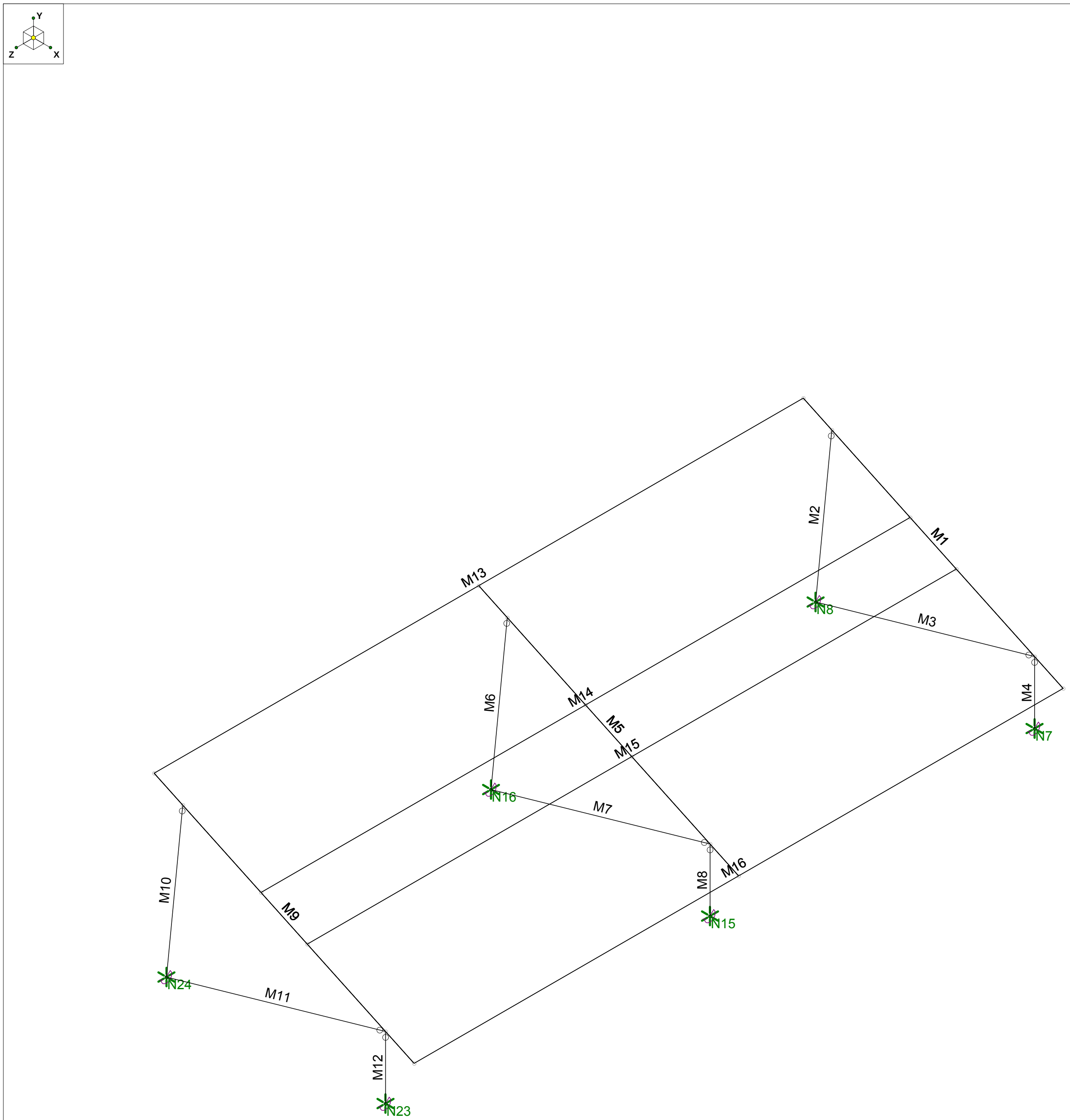


Schletter, Inc.		25° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-05	

1. INTRODUCTION

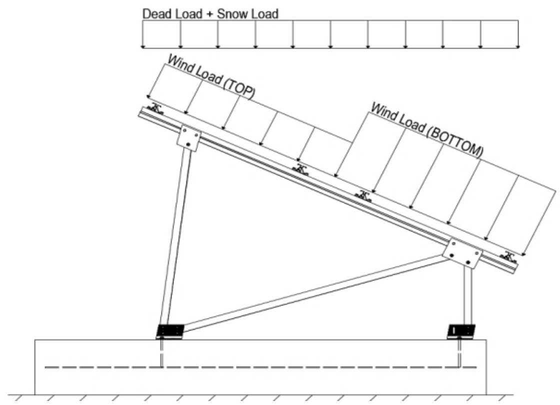
1.1 Project Description
The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. PVMax ground mount system.

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

PV modules are required to meet the following specifications:

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

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



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

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

2. LOAD ACTIONS

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

Self-weight of the PV modules.

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

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

Exposure Category = C
Importance Category = II

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

Pressure Coefficients

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

Provided pressure coefficients are the result of wind tunnel testing done by Ruscheweyh Consult. Coefficients are located in test report # 1127/0611-1e. Negative forces are applied away from the surface.

2.4 Seismic Loads

S_S =	2.50	R =	1.25
S_{DS} =	1.67	C_S =	0.8
S_1 =	1.00	ρ =	1.3
S_{D1} =	1.00	Ω =	1.25
T_a =	0.06	C_d =	1.25

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

2.5 Combination of Loads

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

Strength Design, LRFD

Component stresses are checked using the following LRFD load combinations:

1.2D + 1.6S + 0.8W
1.2D + 1.6W + 0.5S
0.9D + 1.6W [M]
1.54D + 1.3E + 0.2S [R]
0.56D + 1.3E [R]
1.54D + 1.25E + 0.2S [O]
0.56D + 1.25E [O]

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

Allowable Stress Design, ASD

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

1.0D + 1.0S
1.0D + 1.0W
1.0D + 0.75L + 0.75W + 0.75S
0.6D + 1.0W [M]
1.238D + 0.875E [O]
1.1785D + 0.65625E + 0.75S [O]
0.362D + 0.875E [O]

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

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

3. STRUCTURAL ANALYSIS

3.1 RISA Results

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

3.2 RISA Components

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

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

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

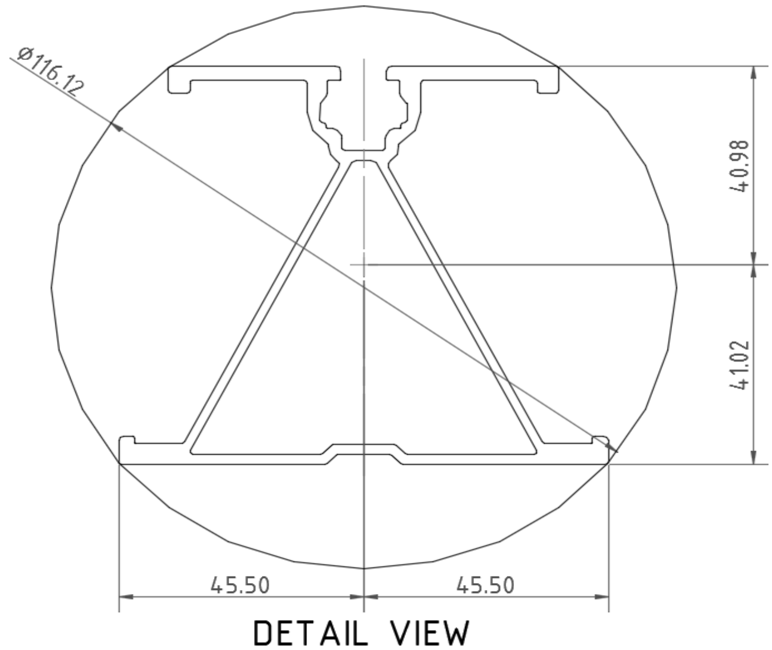
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

4. MEMBER DESIGN CALCULATIONS

4.1 Purlin Design

Aluminum purlins are used to transfer loads to the support structure. Purlins are designed as continous beams with cantilevers. These are considered beams with internal hinges that can be joined with splices at 25% of the support respective span. See Appendix A.1 for detailed member calculations. Section units are in (mm).

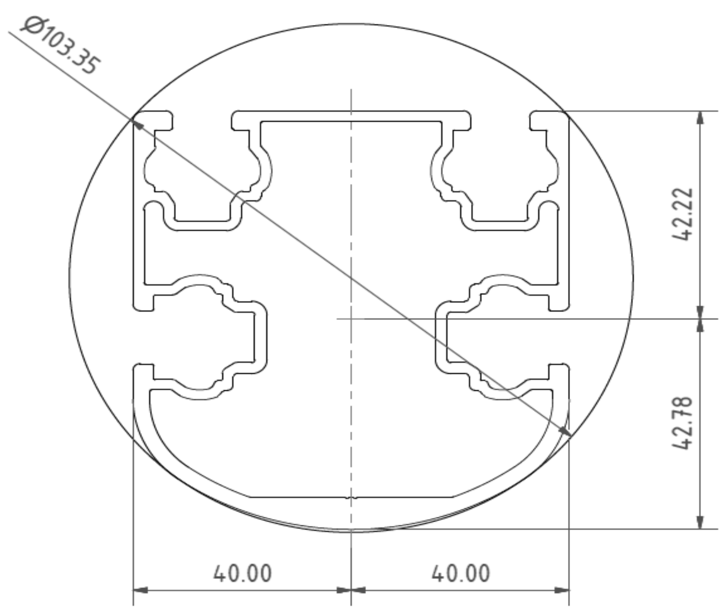
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	93	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	-2.167	k-ft
M_z =	0.002	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	78%	



4.2 Girder Design

Loads from purlins are transferred using an inclined girder, which is connected to a set of aluminum struts. Loads on the girder result from the support reactions of the purlins. See Appendix A.2 for detailed member calculations. Section units are in (mm).

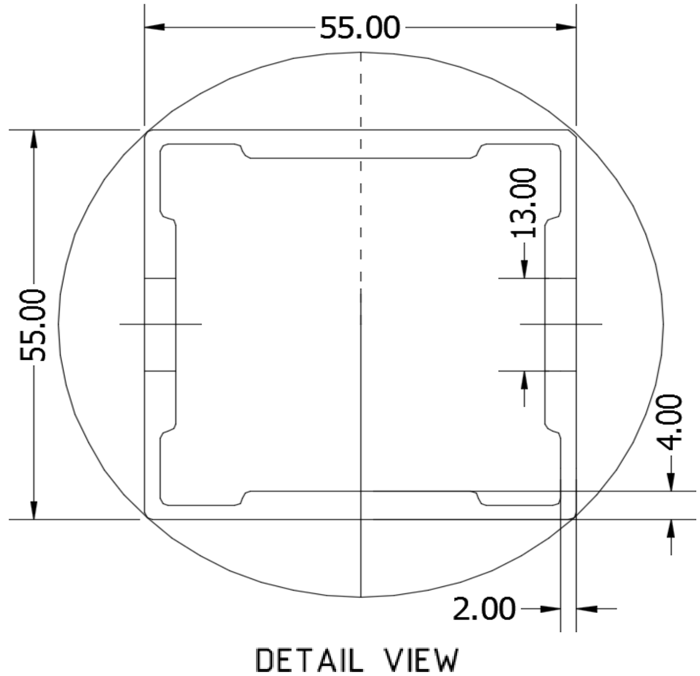
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	88.90	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.35	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.180	k-ft
M_z =	0.000	k-ft
P_n =	-0.874	k
$M_{y\ allowable}$ =	3.464	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	93%	



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).

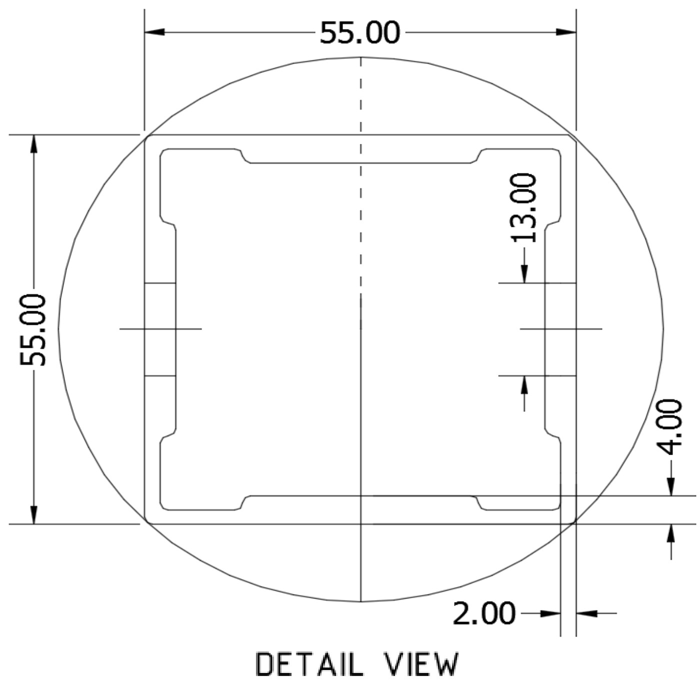
Strut Type =	55x55	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.423	k-ft
P_n =	0.487	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	32%	



4.4 Diagonal Strut Design

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

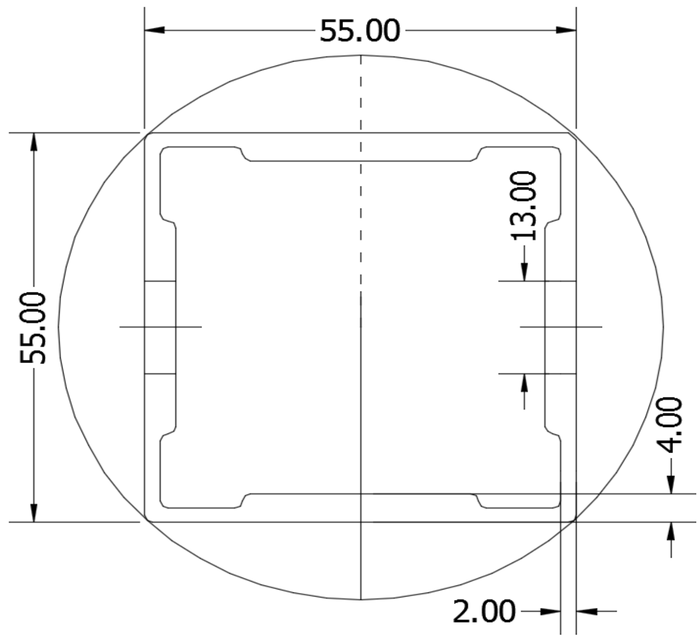
Strut Type =	55x55	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	86.60	in
$\Phi F_{ty\ AXIAL}$ =	7.50	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.011	k-ft
M_z =	0.000	k-ft
P_n =	2.474	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	7.371	k
Utilization =	34%	



4.5 Rear Strut Design

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

Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	63.42	in
$\Phi F_{ty\ AXIAL}$ =	12.77	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	-0.011	k-ft
M_z =	0.000	k-ft
P_n =	3.450	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	12.545	k
Utilization =	28%	



DETAIL VIEW

5. FOUNDATION DESIGN CALCULATIONS

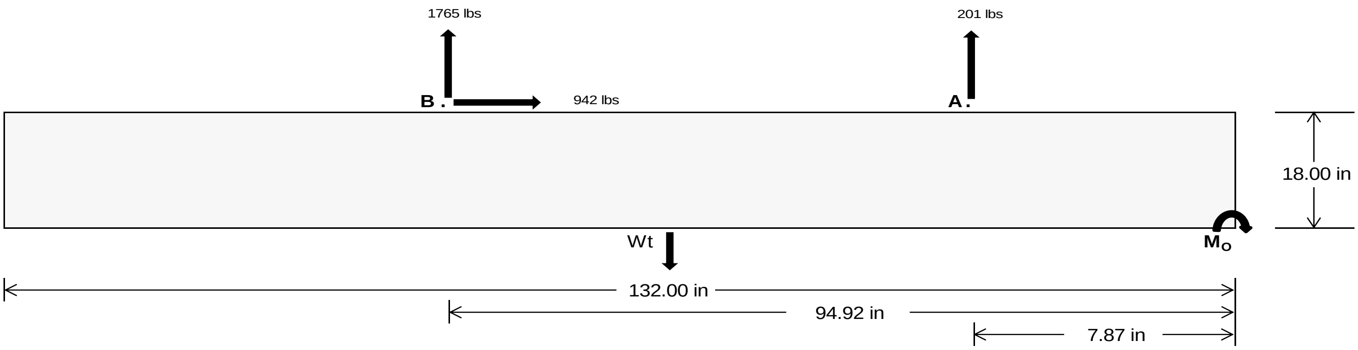
5.1 Helical Pile Foundations

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 =	847.53	7348.41	k
Compressive Load =	3827.81	5350.81	k
Lateral Load =	291.68	3918.71	k
Moment (Weak Axis) =	0.57	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 (3) #5 rebar.

Overturning Check
M_O = 186033.7 in-lbs
Resisting Force Required = 2818.69 lbs
S.F. = 1.67
Weight Required = 4697.82 lbs
Minimum Width = 39 in in
Weight Provided = 7775.63 lbs

A minimum 132in long x 39in wide x 18in tall ballast foundation is required to resist overturning.

Sliding
Force = 942.01 lbs
Friction = 0.4
Weight Required = 2355.03 lbs
Resisting Weight = 7775.63 lbs
Additional Weight Required = 0 lbs

Use a 132in long x 39in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

Cohesion
Sliding Force = 942.01 lbs
Cohesion = 130 psf
Area = 35.75 ft^2
Resisting = 3887.81 lbs
Additional Weight Required = 0 lbs

Use a 132in long x 39in 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			
	39 in	40 in	41 in	42 in
P_{ftg} = (145 pcf)(11 ft)(1.5 ft)(3.25 ft) =	7776 lbs	7975 lbs	8174 lbs	8374 lbs

ASD LC	1.0D + 1.0S				1.0D + 1.0W				1.0D + 0.75L + 0.75W + 0.75S				0.6D + 1.0W			
Width	39 in	40 in	41 in	42 in	39 in	40 in	41 in	42 in	39 in	40 in	41 in	42 in	39 in	40 in	41 in	42 in
F_A	1076 lbs	1076 lbs	1076 lbs	1076 lbs	1619 lbs	1619 lbs	1619 lbs	1619 lbs	1919 lbs	1919 lbs	1919 lbs	1919 lbs	-402 lbs	-402 lbs	-402 lbs	-402 lbs
F_B	1057 lbs	1057 lbs	1057 lbs	1057 lbs	2354 lbs	2354 lbs	2354 lbs	2354 lbs	2458 lbs	2458 lbs	2458 lbs	2458 lbs	-3529 lbs	-3529 lbs	-3529 lbs	-3529 lbs
F_V	133 lbs	133 lbs	133 lbs	133 lbs	1678 lbs	1678 lbs	1678 lbs	1678 lbs	1347 lbs	1347 lbs	1347 lbs	1347 lbs	-1884 lbs	-1884 lbs	-1884 lbs	-1884 lbs
P_{total}	9909 lbs	10108 lbs	10308 lbs	10507 lbs	11748 lbs	11948 lbs	12147 lbs	12346 lbs	12153 lbs	12353 lbs	12552 lbs	12751 lbs	734 lbs	853 lbs	973 lbs	1093 lbs
M	2865 lbs-ft	2865 lbs-ft	2865 lbs-ft	2865 lbs-ft	4686 lbs-ft	4686 lbs-ft	4686 lbs-ft	4686 lbs-ft	5392 lbs-ft	5392 lbs-ft	5392 lbs-ft	5392 lbs-ft	3730 lbs-ft	3730 lbs-ft	3730 lbs-ft	3730 lbs-ft
e	0.29 ft	0.28 ft	0.28 ft	0.27 ft	0.40 ft	0.39 ft	0.39 ft	0.38 ft	0.44 ft	0.44 ft	0.43 ft	0.42 ft	5.08 ft	4.37 ft	3.83 ft	3.41 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}	233.5 psf	233.1 psf	232.7 psf	232.3 psf	257.1 psf	256.1 psf	255.2 psf	254.3 psf	257.7 psf	256.7 psf	255.7 psf	254.8 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	320.9 psf	318.3 psf	315.8 psf	313.5 psf	400.1 psf	395.6 psf	391.2 psf	387.1 psf	422.2 psf	417.1 psf	412.2 psf	407.6 psf	361.0 psf	151.1 psf	113.9 psf	99.8 psf

Maximum Bearing Pressure = 422 psf
Allowable Bearing Pressure = 1500 psf

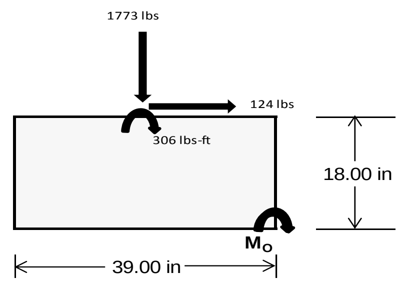
Use a 132in long x 39in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O =	2389.4 ft-lbs
Resisting Force Required =	1470.40 lbs
S.F. =	1.67
Weight Required =	2450.67 lbs
Minimum Width =	39 in in
Weight Provided =	7775.63 lbs

A minimum 132in long x 39in 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	39 in			39 in			39 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	241 lbs	500 lbs	165 lbs	664 lbs	1773 lbs	606 lbs	97 lbs	146 lbs	22 lbs
F_V	171 lbs	168 lbs	173 lbs	127 lbs	124 lbs	133 lbs	171 lbs	169 lbs	172 lbs
P_{total}	9867 lbs	10126 lbs	9791 lbs	9827 lbs	10937 lbs	9770 lbs	2912 lbs	2961 lbs	2837 lbs
M	661 lbs-ft	652 lbs-ft	666 lbs-ft	494 lbs-ft	492 lbs-ft	515 lbs-ft	659 lbs-ft	651 lbs-ft	661 lbs-ft
e	0.07 ft	0.06 ft	0.07 ft	0.05 ft	0.04 ft	0.05 ft	0.23 ft	0.22 ft	0.23 ft
L/6	0.54 ft	0.54 ft	0.54 ft	0.54 ft	0.54 ft	0.54 ft	0.54 ft	0.54 ft	0.54 ft
f_{min}	241.9 psf	249.6 psf	239.5 psf	249.4 psf	280.5 psf	246.7 psf	47.4 psf	49.2 psf	45.2 psf
f_{max}	310.1 psf	316.9 psf	308.3 psf	300.4 psf	331.3 psf	299.9 psf	115.5 psf	116.4 psf	113.5 psf

Maximum Bearing Pressure = 331 psf
Allowable Bearing Pressure = 1500 psf

Use a 132in long x 39in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Foundation Requirements: 132in long x 39in wide x 18in tall ballast foundation and fiber reinforcing with (3) #5 rebar.

5.3 Foundation Anchors

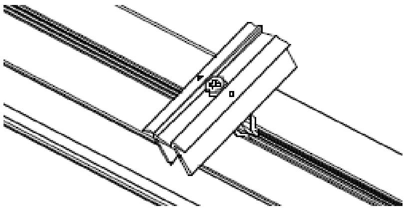
Threaded rods are anchored to the the ballast foundations using the Simpson AT-XP epoxy solution. LRFD load results are compared to the allowable strengths of the epoxy solution. Please see the supplementary calculations provided by the Simpson Anchor Designer software.

6. DESIGN OF JOINTS AND CONNECTIONS

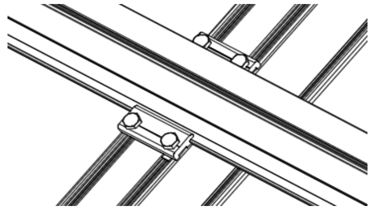
6.1 Anchorage of Modules to Purlins and Connection of Purlins to Girders

Modules are secured to the purlins with Schletter, Inc. Rapid2+ mounting clamps. Purlins are secured to the girders with the use of 80mm mounting clamps. The reliability of calculations is uncertain due to limited standards, therefore the strength of the clamp fasteners has been evaluated by load testing.

Fastening of Modules to Purlins		
Maximum Uplifting Force =	1.005	k
Allowable Uplift =	1.214	k
Utilization =	83%	



Fastening of Purlins to Girders		
Maximum Uplifting Force =	2.790	k
Allowable Uplift =	4.357	k
Utilization =	64%	



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 =	2.944	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	40%	

Rear Strut		
Maximum Axial Load =	4.977	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	67%	

Diagonal Strut		
Maximum Axial Load =	2.601	k
M12 Bolt Shear Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	35%	

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

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

7. SEISMIC DESIGN

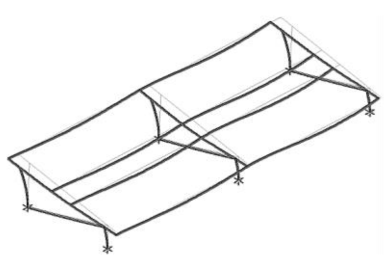
7.1 Seismic Drift

The racking structure has been analyzed under seismic loading. The allowable story drift of the structure must fall within the limits provided by (ASCE 7, Table 12.12-1).

Mean Height, h_{sx} =	46.89	in
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$	
	0.938	in
Max Drift, Δ_{MAX} =	0.437	in

$0.437 \leq 0.938$, OK.

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



APPENDIX A

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

Purlin = **S1.5**

Strong Axis:
3.4.14
L_b = 93 in
J = 0.432
257.282

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

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= 28.1 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 = 93
J = 0.432
163.616

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

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 = 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

3.4.16.1 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

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

3.4.16

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

3.4.9

b/t = 24.5
S1 = 12.21 (See 3.4.16 above for formula)
S2 = 32.70 (See 3.4.16 above for formula)
$\varphi F_L = \varphi c[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 28.2 ksi

b/t = 24.5
S1 = 12.21
S2 = 32.70
$\varphi F_L = \varphi c[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 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

$\varphi F_L =$ 7.50 ksi
A = 663.99 mm^2
1.03 in^2
$P_{max} =$ 7.72 kips

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

Strut = __**55x55**__

Strong Axis:

3.4.14

$L_b =$ 63.42 in
J = 0.942
98.9729

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

S1 = 0.51461

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

S2 = 1701.56
$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)/2}))}]$
$\varphi F_L =$ 30.2 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7
$\varphi F_L = \varphi b[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 28.2 ksi

Weak Axis:

3.4.14

$L_b =$ 63.42
J = 0.942
98.9729

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

S1 = 0.51461

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

S2 = 1701.56
$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)/2}))}]$
$\varphi F_L =$ 30.2

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7
$\varphi F_L = \varphi b[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

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 in³

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 in³

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 1.46712

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.7854

φF_L= (φccFcy)/(λ²)

φF_L= 12.7711 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

$\varphi F_L = \varphi y Fcy$

$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 12.77 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 13.14 kips

APPENDIX B

B.1

The following pages will contain the results from RISA. Please refer back to Section 2 for load information and Section 4-5 for member and foundation design.

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Dead Load, Max	DL		-1				4		
2	Dead Load, Min	DL		-1				4		
3	Snow Load	SL						4		
4	Wind Load - Pressure	WL						4		
5	Wind Load - Suction	WL						4		
6	Seismic - Lateral	EL			.8			8		

Member Distributed Loads (BLC 1 : Dead Load, Max)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Y	-8.366	-8.366	0	0
2	M14	Y	-8.366	-8.366	0	0
3	M15	Y	-8.366	-8.366	0	0
4	M16	Y	-8.366	-8.366	0	0

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

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

Member Distributed Loads (BLC 3 : Snow Load)

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

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

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	y	-81.397	-81.397	0	0
2	M14	y	-81.397	-81.397	0	0
3	M15	y	-125.796	-125.796	0	0
4	M16	y	-125.796	-125.796	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	184.994	184.994	0	0
2	M14	y	140.595	140.595	0	0
3	M15	y	73.997	73.997	0	0
4	M16	y	73.997	73.997	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	807.114	2	1307.564	2	.445	1	.002	1	0	1	0	1
2		min	-974.24	3	-1771.968	3	-34.494	5	-.174	4	0	1	0	1
3	N7	max	.022	9	1010.808	1	-.454	12	0	12	0	1	0	1
4		min	-.232	2	-178.087	3	-224.37	4	-.435	4	0	1	0	1
5	N15	max	.022	9	2944.468	2	0	11	0	11	0	1	0	1
6		min	-2.419	2	-651.948	3	-215.848	4	-.423	4	0	1	0	1
7	N16	max	2731.807	2	4116.005	2	0	3	0	3	0	1	0	1
8		min	-3014.394	3	-5652.621	3	-34.575	5	-.176	4	0	1	0	1
9	N23	max	.028	14	1010.808	1	6.236	1	.013	1	0	1	0	1
10		min	-.232	2	-178.087	3	-219.522	4	-.428	4	0	1	0	1
11	N24	max	807.114	2	1307.564	2	-.043	12	0	12	0	1	0	1
12		min	-974.24	3	-1771.968	3	-34.988	5	-.175	4	0	1	0	1
13	Totals:	max	4343.152	2	11645.537	2	0	11						
14		min	-4963.592	3	-10204.681	3	-760.705	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	61.642	1	461.679	2	-7.218	12	0	15	.146	1	0	4
2			min	5.073	12	-848.471	3	-134.781	1	-.015	2	.012	12	0	3
3		2	max	61.642	1	321.987	2	-5.918	12	0	15	.082	4	.623	3
4			min	5.073	12	-597.773	3	-103.162	1	-.015	2	.002	10	-.337	2
5		3	max	61.642	1	182.295	2	-4.618	12	0	15	.047	5	1.029	3
6			min	5.073	12	-347.074	3	-71.543	1	-.015	2	-.031	1	-.555	2
7		4	max	61.642	1	42.604	2	-3.318	12	0	15	.026	5	1.22	3
8			min	5.073	12	-96.376	3	-39.924	1	-.015	2	-.079	1	-.651	2
9		5	max	61.642	1	154.323	3	.16	10	0	15	.006	5	1.195	3
10			min	5.073	12	-97.088	2	-24.035	4	-.015	2	-.1	1	-.628	2
11		6	max	61.642	1	405.021	3	23.314	1	0	15	-.005	12	.955	3
12			min	1.54	15	-236.78	2	-19.701	5	-.015	2	-.093	1	-.484	2
13		7	max	61.642	1	655.72	3	54.933	1	0	15	-.005	12	.498	3
14			min	-6.387	5	-376.471	2	-17.69	5	-.015	2	-.06	1	-.22	2
15		8	max	61.642	1	906.418	3	86.552	1	0	15	.004	2	.164	2
16			min	-15.226	5	-516.163	2	-15.678	5	-.015	2	-.043	4	-.175	3
17		9	max	61.642	1	1157.117	3	118.171	1	0	15	.089	1	.669	2
18			min	-24.066	5	-655.855	2	-13.667	5	-.015	2	-.054	5	-1.063	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	61.642	1	795.546	2	-4.483	12	.003	14	.205	1	1.294	2
20			min	5.073	12	-1407.815	3	-149.79	1	-.015	2	.002	12	-2.167	3
21		11	max	61.642	1	655.855	2	-3.183	12	.015	2	.089	1	.669	2
22			min	5.073	12	-1157.117	3	-118.171	1	0	15	-.003	3	-1.063	3
23		12	max	61.642	1	516.163	2	-1.883	12	.015	2	.042	4	.164	2
24			min	5.073	12	-906.418	3	-86.552	1	0	15	-.006	3	-.175	3
25		13	max	61.642	1	376.471	2	-.583	12	.015	2	.02	5	.498	3
26			min	5.073	12	-655.72	3	-54.933	1	0	15	-.06	1	-.22	2
27		14	max	61.642	1	236.78	2	1.237	3	.015	2	0	15	.955	3
28			min	3.613	15	-405.021	3	-27.73	4	0	15	-.093	1	-.484	2
29		15	max	61.642	1	97.088	2	8.305	1	.015	2	-.004	12	1.195	3
30			min	-3.347	5	-154.323	3	-20.532	5	0	15	-.1	1	-.628	2
31		16	max	61.642	1	96.376	3	39.924	1	.015	2	-.001	12	1.22	3
32			min	-12.186	5	-42.604	2	-18.521	5	0	15	-.079	1	-.651	2
33		17	max	61.642	1	347.074	3	71.543	1	.015	2	.003	3	1.029	3
34			min	-21.026	5	-182.295	2	-16.509	5	0	15	-.058	4	-.555	2
35		18	max	61.642	1	597.773	3	103.162	1	.015	2	.044	1	.623	3
36			min	-29.865	5	-321.987	2	-14.498	5	0	15	-.064	5	-.337	2
37		19	max	61.642	1	848.471	3	134.781	1	.015	2	.146	1	0	2
38			min	-38.705	5	-461.679	2	-12.486	5	0	15	-.076	5	0	3
39	M14	1	max	40.275	4	518.346	2	-7.447	12	.012	3	.183	4	0	1
40			min	2.294	12	-675.806	3	-139.904	1	-.014	2	.014	12	0	3
41		2	max	33.63	1	378.655	2	-6.147	12	.012	3	.124	4	.5	3
42			min	2.294	12	-486.28	3	-108.285	1	-.014	2	.004	10	-.386	2
43		3	max	33.63	1	238.963	2	-4.847	12	.012	3	.073	5	.837	3
44			min	2.294	12	-296.753	3	-76.666	1	-.014	2	-.014	1	-.652	2
45		4	max	33.63	1	99.271	2	-3.547	12	.012	3	.041	5	1.011	3
46			min	2.294	12	-107.227	3	-47.126	4	-.014	2	-.066	1	-.798	2
47		5	max	33.63	1	82.3	3	-.377	10	.012	3	.01	5	1.022	3
48			min	-2.539	5	-40.42	2	-38.181	4	-.014	2	-.091	1	-.823	2
49		6	max	33.63	1	271.826	3	18.191	1	.012	3	-.004	12	.87	3
50			min	-11.378	5	-180.112	2	-32.53	5	-.014	2	-.089	1	-.728	2
51		7	max	33.63	1	461.353	3	49.81	1	.012	3	-.005	12	.554	3
52			min	-20.218	5	-319.804	2	-30.518	5	-.014	2	-.06	4	-.513	2
53		8	max	33.63	1	650.88	3	81.429	1	.012	3	.002	2	.075	3
54			min	-29.057	5	-459.495	2	-28.507	5	-.014	2	-.074	4	-.177	2
55		9	max	33.63	1	840.406	3	113.048	1	.012	3	.08	1	.278	2
56			min	-37.897	5	-599.187	2	-26.495	5	-.014	2	-.095	5	-.567	3
57		10	max	58.407	4	738.879	2	-4.254	12	.012	3	.191	1	.855	2
58			min	2.294	12	-1029.933	3	-144.667	1	-.014	2	.001	3	-1.372	3
59		11	max	49.568	4	599.187	2	-2.954	12	.014	2	.123	4	.278	2
60			min	2.294	12	-840.406	3	-113.048	1	-.012	3	-.003	3	-.567	3
61		12	max	40.728	4	459.495	2	-1.654	12	.014	2	.071	5	.075	3
62			min	2.294	12	-650.88	3	-81.429	1	-.012	3	-.006	3	-.177	2
63		13	max	33.63	1	319.804	2	-.354	12	.014	2	.038	5	.554	3
64			min	2.294	12	-461.353	3	-49.81	1	-.012	3	-.06	1	-.513	2
65		14	max	33.63	1	180.112	2	1.581	3	.014	2	.007	5	.87	3
66			min	2.294	12	-271.826	3	-38.956	4	-.012	3	-.089	1	-.728	2
67		15	max	33.63	1	40.42	2	13.428	1	.014	2	-.003	12	1.022	3
68			min	2.294	12	-82.3	3	-32.705	5	-.012	3	-.091	1	-.823	2
69		16	max	33.63	1	107.227	3	45.047	1	.014	2	0	12	1.011	3
70			min	-2.212	5	-99.271	2	-30.693	5	-.012	3	-.066	1	-.798	2
71		17	max	33.63	1	296.753	3	76.666	1	.014	2	.005	3	.837	3
72			min	-11.051	5	-238.963	2	-28.682	5	-.012	3	-.078	4	-.652	2
73		18	max	33.63	1	486.28	3	108.285	1	.014	2	.066	1	.5	3
74			min	-19.891	5	-378.655	2	-26.67	5	-.012	3	-.098	5	-.386	2
75		19	max	33.63	1	675.806	3	139.904	1	.014	2	.173	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	-28.73	5	-518.346	2	-24.659	5	-.012	3	-.12	5	0	3
77	M15	1	max	67.759	5	724.878	2	-7.317	12	.014	2	.229	4	0	2
78			min	-34.839	1	-366.674	3	-139.922	1	-.01	3	.013	12	0	3
79		2	max	58.92	5	524.014	2	-6.016	12	.014	2	.159	4	.274	3
80			min	-34.839	1	-268.904	3	-108.303	1	-.01	3	.004	10	-.538	2
81		3	max	50.08	5	323.151	2	-4.716	12	.014	2	.099	5	.463	3
82			min	-34.839	1	-171.135	3	-76.684	1	-.01	3	-.014	1	-.902	2
83		4	max	41.241	5	122.287	2	-3.416	12	.014	2	.056	5	.568	3
84			min	-34.839	1	-73.366	3	-58.727	4	-.01	3	-.066	1	-1.094	2
85		5	max	32.401	5	24.403	3	-.443	10	.014	2	.016	5	.589	3
86			min	-34.839	1	-78.577	2	-49.782	4	-.01	3	-.091	1	-1.113	2
87		6	max	23.562	5	122.173	3	18.173	1	.014	2	-.004	12	.526	3
88			min	-34.839	1	-279.44	2	-44.105	5	-.01	3	-.089	1	-.959	2
89		7	max	14.722	5	219.942	3	49.792	1	.014	2	-.005	12	.379	3
90			min	-34.839	1	-480.304	2	-42.093	5	-.01	3	-.074	4	-.632	2
91		8	max	5.883	5	317.711	3	81.411	1	.014	2	.002	10	.148	3
92			min	-34.839	1	-681.168	2	-40.082	5	-.01	3	-.098	4	-.132	2
93		9	max	-1.919	15	415.481	3	113.03	1	.014	2	.08	1	.541	2
94			min	-34.839	1	-882.031	2	-38.07	5	-.01	3	-.129	5	-.168	3
95		10	max	-2.958	10	1082.895	2	-4.384	12	.014	2	.228	4	1.387	2
96			min	-34.839	1	-513.25	3	-144.649	1	-.01	3	.002	12	-.568	3
97		11	max	-1.177	15	882.031	2	-3.084	12	.01	3	.157	4	.541	2
98			min	-34.839	1	-415.481	3	-113.03	1	-.014	2	-.003	3	-.168	3
99		12	max	-2.958	10	681.168	2	-1.784	12	.01	3	.095	5	.148	3
100			min	-34.839	1	-317.711	3	-81.411	1	-.014	2	-.006	3	-.132	2
101		13	max	-2.958	10	480.304	2	-.484	12	.01	3	.052	5	.379	3
102			min	-34.839	1	-219.942	3	-59.522	4	-.014	2	-.06	1	-.632	2
103		14	max	-2.958	10	279.44	2	1.373	3	.01	3	.012	5	.526	3
104			min	-36.676	4	-122.173	3	-50.577	4	-.014	2	-.089	1	-.959	2
105		15	max	-2.958	10	78.577	2	13.446	1	.01	3	-.003	12	.589	3
106			min	-45.515	4	-24.403	3	-44.282	5	-.014	2	-.091	1	-1.113	2
107		16	max	-2.958	10	73.366	3	45.065	1	.01	3	0	12	.568	3
108			min	-54.355	4	-122.287	2	-42.271	5	-.014	2	-.08	4	-1.094	2
109		17	max	-2.958	10	171.135	3	76.684	1	.01	3	.004	3	.463	3
110			min	-63.194	4	-323.151	2	-40.259	5	-.014	2	-.104	4	-.902	2
111		18	max	-2.958	10	268.904	3	108.303	1	.01	3	.066	1	.274	3
112			min	-72.033	4	-524.014	2	-38.248	5	-.014	2	-.134	5	-.538	2
113		19	max	-2.958	10	366.674	3	139.922	1	.01	3	.173	1	0	2
114			min	-80.873	4	-724.878	2	-36.236	5	-.014	2	-.166	5	0	5
115	M16	1	max	65.824	5	670.52	2	-6.782	12	.01	2	.174	4	0	2
116			min	-66.224	1	-320.646	3	-135.137	1	-.013	3	.011	12	0	3
117		2	max	56.984	5	469.656	2	-5.482	12	.01	2	.117	4	.234	3
118			min	-66.224	1	-222.877	3	-103.518	1	-.013	3	.003	10	-.491	2
119		3	max	48.145	5	268.793	2	-4.182	12	.01	2	.073	5	.384	3
120			min	-66.224	1	-125.108	3	-71.899	1	-.013	3	-.03	1	-.809	2
121		4	max	39.305	5	67.929	2	-2.882	12	.01	2	.042	5	.449	3
122			min	-66.224	1	-27.339	3	-44.042	4	-.013	3	-.079	1	-.954	2
123		5	max	30.466	5	70.431	3	-.098	10	.01	2	.013	5	.431	3
124			min	-66.224	1	-132.935	2	-35.096	4	-.013	3	-.1	1	-.926	2
125		6	max	21.626	5	168.2	3	22.958	1	.01	2	-.005	12	.328	3
126			min	-66.224	1	-333.798	2	-30.647	5	-.013	3	-.094	1	-.725	2
127		7	max	12.787	5	265.969	3	54.577	1	.01	2	-.004	12	.141	3
128			min	-66.224	1	-534.662	2	-28.635	5	-.013	3	-.06	1	-.351	2
129		8	max	3.948	5	363.739	3	86.196	1	.01	2	.003	2	.196	2
130			min	-66.224	1	-735.525	2	-26.624	5	-.013	3	-.065	4	-.13	3
131		9	max	-3.211	15	461.508	3	117.815	1	.01	2	.088	1	.916	2
132			min	-66.224	1	-936.389	2	-24.612	5	-.013	3	-.086	5	-.485	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	-4.798	12	1137.253	2	-4.919	12	.01	2	.203	1	1.809	2
134			min	-66.224	1	-559.277	3	-149.434	1	-.013	3	.003	12	-.925	3
135		11	max	-2.361	15	936.389	2	-3.619	12	.013	3	.117	4	.916	2
136			min	-66.224	1	-461.508	3	-117.815	1	-.01	2	0	3	-.485	3
137		12	max	-4.798	12	735.525	2	-2.318	12	.013	3	.064	4	.196	2
138			min	-66.224	1	-363.739	3	-86.196	1	-.01	2	-.005	3	-.13	3
139		13	max	-4.798	12	534.662	2	-1.018	12	.013	3	.032	5	.141	3
140			min	-66.224	1	-265.969	3	-54.577	1	-.01	2	-.06	1	-.351	2
141		14	max	-4.798	12	333.798	2	.539	3	.013	3	.002	5	.328	3
142			min	-66.224	1	-168.2	3	-38.703	4	-.01	2	-.094	1	-.725	2
143		15	max	-4.798	12	132.935	2	8.661	1	.013	3	-.004	12	.431	3
144			min	-66.224	1	-70.431	3	-31.462	5	-.01	2	-.1	1	-.926	2
145		16	max	-4.798	12	27.339	3	40.28	1	.013	3	-.002	12	.449	3
146			min	-66.224	1	-67.929	2	-29.451	5	-.01	2	-.079	1	-.954	2
147		17	max	-4.798	12	125.108	3	71.899	1	.013	3	.002	3	.384	3
148			min	-72.096	4	-268.793	2	-27.439	5	-.01	2	-.083	4	-.809	2
149		18	max	-4.798	12	222.877	3	103.518	1	.013	3	.045	1	.234	3
150			min	-80.935	4	-469.656	2	-25.428	5	-.01	2	-.099	5	-.491	2
151		19	max	-4.798	12	320.646	3	135.137	1	.013	3	.148	1	0	2
152			min	-89.775	4	-670.52	2	-23.416	5	-.01	2	-.12	5	0	5
153	M2	1	max	1101.96	2	1.963	4	.398	1	0	3	0	3	0	1
154			min	-1558.408	3	.479	15	-31.161	4	0	4	0	2	0	1
155		2	max	1102.388	2	1.907	4	.398	1	0	3	0	1	0	15
156			min	-1558.087	3	.466	15	-31.534	4	0	4	-.009	4	0	4
157		3	max	1102.817	2	1.85	4	.398	1	0	3	0	1	0	15
158			min	-1557.766	3	.452	15	-31.907	4	0	4	-.018	4	-.001	4
159		4	max	1103.245	2	1.793	4	.398	1	0	3	0	1	0	15
160			min	-1557.444	3	.437	12	-32.281	4	0	4	-.028	4	-.002	4
161		5	max	1103.674	2	1.736	4	.398	1	0	3	0	1	0	15
162			min	-1557.123	3	.415	12	-32.654	4	0	4	-.037	4	-.002	4
163		6	max	1104.102	2	1.679	4	.398	1	0	3	0	1	0	15
164			min	-1556.802	3	.393	12	-33.027	4	0	4	-.047	4	-.003	4
165		7	max	1104.53	2	1.623	4	.398	1	0	3	0	1	0	12
166			min	-1556.48	3	.371	12	-33.401	4	0	4	-.056	4	-.003	4
167		8	max	1104.959	2	1.566	4	.398	1	0	3	0	1	0	12
168			min	-1556.159	3	.349	12	-33.774	4	0	4	-.066	4	-.004	4
169		9	max	1105.387	2	1.509	4	.398	1	0	3	0	1	0	12
170			min	-1555.837	3	.327	12	-34.147	4	0	4	-.076	4	-.004	4
171		10	max	1105.816	2	1.452	4	.398	1	0	3	.001	1	-.001	12
172			min	-1555.516	3	.304	12	-34.521	4	0	4	-.086	4	-.004	4
173		11	max	1106.244	2	1.396	4	.398	1	0	3	.001	1	-.001	12
174			min	-1555.195	3	.282	12	-34.894	4	0	4	-.096	4	-.005	4
175		12	max	1106.673	2	1.339	4	.398	1	0	3	.001	1	-.001	12
176			min	-1554.873	3	.26	12	-35.267	4	0	4	-.106	4	-.005	4
177		13	max	1107.101	2	1.282	4	.398	1	0	3	.001	1	-.001	12
178			min	-1554.552	3	.238	12	-35.641	4	0	4	-.116	4	-.006	4
179		14	max	1107.53	2	1.225	4	.398	1	0	3	.001	1	-.001	12
180			min	-1554.231	3	.216	12	-36.014	4	0	4	-.127	4	-.006	4
181		15	max	1107.958	2	1.172	2	.398	1	0	3	.002	1	-.001	12
182			min	-1553.909	3	.194	12	-36.387	4	0	4	-.137	4	-.006	4
183		16	max	1108.387	2	1.127	2	.398	1	0	3	.002	1	-.001	12
184			min	-1553.588	3	.172	12	-36.761	4	0	4	-.148	4	-.007	4
185		17	max	1108.815	2	1.083	2	.398	1	0	3	.002	1	-.002	12
186			min	-1553.267	3	.15	12	-37.134	4	0	4	-.159	4	-.007	4
187		18	max	1109.244	2	1.039	2	.398	1	0	3	.002	1	-.002	12
188			min	-1552.945	3	.127	12	-37.507	4	0	4	-.169	4	-.007	4
189		19	max	1109.672	2	.995	2	.398	1	0	3	.002	1	-.002	12

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
190			min	-1552.624	3	.105	12	-37.881	4	0	4	-.18	4	-.008	4
191	M3	1	max	721.639	2	7.911	4	2.715	4	0	3	0	1	.008	4
192			min	-845.745	3	1.872	15	.008	12	0	4	-.019	4	.002	12
193		2	max	721.468	2	7.144	4	3.253	4	0	3	0	1	.005	2
194			min	-845.873	3	1.691	15	.008	12	0	4	-.018	4	0	12
195		3	max	721.298	2	6.377	4	3.792	4	0	3	0	1	.002	2
196			min	-846.001	3	1.511	15	.008	12	0	4	-.017	4	0	3
197		4	max	721.128	2	5.61	4	4.331	4	0	3	0	1	0	2
198			min	-846.128	3	1.331	15	.008	12	0	4	-.015	4	-.002	3
199		5	max	720.957	2	4.842	4	4.87	4	0	3	0	1	0	15
200			min	-846.256	3	1.15	15	.008	12	0	4	-.013	4	-.004	3
201		6	max	720.787	2	4.075	4	5.408	4	0	3	0	1	-.001	15
202			min	-846.384	3	.97	15	.008	12	0	4	-.011	5	-.005	6
203		7	max	720.617	2	3.308	4	5.947	4	0	3	0	1	-.001	15
204			min	-846.512	3	.79	15	.008	12	0	4	-.008	5	-.007	6
205		8	max	720.446	2	2.541	4	6.486	4	0	3	0	1	-.002	15
206			min	-846.64	3	.609	15	.008	12	0	4	-.006	5	-.008	6
207		9	max	720.276	2	1.774	4	7.025	4	0	3	0	1	-.002	15
208			min	-846.767	3	.429	15	.008	12	0	4	-.003	5	-.009	6
209		10	max	720.106	2	1.006	4	7.563	4	0	3	0	1	-.002	15
210			min	-846.895	3	.211	12	.008	12	0	4	0	5	-.009	6
211		11	max	719.935	2	.367	2	8.102	4	0	3	.003	4	-.002	15
212			min	-847.023	3	-.149	3	.008	12	0	4	0	12	-.009	6
213		12	max	719.765	2	-.112	15	8.641	4	0	3	.007	4	-.002	15
214			min	-847.151	3	-.597	3	.008	12	0	4	0	12	-.009	6
215		13	max	719.595	2	-.292	15	9.18	4	0	3	.011	4	-.002	15
216			min	-847.278	3	-1.296	6	.008	12	0	4	0	12	-.009	6
217		14	max	719.424	2	-.473	15	9.718	4	0	3	.015	4	-.002	15
218			min	-847.406	3	-2.064	6	.008	12	0	4	0	12	-.008	6
219		15	max	719.254	2	-.653	15	10.257	4	0	3	.019	4	-.002	15
220			min	-847.534	3	-2.831	6	.008	12	0	4	0	12	-.007	6
221		16	max	719.084	2	-.833	15	10.796	4	0	3	.023	4	-.001	15
222			min	-847.662	3	-3.598	6	.008	12	0	4	0	12	-.006	6
223		17	max	718.913	2	-1.014	15	11.335	4	0	3	.028	4	-.001	15
224			min	-847.789	3	-4.365	6	.008	12	0	4	0	12	-.004	6
225		18	max	718.743	2	-1.194	15	11.873	4	0	3	.033	4	0	15
226			min	-847.917	3	-5.132	6	.008	12	0	4	0	12	-.002	6
227		19	max	718.572	2	-1.374	15	12.412	4	0	3	.038	4	0	1
228			min	-848.045	3	-5.9	6	.008	12	0	4	0	12	0	1
229	M4	1	max	1007.741	1	0	1	-.453	12	0	1	.027	4	0	1
230			min	-180.387	3	0	1	-222.46	4	0	1	0	10	0	1
231		2	max	1007.912	1	0	1	-.453	12	0	1	.002	5	0	1
232			min	-180.259	3	0	1	-222.608	4	0	1	0	2	0	1
233		3	max	1008.082	1	0	1	-.453	12	0	1	0	12	0	1
234			min	-180.132	3	0	1	-222.755	4	0	1	-.024	4	0	1
235		4	max	1008.252	1	0	1	-.453	12	0	1	0	12	0	1
236			min	-180.004	3	0	1	-222.903	4	0	1	-.049	4	0	1
237		5	max	1008.423	1	0	1	-.453	12	0	1	0	12	0	1
238			min	-179.876	3	0	1	-223.051	4	0	1	-.075	4	0	1
239		6	max	1008.593	1	0	1	-.453	12	0	1	0	12	0	1
240			min	-179.748	3	0	1	-223.198	4	0	1	-.101	4	0	1
241		7	max	1008.763	1	0	1	-.453	12	0	1	0	12	0	1
242			min	-179.621	3	0	1	-223.346	4	0	1	-.126	4	0	1
243		8	max	1008.934	1	0	1	-.453	12	0	1	0	12	0	1
244			min	-179.493	3	0	1	-223.494	4	0	1	-.152	4	0	1
245		9	max	1009.104	1	0	1	-.453	12	0	1	0	12	0	1
246			min	-179.365	3	0	1	-223.641	4	0	1	-.178	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	1009.274	1	0	1	-.453	12	0	1	0	12	0	1
248			min	-179.237	3	0	1	-223.789	4	0	1	-.203	4	0	1
249		11	max	1009.445	1	0	1	-.453	12	0	1	0	12	0	1
250			min	-179.11	3	0	1	-223.936	4	0	1	-.229	4	0	1
251		12	max	1009.615	1	0	1	-.453	12	0	1	0	12	0	1
252			min	-178.982	3	0	1	-224.084	4	0	1	-.255	4	0	1
253		13	max	1009.785	1	0	1	-.453	12	0	1	0	12	0	1
254			min	-178.854	3	0	1	-224.232	4	0	1	-.28	4	0	1
255		14	max	1009.956	1	0	1	-.453	12	0	1	0	12	0	1
256			min	-178.726	3	0	1	-224.379	4	0	1	-.306	4	0	1
257		15	max	1010.126	1	0	1	-.453	12	0	1	0	12	0	1
258			min	-178.598	3	0	1	-224.527	4	0	1	-.332	4	0	1
259		16	max	1010.296	1	0	1	-.453	12	0	1	0	12	0	1
260			min	-178.471	3	0	1	-224.675	4	0	1	-.358	4	0	1
261		17	max	1010.467	1	0	1	-.453	12	0	1	0	12	0	1
262			min	-178.343	3	0	1	-224.822	4	0	1	-.384	4	0	1
263		18	max	1010.637	1	0	1	-.453	12	0	1	0	12	0	1
264			min	-178.215	3	0	1	-224.97	4	0	1	-.409	4	0	1
265		19	max	1010.808	1	0	1	-.453	12	0	1	0	12	0	1
266			min	-178.087	3	0	1	-225.118	4	0	1	-.435	4	0	1
267	M6	1	max	3442.118	2	2.471	2	0	1	0	1	0	4	0	1
268			min	-4976.832	3	-.107	3	-31.46	4	0	4	0	1	0	1
269		2	max	3442.546	2	2.427	2	0	1	0	1	0	1	0	3
270			min	-4976.511	3	-.14	3	-31.833	4	0	4	-.009	4	0	2
271		3	max	3442.975	2	2.383	2	0	1	0	1	0	1	0	3
272			min	-4976.19	3	-.173	3	-32.207	4	0	4	-.018	4	-.001	2
273		4	max	3443.403	2	2.338	2	0	1	0	1	0	1	0	3
274			min	-4975.868	3	-.206	3	-32.58	4	0	4	-.028	4	-.002	2
275		5	max	3443.832	2	2.294	2	0	1	0	1	0	1	0	3
276			min	-4975.547	3	-.24	3	-32.953	4	0	4	-.037	4	-.003	2
277		6	max	3444.26	2	2.25	2	0	1	0	1	0	1	0	3
278			min	-4975.226	3	-.273	3	-33.327	4	0	4	-.047	4	-.003	2
279		7	max	3444.689	2	2.206	2	0	1	0	1	0	1	0	3
280			min	-4974.904	3	-.306	3	-33.7	4	0	4	-.057	4	-.004	2
281		8	max	3445.117	2	2.161	2	0	1	0	1	0	1	0	3
282			min	-4974.583	3	-.339	3	-34.073	4	0	4	-.067	4	-.005	2
283		9	max	3445.546	2	2.117	2	0	1	0	1	0	1	0	3
284			min	-4974.261	3	-.372	3	-34.447	4	0	4	-.077	4	-.005	2
285		10	max	3445.974	2	2.073	2	0	1	0	1	0	1	0	3
286			min	-4973.94	3	-.406	3	-34.82	4	0	4	-.087	4	-.006	2
287		11	max	3446.403	2	2.029	2	0	1	0	1	0	1	0	3
288			min	-4973.619	3	-.439	3	-35.193	4	0	4	-.097	4	-.007	2
289		12	max	3446.831	2	1.984	2	0	1	0	1	0	1	0	3
290			min	-4973.297	3	-.472	3	-35.567	4	0	4	-.107	4	-.007	2
291		13	max	3447.26	2	1.94	2	0	1	0	1	0	1	.001	3
292			min	-4972.976	3	-.505	3	-35.94	4	0	4	-.117	4	-.008	2
293		14	max	3447.688	2	1.896	2	0	1	0	1	0	1	.001	3
294			min	-4972.655	3	-.538	3	-36.313	4	0	4	-.128	4	-.008	2
295		15	max	3448.117	2	1.852	2	0	1	0	1	0	1	.001	3
296			min	-4972.333	3	-.572	3	-36.687	4	0	4	-.139	4	-.009	2
297		16	max	3448.545	2	1.807	2	0	1	0	1	0	1	.002	3
298			min	-4972.012	3	-.605	3	-37.06	4	0	4	-.149	4	-.009	2
299		17	max	3448.974	2	1.763	2	0	1	0	1	0	1	.002	3
300			min	-4971.691	3	-.638	3	-37.433	4	0	4	-.16	4	-.01	2
301		18	max	3449.402	2	1.719	2	0	1	0	1	0	1	.002	3
302			min	-4971.369	3	-.671	3	-37.807	4	0	4	-.171	4	-.01	2
303		19	max	3449.831	2	1.675	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	-4971.048	3	-.704	3	-38.18	4	0	4	-.182	4	-.011	2
305	M7	1	max	2473.847	2	7.91	6	2.532	4	0	1	0	1	.011	2
306			min	-2598.286	3	1.857	15	0	1	0	4	-.019	4	-.002	3
307		2	max	2473.677	2	7.142	6	3.071	4	0	1	0	1	.008	2
308			min	-2598.414	3	1.677	15	0	1	0	4	-.018	4	-.004	3
309		3	max	2473.506	2	6.375	6	3.61	4	0	1	0	1	.006	2
310			min	-2598.541	3	1.497	15	0	1	0	4	-.017	4	-.005	3
311		4	max	2473.336	2	5.608	6	4.149	4	0	1	0	1	.003	2
312			min	-2598.669	3	1.316	15	0	1	0	4	-.015	4	-.006	3
313		5	max	2473.165	2	4.841	6	4.687	4	0	1	0	1	.001	2
314			min	-2598.797	3	1.136	15	0	1	0	4	-.013	4	-.007	3
315		6	max	2472.995	2	4.074	6	5.226	4	0	1	0	1	0	2
316			min	-2598.925	3	.956	15	0	1	0	4	-.011	4	-.008	3
317		7	max	2472.825	2	3.306	6	5.765	4	0	1	0	1	-.002	15
318			min	-2599.052	3	.745	12	0	1	0	4	-.009	4	-.008	3
319		8	max	2472.654	2	2.632	2	6.303	4	0	1	0	1	-.002	15
320			min	-2599.18	3	.446	12	0	1	0	4	-.006	4	-.009	3
321		9	max	2472.484	2	2.034	2	6.842	4	0	1	0	1	-.002	15
322			min	-2599.308	3	.147	12	0	1	0	4	-.004	5	-.009	3
323		10	max	2472.314	2	1.436	2	7.381	4	0	1	0	1	-.002	15
324			min	-2599.436	3	-.281	3	0	1	0	4	0	5	-.009	4
325		11	max	2472.143	2	.839	2	7.92	4	0	1	.002	4	-.002	15
326			min	-2599.563	3	-.729	3	0	1	0	4	0	1	-.009	4
327		12	max	2471.973	2	.241	2	8.458	4	0	1	.006	4	-.002	15
328			min	-2599.691	3	-1.178	3	0	1	0	4	0	1	-.009	4
329		13	max	2471.803	2	-.307	15	8.997	4	0	1	.01	4	-.002	15
330			min	-2599.819	3	-1.626	3	0	1	0	4	0	1	-.009	4
331		14	max	2471.632	2	-.487	15	9.536	4	0	1	.013	4	-.002	15
332			min	-2599.947	3	-2.075	3	0	1	0	4	0	1	-.008	4
333		15	max	2471.462	2	-.668	15	10.075	4	0	1	.018	4	-.002	15
334			min	-2600.074	3	-2.831	4	0	1	0	4	0	1	-.007	4
335		16	max	2471.292	2	-.848	15	10.613	4	0	1	.022	4	-.001	15
336			min	-2600.202	3	-3.599	4	0	1	0	4	0	1	-.006	4
337		17	max	2471.121	2	-1.028	15	11.152	4	0	1	.026	4	-.001	15
338			min	-2600.33	3	-4.366	4	0	1	0	4	0	1	-.004	4
339		18	max	2470.951	2	-1.209	15	11.691	4	0	1	.031	4	0	15
340			min	-2600.458	3	-5.133	4	0	1	0	4	0	1	-.002	4
341		19	max	2470.781	2	-1.389	15	12.23	4	0	1	.036	4	0	1
342			min	-2600.585	3	-5.9	4	0	1	0	4	0	1	0	1
343	M8	1	max	2941.402	2	0	1	0	1	0	1	.026	4	0	1
344			min	-654.248	3	0	1	-216.224	4	0	1	0	1	0	1
345		2	max	2941.572	2	0	1	0	1	0	1	.001	5	0	1
346			min	-654.12	3	0	1	-216.371	4	0	1	0	1	0	1
347		3	max	2941.743	2	0	1	0	1	0	1	0	1	0	1
348			min	-653.993	3	0	1	-216.519	4	0	1	-.024	4	0	1
349		4	max	2941.913	2	0	1	0	1	0	1	0	1	0	1
350			min	-653.865	3	0	1	-216.667	4	0	1	-.048	4	0	1
351		5	max	2942.083	2	0	1	0	1	0	1	0	1	0	1
352			min	-653.737	3	0	1	-216.814	4	0	1	-.073	4	0	1
353		6	max	2942.254	2	0	1	0	1	0	1	0	1	0	1
354			min	-653.609	3	0	1	-216.962	4	0	1	-.098	4	0	1
355		7	max	2942.424	2	0	1	0	1	0	1	0	1	0	1
356			min	-653.482	3	0	1	-217.11	4	0	1	-.123	4	0	1
357		8	max	2942.594	2	0	1	0	1	0	1	0	1	0	1
358			min	-653.354	3	0	1	-217.257	4	0	1	-.148	4	0	1
359		9	max	2942.765	2	0	1	0	1	0	1	0	1	0	1
360			min	-653.226	3	0	1	-217.405	4	0	1	-.173	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	2942.935	2	0	1	0	1	0	1	0	1	0	1
362			min	-653.098	3	0	1	-217.553	4	0	1	-.198	4	0	1
363		11	max	2943.106	2	0	1	0	1	0	1	0	1	0	1
364			min	-652.971	3	0	1	-217.7	4	0	1	-.223	4	0	1
365		12	max	2943.276	2	0	1	0	1	0	1	0	1	0	1
366			min	-652.843	3	0	1	-217.848	4	0	1	-.248	4	0	1
367		13	max	2943.446	2	0	1	0	1	0	1	0	1	0	1
368			min	-652.715	3	0	1	-217.995	4	0	1	-.273	4	0	1
369		14	max	2943.617	2	0	1	0	1	0	1	0	1	0	1
370			min	-652.587	3	0	1	-218.143	4	0	1	-.298	4	0	1
371		15	max	2943.787	2	0	1	0	1	0	1	0	1	0	1
372			min	-652.459	3	0	1	-218.291	4	0	1	-.323	4	0	1
373		16	max	2943.957	2	0	1	0	1	0	1	0	1	0	1
374			min	-652.332	3	0	1	-218.438	4	0	1	-.348	4	0	1
375		17	max	2944.128	2	0	1	0	1	0	1	0	1	0	1
376			min	-652.204	3	0	1	-218.586	4	0	1	-.373	4	0	1
377		18	max	2944.298	2	0	1	0	1	0	1	0	1	0	1
378			min	-652.076	3	0	1	-218.734	4	0	1	-.398	4	0	1
379		19	max	2944.468	2	0	1	0	1	0	1	0	1	0	1
380			min	-651.948	3	0	1	-218.881	4	0	1	-.423	4	0	1
381	M10	1	max	1101.96	2	1.886	6	-.03	12	0	1	0	2	0	1
382			min	-1558.408	3	.427	15	-31.391	4	0	5	0	3	0	1
383		2	max	1102.388	2	1.829	6	-.03	12	0	1	0	10	0	15
384			min	-1558.087	3	.413	15	-31.764	4	0	5	-.009	4	0	6
385		3	max	1102.817	2	1.772	6	-.03	12	0	1	0	10	0	15
386			min	-1557.766	3	.4	15	-32.138	4	0	5	-.018	4	-.001	6
387		4	max	1103.245	2	1.716	6	-.03	12	0	1	0	10	0	15
388			min	-1557.444	3	.387	15	-32.511	4	0	5	-.028	4	-.002	6
389		5	max	1103.674	2	1.659	6	-.03	12	0	1	0	10	0	15
390			min	-1557.123	3	.373	15	-32.884	4	0	5	-.037	4	-.002	6
391		6	max	1104.102	2	1.602	6	-.03	12	0	1	0	10	0	15
392			min	-1556.802	3	.36	15	-33.258	4	0	5	-.047	4	-.003	6
393		7	max	1104.53	2	1.545	6	-.03	12	0	1	0	10	0	15
394			min	-1556.48	3	.346	15	-33.631	4	0	5	-.057	4	-.003	6
395		8	max	1104.959	2	1.488	6	-.03	12	0	1	0	10	0	15
396			min	-1556.159	3	.333	15	-34.004	4	0	5	-.066	4	-.003	6
397		9	max	1105.387	2	1.437	2	-.03	12	0	1	0	10	0	15
398			min	-1555.837	3	.32	15	-34.378	4	0	5	-.076	4	-.004	6
399		10	max	1105.816	2	1.393	2	-.03	12	0	1	0	10	0	15
400			min	-1555.516	3	.304	12	-34.751	4	0	5	-.086	4	-.004	6
401		11	max	1106.244	2	1.349	2	-.03	12	0	1	0	10	-.001	15
402			min	-1555.195	3	.282	12	-35.124	4	0	5	-.097	4	-.005	6
403		12	max	1106.673	2	1.304	2	-.03	12	0	1	0	10	-.001	15
404			min	-1554.873	3	.26	12	-35.498	4	0	5	-.107	4	-.005	6
405		13	max	1107.101	2	1.26	2	-.03	12	0	1	0	12	-.001	15
406			min	-1554.552	3	.238	12	-35.871	4	0	5	-.117	4	-.005	6
407		14	max	1107.53	2	1.216	2	-.03	12	0	1	0	12	-.001	15
408			min	-1554.231	3	.216	12	-36.244	4	0	5	-.128	4	-.006	6
409		15	max	1107.958	2	1.172	2	-.03	12	0	1	0	12	-.001	15
410			min	-1553.909	3	.194	12	-36.618	4	0	5	-.138	4	-.006	6
411		16	max	1108.387	2	1.127	2	-.03	12	0	1	0	12	-.001	15
412			min	-1553.588	3	.172	12	-36.991	4	0	5	-.149	4	-.006	6
413		17	max	1108.815	2	1.083	2	-.03	12	0	1	0	12	-.001	15
414			min	-1553.267	3	.15	12	-37.364	4	0	5	-.16	4	-.007	2
415		18	max	1109.244	2	1.039	2	-.03	12	0	1	0	12	-.002	15
416			min	-1552.945	3	.127	12	-37.738	4	0	5	-.171	4	-.007	2
417		19	max	1109.672	2	.995	2	-.03	12	0	1	0	12	-.002	12

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
418			min	-1552.624	3	.105	12	-38.111	4	0	5	-.182	4	-.007	2
419	M11	1	max	721.639	2	7.858	6	2.652	4	0	1	0	12	.007	2
420			min	-845.745	3	1.835	15	-.108	1	0	4	-.019	4	.002	12
421		2	max	721.468	2	7.09	6	3.191	4	0	1	0	12	.005	2
422			min	-845.873	3	1.655	15	-.108	1	0	4	-.018	4	0	12
423		3	max	721.298	2	6.323	6	3.73	4	0	1	0	12	.002	2
424			min	-846.001	3	1.475	15	-.108	1	0	4	-.017	4	0	3
425		4	max	721.128	2	5.556	6	4.268	4	0	1	0	12	0	2
426			min	-846.128	3	1.294	15	-.108	1	0	4	-.015	4	-.002	3
427		5	max	720.957	2	4.789	6	4.807	4	0	1	0	12	0	15
428			min	-846.256	3	1.114	15	-.108	1	0	4	-.013	4	-.004	3
429		6	max	720.787	2	4.022	6	5.346	4	0	1	0	12	-.001	15
430			min	-846.384	3	.934	15	-.108	1	0	4	-.011	4	-.005	4
431		7	max	720.617	2	3.254	6	5.885	4	0	1	0	12	-.002	15
432			min	-846.512	3	.753	15	-.108	1	0	4	-.009	4	-.007	4
433		8	max	720.446	2	2.487	6	6.423	4	0	1	0	12	-.002	15
434			min	-846.64	3	.573	15	-.108	1	0	4	-.006	4	-.008	4
435		9	max	720.276	2	1.72	6	6.962	4	0	1	0	12	-.002	15
436			min	-846.767	3	.393	15	-.108	1	0	4	-.003	4	-.009	4
437		10	max	720.106	2	.965	2	7.501	4	0	1	0	12	-.002	15
438			min	-846.895	3	.211	12	-.108	1	0	4	0	1	-.009	4
439		11	max	719.935	2	.367	2	8.04	4	0	1	.003	5	-.002	15
440			min	-847.023	3	-.149	3	-.108	1	0	4	0	1	-.01	4
441		12	max	719.765	2	-.148	15	8.578	4	0	1	.006	5	-.002	15
442			min	-847.151	3	-.597	3	-.108	1	0	4	0	1	-.01	4
443		13	max	719.595	2	-.329	15	9.117	4	0	1	.01	4	-.002	15
444			min	-847.278	3	-1.35	4	-.108	1	0	4	0	1	-.009	4
445		14	max	719.424	2	-.509	15	9.656	4	0	1	.014	4	-.002	15
446			min	-847.406	3	-2.117	4	-.108	1	0	4	0	1	-.008	4
447		15	max	719.254	2	-.689	15	10.195	4	0	1	.018	4	-.002	15
448			min	-847.534	3	-2.884	4	-.108	1	0	4	0	1	-.007	4
449		16	max	719.084	2	-.87	15	10.733	4	0	1	.023	4	-.001	15
450			min	-847.662	3	-3.652	4	-.108	1	0	4	0	1	-.006	4
451		17	max	718.913	2	-1.05	15	11.272	4	0	1	.027	4	-.001	15
452			min	-847.789	3	-4.419	4	-.108	1	0	4	0	1	-.004	4
453		18	max	718.743	2	-1.23	15	11.811	4	0	1	.032	4	0	15
454			min	-847.917	3	-5.186	4	-.108	1	0	4	0	1	-.002	4
455		19	max	718.572	2	-1.411	15	12.35	4	0	1	.037	4	0	1
456			min	-848.045	3	-5.953	4	-.108	1	0	4	-.001	1	0	1
457	M12	1	max	1007.741	1	0	1	6.423	1	0	1	.027	4	0	1
458			min	-180.387	3	0	1	-218.749	4	0	1	0	1	0	1
459		2	max	1007.912	1	0	1	6.423	1	0	1	.002	5	0	1
460			min	-180.259	3	0	1	-218.896	4	0	1	0	3	0	1
461		3	max	1008.082	1	0	1	6.423	1	0	1	0	1	0	1
462			min	-180.132	3	0	1	-219.044	4	0	1	-.023	4	0	1
463		4	max	1008.252	1	0	1	6.423	1	0	1	.001	1	0	1
464			min	-180.004	3	0	1	-219.192	4	0	1	-.049	4	0	1
465		5	max	1008.423	1	0	1	6.423	1	0	1	.002	1	0	1
466			min	-179.876	3	0	1	-219.339	4	0	1	-.074	4	0	1
467		6	max	1008.593	1	0	1	6.423	1	0	1	.003	1	0	1
468			min	-179.748	3	0	1	-219.487	4	0	1	-.099	4	0	1
469		7	max	1008.763	1	0	1	6.423	1	0	1	.004	1	0	1
470			min	-179.621	3	0	1	-219.634	4	0	1	-.124	4	0	1
471		8	max	1008.934	1	0	1	6.423	1	0	1	.004	1	0	1
472			min	-179.493	3	0	1	-219.782	4	0	1	-.149	4	0	1
473		9	max	1009.104	1	0	1	6.423	1	0	1	.005	1	0	1
474			min	-179.365	3	0	1	-219.93	4	0	1	-.175	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	1009.274	1	0	1	6.423	1	0	1	.006	1	0	1
476			min	-179.237	3	0	1	-220.077	4	0	1	-.2	4	0	1
477		11	max	1009.445	1	0	1	6.423	1	0	1	.007	1	0	1
478			min	-179.11	3	0	1	-220.225	4	0	1	-.225	4	0	1
479		12	max	1009.615	1	0	1	6.423	1	0	1	.007	1	0	1
480			min	-178.982	3	0	1	-220.373	4	0	1	-.25	4	0	1
481		13	max	1009.785	1	0	1	6.423	1	0	1	.008	1	0	1
482			min	-178.854	3	0	1	-220.52	4	0	1	-.276	4	0	1
483		14	max	1009.956	1	0	1	6.423	1	0	1	.009	1	0	1
484			min	-178.726	3	0	1	-220.668	4	0	1	-.301	4	0	1
485		15	max	1010.126	1	0	1	6.423	1	0	1	.01	1	0	1
486			min	-178.598	3	0	1	-220.815	4	0	1	-.326	4	0	1
487		16	max	1010.296	1	0	1	6.423	1	0	1	.01	1	0	1
488			min	-178.471	3	0	1	-220.963	4	0	1	-.352	4	0	1
489		17	max	1010.467	1	0	1	6.423	1	0	1	.011	1	0	1
490			min	-178.343	3	0	1	-221.111	4	0	1	-.377	4	0	1
491		18	max	1010.637	1	0	1	6.423	1	0	1	.012	1	0	1
492			min	-178.215	3	0	1	-221.258	4	0	1	-.403	4	0	1
493		19	max	1010.808	1	0	1	6.423	1	0	1	.013	1	0	1
494			min	-178.087	3	0	1	-221.406	4	0	1	-.428	4	0	1
495	M1	1	max	134.786	1	848.432	3	38.682	5	0	2	.146	1	0	15
496			min	-12.486	5	-461.116	2	-61.585	1	0	3	-.076	5	-.015	2
497		2	max	135.392	1	847.459	3	39.923	5	0	2	.114	1	.229	2
498			min	-12.204	5	-462.414	2	-61.585	1	0	3	-.055	5	-.45	3
499		3	max	522.322	3	574.036	2	10.558	5	0	3	.081	1	.46	2
500			min	-304.681	2	-629.966	3	-61.292	1	0	2	-.034	5	-.879	3
501		4	max	522.776	3	572.738	2	11.799	5	0	3	.049	1	.158	2
502			min	-304.075	2	-630.94	3	-61.292	1	0	2	-.028	5	-.546	3
503		5	max	523.23	3	571.439	2	13.041	5	0	3	.017	1	-.004	15
504			min	-303.47	2	-631.913	3	-61.292	1	0	2	-.022	5	-.213	3
505		6	max	523.684	3	570.141	2	14.282	5	0	3	-.001	12	.121	3
506			min	-302.865	2	-632.887	3	-61.292	1	0	2	-.018	4	-.445	2
507		7	max	524.138	3	568.843	2	15.523	5	0	3	-.004	12	.455	3
508			min	-302.259	2	-633.861	3	-61.292	1	0	2	-.048	1	-.746	2
509		8	max	524.592	3	567.545	2	16.765	5	0	3	.002	5	.79	3
510			min	-301.654	2	-634.834	3	-61.292	1	0	2	-.08	1	-1.045	2
511		9	max	536.378	3	51.458	2	46.658	5	0	9	.05	1	.922	3
512			min	-245.829	2	.391	15	-94.948	1	0	3	-.1	5	-1.195	2
513		10	max	536.832	3	50.16	2	47.899	5	0	9	0	10	.899	3
514			min	-245.224	2	-.001	5	-94.948	1	0	3	-.076	4	-1.222	2
515		11	max	537.286	3	48.862	2	49.14	5	0	9	-.004	12	.876	3
516			min	-244.618	2	-1.633	4	-94.948	1	0	3	-.061	4	-1.248	2
517		12	max	548.865	3	412.291	3	122.842	5	0	2	.079	1	.766	3
518			min	-188.7	2	-675.241	2	-60.124	1	0	3	-.174	5	-1.107	2
519		13	max	549.319	3	411.318	3	124.084	5	0	2	.048	1	.549	3
520			min	-188.094	2	-676.539	2	-60.124	1	0	3	-.109	5	-.75	2
521		14	max	549.773	3	410.344	3	125.325	5	0	2	.016	1	.332	3
522			min	-187.489	2	-677.837	2	-60.124	1	0	3	-.043	5	-.393	2
523		15	max	550.227	3	409.37	3	126.567	5	0	2	.023	5	.116	3
524			min	-186.884	2	-679.136	2	-60.124	1	0	3	-.016	1	-.05	1
525		16	max	550.681	3	408.397	3	127.808	5	0	2	.09	5	.324	2
526			min	-186.278	2	-680.434	2	-60.124	1	0	3	-.047	1	-.1	3
527		17	max	551.135	3	407.423	3	129.05	5	0	2	.158	5	.683	2
528			min	-185.673	2	-681.732	2	-60.124	1	0	3	-.079	1	-.315	3
529		18	max	23.133	5	672.311	2	-4.798	12	0	5	.16	5	.344	2
530			min	-135.739	1	-319.75	3	-91.037	4	0	2	-.113	1	-.156	3
531		19	max	23.416	5	671.013	2	-4.798	12	0	5	.12	5	.013	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	-135.133	1	-320.723	3	-89.796	4	0	2	-.148	1	-.01	2
533	M5	1	max	299.57	1	2815.585	3	73.788	5	0	1	0	1	.03	2
534			min	8.967	12	-1588.215	2	0	1	0	4	-.158	4	0	15
535		2	max	300.175	1	2814.612	3	75.029	5	0	1	0	1	.868	2
536			min	9.27	12	-1589.513	2	0	1	0	4	-.119	4	-1.481	3
537		3	max	1639.774	3	1631.667	2	47.44	4	0	4	0	1	1.669	2
538			min	-999.665	2	-1922.547	3	0	1	0	1	-.08	4	-2.909	3
539		4	max	1640.228	3	1630.369	2	48.681	4	0	4	0	1	.808	2
540			min	-999.06	2	-1923.52	3	0	1	0	1	-.054	4	-1.894	3
541		5	max	1640.682	3	1629.07	2	49.923	4	0	4	0	1	.02	9
542			min	-998.454	2	-1924.494	3	0	1	0	1	-.028	4	-.879	3
543		6	max	1641.136	3	1627.772	2	51.164	4	0	4	0	1	.137	3
544			min	-997.849	2	-1925.468	3	0	1	0	1	-.002	5	-.911	2
545		7	max	1641.59	3	1626.474	2	52.406	4	0	4	.026	4	1.153	3
546			min	-997.244	2	-1926.441	3	0	1	0	1	0	1	-1.77	2
547		8	max	1642.044	3	1625.176	2	53.647	4	0	4	.054	4	2.17	3
548			min	-996.638	2	-1927.415	3	0	1	0	1	0	1	-2.628	2
549		9	max	1654.938	3	173.578	2	152.787	4	0	1	0	1	2.499	3
550			min	-875.275	2	.39	15	0	1	0	1	-.148	4	-2.998	2
551		10	max	1655.392	3	172.28	2	154.028	4	0	1	0	1	2.414	3
552			min	-874.669	2	-.002	15	0	1	0	1	-.067	4	-3.089	2
553		11	max	1655.846	3	170.981	2	155.27	4	0	1	.014	4	2.329	3
554			min	-874.064	2	-1.554	6	0	1	0	1	0	1	-3.18	2
555		12	max	1669.153	3	1222.657	3	174.839	4	0	1	0	1	2.041	3
556			min	-752.887	2	-1974.982	2	0	1	0	4	-.25	4	-2.846	2
557		13	max	1669.607	3	1221.683	3	176.081	4	0	1	0	1	1.396	3
558			min	-752.282	2	-1976.28	2	0	1	0	4	-.157	4	-1.804	2
559		14	max	1670.061	3	1220.71	3	177.322	4	0	1	0	1	.752	3
560			min	-751.677	2	-1977.578	2	0	1	0	4	-.064	4	-.761	2
561		15	max	1670.515	3	1219.736	3	178.564	4	0	1	.03	4	.283	2
562			min	-751.071	2	-1978.877	2	0	1	0	4	0	1	-.001	13
563		16	max	1670.969	3	1218.762	3	179.805	4	0	1	.125	4	1.328	2
564			min	-750.466	2	-1980.175	2	0	1	0	4	0	1	-.535	3
565		17	max	1671.423	3	1217.789	3	181.047	4	0	1	.22	4	2.373	2
566			min	-749.861	2	-1981.473	2	0	1	0	4	0	1	-1.178	3
567		18	max	-10.139	12	2278.098	2	0	1	0	4	.25	4	1.222	2
568			min	-299.48	1	-1117.868	3	-20.133	5	0	1	0	1	-.617	3
569		19	max	-9.836	12	2276.8	2	0	1	0	4	.24	4	.02	2
570			min	-298.875	1	-1118.842	3	-18.891	5	0	1	0	1	-.027	3
571	M9	1	max	134.786	1	848.432	3	61.585	1	0	3	-.012	12	0	15
572			min	7.217	12	-461.116	2	5.073	12	0	4	-.146	1	-.015	2
573		2	max	135.392	1	847.459	3	62.054	4	0	3	-.009	12	.229	2
574			min	7.52	12	-462.414	2	5.073	12	0	4	-.114	1	-.45	3
575		3	max	522.322	3	574.036	2	61.292	1	0	2	-.007	12	.46	2
576			min	-304.681	2	-629.966	3	5.04	12	0	3	-.081	1	-.879	3
577		4	max	522.776	3	572.738	2	61.292	1	0	2	-.004	12	.158	2
578			min	-304.075	2	-630.94	3	5.04	12	0	3	-.049	1	-.546	3
579		5	max	523.23	3	571.439	2	61.292	1	0	2	-.001	10	-.004	15
580			min	-303.47	2	-631.913	3	5.04	12	0	3	-.028	4	-.213	3
581		6	max	523.684	3	570.141	2	61.292	1	0	2	.016	1	.121	3
582			min	-302.865	2	-632.887	3	5.04	12	0	3	-.013	5	-.445	2
583		7	max	524.138	3	568.843	2	61.292	1	0	2	.048	1	.455	3
584			min	-302.259	2	-633.861	3	5.04	12	0	3	0	5	-.746	2
585		8	max	524.592	3	567.545	2	61.292	1	0	2	.08	1	.79	3
586			min	-301.654	2	-634.834	3	5.04	12	0	3	.006	12	-1.045	2
587		9	max	536.378	3	51.458	2	94.948	1	0	3	-.004	12	.922	3
588			min	-245.829	2	.399	15	7.33	12	0	9	-.119	4	-1.195	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	536.832	3	50.16	2	94.948	1	0	3	0	1	.899	3
590			min	-245.224	2	.007	15	7.33	12	0	9	-.076	4	-1.222	2
591		11	max	537.286	3	48.862	2	94.948	1	0	3	.051	1	.876	3
592			min	-244.618	2	-1.582	6	7.33	12	0	9	-.043	5	-1.248	2
593		12	max	548.865	3	412.291	3	145.367	4	0	3	-.006	12	.766	3
594			min	-188.7	2	-675.241	2	4.353	12	0	2	-.204	4	-1.107	2
595		13	max	549.319	3	411.318	3	146.609	4	0	3	-.004	12	.549	3
596			min	-188.094	2	-676.539	2	4.353	12	0	2	-.127	4	-.75	2
597		14	max	549.773	3	410.344	3	147.85	4	0	3	-.001	12	.332	3
598			min	-187.489	2	-677.837	2	4.353	12	0	2	-.049	4	-.393	2
599		15	max	550.227	3	409.37	3	149.092	4	0	3	.029	4	.116	3
600			min	-186.884	2	-679.136	2	4.353	12	0	2	.001	12	-.05	1
601		16	max	550.681	3	408.397	3	150.333	4	0	3	.108	4	.324	2
602			min	-186.278	2	-680.434	2	4.353	12	0	2	.003	12	-.1	3
603		17	max	551.135	3	407.423	3	151.574	4	0	3	.188	4	.683	2
604			min	-185.673	2	-681.732	2	4.353	12	0	2	.006	12	-.315	3
605		18	max	-7.085	12	672.311	2	66.279	1	0	2	.201	4	.344	2
606			min	-135.739	1	-319.75	3	-67.185	5	0	3	.008	12	-.156	3
607		19	max	-6.783	12	671.013	2	66.279	1	0	2	.174	4	.013	3
608			min	-135.133	1	-320.723	3	-65.943	5	0	3	.011	12	-.01	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	0	1	.129	2	.009	3	1.063e-2	2	NC	1	NC	1
2			min	-.455	4	-.027	3	-.005	2	-2.428e-3	3	NC	1	NC	1
3		2	max	0	1	.163	3	.015	1	1.177e-2	2	NC	4	NC	1
4			min	-.455	4	.001	15	-.009	5	-2.266e-3	3	976.25	3	NC	1
5		3	max	0	1	.318	3	.036	1	1.291e-2	2	NC	5	NC	2
6			min	-.455	4	-.029	1	-.012	5	-2.104e-3	3	538.399	3	5172.739	1
7		4	max	0	1	.414	3	.053	1	1.405e-2	2	NC	5	NC	2
8			min	-.455	4	-.059	1	-.009	5	-1.942e-3	3	421.871	3	3492.628	1
9		5	max	0	1	.438	3	.061	1	1.519e-2	2	NC	5	NC	3
10			min	-.455	4	-.056	1	-.003	5	-1.78e-3	3	399.516	3	3026.407	1
11		6	max	0	1	.394	3	.058	1	1.633e-2	2	NC	5	NC	2
12			min	-.455	4	-.02	1	-.002	10	-1.618e-3	3	441.859	3	3200.579	1
13		7	max	0	1	.294	3	.044	1	1.747e-2	2	NC	4	NC	2
14			min	-.455	4	.001	15	-.005	10	-1.456e-3	3	579.045	3	4228.67	1
15		8	max	0	1	.166	3	.028	3	1.861e-2	2	NC	1	NC	2
16			min	-.455	4	.003	15	-.008	10	-1.294e-3	3	962.496	3	8067.609	1
17		9	max	0	1	.221	2	.028	3	1.975e-2	2	NC	4	NC	1
18			min	-.455	4	.004	15	-.015	2	-1.133e-3	3	2028.132	2	9873.078	3
19		10	max	0	1	.253	2	.028	3	2.089e-2	2	NC	4	NC	1
20			min	-.455	4	-.004	3	-.02	2	-9.707e-4	3	1503.469	2	9869.036	3
21		11	max	0	12	.221	2	.028	3	1.975e-2	2	NC	4	NC	1
22			min	-.455	4	.004	15	-.015	2	-1.133e-3	3	2028.132	2	9873.078	3
23		12	max	0	12	.166	3	.028	3	1.861e-2	2	NC	1	NC	2
24			min	-.455	4	.003	15	-.008	10	-1.294e-3	3	962.496	3	8067.609	1
25		13	max	0	12	.294	3	.044	1	1.747e-2	2	NC	4	NC	2
26			min	-.455	4	0	15	-.005	10	-1.456e-3	3	579.045	3	4228.67	1
27		14	max	0	12	.394	3	.058	1	1.633e-2	2	NC	5	NC	2
28			min	-.455	4	-.02	1	-.002	10	-1.618e-3	3	441.859	3	3200.579	1
29		15	max	0	12	.438	3	.061	1	1.519e-2	2	NC	5	NC	3
30			min	-.455	4	-.056	1	0	10	-1.78e-3	3	399.516	3	3026.407	1
31		16	max	0	12	.414	3	.053	1	1.405e-2	2	NC	5	NC	2
32			min	-.455	4	-.059	1	0	10	-1.942e-3	3	421.871	3	3492.628	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	.318	3	.036	1	1.291e-2	2	NC	5	NC	2
34			min	-.455	4	-.029	1	-.001	10	-2.104e-3	3	538.399	3	5172.739	1
35		18	max	0	12	.163	3	.016	4	1.177e-2	2	NC	4	NC	1
36			min	-.455	4	0	15	-.003	10	-2.266e-3	3	976.25	3	NC	1
37		19	max	0	12	.129	2	.009	3	1.063e-2	2	NC	1	NC	1
38			min	-.455	4	-.027	3	-.005	2	-2.428e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.278	3	.008	3	6.046e-3	2	NC	1	NC	1
40			min	-.352	4	-.402	2	-.005	2	-4.903e-3	3	NC	1	NC	1
41		2	max	0	1	.492	3	.01	1	7.07e-3	2	NC	5	NC	1
42			min	-.352	4	-.601	2	-.014	5	-5.822e-3	3	867.751	3	NC	1
43		3	max	0	1	.678	3	.028	1	8.095e-3	2	NC	5	NC	2
44			min	-.352	4	-.779	2	-.018	5	-6.741e-3	3	464.938	3	6706.199	1
45		4	max	0	1	.815	3	.044	1	9.119e-3	2	NC	5	NC	2
46			min	-.352	4	-.918	2	-.013	5	-7.66e-3	3	346.188	3	4199.95	1
47		5	max	0	1	.894	3	.053	1	1.014e-2	2	NC	5	NC	2
48			min	-.352	4	-1.011	2	-.003	5	-8.579e-3	3	302.049	3	3490.256	1
49		6	max	0	1	.913	3	.052	1	1.117e-2	2	NC	5	NC	2
50			min	-.352	4	-1.057	2	-.002	10	-9.499e-3	3	284.172	2	3592.559	1
51		7	max	0	1	.882	3	.04	1	1.219e-2	2	NC	5	NC	2
52			min	-.352	4	-1.06	2	-.004	10	-1.042e-2	3	282.864	2	4652.784	1
53		8	max	0	1	.819	3	.028	4	1.322e-2	2	NC	5	NC	2
54			min	-.352	4	-1.033	2	-.007	10	-1.134e-2	3	294.773	2	6939.211	4
55		9	max	0	1	.752	3	.025	3	1.424e-2	2	NC	5	NC	1
56			min	-.352	4	-.997	2	-.014	2	-1.226e-2	3	312.825	2	NC	1
57		10	max	0	1	.72	3	.025	3	1.526e-2	2	NC	5	NC	1
58			min	-.352	4	-.977	2	-.018	2	-1.317e-2	3	323.398	2	NC	1
59		11	max	0	12	.752	3	.025	3	1.424e-2	2	NC	5	NC	1
60			min	-.352	4	-.997	2	-.015	5	-1.226e-2	3	312.825	2	NC	1
61		12	max	0	12	.819	3	.025	3	1.322e-2	2	NC	5	NC	2
62			min	-.352	4	-1.033	2	-.017	5	-1.134e-2	3	294.773	2	8707.86	1
63		13	max	0	12	.882	3	.04	1	1.219e-2	2	NC	5	NC	2
64			min	-.352	4	-1.06	2	-.011	5	-1.042e-2	3	282.864	2	4652.784	1
65		14	max	0	12	.913	3	.052	1	1.117e-2	2	NC	5	NC	2
66			min	-.352	4	-1.057	2	-.002	10	-9.499e-3	3	284.172	2	3592.559	1
67		15	max	0	12	.894	3	.053	1	1.014e-2	2	NC	5	NC	2
68			min	-.352	4	-1.011	2	0	10	-8.579e-3	3	302.049	3	3490.256	1
69		16	max	0	12	.815	3	.044	1	9.119e-3	2	NC	5	NC	2
70			min	-.352	4	-.918	2	0	10	-7.66e-3	3	346.188	3	4199.95	1
71		17	max	0	12	.678	3	.029	4	8.095e-3	2	NC	5	NC	2
72			min	-.352	4	-.779	2	-.001	10	-6.741e-3	3	464.938	3	6320.034	4
73		18	max	0	12	.492	3	.019	4	7.07e-3	2	NC	5	NC	1
74			min	-.352	4	-.601	2	-.003	10	-5.822e-3	3	867.751	3	9452.827	4
75		19	max	0	12	.278	3	.008	3	6.046e-3	2	NC	1	NC	1
76			min	-.352	4	-.402	2	-.005	2	-4.903e-3	3	NC	1	NC	1
77	M15	1	max	0	10	.284	3	.008	3	4.176e-3	3	NC	1	NC	1
78			min	-.294	4	-.401	2	-.005	2	-6.291e-3	2	NC	1	NC	1
79		2	max	0	10	.432	3	.01	1	4.958e-3	3	NC	5	NC	1
80			min	-.295	4	-.646	2	-.02	5	-7.362e-3	2	759.623	2	8514.033	5
81		3	max	0	10	.563	3	.028	1	5.739e-3	3	NC	5	NC	2
82			min	-.295	4	-.86	2	-.026	5	-8.433e-3	2	405.296	2	6677.572	1
83		4	max	0	10	.668	3	.044	1	6.52e-3	3	NC	5	NC	2
84			min	-.295	4	-1.022	2	-.019	5	-9.505e-3	2	299.645	2	4183.321	1
85		5	max	0	10	.74	3	.053	1	7.302e-3	3	NC	5	NC	2
86			min	-.295	4	-1.12	2	-.006	5	-1.058e-2	2	258.69	2	3475.304	1
87		6	max	0	10	.778	3	.052	1	8.083e-3	3	NC	5	NC	2
88			min	-.295	4	-1.154	2	-.001	10	-1.165e-2	2	247.134	2	3573.452	1
89		7	max	0	10	.785	3	.04	1	8.865e-3	3	NC	5	NC	2

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
90			min	-.295	4	-1.132	2	-.004	10	-1.272e-2	2	254.559	2	4616.189	1
91		8	max	0	10	.77	3	.034	4	9.646e-3	3	NC	5	NC	2
92			min	-.295	4	-1.074	2	-.007	10	-1.379e-2	2	276.624	2	5636.679	4
93		9	max	0	10	.747	3	.024	4	1.043e-2	3	NC	5	NC	1
94			min	-.295	4	-1.008	2	-.013	2	-1.486e-2	2	306.321	2	8017.016	4
95		10	max	0	1	.735	3	.023	3	1.121e-2	3	NC	5	NC	1
96			min	-.295	4	-.976	2	-.017	2	-1.593e-2	2	323.636	2	NC	1
97		11	max	0	1	.747	3	.023	3	1.043e-2	3	NC	5	NC	1
98			min	-.295	4	-1.008	2	-.02	5	-1.486e-2	2	306.321	2	9349.628	5
99		12	max	0	1	.77	3	.023	3	9.646e-3	3	NC	5	NC	2
100			min	-.295	4	-1.074	2	-.023	5	-1.379e-2	2	276.624	2	7967.507	5
101		13	max	0	1	.785	3	.04	1	8.865e-3	3	NC	5	NC	2
102			min	-.295	4	-1.132	2	-.016	5	-1.272e-2	2	254.559	2	4616.189	1
103		14	max	0	1	.778	3	.052	1	8.083e-3	3	NC	5	NC	2
104			min	-.295	4	-1.154	2	-.002	5	-1.165e-2	2	247.134	2	3573.452	1
105		15	max	0	1	.74	3	.053	1	7.302e-3	3	NC	5	NC	2
106			min	-.294	4	-1.12	2	0	10	-1.058e-2	2	258.69	2	3475.304	1
107		16	max	0	1	.668	3	.044	1	6.52e-3	3	NC	5	NC	2
108			min	-.294	4	-1.022	2	0	10	-9.505e-3	2	299.645	2	4183.321	1
109		17	max	0	1	.563	3	.037	4	5.739e-3	3	NC	5	NC	2
110			min	-.294	4	-.86	2	-.001	10	-8.433e-3	2	405.296	2	5017.944	4
111		18	max	0	1	.432	3	.025	4	4.958e-3	3	NC	5	NC	1
112			min	-.294	4	-.646	2	-.002	10	-7.362e-3	2	759.623	2	7260.588	4
113		19	max	0	1	.284	3	.008	3	4.176e-3	3	NC	1	NC	1
114			min	-.294	4	-.401	2	-.005	2	-6.291e-3	2	NC	1	NC	1
115	M16	1	max	0	12	.115	2	.007	3	7.75e-3	3	NC	1	NC	1
116			min	-.121	4	-.097	3	-.004	2	-8.965e-3	2	NC	1	NC	1
117		2	max	0	12	.008	9	.015	1	8.76e-3	3	NC	4	NC	1
118			min	-.121	4	-.043	3	-.016	5	-9.727e-3	2	1391.71	2	NC	1
119		3	max	0	12	0	15	.036	1	9.769e-3	3	NC	5	NC	2
120			min	-.121	4	-.124	2	-.02	5	-1.049e-2	2	777.399	2	5164.742	1
121		4	max	0	12	.014	3	.053	1	1.078e-2	3	NC	5	NC	3
122			min	-.121	4	-.183	2	-.016	5	-1.125e-2	2	623.902	2	3475.754	1
123		5	max	0	12	.006	12	.062	1	1.179e-2	3	NC	5	NC	3
124			min	-.121	4	-.187	2	-.007	5	-1.201e-2	2	616.484	2	3000.543	1
125		6	max	0	12	0	5	.059	1	1.28e-2	3	NC	5	NC	2
126			min	-.121	4	-.136	2	0	10	-1.278e-2	2	739.069	2	3155.346	1
127		7	max	0	12	.01	9	.045	1	1.381e-2	3	NC	3	NC	2
128			min	-.121	4	-.079	3	-.003	10	-1.354e-2	2	1163.816	2	4122.546	1
129		8	max	0	12	.077	1	.025	14	1.482e-2	3	NC	4	NC	2
130			min	-.121	4	-.139	3	-.006	10	-1.43e-2	2	3861.545	2	7608.524	1
131		9	max	0	12	.166	2	.02	3	1.583e-2	3	NC	4	NC	1
132			min	-.121	4	-.191	3	-.011	2	-1.506e-2	2	1974.216	3	NC	1
133		10	max	0	1	.211	2	.02	3	1.684e-2	3	NC	4	NC	1
134			min	-.121	4	-.214	3	-.015	2	-1.582e-2	2	1587.522	3	NC	1
135		11	max	0	1	.166	2	.02	3	1.583e-2	3	NC	4	NC	1
136			min	-.121	4	-.191	3	-.012	5	-1.506e-2	2	1974.216	3	NC	1
137		12	max	0	1	.077	1	.024	1	1.482e-2	3	NC	4	NC	2
138			min	-.121	4	-.139	3	-.013	5	-1.43e-2	2	3861.545	2	7608.524	1
139		13	max	0	1	.01	9	.045	1	1.381e-2	3	NC	3	NC	2
140			min	-.121	4	-.079	3	-.006	5	-1.354e-2	2	1163.816	2	4122.546	1
141		14	max	0	1	0	15	.059	1	1.28e-2	3	NC	5	NC	2
142			min	-.121	4	-.136	2	0	10	-1.278e-2	2	739.069	2	3155.346	1
143		15	max	0	1	.006	12	.062	1	1.179e-2	3	NC	5	NC	3
144			min	-.121	4	-.187	2	.001	10	-1.201e-2	2	616.484	2	3000.543	1
145		16	max	0	1	.014	3	.053	1	1.078e-2	3	NC	5	NC	3
146			min	-.121	4	-.183	2	.001	10	-1.125e-2	2	623.902	2	3475.754	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	0	15	.036	1	9.769e-3	3	NC	5	NC	2
148			min	-.121	4	-.124	2	0	10	-1.049e-2	2	777.399	2	5164.742	1
149		18	max	0	1	.008	9	.022	4	8.76e-3	3	NC	4	NC	1
150			min	-.121	4	-.043	3	-.002	10	-9.727e-3	2	1391.71	2	8307.843	4
151		19	max	0	1	.115	2	.007	3	7.75e-3	3	NC	1	NC	1
152			min	-.121	4	-.097	3	-.004	2	-8.965e-3	2	NC	1	NC	1
153	M2	1	max	.007	2	.008	2	.005	1	1.279e-3	5	NC	1	NC	1
154			min	-.009	3	-.013	3	-.43	4	-1.246e-4	1	7754.588	2	145.919	4
155		2	max	.006	2	.007	2	.004	1	1.335e-3	5	NC	1	NC	1
156			min	-.009	3	-.012	3	-.395	4	-1.17e-4	1	8829.876	2	158.827	4
157		3	max	.006	2	.006	2	.004	1	1.392e-3	5	NC	1	NC	1
158			min	-.008	3	-.012	3	-.36	4	-1.094e-4	1	NC	1	174.145	4
159		4	max	.006	2	.005	2	.004	1	1.448e-3	5	NC	1	NC	1
160			min	-.008	3	-.011	3	-.326	4	-1.018e-4	1	NC	1	192.501	4
161		5	max	.005	2	.004	2	.003	1	1.505e-3	5	NC	1	NC	1
162			min	-.007	3	-.011	3	-.292	4	-9.426e-5	1	NC	1	214.744	4
163		6	max	.005	2	.003	2	.003	1	1.561e-3	5	NC	1	NC	1
164			min	-.007	3	-.01	3	-.259	4	-8.667e-5	1	NC	1	242.051	4
165		7	max	.004	2	.003	2	.002	1	1.618e-3	5	NC	1	NC	1
166			min	-.006	3	-.01	3	-.227	4	-7.908e-5	1	NC	1	276.089	4
167		8	max	.004	2	.002	2	.002	1	1.674e-3	5	NC	1	NC	1
168			min	-.006	3	-.009	3	-.196	4	-7.149e-5	1	NC	1	319.287	4
169		9	max	.004	2	.001	2	.002	1	1.73e-3	5	NC	1	NC	1
170			min	-.005	3	-.008	3	-.167	4	-6.391e-5	1	NC	1	375.291	4
171		10	max	.003	2	0	2	.001	1	1.789e-3	4	NC	1	NC	1
172			min	-.005	3	-.008	3	-.139	4	-5.632e-5	1	NC	1	449.791	4
173		11	max	.003	2	0	2	.001	1	1.848e-3	4	NC	1	NC	1
174			min	-.004	3	-.007	3	-.114	4	-4.873e-5	1	NC	1	552.066	4
175		12	max	.003	2	0	2	0	1	1.907e-3	4	NC	1	NC	1
176			min	-.004	3	-.006	3	-.09	4	-4.114e-5	1	NC	1	698.119	4
177		13	max	.002	2	0	15	0	1	1.966e-3	4	NC	1	NC	1
178			min	-.003	3	-.006	3	-.068	4	-3.355e-5	1	NC	1	917.528	4
179		14	max	.002	2	0	15	0	1	2.025e-3	4	NC	1	NC	1
180			min	-.003	3	-.005	3	-.049	4	-2.596e-5	1	NC	1	1270.16	4
181		15	max	.001	2	0	15	0	1	2.084e-3	4	NC	1	NC	1
182			min	-.002	3	-.004	3	-.033	4	-1.837e-5	1	NC	1	1893.06	4
183		16	max	.001	2	0	15	0	1	2.143e-3	4	NC	1	NC	1
184			min	-.002	3	-.003	3	-.02	4	-1.079e-5	1	NC	1	3161.334	4
185		17	max	0	2	0	15	0	1	2.202e-3	4	NC	1	NC	1
186			min	-.001	3	-.002	3	-.01	4	-3.196e-6	1	NC	1	6444.183	4
187		18	max	0	2	0	15	0	1	2.261e-3	4	NC	1	NC	1
188			min	0	3	-.001	3	-.003	4	-2.69e-7	3	NC	1	NC	1
189		19	max	0	1	0	1	0	1	2.32e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	4.951e-7	12	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	-2.047e-7	12	NC	1	NC	1
192			min	0	1	0	1	0	1	-5.662e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.011	4	9.624e-6	1	NC	1	NC	1
194			min	0	2	-.002	6	0	12	-5.304e-5	5	NC	1	8235.151	4
195		3	max	0	3	0	15	.021	4	4.654e-4	4	NC	1	NC	1
196			min	0	2	-.003	6	0	12	1.668e-6	12	NC	1	4274.538	4
197		4	max	.001	3	-.001	15	.031	4	9.813e-4	4	NC	1	NC	1
198			min	-.001	2	-.005	6	0	12	2.604e-6	12	NC	1	2956.223	4
199		5	max	.002	3	-.002	15	.039	4	1.497e-3	4	NC	1	NC	1
200			min	-.001	2	-.007	6	0	12	3.541e-6	12	NC	1	2297.52	4
201		6	max	.002	3	-.002	15	.048	4	2.013e-3	4	NC	1	NC	1
202			min	-.002	2	-.009	6	0	12	4.477e-6	12	NC	1	1901.698	4
203		7	max	.002	3	-.002	15	.055	4	2.529e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
204			min	-.002	2	-.01	6	0	12	5.413e-6	12	8766.12	6	1636.345	4
205		8	max	.003	3	-.003	15	.063	4	3.045e-3	4	NC	1	NC	1
206			min	-.002	2	-.012	6	0	12	6.35e-6	12	7859.747	6	1444.572	4
207		9	max	.003	3	-.003	15	.07	4	3.56e-3	4	NC	2	NC	1
208			min	-.003	2	-.012	6	0	12	7.286e-6	12	7322.637	6	1297.82	4
209		10	max	.004	3	-.003	15	.077	4	4.076e-3	4	NC	2	NC	1
210			min	-.003	2	-.013	6	0	12	8.222e-6	12	7060.913	6	1180.152	4
211		11	max	.004	3	-.003	15	.084	4	4.592e-3	4	NC	2	NC	1
212			min	-.003	2	-.013	6	0	12	9.159e-6	12	7035.912	6	1081.973	4
213		12	max	.005	3	-.003	15	.091	4	5.108e-3	4	NC	2	NC	1
214			min	-.004	2	-.013	6	0	12	1.009e-5	12	7249.344	6	997.191	4
215		13	max	.005	3	-.003	15	.098	4	5.624e-3	4	NC	1	NC	1
216			min	-.004	2	-.012	6	0	12	1.103e-5	12	7745.843	6	921.81	4
217		14	max	.005	3	-.002	15	.106	4	6.14e-3	4	NC	1	NC	1
218			min	-.005	2	-.011	6	0	12	1.197e-5	12	8636.217	6	853.165	4
219		15	max	.006	3	-.002	15	.115	4	6.655e-3	4	NC	1	NC	1
220			min	-.005	2	-.009	6	0	12	1.29e-5	12	NC	1	789.498	4
221		16	max	.006	3	-.001	15	.124	4	7.171e-3	4	NC	1	NC	1
222			min	-.005	2	-.007	6	0	12	1.384e-5	12	NC	1	729.681	4
223		17	max	.007	3	0	15	.134	4	7.687e-3	4	NC	1	NC	1
224			min	-.006	2	-.005	1	0	12	1.478e-5	12	NC	1	673.042	4
225		18	max	.007	3	0	15	.146	4	8.203e-3	4	NC	1	NC	1
226			min	-.006	2	-.004	1	0	12	1.571e-5	12	NC	1	619.227	4
227		19	max	.007	3	0	5	.159	4	8.719e-3	4	NC	1	NC	1
228			min	-.006	2	-.002	1	0	12	1.665e-5	12	NC	1	568.103	4
229	M4	1	max	.002	1	.006	2	0	12	2.83e-4	4	NC	1	NC	2
230			min	0	3	-.008	3	-.159	4	3.36e-6	12	NC	1	155.678	4
231		2	max	.002	1	.006	2	0	12	2.83e-4	4	NC	1	NC	2
232			min	0	3	-.007	3	-.147	4	3.36e-6	12	NC	1	169.179	4
233		3	max	.002	1	.005	2	0	12	2.83e-4	4	NC	1	NC	2
234			min	0	3	-.007	3	-.134	4	3.36e-6	12	NC	1	185.251	4
235		4	max	.002	1	.005	2	0	12	2.83e-4	4	NC	1	NC	2
236			min	0	3	-.006	3	-.121	4	3.36e-6	12	NC	1	204.563	4
237		5	max	.002	1	.005	2	0	12	2.83e-4	4	NC	1	NC	2
238			min	0	3	-.006	3	-.109	4	3.36e-6	12	NC	1	228.021	4
239		6	max	.002	1	.004	2	0	12	2.83e-4	4	NC	1	NC	2
240			min	0	3	-.005	3	-.097	4	3.36e-6	12	NC	1	256.881	4
241		7	max	.002	1	.004	2	0	12	2.83e-4	4	NC	1	NC	1
242			min	0	3	-.005	3	-.085	4	3.36e-6	12	NC	1	292.928	4
243		8	max	.001	1	.004	2	0	12	2.83e-4	4	NC	1	NC	1
244			min	0	3	-.005	3	-.073	4	3.36e-6	12	NC	1	338.765	4
245		9	max	.001	1	.003	2	0	12	2.83e-4	4	NC	1	NC	1
246			min	0	3	-.004	3	-.062	4	3.36e-6	12	NC	1	398.309	4
247		10	max	.001	1	.003	2	0	12	2.83e-4	4	NC	1	NC	1
248			min	0	3	-.004	3	-.052	4	3.36e-6	12	NC	1	477.682	4
249		11	max	.001	1	.003	2	0	12	2.83e-4	4	NC	1	NC	1
250			min	0	3	-.003	3	-.042	4	3.36e-6	12	NC	1	586.901	4
251		12	max	0	1	.002	2	0	12	2.83e-4	4	NC	1	NC	1
252			min	0	3	-.003	3	-.033	4	3.36e-6	12	NC	1	743.286	4
253		13	max	0	1	.002	2	0	12	2.83e-4	4	NC	1	NC	1
254			min	0	3	-.003	3	-.025	4	3.36e-6	12	NC	1	978.985	4
255		14	max	0	1	.002	2	0	12	2.83e-4	4	NC	1	NC	1
256			min	0	3	-.002	3	-.018	4	3.36e-6	12	NC	1	1359.38	4
257		15	max	0	1	.001	2	0	12	2.83e-4	4	NC	1	NC	1
258			min	0	3	-.002	3	-.012	4	3.36e-6	12	NC	1	2035.16	4
259		16	max	0	1	0	2	0	12	2.83e-4	4	NC	1	NC	1
260			min	0	3	-.001	3	-.007	4	3.36e-6	12	NC	1	3422.747	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	2.83e-4	4	NC	1	NC	1
262			min	0	3	0	3	-.004	4	3.36e-6	12	NC	1	7065.454	4
263		18	max	0	1	0	2	0	12	2.83e-4	4	NC	1	NC	1
264			min	0	3	0	3	-.001	4	3.36e-6	12	NC	1	NC	1
265		19	max	0	1	0	1	0	1	2.83e-4	4	NC	1	NC	1
266			min	0	1	0	1	0	1	3.36e-6	12	NC	1	NC	1
267	M6	1	max	.021	2	.028	2	0	1	1.333e-3	4	NC	4	NC	1
268			min	-.03	3	-.04	3	-.434	4	0	1	1566.284	3	144.674	4
269		2	max	.02	2	.026	2	0	1	1.388e-3	4	NC	4	NC	1
270			min	-.028	3	-.038	3	-.398	4	0	1	1662.216	3	157.475	4
271		3	max	.018	2	.023	2	0	1	1.443e-3	4	NC	4	NC	1
272			min	-.027	3	-.035	3	-.363	4	0	1	1770.626	3	172.665	4
273		4	max	.017	2	.021	2	0	1	1.498e-3	4	NC	4	NC	1
274			min	-.025	3	-.033	3	-.329	4	0	1	1894.063	3	190.868	4
275		5	max	.016	2	.019	2	0	1	1.553e-3	4	NC	4	NC	1
276			min	-.023	3	-.031	3	-.295	4	0	1	2035.805	3	212.927	4
277		6	max	.015	2	.017	2	0	1	1.608e-3	4	NC	4	NC	1
278			min	-.022	3	-.029	3	-.261	4	0	1	2200.141	3	240.008	4
279		7	max	.014	2	.015	2	0	1	1.663e-3	4	NC	1	NC	1
280			min	-.02	3	-.026	3	-.229	4	0	1	2392.795	3	273.767	4
281		8	max	.013	2	.013	2	0	1	1.718e-3	4	NC	1	NC	1
282			min	-.018	3	-.024	3	-.198	4	0	1	2621.575	3	316.61	4
283		9	max	.012	2	.011	2	0	1	1.773e-3	4	NC	1	NC	1
284			min	-.017	3	-.022	3	-.169	4	0	1	2897.419	3	372.158	4
285		10	max	.01	2	.009	2	0	1	1.828e-3	4	NC	1	NC	1
286			min	-.015	3	-.019	3	-.141	4	0	1	3236.132	3	446.054	4
287		11	max	.009	2	.007	2	0	1	1.883e-3	4	NC	1	NC	1
288			min	-.013	3	-.017	3	-.115	4	0	1	3661.431	3	547.506	4
289		12	max	.008	2	.006	2	0	1	1.938e-3	4	NC	1	NC	1
290			min	-.012	3	-.015	3	-.091	4	0	1	4210.6	3	692.393	4
291		13	max	.007	2	.004	2	0	1	1.993e-3	4	NC	1	NC	1
292			min	-.01	3	-.013	3	-.069	4	0	1	4945.79	3	910.069	4
293		14	max	.006	2	.003	2	0	1	2.048e-3	4	NC	1	NC	1
294			min	-.008	3	-.01	3	-.05	4	0	1	5978.901	3	1259.955	4
295		15	max	.005	2	.002	2	0	1	2.103e-3	4	NC	1	NC	1
296			min	-.007	3	-.008	3	-.033	4	0	1	7533.758	3	1878.098	4
297		16	max	.003	2	.001	2	0	1	2.158e-3	4	NC	1	NC	1
298			min	-.005	3	-.006	3	-.02	4	0	1	NC	1	3136.974	4
299		17	max	.002	2	0	2	0	1	2.213e-3	4	NC	1	NC	1
300			min	-.003	3	-.004	3	-.01	4	0	1	NC	1	6396.729	4
301		18	max	.001	2	0	2	0	1	2.268e-3	4	NC	1	NC	1
302			min	-.002	3	-.002	3	-.003	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	2.323e-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	-5.664e-4	4	NC	1	NC	1
307		2	max	.001	3	0	2	.011	4	0	1	NC	1	NC	1
308			min	-.001	2	-.003	3	0	1	-6.263e-5	5	NC	1	8226.235	4
309		3	max	.003	3	0	2	.021	4	4.418e-4	4	NC	1	NC	1
310			min	-.002	2	-.005	3	0	1	0	1	NC	1	4271.932	4
311		4	max	.004	3	-.001	15	.031	4	9.459e-4	4	NC	1	NC	1
312			min	-.004	2	-.008	3	0	1	0	1	NC	1	2956.263	4
313		5	max	.005	3	-.002	15	.039	4	1.45e-3	4	NC	1	NC	1
314			min	-.005	2	-.01	3	0	1	0	1	NC	1	2299.358	4
315		6	max	.006	3	-.002	15	.048	4	1.954e-3	4	NC	1	NC	1
316			min	-.006	2	-.012	3	0	1	0	1	8499.435	3	1905.051	4
317		7	max	.008	3	-.003	15	.055	4	2.458e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
318			min	-.007	2	-.014	3	0	1	0	1	7599.949	3	1641.112	4
319		8	max	.009	3	-.003	15	.062	4	2.962e-3	4	NC	1	NC	1
320			min	-.008	2	-.015	3	0	1	0	1	7069.056	3	1450.721	4
321		9	max	.01	3	-.003	15	.069	4	3.466e-3	4	NC	1	NC	1
322			min	-.01	2	-.015	3	0	1	0	1	6796.9	3	1305.344	4
323		10	max	.011	3	-.003	15	.076	4	3.971e-3	4	NC	1	NC	1
324			min	-.011	2	-.016	3	0	1	0	1	6734.397	3	1189.04	4
325		11	max	.013	3	-.003	15	.083	4	4.475e-3	4	NC	1	NC	1
326			min	-.012	2	-.016	3	0	1	0	1	6869.55	3	1092.194	4
327		12	max	.014	3	-.003	15	.09	4	4.979e-3	4	NC	1	NC	1
328			min	-.013	2	-.015	3	0	1	0	1	7221.968	3	1008.685	4
329		13	max	.015	3	-.003	15	.097	4	5.483e-3	4	NC	1	NC	1
330			min	-.014	2	-.015	3	0	1	0	1	7743.48	4	934.475	4
331		14	max	.016	3	-.003	15	.104	4	5.987e-3	4	NC	1	NC	1
332			min	-.016	2	-.014	3	0	1	0	1	8633.675	4	866.859	4
333		15	max	.018	3	-.002	15	.113	4	6.491e-3	4	NC	1	NC	1
334			min	-.017	2	-.012	3	0	1	0	1	NC	1	804.037	4
335		16	max	.019	3	-.002	15	.122	4	6.995e-3	4	NC	1	NC	1
336			min	-.018	2	-.011	3	0	1	0	1	NC	1	744.848	4
337		17	max	.02	3	-.001	15	.131	4	7.499e-3	4	NC	1	NC	1
338			min	-.019	2	-.009	3	0	1	0	1	NC	1	688.593	4
339		18	max	.021	3	0	15	.143	4	8.004e-3	4	NC	1	NC	1
340			min	-.02	2	-.007	3	0	1	0	1	NC	1	634.912	4
341		19	max	.023	3	0	15	.155	4	8.508e-3	4	NC	1	NC	1
342			min	-.022	2	-.005	3	0	1	0	1	NC	1	583.675	4
343	M8	1	max	.007	2	.02	2	0	1	2.12e-4	4	NC	1	NC	1
344			min	-.002	3	-.023	3	-.155	4	0	1	NC	1	159.945	4
345		2	max	.007	2	.019	2	0	1	2.12e-4	4	NC	1	NC	1
346			min	-.001	3	-.022	3	-.143	4	0	1	NC	1	173.822	4
347		3	max	.006	2	.018	2	0	1	2.12e-4	4	NC	1	NC	1
348			min	-.001	3	-.021	3	-.13	4	0	1	NC	1	190.343	4
349		4	max	.006	2	.017	2	0	1	2.12e-4	4	NC	1	NC	1
350			min	-.001	3	-.019	3	-.118	4	0	1	NC	1	210.192	4
351		5	max	.005	2	.016	2	0	1	2.12e-4	4	NC	1	NC	1
352			min	-.001	3	-.018	3	-.106	4	0	1	NC	1	234.301	4
353		6	max	.005	2	.015	2	0	1	2.12e-4	4	NC	1	NC	1
354			min	-.001	3	-.017	3	-.094	4	0	1	NC	1	263.964	4
355		7	max	.005	2	.014	2	0	1	2.12e-4	4	NC	1	NC	1
356			min	-.001	3	-.015	3	-.082	4	0	1	NC	1	301.013	4
357		8	max	.004	2	.012	2	0	1	2.12e-4	4	NC	1	NC	1
358			min	0	3	-.014	3	-.071	4	0	1	NC	1	348.124	4
359		9	max	.004	2	.011	2	0	1	2.12e-4	4	NC	1	NC	1
360			min	0	3	-.013	3	-.061	4	0	1	NC	1	409.322	4
361		10	max	.004	2	.01	2	0	1	2.12e-4	4	NC	1	NC	1
362			min	0	3	-.012	3	-.051	4	0	1	NC	1	490.902	4
363		11	max	.003	2	.009	2	0	1	2.12e-4	4	NC	1	NC	1
364			min	0	3	-.01	3	-.041	4	0	1	NC	1	603.156	4
365		12	max	.003	2	.008	2	0	1	2.12e-4	4	NC	1	NC	1
366			min	0	3	-.009	3	-.032	4	0	1	NC	1	763.888	4
367		13	max	.002	2	.007	2	0	1	2.12e-4	4	NC	1	NC	1
368			min	0	3	-.008	3	-.025	4	0	1	NC	1	1006.14	4
369		14	max	.002	2	.006	2	0	1	2.12e-4	4	NC	1	NC	1
370			min	0	3	-.006	3	-.018	4	0	1	NC	1	1397.114	4
371		15	max	.002	2	.005	2	0	1	2.12e-4	4	NC	1	NC	1
372			min	0	3	-.005	3	-.012	4	0	1	NC	1	2091.693	4
373		16	max	.001	2	.003	2	0	1	2.12e-4	4	NC	1	NC	1
374			min	0	3	-.004	3	-.007	4	0	1	NC	1	3517.899	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	2	.002	2	0	1	2.12e-4	4	NC	1	NC	1
376			min	0	3	-.003	3	-.003	4	0	1	NC	1	7262.053	4
377		18	max	0	2	.001	2	0	1	2.12e-4	4	NC	1	NC	1
378			min	0	3	-.001	3	-.001	4	0	1	NC	1	NC	1
379		19	max	0	1	0	1	0	1	2.12e-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	.008	2	0	10	1.331e-3	4	NC	1	NC	1
382			min	-.009	3	-.013	3	-.433	4	1.025e-5	10	7754.588	2	144.981	4
383		2	max	.006	2	.007	2	0	10	1.386e-3	4	NC	1	NC	1
384			min	-.009	3	-.012	3	-.397	4	9.615e-6	10	8829.876	2	157.808	4
385		3	max	.006	2	.006	2	0	12	1.44e-3	4	NC	1	NC	1
386			min	-.008	3	-.012	3	-.362	4	8.975e-6	10	NC	1	173.031	4
387		4	max	.006	2	.005	2	0	12	1.495e-3	4	NC	1	NC	1
388			min	-.008	3	-.011	3	-.328	4	8.336e-6	10	NC	1	191.273	4
389		5	max	.005	2	.004	2	0	12	1.549e-3	4	NC	1	NC	1
390			min	-.007	3	-.011	3	-.294	4	7.697e-6	10	NC	1	213.379	4
391		6	max	.005	2	.003	2	0	12	1.604e-3	4	NC	1	NC	1
392			min	-.007	3	-.01	3	-.261	4	7.058e-6	10	NC	1	240.518	4
393		7	max	.004	2	.003	2	0	12	1.659e-3	4	NC	1	NC	1
394			min	-.006	3	-.01	3	-.229	4	6.419e-6	10	NC	1	274.349	4
395		8	max	.004	2	.002	2	0	12	1.713e-3	4	NC	1	NC	1
396			min	-.006	3	-.009	3	-.198	4	5.779e-6	10	NC	1	317.285	4
397		9	max	.004	2	.001	2	0	12	1.768e-3	4	NC	1	NC	1
398			min	-.005	3	-.008	3	-.168	4	5.14e-6	10	NC	1	372.952	4
399		10	max	.003	2	0	2	0	12	1.822e-3	4	NC	1	NC	1
400			min	-.005	3	-.008	3	-.14	4	4.501e-6	10	NC	1	447.009	4
401		11	max	.003	2	0	2	0	12	1.877e-3	4	NC	1	NC	1
402			min	-.004	3	-.007	3	-.114	4	3.862e-6	10	NC	1	548.682	4
403		12	max	.003	2	0	2	0	12	1.931e-3	4	NC	1	NC	1
404			min	-.004	3	-.006	3	-.09	4	3.223e-6	10	NC	1	693.888	4
405		13	max	.002	2	0	2	0	12	1.986e-3	4	NC	1	NC	1
406			min	-.003	3	-.006	3	-.069	4	2.583e-6	10	NC	1	912.049	4
407		14	max	.002	2	0	2	0	12	2.04e-3	4	NC	1	NC	1
408			min	-.003	3	-.005	3	-.05	4	1.944e-6	10	NC	1	1262.724	4
409		15	max	.001	2	0	15	0	12	2.095e-3	4	NC	1	NC	1
410			min	-.002	3	-.004	3	-.033	4	1.305e-6	10	NC	1	1882.29	4
411		16	max	.001	2	0	15	0	12	2.149e-3	4	NC	1	NC	1
412			min	-.002	3	-.003	3	-.02	4	6.658e-7	10	NC	1	3144.149	4
413		17	max	0	2	0	15	0	10	2.204e-3	4	NC	1	NC	1
414			min	-.001	3	-.002	3	-.01	4	0	10	NC	1	6412.007	4
415		18	max	0	2	0	15	0	10	2.258e-3	4	NC	1	NC	1
416			min	0	3	-.001	4	-.003	4	-4.392e-6	1	NC	1	NC	1
417		19	max	0	1	0	1	0	1	2.313e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-1.198e-5	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	4.137e-6	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-5.638e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.011	4	-7.316e-7	12	NC	1	NC	1
422			min	0	2	-.002	4	0	1	-5.594e-5	4	NC	1	8262.017	4
423		3	max	0	3	0	15	.021	4	4.519e-4	4	NC	1	NC	1
424			min	0	2	-.004	4	0	1	-2.339e-5	1	NC	1	4290.424	4
425		4	max	.001	3	-.001	15	.03	4	9.598e-4	4	NC	1	NC	1
426			min	-.001	2	-.006	4	0	1	-3.715e-5	1	NC	1	2968.747	4
427		5	max	.002	3	-.002	15	.039	4	1.468e-3	4	NC	1	NC	1
428			min	-.001	2	-.008	4	0	1	-5.091e-5	1	NC	1	2308.606	4
429		6	max	.002	3	-.002	15	.047	4	1.976e-3	4	NC	1	NC	1
430			min	-.002	2	-.01	4	0	1	-6.467e-5	1	9857.363	4	1912.13	4
431		7	max	.002	3	-.003	15	.055	4	2.483e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
432			min	-.002	2	-.011	4	0	1	-7.843e-5	1	8468.317	4	1646.518	4
433		8	max	.003	3	-.003	15	.062	4	2.991e-3	4	NC	1	NC	1
434			min	-.002	2	-.012	4	0	1	-9.219e-5	1	7611.636	4	1454.708	4
435		9	max	.003	3	-.003	15	.069	4	3.499e-3	4	NC	2	NC	1
436			min	-.003	2	-.013	4	0	1	-1.06e-4	1	7106.156	4	1308.05	4
437		10	max	.004	3	-.003	15	.076	4	4.007e-3	4	NC	2	NC	1
438			min	-.003	2	-.014	4	-.001	1	-1.197e-4	1	6864.052	4	1190.543	4
439		11	max	.004	3	-.003	15	.083	4	4.515e-3	4	NC	2	NC	1
440			min	-.003	2	-.014	4	-.001	1	-1.335e-4	1	6849.735	4	1092.547	4
441		12	max	.005	3	-.003	15	.09	4	5.023e-3	4	NC	2	NC	1
442			min	-.004	2	-.014	4	-.002	1	-1.472e-4	1	7066.204	4	1007.933	4
443		13	max	.005	3	-.003	15	.097	4	5.531e-3	4	NC	1	NC	1
444			min	-.004	2	-.013	4	-.002	1	-1.61e-4	1	7557.96	4	932.673	4
445		14	max	.005	3	-.003	15	.105	4	6.039e-3	4	NC	1	NC	1
446			min	-.005	2	-.012	4	-.002	1	-1.748e-4	1	8433.977	4	864.078	4
447		15	max	.006	3	-.003	15	.113	4	6.547e-3	4	NC	1	NC	1
448			min	-.005	2	-.01	4	-.003	1	-1.885e-4	1	9935.402	4	800.368	4
449		16	max	.006	3	-.002	15	.122	4	7.054e-3	4	NC	1	NC	1
450			min	-.005	2	-.008	4	-.003	1	-2.023e-4	1	NC	1	740.404	4
451		17	max	.007	3	-.002	15	.132	4	7.562e-3	4	NC	1	NC	1
452			min	-.006	2	-.006	4	-.004	1	-2.16e-4	1	NC	1	683.507	4
453		18	max	.007	3	-.001	15	.144	4	8.07e-3	4	NC	1	NC	1
454			min	-.006	2	-.004	1	-.004	1	-2.298e-4	1	NC	1	629.329	4
455		19	max	.007	3	0	10	.157	4	8.578e-3	4	NC	1	NC	1
456			min	-.006	2	-.002	1	-.005	1	-2.436e-4	1	NC	1	577.746	4
457	M12	1	max	.002	1	.006	2	.005	1	2.622e-4	5	NC	1	NC	2
458			min	0	3	-.008	3	-.157	4	-4.139e-5	1	NC	1	158.321	4
459		2	max	.002	1	.006	2	.004	1	2.622e-4	5	NC	1	NC	2
460			min	0	3	-.007	3	-.144	4	-4.139e-5	1	NC	1	172.05	4
461		3	max	.002	1	.005	2	.004	1	2.622e-4	5	NC	1	NC	2
462			min	0	3	-.007	3	-.132	4	-4.139e-5	1	NC	1	188.395	4
463		4	max	.002	1	.005	2	.004	1	2.622e-4	5	NC	1	NC	2
464			min	0	3	-.006	3	-.119	4	-4.139e-5	1	NC	1	208.033	4
465		5	max	.002	1	.005	2	.003	1	2.622e-4	5	NC	1	NC	2
466			min	0	3	-.006	3	-.107	4	-4.139e-5	1	NC	1	231.888	4
467		6	max	.002	1	.004	2	.003	1	2.622e-4	5	NC	1	NC	2
468			min	0	3	-.005	3	-.095	4	-4.139e-5	1	NC	1	261.237	4
469		7	max	.002	1	.004	2	.002	1	2.622e-4	5	NC	1	NC	1
470			min	0	3	-.005	3	-.083	4	-4.139e-5	1	NC	1	297.894	4
471		8	max	.001	1	.004	2	.002	1	2.622e-4	5	NC	1	NC	1
472			min	0	3	-.005	3	-.072	4	-4.139e-5	1	NC	1	344.507	4
473		9	max	.001	1	.003	2	.002	1	2.622e-4	5	NC	1	NC	1
474			min	0	3	-.004	3	-.061	4	-4.139e-5	1	NC	1	405.059	4
475		10	max	.001	1	.003	2	.001	1	2.622e-4	5	NC	1	NC	1
476			min	0	3	-.004	3	-.051	4	-4.139e-5	1	NC	1	485.776	4
477		11	max	.001	1	.003	2	.001	1	2.622e-4	5	NC	1	NC	1
478			min	0	3	-.003	3	-.042	4	-4.139e-5	1	NC	1	596.844	4
479		12	max	0	1	.002	2	0	1	2.622e-4	5	NC	1	NC	1
480			min	0	3	-.003	3	-.033	4	-4.139e-5	1	NC	1	755.876	4
481		13	max	0	1	.002	2	0	1	2.622e-4	5	NC	1	NC	1
482			min	0	3	-.003	3	-.025	4	-4.139e-5	1	NC	1	995.564	4
483		14	max	0	1	.002	2	0	1	2.622e-4	5	NC	1	NC	1
484			min	0	3	-.002	3	-.018	4	-4.139e-5	1	NC	1	1382.397	4
485		15	max	0	1	.001	2	0	1	2.622e-4	5	NC	1	NC	1
486			min	0	3	-.002	3	-.012	4	-4.139e-5	1	NC	1	2069.611	4
487		16	max	0	1	0	2	0	1	2.622e-4	5	NC	1	NC	1
488			min	0	3	-.001	3	-.007	4	-4.139e-5	1	NC	1	3480.676	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	2.622e-4	5	NC	1	NC	1
490			min	0	3	0	3	-.003	4	-4.139e-5	1	NC	1	7185.01	4
491		18	max	0	1	0	2	0	1	2.622e-4	5	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-4.139e-5	1	NC	1	NC	1
493		19	max	0	1	0	1	0	1	2.622e-4	5	NC	1	NC	1
494			min	0	1	0	1	0	1	-4.139e-5	1	NC	1	NC	1
495	M1	1	max	.009	3	.129	2	.455	4	8.461e-3	2	NC	1	NC	1
496			min	-.005	2	-.027	3	0	12	-1.914e-2	3	NC	1	NC	1
497		2	max	.009	3	.061	2	.443	4	5.605e-3	4	NC	4	NC	1
498			min	-.005	2	-.011	3	-.003	1	-9.47e-3	3	1706.453	2	NC	1
499		3	max	.009	3	.014	3	.43	4	9.855e-3	4	NC	5	NC	1
500			min	-.005	2	-.011	2	-.005	1	-1.099e-4	3	824.873	2	8924.546	5
501		4	max	.009	3	.055	3	.416	4	8.493e-3	4	NC	5	NC	1
502			min	-.005	2	-.091	2	-.004	1	-4.034e-3	3	522.963	2	6403.307	5
503		5	max	.009	3	.108	3	.402	4	7.321e-3	2	NC	5	NC	1
504			min	-.005	2	-.175	2	-.003	1	-7.957e-3	3	378.822	2	5129.338	5
505		6	max	.009	3	.165	3	.388	4	1.097e-2	2	NC	15	NC	1
506			min	-.005	2	-.256	2	-.001	1	-1.188e-2	3	299.211	2	4354.366	5
507		7	max	.008	3	.219	3	.373	4	1.461e-2	2	NC	15	NC	1
508			min	-.005	2	-.328	2	0	3	-1.58e-2	3	252.113	2	3807.463	4
509		8	max	.008	3	.264	3	.359	4	1.826e-2	2	NC	15	NC	1
510			min	-.005	2	-.385	2	0	12	-1.973e-2	3	224.207	2	3397.465	4
511		9	max	.008	3	.293	3	.343	4	2.057e-2	2	9883.51	15	NC	1
512			min	-.005	2	-.421	2	0	1	-2.003e-2	3	209.661	2	3122.558	4
513		10	max	.008	3	.304	3	.325	4	2.2e-2	2	9676.9	15	NC	1
514			min	-.005	2	-.433	2	0	10	-1.793e-2	3	205.394	2	3026.364	4
515		11	max	.008	3	.297	3	.306	4	2.343e-2	2	9883.007	15	NC	1
516			min	-.005	2	-.42	2	0	12	-1.583e-2	3	210.364	2	3064.368	4
517		12	max	.008	3	.272	3	.286	4	2.251e-2	2	NC	15	NC	1
518			min	-.005	2	-.383	2	0	1	-1.35e-2	3	226.317	2	3240.458	4
519		13	max	.007	3	.232	3	.262	4	1.804e-2	2	NC	15	NC	1
520			min	-.005	2	-.323	2	0	1	-1.08e-2	3	257.189	2	3767.802	4
521		14	max	.007	3	.181	3	.237	4	1.358e-2	2	NC	15	NC	1
522			min	-.005	2	-.249	2	0	12	-8.111e-3	3	309.951	2	4913.973	4
523		15	max	.007	3	.123	3	.21	4	9.121e-3	2	NC	5	NC	1
524			min	-.004	2	-.166	2	0	12	-5.419e-3	3	400.709	2	7459.142	4
525		16	max	.007	3	.063	3	.184	4	7.294e-3	4	NC	5	NC	1
526			min	-.004	2	-.083	2	0	12	-2.726e-3	3	568.596	2	NC	1
527		17	max	.007	3	.005	3	.16	4	8.384e-3	4	NC	5	NC	1
528			min	-.004	2	-.006	2	0	12	-3.371e-5	3	927.084	2	NC	1
529		18	max	.007	3	.058	2	.139	4	6.716e-3	2	NC	4	NC	1
530			min	-.004	2	-.047	3	0	12	-2.669e-3	3	1964.614	2	NC	1
531		19	max	.007	3	.115	2	.121	4	1.349e-2	2	NC	1	NC	1
532			min	-.004	2	-.097	3	0	1	-5.429e-3	3	NC	1	NC	1
533	M5	1	max	.028	3	.253	2	.455	4	0	1	NC	1	NC	1
534			min	-.02	2	-.004	3	0	1	-6.161e-6	4	NC	1	NC	1
535		2	max	.028	3	.119	2	.445	4	5.051e-3	4	NC	5	NC	1
536			min	-.02	2	.002	15	0	1	0	1	865.825	2	NC	1
537		3	max	.028	3	.043	3	.433	4	9.951e-3	4	NC	5	NC	1
538			min	-.02	2	-.033	2	0	1	0	1	406.039	2	7369.143	4
539		4	max	.027	3	.136	3	.419	4	8.107e-3	4	NC	15	NC	1
540			min	-.019	2	-.215	2	0	1	0	1	247.461	2	5647.924	4
541		5	max	.027	3	.266	3	.404	4	6.263e-3	4	9317.901	15	NC	1
542			min	-.019	2	-.413	2	0	1	0	1	173.581	2	4804.086	4
543		6	max	.026	3	.414	3	.389	4	4.419e-3	4	7158.097	15	NC	1
544			min	-.019	2	-.611	2	0	1	0	1	133.835	2	4275.093	4
545		7	max	.026	3	.56	3	.373	4	2.576e-3	4	5913.969	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	-.018	2	-.79	2	0	1	0	1	110.827	2	3855.864	4
547		8	max	.025	3	.682	3	.358	4	7.319e-4	4	5191.94	15	NC	1
548			min	-.018	2	-.933	2	0	1	0	1	97.427	2	3453.019	4
549		9	max	.025	3	.761	3	.343	4	0	1	4822.187	15	NC	1
550			min	-.018	2	-1.025	2	0	1	-4.271e-6	5	90.548	2	3116.134	4
551		10	max	.024	3	.789	3	.325	4	0	1	4710.882	15	NC	1
552			min	-.017	2	-1.056	2	0	1	-4.124e-6	5	88.537	2	3048.878	4
553		11	max	.024	3	.769	3	.306	4	0	1	4822.441	15	NC	1
554			min	-.017	2	-1.025	2	0	1	-3.976e-6	5	90.875	2	3102.003	4
555		12	max	.023	3	.702	3	.287	4	5.976e-4	4	5192.525	15	NC	1
556			min	-.017	2	-.93	2	0	1	0	1	98.51	2	3183.581	4
557		13	max	.023	3	.595	3	.263	4	2.104e-3	4	5915.117	15	NC	1
558			min	-.017	2	-.778	2	0	1	0	1	113.663	2	3693.598	4
559		14	max	.022	3	.459	3	.236	4	3.61e-3	4	7160.273	15	NC	1
560			min	-.016	2	-.59	2	0	1	0	1	140.282	2	5055.648	4
561		15	max	.021	3	.309	3	.208	4	5.115e-3	4	9322.111	15	NC	1
562			min	-.016	2	-.387	2	0	1	0	1	187.768	2	8860.703	4
563		16	max	.021	3	.156	3	.18	4	6.621e-3	4	NC	15	NC	1
564			min	-.016	2	-.189	2	0	1	0	1	279.912	2	NC	1
565		17	max	.02	3	.014	3	.156	4	8.127e-3	4	NC	5	NC	1
566			min	-.016	2	-.018	2	0	1	0	1	487.268	2	NC	1
567		18	max	.02	3	.108	2	.136	4	4.126e-3	4	NC	5	NC	1
568			min	-.015	2	-.106	3	0	1	0	1	1088.601	2	NC	1
569		19	max	.02	3	.211	2	.121	4	0	1	NC	1	NC	1
570			min	-.015	2	-.214	3	0	1	-3.414e-6	4	NC	1	NC	1
571	M9	1	max	.009	3	.129	2	.455	4	1.914e-2	3	NC	1	NC	1
572			min	-.005	2	-.027	3	0	1	-8.461e-3	2	NC	1	NC	1
573		2	max	.009	3	.061	2	.445	4	9.47e-3	3	NC	4	NC	1
574			min	-.005	2	-.011	3	0	12	-4.154e-3	2	1706.453	2	NC	1
575		3	max	.009	3	.014	3	.432	4	9.92e-3	4	NC	5	NC	1
576			min	-.005	2	-.011	2	0	10	-3.452e-5	10	824.873	2	7754.695	4
577		4	max	.009	3	.055	3	.419	4	7.862e-3	5	NC	5	NC	1
578			min	-.005	2	-.091	2	0	10	-3.675e-3	2	522.963	2	5814.074	4
579		5	max	.009	3	.108	3	.404	4	7.957e-3	3	NC	5	NC	1
580			min	-.005	2	-.175	2	0	10	-7.321e-3	2	378.822	2	4847.129	4
581		6	max	.009	3	.165	3	.389	4	1.188e-2	3	NC	15	NC	1
582			min	-.005	2	-.256	2	0	10	-1.097e-2	2	299.211	2	4248.843	4
583		7	max	.008	3	.219	3	.373	4	1.58e-2	3	NC	15	NC	1
584			min	-.005	2	-.328	2	0	1	-1.461e-2	2	252.113	2	3806.244	4
585		8	max	.008	3	.264	3	.358	4	1.973e-2	3	NC	15	NC	1
586			min	-.005	2	-.385	2	0	1	-1.826e-2	2	224.207	2	3423.254	4
587		9	max	.008	3	.293	3	.343	4	2.003e-2	3	9861.499	15	NC	1
588			min	-.005	2	-.421	2	0	12	-2.057e-2	2	209.661	2	3114.754	4
589		10	max	.008	3	.304	3	.325	4	1.793e-2	3	9655.376	15	NC	1
590			min	-.005	2	-.433	2	0	1	-2.2e-2	2	205.394	2	3027.376	4
591		11	max	.008	3	.297	3	.306	4	1.583e-2	3	9860.935	15	NC	1
592			min	-.005	2	-.42	2	0	1	-2.343e-2	2	210.364	2	3073.477	4
593		12	max	.008	3	.272	3	.286	4	1.35e-2	3	NC	15	NC	1
594			min	-.005	2	-.383	2	0	12	-2.251e-2	2	226.317	2	3217.273	4
595		13	max	.007	3	.232	3	.262	4	1.08e-2	3	NC	15	NC	1
596			min	-.005	2	-.323	2	0	10	-1.804e-2	2	257.189	2	3765.058	4
597		14	max	.007	3	.181	3	.236	4	8.111e-3	3	NC	15	NC	1
598			min	-.005	2	-.249	2	-.001	1	-1.358e-2	2	309.951	2	5036.856	5
599		15	max	.007	3	.123	3	.209	4	5.419e-3	3	NC	5	NC	1
600			min	-.004	2	-.166	2	-.003	1	-9.121e-3	2	400.709	2	8058.556	5
601		16	max	.007	3	.063	3	.182	4	6.564e-3	5	NC	5	NC	1
602			min	-.004	2	-.083	2	-.004	1	-4.66e-3	2	568.596	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	.005	3	.157	4	8.215e-3	4	NC	5	NC	1
604			min	-.004	2	-.006	2	-.005	1	-3.374e-4	1	927.084	2	NC	1
605		18	max	.007	3	.058	2	.137	4	4.023e-3	5	NC	4	NC	1
606			min	-.004	2	-.047	3	-.003	1	-6.716e-3	2	1964.614	2	NC	1
607		19	max	.007	3	.115	2	.121	4	5.429e-3	3	NC	1	NC	1
608			min	-.004	2	-.097	3	0	12	-1.349e-2	2	NC	1	NC	1

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, 14-42 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

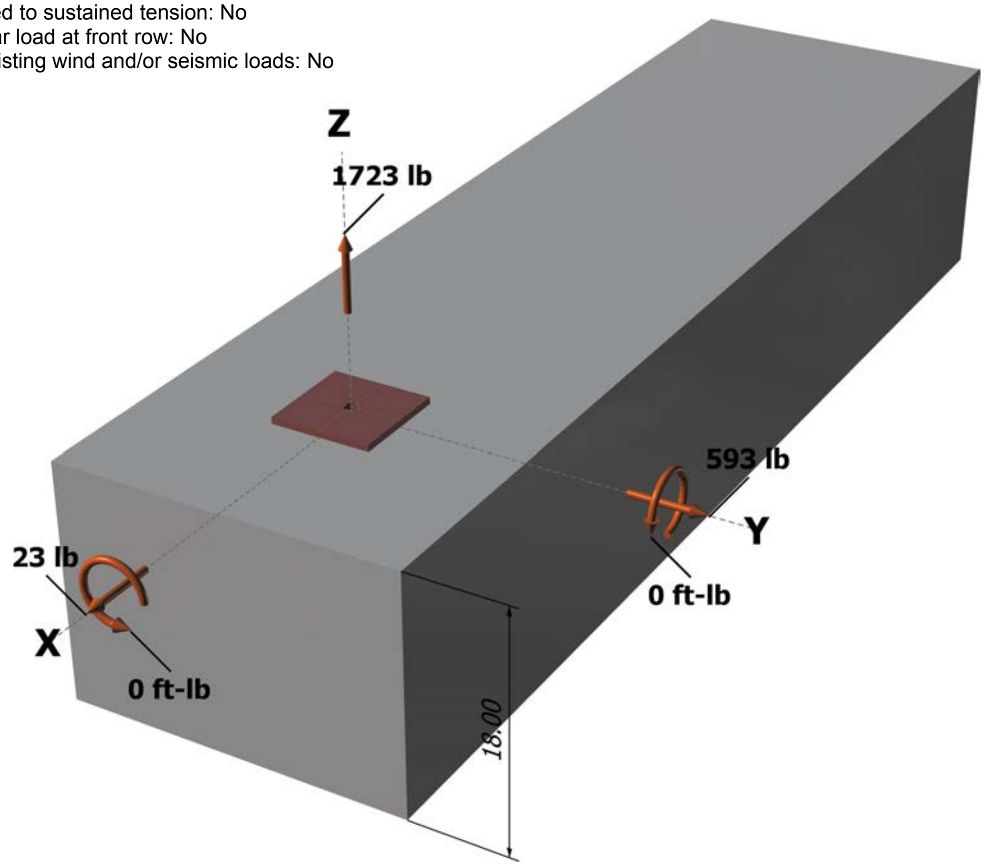
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch): 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 4.00 x 0.28

<Figure 1>



<Figure 2>

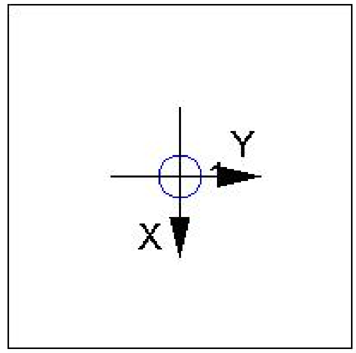
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

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

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

<Figure 3>



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in y-direction:

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

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

Shear parallel to edge in x-direction:

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

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

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

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

Shear parallel to edge in y-direction:

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

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

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

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

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

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

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

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

11. Results

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

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

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

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

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

12. Warnings

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

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

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

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, 37-42 Inch Width		
Address:			
Phone:			
E-mail:			

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

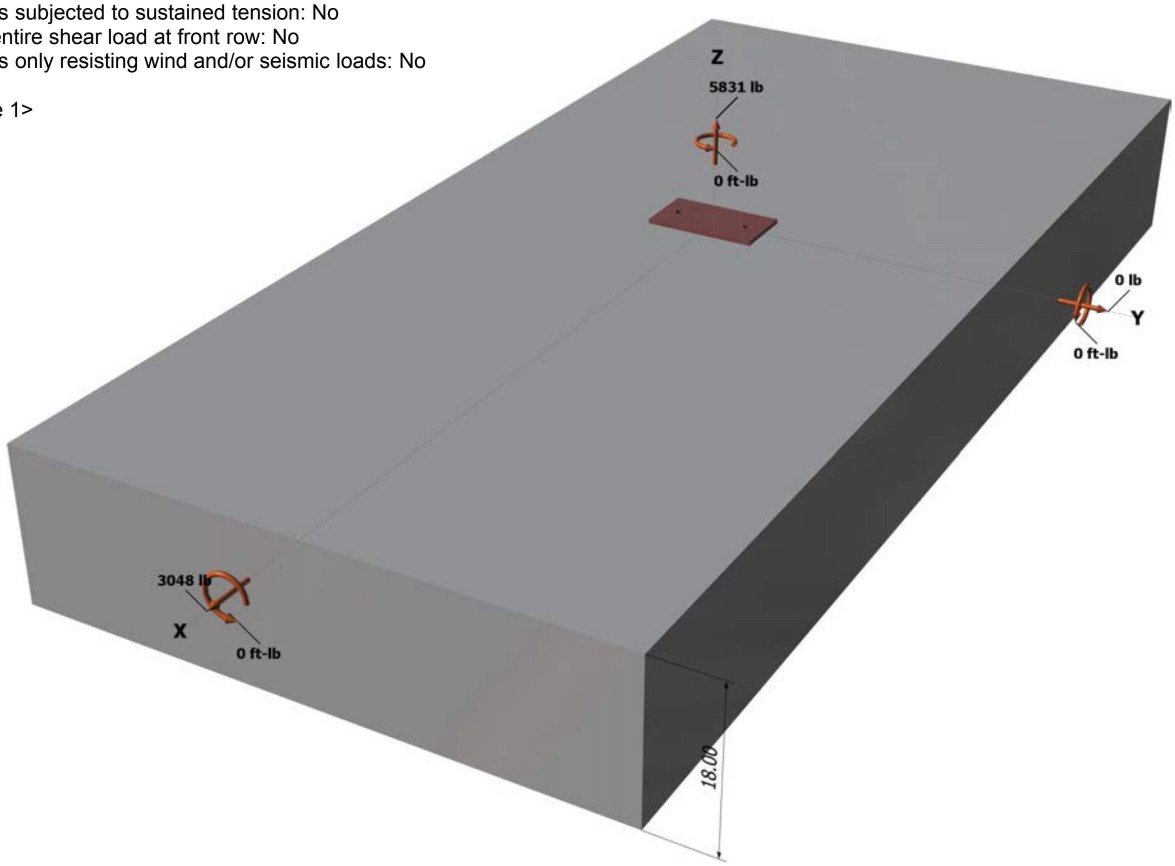
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

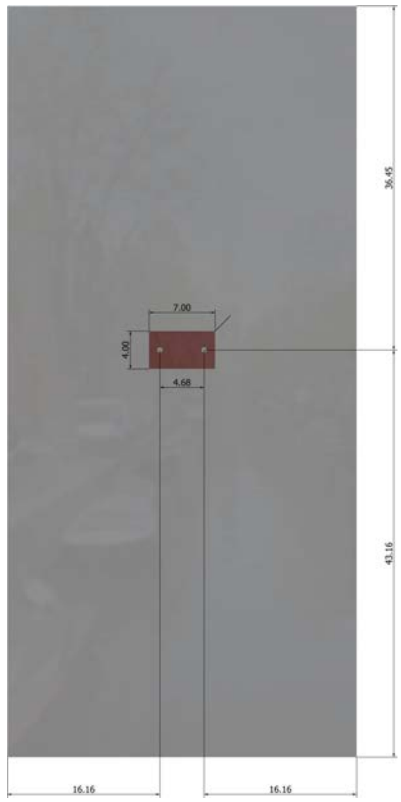
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout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

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

<Figure 1>



<Figure 2>



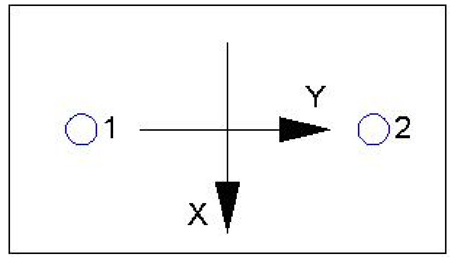
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	2915.5	1524.0	0.0	1524.0
2	2915.5	1524.0	0.0	1524.0
Sum	5831.0	3048.0	0.0	3048.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 5831
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)
666.00	648.00	1.000	0.969	1.000	1.000	15593	0.70	10875

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	16.16	24369

$\phi V_{cbx} = \phi\,(2)(A_{Vc} / A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (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)
872.64	1175.16	1.000	1.000	1.000	24369	0.70	25334

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, ϕN_n (lb)	Ratio	Status
Steel	2916	6071	0.48	Pass
Concrete breakout	5831	10231	0.57	Pass
Adhesive	**5831**	**8093**	**0.72**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status
Steel	**1524**	**3156**	**0.48**	**Pass (Governs)**
T Concrete breakout x+	3048	10875	0.28	Pass
|| Concrete breakout y-	1524	25334	0.06	Pass
Pryout	3048	20601	0.15	Pass

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

Sec. D.7.3	0.72	0.48	120.3 %	1.2	Pass

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

12. Warnings

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

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

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