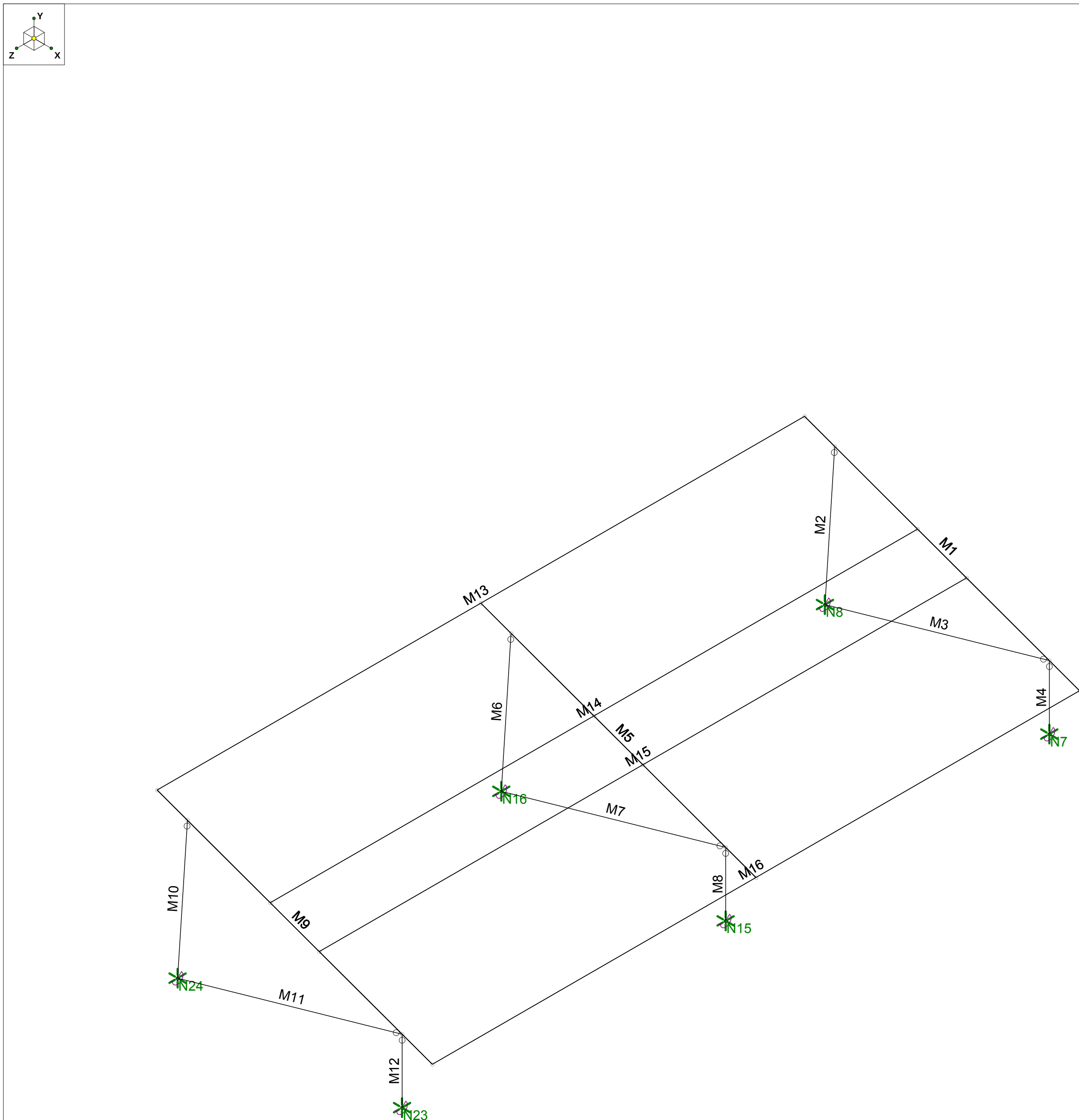


Schletter, Inc.		20° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-10	

1. INTRODUCTION

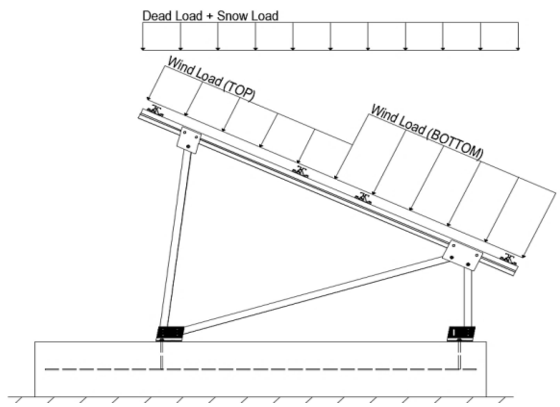
1.1 Project Description
The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. PVMax ground mount system.

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 7-10 - Chapter 26-31, Wind Loads
- ASCE 7-10 - Chapter 7, Snow Loads
- ASCE 7-10 - Chapter 2, Combination of Loads
- International Building Code, IBC, 2012, 2015
- 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 7-10, Eq. 7.4-1)*
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 7-10, Eq. 27.3-1)*

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 + 0.5W
1.2D + 1.0W + 0.5S
0.9D + 1.0W [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 + 0.6W
1.0D + 0.75L + 0.45W + 0.75S
0.6D + 0.6W [M]
1.238D + 0.875E [O]
1.1785D + 0.65625E + 0.75S [O]
0.362D + 0.875E [O]

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

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

3. STRUCTURAL ANALYSIS

3.1 RISA Results

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

3.2 RISA Components

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

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

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

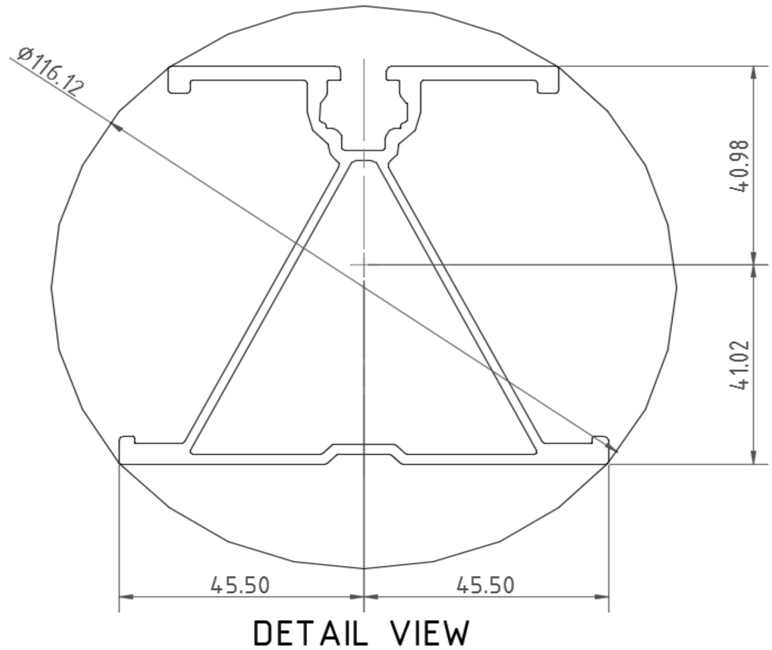
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

4. MEMBER DESIGN CALCULATIONS

4.1 Purlin Design

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

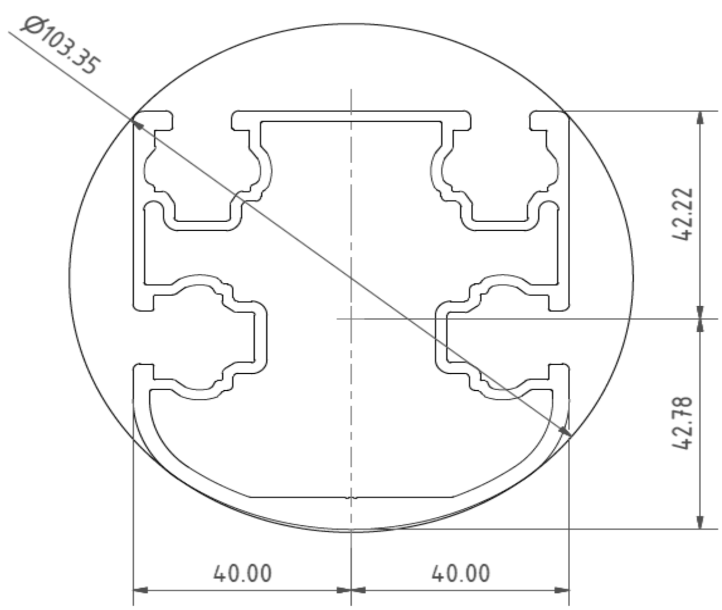
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	120	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	1.968	k-ft
M_z =	0.302	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	97%	



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).

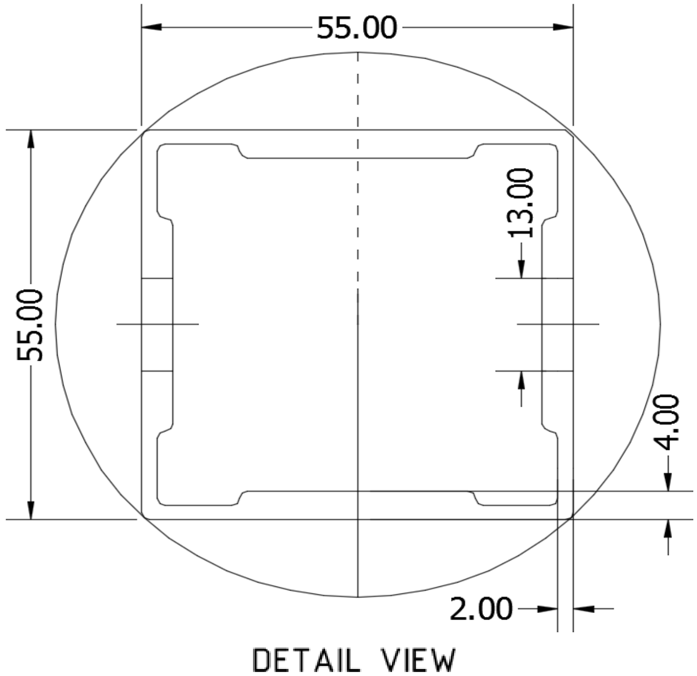
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	88.90	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.35	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.076	k-ft
M_z =	0.000	k-ft
P_n =	-0.264	k
$M_{y\ allowable}$ =	3.464	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	89%	



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).

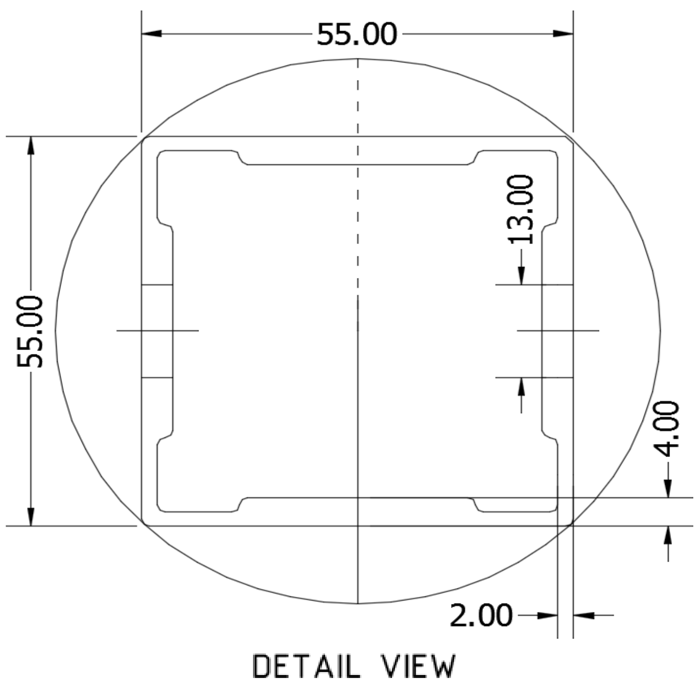
Strut Type =	55x55	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.506	k-ft
P_n =	0.653	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	38%	



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).

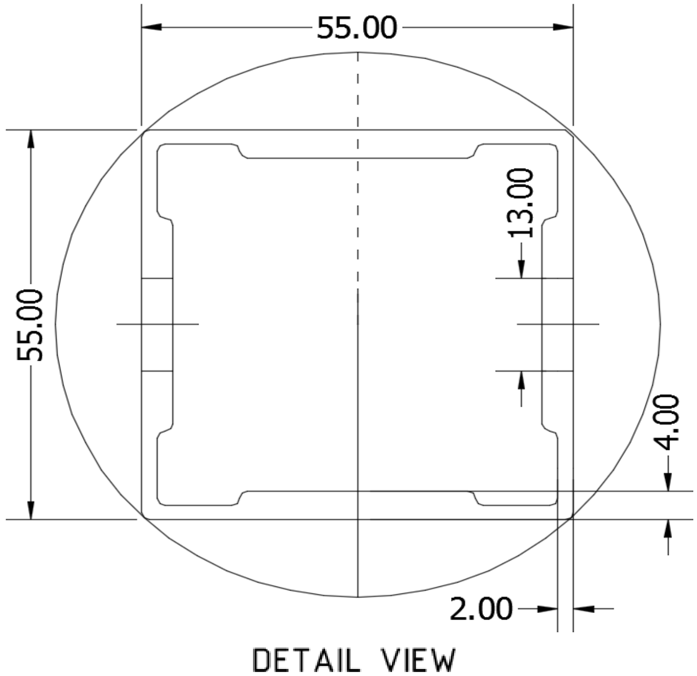
Strut Type =	55x55	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	86.60	in
$\Phi F_{ty\ AXIAL}$ =	7.50	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.010	k-ft
M_z =	0.000	k-ft
P_n =	1.647	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	7.371	k
Utilization =	23%	



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 =	-0.008	k-ft
M_z =	-0.289	k-ft
P_n =	0.654	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	15.642	k
Utilization =	25%	



5. FOUNDATION DESIGN CALCULATIONS

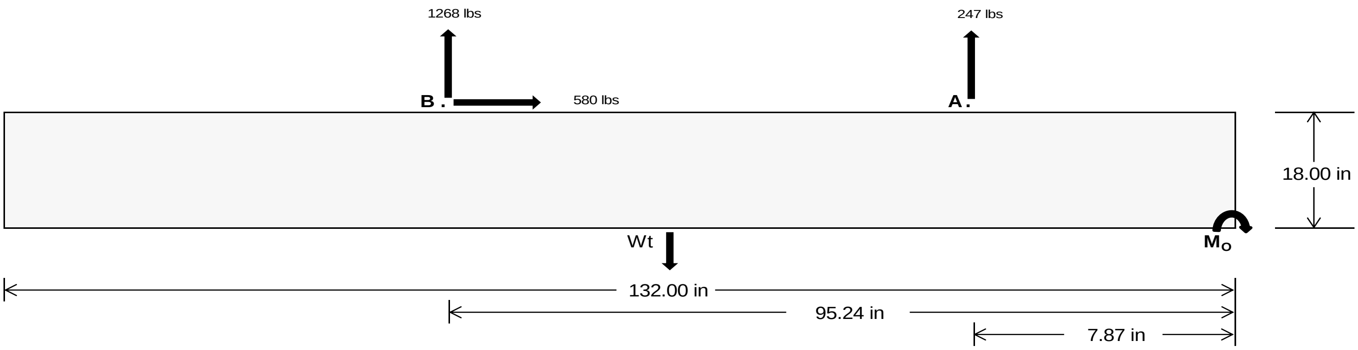
5.1 Helical Pile Foundations

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 =	1091.38	5514.25	k
Compressive Load =	4442.27	4835.31	k
Lateral Load =	336.95	2515.39	k
Moment (Weak Axis) =	0.68	0.37	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 table 1806.2 (2012, 2015).



<u>Concrete Properties</u>

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

<u>Footing Reinforcement</u>

Use fiber reinforcing with (2) #5 rebar.

<u>Overturning Check</u>

M_O =	133120.0 in-lbs
Resisting Force Required =	2016.97 lbs
S.F. =	1.67
Weight Required =	3361.62 lbs
Minimum Width =	<u>29 in</u> in
Weight Provided =	5781.88 lbs

A minimum 132in long x 29in wide x 18in tall ballast foundation is required to resist overturning.

<u>Sliding</u>

Force =	580.09 lbs
Friction =	0.4
Weight Required =	1450.23 lbs
Resisting Weight =	5781.88 lbs
Additional Weight Required =	0 lbs

Use a 132in long x 29in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

<u>Cohesion</u>

Sliding Force =	580.09 lbs
Cohesion =	130 psf
Area =	26.58 ft^2
Resisting =	2890.94 lbs
Additional Weight Required =	0 lbs

Use a 132in long x 29in wide x 18in tall ballast foundation. Cohesion is OK.

<u>Shear Key</u>

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

Shear key is not required.

<u>Bearing Pressure</u>

	Ballast Width			
	<u>29 in</u>	<u>30 in</u>	<u>31 in</u>	<u>32 in</u>
P_{ftg} = (145 pcf)(11 ft)(1.5 ft)(2.42 ft) =	<u>5782 lbs</u>	<u>5981 lbs</u>	<u>6181 lbs</u>	<u>6380 lbs</u>

ASD LC	1.0D + 1.0S				1.0D + 0.6W				1.0D + 0.75L + 0.45W + 0.75S				0.6D + 0.6W			
Width	29 in	30 in	31 in	32 in	29 in	30 in	31 in	32 in	29 in	30 in	31 in	32 in	29 in	30 in	31 in	32 in
F_A	1553 lbs	1553 lbs	1553 lbs	1553 lbs	1501 lbs	1501 lbs	1501 lbs	1501 lbs	2162 lbs	2162 lbs	2162 lbs	2162 lbs	-494 lbs	-494 lbs	-494 lbs	-494 lbs
F_B	1584 lbs	1584 lbs	1584 lbs	1584 lbs	1805 lbs	1805 lbs	1805 lbs	1805 lbs	2412 lbs	2412 lbs	2412 lbs	2412 lbs	-2535 lbs	-2535 lbs	-2535 lbs	-2535 lbs
F_V	176 lbs	176 lbs	176 lbs	176 lbs	1040 lbs	1040 lbs	1040 lbs	1040 lbs	899 lbs	899 lbs	899 lbs	899 lbs	-1160 lbs	-1160 lbs	-1160 lbs	-1160 lbs
P_{total}	8919 lbs	9119 lbs	9318 lbs	9517 lbs	9088 lbs	9287 lbs	9487 lbs	9686 lbs	10356 lbs	10555 lbs	10754 lbs	10954 lbs	440 lbs	559 lbs	679 lbs	799 lbs
M	3926 lbs-ft	3926 lbs-ft	3926 lbs-ft	3926 lbs-ft	4432 lbs-ft	4432 lbs-ft	4432 lbs-ft	4432 lbs-ft	5944 lbs-ft	5944 lbs-ft	5944 lbs-ft	5944 lbs-ft	2045 lbs-ft	2045 lbs-ft	2045 lbs-ft	2045 lbs-ft
e	0.44 ft	0.43 ft	0.42 ft	0.41 ft	0.49 ft	0.48 ft	0.47 ft	0.46 ft	0.57 ft	0.56 ft	0.55 ft	0.54 ft	4.65 ft	3.66 ft	3.01 ft	2.56 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}	255.0 psf	253.7 psf	252.5 psf	251.4 psf	250.9 psf	249.8 psf	248.8 psf	247.8 psf	267.6 psf	265.9 psf	264.4 psf	262.9 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	416.1 psf	409.5 psf	403.3 psf	397.5 psf	432.8 psf	425.6 psf	418.9 psf	412.6 psf	511.5 psf	501.7 psf	492.6 psf	484.0 psf	142.6 psf	80.9 psf	70.4 psf	67.9 psf

Maximum Bearing Pressure =	512 psf
Allowable Bearing Pressure =	1500 psf

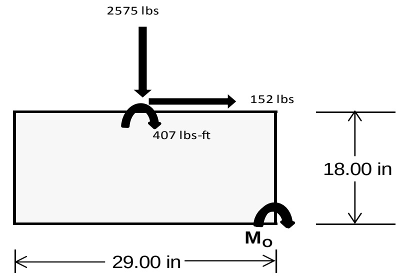
Use a 132in long x 29in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O =	2476.1 ft-lbs
Resisting Force Required =	2049.17 lbs
S.F. =	1.67
Weight Required =	3415.28 lbs
Minimum Width =	29 in in
Weight Provided =	5781.88 lbs

A minimum 132in long x 29in 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	29 in			29 in			29 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	265 lbs	641 lbs	217 lbs	887 lbs	2575 lbs	849 lbs	94 lbs	187 lbs	46 lbs
F_V	212 lbs	208 lbs	214 lbs	157 lbs	152 lbs	167 lbs	212 lbs	209 lbs	213 lbs
P_{total}	7423 lbs	7799 lbs	7375 lbs	7701 lbs	9389 lbs	7663 lbs	2188 lbs	2280 lbs	2139 lbs
M	845 lbs-ft	837 lbs-ft	853 lbs-ft	637 lbs-ft	635 lbs-ft	668 lbs-ft	844 lbs-ft	835 lbs-ft	846 lbs-ft
e	0.11 ft	0.11 ft	0.12 ft	0.08 ft	0.07 ft	0.09 ft	0.39 ft	0.37 ft	0.40 ft
L/6	0.40 ft	0.40 ft	0.40 ft	0.40 ft	0.40 ft	0.40 ft	0.40 ft	0.40 ft	0.40 ft
f_{min}	200.3 psf	215.2 psf	197.8 psf	230.2 psf	293.8 psf	225.9 psf	3.4 psf	7.8 psf	1.5 psf
f_{max}	358.2 psf	371.6 psf	357.1 psf	349.1 psf	412.5 psf	350.6 psf	161.2 psf	163.8 psf	159.5 psf

Maximum Bearing Pressure = 413 psf
Allowable Bearing Pressure = 1500 psf

Use a 132in long x 29in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Foundation Requirements: 132in long x 29in wide x 18in tall ballast foundation and fiber reinforcing with (2) #5 rebar.

5.3 Foundation Anchors

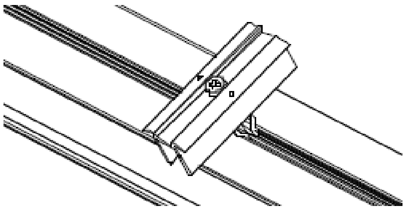
Threaded rods are anchored to the the ballast foundations using the Simpson AT-XP epoxy solution. LRFD load results are compared to the allowable strengths of the epoxy solution. Please see the supplementary calculations provided by the Simpson Anchor Designer software.

6. DESIGN OF JOINTS AND CONNECTIONS

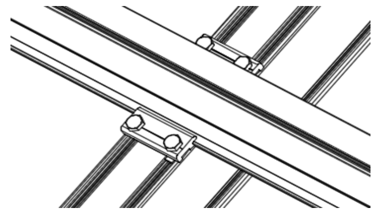
6.1 Anchorage of Modules to Purlins and Connection of Purlins to Girders

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

Fastening of Modules to Purlins		
Maximum Uplifting Force =	0.597	k
Allowable Uplift =	1.214	k
Utilization =	49%	



Fastening of Purlins to Girders		
Maximum Uplifting Force =	2.117	k
Allowable Uplift =	4.357	k
Utilization =	49%	



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 =	3.417	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	46%	

Rear Strut		
Maximum Axial Load =	3.785	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	51%	

Diagonal Strut		
Maximum Axial Load =	1.742	k
M12 Bolt Shear Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	23%	

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

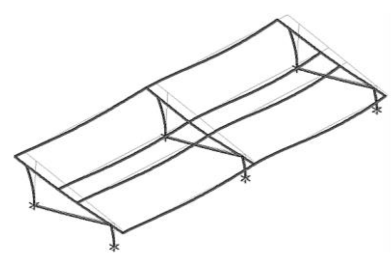
7.1 Seismic Drift

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} =	0.543	in

$0.543 \le 0.802$, 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 = 120 in
J = 0.432
331.976

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

S1 = 0.51461

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

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 27.4 ksi

3.4.16
b/t = 32.195

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

S1 = 12.2

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

S2 = 46.7
φF_L= φb[Bp-1.6Dp*b/t]
φF_L= 25.1 ksi

3.4.16.1 Not Used
Rb/t =

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0
φF_L= 1.17φyFcy
φF_L= 38.9 ksi

3.4.18
h/t = 37.0588

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

S1 = 36.9
m = 0.65
C_0 = 40.985
Cc = 41.015

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

S2 = 77.2
φF_L= φb[Bbr-mDbr*h/t]
φF_L= 43.2 ksi

φF_LSt= 25.1 ksi
Ix = 897074 mm^4
2.155 in^4
y = 41.015 mm
Sx = 1.335 in³
M_{max}St = 2.788 k-ft

Weak Axis:
3.4.14

L_b = 120
J = 0.432
211.117

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

S1 = 0.51461

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

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 28.6

3.4.16
b/t = 37.0588

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

S1 = 12.2

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

S2 = 46.7
φF_L= φb[Bp-1.6Dp*b/t]
φF_L= 23.1 ksi

3.4.16.1
N/A for Weak Direction

3.4.18
h/t = 32.195

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

S1 = 36.9
m = 0.65
C_0 = 45.5
Cc = 45.5

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

S2 = 77.3
φF_L= 1.3φyFcy
φF_L= 43.2 ksi

φF_LWk= 23.1 ksi
Iy = 446476 mm^4
1.073 in^4
x = 45.5 mm
Sy = 0.599 in³
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

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St =$ 29.4 ksi

Ix = 984962 mm^4

2.366 in^4

y = 43.717 mm

Sx = 1.375 in^3

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

3.4.18

h/t = 16.2

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

S1 = 36.9

m = 0.65

$C_0 =$ 40

Cc = 40

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

S2 = 77.3

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L Wk =$ 33.3 ksi

Iy = 923544 mm^4

2.219 in^4

x = 40 mm

Sy = 1.409 in^3

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

Compression

3.4.9

b/t = 16.2

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

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

$\varphi F_L =$ 31.6 ksi

b/t = 7.4

S1 = 12.21

S2 = 32.70

$\varphi F_L = \varphi yFcy$

$\varphi F_L =$ 33.3 ksi

3.4.10

Rb/t = 18.1

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

S1 = 6.87

S2 = 131.3

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

$\varphi F_L =$ 31.09 ksi

$\varphi F_L =$ 31.09 ksi

A = 1215.13 mm^2

1.88 in^2

$P_{max} =$ 58.55 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 24.8 in

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

Weak Axis:

3.4.14

L_b = 24.8

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 0.57371

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.87952

φF_L= φcc(Bc-Dc*λ)

φF_L= 28.0279 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

φF_L= φyFcy

φF_L= 33.25 ksi

φF_L= 28.03 ksi

A = 663.99 mm^2

1.03 in^2

P_{max} = 28.85 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 86.60 in

J = 0.942

135.148

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.6 ksi

Weak Axis:

3.4.14

L_b = 86.6

J = 0.942

135.148

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.6

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

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)
$\varphi F_L = \varphi c[Bp\text{-}1.6Dp*b/t]$
$\varphi F_L =$ 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
$\varphi F_L = \varphi y Fcy$
$\varphi F_L =$ 33.25 ksi

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

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

Strut = **55x55**

Strong Axis:

3.4.14

$L_b =$ 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
$\varphi F_L = \varphi b[Bc\text{-}1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)/2}))}]$
$\varphi F_L =$ 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
$\varphi F_L = \varphi b[Bp\text{-}1.6Dp*b/t]$
$\varphi F_L =$ 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
$\varphi F_L = \varphi b[Bc\text{-}1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)/2}))}]$
$\varphi F_L =$ 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
$\varphi F_L = \varphi b[Bp\text{-}1.6Dp*b/t]$
$\varphi F_L =$ 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 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 + 0.5W	Yes	Y		1	1.2	3	1.6	4	.5														
2	LRFD 1.2D + 1.0W + 0.5S	Yes	Y		1	1.2	3	.5	4	1														
3	LRFD 0.9D + 1.0W	Yes	Y		2	.9					5	1												
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 + 0.6W	Yes	Y		1	1			4	.6														
11	ASD 1.0D + 0.75L + 0.45W + 0....	Yes	Y		1	1	3	.75	4	.45														
12	ASD 0.6D + 0.6W	Yes	Y		2	.6					5	.6												
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	469.783	2	1102.084	1	.86	1	.004	1	0	1	0	1
2		min	-611.492	3	-1295.014	3	-62.278	5	-.28	4	0	1	0	1
3	N7	max	.036	9	1209.185	1	-.43	12	0	12	0	1	0	1
4		min	-.126	2	-236.19	3	-259.196	4	-.52	4	0	1	0	1
5	N15	max	.025	9	3417.13	1	0	9	0	9	0	1	0	1
6		min	-1.574	2	-839.521	3	-248.839	4	-.506	4	0	1	0	1
7	N16	max	1795.589	2	3719.473	1	0	3	0	3	0	1	0	1
8		min	-1934.914	3	-4241.734	3	-62.043	5	-.282	4	0	1	0	1
9	N23	max	.037	14	1209.185	1	9.385	1	.02	1	0	1	0	1
10		min	-.126	2	-236.19	3	-253.045	4	-.509	4	0	1	0	1
11	N24	max	469.783	2	1102.084	1	-.047	12	0	12	0	1	0	1
12		min	-611.492	3	-1295.014	3	-62.813	5	-.282	4	0	1	0	1
13	Totals:	max	2733.329	2	11759.14	1	0	9						
14		min	-3158.508	3	-8143.663	3	-943.207	4						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
1	M13	1	max	99.316	1	486.677	1	-6.39	12	0	3	.237	1	0	4
2			min	4.639	12	-647.148	3	-161.474	1	-.013	2	.011	12	0	3
3		2	max	99.316	1	340.883	1	-5.032	12	0	3	.093	4	.613	3
4			min	4.639	12	-455.416	3	-124.12	1	-.013	2	.005	12	-.46	1
5		3	max	99.316	1	195.09	1	-3.675	12	0	3	.049	5	1.012	3
6			min	4.639	12	-263.684	3	-86.766	1	-.013	2	-.039	1	-.758	1
7		4	max	99.316	1	49.296	1	-2.317	12	0	3	.026	5	1.198	3
8			min	4.639	12	-71.953	3	-49.412	1	-.013	2	-.115	1	-.893	1
9		5	max	99.316	1	119.779	3	-.873	10	0	3	.005	5	1.172	3
10			min	4.639	12	-96.498	1	-21.065	4	-.013	2	-.149	1	-.867	1
11		6	max	99.316	1	311.51	3	25.295	1	0	3	-.006	12	.932	3
12			min	3.76	15	-242.292	1	-16.015	5	-.013	2	-.142	1	-.679	1
13		7	max	99.316	1	503.242	3	62.649	1	0	3	-.004	12	.48	3
14			min	-5.568	5	-388.086	1	-13.915	5	-.013	2	-.093	1	-.329	1
15		8	max	99.316	1	694.974	3	100.003	1	0	3	0	10	.184	1
16			min	-16.974	5	-533.879	1	-11.814	5	-.013	2	-.047	4	-.186	3
17		9	max	99.316	1	886.705	3	137.357	1	0	3	.13	1	.858	1
18			min	-28.38	5	-679.673	1	-9.714	5	-.013	2	-.057	5	-1.065	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	99.316	1	825.467	1	-5.828	12	.013	2	.303	1	1.694	1
20			min	4.639	12	-1078.437	3	-174.711	1	0	3	.008	12	-2.156	3
21		11	max	99.316	1	679.673	1	-4.471	12	.013	2	.13	1	.858	1
22			min	4.639	12	-886.705	3	-137.357	1	0	3	.003	12	-1.065	3
23		12	max	99.316	1	533.879	1	-3.113	12	.013	2	.045	4	.184	1
24			min	4.639	12	-694.974	3	-100.003	1	0	3	-.003	3	-.186	3
25		13	max	99.316	1	388.086	1	-1.756	12	.013	2	.021	5	.48	3
26			min	4.639	12	-503.242	3	-62.649	1	0	3	-.093	1	-.329	1
27		14	max	99.316	1	242.292	1	-.398	12	.013	2	0	15	.932	3
28			min	3.467	15	-311.51	3	-25.295	1	0	3	-.142	1	-.679	1
29		15	max	99.316	1	96.498	1	12.058	1	.013	2	-.005	12	1.172	3
30			min	-6.09	5	-119.779	3	-16.725	5	0	3	-.149	1	-.867	1
31		16	max	99.316	1	71.953	3	49.412	1	.013	2	-.003	12	1.198	3
32			min	-17.496	5	-49.296	1	-14.624	5	0	3	-.115	1	-.893	1
33		17	max	99.316	1	263.684	3	86.766	1	.013	2	0	3	1.012	3
34			min	-28.902	5	-195.09	1	-12.524	5	0	3	-.063	4	-.758	1
35		18	max	99.316	1	455.416	3	124.12	1	.013	2	.078	1	.613	3
36			min	-40.308	5	-340.883	1	-10.423	5	0	3	-.066	5	-.46	1
37		19	max	99.316	1	647.148	3	161.474	1	.013	2	.237	1	0	1
38			min	-51.714	5	-486.677	1	-8.323	5	0	3	-.077	5	0	3
39	M14	1	max	59.648	4	515.354	1	-6.566	12	.008	3	.27	1	0	1
40			min	1.986	12	-506.136	3	-166.476	1	-.011	1	.012	12	0	3
41		2	max	48.242	4	369.56	1	-5.209	12	.008	3	.133	4	.481	3
42			min	1.986	12	-360.448	3	-129.122	1	-.011	1	.006	12	-.492	1
43		3	max	46.183	1	223.766	1	-3.851	12	.008	3	.073	5	.801	3
44			min	1.986	12	-214.759	3	-91.768	1	-.011	1	-.017	1	-.821	1
45		4	max	46.183	1	77.972	1	-2.493	12	.008	3	.039	5	.959	3
46			min	1.986	12	-69.071	3	-54.414	1	-.011	1	-.098	1	-.989	1
47		5	max	46.183	1	76.617	3	-1.136	12	.008	3	.008	5	.954	3
48			min	1.986	12	-67.822	1	-31.379	4	-.011	1	-.138	1	-.995	1
49		6	max	46.183	1	222.306	3	20.293	1	.008	3	-.005	12	.788	3
50			min	-7.115	5	-213.615	1	-25.084	5	-.011	1	-.136	1	-.838	1
51		7	max	46.183	1	367.994	3	57.647	1	.008	3	-.004	12	.46	3
52			min	-18.521	5	-359.409	1	-22.983	5	-.011	1	-.093	1	-.52	1
53		8	max	46.183	1	513.682	3	95.001	1	.008	3	0	10	0	15
54			min	-29.927	5	-505.203	1	-20.883	5	-.011	1	-.076	4	-.049	2
55		9	max	46.183	1	659.37	3	132.355	1	.008	3	.118	1	.603	1
56			min	-41.332	5	-650.997	1	-18.782	5	-.011	1	-.094	5	-.681	3
57		10	max	67.313	4	796.791	1	-5.652	12	.011	1	.286	1	1.407	1
58			min	1.986	12	-805.059	3	-169.709	1	-.008	3	.008	12	-1.495	3
59		11	max	55.907	4	650.997	1	-4.295	12	.011	1	.134	4	.603	1
60			min	1.986	12	-659.37	3	-132.355	1	-.008	3	.002	12	-.681	3
61		12	max	46.183	1	505.203	1	-2.937	12	.011	1	.071	5	0	15
62			min	1.986	12	-513.682	3	-95.001	1	-.008	3	-.008	1	-.049	2
63		13	max	46.183	1	359.409	1	-1.579	12	.011	1	.037	5	.46	3
64			min	1.986	12	-367.994	3	-57.647	1	-.008	3	-.093	1	-.52	1
65		14	max	46.183	1	213.615	1	-.222	12	.011	1	.006	5	.788	3
66			min	1.986	12	-222.306	3	-32.07	4	-.008	3	-.136	1	-.838	1
67		15	max	46.183	1	67.822	1	17.061	1	.011	1	-.005	12	.954	3
68			min	.399	15	-76.617	3	-25.231	5	-.008	3	-.138	1	-.995	1
69		16	max	46.183	1	69.071	3	54.414	1	.011	1	-.003	12	.959	3
70			min	-10.762	5	-77.972	1	-23.13	5	-.008	3	-.098	1	-.989	1
71		17	max	46.183	1	214.759	3	91.768	1	.011	1	.001	3	.801	3
72			min	-22.168	5	-223.766	1	-21.03	5	-.008	3	-.08	4	-.821	1
73		18	max	46.183	1	360.448	3	129.122	1	.011	1	.106	1	.481	3
74			min	-33.574	5	-369.56	1	-18.929	5	-.008	3	-.097	5	-.492	1
75		19	max	46.183	1	506.136	3	166.476	1	.011	1	.27	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	-44.98	5	-515.354	1	-16.829	5	-.008	3	-.117	5	0	3
77	M15	1	max	81.556	5	616.952	2	-6.527	12	.011	1	.27	1	0	2
78			min	-48.54	1	-273.267	3	-166.454	1	-.007	3	.012	12	0	3
79		2	max	70.15	5	440.716	2	-5.169	12	.011	1	.17	4	.261	3
80			min	-48.54	1	-196.643	3	-129.1	1	-.007	3	.006	12	-.588	2
81		3	max	58.744	5	264.48	2	-3.812	12	.011	1	.099	5	.437	3
82			min	-48.54	1	-120.02	3	-91.746	1	-.007	3	-.017	1	-.979	2
83		4	max	47.339	5	88.245	2	-2.454	12	.011	1	.055	5	.528	3
84			min	-48.54	1	-43.396	3	-54.392	1	-.007	3	-.098	1	-1.175	2
85		5	max	35.933	5	33.228	3	-1.096	12	.011	1	.014	5	.533	3
86			min	-48.54	1	-87.991	2	-40.513	4	-.007	3	-.138	1	-1.175	2
87		6	max	24.527	5	109.852	3	20.315	1	.011	1	-.005	12	.454	3
88			min	-48.54	1	-264.227	2	-34.203	5	-.007	3	-.136	1	-.98	2
89		7	max	13.121	5	186.476	3	57.669	1	.011	1	-.004	12	.289	3
90			min	-48.54	1	-440.463	2	-32.102	5	-.007	3	-.093	1	-.588	2
91		8	max	1.715	5	263.1	3	95.023	1	.011	1	0	10	.04	3
92			min	-48.54	1	-616.698	2	-30.002	5	-.007	3	-.1	4	-.015	1
93		9	max	-2.326	12	339.723	3	132.377	1	.011	1	.118	1	.782	2
94			min	-48.54	1	-792.934	2	-27.901	5	-.007	3	-.129	5	-.295	3
95		10	max	-2.326	12	969.17	2	-5.692	12	.007	3	.286	1	1.761	2
96			min	-48.54	1	-416.347	3	-169.731	1	-.011	1	.008	12	-.715	3
97		11	max	3.935	5	792.934	2	-4.334	12	.007	3	.169	4	.782	2
98			min	-48.54	1	-339.723	3	-132.377	1	-.011	1	.002	12	-.295	3
99		12	max	-2.326	12	616.698	2	-2.976	12	.007	3	.096	5	.04	3
100			min	-48.54	1	-263.1	3	-95.023	1	-.011	1	-.008	1	-.015	1
101		13	max	-2.326	12	440.463	2	-1.619	12	.007	3	.052	5	.289	3
102			min	-48.54	1	-186.476	3	-57.669	1	-.011	1	-.093	1	-.588	2
103		14	max	-2.326	12	264.227	2	-.261	12	.007	3	.01	5	.454	3
104			min	-48.54	1	-109.852	3	-41.222	4	-.011	1	-.136	1	-.98	2
105		15	max	-2.326	12	87.991	2	17.039	1	.007	3	-.005	12	.533	3
106			min	-52.455	4	-33.228	3	-34.352	5	-.011	1	-.138	1	-1.175	2
107		16	max	-2.326	12	43.396	3	54.392	1	.007	3	-.003	12	.528	3
108			min	-63.861	4	-88.245	2	-32.251	5	-.011	1	-.098	1	-1.175	2
109		17	max	-2.326	12	120.02	3	91.746	1	.007	3	.001	3	.437	3
110			min	-75.266	4	-264.48	2	-30.151	5	-.011	1	-.106	4	-.979	2
111		18	max	-2.326	12	196.643	3	129.1	1	.007	3	.106	1	.261	3
112			min	-86.672	4	-440.716	2	-28.05	5	-.011	1	-.133	5	-.588	2
113		19	max	-2.326	12	273.267	3	166.454	1	.007	3	.27	1	0	2
114			min	-98.078	4	-616.952	2	-25.95	5	-.011	1	-.163	5	0	5
115	M16	1	max	80.451	5	590.409	2	-6.26	12	.012	1	.238	1	0	2
116			min	-105.484	1	-254.541	3	-161.694	1	-.01	3	.01	12	0	3
117		2	max	69.046	5	414.173	2	-4.902	12	.012	1	.127	4	.24	3
118			min	-105.484	1	-177.917	3	-124.34	1	-.01	3	.004	12	-.558	2
119		3	max	57.64	5	237.937	2	-3.545	12	.012	1	.073	5	.395	3
120			min	-105.484	1	-101.293	3	-86.986	1	-.01	3	-.038	1	-.92	2
121		4	max	46.234	5	61.702	2	-2.187	12	.012	1	.041	5	.465	3
122			min	-105.484	1	-24.669	3	-49.632	1	-.01	3	-.114	1	-1.087	2
123		5	max	34.828	5	51.954	3	-.829	12	.012	1	.01	5	.45	3
124			min	-105.484	1	-114.534	2	-29.292	4	-.01	3	-.149	1	-1.057	2
125		6	max	23.423	5	128.578	3	25.075	1	.012	1	-.005	12	.35	3
126			min	-105.484	1	-290.77	2	-24.147	5	-.01	3	-.142	1	-.832	2
127		7	max	12.017	5	205.202	3	62.429	1	.012	1	-.004	12	.164	3
128			min	-105.484	1	-467.005	2	-22.046	5	-.01	3	-.093	1	-.411	2
129		8	max	.611	5	281.826	3	99.783	1	.012	1	0	10	.205	2
130			min	-105.484	1	-643.241	2	-19.946	5	-.01	3	-.069	4	-.106	3
131		9	max	-4.682	12	358.45	3	137.137	1	.012	1	.129	1	1.018	2
132			min	-105.484	1	-819.477	2	-17.845	5	-.01	3	-.088	5	-.462	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	-4.682	12	995.713	2	-5.959	12	.01	3	.302	1	2.027	2
134			min	-105.484	1	-435.074	3	-174.491	1	-.012	1	.009	12	-.903	3
135		11	max	-.524	15	819.477	2	-4.601	12	.01	3	.13	4	1.018	2
136			min	-105.484	1	-358.45	3	-137.137	1	-.012	1	.003	12	-.462	3
137		12	max	-4.682	12	643.241	2	-3.244	12	.01	3	.067	4	.205	2
138			min	-105.484	1	-281.826	3	-99.783	1	-.012	1	-.003	1	-.106	3
139		13	max	-4.682	12	467.005	2	-1.886	12	.01	3	.033	5	.164	3
140			min	-105.484	1	-205.202	3	-62.429	1	-.012	1	-.093	1	-.411	2
141		14	max	-4.682	12	290.77	2	-.528	12	.01	3	.002	5	.35	3
142			min	-105.484	1	-128.578	3	-32.551	4	-.012	1	-.142	1	-.832	2
143		15	max	-4.682	12	114.534	2	12.279	1	.01	3	-.005	12	.45	3
144			min	-105.484	1	-51.954	3	-24.844	5	-.012	1	-.149	1	-1.057	2
145		16	max	-4.682	12	24.669	3	49.632	1	.01	3	-.004	12	.465	3
146			min	-105.484	1	-61.702	2	-22.743	5	-.012	1	-.114	1	-1.087	2
147		17	max	-4.682	12	101.293	3	86.986	1	.01	3	0	12	.395	3
148			min	-105.484	1	-237.937	2	-20.643	5	-.012	1	-.087	4	-.92	2
149		18	max	-4.682	12	177.917	3	124.34	1	.01	3	.079	1	.24	3
150			min	-105.484	1	-414.173	2	-18.542	5	-.012	1	-.099	5	-.558	2
151		19	max	-4.682	12	254.541	3	161.694	1	.01	3	.238	1	0	2
152			min	-115.3	4	-590.409	2	-16.442	5	-.012	1	-.119	5	0	5
153	M2	1	max	1077.007	1	2.072	4	.927	1	0	3	0	3	0	1
154			min	-1156.117	3	.507	15	-59.063	4	0	4	0	1	0	1
155		2	max	1077.387	1	2.038	4	.927	1	0	3	0	1	0	15
156			min	-1155.833	3	.499	15	-59.392	4	0	4	-.015	4	0	4
157		3	max	1077.766	1	2.005	4	.927	1	0	3	0	1	0	15
158			min	-1155.548	3	.492	15	-59.722	4	0	4	-.03	4	-.001	4
159		4	max	1078.145	1	1.971	4	.927	1	0	3	0	1	0	15
160			min	-1155.264	3	.484	15	-60.051	4	0	4	-.046	4	-.002	4
161		5	max	1078.524	1	1.938	4	.927	1	0	3	0	1	0	15
162			min	-1154.979	3	.476	15	-60.381	4	0	4	-.061	4	-.002	4
163		6	max	1078.904	1	1.905	4	.927	1	0	3	.001	1	0	15
164			min	-1154.695	3	.468	15	-60.71	4	0	4	-.077	4	-.003	4
165		7	max	1079.283	1	1.871	4	.927	1	0	3	.001	1	0	15
166			min	-1154.41	3	.46	15	-61.039	4	0	4	-.092	4	-.003	4
167		8	max	1079.662	1	1.838	4	.927	1	0	3	.002	1	0	15
168			min	-1154.126	3	.452	15	-61.369	4	0	4	-.108	4	-.004	4
169		9	max	1080.041	1	1.804	4	.927	1	0	3	.002	1	0	15
170			min	-1153.842	3	.444	15	-61.698	4	0	4	-.124	4	-.004	4
171		10	max	1080.421	1	1.771	4	.927	1	0	3	.002	1	-.001	15
172			min	-1153.557	3	.437	15	-62.028	4	0	4	-.14	4	-.004	4
173		11	max	1080.8	1	1.738	4	.927	1	0	3	.002	1	-.001	15
174			min	-1153.273	3	.429	15	-62.357	4	0	4	-.156	4	-.005	4
175		12	max	1081.179	1	1.704	4	.927	1	0	3	.003	1	-.001	15
176			min	-1152.988	3	.421	15	-62.687	4	0	4	-.172	4	-.005	4
177		13	max	1081.558	1	1.671	4	.927	1	0	3	.003	1	-.001	15
178			min	-1152.704	3	.413	15	-63.016	4	0	4	-.188	4	-.006	4
179		14	max	1081.938	1	1.637	4	.927	1	0	3	.003	1	-.002	15
180			min	-1152.419	3	.405	15	-63.346	4	0	4	-.204	4	-.006	4
181		15	max	1082.317	1	1.604	4	.927	1	0	3	.003	1	-.002	15
182			min	-1152.135	3	.397	15	-63.675	4	0	4	-.22	4	-.007	4
183		16	max	1082.696	1	1.571	4	.927	1	0	3	.004	1	-.002	15
184			min	-1151.85	3	.389	15	-64.005	4	0	4	-.237	4	-.007	4
185		17	max	1083.075	1	1.537	4	.927	1	0	3	.004	1	-.002	15
186			min	-1151.566	3	.381	12	-64.334	4	0	4	-.253	4	-.007	4
187		18	max	1083.455	1	1.504	4	.927	1	0	3	.004	1	-.002	15
188			min	-1151.282	3	.368	12	-64.664	4	0	4	-.269	4	-.008	4
189		19	max	1083.834	1	1.47	4	.927	1	0	3	.004	1	-.002	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
190			min	-1150.997	3	.355	12	-64.993	4	0	4	-.286	4	-.008	4
191	M3	1	max	419.796	2	8.009	4	1.282	4	0	3	0	1	.008	4
192			min	-552.837	3	1.895	15	.004	12	0	4	-.02	4	.002	15
193		2	max	419.626	2	7.239	4	1.823	4	0	3	0	1	.005	4
194			min	-552.965	3	1.714	15	.004	12	0	4	-.02	4	0	12
195		3	max	419.456	2	6.469	4	2.363	4	0	3	0	1	.002	2
196			min	-553.093	3	1.533	15	.004	12	0	4	-.019	4	0	3
197		4	max	419.285	2	5.699	4	2.904	4	0	3	0	1	0	2
198			min	-553.22	3	1.352	15	.004	12	0	4	-.018	4	-.002	3
199		5	max	419.115	2	4.929	4	3.445	4	0	3	0	1	0	15
200			min	-553.348	3	1.171	15	.004	12	0	4	-.016	4	-.003	3
201		6	max	418.945	2	4.159	4	3.985	4	0	3	0	1	-.001	15
202			min	-553.476	3	.99	15	.004	12	0	4	-.015	4	-.005	6
203		7	max	418.774	2	3.389	4	4.526	4	0	3	0	1	-.001	15
204			min	-553.604	3	.809	15	.004	12	0	4	-.013	4	-.006	6
205		8	max	418.604	2	2.619	4	5.066	4	0	3	0	1	-.002	15
206			min	-553.732	3	.628	15	.004	12	0	4	-.011	5	-.007	6
207		9	max	418.434	2	1.849	4	5.607	4	0	3	0	1	-.002	15
208			min	-553.859	3	.447	15	.004	12	0	4	-.009	5	-.008	6
209		10	max	418.263	2	1.079	4	6.147	4	0	3	0	1	-.002	15
210			min	-553.987	3	.266	15	.004	12	0	4	-.006	5	-.009	6
211		11	max	418.093	2	.369	2	6.688	4	0	3	0	1	-.002	15
212			min	-554.115	3	-.039	3	.004	12	0	4	-.004	5	-.009	6
213		12	max	417.923	2	-.096	15	7.228	4	0	3	0	1	-.002	15
214			min	-554.243	3	-.489	3	.004	12	0	4	0	5	-.009	6
215		13	max	417.752	2	-.277	15	7.769	4	0	3	.002	4	-.002	15
216			min	-554.37	3	-1.232	6	.004	12	0	4	0	12	-.009	6
217		14	max	417.582	2	-.458	15	8.309	4	0	3	.006	4	-.002	15
218			min	-554.498	3	-2.002	6	.004	12	0	4	0	12	-.008	6
219		15	max	417.412	2	-.639	15	8.85	4	0	3	.009	4	-.002	15
220			min	-554.626	3	-2.772	6	.004	12	0	4	0	12	-.007	6
221		16	max	417.241	2	-.82	15	9.391	4	0	3	.013	4	-.001	15
222			min	-554.754	3	-3.542	6	.004	12	0	4	0	12	-.006	6
223		17	max	417.071	2	-1.001	15	9.931	4	0	3	.017	4	0	15
224			min	-554.881	3	-4.312	6	.004	12	0	4	0	12	-.004	6
225		18	max	416.901	2	-1.182	15	10.472	4	0	3	.022	4	0	15
226			min	-555.009	3	-5.082	6	.004	12	0	4	0	12	-.002	6
227		19	max	416.73	2	-1.363	15	11.012	4	0	3	.026	4	0	1
228			min	-555.137	3	-5.852	6	.004	12	0	4	0	12	0	1
229	M4	1	max	1206.119	1	0	1	-.428	12	0	1	.016	4	0	1
230			min	-238.49	3	0	1	-258.033	4	0	1	0	12	0	1
231		2	max	1206.289	1	0	1	-.428	12	0	1	0	12	0	1
232			min	-238.362	3	0	1	-258.181	4	0	1	-.013	4	0	1
233		3	max	1206.459	1	0	1	-.428	12	0	1	0	12	0	1
234			min	-238.234	3	0	1	-258.329	4	0	1	-.043	4	0	1
235		4	max	1206.63	1	0	1	-.428	12	0	1	0	12	0	1
236			min	-238.106	3	0	1	-258.476	4	0	1	-.073	4	0	1
237		5	max	1206.8	1	0	1	-.428	12	0	1	0	12	0	1
238			min	-237.979	3	0	1	-258.624	4	0	1	-.102	4	0	1
239		6	max	1206.97	1	0	1	-.428	12	0	1	0	12	0	1
240			min	-237.851	3	0	1	-258.772	4	0	1	-.132	4	0	1
241		7	max	1207.141	1	0	1	-.428	12	0	1	0	12	0	1
242			min	-237.723	3	0	1	-258.919	4	0	1	-.162	4	0	1
243		8	max	1207.311	1	0	1	-.428	12	0	1	0	12	0	1
244			min	-237.595	3	0	1	-259.067	4	0	1	-.192	4	0	1
245		9	max	1207.481	1	0	1	-.428	12	0	1	0	12	0	1
246			min	-237.468	3	0	1	-259.215	4	0	1	-.221	4	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
247		10	max	1207.652	1	0	1	-.428	12	0	1	0	12	0	1
248			min	-237.34	3	0	1	-259.362	4	0	1	-.251	4	0	1
249		11	max	1207.822	1	0	1	-.428	12	0	1	0	12	0	1
250			min	-237.212	3	0	1	-259.51	4	0	1	-.281	4	0	1
251		12	max	1207.992	1	0	1	-.428	12	0	1	0	12	0	1
252			min	-237.084	3	0	1	-259.657	4	0	1	-.311	4	0	1
253		13	max	1208.163	1	0	1	-.428	12	0	1	0	12	0	1
254			min	-236.957	3	0	1	-259.805	4	0	1	-.34	4	0	1
255		14	max	1208.333	1	0	1	-.428	12	0	1	0	12	0	1
256			min	-236.829	3	0	1	-259.953	4	0	1	-.37	4	0	1
257		15	max	1208.503	1	0	1	-.428	12	0	1	0	12	0	1
258			min	-236.701	3	0	1	-260.1	4	0	1	-.4	4	0	1
259		16	max	1208.674	1	0	1	-.428	12	0	1	0	12	0	1
260			min	-236.573	3	0	1	-260.248	4	0	1	-.43	4	0	1
261		17	max	1208.844	1	0	1	-.428	12	0	1	0	12	0	1
262			min	-236.446	3	0	1	-260.396	4	0	1	-.46	4	0	1
263		18	max	1209.014	1	0	1	-.428	12	0	1	0	12	0	1
264			min	-236.318	3	0	1	-260.543	4	0	1	-.49	4	0	1
265		19	max	1209.185	1	0	1	-.428	12	0	1	0	12	0	1
266			min	-236.19	3	0	1	-260.691	4	0	1	-.52	4	0	1
267	M6	1	max	3465.142	1	2.479	2	0	1	0	1	0	4	0	1
268			min	-3784.73	3	.108	3	-59.633	4	0	4	0	1	0	1
269		2	max	3465.521	1	2.453	2	0	1	0	1	0	1	0	3
270			min	-3784.446	3	.088	3	-59.962	4	0	4	-.015	4	0	2
271		3	max	3465.9	1	2.427	2	0	1	0	1	0	1	0	3
272			min	-3784.161	3	.069	3	-60.291	4	0	4	-.031	4	-.001	2
273		4	max	3466.279	1	2.401	2	0	1	0	1	0	1	0	3
274			min	-3783.877	3	.049	3	-60.621	4	0	4	-.046	4	-.002	2
275		5	max	3466.659	1	2.375	2	0	1	0	1	0	1	0	3
276			min	-3783.593	3	.03	3	-60.95	4	0	4	-.062	4	-.002	2
277		6	max	3467.038	1	2.349	2	0	1	0	1	0	1	0	3
278			min	-3783.308	3	.01	3	-61.28	4	0	4	-.077	4	-.003	2
279		7	max	3467.417	1	2.323	2	0	1	0	1	0	1	0	3
280			min	-3783.024	3	-.009	3	-61.609	4	0	4	-.093	4	-.004	2
281		8	max	3467.796	1	2.297	2	0	1	0	1	0	1	0	3
282			min	-3782.739	3	-.029	3	-61.939	4	0	4	-.109	4	-.004	2
283		9	max	3468.176	1	2.271	2	0	1	0	1	0	1	0	3
284			min	-3782.455	3	-.048	3	-62.268	4	0	4	-.125	4	-.005	2
285		10	max	3468.555	1	2.245	2	0	1	0	1	0	1	0	3
286			min	-3782.17	3	-.068	3	-62.598	4	0	4	-.141	4	-.005	2
287		11	max	3468.934	1	2.219	2	0	1	0	1	0	1	0	3
288			min	-3781.886	3	-.087	3	-62.927	4	0	4	-.157	4	-.006	2
289		12	max	3469.313	1	2.193	2	0	1	0	1	0	1	0	3
290			min	-3781.601	3	-.107	3	-63.257	4	0	4	-.173	4	-.007	2
291		13	max	3469.693	1	2.167	2	0	1	0	1	0	1	0	3
292			min	-3781.317	3	-.126	3	-63.586	4	0	4	-.189	4	-.007	2
293		14	max	3470.072	1	2.141	2	0	1	0	1	0	1	0	3
294			min	-3781.033	3	-.146	3	-63.916	4	0	4	-.206	4	-.008	2
295		15	max	3470.451	1	2.115	2	0	1	0	1	0	1	0	3
296			min	-3780.748	3	-.165	3	-64.245	4	0	4	-.222	4	-.008	2
297		16	max	3470.831	1	2.089	2	0	1	0	1	0	1	0	3
298			min	-3780.464	3	-.185	3	-64.574	4	0	4	-.239	4	-.009	2
299		17	max	3471.21	1	2.063	2	0	1	0	1	0	1	0	3
300			min	-3780.179	3	-.204	3	-64.904	4	0	4	-.255	4	-.009	2
301		18	max	3471.589	1	2.037	2	0	1	0	1	0	1	0	3
302			min	-3779.895	3	-.224	3	-65.233	4	0	4	-.272	4	-.01	2
303		19	max	3471.968	1	2.011	2	0	1	0	1	0	1	0	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	-3779.61	3	-.243	3	-65.563	4	0	4	-.289	4	-.01	2
305	M7	1	max	1646.793	2	8.02	6	1.145	4	0	1	0	1	.01	2
306			min	-1739.255	3	1.882	15	0	1	0	4	-.021	4	0	3
307		2	max	1646.622	2	7.25	6	1.686	4	0	1	0	1	.008	2
308			min	-1739.383	3	1.701	15	0	1	0	4	-.02	4	-.002	3
309		3	max	1646.452	2	6.48	6	2.226	4	0	1	0	1	.005	2
310			min	-1739.511	3	1.52	15	0	1	0	4	-.019	4	-.003	3
311		4	max	1646.282	2	5.71	6	2.767	4	0	1	0	1	.003	2
312			min	-1739.639	3	1.339	15	0	1	0	4	-.018	4	-.005	3
313		5	max	1646.111	2	4.94	6	3.307	4	0	1	0	1	0	2
314			min	-1739.766	3	1.158	15	0	1	0	4	-.017	4	-.006	3
315		6	max	1645.941	2	4.17	6	3.848	4	0	1	0	1	0	2
316			min	-1739.894	3	.977	15	0	1	0	4	-.015	4	-.006	3
317		7	max	1645.771	2	3.4	6	4.388	4	0	1	0	1	-.001	15
318			min	-1740.022	3	.796	15	0	1	0	4	-.014	4	-.007	3
319		8	max	1645.6	2	2.63	6	4.929	4	0	1	0	1	-.002	15
320			min	-1740.15	3	.615	15	0	1	0	4	-.012	4	-.007	3
321		9	max	1645.43	2	1.968	2	5.47	4	0	1	0	1	-.002	15
322			min	-1740.277	3	.317	12	0	1	0	4	-.009	4	-.008	4
323		10	max	1645.26	2	1.368	2	6.01	4	0	1	0	1	-.002	15
324			min	-1740.405	3	-.041	3	0	1	0	4	-.007	4	-.009	4
325		11	max	1645.089	2	.768	2	6.551	4	0	1	0	1	-.002	15
326			min	-1740.533	3	-.491	3	0	1	0	4	-.004	4	-.009	4
327		12	max	1644.919	2	.168	2	7.091	4	0	1	0	1	-.002	15
328			min	-1740.661	3	-.941	3	0	1	0	4	-.002	5	-.009	4
329		13	max	1644.749	2	-.29	15	7.632	4	0	1	.002	4	-.002	15
330			min	-1740.788	3	-1.391	3	0	1	0	4	0	1	-.009	4
331		14	max	1644.578	2	-.471	15	8.172	4	0	1	.005	4	-.002	15
332			min	-1740.916	3	-1.99	4	0	1	0	4	0	1	-.008	4
333		15	max	1644.408	2	-.652	15	8.713	4	0	1	.008	4	-.002	15
334			min	-1741.044	3	-2.76	4	0	1	0	4	0	1	-.007	4
335		16	max	1644.238	2	-.833	15	9.253	4	0	1	.012	4	-.001	15
336			min	-1741.172	3	-3.53	4	0	1	0	4	0	1	-.006	4
337		17	max	1644.067	2	-1.014	15	9.794	4	0	1	.016	4	-.001	15
338			min	-1741.299	3	-4.3	4	0	1	0	4	0	1	-.004	4
339		18	max	1643.897	2	-1.195	15	10.334	4	0	1	.02	4	0	15
340			min	-1741.427	3	-5.07	4	0	1	0	4	0	1	-.002	4
341		19	max	1643.727	2	-1.376	15	10.875	4	0	1	.025	4	0	1
342			min	-1741.555	3	-5.84	4	0	1	0	4	0	1	0	1
343	M8	1	max	3414.064	1	0	1	0	1	0	1	.016	4	0	1
344			min	-841.82	3	0	1	-251.123	4	0	1	0	1	0	1
345		2	max	3414.234	1	0	1	0	1	0	1	0	1	0	1
346			min	-841.692	3	0	1	-251.271	4	0	1	-.013	4	0	1
347		3	max	3414.405	1	0	1	0	1	0	1	0	1	0	1
348			min	-841.565	3	0	1	-251.418	4	0	1	-.042	4	0	1
349		4	max	3414.575	1	0	1	0	1	0	1	0	1	0	1
350			min	-841.437	3	0	1	-251.566	4	0	1	-.071	4	0	1
351		5	max	3414.745	1	0	1	0	1	0	1	0	1	0	1
352			min	-841.309	3	0	1	-251.713	4	0	1	-.1	4	0	1
353		6	max	3414.916	1	0	1	0	1	0	1	0	1	0	1
354			min	-841.181	3	0	1	-251.861	4	0	1	-.129	4	0	1
355		7	max	3415.086	1	0	1	0	1	0	1	0	1	0	1
356			min	-841.054	3	0	1	-252.009	4	0	1	-.158	4	0	1
357		8	max	3415.256	1	0	1	0	1	0	1	0	1	0	1
358			min	-840.926	3	0	1	-252.156	4	0	1	-.187	4	0	1
359		9	max	3415.427	1	0	1	0	1	0	1	0	1	0	1
360			min	-840.798	3	0	1	-252.304	4	0	1	-.216	4	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
361		10	max	3415.597	1	0	1	0	1	0	1	0	1	0	1
362			min	-840.67	3	0	1	-252.452	4	0	1	-.245	4	0	1
363		11	max	3415.767	1	0	1	0	1	0	1	0	1	0	1
364			min	-840.543	3	0	1	-252.599	4	0	1	-.274	4	0	1
365		12	max	3415.938	1	0	1	0	1	0	1	0	1	0	1
366			min	-840.415	3	0	1	-252.747	4	0	1	-.303	4	0	1
367		13	max	3416.108	1	0	1	0	1	0	1	0	1	0	1
368			min	-840.287	3	0	1	-252.895	4	0	1	-.332	4	0	1
369		14	max	3416.278	1	0	1	0	1	0	1	0	1	0	1
370			min	-840.159	3	0	1	-253.042	4	0	1	-.361	4	0	1
371		15	max	3416.449	1	0	1	0	1	0	1	0	1	0	1
372			min	-840.032	3	0	1	-253.19	4	0	1	-.39	4	0	1
373		16	max	3416.619	1	0	1	0	1	0	1	0	1	0	1
374			min	-839.904	3	0	1	-253.337	4	0	1	-.419	4	0	1
375		17	max	3416.789	1	0	1	0	1	0	1	0	1	0	1
376			min	-839.776	3	0	1	-253.485	4	0	1	-.448	4	0	1
377		18	max	3416.96	1	0	1	0	1	0	1	0	1	0	1
378			min	-839.648	3	0	1	-253.633	4	0	1	-.477	4	0	1
379		19	max	3417.13	1	0	1	0	1	0	1	0	1	0	1
380			min	-839.521	3	0	1	-253.78	4	0	1	-.506	4	0	1
381	M10	1	max	1077.007	1	1.983	6	-.04	12	0	1	0	1	0	1
382			min	-1156.117	3	.448	15	-59.555	4	0	5	0	3	0	1
383		2	max	1077.387	1	1.949	6	-.04	12	0	1	0	10	0	15
384			min	-1155.833	3	.44	15	-59.885	4	0	5	-.015	4	0	6
385		3	max	1077.766	1	1.916	6	-.04	12	0	1	0	12	0	15
386			min	-1155.548	3	.432	15	-60.214	4	0	5	-.031	4	0	6
387		4	max	1078.145	1	1.882	6	-.04	12	0	1	0	12	0	15
388			min	-1155.264	3	.424	15	-60.544	4	0	5	-.046	4	-.001	6
389		5	max	1078.524	1	1.849	6	-.04	12	0	1	0	12	0	15
390			min	-1154.979	3	.416	15	-60.873	4	0	5	-.062	4	-.002	6
391		6	max	1078.904	1	1.816	6	-.04	12	0	1	0	12	0	15
392			min	-1154.695	3	.408	15	-61.203	4	0	5	-.077	4	-.002	6
393		7	max	1079.283	1	1.782	6	-.04	12	0	1	0	12	0	15
394			min	-1154.41	3	.4	15	-61.532	4	0	5	-.093	4	-.003	6
395		8	max	1079.662	1	1.749	6	-.04	12	0	1	0	12	0	15
396			min	-1154.126	3	.393	15	-61.862	4	0	5	-.109	4	-.003	6
397		9	max	1080.041	1	1.716	6	-.04	12	0	1	0	12	0	15
398			min	-1153.842	3	.385	15	-62.191	4	0	5	-.125	4	-.004	6
399		10	max	1080.421	1	1.682	6	-.04	12	0	1	0	12	0	15
400			min	-1153.557	3	.377	15	-62.521	4	0	5	-.141	4	-.004	6
401		11	max	1080.8	1	1.649	6	-.04	12	0	1	0	12	-.001	15
402			min	-1153.273	3	.369	15	-62.85	4	0	5	-.157	4	-.005	6
403		12	max	1081.179	1	1.615	6	-.04	12	0	1	0	12	-.001	15
404			min	-1152.988	3	.361	15	-63.18	4	0	5	-.173	4	-.005	6
405		13	max	1081.558	1	1.582	6	-.04	12	0	1	0	12	-.001	15
406			min	-1152.704	3	.353	15	-63.509	4	0	5	-.189	4	-.005	6
407		14	max	1081.938	1	1.549	6	-.04	12	0	1	0	12	-.001	15
408			min	-1152.419	3	.345	15	-63.838	4	0	5	-.206	4	-.006	6
409		15	max	1082.317	1	1.515	6	-.04	12	0	1	0	12	-.001	15
410			min	-1152.135	3	.338	15	-64.168	4	0	5	-.222	4	-.006	6
411		16	max	1082.696	1	1.482	6	-.04	12	0	1	0	12	-.001	15
412			min	-1151.85	3	.33	15	-64.497	4	0	5	-.238	4	-.007	6
413		17	max	1083.075	1	1.448	6	-.04	12	0	1	0	12	-.002	15
414			min	-1151.566	3	.322	15	-64.827	4	0	5	-.255	4	-.007	6
415		18	max	1083.455	1	1.415	6	-.04	12	0	1	0	12	-.002	15
416			min	-1151.282	3	.314	15	-65.156	4	0	5	-.272	4	-.007	6
417		19	max	1083.834	1	1.382	6	-.04	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	-1150.997	3	.306	15	-65.486	4	0	5	-.288	4	-.008	6
419	M11	1	max	419.796	2	7.955	6	1.241	4	0	1	0	12	.008	6
420			min	-552.837	3	1.859	15	-.078	1	0	4	-.021	4	.002	15
421		2	max	419.626	2	7.185	6	1.782	4	0	1	0	12	.005	2
422			min	-552.965	3	1.678	15	-.078	1	0	4	-.02	4	0	12
423		3	max	419.456	2	6.415	6	2.322	4	0	1	0	12	.002	2
424			min	-553.093	3	1.497	15	-.078	1	0	4	-.019	4	0	3
425		4	max	419.285	2	5.645	6	2.863	4	0	1	0	12	0	2
426			min	-553.22	3	1.316	15	-.078	1	0	4	-.018	4	-.002	3
427		5	max	419.115	2	4.875	6	3.403	4	0	1	0	12	0	15
428			min	-553.348	3	1.135	15	-.078	1	0	4	-.017	4	-.003	4
429		6	max	418.945	2	4.105	6	3.944	4	0	1	0	12	-.001	15
430			min	-553.476	3	.954	15	-.078	1	0	4	-.015	4	-.005	4
431		7	max	418.774	2	3.335	6	4.484	4	0	1	0	12	-.002	15
432			min	-553.604	3	.773	15	-.078	1	0	4	-.013	4	-.006	4
433		8	max	418.604	2	2.565	6	5.025	4	0	1	0	12	-.002	15
434			min	-553.732	3	.592	15	-.078	1	0	4	-.011	4	-.008	4
435		9	max	418.434	2	1.795	6	5.565	4	0	1	0	12	-.002	15
436			min	-553.859	3	.411	15	-.078	1	0	4	-.009	4	-.009	4
437		10	max	418.263	2	1.025	6	6.106	4	0	1	0	12	-.002	15
438			min	-553.987	3	.23	15	-.078	1	0	4	-.007	4	-.009	4
439		11	max	418.093	2	.369	2	6.647	4	0	1	0	12	-.002	15
440			min	-554.115	3	-.039	3	-.078	1	0	4	-.004	4	-.01	4
441		12	max	417.923	2	-.132	15	7.187	4	0	1	0	12	-.002	15
442			min	-554.243	3	-.516	4	-.078	1	0	4	-.001	4	-.009	4
443		13	max	417.752	2	-.313	15	7.728	4	0	1	.002	5	-.002	15
444			min	-554.37	3	-1.286	4	-.078	1	0	4	0	1	-.009	4
445		14	max	417.582	2	-.494	15	8.268	4	0	1	.005	5	-.002	15
446			min	-554.498	3	-2.056	4	-.078	1	0	4	0	1	-.008	4
447		15	max	417.412	2	-.675	15	8.809	4	0	1	.009	4	-.002	15
448			min	-554.626	3	-2.826	4	-.078	1	0	4	0	1	-.007	4
449		16	max	417.241	2	-.856	15	9.349	4	0	1	.013	4	-.001	15
450			min	-554.754	3	-3.596	4	-.078	1	0	4	0	1	-.006	4
451		17	max	417.071	2	-1.037	15	9.89	4	0	1	.017	4	-.001	15
452			min	-554.881	3	-4.366	4	-.078	1	0	4	0	1	-.004	4
453		18	max	416.901	2	-1.218	15	10.43	4	0	1	.021	4	0	15
454			min	-555.009	3	-5.136	4	-.078	1	0	4	0	1	-.002	4
455		19	max	416.73	2	-1.399	15	10.971	4	0	1	.026	4	0	1
456			min	-555.137	3	-5.906	4	-.078	1	0	4	0	1	0	1
457	M12	1	max	1206.119	1	0	1	9.741	1	0	1	.016	4	0	1
458			min	-238.49	3	0	1	-252.841	4	0	1	0	1	0	1
459		2	max	1206.289	1	0	1	9.741	1	0	1	0	1	0	1
460			min	-238.362	3	0	1	-252.988	4	0	1	-.013	4	0	1
461		3	max	1206.459	1	0	1	9.741	1	0	1	.002	1	0	1
462			min	-238.234	3	0	1	-253.136	4	0	1	-.042	4	0	1
463		4	max	1206.63	1	0	1	9.741	1	0	1	.003	1	0	1
464			min	-238.106	3	0	1	-253.284	4	0	1	-.071	4	0	1
465		5	max	1206.8	1	0	1	9.741	1	0	1	.004	1	0	1
466			min	-237.979	3	0	1	-253.431	4	0	1	-.1	4	0	1
467		6	max	1206.97	1	0	1	9.741	1	0	1	.005	1	0	1
468			min	-237.851	3	0	1	-253.579	4	0	1	-.129	4	0	1
469		7	max	1207.141	1	0	1	9.741	1	0	1	.006	1	0	1
470			min	-237.723	3	0	1	-253.726	4	0	1	-.158	4	0	1
471		8	max	1207.311	1	0	1	9.741	1	0	1	.007	1	0	1
472			min	-237.595	3	0	1	-253.874	4	0	1	-.188	4	0	1
473		9	max	1207.481	1	0	1	9.741	1	0	1	.008	1	0	1
474			min	-237.468	3	0	1	-254.022	4	0	1	-.217	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	1207.652	1	0	1	9.741	1	0	1	.01	1	0	1
476			min	-237.34	3	0	1	-254.169	4	0	1	-.246	4	0	1
477		11	max	1207.822	1	0	1	9.741	1	0	1	.011	1	0	1
478			min	-237.212	3	0	1	-254.317	4	0	1	-.275	4	0	1
479		12	max	1207.992	1	0	1	9.741	1	0	1	.012	1	0	1
480			min	-237.084	3	0	1	-254.465	4	0	1	-.304	4	0	1
481		13	max	1208.163	1	0	1	9.741	1	0	1	.013	1	0	1
482			min	-236.957	3	0	1	-254.612	4	0	1	-.334	4	0	1
483		14	max	1208.333	1	0	1	9.741	1	0	1	.014	1	0	1
484			min	-236.829	3	0	1	-254.76	4	0	1	-.363	4	0	1
485		15	max	1208.503	1	0	1	9.741	1	0	1	.015	1	0	1
486			min	-236.701	3	0	1	-254.907	4	0	1	-.392	4	0	1
487		16	max	1208.674	1	0	1	9.741	1	0	1	.016	1	0	1
488			min	-236.573	3	0	1	-255.055	4	0	1	-.421	4	0	1
489		17	max	1208.844	1	0	1	9.741	1	0	1	.017	1	0	1
490			min	-236.446	3	0	1	-255.203	4	0	1	-.451	4	0	1
491		18	max	1209.014	1	0	1	9.741	1	0	1	.018	1	0	1
492			min	-236.318	3	0	1	-255.35	4	0	1	-.48	4	0	1
493		19	max	1209.185	1	0	1	9.741	1	0	1	.02	1	0	1
494			min	-236.19	3	0	1	-255.498	4	0	1	-.509	4	0	1
495	M1	1	max	161.478	1	647.127	3	51.694	5	0	1	.237	1	0	3
496			min	-8.323	5	-485.32	1	-99.205	1	0	3	-.077	5	-.013	2
497		2	max	161.968	1	646.118	3	52.935	5	0	1	.184	1	.243	1
498			min	-8.094	5	-486.666	1	-99.205	1	0	3	-.049	5	-.341	3
499		3	max	331.185	3	544.527	1	-2.319	15	0	3	.132	1	.488	1
500			min	-200.742	2	-467.429	3	-98.507	1	0	1	-.022	5	-.668	3
501		4	max	331.552	3	543.181	1	-1.484	15	0	3	.08	1	.201	1
502			min	-200.253	2	-468.439	3	-98.507	1	0	1	-.023	5	-.421	3
503		5	max	331.92	3	541.835	1	-.648	15	0	3	.028	1	-.004	15
504			min	-199.763	2	-469.448	3	-98.507	1	0	1	-.024	5	-.174	3
505		6	max	332.287	3	540.489	1	.188	15	0	3	-.001	12	.074	3
506			min	-199.273	2	-470.458	3	-98.507	1	0	1	-.029	4	-.371	1
507		7	max	332.655	3	539.143	1	1.396	5	0	3	-.003	12	.323	3
508			min	-198.783	2	-471.467	3	-98.507	1	0	1	-.076	1	-.656	1
509		8	max	333.022	3	537.797	1	2.637	5	0	3	-.006	12	.572	3
510			min	-198.293	2	-472.477	3	-98.507	1	0	1	-.128	1	-.94	1
511		9	max	343.322	3	42.102	2	48.785	5	0	9	.075	1	.668	3
512			min	-132.489	2	.406	15	-144.72	1	0	3	-.124	5	-1.071	1
513		10	max	343.689	3	40.756	2	50.026	5	0	9	0	10	.65	3
514			min	-131.999	2	0	5	-144.72	1	0	3	-.098	4	-1.083	1
515		11	max	344.057	3	39.41	2	51.268	5	0	9	-.004	12	.633	3
516			min	-131.509	2	-1.679	4	-144.72	1	0	3	-.087	4	-1.094	1
517		12	max	354.292	3	306.794	3	139.656	5	0	2	.126	1	.551	3
518			min	-78.506	10	-582.275	1	-96.228	1	0	3	-.188	5	-.966	1
519		13	max	354.659	3	305.784	3	140.898	5	0	2	.076	1	.39	3
520			min	-78.097	10	-583.621	1	-96.228	1	0	3	-.114	5	-.659	1
521		14	max	355.027	3	304.775	3	142.139	5	0	2	.025	1	.229	3
522			min	-77.689	10	-584.967	1	-96.228	1	0	3	-.04	5	-.35	1
523		15	max	355.394	3	303.765	3	143.381	5	0	2	.036	5	.068	3
524			min	-77.281	10	-586.313	1	-96.228	1	0	3	-.026	1	-.041	1
525		16	max	355.761	3	302.756	3	144.622	5	0	2	.112	5	.292	2
526			min	-76.873	10	-587.659	1	-96.228	1	0	3	-.077	1	-.092	3
527		17	max	356.129	3	301.746	3	145.863	5	0	2	.188	5	.601	2
528			min	-76.464	10	-589.005	1	-96.228	1	0	3	-.128	1	-.251	3
529		18	max	16.213	5	592.215	2	-4.683	12	0	5	.168	5	.302	2
530			min	-162.18	1	-253.579	3	-116.61	4	0	2	-.182	1	-.124	3
531		19	max	16.442	5	590.869	2	-4.683	12	0	5	.119	5	.01	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	-161.69	1	-254.588	3	-115.368	4	0	2	-.238	1	-.012	1
533	M5	1	max	349.412	1	2156.806	3	90.768	5	0	1	0	1	.027	2
534			min	11.658	12	-1642.986	1	0	1	0	4	-.171	4	0	3
535		2	max	349.902	1	2155.796	3	92.009	5	0	1	0	1	.894	1
536			min	11.903	12	-1644.332	1	0	1	0	4	-.123	4	-1.139	3
537		3	max	1064.477	3	1660.035	1	38.671	4	0	4	0	1	1.722	1
538			min	-715.035	2	-1499.392	3	0	1	0	1	-.076	4	-2.232	3
539		4	max	1064.845	3	1658.689	1	39.912	4	0	4	0	1	.846	1
540			min	-714.545	2	-1500.402	3	0	1	0	1	-.055	4	-1.44	3
541		5	max	1065.212	3	1657.343	1	41.154	4	0	4	0	1	.011	9
542			min	-714.055	2	-1501.412	3	0	1	0	1	-.033	4	-.649	3
543		6	max	1065.58	3	1655.997	1	42.395	4	0	4	0	1	.144	3
544			min	-713.565	2	-1502.421	3	0	1	0	1	-.011	5	-.903	1
545		7	max	1065.947	3	1654.651	1	43.637	4	0	4	.011	4	.937	3
546			min	-713.075	2	-1503.431	3	0	1	0	1	0	1	-1.776	1
547		8	max	1066.314	3	1653.305	1	44.878	4	0	4	.035	4	1.731	3
548			min	-712.585	2	-1504.44	3	0	1	0	1	0	1	-2.649	1
549		9	max	1083.473	3	140.264	2	156.716	4	0	1	0	1	1.993	3
550			min	-576.907	2	.407	15	0	1	0	1	-.172	4	-2.998	1
551		10	max	1083.84	3	138.918	2	157.958	4	0	1	0	1	1.929	3
552			min	-576.417	2	0	15	0	1	0	1	-.089	5	-3.037	1
553		11	max	1084.208	3	137.572	2	159.199	4	0	1	0	1	1.866	3
554			min	-575.927	2	-1.522	6	0	1	0	1	-.007	5	-3.076	1
555		12	max	1101.496	3	970.042	3	196.234	4	0	1	0	1	1.638	3
556			min	-440.283	2	-1802.201	1	0	1	0	4	-.269	4	-2.742	1
557		13	max	1101.863	3	969.033	3	197.475	4	0	1	0	1	1.126	3
558			min	-439.793	2	-1803.547	1	0	1	0	4	-.165	4	-1.791	1
559		14	max	1102.231	3	968.023	3	198.717	4	0	1	0	1	.615	3
560			min	-439.303	2	-1804.893	1	0	1	0	4	-.061	4	-.838	1
561		15	max	1102.598	3	967.014	3	199.958	4	0	1	.044	4	.185	2
562			min	-438.813	2	-1806.239	1	0	1	0	4	0	1	-.004	13
563		16	max	1102.966	3	966.004	3	201.2	4	0	1	.15	4	1.132	2
564			min	-438.323	2	-1807.585	1	0	1	0	4	0	1	-.405	3
565		17	max	1103.333	3	964.995	3	202.441	4	0	1	.257	4	2.08	2
566			min	-437.833	2	-1808.931	1	0	1	0	4	0	1	-.915	3
567		18	max	-12.162	12	1995.379	2	0	1	0	4	.268	4	1.073	2
568			min	-349.478	1	-869.417	3	-33.833	5	0	1	0	1	-.478	3
569		19	max	-11.917	12	1994.033	2	0	1	0	4	.251	4	.023	1
570			min	-348.988	1	-870.426	3	-32.592	5	0	1	0	1	-.019	3
571	M9	1	max	161.478	1	647.127	3	99.205	1	0	3	-.011	12	0	3
572			min	6.39	12	-485.32	1	4.639	12	0	4	-.237	1	-.013	2
573		2	max	161.968	1	646.118	3	99.205	1	0	3	-.009	12	.243	1
574			min	6.635	12	-486.666	1	4.639	12	0	4	-.184	1	-.341	3
575		3	max	331.185	3	544.527	1	98.507	1	0	1	-.006	12	.488	1
576			min	-200.742	2	-467.429	3	4.597	12	0	3	-.132	1	-.668	3
577		4	max	331.552	3	543.181	1	98.507	1	0	1	-.004	12	.201	1
578			min	-200.253	2	-468.439	3	4.597	12	0	3	-.08	1	-.421	3
579		5	max	331.92	3	541.835	1	98.507	1	0	1	-.001	12	-.004	15
580			min	-199.763	2	-469.448	3	4.597	12	0	3	-.034	4	-.174	3
581		6	max	332.287	3	540.489	1	98.507	1	0	1	.024	1	.074	3
582			min	-199.273	2	-470.458	3	4.597	12	0	3	-.022	5	-.371	1
583		7	max	332.655	3	539.143	1	98.507	1	0	1	.076	1	.323	3
584			min	-198.783	2	-471.467	3	4.597	12	0	3	-.015	5	-.656	1
585		8	max	333.022	3	537.797	1	98.507	1	0	1	.128	1	.572	3
586			min	-198.293	2	-472.477	3	4.597	12	0	3	-.008	5	-.94	1
587		9	max	343.322	3	42.102	2	144.72	1	0	3	-.003	12	.668	3
588			min	-132.489	2	.412	15	6.581	12	0	9	-.149	4	-1.071	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
589		10	max	343.689	3	40.756	2	144.72	1	0	3	0	1	.65	3
590			min	-131.999	2	.006	15	6.581	12	0	9	-.098	4	-1.083	1
591		11	max	344.057	3	39.41	2	144.72	1	0	3	.077	1	.633	3
592			min	-131.509	2	-1.633	6	6.581	12	0	9	-.062	5	-1.094	1
593		12	max	354.292	3	306.794	3	172.715	4	0	3	-.006	12	.551	3
594			min	-78.506	10	-582.275	1	4.257	12	0	2	-.231	4	-.966	1
595		13	max	354.659	3	305.784	3	173.957	4	0	3	-.003	12	.39	3
596			min	-78.097	10	-583.621	1	4.257	12	0	2	-.14	4	-.659	1
597		14	max	355.027	3	304.775	3	175.198	4	0	3	-.001	12	.229	3
598			min	-77.689	10	-584.967	1	4.257	12	0	2	-.048	4	-.35	1
599		15	max	355.394	3	303.765	3	176.44	4	0	3	.045	4	.068	3
600			min	-77.281	10	-586.313	1	4.257	12	0	2	.001	12	-.041	1
601		16	max	355.761	3	302.756	3	177.681	4	0	3	.138	4	.292	2
602			min	-76.873	10	-587.659	1	4.257	12	0	2	.003	12	-.092	3
603		17	max	356.129	3	301.746	3	178.922	4	0	3	.232	4	.601	2
604			min	-76.464	10	-589.005	1	4.257	12	0	2	.006	12	-.251	3
605		18	max	-6.505	12	592.215	2	105.592	1	0	2	.229	4	.302	2
606			min	-162.18	1	-253.579	3	-81.82	5	0	3	.008	12	-.124	3
607		19	max	-6.26	12	590.869	2	105.592	1	0	2	.238	1	.01	3
608			min	-161.69	1	-254.588	3	-80.578	5	0	3	.01	12	-.012	1

Envelope Member Section Deflections

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
1	M13	1	max	0	1	.109	1	.006	3	8.714e-3	1	NC	1	NC	1
2			min	-.564	4	-.017	3	-.003	2	-1.418e-3	3	NC	1	NC	1
3		2	max	0	1	.288	3	.038	1	1.001e-2	1	NC	5	NC	2
4			min	-.564	4	-.1	1	-.017	5	-1.457e-3	3	785.028	3	6646.298	1
5		3	max	0	1	.536	3	.09	1	1.131e-2	1	NC	5	NC	3
6			min	-.564	4	-.265	1	-.02	5	-1.497e-3	3	433.86	3	2719.217	1
7		4	max	0	1	.686	3	.135	1	1.261e-2	1	NC	5	NC	3
8			min	-.564	4	-.357	1	-.014	5	-1.536e-3	3	341.287	3	1799.258	1
9		5	max	0	1	.72	3	.158	1	1.39e-2	1	NC	5	NC	3
10			min	-.564	4	-.363	1	-.003	5	-1.575e-3	3	325.384	3	1532.563	1
11		6	max	0	1	.642	3	.153	1	1.52e-2	1	NC	5	NC	3
12			min	-.564	4	-.285	1	.006	15	-1.615e-3	3	364.25	3	1587.57	1
13		7	max	0	1	.473	3	.12	1	1.65e-2	1	NC	5	NC	3
14			min	-.564	4	-.142	1	.006	10	-1.654e-3	3	489.21	3	2024.325	1
15		8	max	0	1	.26	3	.07	1	1.779e-2	1	NC	4	NC	2
16			min	-.564	4	0	15	0	10	-1.694e-3	3	866.322	3	3510.363	1
17		9	max	0	1	.192	2	.023	4	1.909e-2	1	NC	4	NC	1
18			min	-.564	4	.005	15	-.005	10	-1.733e-3	3	2811.565	2	NC	1
19		10	max	0	1	.255	1	.019	3	2.039e-2	1	NC	3	NC	1
20			min	-.564	4	-.021	3	-.012	2	-1.772e-3	3	1637.628	1	NC	1
21		11	max	0	12	.192	2	.02	1	1.909e-2	1	NC	4	NC	1
22			min	-.564	4	.005	15	-.014	5	-1.733e-3	3	2811.565	2	NC	1
23		12	max	0	12	.26	3	.07	1	1.779e-2	1	NC	4	NC	2
24			min	-.564	4	0	15	-.014	5	-1.694e-3	3	866.322	3	3510.363	1
25		13	max	0	12	.473	3	.12	1	1.65e-2	1	NC	5	NC	3
26			min	-.564	4	-.142	1	-.005	5	-1.654e-3	3	489.21	3	2024.325	1
27		14	max	0	12	.642	3	.153	1	1.52e-2	1	NC	5	NC	3
28			min	-.564	4	-.285	1	.005	15	-1.615e-3	3	364.25	3	1587.57	1
29		15	max	0	12	.72	3	.158	1	1.39e-2	1	NC	5	NC	3
30			min	-.564	4	-.363	1	.011	10	-1.575e-3	3	325.384	3	1532.563	1
31		16	max	0	12	.686	3	.135	1	1.261e-2	1	NC	5	NC	3
32			min	-.564	4	-.357	1	.01	10	-1.536e-3	3	341.287	3	1799.258	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	.536	3	.09	1	1.131e-2	1	NC	5	NC	3
34			min	-.564	4	-.265	1	.006	10	-1.497e-3	3	433.86	3	2719.217	1
35		18	max	0	12	.288	3	.038	1	1.001e-2	1	NC	5	NC	2
36			min	-.564	4	-.1	1	.001	10	-1.457e-3	3	785.028	3	6646.298	1
37		19	max	0	12	.109	1	.006	3	8.714e-3	1	NC	1	NC	1
38			min	-.565	4	-.017	3	-.003	2	-1.418e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.198	3	.005	3	5.407e-3	1	NC	1	NC	1
40			min	-.435	4	-.352	1	-.002	2	-3.561e-3	3	NC	1	NC	1
41		2	max	0	1	.493	3	.026	1	6.489e-3	1	NC	5	NC	2
42			min	-.435	4	-.687	1	-.025	5	-4.337e-3	3	717.145	1	9763.545	1
43		3	max	0	1	.743	3	.072	1	7.571e-3	1	NC	15	NC	3
44			min	-.435	4	-.974	1	-.03	5	-5.114e-3	3	385.554	1	3396.647	1
45		4	max	0	1	.916	3	.116	1	8.652e-3	1	NC	15	NC	3
46			min	-.435	4	-1.183	1	-.02	5	-5.89e-3	3	288.751	1	2103.914	1
47		5	max	0	1	.996	3	.141	1	9.734e-3	1	NC	15	NC	3
48			min	-.435	4	-1.296	1	-.003	5	-6.666e-3	3	254.157	1	1728.608	1
49		6	max	0	1	.983	3	.139	1	1.082e-2	1	NC	15	NC	3
50			min	-.435	4	-1.313	1	.009	10	-7.442e-3	3	249.657	1	1750.008	1
51		7	max	0	1	.895	3	.111	1	1.19e-2	1	NC	15	NC	3
52			min	-.435	4	-1.25	1	.006	10	-8.218e-3	3	267.395	1	2195.128	1
53		8	max	0	1	.763	3	.066	1	1.298e-2	1	NC	15	NC	2
54			min	-.435	4	-1.136	1	0	10	-8.995e-3	3	306.053	1	3753.738	1
55		9	max	0	1	.636	3	.033	4	1.406e-2	1	NC	15	NC	1
56			min	-.435	4	-1.02	1	-.005	10	-9.771e-3	3	359.141	1	7139.559	4
57		10	max	0	1	.576	3	.017	3	1.514e-2	1	NC	5	NC	1
58			min	-.435	4	-.965	1	-.011	2	-1.055e-2	3	391.69	1	NC	1
59		11	max	0	12	.636	3	.019	1	1.406e-2	1	NC	15	NC	1
60			min	-.435	4	-1.02	1	-.025	5	-9.771e-3	3	359.141	1	NC	1
61		12	max	0	12	.763	3	.066	1	1.298e-2	1	NC	15	NC	2
62			min	-.435	4	-1.136	1	-.028	5	-8.995e-3	3	306.053	1	3753.738	1
63		13	max	0	12	.895	3	.111	1	1.19e-2	1	NC	15	NC	3
64			min	-.435	4	-1.25	1	-.018	5	-8.218e-3	3	267.395	1	2195.128	1
65		14	max	0	12	.983	3	.139	1	1.082e-2	1	NC	15	NC	3
66			min	-.435	4	-1.313	1	0	15	-7.442e-3	3	249.657	1	1750.008	1
67		15	max	0	12	.996	3	.141	1	9.734e-3	1	NC	15	NC	3
68			min	-.435	4	-1.296	1	.01	10	-6.666e-3	3	254.157	1	1728.608	1
69		16	max	0	12	.916	3	.116	1	8.652e-3	1	NC	15	NC	3
70			min	-.435	4	-1.183	1	.008	10	-5.89e-3	3	288.751	1	2103.914	1
71		17	max	0	12	.743	3	.072	1	7.571e-3	1	NC	15	NC	3
72			min	-.435	4	-.974	1	.005	10	-5.114e-3	3	385.554	1	3396.647	1
73		18	max	0	12	.493	3	.035	4	6.489e-3	1	NC	5	NC	2
74			min	-.435	4	-.687	1	0	10	-4.337e-3	3	717.145	1	6896.223	4
75		19	max	0	12	.198	3	.005	3	5.407e-3	1	NC	1	NC	1
76			min	-.435	4	-.352	1	-.002	2	-3.561e-3	3	NC	1	NC	1
77	M15	1	max	0	12	.202	3	.005	3	3.01e-3	3	NC	1	NC	1
78			min	-.361	4	-.351	1	-.002	2	-5.529e-3	1	NC	1	NC	1
79		2	max	0	12	.389	3	.026	1	3.669e-3	3	NC	5	NC	2
80			min	-.361	4	-.725	1	-.035	5	-6.64e-3	1	634.687	2	6667.168	5
81		3	max	0	12	.55	3	.073	1	4.329e-3	3	NC	15	NC	3
82			min	-.361	4	-1.045	1	-.042	5	-7.752e-3	1	342.704	2	3386.825	1
83		4	max	0	12	.67	3	.116	1	4.988e-3	3	NC	15	NC	3
84			min	-.361	4	-1.273	1	-.03	5	-8.864e-3	1	258.583	2	2099.05	1
85		5	max	0	12	.738	3	.141	1	5.647e-3	3	NC	15	NC	3
86			min	-.361	4	-1.39	1	-.007	5	-9.976e-3	1	230.235	2	1724.862	1
87		6	max	0	12	.755	3	.139	1	6.306e-3	3	NC	15	NC	3
88			min	-.361	4	-1.397	1	.009	10	-1.109e-2	1	229.522	1	1745.921	1
89		7	max	0	12	.728	3	.111	1	6.965e-3	3	NC	15	NC	3

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
90			min	-.361	4	-1.312	1	.006	10	-1.22e-2	1	249.956	1	2188.563	1
91		8	max	0	12	.674	3	.066	1	7.625e-3	3	NC	15	NC	2
92			min	-.361	4	-1.171	1	0	10	-1.331e-2	1	292.94	1	3734.639	1
93		9	max	0	12	.616	3	.042	4	8.284e-3	3	NC	15	NC	1
94			min	-.361	4	-1.03	1	-.004	10	-1.442e-2	1	353.759	1	5668.751	4
95		10	max	0	1	.588	3	.016	3	8.943e-3	3	NC	5	NC	1
96			min	-.361	4	-.963	1	-.01	2	-1.553e-2	1	392.398	1	NC	1
97		11	max	0	1	.616	3	.02	1	8.284e-3	3	NC	15	NC	1
98			min	-.361	4	-1.03	1	-.033	5	-1.442e-2	1	353.759	1	7165.202	5
99		12	max	0	1	.674	3	.066	1	7.625e-3	3	NC	15	NC	2
100			min	-.361	4	-1.171	1	-.039	5	-1.331e-2	1	292.94	1	3734.639	1
101		13	max	0	1	.728	3	.111	1	6.965e-3	3	NC	15	NC	3
102			min	-.361	4	-1.312	1	-.026	5	-1.22e-2	1	249.956	1	2188.563	1
103		14	max	0	1	.755	3	.139	1	6.306e-3	3	NC	15	NC	3
104			min	-.361	4	-1.397	1	-.002	5	-1.109e-2	1	229.522	1	1745.921	1
105		15	max	0	1	.738	3	.141	1	5.647e-3	3	NC	15	NC	3
106			min	-.361	4	-1.39	1	.01	10	-9.976e-3	1	230.235	2	1724.862	1
107		16	max	0	1	.67	3	.116	1	4.988e-3	3	NC	15	NC	3
108			min	-.361	4	-1.273	1	.009	10	-8.864e-3	1	258.583	2	2099.05	1
109		17	max	0	1	.55	3	.073	1	4.329e-3	3	NC	15	NC	3
110			min	-.361	4	-1.045	1	.005	10	-7.752e-3	1	342.704	2	3386.825	1
111		18	max	0	1	.389	3	.045	4	3.669e-3	3	NC	5	NC	2
112			min	-.361	4	-.725	1	0	10	-6.64e-3	1	634.687	2	5363.947	4
113		19	max	0	1	.202	3	.005	3	3.01e-3	3	NC	1	NC	1
114			min	-.361	4	-.351	1	-.002	2	-5.529e-3	1	NC	1	NC	1
115	M16	1	max	0	12	.105	1	.004	3	5.31e-3	3	NC	1	NC	1
116			min	-.145	4	-.067	3	-.002	2	-8.068e-3	1	NC	1	NC	1
117		2	max	0	12	.037	3	.037	1	6.254e-3	3	NC	5	NC	2
118			min	-.145	4	-.167	2	-.027	5	-9.209e-3	1	917.69	2	6686.934	1
119		3	max	0	12	.119	3	.089	1	7.197e-3	3	NC	5	NC	3
120			min	-.145	4	-.375	2	-.033	5	-1.035e-2	1	510.665	2	2726.403	1
121		4	max	0	12	.162	3	.135	1	8.141e-3	3	NC	5	NC	3
122			min	-.145	4	-.495	2	-.025	5	-1.149e-2	1	406.879	2	1800.443	1
123		5	max	0	12	.161	3	.158	1	9.084e-3	3	NC	5	NC	3
124			min	-.145	4	-.51	2	-.009	5	-1.263e-2	1	396.787	2	1530.93	1
125		6	max	0	12	.116	3	.153	1	1.003e-2	3	NC	5	NC	3
126			min	-.145	4	-.423	2	.006	15	-1.377e-2	1	463.447	2	1582.507	1
127		7	max	0	12	.037	3	.121	1	1.097e-2	3	NC	5	NC	3
128			min	-.145	4	-.256	2	.007	10	-1.491e-2	1	683.924	2	2010.523	1
129		8	max	0	12	.009	9	.071	1	1.191e-2	3	NC	3	NC	2
130			min	-.145	4	-.057	3	.002	10	-1.605e-2	1	1652.048	2	3454.306	1
131		9	max	0	12	.163	1	.03	4	1.286e-2	3	NC	4	NC	1
132			min	-.145	4	-.14	3	-.004	10	-1.719e-2	1	3292.486	3	7940.361	4
133		10	max	0	1	.244	1	.014	3	1.38e-2	3	NC	5	NC	1
134			min	-.145	4	-.177	3	-.01	2	-1.833e-2	1	1727.747	1	NC	1
135		11	max	0	1	.163	1	.021	1	1.286e-2	3	NC	4	NC	1
136			min	-.145	4	-.14	3	-.021	5	-1.719e-2	1	3292.486	3	NC	1
137		12	max	0	1	.009	9	.071	1	1.191e-2	3	NC	3	NC	2
138			min	-.145	4	-.057	3	-.022	5	-1.605e-2	1	1652.048	2	3454.306	1
139		13	max	0	1	.037	3	.121	1	1.097e-2	3	NC	5	NC	3
140			min	-.145	4	-.256	2	-.01	5	-1.491e-2	1	683.924	2	2010.523	1
141		14	max	0	1	.116	3	.153	1	1.003e-2	3	NC	5	NC	3
142			min	-.145	4	-.423	2	.005	15	-1.377e-2	1	463.447	2	1582.507	1
143		15	max	0	1	.161	3	.158	1	9.084e-3	3	NC	5	NC	3
144			min	-.145	4	-.51	2	.011	12	-1.263e-2	1	396.787	2	1530.93	1
145		16	max	0	1	.162	3	.135	1	8.141e-3	3	NC	5	NC	3
146			min	-.144	4	-.495	2	.009	12	-1.149e-2	1	406.879	2	1800.443	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	.119	3	.089	1	7.197e-3	3	NC	5	NC	3
148			min	-.144	4	-.375	2	.007	10	-1.035e-2	1	510.665	2	2726.403	1
149		18	max	0	1	.037	3	.04	4	6.254e-3	3	NC	5	NC	2
150			min	-.144	4	-.167	2	.002	10	-9.209e-3	1	917.69	2	6038.6	4
151		19	max	.001	1	.105	1	.004	3	5.31e-3	3	NC	1	NC	1
152			min	-.144	4	-.067	3	-.002	2	-8.068e-3	1	NC	1	NC	1
153	M2	1	max	.006	1	.004	2	.008	1	1.349e-3	5	NC	1	NC	2
154			min	-.006	3	-.008	3	-.531	4	-2.041e-4	1	NC	1	104.149	4
155		2	max	.005	1	.004	2	.007	1	1.443e-3	5	NC	1	NC	2
156			min	-.006	3	-.008	3	-.488	4	-1.904e-4	1	NC	1	113.44	4
157		3	max	.005	1	.003	2	.006	1	1.536e-3	5	NC	1	NC	2
158			min	-.005	3	-.007	3	-.445	4	-1.767e-4	1	NC	1	124.481	4
159		4	max	.005	1	.002	2	.006	1	1.629e-3	5	NC	1	NC	2
160			min	-.005	3	-.007	3	-.402	4	-1.63e-4	1	NC	1	137.727	4
161		5	max	.004	1	.002	2	.005	1	1.722e-3	5	NC	1	NC	1
162			min	-.005	3	-.007	3	-.36	4	-1.493e-4	1	NC	1	153.8	4
163		6	max	.004	1	.001	2	.005	1	1.816e-3	5	NC	1	NC	1
164			min	-.004	3	-.007	3	-.319	4	-1.356e-4	1	NC	1	173.559	4
165		7	max	.004	1	0	2	.004	1	1.909e-3	5	NC	1	NC	1
166			min	-.004	3	-.006	3	-.279	4	-1.219e-4	1	NC	1	198.225	4
167		8	max	.004	1	0	2	.003	1	2.002e-3	5	NC	1	NC	1
168			min	-.004	3	-.006	3	-.241	4	-1.083e-4	1	NC	1	229.581	4
169		9	max	.003	1	0	2	.003	1	2.099e-3	4	NC	1	NC	1
170			min	-.003	3	-.006	3	-.205	4	-9.456e-5	1	NC	1	270.308	4
171		10	max	.003	1	0	15	.002	1	2.197e-3	4	NC	1	NC	1
172			min	-.003	3	-.005	3	-.171	4	-8.088e-5	1	NC	1	324.601	4
173		11	max	.003	1	0	15	.002	1	2.296e-3	4	NC	1	NC	1
174			min	-.003	3	-.005	3	-.139	4	-6.719e-5	1	NC	1	399.325	4
175		12	max	.002	1	0	15	.002	1	2.394e-3	4	NC	1	NC	1
176			min	-.002	3	-.004	3	-.109	4	-5.35e-5	1	NC	1	506.36	4
177		13	max	.002	1	0	15	.001	1	2.492e-3	4	NC	1	NC	1
178			min	-.002	3	-.004	3	-.083	4	-3.982e-5	1	NC	1	667.773	4
179		14	max	.002	1	0	15	0	1	2.59e-3	4	NC	1	NC	1
180			min	-.002	3	-.003	3	-.06	4	-2.613e-5	1	NC	1	928.496	4
181		15	max	.001	1	0	15	0	1	2.689e-3	4	NC	1	NC	1
182			min	-.001	3	-.003	3	-.04	4	-1.244e-5	1	NC	1	1392.223	4
183		16	max	0	1	0	15	0	1	2.787e-3	4	NC	1	NC	1
184			min	-.001	3	-.002	3	-.024	4	-3.741e-7	3	NC	1	2346.107	4
185		17	max	0	1	0	15	0	1	2.885e-3	4	NC	1	NC	1
186			min	0	3	-.001	3	-.011	4	4.289e-7	12	NC	1	4857.807	4
187		18	max	0	1	0	15	0	1	2.983e-3	4	NC	1	NC	1
188			min	0	3	0	6	-.003	4	1.079e-6	12	NC	1	NC	1
189		19	max	0	1	0	1	0	1	3.081e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	1.729e-6	12	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	-5.538e-7	12	NC	1	NC	1
192			min	0	1	0	1	0	1	-7.254e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.015	4	9.951e-6	1	NC	1	NC	1
194			min	0	2	-.002	6	0	12	-7.471e-5	5	NC	1	NC	1
195		3	max	0	3	0	15	.029	4	5.8e-4	4	NC	1	NC	1
196			min	0	2	-.003	6	0	12	1.451e-6	12	NC	1	NC	1
197		4	max	0	3	-.001	15	.042	4	1.233e-3	4	NC	1	NC	1
198			min	0	2	-.005	6	0	12	2.454e-6	12	NC	1	9646.761	5
199		5	max	.001	3	-.002	15	.054	4	1.885e-3	4	NC	1	NC	1
200			min	0	2	-.007	6	0	12	3.456e-6	12	NC	1	8325.348	5
201		6	max	.001	3	-.002	15	.065	4	2.538e-3	4	NC	1	NC	1
202			min	-.001	2	-.009	6	0	12	4.459e-6	12	NC	1	7782.517	5
203		7	max	.002	3	-.002	15	.076	4	3.191e-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	-.001	2	-.01	6	0	12	5.461e-6	12	9087.876	6	7719.013	5
205		8	max	.002	3	-.002	15	.086	4	3.843e-3	4	NC	1	NC	1
206			min	-.001	2	-.011	6	0	12	6.464e-6	12	8120.083	6	8054.527	5
207		9	max	.002	3	-.003	15	.096	4	4.496e-3	4	NC	2	NC	1
208			min	-.002	2	-.012	6	0	12	7.467e-6	12	7543.562	6	8827.366	5
209		10	max	.002	3	-.003	15	.105	4	5.149e-3	4	NC	2	NC	1
210			min	-.002	2	-.013	6	0	12	8.469e-6	12	7256.593	6	NC	1
211		11	max	.003	3	-.003	15	.114	4	5.801e-3	4	NC	2	NC	1
212			min	-.002	2	-.013	6	0	12	9.472e-6	12	7216.427	6	NC	1
213		12	max	.003	3	-.003	15	.123	4	6.454e-3	4	NC	2	NC	1
214			min	-.002	2	-.012	6	0	12	1.047e-5	12	7422.831	6	NC	1
215		13	max	.003	3	-.003	15	.132	4	7.107e-3	4	NC	1	NC	1
216			min	-.002	2	-.012	6	0	12	1.148e-5	12	7920.039	6	NC	1
217		14	max	.003	3	-.002	15	.141	4	7.759e-3	4	NC	1	NC	1
218			min	-.003	2	-.011	6	0	12	1.248e-5	12	8820.114	6	NC	1
219		15	max	.004	3	-.002	15	.15	4	8.412e-3	4	NC	1	NC	1
220			min	-.003	2	-.009	6	0	12	1.348e-5	12	NC	1	NC	1
221		16	max	.004	3	-.001	15	.16	4	9.065e-3	4	NC	1	NC	1
222			min	-.003	2	-.008	1	0	12	1.448e-5	12	NC	1	NC	1
223		17	max	.004	3	0	15	.17	4	9.717e-3	4	NC	1	NC	1
224			min	-.003	2	-.006	1	0	12	1.549e-5	12	NC	1	NC	1
225		18	max	.005	3	0	15	.181	4	1.037e-2	4	NC	1	NC	1
226			min	-.003	2	-.005	1	0	12	1.649e-5	12	NC	1	NC	1
227		19	max	.005	3	0	5	.193	4	1.102e-2	4	NC	1	NC	1
228			min	-.004	2	-.003	1	0	12	1.749e-5	12	NC	1	NC	1
229	M4	1	max	.003	1	.003	2	0	12	2.065e-5	1	NC	1	NC	3
230			min	0	3	-.005	3	-.193	4	-6.12e-4	4	NC	1	128.368	4
231		2	max	.003	1	.003	2	0	12	2.065e-5	1	NC	1	NC	3
232			min	0	3	-.005	3	-.178	4	-6.12e-4	4	NC	1	139.684	4
233		3	max	.003	1	.003	2	0	12	2.065e-5	1	NC	1	NC	2
234			min	0	3	-.004	3	-.162	4	-6.12e-4	4	NC	1	153.144	4
235		4	max	.002	1	.003	2	0	12	2.065e-5	1	NC	1	NC	2
236			min	0	3	-.004	3	-.146	4	-6.12e-4	4	NC	1	169.308	4
237		5	max	.002	1	.002	2	0	12	2.065e-5	1	NC	1	NC	2
238			min	0	3	-.004	3	-.131	4	-6.12e-4	4	NC	1	188.934	4
239		6	max	.002	1	.002	2	0	12	2.065e-5	1	NC	1	NC	2
240			min	0	3	-.004	3	-.116	4	-6.12e-4	4	NC	1	213.075	4
241		7	max	.002	1	.002	2	0	12	2.065e-5	1	NC	1	NC	2
242			min	0	3	-.003	3	-.102	4	-6.12e-4	4	NC	1	243.222	4
243		8	max	.002	1	.002	2	0	12	2.065e-5	1	NC	1	NC	2
244			min	0	3	-.003	3	-.088	4	-6.12e-4	4	NC	1	281.555	4
245		9	max	.002	1	.002	2	0	12	2.065e-5	1	NC	1	NC	2
246			min	0	3	-.003	3	-.075	4	-6.12e-4	4	NC	1	331.353	4
247		10	max	.001	1	.002	2	0	12	2.065e-5	1	NC	1	NC	1
248			min	0	3	-.002	3	-.062	4	-6.12e-4	4	NC	1	397.74	4
249		11	max	.001	1	.001	2	0	12	2.065e-5	1	NC	1	NC	1
250			min	0	3	-.002	3	-.051	4	-6.12e-4	4	NC	1	489.104	4
251		12	max	.001	1	.001	2	0	12	2.065e-5	1	NC	1	NC	1
252			min	0	3	-.002	3	-.04	4	-6.12e-4	4	NC	1	619.952	4
253		13	max	0	1	.001	2	0	12	2.065e-5	1	NC	1	NC	1
254			min	0	3	-.002	3	-.03	4	-6.12e-4	4	NC	1	817.212	4
255		14	max	0	1	0	2	0	12	2.065e-5	1	NC	1	NC	1
256			min	0	3	-.001	3	-.022	4	-6.12e-4	4	NC	1	1135.672	4
257		15	max	0	1	0	2	0	12	2.065e-5	1	NC	1	NC	1
258			min	0	3	-.001	3	-.015	4	-6.12e-4	4	NC	1	1701.639	4
259		16	max	0	1	0	2	0	12	2.065e-5	1	NC	1	NC	1
260			min	0	3	0	3	-.009	4	-6.12e-4	4	NC	1	2864.306	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
261		17	max	0	1	0	2	0	12	2.065e-5	1	NC	1	NC	1
262			min	0	3	0	3	-.004	4	-6.12e-4	4	NC	1	5918.578	4
263		18	max	0	1	0	2	0	12	2.065e-5	1	NC	1	NC	1
264			min	0	3	0	3	-.001	4	-6.12e-4	4	NC	1	NC	1
265		19	max	0	1	0	1	0	1	2.065e-5	1	NC	1	NC	1
266			min	0	1	0	1	0	1	-6.12e-4	4	NC	1	NC	1
267	M6	1	max	.018	1	.018	2	0	1	1.419e-3	4	NC	3	NC	1
268			min	-.02	3	-.025	3	-.536	4	0	1	3145.971	2	103.221	4
269		2	max	.017	1	.016	2	0	1	1.51e-3	4	NC	3	NC	1
270			min	-.019	3	-.024	3	-.492	4	0	1	3444.264	2	112.432	4
271		3	max	.016	1	.015	2	0	1	1.602e-3	4	NC	3	NC	1
272			min	-.018	3	-.022	3	-.449	4	0	1	3802.281	2	123.376	4
273		4	max	.015	1	.013	2	0	1	1.694e-3	4	NC	3	NC	1
274			min	-.017	3	-.021	3	-.405	4	0	1	4236.516	2	136.506	4
275		5	max	.014	1	.012	2	0	1	1.785e-3	4	NC	3	NC	1
276			min	-.016	3	-.02	3	-.363	4	0	1	4769.763	2	152.439	4
277		6	max	.013	1	.01	2	0	1	1.877e-3	4	NC	1	NC	1
278			min	-.015	3	-.018	3	-.322	4	0	1	5434.234	2	172.027	4
279		7	max	.012	1	.009	2	0	1	1.969e-3	4	NC	1	NC	1
280			min	-.013	3	-.017	3	-.282	4	0	1	6276.677	2	196.48	4
281		8	max	.011	1	.008	2	0	1	2.06e-3	4	NC	1	NC	1
282			min	-.012	3	-.015	3	-.243	4	0	1	7367.047	2	227.566	4
283		9	max	.01	1	.006	2	0	1	2.152e-3	4	NC	1	NC	1
284			min	-.011	3	-.014	3	-.207	4	0	1	8813.932	2	267.944	4
285		10	max	.009	1	.005	2	0	1	2.244e-3	4	NC	1	NC	1
286			min	-.01	3	-.013	3	-.172	4	0	1	NC	1	321.776	4
287		11	max	.008	1	.004	2	0	1	2.335e-3	4	NC	1	NC	1
288			min	-.009	3	-.011	3	-.14	4	0	1	NC	1	395.868	4
289		12	max	.007	1	.003	2	0	1	2.427e-3	4	NC	1	NC	1
290			min	-.008	3	-.01	3	-.11	4	0	1	NC	1	502.008	4
291		13	max	.006	1	.002	2	0	1	2.519e-3	4	NC	1	NC	1
292			min	-.007	3	-.008	3	-.084	4	0	1	NC	1	662.085	4
293		14	max	.005	1	.002	2	0	1	2.61e-3	4	NC	1	NC	1
294			min	-.006	3	-.007	3	-.06	4	0	1	NC	1	920.684	4
295		15	max	.004	1	0	2	0	1	2.702e-3	4	NC	1	NC	1
296			min	-.004	3	-.006	3	-.04	4	0	1	NC	1	1380.718	4
297		16	max	.003	1	0	2	0	1	2.794e-3	4	NC	1	NC	1
298			min	-.003	3	-.004	3	-.024	4	0	1	NC	1	2327.265	4
299		17	max	.002	1	0	2	0	1	2.885e-3	4	NC	1	NC	1
300			min	-.002	3	-.003	3	-.011	4	0	1	NC	1	4820.83	4
301		18	max	.001	1	0	2	0	1	2.977e-3	4	NC	1	NC	1
302			min	-.001	3	-.001	3	-.003	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	3.069e-3	4	NC	1	NC	1
304			min	0	1	0	1	0	1	0	1	NC	1	NC	1
305	M7	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
306			min	0	1	0	1	0	1	-7.208e-4	4	NC	1	NC	1
307		2	max	0	3	0	15	.015	4	0	1	NC	1	NC	1
308			min	0	2	-.002	3	0	1	-8.295e-5	4	NC	1	NC	1
309		3	max	.002	3	0	15	.028	4	5.549e-4	4	NC	1	NC	1
310			min	-.002	2	-.004	3	0	1	0	1	NC	1	NC	1
311		4	max	.003	3	-.001	15	.041	4	1.193e-3	4	NC	1	NC	1
312			min	-.002	2	-.006	3	0	1	0	1	NC	1	9083.414	4
313		5	max	.003	3	-.002	15	.053	4	1.831e-3	4	NC	1	NC	1
314			min	-.003	2	-.008	3	0	1	0	1	NC	1	7801.602	4
315		6	max	.004	3	-.002	15	.065	4	2.468e-3	4	NC	1	NC	1
316			min	-.004	2	-.01	3	0	1	0	1	9807.042	3	7250.262	4
317		7	max	.005	3	-.002	15	.075	4	3.106e-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	-.005	2	-.011	3	0	1	0	1	8709.276	3	7138.77	4
319		8	max	.006	3	-.003	15	.086	4	3.744e-3	4	NC	1	NC	1
320			min	-.006	2	-.012	3	0	1	0	1	8052.067	3	7379.979	4
321		9	max	.007	3	-.003	15	.095	4	4.382e-3	4	NC	1	NC	1
322			min	-.006	2	-.013	3	0	1	0	1	7596.24	4	7989.495	4
323		10	max	.008	3	-.003	15	.104	4	5.02e-3	4	NC	1	NC	1
324			min	-.007	2	-.013	4	0	1	0	1	7304.165	4	9078.157	4
325		11	max	.008	3	-.003	15	.113	4	5.658e-3	4	NC	1	NC	1
326			min	-.008	2	-.013	4	0	1	0	1	7261.157	4	NC	1
327		12	max	.009	3	-.003	15	.121	4	6.295e-3	4	NC	1	NC	1
328			min	-.009	2	-.013	4	0	1	0	1	7466.617	4	NC	1
329		13	max	.01	3	-.003	15	.13	4	6.933e-3	4	NC	1	NC	1
330			min	-.01	2	-.012	4	0	1	0	1	7964.774	4	NC	1
331		14	max	.011	3	-.003	15	.139	4	7.571e-3	4	NC	1	NC	1
332			min	-.01	2	-.011	4	0	1	0	1	8868.104	4	NC	1
333		15	max	.012	3	-.002	15	.147	4	8.209e-3	4	NC	1	NC	1
334			min	-.011	2	-.01	1	0	1	0	1	NC	1	NC	1
335		16	max	.013	3	-.002	15	.157	4	8.847e-3	4	NC	1	NC	1
336			min	-.012	2	-.009	1	0	1	0	1	NC	1	NC	1
337		17	max	.014	3	-.001	15	.166	4	9.485e-3	4	NC	1	NC	1
338			min	-.013	2	-.009	1	0	1	0	1	NC	1	NC	1
339		18	max	.014	3	0	15	.177	4	1.012e-2	4	NC	1	NC	1
340			min	-.014	2	-.007	1	0	1	0	1	NC	1	NC	1
341		19	max	.015	3	0	15	.188	4	1.076e-2	4	NC	1	NC	1
342			min	-.014	2	-.006	1	0	1	0	1	NC	1	NC	1
343	M8	1	max	.008	1	.013	2	0	1	0	1	NC	1	NC	1
344			min	-.002	3	-.015	3	-.188	4	-6.611e-4	4	NC	1	131.76	4
345		2	max	.008	1	.012	2	0	1	0	1	NC	1	NC	1
346			min	-.002	3	-.014	3	-.173	4	-6.611e-4	4	NC	1	143.378	4
347		3	max	.007	1	.011	2	0	1	0	1	NC	1	NC	1
348			min	-.002	3	-.014	3	-.158	4	-6.611e-4	4	NC	1	157.198	4
349		4	max	.007	1	.011	2	0	1	0	1	NC	1	NC	1
350			min	-.002	3	-.013	3	-.143	4	-6.611e-4	4	NC	1	173.794	4
351		5	max	.006	1	.01	2	0	1	0	1	NC	1	NC	1
352			min	-.002	3	-.012	3	-.128	4	-6.611e-4	4	NC	1	193.945	4
353		6	max	.006	1	.009	2	0	1	0	1	NC	1	NC	1
354			min	-.001	3	-.011	3	-.113	4	-6.611e-4	4	NC	1	218.73	4
355		7	max	.005	1	.009	2	0	1	0	1	NC	1	NC	1
356			min	-.001	3	-.01	3	-.099	4	-6.611e-4	4	NC	1	249.682	4
357		8	max	.005	1	.008	2	0	1	0	1	NC	1	NC	1
358			min	-.001	3	-.009	3	-.086	4	-6.611e-4	4	NC	1	289.038	4
359		9	max	.005	1	.007	2	0	1	0	1	NC	1	NC	1
360			min	-.001	3	-.008	3	-.073	4	-6.611e-4	4	NC	1	340.165	4
361		10	max	.004	1	.006	2	0	1	0	1	NC	1	NC	1
362			min	-.001	3	-.008	3	-.061	4	-6.611e-4	4	NC	1	408.325	4
363		11	max	.004	1	.006	2	0	1	0	1	NC	1	NC	1
364			min	0	3	-.007	3	-.049	4	-6.611e-4	4	NC	1	502.128	4
365		12	max	.003	1	.005	2	0	1	0	1	NC	1	NC	1
366			min	0	3	-.006	3	-.039	4	-6.611e-4	4	NC	1	636.47	4
367		13	max	.003	1	.004	2	0	1	0	1	NC	1	NC	1
368			min	0	3	-.005	3	-.03	4	-6.611e-4	4	NC	1	838.998	4
369		14	max	.002	1	.004	2	0	1	0	1	NC	1	NC	1
370			min	0	3	-.004	3	-.021	4	-6.611e-4	4	NC	1	1165.966	4
371		15	max	.002	1	.003	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.003	3	-.014	4	-6.611e-4	4	NC	1	1747.055	4
373		16	max	.001	1	.002	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.003	3	-.008	4	-6.611e-4	4	NC	1	2940.8	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
375		17	max	0	1	.001	2	0	1	0	1	NC	1	NC	1
376			min	0	3	-.002	3	-.004	4	-6.611e-4	4	NC	1	6076.749	4
377		18	max	0	1	0	2	0	1	0	1	NC	1	NC	1
378			min	0	3	0	3	-.001	4	-6.611e-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	-6.611e-4	4	NC	1	NC	1
381	M10	1	max	.006	1	.004	2	0	12	1.422e-3	4	NC	1	NC	2
382			min	-.006	3	-.008	3	-.536	4	9.968e-6	12	NC	1	103.356	4
383		2	max	.005	1	.004	2	0	12	1.513e-3	4	NC	1	NC	2
384			min	-.006	3	-.008	3	-.492	4	9.318e-6	12	NC	1	112.578	4
385		3	max	.005	1	.003	2	0	12	1.604e-3	4	NC	1	NC	2
386			min	-.005	3	-.007	3	-.448	4	8.668e-6	12	NC	1	123.537	4
387		4	max	.005	1	.002	2	0	12	1.695e-3	4	NC	1	NC	2
388			min	-.005	3	-.007	3	-.405	4	8.018e-6	12	NC	1	136.685	4
389		5	max	.004	1	.002	2	0	12	1.786e-3	4	NC	1	NC	1
390			min	-.005	3	-.007	3	-.363	4	7.369e-6	12	NC	1	152.639	4
391		6	max	.004	1	.001	2	0	12	1.877e-3	4	NC	1	NC	1
392			min	-.004	3	-.007	3	-.321	4	6.719e-6	12	NC	1	172.252	4
393		7	max	.004	1	0	2	0	12	1.968e-3	4	NC	1	NC	1
394			min	-.004	3	-.006	3	-.281	4	6.069e-6	12	NC	1	196.738	4
395		8	max	.004	1	0	2	0	12	2.058e-3	4	NC	1	NC	1
396			min	-.004	3	-.006	3	-.243	4	5.419e-6	12	NC	1	227.865	4
397		9	max	.003	1	0	2	0	12	2.149e-3	4	NC	1	NC	1
398			min	-.003	3	-.006	3	-.206	4	4.769e-6	12	NC	1	268.298	4
399		10	max	.003	1	0	2	0	12	2.24e-3	4	NC	1	NC	1
400			min	-.003	3	-.005	3	-.172	4	4.12e-6	12	NC	1	322.201	4
401		11	max	.003	1	0	2	0	12	2.331e-3	4	NC	1	NC	1
402			min	-.003	3	-.005	3	-.14	4	3.47e-6	12	NC	1	396.394	4
403		12	max	.002	1	-.001	2	0	12	2.422e-3	4	NC	1	NC	1
404			min	-.002	3	-.004	3	-.11	4	2.82e-6	12	NC	1	502.677	4
405		13	max	.002	1	0	15	0	12	2.513e-3	4	NC	1	NC	1
406			min	-.002	3	-.004	3	-.083	4	2.17e-6	12	NC	1	662.975	4
407		14	max	.002	1	0	15	0	12	2.604e-3	4	NC	1	NC	1
408			min	-.002	3	-.003	3	-.06	4	1.52e-6	12	NC	1	921.933	4
409		15	max	.001	1	0	15	0	12	2.695e-3	4	NC	1	NC	1
410			min	-.001	3	-.003	4	-.04	4	8.706e-7	12	NC	1	1382.62	4
411		16	max	0	1	0	15	0	12	2.786e-3	4	NC	1	NC	1
412			min	-.001	3	-.002	4	-.024	4	-1.245e-6	1	NC	1	2330.548	4
413		17	max	0	1	0	15	0	12	2.877e-3	4	NC	1	NC	1
414			min	0	3	-.002	4	-.011	4	-1.493e-5	1	NC	1	4827.924	4
415		18	max	0	1	0	15	0	12	2.968e-3	4	NC	1	NC	1
416			min	0	3	0	4	-.003	4	-2.862e-5	1	NC	1	NC	1
417		19	max	0	1	0	1	0	1	3.059e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-4.231e-5	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	1.334e-5	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-7.182e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.015	4	-4.487e-7	12	NC	1	NC	1
422			min	0	2	-.002	4	0	1	-7.797e-5	4	NC	1	NC	1
423		3	max	0	3	0	15	.028	4	5.623e-4	4	NC	1	NC	1
424			min	0	2	-.004	4	0	1	-3.324e-5	1	NC	1	NC	1
425		4	max	0	3	-.001	15	.041	4	1.203e-3	4	NC	1	NC	1
426			min	0	2	-.005	4	0	1	-5.654e-5	1	NC	1	9376.546	4
427		5	max	.001	3	-.002	15	.053	4	1.843e-3	4	NC	1	NC	1
428			min	0	2	-.007	4	0	1	-7.983e-5	1	NC	1	8083.5	4
429		6	max	.001	3	-.002	15	.065	4	2.483e-3	4	NC	1	NC	1
430			min	-.001	2	-.009	4	-.001	1	-1.031e-4	1	NC	1	7546	4
431		7	max	.002	3	-.003	15	.075	4	3.123e-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	-.001	2	-.011	4	-.002	1	-1.264e-4	1	8763.359	4	7470.935	4
433		8	max	.002	3	-.003	15	.085	4	3.764e-3	4	NC	1	NC	1
434			min	-.001	2	-.012	4	-.002	1	-1.497e-4	1	7851.515	4	7777.02	4
435		9	max	.002	3	-.003	15	.095	4	4.404e-3	4	NC	2	NC	1
436			min	-.002	2	-.013	4	-.002	1	-1.73e-4	1	7310.526	4	8495.466	4
437		10	max	.002	3	-.003	15	.104	4	5.044e-3	4	NC	2	NC	1
438			min	-.002	2	-.013	4	-.003	1	-1.963e-4	1	7045.655	4	9771.703	4
439		11	max	.003	3	-.003	15	.113	4	5.684e-3	4	NC	2	NC	1
440			min	-.002	2	-.014	4	-.003	1	-2.196e-4	1	7017.712	4	NC	1
441		12	max	.003	3	-.003	15	.121	4	6.325e-3	4	NC	2	NC	1
442			min	-.002	2	-.013	4	-.003	1	-2.429e-4	1	7227.995	4	NC	1
443		13	max	.003	3	-.003	15	.13	4	6.965e-3	4	NC	1	NC	1
444			min	-.002	2	-.013	4	-.004	1	-2.662e-4	1	7720.706	4	NC	1
445		14	max	.003	3	-.003	15	.139	4	7.605e-3	4	NC	1	NC	1
446			min	-.003	2	-.011	4	-.004	1	-2.895e-4	1	8606.038	4	NC	1
447		15	max	.004	3	-.002	15	.148	4	8.245e-3	4	NC	1	NC	1
448			min	-.003	2	-.01	4	-.005	1	-3.128e-4	1	NC	1	NC	1
449		16	max	.004	3	-.002	15	.157	4	8.885e-3	4	NC	1	NC	1
450			min	-.003	2	-.008	4	-.005	1	-3.361e-4	1	NC	1	NC	1
451		17	max	.004	3	-.002	15	.167	4	9.526e-3	4	NC	1	NC	1
452			min	-.003	2	-.006	1	-.006	1	-3.593e-4	1	NC	1	NC	1
453		18	max	.005	3	0	15	.178	4	1.017e-2	4	NC	1	NC	1
454			min	-.003	2	-.005	1	-.007	1	-3.826e-4	1	NC	1	NC	1
455		19	max	.005	3	0	15	.189	4	1.081e-2	4	NC	1	NC	1
456			min	-.004	2	-.003	1	-.007	1	-4.059e-4	1	NC	1	NC	1
457	M12	1	max	.003	1	.003	2	.007	1	-1.081e-6	12	NC	1	NC	3
458			min	0	3	-.005	3	-.189	4	-6.228e-4	4	NC	1	131.009	4
459		2	max	.003	1	.003	2	.007	1	-1.081e-6	12	NC	1	NC	3
460			min	0	3	-.005	3	-.174	4	-6.228e-4	4	NC	1	142.556	4
461		3	max	.003	1	.003	2	.006	1	-1.081e-6	12	NC	1	NC	2
462			min	0	3	-.004	3	-.159	4	-6.228e-4	4	NC	1	156.293	4
463		4	max	.002	1	.003	2	.006	1	-1.081e-6	12	NC	1	NC	2
464			min	0	3	-.004	3	-.144	4	-6.228e-4	4	NC	1	172.789	4
465		5	max	.002	1	.002	2	.005	1	-1.081e-6	12	NC	1	NC	2
466			min	0	3	-.004	3	-.129	4	-6.228e-4	4	NC	1	192.818	4
467		6	max	.002	1	.002	2	.004	1	-1.081e-6	12	NC	1	NC	2
468			min	0	3	-.004	3	-.114	4	-6.228e-4	4	NC	1	217.453	4
469		7	max	.002	1	.002	2	.004	1	-1.081e-6	12	NC	1	NC	2
470			min	0	3	-.003	3	-.1	4	-6.228e-4	4	NC	1	248.22	4
471		8	max	.002	1	.002	2	.003	1	-1.081e-6	12	NC	1	NC	2
472			min	0	3	-.003	3	-.086	4	-6.228e-4	4	NC	1	287.339	4
473		9	max	.002	1	.002	2	.003	1	-1.081e-6	12	NC	1	NC	2
474			min	0	3	-.003	3	-.073	4	-6.228e-4	4	NC	1	338.158	4
475		10	max	.001	1	.002	2	.002	1	-1.081e-6	12	NC	1	NC	1
476			min	0	3	-.002	3	-.061	4	-6.228e-4	4	NC	1	405.908	4
477		11	max	.001	1	.001	2	.002	1	-1.081e-6	12	NC	1	NC	1
478			min	0	3	-.002	3	-.05	4	-6.228e-4	4	NC	1	499.146	4
479		12	max	.001	1	.001	2	.002	1	-1.081e-6	12	NC	1	NC	1
480			min	0	3	-.002	3	-.039	4	-6.228e-4	4	NC	1	632.678	4
481		13	max	0	1	.001	2	.001	1	-1.081e-6	12	NC	1	NC	1
482			min	0	3	-.002	3	-.03	4	-6.228e-4	4	NC	1	833.984	4
483		14	max	0	1	0	2	0	1	-1.081e-6	12	NC	1	NC	1
484			min	0	3	-.001	3	-.021	4	-6.228e-4	4	NC	1	1158.976	4
485		15	max	0	1	0	2	0	1	-1.081e-6	12	NC	1	NC	1
486			min	0	3	-.001	3	-.014	4	-6.228e-4	4	NC	1	1736.55	4
487		16	max	0	1	0	2	0	1	-1.081e-6	12	NC	1	NC	1
488			min	0	3	0	3	-.008	4	-6.228e-4	4	NC	1	2923.06	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	-1.081e-6	12	NC	1	NC	1
490			min	0	3	0	3	-.004	4	-6.228e-4	4	NC	1	6039.956	4
491		18	max	0	1	0	2	0	1	-1.081e-6	12	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-6.228e-4	4	NC	1	NC	1
493		19	max	0	1	0	1	0	1	-1.081e-6	12	NC	1	NC	1
494			min	0	1	0	1	0	1	-6.228e-4	4	NC	1	NC	1
495	M1	1	max	.006	3	.109	1	.565	4	1.63e-2	1	NC	1	NC	1
496			min	-.003	2	-.017	3	0	12	-2.379e-2	3	NC	1	NC	1
497		2	max	.006	3	.053	1	.548	4	8.58e-3	4	NC	4	NC	1
498			min	-.003	2	-.008	3	-.005	1	-1.177e-2	3	2063.184	1	NC	1
499		3	max	.006	3	.009	3	.531	4	1.393e-2	4	NC	5	NC	1
500			min	-.003	2	-.008	2	-.008	1	-1.462e-4	1	987.933	1	7654.92	5
501		4	max	.006	3	.037	3	.514	4	1.222e-2	4	NC	5	NC	1
502			min	-.003	2	-.076	1	-.007	1	-4.324e-3	3	617.986	1	5354.775	5
503		5	max	.006	3	.075	3	.497	4	1.051e-2	4	NC	15	NC	1
504			min	-.003	2	-.15	1	-.005	1	-8.532e-3	3	442.605	1	4193.17	5
505		6	max	.006	3	.115	3	.48	4	1.426e-2	1	NC	15	NC	1
506			min	-.003	2	-.221	1	-.002	1	-1.274e-2	3	346.548	1	3500.509	5
507		7	max	.006	3	.155	3	.462	4	1.906e-2	1	9971.178	15	NC	1
508			min	-.002	2	-.285	1	0	12	-1.695e-2	3	290.119	1	3035.962	4
509		8	max	.005	3	.188	3	.443	4	2.386e-2	1	8859.612	15	NC	1
510			min	-.002	2	-.337	1	0	12	-2.116e-2	3	256.858	1	2710.087	4
511		9	max	.005	3	.209	3	.423	4	2.635e-2	1	8280.06	15	NC	1
512			min	-.002	2	-.369	1	0	1	-2.124e-2	3	239.586	1	2517.334	4
513		10	max	.005	3	.217	3	.401	4	2.731e-2	1	8103.551	15	NC	1
514			min	-.002	2	-.379	1	0	12	-1.859e-2	3	234.422	1	2464.221	4
515		11	max	.005	3	.211	3	.376	4	2.826e-2	1	8279.84	15	NC	1
516			min	-.002	2	-.369	1	0	12	-1.594e-2	3	239.927	1	2526.332	4
517		12	max	.005	3	.194	3	.35	4	2.704e-2	2	8859.106	15	NC	1
518			min	-.002	2	-.336	1	0	1	-1.329e-2	3	257.92	1	2720.516	4
519		13	max	.005	3	.165	3	.32	4	2.169e-2	2	9970.209	15	NC	1
520			min	-.002	2	-.283	1	0	1	-1.064e-2	3	292.738	1	3204.723	4
521		14	max	.005	3	.128	3	.288	4	1.634e-2	2	NC	15	NC	1
522			min	-.002	2	-.218	1	0	12	-7.988e-3	3	352.182	1	4206.475	4
523		15	max	.005	3	.087	3	.256	4	1.101e-2	1	NC	15	NC	1
524			min	-.002	2	-.145	1	0	12	-5.336e-3	3	454.242	1	6373.329	4
525		16	max	.005	3	.044	3	.224	4	9.32e-3	4	NC	5	NC	1
526			min	-.002	2	-.072	1	0	12	-2.685e-3	3	642.56	1	NC	1
527		17	max	.004	3	.003	3	.194	4	1.037e-2	4	NC	5	NC	1
528			min	-.002	2	-.005	2	0	12	-3.337e-5	3	1043.659	1	NC	1
529		18	max	.004	3	.053	1	.168	4	1.016e-2	2	NC	4	NC	1
530			min	-.002	2	-.033	3	0	12	-4.018e-3	3	2204.953	1	NC	1
531		19	max	.004	3	.105	1	.144	4	2.04e-2	2	NC	1	NC	1
532			min	-.002	2	-.067	3	-.001	1	-8.156e-3	3	NC	1	NC	1
533	M5	1	max	.019	3	.255	1	.564	4	0	1	NC	1	NC	1
534			min	-.012	2	-.021	3	0	1	-3.397e-6	4	NC	1	NC	1
535		2	max	.019	3	.125	1	.551	4	7.138e-3	4	NC	5	NC	1
536			min	-.012	2	-.008	3	0	1	0	1	875.82	1	NC	1
537		3	max	.019	3	.028	3	.536	4	1.406e-2	4	NC	5	NC	1
538			min	-.012	2	-.024	2	0	1	0	1	409.682	1	6279.213	4
539		4	max	.018	3	.105	3	.519	4	1.145e-2	4	9622.185	15	NC	1
540			min	-.012	2	-.205	1	0	1	0	1	248.807	1	4703.832	4
541		5	max	.018	3	.212	3	.5	4	8.85e-3	4	6733.795	15	NC	1
542			min	-.012	2	-.402	1	0	1	0	1	174.037	1	3912.396	4
543		6	max	.018	3	.331	3	.481	4	6.245e-3	4	5184.524	15	NC	1
544			min	-.012	2	-.599	1	0	1	0	1	133.911	1	3420.997	4
545		7	max	.017	3	.448	3	.462	4	3.641e-3	4	4289.789	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	-.011	2	-.778	1	0	1	0	1	110.727	1	3059.202	4
547		8	max	.017	3	.546	3	.443	4	1.037e-3	4	3769.534	15	NC	1
548			min	-.011	2	-.921	1	0	1	0	1	97.243	1	2750.385	4
549		9	max	.017	3	.609	3	.423	4	0	1	3502.729	15	NC	1
550			min	-.011	2	-1.012	1	0	1	-2.148e-6	5	90.33	1	2514.944	4
551		10	max	.016	3	.631	3	.401	4	0	1	3422.341	15	NC	1
552			min	-.011	2	-1.042	1	0	1	-2.058e-6	5	88.276	1	2481.408	4
553		11	max	.016	3	.616	3	.376	4	0	1	3502.808	15	NC	1
554			min	-.011	2	-1.011	1	0	1	-1.967e-6	5	90.469	1	2553.661	4
555		12	max	.015	3	.562	3	.351	4	7.425e-4	4	3769.721	15	NC	1
556			min	-.01	2	-.918	1	0	1	0	1	97.7	1	2675.699	4
557		13	max	.015	3	.477	3	.321	4	2.607e-3	4	4290.175	15	NC	1
558			min	-.01	2	-.771	1	0	1	0	1	111.916	1	3152.322	4
559		14	max	.015	3	.368	3	.288	4	4.472e-3	4	5185.283	15	NC	1
560			min	-.01	2	-.588	1	0	1	0	1	136.586	1	4356.197	4
561		15	max	.014	3	.247	3	.253	4	6.337e-3	4	6735.303	15	NC	1
562			min	-.01	2	-.388	1	0	1	0	1	179.839	1	7667.384	4
563		16	max	.014	3	.124	3	.219	4	8.201e-3	4	9625.35	15	NC	1
564			min	-.01	2	-.19	1	0	1	0	1	261.805	1	NC	1
565		17	max	.014	3	.01	3	.189	4	1.007e-2	4	NC	5	NC	1
566			min	-.01	2	-.015	2	0	1	0	1	441.3	1	NC	1
567		18	max	.014	3	.126	1	.164	4	5.112e-3	4	NC	5	NC	1
568			min	-.01	2	-.088	3	0	1	0	1	960.55	1	NC	1
569		19	max	.014	3	.244	1	.145	4	0	1	NC	1	NC	1
570			min	-.01	2	-.177	3	0	1	-1.69e-6	4	NC	1	NC	1
571	M9	1	max	.006	3	.109	1	.564	4	2.379e-2	3	NC	1	NC	1
572			min	-.003	2	-.017	3	0	1	-1.63e-2	1	NC	1	NC	1
573		2	max	.006	3	.053	1	.551	4	1.177e-2	3	NC	4	NC	1
574			min	-.003	2	-.008	3	0	12	-7.926e-3	1	2063.184	1	NC	1
575		3	max	.006	3	.009	3	.535	4	1.402e-2	4	NC	5	NC	1
576			min	-.003	2	-.008	2	0	12	-2.455e-5	10	987.933	1	6425.458	4
577		4	max	.006	3	.037	3	.518	4	1.101e-2	5	NC	5	NC	1
578			min	-.003	2	-.076	1	0	12	-4.656e-3	1	617.986	1	4757.455	4
579		5	max	.006	3	.075	3	.5	4	8.532e-3	3	NC	15	NC	1
580			min	-.003	2	-.15	1	0	12	-9.458e-3	1	442.605	1	3916.269	4
581		6	max	.006	3	.115	3	.481	4	1.274e-2	3	NC	15	NC	1
582			min	-.003	2	-.221	1	0	12	-1.426e-2	1	346.548	1	3399.343	4
583		7	max	.006	3	.155	3	.462	4	1.695e-2	3	9953.815	15	NC	1
584			min	-.002	2	-.285	1	0	1	-1.906e-2	1	290.119	1	3031.328	4
585		8	max	.005	3	.188	3	.443	4	2.116e-2	3	8844.531	15	NC	1
586			min	-.002	2	-.337	1	0	1	-2.386e-2	1	256.858	1	2733.575	4
587		9	max	.005	3	.209	3	.423	4	2.124e-2	3	8266.142	15	NC	1
588			min	-.002	2	-.369	1	0	12	-2.635e-2	1	239.586	1	2510.672	4
589		10	max	.005	3	.217	3	.401	4	1.859e-2	3	8089.972	15	NC	1
590			min	-.002	2	-.379	1	0	1	-2.731e-2	1	234.422	1	2465.274	4
591		11	max	.005	3	.211	3	.376	4	1.594e-2	3	8265.926	15	NC	1
592			min	-.002	2	-.369	1	0	1	-2.826e-2	1	239.927	1	2534.745	4
593		12	max	.005	3	.194	3	.35	4	1.329e-2	3	8844.118	15	NC	1
594			min	-.002	2	-.336	1	0	12	-2.704e-2	2	257.92	1	2697.207	4
595		13	max	.005	3	.165	3	.32	4	1.064e-2	3	9953.156	15	NC	1
596			min	-.002	2	-.283	1	0	12	-2.169e-2	2	292.738	1	3205.571	4
597		14	max	.005	3	.128	3	.287	4	7.988e-3	3	NC	15	NC	1
598			min	-.002	2	-.218	1	-.002	1	-1.634e-2	2	352.182	1	4332.775	5
599		15	max	.005	3	.087	3	.253	4	5.958e-3	5	NC	15	NC	1
600			min	-.002	2	-.145	1	-.005	1	-1.101e-2	1	454.242	1	7012.862	5
601		16	max	.005	3	.044	3	.22	4	8.006e-3	5	NC	5	NC	1
602			min	-.002	2	-.072	1	-.007	1	-5.771e-3	1	642.56	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
603		17	max	.004	3	.003	3	.19	4	1.011e-2	4	NC	5	NC	1
604			min	-.002	2	-.005	2	-.007	1	-5.286e-4	1	1043.659	1	NC	1
605		18	max	.004	3	.053	1	.165	4	4.787e-3	5	NC	4	NC	1
606			min	-.002	2	-.033	3	-.005	1	-1.016e-2	2	2204.953	1	NC	1
607		19	max	.004	3	.105	1	.145	4	8.156e-3	3	NC	1	NC	1
608			min	-.002	2	-.067	3	0	12	-2.04e-2	2	NC	1	NC	1

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

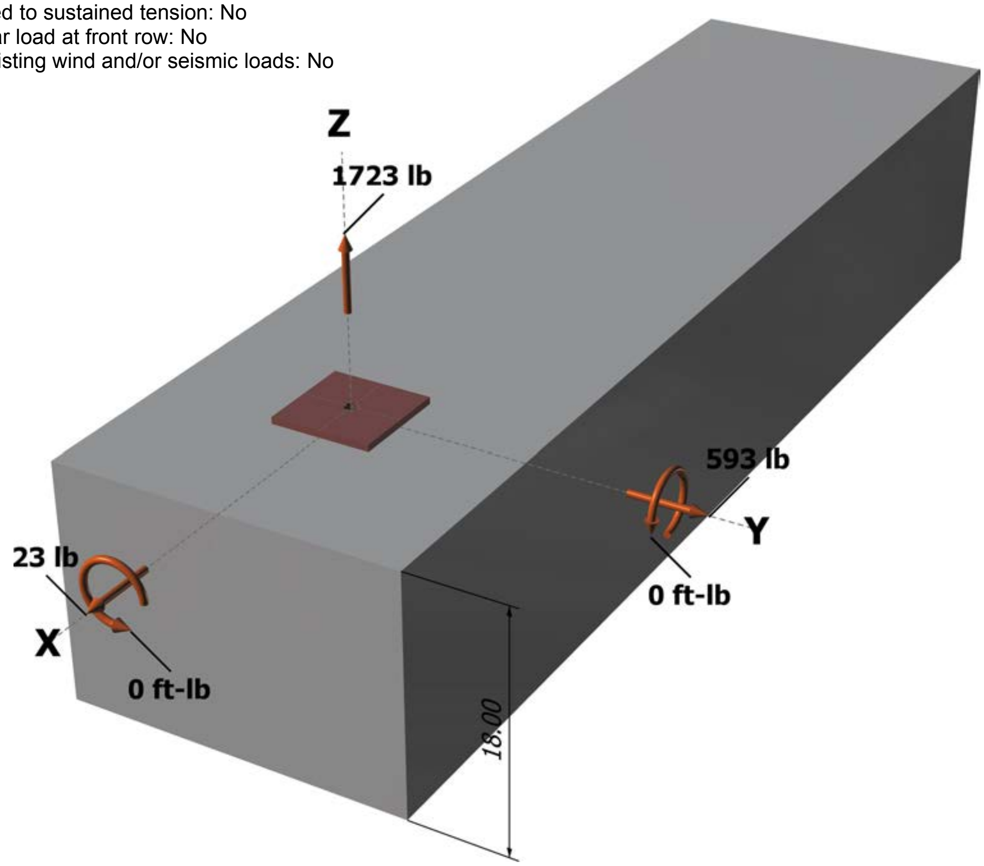
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

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

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

<Figure 1>



<Figure 2>

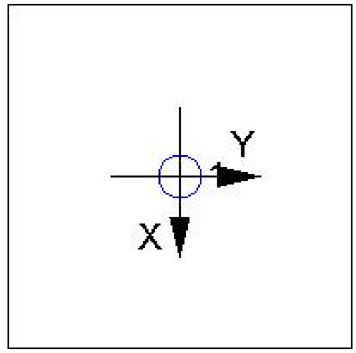
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

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

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

<Figure 3>



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in y-direction:

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

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

Shear parallel to edge in x-direction:

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

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

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

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

Shear parallel to edge in y-direction:

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

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

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

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

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

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

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

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

11. Results

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

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

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

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

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

12. Warnings

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

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

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

SIMPSON Strong-Tie

Anchor Designer™ Software
Version 2.4.5673.0

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

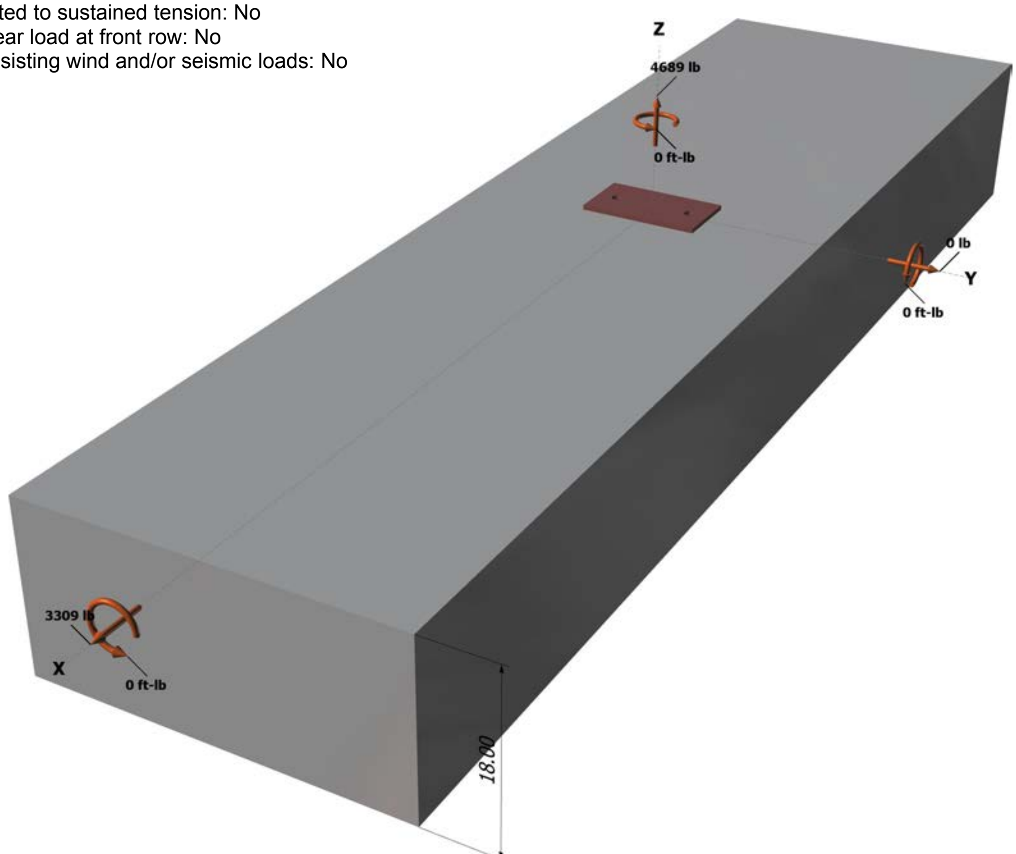
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

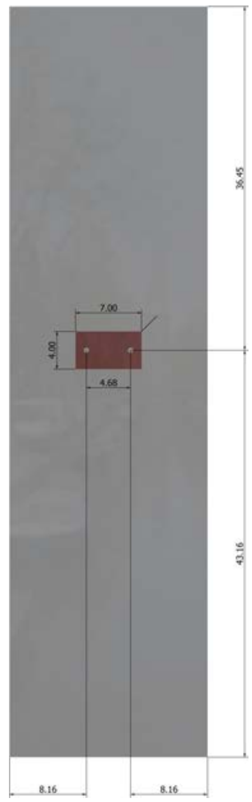
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout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



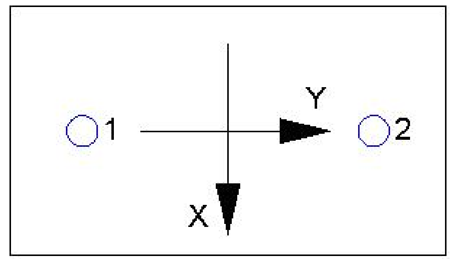
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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	2344.5	1654.5	0.0	1654.5
2	2344.5	1654.5	0.0	1654.5
Sum	4689.0	3309.0	0.0	3309.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 4689
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)
378.00	324.00	1.000	0.972	1.00	1.000	12492	0.65	9208

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)
378.00	648.00	1.000	0.836	1.000	1.000	15593	0.70	5323

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	8.16	8744

$\phi V_{cbx} = \phi\,(2)(A_{Vc} / A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (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)
299.64	299.64	1.000	1.000	1.000	8744	0.70	12241

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
378.00	324.00	1.000	0.972	1.000	1.000	12492	14166	0.70

ϕV_{cpg} (lb)
19833

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	2345	6071	0.39	Pass
Concrete breakout	4689	9208	0.51	Pass
Adhesive	**4689**	**8093**	**0.58**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, $øV_n$ (lb)	Ratio	Status
Steel	1655	3156	0.52	Pass
T Concrete breakout x+	**3309**	**5323**	**0.62**	**Pass (Governs)**
|| Concrete breakout y-	**1655**	**12241**	**0.14**	**Pass (Governs)**
Pryout	3309	19833	0.17	Pass

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

Sec. D.7.3	0.58	0.62	120.1 %	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.