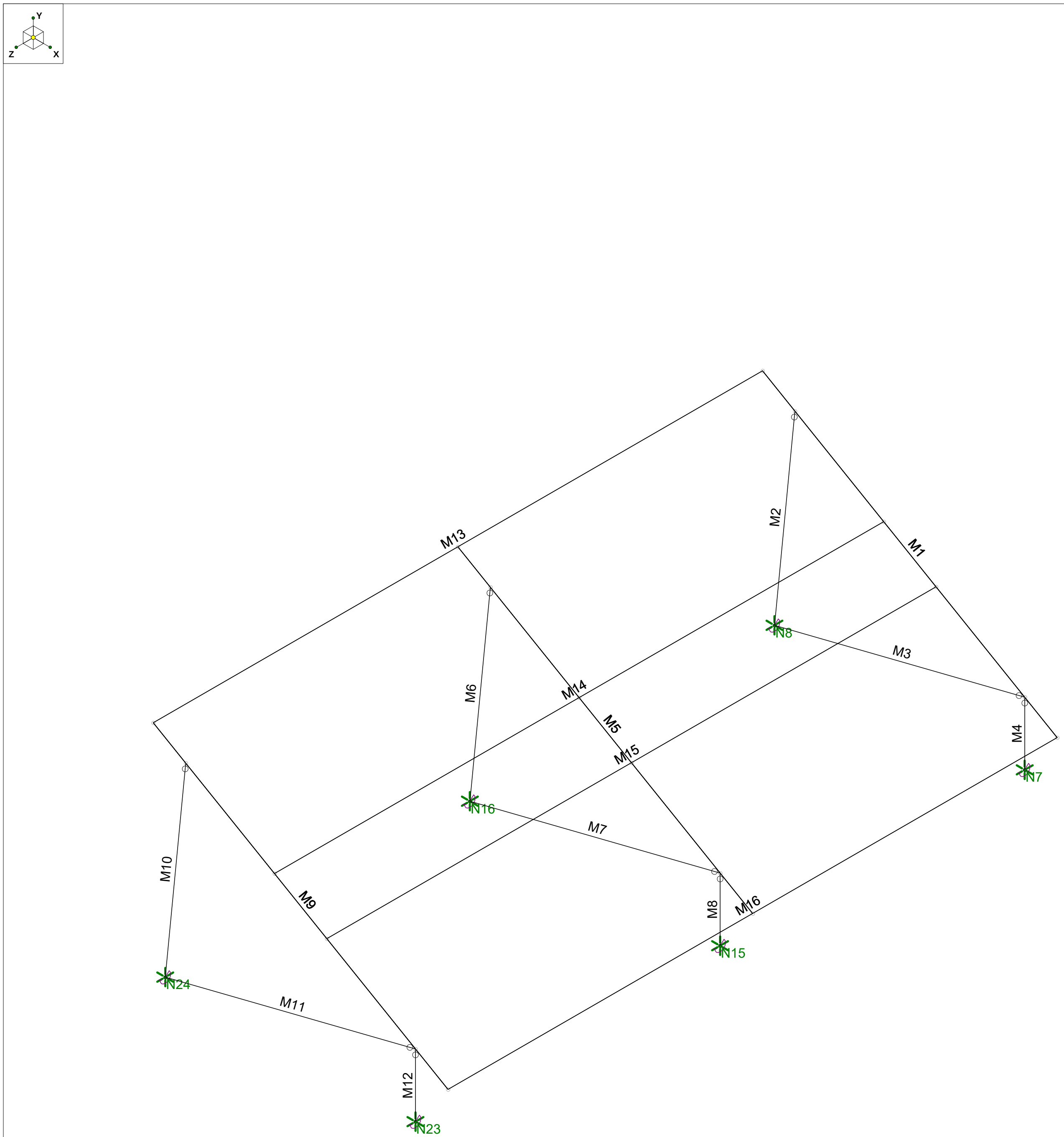


Schletter, Inc.		30° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-10	

1. INTRODUCTION

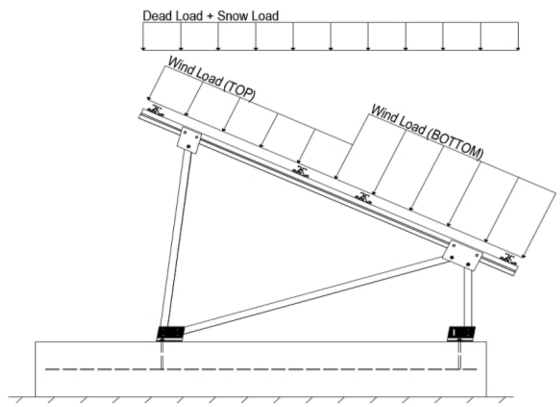
1.1 Project Description
The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. PVMax ground mount system.

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 =	2000 mm	Height =	1900 mm
Width =	1050 mm	Width =	970 mm
Dead Load =	3.00 psf	Dead Load =	1.75 psf

Modules Per Row = 2
Module Tilt = 30°
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
g_{MIN} = 1.75 psf

Self-weight of the PV modules.

2.2 Snow Loads
Ground Snow Load, P_g = 30.00 psf
Sloped Roof Snow Load, P_s = 16.49 psf *(ASCE 7-10, Eq. 7.4-1)*
I_s = 1.00
C_s = 0.73
C_e = 0.90
C_t = 1.20

2.3 Wind Loads
Design Wind Speed, V = 115 mph
Height < 15 ft

Exposure Category = C
Importance Category = II

Peak Velocity Pressure, q_z = 20.76 psf *Including the gust factor, G=0.85. (ASCE 7-10, Eq. 27.3-1)*

Pressure Coefficients

$Cf+_{TOP}$	=	1.150	*(Pressure)*
$Cf+_{BOTTOM}$	=	1.850	
$Cf-_{TOP, OUTER\ PURLIN}$	=	-2.600	
$Cf-_{TOP, INNER\ PURLIN}$	=	-2.000	*(Suction)*
$Cf-_{BOTTOM}$	=	-1.100	

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 =	0.07	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

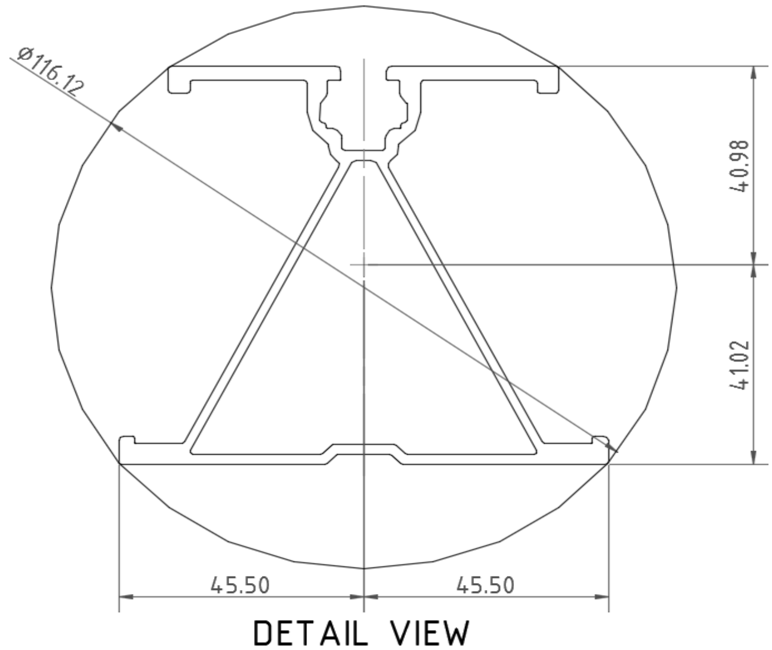
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

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).

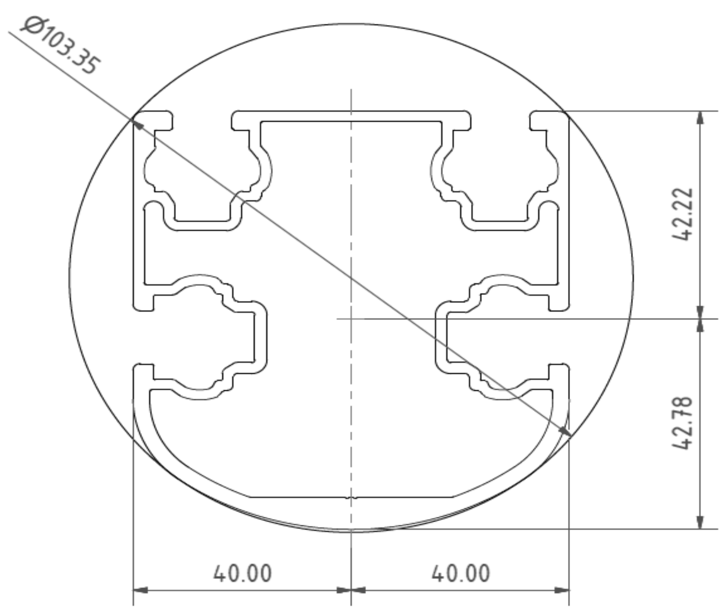
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	120	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	1.809	k-ft
M_z =	0.402	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	100%	



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).

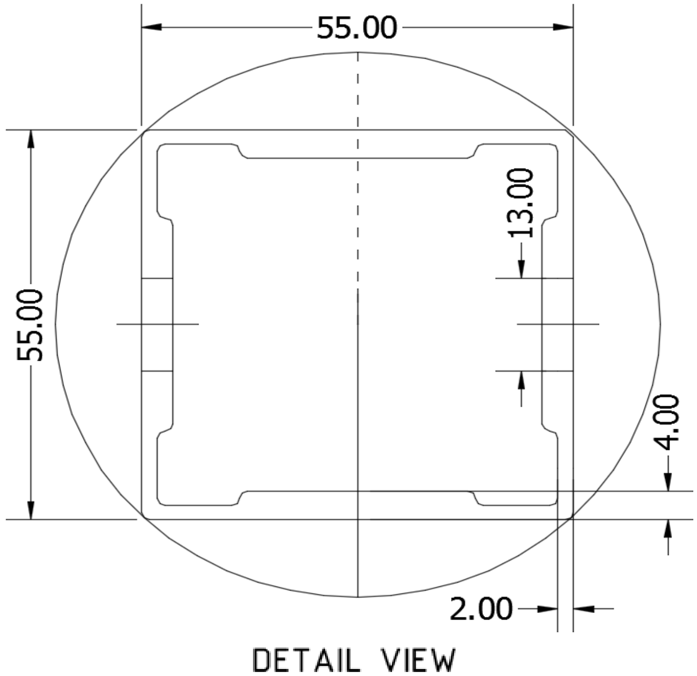
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	104.56	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.00	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.308	k-ft
M_z =	0.000	k-ft
P_n =	-0.888	k
$M_{y\ allowable}$ =	3.422	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	98%	



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).

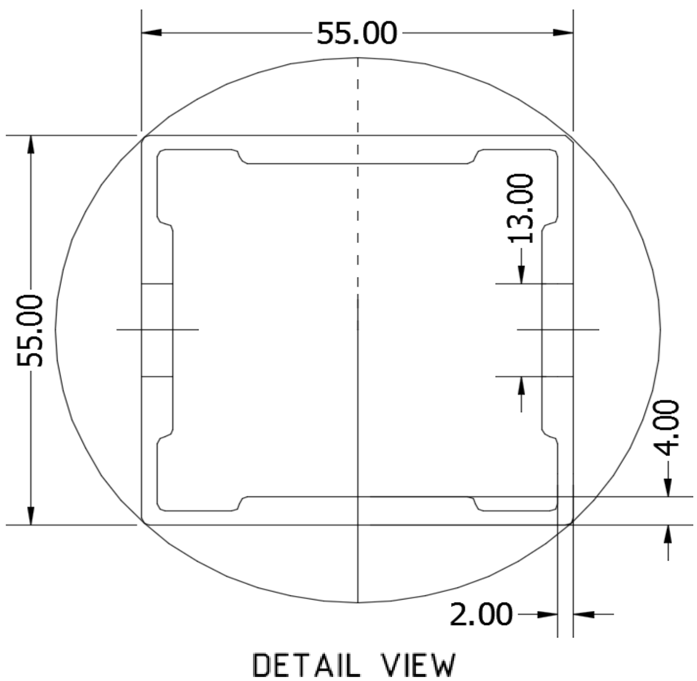
Strut Type =	55x55	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.666	k-ft
P_n =	0.163	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	48%	



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).

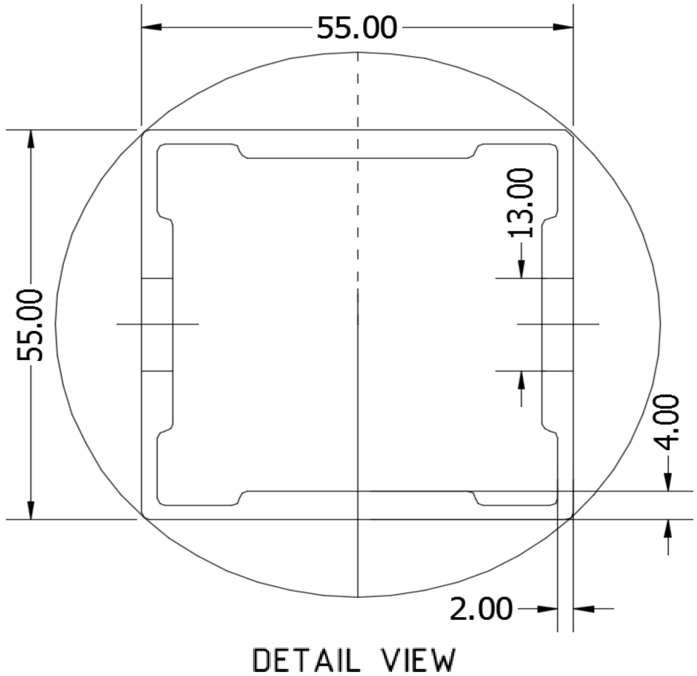
Strut Type =	55x55	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	98.03	in
$\Phi F_{ty\ AXIAL}$ =	6.11	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.011	k-ft
M_z =	0.000	k-ft
P_n =	2.389	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	6.000	k
Utilization =	41%	



4.5 Rear Strut Design

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

Strut Type =	55x55	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	78.35	in
$\Phi F_{ty\ AXIAL}$ =	8.88	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 =	3.232	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	8.726	k
Utilization =	38%	



5. FOUNDATION DESIGN CALCULATIONS

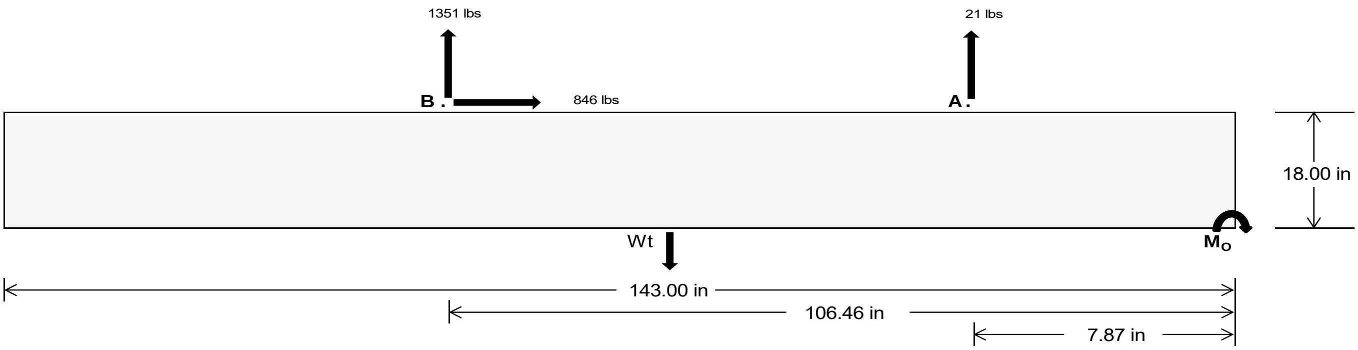
5.1 Helical Pile Foundations

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 =	116.24	5876.99	k
Compressive Load =	3748.48	4848.90	k
Lateral Load =	435.65	3669.35	k
Moment (Weak Axis) =	0.87	0.34	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).



Concrete Properties

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

Footing Reinforcement

Use fiber reinforcing with (2) #5 rebar.

Overturning Check

M_O =	159225.8 in-lbs
Resisting Force Required =	2226.93 lbs
S.F. =	1.67
Weight Required =	3711.56 lbs
Minimum Width =	35 in in
Weight Provided =	7559.64 lbs

A minimum 143in long x 35in wide x 18in tall ballast foundation is required to resist overturning.

Sliding

Force =	846.28 lbs
Friction =	0.4
Weight Required =	2115.69 lbs
Resisting Weight =	7559.64 lbs
Additional Weight Required =	0 lbs

Use a 143in long x 35in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

Cohesion

Sliding Force =	846.28 lbs
Cohesion =	130 psf
Area =	34.76 ft^2
Resisting =	3779.82 lbs
Additional Weight Required =	0 lbs

Use a 143in long x 35in wide x 18in tall ballast foundation. Cohesion is OK.

Shear Key

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

Shear key is not required.

Bearing Pressure

	Ballast Width			
	35 in	36 in	37 in	38 in
P_{ftg} = (145 pcf)(11.92 ft)(1.5 ft)(2.92 ft) =	7560 lbs	7776 lbs	7992 lbs	8208 lbs

ASD LC	1.0D + 1.0S				1.0D + 0.6W				1.0D + 0.75L + 0.45W + 0.75S				0.6D + 0.6W			
Width	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in
F_A	1398 lbs	1398 lbs	1398 lbs	1398 lbs	1211 lbs	1211 lbs	1211 lbs	1211 lbs	1811 lbs	1811 lbs	1811 lbs	1811 lbs	-42 lbs	-42 lbs	-42 lbs	-42 lbs
F_B	1394 lbs	1394 lbs	1394 lbs	1394 lbs	1987 lbs	1987 lbs	1987 lbs	1987 lbs	2391 lbs	2391 lbs	2391 lbs	2391 lbs	-2702 lbs	-2702 lbs	-2702 lbs	-2702 lbs
F_V	207 lbs	207 lbs	207 lbs	207 lbs	1546 lbs	1546 lbs	1546 lbs	1546 lbs	1295 lbs	1295 lbs	1295 lbs	1295 lbs	-1693 lbs	-1693 lbs	-1693 lbs	-1693 lbs
P_{total}	10352 lbs	10568 lbs	10784 lbs	11000 lbs	10757 lbs	10973 lbs	11189 lbs	11405 lbs	11762 lbs	11978 lbs	12194 lbs	12410 lbs	1791 lbs	1921 lbs	2051 lbs	2180 lbs
M	3663 lbs-ft	3663 lbs-ft	3663 lbs-ft	3663 lbs-ft	2954 lbs-ft	2954 lbs-ft	2954 lbs-ft	2954 lbs-ft	4578 lbs-ft	4578 lbs-ft	4578 lbs-ft	4578 lbs-ft	5108 lbs-ft	5108 lbs-ft	5108 lbs-ft	5108 lbs-ft
e	0.35 ft	0.35 ft	0.34 ft	0.33 ft	0.27 ft	0.27 ft	0.26 ft	0.26 ft	0.39 ft	0.38 ft	0.38 ft	0.37 ft	2.85 ft	2.66 ft	2.49 ft	2.34 ft
L/6	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft
f_{min}	244.8 psf	244.0 psf	243.3 psf	242.6 psf	266.7 psf	265.3 psf	264.1 psf	262.8 psf	272.1 psf	270.6 psf	269.1 psf	267.8 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	350.9 psf	347.2 psf	343.7 psf	340.4 psf	352.3 psf	348.6 psf	345.0 psf	341.7 psf	404.7 psf	399.5 psf	394.6 psf	389.9 psf	131.8 psf	129.4 psf	127.9 psf	126.9 psf

Maximum Bearing Pressure = 405 psf
Allowable Bearing Pressure = 1500 psf

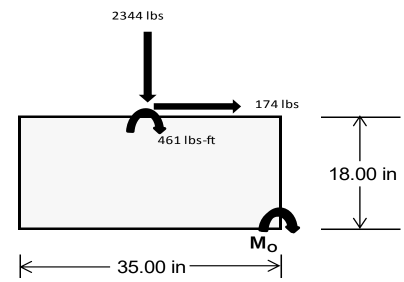
Use a 143in long x 35in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O = 2695.9 ft-lbs
Resisting Force Required = 1848.62 lbs
S.F. = 1.67
Weight Required = 3081.03 lbs
Minimum Width = 35 in in
Weight Provided = 7559.64 lbs

A minimum 143in long x 35in 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	35 in			35 in			35 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	350 lbs	720 lbs	226 lbs	899 lbs	2344 lbs	803 lbs	145 lbs	211 lbs	23 lbs
F_V	244 lbs	238 lbs	251 lbs	177 lbs	174 lbs	198 lbs	246 lbs	239 lbs	248 lbs
P_{total}	9708 lbs	10079 lbs	9585 lbs	9808 lbs	11253 lbs	9712 lbs	2882 lbs	2947 lbs	2760 lbs
M	969 lbs-ft	953 lbs-ft	990 lbs-ft	718 lbs-ft	722 lbs-ft	784 lbs-ft	969 lbs-ft	950 lbs-ft	977 lbs-ft
e	0.10 ft	0.09 ft	0.10 ft	0.07 ft	0.06 ft	0.08 ft	0.34 ft	0.32 ft	0.35 ft
L/6	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft
f_{min}	222.0 psf	233.6 psf	217.2 psf	239.7 psf	281.0 psf	233.1 psf	25.5 psf	28.6 psf	21.6 psf
f_{max}	336.7 psf	346.4 psf	334.4 psf	324.7 psf	366.5 psf	325.8 psf	140.3 psf	141.0 psf	137.2 psf

Maximum Bearing Pressure = 366 psf
Allowable Bearing Pressure = 1500 psf

Use a 143in long x 35in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Foundation Requirements: 143in 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.

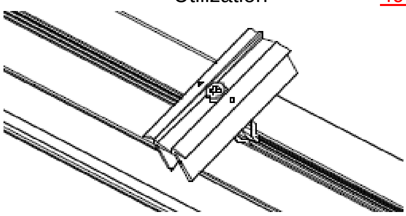
6. DESIGN OF JOINTS AND CONNECTIONS

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.

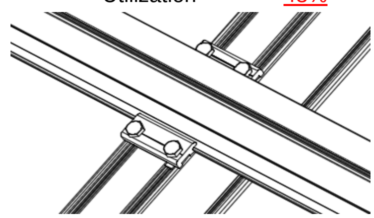
Fastening of Modules to Purlins

Maximum Uplifting Force =	0.592	k
Allowable Uplift =	1.214	k
Utilization =	49%	



Fastening of Purlins to Girders

Maximum Uplifting Force =	2.102	k
Allowable Uplift =	4.357	k
Utilization =	48%	



6.2 Strut Connections

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

Front Strut

Maximum Axial Load =	2.883	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	39%	

Rear Strut

Maximum Axial Load =	3.948	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	53%	

Diagonal Strut

Maximum Axial Load =	2.486	k
M12 Bolt Shear Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	34%	

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

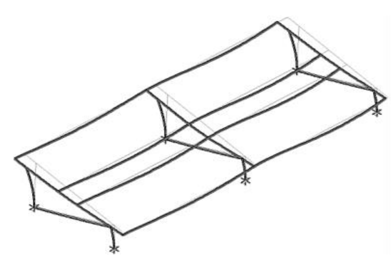
7.1 Seismic Drift

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} =	60.93	in
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$	
	1.219	in
Max Drift, Δ_{MAX} =	0.996	in

0.996 ≤ 1.219, OK.

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



APPENDIX A

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

Purlin = **S1.5**

Strong Axis:

3.4.14

L_b = 120 in

J = 0.432

331.976

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 27.4 ksi

3.4.16

b/t = 32.195

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 25.1 ksi

3.4.16.1 Not Used

Rb/t =

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 37.0588

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

S1 = 36.9

m = 0.65

C_0 = 40.985

Cc = 41.015

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

S2 = 77.2

φF_L= φb[Bbr-mDbr*h/t]

φF_L= 43.2 ksi

$\varphi F_L St$= 25.1 ksi

Ix = 897074 mm^4

2.155 in^4

y = 41.015 mm

Sx = 1.335 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

$\varphi F_L Wk$= 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)
$\varphi F_L = \varphi c[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 25.1 ksi

b/t = 37.0588
S1 = 12.21
S2 = 32.70
$\varphi F_L = (\varphi ck2*\sqrt{(BpE)})/(1.6b/t)$
$\varphi F_L =$ 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
$\varphi F_L = \varphi y Fcy$
$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 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

$L_b =$ 104.56 in
J = 1.08
179.85

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

S1 = 0.51461

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

S2 = 1701.56
$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)}/2))}]$
$\varphi F_L =$ 29.0 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
$\varphi F_L = \varphi b[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 31.6 ksi

Weak Axis:
3.4.14

$L_b =$ 104.56
J = 1.08
190.335

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

S1 = 0.51461

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

S2 = 1701.56
$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)}/2))}]$
$\varphi F_L =$ 28.9

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
$\varphi F_L = \varphi y Fcy$
$\varphi F_L =$ 33.3 ksi

3.4.16.1 Used

Rb/t = 18.1

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

S1 = 1.1

$S2 = C_t$

S2 = 141.0

φF_L= φb[Bt-Dt*√(Rb/t)]

φF_L= 31.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 7.4

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

S1 = 35.2

m = 0.68

C_0 = 41.067

Cc = 43.717

$$S2 = \frac{k_1Bbr}{mDbr}$$

S2 = 73.8

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 29.0 ksi

Ix = 984962 mm^4

2.366 in^4

y = 43.717 mm

Sx = 1.375 in^3

M_{max}St = 3.323 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

$$S2 = \frac{k_1Bbr}{mDbr}$$

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 33.3 ksi

Iy = 923544 mm^4

2.219 in^4

x = 40 mm

Sy = 1.409 in^3

M_{max}Wk = 3.904 k-ft

Compression

3.4.9

b/t = 16.2

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 31.6 ksi

b/t = 7.4

S1 = 12.21

S2 = 32.70

φF_L= φyFcy

φF_L= 33.3 ksi

3.4.10

Rb/t = 18.1

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

S1 = 6.87

S2 = 131.3

φF_L= φc[Bt-Dt*√(Rb/t)]

φF_L= 31.09 ksi

φF_L= 31.09 ksi

A = 1215.13 mm^2

1.88 in^2

P_{max} = 58.55 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 24.8 in

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

Weak Axis:

3.4.14

L_b = 24.8

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7
λ = 0.57371
r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671
φcc = 0.87952
φF_L= φcc(Bc-Dc*λ)
φF_L= 28.0279 ksi

3.4.9
b/t = 24.5
S1 = 12.21 (See 3.4.16 above for formula)
S2 = 32.70 (See 3.4.16 above for formula)
φF_L= φc[Bp-1.6Dp*b/t]
φF_L= 28.2 ksi

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

3.4.10
Rb/t = 0.0

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

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

φF_L= 28.03 ksi
A = 663.99 mm^2
1.03 in^2
P_{max} = 28.85 kips

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

Strut = **55x55**

Strong Axis:
3.4.14
L_b = 98.03 in
J = 0.942
152.985

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

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

Weak Axis:
3.4.14
L_b = 98.03
J = 0.942
152.985

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

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

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 in³

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 in³

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 2.26776

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.89749

φF_L= (φccFcy)/(λ²)

φF_L= 6.10803 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 = 6.11 ksi
A = 663.99 mm^2
1.03 in^2
P_{max} = 6.29 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 78.35 in
J = 0.942
122.273

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

S1 = 0.51461

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

S2 = 1701.56
φF_L = φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L = 29.8 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7
φF_L = φb[Bp-1.6Dp*b/t]
φF_L = 28.2 ksi

Weak Axis:

3.4.14

L_b = 78.35
J = 0.942
122.273

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

S1 = 0.51461

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

S2 = 1701.56
φF_L = φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L = 29.8

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7
φF_L = φb[Bp-1.6Dp*b/t]
φF_L = 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 1.8125

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.83375

φF_L= (φccFcy)/(λ²)

φF_L= 8.88278 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

$\varphi F_L =$ 8.88 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 9.14 kips

APPENDIX B

B.1

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

Basic Load Cases

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

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

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Y	-9.843	-9.843	0	0
2	M14	Y	-9.843	-9.843	0	0
3	M15	Y	-9.843	-9.843	0	0
4	M16	Y	-9.843	-9.843	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	-5.454	-5.454	0	0
2	M14	Y	-5.454	-5.454	0	0
3	M15	Y	-5.454	-5.454	0	0
4	M16	Y	-5.454	-5.454	0	0

Member Distributed Loads (BLC 3 : Snow Load)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Y	-46.866	-46.866	0	0
2	M14	Y	-46.866	-46.866	0	0
3	M15	Y	-46.866	-46.866	0	0
4	M16	Y	-46.866	-46.866	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	-78.344	-78.344	0	0
2	M14	y	-78.344	-78.344	0	0
3	M15	y	-126.031	-126.031	0	0
4	M16	y	-126.031	-126.031	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	177.125	177.125	0	0
2	M14	y	136.25	136.25	0	0
3	M15	y	74.938	74.938	0	0
4	M16	y	74.938	74.938	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	7.874	7.874	0	0
2	M14	Z	7.874	7.874	0	0
3	M15	Z	7.874	7.874	0	0
4	M16	Z	7.874	7.874	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	723.523	2	1162.435	2	.907	1	.004	1	0	1	0	1
2		min	-904.921	3	-1398.546	3	-42.055	5	-.258	4	0	1	0	1
3	N7	max	.046	9	1128.189	1	-1.082	12	-.002	12	0	1	0	1
4		min	-.205	2	-56.004	5	-335.112	4	-.666	4	0	1	0	1
5	N15	max	.01	9	2883.445	1	0	3	0	3	0	1	0	1
6		min	-2.219	2	-89.419	3	-313.733	4	-.635	4	0	1	0	1
7	N16	max	2643.083	2	3729.925	2	0	3	0	12	0	1	0	1
8		min	-2822.578	3	-4520.76	3	-41.821	5	-.261	4	0	1	0	1
9	N23	max	.057	14	1128.189	1	18.723	1	.036	1	0	1	0	1
10		min	-.205	2	4.738	3	-321.68	5	-.644	4	0	1	0	1
11	N24	max	723.523	2	1162.435	2	-.065	12	0	12	0	1	0	1
12		min	-904.921	3	-1398.546	3	-42.968	5	-.261	4	0	1	0	1
13	Totals:	max	4087.5	2	10794.667	1	0	2						
14		min	-4632.51	3	-7397.795	3	-1088.44	4						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
1	M13	1	max	108.07	1	427.854	1	-10.809	12	0	3	.304	1	0	4
2			min	6.492	12	-644.122	3	-211.501	1	-.015	2	.018	12	0	3
3		2	max	108.07	1	299.072	1	-8.49	12	0	3	.159	4	.61	3
4			min	6.492	12	-453.342	3	-162.278	1	-.015	2	.008	12	-.404	1
5		3	max	108.07	1	170.29	1	-6.17	12	0	3	.088	5	1.007	3
6			min	6.492	12	-262.562	3	-113.054	1	-.015	2	-.057	1	-.665	1
7		4	max	108.07	1	41.508	1	-3.851	12	0	3	.047	5	1.193	3
8			min	6.492	12	-71.783	3	-63.831	1	-.015	2	-.155	1	-.782	1
9		5	max	108.07	1	118.997	3	-1.323	10	0	3	.009	5	1.167	3
10			min	6.492	12	-87.274	1	-36.036	4	-.015	2	-.199	1	-.757	1
11		6	max	108.07	1	309.777	3	34.616	1	0	3	-.01	12	.929	3
12			min	2.71	15	-216.056	1	-28.301	5	-.015	2	-.188	1	-.588	1
13		7	max	108.07	1	500.556	3	83.839	1	0	3	-.007	12	.479	3
14			min	-8.777	5	-344.838	1	-24.771	5	-.015	2	-.122	1	-.277	1
15		8	max	108.07	1	691.336	3	133.063	1	0	3	.002	2	.178	1
16			min	-21.889	5	-473.62	1	-21.241	5	-.015	2	-.082	4	-.184	3
17		9	max	108.07	1	882.115	3	182.286	1	0	3	.174	1	.776	1
18			min	-35.001	5	-602.402	1	-17.711	5	-.015	2	-.101	5	-1.058	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
19		10	max	108.07	1	731.183	1	-10.065	12	.004	14	.404	1	1.517	1
20			min	6.492	12	-1072.895	3	-231.51	1	-.015	2	.015	12	-2.144	3
21		11	max	108.07	1	602.402	1	-7.746	12	.015	2	.174	1	.776	1
22			min	6.492	12	-882.115	3	-182.286	1	0	3	.005	12	-1.058	3
23		12	max	108.07	1	473.62	1	-5.427	12	.015	2	.08	4	.178	1
24			min	6.492	12	-691.336	3	-133.063	1	0	3	-.004	3	-.184	3
25		13	max	108.07	1	344.838	1	-3.107	12	.015	2	.036	5	.479	3
26			min	6.492	12	-500.556	3	-83.839	1	0	3	-.122	1	-.277	1
27		14	max	108.07	1	216.056	1	-.788	12	.015	2	-.002	15	.929	3
28			min	6.492	12	-309.777	3	-41.785	4	0	3	-.188	1	-.588	1
29		15	max	108.07	1	87.274	1	14.607	1	.015	2	-.009	12	1.167	3
30			min	-2.122	5	-118.997	3	-29.662	5	0	3	-.199	1	-.757	1
31		16	max	108.07	1	71.783	3	63.831	1	.015	2	-.006	12	1.193	3
32			min	-15.233	5	-41.508	1	-26.132	5	0	3	-.155	1	-.782	1
33		17	max	108.07	1	262.562	3	113.054	1	.015	2	0	3	1.007	3
34			min	-28.345	5	-170.29	1	-22.602	5	0	3	-.111	4	-.665	1
35		18	max	108.07	1	453.342	3	162.278	1	.015	2	.096	1	.61	3
36			min	-41.457	5	-299.072	1	-19.072	5	0	3	-.119	5	-.404	1
37		19	max	108.07	1	644.122	3	211.501	1	.015	2	.304	1	0	1
38			min	-54.568	5	-427.854	1	-15.542	5	0	3	-.138	5	0	3
39	M14	1	max	62.465	4	465.758	1	-11.16	12	.011	3	.354	1	0	4
40			min	3.254	12	-513.31	3	-219.068	1	-.013	2	.021	12	0	3
41		2	max	58.59	1	336.976	1	-8.841	12	.011	3	.234	4	.49	3
42			min	3.254	12	-367.947	3	-169.844	1	-.013	2	.01	12	-.446	1
43		3	max	58.59	1	208.194	1	-6.522	12	.011	3	.133	5	.818	3
44			min	3.254	12	-222.584	3	-120.621	1	-.013	2	-.024	1	-.749	1
45		4	max	58.59	1	79.412	1	-4.202	12	.011	3	.072	5	.984	3
46			min	3.254	12	-77.221	3	-71.397	1	-.013	2	-.13	1	-.909	1
47		5	max	58.59	1	68.142	3	-1.883	12	.011	3	.015	5	.989	3
48			min	-3.498	5	-49.37	1	-55.532	4	-.013	2	-.182	1	-.925	1
49		6	max	58.59	1	213.505	3	27.05	1	.011	3	-.009	12	.833	3
50			min	-16.61	5	-178.152	1	-45.619	5	-.013	2	-.179	1	-.799	1
51		7	max	58.59	1	358.868	3	76.273	1	.011	3	-.007	12	.515	3
52			min	-29.721	5	-306.934	1	-42.089	5	-.013	2	-.122	1	-.529	1
53		8	max	58.59	1	504.231	3	125.496	1	.011	3	0	10	.035	3
54			min	-42.833	5	-435.715	1	-38.558	5	-.013	2	-.137	4	-.13	2
55		9	max	58.59	1	649.594	3	174.72	1	.011	3	.157	1	.439	1
56			min	-55.945	5	-564.497	1	-35.028	5	-.013	2	-.172	5	-.606	3
57		10	max	90.43	4	693.279	1	-9.714	12	.011	3	.378	1	1.138	1
58			min	3.254	12	-794.957	3	-223.943	1	-.013	2	.014	12	-1.408	3
59		11	max	77.319	4	564.497	1	-7.395	12	.013	2	.234	4	.439	1
60			min	3.254	12	-649.594	3	-174.72	1	-.011	3	.004	12	-.606	3
61		12	max	64.207	4	435.715	1	-5.075	12	.013	2	.13	4	.035	3
62			min	3.254	12	-504.231	3	-125.496	1	-.011	3	-.01	1	-.13	2
63		13	max	58.59	1	306.934	1	-2.756	12	.013	2	.068	5	.515	3
64			min	3.254	12	-358.868	3	-76.273	1	-.011	3	-.122	1	-.529	1
65		14	max	58.59	1	178.152	1	-.436	12	.013	2	.011	5	.833	3
66			min	3.254	12	-213.505	3	-56.692	4	-.011	3	-.179	1	-.799	1
67		15	max	58.59	1	49.37	1	22.174	1	.013	2	-.008	12	.989	3
68			min	3.254	12	-68.142	3	-45.895	5	-.011	3	-.182	1	-.925	1
69		16	max	58.59	1	77.221	3	71.397	1	.013	2	-.005	12	.984	3
70			min	-2.043	5	-79.412	1	-42.365	5	-.011	3	-.13	1	-.909	1
71		17	max	58.59	1	222.584	3	120.621	1	.013	2	.002	3	.818	3
72			min	-15.155	5	-208.194	1	-38.834	5	-.011	3	-.144	4	-.749	1
73		18	max	58.59	1	367.947	3	169.844	1	.013	2	.138	1	.49	3
74			min	-28.266	5	-336.976	1	-35.304	5	-.011	3	-.177	5	-.446	1
75		19	max	58.59	1	513.31	3	219.068	1	.013	2	.354	1	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
76			min	-41.378	5	-465.758	1	-31.774	5	-.011	3	-.214	5	0	3
77	M15	1	max	101.605	5	625.02	2	-11.086	12	.014	2	.424	4	0	2
78			min	-62.846	1	-283.776	3	-218.993	1	-.009	3	.02	12	0	3
79		2	max	88.493	5	449.335	2	-8.767	12	.014	2	.289	4	.272	3
80			min	-62.846	1	-206.538	3	-169.77	1	-.009	3	.009	12	-.597	2
81		3	max	75.382	5	273.649	2	-6.448	12	.014	2	.172	5	.459	3
82			min	-62.846	1	-129.299	3	-120.547	1	-.009	3	-.024	1	-.999	2
83		4	max	62.27	5	97.964	2	-4.128	12	.014	2	.096	5	.56	3
84			min	-62.846	1	-52.061	3	-84.265	4	-.009	3	-.131	1	-1.205	2
85		5	max	49.158	5	25.178	3	-1.809	12	.014	2	.024	5	.575	3
86			min	-62.846	1	-77.721	2	-69.35	4	-.009	3	-.182	1	-1.216	2
87		6	max	36.047	5	102.416	3	27.124	1	.014	2	-.009	12	.504	3
88			min	-62.846	1	-253.407	2	-59.374	5	-.009	3	-.18	1	-1.032	2
89		7	max	22.935	5	179.655	3	76.347	1	.014	2	-.007	12	.347	3
90			min	-62.846	1	-429.092	2	-55.843	5	-.009	3	-.138	4	-.653	2
91		8	max	9.823	5	256.893	3	125.571	1	.014	2	0	10	.105	3
92			min	-62.846	1	-604.778	2	-52.313	5	-.009	3	-.174	4	-.091	1
93		9	max	-2.071	15	334.132	3	174.794	1	.014	2	.157	1	.691	2
94			min	-62.846	1	-780.463	2	-48.783	5	-.009	3	-.224	5	-.224	3
95		10	max	-3.845	12	956.148	2	-9.788	12	.014	2	.423	4	1.656	2
96			min	-62.846	1	-411.37	3	-224.017	1	-.009	3	.014	12	-.638	3
97		11	max	-3.845	12	780.463	2	-7.469	12	.009	3	.287	4	.691	2
98			min	-62.846	1	-334.132	3	-174.794	1	-.014	2	.004	12	-.224	3
99		12	max	-3.845	12	604.778	2	-5.149	12	.009	3	.167	4	.105	3
100			min	-62.846	1	-256.893	3	-125.571	1	-.014	2	-.01	1	-.091	1
101		13	max	-3.845	12	429.092	2	-2.83	12	.009	3	.09	5	.347	3
102			min	-62.846	1	-179.655	3	-85.481	4	-.014	2	-.122	1	-.653	2
103		14	max	-3.845	12	253.407	2	-.511	12	.009	3	.018	5	.504	3
104			min	-62.846	1	-102.416	3	-70.566	4	-.014	2	-.18	1	-1.032	2
105		15	max	-3.845	12	77.721	2	22.1	1	.009	3	-.008	12	.575	3
106			min	-74.692	4	-25.178	3	-59.656	5	-.014	2	-.182	1	-1.216	2
107		16	max	-3.845	12	52.061	3	71.323	1	.009	3	-.005	12	.56	3
108			min	-87.804	4	-97.964	2	-56.126	5	-.014	2	-.147	4	-1.205	2
109		17	max	-3.845	12	129.299	3	120.547	1	.009	3	.002	3	.459	3
110			min	-100.915	4	-273.649	2	-52.596	5	-.014	2	-.184	4	-.999	2
111		18	max	-3.845	12	206.538	3	169.77	1	.009	3	.137	1	.272	3
112			min	-114.027	4	-449.335	2	-49.066	5	-.014	2	-.232	5	-.597	2
113		19	max	-3.845	12	283.776	3	218.993	1	.009	3	.353	1	0	2
114			min	-127.139	4	-625.02	2	-45.536	5	-.014	2	-.284	5	0	5
115	M16	1	max	96.069	5	587.27	2	-10.588	12	.012	1	.317	4	0	2
116			min	-121.63	1	-254.408	3	-211.992	1	-.012	3	.017	12	0	3
117		2	max	82.957	5	411.584	2	-8.269	12	.012	1	.206	4	.24	3
118			min	-121.63	1	-177.17	3	-162.769	1	-.012	3	.007	12	-.555	2
119		3	max	69.846	5	235.899	2	-5.949	12	.012	1	.122	5	.394	3
120			min	-121.63	1	-99.931	3	-113.545	1	-.012	3	-.055	1	-.915	2
121		4	max	56.734	5	60.213	2	-3.63	12	.012	1	.068	5	.462	3
122			min	-121.63	1	-22.693	3	-64.322	1	-.012	3	-.154	1	-1.079	2
123		5	max	43.622	5	54.546	3	-1.311	12	.012	1	.018	5	.444	3
124			min	-121.63	1	-115.472	2	-47.686	4	-.012	3	-.198	1	-1.048	2
125		6	max	30.511	5	131.784	3	34.125	1	.012	1	-.009	12	.341	3
126			min	-121.63	1	-291.157	2	-39.726	5	-.012	3	-.188	1	-.823	2
127		7	max	17.399	5	209.023	3	83.348	1	.012	1	-.007	12	.151	3
128			min	-121.63	1	-466.843	2	-36.196	5	-.012	3	-.122	1	-.401	2
129		8	max	4.287	5	286.261	3	132.572	1	.012	1	.001	10	.215	2
130			min	-121.63	1	-642.528	2	-32.665	5	-.012	3	-.112	4	-.124	3
131		9	max	-5.809	15	363.5	3	181.795	1	.012	1	.172	1	1.026	2
132			min	-121.63	1	-818.214	2	-29.135	5	-.012	3	-.143	5	-.485	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
133		10	max	-6.917	12	993.899	2	-10.286	12	.012	1	.402	1	2.033	2
134			min	-121.63	1	-440.738	3	-231.019	1	-.012	3	.016	12	-.932	3
135		11	max	-5.497	15	818.214	2	-7.967	12	.012	3	.211	4	1.026	2
136			min	-121.63	1	-363.5	3	-181.795	1	-.012	1	.006	12	-.485	3
137		12	max	-6.917	12	642.528	2	-5.647	12	.012	3	.11	4	.215	2
138			min	-121.63	1	-286.261	3	-132.572	1	-.012	1	-.003	3	-.124	3
139		13	max	-6.917	12	466.843	2	-3.328	12	.012	3	.053	5	.151	3
140			min	-121.63	1	-209.023	3	-83.348	1	-.012	1	-.122	1	-.401	2
141		14	max	-6.917	12	291.157	2	-1.009	12	.012	3	.002	5	.341	3
142			min	-121.63	1	-131.784	3	-53.224	4	-.012	1	-.188	1	-.823	2
143		15	max	-6.917	12	115.472	2	15.099	1	.012	3	-.009	12	.444	3
144			min	-121.63	1	-54.546	3	-41.052	5	-.012	1	-.198	1	-1.048	2
145		16	max	-6.917	12	22.693	3	64.322	1	.012	3	-.006	12	.462	3
146			min	-121.63	1	-60.213	2	-37.522	5	-.012	1	-.154	1	-1.079	2
147		17	max	-6.917	12	99.931	3	113.545	1	.012	3	-.001	12	.394	3
148			min	-121.63	1	-235.899	2	-33.992	5	-.012	1	-.144	4	-.915	2
149		18	max	-6.917	12	177.17	3	162.769	1	.012	3	.098	1	.24	3
150			min	-129.875	4	-411.584	2	-30.462	5	-.012	1	-.165	5	-.555	2
151		19	max	-6.917	12	254.408	3	211.992	1	.012	3	.307	1	0	2
152			min	-142.987	4	-587.27	2	-26.931	5	-.012	1	-.197	5	0	5
153	M2	1	max	1017.512	1	2.056	4	.605	1	0	12	0	3	0	1
154			min	-1221.565	3	.498	15	-37.161	4	0	4	0	1	0	1
155		2	max	1018.042	1	1.985	4	.605	1	0	12	0	1	0	15
156			min	-1221.168	3	.481	15	-37.623	4	0	4	-.013	4	0	4
157		3	max	1018.571	1	1.914	4	.605	1	0	12	0	1	0	15
158			min	-1220.771	3	.464	15	-38.084	4	0	4	-.027	4	-.001	4
159		4	max	1019.1	1	1.843	4	.605	1	0	12	0	1	0	15
160			min	-1220.374	3	.448	15	-38.545	4	0	4	-.041	4	-.002	4
161		5	max	1019.63	1	1.772	4	.605	1	0	12	0	1	0	15
162			min	-1219.977	3	.431	15	-39.006	4	0	4	-.055	4	-.003	4
163		6	max	1020.159	1	1.701	4	.605	1	0	12	.001	1	0	15
164			min	-1219.581	3	.414	15	-39.467	4	0	4	-.069	4	-.003	4
165		7	max	1020.688	1	1.63	4	.605	1	0	12	.001	1	0	15
166			min	-1219.184	3	.398	15	-39.929	4	0	4	-.083	4	-.004	4
167		8	max	1021.217	1	1.559	4	.605	1	0	12	.002	1	-.001	15
168			min	-1218.787	3	.381	15	-40.39	4	0	4	-.097	4	-.005	4
169		9	max	1021.747	1	1.488	4	.605	1	0	12	.002	1	-.001	15
170			min	-1218.39	3	.364	15	-40.851	4	0	4	-.112	4	-.005	4
171		10	max	1022.276	1	1.417	4	.605	1	0	12	.002	1	-.001	15
172			min	-1217.993	3	.348	15	-41.312	4	0	4	-.127	4	-.006	4
173		11	max	1022.805	1	1.345	4	.605	1	0	12	.002	1	-.001	15
174			min	-1217.596	3	.331	15	-41.774	4	0	4	-.142	4	-.006	4
175		12	max	1023.335	1	1.274	4	.605	1	0	12	.002	1	-.002	15
176			min	-1217.199	3	.314	15	-42.235	4	0	4	-.157	4	-.007	4
177		13	max	1023.864	1	1.203	4	.605	1	0	12	.003	1	-.002	15
178			min	-1216.802	3	.297	15	-42.696	4	0	4	-.172	4	-.007	4
179		14	max	1024.393	1	1.132	4	.605	1	0	12	.003	1	-.002	15
180			min	-1216.405	3	.277	12	-43.157	4	0	4	-.187	4	-.007	4
181		15	max	1024.922	1	1.061	4	.605	1	0	12	.003	1	-.002	15
182			min	-1216.008	3	.249	12	-43.618	4	0	4	-.203	4	-.008	4
183		16	max	1025.452	1	.99	4	.605	1	0	12	.003	1	-.002	15
184			min	-1215.611	3	.222	12	-44.08	4	0	4	-.219	4	-.008	4
185		17	max	1025.981	1	.919	4	.605	1	0	12	.003	1	-.002	15
186			min	-1215.214	3	.194	12	-44.541	4	0	4	-.234	4	-.009	4
187		18	max	1026.51	1	.848	4	.605	1	0	12	.004	1	-.002	15
188			min	-1214.817	3	.166	12	-45.002	4	0	4	-.251	4	-.009	4
189		19	max	1027.04	1	.777	4	.605	1	0	12	.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	-1214.42	3	.139	12	-45.463	4	0	4	-.267	4	-.009	4
191	M3	1	max	639.39	2	8.9	4	1.931	4	0	12	0	1	.009	4
192			min	-801.565	3	2.103	15	.027	12	0	4	-.029	4	.002	15
193		2	max	639.219	2	8.031	4	2.536	4	0	12	0	1	.005	4
194			min	-801.693	3	1.899	15	.027	12	0	4	-.028	4	.001	12
195		3	max	639.049	2	7.162	4	3.141	4	0	12	0	1	.002	2
196			min	-801.821	3	1.695	15	.027	12	0	4	-.026	4	0	3
197		4	max	638.878	2	6.293	4	3.746	4	0	12	.001	1	0	15
198			min	-801.948	3	1.49	15	.027	12	0	4	-.025	4	-.002	3
199		5	max	638.708	2	5.424	4	4.351	4	0	12	.001	1	0	15
200			min	-802.076	3	1.286	15	.027	12	0	4	-.023	4	-.004	6
201		6	max	638.538	2	4.555	4	4.956	4	0	12	.002	1	-.002	15
202			min	-802.204	3	1.082	15	.027	12	0	4	-.021	5	-.007	6
203		7	max	638.367	2	3.686	4	5.561	4	0	12	.002	1	-.002	15
204			min	-802.332	3	.878	15	.027	12	0	4	-.018	5	-.009	6
205		8	max	638.197	2	2.818	4	6.166	4	0	12	.002	1	-.002	15
206			min	-802.459	3	.673	15	.027	12	0	4	-.016	5	-.01	6
207		9	max	638.027	2	1.949	4	6.771	4	0	12	.002	1	-.003	15
208			min	-802.587	3	.469	15	.027	12	0	4	-.013	5	-.011	6
209		10	max	637.856	2	1.08	4	7.377	4	0	12	.002	1	-.003	15
210			min	-802.715	3	.265	15	.027	12	0	4	-.009	5	-.012	6
211		11	max	637.686	2	.283	2	7.982	4	0	12	.003	1	-.003	15
212			min	-802.843	3	-.084	3	.027	12	0	4	-.006	5	-.012	6
213		12	max	637.516	2	-.144	15	8.587	4	0	12	.003	1	-.003	15
214			min	-802.97	3	-.659	6	.027	12	0	4	-.002	5	-.012	6
215		13	max	637.345	2	-.348	15	9.192	4	0	12	.003	1	-.003	15
216			min	-803.098	3	-1.528	6	.027	12	0	4	0	12	-.012	6
217		14	max	637.175	2	-.552	15	9.797	4	0	12	.007	4	-.003	15
218			min	-803.226	3	-2.397	6	.027	12	0	4	0	12	-.011	6
219		15	max	637.005	2	-.756	15	10.402	4	0	12	.012	4	-.002	15
220			min	-803.354	3	-3.266	6	.027	12	0	4	0	12	-.009	6
221		16	max	636.834	2	-.961	15	11.007	4	0	12	.017	4	-.002	15
222			min	-803.482	3	-4.135	6	.027	12	0	4	0	12	-.008	6
223		17	max	636.664	2	-1.165	15	11.612	4	0	12	.022	4	-.001	15
224			min	-803.609	3	-5.003	6	.027	12	0	4	0	12	-.006	6
225		18	max	636.494	2	-1.369	15	12.217	4	0	12	.028	4	0	15
226			min	-803.737	3	-5.872	6	.027	12	0	4	0	12	-.003	6
227		19	max	636.323	2	-1.573	15	12.822	4	0	12	.034	4	0	1
228			min	-803.865	3	-6.741	6	.027	12	0	4	0	12	0	1
229	M4	1	max	1125.123	1	0	1	-1.082	12	0	1	.027	4	0	1
230			min	-57.435	5	0	1	-334.056	4	0	1	0	12	0	1
231		2	max	1125.293	1	0	1	-1.082	12	0	1	.001	1	0	1
232			min	-57.356	5	0	1	-334.204	4	0	1	-.011	4	0	1
233		3	max	1125.464	1	0	1	-1.082	12	0	1	0	12	0	1
234			min	-57.276	5	0	1	-334.352	4	0	1	-.05	4	0	1
235		4	max	1125.634	1	0	1	-1.082	12	0	1	0	12	0	1
236			min	-57.197	5	0	1	-334.499	4	0	1	-.088	4	0	1
237		5	max	1125.804	1	0	1	-1.082	12	0	1	0	12	0	1
238			min	-57.117	5	0	1	-334.647	4	0	1	-.126	4	0	1
239		6	max	1125.975	1	0	1	-1.082	12	0	1	0	12	0	1
240			min	-57.038	5	0	1	-334.795	4	0	1	-.165	4	0	1
241		7	max	1126.145	1	0	1	-1.082	12	0	1	0	12	0	1
242			min	-56.958	5	0	1	-334.942	4	0	1	-.203	4	0	1
243		8	max	1126.315	1	0	1	-1.082	12	0	1	0	12	0	1
244			min	-56.879	5	0	1	-335.09	4	0	1	-.242	4	0	1
245		9	max	1126.486	1	0	1	-1.082	12	0	1	0	12	0	1
246			min	-56.799	5	0	1	-335.238	4	0	1	-.28	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	1126.656	1	0	1	-1.082	12	0	1	0	12	0	1
248			min	-56.72	5	0	1	-335.385	4	0	1	-.319	4	0	1
249		11	max	1126.826	1	0	1	-1.082	12	0	1	-.001	12	0	1
250			min	-56.64	5	0	1	-335.533	4	0	1	-.357	4	0	1
251		12	max	1126.997	1	0	1	-1.082	12	0	1	-.001	12	0	1
252			min	-56.561	5	0	1	-335.68	4	0	1	-.396	4	0	1
253		13	max	1127.167	1	0	1	-1.082	12	0	1	-.001	12	0	1
254			min	-56.481	5	0	1	-335.828	4	0	1	-.434	4	0	1
255		14	max	1127.337	1	0	1	-1.082	12	0	1	-.001	12	0	1
256			min	-56.402	5	0	1	-335.976	4	0	1	-.473	4	0	1
257		15	max	1127.508	1	0	1	-1.082	12	0	1	-.002	12	0	1
258			min	-56.322	5	0	1	-336.123	4	0	1	-.511	4	0	1
259		16	max	1127.678	1	0	1	-1.082	12	0	1	-.002	12	0	1
260			min	-56.243	5	0	1	-336.271	4	0	1	-.55	4	0	1
261		17	max	1127.848	1	0	1	-1.082	12	0	1	-.002	12	0	1
262			min	-56.163	5	0	1	-336.419	4	0	1	-.589	4	0	1
263		18	max	1128.019	1	0	1	-1.082	12	0	1	-.002	12	0	1
264			min	-56.084	5	0	1	-336.566	4	0	1	-.627	4	0	1
265		19	max	1128.189	1	0	1	-1.082	12	0	1	-.002	12	0	1
266			min	-56.004	5	0	1	-336.714	4	0	1	-.666	4	0	1
267	M6	1	max	3222.393	1	2.223	2	0	1	0	1	0	4	0	1
268			min	-3948.092	3	.311	12	-37.604	4	0	4	0	1	0	1
269		2	max	3222.922	1	2.168	2	0	1	0	1	0	1	0	12
270			min	-3947.696	3	.283	12	-38.065	4	0	4	-.014	4	0	2
271		3	max	3223.452	1	2.112	2	0	1	0	1	0	1	0	12
272			min	-3947.299	3	.256	12	-38.526	4	0	4	-.027	4	-.002	2
273		4	max	3223.981	1	2.057	2	0	1	0	1	0	1	0	12
274			min	-3946.902	3	.228	12	-38.987	4	0	4	-.041	4	-.002	2
275		5	max	3224.51	1	2.001	2	0	1	0	1	0	1	0	12
276			min	-3946.505	3	.2	12	-39.449	4	0	4	-.055	4	-.003	2
277		6	max	3225.039	1	1.946	2	0	1	0	1	0	1	0	12
278			min	-3946.108	3	.173	12	-39.91	4	0	4	-.07	4	-.004	2
279		7	max	3225.569	1	1.891	2	0	1	0	1	0	1	0	12
280			min	-3945.711	3	.137	3	-40.371	4	0	4	-.084	4	-.004	2
281		8	max	3226.098	1	1.835	2	0	1	0	1	0	1	0	12
282			min	-3945.314	3	.096	3	-40.832	4	0	4	-.098	4	-.005	2
283		9	max	3226.627	1	1.78	2	0	1	0	1	0	1	0	12
284			min	-3944.917	3	.054	3	-41.293	4	0	4	-.113	4	-.006	2
285		10	max	3227.157	1	1.725	2	0	1	0	1	0	1	0	12
286			min	-3944.52	3	.013	3	-41.755	4	0	4	-.128	4	-.006	2
287		11	max	3227.686	1	1.669	2	0	1	0	1	0	1	0	12
288			min	-3944.123	3	-.029	3	-42.216	4	0	4	-.143	4	-.007	2
289		12	max	3228.215	1	1.614	2	0	1	0	1	0	1	0	3
290			min	-3943.726	3	-.07	3	-42.677	4	0	4	-.158	4	-.008	2
291		13	max	3228.745	1	1.559	2	0	1	0	1	0	1	0	3
292			min	-3943.329	3	-.112	3	-43.138	4	0	4	-.174	4	-.008	2
293		14	max	3229.274	1	1.503	2	0	1	0	1	0	1	0	3
294			min	-3942.932	3	-.153	3	-43.6	4	0	4	-.189	4	-.009	2
295		15	max	3229.803	1	1.448	2	0	1	0	1	0	1	0	3
296			min	-3942.535	3	-.195	3	-44.061	4	0	4	-.205	4	-.009	2
297		16	max	3230.332	1	1.393	2	0	1	0	1	0	1	0	3
298			min	-3942.138	3	-.236	3	-44.522	4	0	4	-.221	4	-.01	2
299		17	max	3230.862	1	1.337	2	0	1	0	1	0	1	0	3
300			min	-3941.741	3	-.278	3	-44.983	4	0	4	-.237	4	-.01	2
301		18	max	3231.391	1	1.282	2	0	1	0	1	0	1	0	3
302			min	-3941.344	3	-.319	3	-45.444	4	0	4	-.253	4	-.011	2
303		19	max	3231.92	1	1.227	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	-3940.947	3	-.361	3	-45.906	4	0	4	-.27	4	-.011	2
305	M7	1	max	2388.904	2	8.909	6	1.399	4	0	1	0	1	.011	2
306			min	-2483.887	3	2.091	15	0	1	0	4	-.029	4	0	3
307		2	max	2388.734	2	8.04	6	2.004	4	0	1	0	1	.008	2
308			min	-2484.015	3	1.887	15	0	1	0	4	-.028	4	-.002	3
309		3	max	2388.564	2	7.171	6	2.609	4	0	1	0	1	.005	2
310			min	-2484.142	3	1.683	15	0	1	0	4	-.027	4	-.004	3
311		4	max	2388.393	2	6.302	6	3.215	4	0	1	0	1	.002	2
312			min	-2484.27	3	1.479	15	0	1	0	4	-.026	4	-.005	3
313		5	max	2388.223	2	5.433	6	3.82	4	0	1	0	1	0	2
314			min	-2484.398	3	1.274	15	0	1	0	4	-.024	4	-.007	3
315		6	max	2388.053	2	4.564	6	4.425	4	0	1	0	1	-.002	15
316			min	-2484.526	3	1.07	15	0	1	0	4	-.022	4	-.008	3
317		7	max	2387.882	2	3.695	6	5.03	4	0	1	0	1	-.002	15
318			min	-2484.653	3	.866	15	0	1	0	4	-.02	4	-.009	4
319		8	max	2387.712	2	2.826	6	5.635	4	0	1	0	1	-.002	15
320			min	-2484.781	3	.662	15	0	1	0	4	-.017	4	-.01	4
321		9	max	2387.542	2	1.992	2	6.24	4	0	1	0	1	-.003	15
322			min	-2484.909	3	.386	12	0	1	0	4	-.015	4	-.011	4
323		10	max	2387.371	2	1.315	2	6.845	4	0	1	0	1	-.003	15
324			min	-2485.037	3	.01	3	0	1	0	4	-.011	4	-.012	4
325		11	max	2387.201	2	.638	2	7.45	4	0	1	0	1	-.003	15
326			min	-2485.164	3	-.498	3	0	1	0	4	-.008	4	-.012	4
327		12	max	2387.031	2	-.039	2	8.055	4	0	1	0	1	-.003	15
328			min	-2485.292	3	-1.006	3	0	1	0	4	-.004	4	-.012	4
329		13	max	2386.86	2	-.359	15	8.66	4	0	1	0	1	-.003	15
330			min	-2485.42	3	-1.518	4	0	1	0	4	0	4	-.012	4
331		14	max	2386.69	2	-.564	15	9.265	4	0	1	.004	4	-.003	15
332			min	-2485.548	3	-2.387	4	0	1	0	4	0	1	-.011	4
333		15	max	2386.52	2	-.768	15	9.87	4	0	1	.008	4	-.002	15
334			min	-2485.675	3	-3.256	4	0	1	0	4	0	1	-.009	4
335		16	max	2386.349	2	-.972	15	10.475	4	0	1	.013	4	-.002	15
336			min	-2485.803	3	-4.125	4	0	1	0	4	0	1	-.008	4
337		17	max	2386.179	2	-1.176	15	11.08	4	0	1	.018	4	-.001	15
338			min	-2485.931	3	-4.994	4	0	1	0	4	0	1	-.006	4
339		18	max	2386.009	2	-1.381	15	11.686	4	0	1	.023	4	0	15
340			min	-2486.059	3	-5.863	4	0	1	0	4	0	1	-.003	4
341		19	max	2385.838	2	-1.585	15	12.291	4	0	1	.029	4	0	1
342			min	-2486.186	3	-6.732	4	0	1	0	4	0	1	0	1
343	M8	1	max	2880.379	1	0	1	0	1	0	1	.023	4	0	1
344			min	-91.719	3	0	1	-317.409	4	0	1	0	1	0	1
345		2	max	2880.549	1	0	1	0	1	0	1	0	1	0	1
346			min	-91.591	3	0	1	-317.556	4	0	1	-.013	4	0	1
347		3	max	2880.72	1	0	1	0	1	0	1	0	1	0	1
348			min	-91.463	3	0	1	-317.704	4	0	1	-.05	4	0	1
349		4	max	2880.89	1	0	1	0	1	0	1	0	1	0	1
350			min	-91.335	3	0	1	-317.852	4	0	1	-.086	4	0	1
351		5	max	2881.06	1	0	1	0	1	0	1	0	1	0	1
352			min	-91.207	3	0	1	-317.999	4	0	1	-.123	4	0	1
353		6	max	2881.231	1	0	1	0	1	0	1	0	1	0	1
354			min	-91.08	3	0	1	-318.147	4	0	1	-.159	4	0	1
355		7	max	2881.401	1	0	1	0	1	0	1	0	1	0	1
356			min	-90.952	3	0	1	-318.295	4	0	1	-.196	4	0	1
357		8	max	2881.571	1	0	1	0	1	0	1	0	1	0	1
358			min	-90.824	3	0	1	-318.442	4	0	1	-.232	4	0	1
359		9	max	2881.742	1	0	1	0	1	0	1	0	1	0	1
360			min	-90.696	3	0	1	-318.59	4	0	1	-.269	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	2881.912	1	0	1	0	1	0	1	0	1	0	1
362			min	-90.569	3	0	1	-318.738	4	0	1	-.305	4	0	1
363		11	max	2882.082	1	0	1	0	1	0	1	0	1	0	1
364			min	-90.441	3	0	1	-318.885	4	0	1	-.342	4	0	1
365		12	max	2882.253	1	0	1	0	1	0	1	0	1	0	1
366			min	-90.313	3	0	1	-319.033	4	0	1	-.379	4	0	1
367		13	max	2882.423	1	0	1	0	1	0	1	0	1	0	1
368			min	-90.185	3	0	1	-319.18	4	0	1	-.415	4	0	1
369		14	max	2882.593	1	0	1	0	1	0	1	0	1	0	1
370			min	-90.058	3	0	1	-319.328	4	0	1	-.452	4	0	1
371		15	max	2882.764	1	0	1	0	1	0	1	0	1	0	1
372			min	-89.93	3	0	1	-319.476	4	0	1	-.489	4	0	1
373		16	max	2882.934	1	0	1	0	1	0	1	0	1	0	1
374			min	-89.802	3	0	1	-319.623	4	0	1	-.525	4	0	1
375		17	max	2883.104	1	0	1	0	1	0	1	0	1	0	1
376			min	-89.674	3	0	1	-319.771	4	0	1	-.562	4	0	1
377		18	max	2883.275	1	0	1	0	1	0	1	0	1	0	1
378			min	-89.547	3	0	1	-319.919	4	0	1	-.599	4	0	1
379		19	max	2883.445	1	0	1	0	1	0	1	0	1	0	1
380			min	-89.419	3	0	1	-320.066	4	0	1	-.635	4	0	1
381	M10	1	max	1017.512	1	1.99	6	-.034	12	0	1	0	4	0	1
382			min	-1221.565	3	.453	15	-37.53	4	0	5	0	3	0	1
383		2	max	1018.042	1	1.919	6	-.034	12	0	1	0	10	0	15
384			min	-1221.168	3	.437	15	-37.992	4	0	5	-.014	4	0	6
385		3	max	1018.571	1	1.848	6	-.034	12	0	1	0	12	0	15
386			min	-1220.771	3	.42	15	-38.453	4	0	5	-.027	4	-.001	6
387		4	max	1019.1	1	1.777	6	-.034	12	0	1	0	12	0	15
388			min	-1220.374	3	.403	15	-38.914	4	0	5	-.041	4	-.002	6
389		5	max	1019.63	1	1.706	6	-.034	12	0	1	0	12	0	15
390			min	-1219.977	3	.387	15	-39.375	4	0	5	-.055	4	-.003	6
391		6	max	1020.159	1	1.634	6	-.034	12	0	1	0	12	0	15
392			min	-1219.581	3	.37	15	-39.836	4	0	5	-.069	4	-.003	6
393		7	max	1020.688	1	1.563	6	-.034	12	0	1	0	12	0	15
394			min	-1219.184	3	.353	15	-40.298	4	0	5	-.084	4	-.004	6
395		8	max	1021.217	1	1.492	6	-.034	12	0	1	0	12	0	15
396			min	-1218.787	3	.337	15	-40.759	4	0	5	-.098	4	-.004	6
397		9	max	1021.747	1	1.421	6	-.034	12	0	1	0	12	-.001	15
398			min	-1218.39	3	.32	15	-41.22	4	0	5	-.113	4	-.005	6
399		10	max	1022.276	1	1.35	6	-.034	12	0	1	0	12	-.001	15
400			min	-1217.993	3	.303	15	-41.681	4	0	5	-.128	4	-.005	6
401		11	max	1022.805	1	1.279	6	-.034	12	0	1	0	12	-.001	15
402			min	-1217.596	3	.286	15	-42.143	4	0	5	-.143	4	-.006	6
403		12	max	1023.335	1	1.208	6	-.034	12	0	1	0	12	-.001	15
404			min	-1217.199	3	.27	15	-42.604	4	0	5	-.158	4	-.006	6
405		13	max	1023.864	1	1.137	6	-.034	12	0	1	0	12	-.002	15
406			min	-1216.802	3	.253	15	-43.065	4	0	5	-.173	4	-.007	6
407		14	max	1024.393	1	1.066	6	-.034	12	0	1	0	12	-.002	15
408			min	-1216.405	3	.236	15	-43.526	4	0	5	-.189	4	-.007	6
409		15	max	1024.922	1	.995	6	-.034	12	0	1	0	12	-.002	15
410			min	-1216.008	3	.22	15	-43.987	4	0	5	-.205	4	-.007	6
411		16	max	1025.452	1	.928	2	-.034	12	0	1	0	12	-.002	15
412			min	-1215.611	3	.203	15	-44.449	4	0	5	-.221	4	-.008	6
413		17	max	1025.981	1	.873	2	-.034	12	0	1	0	12	-.002	15
414			min	-1215.214	3	.186	15	-44.91	4	0	5	-.237	4	-.008	6
415		18	max	1026.51	1	.817	2	-.034	12	0	1	0	12	-.002	15
416			min	-1214.817	3	.166	12	-45.371	4	0	5	-.253	4	-.008	6
417		19	max	1027.04	1	.762	2	-.034	12	0	1	0	12	-.002	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
418			min	-1214.42	3	.139	12	-45.832	4	0	5	-.269	4	-.009	6
419	M11	1	max	639.39	2	8.849	6	1.645	5	0	1	0	12	.009	6
420			min	-801.565	3	2.069	15	-.472	1	0	4	-.029	4	.002	15
421		2	max	639.219	2	7.98	6	2.251	5	0	1	0	12	.005	2
422			min	-801.693	3	1.865	15	-.472	1	0	4	-.028	4	.001	12
423		3	max	639.049	2	7.112	6	2.856	5	0	1	0	12	.002	2
424			min	-801.821	3	1.661	15	-.472	1	0	4	-.027	4	0	3
425		4	max	638.878	2	6.243	6	3.461	5	0	1	0	12	0	2
426			min	-801.948	3	1.457	15	-.472	1	0	4	-.025	4	-.002	3
427		5	max	638.708	2	5.374	6	4.066	5	0	1	0	12	-.001	15
428			min	-802.076	3	1.252	15	-.472	1	0	4	-.023	4	-.005	4
429		6	max	638.538	2	4.505	6	4.671	5	0	1	0	12	-.002	15
430			min	-802.204	3	1.048	15	-.472	1	0	4	-.021	4	-.007	4
431		7	max	638.367	2	3.636	6	5.276	5	0	1	0	12	-.002	15
432			min	-802.332	3	.844	15	-.472	1	0	4	-.019	4	-.009	4
433		8	max	638.197	2	2.767	6	5.881	5	0	1	0	12	-.003	15
434			min	-802.459	3	.64	15	-.472	1	0	4	-.016	4	-.01	4
435		9	max	638.027	2	1.898	6	6.486	5	0	1	0	12	-.003	15
436			min	-802.587	3	.435	15	-.472	1	0	4	-.014	4	-.012	4
437		10	max	637.856	2	1.029	6	7.091	5	0	1	0	12	-.003	15
438			min	-802.715	3	.231	15	-.472	1	0	4	-.01	4	-.012	4
439		11	max	637.686	2	.283	2	7.696	5	0	1	0	12	-.003	15
440			min	-802.843	3	-.084	3	-.472	1	0	4	-.007	4	-.012	4
441		12	max	637.516	2	-.177	15	8.301	5	0	1	0	12	-.003	15
442			min	-802.97	3	-.709	4	-.472	1	0	4	-.003	4	-.012	4
443		13	max	637.345	2	-.382	15	8.906	5	0	1	.002	5	-.003	15
444			min	-803.098	3	-1.578	4	-.472	1	0	4	-.003	1	-.012	4
445		14	max	637.175	2	-.586	15	9.511	5	0	1	.006	5	-.003	15
446			min	-803.226	3	-2.447	4	-.472	1	0	4	-.003	1	-.011	4
447		15	max	637.005	2	-.79	15	10.116	5	0	1	.011	5	-.002	15
448			min	-803.354	3	-3.316	4	-.472	1	0	4	-.004	1	-.01	4
449		16	max	636.834	2	-.994	15	10.722	5	0	1	.015	5	-.002	15
450			min	-803.482	3	-4.185	4	-.472	1	0	4	-.004	1	-.008	4
451		17	max	636.664	2	-1.199	15	11.327	5	0	1	.021	5	-.001	15
452			min	-803.609	3	-5.054	4	-.472	1	0	4	-.004	1	-.006	4
453		18	max	636.494	2	-1.403	15	11.932	5	0	1	.026	5	0	15
454			min	-803.737	3	-5.923	4	-.472	1	0	4	-.004	1	-.003	4
455		19	max	636.323	2	-1.607	15	12.537	5	0	1	.032	5	0	1
456			min	-803.865	3	-6.792	4	-.472	1	0	4	-.004	1	0	1
457	M12	1	max	1125.123	1	0	1	19.319	1	0	1	.026	5	0	1
458			min	2.438	3	0	1	-322.21	4	0	1	-.004	1	0	1
459		2	max	1125.293	1	0	1	19.319	1	0	1	0	12	0	1
460			min	2.566	3	0	1	-322.357	4	0	1	-.012	4	0	1
461		3	max	1125.464	1	0	1	19.319	1	0	1	0	1	0	1
462			min	2.694	3	0	1	-322.505	4	0	1	-.049	4	0	1
463		4	max	1125.634	1	0	1	19.319	1	0	1	.003	1	0	1
464			min	2.822	3	0	1	-322.653	4	0	1	-.086	4	0	1
465		5	max	1125.804	1	0	1	19.319	1	0	1	.005	1	0	1
466			min	2.949	3	0	1	-322.8	4	0	1	-.123	4	0	1
467		6	max	1125.975	1	0	1	19.319	1	0	1	.008	1	0	1
468			min	3.077	3	0	1	-322.948	4	0	1	-.16	4	0	1
469		7	max	1126.145	1	0	1	19.319	1	0	1	.01	1	0	1
470			min	3.205	3	0	1	-323.096	4	0	1	-.197	4	0	1
471		8	max	1126.315	1	0	1	19.319	1	0	1	.012	1	0	1
472			min	3.333	3	0	1	-323.243	4	0	1	-.234	4	0	1
473		9	max	1126.486	1	0	1	19.319	1	0	1	.014	1	0	1
474			min	3.46	3	0	1	-323.391	4	0	1	-.271	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	1126.656	1	0	1	19.319	1	0	1	.016	1	0	1
476			min	3.588	3	0	1	-323.539	4	0	1	-.309	4	0	1
477		11	max	1126.826	1	0	1	19.319	1	0	1	.019	1	0	1
478			min	3.716	3	0	1	-323.686	4	0	1	-.346	4	0	1
479		12	max	1126.997	1	0	1	19.319	1	0	1	.021	1	0	1
480			min	3.844	3	0	1	-323.834	4	0	1	-.383	4	0	1
481		13	max	1127.167	1	0	1	19.319	1	0	1	.023	1	0	1
482			min	3.971	3	0	1	-323.981	4	0	1	-.42	4	0	1
483		14	max	1127.337	1	0	1	19.319	1	0	1	.025	1	0	1
484			min	4.099	3	0	1	-324.129	4	0	1	-.457	4	0	1
485		15	max	1127.508	1	0	1	19.319	1	0	1	.028	1	0	1
486			min	4.227	3	0	1	-324.277	4	0	1	-.495	4	0	1
487		16	max	1127.678	1	0	1	19.319	1	0	1	.03	1	0	1
488			min	4.355	3	0	1	-324.424	4	0	1	-.532	4	0	1
489		17	max	1127.848	1	0	1	19.319	1	0	1	.032	1	0	1
490			min	4.482	3	0	1	-324.572	4	0	1	-.569	4	0	1
491		18	max	1128.019	1	0	1	19.319	1	0	1	.034	1	0	1
492			min	4.61	3	0	1	-324.72	4	0	1	-.606	4	0	1
493		19	max	1128.189	1	0	1	19.319	1	0	1	.036	1	0	1
494			min	4.738	3	0	1	-324.867	4	0	1	-.644	4	0	1
495	M1	1	max	211.509	1	644.063	3	54.5	5	0	1	.304	1	0	3
496			min	-15.542	5	-425.462	1	-107.852	1	0	3	-.138	5	-.015	2
497		2	max	212.352	1	642.969	3	55.961	5	0	1	.237	1	.25	1
498			min	-15.149	5	-426.921	1	-107.852	1	0	3	-.104	5	-.399	3
499		3	max	515.686	3	496.491	1	21.5	5	0	3	.17	1	.506	1
500			min	-314.597	2	-477.659	3	-107.58	1	0	1	-.069	5	-.786	3
501		4	max	516.318	3	495.032	1	22.96	5	0	3	.103	1	.198	1
502			min	-313.755	2	-478.753	3	-107.58	1	0	1	-.055	5	-.489	3
503		5	max	516.95	3	493.573	1	24.42	5	0	3	.036	1	-.005	15
504			min	-312.913	2	-479.848	3	-107.58	1	0	1	-.041	5	-.192	3
505		6	max	517.582	3	492.114	1	25.88	5	0	3	-.002	12	.107	3
506			min	-312.07	2	-480.942	3	-107.58	1	0	1	-.032	4	-.439	2
507		7	max	518.213	3	490.655	1	27.341	5	0	3	-.006	15	.405	3
508			min	-311.228	2	-482.036	3	-107.58	1	0	1	-.097	1	-.744	2
509		8	max	518.845	3	489.196	1	28.801	5	0	3	.009	5	.705	3
510			min	-310.385	2	-483.13	3	-107.58	1	0	1	-.164	1	-1.047	2
511		9	max	536.351	3	45.382	2	71.407	5	0	9	.101	1	.823	3
512			min	-218.769	2	.439	15	-166.241	1	0	3	-.172	5	-1.199	2
513		10	max	536.983	3	43.923	2	72.867	5	0	9	0	12	.803	3
514			min	-217.927	2	-.004	5	-166.241	1	0	3	-.129	4	-1.227	2
515		11	max	537.614	3	42.464	2	74.327	5	0	9	-.006	12	.784	3
516			min	-217.084	2	-1.791	4	-166.241	1	0	3	-.106	4	-1.253	2
517		12	max	554.999	3	318.507	3	186.806	5	0	2	.161	1	.684	3
518			min	-125.454	2	-582.534	2	-103.48	1	0	3	-.291	5	-1.111	2
519		13	max	555.631	3	317.413	3	188.266	5	0	2	.096	1	.487	3
520			min	-124.612	2	-583.993	2	-103.48	1	0	3	-.175	5	-.749	2
521		14	max	556.263	3	316.318	3	189.726	5	0	2	.032	1	.29	3
522			min	-123.769	2	-585.452	2	-103.48	1	0	3	-.058	5	-.388	1
523		15	max	556.894	3	315.224	3	191.186	5	0	2	.061	5	.094	3
524			min	-122.927	2	-586.911	2	-103.48	1	0	3	-.032	1	-.051	1
525		16	max	557.526	3	314.13	3	192.646	5	0	2	.18	5	.343	2
526			min	-122.084	2	-588.37	2	-103.48	1	0	3	-.096	1	-.101	3
527		17	max	558.158	3	313.035	3	194.106	5	0	2	.3	5	.708	2
528			min	-121.242	2	-589.829	2	-103.48	1	0	3	-.16	1	-.296	3
529		18	max	26.537	5	589.648	2	-6.918	12	0	5	.268	5	.355	2
530			min	-212.828	1	-253.436	3	-144.597	4	0	2	-.231	1	-.145	3
531		19	max	26.931	5	588.189	2	-6.918	12	0	5	.197	5	.012	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
532			min	-211.985	1	-254.531	3	-143.137	4	0	2	-.307	1	-.012	1
533	M5	1	max	463.003	1	2145.622	3	111.683	5	0	1	0	1	.031	2
534			min	20.132	12	-1449.995	1	0	1	0	4	-.301	4	0	3
535		2	max	463.846	1	2144.528	3	113.143	5	0	1	0	1	.928	1
536			min	20.553	12	-1451.455	1	0	1	0	4	-.232	4	-1.331	3
537		3	max	1637.099	3	1450.993	1	83.441	4	0	4	0	1	1.798	1
538			min	-1084.019	2	-1499.333	3	0	1	0	1	-.162	4	-2.622	3
539		4	max	1637.731	3	1449.534	1	84.901	4	0	4	0	1	.898	1
540			min	-1083.177	2	-1500.427	3	0	1	0	1	-.109	4	-1.691	3
541		5	max	1638.363	3	1448.075	1	86.361	4	0	4	0	1	.024	9
542			min	-1082.334	2	-1501.521	3	0	1	0	1	-.056	4	-.76	3
543		6	max	1638.994	3	1446.616	1	87.821	4	0	4	0	1	.173	3
544			min	-1081.492	2	-1502.616	3	0	1	0	1	-.002	5	-.953	2
545		7	max	1639.626	3	1445.157	1	89.281	4	0	4	.053	4	1.105	3
546			min	-1080.65	2	-1503.71	3	0	1	0	1	0	1	-1.844	2
547		8	max	1640.258	3	1443.698	1	90.741	4	0	4	.109	4	2.039	3
548			min	-1079.807	2	-1504.804	3	0	1	0	1	0	1	-2.734	2
549		9	max	1669.765	3	152.057	2	238.981	4	0	1	0	1	2.348	3
550			min	-890.017	2	.445	15	0	1	0	1	-.262	4	-3.121	2
551		10	max	1670.397	3	150.597	2	240.442	4	0	1	0	1	2.274	3
552			min	-889.175	2	.005	15	0	1	0	1	-.114	4	-3.215	2
553		11	max	1671.029	3	149.138	2	241.902	4	0	1	.036	4	2.202	3
554			min	-888.333	2	-1.458	6	0	1	0	1	0	1	-3.308	2
555		12	max	1700.778	3	979.504	3	265.718	4	0	1	0	1	1.933	3
556			min	-698.57	2	-1740.553	2	0	1	0	4	-.426	4	-2.958	2
557		13	max	1701.41	3	978.41	3	267.178	4	0	1	0	1	1.325	3
558			min	-697.728	2	-1742.012	2	0	1	0	4	-.26	4	-1.877	2
559		14	max	1702.042	3	977.316	3	268.638	4	0	1	0	1	.718	3
560			min	-696.886	2	-1743.471	2	0	1	0	4	-.094	4	-.817	1
561		15	max	1702.674	3	976.221	3	270.098	4	0	1	.073	4	.287	2
562			min	-696.043	2	-1744.93	2	0	1	0	4	0	1	0	13
563		16	max	1703.305	3	975.127	3	271.558	4	0	1	.241	4	1.371	2
564			min	-695.201	2	-1746.389	2	0	1	0	4	0	1	-.493	3
565		17	max	1703.937	3	974.033	3	273.018	4	0	1	.41	4	2.455	2
566			min	-694.358	2	-1747.848	2	0	1	0	4	0	1	-1.098	3
567		18	max	-20.993	12	1993.746	2	0	1	0	4	.429	4	1.258	2
568			min	-462.893	1	-881.045	3	-28.098	5	0	1	0	1	-.572	3
569		19	max	-20.571	12	1992.287	2	0	1	0	4	.413	4	.023	1
570			min	-462.051	1	-882.14	3	-26.638	5	0	1	0	1	-.025	3
571	M9	1	max	211.509	1	644.063	3	107.852	1	0	3	-.018	12	0	3
572			min	10.808	12	-425.462	1	6.491	12	0	4	-.304	1	-.015	2
573		2	max	212.352	1	642.969	3	107.852	1	0	3	-.014	12	.25	1
574			min	11.23	12	-426.921	1	6.491	12	0	4	-.237	1	-.399	3
575		3	max	515.686	3	496.491	1	107.58	1	0	1	-.01	12	.506	1
576			min	-314.597	2	-477.659	3	6.456	12	0	3	-.17	1	-.786	3
577		4	max	516.318	3	495.032	1	107.58	1	0	1	-.006	12	.198	1
578			min	-313.755	2	-478.753	3	6.456	12	0	3	-.103	1	-.489	3
579		5	max	516.95	3	493.573	1	107.58	1	0	1	-.002	12	-.005	15
580			min	-312.913	2	-479.848	3	6.456	12	0	3	-.055	4	-.192	3
581		6	max	517.582	3	492.114	1	107.58	1	0	1	.031	1	.107	3
582			min	-312.07	2	-480.942	3	6.456	12	0	3	-.021	5	-.439	2
583		7	max	518.213	3	490.655	1	107.58	1	0	1	.097	1	.405	3
584			min	-311.228	2	-482.036	3	6.456	12	0	3	.003	15	-.744	2
585		8	max	518.845	3	489.196	1	107.58	1	0	1	.164	1	.705	3
586			min	-310.385	2	-483.13	3	6.456	12	0	3	.01	12	-1.047	2
587		9	max	536.351	3	45.382	2	166.241	1	0	3	-.006	12	.823	3
588			min	-218.769	2	.454	15	9.702	12	0	9	-.212	4	-1.199	2

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
589		10	max	536.983	3	43.923	2	166.241	1	0	3	.002	1	.803	3
590			min	-217.927	2	.013	15	9.702	12	0	9	-.127	4	-1.227	2
591		11	max	537.614	3	42.464	2	166.241	1	0	3	.105	1	.784	3
592			min	-217.084	2	-1.676	6	9.702	12	0	9	-.066	5	-1.253	2
593		12	max	554.999	3	318.507	3	229.476	4	0	3	-.009	12	.684	3
594			min	-125.454	2	-582.534	2	5.865	12	0	2	-.357	4	-1.111	2
595		13	max	555.631	3	317.413	3	230.936	4	0	3	-.006	12	.487	3
596			min	-124.612	2	-583.993	2	5.865	12	0	2	-.214	4	-.749	2
597		14	max	556.263	3	316.318	3	232.396	4	0	3	-.002	12	.29	3
598			min	-123.769	2	-585.452	2	5.865	12	0	2	-.07	4	-.388	1
599		15	max	556.894	3	315.224	3	233.857	4	0	3	.074	4	.094	3
600			min	-122.927	2	-586.911	2	5.865	12	0	2	.002	12	-.051	1
601		16	max	557.526	3	314.13	3	235.317	4	0	3	.22	4	.343	2
602			min	-122.084	2	-588.37	2	5.865	12	0	2	.005	12	-.101	3
603		17	max	558.158	3	313.035	3	236.777	4	0	3	.367	4	.708	2
604			min	-121.242	2	-589.829	2	5.865	12	0	2	.009	12	-.296	3
605		18	max	-11.01	12	589.648	2	121.836	1	0	2	.36	4	.355	2
606			min	-212.828	1	-253.436	3	-97.887	5	0	3	.013	12	-.145	3
607		19	max	-10.589	12	588.189	2	121.836	1	0	2	.317	4	.012	3
608			min	-211.985	1	-254.531	3	-96.427	5	0	3	.017	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	.001	1	.179	2	.01	3	1.231e-2	2	NC	1	NC	1
2			min	-1.035	4	-.036	3	-.005	2	-2.55e-3	3	NC	1	NC	1
3		2	max	0	1	.269	3	.051	1	1.381e-2	2	NC	5	NC	2
4			min	-1.035	4	-.01	9	-.031	5	-2.552e-3	3	786.813	3	4783.007	1
5		3	max	0	1	.516	3	.121	1	1.53e-2	2	NC	5	NC	3
6			min	-1.035	4	-.143	1	-.037	5	-2.554e-3	3	434.739	3	1997.736	1
7		4	max	0	1	.666	3	.181	1	1.679e-2	2	NC	5	NC	3
8			min	-1.035	4	-.216	1	-.027	5	-2.557e-3	3	341.823	3	1335.082	1
9		5	max	0	1	.701	3	.211	1	1.829e-2	2	NC	5	NC	5
10			min	-1.035	4	-.213	1	-.007	5	-2.559e-3	3	325.636	3	1144.394	1
11		6	max	0	1	.623	3	.202	1	1.978e-2	2	NC	5	NC	5
12			min	-1.035	4	-.138	1	.009	15	-2.561e-3	3	364.007	3	1191.545	1
13		7	max	0	1	.456	3	.158	1	2.127e-2	2	NC	5	NC	10
14			min	-1.035	4	-.016	9	.01	10	-2.563e-3	3	487.428	3	1528.119	1
15		8	max	0	1	.244	3	.091	1	2.276e-2	2	NC	1	NC	10
16			min	-1.035	4	.005	15	0	10	-2.566e-3	3	856.281	3	2679.09	1
17		9	max	0	1	.315	2	.038	4	2.426e-2	2	NC	4	NC	1
18			min	-1.035	4	.009	15	-.009	10	-2.568e-3	3	1759.262	2	6252.889	4
19		10	max	0	1	.375	2	.031	3	2.575e-2	2	NC	3	NC	1
20			min	-1.035	4	-.035	3	-.021	2	-2.57e-3	3	1225.058	2	NC	1
21		11	max	0	12	.315	2	.032	3	2.426e-2	2	NC	4	NC	1
22			min	-1.035	4	.009	15	-.024	5	-2.568e-3	3	1759.262	2	NC	1
23		12	max	0	12	.244	3	.091	1	2.276e-2	2	NC	1	NC	4
24			min	-1.035	4	.005	15	-.023	5	-2.566e-3	3	856.281	3	2679.09	1
25		13	max	0	12	.456	3	.158	1	2.127e-2	2	NC	5	NC	5
26			min	-1.035	4	-.016	9	-.007	5	-2.563e-3	3	487.428	3	1528.119	1
27		14	max	0	12	.623	3	.202	1	1.978e-2	2	NC	5	NC	5
28			min	-1.035	4	-.138	1	.01	15	-2.561e-3	3	364.007	3	1191.545	1
29		15	max	0	12	.701	3	.211	1	1.829e-2	2	NC	5	NC	10
30			min	-1.035	4	-.213	1	.019	10	-2.559e-3	3	325.636	3	1144.394	1
31		16	max	0	12	.666	3	.181	1	1.679e-2	2	NC	5	NC	3
32			min	-1.035	4	-.216	1	.017	10	-2.557e-3	3	341.823	3	1335.082	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	.516	3	.121	1	1.53e-2	2	NC	5	NC	3
34			min	-1.035	4	-.143	1	.01	10	-2.554e-3	3	434.739	3	1997.736	1
35		18	max	0	12	.269	3	.052	4	1.381e-2	2	NC	5	NC	2
36			min	-1.035	4	-.01	9	.002	10	-2.552e-3	3	786.813	3	4527.551	4
37		19	max	0	12	.179	2	.01	3	1.231e-2	2	NC	1	NC	1
38			min	-1.035	4	-.036	3	-.005	2	-2.55e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.34	3	.009	3	7.131e-3	2	NC	1	NC	1
40			min	-.748	4	-.552	2	-.005	2	-5.151e-3	3	NC	1	NC	1
41		2	max	0	1	.672	3	.034	1	8.413e-3	2	NC	5	NC	2
42			min	-.748	4	-.889	2	-.046	5	-6.197e-3	3	701.943	1	5462.987	5
43		3	max	0	1	.957	3	.095	1	9.694e-3	2	NC	15	NC	3
44			min	-.748	4	-1.184	2	-.055	5	-7.244e-3	3	374.243	1	2565.837	1
45		4	max	0	1	1.163	3	.152	1	1.098e-2	2	9324.955	15	NC	3
46			min	-.748	4	-1.411	2	-.038	5	-8.291e-3	3	276.343	1	1593.772	1
47		5	max	0	1	1.273	3	.184	1	1.226e-2	2	8068.611	15	NC	3
48			min	-.748	4	-1.552	2	-.007	5	-9.337e-3	3	238.135	1	1312.18	1
49		6	max	0	1	1.289	3	.182	1	1.354e-2	2	7732.605	15	NC	3
50			min	-.748	4	-1.608	2	.015	10	-1.038e-2	3	226.909	1	1331.482	1
51		7	max	0	1	1.224	3	.144	1	1.482e-2	2	7999.255	15	NC	10
52			min	-.748	4	-1.589	2	.009	10	-1.143e-2	3	231.625	2	1676.388	1
53		8	max	0	1	1.109	3	.088	4	1.61e-2	2	8740.244	15	NC	3
54			min	-.748	4	-1.519	2	0	10	-1.248e-2	3	248.194	2	2703.512	4
55		9	max	0	1	.993	3	.058	4	1.738e-2	2	9734.342	15	NC	1
56			min	-.748	4	-1.439	2	-.008	10	-1.352e-2	3	270.824	2	4068.488	4
57		10	max	0	1	.938	3	.027	3	1.866e-2	2	NC	15	NC	1
58			min	-.748	4	-1.398	2	-.019	2	-1.457e-2	3	283.904	2	NC	1
59		11	max	0	12	.993	3	.029	3	1.738e-2	2	9734.306	15	NC	1
60			min	-.748	4	-1.439	2	-.045	5	-1.352e-2	3	270.824	2	5580.726	5
61		12	max	0	12	1.109	3	.084	1	1.61e-2	2	8740.14	15	NC	3
62			min	-.748	4	-1.519	2	-.051	5	-1.248e-2	3	248.194	2	2893.471	1
63		13	max	0	12	1.224	3	.144	1	1.482e-2	2	7999.085	15	NC	4
64			min	-.748	4	-1.589	2	-.033	5	-1.143e-2	3	231.625	2	1676.388	1
65		14	max	0	12	1.289	3	.182	1	1.354e-2	2	7732.367	15	NC	3
66			min	-.748	4	-1.608	2	0	15	-1.038e-2	3	226.909	1	1331.482	1
67		15	max	0	12	1.273	3	.184	1	1.226e-2	2	8068.287	15	NC	3
68			min	-.748	4	-1.552	2	.017	10	-9.337e-3	3	238.135	1	1312.18	1
69		16	max	0	12	1.163	3	.152	1	1.098e-2	2	9324.488	15	NC	3
70			min	-.748	4	-1.411	2	.014	10	-8.291e-3	3	276.343	1	1593.772	1
71		17	max	0	12	.957	3	.095	1	9.694e-3	2	NC	15	NC	3
72			min	-.748	4	-1.184	2	.008	10	-7.244e-3	3	374.243	1	2551.469	4
73		18	max	0	12	.672	3	.061	4	8.413e-3	2	NC	5	NC	2
74			min	-.748	4	-.889	2	0	10	-6.197e-3	3	701.943	1	3898.992	4
75		19	max	0	12	.34	3	.009	3	7.131e-3	2	NC	1	NC	1
76			min	-.748	4	-.552	2	-.005	2	-5.151e-3	3	NC	1	NC	1
77	M15	1	max	0	12	.348	3	.008	3	4.384e-3	3	NC	1	NC	1
78			min	-.592	4	-.551	2	-.004	2	-7.419e-3	2	NC	1	NC	1
79		2	max	0	12	.573	3	.034	1	5.277e-3	3	NC	5	NC	2
80			min	-.592	4	-.972	2	-.061	5	-8.759e-3	2	570.247	2	4055.39	5
81		3	max	0	12	.771	3	.095	1	6.17e-3	3	NC	15	NC	3
82			min	-.592	4	-1.336	2	-.074	5	-1.01e-2	2	305.787	2	2552.953	1
83		4	max	0	12	.925	3	.152	1	7.062e-3	3	9340.673	15	NC	3
84			min	-.592	4	-1.604	2	-.054	5	-1.144e-2	2	228.002	2	1587.623	1
85		5	max	0	12	1.026	3	.185	1	7.955e-3	3	8083.857	15	NC	3
86			min	-.592	4	-1.755	2	-.014	5	-1.278e-2	2	199.348	2	1307.657	1
87		6	max	0	12	1.07	3	.182	1	8.848e-3	3	7749.439	15	NC	3
88			min	-.592	4	-1.789	2	.016	10	-1.412e-2	2	193.912	2	1326.795	1
89		7	max	0	12	1.066	3	.145	1	9.741e-3	3	8019.811	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	-.592	4	-1.723	2	.01	10	-1.546e-2	2	204.798	2	1669.256	1
91		8	max	0	12	1.029	3	.104	4	1.063e-2	3	8767.111	15	NC	3
92			min	-.592	4	-1.595	2	.001	10	-1.68e-2	2	229.949	2	2297.445	4
93		9	max	0	12	.982	3	.071	4	1.153e-2	3	9769.52	15	NC	1
94			min	-.592	4	-1.461	2	-.007	10	-1.814e-2	2	263.905	2	3335.125	4
95		10	max	0	1	.957	3	.025	3	1.242e-2	3	NC	15	NC	1
96			min	-.592	4	-1.396	2	-.018	2	-1.948e-2	2	284.225	2	NC	1
97		11	max	0	1	.982	3	.027	3	1.153e-2	3	9769.489	15	NC	1
98			min	-.592	4	-1.461	2	-.058	5	-1.814e-2	2	263.905	2	4278.464	5
99		12	max	0	1	1.029	3	.085	1	1.063e-2	3	8767.032	15	NC	3
100			min	-.592	4	-1.595	2	-.067	5	-1.68e-2	2	229.949	2	2873.598	1
101		13	max	0	1	1.066	3	.145	1	9.741e-3	3	8019.689	15	NC	3
102			min	-.592	4	-1.723	2	-.044	5	-1.546e-2	2	204.798	2	1669.256	1
103		14	max	0	1	1.07	3	.182	1	8.848e-3	3	7749.272	15	NC	3
104			min	-.592	4	-1.789	2	-.003	5	-1.412e-2	2	193.912	2	1326.795	1
105		15	max	0	1	1.026	3	.185	1	7.955e-3	3	8083.632	15	NC	3
106			min	-.592	4	-1.755	2	.017	10	-1.278e-2	2	199.348	2	1307.657	1
107		16	max	0	1	.925	3	.152	1	7.062e-3	3	9340.351	15	NC	3
108			min	-.592	4	-1.604	2	.014	10	-1.144e-2	2	228.002	2	1587.623	1
109		17	max	0	1	.771	3	.113	4	6.17e-3	3	NC	15	NC	3
110			min	-.592	4	-1.336	2	.008	10	-1.01e-2	2	305.787	2	2110.068	4
111		18	max	0	1	.573	3	.076	4	5.277e-3	3	NC	5	NC	2
112			min	-.592	4	-.972	2	0	10	-8.759e-3	2	570.247	2	3123.155	4
113		19	max	0	1	.348	3	.008	3	4.384e-3	3	NC	1	NC	1
114			min	-.592	4	-.551	2	-.004	2	-7.419e-3	2	NC	1	NC	1
115	M16	1	max	0	12	.163	1	.007	3	7.957e-3	3	NC	1	NC	1
116			min	-.149	4	-.118	3	-.004	2	-1.052e-2	1	NC	1	NC	1
117		2	max	0	12	.003	13	.05	1	9.178e-3	3	NC	5	NC	2
118			min	-.149	4	-.096	2	-.044	5	-1.166e-2	1	941.106	2	4847.295	1
119		3	max	0	12	.05	3	.12	1	1.04e-2	3	NC	5	NC	3
120			min	-.149	4	-.298	2	-.055	5	-1.28e-2	1	524.856	2	2011.974	1
121		4	max	0	12	.085	3	.18	1	1.162e-2	3	NC	5	NC	3
122			min	-.149	4	-.413	2	-.042	5	-1.393e-2	1	419.943	2	1340.012	1
123		5	max	0	12	.076	3	.21	1	1.284e-2	3	NC	5	NC	3
124			min	-.149	4	-.423	2	-.015	5	-1.507e-2	1	412.643	2	1145.523	1
125		6	max	0	12	.023	3	.203	1	1.406e-2	3	NC	5	NC	3
126			min	-.149	4	-.332	2	.01	15	-1.621e-2	1	489.189	2	1189.145	1
127		7	max	0	12	.002	13	.159	1	1.528e-2	3	NC	5	NC	3
128			min	-.149	4	-.162	2	.012	10	-1.734e-2	1	748.571	2	1517.771	1
129		8	max	0	12	.093	1	.092	1	1.65e-2	3	NC	4	NC	3
130			min	-.149	4	-.161	3	.003	10	-1.848e-2	1	2126.129	2	2629.811	1
131		9	max	0	12	.258	1	.048	4	1.772e-2	3	NC	4	NC	2
132			min	-.149	4	-.248	3	-.006	10	-1.962e-2	1	1845.921	3	4951.718	4
133		10	max	0	1	.332	1	.022	3	1.894e-2	3	NC	5	NC	1
134			min	-.149	4	-.286	3	-.017	2	-2.076e-2	1	1416.902	1	NC	1
135		11	max	0	1	.258	1	.026	1	1.772e-2	3	NC	4	NC	2
136			min	-.149	4	-.248	3	-.034	5	-1.962e-2	1	1845.921	3	7327.546	5
137		12	max	0	1	.093	1	.092	1	1.65e-2	3	NC	4	NC	3
138			min	-.148	4	-.161	3	-.035	5	-1.848e-2	1	2126.129	2	2629.811	1
139		13	max	0	1	.002	13	.159	1	1.528e-2	3	NC	5	NC	3
140			min	-.148	4	-.162	2	-.015	5	-1.734e-2	1	748.571	2	1517.771	1
141		14	max	0	1	.023	3	.203	1	1.406e-2	3	NC	5	NC	3
142			min	-.148	4	-.332	2	.01	15	-1.621e-2	1	489.189	2	1189.145	1
143		15	max	0	1	.076	3	.21	1	1.284e-2	3	NC	5	NC	3
144			min	-.148	4	-.423	2	.018	12	-1.507e-2	1	412.643	2	1145.523	1
145		16	max	0	1	.085	3	.18	1	1.162e-2	3	NC	5	NC	3
146			min	-.148	4	-.413	2	.015	12	-1.393e-2	1	419.943	2	1340.012	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	.05	3	.12	1	1.04e-2	3	NC	5	NC	3
148			min	-.148	4	-.298	2	.011	12	-1.28e-2	1	524.856	2	2011.974	1
149		18	max	.001	1	.002	13	.065	4	9.178e-3	3	NC	5	NC	2
150			min	-.148	4	-.096	2	.003	10	-1.166e-2	1	941.106	2	3644.517	4
151		19	max	.001	1	.163	1	.007	3	7.957e-3	3	NC	1	NC	1
152			min	-.148	4	-.118	3	-.004	2	-1.052e-2	1	NC	1	NC	1
153	M2	1	max	.008	1	.009	2	.014	1	2.699e-3	5	NC	1	NC	2
154			min	-.009	3	-.015	3	-.964	4	-3.329e-4	1	8490.823	2	80.364	4
155		2	max	.007	1	.008	2	.013	1	2.762e-3	5	NC	1	NC	2
156			min	-.009	3	-.015	3	-.886	4	-3.16e-4	1	NC	1	87.484	4
157		3	max	.007	1	.006	2	.012	1	2.824e-3	5	NC	1	NC	2
158			min	-.008	3	-.014	3	-.808	4	-2.991e-4	1	NC	1	95.936	4
159		4	max	.006	1	.005	2	.011	1	2.886e-3	5	NC	1	NC	2
160			min	-.008	3	-.014	3	-.731	4	-2.822e-4	1	NC	1	106.065	4
161		5	max	.006	1	.003	2	.01	1	2.948e-3	5	NC	1	NC	2
162			min	-.007	3	-.013	3	-.655	4	-2.653e-4	1	NC	1	118.345	4
163		6	max	.006	1	.002	2	.008	1	3.01e-3	5	NC	1	NC	2
164			min	-.007	3	-.013	3	-.581	4	-2.484e-4	1	NC	1	133.425	4
165		7	max	.005	1	.001	2	.007	1	3.072e-3	5	NC	1	NC	1
166			min	-.006	3	-.012	3	-.509	4	-2.315e-4	1	NC	1	152.232	4
167		8	max	.005	1	0	2	.006	1	3.134e-3	5	NC	1	NC	1
168			min	-.006	3	-.012	3	-.44	4	-2.146e-4	1	NC	1	176.113	4
169		9	max	.004	1	0	15	.005	1	3.198e-3	4	NC	1	NC	1
170			min	-.005	3	-.011	3	-.374	4	-1.977e-4	1	NC	1	207.094	4
171		10	max	.004	1	-.001	15	.005	1	3.266e-3	4	NC	1	NC	1
172			min	-.005	3	-.011	3	-.312	4	-1.807e-4	1	NC	1	248.338	4
173		11	max	.003	1	-.001	15	.004	1	3.334e-3	4	NC	1	NC	1
174			min	-.004	3	-.01	3	-.254	4	-1.638e-4	1	NC	1	305.014	4
175		12	max	.003	1	-.001	15	.003	1	3.402e-3	4	NC	1	NC	1
176			min	-.004	3	-.009	3	-.201	4	-1.469e-4	1	NC	1	386.048	4
177		13	max	.003	1	-.001	15	.002	1	3.47e-3	4	NC	1	NC	1
178			min	-.003	3	-.008	3	-.153	4	-1.3e-4	1	NC	1	507.975	4
179		14	max	.002	1	-.001	15	.002	1	3.538e-3	4	NC	1	NC	1
180			min	-.003	3	-.007	3	-.11	4	-1.131e-4	1	NC	1	704.35	4
181		15	max	.002	1	-.001	15	.001	1	3.606e-3	4	NC	1	NC	1
182			min	-.002	3	-.006	3	-.074	4	-9.62e-5	1	NC	1	1052.271	4
183		16	max	.001	1	0	15	0	1	3.674e-3	4	NC	1	NC	1
184			min	-.002	3	-.004	6	-.044	4	-7.929e-5	1	NC	1	1763.875	4
185		17	max	0	1	0	15	0	1	3.742e-3	4	NC	1	NC	1
186			min	-.001	3	-.003	6	-.021	4	-6.238e-5	1	NC	1	3620.01	4
187		18	max	0	1	0	15	0	1	3.81e-3	4	NC	1	NC	1
188			min	0	3	-.002	6	-.007	4	-4.547e-5	1	NC	1	NC	1
189		19	max	0	1	0	1	0	1	3.878e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	-2.856e-5	1	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	5.412e-6	1	NC	1	NC	1
192			min	0	1	0	1	0	1	-8.42e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.021	4	4.177e-5	1	NC	1	NC	1
194			min	0	2	-.003	6	0	1	-2.535e-5	5	NC	1	NC	1
195		3	max	0	3	-.001	15	.04	4	8.114e-4	4	NC	1	NC	1
196			min	0	2	-.006	6	0	1	4.375e-6	12	NC	1	7954.73	5
197		4	max	.001	3	-.002	15	.058	4	1.638e-3	4	NC	1	NC	1
198			min	-.001	2	-.009	6	0	1	6.383e-6	12	NC	1	6002.957	5
199		5	max	.002	3	-.003	15	.074	4	2.465e-3	4	NC	1	NC	1
200			min	-.001	2	-.012	6	0	1	8.391e-6	12	8520.357	6	5157.93	5
201		6	max	.002	3	-.003	15	.089	4	3.292e-3	4	NC	5	NC	1
202			min	-.002	2	-.015	6	0	1	1.04e-5	12	6904.454	6	4794.105	5
203		7	max	.003	3	-.004	15	.103	4	4.118e-3	4	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
204			min	-.002	2	-.017	6	0	1	1.241e-5	12	5931.236	6	4719.521	5
205		8	max	.003	3	-.004	15	.116	4	4.945e-3	4	NC	5	NC	1
206			min	-.002	2	-.019	6	0	12	1.442e-5	12	5331.006	6	4876.016	5
207		9	max	.003	3	-.005	15	.128	4	5.772e-3	4	NC	5	NC	1
208			min	-.003	2	-.021	6	0	12	1.642e-5	12	4976.818	6	5272.409	5
209		10	max	.004	3	-.005	15	.139	4	6.599e-3	4	NC	5	NC	1
210			min	-.003	2	-.021	6	0	12	1.843e-5	12	4807.129	6	5978.494	5
211		11	max	.004	3	-.005	15	.15	4	7.425e-3	4	NC	5	NC	1
212			min	-.003	2	-.021	6	0	12	2.044e-5	12	4796.991	6	7159.244	5
213		12	max	.005	3	-.005	15	.161	4	8.252e-3	4	NC	5	NC	1
214			min	-.004	2	-.021	6	0	12	2.245e-5	12	4948.492	6	9186.08	5
215		13	max	.005	3	-.004	15	.171	4	9.079e-3	4	NC	5	NC	1
216			min	-.004	2	-.019	6	0	12	2.446e-5	12	5292.785	6	NC	1
217		14	max	.006	3	-.004	15	.182	4	9.905e-3	4	NC	5	NC	1
218			min	-.005	2	-.017	6	0	12	2.646e-5	12	5906.173	6	NC	1
219		15	max	.006	3	-.003	15	.193	4	1.073e-2	4	NC	3	NC	1
220			min	-.005	2	-.015	6	0	12	2.847e-5	12	6957.519	6	NC	1
221		16	max	.007	3	-.002	15	.204	4	1.156e-2	4	NC	1	NC	1
222			min	-.005	2	-.012	6	0	12	3.048e-5	12	8855.603	6	NC	1
223		17	max	.007	3	-.002	15	.217	4	1.239e-2	4	NC	1	NC	1
224			min	-.006	2	-.008	1	0	12	3.249e-5	12	NC	1	NC	1
225		18	max	.007	3	0	15	.231	4	1.321e-2	4	NC	1	NC	2
226			min	-.006	2	-.005	1	0	12	3.45e-5	12	NC	1	9285.541	1
227		19	max	.008	3	0	5	.247	4	1.404e-2	4	NC	1	NC	2
228			min	-.006	2	-.002	1	0	12	3.65e-5	12	NC	1	7746.938	1
229	M4	1	max	.003	1	.006	2	0	12	2.336e-4	1	NC	1	NC	3
230			min	0	5	-.008	3	-.247	4	-6.414e-4	5	NC	1	100.619	4
231		2	max	.003	1	.006	2	0	12	2.336e-4	1	NC	1	NC	3
232			min	0	5	-.008	3	-.227	4	-6.414e-4	5	NC	1	109.447	4
233		3	max	.002	1	.005	2	0	12	2.336e-4	1	NC	1	NC	3
234			min	0	5	-.007	3	-.207	4	-6.414e-4	5	NC	1	119.95	4
235		4	max	.002	1	.005	2	0	12	2.336e-4	1	NC	1	NC	3
236			min	0	5	-.007	3	-.187	4	-6.414e-4	5	NC	1	132.565	4
237		5	max	.002	1	.005	2	0	12	2.336e-4	1	NC	1	NC	3
238			min	0	5	-.006	3	-.168	4	-6.414e-4	5	NC	1	147.885	4
239		6	max	.002	1	.004	2	0	12	2.336e-4	1	NC	1	NC	3
240			min	0	5	-.006	3	-.149	4	-6.414e-4	5	NC	1	166.729	4
241		7	max	.002	1	.004	2	0	12	2.336e-4	1	NC	1	NC	3
242			min	0	5	-.005	3	-.13	4	-6.414e-4	5	NC	1	190.265	4
243		8	max	.002	1	.004	2	0	12	2.336e-4	1	NC	1	NC	3
244			min	0	5	-.005	3	-.113	4	-6.414e-4	5	NC	1	220.191	4
245		9	max	.001	1	.003	2	0	12	2.336e-4	1	NC	1	NC	2
246			min	0	5	-.004	3	-.096	4	-6.414e-4	5	NC	1	259.067	4
247		10	max	.001	1	.003	2	0	12	2.336e-4	1	NC	1	NC	2
248			min	0	5	-.004	3	-.08	4	-6.414e-4	5	NC	1	310.894	4
249		11	max	.001	1	.003	2	0	12	2.336e-4	1	NC	1	NC	2
250			min	0	5	-.004	3	-.065	4	-6.414e-4	5	NC	1	382.217	4
251		12	max	.001	1	.002	2	0	12	2.336e-4	1	NC	1	NC	2
252			min	0	5	-.003	3	-.051	4	-6.414e-4	5	NC	1	484.357	4
253		13	max	0	1	.002	2	0	12	2.336e-4	1	NC	1	NC	1
254			min	0	5	-.003	3	-.039	4	-6.414e-4	5	NC	1	638.328	4
255		14	max	0	1	.002	2	0	12	2.336e-4	1	NC	1	NC	1
256			min	0	5	-.002	3	-.028	4	-6.414e-4	5	NC	1	886.881	4
257		15	max	0	1	.001	2	0	12	2.336e-4	1	NC	1	NC	1
258			min	0	5	-.002	3	-.019	4	-6.414e-4	5	NC	1	1328.564	4
259		16	max	0	1	0	2	0	12	2.336e-4	1	NC	1	NC	1
260			min	0	5	-.001	3	-.011	4	-6.414e-4	5	NC	1	2235.791	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	2.336e-4	1	NC	1	NC	1
262			min	0	5	0	3	-.005	4	-6.414e-4	5	NC	1	4618.582	4
263		18	max	0	1	0	2	0	12	2.336e-4	1	NC	1	NC	1
264			min	0	5	0	3	-.002	4	-6.414e-4	5	NC	1	NC	1
265		19	max	0	1	0	1	0	1	2.336e-4	1	NC	1	NC	1
266			min	0	1	0	1	0	1	-6.414e-4	5	NC	1	NC	1
267	M6	1	max	.024	1	.034	2	0	1	2.864e-3	4	NC	3	NC	1
268			min	-.029	3	-.047	3	-.975	4	0	1	2272.567	2	79.483	4
269		2	max	.023	1	.031	2	0	1	2.923e-3	4	NC	3	NC	1
270			min	-.028	3	-.044	3	-.896	4	0	1	2503.6	2	86.525	4
271		3	max	.021	1	.028	2	0	1	2.983e-3	4	NC	3	NC	1
272			min	-.026	3	-.042	3	-.817	4	0	1	2784.337	2	94.885	4
273		4	max	.02	1	.025	2	0	1	3.042e-3	4	NC	3	NC	1
274			min	-.025	3	-.039	3	-.739	4	0	1	3129.521	2	104.904	4
275		5	max	.019	1	.022	2	0	1	3.102e-3	4	NC	3	NC	1
276			min	-.023	3	-.037	3	-.662	4	0	1	3559.991	2	117.049	4
277		6	max	.017	1	.019	2	0	1	3.161e-3	4	NC	3	NC	1
278			min	-.021	3	-.034	3	-.587	4	0	1	4105.998	2	131.966	4
279		7	max	.016	1	.016	2	0	1	3.221e-3	4	NC	1	NC	1
280			min	-.02	3	-.032	3	-.515	4	0	1	4812.837	2	150.568	4
281		8	max	.015	1	.013	2	0	1	3.28e-3	4	NC	1	NC	1
282			min	-.018	3	-.029	3	-.445	4	0	1	5750.891	2	174.188	4
283		9	max	.013	1	.011	2	0	1	3.34e-3	4	NC	1	NC	1
284			min	-.016	3	-.027	3	-.378	4	0	1	7034.583	2	204.83	4
285		10	max	.012	1	.009	2	0	1	3.399e-3	4	NC	1	NC	1
286			min	-.015	3	-.024	3	-.315	4	0	1	8860.617	2	245.624	4
287		11	max	.011	1	.007	2	0	1	3.459e-3	4	NC	1	NC	1
288			min	-.013	3	-.021	3	-.257	4	0	1	NC	1	301.68	4
289		12	max	.009	1	.005	2	0	1	3.518e-3	4	NC	1	NC	1
290			min	-.011	3	-.019	3	-.203	4	0	1	NC	1	381.826	4
291		13	max	.008	1	.003	2	0	1	3.578e-3	4	NC	1	NC	1
292			min	-.01	3	-.016	3	-.154	4	0	1	NC	1	502.412	4
293		14	max	.007	1	.002	2	0	1	3.637e-3	4	NC	1	NC	1
294			min	-.008	3	-.014	3	-.111	4	0	1	NC	1	696.619	4
295		15	max	.005	1	0	2	0	1	3.697e-3	4	NC	1	NC	1
296			min	-.007	3	-.011	3	-.074	4	0	1	NC	1	1040.675	4
297		16	max	.004	1	0	2	0	1	3.756e-3	4	NC	1	NC	1
298			min	-.005	3	-.008	3	-.044	4	0	1	NC	1	1744.301	4
299		17	max	.003	1	0	2	0	1	3.816e-3	4	NC	1	NC	1
300			min	-.003	3	-.005	3	-.022	4	0	1	NC	1	3579.28	4
301		18	max	.001	1	0	2	0	1	3.875e-3	4	NC	1	NC	1
302			min	-.002	3	-.003	3	-.007	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	3.935e-3	4	NC	1	NC	1
304			min	0	1	0	1	0	1	0	1	NC	1	NC	1
305	M7	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
306			min	0	1	0	1	0	1	-8.549e-4	4	NC	1	NC	1
307		2	max	.001	3	0	15	.021	4	0	1	NC	1	NC	1
308			min	-.001	2	-.004	3	0	1	-5.615e-5	4	NC	1	NC	1
309		3	max	.003	3	-.001	15	.041	4	7.426e-4	4	NC	1	NC	1
310			min	-.003	2	-.007	3	0	1	0	1	NC	1	7071.216	4
311		4	max	.004	3	-.002	15	.059	4	1.541e-3	4	NC	1	NC	1
312			min	-.004	2	-.01	3	0	1	0	1	NC	1	5282.925	4
313		5	max	.005	3	-.003	15	.075	4	2.34e-3	4	NC	1	NC	1
314			min	-.005	2	-.013	3	0	1	0	1	8537.256	3	4486.358	4
315		6	max	.007	3	-.004	15	.09	4	3.139e-3	4	NC	1	NC	1
316			min	-.006	2	-.016	3	0	1	0	1	6945.504	4	4112.418	4
317		7	max	.008	3	-.004	15	.104	4	3.937e-3	4	NC	2	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
318			min	-.008	2	-.018	3	0	1	0	1	5963.694	4	3981.329	4
319		8	max	.009	3	-.005	15	.117	4	4.736e-3	4	NC	2	NC	1
320			min	-.009	2	-.02	3	0	1	0	1	5358.103	4	4029.738	4
321		9	max	.011	3	-.005	15	.129	4	5.535e-3	4	NC	5	NC	1
322			min	-.01	2	-.021	4	0	1	0	1	5000.5	4	4246.099	4
323		10	max	.012	3	-.005	15	.14	4	6.334e-3	4	NC	5	NC	1
324			min	-.012	2	-.022	4	0	1	0	1	4828.695	4	4655.653	4
325		11	max	.014	3	-.005	15	.15	4	7.132e-3	4	NC	5	NC	1
326			min	-.013	2	-.022	4	0	1	0	1	4817.411	4	5327.218	4
327		12	max	.015	3	-.005	15	.16	4	7.931e-3	4	NC	5	NC	1
328			min	-.014	2	-.021	4	0	1	0	1	4968.599	4	6404.114	4
329		13	max	.016	3	-.005	15	.17	4	8.73e-3	4	NC	5	NC	1
330			min	-.016	2	-.02	4	0	1	0	1	5313.43	4	8188.28	4
331		14	max	.018	3	-.004	15	.179	4	9.528e-3	4	NC	5	NC	1
332			min	-.017	2	-.018	3	0	1	0	1	5928.411	4	NC	1
333		15	max	.019	3	-.004	15	.189	4	1.033e-2	4	NC	1	NC	1
334			min	-.018	2	-.017	3	0	1	0	1	6982.947	4	NC	1
335		16	max	.02	3	-.003	15	.199	4	1.113e-2	4	NC	1	NC	1
336			min	-.019	2	-.014	3	0	1	0	1	8887.199	4	NC	1
337		17	max	.022	3	-.002	15	.21	4	1.192e-2	4	NC	1	NC	1
338			min	-.021	2	-.012	3	0	1	0	1	NC	1	NC	1
339		18	max	.023	3	-.001	15	.222	4	1.272e-2	4	NC	1	NC	1
340			min	-.022	2	-.009	3	0	1	0	1	NC	1	NC	1
341		19	max	.024	3	0	10	.236	4	1.352e-2	4	NC	1	NC	1
342			min	-.023	2	-.006	3	0	1	0	1	NC	1	NC	1
343	M8	1	max	.007	1	.023	2	0	1	0	1	NC	1	NC	1
344			min	0	3	-.025	3	-.236	4	-8.699e-4	4	NC	1	105.252	4
345		2	max	.006	1	.021	2	0	1	0	1	NC	1	NC	1
346			min	0	3	-.024	3	-.217	4	-8.699e-4	4	NC	1	114.505	4
347		3	max	.006	1	.02	2	0	1	0	1	NC	1	NC	1
348			min	0	3	-.022	3	-.198	4	-8.699e-4	4	NC	1	125.514	4
349		4	max	.006	1	.019	2	0	1	0	1	NC	1	NC	1
350			min	0	3	-.021	3	-.179	4	-8.699e-4	4	NC	1	138.736	4
351		5	max	.005	1	.018	2	0	1	0	1	NC	1	NC	1
352			min	0	3	-.019	3	-.16	4	-8.699e-4	4	NC	1	154.79	4
353		6	max	.005	1	.016	2	0	1	0	1	NC	1	NC	1
354			min	0	3	-.018	3	-.142	4	-8.699e-4	4	NC	1	174.538	4
355		7	max	.005	1	.015	2	0	1	0	1	NC	1	NC	1
356			min	0	3	-.017	3	-.125	4	-8.699e-4	4	NC	1	199.201	4
357		8	max	.004	1	.014	2	0	1	0	1	NC	1	NC	1
358			min	0	3	-.015	3	-.108	4	-8.699e-4	4	NC	1	230.561	4
359		9	max	.004	1	.013	2	0	1	0	1	NC	1	NC	1
360			min	0	3	-.014	3	-.091	4	-8.699e-4	4	NC	1	271.3	4
361		10	max	.003	1	.011	2	0	1	0	1	NC	1	NC	1
362			min	0	3	-.013	3	-.076	4	-8.699e-4	4	NC	1	325.611	4
363		11	max	.003	1	.01	2	0	1	0	1	NC	1	NC	1
364			min	0	3	-.011	3	-.062	4	-8.699e-4	4	NC	1	400.354	4
365		12	max	.003	1	.009	2	0	1	0	1	NC	1	NC	1
366			min	0	3	-.01	3	-.049	4	-8.699e-4	4	NC	1	507.394	4
367		13	max	.002	1	.008	2	0	1	0	1	NC	1	NC	1
368			min	0	3	-.008	3	-.037	4	-8.699e-4	4	NC	1	668.757	4
369		14	max	.002	1	.006	2	0	1	0	1	NC	1	NC	1
370			min	0	3	-.007	3	-.027	4	-8.699e-4	4	NC	1	929.253	4
371		15	max	.002	1	.005	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.006	3	-.018	4	-8.699e-4	4	NC	1	1392.179	4
373		16	max	.001	1	.004	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.004	3	-.011	4	-8.699e-4	4	NC	1	2343.1	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
375		17	max	0	1	.003	2	0	1	0	1	NC	1	NC	1
376			min	0	3	-.003	3	-.005	4	-8.699e-4	4	NC	1	4840.86	4
377		18	max	0	1	.001	2	0	1	0	1	NC	1	NC	1
378			min	0	3	-.001	3	-.002	4	-8.699e-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	-8.699e-4	4	NC	1	NC	1
381	M10	1	max	.008	1	.009	2	0	12	2.857e-3	4	NC	1	NC	2
382			min	-.009	3	-.015	3	-.973	4	2.088e-5	12	8490.823	2	79.65	4
383		2	max	.007	1	.008	2	0	12	2.915e-3	4	NC	1	NC	2
384			min	-.009	3	-.015	3	-.894	4	1.982e-5	12	NC	1	86.707	4
385		3	max	.007	1	.006	2	0	12	2.972e-3	4	NC	1	NC	2
386			min	-.008	3	-.014	3	-.815	4	1.876e-5	12	NC	1	95.084	4
387		4	max	.006	1	.005	2	0	12	3.03e-3	4	NC	1	NC	2
388			min	-.008	3	-.014	3	-.737	4	1.771e-5	12	NC	1	105.126	4
389		5	max	.006	1	.003	2	0	12	3.088e-3	4	NC	1	NC	2
390			min	-.007	3	-.013	3	-.661	4	1.665e-5	12	NC	1	117.298	4
391		6	max	.006	1	.002	2	0	12	3.145e-3	4	NC	1	NC	2
392			min	-.007	3	-.013	3	-.586	4	1.559e-5	12	NC	1	132.248	4
393		7	max	.005	1	.001	2	0	12	3.203e-3	4	NC	1	NC	1
394			min	-.006	3	-.012	3	-.514	4	1.454e-5	12	NC	1	150.892	4
395		8	max	.005	1	0	2	0	12	3.261e-3	4	NC	1	NC	1
396			min	-.006	3	-.012	3	-.444	4	1.348e-5	12	NC	1	174.566	4
397		9	max	.004	1	0	2	0	12	3.318e-3	4	NC	1	NC	1
398			min	-.005	3	-.011	3	-.377	4	1.242e-5	12	NC	1	205.28	4
399		10	max	.004	1	-.002	2	0	12	3.376e-3	4	NC	1	NC	1
400			min	-.005	3	-.011	3	-.315	4	1.136e-5	12	NC	1	246.17	4
401		11	max	.003	1	-.002	15	0	12	3.433e-3	4	NC	1	NC	1
402			min	-.004	3	-.01	3	-.256	4	1.031e-5	12	NC	1	302.362	4
403		12	max	.003	1	-.002	15	0	12	3.491e-3	4	NC	1	NC	1
404			min	-.004	3	-.009	3	-.202	4	9.25e-6	12	NC	1	382.706	4
405		13	max	.003	1	-.002	15	0	12	3.549e-3	4	NC	1	NC	1
406			min	-.003	3	-.008	3	-.154	4	8.193e-6	12	NC	1	503.602	4
407		14	max	.002	1	-.002	15	0	12	3.606e-3	4	NC	1	NC	1
408			min	-.003	3	-.007	4	-.111	4	7.135e-6	12	NC	1	698.331	4
409		15	max	.002	1	-.002	15	0	12	3.664e-3	4	NC	1	NC	1
410			min	-.002	3	-.006	4	-.074	4	6.078e-6	12	NC	1	1043.366	4
411		16	max	.001	1	-.001	15	0	12	3.722e-3	4	NC	1	NC	1
412			min	-.002	3	-.005	4	-.044	4	5.021e-6	12	NC	1	1749.167	4
413		17	max	0	1	0	15	0	12	3.779e-3	4	NC	1	NC	1
414			min	-.001	3	-.004	4	-.022	4	3.964e-6	12	NC	1	3590.591	4
415		18	max	0	1	0	15	0	12	3.837e-3	4	NC	1	NC	1
416			min	0	3	-.002	4	-.007	4	2.907e-6	12	NC	1	NC	1
417		19	max	0	1	0	1	0	1	3.895e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	1.849e-6	12	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	-3.591e-7	12	NC	1	NC	1
420			min	0	1	0	1	0	1	-8.452e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.021	4	-2.367e-6	12	NC	1	NC	1
422			min	0	2	-.003	4	0	12	-4.177e-5	1	NC	1	NC	1
423		3	max	0	3	-.002	15	.04	4	7.668e-4	5	NC	1	NC	1
424			min	0	2	-.006	4	0	12	-7.813e-5	1	NC	1	7454.887	4
425		4	max	.001	3	-.002	15	.058	4	1.568e-3	4	NC	1	NC	1
426			min	-.001	2	-.01	4	0	12	-1.145e-4	1	NC	1	5599.909	4
427		5	max	.002	3	-.003	15	.074	4	2.372e-3	4	NC	1	NC	1
428			min	-.001	2	-.013	4	0	12	-1.508e-4	1	8243.393	4	4785.446	4
429		6	max	.002	3	-.004	15	.089	4	3.177e-3	4	NC	5	NC	1
430			min	-.002	2	-.016	4	0	12	-1.872e-4	1	6699.357	4	4418.855	4
431		7	max	.003	3	-.004	15	.103	4	3.981e-3	4	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
432			min	-.002	2	-.018	4	0	10	-2.236e-4	1	5768.609	4	4315.447	4
433		8	max	.003	3	-.005	15	.116	4	4.786e-3	4	NC	5	NC	1
434			min	-.002	2	-.02	4	0	1	-2.599e-4	1	5194.924	4	4414.291	4
435		9	max	.003	3	-.005	15	.128	4	5.59e-3	4	NC	5	NC	1
436			min	-.003	2	-.022	4	0	1	-2.963e-4	1	4857.653	4	4712.604	4
437		10	max	.004	3	-.006	15	.139	4	6.394e-3	4	NC	5	NC	1
438			min	-.003	2	-.022	4	-.001	1	-3.326e-4	1	4698.434	4	5254.193	4
439		11	max	.004	3	-.006	15	.149	4	7.199e-3	4	NC	5	NC	1
440			min	-.003	2	-.023	4	-.002	1	-3.69e-4	1	4693.931	4	6146.438	4
441		12	max	.005	3	-.005	15	.159	4	8.003e-3	4	NC	5	NC	1
442			min	-.004	2	-.022	4	-.002	1	-4.053e-4	1	4846.893	4	7619.194	4
443		13	max	.005	3	-.005	15	.169	4	8.808e-3	4	NC	5	NC	1
444			min	-.004	2	-.021	4	-.003	1	-4.417e-4	1	5188.366	4	NC	1
445		14	max	.006	3	-.005	15	.179	4	9.612e-3	4	NC	5	NC	1
446			min	-.005	2	-.019	4	-.004	1	-4.78e-4	1	5793.604	4	NC	1
447		15	max	.006	3	-.004	15	.189	4	1.042e-2	4	NC	3	NC	1
448			min	-.005	2	-.016	4	-.006	1	-5.144e-4	1	6828.716	4	NC	1
449		16	max	.007	3	-.003	15	.2	4	1.122e-2	4	NC	1	NC	1
450			min	-.005	2	-.013	4	-.007	1	-5.508e-4	1	8695.476	4	NC	1
451		17	max	.007	3	-.002	15	.212	4	1.203e-2	4	NC	1	NC	1
452			min	-.006	2	-.01	4	-.009	1	-5.871e-4	1	NC	1	NC	1
453		18	max	.007	3	-.002	15	.224	4	1.283e-2	4	NC	1	NC	2
454			min	-.006	2	-.006	4	-.011	1	-6.235e-4	1	NC	1	9285.541	1
455		19	max	.008	3	0	10	.238	4	1.363e-2	4	NC	1	NC	2
456			min	-.006	2	-.002	1	-.013	1	-6.598e-4	1	NC	1	7746.938	1
457	M12	1	max	.003	1	.006	2	.013	1	-1.341e-5	12	NC	1	NC	3
458			min	0	3	-.008	3	-.238	4	-7.454e-4	4	NC	1	104.017	4
459		2	max	.003	1	.006	2	.012	1	-1.341e-5	12	NC	1	NC	3
460			min	0	3	-.008	3	-.219	4	-7.454e-4	4	NC	1	113.151	4
461		3	max	.002	1	.005	2	.011	1	-1.341e-5	12	NC	1	NC	3
462			min	0	3	-.007	3	-.2	4	-7.454e-4	4	NC	1	124.019	4
463		4	max	.002	1	.005	2	.01	1	-1.341e-5	12	NC	1	NC	3
464			min	0	3	-.007	3	-.181	4	-7.454e-4	4	NC	1	137.072	4
465		5	max	.002	1	.005	2	.009	1	-1.341e-5	12	NC	1	NC	3
466			min	0	3	-.006	3	-.162	4	-7.454e-4	4	NC	1	152.923	4
467		6	max	.002	1	.004	2	.008	1	-1.341e-5	12	NC	1	NC	3
468			min	0	3	-.006	3	-.144	4	-7.454e-4	4	NC	1	172.42	4
469		7	max	.002	1	.004	2	.007	1	-1.341e-5	12	NC	1	NC	3
470			min	0	3	-.005	3	-.126	4	-7.454e-4	4	NC	1	196.77	4
471		8	max	.002	1	.004	2	.006	1	-1.341e-5	12	NC	1	NC	3
472			min	0	3	-.005	3	-.109	4	-7.454e-4	4	NC	1	227.732	4
473		9	max	.001	1	.003	2	.005	1	-1.341e-5	12	NC	1	NC	2
474			min	0	3	-.004	3	-.093	4	-7.454e-4	4	NC	1	267.955	4
475		10	max	.001	1	.003	2	.004	1	-1.341e-5	12	NC	1	NC	2
476			min	0	3	-.004	3	-.077	4	-7.454e-4	4	NC	1	321.577	4
477		11	max	.001	1	.003	2	.004	1	-1.341e-5	12	NC	1	NC	2
478			min	0	3	-.004	3	-.063	4	-7.454e-4	4	NC	1	395.37	4
479		12	max	.001	1	.002	2	.003	1	-1.341e-5	12	NC	1	NC	2
480			min	0	3	-.003	3	-.05	4	-7.454e-4	4	NC	1	501.049	4
481		13	max	0	1	.002	2	.002	1	-1.341e-5	12	NC	1	NC	1
482			min	0	3	-.003	3	-.038	4	-7.454e-4	4	NC	1	660.358	4
483		14	max	0	1	.002	2	.002	1	-1.341e-5	12	NC	1	NC	1
484			min	0	3	-.002	3	-.027	4	-7.454e-4	4	NC	1	917.533	4
485		15	max	0	1	.001	2	.001	1	-1.341e-5	12	NC	1	NC	1
486			min	0	3	-.002	3	-.018	4	-7.454e-4	4	NC	1	1374.545	4
487		16	max	0	1	0	2	0	1	-1.341e-5	12	NC	1	NC	1
488			min	0	3	-.001	3	-.011	4	-7.454e-4	4	NC	1	2313.286	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	-1.341e-5	12	NC	1	NC	1
490			min	0	3	0	3	-.005	4	-7.454e-4	4	NC	1	4778.943	4
491		18	max	0	1	0	2	0	1	-1.341e-5	12	NC	1	NC	1
492			min	0	3	0	3	-.002	4	-7.454e-4	4	NC	1	NC	1
493		19	max	0	1	0	1	0	1	-1.341e-5	12	NC	1	NC	1
494			min	0	1	0	1	0	1	-7.454e-4	4	NC	1	NC	1
495	M1	1	max	.01	3	.179	2	1.035	4	1.372e-2	1	NC	1	NC	1
496			min	-.005	2	-.036	3	0	12	-2.373e-2	3	NC	1	NC	1
497		2	max	.01	3	.086	2	1	4	1.033e-2	4	NC	5	NC	1
498			min	-.005	2	-.016	3	-.01	1	-1.178e-2	3	1471.082	2	8154.439	5
499		3	max	.01	3	.015	3	.964	4	1.769e-2	4	NC	5	NC	2
500			min	-.005	2	-.012	2	-.014	1	-2.966e-4	1	709.941	2	4499.566	5
501		4	max	.01	3	.066	3	.926	4	1.536e-2	4	NC	15	NC	2
502			min	-.005	2	-.123	2	-.013	1	-4.825e-3	3	449.456	2	3267.96	5
503		5	max	.01	3	.131	3	.887	4	1.303e-2	4	9888.605	15	NC	1
504			min	-.005	2	-.238	2	-.009	1	-9.53e-3	3	324.998	2	2649.039	5
505		6	max	.009	3	.201	3	.847	4	1.445e-2	1	7801.805	15	NC	1
506			min	-.005	2	-.35	2	-.004	1	-1.424e-2	3	256.312	2	2272.759	5
507		7	max	.009	3	.267	3	.807	4	1.937e-2	1	6571.235	15	NC	1
508			min	-.005	2	-.449	2	0	3	-1.894e-2	3	215.724	2	1998.653	4
509		8	max	.009	3	.323	3	.765	4	2.429e-2	1	5843.791	15	NC	1
510			min	-.005	2	-.528	2	0	12	-2.365e-2	3	191.704	2	1791.765	4
511		9	max	.009	3	.359	3	.722	4	2.705e-2	2	5463.678	15	NC	1
512			min	-.005	2	-.578	2	0	1	-2.397e-2	3	179.183	2	1654.548	4
513		10	max	.009	3	.373	3	.675	4	2.91e-2	2	5347.623	15	NC	1
514			min	-.004	2	-.595	2	0	12	-2.137e-2	3	175.51	2	1613.544	4
515		11	max	.008	3	.364	3	.624	4	3.116e-2	2	5463.429	15	NC	1
516			min	-.004	2	-.578	2	0	12	-1.877e-2	3	179.804	2	1648.407	4
517		12	max	.008	3	.333	3	.569	4	3.002e-2	2	5843.207	15	NC	1
518			min	-.004	2	-.526	2	-.001	1	-1.594e-2	3	193.563	2	1766.253	4
519		13	max	.008	3	.284	3	.508	4	2.41e-2	2	6570.101	15	NC	1
520			min	-.004	2	-.443	2	0	1	-1.275e-2	3	220.188	2	2097.599	4
521		14	max	.008	3	.221	3	.442	4	1.818e-2	2	7799.724	15	NC	1
522			min	-.004	2	-.34	2	0	12	-9.558e-3	3	265.774	2	2833.175	4
523		15	max	.007	3	.15	3	.374	4	1.226e-2	2	9884.782	15	NC	1
524			min	-.004	2	-.226	2	0	12	-6.369e-3	3	344.336	2	4587.604	4
525		16	max	.007	3	.076	3	.309	4	1.079e-2	4	NC	15	NC	1
526			min	-.004	2	-.112	2	0	12	-3.181e-3	3	489.912	2	NC	1
527		17	max	.007	3	.005	3	.248	4	1.208e-2	4	NC	5	NC	2
528			min	-.004	2	-.006	2	0	12	8.211e-6	3	799.172	1	9540.251	1
529		18	max	.007	3	.083	1	.194	4	1.002e-2	2	NC	5	NC	1
530			min	-.004	2	-.058	3	0	12	-3.686e-3	3	1685.099	1	NC	1
531		19	max	.007	3	.163	1	.148	4	1.991e-2	2	NC	1	NC	1
532			min	-.004	2	-.118	3	-.001	1	-7.503e-3	3	NC	1	NC	1
533	M5	1	max	.031	3	.375	2	1.035	4	0	1	NC	1	NC	1
534			min	-.021	2	-.035	3	0	1	-9.747e-6	4	NC	1	NC	1
535		2	max	.031	3	.18	2	1.008	4	9.078e-3	4	NC	5	NC	1
536			min	-.021	2	-.012	3	0	1	0	1	700.569	2	6030.126	4
537		3	max	.031	3	.048	3	.974	4	1.795e-2	4	NC	15	NC	1
538			min	-.022	2	-.04	2	0	1	0	1	329.007	2	3566.54	4
539		4	max	.03	3	.174	3	.935	4	1.462e-2	4	6861.793	15	NC	1
540			min	-.021	2	-.302	2	0	1	0	1	201.152	2	2787.746	4
541		5	max	.029	3	.347	3	.893	4	1.13e-2	4	4786.947	15	NC	1
542			min	-.021	2	-.587	2	0	1	0	1	141.345	2	2422.273	4
543		6	max	.029	3	.541	3	.85	4	7.976e-3	4	3676.477	15	NC	1
544			min	-.02	2	-.871	2	0	1	0	1	109.1	2	2200.009	4
545		7	max	.028	3	.73	3	.806	4	4.652e-3	4	3036.624	15	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
546			min	-.02	2	-1.128	2	0	1	0	1	90.412	2	2016.93	4
547		8	max	.028	3	.888	3	.764	4	1.328e-3	4	2665.345	15	NC	1
548			min	-.019	2	-1.335	2	0	1	0	1	79.522	2	1822.187	4
549		9	max	.027	3	.991	3	.722	4	0	1	2475.004	15	NC	1
550			min	-.019	2	-1.466	2	0	1	-5.859e-6	5	73.925	2	1648.279	4
551		10	max	.026	3	1.028	3	.674	4	0	1	2417.616	15	NC	1
552			min	-.019	2	-1.51	2	0	1	-5.651e-6	5	72.289	2	1626.409	4
553		11	max	.026	3	1.002	3	.623	4	0	1	2475.104	15	NC	1
554			min	-.018	2	-1.466	2	0	1	-5.443e-6	5	74.201	2	1672.588	4
555		12	max	.025	3	.915	3	.571	4	8.441e-4	4	2665.589	15	NC	1
556			min	-.018	2	-1.329	2	0	1	0	1	80.421	2	1730.609	4
557		13	max	.024	3	.775	3	.51	4	2.958e-3	4	3037.136	15	NC	1
558			min	-.018	2	-1.112	2	0	1	0	1	92.732	2	2048.764	4
559		14	max	.024	3	.598	3	.441	4	5.072e-3	4	3677.495	15	NC	1
560			min	-.018	2	-.842	2	0	1	0	1	114.336	2	2935.086	4
561		15	max	.023	3	.402	3	.369	4	7.186e-3	4	4788.986	15	NC	1
562			min	-.017	2	-.55	2	0	1	0	1	152.798	2	5797.712	4
563		16	max	.022	3	.202	3	.299	4	9.3e-3	4	6866.103	15	NC	1
564			min	-.017	2	-.266	2	0	1	0	1	225.41	1	NC	1
565		17	max	.022	3	.016	3	.237	4	1.141e-2	4	NC	15	NC	1
566			min	-.017	2	-.02	2	0	1	0	1	383.36	1	NC	1
567		18	max	.022	3	.174	1	.186	4	5.773e-3	4	NC	5	NC	1
568			min	-.017	2	-.143	3	0	1	0	1	841.56	1	NC	1
569		19	max	.022	3	.332	1	.149	4	0	1	NC	1	NC	1
570			min	-.017	2	-.286	3	0	1	-5.737e-6	4	NC	1	NC	1
571	M9	1	max	.01	3	.179	2	1.035	4	2.373e-2	3	NC	1	NC	1
572			min	-.005	2	-.036	3	-.001	1	-1.372e-2	1	NC	1	NC	1
573		2	max	.01	3	.086	2	1.006	4	1.178e-2	3	NC	5	NC	1
574			min	-.005	2	-.016	3	0	12	-6.608e-3	1	1471.082	2	6427.583	4
575		3	max	.01	3	.015	3	.972	4	1.789e-2	4	NC	5	NC	2
576			min	-.005	2	-.012	2	0	12	1.134e-6	10	709.941	2	3737.116	4
577		4	max	.01	3	.066	3	.934	4	1.4e-2	5	NC	15	NC	2
578			min	-.005	2	-.123	2	0	12	-4.722e-3	2	449.456	2	2866.034	4
579		5	max	.01	3	.131	3	.893	4	1.055e-2	5	9840.069	15	NC	1
580			min	-.005	2	-.238	2	0	12	-9.536e-3	1	324.998	2	2445.319	4
581		6	max	.009	3	.201	3	.85	4	1.424e-2	3	7765.156	15	NC	1
582			min	-.005	2	-.35	2	0	12	-1.445e-2	1	256.312	2	2189.304	4
583		7	max	.009	3	.267	3	.807	4	1.894e-2	3	6541.38	15	NC	1
584			min	-.005	2	-.449	2	0	1	-1.937e-2	1	215.724	2	1993.452	4
585		8	max	.009	3	.323	3	.764	4	2.365e-2	3	5817.856	15	NC	1
586			min	-.005	2	-.528	2	-.001	1	-2.429e-2	1	191.704	2	1808.153	4
587		9	max	.009	3	.359	3	.722	4	2.397e-2	3	5439.744	15	NC	1
588			min	-.005	2	-.578	2	0	12	-2.705e-2	2	179.183	2	1648.572	4
589		10	max	.009	3	.373	3	.675	4	2.137e-2	3	5324.28	15	NC	1
590			min	-.004	2	-.595	2	0	1	-2.91e-2	2	175.51	2	1614.715	4
591		11	max	.008	3	.364	3	.623	4	1.877e-2	3	5439.515	15	NC	1
592			min	-.004	2	-.578	2	0	1	-3.116e-2	2	179.804	2	1656.189	4
593		12	max	.008	3	.333	3	.57	4	1.594e-2	3	5817.444	15	NC	1
594			min	-.004	2	-.526	2	0	12	-3.002e-2	2	193.563	2	1750.403	4
595		13	max	.008	3	.284	3	.508	4	1.275e-2	3	6540.795	15	NC	1
596			min	-.004	2	-.443	2	0	12	-2.41e-2	2	220.188	2	2097.986	4
597		14	max	.008	3	.221	3	.44	4	9.558e-3	3	7764.356	15	NC	1
598			min	-.004	2	-.34	2	-.003	1	-1.818e-2	2	265.774	2	2942.447	5
599		15	max	.007	3	.15	3	.369	4	6.832e-3	5	9838.952	15	NC	1
600			min	-.004	2	-.226	2	-.008	1	-1.226e-2	2	344.336	2	5191.418	5
601		16	max	.007	3	.076	3	.301	4	9.198e-3	5	NC	15	NC	1
602			min	-.004	2	-.112	2	-.012	1	-6.334e-3	2	489.912	2	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
603		17	max	.007	3	.005	3	.239	4	1.159e-2	4	NC	5	NC	2
604			min	-.004	2	-.006	2	-.013	1	-8.505e-4	1	799.172	1	9540.251	1
605		18	max	.007	3	.083	1	.189	4	5.527e-3	5	NC	5	NC	1
606			min	-.004	2	-.058	3	-.009	1	-1.002e-2	2	1685.099	1	NC	1
607		19	max	.007	3	.163	1	.149	4	7.503e-3	3	NC	1	NC	1
608			min	-.004	2	-.118	3	0	12	-1.991e-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

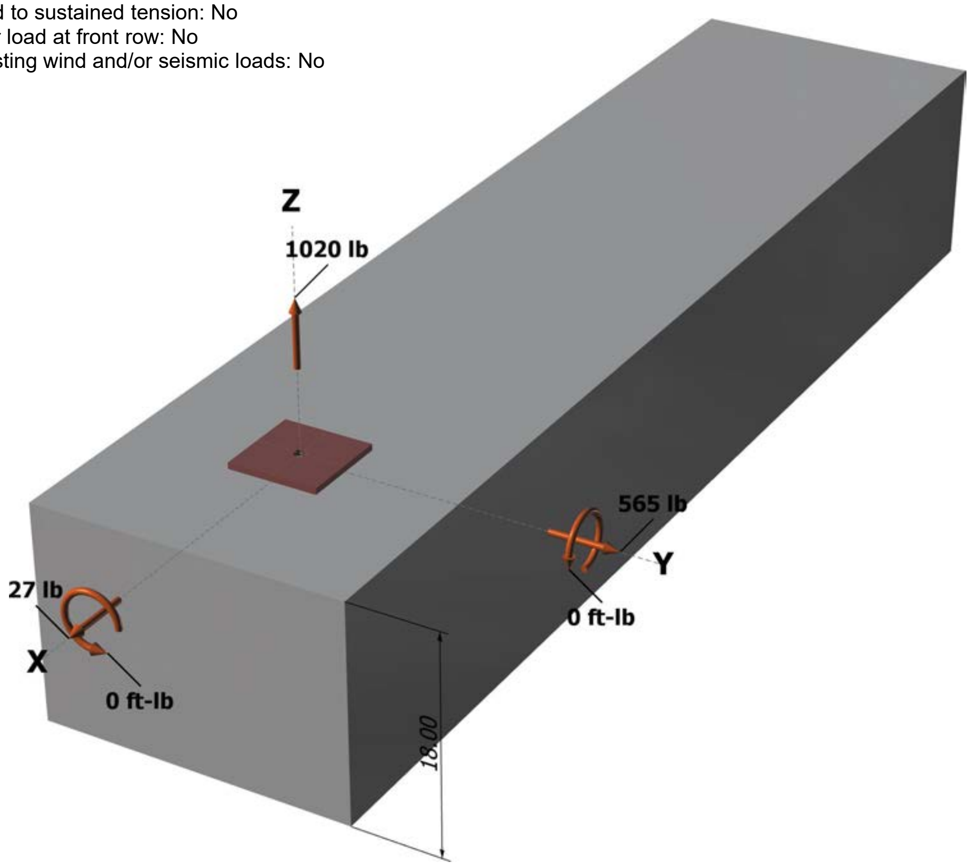
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

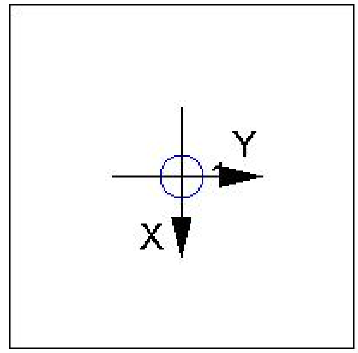
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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	1020.0	27.0	565.0	565.6
Sum	1020.0	27.0	565.0	565.6

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 1020
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	1020	6071	0.17	Pass
Concrete breakout	1020	5710	0.18	Pass
Adhesive	**1020**	**5365**	**0.19**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, øV_n (lb)	Ratio	Status
Steel	**566**	**3156**	**0.18**	**Pass (Governs)**
T Concrete breakout y+	565	3934	0.14	Pass
T Concrete breakout x+	27	3018	0.01	Pass
|| Concrete breakout y+	27	8508	0.00	Pass
|| Concrete breakout x+	565	6875	0.08	Pass
Concrete breakout, combined	-	-	0.14	Pass
Pryout	566	12298	0.05	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. D.7.1	0.19	0.00	19.0 %	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 2.4.6025.0

Company:	Schletter, Inc.	Date:	8/1/2016
Engineer:	HCV	Page:	1/5
Project:	Standard PVMax - Worst Case, 21-31 Inch Width		
Address:			
Phone:			
E-mail:			

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

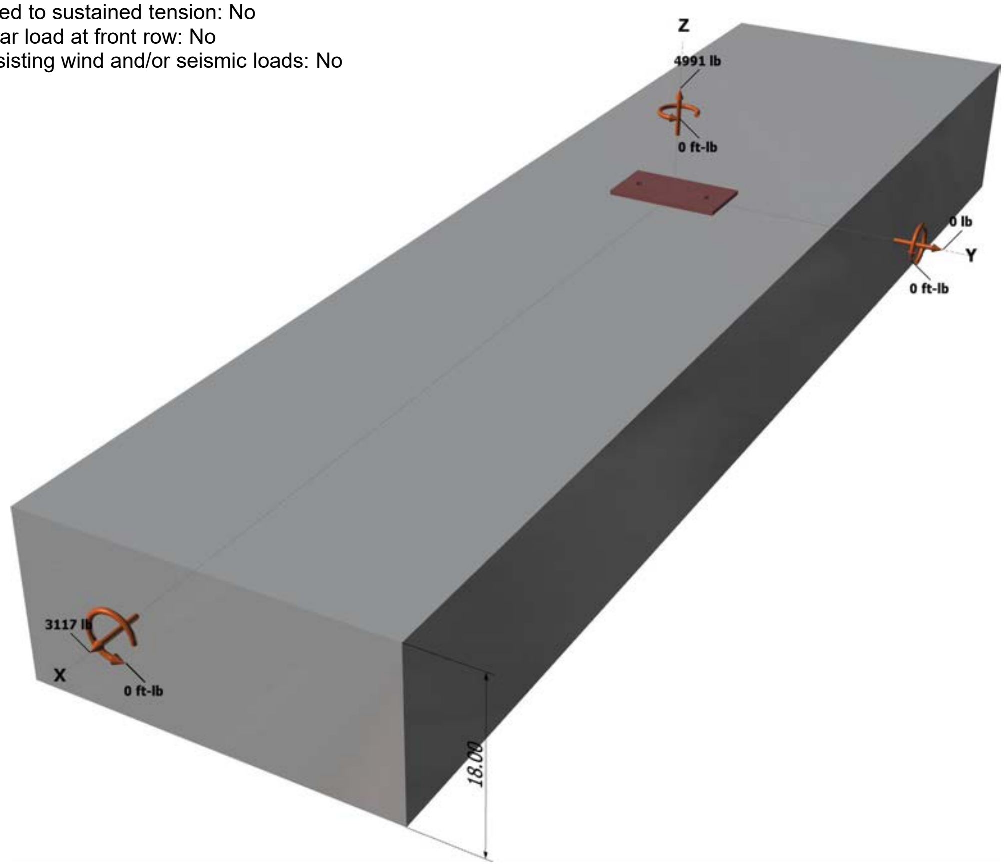
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

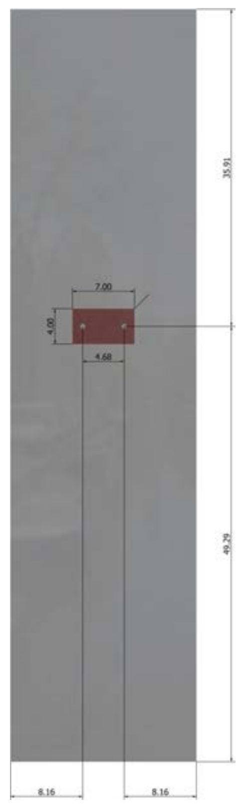
Load and Geometry
Load factor source: ACI 318 Section 9.2
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: No
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

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

<Figure 1>



<Figure 2>



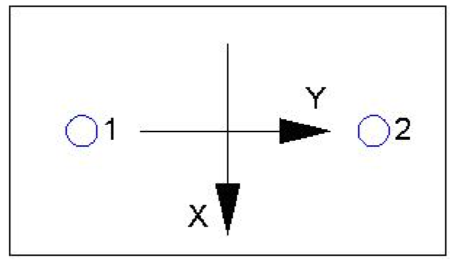
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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	2495.5	1558.5	0.0	1558.5
2	2495.5	1558.5	0.0	1558.5
Sum	4991.0	3117.0	0.0	3117.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 4991
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, ϕN_n (lb)	Ratio	Status
Steel	2496	6071	0.41	Pass
Concrete breakout	4991	9208	0.54	Pass
Adhesive	**4991**	**8093**	**0.62**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status
Steel	1559	3156	0.49	Pass
T Concrete breakout x+	**3117**	**5323**	**0.59**	**Pass (Governs)**

|| Concrete breakout y-	**1559**	**12241**	**0.13**	**Pass (Governs)**
Pryout	3117	19833	0.16	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. D.7.3	0.62	0.59	120.2 %	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.