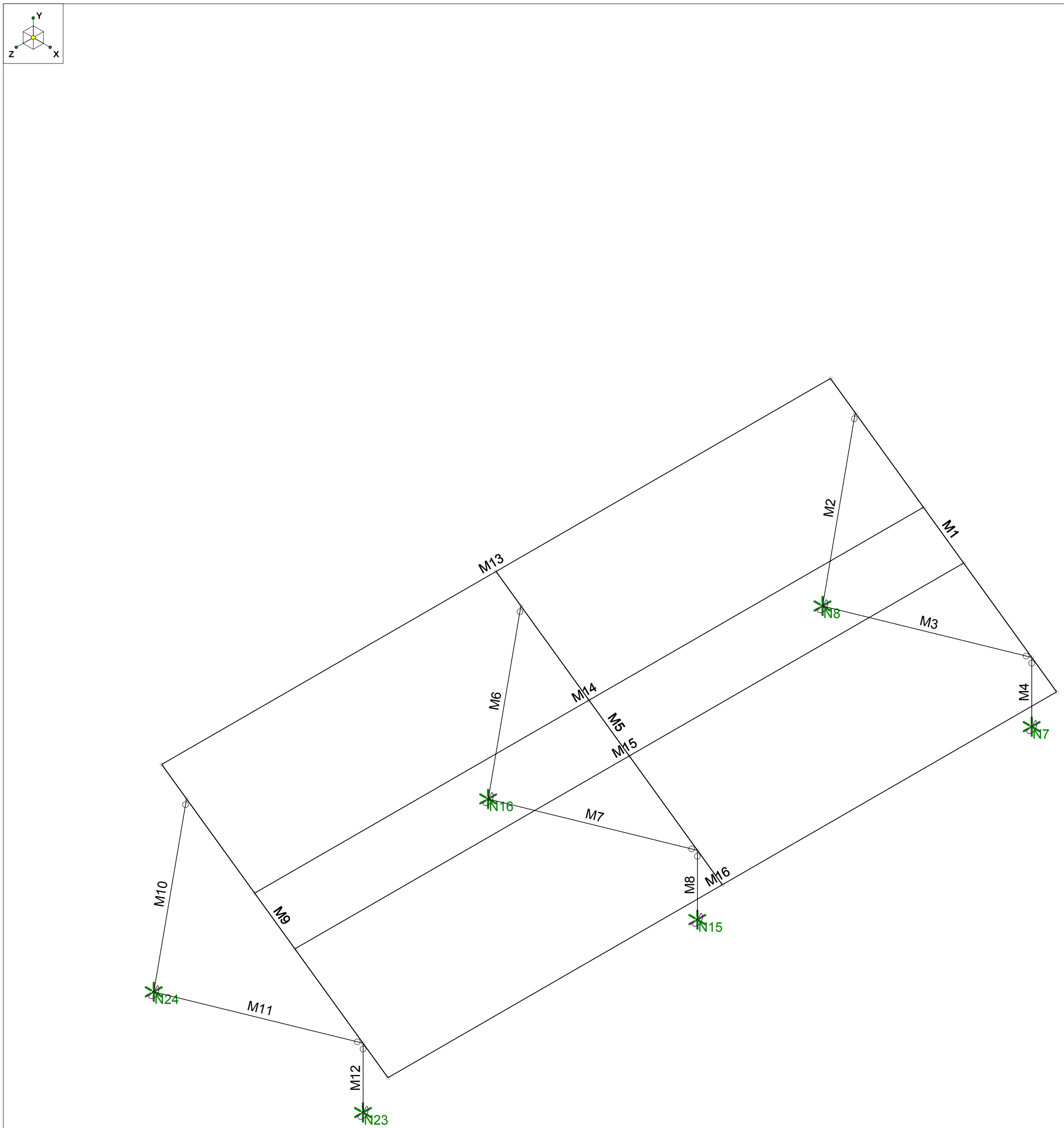


Schletter, Inc.		35° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-05	

1. INTRODUCTION

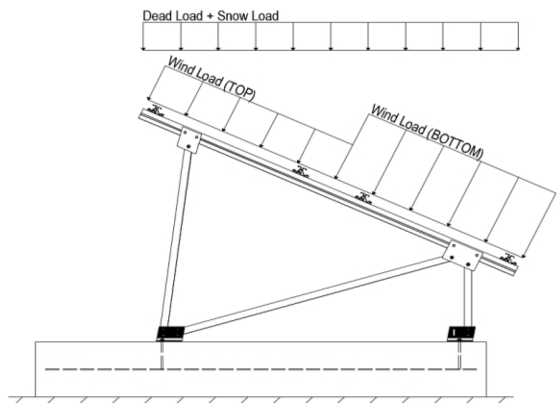
1.1 Project Description
The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. PVMax ground mount system.

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

PV modules are required to meet the following specifications:

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

Modules Per Row = 2
Module Tilt = 35°
Maximum Height Above Grade = 3 ft



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

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

2. LOAD ACTIONS

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

Self-weight of the PV modules.

2.2 Snow Loads
Ground Snow Load, P_g = 30.00 psf
Sloped Roof Snow Load, P_s = 14.43 psf *(ASCE 7-05, Eq. 7-2)*
I_s = 1.00
C_s = 0.64
C_e = 0.90
C_t = 1.20

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

Exposure Category = C
Importance Category = II

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

Pressure Coefficients

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

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

2.4 Seismic Loads

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

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

2.5 Combination of Loads

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

Strength Design, LRFD

Component stresses are checked using the following LRFD load combinations:

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

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

Allowable Stress Design, ASD

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

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

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

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

3. STRUCTURAL ANALYSIS

3.1 RISA Results

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

3.2 RISA Components

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

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

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

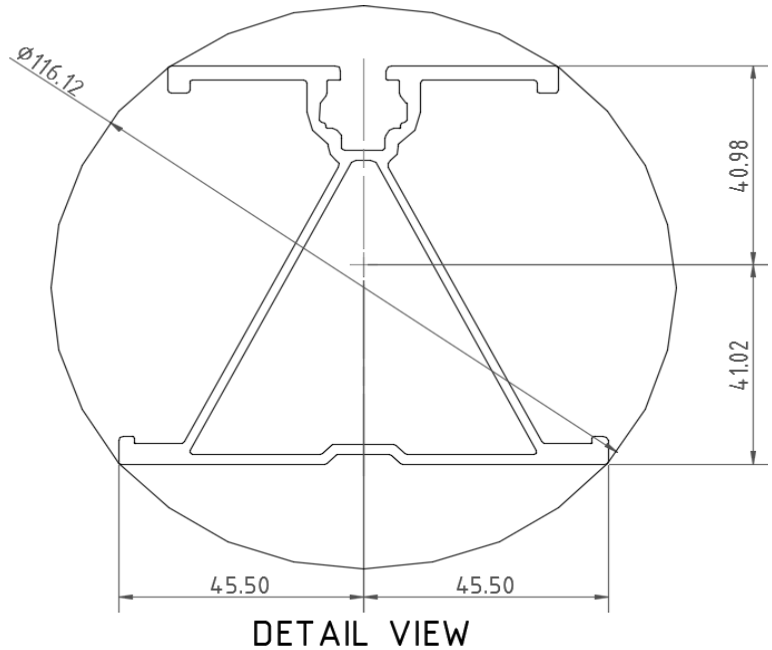
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

4. MEMBER DESIGN CALCULATIONS

4.1 Purlin Design

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

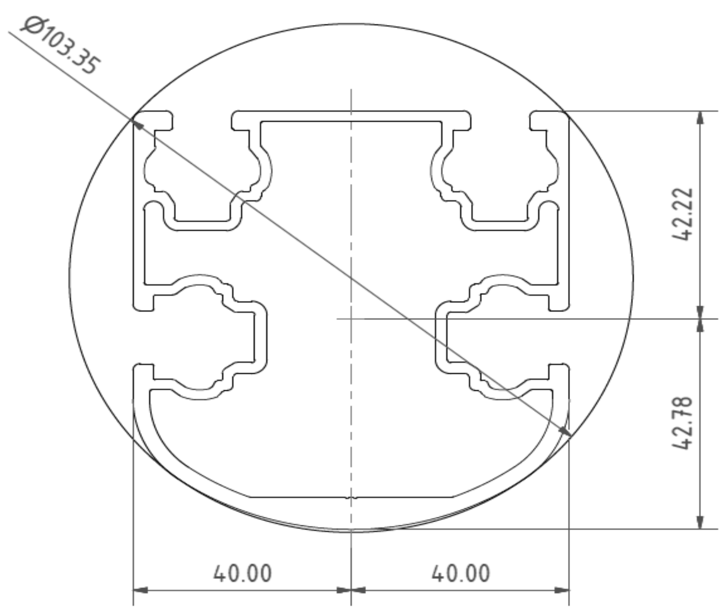
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	72	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	-1.366	k-ft
M_z =	-0.008	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	50%	



4.2 Girder Design

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

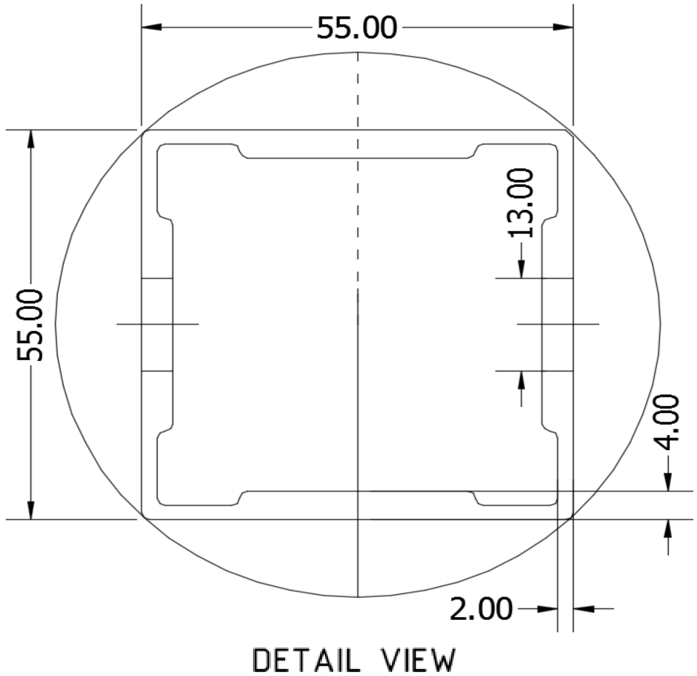
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	88.90	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.35	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-2.499	k-ft
M_z =	0.000	k-ft
P_n =	-0.956	k
$M_{y\ allowable}$ =	3.464	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	74%	



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).

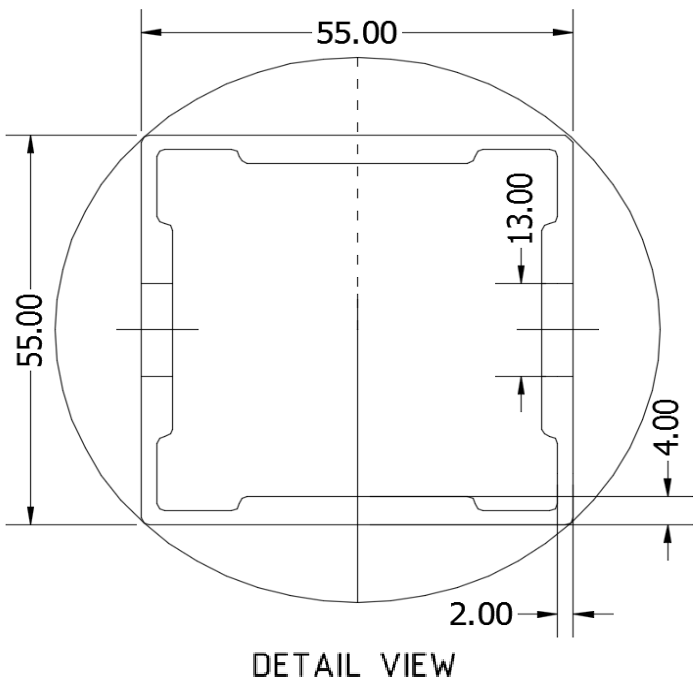
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.352	k-ft
P_n =	0.308	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	26%	



4.4 Diagonal Strut Design

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

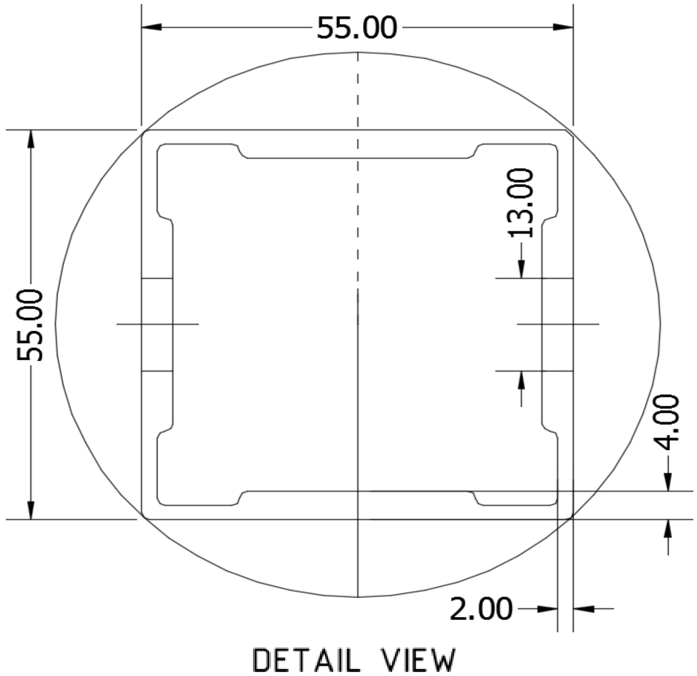
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	86.60	in
$\Phi F_{ty\ AXIAL}$ =	7.50	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.009	k-ft
M_z =	0.000	k-ft
P_n =	2.780	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	7.371	k
Utilization =	38%	



4.5 Rear Strut Design

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

Strut Type =	55x55	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	78.03	in
$\Phi F_{ty\ AXIAL}$ =	8.94	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	-0.009	k-ft
M_z =	0.000	k-ft
P_n =	2.821	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	8.786	k
Utilization =	33%	



5. FOUNDATION DESIGN CALCULATIONS

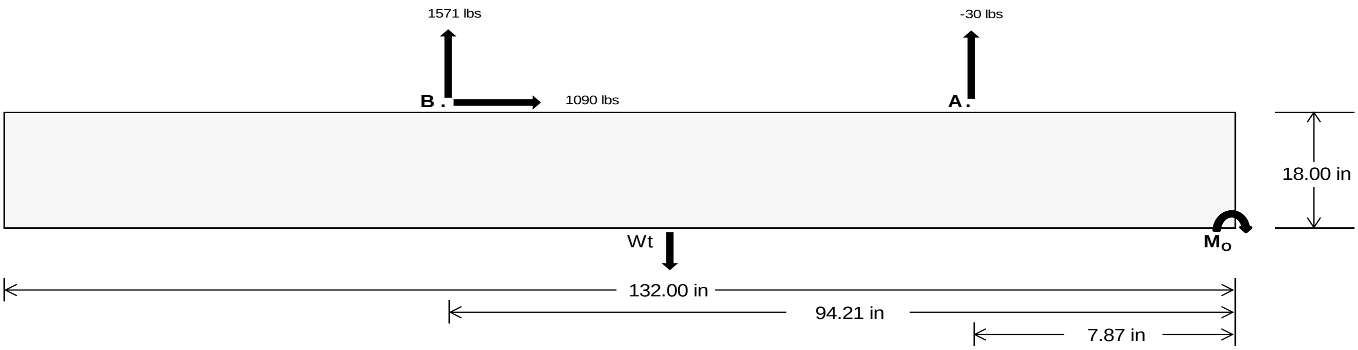
5.1 Helical Pile Foundations

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 =	114.10	6539.97	k
Compressive Load =	2304.82	4616.97	k
Lateral Load =	255.35	4534.70	k
Moment (Weak Axis) =	0.46	0.12	k

5.2 Design of Ballast Foundations

Ballast foundations are used to secure the racking structure in place. The foundations are checked for potential overturning and sliding. Bearing pressures applied by the racking and ballast foundations are checked against the allowable bearing pressures provided by the IBC tables 1804.2 (2003, 2006) & 1806.2 (2009).



Concrete Properties

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

Footing Reinforcement

Use fiber reinforcing with (2) #5 rebar.

Overturning Check

M_O = 167396.9 in-lbs
Resisting Force Required = 2536.32 lbs
S.F. = 1.67
Weight Required = 4227.19 lbs
Minimum Width = 33 in in
Weight Provided = 6579.38 lbs

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

Sliding

Force = 1090.27 lbs
Friction = 0.4
Weight Required = 2725.67 lbs
Resisting Weight = 6579.38 lbs
Additional Weight Required = 0 lbs

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

Cohesion

Sliding Force = 1090.27 lbs
Cohesion = 130 psf
Area = 30.25 ft^2
Resisting = 3289.69 lbs
Additional Weight Required = 0 lbs

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

Shear Key

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

Shear key is not required.

Bearing Pressure

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

ASD LC	1.0D + 1.0S				1.0D + 1.0W				1.0D + 0.75L + 0.75W + 0.75S				0.6D + 1.0W			
Width	33 in	34 in	35 in	36 in	33 in	34 in	35 in	36 in	33 in	34 in	35 in	36 in	33 in	34 in	35 in	36 in
F_A	654 lbs	654 lbs	654 lbs	654 lbs	998 lbs	998 lbs	998 lbs	998 lbs	1155 lbs	1155 lbs	1155 lbs	1155 lbs	60 lbs	60 lbs	60 lbs	60 lbs
F_B	566 lbs	566 lbs	566 lbs	566 lbs	2124 lbs	2124 lbs	2124 lbs	2124 lbs	1944 lbs	1944 lbs	1944 lbs	1944 lbs	-3142 lbs	-3142 lbs	-3142 lbs	-3142 lbs
F_V	82 lbs	82 lbs	82 lbs	82 lbs	1961 lbs	1961 lbs	1961 lbs	1961 lbs	1523 lbs	1523 lbs	1523 lbs	1523 lbs	-2181 lbs	-2181 lbs	-2181 lbs	-2181 lbs
P_{total}	7799 lbs	7999 lbs	8198 lbs	8398 lbs	9701 lbs	9900 lbs	10100 lbs	10299 lbs	9679 lbs	9878 lbs	10078 lbs	10277 lbs	866 lbs	986 lbs	1105 lbs	1225 lbs
M	1961 lbs-ft	1961 lbs-ft	1961 lbs-ft	1961 lbs-ft	2782 lbs-ft	2782 lbs-ft	2782 lbs-ft	2782 lbs-ft	3310 lbs-ft	3310 lbs-ft	3310 lbs-ft	3310 lbs-ft	4409 lbs-ft	4409 lbs-ft	4409 lbs-ft	4409 lbs-ft
e	0.25 ft	0.25 ft	0.24 ft	0.23 ft	0.29 ft	0.28 ft	0.28 ft	0.27 ft	0.34 ft	0.34 ft	0.33 ft	0.32 ft	5.09 ft	4.47 ft	3.99 ft	3.60 ft
L/6	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft
f_{min}	222.5 psf	222.3 psf	222.2 psf	222.1 psf	270.5 psf	269.0 psf	267.5 psf	266.1 psf	260.3 psf	259.0 psf	257.8 psf	256.7 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	293.2 psf	291.0 psf	288.9 psf	286.9 psf	370.9 psf	366.4 psf	362.1 psf	358.1 psf	379.7 psf	374.9 psf	370.4 psf	366.1 psf	513.5 psf	225.9 psf	167.2 psf	143.2 psf

Maximum Bearing Pressure = 513 psf
Allowable Bearing Pressure = 1500 psf

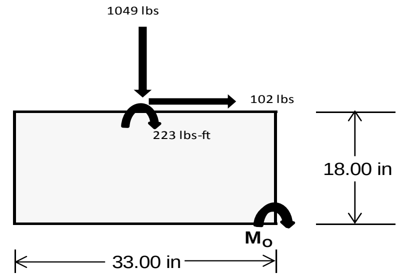
Use a 132in long x 33in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O = 1066.7 ft-lbs
Resisting Force Required = 775.79 lbs
S.F. = 1.67
Weight Required = 1292.99 lbs
Minimum Width = 33 in in
Weight Provided = 6579.38 lbs

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



Bearing Pressure

ASD LC	1.238D + 0.875E			1.1785D + 0.65625E + 0.75S			0.362D + 0.875E		
Width	33 in			33 in			33 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	241 lbs	387 lbs	112 lbs	470 lbs	1049 lbs	372 lbs	116 lbs	113 lbs	-13 lbs
F_V	140 lbs	137 lbs	142 lbs	103 lbs	102 lbs	108 lbs	140 lbs	137 lbs	141 lbs
P_{total}	8386 lbs	8533 lbs	8257 lbs	8224 lbs	8803 lbs	8126 lbs	2498 lbs	2495 lbs	2369 lbs
M	508 lbs-ft	499 lbs-ft	512 lbs-ft	378 lbs-ft	376 lbs-ft	392 lbs-ft	507 lbs-ft	499 lbs-ft	509 lbs-ft
e	0.06 ft	0.06 ft	0.06 ft	0.05 ft	0.04 ft	0.05 ft	0.20 ft	0.20 ft	0.22 ft
L/6	0.46 ft	0.46 ft	0.46 ft	0.46 ft	0.46 ft	0.46 ft	0.46 ft	0.46 ft	0.46 ft
f_{min}	240.6 psf	246.0 psf	236.0 psf	244.6 psf	263.9 psf	240.3 psf	46.0 psf	46.5 psf	41.6 psf
f_{max}	313.8 psf	318.1 psf	309.9 psf	299.1 psf	318.1 psf	296.9 psf	119.1 psf	118.5 psf	115.1 psf

Maximum Bearing Pressure = 318 psf
Allowable Bearing Pressure = 1500 psf

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

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

5.3 Foundation Anchors

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

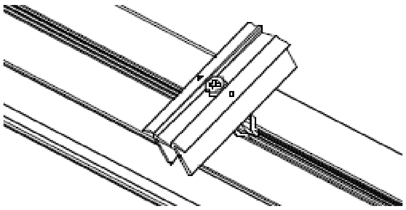
6. DESIGN OF JOINTS AND CONNECTIONS

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

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

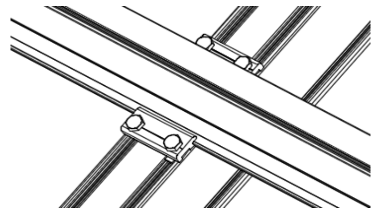
Fastening of Modules to Purlins

Maximum Uplifting Force =	1.086	k
Allowable Uplift =	1.214	k
Utilization =	89%	



Fastening of Purlins to Girders

Maximum Uplifting Force =	2.344	k
Allowable Uplift =	4.357	k
Utilization =	54%	



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 =	1.773	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	24%	

Rear Strut

Maximum Axial Load =	4.325	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	58%	

Diagonal Strut

Maximum Axial Load =	2.840	k
M12 Bolt Shear Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	38%	

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

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

7. SEISMIC DESIGN

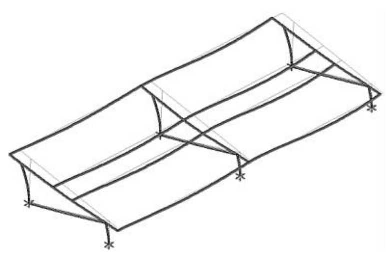
7.1 Seismic Drift

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

Mean Height, h_{sx} =	53.78	in
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$	
	1.076	in
Max Drift, Δ_{MAX} =	0.35	in

0.35 ≤ 1.076, OK.

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



APPENDIX A

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

Purlin = **S1.5**

Strong Axis:

3.4.14

L_b = 72 in

J = 0.432

199.186

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

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= 28.8 ksi

3.4.16

b/t = 32.195

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 25.1 ksi

3.4.16.1 Not Used

Rb/t =

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 37.0588

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

S1 = 36.9

m = 0.65

C_0 = 40.985

Cc = 41.015

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

S2 = 77.2

φF_L= φb[Bbr-mDbr*h/t]

φF_L= 43.2 ksi

φF_LSt= 25.1 ksi

Ix = 897074 mm^4

2.155 in^4

y = 41.015 mm

Sx = 1.335 in^3

M_{max}St = 2.788 k-ft

Weak Axis:

3.4.14

L_b = 72

J = 0.432

126.67

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

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= 29.7

3.4.16

b/t = 37.0588

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 23.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 32.195

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

S1 = 36.9

m = 0.65

C_0 = 45.5

Cc = 45.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 23.1 ksi

Iy = 446476 mm^4

1.073 in^4

x = 45.5 mm

Sy = 0.599 in^3

M_{max}Wk = 1.152 k-ft

Compression

3.4.9

b/t = 32.195
S1 = 12.21 (See 3.4.16 above for formula)
S2 = 32.70 (See 3.4.16 above for formula)
φF_L= φc[Bp-1.6Dp*b/t]
φF_L= 25.1 ksi

b/t = 37.0588
S1 = 12.21
S2 = 32.70
φF_L= (φck2*√(BpE))/(1.6b/t)
φF_L= 21.9 ksi

3.4.10

Rb/t = 0.0

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

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

φF_L= 21.94 ksi
A = 1215.13 mm^2
1.88 in^2
P_{max} = 41.32 kips

A.2 Design of Aluminum Girders - Aluminum Design Manual, 2005 Edition

Girder = **BF0**

Strong Axis:

3.4.14

L_b = 88.9 in
J = 1.08
152.913

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

S1 = 0.51461

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

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 29.4 ksi

3.4.16

b/t = 16.2

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

S1 = 12.2

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

S2 = 46.7
φF_L= φb[Bp-1.6Dp*b/t]
φF_L= 31.6 ksi

Weak Axis:

3.4.14

L_b = 88.9
J = 1.08
161.829

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

S1 = 0.51461

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

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 29.2

3.4.16

b/t = 7.4

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

S1 = 12.2

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

S2 = 46.7
φF_L= φyFcy
φF_L= 33.3 ksi

3.4.16.1 Used

Rb/t = 18.1

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

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

$\varphi F_L =$ 31.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 7.4

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

S1 = 35.2

m = 0.68

C_0 = 41.067

Cc = 43.717

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

S2 = 73.8

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St =$ 29.4 ksi

Ix = 984962 mm^4

2.366 in^4

y = 43.717 mm

Sx = 1.375 in^3

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

3.4.18

h/t = 16.2

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

S1 = 36.9

m = 0.65

C_0 = 40

Cc = 40

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

S2 = 77.3

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L Wk =$ 33.3 ksi

Iy = 923544 mm^4

2.219 in^4

x = 40 mm

Sy = 1.409 in^3

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

Compression

3.4.9

b/t = 16.2

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

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

$\varphi F_L =$ 31.6 ksi

b/t = 7.4

S1 = 12.21

S2 = 32.70

$\varphi F_L = \varphi yFcy$

$\varphi F_L =$ 33.3 ksi

3.4.10

Rb/t = 18.1

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

S1 = 6.87

S2 = 131.3

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

$\varphi F_L =$ 31.09 ksi

$\varphi F_L =$ 31.09 ksi

A = 1215.13 mm^2

1.88 in^2

P_{max} = 58.55 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 24.8 in

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

Weak Axis:

3.4.14

L_b = 24.8

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 0.57371

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.87952

φF_L= φcc(Bc-Dc*λ)

φF_L= 28.0279 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

φF_L= φyFcy

φF_L= 33.25 ksi

φF_L= 28.03 ksi

A = 663.99 mm^2

1.03 in^2

P_{max} = 28.85 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 86.60 in

J = 0.942

135.148

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.6 ksi

Weak Axis:

3.4.14

L_b = 86.6

J = 0.942

135.148

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.6

3.4.16
b/t = 24.5

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

S1 = 12.2

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

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

3.4.16
b/t = 24.5

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

S1 = 12.2

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

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

3.4.16.1 Not Used
Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0
φF_L= 1.17φyFcy
φF_L= 38.9 ksi

3.4.16.1
N/A for Weak Direction

3.4.18
h/t = 24.5

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

S1 = 36.9
m = 0.65
C_0 = 27.5
Cc = 27.5

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

S2 = 77.3
φF_L= 1.3φyFcy
φF_L= 43.2 ksi

3.4.18
h/t = 24.5

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

S1 = 36.9
m = 0.65
C_0 = 27.5
Cc = 27.5

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

S2 = 77.3
φF_L= 1.3φyFcy
φF_L= 43.2 ksi

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

φF_LWk= 28.2 ksi
Iy = 279836 mm^4
0.672 in^4
x = 27.5 mm
Sy = 0.621 in^3
M_{max}Wk = 1.460 k-ft

Compression

3.4.7
λ = 2.00335
r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671
φcc = 0.86047
φF_L= (φccFcy)/(λ²)
φF_L= 7.50396 ksi

3.4.9

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

b/t = 24.5
S1 = 12.21
S2 = 32.70
$\varphi F_L = \varphi c[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87
S2 = 131.3
$\varphi F_L = \varphi yFcy$
$\varphi F_L =$ 33.25 ksi

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

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

Strut = **55x55**

Strong Axis:

3.4.14

$L_b =$ 78.03 in
J = 0.942
121.773

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

S1 = 0.51461

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

S2 = 1701.56
$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)/2}))}]$
$\varphi F_L =$ 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
$\varphi F_L = \varphi b[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 28.2 ksi

Weak Axis:

3.4.14

$L_b =$ 78.03
J = 0.942
121.773

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

S1 = 0.51461

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

S2 = 1701.56
$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)/2}))}]$
$\varphi F_L =$ 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
$\varphi F_L = \varphi b[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 1.80509

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.83271

φF_L= (φccFcy)/(λ²)

φF_L= 8.94465 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

$\varphi F_L = \varphi y Fcy$

$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 8.94 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 9.21 kips

APPENDIX B

B.1

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

Basic Load Cases

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

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

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

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

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

Member Distributed Loads (BLC 3 : Snow Load)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Y	-32.97	-32.97	0	0
2	M14	Y	-32.97	-32.97	0	0
3	M15	Y	-32.97	-32.97	0	0
4	M16	Y	-32.97	-32.97	0	0

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

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	y	-88.797	-88.797	0	0
2	M14	y	-88.797	-88.797	0	0
3	M15	y	-147.995	-147.995	0	0
4	M16	y	-147.995	-147.995	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	199.793	199.793	0	0
2	M14	y	155.395	155.395	0	0
3	M15	y	88.797	88.797	0	0
4	M16	y	88.797	88.797	0	0

Member Distributed Loads (BLC 6 : Seismic - Lateral)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Z	6.693	6.693	0	0
2	M14	Z	6.693	6.693	0	0
3	M15	Z	6.693	6.693	0	0
4	M16	Z	6.693	6.693	0	0
5	M13	Z	0	0	0	0
6	M14	Z	0	0	0	0
7	M15	Z	0	0	0	0
8	M16	Z	0	0	0	0

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	LRFD 1.2D + 1.6S + 0.8W	Yes	Y		1	1.2	3	1.6	4	.8														
2	LRFD 1.2D + 1.6W + 0.5S	Yes	Y		1	1.2	3	.5	4	1.6														
3	LRFD 0.9D + 1.6W	Yes	Y		2	.9					5	1.6												
4	LATERAL - LRFD 1.54D + 1.3E ...	Yes	Y		1	1.54	3	.2			6	1.3												
5	LATERAL - LRFD 0.56D + 1.3E	Yes	Y		1	.56					6	1.3												
6	LATERAL - LRFD 1.54D + 1.25...	Yes	Y		1	1.54	3	.2			6	1.25												
7	LATERAL - LRFD 0.56D + 1.25E	Yes	Y		1	.56					6	1.25												
8																								
9	ASD 1.0D + 1.0S	Yes	Y		1	1	3	1																
10	ASD 1.0D + 1.0W	Yes	Y		1	1			4	1														
11	ASD 1.0D + 0.75L + 0.75W + 0....	Yes	Y		1	1	3	.75	4	.75														
12	ASD 0.6D + 1.0W	Yes	Y		2	.6					5	1												
13	LATERAL - ASD 1.238D + 0.875E	Yes	Y		1	1.2...					6	.875												
14	LATERAL - ASD 1.1785D + 0.65...	Yes	Y		1	1.1...	3	.75			6	.656												
15	LATERAL - ASD 0.362D + 0.875E	Yes	Y		1	.362					6	.875												

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N8	max	1027.105	2	1199.699	2	.223	1	0	1	0	1	0	1
2		min	-1189.667	3	-1656.518	3	-14.973	5	-.091	4	0	1	0	1
3	N7	max	.033	3	646.535	1	-.358	10	0	10	0	1	0	1
4		min	-.189	2	-87.771	5	-196.421	4	-.357	4	0	1	0	1
5	N15	max	.151	3	1772.935	2	0	11	0	11	0	1	0	1
6		min	-1.698	2	60.214	15	-188.649	4	-.346	4	0	1	0	1
7	N16	max	3163.289	2	3551.519	2	0	3	0	3	0	1	0	1
8		min	-3488.233	3	-5030.747	3	-15.251	5	-.092	4	0	1	0	1
9	N23	max	.033	3	646.535	1	3.945	1	.007	1	0	1	0	1
10		min	-.189	2	60.391	12	-192.535	5	-.352	4	0	1	0	1
11	N24	max	1027.105	2	1199.699	2	-.02	10	0	10	0	1	0	1
12		min	-1189.667	3	-1656.518	3	-15.409	5	-.092	4	0	1	0	1
13	Totals:	max	5215.423	2	8956.621	2	0	11						
14		min	-5867.351	3	-8010.909	3	-621.364	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	43.993	4	361.83	2	-9.306	12	0	15	.11	4	0	4
2			min	2.489	10	-718.117	3	-102.969	1	-.011	2	.006	10	0	3
3		2	max	37.15	4	251.643	2	-7.94	12	0	15	.072	4	.409	3
4			min	2.489	10	-507.931	3	-78.268	1	-.011	2	-.002	10	-.204	2
5		3	max	34.14	1	141.456	2	-5.842	10	0	15	.045	5	.677	3
6			min	2.489	10	-297.745	3	-53.568	1	-.011	2	-.024	1	-.336	2
7		4	max	34.14	1	31.268	2	-2.067	10	0	15	.025	5	.806	3
8			min	2.489	10	-87.558	3	-35.961	4	-.011	2	-.051	1	-.393	2
9		5	max	34.14	1	122.628	3	1.707	10	0	15	.007	5	.794	3
10			min	2.489	10	-78.919	2	-27.627	4	-.011	2	-.062	1	-.377	2
11		6	max	34.14	1	332.814	3	20.534	1	0	15	-.005	12	.642	3
12			min	.246	15	-189.107	2	-23.742	5	-.011	2	-.057	1	-.288	2
13		7	max	34.14	1	543	3	45.235	1	0	15	-.002	10	.35	3
14			min	-6.36	5	-299.294	2	-21.628	5	-.011	2	-.035	1	-.125	2
15		8	max	34.14	1	753.186	3	69.935	1	0	15	.008	2	.111	2
16			min	-13.203	5	-409.481	2	-19.515	5	-.011	2	-.038	4	-.082	3
17		9	max	34.14	1	963.372	3	94.636	1	0	15	.059	1	.421	2
18			min	-20.047	5	-519.669	2	-17.401	5	-.011	2	-.05	5	-.654	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	42.227	4	629.856	2	-2.988	12	.005	3	.13	1	.804	2
20			min	2.489	10	-1173.558	3	-119.336	1	-.011	2	-.008	3	-1.366	3
21		11	max	35.383	4	519.669	2	-1.622	12	.011	2	.073	4	.421	2
22			min	2.489	10	-963.372	3	-94.636	1	0	15	-.01	3	-.654	3
23		12	max	34.14	1	409.481	2	-.043	3	.011	2	.038	4	.111	2
24			min	2.489	10	-753.186	3	-69.935	1	0	15	-.01	3	-.082	3
25		13	max	34.14	1	299.294	2	2.007	3	.011	2	.018	5	.35	3
26			min	2.489	10	-543	3	-45.235	1	0	15	-.035	1	-.125	2
27		14	max	34.14	1	189.107	2	4.056	3	.011	2	0	15	.642	3
28			min	2.489	10	-332.814	3	-31.707	4	0	15	-.057	1	-.288	2
29		15	max	34.14	1	78.919	2	6.105	3	.011	2	-.003	12	.794	3
30			min	-1.144	5	-122.628	3	-24.777	5	0	15	-.062	1	-.377	2
31		16	max	34.14	1	87.558	3	28.867	1	.011	2	0	3	.806	3
32			min	-7.988	5	-31.268	2	-22.664	5	0	15	-.051	1	-.393	2
33		17	max	34.14	1	297.745	3	53.568	1	.011	2	.006	3	.677	3
34			min	-14.831	5	-141.456	2	-20.55	5	0	15	-.054	4	-.336	2
35		18	max	34.14	1	507.931	3	78.268	1	.011	2	.02	1	.409	3
36			min	-21.675	5	-251.643	2	-18.436	5	0	15	-.061	5	-.204	2
37		19	max	34.14	1	718.117	3	102.969	1	.011	2	.081	1	0	2
38			min	-28.518	5	-361.83	2	-16.323	5	0	15	-.073	5	0	3
39	M14	1	max	25.571	4	440.64	2	-9.689	12	.012	3	.167	4	0	2
40			min	2.052	10	-608.184	3	-107.682	1	-.012	2	.008	10	0	3
41		2	max	22.158	1	330.452	2	-8.322	12	.012	3	.116	4	.351	3
42			min	2.052	10	-445.356	3	-82.982	1	-.012	2	0	10	-.257	2
43		3	max	22.158	1	220.265	2	-6.402	10	.012	3	.072	5	.594	3
44			min	2.052	10	-282.528	3	-63.534	4	-.012	2	-.011	1	-.441	2
45		4	max	22.158	1	110.078	2	-2.627	10	.012	3	.041	5	.728	3
46			min	-.773	5	-119.699	3	-55.2	4	-.012	2	-.042	1	-.551	2
47		5	max	22.158	1	43.129	3	1.147	10	.012	3	.011	5	.753	3
48			min	-7.616	5	-3.299	1	-46.866	4	-.012	2	-.056	1	-.587	2
49		6	max	22.158	1	205.957	3	15.821	1	.012	3	-.004	12	.67	3
50			min	-14.46	5	-110.297	2	-41.615	5	-.012	2	-.054	1	-.551	2
51		7	max	22.158	1	368.785	3	40.521	1	.012	3	-.003	10	.479	3
52			min	-21.303	5	-220.485	2	-39.501	5	-.012	2	-.054	4	-.44	2
53		8	max	22.158	1	531.614	3	65.222	1	.012	3	.006	2	.179	3
54			min	-28.147	5	-330.672	2	-37.388	5	-.012	2	-.071	4	-.257	2
55		9	max	22.158	1	694.442	3	89.922	1	.012	3	.052	1	.018	1
56			min	-34.99	5	-440.859	2	-35.274	5	-.012	2	-.094	5	-.23	3
57		10	max	51.573	4	551.047	2	-2.606	12	.012	2	.166	4	.331	2
58			min	2.052	10	-857.27	3	-114.623	1	-.012	3	-.008	3	-.747	3
59		11	max	44.729	4	440.859	2	-1.24	12	.012	2	.115	4	.018	1
60			min	2.052	10	-694.442	3	-89.922	1	-.012	3	-.01	3	-.23	3
61		12	max	37.886	4	330.672	2	.542	3	.012	2	.069	5	.179	3
62			min	2.052	10	-531.614	3	-65.222	1	-.012	3	-.01	3	-.257	2
63		13	max	31.042	4	220.485	2	2.591	3	.012	2	.038	5	.479	3
64			min	2.052	10	-368.785	3	-56.002	4	-.012	3	-.035	1	-.44	2
65		14	max	24.199	4	110.297	2	4.64	3	.012	2	.008	5	.67	3
66			min	2.052	10	-205.957	3	-47.668	4	-.012	3	-.054	1	-.551	2
67		15	max	22.158	1	3.299	1	8.88	1	.012	2	-.002	12	.753	3
68			min	2.052	10	-43.129	3	-41.819	5	-.012	3	-.056	1	-.587	2
69		16	max	22.158	1	119.699	3	33.58	1	.012	2	.002	3	.728	3
70			min	2.052	10	-110.078	2	-39.705	5	-.012	3	-.058	4	-.551	2
71		17	max	22.158	1	282.528	3	58.281	1	.012	2	.009	3	.594	3
72			min	-2.303	5	-220.265	2	-37.592	5	-.012	3	-.076	4	-.441	2
73		18	max	22.158	1	445.356	3	82.982	1	.012	2	.036	1	.351	3
74			min	-9.147	5	-330.452	2	-35.478	5	-.012	3	-.098	5	-.257	2
75		19	max	22.158	1	608.184	3	107.682	1	.012	2	.099	1	0	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
76			min	-15.99	5	-440.64	2	-33.365	5	-.012	3	-.121	5	0	3
77	M15	1	max	56.531	5	653.905	2	-9.387	12	.013	2	.213	4	0	2
78			min	-22.5	1	-368.856	3	-107.768	1	-.01	3	.008	10	0	3
79		2	max	49.687	5	480.573	2	-8.02	12	.013	2	.152	4	.215	3
80			min	-22.5	1	-277.066	3	-86.819	4	-.01	3	0	10	-.378	2
81		3	max	42.844	5	307.241	2	-6.557	10	.013	2	.098	5	.369	3
82			min	-22.5	1	-185.275	3	-78.485	4	-.01	3	-.011	1	-.641	2
83		4	max	36	5	133.909	2	-2.783	10	.013	2	.057	5	.462	3
84			min	-22.5	1	-93.485	3	-70.151	4	-.01	3	-.042	1	-.788	2
85		5	max	29.157	5	-.261	15	.991	10	.013	2	.017	5	.494	3
86			min	-22.5	1	-39.423	2	-61.818	4	-.01	3	-.056	1	-.819	2
87		6	max	22.313	5	90.096	3	15.735	1	.013	2	-.004	12	.465	3
88			min	-22.5	1	-212.755	2	-56.53	5	-.01	3	-.054	1	-.735	2
89		7	max	15.47	5	181.886	3	40.435	1	.013	2	-.003	10	.374	3
90			min	-22.5	1	-386.087	2	-54.416	5	-.01	3	-.068	4	-.536	2
91		8	max	8.627	5	273.677	3	65.136	1	.013	2	.006	2	.222	3
92			min	-22.5	1	-559.418	2	-52.303	5	-.01	3	-.095	4	-.22	2
93		9	max	1.783	5	365.467	3	89.836	1	.013	2	.052	1	.21	2
94			min	-22.5	1	-732.75	2	-50.189	5	-.01	3	-.128	5	.001	15
95		10	max	-1.582	10	906.082	2	-2.908	12	.013	2	.21	4	.757	2
96			min	-22.5	1	-457.257	3	-114.537	1	-.01	3	-.007	3	-.265	3
97		11	max	-1.582	10	732.75	2	-1.542	12	.01	3	.149	4	.21	2
98			min	-22.5	1	-365.467	3	-89.836	1	-.013	2	-.009	3	.001	15
99		12	max	-1.582	10	559.418	2	.06	3	.01	3	.093	5	.222	3
100			min	-22.5	1	-273.677	3	-79.316	4	-.013	2	-.009	3	-.22	2
101		13	max	-1.582	10	386.087	2	2.109	3	.01	3	.052	5	.374	3
102			min	-26.397	4	-181.886	3	-70.983	4	-.013	2	-.035	1	-.536	2
103		14	max	-1.582	10	212.755	2	4.158	3	.01	3	.012	5	.465	3
104			min	-33.24	4	-90.096	3	-62.649	4	-.013	2	-.054	1	-.735	2
105		15	max	-1.582	10	39.423	2	8.966	1	.01	3	-.002	12	.494	3
106			min	-40.084	4	.261	15	-56.741	5	-.013	2	-.056	1	-.819	2
107		16	max	-1.582	10	93.485	3	33.666	1	.01	3	.002	3	.462	3
108			min	-46.927	4	-133.909	2	-54.627	5	-.013	2	-.074	4	-.788	2
109		17	max	-1.582	10	185.275	3	58.367	1	.01	3	.008	3	.369	3
110			min	-53.771	4	-307.241	2	-52.514	5	-.013	2	-.102	4	-.641	2
111		18	max	-1.582	10	277.066	3	83.068	1	.01	3	.036	1	.215	3
112			min	-60.614	4	-480.573	2	-50.4	5	-.013	2	-.134	5	-.378	2
113		19	max	-1.582	10	368.856	3	107.768	1	.01	3	.1	1	0	2
114			min	-67.458	4	-653.905	2	-48.286	5	-.013	2	-.167	5	0	5
115	M16	1	max	54.076	5	579.76	2	-8.33	12	.004	2	.16	4	0	2
116			min	-37.521	1	-298.467	3	-103.514	1	-.01	3	.007	10	0	3
117		2	max	47.233	5	406.428	2	-6.964	12	.004	2	.111	4	.168	3
118			min	-37.521	1	-206.676	3	-78.813	1	-.01	3	0	10	-.329	2
119		3	max	40.389	5	233.096	2	-5.598	12	.004	2	.073	5	.276	3
120			min	-37.521	1	-114.886	3	-60.075	4	-.01	3	-.023	1	-.542	2
121		4	max	33.546	5	59.765	2	-2.614	10	.004	2	.043	5	.322	3
122			min	-37.521	1	-23.095	3	-51.741	4	-.01	3	-.05	1	-.64	2
123		5	max	26.703	5	68.695	3	1.161	10	.004	2	.015	5	.306	3
124			min	-37.521	1	-113.567	2	-43.408	4	-.01	3	-.062	1	-.622	2
125		6	max	19.859	5	160.485	3	19.989	1	.004	2	-.005	12	.23	3
126			min	-37.521	1	-286.899	2	-39.398	5	-.01	3	-.057	1	-.488	2
127		7	max	13.016	5	252.276	3	44.69	1	.004	2	-.003	10	.092	3
128			min	-37.521	1	-460.231	2	-37.285	5	-.01	3	-.047	4	-.239	2
129		8	max	6.172	5	344.066	3	69.39	1	.004	2	.006	2	.126	2
130			min	-37.521	1	-633.563	2	-35.171	5	-.01	3	-.062	4	-.106	3
131		9	max	-.363	15	435.857	3	94.091	1	.004	2	.057	1	.606	2
132			min	-37.521	1	-806.895	2	-33.058	5	-.01	3	-.084	5	-.366	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	-3.297	10	980.227	2	-3.965	12	.01	3	.158	4	1.201	2
134			min	-37.521	1	-527.647	3	-118.791	1	-.004	2	-.003	3	-.688	3
135		11	max	-3.297	10	806.895	2	-2.599	12	.01	3	.107	4	.606	2
136			min	-37.521	1	-435.857	3	-94.091	1	-.004	2	-.006	3	-.366	3
137		12	max	-3.297	10	633.563	2	-1.233	12	.01	3	.062	4	.126	2
138			min	-37.521	1	-344.066	3	-69.39	1	-.004	2	-.007	3	-.106	3
139		13	max	-3.297	10	460.231	2	.445	3	.01	3	.031	5	.092	3
140			min	-37.521	1	-252.276	3	-55.739	4	-.004	2	-.035	1	-.239	2
141		14	max	-3.297	10	286.899	2	2.494	3	.01	3	.002	5	.23	3
142			min	-37.521	1	-160.485	3	-47.405	4	-.004	2	-.057	1	-.488	2
143		15	max	-3.297	10	113.567	2	4.711	1	.01	3	-.003	12	.306	3
144			min	-43.948	4	-68.695	3	-40.413	5	-.004	2	-.062	1	-.622	2
145		16	max	-3.297	10	23.095	3	29.412	1	.01	3	0	12	.322	3
146			min	-50.791	4	-59.765	2	-38.3	5	-.004	2	-.065	4	-.64	2
147		17	max	-3.297	10	114.886	3	54.113	1	.01	3	.004	3	.276	3
148			min	-57.634	4	-233.096	2	-36.186	5	-.004	2	-.082	4	-.542	2
149		18	max	-3.297	10	206.676	3	78.813	1	.01	3	.022	1	.168	3
150			min	-64.478	4	-406.428	2	-34.072	5	-.004	2	-.1	5	-.329	2
151		19	max	-3.297	10	298.467	3	103.514	1	.01	3	.082	1	0	2
152			min	-71.321	4	-579.76	2	-31.959	5	-.004	2	-.122	5	0	5
153	M2	1	max	952.075	2	2.046	4	.114	1	0	2	0	3	0	1
154			min	-1419.401	3	.492	15	-11.136	4	0	4	0	2	0	1
155		2	max	952.596	2	1.927	4	.114	1	0	2	0	1	0	15
156			min	-1419.01	3	.464	15	-11.595	4	0	4	-.004	4	0	4
157		3	max	953.116	2	1.808	4	.114	1	0	2	0	1	0	15
158			min	-1418.62	3	.436	15	-12.053	4	0	4	-.008	4	-.001	4
159		4	max	953.637	2	1.689	4	.114	1	0	2	0	1	0	15
160			min	-1418.229	3	.408	15	-12.512	4	0	4	-.013	4	-.002	4
161		5	max	954.158	2	1.57	4	.114	1	0	2	0	1	0	15
162			min	-1417.839	3	.38	15	-12.97	4	0	4	-.017	4	-.003	4
163		6	max	954.679	2	1.451	4	.114	1	0	2	0	1	0	15
164			min	-1417.448	3	.352	15	-13.428	4	0	4	-.022	4	-.003	4
165		7	max	955.199	2	1.333	4	.114	1	0	2	0	1	0	15
166			min	-1417.058	3	.324	15	-13.887	4	0	4	-.027	4	-.004	4
167		8	max	955.72	2	1.214	4	.114	1	0	2	0	1	0	15
168			min	-1416.667	3	.284	12	-14.345	4	0	4	-.032	4	-.004	4
169		9	max	956.241	2	1.095	4	.114	1	0	2	0	1	-.001	15
170			min	-1416.277	3	.238	12	-14.803	4	0	4	-.037	4	-.004	4
171		10	max	956.761	2	.976	4	.114	1	0	2	0	1	-.001	15
172			min	-1415.886	3	.191	12	-15.262	4	0	4	-.042	4	-.005	4
173		11	max	957.282	2	.859	2	.114	1	0	2	0	1	-.001	15
174			min	-1415.496	3	.145	12	-15.72	4	0	4	-.048	4	-.005	4
175		12	max	957.803	2	.766	2	.114	1	0	2	0	1	-.001	15
176			min	-1415.105	3	.099	12	-16.178	4	0	4	-.054	4	-.005	4
177		13	max	958.323	2	.674	2	.114	1	0	2	0	1	-.001	15
178			min	-1414.714	3	.052	12	-16.637	4	0	4	-.059	4	-.006	4
179		14	max	958.844	2	.581	2	.114	1	0	2	0	1	-.001	12
180			min	-1414.324	3	-.009	3	-17.095	4	0	4	-.065	4	-.006	4
181		15	max	959.365	2	.488	2	.114	1	0	2	0	1	-.001	12
182			min	-1413.933	3	-.078	3	-17.553	4	0	4	-.072	4	-.006	4
183		16	max	959.886	2	.396	2	.114	1	0	2	0	1	-.001	12
184			min	-1413.543	3	-.148	3	-18.012	4	0	4	-.078	4	-.006	4
185		17	max	960.406	2	.303	2	.114	1	0	2	0	1	-.001	12
186			min	-1413.152	3	-.217	3	-18.47	4	0	4	-.084	4	-.006	4
187		18	max	960.927	2	.211	2	.114	1	0	2	0	1	-.001	12
188			min	-1412.762	3	-.287	3	-18.928	4	0	4	-.091	4	-.006	4
189		19	max	961.448	2	.118	2	.114	1	0	2	0	1	-.001	12

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
190			min	-1412.371	3	-.356	3	-19.387	4	0	4	-.098	4	-.006	4
191	M3	1	max	895.249	2	7.685	4	4.116	4	0	3	0	1	.006	4
192			min	-978.541	3	1.816	15	.011	10	0	4	-.018	4	.001	12
193		2	max	895.079	2	6.924	4	4.65	4	0	3	0	1	.004	2
194			min	-978.669	3	1.637	15	.011	10	0	4	-.016	4	0	3
195		3	max	894.908	2	6.164	4	5.185	4	0	3	0	1	.001	2
196			min	-978.797	3	1.458	15	.011	10	0	4	-.014	4	-.001	3
197		4	max	894.738	2	5.403	4	5.72	4	0	3	0	1	0	15
198			min	-978.925	3	1.279	15	.011	10	0	4	-.012	5	-.003	3
199		5	max	894.568	2	4.642	4	6.254	4	0	3	0	1	0	15
200			min	-979.052	3	1.101	15	.011	10	0	4	-.009	5	-.004	6
201		6	max	894.397	2	3.881	4	6.789	4	0	3	0	1	-.001	15
202			min	-979.18	3	.922	15	.011	10	0	4	-.007	5	-.006	6
203		7	max	894.227	2	3.12	4	7.324	4	0	3	0	1	-.002	15
204			min	-979.308	3	.743	15	.011	10	0	4	-.004	5	-.007	6
205		8	max	894.057	2	2.359	4	7.858	4	0	3	0	1	-.002	15
206			min	-979.436	3	.564	15	.011	10	0	4	0	5	-.008	6
207		9	max	893.886	2	1.598	4	8.393	4	0	3	.003	4	-.002	15
208			min	-979.563	3	.385	15	.011	10	0	4	0	10	-.009	6
209		10	max	893.716	2	.837	4	8.928	4	0	3	.007	4	-.002	15
210			min	-979.691	3	.164	12	.011	10	0	4	0	10	-.01	6
211		11	max	893.546	2	.223	2	9.462	4	0	3	.01	4	-.002	15
212			min	-979.819	3	-.214	3	.011	10	0	4	0	10	-.01	6
213		12	max	893.375	2	-.152	15	9.997	4	0	3	.014	4	-.002	15
214			min	-979.947	3	-.686	6	.011	10	0	4	0	10	-.01	6
215		13	max	893.205	2	-.33	15	10.532	4	0	3	.019	4	-.002	15
216			min	-980.074	3	-1.447	6	.011	10	0	4	0	10	-.009	6
217		14	max	893.035	2	-.509	15	11.066	4	0	3	.023	4	-.002	15
218			min	-980.202	3	-2.208	6	.011	10	0	4	0	10	-.009	6
219		15	max	892.864	2	-.688	15	11.601	4	0	3	.028	4	-.002	15
220			min	-980.33	3	-2.969	6	.011	10	0	4	0	10	-.007	6
221		16	max	892.694	2	-.867	15	12.136	4	0	3	.033	4	-.001	15
222			min	-980.458	3	-3.73	6	.011	10	0	4	0	10	-.006	6
223		17	max	892.524	2	-1.046	15	12.671	4	0	3	.038	4	-.001	15
224			min	-980.586	3	-4.491	6	.011	10	0	4	0	10	-.004	6
225		18	max	892.353	2	-1.225	15	13.205	4	0	3	.043	4	0	15
226			min	-980.713	3	-5.252	6	.011	10	0	4	0	10	-.002	6
227		19	max	892.183	2	-1.404	15	13.74	4	0	3	.049	4	0	1
228			min	-980.841	3	-6.013	6	.011	10	0	4	0	10	0	1
229	M4	1	max	643.468	1	0	1	-.361	10	0	1	.047	4	0	1
230			min	-89.202	5	0	1	-193.939	4	0	1	0	10	0	1
231		2	max	643.639	1	0	1	-.361	10	0	1	.024	4	0	1
232			min	-89.122	5	0	1	-194.087	4	0	1	0	10	0	1
233		3	max	643.809	1	0	1	-.361	10	0	1	.002	4	0	1
234			min	-89.043	5	0	1	-194.234	4	0	1	0	10	0	1
235		4	max	643.979	1	0	1	-.361	10	0	1	0	12	0	1
236			min	-88.963	5	0	1	-194.382	4	0	1	-.02	4	0	1
237		5	max	644.15	1	0	1	-.361	10	0	1	0	10	0	1
238			min	-88.884	5	0	1	-194.53	4	0	1	-.043	4	0	1
239		6	max	644.32	1	0	1	-.361	10	0	1	0	10	0	1
240			min	-88.804	5	0	1	-194.677	4	0	1	-.065	4	0	1
241		7	max	644.49	1	0	1	-.361	10	0	1	0	10	0	1
242			min	-88.725	5	0	1	-194.825	4	0	1	-.087	4	0	1
243		8	max	644.661	1	0	1	-.361	10	0	1	0	10	0	1
244			min	-88.645	5	0	1	-194.973	4	0	1	-.11	4	0	1
245		9	max	644.831	1	0	1	-.361	10	0	1	0	10	0	1
246			min	-88.566	5	0	1	-195.12	4	0	1	-.132	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	645.001	1	0	1	-.361	10	0	1	0	10	0	1
248			min	-88.486	5	0	1	-195.268	4	0	1	-.155	4	0	1
249		11	max	645.172	1	0	1	-.361	10	0	1	0	10	0	1
250			min	-88.407	5	0	1	-195.416	4	0	1	-.177	4	0	1
251		12	max	645.342	1	0	1	-.361	10	0	1	0	10	0	1
252			min	-88.327	5	0	1	-195.563	4	0	1	-.199	4	0	1
253		13	max	645.512	1	0	1	-.361	10	0	1	0	10	0	1
254			min	-88.248	5	0	1	-195.711	4	0	1	-.222	4	0	1
255		14	max	645.683	1	0	1	-.361	10	0	1	0	10	0	1
256			min	-88.168	5	0	1	-195.858	4	0	1	-.244	4	0	1
257		15	max	645.853	1	0	1	-.361	10	0	1	0	10	0	1
258			min	-88.089	5	0	1	-196.006	4	0	1	-.267	4	0	1
259		16	max	646.023	1	0	1	-.361	10	0	1	0	10	0	1
260			min	-88.009	5	0	1	-196.154	4	0	1	-.289	4	0	1
261		17	max	646.194	1	0	1	-.361	10	0	1	0	10	0	1
262			min	-87.93	5	0	1	-196.301	4	0	1	-.312	4	0	1
263		18	max	646.364	1	0	1	-.361	10	0	1	0	10	0	1
264			min	-87.85	5	0	1	-196.449	4	0	1	-.335	4	0	1
265		19	max	646.535	1	0	1	-.361	10	0	1	0	10	0	1
266			min	-87.771	5	0	1	-196.597	4	0	1	-.357	4	0	1
267	M6	1	max	2811.758	2	2.217	2	0	1	0	1	0	4	0	1
268			min	-4325.477	3	.257	12	-11.251	4	0	5	0	1	0	1
269		2	max	2812.279	2	2.124	2	0	1	0	1	0	1	0	12
270			min	-4325.087	3	.211	12	-11.709	4	0	5	-.004	4	0	2
271		3	max	2812.8	2	2.031	2	0	1	0	1	0	1	0	12
272			min	-4324.696	3	.164	12	-12.168	4	0	5	-.008	4	-.002	2
273		4	max	2813.32	2	1.939	2	0	1	0	1	0	1	0	12
274			min	-4324.306	3	.118	12	-12.626	4	0	5	-.013	4	-.002	2
275		5	max	2813.841	2	1.846	2	0	1	0	1	0	1	0	12
276			min	-4323.915	3	.055	3	-13.084	4	0	5	-.017	4	-.003	2
277		6	max	2814.362	2	1.754	2	0	1	0	1	0	1	0	12
278			min	-4323.525	3	-.014	3	-13.543	4	0	5	-.022	4	-.004	2
279		7	max	2814.882	2	1.661	2	0	1	0	1	0	1	0	12
280			min	-4323.134	3	-.084	3	-14.001	4	0	5	-.027	4	-.004	2
281		8	max	2815.403	2	1.568	2	0	1	0	1	0	1	0	3
282			min	-4322.743	3	-.153	3	-14.459	4	0	5	-.032	4	-.005	2
283		9	max	2815.924	2	1.476	2	0	1	0	1	0	1	0	3
284			min	-4322.353	3	-.223	3	-14.918	4	0	5	-.037	4	-.005	2
285		10	max	2816.444	2	1.383	2	0	1	0	1	0	1	0	3
286			min	-4321.962	3	-.292	3	-15.376	4	0	5	-.043	4	-.006	2
287		11	max	2816.965	2	1.291	2	0	1	0	1	0	1	0	3
288			min	-4321.572	3	-.362	3	-15.834	4	0	5	-.048	4	-.006	2
289		12	max	2817.486	2	1.198	2	0	1	0	1	0	1	0	3
290			min	-4321.181	3	-.431	3	-16.293	4	0	5	-.054	4	-.007	2
291		13	max	2818.006	2	1.105	2	0	1	0	1	0	1	0	3
292			min	-4320.791	3	-.501	3	-16.751	4	0	5	-.06	4	-.007	2
293		14	max	2818.527	2	1.013	2	0	1	0	1	0	1	0	3
294			min	-4320.4	3	-.57	3	-17.21	4	0	5	-.066	4	-.007	2
295		15	max	2819.048	2	.92	2	0	1	0	1	0	1	0	3
296			min	-4320.01	3	-.64	3	-17.668	4	0	5	-.072	4	-.008	2
297		16	max	2819.569	2	.827	2	0	1	0	1	0	1	.001	3
298			min	-4319.619	3	-.709	3	-18.126	4	0	5	-.079	4	-.008	2
299		17	max	2820.089	2	.735	2	0	1	0	1	0	1	.001	3
300			min	-4319.229	3	-.779	3	-18.585	4	0	5	-.085	4	-.008	2
301		18	max	2820.61	2	.642	2	0	1	0	1	0	1	.002	3
302			min	-4318.838	3	-.848	3	-19.043	4	0	5	-.092	4	-.009	2
303		19	max	2821.131	2	.55	2	0	1	0	1	0	1	.002	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
304			min	-4318.448	3	-.917	3	-19.501	4	0	5	-.099	4	-.009	2
305	M7	1	max	2779.781	2	7.678	6	3.855	4	0	1	0	1	.009	2
306			min	-2837.629	3	1.804	15	0	1	0	4	-.018	4	-.002	3
307		2	max	2779.611	2	6.917	6	4.39	4	0	1	0	1	.006	2
308			min	-2837.756	3	1.625	15	0	1	0	4	-.016	4	-.003	3
309		3	max	2779.44	2	6.156	6	4.925	4	0	1	0	1	.004	2
310			min	-2837.884	3	1.446	15	0	1	0	4	-.014	4	-.005	3
311		4	max	2779.27	2	5.395	6	5.459	4	0	1	0	1	.002	2
312			min	-2838.012	3	1.267	15	0	1	0	4	-.012	4	-.006	3
313		5	max	2779.1	2	4.634	6	5.994	4	0	1	0	1	0	2
314			min	-2838.14	3	1.088	15	0	1	0	4	-.01	4	-.007	3
315		6	max	2778.929	2	3.873	6	6.529	4	0	1	0	1	-.001	15
316			min	-2838.267	3	.91	15	0	1	0	4	-.007	5	-.007	3
317		7	max	2778.759	2	3.112	6	7.063	4	0	1	0	1	-.002	15
318			min	-2838.395	3	.731	15	0	1	0	4	-.004	5	-.008	3
319		8	max	2778.589	2	2.372	2	7.598	4	0	1	0	1	-.002	15
320			min	-2838.523	3	.456	12	0	1	0	4	-.001	5	-.008	4
321		9	max	2778.418	2	1.779	2	8.133	4	0	1	.002	4	-.002	15
322			min	-2838.651	3	.16	12	0	1	0	4	0	1	-.009	4
323		10	max	2778.248	2	1.186	2	8.668	4	0	1	.005	4	-.002	15
324			min	-2838.778	3	-.251	3	0	1	0	4	0	1	-.01	4
325		11	max	2778.077	2	.593	2	9.202	4	0	1	.009	4	-.002	15
326			min	-2838.906	3	-.695	3	0	1	0	4	0	1	-.01	4
327		12	max	2777.907	2	0	2	9.737	4	0	1	.013	4	-.002	15
328			min	-2839.034	3	-1.14	3	0	1	0	4	0	1	-.01	4
329		13	max	2777.737	2	-.343	15	10.272	4	0	1	.017	4	-.002	15
330			min	-2839.162	3	-1.585	3	0	1	0	4	0	1	-.009	4
331		14	max	2777.566	2	-.521	15	10.806	4	0	1	.022	4	-.002	15
332			min	-2839.289	3	-2.215	4	0	1	0	4	0	1	-.009	4
333		15	max	2777.396	2	-.7	15	11.341	4	0	1	.026	4	-.002	15
334			min	-2839.417	3	-2.976	4	0	1	0	4	0	1	-.007	4
335		16	max	2777.226	2	-.879	15	11.876	4	0	1	.031	4	-.001	15
336			min	-2839.545	3	-3.737	4	0	1	0	4	0	1	-.006	4
337		17	max	2777.055	2	-1.058	15	12.41	4	0	1	.036	4	-.001	15
338			min	-2839.673	3	-4.497	4	0	1	0	4	0	1	-.004	4
339		18	max	2776.885	2	-1.237	15	12.945	4	0	1	.041	4	0	15
340			min	-2839.8	3	-5.258	4	0	1	0	4	0	1	-.002	4
341		19	max	2776.715	2	-1.416	15	13.48	4	0	1	.047	4	0	1
342			min	-2839.928	3	-6.019	4	0	1	0	4	0	1	0	1
343	M8	1	max	1769.869	2	0	1	0	1	0	1	.045	4	0	1
344			min	59.289	15	0	1	-187.73	4	0	1	0	1	0	1
345		2	max	1770.039	2	0	1	0	1	0	1	.023	4	0	1
346			min	59.34	15	0	1	-187.877	4	0	1	0	1	0	1
347		3	max	1770.21	2	0	1	0	1	0	1	.001	5	0	1
348			min	59.391	15	0	1	-188.025	4	0	1	0	1	0	1
349		4	max	1770.38	2	0	1	0	1	0	1	0	1	0	1
350			min	59.443	15	0	1	-188.173	4	0	1	-.02	4	0	1
351		5	max	1770.55	2	0	1	0	1	0	1	0	1	0	1
352			min	59.494	15	0	1	-188.32	4	0	1	-.042	4	0	1
353		6	max	1770.721	2	0	1	0	1	0	1	0	1	0	1
354			min	59.546	15	0	1	-188.468	4	0	1	-.063	4	0	1
355		7	max	1770.891	2	0	1	0	1	0	1	0	1	0	1
356			min	59.597	15	0	1	-188.616	4	0	1	-.085	4	0	1
357		8	max	1771.061	2	0	1	0	1	0	1	0	1	0	1
358			min	59.648	15	0	1	-188.763	4	0	1	-.107	4	0	1
359		9	max	1771.232	2	0	1	0	1	0	1	0	1	0	1
360			min	59.7	15	0	1	-188.911	4	0	1	-.128	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	1771.402	2	0	1	0	1	0	1	0	1	0	1
362			min	59.751	15	0	1	-189.058	4	0	1	-.15	4	0	1
363		11	max	1771.572	2	0	1	0	1	0	1	0	1	0	1
364			min	59.802	15	0	1	-189.206	4	0	1	-.172	4	0	1
365		12	max	1771.743	2	0	1	0	1	0	1	0	1	0	1
366			min	59.854	15	0	1	-189.354	4	0	1	-.194	4	0	1
367		13	max	1771.913	2	0	1	0	1	0	1	0	1	0	1
368			min	59.905	15	0	1	-189.501	4	0	1	-.215	4	0	1
369		14	max	1772.083	2	0	1	0	1	0	1	0	1	0	1
370			min	59.957	15	0	1	-189.649	4	0	1	-.237	4	0	1
371		15	max	1772.254	2	0	1	0	1	0	1	0	1	0	1
372			min	60.008	15	0	1	-189.797	4	0	1	-.259	4	0	1
373		16	max	1772.424	2	0	1	0	1	0	1	0	1	0	1
374			min	60.059	15	0	1	-189.944	4	0	1	-.281	4	0	1
375		17	max	1772.594	2	0	1	0	1	0	1	0	1	0	1
376			min	60.111	15	0	1	-190.092	4	0	1	-.303	4	0	1
377		18	max	1772.765	2	0	1	0	1	0	1	0	1	0	1
378			min	60.162	15	0	1	-190.239	4	0	1	-.324	4	0	1
379		19	max	1772.935	2	0	1	0	1	0	1	0	1	0	1
380			min	60.214	15	0	1	-190.387	4	0	1	-.346	4	0	1
381	M10	1	max	952.075	2	1.996	6	-.009	10	0	1	0	4	0	1
382			min	-1419.401	3	.458	15	-11.219	4	0	5	0	3	0	1
383		2	max	952.596	2	1.877	6	-.009	10	0	1	0	10	0	15
384			min	-1419.01	3	.43	15	-11.677	4	0	5	-.004	4	0	6
385		3	max	953.116	2	1.758	6	-.009	10	0	1	0	10	0	15
386			min	-1418.62	3	.402	15	-12.136	4	0	5	-.008	4	-.001	6
387		4	max	953.637	2	1.639	6	-.009	10	0	1	0	10	0	15
388			min	-1418.229	3	.374	15	-12.594	4	0	5	-.013	4	-.002	6
389		5	max	954.158	2	1.52	6	-.009	10	0	1	0	10	0	15
390			min	-1417.839	3	.346	15	-13.052	4	0	5	-.017	4	-.003	6
391		6	max	954.679	2	1.402	6	-.009	10	0	1	0	10	0	15
392			min	-1417.448	3	.318	15	-13.511	4	0	5	-.022	4	-.003	6
393		7	max	955.199	2	1.283	6	-.009	10	0	1	0	10	0	15
394			min	-1417.058	3	.29	15	-13.969	4	0	5	-.027	4	-.004	6
395		8	max	955.72	2	1.164	6	-.009	10	0	1	0	10	0	15
396			min	-1416.667	3	.262	15	-14.427	4	0	5	-.032	4	-.004	6
397		9	max	956.241	2	1.045	6	-.009	10	0	1	0	10	0	15
398			min	-1416.277	3	.235	15	-14.886	4	0	5	-.037	4	-.004	6
399		10	max	956.761	2	.952	2	-.009	10	0	1	0	10	-.001	15
400			min	-1415.886	3	.191	12	-15.344	4	0	5	-.043	4	-.005	6
401		11	max	957.282	2	.859	2	-.009	10	0	1	0	10	-.001	15
402			min	-1415.496	3	.145	12	-15.802	4	0	5	-.048	4	-.005	6
403		12	max	957.803	2	.766	2	-.009	10	0	1	0	10	-.001	15
404			min	-1415.105	3	.099	12	-16.261	4	0	5	-.054	4	-.005	6
405		13	max	958.323	2	.674	2	-.009	10	0	1	0	10	-.001	15
406			min	-1414.714	3	.052	12	-16.719	4	0	5	-.06	4	-.005	6
407		14	max	958.844	2	.581	2	-.009	10	0	1	0	10	-.001	15
408			min	-1414.324	3	-.009	3	-17.177	4	0	5	-.066	4	-.006	6
409		15	max	959.365	2	.488	2	-.009	10	0	1	0	10	-.001	15
410			min	-1413.933	3	-.078	3	-17.636	4	0	5	-.072	4	-.006	6
411		16	max	959.886	2	.396	2	-.009	10	0	1	0	10	-.001	15
412			min	-1413.543	3	-.148	3	-18.094	4	0	5	-.078	4	-.006	6
413		17	max	960.406	2	.303	2	-.009	10	0	1	0	10	-.001	15
414			min	-1413.152	3	-.217	3	-18.552	4	0	5	-.085	4	-.006	6
415		18	max	960.927	2	.211	2	-.009	10	0	1	0	10	-.001	12
416			min	-1412.762	3	-.287	3	-19.011	4	0	5	-.092	4	-.006	2
417		19	max	961.448	2	.118	2	-.009	10	0	1	0	10	-.001	12

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
418			min	-1412.371	3	-.356	3	-19.469	4	0	5	-.098	4	-.006	2
419	M11	1	max	895.249	2	7.643	6	4.028	4	0	1	0	10	.006	2
420			min	-978.541	3	1.787	15	-.123	1	0	4	-.018	4	.001	12
421		2	max	895.079	2	6.882	6	4.562	4	0	1	0	10	.004	2
422			min	-978.669	3	1.608	15	-.123	1	0	4	-.016	4	0	3
423		3	max	894.908	2	6.121	6	5.097	4	0	1	0	10	.001	2
424			min	-978.797	3	1.429	15	-.123	1	0	4	-.014	4	-.001	3
425		4	max	894.738	2	5.36	6	5.632	4	0	1	0	10	0	2
426			min	-978.925	3	1.25	15	-.123	1	0	4	-.012	4	-.003	3
427		5	max	894.568	2	4.599	6	6.166	4	0	1	0	10	-.001	15
428			min	-979.052	3	1.071	15	-.123	1	0	4	-.009	4	-.004	4
429		6	max	894.397	2	3.838	6	6.701	4	0	1	0	10	-.001	15
430			min	-979.18	3	.893	15	-.123	1	0	4	-.007	4	-.006	4
431		7	max	894.227	2	3.077	6	7.236	4	0	1	0	10	-.002	15
432			min	-979.308	3	.714	15	-.123	1	0	4	-.004	4	-.007	4
433		8	max	894.057	2	2.316	6	7.77	4	0	1	0	10	-.002	15
434			min	-979.436	3	.535	15	-.123	1	0	4	0	4	-.009	4
435		9	max	893.886	2	1.555	6	8.305	4	0	1	.003	5	-.002	15
436			min	-979.563	3	.356	15	-.123	1	0	4	0	1	-.009	4
437		10	max	893.716	2	.816	2	8.84	4	0	1	.006	5	-.002	15
438			min	-979.691	3	.164	12	-.123	1	0	4	0	1	-.01	4
439		11	max	893.546	2	.223	2	9.374	4	0	1	.01	5	-.002	15
440			min	-979.819	3	-.214	3	-.123	1	0	4	0	1	-.01	4
441		12	max	893.375	2	-.181	15	9.909	4	0	1	.014	5	-.002	15
442			min	-979.947	3	-.729	4	-.123	1	0	4	0	1	-.01	4
443		13	max	893.205	2	-.36	15	10.444	4	0	1	.018	5	-.002	15
444			min	-980.074	3	-1.49	4	-.123	1	0	4	0	1	-.009	4
445		14	max	893.035	2	-.538	15	10.979	4	0	1	.023	5	-.002	15
446			min	-980.202	3	-2.251	4	-.123	1	0	4	0	1	-.009	4
447		15	max	892.864	2	-.717	15	11.513	4	0	1	.027	4	-.002	15
448			min	-980.33	3	-3.012	4	-.123	1	0	4	0	1	-.008	4
449		16	max	892.694	2	-.896	15	12.048	4	0	1	.032	4	-.001	15
450			min	-980.458	3	-3.773	4	-.123	1	0	4	0	1	-.006	4
451		17	max	892.524	2	-1.075	15	12.583	4	0	1	.037	4	-.001	15
452			min	-980.586	3	-4.534	4	-.123	1	0	4	0	1	-.004	4
453		18	max	892.353	2	-1.254	15	13.117	4	0	1	.043	4	0	15
454			min	-980.713	3	-5.295	4	-.123	1	0	4	-.001	1	-.002	4
455		19	max	892.183	2	-1.433	15	13.652	4	0	1	.048	4	0	1
456			min	-980.841	3	-6.056	4	-.123	1	0	4	-.001	1	0	1
457	M12	1	max	643.468	1	0	1	4.012	1	0	1	.046	4	0	1
458			min	58.858	12	0	1	-191.078	4	0	1	0	1	0	1
459		2	max	643.639	1	0	1	4.012	1	0	1	.024	4	0	1
460			min	58.943	12	0	1	-191.226	4	0	1	0	1	0	1
461		3	max	643.809	1	0	1	4.012	1	0	1	.002	5	0	1
462			min	59.028	12	0	1	-191.373	4	0	1	0	1	0	1
463		4	max	643.979	1	0	1	4.012	1	0	1	0	1	0	1
464			min	59.113	12	0	1	-191.521	4	0	1	-.02	4	0	1
465		5	max	644.15	1	0	1	4.012	1	0	1	0	1	0	1
466			min	59.198	12	0	1	-191.669	4	0	1	-.042	4	0	1
467		6	max	644.32	1	0	1	4.012	1	0	1	.001	1	0	1
468			min	59.283	12	0	1	-191.816	4	0	1	-.064	4	0	1
469		7	max	644.49	1	0	1	4.012	1	0	1	.002	1	0	1
470			min	59.369	12	0	1	-191.964	4	0	1	-.086	4	0	1
471		8	max	644.661	1	0	1	4.012	1	0	1	.002	1	0	1
472			min	59.454	12	0	1	-192.112	4	0	1	-.108	4	0	1
473		9	max	644.831	1	0	1	4.012	1	0	1	.003	1	0	1
474			min	59.539	12	0	1	-192.259	4	0	1	-.13	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	645.001	1	0	1	4.012	1	0	1	.003	1	0	1
476			min	59.624	12	0	1	-192.407	4	0	1	-.152	4	0	1
477		11	max	645.172	1	0	1	4.012	1	0	1	.004	1	0	1
478			min	59.709	12	0	1	-192.555	4	0	1	-.174	4	0	1
479		12	max	645.342	1	0	1	4.012	1	0	1	.004	1	0	1
480			min	59.795	12	0	1	-192.702	4	0	1	-.197	4	0	1
481		13	max	645.512	1	0	1	4.012	1	0	1	.005	1	0	1
482			min	59.88	12	0	1	-192.85	4	0	1	-.219	4	0	1
483		14	max	645.683	1	0	1	4.012	1	0	1	.005	1	0	1
484			min	59.965	12	0	1	-192.997	4	0	1	-.241	4	0	1
485		15	max	645.853	1	0	1	4.012	1	0	1	.005	1	0	1
486			min	60.05	12	0	1	-193.145	4	0	1	-.263	4	0	1
487		16	max	646.023	1	0	1	4.012	1	0	1	.006	1	0	1
488			min	60.135	12	0	1	-193.293	4	0	1	-.285	4	0	1
489		17	max	646.194	1	0	1	4.012	1	0	1	.006	1	0	1
490			min	60.22	12	0	1	-193.44	4	0	1	-.307	4	0	1
491		18	max	646.364	1	0	1	4.012	1	0	1	.007	1	0	1
492			min	60.306	12	0	1	-193.588	4	0	1	-.33	4	0	1
493		19	max	646.535	1	0	1	4.012	1	0	1	.007	1	0	1
494			min	60.391	12	0	1	-193.736	4	0	1	-.352	4	0	1
495	M1	1	max	102.972	1	718.047	3	28.495	5	0	2	.081	1	0	15
496			min	-16.323	5	-361.396	2	-34.116	1	0	3	-.073	5	-.011	2
497		2	max	103.794	1	717.167	3	29.736	5	0	2	.063	1	.18	2
498			min	-15.94	5	-362.57	2	-34.116	1	0	3	-.057	5	-.384	3
499		3	max	614.003	3	496.31	2	20.027	5	0	3	.045	1	.362	2
500			min	-356.11	2	-575.503	3	-34.035	1	0	2	-.041	5	-.746	3
501		4	max	614.62	3	495.136	2	21.269	5	0	3	.027	1	.1	2
502			min	-355.288	2	-576.383	3	-34.035	1	0	2	-.031	5	-.442	3
503		5	max	615.236	3	493.963	2	22.51	5	0	3	.009	1	-.003	15
504			min	-354.466	2	-577.263	3	-34.035	1	0	2	-.019	5	-.161	2
505		6	max	615.852	3	492.79	2	23.751	5	0	3	0	10	.167	3
506			min	-353.645	2	-578.143	3	-34.035	1	0	2	-.009	4	-.421	2
507		7	max	616.468	3	491.616	2	24.993	5	0	3	.006	5	.472	3
508			min	-352.823	2	-579.023	3	-34.035	1	0	2	-.027	1	-.681	2
509		8	max	617.085	3	490.443	2	26.234	5	0	3	.02	5	.778	3
510			min	-352.002	2	-579.903	3	-34.035	1	0	2	-.045	1	-.94	2
511		9	max	632.585	3	52.367	2	43.386	5	0	9	.029	1	.902	3
512			min	-307.523	2	.354	15	-56.209	1	0	3	-.082	5	-1.072	2
513		10	max	633.201	3	51.193	2	44.627	5	0	9	0	10	.885	3
514			min	-306.702	2	-.002	5	-56.209	1	0	3	-.059	4	-1.099	2
515		11	max	633.817	3	50.02	2	45.869	5	0	9	-.002	10	.869	3
516			min	-305.88	2	-1.483	4	-56.209	1	0	3	-.043	4	-1.126	2
517		12	max	648.838	3	403.775	3	108.047	5	0	2	.045	1	.764	3
518			min	-261.163	2	-602.393	2	-33.711	1	0	3	-.164	5	-1.002	2
519		13	max	649.454	3	402.895	3	109.288	5	0	2	.027	1	.551	3
520			min	-260.341	2	-603.567	2	-33.711	1	0	3	-.107	5	-.684	2
521		14	max	650.071	3	402.015	3	110.53	5	0	2	.009	1	.338	3
522			min	-259.52	2	-604.74	2	-33.711	1	0	3	-.049	5	-.365	2
523		15	max	650.687	3	401.134	3	111.771	5	0	2	.01	5	.127	3
524			min	-258.698	2	-605.913	2	-33.711	1	0	3	-.009	1	-.048	1
525		16	max	651.303	3	400.254	3	113.012	5	0	2	.069	5	.274	2
526			min	-257.877	2	-607.087	2	-33.711	1	0	3	-.026	1	-.085	3
527		17	max	651.919	3	399.374	3	114.254	5	0	2	.129	5	.595	2
528			min	-257.055	2	-608.26	2	-33.711	1	0	3	-.044	1	-.296	3
529		18	max	31.575	5	581.315	2	-3.297	10	0	5	.155	5	.302	2
530			min	-104.333	1	-297.688	3	-72.551	4	0	2	-.063	1	-.147	3
531		19	max	31.958	5	580.141	2	-3.297	10	0	5	.122	5	.01	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
532			min	-103.511	1	-298.569	3	-71.31	4	0	2	-.082	1	-.004	2
533	M5	1	max	238.666	1	2347.1	3	59.989	5	0	1	0	1	.021	2
534			min	5.978	12	-1257.798	2	0	1	0	4	-.145	4	0	15
535		2	max	239.488	1	2346.22	3	61.231	5	0	1	0	1	.685	2
536			min	6.389	12	-1258.971	2	0	1	0	4	-.113	4	-1.228	3
537		3	max	1829.53	3	1265.874	2	52.353	4	0	4	0	1	1.319	2
538			min	-1070.58	2	-1608.844	3	0	1	0	1	-.08	4	-2.419	3
539		4	max	1830.147	3	1264.7	2	53.595	4	0	4	0	1	.652	2
540			min	-1069.758	2	-1609.724	3	0	1	0	1	-.052	4	-1.57	3
541		5	max	1830.763	3	1263.527	2	54.836	4	0	4	0	1	.018	9
542			min	-1068.936	2	-1610.604	3	0	1	0	1	-.024	4	-.72	3
543		6	max	1831.379	3	1262.354	2	56.078	4	0	4	.006	4	.13	3
544			min	-1068.115	2	-1611.484	3	0	1	0	1	0	1	-.682	2
545		7	max	1831.995	3	1261.18	2	57.319	4	0	4	.036	4	.981	3
546			min	-1067.293	2	-1612.364	3	0	1	0	1	0	1	-1.348	2
547		8	max	1832.611	3	1260.007	2	58.56	4	0	4	.066	4	1.832	3
548			min	-1066.472	2	-1613.244	3	0	1	0	1	0	1	-2.013	2
549		9	max	1840.343	3	179.328	2	147.56	4	0	1	0	1	2.107	3
550			min	-957.976	2	.349	15	0	1	0	1	-.13	4	-2.311	2
551		10	max	1840.959	3	178.155	2	148.802	4	0	1	0	1	2.038	3
552			min	-957.155	2	-.006	7	0	1	0	1	-.052	4	-2.405	2
553		11	max	1841.575	3	176.981	2	150.043	4	0	1	.027	4	1.971	3
554			min	-956.333	2	-1.468	6	0	1	0	1	0	1	-2.499	2
555		12	max	1850.266	3	1075.454	3	156.686	4	0	1	0	1	1.724	3
556			min	-848.315	2	-1618.085	2	0	1	0	4	-.235	4	-2.24	2
557		13	max	1850.882	3	1074.574	3	157.927	4	0	1	0	1	1.157	3
558			min	-847.493	2	-1619.258	2	0	1	0	4	-.152	4	-1.386	2
559		14	max	1851.498	3	1073.694	3	159.168	4	0	1	0	1	.59	3
560			min	-846.672	2	-1620.431	2	0	1	0	4	-.069	4	-.531	2
561		15	max	1852.115	3	1072.814	3	160.41	4	0	1	.016	5	.324	2
562			min	-845.85	2	-1621.605	2	0	1	0	4	0	1	0	15
563		16	max	1852.731	3	1071.934	3	161.651	4	0	1	.101	4	1.18	2
564			min	-845.028	2	-1622.778	2	0	1	0	4	0	1	-.542	3
565		17	max	1853.347	3	1071.054	3	162.893	4	0	1	.186	4	2.037	2
566			min	-844.207	2	-1623.952	2	0	1	0	4	0	1	-1.107	3
567		18	max	-8.339	12	1963.012	2	0	1	0	4	.238	4	1.044	2
568			min	-238.41	1	-1054.601	3	-9.338	5	0	1	0	1	-.577	3
569		19	max	-7.929	12	1961.838	2	0	1	0	4	.234	4	.008	2
570			min	-237.588	1	-1055.481	3	-8.096	5	0	1	0	1	-.02	3
571	M9	1	max	102.972	1	718.047	3	44.078	4	0	3	-.006	10	0	15
572			min	9.305	12	-361.396	2	2.489	10	0	4	-.11	4	-.011	2
573		2	max	103.794	1	717.167	3	45.319	4	0	3	-.004	10	.18	2
574			min	9.716	12	-362.57	2	2.489	10	0	4	-.086	4	-.384	3
575		3	max	614.003	3	496.31	2	35.814	4	0	2	-.003	10	.362	2
576			min	-356.11	2	-575.503	3	2.48	10	0	3	-.062	4	-.746	3
577		4	max	614.62	3	495.136	2	37.055	4	0	2	-.002	10	.1	2
578			min	-355.288	2	-576.383	3	2.48	10	0	3	-.043	4	-.442	3
579		5	max	615.236	3	493.963	2	38.297	4	0	2	0	10	-.003	15
580			min	-354.466	2	-577.263	3	2.48	10	0	3	-.023	4	-.161	2
581		6	max	615.852	3	492.79	2	39.538	4	0	2	.009	1	.167	3
582			min	-353.645	2	-578.143	3	2.48	10	0	3	-.005	5	-.421	2
583		7	max	616.468	3	491.616	2	40.78	4	0	2	.027	1	.472	3
584			min	-352.823	2	-579.023	3	2.48	10	0	3	.002	10	-.681	2
585		8	max	617.085	3	490.443	2	42.021	4	0	2	.045	1	.778	3
586			min	-352.002	2	-579.903	3	2.48	10	0	3	.003	10	-.94	2
587		9	max	632.585	3	52.367	2	69.029	4	0	3	-.002	10	.902	3
588			min	-307.523	2	.363	15	4.534	10	0	9	-.096	4	-1.072	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	633.201	3	51.193	2	70.27	4	0	3	0	3	.885	3
590			min	-306.702	2	.01	15	4.534	10	0	9	-.059	4	-1.099	2
591		11	max	633.817	3	50.02	2	71.512	4	0	3	.03	1	.869	3
592			min	-305.88	2	-1.429	6	4.534	10	0	9	-.03	5	-1.126	2
593		12	max	648.838	3	403.775	3	123.833	4	0	3	-.004	10	.764	3
594			min	-261.163	2	-602.393	2	2.95	10	0	2	-.186	4	-1.002	2
595		13	max	649.454	3	402.895	3	125.075	4	0	3	-.002	10	.551	3
596			min	-260.341	2	-603.567	2	2.95	10	0	2	-.12	4	-.684	2
597		14	max	650.071	3	402.015	3	126.316	4	0	3	0	10	.338	3
598			min	-259.52	2	-604.74	2	2.95	10	0	2	-.054	4	-.365	2
599		15	max	650.687	3	401.134	3	127.558	4	0	3	.013	4	.127	3
600			min	-258.698	2	-605.913	2	2.95	10	0	2	0	10	-.048	1
601		16	max	651.303	3	400.254	3	128.799	4	0	3	.081	4	.274	2
602			min	-257.877	2	-607.087	2	2.95	10	0	2	.002	10	-.085	3
603		17	max	651.919	3	399.374	3	130.041	4	0	3	.149	4	.595	2
604			min	-257.055	2	-608.26	2	2.95	10	0	2	.004	10	-.296	3
605		18	max	-8.741	12	581.315	2	37.544	1	0	2	.184	4	.302	2
606			min	-104.333	1	-297.688	3	-55.439	5	0	3	.006	10	-.147	3
607		19	max	-8.33	12	580.141	2	37.544	1	0	2	.16	4	.01	3
608			min	-103.511	1	-298.569	3	-54.197	5	0	3	.007	10	-.004	2

Envelope Member Section Deflections

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
1	M13	1	max	0	1	.119	2	.01	3	1.01e-2	2	NC	1	NC	1
2			min	-.364	4	-.037	3	-.007	2	-3.599e-3	3	NC	1	NC	1
3		2	max	0	1	.091	2	.012	3	1.071e-2	2	NC	4	NC	1
4			min	-.364	4	.002	15	-.005	2	-3.312e-3	3	1791.4	3	NC	1
5		3	max	0	1	.109	3	.015	3	1.133e-2	2	NC	4	NC	1
6			min	-.364	4	.002	15	-.006	5	-3.025e-3	3	981.151	3	NC	1
7		4	max	0	1	.152	3	.018	3	1.195e-2	2	NC	4	NC	2
8			min	-.364	4	.001	15	-.005	5	-2.738e-3	3	759.192	3	7624.355	1
9		5	max	0	1	.167	3	.021	3	1.257e-2	2	NC	4	NC	2
10			min	-.364	4	.001	15	-.005	10	-2.45e-3	3	703.878	3	6815.723	1
11		6	max	0	1	.155	3	.024	3	1.319e-2	2	NC	4	NC	2
12			min	-.364	4	.002	15	-.007	10	-2.163e-3	3	750.407	3	7551.928	1
13		7	max	0	1	.12	3	.027	3	1.381e-2	2	NC	1	NC	1
14			min	-.364	4	.002	15	-.01	2	-1.876e-3	3	917.349	3	8772.133	3
15		8	max	0	1	.14	2	.029	3	1.442e-2	2	NC	1	NC	1
16			min	-.364	4	.002	15	-.015	2	-1.588e-3	3	1307.759	3	7936.693	3
17		9	max	0	1	.167	2	.03	3	1.504e-2	2	NC	4	NC	1
18			min	-.364	4	.003	15	-.019	2	-1.301e-3	3	2163.851	3	7524.64	3
19		10	max	0	1	.179	2	.03	3	1.566e-2	2	NC	4	NC	1
20			min	-.364	4	.003	15	-.021	2	-1.014e-3	3	2421.362	2	7404.859	3
21		11	max	0	10	.167	2	.03	3	1.504e-2	2	NC	4	NC	1
22			min	-.364	4	.003	15	-.019	2	-1.301e-3	3	2163.851	3	7524.64	3
23		12	max	0	10	.14	2	.029	3	1.442e-2	2	NC	1	NC	1
24			min	-.364	4	.002	15	-.015	2	-1.588e-3	3	1307.759	3	7936.693	3
25		13	max	0	10	.12	3	.027	3	1.381e-2	2	NC	1	NC	1
26			min	-.364	4	.002	15	-.01	2	-1.876e-3	3	917.349	3	8772.133	3
27		14	max	0	10	.155	3	.024	3	1.319e-2	2	NC	4	NC	2
28			min	-.364	4	.001	15	-.007	10	-2.163e-3	3	750.407	3	7551.928	1
29		15	max	0	10	.167	3	.021	3	1.257e-2	2	NC	4	NC	2
30			min	-.364	4	0	15	-.005	10	-2.45e-3	3	703.878	3	6815.723	1
31		16	max	0	10	.152	3	.018	3	1.195e-2	2	NC	4	NC	2
32			min	-.364	4	0	15	-.004	10	-2.738e-3	3	759.192	3	7624.355	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	10	.109	3	.015	3	1.133e-2	2	NC	4	NC	1
34			min	-.364	4	0	15	-.004	10	-3.025e-3	3	981.151	3	NC	1
35		18	max	0	10	.091	2	.012	3	1.071e-2	2	NC	4	NC	1
36			min	-.364	4	.001	15	-.005	2	-3.312e-3	3	1791.4	3	NC	1
37		19	max	0	10	.119	2	.01	3	1.01e-2	2	NC	1	NC	1
38			min	-.364	4	-.037	3	-.007	2	-3.599e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.284	3	.009	3	5.408e-3	2	NC	1	NC	1
40			min	-.282	4	-.368	2	-.006	2	-4.727e-3	3	NC	1	NC	1
41		2	max	0	1	.395	3	.01	3	6.117e-3	2	NC	4	NC	1
42			min	-.282	4	-.471	2	-.008	5	-5.411e-3	3	1290.907	3	NC	1
43		3	max	0	1	.495	3	.012	3	6.827e-3	2	NC	5	NC	1
44			min	-.282	4	-.565	2	-.01	5	-6.096e-3	3	682.36	3	NC	1
45		4	max	0	1	.573	3	.015	3	7.536e-3	2	NC	5	NC	2
46			min	-.282	4	-.644	2	-.007	5	-6.78e-3	3	496.737	3	9439.399	1
47		5	max	0	1	.627	3	.018	3	8.246e-3	2	NC	5	NC	2
48			min	-.282	4	-.704	2	-.005	10	-7.464e-3	3	419.338	3	8050.498	1
49		6	max	0	1	.654	3	.021	3	8.955e-3	2	NC	5	NC	2
50			min	-.282	4	-.743	2	-.006	10	-8.149e-3	3	383.726	2	8649.561	1
51		7	max	0	1	.658	3	.023	3	9.665e-3	2	NC	5	NC	1
52			min	-.282	4	-.763	2	-.009	2	-8.833e-3	3	364.285	2	NC	1
53		8	max	0	1	.646	3	.025	3	1.037e-2	2	NC	5	NC	1
54			min	-.282	4	-.768	2	-.014	2	-9.518e-3	3	359.991	2	9038.899	3
55		9	max	0	1	.627	3	.026	3	1.108e-2	2	NC	5	NC	1
56			min	-.282	4	-.764	2	-.018	2	-1.02e-2	3	363.737	2	8502.472	3
57		10	max	0	1	.617	3	.026	3	1.179e-2	2	NC	5	NC	1
58			min	-.282	4	-.76	2	-.02	2	-1.089e-2	3	367.339	2	8344.704	3
59		11	max	0	10	.627	3	.026	3	1.108e-2	2	NC	5	NC	1
60			min	-.282	4	-.764	2	-.018	2	-1.02e-2	3	363.737	2	8502.472	3
61		12	max	0	10	.646	3	.025	3	1.037e-2	2	NC	5	NC	1
62			min	-.282	4	-.768	2	-.014	2	-9.518e-3	3	359.991	2	9038.899	3
63		13	max	0	10	.658	3	.023	3	9.665e-3	2	NC	5	NC	1
64			min	-.282	4	-.763	2	-.009	2	-8.833e-3	3	364.285	2	NC	1
65		14	max	0	10	.654	3	.021	3	8.955e-3	2	NC	5	NC	2
66			min	-.282	4	-.743	2	-.006	10	-8.149e-3	3	383.726	2	8649.561	1
67		15	max	0	10	.627	3	.018	3	8.246e-3	2	NC	5	NC	2
68			min	-.282	4	-.704	2	-.005	10	-7.464e-3	3	419.338	3	8050.498	1
69		16	max	0	10	.573	3	.016	4	7.536e-3	2	NC	5	NC	2
70			min	-.282	4	-.644	2	-.004	10	-6.78e-3	3	496.737	3	8988.601	4
71		17	max	0	10	.495	3	.016	4	6.827e-3	2	NC	5	NC	1
72			min	-.282	4	-.565	2	-.004	10	-6.096e-3	3	682.36	3	8818.392	4
73		18	max	0	10	.395	3	.011	4	6.117e-3	2	NC	4	NC	1
74			min	-.282	4	-.471	2	-.005	2	-5.411e-3	3	1290.907	3	NC	1
75		19	max	0	10	.284	3	.009	3	5.408e-3	2	NC	1	NC	1
76			min	-.282	4	-.368	2	-.006	2	-4.727e-3	3	NC	1	NC	1
77	M15	1	max	0	10	.288	3	.009	3	4.212e-3	3	NC	1	NC	1
78			min	-.237	4	-.366	2	-.006	2	-5.693e-3	2	NC	1	NC	1
79		2	max	0	10	.375	3	.01	3	4.823e-3	3	NC	4	NC	1
80			min	-.237	4	-.491	2	-.012	5	-6.449e-3	2	1152.835	2	NC	1
81		3	max	0	10	.456	3	.012	3	5.433e-3	3	NC	5	NC	1
82			min	-.237	4	-.603	2	-.015	5	-7.205e-3	2	608.053	2	8824.126	5
83		4	max	0	10	.523	3	.014	3	6.043e-3	3	NC	5	NC	2
84			min	-.237	4	-.693	2	-.011	5	-7.961e-3	2	441.076	2	9368.285	1
85		5	max	0	10	.574	3	.017	3	6.653e-3	3	NC	5	NC	2
86			min	-.237	4	-.755	2	-.004	10	-8.717e-3	2	370.483	2	7975.844	1
87		6	max	0	10	.608	3	.02	3	7.264e-3	3	NC	5	NC	2
88			min	-.237	4	-.789	2	-.006	10	-9.472e-3	2	340.964	2	8537.364	1
89		7	max	0	10	.626	3	.022	3	7.874e-3	3	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
90			min	-.237	4	-.797	2	-.008	2	-1.023e-2	2	334.579	2	8844.659	4
91		8	max	0	10	.631	3	.023	3	8.484e-3	3	NC	5	NC	1
92			min	-.237	4	-.786	2	-.013	2	-1.098e-2	2	342.939	2	7933.442	4
93		9	max	0	10	.628	3	.024	3	9.095e-3	3	NC	5	NC	1
94			min	-.237	4	-.768	2	-.017	2	-1.174e-2	2	358.234	2	9174.517	3
95		10	max	0	1	.625	3	.025	3	9.705e-3	3	NC	5	NC	1
96			min	-.237	4	-.758	2	-.019	2	-1.25e-2	2	367.536	2	9017.553	3
97		11	max	0	1	.628	3	.024	3	9.095e-3	3	NC	5	NC	1
98			min	-.237	4	-.768	2	-.017	2	-1.174e-2	2	358.234	2	9174.517	3
99		12	max	0	1	.631	3	.023	3	8.484e-3	3	NC	5	NC	1
100			min	-.237	4	-.786	2	-.014	5	-1.098e-2	2	342.939	2	9720.062	3
101		13	max	0	1	.626	3	.022	3	7.874e-3	3	NC	5	NC	1
102			min	-.237	4	-.797	2	-.009	5	-1.023e-2	2	334.579	2	NC	1
103		14	max	0	1	.608	3	.02	3	7.264e-3	3	NC	5	NC	2
104			min	-.237	4	-.789	2	-.006	10	-9.472e-3	2	340.964	2	8537.364	1
105		15	max	0	1	.574	3	.017	3	6.653e-3	3	NC	5	NC	2
106			min	-.237	4	-.755	2	-.004	10	-8.717e-3	2	370.483	2	7975.844	1
107		16	max	0	1	.523	3	.02	4	6.043e-3	3	NC	5	NC	2
108			min	-.237	4	-.693	2	-.003	10	-7.961e-3	2	441.076	2	7251.274	4
109		17	max	0	1	.456	3	.021	4	5.433e-3	3	NC	5	NC	1
110			min	-.237	4	-.603	2	-.003	10	-7.205e-3	2	608.053	2	6868.136	4
111		18	max	0	1	.375	3	.014	4	4.823e-3	3	NC	4	NC	1
112			min	-.237	4	-.491	2	-.005	2	-6.449e-3	2	1152.835	2	9681.244	4
113		19	max	0	1	.288	3	.009	3	4.212e-3	3	NC	1	NC	1
114			min	-.237	4	-.366	2	-.006	2	-5.693e-3	2	NC	1	NC	1
115	M16	1	max	0	10	.106	2	.007	3	7.972e-3	3	NC	1	NC	1
116			min	-.095	4	-.098	3	-.005	2	-8.358e-3	2	NC	1	NC	1
117		2	max	0	10	.051	2	.009	3	8.556e-3	3	NC	4	NC	1
118			min	-.095	4	-.077	3	-.009	5	-8.603e-3	2	2643.655	2	NC	1
119		3	max	0	10	.017	1	.012	1	9.141e-3	3	NC	4	NC	1
120			min	-.095	4	-.062	3	-.012	5	-8.849e-3	2	1474.111	2	NC	1
121		4	max	0	10	.009	9	.018	1	9.725e-3	3	NC	4	NC	2
122			min	-.095	4	-.057	3	-.01	5	-9.094e-3	2	1179.078	2	7480.163	1
123		5	max	0	10	.009	9	.02	1	1.031e-2	3	NC	4	NC	2
124			min	-.095	4	-.063	3	-.005	5	-9.34e-3	2	1157.955	2	6627.219	1
125		6	max	0	10	.015	1	.019	1	1.089e-2	3	NC	4	NC	2
126			min	-.095	4	-.079	3	-.005	10	-9.585e-3	2	1371.403	2	7228.681	1
127		7	max	0	10	.04	1	.019	3	1.148e-2	3	NC	3	NC	1
128			min	-.095	4	-.103	3	-.006	10	-9.83e-3	2	2093.881	2	NC	1
129		8	max	0	10	.081	2	.021	3	1.206e-2	3	NC	1	NC	1
130			min	-.095	4	-.131	3	-.011	2	-1.008e-2	2	4407.395	3	NC	1
131		9	max	0	10	.121	2	.021	3	1.265e-2	3	NC	4	NC	1
132			min	-.095	4	-.154	3	-.015	2	-1.032e-2	2	2566.216	3	NC	1
133		10	max	0	1	.139	2	.021	3	1.323e-2	3	NC	4	NC	1
134			min	-.095	4	-.164	3	-.017	2	-1.057e-2	2	2166.922	3	NC	1
135		11	max	0	1	.121	2	.021	3	1.265e-2	3	NC	4	NC	1
136			min	-.095	4	-.154	3	-.015	2	-1.032e-2	2	2566.216	3	NC	1
137		12	max	0	1	.081	2	.021	3	1.206e-2	3	NC	1	NC	1
138			min	-.095	4	-.131	3	-.011	2	-1.008e-2	2	4407.395	3	NC	1
139		13	max	0	1	.04	1	.019	3	1.148e-2	3	NC	3	NC	1
140			min	-.095	4	-.103	3	-.006	10	-9.83e-3	2	2093.881	2	NC	1
141		14	max	0	1	.015	1	.019	1	1.089e-2	3	NC	4	NC	2
142			min	-.095	4	-.079	3	-.005	10	-9.585e-3	2	1371.403	2	7228.681	1
143		15	max	0	1	.009	9	.02	1	1.031e-2	3	NC	4	NC	2
144			min	-.095	4	-.063	3	-.003	10	-9.34e-3	2	1157.955	2	6627.219	1
145		16	max	0	1	.009	9	.02	4	9.725e-3	3	NC	4	NC	2
146			min	-.095	4	-.057	3	-.003	10	-9.094e-3	2	1179.078	2	7147.015	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
147		17	max	0	1	.017	1	.019	4	9.141e-3	3	NC	4	NC	1
148			min	-.095	4	-.062	3	-.003	10	-8.849e-3	2	1474.111	2	7379.706	4
149		18	max	0	1	.051	2	.013	4	8.556e-3	3	NC	4	NC	1
150			min	-.095	4	-.077	3	-.003	2	-8.603e-3	2	2643.655	2	NC	1
151		19	max	0	1	.106	2	.007	3	7.972e-3	3	NC	1	NC	1
152			min	-.095	4	-.098	3	-.005	2	-8.358e-3	2	NC	1	NC	1
153	M2	1	max	.007	2	.011	2	.003	1	1.159e-3	5	NC	1	NC	1
154			min	-.01	3	-.016	3	-.345	4	-6.869e-5	1	7114.189	2	223.316	4
155		2	max	.007	2	.009	2	.002	1	1.18e-3	5	NC	1	NC	1
156			min	-.01	3	-.016	3	-.317	4	-6.523e-5	1	8217.113	2	242.577	4
157		3	max	.006	2	.008	2	.002	1	1.202e-3	5	NC	1	NC	1
158			min	-.009	3	-.015	3	-.29	4	-6.176e-5	1	9700.222	2	265.355	4
159		4	max	.006	2	.007	2	.002	1	1.223e-3	5	NC	1	NC	1
160			min	-.009	3	-.015	3	-.263	4	-5.83e-5	1	NC	1	292.554	4
161		5	max	.006	2	.005	2	.002	1	1.245e-3	5	NC	1	NC	1
162			min	-.008	3	-.014	3	-.237	4	-5.483e-5	1	NC	1	325.401	4
163		6	max	.005	2	.004	2	.002	1	1.267e-3	5	NC	1	NC	1
164			min	-.008	3	-.013	3	-.211	4	-5.136e-5	1	NC	1	365.585	4
165		7	max	.005	2	.003	2	.001	1	1.288e-3	5	NC	1	NC	1
166			min	-.007	3	-.013	3	-.185	4	-4.79e-5	1	NC	1	415.492	4
167		8	max	.004	2	.002	2	.001	1	1.31e-3	5	NC	1	NC	1
168			min	-.006	3	-.012	3	-.161	4	-4.443e-5	1	NC	1	478.581	4
169		9	max	.004	2	0	2	.001	1	1.331e-3	5	NC	1	NC	1
170			min	-.006	3	-.011	3	-.138	4	-4.096e-5	1	NC	1	560.024	4
171		10	max	.004	2	0	2	0	1	1.353e-3	5	NC	1	NC	1
172			min	-.005	3	-.01	3	-.115	4	-3.75e-5	1	NC	1	667.842	4
173		11	max	.003	2	0	2	0	1	1.374e-3	5	NC	1	NC	1
174			min	-.005	3	-.009	3	-.094	4	-3.403e-5	1	NC	1	815.038	4
175		12	max	.003	2	-.001	15	0	1	1.396e-3	5	NC	1	NC	1
176			min	-.004	3	-.009	3	-.075	4	-3.057e-5	1	NC	1	1023.865	4
177		13	max	.002	2	-.001	15	0	1	1.418e-3	5	NC	1	NC	1
178			min	-.003	3	-.008	3	-.058	4	-2.71e-5	1	NC	1	1335.071	4
179		14	max	.002	2	0	15	0	1	1.44e-3	4	NC	1	NC	1
180			min	-.003	3	-.006	3	-.042	4	-2.363e-5	1	NC	1	1830.169	4
181		15	max	.002	2	0	15	0	1	1.462e-3	4	NC	1	NC	1
182			min	-.002	3	-.005	3	-.029	4	-2.017e-5	1	NC	1	2692.896	4
183		16	max	.001	2	0	15	0	1	1.485e-3	4	NC	1	NC	1
184			min	-.002	3	-.004	3	-.017	4	-1.67e-5	1	NC	1	4415.476	4
185		17	max	0	2	0	15	0	1	1.508e-3	4	NC	1	NC	1
186			min	-.001	3	-.003	3	-.009	4	-1.323e-5	1	NC	1	8736.991	4
187		18	max	0	2	0	15	0	1	1.53e-3	4	NC	1	NC	1
188			min	0	3	-.001	3	-.003	4	-9.767e-6	1	NC	1	NC	1
189		19	max	0	1	0	1	0	1	1.553e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	-6.301e-6	1	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	1.49e-6	1	NC	1	NC	1
192			min	0	1	0	1	0	1	-3.981e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.007	4	8.2e-6	1	NC	1	NC	1
194			min	0	2	-.002	6	0	1	-2.474e-5	5	NC	1	NC	1
195		3	max	0	3	0	15	.014	4	3.544e-4	4	NC	1	NC	1
196			min	0	2	-.004	6	0	1	1.326e-6	10	NC	1	6500.087	4
197		4	max	.001	3	-.001	15	.02	4	7.306e-4	4	NC	1	NC	1
198			min	-.001	2	-.006	6	0	1	1.958e-6	10	NC	1	4546.073	4
199		5	max	.002	3	-.002	15	.025	4	1.107e-3	4	NC	1	NC	1
200			min	-.002	2	-.008	6	0	1	2.589e-6	10	NC	1	3566.986	4
201		6	max	.002	3	-.002	15	.03	4	1.483e-3	4	NC	1	NC	1
202			min	-.002	2	-.01	6	0	1	3.221e-6	10	9386.777	6	2974.383	4
203		7	max	.003	3	-.002	15	.035	4	1.859e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
204			min	-.003	2	-.011	6	0	3	3.853e-6	10	8108.719	6	2571.555	4
205		8	max	.003	3	-.003	15	.04	4	2.235e-3	4	NC	2	NC	1
206			min	-.003	2	-.012	6	0	3	4.485e-6	10	7321.847	6	2273.82	4
207		9	max	.004	3	-.003	15	.044	4	2.612e-3	4	NC	5	NC	1
208			min	-.003	2	-.013	6	0	12	5.116e-6	10	6861.841	6	2038.683	4
209		10	max	.004	3	-.003	15	.049	4	2.988e-3	4	NC	5	NC	1
210			min	-.004	2	-.013	6	0	12	5.748e-6	10	6649.487	6	1842.627	4
211		11	max	.005	3	-.003	15	.054	4	3.364e-3	4	NC	5	NC	1
212			min	-.004	2	-.013	6	0	12	6.38e-6	10	6653.759	6	1671.873	4
213		12	max	.005	3	-.003	15	.059	4	3.74e-3	4	NC	5	NC	1
214			min	-.005	2	-.013	6	0	10	7.012e-6	10	6879.91	6	1518.194	4
215		13	max	.006	3	-.003	15	.065	4	4.117e-3	4	NC	2	NC	1
216			min	-.005	2	-.012	6	0	10	7.644e-6	10	7373.039	6	1376.784	4
217		14	max	.006	3	-.002	15	.072	4	4.493e-3	4	NC	1	NC	1
218			min	-.006	2	-.011	6	0	10	8.275e-6	10	8240.985	6	1245.036	4
219		15	max	.007	3	-.002	15	.08	4	4.869e-3	4	NC	1	NC	1
220			min	-.006	2	-.009	6	0	10	8.907e-6	10	9720.94	6	1121.752	4
221		16	max	.007	3	-.001	15	.089	4	5.245e-3	4	NC	1	NC	1
222			min	-.006	2	-.007	3	0	10	9.539e-6	10	NC	1	1006.576	4
223		17	max	.008	3	0	15	.1	4	5.621e-3	4	NC	1	NC	1
224			min	-.007	2	-.006	3	0	10	1.017e-5	10	NC	1	899.58	4
225		18	max	.008	3	0	15	.112	4	5.998e-3	4	NC	1	NC	1
226			min	-.007	2	-.004	3	0	10	1.08e-5	10	NC	1	800.97	4
227		19	max	.008	3	0	2	.126	4	6.374e-3	4	NC	1	NC	1
228			min	-.008	2	-.003	3	0	10	1.143e-5	10	NC	1	710.892	4
229	M4	1	max	.002	1	.008	2	0	10	1.179e-3	4	NC	1	NC	2
230			min	0	5	-.009	3	-.126	4	4.292e-6	10	NC	1	196.285	4
231		2	max	.001	1	.007	2	0	10	1.179e-3	4	NC	1	NC	1
232			min	0	5	-.008	3	-.117	4	4.292e-6	10	NC	1	212.677	4
233		3	max	.001	1	.007	2	0	10	1.179e-3	4	NC	1	NC	1
234			min	0	5	-.008	3	-.107	4	4.292e-6	10	NC	1	232.235	4
235		4	max	.001	1	.006	2	0	10	1.179e-3	4	NC	1	NC	1
236			min	0	5	-.007	3	-.097	4	4.292e-6	10	NC	1	255.771	4
237		5	max	.001	1	.006	2	0	10	1.179e-3	4	NC	1	NC	1
238			min	0	5	-.007	3	-.087	4	4.292e-6	10	NC	1	284.391	4
239		6	max	.001	1	.006	2	0	10	1.179e-3	4	NC	1	NC	1
240			min	0	5	-.006	3	-.078	4	4.292e-6	10	NC	1	319.63	4
241		7	max	.001	1	.005	2	0	10	1.179e-3	4	NC	1	NC	1
242			min	0	5	-.006	3	-.068	4	4.292e-6	10	NC	1	363.666	4
243		8	max	0	1	.005	2	0	10	1.179e-3	4	NC	1	NC	1
244			min	0	5	-.005	3	-.059	4	4.292e-6	10	NC	1	419.673	4
245		9	max	0	1	.004	2	0	10	1.179e-3	4	NC	1	NC	1
246			min	0	5	-.005	3	-.05	4	4.292e-6	10	NC	1	492.43	4
247		10	max	0	1	.004	2	0	10	1.179e-3	4	NC	1	NC	1
248			min	0	5	-.004	3	-.042	4	4.292e-6	10	NC	1	589.404	4
249		11	max	0	1	.003	2	0	10	1.179e-3	4	NC	1	NC	1
250			min	0	5	-.004	3	-.034	4	4.292e-6	10	NC	1	722.803	4
251		12	max	0	1	.003	2	0	10	1.179e-3	4	NC	1	NC	1
252			min	0	5	-.003	3	-.027	4	4.292e-6	10	NC	1	913.734	4
253		13	max	0	1	.003	2	0	10	1.179e-3	4	NC	1	NC	1
254			min	0	5	-.003	3	-.021	4	4.292e-6	10	NC	1	1201.344	4
255		14	max	0	1	.002	2	0	10	1.179e-3	4	NC	1	NC	1
256			min	0	5	-.002	3	-.015	4	4.292e-6	10	NC	1	1665.217	4
257		15	max	0	1	.002	2	0	10	1.179e-3	4	NC	1	NC	1
258			min	0	5	-.002	3	-.01	4	4.292e-6	10	NC	1	2488.632	4
259		16	max	0	1	.001	2	0	10	1.179e-3	4	NC	1	NC	1
260			min	0	5	-.001	3	-.006	4	4.292e-6	10	NC	1	4177.639	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	10	1.179e-3	4	NC	1	NC	1
262			min	0	5	0	3	-.003	4	4.292e-6	10	NC	1	8605.385	4
263		18	max	0	1	0	2	0	10	1.179e-3	4	NC	1	NC	1
264			min	0	5	0	3	0	4	4.292e-6	10	NC	1	NC	1
265		19	max	0	1	0	1	0	1	1.179e-3	4	NC	1	NC	1
266			min	0	1	0	1	0	1	4.292e-6	10	NC	1	NC	1
267	M6	1	max	.021	2	.033	2	0	1	1.198e-3	4	NC	4	NC	1
268			min	-.032	3	-.048	3	-.348	4	0	1	1613.102	3	221.463	4
269		2	max	.02	2	.03	2	0	1	1.219e-3	4	NC	4	NC	1
270			min	-.03	3	-.045	3	-.32	4	0	1	1707.533	3	240.567	4
271		3	max	.019	2	.027	2	0	1	1.24e-3	4	NC	4	NC	1
272			min	-.028	3	-.042	3	-.293	4	0	1	1813.852	3	263.158	4
273		4	max	.017	2	.025	2	0	1	1.261e-3	4	NC	4	NC	1
274			min	-.027	3	-.04	3	-.265	4	0	1	1934.583	3	290.135	4
275		5	max	.016	2	.022	2	0	1	1.282e-3	4	NC	4	NC	1
276			min	-.025	3	-.037	3	-.239	4	0	1	2072.971	3	322.712	4
277		6	max	.015	2	.019	2	0	1	1.302e-3	4	NC	4	NC	1
278			min	-.023	3	-.034	3	-.212	4	0	1	2233.26	3	362.566	4
279		7	max	.014	2	.016	2	0	1	1.323e-3	4	NC	1	NC	1
280			min	-.021	3	-.032	3	-.187	4	0	1	2421.11	3	412.064	4
281		8	max	.013	2	.014	2	0	1	1.344e-3	4	NC	1	NC	1
282			min	-.02	3	-.029	3	-.162	4	0	1	2644.243	3	474.633	4
283		9	max	.012	2	.012	2	0	1	1.365e-3	4	NC	1	NC	1
284			min	-.018	3	-.026	3	-.139	4	0	1	2913.475	3	555.403	4
285		10	max	.01	2	.009	2	0	1	1.386e-3	4	NC	1	NC	1
286			min	-.016	3	-.024	3	-.116	4	0	1	3244.433	3	662.326	4
287		11	max	.009	2	.007	2	0	1	1.407e-3	4	NC	1	NC	1
288			min	-.014	3	-.021	3	-.095	4	0	1	3660.573	3	808.295	4
289		12	max	.008	2	.006	2	0	1	1.428e-3	4	NC	1	NC	1
290			min	-.012	3	-.018	3	-.076	4	0	1	4198.774	3	1015.366	4
291		13	max	.007	2	.004	2	0	1	1.448e-3	4	NC	1	NC	1
292			min	-.011	3	-.016	3	-.058	4	0	1	4920.525	3	1323.931	4
293		14	max	.006	2	.003	2	0	1	1.469e-3	4	NC	1	NC	1
294			min	-.009	3	-.013	3	-.042	4	0	1	5936.546	3	1814.77	4
295		15	max	.005	2	.002	2	0	1	1.49e-3	4	NC	1	NC	1
296			min	-.007	3	-.01	3	-.029	4	0	1	7468.346	3	2669.934	4
297		16	max	.003	2	0	2	0	1	1.511e-3	4	NC	1	NC	1
298			min	-.005	3	-.008	3	-.018	4	0	1	NC	1	4376.988	4
299		17	max	.002	2	0	2	0	1	1.532e-3	4	NC	1	NC	1
300			min	-.004	3	-.005	3	-.009	4	0	1	NC	1	8657.796	4
301		18	max	.001	2	0	2	0	1	1.553e-3	4	NC	1	NC	1
302			min	-.002	3	-.003	3	-.003	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	1.574e-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	-4.037e-4	4	NC	1	NC	1
307		2	max	.001	3	0	2	.007	4	0	1	NC	1	NC	1
308			min	-.001	2	-.003	3	0	1	-3.682e-5	5	NC	1	NC	1
309		3	max	.003	3	0	15	.014	4	3.312e-4	4	NC	1	NC	1
310			min	-.003	2	-.006	3	0	1	0	1	NC	1	6413.03	4
311		4	max	.004	3	-.001	15	.02	4	6.987e-4	4	NC	1	NC	1
312			min	-.004	2	-.008	3	0	1	0	1	NC	1	4486.898	4
313		5	max	.005	3	-.002	15	.025	4	1.066e-3	4	NC	1	NC	1
314			min	-.005	2	-.01	3	0	1	0	1	NC	1	3523.149	4
315		6	max	.007	3	-.002	15	.031	4	1.434e-3	4	NC	1	NC	1
316			min	-.007	2	-.012	3	0	1	0	1	8848.929	3	2941.167	4
317		7	max	.008	3	-.003	15	.035	4	1.801e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
318			min	-.008	2	-.014	3	0	1	0	1	7906.829	3	2546.838	4
319		8	max	.01	3	-.003	15	.04	4	2.168e-3	4	NC	1	NC	1
320			min	-.009	2	-.015	3	0	1	0	1	7295.399	4	2256.55	4
321		9	max	.011	3	-.003	15	.044	4	2.536e-3	4	NC	1	NC	1
322			min	-.011	2	-.016	3	0	1	0	1	6838.534	4	2028.265	4
323		10	max	.012	3	-.003	15	.049	4	2.903e-3	4	NC	1	NC	1
324			min	-.012	2	-.017	3	0	1	0	1	6628.115	4	1838.622	4
325		11	max	.014	3	-.003	15	.054	4	3.271e-3	4	NC	1	NC	1
326			min	-.013	2	-.017	3	0	1	0	1	6633.403	4	1673.832	4
327		12	max	.015	3	-.003	15	.059	4	3.638e-3	4	NC	1	NC	1
328			min	-.015	2	-.017	3	0	1	0	1	6859.765	4	1525.559	4
329		13	max	.016	3	-.003	15	.065	4	4.006e-3	4	NC	1	NC	1
330			min	-.016	2	-.016	3	0	1	0	1	7352.268	4	1388.851	4
331		14	max	.018	3	-.003	15	.071	4	4.373e-3	4	NC	1	NC	1
332			min	-.017	2	-.015	3	0	1	0	1	8218.533	4	1260.965	4
333		15	max	.019	3	-.002	15	.079	4	4.741e-3	4	NC	1	NC	1
334			min	-.019	2	-.014	3	0	1	0	1	9695.194	4	1140.61	4
335		16	max	.02	3	-.002	15	.087	4	5.108e-3	4	NC	1	NC	1
336			min	-.02	2	-.013	3	0	1	0	1	NC	1	1027.405	4
337		17	max	.022	3	0	2	.097	4	5.475e-3	4	NC	1	NC	1
338			min	-.021	2	-.011	3	0	1	0	1	NC	1	921.471	4
339		18	max	.023	3	0	2	.109	4	5.843e-3	4	NC	1	NC	1
340			min	-.023	2	-.009	3	0	1	0	1	NC	1	823.116	4
341		19	max	.025	3	.003	2	.123	4	6.21e-3	4	NC	1	NC	1
342			min	-.024	2	-.007	3	0	1	0	1	NC	1	732.634	4
343	M8	1	max	.004	2	.024	2	0	1	1.075e-3	4	NC	1	NC	1
344			min	0	15	-.026	3	-.123	4	0	1	NC	1	202.288	4
345		2	max	.004	2	.022	2	0	1	1.075e-3	4	NC	1	NC	1
346			min	0	15	-.024	3	-.113	4	0	1	NC	1	219.197	4
347		3	max	.004	2	.021	2	0	1	1.075e-3	4	NC	1	NC	1
348			min	0	15	-.023	3	-.104	4	0	1	NC	1	239.37	4
349		4	max	.004	2	.02	2	0	1	1.075e-3	4	NC	1	NC	1
350			min	0	15	-.021	3	-.094	4	0	1	NC	1	263.646	4
351		5	max	.003	2	.018	2	0	1	1.075e-3	4	NC	1	NC	1
352			min	0	15	-.02	3	-.085	4	0	1	NC	1	293.164	4
353		6	max	.003	2	.017	2	0	1	1.075e-3	4	NC	1	NC	1
354			min	0	15	-.019	3	-.075	4	0	1	NC	1	329.508	4
355		7	max	.003	2	.016	2	0	1	1.075e-3	4	NC	1	NC	1
356			min	0	15	-.017	3	-.066	4	0	1	NC	1	374.924	4
357		8	max	.003	2	.015	2	0	1	1.075e-3	4	NC	1	NC	1
358			min	0	15	-.016	3	-.057	4	0	1	NC	1	432.686	4
359		9	max	.002	2	.013	2	0	1	1.075e-3	4	NC	1	NC	1
360			min	0	15	-.014	3	-.049	4	0	1	NC	1	507.722	4
361		10	max	.002	2	.012	2	0	1	1.075e-3	4	NC	1	NC	1
362			min	0	15	-.013	3	-.041	4	0	1	NC	1	607.734	4
363		11	max	.002	2	.011	2	0	1	1.075e-3	4	NC	1	NC	1
364			min	0	15	-.011	3	-.033	4	0	1	NC	1	745.312	4
365		12	max	.002	2	.009	2	0	1	1.075e-3	4	NC	1	NC	1
366			min	0	15	-.01	3	-.026	4	0	1	NC	1	942.226	4
367		13	max	.001	2	.008	2	0	1	1.075e-3	4	NC	1	NC	1
368			min	0	15	-.009	3	-.02	4	0	1	NC	1	1238.853	4
369		14	max	.001	2	.007	2	0	1	1.075e-3	4	NC	1	NC	1
370			min	0	15	-.007	3	-.014	4	0	1	NC	1	1717.275	4
371		15	max	0	2	.005	2	0	1	1.075e-3	4	NC	1	NC	1
372			min	0	15	-.006	3	-.01	4	0	1	NC	1	2566.529	4
373		16	max	0	2	.004	2	0	1	1.075e-3	4	NC	1	NC	1
374			min	0	15	-.004	3	-.006	4	0	1	NC	1	4308.575	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
375		17	max	0	2	.003	2	0	1	1.075e-3	4	NC	1	NC	1
376			min	0	15	-.003	3	-.003	4	0	1	NC	1	8875.508	4
377		18	max	0	2	.001	2	0	1	1.075e-3	4	NC	1	NC	1
378			min	0	15	-.001	3	0	4	0	1	NC	1	NC	1
379		19	max	0	1	0	1	0	1	1.075e-3	4	NC	1	NC	1
380			min	0	1	0	1	0	1	0	1	NC	1	NC	1
381	M10	1	max	.007	2	.011	2	0	10	1.197e-3	4	NC	1	NC	1
382			min	-.01	3	-.016	3	-.347	4	4.175e-6	10	7114.189	2	222.074	4
383		2	max	.007	2	.009	2	0	10	1.217e-3	4	NC	1	NC	1
384			min	-.01	3	-.016	3	-.319	4	3.96e-6	10	8217.113	2	241.232	4
385		3	max	.006	2	.008	2	0	10	1.237e-3	4	NC	1	NC	1
386			min	-.009	3	-.015	3	-.292	4	3.744e-6	10	9700.222	2	263.888	4
387		4	max	.006	2	.007	2	0	10	1.257e-3	4	NC	1	NC	1
388			min	-.009	3	-.015	3	-.265	4	3.528e-6	10	NC	1	290.943	4
389		5	max	.006	2	.005	2	0	10	1.277e-3	4	NC	1	NC	1
390			min	-.008	3	-.014	3	-.238	4	3.312e-6	10	NC	1	323.616	4
391		6	max	.005	2	.004	2	0	10	1.297e-3	4	NC	1	NC	1
392			min	-.008	3	-.013	3	-.212	4	3.097e-6	10	NC	1	363.589	4
393		7	max	.005	2	.003	2	0	10	1.317e-3	4	NC	1	NC	1
394			min	-.007	3	-.013	3	-.186	4	2.881e-6	10	NC	1	413.235	4
395		8	max	.004	2	.002	2	0	10	1.337e-3	4	NC	1	NC	1
396			min	-.006	3	-.012	3	-.162	4	2.665e-6	10	NC	1	475.995	4
397		9	max	.004	2	0	2	0	10	1.357e-3	4	NC	1	NC	1
398			min	-.006	3	-.011	3	-.138	4	2.45e-6	10	NC	1	557.016	4
399		10	max	.004	2	0	2	0	10	1.377e-3	4	NC	1	NC	1
400			min	-.005	3	-.01	3	-.116	4	2.234e-6	10	NC	1	664.279	4
401		11	max	.003	2	0	2	0	10	1.397e-3	4	NC	1	NC	1
402			min	-.005	3	-.009	3	-.095	4	2.018e-6	10	NC	1	810.723	4
403		12	max	.003	2	-.001	2	0	10	1.417e-3	4	NC	1	NC	1
404			min	-.004	3	-.009	3	-.076	4	1.803e-6	10	NC	1	1018.49	4
405		13	max	.002	2	-.002	2	0	10	1.437e-3	4	NC	1	NC	1
406			min	-.003	3	-.008	3	-.058	4	1.587e-6	10	NC	1	1328.135	4
407		14	max	.002	2	-.002	15	0	10	1.457e-3	4	NC	1	NC	1
408			min	-.003	3	-.006	3	-.042	4	1.371e-6	10	NC	1	1820.779	4
409		15	max	.002	2	-.001	15	0	10	1.477e-3	4	NC	1	NC	1
410			min	-.002	3	-.005	3	-.029	4	1.155e-6	10	NC	1	2679.301	4
411		16	max	.001	2	-.001	15	0	10	1.497e-3	4	NC	1	NC	1
412			min	-.002	3	-.004	3	-.018	4	9.398e-7	10	NC	1	4393.684	4
413		17	max	0	2	0	15	0	10	1.517e-3	4	NC	1	NC	1
414			min	-.001	3	-.003	4	-.009	4	7.241e-7	10	NC	1	8695.409	4
415		18	max	0	2	0	15	0	10	1.537e-3	4	NC	1	NC	1
416			min	0	3	-.002	4	-.003	4	5.084e-7	10	NC	1	NC	1
417		19	max	0	1	0	1	0	1	1.557e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	2.927e-7	10	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	-6.232e-8	10	NC	1	NC	1
420			min	0	1	0	1	0	1	-3.992e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.007	4	-6.941e-7	10	NC	1	NC	1
422			min	0	2	-.002	4	0	10	-2.773e-5	4	NC	1	NC	1
423		3	max	0	3	-.001	15	.014	4	3.444e-4	5	NC	1	NC	1
424			min	0	2	-.004	4	0	10	-1.491e-5	1	NC	1	6483.159	4
425		4	max	.001	3	-.002	15	.02	4	7.152e-4	4	NC	1	NC	1
426			min	-.001	2	-.006	4	0	10	-2.162e-5	1	NC	1	4536.035	4
427		5	max	.002	3	-.002	15	.025	4	1.087e-3	4	NC	1	NC	1
428			min	-.002	2	-.008	4	0	10	-2.833e-5	1	NC	1	3561.008	4
429		6	max	.002	3	-.003	15	.03	4	1.458e-3	4	NC	1	NC	1
430			min	-.002	2	-.01	4	0	10	-3.504e-5	1	9134.849	4	2971.419	4
431		7	max	.003	3	-.003	15	.035	4	1.83e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
432			min	-.003	2	-.012	4	0	2	-4.175e-5	1	7906.794	4	2571.137	4
433		8	max	.003	3	-.003	15	.039	4	2.201e-3	4	NC	2	NC	1
434			min	-.003	2	-.013	4	0	1	-4.846e-5	1	7151.364	4	2275.705	4
435		9	max	.004	3	-.003	15	.044	4	2.572e-3	4	NC	5	NC	1
436			min	-.003	2	-.014	4	0	1	-5.517e-5	1	6711.427	4	2042.701	4
437		10	max	.004	3	-.004	15	.049	4	2.944e-3	4	NC	5	NC	1
438			min	-.004	2	-.014	4	0	1	-6.188e-5	1	6511.418	4	1848.61	4
439		11	max	.005	3	-.004	15	.053	4	3.315e-3	4	NC	5	NC	1
440			min	-.004	2	-.014	4	0	1	-6.859e-5	1	6522.144	4	1679.615	4
441		12	max	.005	3	-.004	15	.059	4	3.687e-3	4	NC	5	NC	1
442			min	-.005	2	-.014	4	0	1	-7.53e-5	1	6749.571	4	1527.434	4
443		13	max	.006	3	-.003	15	.065	4	4.058e-3	4	NC	2	NC	1
444			min	-.005	2	-.013	4	0	1	-8.201e-5	1	7238.568	4	1387.206	4
445		14	max	.006	3	-.003	15	.072	4	4.43e-3	4	NC	1	NC	1
446			min	-.006	2	-.012	4	0	1	-8.872e-5	1	8095.556	4	1256.287	4
447		15	max	.007	3	-.003	15	.079	4	4.801e-3	4	NC	1	NC	1
448			min	-.006	2	-.01	4	-.001	1	-9.543e-5	1	9554.103	4	1133.462	4
449		16	max	.007	3	-.002	15	.088	4	5.173e-3	4	NC	1	NC	1
450			min	-.006	2	-.008	4	-.001	1	-1.021e-4	1	NC	1	1018.39	4
451		17	max	.008	3	-.002	15	.099	4	5.544e-3	4	NC	1	NC	1
452			min	-.007	2	-.006	4	-.002	1	-1.089e-4	1	NC	1	911.185	4
453		18	max	.008	3	-.001	10	.111	4	5.916e-3	4	NC	1	NC	1
454			min	-.007	2	-.004	3	-.002	1	-1.156e-4	1	NC	1	812.109	4
455		19	max	.008	3	0	2	.125	4	6.287e-3	4	NC	1	NC	1
456			min	-.008	2	-.003	3	-.003	1	-1.223e-4	1	NC	1	721.376	4
457	M12	1	max	.002	1	.008	2	.003	1	1.145e-3	5	NC	1	NC	2
458			min	0	12	-.009	3	-.125	4	-5.108e-5	1	NC	1	199.179	4
459		2	max	.001	1	.007	2	.002	1	1.145e-3	5	NC	1	NC	1
460			min	0	12	-.008	3	-.115	4	-5.108e-5	1	NC	1	215.815	4
461		3	max	.001	1	.007	2	.002	1	1.145e-3	5	NC	1	NC	1
462			min	0	12	-.008	3	-.105	4	-5.108e-5	1	NC	1	235.662	4
463		4	max	.001	1	.006	2	.002	1	1.145e-3	5	NC	1	NC	1
464			min	0	12	-.007	3	-.096	4	-5.108e-5	1	NC	1	259.546	4
465		5	max	.001	1	.006	2	.002	1	1.145e-3	5	NC	1	NC	1
466			min	0	12	-.007	3	-.086	4	-5.108e-5	1	NC	1	288.589	4
467		6	max	.001	1	.006	2	.002	1	1.145e-3	5	NC	1	NC	1
468			min	0	12	-.006	3	-.076	4	-5.108e-5	1	NC	1	324.349	4
469		7	max	.001	1	.005	2	.001	1	1.145e-3	5	NC	1	NC	1
470			min	0	12	-.006	3	-.067	4	-5.108e-5	1	NC	1	369.036	4
471		8	max	0	1	.005	2	.001	1	1.145e-3	5	NC	1	NC	1
472			min	0	12	-.005	3	-.058	4	-5.108e-5	1	NC	1	425.87	4
473		9	max	0	1	.004	2	.001	1	1.145e-3	5	NC	1	NC	1
474			min	0	12	-.005	3	-.05	4	-5.108e-5	1	NC	1	499.703	4
475		10	max	0	1	.004	2	0	1	1.145e-3	5	NC	1	NC	1
476			min	0	12	-.004	3	-.041	4	-5.108e-5	1	NC	1	598.11	4
477		11	max	0	1	.003	2	0	1	1.145e-3	5	NC	1	NC	1
478			min	0	12	-.004	3	-.034	4	-5.108e-5	1	NC	1	733.48	4
479		12	max	0	1	.003	2	0	1	1.145e-3	5	NC	1	NC	1
480			min	0	12	-.003	3	-.027	4	-5.108e-5	1	NC	1	927.232	4
481		13	max	0	1	.003	2	0	1	1.145e-3	5	NC	1	NC	1
482			min	0	12	-.003	3	-.02	4	-5.108e-5	1	NC	1	1219.092	4
483		14	max	0	1	.002	2	0	1	1.145e-3	5	NC	1	NC	1
484			min	0	12	-.002	3	-.015	4	-5.108e-5	1	NC	1	1689.82	4
485		15	max	0	1	.002	2	0	1	1.145e-3	5	NC	1	NC	1
486			min	0	12	-.002	3	-.01	4	-5.108e-5	1	NC	1	2525.403	4
487		16	max	0	1	.001	2	0	1	1.145e-3	5	NC	1	NC	1
488			min	0	12	-.001	3	-.006	4	-5.108e-5	1	NC	1	4239.37	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	1.145e-3	5	NC	1	NC	1
490			min	0	12	0	3	-.003	4	-5.108e-5	1	NC	1	8732.554	4
491		18	max	0	1	0	2	0	1	1.145e-3	5	NC	1	NC	1
492			min	0	12	0	3	0	4	-5.108e-5	1	NC	1	NC	1
493		19	max	0	1	0	1	0	1	1.145e-3	5	NC	1	NC	1
494			min	0	1	0	1	0	1	-5.108e-5	1	NC	1	NC	1
495	M1	1	max	.01	3	.119	2	.364	4	3.722e-3	2	NC	1	NC	1
496			min	-.007	2	-.037	3	0	10	-1.042e-2	3	NC	1	NC	1
497		2	max	.01	3	.055	2	.355	4	3.398e-3	4	NC	4	NC	1
498			min	-.007	2	-.014	3	-.002	1	-5.163e-3	3	1798.026	2	NC	1
499		3	max	.01	3	.017	3	.345	4	6.267e-3	4	NC	5	NC	1
500			min	-.007	2	-.013	2	-.003	1	-8.284e-5	3	874.018	2	NC	1
501		4	max	.01	3	.062	3	.334	4	5.333e-3	4	NC	5	NC	1
502			min	-.007	2	-.087	2	-.002	1	-2.707e-3	3	558.78	2	7488.958	5
503		5	max	.01	3	.116	3	.322	4	4.874e-3	2	NC	5	NC	1
504			min	-.007	2	-.163	2	-.002	1	-5.33e-3	3	407.72	2	6119.36	5
505		6	max	.01	3	.173	3	.311	4	7.295e-3	2	NC	5	NC	1
506			min	-.006	2	-.236	2	0	1	-7.954e-3	3	323.881	2	5270.554	5
507		7	max	.01	3	.226	3	.299	4	9.716e-3	2	NC	15	NC	1
508			min	-.006	2	-.301	2	0	3	-1.058e-2	3	274.075	2	4636.825	4
509		8	max	.009	3	.27	3	.287	4	1.214e-2	2	NC	15	NC	1
510			min	-.006	2	-.352	2	0	10	-1.32e-2	3	244.474	2	4123.855	4
511		9	max	.009	3	.298	3	.275	4	1.364e-2	2	NC	15	NC	1
512			min	-.006	2	-.384	2	0	1	-1.366e-2	3	229.013	2	3737.935	4
513		10	max	.009	3	.308	3	.261	4	1.452e-2	2	NC	15	NC	1
514			min	-.006	2	-.395	2	0	10	-1.269e-2	3	224.514	2	3572.712	4
515		11	max	.009	3	.301	3	.247	4	1.541e-2	2	NC	15	NC	1
516			min	-.006	2	-.384	2	0	10	-1.171e-2	3	229.943	2	3557.19	4
517		12	max	.008	3	.276	3	.231	4	1.477e-2	2	NC	15	NC	1
518			min	-.006	2	-.35	2	0	1	-1.031e-2	3	247.21	2	3677.278	4
519		13	max	.008	3	.235	3	.212	4	1.184e-2	2	NC	15	NC	1
520			min	-.006	2	-.296	2	0	1	-8.248e-3	3	280.536	2	4191.094	4
521		14	max	.008	3	.184	3	.191	4	8.909e-3	2	NC	5	NC	1
522			min	-.006	2	-.228	2	0	12	-6.19e-3	3	337.359	2	5366.208	4
523		15	max	.008	3	.126	3	.169	4	5.979e-3	2	NC	5	NC	1
524			min	-.006	2	-.153	2	0	10	-4.132e-3	3	434.819	2	7981.535	4
525		16	max	.008	3	.065	3	.147	4	5.412e-3	4	NC	5	NC	1
526			min	-.005	2	-.077	2	0	10	-2.073e-3	3	614.472	2	NC	1
527		17	max	.007	3	.006	3	.127	4	6.365e-3	4	NC	5	NC	1
528			min	-.005	2	-.007	2	0	10	-1.516e-5	3	996.874	2	NC	1
529		18	max	.007	3	.052	2	.109	4	3.542e-3	2	NC	4	NC	1
530			min	-.005	2	-.047	3	0	10	-1.343e-3	3	2105.458	2	NC	1
531		19	max	.007	3	.106	2	.095	4	7.114e-3	2	NC	1	NC	1
532			min	-.005	2	-.098	3	0	1	-2.749e-3	3	NC	1	NC	1
533	M5	1	max	.03	3	.179	2	.364	4	0	1	NC	1	NC	1
534			min	-.021	2	.003	15	0	1	-1.171e-5	4	NC	1	NC	1
535		2	max	.03	3	.078	2	.357	4	3.211e-3	4	NC	4	NC	1
536			min	-.021	2	.001	15	0	1	0	1	1160.161	2	NC	1
537		3	max	.03	3	.05	3	.347	4	6.333e-3	4	NC	5	NC	1
538			min	-.022	2	-.036	2	0	1	0	1	542.154	2	8520.85	4
539		4	max	.029	3	.129	3	.336	4	5.158e-3	4	NC	5	NC	1
540			min	-.021	2	-.175	2	0	1	0	1	328.846	2	6655.013	4
541		5	max	.029	3	.238	3	.324	4	3.984e-3	4	NC	15	NC	1
542			min	-.021	2	-.326	2	0	1	0	1	229.797	2	5768.721	4
543		6	max	.028	3	.362	3	.311	4	2.809e-3	4	NC	15	NC	1
544			min	-.02	2	-.477	2	0	1	0	1	176.688	2	5207.875	4
545		7	max	.027	3	.484	3	.298	4	1.635e-3	4	8862.148	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	-.615	2	0	1	0	1	146.023	2	4721.997	4
547		8	max	.027	3	.585	3	.287	4	4.602e-4	4	7770.085	15	NC	1
548			min	-.02	2	-.726	2	0	1	0	1	128.195	2	4197.105	4
549		9	max	.026	3	.65	3	.275	4	0	1	7211.911	15	NC	1
550			min	-.019	2	-.796	2	0	1	-8.912e-6	5	119.051	2	3725.564	4
551		10	max	.026	3	.673	3	.261	4	0	1	7044.201	15	NC	1
552			min	-.019	2	-.82	2	0	1	-8.669e-6	5	116.397	2	3600.348	4
553		11	max	.025	3	.655	3	.246	4	0	1	7212.944	15	NC	1
554			min	-.019	2	-.796	2	0	1	-8.425e-6	5	119.599	2	3605.494	4
555		12	max	.024	3	.597	3	.231	4	4.465e-4	4	7772.44	15	NC	1
556			min	-.018	2	-.722	2	0	1	0	1	130.056	2	3611.543	4
557		13	max	.024	3	.504	3	.213	4	1.584e-3	4	8866.673	15	NC	1
558			min	-.018	2	-.603	2	0	1	0	1	150.991	2	4101.685	4
559		14	max	.023	3	.389	3	.191	4	2.722e-3	4	NC	15	NC	1
560			min	-.018	2	-.456	2	0	1	0	1	188.186	2	5492.848	4
561		15	max	.022	3	.262	3	.167	4	3.86e-3	4	NC	15	NC	1
562			min	-.018	2	-.298	2	0	1	0	1	255.635	2	9310.159	4
563		16	max	.022	3	.134	3	.144	4	4.998e-3	4	NC	5	NC	1
564			min	-.017	2	-.147	2	0	1	0	1	389.632	2	NC	1
565		17	max	.021	3	.017	3	.123	4	6.136e-3	4	NC	5	NC	1
566			min	-.017	2	-.02	2	0	1	0	1	700.174	2	NC	1
567		18	max	.021	3	.07	2	.107	4	3.113e-3	4	NC	4	NC	1
568			min	-.017	2	-.08	3	0	1	0	1	1514.564	3	NC	1
569		19	max	.021	3	.139	2	.095	4	0	1	NC	1	NC	1
570			min	-.017	2	-.164	3	0	1	-7.258e-6	4	NC	1	NC	1
571	M9	1	max	.01	3	.119	2	.364	4	1.042e-2	3	NC	1	NC	1
572			min	-.007	2	-.037	3	0	1	-3.722e-3	2	NC	1	NC	1
573		2	max	.01	3	.055	2	.356	4	5.163e-3	3	NC	4	NC	1
574			min	-.007	2	-.014	3	0	10	-1.828e-3	2	1798.026	2	NC	1
575		3	max	.01	3	.017	3	.347	4	6.312e-3	4	NC	5	NC	1
576			min	-.007	2	-.013	2	0	10	-3.177e-5	2	874.018	2	9120.363	4
577		4	max	.01	3	.062	3	.336	4	5.033e-3	5	NC	5	NC	1
578			min	-.007	2	-.087	2	0	10	-2.453e-3	2	558.78	2	6920.668	4
579		5	max	.01	3	.116	3	.324	4	5.33e-3	3	NC	5	NC	1
580			min	-.007	2	-.163	2	0	10	-4.874e-3	2	407.72	2	5839.992	4
581		6	max	.01	3	.173	3	.311	4	7.954e-3	3	NC	5	NC	1
582			min	-.006	2	-.236	2	0	10	-7.295e-3	2	323.881	2	5164.91	4
583		7	max	.01	3	.226	3	.299	4	1.058e-2	3	NC	15	NC	1
584			min	-.006	2	-.301	2	0	1	-9.716e-3	2	274.075	2	4640.332	4
585		8	max	.009	3	.27	3	.287	4	1.32e-2	3	NC	15	NC	1
586			min	-.006	2	-.352	2	0	1	-1.214e-2	2	244.474	2	4151.292	4
587		9	max	.009	3	.298	3	.275	4	1.366e-2	3	NC	15	NC	1
588			min	-.006	2	-.384	2	0	10	-1.364e-2	2	229.013	2	3729.205	4
589		10	max	.009	3	.308	3	.261	4	1.269e-2	3	NC	15	NC	1
590			min	-.006	2	-.395	2	0	1	-1.452e-2	2	224.514	2	3573.699	4
591		11	max	.009	3	.301	3	.246	4	1.171e-2	3	NC	15	NC	1
592			min	-.006	2	-.384	2	0	1	-1.541e-2	2	229.943	2	3566.61	4
593		12	max	.008	3	.276	3	.231	4	1.031e-2	3	NC	15	NC	1
594			min	-.006	2	-.35	2	0	10	-1.477e-2	2	247.21	2	3655.706	4
595		13	max	.008	3	.235	3	.212	4	8.248e-3	3	NC	15	NC	1
596			min	-.006	2	-.296	2	0	10	-1.184e-2	2	280.536	2	4184.821	4
597		14	max	.008	3	.184	3	.19	4	6.19e-3	3	NC	5	NC	1
598			min	-.006	2	-.228	2	0	1	-8.909e-3	2	337.359	2	5471.302	5
599		15	max	.008	3	.126	3	.168	4	4.132e-3	3	NC	5	NC	1
600			min	-.006	2	-.153	2	-.002	1	-5.979e-3	2	434.819	2	8462.842	5
601		16	max	.008	3	.065	3	.146	4	5.031e-3	5	NC	5	NC	1
602			min	-.005	2	-.077	2	-.002	1	-3.048e-3	2	614.472	2	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
603		17	max	.007	3	.006	3	.125	4	6.251e-3	4	NC	5	NC	1
604			min	-.005	2	-.007	2	-.003	1	-1.905e-4	1	996.874	2	NC	1
605		18	max	.007	3	.052	2	.108	4	3.117e-3	5	NC	4	NC	1
606			min	-.005	2	-.047	3	-.002	1	-3.542e-3	2	2105.458	2	NC	1
607		19	max	.007	3	.106	2	.095	4	2.749e-3	3	NC	1	NC	1
608			min	-.005	2	-.098	3	0	10	-7.114e-3	2	NC	1	NC	1

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

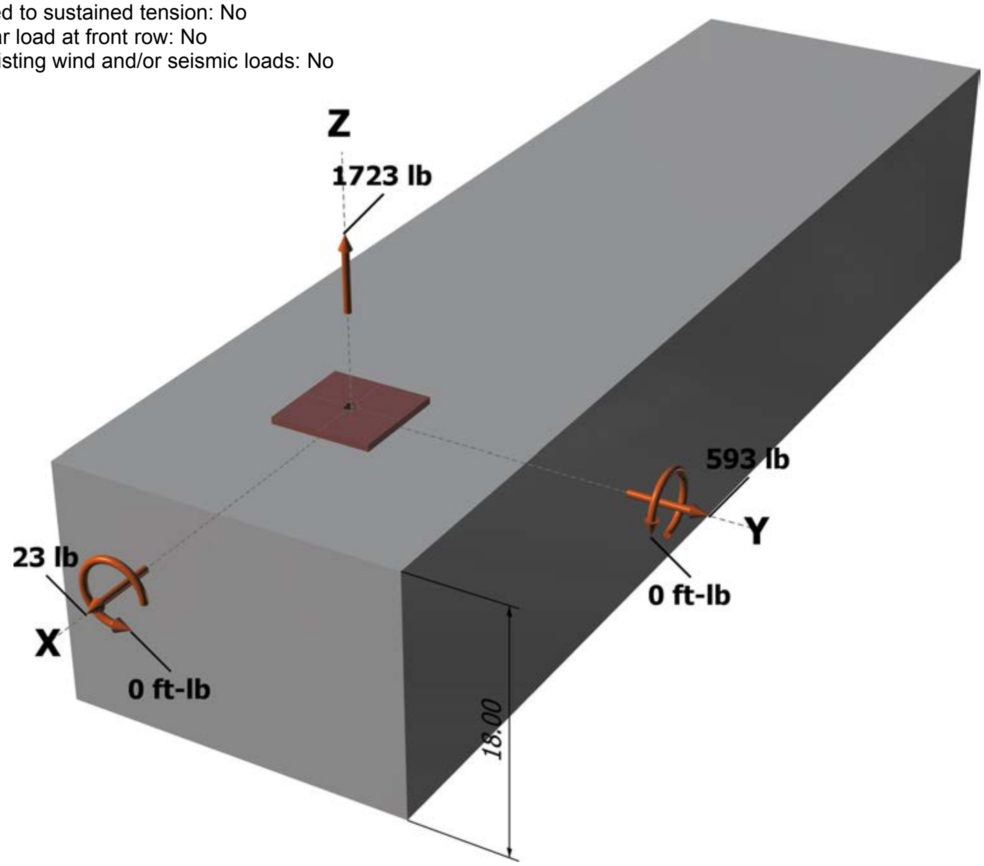
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

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

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

<Figure 1>



<Figure 2>

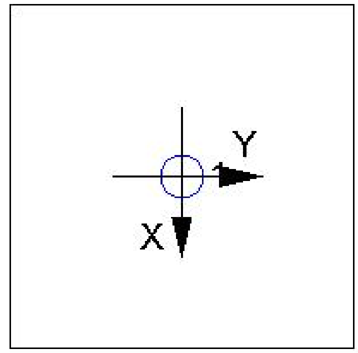
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

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

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

<Figure 3>



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in y-direction:

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

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

Shear parallel to edge in x-direction:

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

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

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

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

Shear parallel to edge in y-direction:

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

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

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

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

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

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

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

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

11. Results

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

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

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

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

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

12. Warnings

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

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

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

Anchor Designer™ Software

Version 2.4.5673.0

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

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

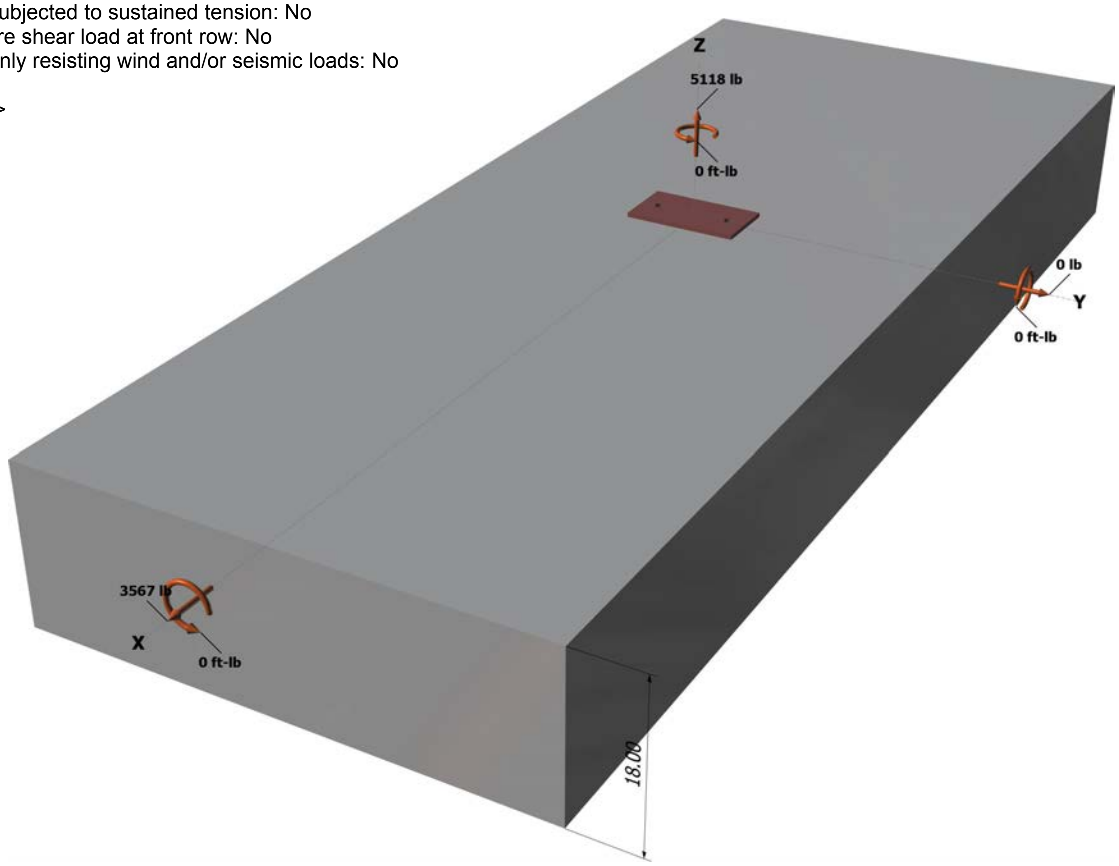
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

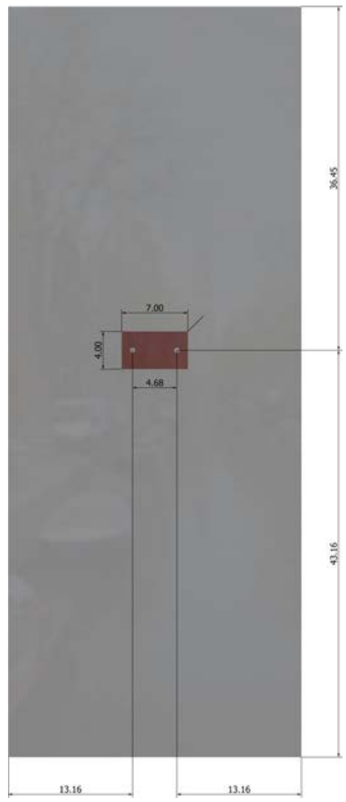
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout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

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

<Figure 1>



<Figure 2>



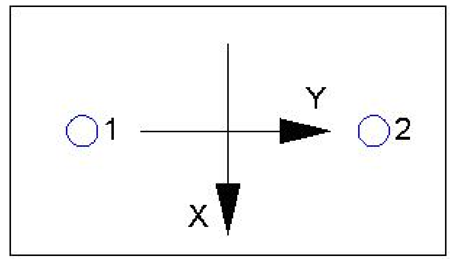
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	2559.0	1783.5	0.0	1783.5
2	2559.0	1783.5	0.0	1783.5
Sum	5118.0	3567.0	0.0	3567.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 5118
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



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

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

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

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

k_c	λ	f'_c (psi)	h_{ef} (in)	N_b (lb)
17.0	1.00	2500	6.000	12492

$\phi N_{cbg} = \phi\,(A_{Nc} / A_{Nco})\,\Psi_{ec,N}\,\Psi_{ed,N}\,\Psi_{c,N}\,\Psi_{cp,N} N_b$ (Sec. D.4.1 & Eq. D-5)

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cbg} (lb)
408.24	324.00	1.000	1.000	1.00	1.000	12492	0.65	10231

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

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

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

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

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

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

A_{Na} (in^2)	A_{Na0} (in^2)	$\Psi_{ed,Na}$	$\Psi_{g,Na}$	$\Psi_{ec,Na}$	$\Psi_{p,Na}$	N_{a0}(lb)	ϕ	ϕN_{ag} (lb)
158.66	109.66	1.000	1.043	1.000	1.000	9755	0.55	8093

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

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

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

Shear perpendicular to edge in x-direction:

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

l_e (in)	d_a (in)	λ	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
4.00	0.50	1.00	2500	12.00	15593

$\phi V_{cbgx} = \phi\,(A_{Vc} / A_{Vco})\Psi_{ec,V}\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. D.4.1 & Eq. D-22)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgx} (lb)
558.00	648.00	1.000	0.919	1.000	1.000	15593	0.70	8641

Shear parallel to edge in x-direction:

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

l_e (in)	d_a (in)	λ	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
4.00	0.50	1.00	2500	13.16	17908

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

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cbx} (lb)
710.64	779.34	1.000	1.000	1.000	17908	0.70	22862

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

$\phi V_{cpg} = \phi\,\min|k_{cp}N_{ag}\,;\,k_{cp}N_{cbg}| = \phi\,\min|k_{cp}(A_{Na} / A_{Na0})\Psi_{ed,Na}\Psi_{g,Na}\Psi_{ec,Na}\Psi_{p,Na}N_{a0}\,;\,k_{cp}(A_{Nc} / A_{Nco})\Psi_{ec,N}\Psi_{ed,N}\Psi_{c,N}\Psi_{cp,N}N_b|$ (Eq. D-30b)

k_{cp}	A_{Na} (in^2)	A_{Na0} (in^2)	$\Psi_{ed,Na}$	$\Psi_{g,Na}$	$\Psi_{ec,Na}$	$\Psi_{p,Na}$	N_{a0} (lb)	N_a (lb)
2.0	158.66	109.66	1.000	1.043	1.000	1.000	9755	14715

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	N_{cb} (lb)	ϕ
408.24	324.00	1.000	1.000	1.000	1.000	12492	15740	0.70

ϕV_{cpg} (lb)
20601

11. Results

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

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	2559	6071	0.42	Pass
Concrete breakout	5118	10231	0.50	Pass
Adhesive	**5118**	**8093**	**0.63**	**Pass (Governs)**

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

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

Sec. D.7.3	0.63	0.57	119.8 %	1.2	Pass

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

12. Warnings

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

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

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