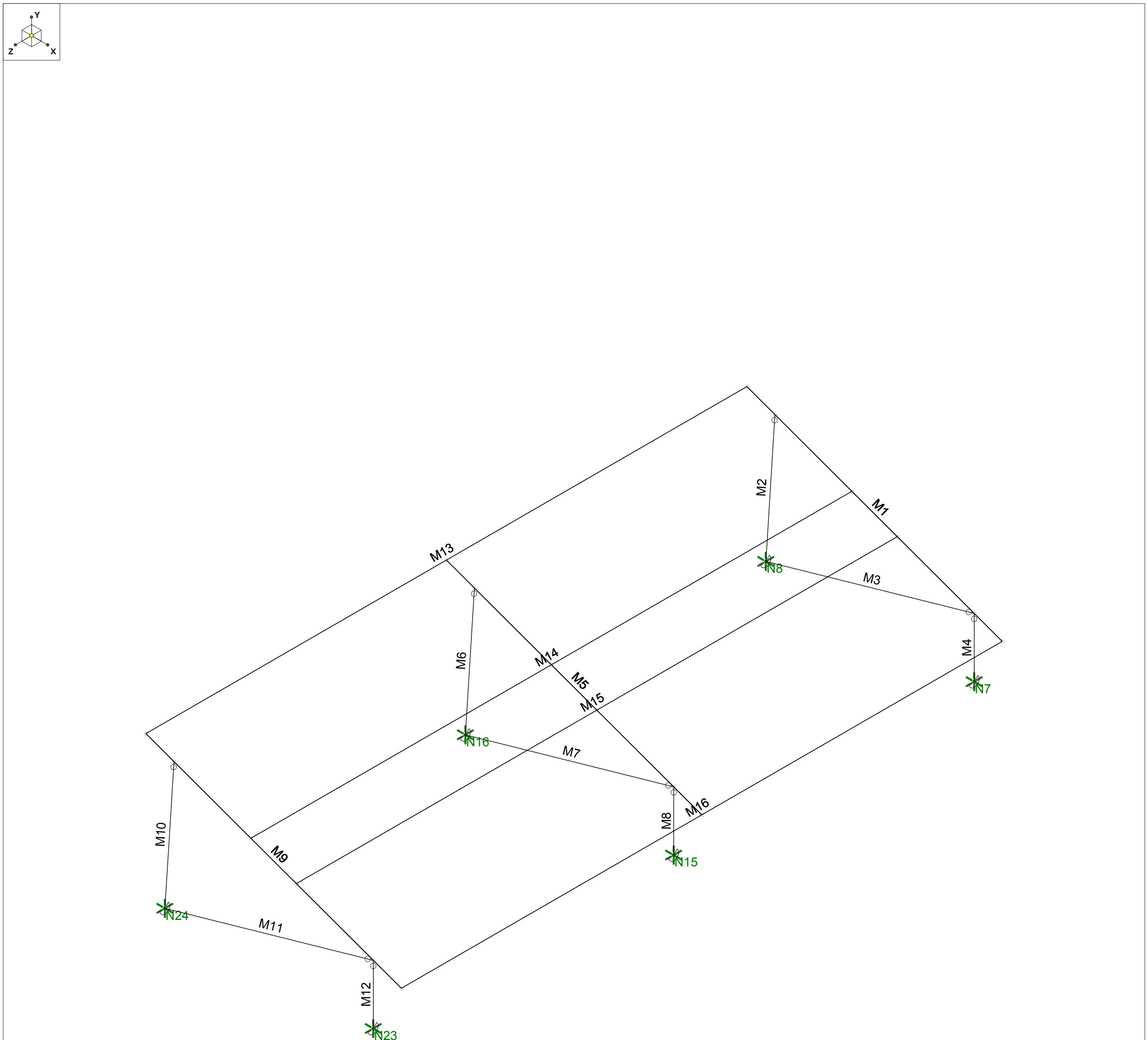


Schletter, Inc.	Standard PVMax Racking System	20° Tilt w/ Seismic Design
HCV	Representative Calculations - ASCE 7-05	

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.

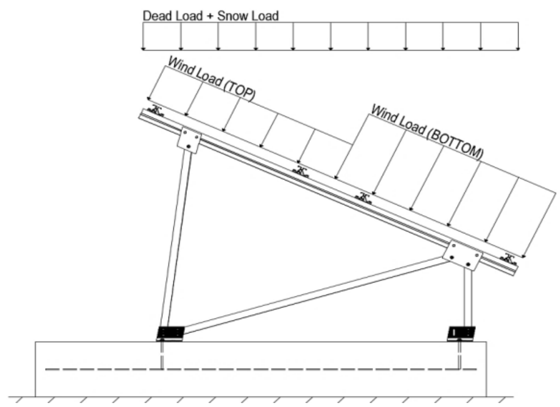
1.2 Construction

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 =	20°
Maximum Height Above Grade =	3 ft



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

1.3 Technical Codes

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

2. LOAD ACTIONS

2.1 Permanent Loads

g_{MAX} =	3.00	psf	*Self-weight of the PV modules.*
g_{MIN} =	1.75	psf	

2.2 Snow Loads

Ground Snow Load, P_g =	30.00	psf	
Sloped Roof Snow Load, P_s =	20.62	psf	*(ASCE 7-05, Eq. 7-2)*
I_s =	1.00		
C_s =	0.91		
C_e =	0.90		
C_t =	1.20		

2.3 Wind Loads

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

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

Pressure Coefficients

$Cf+_{TOP}$	=	1.050	*(Pressure)*
$Cf+_{BOTTOM}$	=	1.650	
$Cf-_{TOP, OUTER PURLIN}$	=	-2.400	
$Cf-_{TOP, INNER PURLIN}$	=	-1.840	*(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 =	0.05	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

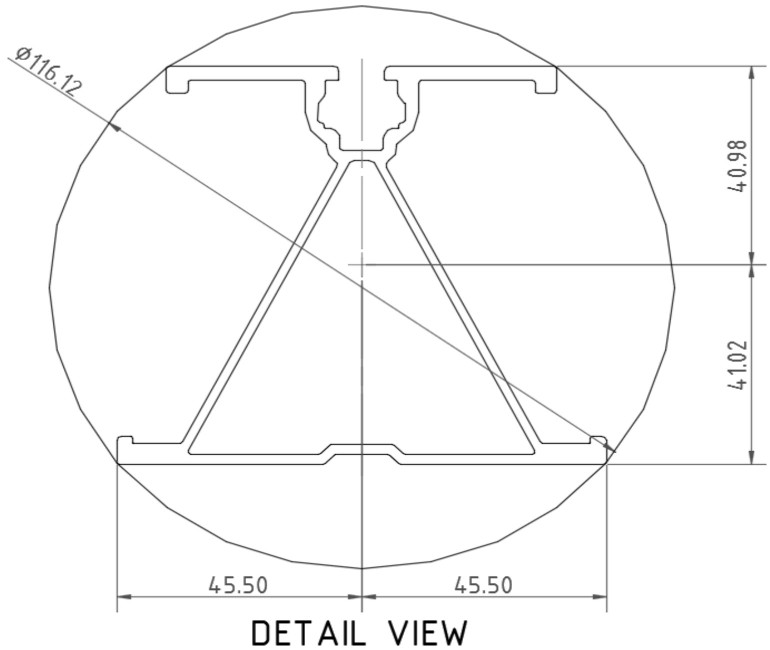
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

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).

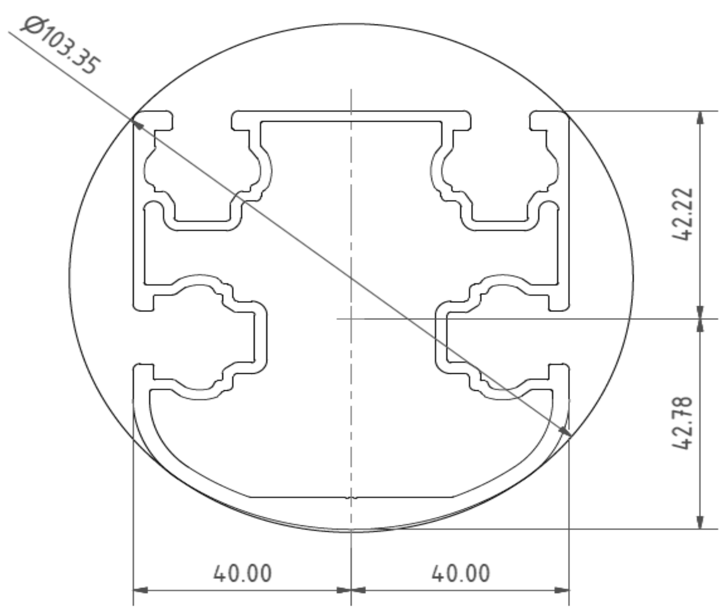
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	99	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	-2.367	k-ft
M_z =	0.003	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	85%	



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).

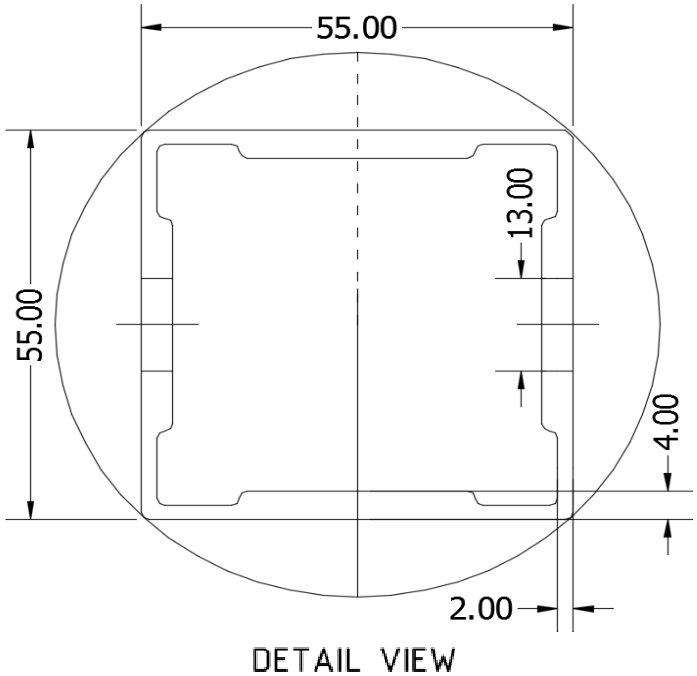
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	88.90	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.35	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.411	k-ft
M_z =	0.000	k-ft
P_n =	-0.756	k
$M_{y\ allowable}$ =	3.464	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	100%	



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).

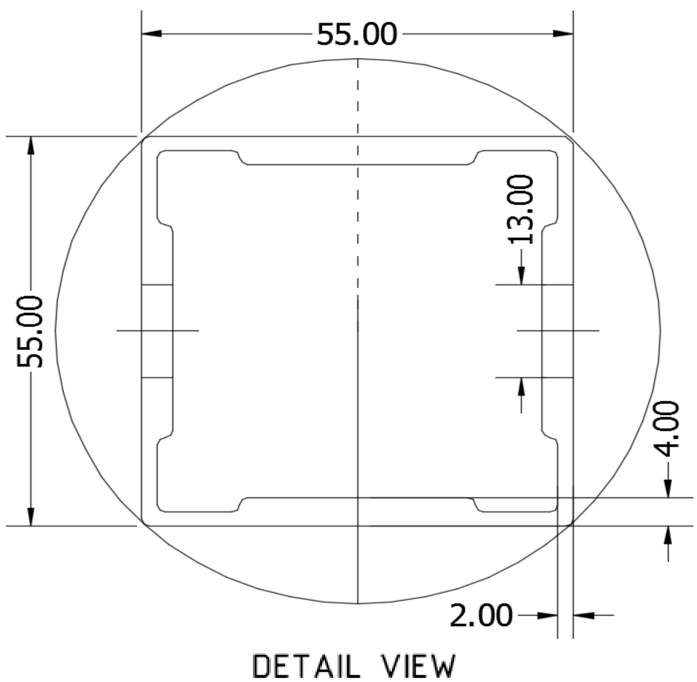
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.429	k-ft
P_n =	0.543	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).

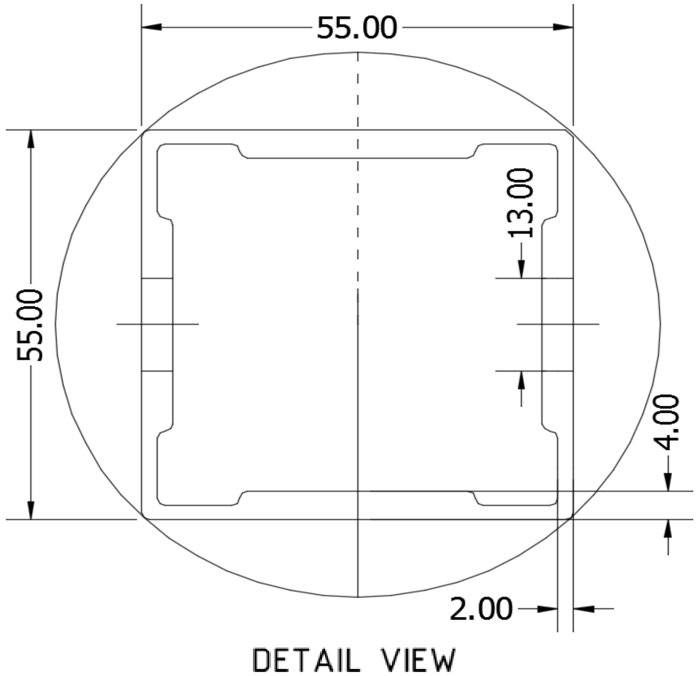
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	86.60	in
$\Phi F_{ty\ AXIAL}$ =	7.50	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.011	k-ft
M_z =	0.000	k-ft
P_n =	2.129	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	7.371	k
Utilization =	30%	



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 =	55.91	in
$\Phi F_{ty\ AXIAL}$ =	15.92	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 =	3.593	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	15.642	k
Utilization =	24%	



5. FOUNDATION DESIGN CALCULATIONS

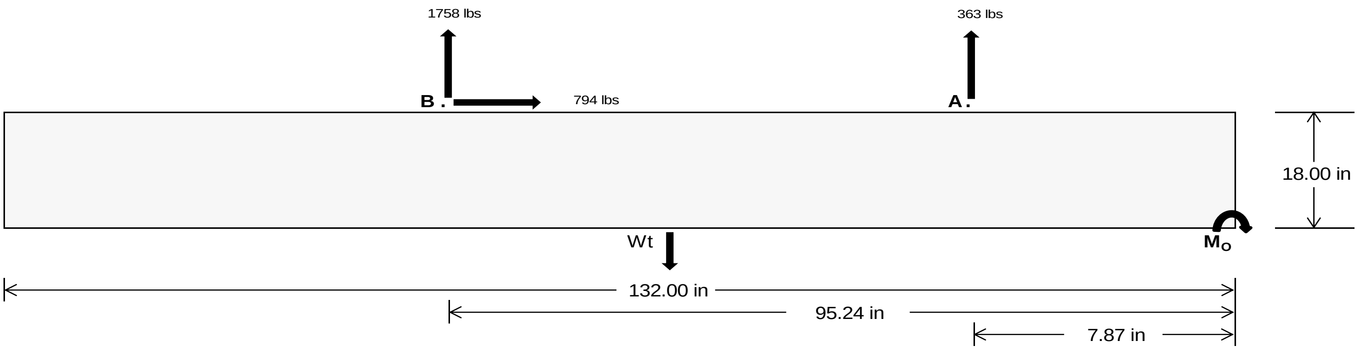
5.1 Helical Pile Foundations

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 =	1522.71	7323.81	k
Compressive Load =	4568.37	5424.69	k
Lateral Load =	288.05	3301.78	k
Moment (Weak Axis) =	0.57	0.29	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 = 184606.2 in-lbs
Resisting Force Required = 2797.06 lbs
S.F. = 1.67
Weight Required = 4661.77 lbs
Minimum Width = 40 in in
Weight Provided = 7975.00 lbs

A minimum 132in long x 40in wide x 18in tall ballast foundation is required to resist overturning.

Sliding

Force = 793.70 lbs
Friction = 0.4
Weight Required = 1984.24 lbs
Resisting Weight = 7975.00 lbs
Additional Weight Required = 0 lbs

Use a 132in long x 40in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

Cohesion

Sliding Force = 793.70 lbs
Cohesion = 130 psf
Area = 36.67 ft^2
Resisting = 3987.50 lbs
Additional Weight Required = 0 lbs

Use a 132in long x 40in 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			
	40 in	41 in	42 in	43 in
P_{ftg} = (145 pcf)(11 ft)(1.5 ft)(3.33 ft) =	7975 lbs	8174 lbs	8374 lbs	8573 lbs

ASD LC	1.0D + 1.0S				1.0D + 1.0W				1.0D + 0.75L + 0.75W + 0.75S				0.6D + 1.0W			
Width	40 in	41 in	42 in	43 in	40 in	41 in	42 in	43 in	40 in	41 in	42 in	43 in	40 in	41 in	42 in	43 in
F_A	1281 lbs	1281 lbs	1281 lbs	1281 lbs	1917 lbs	1917 lbs	1917 lbs	1917 lbs	2291 lbs	2291 lbs	2291 lbs	2291 lbs	-727 lbs	-727 lbs	-727 lbs	-727 lbs
F_B	1299 lbs	1299 lbs	1299 lbs	1299 lbs	2323 lbs	2323 lbs	2323 lbs	2323 lbs	2609 lbs	2609 lbs	2609 lbs	2609 lbs	-3517 lbs	-3517 lbs	-3517 lbs	-3517 lbs
F_V	137 lbs	137 lbs	137 lbs	137 lbs	1401 lbs	1401 lbs	1401 lbs	1401 lbs	1143 lbs	1143 lbs	1143 lbs	1143 lbs	-1587 lbs	-1587 lbs	-1587 lbs	-1587 lbs
P_{total}	10555 lbs	10755 lbs	10954 lbs	11153 lbs	12215 lbs	12415 lbs	12614 lbs	12813 lbs	12875 lbs	13074 lbs	13273 lbs	13473 lbs	541 lbs	661 lbs	781 lbs	900 lbs
M	3244 lbs-ft	3244 lbs-ft	3244 lbs-ft	3244 lbs-ft	5728 lbs-ft	5728 lbs-ft	5728 lbs-ft	5728 lbs-ft	6456 lbs-ft	6456 lbs-ft	6456 lbs-ft	6456 lbs-ft	2666 lbs-ft	2666 lbs-ft	2666 lbs-ft	2666 lbs-ft
e	0.31 ft	0.30 ft	0.30 ft	0.29 ft	0.47 ft	0.46 ft	0.45 ft	0.45 ft	0.50 ft	0.49 ft	0.49 ft	0.48 ft	4.92 ft	4.03 ft	3.41 ft	2.96 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}	239.6 psf	239.1 psf	238.6 psf	238.1 psf	247.9 psf	247.2 psf	246.5 psf	245.8 psf	255.1 psf	254.2 psf	253.3 psf	252.5 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	336.1 psf	333.2 psf	330.5 psf	327.8 psf	418.4 psf	413.5 psf	408.8 psf	404.3 psf	447.2 psf	441.6 psf	436.2 psf	431.1 psf	188.0 psf	87.9 psf	71.3 psf	66.0 psf

Maximum Bearing Pressure = 447 psf
Allowable Bearing Pressure = 1500 psf

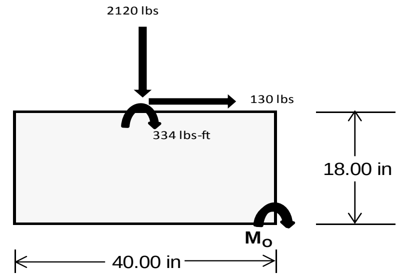
Use a 132in long x 40in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O = 3004.7 ft-lbs
Resisting Force Required = 1802.83 lbs
S.F. = 1.67
Weight Required = 3004.72 lbs
Minimum Width = 40 in in
Weight Provided = 7975.00 lbs

A minimum 132in long x 40in 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	40 in			40 in			40 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	235 lbs	534 lbs	183 lbs	750 lbs	2120 lbs	710 lbs	87 lbs	156 lbs	35 lbs
F_V	180 lbs	177 lbs	181 lbs	134 lbs	130 lbs	140 lbs	180 lbs	178 lbs	181 lbs
P_{total}	10108 lbs	10407 lbs	10056 lbs	10149 lbs	11519 lbs	10109 lbs	2974 lbs	3043 lbs	2922 lbs
M	707 lbs-ft	700 lbs-ft	713 lbs-ft	531 lbs-ft	529 lbs-ft	552 lbs-ft	706 lbs-ft	699 lbs-ft	708 lbs-ft
e	0.07 ft	0.07 ft	0.07 ft	0.05 ft	0.05 ft	0.05 ft	0.24 ft	0.23 ft	0.24 ft
L/6	0.56 ft	0.56 ft	0.56 ft	0.56 ft	0.56 ft	0.56 ft	0.56 ft	0.56 ft	0.56 ft
f_{min}	241.0 psf	249.5 psf	239.2 psf	250.7 psf	288.2 psf	248.6 psf	46.4 psf	48.7 psf	44.9 psf
f_{max}	310.4 psf	318.2 psf	309.3 psf	302.9 psf	340.1 psf	302.8 psf	115.8 psf	117.3 psf	114.5 psf

Maximum Bearing Pressure = 340 psf
Allowable Bearing Pressure = 1500 psf

Use a 132in long x 40in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Foundation Requirements: 132in long x 40in wide x 18in tall ballast foundation and fiber reinforcing with (3) #5 rebar.

5.3 Foundation Anchors

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

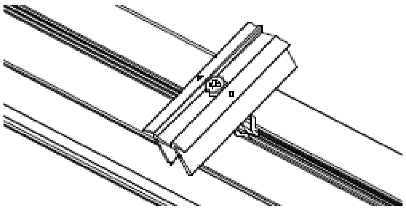
6. DESIGN OF JOINTS AND CONNECTIONS

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

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

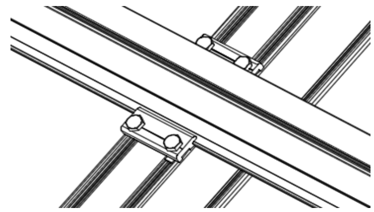
Fastening of Modules to Purlins

Maximum Uplifting Force =	0.964	k
Allowable Uplift =	1.214	k
Utilization =	79%	



Fastening of Purlins to Girders

Maximum Uplifting Force =	2.845	k
Allowable Uplift =	4.357	k
Utilization =	65%	



6.2 Strut Connections

The aluminum struts connect the aluminum girder ends to custom brackets with mounting holes. Single M12 bolts are used to attach each end of the strut to the girder and post. ASTM A193/A193M-86 equivalent stainless steel bolts are used.

Front Strut

Maximum Axial Load =	3.514	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	47%	

Rear Strut

Maximum Axial Load =	5.033	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	68%	

Diagonal Strut

Maximum Axial Load =	2.280	k
M12 Bolt Shear Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	31%	

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

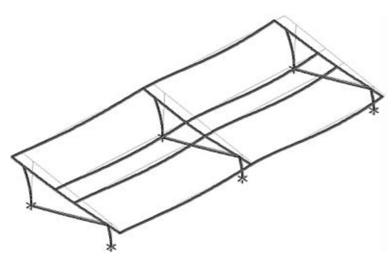
7.1 Seismic Drift

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} =	40.12	in
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$	
	0.802	in
Max Drift, Δ_{MAX} =	0.425	in

$0.425 \leq 0.802$, 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 = 99 in

J = 0.432

273.88

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

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= 28.0 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 = 99

J = 0.432

174.171

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

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= 29.1

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

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

$\varphi F_L =$ 31.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 7.4

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

S1 = 35.2

m = 0.68

$C_0 =$ 41.067

Cc = 43.717

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

S2 = 73.8

$\varphi F_L = 1.3\varphi y Fcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St =$ 29.4 ksi

Ix = 984962 mm^4

2.366 in^4

y = 43.717 mm

Sx = 1.375 in^3

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

3.4.18

h/t = 16.2

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

S1 = 36.9

m = 0.65

$C_0 =$ 40

Cc = 40

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

S2 = 77.3

$\varphi F_L = 1.3\varphi y Fcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L Wk =$ 33.3 ksi

Iy = 923544 mm^4

2.219 in^4

x = 40 mm

Sy = 1.409 in^3

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

Compression

3.4.9

b/t = 16.2

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

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

$\varphi F_L =$ 31.6 ksi

b/t = 7.4

S1 = 12.21

S2 = 32.70

$\varphi F_L = \varphi y Fcy$

$\varphi F_L =$ 33.3 ksi

3.4.10

Rb/t = 18.1

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

S1 = 6.87

S2 = 131.3

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

$\varphi F_L =$ 31.09 ksi

$\varphi F_L =$ 31.09 ksi

A = 1215.13 mm^2

1.88 in^2

$P_{max} =$ 58.55 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 24.8 in

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

Weak Axis:

3.4.14

L_b = 24.8

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

$\lambda =$ 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

$\varphi cc =$ 0.87952

$\varphi F_L = \varphi cc(Bc\text{-}Dc^*\lambda)$

$\varphi F_L =$ 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)

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

$\varphi F_L =$ 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

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

$\varphi F_L =$ 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

$\varphi F_L =$ 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

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

$\varphi F_L =$ 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

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

$\varphi F_L =$ 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

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 = 2.00335

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.86047

φF_L= (φccFcy)/(λ²)

φF_L= 7.50396 ksi

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

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

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 55.91 in
J = 0.942
87.2529

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

S1 = 0.51461

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

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 30.4 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

Weak Axis:

3.4.14

L_b = 55.91
J = 0.942
87.2529

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

S1 = 0.51461

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

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 30.4

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 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 1.29339

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.76107

φF_L= (φccFcy)/(λ²)

φF_L= 15.9235 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

$\varphi F_L =$ 15.92 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 16.39 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	-54.031	-54.031	0	0
2	M14	Y	-54.031	-54.031	0	0
3	M15	Y	-54.031	-54.031	0	0
4	M16	Y	-54.031	-54.031	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	-77.697	-77.697	0	0
2	M14	y	-77.697	-77.697	0	0
3	M15	y	-122.096	-122.096	0	0
4	M16	y	-122.096	-122.096	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	177.594	177.594	0	0
2	M14	y	136.155	136.155	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	658.979	2	1312.781	2	.585	1	.003	1	0	1	0	1
2		min	-814.142	3	-1751.425	3	-50.023	5	-.221	4	0	1	0	1
3	N7	max	.024	9	1165.237	1	-.381	12	0	12	0	1	0	1
4		min	-.218	2	-343.877	3	-221.579	4	-.44	4	0	1	0	1
5	N15	max	.021	9	3514.133	2	0	1	0	1	0	1	0	1
6		min	-2.4	2	-1171.318	3	-213.605	4	-.429	4	0	1	0	1
7	N16	max	2292.871	2	4172.842	2	0	11	0	11	0	1	0	1
8		min	-2539.827	3	-5633.701	3	-50.013	5	-.223	4	0	1	0	1
9	N23	max	.028	14	1165.237	1	6.264	1	.013	1	0	1	0	1
10		min	-.218	2	-343.877	3	-217.215	4	-.433	4	0	1	0	1
11	N24	max	658.979	2	1312.781	2	-.046	12	0	12	0	1	0	1
12		min	-814.142	3	-1751.425	3	-50.481	5	-.223	4	0	1	0	1
13	Totals:	max	3607.995	2	12618.38	2	0	1						
14		min	-4169.231	3	-10995.623	3	-799.494	5						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
1	M13	1	max	65.069	1	487.934	2	-6.016	12	0	15	.155	1	0	4
2			min	4.344	12	-864.405	3	-131.898	1	-.016	2	.01	12	0	3
3		2	max	65.069	1	340.505	2	-4.895	12	0	15	.075	4	.675	3
4			min	4.344	12	-608.55	3	-101.082	1	-.016	2	.002	10	-.38	2
5		3	max	65.069	1	193.077	2	-3.775	12	0	15	.042	5	1.116	3
6			min	4.344	12	-352.695	3	-70.265	1	-.016	2	-.031	1	-.624	2
7		4	max	65.069	1	45.648	2	-2.655	12	0	15	.023	5	1.322	3
8			min	4.344	12	-96.839	3	-39.448	1	-.016	2	-.081	1	-.734	2
9		5	max	65.069	1	159.016	3	-.072	10	0	15	.006	5	1.293	3
10			min	4.344	12	-101.781	2	-20.557	4	-.016	2	-.103	1	-.708	2
11		6	max	65.069	1	414.871	3	22.186	1	0	15	-.004	12	1.03	3
12			min	2.456	15	-249.21	2	-16.584	5	-.016	2	-.097	1	-.547	2
13		7	max	65.069	1	670.726	3	53.003	1	0	15	-.004	12	.533	3
14			min	-5.597	5	-396.638	2	-14.851	5	-.016	2	-.062	1	-.251	2
15		8	max	65.069	1	926.582	3	83.82	1	0	15	.003	2	.18	2
16			min	-15.007	5	-544.067	2	-13.118	5	-.016	2	-.039	4	-.199	3
17		9	max	65.069	1	1182.437	3	114.637	1	0	15	.091	1	.746	2
18			min	-24.417	5	-691.496	2	-11.385	5	-.016	2	-.049	5	-1.166	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
19		10	max	65.069	1	838.925	2	-4.065	12	.016	2	.21	1	1.448	2
20			min	4.344	12	-1438.292	3	-145.454	1	0	3	.002	12	-2.367	3
21		11	max	65.069	1	691.496	2	-2.945	12	.016	2	.091	1	.746	2
22			min	4.344	12	-1182.437	3	-114.637	1	0	15	-.002	3	-1.166	3
23		12	max	65.069	1	544.067	2	-1.825	12	.016	2	.038	4	.18	2
24			min	4.344	12	-926.582	3	-83.82	1	0	15	-.005	3	-.199	3
25		13	max	65.069	1	396.638	2	-.705	12	.016	2	.018	5	.533	3
26			min	4.344	12	-670.726	3	-53.003	1	0	15	-.062	1	-.251	2
27		14	max	65.069	1	249.21	2	.74	3	.016	2	0	15	1.03	3
28			min	2.328	15	-414.871	3	-23.776	4	0	15	-.097	1	-.547	2
29		15	max	65.069	1	101.781	2	8.631	1	.016	2	-.003	12	1.293	3
30			min	-5.842	5	-159.016	3	-17.268	5	0	15	-.103	1	-.708	2
31		16	max	65.069	1	96.839	3	39.448	1	.016	2	-.002	12	1.322	3
32			min	-15.252	5	-45.648	2	-15.535	5	0	15	-.081	1	-.734	2
33		17	max	65.069	1	352.695	3	70.265	1	.016	2	.002	3	1.116	3
34			min	-24.662	5	-193.077	2	-13.802	5	0	15	-.052	4	-.624	2
35		18	max	65.069	1	608.55	3	101.082	1	.016	2	.048	1	.675	3
36			min	-34.071	5	-340.505	2	-12.07	5	0	15	-.057	5	-.38	2
37		19	max	65.069	1	864.405	3	131.898	1	.016	2	.155	1	0	2
38			min	-43.481	5	-487.934	2	-10.337	5	0	15	-.068	5	0	3
39	M14	1	max	45.541	4	540.176	2	-6.197	12	.012	3	.181	1	0	1
40			min	1.923	12	-690.556	3	-136.672	1	-.014	2	.012	12	0	3
41		2	max	36.131	4	392.747	2	-5.077	12	.012	3	.111	4	.544	3
42			min	1.923	12	-495.478	3	-105.855	1	-.014	2	.004	10	-.428	2
43		3	max	34.132	1	245.319	2	-3.957	12	.012	3	.064	5	.908	3
44			min	1.923	12	-300.4	3	-75.038	1	-.014	2	-.013	1	-.72	2
45		4	max	34.132	1	97.89	2	-2.837	12	.012	3	.036	5	1.094	3
46			min	1.923	12	-105.322	3	-44.221	1	-.014	2	-.068	1	-.877	2
47		5	max	34.132	1	89.756	3	-.524	10	.012	3	.009	5	1.101	3
48			min	.448	15	-50.685	1	-32.134	4	-.014	2	-.094	1	-.899	2
49		6	max	34.132	1	284.834	3	17.413	1	.012	3	-.004	12	.93	3
50			min	-8.709	5	-196.968	2	-26.978	5	-.014	2	-.093	1	-.787	2
51		7	max	34.132	1	479.912	3	48.229	1	.012	3	-.004	12	.579	3
52			min	-18.119	5	-344.396	2	-25.245	5	-.014	2	-.063	1	-.538	2
53		8	max	34.132	1	674.99	3	79.046	1	.012	3	.001	10	.05	3
54			min	-27.528	5	-491.825	2	-23.512	5	-.014	2	-.066	4	-.155	2
55		9	max	34.132	1	870.069	3	109.863	1	.012	3	.082	1	.372	1
56			min	-36.938	5	-639.254	2	-21.779	5	-.014	2	-.084	5	-.658	3
57		10	max	57.245	4	786.683	2	-3.884	12	.014	2	.197	1	1.017	2
58			min	1.923	12	-1065.147	3	-140.68	1	-.012	3	.002	12	-1.545	3
59		11	max	47.835	4	639.254	2	-2.764	12	.014	2	.111	4	.372	1
60			min	1.923	12	-870.069	3	-109.863	1	-.012	3	-.002	3	-.658	3
61		12	max	38.425	4	491.825	2	-1.644	12	.014	2	.063	5	.05	3
62			min	1.923	12	-674.99	3	-79.046	1	-.012	3	-.005	3	-.155	2
63		13	max	34.132	1	344.396	2	-.524	12	.014	2	.034	5	.579	3
64			min	1.923	12	-479.912	3	-48.229	1	-.012	3	-.063	1	-.538	2
65		14	max	34.132	1	196.968	2	1.012	3	.014	2	.007	5	.93	3
66			min	1.923	12	-284.834	3	-32.817	4	-.012	3	-.093	1	-.787	2
67		15	max	34.132	1	50.685	1	13.404	1	.014	2	-.003	12	1.101	3
68			min	1.923	12	-89.756	3	-27.123	5	-.012	3	-.094	1	-.899	2
69		16	max	34.132	1	105.322	3	44.221	1	.014	2	0	12	1.094	3
70			min	-6.447	5	-97.89	2	-25.391	5	-.012	3	-.068	1	-.877	2
71		17	max	34.132	1	300.4	3	75.038	1	.014	2	.004	3	.908	3
72			min	-15.857	5	-245.319	2	-23.658	5	-.012	3	-.069	4	-.72	2
73		18	max	34.132	1	495.478	3	105.855	1	.014	2	.07	1	.544	3
74			min	-25.267	5	-392.747	2	-21.925	5	-.012	3	-.087	5	-.428	2
75		19	max	34.132	1	690.556	3	136.672	1	.014	2	.181	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	-34.676	5	-540.176	2	-20.192	5	-.012	3	-.106	5	0	3
77	M15	1	max	69.453	5	760.058	2	-6.104	12	.014	2	.212	4	0	2
78			min	-35.486	1	-383.386	3	-136.679	1	-.01	3	.011	12	0	3
79		2	max	60.043	5	547.511	2	-4.984	12	.014	2	.146	4	.304	3
80			min	-35.486	1	-279.473	3	-105.862	1	-.01	3	.005	10	-.599	2
81		3	max	50.633	5	334.964	2	-3.864	12	.014	2	.09	5	.512	3
82			min	-35.486	1	-175.56	3	-75.045	1	-.01	3	-.013	1	-1.004	2
83		4	max	41.223	5	122.416	2	-2.744	12	.014	2	.051	5	.626	3
84			min	-35.486	1	-71.647	3	-51.025	4	-.01	3	-.068	1	-1.213	2
85		5	max	31.813	5	32.266	3	-.571	10	.014	2	.014	5	.644	3
86			min	-35.486	1	-90.131	2	-42.872	4	-.01	3	-.094	1	-1.228	2
87		6	max	22.404	5	136.179	3	17.406	1	.014	2	-.004	12	.567	3
88			min	-35.486	1	-302.678	2	-37.7	5	-.01	3	-.093	1	-1.048	2
89		7	max	12.994	5	240.092	3	48.223	1	.014	2	-.004	12	.394	3
90			min	-35.486	1	-515.225	2	-35.967	5	-.01	3	-.069	4	-.673	2
91		8	max	3.584	5	344.005	3	79.04	1	.014	2	.001	10	.126	3
92			min	-35.486	1	-727.773	2	-34.234	5	-.01	3	-.089	4	-.104	2
93		9	max	-2.462	12	447.918	3	109.857	1	.014	2	.082	1	.661	2
94			min	-35.486	1	-940.32	2	-32.501	5	-.01	3	-.118	5	-.237	3
95		10	max	-2.462	12	1152.867	2	-3.977	12	.01	3	.211	4	1.62	2
96			min	-35.486	1	-551.832	3	-140.674	1	-.014	2	.002	12	-.695	3
97		11	max	1.511	5	940.32	2	-2.857	12	.01	3	.145	4	.661	2
98			min	-35.486	1	-447.918	3	-109.857	1	-.014	2	-.001	3	-.237	3
99		12	max	-2.462	12	727.773	2	-1.737	12	.01	3	.086	5	.126	3
100			min	-35.486	1	-344.005	3	-79.04	1	-.014	2	-.004	3	-.104	2
101		13	max	-2.462	12	515.225	2	-.617	12	.01	3	.048	5	.394	3
102			min	-35.486	1	-240.092	3	-51.723	4	-.014	2	-.063	1	-.673	2
103		14	max	-2.462	12	302.678	2	.864	3	.01	3	.011	5	.567	3
104			min	-35.486	1	-136.179	3	-43.569	4	-.014	2	-.093	1	-1.048	2
105		15	max	-2.462	12	90.131	2	13.411	1	.01	3	-.003	12	.644	3
106			min	-44.084	4	-32.266	3	-37.847	5	-.014	2	-.094	1	-1.228	2
107		16	max	-2.462	12	71.647	3	44.228	1	.01	3	0	12	.626	3
108			min	-53.493	4	-122.416	2	-36.114	5	-.014	2	-.074	4	-1.213	2
109		17	max	-2.462	12	175.56	3	75.045	1	.01	3	.003	3	.512	3
110			min	-62.903	4	-334.964	2	-34.381	5	-.014	2	-.095	4	-1.004	2
111		18	max	-2.462	12	279.473	3	105.862	1	.01	3	.07	1	.304	3
112			min	-72.313	4	-547.511	2	-32.648	5	-.014	2	-.122	5	-.599	2
113		19	max	-2.462	12	383.386	3	136.679	1	.01	3	.181	1	0	2
114			min	-81.723	4	-760.058	2	-30.915	5	-.014	2	-.151	5	0	5
115	M16	1	max	68.075	5	710.047	2	-5.702	12	.011	2	.16	4	0	2
116			min	-69.393	1	-342.148	3	-132.195	1	-.014	3	.009	12	0	3
117		2	max	58.665	5	497.5	2	-4.582	12	.011	2	.107	4	.266	3
118			min	-69.393	1	-238.235	3	-101.378	1	-.014	3	.003	10	-.553	2
119		3	max	49.255	5	284.952	2	-3.462	12	.011	2	.065	5	.437	3
120			min	-69.393	1	-134.322	3	-70.561	1	-.014	3	-.03	1	-.912	2
121		4	max	39.846	5	72.405	2	-2.342	12	.011	2	.038	5	.512	3
122			min	-69.393	1	-30.409	3	-39.745	1	-.014	3	-.081	1	-1.076	2
123		5	max	30.436	5	73.504	3	-.26	10	.011	2	.011	5	.493	3
124			min	-69.393	1	-140.142	2	-30.096	4	-.014	3	-.103	1	-1.045	2
125		6	max	21.026	5	177.417	3	21.889	1	.011	2	-.004	12	.378	3
126			min	-69.393	1	-352.69	2	-26.028	5	-.014	3	-.097	1	-.819	2
127		7	max	11.616	5	281.33	3	52.706	1	.011	2	-.004	12	.167	3
128			min	-69.393	1	-565.237	2	-24.295	5	-.014	3	-.063	1	-.398	2
129		8	max	2.207	5	385.243	3	83.523	1	.011	2	.002	2	.217	2
130			min	-69.393	1	-777.784	2	-22.562	5	-.014	3	-.059	4	-.138	3
131		9	max	-4.139	12	489.156	3	114.34	1	.011	2	.09	1	1.028	2
132			min	-69.393	1	-990.331	2	-20.829	5	-.014	3	-.078	5	-.539	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	-4.139	12	1202.879	2	-4.378	12	.014	3	.209	1	2.033	2
134			min	-69.393	1	-593.069	3	-145.157	1	-.011	2	.004	12	-1.035	3
135		11	max	-.327	15	990.331	2	-3.258	12	.014	3	.107	4	1.028	2
136			min	-69.393	1	-489.156	3	-114.34	1	-.011	2	0	3	-.539	3
137		12	max	-4.139	12	777.784	2	-2.138	12	.014	3	.058	4	.217	2
138			min	-69.393	1	-385.243	3	-83.523	1	-.011	2	-.004	3	-.138	3
139		13	max	-4.139	12	565.237	2	-1.018	12	.014	3	.029	5	.167	3
140			min	-69.393	1	-281.33	3	-52.706	1	-.011	2	-.063	1	-.398	2
141		14	max	-4.139	12	352.69	2	.239	3	.014	3	.002	5	.378	3
142			min	-69.393	1	-177.417	3	-33.236	4	-.011	2	-.097	1	-.819	2
143		15	max	-4.139	12	140.142	2	8.928	1	.014	3	-.004	12	.493	3
144			min	-69.393	1	-73.504	3	-26.699	5	-.011	2	-.103	1	-1.045	2
145		16	max	-4.139	12	30.409	3	39.745	1	.014	3	-.002	12	.512	3
146			min	-69.393	1	-72.405	2	-24.966	5	-.011	2	-.081	1	-1.076	2
147		17	max	-4.139	12	134.322	3	70.561	1	.014	3	.001	3	.437	3
148			min	-72.414	4	-284.952	2	-23.234	5	-.011	2	-.076	4	-.912	2
149		18	max	-4.139	12	238.235	3	101.378	1	.014	3	.049	1	.266	3
150			min	-81.823	4	-497.5	2	-21.501	5	-.011	2	-.089	5	-.553	2
151		19	max	-4.139	12	342.148	3	132.195	1	.014	3	.156	1	0	2
152			min	-91.233	4	-710.047	2	-19.768	5	-.011	2	-.108	5	0	5
153	M2	1	max	1137.58	2	2.077	4	.61	1	0	3	0	3	0	1
154			min	-1563.892	3	.51	15	-46.044	4	0	4	0	2	0	1
155		2	max	1137.96	2	2.044	4	.61	1	0	3	0	1	0	12
156			min	-1563.608	3	.497	12	-46.373	4	0	4	-.012	4	0	4
157		3	max	1138.339	2	2.01	4	.61	1	0	3	0	1	0	12
158			min	-1563.323	3	.484	12	-46.703	4	0	4	-.024	4	-.001	4
159		4	max	1138.718	2	1.977	4	.61	1	0	3	0	1	0	12
160			min	-1563.039	3	.471	12	-47.032	4	0	4	-.036	4	-.002	4
161		5	max	1139.098	2	1.943	4	.61	1	0	3	0	1	0	12
162			min	-1562.754	3	.458	12	-47.362	4	0	4	-.048	4	-.002	4
163		6	max	1139.477	2	1.91	4	.61	1	0	3	0	1	0	12
164			min	-1562.47	3	.445	12	-47.691	4	0	4	-.06	4	-.003	4
165		7	max	1139.856	2	1.877	4	.61	1	0	3	0	1	0	12
166			min	-1562.185	3	.432	12	-48.02	4	0	4	-.072	4	-.003	4
167		8	max	1140.235	2	1.843	4	.61	1	0	3	.001	1	0	12
168			min	-1561.901	3	.419	12	-48.35	4	0	4	-.085	4	-.004	4
169		9	max	1140.615	2	1.81	4	.61	1	0	3	.001	1	0	12
170			min	-1561.617	3	.406	12	-48.679	4	0	4	-.097	4	-.004	4
171		10	max	1140.994	2	1.777	4	.61	1	0	3	.001	1	-.001	12
172			min	-1561.332	3	.393	12	-49.009	4	0	4	-.11	4	-.004	4
173		11	max	1141.373	2	1.743	4	.61	1	0	3	.002	1	-.001	12
174			min	-1561.048	3	.38	12	-49.338	4	0	4	-.122	4	-.005	4
175		12	max	1141.752	2	1.71	4	.61	1	0	3	.002	1	-.001	12
176			min	-1560.763	3	.367	12	-49.668	4	0	4	-.135	4	-.005	4
177		13	max	1142.132	2	1.676	4	.61	1	0	3	.002	1	-.001	12
178			min	-1560.479	3	.354	12	-49.997	4	0	4	-.148	4	-.006	4
179		14	max	1142.511	2	1.643	4	.61	1	0	3	.002	1	-.001	12
180			min	-1560.194	3	.341	12	-50.327	4	0	4	-.161	4	-.006	4
181		15	max	1142.89	2	1.61	4	.61	1	0	3	.002	1	-.002	12
182			min	-1559.91	3	.328	12	-50.656	4	0	4	-.173	4	-.007	4
183		16	max	1143.269	2	1.576	4	.61	1	0	3	.002	1	-.002	12
184			min	-1559.625	3	.315	12	-50.986	4	0	4	-.186	4	-.007	4
185		17	max	1143.649	2	1.543	4	.61	1	0	3	.002	1	-.002	12
186			min	-1559.341	3	.302	12	-51.315	4	0	4	-.2	4	-.007	4
187		18	max	1144.028	2	1.509	4	.61	1	0	3	.003	1	-.002	12
188			min	-1559.057	3	.289	12	-51.645	4	0	4	-.213	4	-.008	4
189		19	max	1144.407	2	1.476	4	.61	1	0	3	.003	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	-1558.772	3	.276	12	-51.974	4	0	4	-.226	4	-.008	4
191	M3	1	max	604.052	2	8.013	4	1.003	4	0	3	0	1	.008	4
192			min	-734.244	3	1.897	15	.004	12	0	4	-.016	4	.002	12
193		2	max	603.882	2	7.243	4	1.544	4	0	3	0	1	.005	2
194			min	-734.372	3	1.716	15	.004	12	0	4	-.016	4	0	12
195		3	max	603.712	2	6.473	4	2.085	4	0	3	0	1	.003	2
196			min	-734.499	3	1.535	15	.004	12	0	4	-.015	4	0	3
197		4	max	603.541	2	5.703	4	2.625	4	0	3	0	1	0	2
198			min	-734.627	3	1.354	15	.004	12	0	4	-.014	4	-.002	3
199		5	max	603.371	2	4.933	4	3.166	4	0	3	0	1	0	15
200			min	-734.755	3	1.173	15	.004	12	0	4	-.013	4	-.003	3
201		6	max	603.201	2	4.163	4	3.706	4	0	3	0	1	-.001	15
202			min	-734.883	3	.992	15	.004	12	0	4	-.011	4	-.005	6
203		7	max	603.03	2	3.393	4	4.247	4	0	3	0	1	-.001	15
204			min	-735.011	3	.811	15	.004	12	0	4	-.009	5	-.006	6
205		8	max	602.86	2	2.623	4	4.787	4	0	3	0	1	-.002	15
206			min	-735.138	3	.63	15	.004	12	0	4	-.008	5	-.007	6
207		9	max	602.69	2	1.853	4	5.328	4	0	3	0	1	-.002	15
208			min	-735.266	3	.449	15	.004	12	0	4	-.006	5	-.008	6
209		10	max	602.519	2	1.083	4	5.868	4	0	3	0	1	-.002	15
210			min	-735.394	3	.239	12	.004	12	0	4	-.003	5	-.009	6
211		11	max	602.349	2	.423	2	6.409	4	0	3	0	1	-.002	15
212			min	-735.522	3	-.108	3	.004	12	0	4	0	5	-.009	6
213		12	max	602.178	2	-.094	15	6.949	4	0	3	.002	4	-.002	15
214			min	-735.649	3	-.558	3	.004	12	0	4	0	12	-.009	6
215		13	max	602.008	2	-.275	15	7.49	4	0	3	.005	4	-.002	15
216			min	-735.777	3	-1.228	6	.004	12	0	4	0	12	-.009	6
217		14	max	601.838	2	-.456	15	8.031	4	0	3	.009	4	-.002	15
218			min	-735.905	3	-1.998	6	.004	12	0	4	0	12	-.008	6
219		15	max	601.667	2	-.637	15	8.571	4	0	3	.012	4	-.002	15
220			min	-736.033	3	-2.768	6	.004	12	0	4	0	12	-.007	6
221		16	max	601.497	2	-.818	15	9.112	4	0	3	.016	4	-.001	15
222			min	-736.16	3	-3.538	6	.004	12	0	4	0	12	-.006	6
223		17	max	601.327	2	-.999	15	9.652	4	0	3	.02	4	0	15
224			min	-736.288	3	-4.308	6	.004	12	0	4	0	12	-.004	6
225		18	max	601.156	2	-1.18	15	10.193	4	0	3	.024	4	0	15
226			min	-736.416	3	-5.078	6	.004	12	0	4	0	12	-.002	6
227		19	max	600.986	2	-1.361	15	10.733	4	0	3	.028	4	0	1
228			min	-736.544	3	-5.848	6	.004	12	0	4	0	12	0	1
229	M4	1	max	1162.171	1	0	1	-.378	12	0	1	.018	4	0	1
230			min	-346.177	3	0	1	-219.895	4	0	1	0	10	0	1
231		2	max	1162.341	1	0	1	-.378	12	0	1	0	12	0	1
232			min	-346.049	3	0	1	-220.043	4	0	1	-.008	4	0	1
233		3	max	1162.512	1	0	1	-.378	12	0	1	0	12	0	1
234			min	-345.921	3	0	1	-220.19	4	0	1	-.033	4	0	1
235		4	max	1162.682	1	0	1	-.378	12	0	1	0	12	0	1
236			min	-345.793	3	0	1	-220.338	4	0	1	-.058	4	0	1
237		5	max	1162.852	1	0	1	-.378	12	0	1	0	12	0	1
238			min	-345.666	3	0	1	-220.486	4	0	1	-.083	4	0	1
239		6	max	1163.023	1	0	1	-.378	12	0	1	0	12	0	1
240			min	-345.538	3	0	1	-220.633	4	0	1	-.109	4	0	1
241		7	max	1163.193	1	0	1	-.378	12	0	1	0	12	0	1
242			min	-345.41	3	0	1	-220.781	4	0	1	-.134	4	0	1
243		8	max	1163.364	1	0	1	-.378	12	0	1	0	12	0	1
244			min	-345.282	3	0	1	-220.928	4	0	1	-.16	4	0	1
245		9	max	1163.534	1	0	1	-.378	12	0	1	0	12	0	1
246			min	-345.155	3	0	1	-221.076	4	0	1	-.185	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	1163.704	1	0	1	-.378	12	0	1	0	12	0	1
248			min	-345.027	3	0	1	-221.224	4	0	1	-.21	4	0	1
249		11	max	1163.875	1	0	1	-.378	12	0	1	0	12	0	1
250			min	-344.899	3	0	1	-221.371	4	0	1	-.236	4	0	1
251		12	max	1164.045	1	0	1	-.378	12	0	1	0	12	0	1
252			min	-344.771	3	0	1	-221.519	4	0	1	-.261	4	0	1
253		13	max	1164.215	1	0	1	-.378	12	0	1	0	12	0	1
254			min	-344.643	3	0	1	-221.667	4	0	1	-.287	4	0	1
255		14	max	1164.386	1	0	1	-.378	12	0	1	0	12	0	1
256			min	-344.516	3	0	1	-221.814	4	0	1	-.312	4	0	1
257		15	max	1164.556	1	0	1	-.378	12	0	1	0	12	0	1
258			min	-344.388	3	0	1	-221.962	4	0	1	-.338	4	0	1
259		16	max	1164.726	1	0	1	-.378	12	0	1	0	12	0	1
260			min	-344.26	3	0	1	-222.109	4	0	1	-.363	4	0	1
261		17	max	1164.897	1	0	1	-.378	12	0	1	0	12	0	1
262			min	-344.132	3	0	1	-222.257	4	0	1	-.389	4	0	1
263		18	max	1165.067	1	0	1	-.378	12	0	1	0	12	0	1
264			min	-344.005	3	0	1	-222.405	4	0	1	-.414	4	0	1
265		19	max	1165.237	1	0	1	-.378	12	0	1	0	12	0	1
266			min	-343.877	3	0	1	-222.552	4	0	1	-.44	4	0	1
267	M6	1	max	3586.47	2	2.714	2	0	1	0	1	0	4	0	1
268			min	-5032.512	3	-.232	3	-46.463	4	0	4	0	1	0	1
269		2	max	3586.85	2	2.688	2	0	1	0	1	0	1	0	3
270			min	-5032.228	3	-.251	3	-46.792	4	0	4	-.012	4	0	2
271		3	max	3587.229	2	2.662	2	0	1	0	1	0	1	0	3
272			min	-5031.943	3	-.271	3	-47.122	4	0	4	-.024	4	-.001	2
273		4	max	3587.608	2	2.636	2	0	1	0	1	0	1	0	3
274			min	-5031.659	3	-.29	3	-47.451	4	0	4	-.036	4	-.002	2
275		5	max	3587.987	2	2.61	2	0	1	0	1	0	1	0	3
276			min	-5031.374	3	-.31	3	-47.781	4	0	4	-.048	4	-.003	2
277		6	max	3588.367	2	2.584	2	0	1	0	1	0	1	0	3
278			min	-5031.09	3	-.329	3	-48.11	4	0	4	-.061	4	-.003	2
279		7	max	3588.746	2	2.558	2	0	1	0	1	0	1	0	3
280			min	-5030.806	3	-.349	3	-48.44	4	0	4	-.073	4	-.004	2
281		8	max	3589.125	2	2.532	2	0	1	0	1	0	1	0	3
282			min	-5030.521	3	-.369	3	-48.769	4	0	4	-.085	4	-.005	2
283		9	max	3589.504	2	2.506	2	0	1	0	1	0	1	0	3
284			min	-5030.237	3	-.388	3	-49.099	4	0	4	-.098	4	-.005	2
285		10	max	3589.884	2	2.48	2	0	1	0	1	0	1	0	3
286			min	-5029.952	3	-.408	3	-49.428	4	0	4	-.111	4	-.006	2
287		11	max	3590.263	2	2.454	2	0	1	0	1	0	1	0	3
288			min	-5029.668	3	-.427	3	-49.758	4	0	4	-.123	4	-.007	2
289		12	max	3590.642	2	2.428	2	0	1	0	1	0	1	0	3
290			min	-5029.383	3	-.447	3	-50.087	4	0	4	-.136	4	-.007	2
291		13	max	3591.021	2	2.402	2	0	1	0	1	0	1	.001	3
292			min	-5029.099	3	-.466	3	-50.417	4	0	4	-.149	4	-.008	2
293		14	max	3591.401	2	2.376	2	0	1	0	1	0	1	.001	3
294			min	-5028.814	3	-.486	3	-50.746	4	0	4	-.162	4	-.008	2
295		15	max	3591.78	2	2.35	2	0	1	0	1	0	1	.001	3
296			min	-5028.53	3	-.505	3	-51.075	4	0	4	-.175	4	-.009	2
297		16	max	3592.159	2	2.324	2	0	1	0	1	0	1	.001	3
298			min	-5028.246	3	-.525	3	-51.405	4	0	4	-.188	4	-.01	2
299		17	max	3592.538	2	2.298	2	0	1	0	1	0	1	.002	3
300			min	-5027.961	3	-.544	3	-51.734	4	0	4	-.201	4	-.01	2
301		18	max	3592.918	2	2.272	2	0	1	0	1	0	1	.002	3
302			min	-5027.677	3	-.564	3	-52.064	4	0	4	-.215	4	-.011	2
303		19	max	3593.297	2	2.246	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	-5027.392	3	-.583	3	-52.393	4	0	4	-.228	4	-.011	2
305	M7	1	max	2128.953	2	8.014	6	.876	4	0	1	0	1	.011	2
306			min	-2277.662	3	1.881	15	0	1	0	4	-.016	4	-.002	3
307		2	max	2128.783	2	7.244	6	1.417	4	0	1	0	1	.009	2
308			min	-2277.79	3	1.7	15	0	1	0	4	-.016	4	-.003	3
309		3	max	2128.612	2	6.474	6	1.957	4	0	1	0	1	.006	2
310			min	-2277.917	3	1.519	15	0	1	0	4	-.015	4	-.005	3
311		4	max	2128.442	2	5.704	6	2.498	4	0	1	0	1	.004	2
312			min	-2278.045	3	1.338	15	0	1	0	4	-.014	4	-.006	3
313		5	max	2128.272	2	4.934	6	3.038	4	0	1	0	1	.002	2
314			min	-2278.173	3	1.157	15	0	1	0	4	-.013	4	-.007	3
315		6	max	2128.101	2	4.164	6	3.579	4	0	1	0	1	0	2
316			min	-2278.301	3	.976	15	0	1	0	4	-.012	4	-.008	3
317		7	max	2127.931	2	3.394	6	4.12	4	0	1	0	1	-.001	2
318			min	-2278.428	3	.77	12	0	1	0	4	-.01	4	-.008	3
319		8	max	2127.761	2	2.711	2	4.66	4	0	1	0	1	-.002	15
320			min	-2278.556	3	.47	12	0	1	0	4	-.008	4	-.008	3
321		9	max	2127.59	2	2.111	2	5.201	4	0	1	0	1	-.002	15
322			min	-2278.684	3	.17	12	0	1	0	4	-.006	4	-.009	3
323		10	max	2127.42	2	1.511	2	5.741	4	0	1	0	1	-.002	15
324			min	-2278.812	3	-.248	3	0	1	0	4	-.004	5	-.009	4
325		11	max	2127.249	2	.911	2	6.282	4	0	1	0	1	-.002	15
326			min	-2278.939	3	-.698	3	0	1	0	4	-.001	5	-.009	4
327		12	max	2127.079	2	.311	2	6.822	4	0	1	.002	4	-.002	15
328			min	-2279.067	3	-1.148	3	0	1	0	4	0	1	-.009	4
329		13	max	2126.909	2	-.289	2	7.363	4	0	1	.005	4	-.002	15
330			min	-2279.195	3	-1.598	3	0	1	0	4	0	1	-.009	4
331		14	max	2126.738	2	-.472	15	7.903	4	0	1	.008	4	-.002	15
332			min	-2279.323	3	-2.048	3	0	1	0	4	0	1	-.008	4
333		15	max	2126.568	2	-.653	15	8.444	4	0	1	.011	4	-.002	15
334			min	-2279.451	3	-2.766	4	0	1	0	4	0	1	-.007	4
335		16	max	2126.398	2	-.834	15	8.984	4	0	1	.015	4	-.001	15
336			min	-2279.578	3	-3.536	4	0	1	0	4	0	1	-.006	4
337		17	max	2126.227	2	-1.015	15	9.525	4	0	1	.019	4	-.001	15
338			min	-2279.706	3	-4.306	4	0	1	0	4	0	1	-.004	4
339		18	max	2126.057	2	-1.196	15	10.066	4	0	1	.023	4	0	15
340			min	-2279.834	3	-5.076	4	0	1	0	4	0	1	-.002	4
341		19	max	2125.887	2	-1.377	15	10.606	4	0	1	.027	4	0	1
342			min	-2279.962	3	-5.846	4	0	1	0	4	0	1	0	1
343	M8	1	max	3511.067	2	0	1	0	1	0	1	.017	4	0	1
344			min	-1173.618	3	0	1	-214.407	4	0	1	0	1	0	1
345		2	max	3511.238	2	0	1	0	1	0	1	0	1	0	1
346			min	-1173.49	3	0	1	-214.554	4	0	1	-.008	4	0	1
347		3	max	3511.408	2	0	1	0	1	0	1	0	1	0	1
348			min	-1173.362	3	0	1	-214.702	4	0	1	-.032	4	0	1
349		4	max	3511.578	2	0	1	0	1	0	1	0	1	0	1
350			min	-1173.235	3	0	1	-214.85	4	0	1	-.057	4	0	1
351		5	max	3511.749	2	0	1	0	1	0	1	0	1	0	1
352			min	-1173.107	3	0	1	-214.997	4	0	1	-.082	4	0	1
353		6	max	3511.919	2	0	1	0	1	0	1	0	1	0	1
354			min	-1172.979	3	0	1	-215.145	4	0	1	-.106	4	0	1
355		7	max	3512.089	2	0	1	0	1	0	1	0	1	0	1
356			min	-1172.851	3	0	1	-215.292	4	0	1	-.131	4	0	1
357		8	max	3512.26	2	0	1	0	1	0	1	0	1	0	1
358			min	-1172.724	3	0	1	-215.44	4	0	1	-.156	4	0	1
359		9	max	3512.43	2	0	1	0	1	0	1	0	1	0	1
360			min	-1172.596	3	0	1	-215.588	4	0	1	-.181	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	3512.6	2	0	1	0	1	0	1	0	1	0	1
362			min	-1172.468	3	0	1	-215.735	4	0	1	-.205	4	0	1
363		11	max	3512.771	2	0	1	0	1	0	1	0	1	0	1
364			min	-1172.34	3	0	1	-215.883	4	0	1	-.23	4	0	1
365		12	max	3512.941	2	0	1	0	1	0	1	0	1	0	1
366			min	-1172.212	3	0	1	-216.031	4	0	1	-.255	4	0	1
367		13	max	3513.111	2	0	1	0	1	0	1	0	1	0	1
368			min	-1172.085	3	0	1	-216.178	4	0	1	-.28	4	0	1
369		14	max	3513.282	2	0	1	0	1	0	1	0	1	0	1
370			min	-1171.957	3	0	1	-216.326	4	0	1	-.305	4	0	1
371		15	max	3513.452	2	0	1	0	1	0	1	0	1	0	1
372			min	-1171.829	3	0	1	-216.473	4	0	1	-.329	4	0	1
373		16	max	3513.622	2	0	1	0	1	0	1	0	1	0	1
374			min	-1171.701	3	0	1	-216.621	4	0	1	-.354	4	0	1
375		17	max	3513.793	2	0	1	0	1	0	1	0	1	0	1
376			min	-1171.574	3	0	1	-216.769	4	0	1	-.379	4	0	1
377		18	max	3513.963	2	0	1	0	1	0	1	0	1	0	1
378			min	-1171.446	3	0	1	-216.916	4	0	1	-.404	4	0	1
379		19	max	3514.133	2	0	1	0	1	0	1	0	1	0	1
380			min	-1171.318	3	0	1	-217.064	4	0	1	-.429	4	0	1
381	M10	1	max	1137.58	2	1.983	6	-.038	12	0	1	0	2	0	1
382			min	-1563.892	3	.446	15	-46.371	4	0	5	0	3	0	1
383		2	max	1137.96	2	1.949	6	-.038	12	0	1	0	10	0	15
384			min	-1563.608	3	.438	15	-46.701	4	0	5	-.012	4	0	6
385		3	max	1138.339	2	1.916	6	-.038	12	0	1	0	10	0	15
386			min	-1563.323	3	.43	15	-47.03	4	0	5	-.024	4	0	6
387		4	max	1138.718	2	1.883	6	-.038	12	0	1	0	10	0	15
388			min	-1563.039	3	.422	15	-47.36	4	0	5	-.036	4	-.001	6
389		5	max	1139.098	2	1.849	6	-.038	12	0	1	0	10	0	15
390			min	-1562.754	3	.415	15	-47.689	4	0	5	-.048	4	-.002	6
391		6	max	1139.477	2	1.816	6	-.038	12	0	1	0	10	0	15
392			min	-1562.47	3	.407	15	-48.018	4	0	5	-.06	4	-.002	6
393		7	max	1139.856	2	1.782	6	-.038	12	0	1	0	12	0	15
394			min	-1562.185	3	.399	15	-48.348	4	0	5	-.073	4	-.003	6
395		8	max	1140.235	2	1.749	6	-.038	12	0	1	0	12	0	15
396			min	-1561.901	3	.391	15	-48.677	4	0	5	-.085	4	-.003	6
397		9	max	1140.615	2	1.716	6	-.038	12	0	1	0	12	0	15
398			min	-1561.617	3	.383	15	-49.007	4	0	5	-.098	4	-.004	6
399		10	max	1140.994	2	1.682	6	-.038	12	0	1	0	12	0	15
400			min	-1561.332	3	.375	15	-49.336	4	0	5	-.11	4	-.004	6
401		11	max	1141.373	2	1.653	2	-.038	12	0	1	0	12	-.001	15
402			min	-1561.048	3	.367	15	-49.666	4	0	5	-.123	4	-.005	6
403		12	max	1141.752	2	1.627	2	-.038	12	0	1	0	12	-.001	15
404			min	-1560.763	3	.36	15	-49.995	4	0	5	-.136	4	-.005	6
405		13	max	1142.132	2	1.601	2	-.038	12	0	1	0	12	-.001	15
406			min	-1560.479	3	.352	15	-50.325	4	0	5	-.149	4	-.005	6
407		14	max	1142.511	2	1.575	2	-.038	12	0	1	0	12	-.001	15
408			min	-1560.194	3	.341	12	-50.654	4	0	5	-.162	4	-.006	6
409		15	max	1142.89	2	1.549	2	-.038	12	0	1	0	12	-.001	15
410			min	-1559.91	3	.328	12	-50.984	4	0	5	-.175	4	-.006	6
411		16	max	1143.269	2	1.523	2	-.038	12	0	1	0	12	-.001	15
412			min	-1559.625	3	.315	12	-51.313	4	0	5	-.188	4	-.007	6
413		17	max	1143.649	2	1.497	2	-.038	12	0	1	0	12	-.002	15
414			min	-1559.341	3	.302	12	-51.643	4	0	5	-.201	4	-.007	6
415		18	max	1144.028	2	1.471	2	-.038	12	0	1	0	12	-.002	15
416			min	-1559.057	3	.289	12	-51.972	4	0	5	-.214	4	-.007	6
417		19	max	1144.407	2	1.445	2	-.038	12	0	1	0	12	-.002	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
418			min	-1558.772	3	.276	12	-52.301	4	0	5	-.228	4	-.008	6
419	M11	1	max	604.052	2	7.955	6	.969	4	0	1	0	12	.008	6
420			min	-734.244	3	1.858	15	-.064	1	0	4	-.016	4	.002	15
421		2	max	603.882	2	7.185	6	1.51	4	0	1	0	12	.005	2
422			min	-734.372	3	1.677	15	-.064	1	0	4	-.016	4	0	12
423		3	max	603.712	2	6.415	6	2.051	4	0	1	0	12	.003	2
424			min	-734.499	3	1.496	15	-.064	1	0	4	-.015	4	0	3
425		4	max	603.541	2	5.645	6	2.591	4	0	1	0	12	0	2
426			min	-734.627	3	1.315	15	-.064	1	0	4	-.014	4	-.002	3
427		5	max	603.371	2	4.875	6	3.132	4	0	1	0	12	0	15
428			min	-734.755	3	1.134	15	-.064	1	0	4	-.013	4	-.003	3
429		6	max	603.201	2	4.105	6	3.672	4	0	1	0	12	-.001	15
430			min	-734.883	3	.953	15	-.064	1	0	4	-.011	4	-.005	4
431		7	max	603.03	2	3.335	6	4.213	4	0	1	0	12	-.002	15
432			min	-735.011	3	.772	15	-.064	1	0	4	-.01	4	-.006	4
433		8	max	602.86	2	2.565	6	4.753	4	0	1	0	12	-.002	15
434			min	-735.138	3	.591	15	-.064	1	0	4	-.008	4	-.008	4
435		9	max	602.69	2	1.795	6	5.294	4	0	1	0	12	-.002	15
436			min	-735.266	3	.41	15	-.064	1	0	4	-.006	4	-.009	4
437		10	max	602.519	2	1.025	6	5.834	4	0	1	0	12	-.002	15
438			min	-735.394	3	.229	15	-.064	1	0	4	-.003	4	-.009	4
439		11	max	602.349	2	.423	2	6.375	4	0	1	0	12	-.002	15
440			min	-735.522	3	-.108	3	-.064	1	0	4	0	4	-.01	4
441		12	max	602.178	2	-.133	15	6.915	4	0	1	.002	5	-.002	15
442			min	-735.649	3	-.558	3	-.064	1	0	4	0	1	-.009	4
443		13	max	602.008	2	-.314	15	7.456	4	0	1	.005	4	-.002	15
444			min	-735.777	3	-1.286	4	-.064	1	0	4	0	1	-.009	4
445		14	max	601.838	2	-.495	15	7.997	4	0	1	.008	4	-.002	15
446			min	-735.905	3	-2.056	4	-.064	1	0	4	0	1	-.008	4
447		15	max	601.667	2	-.676	15	8.537	4	0	1	.012	4	-.002	15
448			min	-736.033	3	-2.826	4	-.064	1	0	4	0	1	-.007	4
449		16	max	601.497	2	-.857	15	9.078	4	0	1	.015	4	-.001	15
450			min	-736.16	3	-3.596	4	-.064	1	0	4	0	1	-.006	4
451		17	max	601.327	2	-1.038	15	9.618	4	0	1	.019	4	-.001	15
452			min	-736.288	3	-4.366	4	-.064	1	0	4	0	1	-.004	4
453		18	max	601.156	2	-1.219	15	10.159	4	0	1	.024	4	0	15
454			min	-736.416	3	-5.136	4	-.064	1	0	4	0	1	-.002	4
455		19	max	600.986	2	-1.4	15	10.699	4	0	1	.028	4	0	1
456			min	-736.544	3	-5.906	4	-.064	1	0	4	0	1	0	1
457	M12	1	max	1162.171	1	0	1	6.491	1	0	1	.017	4	0	1
458			min	-346.177	3	0	1	-216.404	4	0	1	0	1	0	1
459		2	max	1162.341	1	0	1	6.491	1	0	1	0	1	0	1
460			min	-346.049	3	0	1	-216.552	4	0	1	-.007	4	0	1
461		3	max	1162.512	1	0	1	6.491	1	0	1	.001	1	0	1
462			min	-345.921	3	0	1	-216.699	4	0	1	-.032	4	0	1
463		4	max	1162.682	1	0	1	6.491	1	0	1	.002	1	0	1
464			min	-345.793	3	0	1	-216.847	4	0	1	-.057	4	0	1
465		5	max	1162.852	1	0	1	6.491	1	0	1	.003	1	0	1
466			min	-345.666	3	0	1	-216.994	4	0	1	-.082	4	0	1
467		6	max	1163.023	1	0	1	6.491	1	0	1	.003	1	0	1
468			min	-345.538	3	0	1	-217.142	4	0	1	-.107	4	0	1
469		7	max	1163.193	1	0	1	6.491	1	0	1	.004	1	0	1
470			min	-345.41	3	0	1	-217.29	4	0	1	-.132	4	0	1
471		8	max	1163.364	1	0	1	6.491	1	0	1	.005	1	0	1
472			min	-345.282	3	0	1	-217.437	4	0	1	-.157	4	0	1
473		9	max	1163.534	1	0	1	6.491	1	0	1	.006	1	0	1
474			min	-345.155	3	0	1	-217.585	4	0	1	-.182	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	1163.704	1	0	1	6.491	1	0	1	.006	1	0	1
476			min	-345.027	3	0	1	-217.733	4	0	1	-.207	4	0	1
477		11	max	1163.875	1	0	1	6.491	1	0	1	.007	1	0	1
478			min	-344.899	3	0	1	-217.88	4	0	1	-.232	4	0	1
479		12	max	1164.045	1	0	1	6.491	1	0	1	.008	1	0	1
480			min	-344.771	3	0	1	-218.028	4	0	1	-.257	4	0	1
481		13	max	1164.215	1	0	1	6.491	1	0	1	.009	1	0	1
482			min	-344.643	3	0	1	-218.176	4	0	1	-.282	4	0	1
483		14	max	1164.386	1	0	1	6.491	1	0	1	.009	1	0	1
484			min	-344.516	3	0	1	-218.323	4	0	1	-.307	4	0	1
485		15	max	1164.556	1	0	1	6.491	1	0	1	.01	1	0	1
486			min	-344.388	3	0	1	-218.471	4	0	1	-.332	4	0	1
487		16	max	1164.726	1	0	1	6.491	1	0	1	.011	1	0	1
488			min	-344.26	3	0	1	-218.618	4	0	1	-.357	4	0	1
489		17	max	1164.897	1	0	1	6.491	1	0	1	.012	1	0	1
490			min	-344.132	3	0	1	-218.766	4	0	1	-.382	4	0	1
491		18	max	1165.067	1	0	1	6.491	1	0	1	.012	1	0	1
492			min	-344.005	3	0	1	-218.914	4	0	1	-.407	4	0	1
493		19	max	1165.237	1	0	1	6.491	1	0	1	.013	1	0	1
494			min	-343.877	3	0	1	-219.061	4	0	1	-.433	4	0	1
495	M1	1	max	131.903	1	864.372	3	43.463	5	0	2	.155	1	0	15
496			min	-10.337	5	-487.382	2	-65.01	1	0	3	-.068	5	-.016	2
497		2	max	132.393	1	863.363	3	44.705	5	0	2	.12	1	.241	2
498			min	-10.108	5	-488.728	2	-65.01	1	0	3	-.044	5	-.457	3
499		3	max	443.33	3	599.837	2	.736	5	0	3	.086	1	.486	2
500			min	-261.263	2	-643.769	3	-64.532	1	0	2	-.021	5	-.894	3
501		4	max	443.698	3	598.491	2	1.978	5	0	3	.052	1	.18	1
502			min	-260.773	2	-644.779	3	-64.532	1	0	2	-.02	5	-.554	3
503		5	max	444.065	3	597.145	2	3.219	5	0	3	.018	1	-.004	15
504			min	-260.283	2	-645.788	3	-64.532	1	0	2	-.019	5	-.213	3
505		6	max	444.433	3	595.799	2	4.46	5	0	3	0	12	.128	3
506			min	-259.793	2	-646.798	3	-64.532	1	0	2	-.02	4	-.46	2
507		7	max	444.8	3	594.453	2	5.702	5	0	3	-.003	12	.469	3
508			min	-259.303	2	-647.807	3	-64.532	1	0	2	-.05	1	-.774	2
509		8	max	445.167	3	593.107	2	6.943	5	0	3	-.006	12	.811	3
510			min	-258.813	2	-648.817	3	-64.532	1	0	2	-.084	1	-1.087	2
511		9	max	454.947	3	54.768	2	42.797	5	0	9	.052	1	.946	3
512			min	-205.439	2	.406	15	-98.69	1	0	3	-.102	5	-1.244	2
513		10	max	455.314	3	53.422	2	44.038	5	0	9	0	10	.923	3
514			min	-204.949	2	-.001	5	-98.69	1	0	3	-.079	4	-1.272	2
515		11	max	455.682	3	52.076	2	45.28	5	0	9	-.003	12	.901	3
516			min	-204.459	2	-1.694	4	-98.69	1	0	3	-.067	4	-1.3	2
517		12	max	465.314	3	428.522	3	120.135	5	0	2	.083	1	.787	3
518			min	-151.021	2	-707.62	2	-63.22	1	0	3	-.167	5	-1.153	2
519		13	max	465.682	3	427.512	3	121.376	5	0	2	.05	1	.561	3
520			min	-150.531	2	-708.966	2	-63.22	1	0	3	-.103	5	-.779	2
521		14	max	466.049	3	426.503	3	122.618	5	0	2	.017	1	.336	3
522			min	-150.041	2	-710.312	2	-63.22	1	0	3	-.039	5	-.405	2
523		15	max	466.416	3	425.493	3	123.859	5	0	2	.027	5	.111	3
524			min	-149.551	2	-711.659	2	-63.22	1	0	3	-.017	1	-.051	1
525		16	max	466.784	3	424.483	3	125.1	5	0	2	.092	5	.346	2
526			min	-149.061	2	-713.005	2	-63.22	1	0	3	-.05	1	-.113	3
527		17	max	467.151	3	423.474	3	126.342	5	0	2	.159	5	.723	2
528			min	-148.571	2	-714.351	2	-63.22	1	0	3	-.083	1	-.337	3
529		18	max	19.539	5	711.873	2	-4.139	12	0	5	.148	5	.364	2
530			min	-132.682	1	-341.203	3	-92.499	4	0	2	-.119	1	-.167	3
531		19	max	19.767	5	710.527	2	-4.139	12	0	5	.108	5	.014	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	-132.192	1	-342.212	3	-91.257	4	0	2	-.156	1	-.011	2
533	M5	1	max	290.899	1	2876.527	3	75.059	5	0	1	0	1	.033	2
534			min	8.131	12	-1674.896	2	0	1	0	4	-.143	4	0	15
535		2	max	291.389	1	2875.517	3	76.301	5	0	1	0	1	.917	2
536			min	8.376	12	-1676.242	2	0	1	0	4	-.103	4	-1.516	3
537		3	max	1403.071	3	1740.15	2	34.383	4	0	4	0	1	1.76	2
538			min	-873.69	2	-1991.63	3	0	1	0	1	-.063	4	-2.975	3
539		4	max	1403.439	3	1738.804	2	35.624	4	0	4	0	1	.843	2
540			min	-873.2	2	-1992.64	3	0	1	0	1	-.045	4	-1.923	3
541		5	max	1403.806	3	1737.458	2	36.866	4	0	4	0	1	.021	9
542			min	-872.71	2	-1993.649	3	0	1	0	1	-.026	4	-.872	3
543		6	max	1404.173	3	1736.112	2	38.107	4	0	4	0	1	.181	3
544			min	-872.22	2	-1994.659	3	0	1	0	1	-.006	5	-.991	2
545		7	max	1404.541	3	1734.765	2	39.349	4	0	4	.015	4	1.233	3
546			min	-871.73	2	-1995.668	3	0	1	0	1	0	1	-1.907	2
547		8	max	1404.908	3	1733.419	2	40.59	4	0	4	.036	4	2.287	3
548			min	-871.24	2	-1996.678	3	0	1	0	1	0	1	-2.822	2
549		9	max	1416.693	3	184.529	2	138.396	4	0	1	0	1	2.631	3
550			min	-757.221	2	.405	15	0	1	0	1	-.144	4	-3.217	2
551		10	max	1417.06	3	183.183	2	139.637	4	0	1	0	1	2.547	3
552			min	-756.731	2	-.001	15	0	1	0	1	-.071	5	-3.314	2
553		11	max	1417.427	3	181.837	2	140.879	4	0	1	.003	4	2.463	3
554			min	-756.241	2	-1.601	6	0	1	0	1	0	1	-3.411	2
555		12	max	1429.506	3	1294.632	3	167.775	4	0	1	0	1	2.16	3
556			min	-642.35	2	-2105.825	2	0	1	0	4	-.236	4	-3.054	2
557		13	max	1429.874	3	1293.622	3	169.016	4	0	1	0	1	1.477	3
558			min	-641.86	2	-2107.171	2	0	1	0	4	-.147	4	-1.942	2
559		14	max	1430.241	3	1292.613	3	170.258	4	0	1	0	1	.795	3
560			min	-641.37	2	-2108.517	2	0	1	0	4	-.057	4	-.83	2
561		15	max	1430.609	3	1291.603	3	171.499	4	0	1	.033	4	.283	2
562			min	-640.88	2	-2109.863	2	0	1	0	4	0	1	-.002	13
563		16	max	1430.976	3	1290.594	3	172.741	4	0	1	.124	4	1.396	2
564			min	-640.39	2	-2111.209	2	0	1	0	4	0	1	-.568	3
565		17	max	1431.344	3	1289.584	3	173.982	4	0	1	.215	4	2.511	2
566			min	-639.9	2	-2112.555	2	0	1	0	4	0	1	-1.249	3
567		18	max	-9	12	2409.463	2	0	1	0	4	.231	4	1.293	2
568			min	-290.811	1	-1185.398	3	-26.616	5	0	1	0	1	-.653	3
569		19	max	-8.755	12	2408.117	2	0	1	0	4	.218	4	.022	2
570			min	-290.321	1	-1186.408	3	-25.375	5	0	1	0	1	-.027	3
571	M9	1	max	131.903	1	864.372	3	65.051	4	0	3	-.01	12	0	15
572			min	6.015	12	-487.382	2	4.343	12	0	4	-.155	1	-.016	2
573		2	max	132.393	1	863.363	3	66.293	4	0	3	-.008	12	.241	2
574			min	6.26	12	-488.728	2	4.343	12	0	4	-.12	1	-.457	3
575		3	max	443.33	3	599.837	2	64.532	1	0	2	-.006	12	.486	2
576			min	-261.263	2	-643.769	3	4.303	12	0	3	-.086	1	-.894	3
577		4	max	443.698	3	598.491	2	64.532	1	0	2	-.004	12	.18	1
578			min	-260.773	2	-644.779	3	4.303	12	0	3	-.052	1	-.554	3
579		5	max	444.065	3	597.145	2	64.532	1	0	2	-.001	12	-.004	15
580			min	-260.283	2	-645.788	3	4.303	12	0	3	-.025	4	-.213	3
581		6	max	444.433	3	595.799	2	64.532	1	0	2	.016	1	.128	3
582			min	-259.793	2	-646.798	3	4.303	12	0	3	-.015	5	-.46	2
583		7	max	444.8	3	594.453	2	64.532	1	0	2	.05	1	.469	3
584			min	-259.303	2	-647.807	3	4.303	12	0	3	-.009	5	-.774	2
585		8	max	445.167	3	593.107	2	64.532	1	0	2	.084	1	.811	3
586			min	-258.813	2	-648.817	3	4.303	12	0	3	-.001	5	-1.087	2
587		9	max	454.947	3	54.768	2	98.69	1	0	3	-.003	12	.946	3
588			min	-205.439	2	.412	15	6.222	12	0	9	-.119	4	-1.244	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	455.314	3	53.422	2	98.69	1	0	3	0	1	.923	3
590			min	-204.949	2	.006	15	6.222	12	0	9	-.079	4	-1.272	2
591		11	max	455.682	3	52.076	2	98.69	1	0	3	.053	1	.901	3
592			min	-204.459	2	-1.647	6	6.222	12	0	9	-.049	5	-1.3	2
593		12	max	465.314	3	428.522	3	142.08	4	0	3	-.005	12	.787	3
594			min	-151.021	2	-707.62	2	3.764	12	0	2	-.195	4	-1.153	2
595		13	max	465.682	3	427.512	3	143.321	4	0	3	-.003	12	.561	3
596			min	-150.531	2	-708.966	2	3.764	12	0	2	-.12	4	-.779	2
597		14	max	466.049	3	426.503	3	144.563	4	0	3	-.001	12	.336	3
598			min	-150.041	2	-710.312	2	3.764	12	0	2	-.044	4	-.405	2
599		15	max	466.416	3	425.493	3	145.804	4	0	3	.032	4	.111	3
600			min	-149.551	2	-711.659	2	3.764	12	0	2	0	12	-.051	1
601		16	max	466.784	3	424.483	3	147.046	4	0	3	.11	4	.346	2
602			min	-149.061	2	-713.005	2	3.764	12	0	2	.003	12	-.113	3
603		17	max	467.151	3	423.474	3	148.287	4	0	3	.188	4	.723	2
604			min	-148.571	2	-714.351	2	3.764	12	0	2	.005	12	-.337	3
605		18	max	-5.948	12	711.873	2	69.45	1	0	2	.189	4	.364	2
606			min	-132.682	1	-341.203	3	-69.413	5	0	3	.007	12	-.167	3
607		19	max	-5.703	12	710.527	2	69.45	1	0	2	.16	4	.014	3
608			min	-132.192	1	-342.212	3	-68.172	5	0	3	.009	12	-.011	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	.135	2	.008	3	1.099e-2	2	NC	1	NC	1
2			min	-.442	4	-.032	3	-.004	2	-2.596e-3	3	NC	1	NC	1
3		2	max	0	1	.199	3	.018	1	1.231e-2	2	NC	4	NC	1
4			min	-.442	4	-.002	9	-.01	5	-2.534e-3	3	857.519	3	NC	1
5		3	max	0	1	.386	3	.042	1	1.362e-2	2	NC	5	NC	2
6			min	-.442	4	-.072	1	-.012	5	-2.472e-3	3	473.588	3	4715.094	1
7		4	max	0	1	.5	3	.063	1	1.493e-2	2	NC	5	NC	3
8			min	-.442	4	-.116	1	-.009	5	-2.411e-3	3	372.053	3	3165.862	1
9		5	max	0	1	.528	3	.073	1	1.625e-2	2	NC	5	NC	3
10			min	-.442	4	-.113	1	-.003	5	-2.349e-3	3	353.918	3	2729.19	1
11		6	max	0	1	.47	3	.069	1	1.756e-2	2	NC	5	NC	3
12			min	-.442	4	-.065	1	0	10	-2.287e-3	3	394.584	3	2867.04	1
13		7	max	0	1	.345	3	.053	1	1.887e-2	2	NC	4	NC	2
14			min	-.442	4	-.004	9	-.003	10	-2.225e-3	3	525.551	3	3742.208	1
15		8	max	0	1	.186	3	.029	1	2.019e-2	2	NC	1	NC	2
16			min	-.442	4	.003	15	-.006	10	-2.163e-3	3	910.385	3	6895.663	1
17		9	max	0	1	.242	2	.024	3	2.15e-2	2	NC	4	NC	1
18			min	-.442	4	.004	15	-.012	2	-2.101e-3	3	1862.214	2	NC	1
19		10	max	0	1	.282	2	.024	3	2.281e-2	2	NC	3	NC	1
20			min	-.442	4	-.025	3	-.017	2	-2.039e-3	3	1348.476	2	NC	1
21		11	max	0	12	.242	2	.024	3	2.15e-2	2	NC	4	NC	1
22			min	-.442	4	.004	15	-.012	2	-2.101e-3	3	1862.214	2	NC	1
23		12	max	0	12	.186	3	.029	1	2.019e-2	2	NC	1	NC	2
24			min	-.442	4	.003	15	-.008	5	-2.163e-3	3	910.385	3	6895.663	1
25		13	max	0	12	.345	3	.053	1	1.887e-2	2	NC	4	NC	2
26			min	-.442	4	-.004	9	-.003	10	-2.225e-3	3	525.551	3	3742.208	1
27		14	max	0	12	.47	3	.069	1	1.756e-2	2	NC	5	NC	3
28			min	-.442	4	-.065	1	0	10	-2.287e-3	3	394.584	3	2867.04	1
29		15	max	0	12	.528	3	.073	1	1.625e-2	2	NC	5	NC	3
30			min	-.442	4	-.113	1	.001	10	-2.349e-3	3	353.918	3	2729.19	1
31		16	max	0	12	.5	3	.063	1	1.493e-2	2	NC	5	NC	3
32			min	-.442	4	-.116	1	.001	10	-2.411e-3	3	372.053	3	3165.862	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	.386	3	.042	1	1.362e-2	2	NC	5	NC	2
34			min	-.442	4	-.072	1	0	10	-2.472e-3	3	473.588	3	4715.094	1
35		18	max	0	12	.199	3	.018	1	1.231e-2	2	NC	4	NC	1
36			min	-.442	4	-.002	9	-.002	10	-2.534e-3	3	857.519	3	NC	1
37		19	max	0	12	.135	2	.008	3	1.099e-2	2	NC	1	NC	1
38			min	-.442	4	-.032	3	-.004	2	-2.596e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.284	3	.007	3	6.307e-3	2	NC	1	NC	1
40			min	-.348	4	-.416	2	-.004	2	-5.036e-3	3	NC	1	NC	1
41		2	max	0	1	.538	3	.012	1	7.431e-3	2	NC	5	NC	1
42			min	-.348	4	-.653	2	-.015	5	-6.021e-3	3	780.304	3	NC	1
43		3	max	0	1	.756	3	.033	1	8.555e-3	2	NC	5	NC	2
44			min	-.348	4	-.862	2	-.018	5	-7.006e-3	3	419.277	3	6055.204	1
45		4	max	0	1	.915	3	.053	1	9.679e-3	2	NC	5	NC	2
46			min	-.348	4	-1.024	2	-.013	5	-7.991e-3	3	313.709	3	3779.483	1
47		5	max	0	1	1.002	3	.064	1	1.08e-2	2	NC	15	NC	3
48			min	-.348	4	-1.129	2	-.003	5	-8.976e-3	3	275.727	3	3129.096	1
49		6	max	0	1	1.016	3	.062	1	1.193e-2	2	NC	15	NC	2
50			min	-.348	4	-1.173	2	0	10	-9.961e-3	3	261.558	2	3202.471	1
51		7	max	0	1	.97	3	.049	1	1.305e-2	2	NC	15	NC	2
52			min	-.348	4	-1.167	2	-.003	10	-1.095e-2	3	263.922	2	4100.664	1
53		8	max	0	1	.886	3	.029	4	1.417e-2	2	NC	15	NC	2
54			min	-.348	4	-1.125	2	-.006	10	-1.193e-2	3	279.547	2	6778.444	4
55		9	max	0	1	.799	3	.022	3	1.53e-2	2	NC	5	NC	1
56			min	-.348	4	-1.073	2	-.011	2	-1.292e-2	3	301.477	2	NC	1
57		10	max	0	1	.758	3	.022	3	1.642e-2	2	NC	5	NC	1
58			min	-.348	4	-1.047	2	-.015	2	-1.39e-2	3	314.177	2	NC	1
59		11	max	0	12	.799	3	.022	3	1.53e-2	2	NC	5	NC	1
60			min	-.348	4	-1.073	2	-.015	5	-1.292e-2	3	301.477	2	NC	1
61		12	max	0	12	.886	3	.027	1	1.417e-2	2	NC	15	NC	2
62			min	-.348	4	-1.125	2	-.017	5	-1.193e-2	3	279.547	2	7421.056	1
63		13	max	0	12	.97	3	.049	1	1.305e-2	2	NC	15	NC	2
64			min	-.348	4	-1.167	2	-.011	5	-1.095e-2	3	263.922	2	4100.664	1
65		14	max	0	12	1.016	3	.062	1	1.193e-2	2	NC	15	NC	2
66			min	-.348	4	-1.173	2	0	5	-9.961e-3	3	261.558	2	3202.471	1
67		15	max	0	12	1.002	3	.064	1	1.08e-2	2	NC	15	NC	3
68			min	-.348	4	-1.129	2	0	10	-8.976e-3	3	275.727	3	3129.096	1
69		16	max	0	12	.915	3	.053	1	9.679e-3	2	NC	5	NC	2
70			min	-.348	4	-1.024	2	0	10	-7.991e-3	3	313.709	3	3779.483	1
71		17	max	0	12	.756	3	.033	1	8.555e-3	2	NC	5	NC	2
72			min	-.348	4	-.862	2	0	10	-7.006e-3	3	419.277	3	6055.204	1
73		18	max	0	12	.538	3	.02	4	7.431e-3	2	NC	5	NC	1
74			min	-.348	4	-.653	2	-.002	10	-6.021e-3	3	780.304	3	9854.546	4
75		19	max	0	12	.284	3	.007	3	6.307e-3	2	NC	1	NC	1
76			min	-.348	4	-.416	2	-.004	2	-5.036e-3	3	NC	1	NC	1
77	M15	1	max	0	12	.29	3	.007	3	4.29e-3	3	NC	1	NC	1
78			min	-.293	4	-.416	2	-.004	2	-6.538e-3	2	NC	1	NC	1
79		2	max	0	12	.464	3	.012	1	5.127e-3	3	NC	5	NC	1
80			min	-.293	4	-.711	2	-.021	5	-7.707e-3	2	670.323	2	8806.456	5
81		3	max	0	12	.617	3	.033	1	5.964e-3	3	NC	5	NC	2
82			min	-.293	4	-.968	2	-.026	5	-8.875e-3	2	358.772	2	6031.8	1
83		4	max	0	12	.738	3	.053	1	6.802e-3	3	NC	5	NC	2
84			min	-.293	4	-1.158	2	-.02	5	-1.004e-2	2	266.654	2	3766.363	1
85		5	max	0	12	.817	3	.064	1	7.639e-3	3	NC	15	NC	3
86			min	-.293	4	-1.269	2	-.006	5	-1.121e-2	2	232.023	2	3117.675	1
87		6	max	0	12	.853	3	.062	1	8.476e-3	3	NC	15	NC	2
88			min	-.293	4	-1.299	2	0	10	-1.238e-2	2	224.14	2	3188.342	1
89		7	max	0	12	.852	3	.049	1	9.313e-3	3	NC	15	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	-.293	4	-1.26	2	-.002	10	-1.355e-2	2	234.436	2	4074.654	1
91		8	max	0	12	.826	3	.036	4	1.015e-2	3	NC	5	NC	2
92			min	-.293	4	-1.178	2	-.005	10	-1.472e-2	2	259.852	2	5488.319	4
93		9	max	0	12	.792	3	.025	4	1.099e-2	3	NC	5	NC	1
94			min	-.293	4	-1.089	2	-.01	2	-1.588e-2	2	293.968	2	7780.108	4
95		10	max	0	1	.774	3	.02	3	1.183e-2	3	NC	5	NC	1
96			min	-.293	4	-1.046	2	-.014	2	-1.705e-2	2	314.152	2	NC	1
97		11	max	0	1	.792	3	.02	3	1.099e-2	3	NC	5	NC	1
98			min	-.293	4	-1.089	2	-.021	5	-1.588e-2	2	293.968	2	9625.179	5
99		12	max	0	1	.826	3	.027	1	1.015e-2	3	NC	5	NC	2
100			min	-.293	4	-1.178	2	-.024	5	-1.472e-2	2	259.852	2	7329.388	1
101		13	max	0	1	.852	3	.049	1	9.313e-3	3	NC	15	NC	2
102			min	-.293	4	-1.26	2	-.016	5	-1.355e-2	2	234.436	2	4074.654	1
103		14	max	0	1	.853	3	.062	1	8.476e-3	3	NC	15	NC	2
104			min	-.293	4	-1.299	2	-.002	5	-1.238e-2	2	224.14	2	3188.342	1
105		15	max	0	1	.817	3	.064	1	7.639e-3	3	NC	15	NC	3
106			min	-.293	4	-1.269	2	.001	10	-1.121e-2	2	232.023	2	3117.675	1
107		16	max	0	1	.738	3	.053	1	6.802e-3	3	NC	5	NC	2
108			min	-.292	4	-1.158	2	0	10	-1.004e-2	2	266.654	2	3766.363	1
109		17	max	0	1	.617	3	.039	4	5.964e-3	3	NC	5	NC	2
110			min	-.292	4	-.968	2	0	10	-8.875e-3	2	358.772	2	5081.04	4
111		18	max	0	1	.464	3	.026	4	5.127e-3	3	NC	5	NC	1
112			min	-.292	4	-.711	2	-.002	10	-7.707e-3	2	670.323	2	7412.019	4
113		19	max	0	1	.29	3	.007	3	4.29e-3	3	NC	1	NC	1
114			min	-.292	4	-.416	2	-.004	2	-6.538e-3	2	NC	1	NC	1
115	M16	1	max	0	12	.119	2	.006	3	7.814e-3	3	NC	1	NC	1
116			min	-.126	4	-.098	3	-.003	2	-9.2e-3	2	NC	1	NC	1
117		2	max	0	12	.003	4	.018	1	8.92e-3	3	NC	4	NC	1
118			min	-.126	4	-.053	2	-.016	5	-1.01e-2	2	1151.368	2	NC	1
119		3	max	0	12	.028	3	.042	1	1.003e-2	3	NC	5	NC	2
120			min	-.126	4	-.189	2	-.02	5	-1.101e-2	2	642.613	2	4713.013	1
121		4	max	0	12	.054	3	.063	1	1.113e-2	3	NC	5	NC	3
122			min	-.126	4	-.266	2	-.016	5	-1.191e-2	2	514.914	2	3155.401	1
123		5	max	0	12	.046	3	.073	1	1.224e-2	3	NC	5	NC	3
124			min	-.126	4	-.271	2	-.007	5	-1.281e-2	2	507.318	2	2711.725	1
125		6	max	0	12	.006	12	.07	1	1.334e-2	3	NC	5	NC	3
126			min	-.126	4	-.208	2	.001	10	-1.371e-2	2	604.655	2	2835.76	1
127		7	max	0	12	.003	4	.054	1	1.445e-2	3	NC	4	NC	2
128			min	-.126	4	-.092	2	-.001	10	-1.462e-2	2	937.912	2	3669.086	1
129		8	max	0	12	.071	1	.03	1	1.556e-2	3	NC	4	NC	2
130			min	-.126	4	-.134	3	-.004	10	-1.552e-2	2	2857.788	2	6595.043	1
131		9	max	0	12	.176	2	.018	3	1.666e-2	3	NC	4	NC	1
132			min	-.126	4	-.199	3	-.008	2	-1.642e-2	2	1965.696	3	NC	1
133		10	max	0	1	.233	2	.018	3	1.777e-2	3	NC	4	NC	1
134			min	-.126	4	-.228	3	-.013	2	-1.732e-2	2	1526.007	3	NC	1
135		11	max	0	1	.176	2	.018	3	1.666e-2	3	NC	4	NC	1
136			min	-.126	4	-.199	3	-.012	5	-1.642e-2	2	1965.696	3	NC	1
137		12	max	0	1	.071	1	.03	1	1.556e-2	3	NC	4	NC	2
138			min	-.126	4	-.134	3	-.013	5	-1.552e-2	2	2857.788	2	6595.043	1
139		13	max	0	1	.003	6	.054	1	1.445e-2	3	NC	4	NC	2
140			min	-.126	4	-.092	2	-.006	5	-1.462e-2	2	937.912	2	3669.086	1
141		14	max	0	1	.006	12	.07	1	1.334e-2	3	NC	5	NC	3
142			min	-.126	4	-.208	2	.001	10	-1.371e-2	2	604.655	2	2835.76	1
143		15	max	0	1	.046	3	.073	1	1.224e-2	3	NC	5	NC	3
144			min	-.126	4	-.271	2	.002	10	-1.281e-2	2	507.318	2	2711.725	1
145		16	max	0	1	.054	3	.063	1	1.113e-2	3	NC	5	NC	3
146			min	-.126	4	-.266	2	.002	10	-1.191e-2	2	514.914	2	3155.401	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	.028	3	.042	1	1.003e-2	3	NC	5	NC	2
148			min	-.126	4	-.189	2	0	10	-1.101e-2	2	642.613	2	4713.013	1
149		18	max	0	1	.003	6	.023	4	8.92e-3	3	NC	4	NC	1
150			min	-.126	4	-.053	2	-.001	10	-1.01e-2	2	1151.368	2	8550.216	4
151		19	max	0	1	.119	2	.006	3	7.814e-3	3	NC	1	NC	1
152			min	-.126	4	-.098	3	-.003	2	-9.2e-3	2	NC	1	NC	1
153	M2	1	max	.006	2	.006	2	.005	1	1.215e-3	5	NC	1	NC	1
154			min	-.008	3	-.011	3	-.419	4	-1.288e-4	1	8703.53	2	132.214	4
155		2	max	.006	2	.006	2	.005	1	1.281e-3	5	NC	1	NC	1
156			min	-.008	3	-.01	3	-.384	4	-1.202e-4	1	9900.208	2	143.995	4
157		3	max	.005	2	.005	2	.004	1	1.348e-3	5	NC	1	NC	1
158			min	-.007	3	-.01	3	-.35	4	-1.116e-4	1	NC	1	157.992	4
159		4	max	.005	2	.004	2	.004	1	1.414e-3	5	NC	1	NC	1
160			min	-.007	3	-.009	3	-.317	4	-1.03e-4	1	NC	1	174.782	4
161		5	max	.005	2	.003	2	.003	1	1.481e-3	5	NC	1	NC	1
162			min	-.006	3	-.009	3	-.284	4	-9.445e-5	1	NC	1	195.151	4
163		6	max	.004	2	.003	2	.003	1	1.547e-3	5	NC	1	NC	1
164			min	-.006	3	-.008	3	-.251	4	-8.588e-5	1	NC	1	220.189	4
165		7	max	.004	2	.002	2	.003	1	1.614e-3	5	NC	1	NC	1
166			min	-.006	3	-.008	3	-.22	4	-7.73e-5	1	NC	1	251.443	4
167		8	max	.004	2	.001	2	.002	1	1.68e-3	5	NC	1	NC	1
168			min	-.005	3	-.007	3	-.19	4	-6.872e-5	1	NC	1	291.166	4
169		9	max	.003	2	0	2	.002	1	1.75e-3	4	NC	1	NC	1
170			min	-.005	3	-.007	3	-.161	4	-6.015e-5	1	NC	1	342.756	4
171		10	max	.003	2	0	2	.002	1	1.819e-3	4	NC	1	NC	1
172			min	-.004	3	-.006	3	-.135	4	-5.157e-5	1	NC	1	411.522	4
173		11	max	.003	2	0	2	.001	1	1.888e-3	4	NC	1	NC	1
174			min	-.004	3	-.006	3	-.109	4	-4.299e-5	1	NC	1	506.154	4
175		12	max	.002	2	0	2	0	1	1.958e-3	4	NC	1	NC	1
176			min	-.003	3	-.005	3	-.086	4	-3.442e-5	1	NC	1	641.689	4
177		13	max	.002	2	0	15	0	1	2.027e-3	4	NC	1	NC	1
178			min	-.003	3	-.005	3	-.065	4	-2.584e-5	1	NC	1	846.054	4
179		14	max	.002	2	0	15	0	1	2.097e-3	4	NC	1	NC	1
180			min	-.002	3	-.004	3	-.047	4	-1.726e-5	1	NC	1	1176.106	4
181		15	max	.001	2	0	15	0	1	2.166e-3	4	NC	1	NC	1
182			min	-.002	3	-.003	3	-.031	4	-8.686e-6	1	NC	1	1763.055	4
183		16	max	.001	2	0	15	0	1	2.236e-3	4	NC	1	NC	1
184			min	-.001	3	-.002	3	-.019	4	-8.525e-7	3	NC	1	2970.181	4
185		17	max	0	2	0	15	0	1	2.305e-3	4	NC	1	NC	1
186			min	0	3	-.002	3	-.009	4	5.323e-8	12	NC	1	6147.933	4
187		18	max	0	2	0	15	0	1	2.374e-3	4	NC	1	NC	1
188			min	0	3	0	3	-.003	4	6.409e-7	12	NC	1	NC	1
189		19	max	0	1	0	1	0	1	2.444e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	1.229e-6	12	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	-4.129e-7	12	NC	1	NC	1
192			min	0	1	0	1	0	1	-5.756e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.012	4	7.109e-6	1	NC	1	NC	1
194			min	0	2	-.002	6	0	12	-3.743e-5	5	NC	1	NC	1
195		3	max	0	3	0	15	.023	4	5.052e-4	4	NC	1	NC	1
196			min	0	2	-.003	6	0	12	1.309e-6	12	NC	1	NC	1
197		4	max	.001	3	-.001	15	.033	4	1.046e-3	4	NC	1	NC	1
198			min	0	2	-.005	6	0	12	2.17e-6	12	NC	1	NC	1
199		5	max	.001	3	-.001	15	.043	4	1.586e-3	4	NC	1	NC	1
200			min	-.001	2	-.007	6	0	12	3.031e-6	12	NC	1	NC	1
201		6	max	.002	3	-.002	15	.052	4	2.126e-3	4	NC	1	NC	1
202			min	-.001	2	-.009	6	0	12	3.892e-6	12	NC	1	NC	1
203		7	max	.002	3	-.002	15	.06	4	2.667e-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	4.753e-6	12	9108.398	6	NC	1
205		8	max	.002	3	-.002	15	.069	4	3.207e-3	4	NC	1	NC	1
206			min	-.002	2	-.011	6	0	12	5.615e-6	12	8137.018	6	NC	1
207		9	max	.003	3	-.003	15	.077	4	3.748e-3	4	NC	1	NC	1
208			min	-.002	2	-.012	6	0	12	6.476e-6	12	7558.222	6	NC	1
209		10	max	.003	3	-.003	15	.084	4	4.288e-3	4	NC	2	NC	1
210			min	-.003	2	-.013	6	0	12	7.337e-6	12	7269.836	6	NC	1
211		11	max	.004	3	-.003	15	.092	4	4.828e-3	4	NC	2	NC	1
212			min	-.003	2	-.013	6	0	12	8.198e-6	12	7228.882	6	NC	1
213		12	max	.004	3	-.003	15	.099	4	5.369e-3	4	NC	2	NC	1
214			min	-.003	2	-.012	6	0	12	9.059e-6	12	7435.026	6	NC	1
215		13	max	.004	3	-.002	15	.107	4	5.909e-3	4	NC	1	NC	1
216			min	-.004	2	-.012	6	0	12	9.92e-6	12	7932.5	6	NC	1
217		14	max	.005	3	-.002	15	.114	4	6.45e-3	4	NC	1	NC	1
218			min	-.004	2	-.01	6	0	12	1.078e-5	12	8833.484	6	NC	1
219		15	max	.005	3	-.002	15	.123	4	6.99e-3	4	NC	1	NC	1
220			min	-.004	2	-.009	6	0	12	1.164e-5	12	NC	1	NC	1
221		16	max	.005	3	-.001	15	.131	4	7.53e-3	4	NC	1	NC	1
222			min	-.004	2	-.007	1	0	12	1.25e-5	12	NC	1	NC	1
223		17	max	.006	3	0	15	.141	4	8.071e-3	4	NC	1	NC	1
224			min	-.005	2	-.006	1	0	12	1.336e-5	12	NC	1	NC	1
225		18	max	.006	3	0	15	.151	4	8.611e-3	4	NC	1	NC	1
226			min	-.005	2	-.004	1	0	12	1.423e-5	12	NC	1	NC	1
227		19	max	.006	3	0	5	.163	4	9.152e-3	4	NC	1	NC	1
228			min	-.005	2	-.002	1	0	12	1.509e-5	12	NC	1	NC	1
229	M4	1	max	.003	1	.005	2	0	12	1.879e-5	1	NC	1	NC	2
230			min	0	3	-.006	3	-.163	4	-2.07e-4	5	NC	1	152.462	4
231		2	max	.003	1	.004	2	0	12	1.879e-5	1	NC	1	NC	2
232			min	0	3	-.006	3	-.15	4	-2.07e-4	5	NC	1	165.84	4
233		3	max	.002	1	.004	2	0	12	1.879e-5	1	NC	1	NC	2
234			min	0	3	-.006	3	-.136	4	-2.07e-4	5	NC	1	181.757	4
235		4	max	.002	1	.004	2	0	12	1.879e-5	1	NC	1	NC	2
236			min	0	3	-.005	3	-.123	4	-2.07e-4	5	NC	1	200.874	4
237		5	max	.002	1	.004	2	0	12	1.879e-5	1	NC	1	NC	2
238			min	0	3	-.005	3	-.111	4	-2.07e-4	5	NC	1	224.087	4
239		6	max	.002	1	.003	2	0	12	1.879e-5	1	NC	1	NC	2
240			min	0	3	-.005	3	-.098	4	-2.07e-4	5	NC	1	252.642	4
241		7	max	.002	1	.003	2	0	12	1.879e-5	1	NC	1	NC	2
242			min	0	3	-.004	3	-.086	4	-2.07e-4	5	NC	1	288.304	4
243		8	max	.002	1	.003	2	0	12	1.879e-5	1	NC	1	NC	1
244			min	0	3	-.004	3	-.074	4	-2.07e-4	5	NC	1	333.648	4
245		9	max	.002	1	.003	2	0	12	1.879e-5	1	NC	1	NC	1
246			min	0	3	-.004	3	-.063	4	-2.07e-4	5	NC	1	392.553	4
247		10	max	.001	1	.002	2	0	12	1.879e-5	1	NC	1	NC	1
248			min	0	3	-.003	3	-.053	4	-2.07e-4	5	NC	1	471.08	4
249		11	max	.001	1	.002	2	0	12	1.879e-5	1	NC	1	NC	1
250			min	0	3	-.003	3	-.043	4	-2.07e-4	5	NC	1	579.144	4
251		12	max	.001	1	.002	2	0	12	1.879e-5	1	NC	1	NC	1
252			min	0	3	-.003	3	-.034	4	-2.07e-4	5	NC	1	733.899	4
253		13	max	0	1	.002	2	0	12	1.879e-5	1	NC	1	NC	1
254			min	0	3	-.002	3	-.026	4	-2.07e-4	5	NC	1	967.183	4
255		14	max	0	1	.001	2	0	12	1.879e-5	1	NC	1	NC	1
256			min	0	3	-.002	3	-.018	4	-2.07e-4	5	NC	1	1343.765	4
257		15	max	0	1	.001	2	0	12	1.879e-5	1	NC	1	NC	1
258			min	0	3	-.001	3	-.012	4	-2.07e-4	5	NC	1	2012.95	4
259		16	max	0	1	0	2	0	12	1.879e-5	1	NC	1	NC	1
260			min	0	3	-.001	3	-.007	4	-2.07e-4	5	NC	1	3387.465	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	1.879e-5	1	NC	1	NC	1
262			min	0	3	0	3	-.004	4	-2.07e-4	5	NC	1	6997.555	4
263		18	max	0	1	0	2	0	12	1.879e-5	1	NC	1	NC	1
264			min	0	3	0	3	-.001	4	-2.07e-4	5	NC	1	NC	1
265		19	max	0	1	0	1	0	1	1.879e-5	1	NC	1	NC	1
266			min	0	1	0	1	0	1	-2.07e-4	5	NC	1	NC	1
267	M6	1	max	.019	2	.023	2	0	1	1.266e-3	4	NC	4	NC	1
268			min	-.027	3	-.033	3	-.422	4	0	1	1672.927	3	131.11	4
269		2	max	.018	2	.021	2	0	1	1.331e-3	4	NC	4	NC	1
270			min	-.025	3	-.031	3	-.388	4	0	1	1775.541	3	142.795	4
271		3	max	.017	2	.019	2	0	1	1.396e-3	4	NC	4	NC	1
272			min	-.024	3	-.029	3	-.353	4	0	1	1891.497	3	156.676	4
273		4	max	.016	2	.017	2	0	1	1.461e-3	4	NC	4	NC	1
274			min	-.022	3	-.027	3	-.319	4	0	1	2023.497	3	173.329	4
275		5	max	.015	2	.015	2	0	1	1.526e-3	4	NC	4	NC	1
276			min	-.021	3	-.025	3	-.286	4	0	1	2175.014	3	193.532	4
277		6	max	.014	2	.014	2	0	1	1.591e-3	4	NC	4	NC	1
278			min	-.019	3	-.024	3	-.253	4	0	1	2350.592	3	218.367	4
279		7	max	.013	2	.012	2	0	1	1.656e-3	4	NC	1	NC	1
280			min	-.018	3	-.022	3	-.222	4	0	1	2556.295	3	249.367	4
281		8	max	.012	2	.01	2	0	1	1.722e-3	4	NC	1	NC	1
282			min	-.016	3	-.02	3	-.192	4	0	1	2800.39	3	288.77	4
283		9	max	.011	2	.009	2	0	1	1.787e-3	4	NC	1	NC	1
284			min	-.015	3	-.018	3	-.163	4	0	1	3094.458	3	339.945	4
285		10	max	.01	2	.007	2	0	1	1.852e-3	4	NC	1	NC	1
286			min	-.013	3	-.016	3	-.136	4	0	1	3455.232	3	408.162	4
287		11	max	.008	2	.006	2	0	1	1.917e-3	4	NC	1	NC	1
288			min	-.012	3	-.014	3	-.11	4	0	1	3907.815	3	502.043	4
289		12	max	.007	2	.005	2	0	1	1.982e-3	4	NC	1	NC	1
290			min	-.01	3	-.012	3	-.087	4	0	1	4491.662	3	636.512	4
291		13	max	.006	2	.004	2	0	1	2.047e-3	4	NC	1	NC	1
292			min	-.009	3	-.01	3	-.066	4	0	1	5272.544	3	839.285	4
293		14	max	.005	2	.003	2	0	1	2.112e-3	4	NC	1	NC	1
294			min	-.007	3	-.009	3	-.047	4	0	1	6368.857	3	1166.805	4
295		15	max	.004	2	.002	2	0	1	2.177e-3	4	NC	1	NC	1
296			min	-.006	3	-.007	3	-.032	4	0	1	8017.413	3	1749.34	4
297		16	max	.003	2	.001	2	0	1	2.242e-3	4	NC	1	NC	1
298			min	-.004	3	-.005	3	-.019	4	0	1	NC	1	2947.671	4
299		17	max	.002	2	0	2	0	1	2.307e-3	4	NC	1	NC	1
300			min	-.003	3	-.003	3	-.009	4	0	1	NC	1	6103.545	4
301		18	max	.001	2	0	2	0	1	2.372e-3	4	NC	1	NC	1
302			min	-.001	3	-.002	3	-.003	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	2.437e-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	-5.73e-4	4	NC	1	NC	1
307		2	max	.001	3	0	2	.012	4	0	1	NC	1	NC	1
308			min	-.001	2	-.003	3	0	1	-4.453e-5	5	NC	1	NC	1
309		3	max	.002	3	0	2	.023	4	4.849e-4	4	NC	1	NC	1
310			min	-.002	2	-.005	3	0	1	0	1	NC	1	NC	1
311		4	max	.003	3	-.001	15	.033	4	1.014e-3	4	NC	1	NC	1
312			min	-.003	2	-.008	3	0	1	0	1	NC	1	NC	1
313		5	max	.004	3	-.002	15	.043	4	1.543e-3	4	NC	1	NC	1
314			min	-.004	2	-.01	3	0	1	0	1	NC	1	NC	1
315		6	max	.006	3	-.002	15	.052	4	2.072e-3	4	NC	1	NC	1
316			min	-.005	2	-.011	3	0	1	0	1	8583.185	3	NC	1
317		7	max	.007	3	-.002	15	.06	4	2.601e-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	-.006	2	-.013	3	0	1	0	1	7668.377	3	NC	1
319		8	max	.008	3	-.003	15	.068	4	3.13e-3	4	NC	1	NC	1
320			min	-.007	2	-.014	3	0	1	0	1	7127.379	3	NC	1
321		9	max	.009	3	-.003	15	.076	4	3.659e-3	4	NC	1	NC	1
322			min	-.008	2	-.014	3	0	1	0	1	6848.438	3	NC	1
323		10	max	.01	3	-.003	15	.083	4	4.188e-3	4	NC	1	NC	1
324			min	-.009	2	-.015	3	0	1	0	1	6781.474	3	NC	1
325		11	max	.011	3	-.003	15	.091	4	4.717e-3	4	NC	1	NC	1
326			min	-.01	2	-.015	3	0	1	0	1	6913.98	3	NC	1
327		12	max	.012	3	-.003	15	.098	4	5.246e-3	4	NC	1	NC	1
328			min	-.011	2	-.014	3	0	1	0	1	7265.361	3	NC	1
329		13	max	.013	3	-.003	15	.105	4	5.775e-3	4	NC	1	NC	1
330			min	-.012	2	-.013	3	0	1	0	1	7894.635	3	NC	1
331		14	max	.014	3	-.003	15	.113	4	6.304e-3	4	NC	1	NC	1
332			min	-.013	2	-.012	3	0	1	0	1	8841.196	4	NC	1
333		15	max	.015	3	-.002	15	.121	4	6.833e-3	4	NC	1	NC	1
334			min	-.014	2	-.011	3	0	1	0	1	NC	1	NC	1
335		16	max	.017	3	-.002	15	.129	4	7.362e-3	4	NC	1	NC	1
336			min	-.015	2	-.009	3	0	1	0	1	NC	1	NC	1
337		17	max	.018	3	-.001	15	.138	4	7.891e-3	4	NC	1	NC	1
338			min	-.017	2	-.008	1	0	1	0	1	NC	1	NC	1
339		18	max	.019	3	0	15	.148	4	8.42e-3	4	NC	1	NC	1
340			min	-.018	2	-.007	1	0	1	0	1	NC	1	NC	1
341		19	max	.02	3	0	15	.159	4	8.949e-3	4	NC	1	NC	1
342			min	-.019	2	-.005	1	0	1	0	1	NC	1	NC	1
343	M8	1	max	.008	2	.017	2	0	1	0	1	NC	1	NC	1
344			min	-.003	3	-.02	3	-.159	4	-2.488e-4	4	NC	1	156.212	4
345		2	max	.008	2	.016	2	0	1	0	1	NC	1	NC	1
346			min	-.003	3	-.019	3	-.146	4	-2.488e-4	4	NC	1	169.922	4
347		3	max	.007	2	.015	2	0	1	0	1	NC	1	NC	1
348			min	-.002	3	-.018	3	-.133	4	-2.488e-4	4	NC	1	186.236	4
349		4	max	.007	2	.014	2	0	1	0	1	NC	1	NC	1
350			min	-.002	3	-.017	3	-.121	4	-2.488e-4	4	NC	1	205.828	4
351		5	max	.007	2	.013	2	0	1	0	1	NC	1	NC	1
352			min	-.002	3	-.015	3	-.108	4	-2.488e-4	4	NC	1	229.619	4
353		6	max	.006	2	.012	2	0	1	0	1	NC	1	NC	1
354			min	-.002	3	-.014	3	-.096	4	-2.488e-4	4	NC	1	258.883	4
355		7	max	.006	2	.011	2	0	1	0	1	NC	1	NC	1
356			min	-.002	3	-.013	3	-.084	4	-2.488e-4	4	NC	1	295.43	4
357		8	max	.005	2	.01	2	0	1	0	1	NC	1	NC	1
358			min	-.002	3	-.012	3	-.073	4	-2.488e-4	4	NC	1	341.901	4
359		9	max	.005	2	.009	2	0	1	0	1	NC	1	NC	1
360			min	-.002	3	-.011	3	-.062	4	-2.488e-4	4	NC	1	402.269	4
361		10	max	.004	2	.008	2	0	1	0	1	NC	1	NC	1
362			min	-.001	3	-.01	3	-.051	4	-2.488e-4	4	NC	1	482.747	4
363		11	max	.004	2	.008	2	0	1	0	1	NC	1	NC	1
364			min	-.001	3	-.009	3	-.042	4	-2.488e-4	4	NC	1	593.496	4
365		12	max	.003	2	.007	2	0	1	0	1	NC	1	NC	1
366			min	-.001	3	-.008	3	-.033	4	-2.488e-4	4	NC	1	752.096	4
367		13	max	.003	2	.006	2	0	1	0	1	NC	1	NC	1
368			min	0	3	-.007	3	-.025	4	-2.488e-4	4	NC	1	991.177	4
369		14	max	.002	2	.005	2	0	1	0	1	NC	1	NC	1
370			min	0	3	-.006	3	-.018	4	-2.488e-4	4	NC	1	1377.118	4
371		15	max	.002	2	.004	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.004	3	-.012	4	-2.488e-4	4	NC	1	2062.939	4
373		16	max	.001	2	.003	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.003	3	-.007	4	-2.488e-4	4	NC	1	3471.634	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	0	1	NC	1	NC	1
376			min	0	3	-.002	3	-.003	4	-2.488e-4	4	NC	1	7171.541	4
377		18	max	0	2	0	2	0	1	0	1	NC	1	NC	1
378			min	0	3	-.001	3	-.001	4	-2.488e-4	4	NC	1	NC	1
379		19	max	0	1	0	1	0	1	0	1	NC	1	NC	1
380			min	0	1	0	1	0	1	-2.488e-4	4	NC	1	NC	1
381	M10	1	max	.006	2	.006	2	0	12	1.264e-3	4	NC	1	NC	1
382			min	-.008	3	-.011	3	-.421	4	9.349e-6	12	8703.53	2	131.362	4
383		2	max	.006	2	.006	2	0	12	1.328e-3	4	NC	1	NC	1
384			min	-.008	3	-.01	3	-.387	4	8.762e-6	12	9900.208	2	143.069	4
385		3	max	.005	2	.005	2	0	12	1.393e-3	4	NC	1	NC	1
386			min	-.007	3	-.01	3	-.353	4	8.174e-6	12	NC	1	156.977	4
387		4	max	.005	2	.004	2	0	12	1.458e-3	4	NC	1	NC	1
388			min	-.007	3	-.009	3	-.319	4	7.586e-6	12	NC	1	173.662	4
389		5	max	.005	2	.003	2	0	12	1.523e-3	4	NC	1	NC	1
390			min	-.006	3	-.009	3	-.285	4	6.999e-6	12	NC	1	193.904	4
391		6	max	.004	2	.003	2	0	12	1.588e-3	4	NC	1	NC	1
392			min	-.006	3	-.008	3	-.253	4	6.411e-6	12	NC	1	218.786	4
393		7	max	.004	2	.002	2	0	12	1.652e-3	4	NC	1	NC	1
394			min	-.006	3	-.008	3	-.222	4	5.823e-6	12	NC	1	249.846	4
395		8	max	.004	2	.001	2	0	12	1.717e-3	4	NC	1	NC	1
396			min	-.005	3	-.007	3	-.191	4	5.212e-6	10	NC	1	289.325	4
397		9	max	.003	2	0	2	0	12	1.782e-3	4	NC	1	NC	1
398			min	-.005	3	-.007	3	-.163	4	4.532e-6	10	NC	1	340.599	4
399		10	max	.003	2	0	2	0	12	1.847e-3	4	NC	1	NC	1
400			min	-.004	3	-.006	3	-.135	4	3.851e-6	10	NC	1	408.947	4
401		11	max	.003	2	0	2	0	12	1.912e-3	4	NC	1	NC	1
402			min	-.004	3	-.006	3	-.11	4	3.17e-6	10	NC	1	503.01	4
403		12	max	.002	2	0	2	0	12	1.976e-3	4	NC	1	NC	1
404			min	-.003	3	-.005	3	-.087	4	2.489e-6	10	NC	1	637.738	4
405		13	max	.002	2	0	2	0	12	2.041e-3	4	NC	1	NC	1
406			min	-.003	3	-.005	3	-.066	4	1.808e-6	10	NC	1	840.906	4
407		14	max	.002	2	0	2	0	12	2.106e-3	4	NC	1	NC	1
408			min	-.002	3	-.004	3	-.047	4	1.128e-6	10	NC	1	1169.065	4
409		15	max	.001	2	0	15	0	12	2.171e-3	4	NC	1	NC	1
410			min	-.002	3	-.003	3	-.032	4	4.467e-7	10	NC	1	1752.745	4
411		16	max	.001	2	0	15	0	12	2.236e-3	4	NC	1	NC	1
412			min	-.001	3	-.002	3	-.019	4	-3.127e-7	2	NC	1	2953.458	4
413		17	max	0	2	0	15	0	12	2.3e-3	4	NC	1	NC	1
414			min	0	3	-.002	3	-.009	4	-8.467e-6	1	NC	1	6115.721	4
415		18	max	0	2	0	15	0	12	2.365e-3	4	NC	1	NC	1
416			min	0	3	0	4	-.003	4	-1.704e-5	1	NC	1	NC	1
417		19	max	0	1	0	1	0	1	2.43e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-2.562e-5	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	8.171e-6	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-5.712e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.012	4	-4.481e-7	12	NC	1	NC	1
422			min	0	2	-.002	4	0	1	-3.904e-5	4	NC	1	NC	1
423		3	max	0	3	0	15	.023	4	4.931e-4	4	NC	1	NC	1
424			min	0	2	-.004	4	0	1	-2.239e-5	1	NC	1	NC	1
425		4	max	.001	3	-.001	15	.033	4	1.025e-3	4	NC	1	NC	1
426			min	0	2	-.005	4	0	1	-3.767e-5	1	NC	1	NC	1
427		5	max	.001	3	-.002	15	.042	4	1.558e-3	4	NC	1	NC	1
428			min	-.001	2	-.007	4	0	1	-5.295e-5	1	NC	1	NC	1
429		6	max	.002	3	-.002	15	.051	4	2.09e-3	4	NC	1	NC	1
430			min	-.001	2	-.009	4	0	1	-6.823e-5	1	NC	1	NC	1
431		7	max	.002	3	-.003	15	.06	4	2.622e-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	-8.351e-5	1	8763.383	4	NC	1
433		8	max	.002	3	-.003	15	.068	4	3.154e-3	4	NC	1	NC	1
434			min	-.002	2	-.012	4	-.001	1	-9.879e-5	1	7851.536	4	NC	1
435		9	max	.003	3	-.003	15	.076	4	3.686e-3	4	NC	1	NC	1
436			min	-.002	2	-.013	4	-.001	1	-1.141e-4	1	7310.544	4	NC	1
437		10	max	.003	3	-.003	15	.083	4	4.218e-3	4	NC	2	NC	1
438			min	-.003	2	-.013	4	-.002	1	-1.293e-4	1	7045.671	4	NC	1
439		11	max	.004	3	-.003	15	.091	4	4.751e-3	4	NC	2	NC	1
440			min	-.003	2	-.014	4	-.002	1	-1.446e-4	1	7017.727	4	NC	1
441		12	max	.004	3	-.003	15	.098	4	5.283e-3	4	NC	2	NC	1
442			min	-.003	2	-.013	4	-.002	1	-1.599e-4	1	7228.01	4	NC	1
443		13	max	.004	3	-.003	15	.105	4	5.815e-3	4	NC	1	NC	1
444			min	-.004	2	-.012	4	-.002	1	-1.752e-4	1	7720.721	4	NC	1
445		14	max	.005	3	-.003	15	.113	4	6.347e-3	4	NC	1	NC	1
446			min	-.004	2	-.011	4	-.003	1	-1.905e-4	1	8606.054	4	NC	1
447		15	max	.005	3	-.002	15	.121	4	6.879e-3	4	NC	1	NC	1
448			min	-.004	2	-.01	4	-.003	1	-2.057e-4	1	NC	1	NC	1
449		16	max	.005	3	-.002	15	.13	4	7.412e-3	4	NC	1	NC	1
450			min	-.004	2	-.008	4	-.004	1	-2.21e-4	1	NC	1	NC	1
451		17	max	.006	3	-.002	15	.139	4	7.944e-3	4	NC	1	NC	1
452			min	-.005	2	-.006	4	-.004	1	-2.363e-4	1	NC	1	NC	1
453		18	max	.006	3	0	15	.149	4	8.476e-3	4	NC	1	NC	1
454			min	-.005	2	-.004	1	-.004	1	-2.516e-4	1	NC	1	NC	1
455		19	max	.006	3	0	15	.16	4	9.008e-3	4	NC	1	NC	1
456			min	-.005	2	-.002	1	-.005	1	-2.669e-4	1	NC	1	NC	1
457	M12	1	max	.003	1	.005	2	.005	1	-1.445e-6	12	NC	1	NC	2
458			min	0	3	-.006	3	-.16	4	-2.125e-4	4	NC	1	154.94	4
459		2	max	.003	1	.004	2	.004	1	-1.445e-6	12	NC	1	NC	2
460			min	0	3	-.006	3	-.147	4	-2.125e-4	4	NC	1	168.534	4
461		3	max	.002	1	.004	2	.004	1	-1.445e-6	12	NC	1	NC	2
462			min	0	3	-.006	3	-.134	4	-2.125e-4	4	NC	1	184.708	4
463		4	max	.002	1	.004	2	.004	1	-1.445e-6	12	NC	1	NC	2
464			min	0	3	-.005	3	-.122	4	-2.125e-4	4	NC	1	204.135	4
465		5	max	.002	1	.004	2	.003	1	-1.445e-6	12	NC	1	NC	2
466			min	0	3	-.005	3	-.109	4	-2.125e-4	4	NC	1	227.724	4
467		6	max	.002	1	.003	2	.003	1	-1.445e-6	12	NC	1	NC	2
468			min	0	3	-.005	3	-.097	4	-2.125e-4	4	NC	1	256.74	4
469		7	max	.002	1	.003	2	.003	1	-1.445e-6	12	NC	1	NC	2
470			min	0	3	-.004	3	-.085	4	-2.125e-4	4	NC	1	292.979	4
471		8	max	.002	1	.003	2	.002	1	-1.445e-6	12	NC	1	NC	1
472			min	0	3	-.004	3	-.073	4	-2.125e-4	4	NC	1	339.057	4
473		9	max	.002	1	.003	2	.002	1	-1.445e-6	12	NC	1	NC	1
474			min	0	3	-.004	3	-.062	4	-2.125e-4	4	NC	1	398.915	4
475		10	max	.001	1	.002	2	.002	1	-1.445e-6	12	NC	1	NC	1
476			min	0	3	-.003	3	-.052	4	-2.125e-4	4	NC	1	478.711	4
477		11	max	.001	1	.002	2	.001	1	-1.445e-6	12	NC	1	NC	1
478			min	0	3	-.003	3	-.042	4	-2.125e-4	4	NC	1	588.523	4
479		12	max	.001	1	.002	2	.001	1	-1.445e-6	12	NC	1	NC	1
480			min	0	3	-.003	3	-.033	4	-2.125e-4	4	NC	1	745.781	4
481		13	max	0	1	.002	2	0	1	-1.445e-6	12	NC	1	NC	1
482			min	0	3	-.002	3	-.025	4	-2.125e-4	4	NC	1	982.837	4
483		14	max	0	1	.001	2	0	1	-1.445e-6	12	NC	1	NC	1
484			min	0	3	-.002	3	-.018	4	-2.125e-4	4	NC	1	1365.508	4
485		15	max	0	1	.001	2	0	1	-1.445e-6	12	NC	1	NC	1
486			min	0	3	-.001	3	-.012	4	-2.125e-4	4	NC	1	2045.51	4
487		16	max	0	1	0	2	0	1	-1.445e-6	12	NC	1	NC	1
488			min	0	3	-.001	3	-.007	4	-2.125e-4	4	NC	1	3442.239	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	-1.445e-6	12	NC	1	NC	1
490			min	0	3	0	3	-.003	4	-2.125e-4	4	NC	1	7110.662	4
491		18	max	0	1	0	2	0	1	-1.445e-6	12	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-2.125e-4	4	NC	1	NC	1
493		19	max	0	1	0	1	0	1	-1.445e-6	12	NC	1	NC	1
494			min	0	1	0	1	0	1	-2.125e-4	4	NC	1	NC	1
495	M1	1	max	.008	3	.135	2	.442	4	1.027e-2	2	NC	1	NC	1
496			min	-.004	2	-.032	3	0	12	-2.179e-2	3	NC	1	NC	1
497		2	max	.008	3	.065	2	.431	4	6.392e-3	4	NC	4	NC	1
498			min	-.004	2	-.015	3	-.004	1	-1.078e-2	3	1652.422	2	NC	1
499		3	max	.008	3	.012	3	.418	4	1.1e-2	4	NC	5	NC	1
500			min	-.004	2	-.009	2	-.005	1	-1.18e-4	3	798.176	2	9290.949	5
501		4	max	.008	3	.055	3	.406	4	9.538e-3	4	NC	5	NC	1
502			min	-.004	2	-.093	2	-.005	1	-4.486e-3	3	505.484	2	6539.255	5
503		5	max	.008	3	.109	3	.394	4	8.181e-3	2	NC	5	NC	1
504			min	-.004	2	-.18	2	-.003	1	-8.854e-3	3	365.817	2	5144.41	5
505		6	max	.007	3	.167	3	.381	4	1.226e-2	2	NC	15	NC	1
506			min	-.004	2	-.264	2	-.001	1	-1.322e-2	3	288.727	2	4305.067	5
507		7	max	.007	3	.223	3	.367	4	1.633e-2	2	NC	15	NC	1
508			min	-.004	2	-.339	2	0	3	-1.759e-2	3	243.147	2	3734.217	4
509		8	max	.007	3	.269	3	.354	4	2.04e-2	2	9866.151	15	NC	1
510			min	-.004	2	-.398	2	0	12	-2.196e-2	3	216.152	2	3324.473	4
511		9	max	.007	3	.3	3	.339	4	2.307e-2	2	9230.797	15	NC	1
512			min	-.004	2	-.436	2	0	1	-2.228e-2	3	202.087	2	3066.279	4
513		10	max	.007	3	.311	3	.322	4	2.479e-2	2	9036.914	15	NC	1
514			min	-.004	2	-.449	2	0	12	-1.991e-2	3	197.963	2	2983.66	4
515		11	max	.007	3	.303	3	.304	4	2.651e-2	2	9230.462	15	NC	1
516			min	-.004	2	-.436	2	0	12	-1.755e-2	3	202.775	2	3037.37	4
517		12	max	.007	3	.278	3	.284	4	2.553e-2	2	9865.379	15	NC	1
518			min	-.004	2	-.397	2	0	1	-1.494e-2	3	218.224	2	3237.609	4
519		13	max	.006	3	.236	3	.261	4	2.047e-2	2	NC	15	NC	1
520			min	-.004	2	-.335	2	0	1	-1.196e-2	3	248.146	2	3788.326	4
521		14	max	.006	3	.184	3	.237	4	1.54e-2	2	NC	15	NC	1
522			min	-.004	2	-.257	2	0	12	-8.979e-3	3	299.333	2	4962.322	4
523		15	max	.006	3	.125	3	.211	4	1.034e-2	2	NC	5	NC	1
524			min	-.004	2	-.172	2	0	12	-6.001e-3	3	387.487	2	7550.058	4
525		16	max	.006	3	.063	3	.186	4	7.739e-3	4	NC	5	NC	1
526			min	-.004	2	-.085	2	0	12	-3.022e-3	3	550.809	2	NC	1
527		17	max	.006	3	.004	3	.163	4	8.792e-3	4	NC	5	NC	1
528			min	-.003	2	-.006	2	0	12	-4.393e-5	3	900.055	2	NC	1
529		18	max	.006	3	.06	2	.143	4	8.105e-3	2	NC	4	NC	1
530			min	-.003	2	-.049	3	0	12	-3.37e-3	3	1910.346	2	NC	1
531		19	max	.006	3	.119	2	.126	4	1.629e-2	2	NC	1	NC	1
532			min	-.003	2	-.098	3	0	1	-6.843e-3	3	NC	1	NC	1
533	M5	1	max	.024	3	.282	2	.442	4	0	1	NC	1	NC	1
534			min	-.017	2	-.025	3	0	1	-4.328e-6	4	NC	1	NC	1
535		2	max	.024	3	.136	2	.433	4	5.634e-3	4	NC	5	NC	1
536			min	-.017	2	-.009	3	0	1	0	1	794.34	2	NC	1
537		3	max	.024	3	.037	3	.422	4	1.11e-2	4	NC	5	NC	1
538			min	-.017	2	-.029	2	0	1	0	1	373.248	2	7712.521	4
539		4	max	.024	3	.138	3	.409	4	9.041e-3	4	NC	15	NC	1
540			min	-.016	2	-.226	2	0	1	0	1	228.073	2	5795.887	4
541		5	max	.023	3	.278	3	.396	4	6.985e-3	4	8356.816	15	NC	1
542			min	-.016	2	-.44	2	0	1	0	1	160.315	2	4831.18	4
543		6	max	.023	3	.435	3	.381	4	4.929e-3	4	6423.905	15	NC	1
544			min	-.016	2	-.652	2	0	1	0	1	123.797	2	4226.011	4
545		7	max	.022	3	.589	3	.367	4	2.874e-3	4	5309.658	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	-.015	2	-.845	2	0	1	0	1	102.626	2	3771.017	4
547		8	max	.022	3	.718	3	.353	4	8.178e-4	4	4662.652	15	NC	1
548			min	-.015	2	-1	2	0	1	0	1	90.282	2	3372.778	4
549		9	max	.022	3	.801	3	.339	4	0	1	4331.181	15	NC	1
550			min	-.015	2	-1.098	2	0	1	-2.793e-6	5	83.941	2	3062.792	4
551		10	max	.021	3	.831	3	.322	4	0	1	4231.363	15	NC	1
552			min	-.015	2	-1.131	2	0	1	-2.677e-6	5	82.087	2	3006.208	4
553		11	max	.021	3	.81	3	.304	4	0	1	4331.337	15	NC	1
554			min	-.014	2	-1.098	2	0	1	-2.56e-6	5	84.243	2	3072.463	4
555		12	max	.02	3	.74	3	.285	4	6.303e-4	4	4663.011	15	NC	1
556			min	-.014	2	-.997	2	0	1	0	1	91.278	2	3184.217	4
557		13	max	.02	3	.626	3	.262	4	2.215e-3	4	5310.369	15	NC	1
558			min	-.014	2	-.834	2	0	1	0	1	105.223	2	3716.708	4
559		14	max	.019	3	.483	3	.236	4	3.8e-3	4	6425.263	15	NC	1
560			min	-.014	2	-.633	2	0	1	0	1	129.682	2	5091.926	4
561		15	max	.019	3	.324	3	.209	4	5.384e-3	4	8359.456	15	NC	1
562			min	-.013	2	-.414	2	0	1	0	1	173.211	2	8856.18	4
563		16	max	.018	3	.163	3	.183	4	6.969e-3	4	NC	15	NC	1
564			min	-.013	2	-.202	2	0	1	0	1	257.407	2	NC	1
565		17	max	.018	3	.013	3	.159	4	8.554e-3	4	NC	5	NC	1
566			min	-.013	2	-.017	2	0	1	0	1	446.152	2	NC	1
567		18	max	.018	3	.121	2	.14	4	4.343e-3	4	NC	5	NC	1
568			min	-.013	2	-.114	3	0	1	0	1	993.17	2	NC	1
569		19	max	.018	3	.233	2	.126	4	0	1	NC	1	NC	1
570			min	-.013	2	-.228	3	0	1	-2.149e-6	4	NC	1	NC	1
571	M9	1	max	.008	3	.135	2	.442	4	2.179e-2	3	NC	1	NC	1
572			min	-.004	2	-.032	3	0	1	-1.027e-2	2	NC	1	NC	1
573		2	max	.008	3	.065	2	.432	4	1.078e-2	3	NC	4	NC	1
574			min	-.004	2	-.015	3	0	12	-5.046e-3	2	1652.422	2	NC	1
575		3	max	.008	3	.012	3	.421	4	1.106e-2	4	NC	5	NC	1
576			min	-.004	2	-.009	2	0	12	-3.792e-5	10	798.176	2	8062.81	4
577		4	max	.008	3	.055	3	.409	4	8.747e-3	5	NC	5	NC	1
578			min	-.004	2	-.093	2	0	12	-4.107e-3	2	505.484	2	5943.578	4
579		5	max	.008	3	.109	3	.395	4	8.854e-3	3	NC	5	NC	1
580			min	-.004	2	-.18	2	0	12	-8.181e-3	2	365.817	2	4870.041	4
581		6	max	.007	3	.167	3	.381	4	1.322e-2	3	NC	15	NC	1
582			min	-.004	2	-.264	2	0	10	-1.226e-2	2	288.727	2	4206.647	4
583		7	max	.007	3	.223	3	.367	4	1.759e-2	3	NC	15	NC	1
584			min	-.004	2	-.339	2	0	1	-1.633e-2	2	243.147	2	3732.275	4
585		8	max	.007	3	.269	3	.353	4	2.196e-2	3	9847.976	15	NC	1
586			min	-.004	2	-.398	2	0	1	-2.04e-2	2	216.152	2	3348.442	4
587		9	max	.007	3	.3	3	.339	4	2.228e-2	3	9213.969	15	NC	1
588			min	-.004	2	-.436	2	0	12	-2.307e-2	2	202.087	2	3059.087	4
589		10	max	.007	3	.311	3	.322	4	1.991e-2	3	9020.467	15	NC	1
590			min	-.004	2	-.449	2	0	1	-2.479e-2	2	197.963	2	2984.585	4
591		11	max	.007	3	.303	3	.304	4	1.755e-2	3	9213.601	15	NC	1
592			min	-.004	2	-.436	2	0	1	-2.651e-2	2	202.775	2	3045.881	4
593		12	max	.007	3	.278	3	.284	4	1.494e-2	3	9847.237	15	NC	1
594			min	-.004	2	-.397	2	0	12	-2.553e-2	2	218.224	2	3215.062	4
595		13	max	.006	3	.236	3	.262	4	1.196e-2	3	NC	15	NC	1
596			min	-.004	2	-.335	2	0	10	-2.047e-2	2	248.146	2	3786.394	4
597		14	max	.006	3	.184	3	.236	4	8.979e-3	3	NC	15	NC	1
598			min	-.004	2	-.257	2	-.001	1	-1.54e-2	2	299.333	2	5077.639	5
599		15	max	.006	3	.125	3	.21	4	6.001e-3	3	NC	5	NC	1
600			min	-.004	2	-.172	2	-.003	1	-1.034e-2	2	387.487	2	8128.949	5
601		16	max	.006	3	.063	3	.184	4	6.864e-3	5	NC	5	NC	1
602			min	-.004	2	-.085	2	-.004	1	-5.28e-3	2	550.809	2	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
603		17	max	.006	3	.004	3	.161	4	8.62e-3	4	NC	5	NC	1
604			min	-.003	2	-.006	2	-.005	1	-3.686e-4	1	900.055	2	NC	1
605		18	max	.006	3	.06	2	.141	4	4.185e-3	5	NC	4	NC	1
606			min	-.003	2	-.049	3	-.003	1	-8.105e-3	2	1910.346	2	NC	1
607		19	max	.006	3	.119	2	.126	4	6.843e-3	3	NC	1	NC	1
608			min	-.003	2	-.098	3	0	12	-1.629e-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

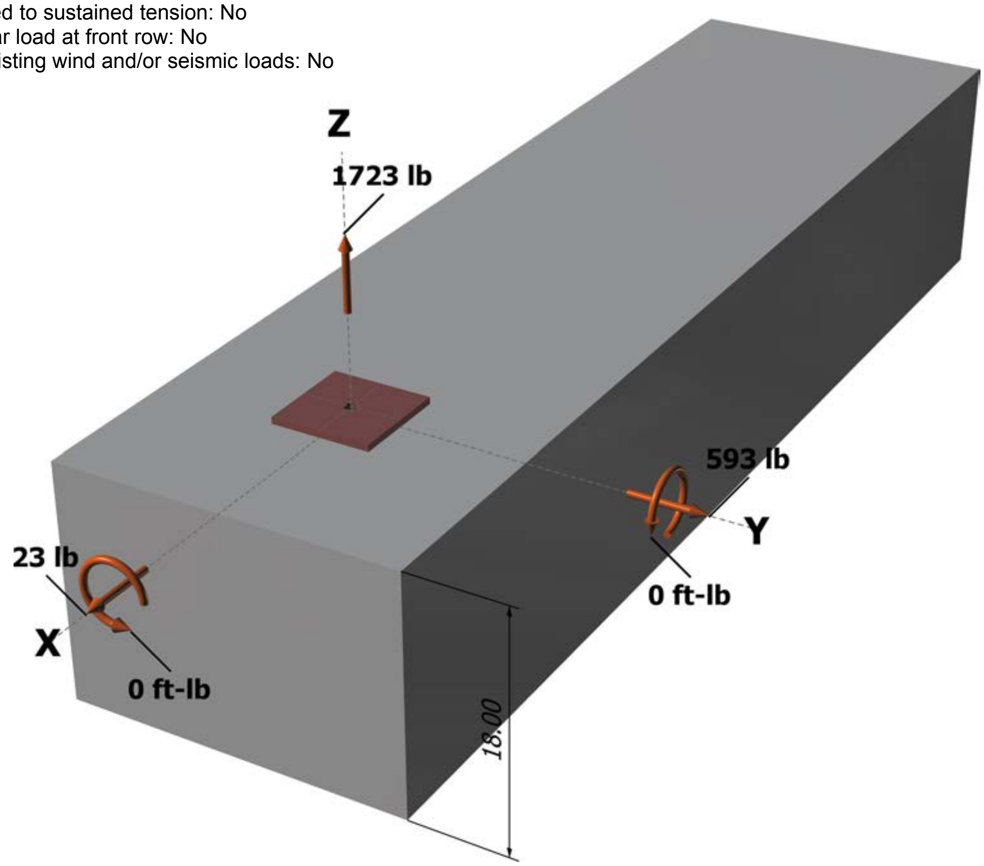
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

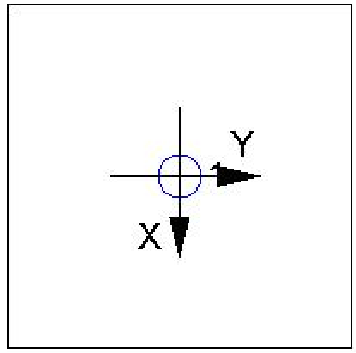
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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, $\varnothing N_n$ (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, $\varnothing V_n$ (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.

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

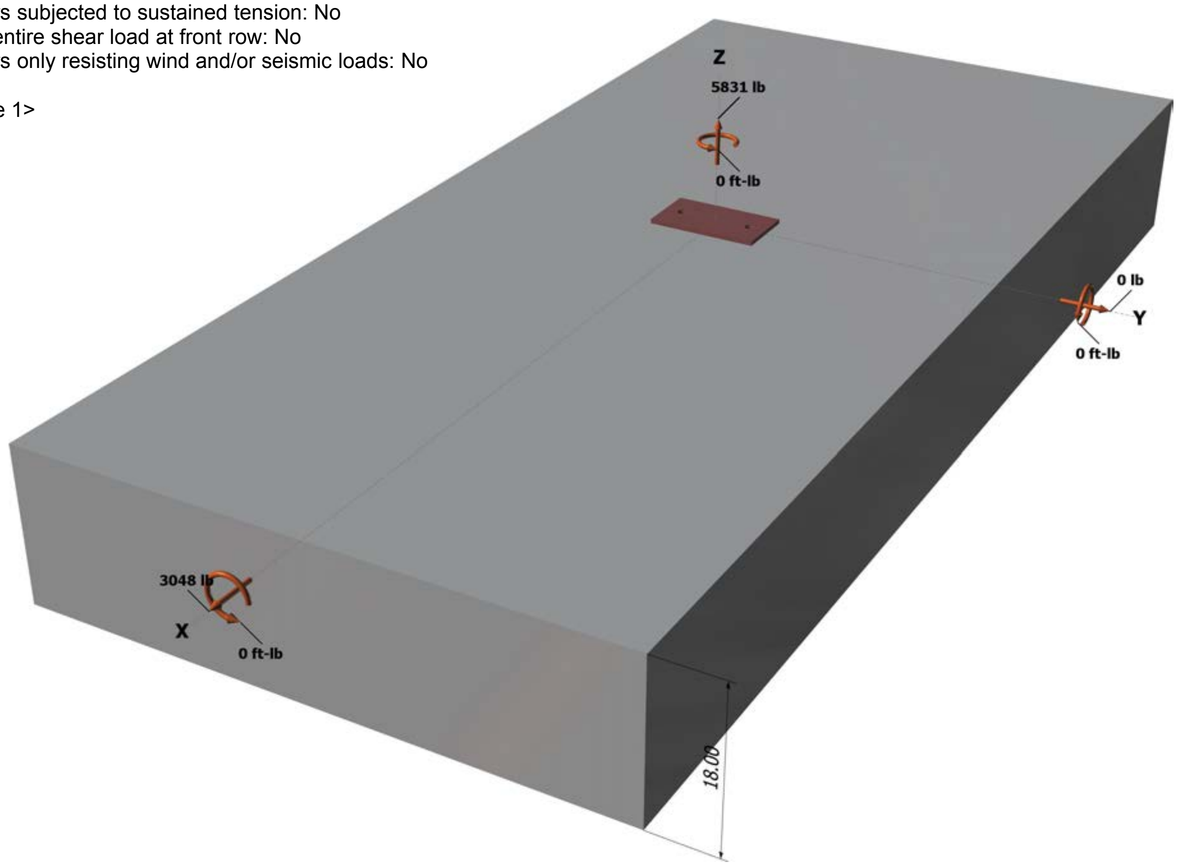
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

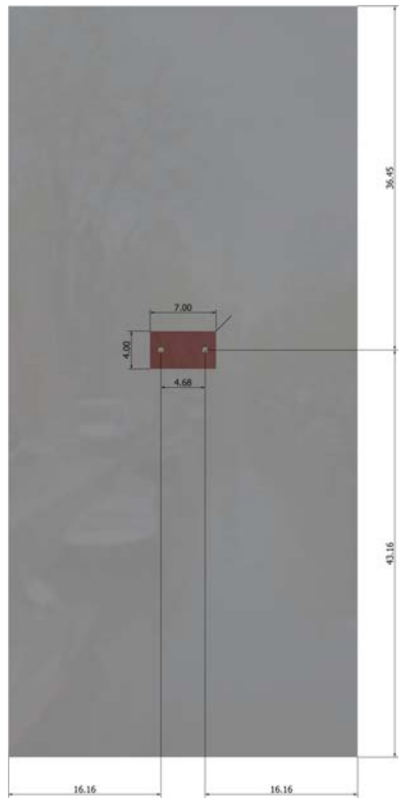
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'$_c$ (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout 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>



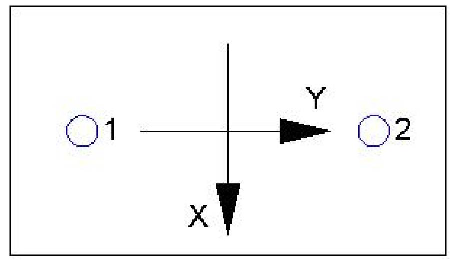
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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, $øN_n$ (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, $øV_n$ (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.