1322.01	3	-.061	3	-31.269	4	0	4	-.14	4	-.006	4
183		16	max	981.205	2	.377	2	.369	1	0	12	.002	1	-.001	12
184			min	-1321.62	3	-.13	3	-31.727	4	0	4	-.151	4	-.006	4
185		17	max	981.726	2	.285	2	.369	1	0	12	.002	1	-.001	12
186			min	-1321.229	3	-.2	3	-32.185	4	0	4	-.163	4	-.006	4
187		18	max	982.247	2	.192	2	.369	1	0	12	.002	1	-.001	12
188			min	-1320.838	3	-.269	3	-32.644	4	0	4	-.174	4	-.006	4
189		19	max	982.767	2	.1	2	.369	1	0	12	.002	1	-.001	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	-1320.448	3	-.339	3	-33.102	4	0	4	-.186	4	-.006	4
191	M3	1	max	787.578	2	7.681	4	7.04	4	0	12	0	1	.006	4
192			min	-920.486	3	1.814	15	.022	12	0	4	-.034	4	.001	12
193		2	max	787.408	2	6.92	4	7.575	4	0	12	0	1	.004	2
194			min	-920.614	3	1.635	15	.022	12	0	4	-.031	4	0	3
195		3	max	787.238	2	6.159	4	8.109	4	0	12	0	1	.001	2
196			min	-920.742	3	1.456	15	.022	12	0	4	-.028	4	-.001	3
197		4	max	787.067	2	5.398	4	8.644	4	0	12	0	1	0	15
198			min	-920.869	3	1.277	15	.022	12	0	4	-.024	4	-.003	3
199		5	max	786.897	2	4.637	4	9.179	4	0	12	0	1	0	15
200			min	-920.997	3	1.099	15	.022	12	0	4	-.02	5	-.004	6
201		6	max	786.727	2	3.876	4	9.714	4	0	12	.001	1	-.001	15
202			min	-921.125	3	.92	15	.022	12	0	4	-.017	5	-.006	6
203		7	max	786.556	2	3.115	4	10.248	4	0	12	.001	1	-.002	15
204			min	-921.253	3	.741	15	.022	12	0	4	-.013	5	-.007	6
205		8	max	786.386	2	2.354	4	10.783	4	0	12	.001	1	-.002	15
206			min	-921.38	3	.562	15	.022	12	0	4	-.008	5	-.008	6
207		9	max	786.215	2	1.593	4	11.318	4	0	12	.002	1	-.002	15
208			min	-921.508	3	.383	15	.022	12	0	4	-.004	5	-.009	6
209		10	max	786.045	2	.832	4	11.852	4	0	12	.002	1	-.002	15
210			min	-921.636	3	.173	12	.022	12	0	4	0	12	-.01	6
211		11	max	785.875	2	.207	2	12.387	4	0	12	.007	4	-.002	15
212			min	-921.764	3	-.199	3	.022	12	0	4	0	12	-.01	6
213		12	max	785.704	2	-.154	15	12.922	4	0	12	.012	4	-.002	15
214			min	-921.892	3	-.691	6	.022	12	0	4	0	12	-.01	6
215		13	max	785.534	2	-.332	15	13.456	4	0	12	.017	4	-.002	15
216			min	-922.019	3	-1.452	6	.022	12	0	4	0	12	-.009	6
217		14	max	785.364	2	-.511	15	13.991	4	0	12	.023	4	-.002	15
218			min	-922.147	3	-2.213	6	.022	12	0	4	0	12	-.009	6
219		15	max	785.193	2	-.69	15	14.526	4	0	12	.029	4	-.002	15
220			min	-922.275	3	-2.974	6	.022	12	0	4	0	12	-.007	6
221		16	max	785.023	2	-.869	15	15.06	4	0	12	.035	4	-.001	15
222			min	-922.403	3	-3.735	6	.022	12	0	4	0	12	-.006	6
223		17	max	784.853	2	-1.048	15	15.595	4	0	12	.041	4	-.001	15
224			min	-922.53	3	-4.496	6	.022	12	0	4	0	12	-.004	6
225		18	max	784.682	2	-1.227	15	16.13	4	0	12	.048	4	0	15
226			min	-922.658	3	-5.257	6	.022	12	0	4	0	12	-.002	6
227		19	max	784.512	2	-1.406	15	16.665	4	0	12	.055	4	0	1
228			min	-922.786	3	-6.018	6	.022	12	0	4	0	12	0	1
229	M4	1	max	918.571	1	0	1	-.817	12	0	1	.052	4	0	1
230			min	-49.456	5	0	1	-299.482	4	0	1	0	12	0	1
231		2	max	918.741	1	0	1	-.817	12	0	1	.018	4	0	1
232			min	-49.377	5	0	1	-299.629	4	0	1	0	12	0	1
233		3	max	918.912	1	0	1	-.817	12	0	1	0	3	0	1
234			min	-49.297	5	0	1	-299.777	4	0	1	-.017	4	0	1
235		4	max	919.082	1	0	1	-.817	12	0	1	0	12	0	1
236			min	-49.218	5	0	1	-299.925	4	0	1	-.051	4	0	1
237		5	max	919.252	1	0	1	-.817	12	0	1	0	12	0	1
238			min	-49.138	5	0	1	-300.072	4	0	1	-.086	4	0	1
239		6	max	919.423	1	0	1	-.817	12	0	1	0	12	0	1
240			min	-49.059	5	0	1	-300.22	4	0	1	-.12	4	0	1
241		7	max	919.593	1	0	1	-.817	12	0	1	0	12	0	1
242			min	-48.979	5	0	1	-300.368	4	0	1	-.155	4	0	1
243		8	max	919.763	1	0	1	-.817	12	0	1	0	12	0	1
244			min	-48.9	5	0	1	-300.515	4	0	1	-.189	4	0	1
245		9	max	919.934	1	0	1	-.817	12	0	1	0	12	0	1
246			min	-48.82	5	0	1	-300.663	4	0	1	-.224	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	920.104	1	0	1	-.817	12	0	1	0	12	0	1
248			min	-48.741	5	0	1	-300.81	4	0	1	-.258	4	0	1
249		11	max	920.274	1	0	1	-.817	12	0	1	0	12	0	1
250			min	-48.661	5	0	1	-300.958	4	0	1	-.293	4	0	1
251		12	max	920.445	1	0	1	-.817	12	0	1	0	12	0	1
252			min	-48.582	5	0	1	-301.106	4	0	1	-.327	4	0	1
253		13	max	920.615	1	0	1	-.817	12	0	1	0	12	0	1
254			min	-48.502	5	0	1	-301.253	4	0	1	-.362	4	0	1
255		14	max	920.785	1	0	1	-.817	12	0	1	-.001	12	0	1
256			min	-48.423	5	0	1	-301.401	4	0	1	-.396	4	0	1
257		15	max	920.956	1	0	1	-.817	12	0	1	-.001	12	0	1
258			min	-48.343	5	0	1	-301.549	4	0	1	-.431	4	0	1
259		16	max	921.126	1	0	1	-.817	12	0	1	-.001	12	0	1
260			min	-48.264	5	0	1	-301.696	4	0	1	-.466	4	0	1
261		17	max	921.297	1	0	1	-.817	12	0	1	-.001	12	0	1
262			min	-48.184	5	0	1	-301.844	4	0	1	-.5	4	0	1
263		18	max	921.467	1	0	1	-.817	12	0	1	-.001	12	0	1
264			min	-48.105	5	0	1	-301.991	4	0	1	-.535	4	0	1
265		19	max	921.637	1	0	1	-.817	12	0	1	-.001	12	0	1
266			min	-48.025	5	0	1	-302.139	4	0	1	-.57	4	0	1
267	M6	1	max	3123.969	2	2.25	2	0	1	0	1	0	4	0	1
268			min	-4331.319	3	.249	12	-25.126	4	0	4	0	1	0	1
269		2	max	3124.49	2	2.157	2	0	1	0	1	0	1	0	12
270			min	-4330.928	3	.203	12	-25.584	4	0	4	-.009	4	0	2
271		3	max	3125.011	2	2.064	2	0	1	0	1	0	1	0	12
272			min	-4330.538	3	.157	12	-26.043	4	0	4	-.018	4	-.002	2
273		4	max	3125.531	2	1.972	2	0	1	0	1	0	1	0	12
274			min	-4330.147	3	.11	12	-26.501	4	0	4	-.028	4	-.002	2
275		5	max	3126.052	2	1.879	2	0	1	0	1	0	1	0	12
276			min	-4329.757	3	.042	3	-26.959	4	0	4	-.037	4	-.003	2
277		6	max	3126.573	2	1.787	2	0	1	0	1	0	1	0	12
278			min	-4329.366	3	-.027	3	-27.418	4	0	4	-.047	4	-.004	2
279		7	max	3127.093	2	1.694	2	0	1	0	1	0	1	0	12
280			min	-4328.976	3	-.097	3	-27.876	4	0	4	-.057	4	-.004	2
281		8	max	3127.614	2	1.601	2	0	1	0	1	0	1	0	3
282			min	-4328.585	3	-.166	3	-28.334	4	0	4	-.067	4	-.005	2
283		9	max	3128.135	2	1.509	2	0	1	0	1	0	1	0	3
284			min	-4328.195	3	-.236	3	-28.793	4	0	4	-.077	4	-.005	2
285		10	max	3128.655	2	1.416	2	0	1	0	1	0	1	0	3
286			min	-4327.804	3	-.305	3	-29.251	4	0	4	-.087	4	-.006	2
287		11	max	3129.176	2	1.323	2	0	1	0	1	0	1	0	3
288			min	-4327.414	3	-.375	3	-29.709	4	0	4	-.098	4	-.006	2
289		12	max	3129.697	2	1.231	2	0	1	0	1	0	1	0	3
290			min	-4327.023	3	-.444	3	-30.168	4	0	4	-.108	4	-.007	2
291		13	max	3130.218	2	1.138	2	0	1	0	1	0	1	0	3
292			min	-4326.633	3	-.514	3	-30.626	4	0	4	-.119	4	-.007	2
293		14	max	3130.738	2	1.046	2	0	1	0	1	0	1	0	3
294			min	-4326.242	3	-.583	3	-31.085	4	0	4	-.13	4	-.008	2
295		15	max	3131.259	2	.953	2	0	1	0	1	0	1	0	3
296			min	-4325.852	3	-.653	3	-31.543	4	0	4	-.141	4	-.008	2
297		16	max	3131.78	2	.86	2	0	1	0	1	0	1	.001	3
298			min	-4325.461	3	-.722	3	-32.001	4	0	4	-.153	4	-.008	2
299		17	max	3132.3	2	.768	2	0	1	0	1	0	1	.001	3
300			min	-4325.07	3	-.792	3	-32.46	4	0	4	-.164	4	-.009	2
301		18	max	3132.821	2	.675	2	0	1	0	1	0	1	.002	3
302			min	-4324.68	3	-.861	3	-32.918	4	0	4	-.176	4	-.009	2
303		19	max	3133.342	2	.582	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	-4324.289	3	-.93	3	-33.376	4	0	4	-.188	4	-.009	2
305	M7	1	max	2856.032	2	7.69	6	6.63	4	0	1	0	1	.009	2
306			min	-2902.034	3	1.806	15	0	1	0	4	-.034	4	-.002	3
307		2	max	2855.862	2	6.929	6	7.165	4	0	1	0	1	.006	2
308			min	-2902.162	3	1.627	15	0	1	0	4	-.031	4	-.003	3
309		3	max	2855.692	2	6.168	6	7.699	4	0	1	0	1	.004	2
310			min	-2902.289	3	1.448	15	0	1	0	4	-.028	4	-.005	3
311		4	max	2855.521	2	5.407	6	8.234	4	0	1	0	1	.002	2
312			min	-2902.417	3	1.269	15	0	1	0	4	-.025	4	-.006	3
313		5	max	2855.351	2	4.646	6	8.769	4	0	1	0	1	0	2
314			min	-2902.545	3	1.09	15	0	1	0	4	-.021	4	-.007	3
315		6	max	2855.181	2	3.885	6	9.304	4	0	1	0	1	-.001	15
316			min	-2902.673	3	.912	15	0	1	0	4	-.018	4	-.007	3
317		7	max	2855.01	2	3.124	6	9.838	4	0	1	0	1	-.002	15
318			min	-2902.8	3	.733	15	0	1	0	4	-.014	4	-.008	3
319		8	max	2854.84	2	2.4	2	10.373	4	0	1	0	1	-.002	15
320			min	-2902.928	3	.449	12	0	1	0	4	-.009	4	-.008	4
321		9	max	2854.67	2	1.807	2	10.908	4	0	1	0	1	-.002	15
322			min	-2903.056	3	.153	12	0	1	0	4	-.005	5	-.009	4
323		10	max	2854.499	2	1.214	2	11.442	4	0	1	0	1	-.002	15
324			min	-2903.184	3	-.262	3	0	1	0	4	0	5	-.01	4
325		11	max	2854.329	2	.621	2	11.977	4	0	1	.004	4	-.002	15
326			min	-2903.311	3	-.706	3	0	1	0	4	0	1	-.01	4
327		12	max	2854.159	2	.028	2	12.512	4	0	1	.01	4	-.002	15
328			min	-2903.439	3	-1.151	3	0	1	0	4	0	1	-.01	4
329		13	max	2853.988	2	-.341	15	13.046	4	0	1	.015	4	-.002	15
330			min	-2903.567	3	-1.596	3	0	1	0	4	0	1	-.009	4
331		14	max	2853.818	2	-.52	15	13.581	4	0	1	.02	4	-.002	15
332			min	-2903.695	3	-2.202	4	0	1	0	4	0	1	-.009	4
333		15	max	2853.648	2	-.698	15	14.116	4	0	1	.026	4	-.002	15
334			min	-2903.823	3	-2.963	4	0	1	0	4	0	1	-.007	4
335		16	max	2853.477	2	-.877	15	14.65	4	0	1	.032	4	-.001	15
336			min	-2903.95	3	-3.724	4	0	1	0	4	0	1	-.006	4
337		17	max	2853.307	2	-1.056	15	15.185	4	0	1	.038	4	-.001	15
338			min	-2904.078	3	-4.485	4	0	1	0	4	0	1	-.004	4
339		18	max	2853.137	2	-1.235	15	15.72	4	0	1	.045	4	0	15
340			min	-2904.206	3	-5.246	4	0	1	0	4	0	1	-.002	4
341		19	max	2852.966	2	-1.414	15	16.254	4	0	1	.051	4	0	1
342			min	-2904.334	3	-6.007	4	0	1	0	4	0	1	0	1
343	M8	1	max	2267.344	1	0	1	0	1	0	1	.049	4	0	1
344			min	94.373	15	0	1	-287.897	4	0	1	0	1	0	1
345		2	max	2267.514	1	0	1	0	1	0	1	.016	4	0	1
346			min	94.424	15	0	1	-288.045	4	0	1	0	1	0	1
347		3	max	2267.685	1	0	1	0	1	0	1	0	1	0	1
348			min	94.475	15	0	1	-288.192	4	0	1	-.017	4	0	1
349		4	max	2267.855	1	0	1	0	1	0	1	0	1	0	1
350			min	94.527	15	0	1	-288.34	4	0	1	-.05	4	0	1
351		5	max	2268.025	1	0	1	0	1	0	1	0	1	0	1
352			min	94.578	15	0	1	-288.488	4	0	1	-.084	4	0	1
353		6	max	2268.196	1	0	1	0	1	0	1	0	1	0	1
354			min	94.63	15	0	1	-288.635	4	0	1	-.117	4	0	1
355		7	max	2268.366	1	0	1	0	1	0	1	0	1	0	1
356			min	94.681	15	0	1	-288.783	4	0	1	-.15	4	0	1
357		8	max	2268.536	1	0	1	0	1	0	1	0	1	0	1
358			min	94.732	15	0	1	-288.931	4	0	1	-.183	4	0	1
359		9	max	2268.707	1	0	1	0	1	0	1	0	1	0	1
360			min	94.784	15	0	1	-289.078	4	0	1	-.216	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	2268.877	1	0	1	0	1	0	1	0	1	0	1
362			min	94.835	15	0	1	-289.226	4	0	1	-.249	4	0	1
363		11	max	2269.048	1	0	1	0	1	0	1	0	1	0	1
364			min	94.886	15	0	1	-289.373	4	0	1	-.283	4	0	1
365		12	max	2269.218	1	0	1	0	1	0	1	0	1	0	1
366			min	94.938	15	0	1	-289.521	4	0	1	-.316	4	0	1
367		13	max	2269.388	1	0	1	0	1	0	1	0	1	0	1
368			min	94.989	15	0	1	-289.669	4	0	1	-.349	4	0	1
369		14	max	2269.559	1	0	1	0	1	0	1	0	1	0	1
370			min	95.041	15	0	1	-289.816	4	0	1	-.382	4	0	1
371		15	max	2269.729	1	0	1	0	1	0	1	0	1	0	1
372			min	95.092	15	0	1	-289.964	4	0	1	-.416	4	0	1
373		16	max	2269.899	1	0	1	0	1	0	1	0	1	0	1
374			min	95.143	15	0	1	-290.112	4	0	1	-.449	4	0	1
375		17	max	2270.07	1	0	1	0	1	0	1	0	1	0	1
376			min	95.195	15	0	1	-290.259	4	0	1	-.482	4	0	1
377		18	max	2270.24	1	0	1	0	1	0	1	0	1	0	1
378			min	95.246	15	0	1	-290.407	4	0	1	-.516	4	0	1
379		19	max	2270.41	1	0	1	0	1	0	1	0	1	0	1
380			min	95.298	15	0	1	-290.554	4	0	1	-.549	4	0	1
381	M10	1	max	973.395	2	1.995	6	-.023	12	0	1	0	2	0	1
382			min	-1327.477	3	.459	15	-25.102	4	0	5	0	3	0	1
383		2	max	973.916	2	1.876	6	-.023	12	0	1	0	10	0	15
384			min	-1327.087	3	.431	15	-25.56	4	0	5	-.009	4	0	6
385		3	max	974.436	2	1.758	6	-.023	12	0	1	0	10	0	15
386			min	-1326.696	3	.404	15	-26.019	4	0	5	-.018	4	-.001	6
387		4	max	974.957	2	1.639	6	-.023	12	0	1	0	12	0	15
388			min	-1326.306	3	.376	15	-26.477	4	0	5	-.028	4	-.002	6
389		5	max	975.478	2	1.52	6	-.023	12	0	1	0	12	0	15
390			min	-1325.915	3	.348	15	-26.936	4	0	5	-.037	4	-.003	6
391		6	max	975.998	2	1.401	6	-.023	12	0	1	0	12	0	15
392			min	-1325.525	3	.32	15	-27.394	4	0	5	-.047	4	-.003	6
393		7	max	976.519	2	1.282	6	-.023	12	0	1	0	12	0	15
394			min	-1325.134	3	.292	15	-27.852	4	0	5	-.057	4	-.004	6
395		8	max	977.04	2	1.163	6	-.023	12	0	1	0	12	0	15
396			min	-1324.744	3	.264	15	-28.311	4	0	5	-.067	4	-.004	6
397		9	max	977.56	2	1.044	6	-.023	12	0	1	0	12	0	15
398			min	-1324.353	3	.236	15	-28.769	4	0	5	-.077	4	-.004	6
399		10	max	978.081	2	.933	2	-.023	12	0	1	0	12	-.001	15
400			min	-1323.963	3	.202	12	-29.227	4	0	5	-.087	4	-.005	6
401		11	max	978.602	2	.841	2	-.023	12	0	1	0	12	-.001	15
402			min	-1323.572	3	.156	12	-29.686	4	0	5	-.098	4	-.005	6
403		12	max	979.123	2	.748	2	-.023	12	0	1	0	12	-.001	15
404			min	-1323.182	3	.11	12	-30.144	4	0	5	-.108	4	-.005	6
405		13	max	979.643	2	.655	2	-.023	12	0	1	0	12	-.001	15
406			min	-1322.791	3	.063	12	-30.602	4	0	5	-.119	4	-.005	6
407		14	max	980.164	2	.563	2	-.023	12	0	1	0	12	-.001	15
408			min	-1322.401	3	.008	3	-31.061	4	0	5	-.13	4	-.006	6
409		15	max	980.685	2	.47	2	-.023	12	0	1	0	12	-.001	15
410			min	-1322.01	3	-.061	3	-31.519	4	0	5	-.141	4	-.006	6
411		16	max	981.205	2	.377	2	-.023	12	0	1	0	12	-.001	15
412			min	-1321.62	3	-.13	3	-31.977	4	0	5	-.153	4	-.006	6
413		17	max	981.726	2	.285	2	-.023	12	0	1	0	12	-.001	15
414			min	-1321.229	3	-.2	3	-32.436	4	0	5	-.164	4	-.006	6
415		18	max	982.247	2	.192	2	-.023	12	0	1	0	12	-.001	15
416			min	-1320.838	3	-.269	3	-32.894	4	0	5	-.176	4	-.006	6
417		19	max	982.767	2	.1	2	-.023	12	0	1	0	12	-.001	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
418			min	-1320.448	3	-.339	3	-33.352	4	0	5	-.188	4	-.006	2
419	M11	1	max	787.578	2	7.642	6	6.817	4	0	1	0	12	.006	2
420			min	-920.486	3	1.788	15	-.328	1	0	4	-.034	4	.001	12
421		2	max	787.408	2	6.881	6	7.352	4	0	1	0	12	.004	2
422			min	-920.614	3	1.609	15	-.328	1	0	4	-.031	4	0	3
423		3	max	787.238	2	6.12	6	7.886	4	0	1	0	12	.001	2
424			min	-920.742	3	1.43	15	-.328	1	0	4	-.028	4	-.001	3
425		4	max	787.067	2	5.359	6	8.421	4	0	1	0	12	0	2
426			min	-920.869	3	1.252	15	-.328	1	0	4	-.025	4	-.003	3
427		5	max	786.897	2	4.598	6	8.956	4	0	1	0	12	-.001	15
428			min	-920.997	3	1.073	15	-.328	1	0	4	-.021	4	-.004	4
429		6	max	786.727	2	3.837	6	9.491	4	0	1	0	12	-.001	15
430			min	-921.125	3	.894	15	-.328	1	0	4	-.017	4	-.006	4
431		7	max	786.556	2	3.076	6	10.025	4	0	1	0	12	-.002	15
432			min	-921.253	3	.715	15	-.328	1	0	4	-.013	4	-.007	4
433		8	max	786.386	2	2.315	6	10.56	4	0	1	0	12	-.002	15
434			min	-921.38	3	.536	15	-.328	1	0	4	-.009	4	-.009	4
435		9	max	786.215	2	1.554	6	11.095	4	0	1	0	12	-.002	15
436			min	-921.508	3	.357	15	-.328	1	0	4	-.004	4	-.009	4
437		10	max	786.045	2	.8	2	11.629	4	0	1	0	5	-.002	15
438			min	-921.636	3	.173	12	-.328	1	0	4	-.002	1	-.01	4
439		11	max	785.875	2	.207	2	12.164	4	0	1	.006	5	-.002	15
440			min	-921.764	3	-.199	3	-.328	1	0	4	-.002	1	-.01	4
441		12	max	785.704	2	-.18	15	12.699	4	0	1	.011	5	-.002	15
442			min	-921.892	3	-.729	4	-.328	1	0	4	-.002	1	-.01	4
443		13	max	785.534	2	-.358	15	13.233	4	0	1	.016	5	-.002	15
444			min	-922.019	3	-1.49	4	-.328	1	0	4	-.002	1	-.009	4
445		14	max	785.364	2	-.537	15	13.768	4	0	1	.022	5	-.002	15
446			min	-922.147	3	-2.251	4	-.328	1	0	4	-.002	1	-.009	4
447		15	max	785.193	2	-.716	15	14.303	4	0	1	.028	5	-.002	15
448			min	-922.275	3	-3.012	4	-.328	1	0	4	-.002	1	-.008	4
449		16	max	785.023	2	-.895	15	14.837	4	0	1	.034	5	-.001	15
450			min	-922.403	3	-3.773	4	-.328	1	0	4	-.002	1	-.006	4
451		17	max	784.853	2	-1.074	15	15.372	4	0	1	.04	5	-.001	15
452			min	-922.53	3	-4.534	4	-.328	1	0	4	-.003	1	-.004	4
453		18	max	784.682	2	-1.253	15	15.907	4	0	1	.046	5	0	15
454			min	-922.658	3	-5.295	4	-.328	1	0	4	-.003	1	-.002	4
455		19	max	784.512	2	-1.432	15	16.442	4	0	1	.053	5	0	1
456			min	-922.786	3	-6.056	4	-.328	1	0	4	-.003	1	0	1
457	M12	1	max	918.571	1	0	1	12.216	1	0	1	.05	5	0	1
458			min	66.942	12	0	1	-291.161	4	0	1	-.003	1	0	1
459		2	max	918.741	1	0	1	12.216	1	0	1	.017	5	0	1
460			min	67.027	12	0	1	-291.309	4	0	1	-.001	1	0	1
461		3	max	918.912	1	0	1	12.216	1	0	1	0	1	0	1
462			min	67.112	12	0	1	-291.456	4	0	1	-.017	4	0	1
463		4	max	919.082	1	0	1	12.216	1	0	1	.001	1	0	1
464			min	67.198	12	0	1	-291.604	4	0	1	-.05	4	0	1
465		5	max	919.252	1	0	1	12.216	1	0	1	.003	1	0	1
466			min	67.283	12	0	1	-291.752	4	0	1	-.084	4	0	1
467		6	max	919.423	1	0	1	12.216	1	0	1	.004	1	0	1
468			min	67.368	12	0	1	-291.899	4	0	1	-.117	4	0	1
469		7	max	919.593	1	0	1	12.216	1	0	1	.006	1	0	1
470			min	67.453	12	0	1	-292.047	4	0	1	-.151	4	0	1
471		8	max	919.763	1	0	1	12.216	1	0	1	.007	1	0	1
472			min	67.538	12	0	1	-292.195	4	0	1	-.184	4	0	1
473		9	max	919.934	1	0	1	12.216	1	0	1	.008	1	0	1
474			min	67.623	12	0	1	-292.342	4	0	1	-.218	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	920.104	1	0	1	12.216	1	0	1	.01	1	0	1
476			min	67.709	12	0	1	-292.49	4	0	1	-.251	4	0	1
477		11	max	920.274	1	0	1	12.216	1	0	1	.011	1	0	1
478			min	67.794	12	0	1	-292.637	4	0	1	-.285	4	0	1
479		12	max	920.445	1	0	1	12.216	1	0	1	.013	1	0	1
480			min	67.879	12	0	1	-292.785	4	0	1	-.319	4	0	1
481		13	max	920.615	1	0	1	12.216	1	0	1	.014	1	0	1
482			min	67.964	12	0	1	-292.933	4	0	1	-.352	4	0	1
483		14	max	920.785	1	0	1	12.216	1	0	1	.016	1	0	1
484			min	68.049	12	0	1	-293.08	4	0	1	-.386	4	0	1
485		15	max	920.956	1	0	1	12.216	1	0	1	.017	1	0	1
486			min	68.135	12	0	1	-293.228	4	0	1	-.42	4	0	1
487		16	max	921.126	1	0	1	12.216	1	0	1	.018	1	0	1
488			min	68.22	12	0	1	-293.376	4	0	1	-.453	4	0	1
489		17	max	921.297	1	0	1	12.216	1	0	1	.02	1	0	1
490			min	68.305	12	0	1	-293.523	4	0	1	-.487	4	0	1
491		18	max	921.467	1	0	1	12.216	1	0	1	.021	1	0	1
492			min	68.39	12	0	1	-293.671	4	0	1	-.521	4	0	1
493		19	max	921.637	1	0	1	12.216	1	0	1	.023	1	0	1
494			min	68.475	12	0	1	-293.819	4	0	1	-.554	4	0	1
495	M1	1	max	177.824	1	692.899	3	42.766	5	0	2	.26	1	.002	3
496			min	-10.005	5	-396.691	2	-108.669	1	0	3	-.108	5	-.013	2
497		2	max	178.646	1	692.019	3	44.008	5	0	2	.203	1	.196	2
498			min	-9.622	5	-397.864	2	-108.669	1	0	3	-.086	5	-.364	3
499		3	max	577.21	3	480.675	2	21.01	5	0	3	.145	1	.396	2
500			min	-329.759	2	-516.156	3	-108.484	1	0	2	-.062	5	-.714	3
501		4	max	577.827	3	479.502	2	22.251	5	0	3	.088	1	.143	2
502			min	-328.938	2	-517.036	3	-108.484	1	0	2	-.051	5	-.441	3
503		5	max	578.443	3	478.329	2	23.493	5	0	3	.031	1	-.003	15
504			min	-328.116	2	-517.916	3	-108.484	1	0	2	-.039	5	-.168	3
505		6	max	579.059	3	477.155	2	24.734	5	0	3	-.002	12	.105	3
506			min	-327.294	2	-518.796	3	-108.484	1	0	2	-.033	4	-.362	2
507		7	max	579.675	3	475.982	2	25.976	5	0	3	-.006	12	.379	3
508			min	-326.473	2	-519.676	3	-108.484	1	0	2	-.084	1	-.614	2
509		8	max	580.291	3	474.809	2	27.217	5	0	3	.001	5	.654	3
510			min	-325.651	2	-520.557	3	-108.484	1	0	2	-.141	1	-.864	2
511		9	max	597.524	3	52.636	2	64.415	5	0	9	.083	1	.761	3
512			min	-245.273	2	.355	15	-158.959	1	0	3	-.139	5	-.991	2
513		10	max	598.14	3	51.463	2	65.657	5	0	9	0	10	.743	3
514			min	-244.451	2	.001	15	-158.959	1	0	3	-.106	4	-1.019	2
515		11	max	598.756	3	50.29	2	66.898	5	0	9	-.006	12	.725	3
516			min	-243.63	2	-1.451	4	-158.959	1	0	3	-.091	4	-1.046	2
517		12	max	615.877	3	352.286	3	163.212	5	0	2	.139	1	.633	3
518			min	-163.218	2	-583.854	2	-106.119	1	0	3	-.23	5	-.928	2
519		13	max	616.493	3	351.405	3	164.453	5	0	2	.083	1	.447	3
520			min	-162.396	2	-585.027	2	-106.119	1	0	3	-.144	5	-.619	2
521		14	max	617.109	3	350.525	3	165.695	5	0	2	.027	1	.262	3
522			min	-161.574	2	-586.201	2	-106.119	1	0	3	-.057	5	-.31	2
523		15	max	617.725	3	349.645	3	166.936	5	0	2	.031	5	.077	3
524			min	-160.753	2	-587.374	2	-106.119	1	0	3	-.029	1	-.021	1
525		16	max	618.342	3	348.765	3	168.178	5	0	2	.12	5	.309	2
526			min	-159.931	2	-588.547	2	-106.119	1	0	3	-.085	1	-.107	3
527		17	max	618.958	3	347.885	3	169.419	5	0	2	.209	5	.62	2
528			min	-159.11	2	-589.721	2	-106.119	1	0	3	-.141	1	-.291	3
529		18	max	20.336	5	610.282	2	-7.952	12	0	3	.219	5	.312	2
530			min	-178.906	1	-293.404	3	-135.977	4	0	2	-.2	1	-.144	3
531		19	max	20.719	5	609.108	2	-7.952	12	0	3	.164	5	.011	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	-178.084	1	-294.284	3	-134.735	4	0	2	-.262	1	-.009	2
533	M5	1	max	385.368	1	2309.219	3	101.209	5	0	1	0	1	.027	2
534			min	19.521	12	-1346.996	2	0	1	0	4	-.247	4	-.003	3
535		2	max	386.189	1	2308.339	3	102.451	5	0	1	0	1	.738	2
536			min	19.931	12	-1348.17	2	0	1	0	4	-.193	4	-1.222	3
537		3	max	1852.754	3	1451.449	2	82.188	4	0	4	0	1	1.416	2
538			min	-1142.917	2	-1655.858	3	0	1	0	1	-.139	4	-2.392	3
539		4	max	1853.37	3	1450.276	2	83.43	4	0	4	0	1	.65	2
540			min	-1142.095	2	-1656.738	3	0	1	0	1	-.095	4	-1.518	3
541		5	max	1853.986	3	1449.103	2	84.671	4	0	4	0	1	.004	9
542			min	-1141.274	2	-1657.618	3	0	1	0	1	-.051	4	-.643	3
543		6	max	1854.602	3	1447.929	2	85.913	4	0	4	0	1	.232	3
544			min	-1140.452	2	-1658.498	3	0	1	0	1	-.006	5	-.879	2
545		7	max	1855.218	3	1446.756	2	87.154	4	0	4	.04	4	1.107	3
546			min	-1139.631	2	-1659.378	3	0	1	0	1	0	1	-1.643	2
547		8	max	1855.835	3	1445.582	2	88.395	4	0	4	.086	4	1.983	3
548			min	-1138.809	2	-1660.258	3	0	1	0	1	0	1	-2.406	2
549		9	max	1884.691	3	176.337	2	215.389	4	0	1	0	1	2.276	3
550			min	-972.122	2	.355	15	0	1	0	1	-.211	4	-2.746	2
551		10	max	1885.307	3	175.164	2	216.631	4	0	1	0	1	2.212	3
552			min	-971.3	2	0	15	0	1	0	1	-.097	4	-2.839	2
553		11	max	1885.924	3	173.99	2	217.872	4	0	1	.018	4	2.148	3
554			min	-970.479	2	-1.299	6	0	1	0	1	0	1	-2.931	2
555		12	max	1915.004	3	1119.418	3	243.365	4	0	1	0	1	1.89	3
556			min	-803.859	2	-1803.864	2	0	1	0	4	-.343	4	-2.628	2
557		13	max	1915.62	3	1118.537	3	244.606	4	0	1	0	1	1.3	3
558			min	-803.037	2	-1805.037	2	0	1	0	4	-.214	4	-1.676	2
559		14	max	1916.236	3	1117.657	3	245.848	4	0	1	0	1	.71	3
560			min	-802.216	2	-1806.211	2	0	1	0	4	-.085	4	-.723	2
561		15	max	1916.853	3	1116.777	3	247.089	4	0	1	.045	4	.231	2
562			min	-801.394	2	-1807.384	2	0	1	0	4	0	1	-.003	13
563		16	max	1917.469	3	1115.897	3	248.331	4	0	1	.176	4	1.185	2
564			min	-800.573	2	-1808.557	2	0	1	0	4	0	1	-.469	3
565		17	max	1918.085	3	1115.017	3	249.572	4	0	1	.307	4	2.139	2
566			min	-799.751	2	-1809.731	2	0	1	0	4	0	1	-1.058	3
567		18	max	-20.401	12	2053.461	2	0	1	0	4	.361	4	1.102	2
568			min	-385.67	1	-1004.868	3	-19.159	5	0	1	0	1	-.553	3
569		19	max	-19.99	12	2052.287	2	0	1	0	4	.352	4	.019	2
570			min	-384.848	1	-1005.748	3	-17.917	5	0	1	0	1	-.023	3
571	M9	1	max	177.824	1	692.899	3	108.669	1	0	3	-.019	12	.002	3
572			min	10.731	12	-396.691	2	7.777	12	0	4	-.26	1	-.013	2
573		2	max	178.646	1	692.019	3	108.669	1	0	3	-.015	12	.196	2
574			min	11.141	12	-397.864	2	7.777	12	0	4	-.203	1	-.364	3
575		3	max	577.21	3	480.675	2	108.484	1	0	2	-.01	12	.396	2
576			min	-329.759	2	-516.156	3	7.754	12	0	3	-.145	1	-.714	3
577		4	max	577.827	3	479.502	2	108.484	1	0	2	-.006	12	.143	2
578			min	-328.938	2	-517.036	3	7.754	12	0	3	-.09	4	-.441	3
579		5	max	578.443	3	478.329	2	108.484	1	0	2	-.002	12	-.003	15
580			min	-328.116	2	-517.916	3	7.754	12	0	3	-.053	4	-.168	3
581		6	max	579.059	3	477.155	2	108.484	1	0	2	.026	1	.105	3
582			min	-327.294	2	-518.796	3	7.754	12	0	3	-.022	5	-.362	2
583		7	max	579.675	3	475.982	2	108.484	1	0	2	.084	1	.379	3
584			min	-326.473	2	-519.676	3	7.754	12	0	3	0	15	-.614	2
585		8	max	580.291	3	474.809	2	108.484	1	0	2	.141	1	.654	3
586			min	-325.651	2	-520.557	3	7.754	12	0	3	.01	12	-.864	2
587		9	max	597.524	3	52.636	2	158.959	1	0	3	-.006	12	.761	3
588			min	-245.273	2	.363	15	11.04	12	0	9	-.176	4	-.991	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	598.14	3	51.463	2	158.959	1	0	3	.001	1	.743	3
590			min	-244.451	2	.009	15	11.04	12	0	9	-.105	4	-1.019	2
591		11	max	598.756	3	50.29	2	158.959	1	0	3	.085	1	.725	3
592			min	-243.63	2	-1.402	6	11.04	12	0	9	-.055	5	-1.046	2
593		12	max	615.877	3	352.286	3	210.631	4	0	3	-.009	12	.633	3
594			min	-163.218	2	-583.854	2	7.161	12	0	2	-.292	4	-.928	2
595		13	max	616.493	3	351.405	3	211.872	4	0	3	-.006	12	.447	3
596			min	-162.396	2	-585.027	2	7.161	12	0	2	-.181	4	-.619	2
597		14	max	617.109	3	350.525	3	213.114	4	0	3	-.002	12	.262	3
598			min	-161.574	2	-586.201	2	7.161	12	0	2	-.069	4	-.31	2
599		15	max	617.725	3	349.645	3	214.355	4	0	3	.044	4	.077	3
600			min	-160.753	2	-587.374	2	7.161	12	0	2	.002	12	-.021	1
601		16	max	618.342	3	348.765	3	215.597	4	0	3	.158	4	.309	2
602			min	-159.931	2	-588.547	2	7.161	12	0	2	.006	12	-.107	3
603		17	max	618.958	3	347.885	3	216.838	4	0	3	.272	4	.62	2
604			min	-159.11	2	-589.721	2	7.161	12	0	2	.009	12	-.291	3
605		18	max	-10.907	12	610.282	2	117.769	1	0	2	.307	4	.312	2
606			min	-178.906	1	-293.404	3	-85.071	5	0	3	.013	12	-.144	3
607		19	max	-10.496	12	609.108	2	117.769	1	0	2	.278	4	.011	3
608			min	-178.084	1	-294.284	3	-83.829	5	0	3	.018	12	-.009	2

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	.102	2	.01	3	8.639e-3	2	NC	1	NC	1
2			min	-.726	4	-.019	3	-.005	2	-2.085e-3	3	NC	1	NC	1
3		2	max	0	1	.309	3	.04	1	9.939e-3	2	NC	5	NC	2
4			min	-.726	4	-.068	1	-.024	5	-2.251e-3	3	732.949	3	6043.888	1
5		3	max	0	1	.574	3	.097	1	1.124e-2	2	NC	5	NC	3
6			min	-.726	4	-.199	2	-.029	5	-2.418e-3	3	405.066	3	2474.479	1
7		4	max	0	1	.734	3	.147	1	1.254e-2	2	NC	5	NC	3
8			min	-.726	4	-.272	2	-.019	5	-2.584e-3	3	318.621	3	1638.724	1
9		5	max	0	1	.771	3	.172	1	1.384e-2	2	NC	5	NC	3
10			min	-.726	4	-.275	2	-.002	5	-2.75e-3	3	303.747	3	1397.597	1
11		6	max	0	1	.687	3	.166	1	1.514e-2	2	NC	5	NC	5
12			min	-.726	4	-.209	2	.01	15	-2.916e-3	3	339.974	3	1450.884	1
13		7	max	0	1	.507	3	.129	1	1.644e-2	2	NC	5	NC	10
14			min	-.726	4	-.098	1	.009	10	-3.082e-3	3	456.454	3	1858.144	1
15		8	max	0	1	.278	3	.074	1	1.774e-2	2	NC	4	NC	2
16			min	-.726	4	0	15	0	10	-3.248e-3	3	807.589	3	3261.378	1
17		9	max	0	1	.179	2	.033	4	1.904e-2	2	NC	4	NC	1
18			min	-.726	4	.004	15	-.01	10	-3.414e-3	3	2668.872	3	7676.95	4
19		10	max	0	1	.236	2	.031	3	2.034e-2	2	NC	3	NC	1
20			min	-.726	4	-.023	3	-.022	2	-3.58e-3	3	1787.596	2	NC	1
21		11	max	0	12	.179	2	.032	3	1.904e-2	2	NC	4	NC	1
22			min	-.726	4	.004	15	-.02	5	-3.414e-3	3	2668.872	3	NC	1
23		12	max	0	12	.278	3	.074	1	1.774e-2	2	NC	4	NC	2
24			min	-.726	4	0	15	-.019	5	-3.248e-3	3	807.589	3	3261.378	1
25		13	max	0	12	.507	3	.129	1	1.644e-2	2	NC	5	NC	5
26			min	-.726	4	-.098	1	-.005	5	-3.082e-3	3	456.454	3	1858.144	1
27		14	max	0	12	.687	3	.166	1	1.514e-2	2	NC	5	NC	5
28			min	-.726	4	-.209	2	.009	15	-2.916e-3	3	339.974	3	1450.884	1
29		15	max	0	12	.771	3	.172	1	1.384e-2	2	NC	5	NC	3
30			min	-.726	4	-.275	2	.018	10	-2.75e-3	3	303.747	3	1397.597	1
31		16	max	0	12	.734	3	.147	1	1.254e-2	2	NC	5	NC	3
32			min	-.726	4	-.272	2	.016	10	-2.584e-3	3	318.621	3	1638.724	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	.574	3	.097	1	1.124e-2	2	NC	5	NC	3
34			min	-.726	4	-.199	2	.01	10	-2.418e-3	3	405.066	3	2474.479	1
35		18	max	0	12	.309	3	.044	4	9.939e-3	2	NC	5	NC	2
36			min	-.726	4	-.068	1	.002	10	-2.251e-3	3	732.949	3	5526.157	4
37		19	max	0	12	.102	2	.01	3	8.639e-3	2	NC	1	NC	1
38			min	-.726	4	-.019	3	-.005	2	-2.085e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.233	3	.009	3	5.013e-3	2	NC	1	NC	1
40			min	-.534	4	-.335	2	-.005	2	-3.98e-3	3	NC	1	NC	1
41		2	max	0	1	.561	3	.028	1	6.005e-3	2	NC	5	NC	2
42			min	-.534	4	-.621	2	-.036	5	-4.85e-3	3	731.423	3	6357.144	5
43		3	max	0	1	.839	3	.078	1	6.998e-3	2	NC	5	NC	3
44			min	-.534	4	-.869	2	-.043	5	-5.721e-3	3	395.913	3	3092.458	1
45		4	max	0	1	1.033	3	.126	1	7.991e-3	2	NC	15	NC	3
46			min	-.534	4	-1.051	2	-.028	5	-6.591e-3	3	300.015	3	1916.94	1
47		5	max	0	1	1.125	3	.153	1	8.983e-3	2	NC	15	NC	3
48			min	-.534	4	-1.154	2	-.002	5	-7.461e-3	3	268.921	3	1576.917	1
49		6	max	0	1	1.117	3	.151	1	9.976e-3	2	NC	15	NC	3
50			min	-.534	4	-1.178	2	.015	10	-8.331e-3	3	271.505	3	1599.871	1
51		7	max	0	1	1.025	3	.12	1	1.097e-2	2	NC	15	NC	10
52			min	-.534	4	-1.134	2	.009	10	-9.201e-3	3	300.478	2	2015.649	1
53		8	max	0	1	.885	3	.074	4	1.196e-2	2	NC	15	NC	2
54			min	-.534	4	-1.047	2	0	10	-1.007e-2	3	337.027	2	3305.712	4
55		9	max	0	1	.747	3	.048	4	1.295e-2	2	NC	5	NC	1
56			min	-.534	4	-.956	2	-.009	10	-1.094e-2	3	386.34	2	5149.978	4
57		10	max	0	1	.683	3	.027	3	1.395e-2	2	NC	5	NC	1
58			min	-.534	4	-.912	2	-.02	2	-1.181e-2	3	415.814	2	NC	1
59		11	max	0	12	.747	3	.029	3	1.295e-2	2	NC	5	NC	1
60			min	-.534	4	-.956	2	-.035	5	-1.094e-2	3	386.34	2	6750.633	5
61		12	max	0	12	.885	3	.069	1	1.196e-2	2	NC	15	NC	2
62			min	-.534	4	-1.047	2	-.04	5	-1.007e-2	3	337.027	2	3488.959	1
63		13	max	0	12	1.025	3	.12	1	1.097e-2	2	NC	15	NC	4
64			min	-.534	4	-1.134	2	-.024	5	-9.201e-3	3	300.478	2	2015.649	1
65		14	max	0	12	1.117	3	.151	1	9.976e-3	2	NC	15	NC	3
66			min	-.534	4	-1.178	2	.001	15	-8.331e-3	3	271.505	3	1599.871	1
67		15	max	0	12	1.125	3	.153	1	8.983e-3	2	NC	15	NC	3
68			min	-.534	4	-1.154	2	.016	10	-7.461e-3	3	268.921	3	1576.917	1
69		16	max	0	12	1.033	3	.126	1	7.991e-3	2	NC	15	NC	3
70			min	-.534	4	-1.051	2	.013	10	-6.591e-3	3	300.015	3	1916.94	1
71		17	max	0	12	.839	3	.078	4	6.998e-3	2	NC	5	NC	3
72			min	-.534	4	-.869	2	.007	10	-5.721e-3	3	395.913	3	3077.747	4
73		18	max	0	12	.561	3	.05	4	6.005e-3	2	NC	5	NC	2
74			min	-.534	4	-.621	2	0	10	-4.85e-3	3	731.423	3	4810.188	4
75		19	max	0	12	.233	3	.009	3	5.013e-3	2	NC	1	NC	1
76			min	-.534	4	-.335	2	-.005	2	-3.98e-3	3	NC	1	NC	1
77	M15	1	max	0	12	.237	3	.008	3	3.526e-3	3	NC	1	NC	1
78			min	-.43	4	-.334	2	-.005	2	-5.275e-3	2	NC	1	NC	1
79		2	max	0	12	.454	3	.028	1	4.304e-3	3	NC	5	NC	2
80			min	-.43	4	-.719	2	-.047	5	-6.325e-3	2	622.487	2	4970.713	5
81		3	max	0	12	.642	3	.078	1	5.082e-3	3	NC	5	NC	3
82			min	-.43	4	-1.047	2	-.056	5	-7.375e-3	2	336.338	2	3083.218	1
83		4	max	0	12	.782	3	.126	1	5.86e-3	3	NC	15	NC	3
84			min	-.43	4	-1.278	2	-.039	5	-8.424e-3	2	254.069	2	1912.274	1
85		5	max	0	12	.862	3	.153	1	6.638e-3	3	NC	15	NC	3
86			min	-.43	4	-1.393	2	-.007	5	-9.474e-3	2	226.618	2	1573.244	1
87		6	max	0	12	.883	3	.151	1	7.416e-3	3	NC	15	NC	3
88			min	-.43	4	-1.391	2	.015	10	-1.052e-2	2	227.074	2	1595.761	1
89		7	max	0	12	.853	3	.12	1	8.194e-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	-.43	4	-1.292	2	.009	10	-1.157e-2	2	250.501	2	2008.852	1
91		8	max	0	12	.791	3	.086	4	8.972e-3	3	NC	15	NC	2
92			min	-.431	4	-1.136	2	0	10	-1.262e-2	2	299.214	2	2847.832	4
93		9	max	0	12	.725	3	.058	4	9.75e-3	3	NC	5	NC	1
94			min	-.431	4	-.982	2	-.008	10	-1.367e-2	2	370.18	2	4274.097	4
95		10	max	0	1	.692	3	.025	3	1.053e-2	3	NC	5	NC	1
96			min	-.431	4	-.91	2	-.019	2	-1.472e-2	2	416.763	2	NC	1
97		11	max	0	1	.725	3	.027	3	9.75e-3	3	NC	5	NC	1
98			min	-.43	4	-.982	2	-.045	5	-1.367e-2	2	370.18	2	5327.266	5
99		12	max	0	1	.791	3	.07	1	8.972e-3	3	NC	15	NC	2
100			min	-.43	4	-1.136	2	-.052	5	-1.262e-2	2	299.214	2	3468.321	1
101		13	max	0	1	.853	3	.12	1	8.194e-3	3	NC	15	NC	3
102			min	-.43	4	-1.292	2	-.033	5	-1.157e-2	2	250.501	2	2008.852	1
103		14	max	0	1	.883	3	.151	1	7.416e-3	3	NC	15	NC	3
104			min	-.43	4	-1.391	2	0	15	-1.052e-2	2	227.074	2	1595.761	1
105		15	max	0	1	.862	3	.153	1	6.638e-3	3	NC	15	NC	3
106			min	-.43	4	-1.393	2	.017	10	-9.474e-3	2	226.618	2	1573.244	1
107		16	max	0	1	.782	3	.126	1	5.86e-3	3	NC	15	NC	3
108			min	-.43	4	-1.278	2	.014	10	-8.424e-3	2	254.069	2	1912.274	1
109		17	max	0	1	.642	3	.092	4	5.082e-3	3	NC	5	NC	3
110			min	-.43	4	-1.047	2	.008	10	-7.375e-3	2	336.338	2	2620.265	4
111		18	max	0	1	.454	3	.061	4	4.304e-3	3	NC	5	NC	2
112			min	-.43	4	-.719	2	0	10	-6.325e-3	2	622.487	2	3963.096	4
113		19	max	0	1	.237	3	.008	3	3.526e-3	3	NC	1	NC	1
114			min	-.43	4	-.334	2	-.005	2	-5.275e-3	2	NC	1	NC	1
115	M16	1	max	0	12	.089	2	.007	3	6.149e-3	3	NC	1	NC	1
116			min	-.138	4	-.075	3	-.004	2	-6.994e-3	2	NC	1	NC	1
117		2	max	0	12	.045	3	.04	1	7.256e-3	3	NC	5	NC	2
118			min	-.138	4	-.183	2	-.037	5	-7.905e-3	2	882.14	2	6083.942	1
119		3	max	0	12	.14	3	.097	1	8.364e-3	3	NC	5	NC	3
120			min	-.138	4	-.4	2	-.045	5	-8.816e-3	2	490.386	2	2481.342	1
121		4	max	0	12	.19	3	.147	1	9.471e-3	3	NC	5	NC	3
122			min	-.138	4	-.526	2	-.033	5	-9.727e-3	2	389.978	2	1639.622	1
123		5	max	0	12	.189	3	.172	1	1.058e-2	3	NC	5	NC	3
124			min	-.138	4	-.544	2	-.01	5	-1.064e-2	2	379.008	2	1395.622	1
125		6	max	0	12	.137	3	.166	1	1.169e-2	3	NC	5	NC	3
126			min	-.138	4	-.457	2	.01	15	-1.155e-2	2	439.77	2	1445.279	1
127		7	max	0	12	.047	3	.13	1	1.279e-2	3	NC	5	NC	3
128			min	-.138	4	-.286	2	.012	10	-1.246e-2	2	638.998	2	1843.08	1
129		8	max	0	12	.007	9	.075	1	1.39e-2	3	NC	3	NC	3
130			min	-.138	4	-.076	2	.002	10	-1.337e-2	2	1452.998	2	3199.394	1
131		9	max	0	12	.113	1	.042	4	1.501e-2	3	NC	2	NC	1
132			min	-.138	4	-.157	3	-.007	10	-1.428e-2	2	2931.858	3	5858.157	4
133		10	max	0	1	.197	2	.022	3	1.612e-2	3	NC	4	NC	1
134			min	-.138	4	-.2	3	-.017	2	-1.519e-2	2	1928.024	3	NC	1
135		11	max	0	1	.113	1	.024	3	1.501e-2	3	NC	2	NC	1
136			min	-.138	4	-.157	3	-.029	5	-1.428e-2	2	2931.858	3	8153.245	5
137		12	max	0	1	.007	9	.075	1	1.39e-2	3	NC	3	NC	3
138			min	-.138	4	-.076	2	-.03	5	-1.337e-2	2	1452.998	2	3199.394	1
139		13	max	0	1	.047	3	.13	1	1.279e-2	3	NC	5	NC	3
140			min	-.138	4	-.286	2	-.013	5	-1.246e-2	2	638.998	2	1843.08	1
141		14	max	0	1	.137	3	.166	1	1.169e-2	3	NC	5	NC	3
142			min	-.138	4	-.457	2	.009	15	-1.155e-2	2	439.77	2	1445.279	1
143		15	max	0	1	.189	3	.172	1	1.058e-2	3	NC	5	NC	3
144			min	-.138	4	-.544	2	.018	12	-1.064e-2	2	379.008	2	1395.622	1
145		16	max	0	1	.19	3	.147	1	9.471e-3	3	NC	5	NC	3
146			min	-.138	4	-.526	2	.015	12	-9.727e-3	2	389.978	2	1639.622	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	.14	3	.097	1	8.364e-3	3	NC	5	NC	3
148			min	-.137	4	-.4	2	.011	10	-8.816e-3	2	490.386	2	2481.342	1
149		18	max	0	1	.045	3	.056	4	7.256e-3	3	NC	5	NC	2
150			min	-.137	4	-.183	2	.003	10	-7.905e-3	2	882.14	2	4304.168	4
151		19	max	.001	1	.089	2	.007	3	6.149e-3	3	NC	1	NC	1
152			min	-.137	4	-.075	3	-.004	2	-6.994e-3	2	NC	1	NC	1
153	M2	1	max	.007	2	.009	2	.008	1	1.632e-3	5	NC	1	NC	2
154			min	-.01	3	-.015	3	-.678	4	-2.447e-4	1	8138.919	2	113.512	4
155		2	max	.007	2	.008	2	.008	1	1.714e-3	5	NC	1	NC	2
156			min	-.009	3	-.015	3	-.624	4	-2.317e-4	1	9511.963	2	123.419	4
157		3	max	.006	2	.007	2	.007	1	1.797e-3	5	NC	1	NC	1
158			min	-.009	3	-.014	3	-.57	4	-2.186e-4	1	NC	1	135.152	4
159		4	max	.006	2	.005	2	.006	1	1.88e-3	5	NC	1	NC	1
160			min	-.008	3	-.014	3	-.516	4	-2.056e-4	1	NC	1	149.179	4
161		5	max	.006	2	.004	2	.006	1	1.962e-3	5	NC	1	NC	1
162			min	-.008	3	-.013	3	-.464	4	-1.925e-4	1	NC	1	166.138	4
163		6	max	.005	2	.003	2	.005	1	2.045e-3	5	NC	1	NC	1
164			min	-.007	3	-.013	3	-.412	4	-1.795e-4	1	NC	1	186.904	4
165		7	max	.005	2	.002	2	.004	1	2.128e-3	5	NC	1	NC	1
166			min	-.007	3	-.012	3	-.362	4	-1.664e-4	1	NC	1	212.716	4
167		8	max	.004	2	0	2	.004	1	2.21e-3	5	NC	1	NC	1
168			min	-.006	3	-.011	3	-.314	4	-1.534e-4	1	NC	1	245.367	4
169		9	max	.004	2	0	2	.003	1	2.293e-3	5	NC	1	NC	1
170			min	-.005	3	-.011	3	-.268	4	-1.403e-4	1	NC	1	287.541	4
171		10	max	.004	2	0	2	.003	1	2.376e-3	5	NC	1	NC	1
172			min	-.005	3	-.01	3	-.224	4	-1.273e-4	1	NC	1	343.395	4
173		11	max	.003	2	-.001	15	.002	1	2.458e-3	5	NC	1	NC	1
174			min	-.004	3	-.009	3	-.183	4	-1.142e-4	1	NC	1	419.671	4
175		12	max	.003	2	-.001	15	.002	1	2.543e-3	4	NC	1	NC	1
176			min	-.004	3	-.008	3	-.146	4	-1.012e-4	1	NC	1	527.891	4
177		13	max	.002	2	-.001	15	.001	1	2.631e-3	4	NC	1	NC	1
178			min	-.003	3	-.007	3	-.112	4	-8.81e-5	1	NC	1	689.139	4
179		14	max	.002	2	-.001	15	0	1	2.718e-3	4	NC	1	NC	1
180			min	-.003	3	-.006	3	-.081	4	-7.505e-5	1	NC	1	945.529	4
181		15	max	.002	2	0	15	0	1	2.805e-3	4	NC	1	NC	1
182			min	-.002	3	-.005	3	-.055	4	-6.2e-5	1	NC	1	1391.794	4
183		16	max	.001	2	0	15	0	1	2.892e-3	4	NC	1	NC	1
184			min	-.002	3	-.004	3	-.034	4	-4.895e-5	1	NC	1	2280.955	4
185		17	max	0	2	0	15	0	1	2.98e-3	4	NC	1	NC	1
186			min	-.001	3	-.003	3	-.017	4	-3.59e-5	1	NC	1	4502.691	4
187		18	max	0	2	0	15	0	1	3.067e-3	4	NC	1	NC	1
188			min	0	3	-.001	6	-.006	4	-2.285e-5	1	NC	1	NC	1
189		19	max	0	1	0	1	0	1	3.154e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	-9.798e-6	1	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	1.85e-6	1	NC	1	NC	1
192			min	0	1	0	1	0	1	-8.136e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.015	4	2.345e-5	1	NC	1	NC	1
194			min	0	2	-.002	6	0	1	-1.626e-4	5	NC	1	6070.236	4
195		3	max	0	3	0	15	.028	4	4.978e-4	4	NC	1	NC	1
196			min	0	2	-.004	6	0	1	3.001e-6	12	NC	1	3181.444	4
197		4	max	.001	3	-.001	15	.04	4	1.153e-3	4	NC	1	NC	1
198			min	-.001	2	-.006	6	0	1	4.414e-6	12	NC	1	2220.461	4
199		5	max	.002	3	-.002	15	.052	4	1.809e-3	4	NC	1	NC	1
200			min	-.002	2	-.008	6	0	3	5.828e-6	12	NC	1	1740.481	4
201		6	max	.002	3	-.002	15	.062	4	2.465e-3	4	NC	1	NC	1
202			min	-.002	2	-.01	6	0	12	7.241e-6	12	9358.231	6	1451.937	4
203		7	max	.003	3	-.002	15	.071	4	3.121e-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	-.011	6	0	12	8.654e-6	12	8085.88	6	1258.126	4
205		8	max	.003	3	-.003	15	.08	4	3.776e-3	4	NC	2	NC	1
206			min	-.003	2	-.012	6	0	12	1.007e-5	12	7302.592	6	1117.459	4
207		9	max	.004	3	-.003	15	.089	4	4.432e-3	4	NC	5	NC	1
208			min	-.003	2	-.013	6	0	12	1.148e-5	12	6844.874	6	1009.031	4
209		10	max	.004	3	-.003	15	.098	4	5.088e-3	4	NC	5	NC	1
210			min	-.003	2	-.014	6	0	12	1.289e-5	12	6633.929	6	921.168	4
211		11	max	.004	3	-.003	15	.106	4	5.743e-3	4	NC	5	NC	1
212			min	-.004	2	-.014	6	0	12	1.431e-5	12	6638.941	6	846.853	4
213		12	max	.005	3	-.003	15	.115	4	6.399e-3	4	NC	5	NC	1
214			min	-.004	2	-.013	6	0	12	1.572e-5	12	6865.247	6	781.665	4
215		13	max	.005	3	-.003	15	.124	4	7.055e-3	4	NC	2	NC	1
216			min	-.005	2	-.012	6	0	12	1.713e-5	12	7357.92	6	722.753	4
217		14	max	.006	3	-.002	15	.134	4	7.71e-3	4	NC	1	NC	1
218			min	-.005	2	-.011	6	0	12	1.855e-5	12	8224.643	6	668.282	4
219		15	max	.006	3	-.002	15	.146	4	8.366e-3	4	NC	1	NC	1
220			min	-.005	2	-.009	6	0	12	1.996e-5	12	9702.201	6	617.11	4
221		16	max	.007	3	-.001	15	.158	4	9.022e-3	4	NC	1	NC	1
222			min	-.006	2	-.007	6	0	12	2.137e-5	12	NC	1	568.584	4
223		17	max	.007	3	0	15	.172	4	9.678e-3	4	NC	1	NC	1
224			min	-.006	2	-.006	3	0	12	2.279e-5	12	NC	1	522.384	4
225		18	max	.008	3	0	15	.188	4	1.033e-2	4	NC	1	NC	1
226			min	-.006	2	-.004	3	0	12	2.42e-5	12	NC	1	478.418	4
227		19	max	.008	3	0	5	.206	4	1.099e-2	4	NC	1	NC	1
228			min	-.007	2	-.003	3	0	12	2.561e-5	12	NC	1	436.726	4
229	M4	1	max	.002	1	.007	2	0	12	6.444e-4	4	NC	1	NC	3
230			min	0	5	-.008	3	-.206	4	9.352e-6	12	NC	1	120.584	4
231		2	max	.002	1	.006	2	0	12	6.444e-4	4	NC	1	NC	3
232			min	0	5	-.008	3	-.19	4	9.352e-6	12	NC	1	130.883	4
233		3	max	.002	1	.006	2	0	12	6.444e-4	4	NC	1	NC	3
234			min	0	5	-.007	3	-.173	4	9.352e-6	12	NC	1	143.154	4
235		4	max	.002	1	.005	2	0	12	6.444e-4	4	NC	1	NC	3
236			min	0	5	-.007	3	-.157	4	9.352e-6	12	NC	1	157.906	4
237		5	max	.002	1	.005	2	0	12	6.444e-4	4	NC	1	NC	2
238			min	0	5	-.007	3	-.141	4	9.352e-6	12	NC	1	175.834	4
239		6	max	.002	1	.005	2	0	12	6.444e-4	4	NC	1	NC	2
240			min	0	5	-.006	3	-.125	4	9.352e-6	12	NC	1	197.898	4
241		7	max	.001	1	.004	2	0	12	6.444e-4	4	NC	1	NC	2
242			min	0	5	-.006	3	-.11	4	9.352e-6	12	NC	1	225.462	4
243		8	max	.001	1	.004	2	0	12	6.444e-4	4	NC	1	NC	2
244			min	0	5	-.005	3	-.095	4	9.352e-6	12	NC	1	260.515	4
245		9	max	.001	1	.004	2	0	12	6.444e-4	4	NC	1	NC	2
246			min	0	5	-.005	3	-.081	4	9.352e-6	12	NC	1	306.051	4
247		10	max	.001	1	.003	2	0	12	6.444e-4	4	NC	1	NC	2
248			min	0	5	-.004	3	-.068	4	9.352e-6	12	NC	1	366.748	4
249		11	max	0	1	.003	2	0	12	6.444e-4	4	NC	1	NC	1
250			min	0	5	-.004	3	-.055	4	9.352e-6	12	NC	1	450.258	4
251		12	max	0	1	.003	2	0	12	6.444e-4	4	NC	1	NC	1
252			min	0	5	-.003	3	-.044	4	9.352e-6	12	NC	1	569.813	4
253		13	max	0	1	.002	2	0	12	6.444e-4	4	NC	1	NC	1
254			min	0	5	-.003	3	-.033	4	9.352e-6	12	NC	1	749.964	4
255		14	max	0	1	.002	2	0	12	6.444e-4	4	NC	1	NC	1
256			min	0	5	-.002	3	-.024	4	9.352e-6	12	NC	1	1040.633	4
257		15	max	0	1	.001	2	0	12	6.444e-4	4	NC	1	NC	1
258			min	0	5	-.002	3	-.016	4	9.352e-6	12	NC	1	1556.844	4
259		16	max	0	1	.001	2	0	12	6.444e-4	4	NC	1	NC	1
260			min	0	5	-.001	3	-.009	4	9.352e-6	12	NC	1	2616.345	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	6.444e-4	4	NC	1	NC	1
262			min	0	5	0	3	-.005	4	9.352e-6	12	NC	1	5396.132	4
263		18	max	0	1	0	2	0	12	6.444e-4	4	NC	1	NC	1
264			min	0	5	0	3	-.001	4	9.352e-6	12	NC	1	NC	1
265		19	max	0	1	0	1	0	1	6.444e-4	4	NC	1	NC	1
266			min	0	1	0	1	0	1	9.352e-6	12	NC	1	NC	1
267	M6	1	max	.023	2	.035	2	0	1	1.736e-3	4	NC	4	NC	1
268			min	-.032	3	-.049	3	-.685	4	0	1	1582.305	3	112.422	4
269		2	max	.022	2	.032	2	0	1	1.816e-3	4	NC	4	NC	1
270			min	-.03	3	-.046	3	-.63	4	0	1	1675.237	3	122.235	4
271		3	max	.021	2	.029	2	0	1	1.897e-3	4	NC	4	NC	1
272			min	-.029	3	-.043	3	-.575	4	0	1	1779.899	3	133.856	4
273		4	max	.019	2	.026	2	0	1	1.977e-3	4	NC	4	NC	1
274			min	-.027	3	-.041	3	-.521	4	0	1	1898.778	3	147.752	4
275		5	max	.018	2	.023	2	0	1	2.057e-3	4	NC	4	NC	1
276			min	-.025	3	-.038	3	-.468	4	0	1	2035.072	3	164.551	4
277		6	max	.017	2	.02	2	0	1	2.137e-3	4	NC	4	NC	1
278			min	-.023	3	-.035	3	-.416	4	0	1	2192.964	3	185.123	4
279		7	max	.015	2	.017	2	0	1	2.218e-3	4	NC	1	NC	1
280			min	-.021	3	-.032	3	-.365	4	0	1	2378.034	3	210.693	4
281		8	max	.014	2	.015	2	0	1	2.298e-3	4	NC	1	NC	1
282			min	-.02	3	-.03	3	-.317	4	0	1	2597.893	3	243.039	4
283		9	max	.013	2	.012	2	0	1	2.378e-3	4	NC	1	NC	1
284			min	-.018	3	-.027	3	-.27	4	0	1	2863.201	3	284.819	4
285		10	max	.012	2	.01	2	0	1	2.458e-3	4	NC	1	NC	1
286			min	-.016	3	-.024	3	-.226	4	0	1	3189.367	3	340.153	4
287		11	max	.01	2	.008	2	0	1	2.539e-3	4	NC	1	NC	1
288			min	-.014	3	-.021	3	-.185	4	0	1	3599.515	3	415.721	4
289		12	max	.009	2	.006	2	0	1	2.619e-3	4	NC	1	NC	1
290			min	-.012	3	-.019	3	-.147	4	0	1	4130.002	3	522.938	4
291		13	max	.008	2	.004	2	0	1	2.699e-3	4	NC	1	NC	1
292			min	-.011	3	-.016	3	-.113	4	0	1	4841.45	3	682.698	4
293		14	max	.006	2	.003	2	0	1	2.779e-3	4	NC	1	NC	1
294			min	-.009	3	-.013	3	-.082	4	0	1	5843.022	3	936.73	4
295		15	max	.005	2	.002	2	0	1	2.86e-3	4	NC	1	NC	1
296			min	-.007	3	-.01	3	-.056	4	0	1	7353.109	3	1378.912	4
297		16	max	.004	2	0	2	0	1	2.94e-3	4	NC	1	NC	1
298			min	-.005	3	-.008	3	-.034	4	0	1	9881.399	3	2259.988	4
299		17	max	.003	2	0	2	0	1	3.02e-3	4	NC	1	NC	1
300			min	-.004	3	-.005	3	-.017	4	0	1	NC	1	4461.718	4
301		18	max	.001	2	0	2	0	1	3.1e-3	4	NC	1	NC	1
302			min	-.002	3	-.003	3	-.006	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	3.181e-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	-8.203e-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	-1.828e-4	4	NC	1	6020.399	4
309		3	max	.003	3	0	2	.028	4	4.548e-4	4	NC	1	NC	1
310			min	-.003	2	-.006	3	0	1	0	1	NC	1	3156.478	4
311		4	max	.004	3	-.001	15	.041	4	1.092e-3	4	NC	1	NC	1
312			min	-.004	2	-.008	3	0	1	0	1	NC	1	2204.39	4
313		5	max	.006	3	-.002	15	.052	4	1.73e-3	4	NC	1	NC	1
314			min	-.005	2	-.01	3	0	1	0	1	NC	1	1729.43	4
315		6	max	.007	3	-.002	15	.062	4	2.368e-3	4	NC	1	NC	1
316			min	-.007	2	-.012	3	0	1	0	1	8789.47	3	1444.456	4
317		7	max	.008	3	-.003	15	.072	4	3.005e-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	-.008	2	-.014	3	0	1	0	1	7855.927	3	1253.575	4
319		8	max	.01	3	-.003	15	.081	4	3.643e-3	4	NC	1	NC	1
320			min	-.01	2	-.015	3	0	1	0	1	7304.377	3	1115.534	4
321		9	max	.011	3	-.003	15	.089	4	4.28e-3	4	NC	1	NC	1
322			min	-.011	2	-.016	3	0	1	0	1	6881.963	4	1009.584	4
323		10	max	.013	3	-.003	15	.097	4	4.918e-3	4	NC	1	NC	1
324			min	-.012	2	-.017	3	0	1	0	1	6667.933	4	924.111	4
325		11	max	.014	3	-.003	15	.105	4	5.555e-3	4	NC	1	NC	1
326			min	-.014	2	-.017	3	0	1	0	1	6671.323	4	852.109	4
327		12	max	.015	3	-.003	15	.114	4	6.193e-3	4	NC	1	NC	1
328			min	-.015	2	-.017	3	0	1	0	1	6897.286	4	789.133	4
329		13	max	.017	3	-.003	15	.123	4	6.831e-3	4	NC	1	NC	1
330			min	-.016	2	-.016	3	0	1	0	1	7390.951	4	732.284	4
331		14	max	.018	3	-.003	15	.132	4	7.468e-3	4	NC	1	NC	1
332			min	-.018	2	-.015	3	0	1	0	1	8260.344	4	679.671	4
333		15	max	.02	3	-.002	15	.143	4	8.106e-3	4	NC	1	NC	1
334			min	-.019	2	-.014	3	0	1	0	1	9743.137	4	630.093	4
335		16	max	.021	3	-.002	15	.154	4	8.743e-3	4	NC	1	NC	1
336			min	-.021	2	-.013	3	0	1	0	1	NC	1	582.844	4
337		17	max	.022	3	0	2	.167	4	9.381e-3	4	NC	1	NC	1
338			min	-.022	2	-.011	3	0	1	0	1	NC	1	537.574	4
339		18	max	.024	3	0	2	.182	4	1.002e-2	4	NC	1	NC	1
340			min	-.023	2	-.01	3	0	1	0	1	NC	1	494.176	4
341		19	max	.025	3	.002	2	.198	4	1.066e-2	4	NC	1	NC	1
342			min	-.025	2	-.008	3	0	1	0	1	NC	1	452.699	4
343	M8	1	max	.005	1	.024	2	0	1	4.774e-4	4	NC	1	NC	1
344			min	0	15	-.026	3	-.198	4	0	1	NC	1	124.995	4
345		2	max	.005	1	.023	2	0	1	4.774e-4	4	NC	1	NC	1
346			min	0	15	-.025	3	-.183	4	0	1	NC	1	135.684	4
347		3	max	.005	1	.022	2	0	1	4.774e-4	4	NC	1	NC	1
348			min	0	15	-.023	3	-.167	4	0	1	NC	1	148.419	4
349		4	max	.005	1	.02	2	0	1	4.774e-4	4	NC	1	NC	1
350			min	0	15	-.022	3	-.151	4	0	1	NC	1	163.729	4
351		5	max	.004	1	.019	2	0	1	4.774e-4	4	NC	1	NC	1
352			min	0	15	-.02	3	-.136	4	0	1	NC	1	182.334	4
353		6	max	.004	1	.018	2	0	1	4.774e-4	4	NC	1	NC	1
354			min	0	15	-.019	3	-.121	4	0	1	NC	1	205.23	4
355		7	max	.004	1	.016	2	0	1	4.774e-4	4	NC	1	NC	1
356			min	0	15	-.018	3	-.106	4	0	1	NC	1	233.833	4
357		8	max	.003	1	.015	2	0	1	4.774e-4	4	NC	1	NC	1
358			min	0	15	-.016	3	-.092	4	0	1	NC	1	270.207	4
359		9	max	.003	1	.013	2	0	1	4.774e-4	4	NC	1	NC	1
360			min	0	15	-.015	3	-.078	4	0	1	NC	1	317.459	4
361		10	max	.003	1	.012	2	0	1	4.774e-4	4	NC	1	NC	1
362			min	0	15	-.013	3	-.065	4	0	1	NC	1	380.443	4
363		11	max	.002	1	.011	2	0	1	4.774e-4	4	NC	1	NC	1
364			min	0	15	-.012	3	-.053	4	0	1	NC	1	467.101	4
365		12	max	.002	1	.009	2	0	1	4.774e-4	4	NC	1	NC	1
366			min	0	15	-.01	3	-.042	4	0	1	NC	1	591.165	4
367		13	max	.002	1	.008	2	0	1	4.774e-4	4	NC	1	NC	1
368			min	0	15	-.009	3	-.032	4	0	1	NC	1	778.113	4
369		14	max	.002	1	.007	2	0	1	4.774e-4	4	NC	1	NC	1
370			min	0	15	-.007	3	-.023	4	0	1	NC	1	1079.756	4
371		15	max	.001	1	.005	2	0	1	4.774e-4	4	NC	1	NC	1
372			min	0	15	-.006	3	-.015	4	0	1	NC	1	1615.469	4
373		16	max	0	1	.004	2	0	1	4.774e-4	4	NC	1	NC	1
374			min	0	15	-.004	3	-.009	4	0	1	NC	1	2715.035	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	.003	2	0	1	4.774e-4	4	NC	1	NC	1
376			min	0	15	-.003	3	-.004	4	0	1	NC	1	5600.081	4
377		18	max	0	1	.001	2	0	1	4.774e-4	4	NC	1	NC	1
378			min	0	15	-.001	3	-.001	4	0	1	NC	1	NC	1
379		19	max	0	1	0	1	0	1	4.774e-4	4	NC	1	NC	1
380			min	0	1	0	1	0	1	0	1	NC	1	NC	1
381	M10	1	max	.007	2	.009	2	0	12	1.751e-3	4	NC	1	NC	2
382			min	-.01	3	-.015	3	-.684	4	1.843e-5	12	8138.919	2	112.557	4
383		2	max	.007	2	.008	2	0	12	1.829e-3	4	NC	1	NC	2
384			min	-.009	3	-.015	3	-.629	4	1.745e-5	12	9511.963	2	122.383	4
385		3	max	.006	2	.007	2	0	12	1.908e-3	4	NC	1	NC	1
386			min	-.009	3	-.014	3	-.575	4	1.648e-5	12	NC	1	134.02	4
387		4	max	.006	2	.005	2	0	12	1.986e-3	4	NC	1	NC	1
388			min	-.008	3	-.014	3	-.521	4	1.55e-5	12	NC	1	147.935	4
389		5	max	.006	2	.004	2	0	12	2.064e-3	4	NC	1	NC	1
390			min	-.008	3	-.013	3	-.467	4	1.452e-5	12	NC	1	164.757	4
391		6	max	.005	2	.003	2	0	12	2.142e-3	4	NC	1	NC	1
392			min	-.007	3	-.013	3	-.415	4	1.355e-5	12	NC	1	185.357	4
393		7	max	.005	2	.002	2	0	12	2.221e-3	4	NC	1	NC	1
394			min	-.007	3	-.012	3	-.365	4	1.257e-5	12	NC	1	210.963	4
395		8	max	.004	2	0	2	0	12	2.299e-3	4	NC	1	NC	1
396			min	-.006	3	-.011	3	-.316	4	1.159e-5	12	NC	1	243.356	4
397		9	max	.004	2	0	2	0	12	2.377e-3	4	NC	1	NC	1
398			min	-.005	3	-.011	3	-.27	4	1.061e-5	12	NC	1	285.198	4
399		10	max	.004	2	0	2	0	12	2.456e-3	4	NC	1	NC	1
400			min	-.005	3	-.01	3	-.226	4	9.637e-6	12	NC	1	340.619	4
401		11	max	.003	2	-.001	2	0	12	2.534e-3	4	NC	1	NC	1
402			min	-.004	3	-.009	3	-.185	4	8.66e-6	12	NC	1	416.307	4
403		12	max	.003	2	-.002	2	0	12	2.612e-3	4	NC	1	NC	1
404			min	-.004	3	-.008	3	-.147	4	7.683e-6	12	NC	1	523.705	4
405		13	max	.002	2	-.002	15	0	12	2.691e-3	4	NC	1	NC	1
406			min	-.003	3	-.007	3	-.113	4	6.705e-6	12	NC	1	683.749	4
407		14	max	.002	2	-.001	15	0	12	2.769e-3	4	NC	1	NC	1
408			min	-.003	3	-.006	3	-.082	4	5.728e-6	12	NC	1	938.263	4
409		15	max	.002	2	-.001	15	0	12	2.847e-3	4	NC	1	NC	1
410			min	-.002	3	-.005	3	-.056	4	4.751e-6	12	NC	1	1381.361	4
411		16	max	.001	2	-.001	15	0	12	2.926e-3	4	NC	1	NC	1
412			min	-.002	3	-.004	4	-.034	4	3.774e-6	12	NC	1	2264.486	4
413		17	max	0	2	0	15	0	12	3.004e-3	4	NC	1	NC	1
414			min	-.001	3	-.003	4	-.017	4	2.797e-6	12	NC	1	4472.225	4
415		18	max	0	2	0	15	0	12	3.082e-3	4	NC	1	NC	1
416			min	0	3	-.002	4	-.006	4	1.82e-6	12	NC	1	NC	1
417		19	max	0	1	0	1	0	1	3.161e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	8.428e-7	12	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	-1.742e-7	12	NC	1	NC	1
420			min	0	1	0	1	0	1	-8.148e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.015	4	-1.588e-6	12	NC	1	NC	1
422			min	0	2	-.002	4	0	12	-1.738e-4	4	NC	1	6059.36	4
423		3	max	0	3	-.001	15	.028	4	4.715e-4	5	NC	1	NC	1
424			min	0	2	-.004	4	0	12	-4.505e-5	1	NC	1	3177.378	4
425		4	max	.001	3	-.002	15	.04	4	1.11e-3	5	NC	1	NC	1
426			min	-.001	2	-.006	4	0	10	-6.665e-5	1	NC	1	2219.111	4
427		5	max	.002	3	-.002	15	.052	4	1.749e-3	4	NC	1	NC	1
428			min	-.002	2	-.008	4	0	1	-8.825e-5	1	NC	1	1740.889	4
429		6	max	.002	3	-.003	15	.062	4	2.39e-3	4	NC	1	NC	1
430			min	-.002	2	-.01	4	0	1	-1.098e-4	1	9132.844	4	1453.772	4
431		7	max	.003	3	-.003	15	.071	4	3.031e-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	-.012	4	0	1	-1.314e-4	1	7905.184	4	1261.261	4
433		8	max	.003	3	-.003	15	.08	4	3.672e-3	4	NC	2	NC	1
434			min	-.003	2	-.013	4	0	1	-1.53e-4	1	7150.003	4	1121.845	4
435		9	max	.004	3	-.003	15	.089	4	4.313e-3	4	NC	5	NC	1
436			min	-.003	2	-.014	4	0	1	-1.746e-4	1	6710.224	4	1014.647	4
437		10	max	.004	3	-.004	15	.097	4	4.954e-3	4	NC	5	NC	1
438			min	-.003	2	-.015	4	-.001	1	-1.962e-4	1	6510.313	4	927.989	4
439		11	max	.004	3	-.004	15	.105	4	5.595e-3	4	NC	5	NC	1
440			min	-.004	2	-.015	4	-.001	1	-2.178e-4	1	6521.089	4	854.837	4
441		12	max	.005	3	-.004	15	.114	4	6.236e-3	4	NC	5	NC	1
442			min	-.004	2	-.014	4	-.002	1	-2.394e-4	1	6748.526	4	790.737	4
443		13	max	.005	3	-.003	15	.123	4	6.877e-3	4	NC	2	NC	1
444			min	-.005	2	-.013	4	-.002	1	-2.61e-4	1	7237.489	4	732.8	4
445		14	max	.006	3	-.003	15	.132	4	7.518e-3	4	NC	1	NC	1
446			min	-.005	2	-.012	4	-.003	1	-2.826e-4	1	8094.388	4	679.153	4
447		15	max	.006	3	-.003	15	.143	4	8.159e-3	4	NC	1	NC	1
448			min	-.005	2	-.011	4	-.004	1	-3.042e-4	1	9552.762	4	628.622	4
449		16	max	.007	3	-.002	15	.155	4	8.8e-3	4	NC	1	NC	1
450			min	-.006	2	-.009	4	-.005	1	-3.258e-4	1	NC	1	580.525	4
451		17	max	.007	3	-.002	15	.168	4	9.441e-3	4	NC	1	NC	1
452			min	-.006	2	-.006	4	-.006	1	-3.474e-4	1	NC	1	534.533	4
453		18	max	.008	3	-.001	15	.183	4	1.008e-2	4	NC	1	NC	1
454			min	-.006	2	-.004	3	-.007	1	-3.69e-4	1	NC	1	490.554	4
455		19	max	.008	3	0	10	.2	4	1.072e-2	4	NC	1	NC	1
456			min	-.007	2	-.003	3	-.008	1	-3.906e-4	1	NC	1	448.645	4
457	M12	1	max	.002	1	.007	2	.008	1	5.776e-4	5	NC	1	NC	3
458			min	0	12	-.008	3	-.2	4	-1.364e-4	1	NC	1	123.875	4
459		2	max	.002	1	.006	2	.007	1	5.776e-4	5	NC	1	NC	3
460			min	0	12	-.008	3	-.184	4	-1.364e-4	1	NC	1	134.459	4
461		3	max	.002	1	.006	2	.007	1	5.776e-4	5	NC	1	NC	3
462			min	0	12	-.007	3	-.169	4	-1.364e-4	1	NC	1	147.07	4
463		4	max	.002	1	.005	2	.006	1	5.776e-4	5	NC	1	NC	3
464			min	0	12	-.007	3	-.153	4	-1.364e-4	1	NC	1	162.232	4
465		5	max	.002	1	.005	2	.006	1	5.776e-4	5	NC	1	NC	2
466			min	0	12	-.007	3	-.137	4	-1.364e-4	1	NC	1	180.656	4
467		6	max	.002	1	.005	2	.005	1	5.776e-4	5	NC	1	NC	2
468			min	0	12	-.006	3	-.122	4	-1.364e-4	1	NC	1	203.33	4
469		7	max	.001	1	.004	2	.004	1	5.776e-4	5	NC	1	NC	2
470			min	0	12	-.006	3	-.107	4	-1.364e-4	1	NC	1	231.657	4
471		8	max	.001	1	.004	2	.004	1	5.776e-4	5	NC	1	NC	2
472			min	0	12	-.005	3	-.093	4	-1.364e-4	1	NC	1	267.679	4
473		9	max	.001	1	.004	2	.003	1	5.776e-4	5	NC	1	NC	2
474			min	0	12	-.005	3	-.079	4	-1.364e-4	1	NC	1	314.474	4
475		10	max	.001	1	.003	2	.003	1	5.776e-4	5	NC	1	NC	2
476			min	0	12	-.004	3	-.066	4	-1.364e-4	1	NC	1	376.849	4
477		11	max	0	1	.003	2	.002	1	5.776e-4	5	NC	1	NC	1
478			min	0	12	-.004	3	-.054	4	-1.364e-4	1	NC	1	462.669	4
479		12	max	0	1	.003	2	.002	1	5.776e-4	5	NC	1	NC	1
480			min	0	12	-.003	3	-.042	4	-1.364e-4	1	NC	1	585.531	4
481		13	max	0	1	.002	2	.001	1	5.776e-4	5	NC	1	NC	1
482			min	0	12	-.003	3	-.032	4	-1.364e-4	1	NC	1	770.666	4
483		14	max	0	1	.002	2	0	1	5.776e-4	5	NC	1	NC	1
484			min	0	12	-.002	3	-.023	4	-1.364e-4	1	NC	1	1069.38	4
485		15	max	0	1	.001	2	0	1	5.776e-4	5	NC	1	NC	1
486			min	0	12	-.002	3	-.016	4	-1.364e-4	1	NC	1	1599.881	4
487		16	max	0	1	.001	2	0	1	5.776e-4	5	NC	1	NC	1
488			min	0	12	-.001	3	-.009	4	-1.364e-4	1	NC	1	2688.723	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	5.776e-4	5	NC	1	NC	1
490			min	0	12	0	3	-.004	4	-1.364e-4	1	NC	1	5545.54	4
491		18	max	0	1	0	2	0	1	5.776e-4	5	NC	1	NC	1
492			min	0	12	0	3	-.001	4	-1.364e-4	1	NC	1	NC	1
493		19	max	0	1	0	1	0	1	5.776e-4	5	NC	1	NC	1
494			min	0	1	0	1	0	1	-1.364e-4	1	NC	1	NC	1
495	M1	1	max	.01	3	.102	2	.726	4	1.314e-2	2	NC	1	NC	1
496			min	-.005	2	-.019	3	0	12	-2.548e-2	3	NC	1	NC	1
497		2	max	.01	3	.047	2	.702	4	7.291e-3	4	NC	4	NC	1
498			min	-.006	2	-.005	3	-.006	1	-1.261e-2	3	2102.219	2	NC	1
499		3	max	.01	3	.016	3	.678	4	1.218e-2	4	NC	5	NC	1
500			min	-.006	2	-.012	2	-.008	1	-1.694e-4	1	1014.228	2	5936.398	5
501		4	max	.01	3	.05	3	.653	4	1.056e-2	4	NC	5	NC	1
502			min	-.005	2	-.078	2	-.008	1	-4.804e-3	3	641.184	2	4297.665	5
503		5	max	.009	3	.094	3	.627	4	8.941e-3	4	NC	5	NC	1
504			min	-.005	2	-.147	2	-.005	1	-9.473e-3	3	463.33	2	3480.264	5
505		6	max	.009	3	.14	3	.6	4	1.224e-2	2	NC	15	NC	1
506			min	-.005	2	-.214	2	-.002	1	-1.414e-2	3	365.271	2	2987.858	5
507		7	max	.009	3	.185	3	.573	4	1.632e-2	2	NC	15	NC	1
508			min	-.005	2	-.273	2	0	12	-1.881e-2	3	307.348	2	2633.541	4
509		8	max	.009	3	.222	3	.545	4	2.04e-2	2	NC	15	NC	1
510			min	-.005	2	-.32	2	0	12	-2.348e-2	3	273.071	2	2369.896	4
511		9	max	.009	3	.245	3	.516	4	2.348e-2	2	9499.024	15	NC	1
512			min	-.005	2	-.35	2	0	1	-2.372e-2	3	255.222	2	2199.45	4
513		10	max	.008	3	.254	3	.485	4	2.589e-2	2	9296.419	15	NC	1
514			min	-.005	2	-.36	2	0	12	-2.102e-2	3	250.016	2	2144.829	4
515		11	max	.008	3	.247	3	.451	4	2.831e-2	2	9498.567	15	NC	1
516			min	-.005	2	-.35	2	0	12	-1.832e-2	3	256.228	2	2183.835	4
517		12	max	.008	3	.226	3	.415	4	2.758e-2	2	NC	15	NC	1
518			min	-.005	2	-.319	2	-.001	1	-1.547e-2	3	276.142	2	2325.867	4
519		13	max	.008	3	.193	3	.376	4	2.213e-2	2	NC	15	NC	1
520			min	-.005	2	-.269	2	0	1	-1.238e-2	3	314.844	2	2705.881	4
521		14	max	.008	3	.15	3	.333	4	1.667e-2	2	NC	15	NC	1
522			min	-.005	2	-.206	2	0	12	-9.291e-3	3	381.323	2	3499.041	4
523		15	max	.007	3	.102	3	.29	4	1.122e-2	2	NC	5	NC	1
524			min	-.004	2	-.138	2	0	12	-6.203e-3	3	496.443	2	5193.007	4
525		16	max	.007	3	.053	3	.247	4	8.67e-3	4	NC	5	NC	1
526			min	-.004	2	-.069	2	0	12	-3.114e-3	3	711.207	2	9620.995	4
527		17	max	.007	3	.006	3	.207	4	9.86e-3	4	NC	5	NC	1
528			min	-.004	2	-.006	2	0	12	-2.584e-5	3	1173.619	2	NC	1
529		18	max	.007	3	.044	2	.17	4	1.058e-2	2	NC	4	NC	1
530			min	-.004	2	-.036	3	0	12	-4.65e-3	3	2509.228	2	NC	1
531		19	max	.007	3	.089	2	.137	4	2.122e-2	2	NC	1	NC	1
532			min	-.004	2	-.075	3	-.001	1	-9.454e-3	3	NC	1	NC	1
533	M5	1	max	.031	3	.236	2	.726	4	0	1	NC	1	NC	1
534			min	-.022	2	-.023	3	0	1	-6.384e-6	4	NC	1	NC	1
535		2	max	.031	3	.106	2	.707	4	6.265e-3	4	NC	5	NC	1
536			min	-.022	2	.002	3	0	1	0	1	889.809	2	8138.572	4
537		3	max	.031	3	.051	3	.684	4	1.234e-2	4	NC	5	NC	1
538			min	-.022	2	-.039	2	0	1	0	1	420.603	2	4776.708	4
539		4	max	.03	3	.145	3	.659	4	1.005e-2	4	NC	15	NC	1
540			min	-.021	2	-.21	2	0	1	0	1	259.058	2	3711.455	4
541		5	max	.029	3	.269	3	.631	4	7.767e-3	4	7722.891	15	NC	1
542			min	-.021	2	-.395	2	0	1	0	1	183.258	2	3209.942	4
543		6	max	.029	3	.406	3	.602	4	5.481e-3	4	5946.346	15	NC	1
544			min	-.02	2	-.576	2	0	1	0	1	142.181	2	2906.871	4
545		7	max	.028	3	.539	3	.573	4	3.194e-3	4	4920.313	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	-.02	2	-.741	2	0	1	0	1	118.264	2	2664.215	4
547		8	max	.028	3	.649	3	.544	4	9.079e-4	4	4323.696	15	NC	1
548			min	-.02	2	-.872	2	0	1	0	1	104.274	2	2414.679	4
549		9	max	.027	3	.72	3	.517	4	0	1	4017.73	15	NC	1
550			min	-.019	2	-.955	2	0	1	-4.696e-6	5	97.067	2	2193.586	4
551		10	max	.026	3	.744	3	.485	4	0	1	3925.565	15	NC	1
552			min	-.019	2	-.983	2	0	1	-4.565e-6	5	94.968	2	2158.021	4
553		11	max	.026	3	.725	3	.451	4	0	1	4017.893	15	NC	1
554			min	-.019	2	-.955	2	0	1	-4.434e-6	5	97.466	2	2209.199	4
555		12	max	.025	3	.662	3	.417	4	6.931e-4	4	4324.082	15	NC	1
556			min	-.018	2	-.867	2	0	1	0	1	105.575	2	2283.314	4
557		13	max	.024	3	.562	3	.377	4	2.44e-3	4	4921.104	15	NC	1
558			min	-.018	2	-.727	2	0	1	0	1	121.631	2	2666.3	4
559		14	max	.024	3	.435	3	.332	4	4.187e-3	4	5947.899	15	NC	1
560			min	-.018	2	-.553	2	0	1	0	1	149.753	2	3678.964	4
561		15	max	.023	3	.294	3	.286	4	5.934e-3	4	7725.965	15	NC	1
562			min	-.018	2	-.365	2	0	1	0	1	199.719	2	6551.741	4
563		16	max	.022	3	.151	3	.241	4	7.681e-3	4	NC	15	NC	1
564			min	-.017	2	-.181	2	0	1	0	1	296.141	2	NC	1
565		17	max	.022	3	.017	3	.199	4	9.428e-3	4	NC	5	NC	1
566			min	-.017	2	-.021	2	0	1	0	1	511.699	2	NC	1
567		18	max	.022	3	.099	2	.165	4	4.787e-3	4	NC	5	NC	1
568			min	-.017	2	-.097	3	0	1	0	1	1136.139	2	NC	1
569		19	max	.022	3	.197	2	.138	4	0	1	NC	1	NC	1
570			min	-.017	2	-.2	3	0	1	-3.941e-6	4	NC	1	NC	1
571	M9	1	max	.01	3	.102	2	.726	4	2.548e-2	3	NC	1	NC	1
572			min	-.005	2	-.019	3	-.001	1	-1.314e-2	2	NC	1	NC	1
573		2	max	.01	3	.047	2	.706	4	1.261e-2	3	NC	4	NC	1
574			min	-.006	2	-.005	3	0	12	-6.443e-3	2	2102.219	2	8412.944	4
575		3	max	.01	3	.016	3	.684	4	1.232e-2	4	NC	5	NC	1
576			min	-.006	2	-.012	2	0	12	-1.799e-5	10	1014.228	2	4878.708	4
577		4	max	.01	3	.05	3	.658	4	9.697e-3	5	NC	5	NC	1
578			min	-.005	2	-.078	2	0	12	-4.07e-3	2	641.184	2	3743.12	4
579		5	max	.009	3	.094	3	.631	4	9.473e-3	3	NC	5	NC	1
580			min	-.005	2	-.147	2	0	12	-8.153e-3	2	463.33	2	3200.437	4
581		6	max	.009	3	.14	3	.602	4	1.414e-2	3	NC	15	NC	1
582			min	-.005	2	-.214	2	0	12	-1.224e-2	2	365.271	2	2874.668	4
583		7	max	.009	3	.185	3	.573	4	1.881e-2	3	NC	15	NC	1
584			min	-.005	2	-.273	2	0	1	-1.632e-2	2	307.348	2	2628.33	4
585		8	max	.009	3	.222	3	.545	4	2.348e-2	3	NC	15	NC	1
586			min	-.005	2	-.32	2	0	1	-2.04e-2	2	273.071	2	2395.272	4
587		9	max	.009	3	.245	3	.516	4	2.372e-2	3	9474.883	15	NC	1
588			min	-.005	2	-.35	2	0	12	-2.348e-2	2	255.222	2	2192.509	4
589		10	max	.008	3	.254	3	.485	4	2.102e-2	3	9272.872	15	NC	1
590			min	-.005	2	-.36	2	0	1	-2.589e-2	2	250.016	2	2146.226	4
591		11	max	.008	3	.247	3	.451	4	1.832e-2	3	9474.436	15	NC	1
592			min	-.005	2	-.35	2	0	1	-2.831e-2	2	256.228	2	2193.028	4
593		12	max	.008	3	.226	3	.416	4	1.547e-2	3	NC	15	NC	1
594			min	-.005	2	-.319	2	0	12	-2.758e-2	2	276.142	2	2302.432	4
595		13	max	.008	3	.193	3	.376	4	1.238e-2	3	NC	15	NC	1
596			min	-.005	2	-.269	2	0	12	-2.213e-2	2	314.844	2	2707.622	4
597		14	max	.008	3	.15	3	.332	4	9.291e-3	3	NC	15	NC	1
598			min	-.005	2	-.206	2	-.002	1	-1.667e-2	2	381.323	2	3646.37	5
599		15	max	.007	3	.102	3	.287	4	6.203e-3	3	NC	5	NC	1
600			min	-.004	2	-.138	2	-.005	1	-1.122e-2	2	496.443	2	5874.276	5
601		16	max	.007	3	.053	3	.242	4	7.601e-3	5	NC	5	NC	1
602			min	-.004	2	-.069	2	-.007	1	-5.767e-3	2	711.207	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	.007	3	.006	3	.201	4	9.531e-3	4	NC	5	NC	1
604			min	-.004	2	-.006	2	-.008	1	-5.376e-4	1	1173.619	2	NC	1
605		18	max	.007	3	.044	2	.166	4	4.65e-3	3	NC	4	NC	1
606			min	-.004	2	-.036	3	-.006	1	-1.058e-2	2	2509.228	2	NC	1
607		19	max	.007	3	.089	2	.138	4	9.454e-3	3	NC	1	NC	1
608			min	-.004	2	-.075	3	0	12	-2.122e-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

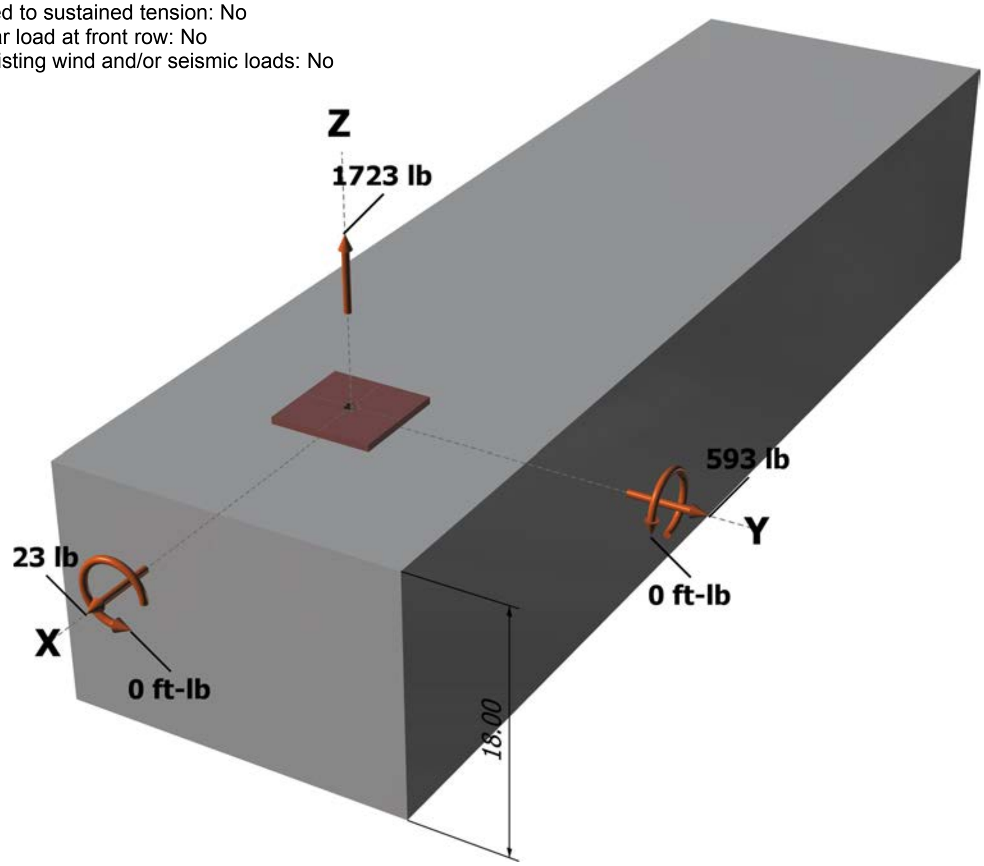
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

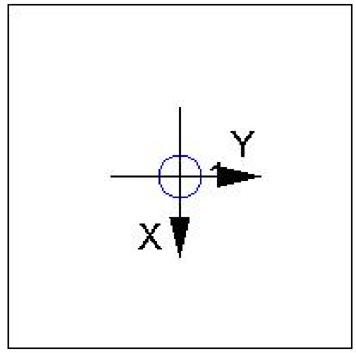
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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, $øN_n$ (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, $øV_n$ (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.

Anchor Designer™
Software
Version 2.4.5673.0

Company:	Schletter, Inc.	Date:	11/17/2015
Engineer:	HCV	Page:	1/5
Project:	Standard PVMax - Worst Case, 31-33 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

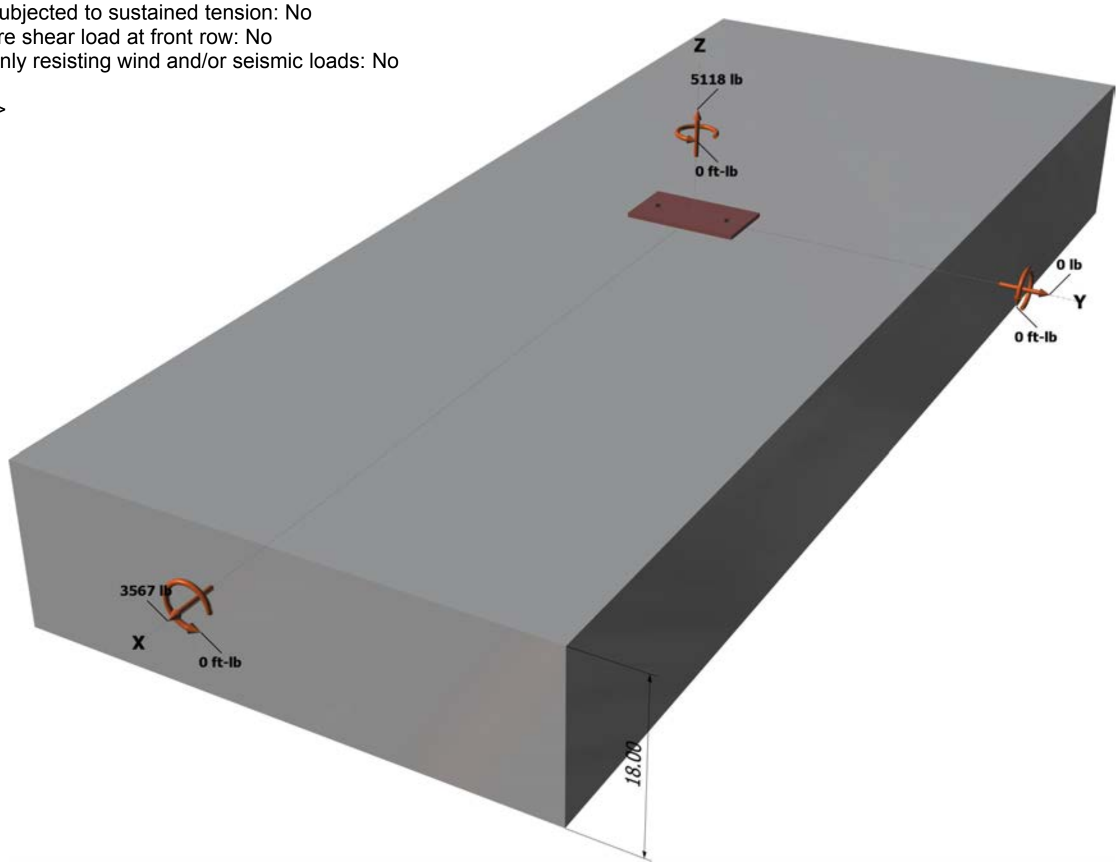
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

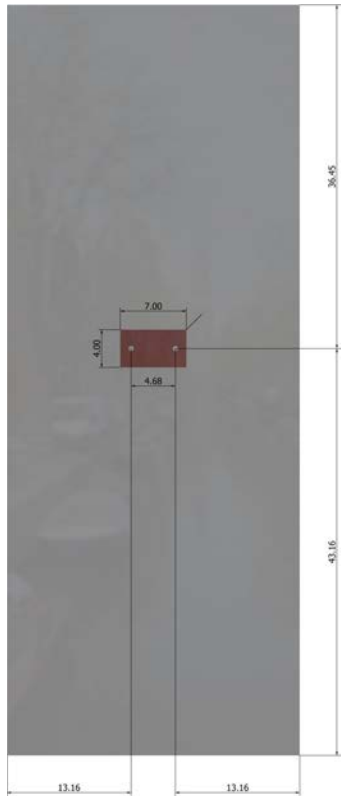


SIMPSON Strong-Tie®

Anchor Designer™
Software
Version 2.4.5673.0

Company:	Schletter, Inc.	Date:	11/17/2015
Engineer:	HCV	Page:	2/5
Project:	Standard PVMax - Worst Case, 31-33 Inch Width		
Address:			
Phone:			
E-mail:			

<Figure 2>



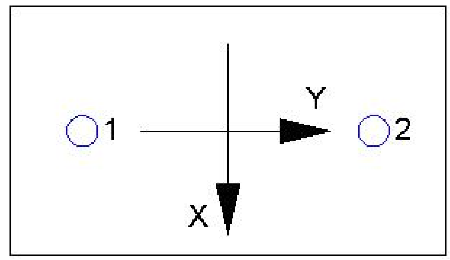
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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	2559.0	1783.5	0.0	1783.5
2	2559.0	1783.5	0.0	1783.5
Sum	5118.0	3567.0	0.0	3567.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 5118
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)
558.00	648.00	1.000	0.919	1.000	1.000	15593	0.70	8641

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	13.16	17908

$\phi V_{cbx} = \phi\,(2)(A_{Vc} / A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (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)
710.64	779.34	1.000	1.000	1.000	17908	0.70	22862

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	2559	6071	0.42	Pass
Concrete breakout	5118	10231	0.50	Pass
Adhesive	**5118**	**8093**	**0.63**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, $øV_n$ (lb)	Ratio	Status
Steel	**1784**	**3156**	**0.57**	**Pass (Governs)**
T Concrete breakout x+	3567	8641	0.41	Pass
|| Concrete breakout y-	1784	22862	0.08	Pass
Pryout	3567	20601	0.17	Pass

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

Sec. D.7.3	0.63	0.57	119.8 %	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.