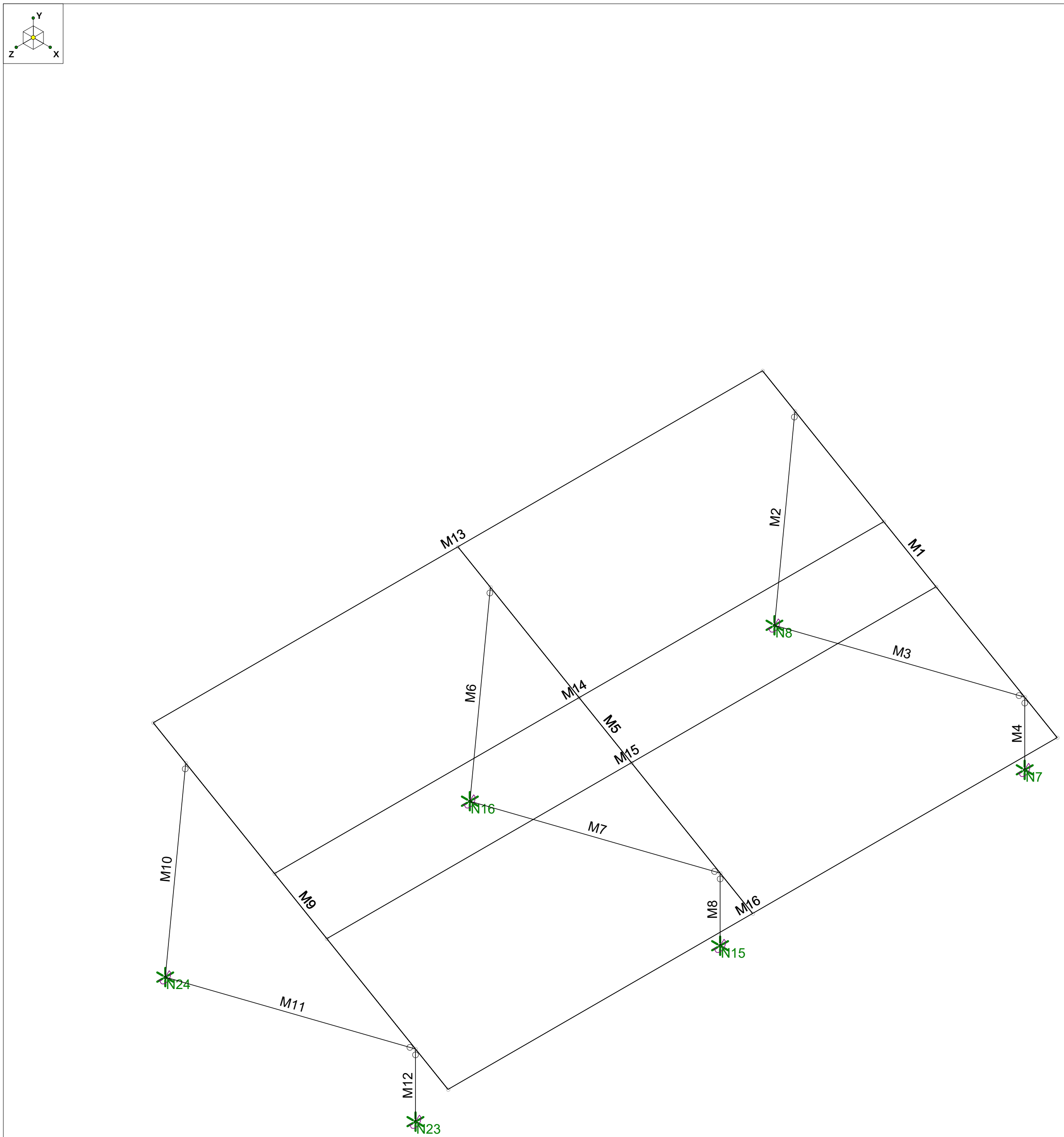


Schletter, Inc.	Standard PVMax Racking System	30° Tilt w/ Seismic Design
HCV		
	Representative Calculations - ASCE 7-10	

1. INTRODUCTION

1.1 Project Description

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

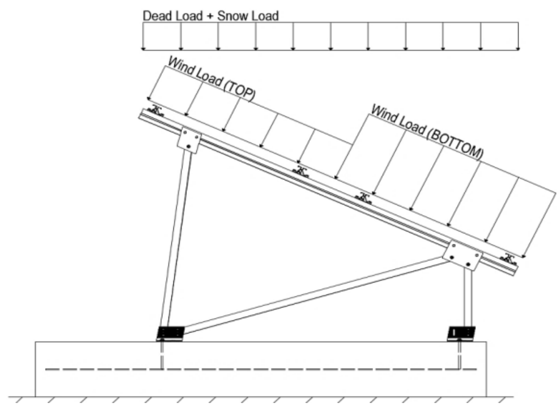
1.2 Construction

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

PV modules are required to meet the following specifications:

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

Modules Per Row = 2
Module Tilt = 30°
Maximum Height Above Grade = 3 ft



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

1.3 Technical Codes

- ASCE 7-10 - Chapter 26-31, Wind Loads
- ASCE 7-10 - Chapter 7, Snow Loads
- ASCE 7-10 - Chapter 2, Combination of Loads
- International Building Code, IBC, 2012, 2015
- Aluminum Design Manual, Eighth Edition, 2005

2. LOAD ACTIONS

2.1 Permanent Loads

g_{MAX} = 3.00 psf
g_{MIN} = 1.75 psf

Self-weight of the PV modules.

2.2 Snow Loads

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

2.3 Wind Loads

Design Wind Speed, V = 150 mph — Exposure Category = C
Height < 15 ft — Importance Category = II

Peak Velocity Pressure, q_z = 35.33 psf *Including the gust factor, G=0.85. (ASCE 7-10, Eq. 27.3-1)*

Pressure Coefficients

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

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

2.4 Seismic Loads

S_S =	2.50	R =	1.25
S_{DS} =	1.67	C_S =	0.8
S_1 =	1.00	ρ =	1.3
S_{D1} =	1.00	Ω =	1.25
T_a =	0.07	C_d =	1.25

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

2.5 Combination of Loads

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

Strength Design, LRFD

Component stresses are checked using the following LRFD load combinations:

1.2D + 1.6S + 0.5W
1.2D + 1.0W + 0.5S
0.9D + 1.0W [M]
1.54D + 1.3E + 0.2S [R]
0.56D + 1.3E [R]
1.54D + 1.25E + 0.2S [O]
0.56D + 1.25E [O]

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

Allowable Stress Design, ASD

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

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

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

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

3. STRUCTURAL ANALYSIS

3.1 RISA Results

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

3.2 RISA Components

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

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

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

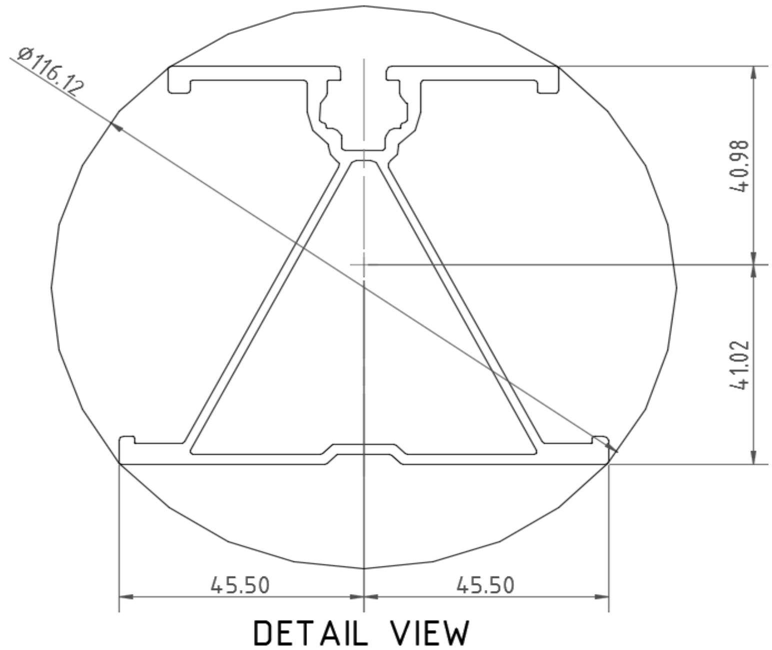
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

4. MEMBER DESIGN CALCULATIONS

4.1 Purlin Design

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

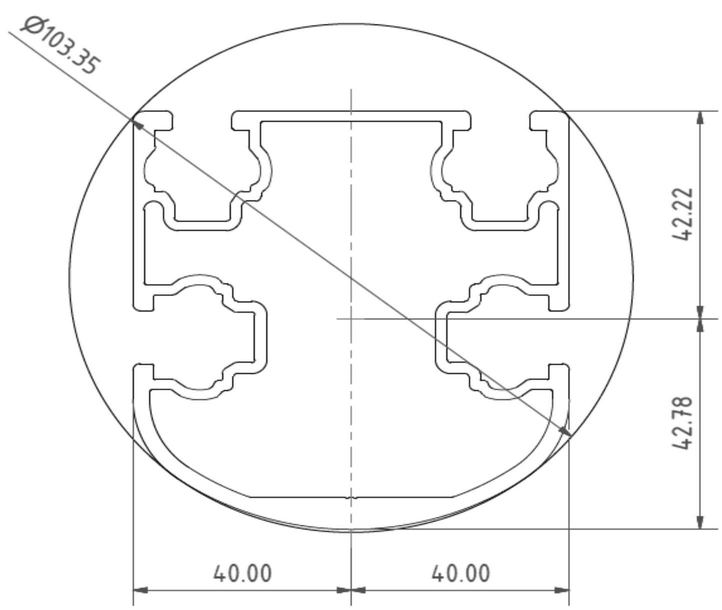
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	84	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	1.559	k-ft
M_z =	0.093	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	64%	



4.2 Girder Design

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

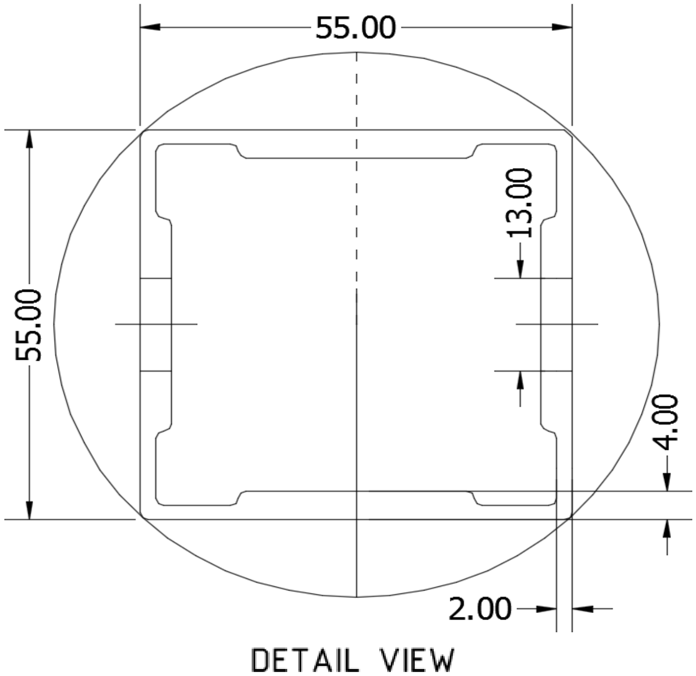
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	104.56	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.00	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.272	k-ft
M_z =	0.000	k-ft
P_n =	-1.029	k
$M_{y\ allowable}$ =	3.422	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	97%	



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).

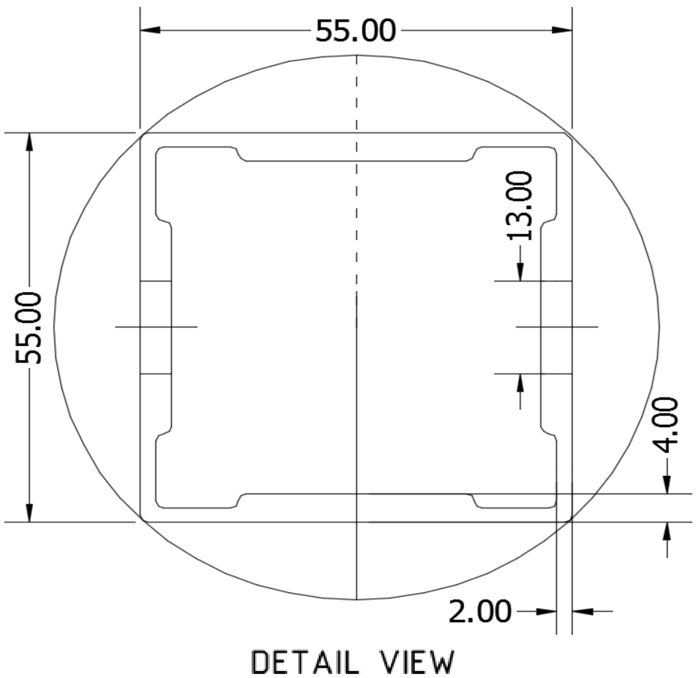
Strut Type =	55x55	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.470	k-ft
P_n =	0.363	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	35%	



4.4 Diagonal Strut Design

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

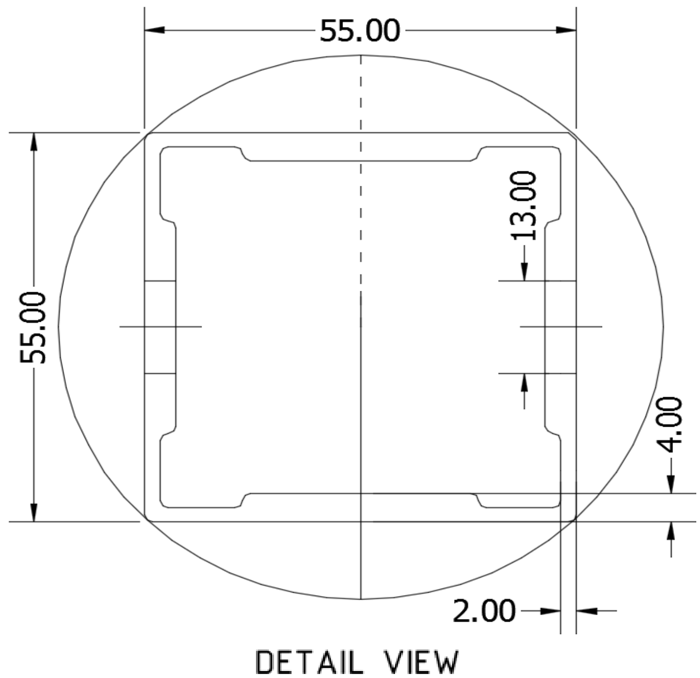
Strut Type =	55x55	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	98.03	in
$\Phi F_{ty\ AXIAL}$ =	6.11	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.012	k-ft
M_z =	0.000	k-ft
P_n =	2.734	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	6.000	k
Utilization =	46%	



4.5 Rear Strut Design

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

Strut Type =	55x55	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	78.35	in
$\Phi F_{ty\ AXIAL}$ =	8.88	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	-0.012	k-ft
M_z =	0.000	k-ft
P_n =	3.248	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	8.726	k
Utilization =	38%	



5. FOUNDATION DESIGN CALCULATIONS

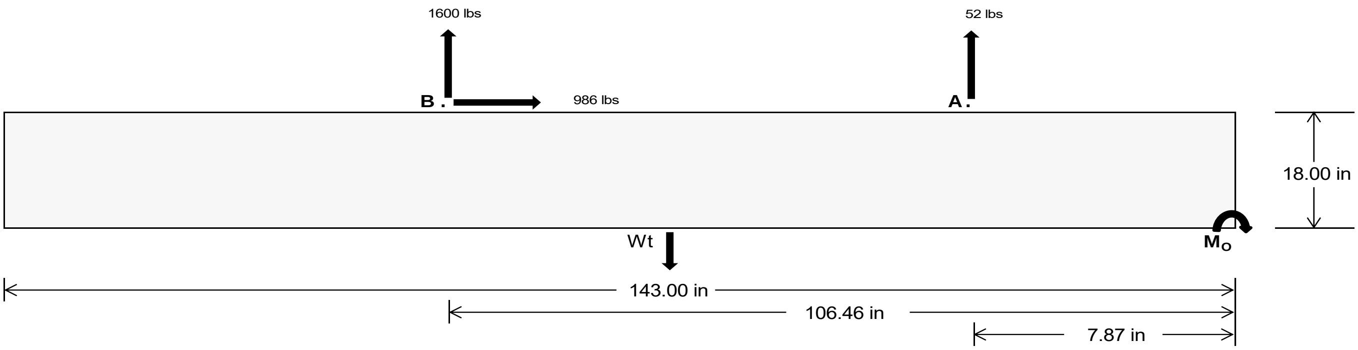
5.1 Helical Pile Foundations

The following LRFD loads include a safety factor of 1.3, and are to be used in conjunction with a Schletter, Inc. Geotechnical Investigation Report. The forces below should fall within the guidelines provided in the Geotechnical Investigation Report. If a Geotechnical Investigation Report is not present, please proceed to Section 5.2 for a concrete foundation design.

Maximum	Front	Rear	
Tensile Load =	242.11	6946.39	k
Compressive Load =	3173.91	5076.80	k
Lateral Load =	322.51	4270.60	k
Moment (Weak Axis) =	0.62	0.21	k

5.2 Design of Ballast Foundations

Ballast foundations are used to secure the racking structure in place. The foundations are checked for potential overturning and sliding. Bearing pressures applied by the racking and ballast foundations are checked against the allowable bearing pressures provided by the IBC table 1806.2 (2012, 2015).



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

Footing Reinforcement
Use fiber reinforcing with (2) #5 rebar.

Overturning Check
M_O = 188480.4 in-lbs
Resisting Force Required = 2636.09 lbs
S.F. = 1.67
Weight Required = 4393.48 lbs
Minimum Width = 35 in in
Weight Provided = 7559.64 lbs

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

Sliding
Force = 985.73 lbs
Friction = 0.4
Weight Required = 2464.34 lbs
Resisting Weight = 7559.64 lbs
Additional Weight Required = 0 lbs

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

Cohesion
Sliding Force = 985.73 lbs
Cohesion = 130 psf
Area = 34.76 ft^2
Resisting = 3779.82 lbs
Additional Weight Required = 0 lbs

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

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

Shear key is not required.

Bearing Pressure

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

ASD LC	1.0D + 1.0S				1.0D + 0.6W				1.0D + 0.75L + 0.45W + 0.75S				0.6D + 0.6W			
Width	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in
F_A	983 lbs	983 lbs	983 lbs	983 lbs	1292 lbs	1292 lbs	1292 lbs	1292 lbs	1601 lbs	1601 lbs	1601 lbs	1601 lbs	-104 lbs	-104 lbs	-104 lbs	-104 lbs
F_B	955 lbs	955 lbs	955 lbs	955 lbs	2173 lbs	2173 lbs	2173 lbs	2173 lbs	2245 lbs	2245 lbs	2245 lbs	2245 lbs	-3200 lbs	-3200 lbs	-3200 lbs	-3200 lbs
F_V	120 lbs	120 lbs	120 lbs	120 lbs	1769 lbs	1769 lbs	1769 lbs	1769 lbs	1405 lbs	1405 lbs	1405 lbs	1405 lbs	-1971 lbs	-1971 lbs	-1971 lbs	-1971 lbs
P_{total}	9498 lbs	9714 lbs	9930 lbs	10146 lbs	11025 lbs	11241 lbs	11457 lbs	11673 lbs	11405 lbs	11621 lbs	11837 lbs	12053 lbs	1232 lbs	1362 lbs	1491 lbs	1621 lbs
M	2608 lbs-ft	2608 lbs-ft	2608 lbs-ft	2608 lbs-ft	3174 lbs-ft	3174 lbs-ft	3174 lbs-ft	3174 lbs-ft	4057 lbs-ft	4057 lbs-ft	4057 lbs-ft	4057 lbs-ft	5815 lbs-ft	5815 lbs-ft	5815 lbs-ft	5815 lbs-ft
e	0.27 ft	0.27 ft	0.26 ft	0.26 ft	0.29 ft	0.28 ft	0.28 ft	0.27 ft	0.36 ft	0.35 ft	0.34 ft	0.34 ft	4.72 ft	4.27 ft	3.90 ft	3.59 ft
L/6	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft
f_{min}	235.5 psf	235.0 psf	234.5 psf	234.1 psf	271.2 psf	269.7 psf	268.3 psf	267.0 psf	269.4 psf	267.9 psf	266.6 psf	265.3 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	311.0 psf	308.5 psf	306.0 psf	303.7 psf	363.2 psf	359.1 psf	355.3 psf	351.7 psf	386.9 psf	382.2 psf	377.8 psf	373.5 psf	227.3 psf	179.3 psf	156.6 psf	143.9 psf

Maximum Bearing Pressure = 387 psf
Allowable Bearing Pressure = 1500 psf

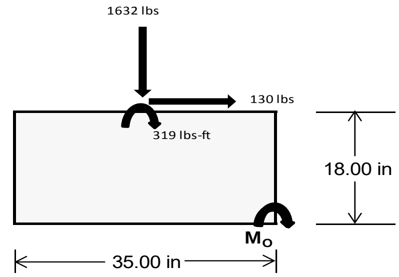
Use a 143in long x 35in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O = 1865.0 ft-lbs
Resisting Force Required = 1278.84 lbs
S.F. = 1.67
Weight Required = 2131.40 lbs
Minimum Width = 35 in in
Weight Provided = 7559.64 lbs

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



Bearing Pressure

ASD LC	1.238D + 0.875E			1.1785D + 0.65625E + 0.75S			0.362D + 0.875E		
Width	35 in			35 in			35 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	290 lbs	514 lbs	155 lbs	676 lbs	1632 lbs	573 lbs	132 lbs	150 lbs	-2 lbs
F_V	181 lbs	176 lbs	184 lbs	133 lbs	130 lbs	143 lbs	182 lbs	177 lbs	183 lbs
P_{total}	9649 lbs	9873 lbs	9514 lbs	9585 lbs	10541 lbs	9482 lbs	2869 lbs	2887 lbs	2735 lbs
M	696 lbs-ft	683 lbs-ft	706 lbs-ft	517 lbs-ft	515 lbs-ft	548 lbs-ft	696 lbs-ft	681 lbs-ft	699 lbs-ft
e	0.07 ft	0.07 ft	0.07 ft	0.05 ft	0.05 ft	0.06 ft	0.24 ft	0.24 ft	0.26 ft
L/6	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft
f_{min}	236.4 psf	243.6 psf	232.0 psf	245.2 psf	272.8 psf	240.4 psf	41.4 psf	42.8 psf	37.3 psf
f_{max}	318.8 psf	324.5 psf	315.5 psf	306.4 psf	333.7 psf	305.3 psf	123.7 psf	123.3 psf	120.0 psf

Maximum Bearing Pressure = 334 psf
Allowable Bearing Pressure = 1500 psf

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

Foundation Requirements: 143in long x 35in wide x 18in tall ballast foundation and fiber reinforcing with (2) #5 rebar.

5.3 Foundation Anchors

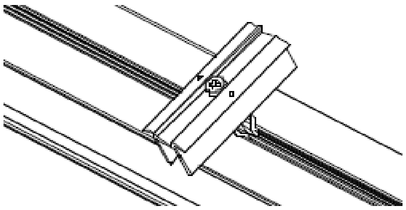
Threaded rods are anchored to the the ballast foundations using the Simpson AT-XP epoxy solution. LRFD load results are compared to the allowable strengths of the epoxy solution. Please see the supplementary calculations provided by the Simpson Anchor Designer software.

6. DESIGN OF JOINTS AND CONNECTIONS

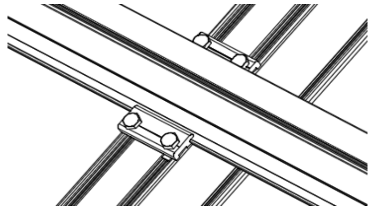
6.1 Anchorage of Modules to Purlins and Connection of Purlins to Girders

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 =	1.020	k
Allowable Uplift =	1.214	k
Utilization =	84%	



Fastening of Purlins to Girders		
Maximum Uplifting Force =	2.558	k
Allowable Uplift =	4.357	k
Utilization =	59%	



6.2 Strut Connections

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

Front Strut		
Maximum Axial Load =	2.441	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	33%	

Rear Strut		
Maximum Axial Load =	4.678	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	63%	

Diagonal Strut		
Maximum Axial Load =	2.884	k
M12 Bolt Shear Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	39%	

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

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

7. SEISMIC DESIGN

7.1 Seismic Drift

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

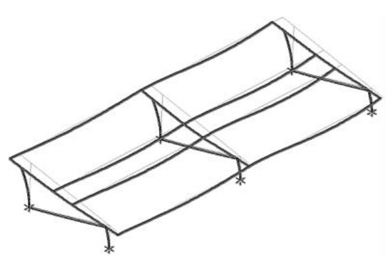
Mean Height, h_{sx} = 60.93 in

Allowable Story Drift for All Other Structures, Δ = { $0.020h_{sx}$; 1.219 in

Max Drift, Δ_{MAX} = 0.611 in

0.611 ≤ 1.219, OK.

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



APPENDIX A

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

Purlin = **S1.5**

Strong Axis:

3.4.14

L_b = 84 in

J = 0.432

232.383

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

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= 28.4 ksi

3.4.16

b/t = 32.195

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 25.1 ksi

3.4.16.1 Not Used

Rb/t =

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 37.0588

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

S1 = 36.9

m = 0.65

C_0 = 40.985

Cc = 41.015

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

S2 = 77.2

φF_L= φb[Bbr-mDbr*h/t]

φF_L= 43.2 ksi

φF_LSt= 25.1 ksi

Ix = 897074 mm^4

2.155 in^4

y = 41.015 mm

Sx = 1.335 in³

M_{max}St = 2.788 k-ft

Weak Axis:

3.4.14

L_b = 84

J = 0.432

147.782

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.4

3.4.16

b/t = 37.0588

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 23.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 32.195

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

S1 = 36.9

m = 0.65

C_0 = 45.5

Cc = 45.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 23.1 ksi

Iy = 446476 mm^4

1.073 in^4

x = 45.5 mm

Sy = 0.599 in³

M_{max}Wk = 1.152 k-ft

Compression

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

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

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

Girder = **BF0**

Strong Axis:

3.4.14

L_b = 104.56 in
J = 1.08
179.85

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

S1 = 0.51461

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

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 29.0 ksi

3.4.16

b/t = 16.2

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

S1 = 12.2

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

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

Weak Axis:

3.4.14

L_b = 104.56
J = 1.08
190.335

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

S1 = 0.51461

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

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 28.9

3.4.16

b/t = 7.4

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

S1 = 12.2

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

S2 = 46.7
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

$\varphi F_L St =$ 29.0 ksi

Ix = 984962 mm^4

2.366 in^4

y = 43.717 mm

Sx = 1.375 in^3

$M_{max}St$ = 3.323 k-ft

3.4.18

h/t = 16.2

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

S1 = 36.9

m = 0.65

C_0 = 40

Cc = 40

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

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 = 98.03 in

J = 0.942

152.985

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.4 ksi

Weak Axis:

3.4.14

L_b = 98.03

J = 0.942

152.985

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.4

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

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

$\varphi F_L =$ 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

$\varphi F_L = 1.17\varphi yFcy$

$\varphi F_L =$ 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

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St =$ 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

$M_{max}St$ = 1.460 k-ft

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

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

$\varphi F_L =$ 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

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L Wk =$ 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 = 2.26776

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.89749

$\varphi F_L = (\varphi ccFcy)/(\lambda^2)$

$\varphi F_L =$ 6.10803 ksi

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

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

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

Strut = <u>**55x55**</u>

<u>Strong Axis:</u>

3.4.14

L_b = 78.35 in
J = 0.942
122.273

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

S1 = 0.51461

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

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

3.4.16

b/t = 24.5

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

S1 = 12.2

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

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

<u>Weak Axis:</u>

3.4.14

L_b = 78.35
J = 0.942
122.273

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

S1 = 0.51461

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

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

3.4.16

b/t = 24.5

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

S1 = 12.2

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

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

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in³

M_{max}St = 1.460 k-ft

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in³

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 1.8125

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.83375

φF_L= (φccFcy)/(λ²)

φF_L= 8.88278 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

$\varphi F_L = \varphi yFcy$

$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 8.88 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 9.14 kips

APPENDIX B

B.1

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

Basic Load Cases

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

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

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

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

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

Member Distributed Loads (BLC 3 : Snow Load)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Y	-46.866	-46.866	0	0
2	M14	Y	-46.866	-46.866	0	0
3	M15	Y	-46.866	-46.866	0	0
4	M16	Y	-46.866	-46.866	0	0

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

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	y	-133.288	-133.288	0	0
2	M14	y	-133.288	-133.288	0	0
3	M15	y	-214.42	-214.42	0	0
4	M16	y	-214.42	-214.42	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	301.347	301.347	0	0
2	M14	y	231.806	231.806	0	0
3	M15	y	127.493	127.493	0	0
4	M16	y	127.493	127.493	0	0

Member Distributed Loads (BLC 6 : Seismic - Lateral)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Z	7.874	7.874	0	0
2	M14	Z	7.874	7.874	0	0
3	M15	Z	7.874	7.874	0	0
4	M16	Z	7.874	7.874	0	0
5	M13	Z	0	0	0	0
6	M14	Z	0	0	0	0
7	M15	Z	0	0	0	0
8	M16	Z	0	0	0	0

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	LRFD 1.2D + 1.6S + 0.5W	Yes	Y		1	1.2	3	1.6	4	.5														
2	LRFD 1.2D + 1.0W + 0.5S	Yes	Y		1	1.2	3	.5	4	1														
3	LRFD 0.9D + 1.0W	Yes	Y		2	.9					5	1												
4	LATERAL - LRFD 1.54D + 1.3E ...	Yes	Y		1	1.54	3	.2			6	1.3												
5	LATERAL - LRFD 0.56D + 1.3E	Yes	Y		1	.56					6	1.3												
6	LATERAL - LRFD 1.54D + 1.25...	Yes	Y		1	1.54	3	.2			6	1.25												
7	LATERAL - LRFD 0.56D + 1.25E	Yes	Y		1	.56					6	1.25												
8																								
9	ASD 1.0D + 1.0S	Yes	Y		1	1	3	1																
10	ASD 1.0D + 0.6W	Yes	Y		1	1			4	.6														
11	ASD 1.0D + 0.75L + 0.45W + 0....	Yes	Y		1	1	3	.75	4	.45														
12	ASD 0.6D + 0.6W	Yes	Y		2	.6					5	.6												
13	LATERAL - ASD 1.238D + 0.875E	Yes	Y		1	1.2...					6	.875												
14	LATERAL - ASD 1.1785D + 0.65...	Yes	Y		1	1.1...	3	.75			6	.656												
15	LATERAL - ASD 0.362D + 0.875E	Yes	Y		1	.362					6	.875												

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N8	max	941.795	2	1309.182	2	.438	1	.002	1	0	1	0	1
2		min	-1115.826	3	-1748.261	3	-28.174	5	-.163	4	0	1	0	1
3	N7	max	.021	9	921.447	1	-.785	12	-.001	12	0	1	0	1
4		min	-.278	2	-87.287	5	-248.082	4	-.48	4	0	1	0	1
5	N15	max	.015	9	2441.466	2	0	3	0	10	0	1	0	1
6		min	-2.567	2	-186.235	3	-234.863	4	-.461	4	0	1	0	1
7	N16	max	2987.446	2	3905.23	2	0	1	0	2	0	1	0	1
8		min	-3285.08	3	-5343.378	3	-28.419	5	-.164	4	0	1	0	1
9	N23	max	.037	4	921.447	1	8.564	1	.016	1	0	1	0	1
10		min	-.278	2	-26.946	3	-240.981	5	-.47	4	0	1	0	1
11	N24	max	941.795	2	1309.182	2	-.044	10	0	10	0	1	0	1
12		min	-1115.826	3	-1748.261	3	-28.848	5	-.164	4	0	1	0	1
13	Totals:	max	4867.912	2	10672.862	2	0	10						
14		min	-5516.973	3	-9080.026	3	-805.228	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	59.094	4	421.734	2	-9.436	12	0	15	.159	4	0	4
2			min	4.252	10	-784.408	3	-144.746	1	-.013	2	.012	10	0	3
3		2	max	49.916	4	293.11	2	-7.812	12	0	15	.104	4	.521	3
4			min	4.252	10	-554.245	3	-110.289	1	-.013	2	0	10	-.278	2
5		3	max	48.425	1	164.486	2	-6.188	12	0	15	.064	5	.862	3
6			min	4.252	10	-324.082	3	-75.833	1	-.013	2	-.037	1	-.456	2
7		4	max	48.425	1	35.861	2	-3.606	10	0	15	.037	5	1.025	3
8			min	4.252	10	-93.919	3	-44.554	4	-.013	2	-.082	1	-.534	2
9		5	max	48.425	1	136.243	3	.806	10	0	15	.011	5	1.008	3
10			min	4.252	10	-92.763	2	-34.113	4	-.013	2	-.101	1	-.512	2
11		6	max	48.425	1	366.406	3	27.536	1	0	15	-.006	12	.813	3
12			min	.838	15	-221.387	2	-29.238	5	-.013	2	-.093	1	-.39	2
13		7	max	48.425	1	596.569	3	61.993	1	0	15	-.005	10	.438	3
14			min	-7.798	5	-350.011	2	-26.767	5	-.013	2	-.058	1	-.167	2
15		8	max	48.425	1	826.732	3	96.449	1	0	15	.007	2	.155	2
16			min	-16.976	5	-478.635	2	-24.295	5	-.013	2	-.055	4	-.115	3
17		9	max	48.425	1	1056.895	3	130.906	1	0	15	.092	1	.577	2
18			min	-26.154	5	-607.259	2	-21.824	5	-.013	2	-.072	5	-.848	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	53.79	4	735.883	2	-5.177	12	.013	2	.207	1	1.1	2
20			min	4.252	10	-1287.058	3	-165.362	1	-.007	3	-.002	3	-1.759	3
21		11	max	48.425	1	607.259	2	-3.553	12	.013	2	.106	4	.577	2
22			min	4.252	10	-1056.895	3	-130.906	1	0	15	-.006	3	-.848	3
23		12	max	48.425	1	478.635	2	-1.929	12	.013	2	.055	4	.155	2
24			min	4.252	10	-826.732	3	-96.449	1	0	15	-.009	3	-.115	3
25		13	max	48.425	1	350.011	2	-.044	3	.013	2	.026	5	.438	3
26			min	4.252	10	-596.569	3	-61.993	1	0	15	-.058	1	-.167	2
27		14	max	48.425	1	221.387	2	2.391	3	.013	2	0	15	.813	3
28			min	3.745	15	-366.406	3	-39.4	4	0	15	-.093	1	-.39	2
29		15	max	48.425	1	92.763	2	6.92	1	.013	2	-.004	12	1.008	3
30			min	-3.52	5	-136.243	3	-30.49	5	0	15	-.101	1	-.512	2
31		16	max	48.425	1	93.919	3	41.376	1	.013	2	-.001	12	1.025	3
32			min	-12.698	5	-35.861	2	-28.018	5	0	15	-.082	1	-.534	2
33		17	max	48.425	1	324.082	3	75.833	1	.013	2	.005	3	.862	3
34			min	-21.876	5	-164.486	2	-25.547	5	0	15	-.078	4	-.456	2
35		18	max	48.425	1	554.245	3	110.289	1	.013	2	.036	1	.521	3
36			min	-31.054	5	-293.11	2	-23.076	5	0	15	-.088	5	-.278	2
37		19	max	48.425	1	784.408	3	144.746	1	.013	2	.135	1	0	2
38			min	-40.233	5	-421.734	2	-20.605	5	0	15	-.105	5	0	3
39	M14	1	max	35.819	4	510.465	2	-9.837	12	.015	3	.239	4	0	4
40			min	2.925	12	-656.389	3	-151.52	1	-.016	2	.015	10	0	3
41		2	max	33.001	1	381.841	2	-8.214	12	.015	3	.166	4	.442	3
42			min	2.925	12	-480.313	3	-117.064	1	-.016	2	.003	10	-.347	2
43		3	max	33.001	1	253.217	2	-6.59	12	.015	3	.102	5	.747	3
44			min	2.925	12	-304.238	3	-82.607	1	-.016	2	-.016	1	-.594	2
45		4	max	33.001	1	124.593	2	-4.362	10	.015	3	.058	5	.915	3
46			min	.395	15	-128.162	3	-67.818	4	-.016	2	-.067	1	-.741	2
47		5	max	33.001	1	47.913	3	.051	10	.015	3	.016	5	.947	3
48			min	-8.604	5	-7.853	1	-57.377	4	-.016	2	-.091	1	-.788	2
49		6	max	33.001	1	223.988	3	20.762	1	.015	3	-.005	12	.841	3
50			min	-17.782	5	-132.655	2	-50.582	5	-.016	2	-.088	1	-.735	2
51		7	max	33.001	1	400.064	3	55.218	1	.015	3	-.005	10	.598	3
52			min	-26.961	5	-261.28	2	-48.111	5	-.016	2	-.078	4	-.581	2
53		8	max	33.001	1	576.139	3	89.675	1	.015	3	.004	2	.218	3
54			min	-36.139	5	-389.904	2	-45.64	5	-.016	2	-.102	4	-.328	2
55		9	max	33.001	1	752.215	3	124.131	1	.015	3	.081	1	.049	1
56			min	-45.317	5	-518.528	2	-43.169	5	-.016	2	-.134	5	-.298	3
57		10	max	66.845	4	647.152	2	-4.775	12	.016	2	.238	4	.478	2
58			min	2.925	12	-928.29	3	-158.588	1	-.015	3	-.002	3	-.952	3
59		11	max	57.667	4	518.528	2	-3.151	12	.016	2	.164	4	.049	1
60			min	2.925	12	-752.215	3	-124.131	1	-.015	3	-.007	3	-.298	3
61		12	max	48.488	4	389.904	2	-1.528	12	.016	2	.099	4	.218	3
62			min	2.925	12	-576.139	3	-89.675	1	-.015	3	-.009	3	-.328	2
63		13	max	39.31	4	261.28	2	.571	3	.016	2	.054	5	.598	3
64			min	2.925	12	-400.064	3	-68.938	4	-.015	3	-.058	1	-.581	2
65		14	max	33.001	1	132.655	2	3.007	3	.016	2	.012	5	.841	3
66			min	2.925	12	-223.988	3	-58.498	4	-.015	3	-.088	1	-.735	2
67		15	max	33.001	1	7.853	1	13.694	1	.016	2	-.003	12	.947	3
68			min	2.925	12	-47.913	3	-50.849	5	-.015	3	-.091	1	-.788	2
69		16	max	33.001	1	128.162	3	48.151	1	.016	2	0	3	.915	3
70			min	2.515	15	-124.593	2	-48.378	5	-.015	3	-.083	4	-.741	2
71		17	max	33.001	1	304.238	3	82.607	1	.016	2	.007	3	.747	3
72			min	-5.416	5	-253.217	2	-45.907	5	-.015	3	-.109	4	-.594	2
73		18	max	33.001	1	480.313	3	117.064	1	.016	2	.062	1	.442	3
74			min	-14.594	5	-381.841	2	-43.436	5	-.015	3	-.139	5	-.347	2
75		19	max	33.001	1	656.389	3	151.52	1	.016	2	.166	1	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
76			min	-23.772	5	-510.465	2	-40.965	5	-.015	3	-.172	5	0	3
77	M15	1	max	75.988	5	723.616	2	-9.605	12	.017	2	.305	4	0	2
78			min	-34.507	1	-383.645	3	-151.539	1	-.013	3	.015	10	0	3
79		2	max	66.81	5	531.889	2	-7.982	12	.017	2	.218	4	.261	3
80			min	-34.507	1	-288.702	3	-117.082	1	-.013	3	.003	10	-.488	2
81		3	max	57.632	5	340.163	2	-6.358	12	.017	2	.14	5	.449	3
82			min	-34.507	1	-193.759	3	-96.681	4	-.013	3	-.016	1	-.827	2
83		4	max	48.454	5	148.436	2	-4.475	10	.017	2	.081	5	.563	3
84			min	-34.507	1	-98.815	3	-86.24	4	-.013	3	-.067	1	-1.017	2
85		5	max	39.276	5	-.367	15	-.063	10	.017	2	.025	5	.603	3
86			min	-34.507	1	-43.291	2	-75.799	4	-.013	3	-.091	1	-1.058	2
87		6	max	30.098	5	91.071	3	20.743	1	.017	2	-.005	12	.569	3
88			min	-34.507	1	-235.018	2	-68.95	5	-.013	3	-.088	1	-.95	2
89		7	max	20.919	5	186.014	3	55.2	1	.017	2	-.005	10	.461	3
90			min	-34.507	1	-426.744	2	-66.478	5	-.013	3	-.097	4	-.693	2
91		8	max	11.741	5	280.957	3	89.656	1	.017	2	.004	2	.28	3
92			min	-34.507	1	-618.471	2	-64.007	5	-.013	3	-.136	4	-.286	2
93		9	max	2.563	5	375.9	3	124.113	1	.017	2	.081	1	.269	2
94			min	-34.507	1	-810.198	2	-61.536	5	-.013	3	-.182	5	.002	15
95		10	max	-3.003	10	1001.925	2	-5.007	12	.013	3	.301	4	.974	2
96			min	-34.507	1	-470.843	3	-158.569	1	-.017	2	-.001	3	-.305	3
97		11	max	-3.003	10	810.198	2	-3.383	12	.013	3	.213	4	.269	2
98			min	-34.507	1	-375.9	3	-124.113	1	-.017	2	-.006	3	.002	15
99		12	max	-3.003	10	618.471	2	-1.76	12	.013	3	.133	4	.28	3
100			min	-34.507	1	-280.957	3	-97.847	4	-.017	2	-.008	3	-.286	2
101		13	max	-3.003	10	426.744	2	.186	3	.013	3	.074	5	.461	3
102			min	-35.583	4	-186.014	3	-87.406	4	-.017	2	-.058	1	-.693	2
103		14	max	-3.003	10	235.018	2	2.621	3	.013	3	.017	5	.569	3
104			min	-44.761	4	-91.071	3	-76.965	4	-.017	2	-.088	1	-.95	2
105		15	max	-3.003	10	43.291	2	13.713	1	.013	3	-.003	12	.603	3
106			min	-53.939	4	.368	15	-69.221	5	-.017	2	-.091	1	-1.058	2
107		16	max	-3.003	10	98.815	3	48.169	1	.013	3	0	3	.563	3
108			min	-63.117	4	-148.436	2	-66.75	5	-.017	2	-.107	4	-1.017	2
109		17	max	-3.003	10	193.759	3	82.626	1	.013	3	.007	3	.449	3
110			min	-72.295	4	-340.163	2	-64.279	5	-.017	2	-.146	4	-.827	2
111		18	max	-3.003	10	288.702	3	117.082	1	.013	3	.062	1	.261	3
112			min	-81.474	4	-531.889	2	-61.808	5	-.017	2	-.191	5	-.488	2
113		19	max	-3.003	10	383.645	3	151.539	1	.013	3	.166	1	0	2
114			min	-90.652	4	-723.616	2	-59.336	5	-.017	2	-.238	5	0	5
115	M16	1	max	70.328	5	640.122	2	-8.713	12	.006	1	.215	4	0	2
116			min	-55.046	1	-306.932	3	-145.418	1	-.013	3	.013	12	0	3
117		2	max	61.15	5	448.396	2	-7.09	12	.006	1	.148	4	.202	3
118			min	-55.046	1	-211.989	3	-110.962	1	-.013	3	.002	10	-.423	2
119		3	max	51.971	5	256.669	2	-5.466	12	.006	1	.096	5	.33	3
120			min	-55.046	1	-117.046	3	-76.505	1	-.013	3	-.035	1	-.697	2
121		4	max	42.793	5	64.942	2	-3.842	12	.006	1	.057	5	.384	3
122			min	-55.046	1	-22.103	3	-59.804	4	-.013	3	-.081	1	-.823	2
123		5	max	33.615	5	72.84	3	.368	10	.006	1	.019	5	.364	3
124			min	-55.046	1	-126.785	2	-49.363	4	-.013	3	-.1	1	-.799	2
125		6	max	24.437	5	167.783	3	26.864	1	.006	1	-.006	12	.271	3
126			min	-55.046	1	-318.511	2	-44.282	5	-.013	3	-.093	1	-.625	2
127		7	max	15.259	5	262.726	3	61.32	1	.006	1	-.005	12	.103	3
128			min	-55.046	1	-510.238	2	-41.811	5	-.013	3	-.064	4	-.303	2
129		8	max	6.081	5	357.669	3	95.777	1	.006	1	.005	2	.168	2
130			min	-55.046	1	-701.965	2	-39.34	5	-.013	3	-.082	4	-.138	3
131		9	max	-2.018	15	452.612	3	130.233	1	.006	1	.09	1	.789	2
132			min	-55.046	1	-893.692	2	-36.869	5	-.013	3	-.111	5	-.453	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	-5.099	12	1085.419	2	-5.899	12	.013	3	.216	4	1.559	2
134			min	-55.046	1	-547.556	3	-164.69	1	-.006	1	.003	12	-.842	3
135		11	max	-3.246	15	893.692	2	-4.275	12	.013	3	.145	4	.789	2
136			min	-55.046	1	-452.612	3	-130.233	1	-.006	1	-.003	3	-.453	3
137		12	max	-5.099	12	701.965	2	-2.652	12	.013	3	.082	4	.168	2
138			min	-55.046	1	-357.669	3	-95.777	1	-.006	1	-.007	3	-.138	3
139		13	max	-5.099	12	510.238	2	-1.028	12	.013	3	.041	5	.103	3
140			min	-55.046	1	-262.726	3	-64.901	4	-.006	1	-.059	1	-.303	2
141		14	max	-5.099	12	318.511	2	1.187	3	.013	3	.003	5	.271	3
142			min	-55.046	1	-167.783	3	-54.46	4	-.006	1	-.093	1	-.625	2
143		15	max	-5.099	12	126.785	2	7.592	1	.013	3	-.004	12	.364	3
144			min	-55.413	4	-72.84	3	-45.503	5	-.006	1	-.1	1	-.799	2
145		16	max	-5.099	12	22.103	3	42.049	1	.013	3	-.002	12	.384	3
146			min	-64.591	4	-64.942	2	-43.032	5	-.006	1	-.087	4	-.823	2
147		17	max	-5.099	12	117.046	3	76.505	1	.013	3	.003	3	.33	3
148			min	-73.769	4	-256.669	2	-40.561	5	-.006	1	-.109	4	-.697	2
149		18	max	-5.099	12	211.989	3	110.962	1	.013	3	.038	1	.202	3
150			min	-82.947	4	-448.396	2	-38.09	5	-.006	1	-.131	5	-.423	2
151		19	max	-5.099	12	306.932	3	145.418	1	.013	3	.138	1	0	2
152			min	-92.125	4	-640.122	2	-35.619	5	-.006	1	-.16	5	0	5
153	M2	1	max	1090.364	2	2.061	4	.267	1	0	3	0	3	0	1
154			min	-1527.922	3	.5	15	-21.84	4	0	4	0	2	0	1
155		2	max	1090.893	2	1.99	4	.267	1	0	3	0	1	0	15
156			min	-1527.525	3	.484	15	-22.301	4	0	4	-.008	4	0	4
157		3	max	1091.422	2	1.919	4	.267	1	0	3	0	1	0	15
158			min	-1527.128	3	.467	15	-22.762	4	0	4	-.016	4	-.001	4
159		4	max	1091.951	2	1.848	4	.267	1	0	3	0	1	0	15
160			min	-1526.731	3	.45	15	-23.224	4	0	4	-.024	4	-.002	4
161		5	max	1092.481	2	1.777	4	.267	1	0	3	0	1	0	15
162			min	-1526.334	3	.433	15	-23.685	4	0	4	-.033	4	-.003	4
163		6	max	1093.01	2	1.706	4	.267	1	0	3	0	1	0	15
164			min	-1525.937	3	.417	15	-24.146	4	0	4	-.041	4	-.003	4
165		7	max	1093.539	2	1.635	4	.267	1	0	3	0	1	0	15
166			min	-1525.54	3	.4	15	-24.607	4	0	4	-.05	4	-.004	4
167		8	max	1094.069	2	1.564	4	.267	1	0	3	0	1	-.001	15
168			min	-1525.143	3	.383	15	-25.068	4	0	4	-.059	4	-.005	4
169		9	max	1094.598	2	1.493	4	.267	1	0	3	0	1	-.001	15
170			min	-1524.746	3	.367	15	-25.53	4	0	4	-.068	4	-.005	4
171		10	max	1095.127	2	1.422	4	.267	1	0	3	0	1	-.001	15
172			min	-1524.349	3	.35	15	-25.991	4	0	4	-.077	4	-.006	4
173		11	max	1095.656	2	1.351	4	.267	1	0	3	0	1	-.001	15
174			min	-1523.952	3	.324	12	-26.452	4	0	4	-.087	4	-.006	4
175		12	max	1096.186	2	1.28	4	.267	1	0	3	.001	1	-.002	15
176			min	-1523.555	3	.297	12	-26.913	4	0	4	-.096	4	-.007	4
177		13	max	1096.715	2	1.209	4	.267	1	0	3	.001	1	-.002	15
178			min	-1523.158	3	.269	12	-27.375	4	0	4	-.106	4	-.007	4
179		14	max	1097.244	2	1.138	4	.267	1	0	3	.001	1	-.002	15
180			min	-1522.761	3	.241	12	-27.836	4	0	4	-.116	4	-.007	4
181		15	max	1097.774	2	1.067	4	.267	1	0	3	.001	1	-.002	15
182			min	-1522.364	3	.214	12	-28.297	4	0	4	-.126	4	-.008	4
183		16	max	1098.303	2	.996	4	.267	1	0	3	.001	1	-.002	15
184			min	-1521.967	3	.186	12	-28.758	4	0	4	-.136	4	-.008	4
185		17	max	1098.832	2	.925	4	.267	1	0	3	.002	1	-.002	15
186			min	-1521.57	3	.158	12	-29.219	4	0	4	-.147	4	-.009	4
187		18	max	1099.361	2	.865	2	.267	1	0	3	.002	1	-.002	15
188			min	-1521.173	3	.131	12	-29.681	4	0	4	-.157	4	-.009	4
189		19	max	1099.891	2	.81	2	.267	1	0	3	.002	1	-.002	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
190			min	-1520.776	3	.103	12	-30.142	4	0	4	-.168	4	-.009	4
191	M3	1	max	854.314	2	8.904	4	1.234	4	0	10	0	1	.009	4
192			min	-986.004	3	2.105	15	.021	12	0	4	-.018	4	.002	15
193		2	max	854.143	2	8.035	4	1.839	4	0	10	0	1	.005	2
194			min	-986.132	3	1.901	15	.021	12	0	4	-.017	4	0	12
195		3	max	853.973	2	7.166	4	2.444	4	0	10	0	1	.002	2
196			min	-986.26	3	1.696	15	.021	12	0	4	-.016	4	0	3
197		4	max	853.802	2	6.297	4	3.049	4	0	10	0	1	0	2
198			min	-986.388	3	1.492	15	.021	12	0	4	-.015	4	-.003	3
199		5	max	853.632	2	5.428	4	3.654	4	0	10	0	1	0	15
200			min	-986.516	3	1.288	15	.021	12	0	4	-.013	5	-.004	6
201		6	max	853.462	2	4.559	4	4.259	4	0	10	0	1	-.001	15
202			min	-986.643	3	1.084	15	.021	12	0	4	-.012	5	-.007	6
203		7	max	853.291	2	3.69	4	4.864	4	0	10	0	1	-.002	15
204			min	-986.771	3	.879	15	.021	12	0	4	-.01	5	-.009	6
205		8	max	853.121	2	2.822	4	5.469	4	0	10	0	1	-.002	15
206			min	-986.899	3	.675	15	.021	12	0	4	-.007	5	-.01	6
207		9	max	852.951	2	1.953	4	6.074	4	0	10	.001	1	-.003	15
208			min	-987.027	3	.471	15	.021	12	0	4	-.005	5	-.011	6
209		10	max	852.78	2	1.084	4	6.679	4	0	10	.001	1	-.003	15
210			min	-987.154	3	.267	15	.021	12	0	4	-.002	5	-.012	6
211		11	max	852.61	2	.32	2	7.285	4	0	10	.002	4	-.003	15
212			min	-987.282	3	-.129	3	.021	12	0	4	0	10	-.012	6
213		12	max	852.44	2	-.142	15	7.89	4	0	10	.006	4	-.003	15
214			min	-987.41	3	-.655	6	.021	12	0	4	0	12	-.012	6
215		13	max	852.269	2	-.346	15	8.495	4	0	10	.009	4	-.003	15
216			min	-987.538	3	-1.524	6	.021	12	0	4	0	12	-.012	6
217		14	max	852.099	2	-.55	15	9.1	4	0	10	.014	4	-.002	15
218			min	-987.665	3	-2.393	6	.021	12	0	4	0	12	-.011	6
219		15	max	851.929	2	-.754	15	9.705	4	0	10	.018	4	-.002	15
220			min	-987.793	3	-3.262	6	.021	12	0	4	0	12	-.009	6
221		16	max	851.758	2	-.959	15	10.31	4	0	10	.023	4	-.002	15
222			min	-987.921	3	-4.131	6	.021	12	0	4	0	12	-.008	6
223		17	max	851.588	2	-1.163	15	10.915	4	0	10	.028	4	-.001	15
224			min	-988.049	3	-5	6	.021	12	0	4	0	12	-.006	6
225		18	max	851.418	2	-1.367	15	11.52	4	0	10	.033	4	0	15
226			min	-988.176	3	-5.868	6	.021	12	0	4	0	12	-.003	6
227		19	max	851.247	2	-1.571	15	12.125	4	0	10	.039	4	0	1
228			min	-988.304	3	-6.737	6	.021	12	0	4	0	12	0	1
229	M4	1	max	918.381	1	0	1	-.785	12	0	1	.031	4	0	1
230			min	-88.718	5	0	1	-245.929	4	0	1	0	10	0	1
231		2	max	918.552	1	0	1	-.785	12	0	1	.003	4	0	1
232			min	-88.638	5	0	1	-246.076	4	0	1	0	10	0	1
233		3	max	918.722	1	0	1	-.785	12	0	1	0	12	0	1
234			min	-88.559	5	0	1	-246.224	4	0	1	-.025	4	0	1
235		4	max	918.892	1	0	1	-.785	12	0	1	0	12	0	1
236			min	-88.479	5	0	1	-246.372	4	0	1	-.054	4	0	1
237		5	max	919.063	1	0	1	-.785	12	0	1	0	12	0	1
238			min	-88.4	5	0	1	-246.519	4	0	1	-.082	4	0	1
239		6	max	919.233	1	0	1	-.785	12	0	1	0	12	0	1
240			min	-88.32	5	0	1	-246.667	4	0	1	-.11	4	0	1
241		7	max	919.403	1	0	1	-.785	12	0	1	0	12	0	1
242			min	-88.241	5	0	1	-246.815	4	0	1	-.139	4	0	1
243		8	max	919.574	1	0	1	-.785	12	0	1	0	12	0	1
244			min	-88.161	5	0	1	-246.962	4	0	1	-.167	4	0	1
245		9	max	919.744	1	0	1	-.785	12	0	1	0	12	0	1
246			min	-88.082	5	0	1	-247.11	4	0	1	-.195	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	919.914	1	0	1	-.785	12	0	1	0	12	0	1
248			min	-88.002	5	0	1	-247.257	4	0	1	-.224	4	0	1
249		11	max	920.085	1	0	1	-.785	12	0	1	0	12	0	1
250			min	-87.923	5	0	1	-247.405	4	0	1	-.252	4	0	1
251		12	max	920.255	1	0	1	-.785	12	0	1	0	12	0	1
252			min	-87.843	5	0	1	-247.553	4	0	1	-.281	4	0	1
253		13	max	920.425	1	0	1	-.785	12	0	1	0	12	0	1
254			min	-87.764	5	0	1	-247.7	4	0	1	-.309	4	0	1
255		14	max	920.596	1	0	1	-.785	12	0	1	-.001	12	0	1
256			min	-87.684	5	0	1	-247.848	4	0	1	-.338	4	0	1
257		15	max	920.766	1	0	1	-.785	12	0	1	-.001	12	0	1
258			min	-87.605	5	0	1	-247.996	4	0	1	-.366	4	0	1
259		16	max	920.936	1	0	1	-.785	12	0	1	-.001	12	0	1
260			min	-87.525	5	0	1	-248.143	4	0	1	-.394	4	0	1
261		17	max	921.107	1	0	1	-.785	12	0	1	-.001	12	0	1
262			min	-87.446	5	0	1	-248.291	4	0	1	-.423	4	0	1
263		18	max	921.277	1	0	1	-.785	12	0	1	-.001	12	0	1
264			min	-87.366	5	0	1	-248.439	4	0	1	-.452	4	0	1
265		19	max	921.447	1	0	1	-.785	12	0	1	-.001	12	0	1
266			min	-87.287	5	0	1	-248.586	4	0	1	-.48	4	0	1
267	M6	1	max	3238.862	2	2.295	2	0	1	0	1	0	4	0	1
268			min	-4677.703	3	.23	12	-22.083	4	0	4	0	1	0	1
269		2	max	3239.391	2	2.239	2	0	1	0	1	0	1	0	12
270			min	-4677.306	3	.203	12	-22.544	4	0	4	-.008	4	0	2
271		3	max	3239.921	2	2.184	2	0	1	0	1	0	1	0	12
272			min	-4676.909	3	.17	3	-23.005	4	0	4	-.016	4	-.002	2
273		4	max	3240.45	2	2.129	2	0	1	0	1	0	1	0	12
274			min	-4676.512	3	.128	3	-23.467	4	0	4	-.025	4	-.002	2
275		5	max	3240.979	2	2.073	2	0	1	0	1	0	1	0	3
276			min	-4676.115	3	.087	3	-23.928	4	0	4	-.033	4	-.003	2
277		6	max	3241.509	2	2.018	2	0	1	0	1	0	1	0	3
278			min	-4675.718	3	.045	3	-24.389	4	0	4	-.042	4	-.004	2
279		7	max	3242.038	2	1.963	2	0	1	0	1	0	1	0	3
280			min	-4675.321	3	.004	3	-24.85	4	0	4	-.051	4	-.005	2
281		8	max	3242.567	2	1.907	2	0	1	0	1	0	1	0	3
282			min	-4674.924	3	-.038	3	-25.312	4	0	4	-.059	4	-.005	2
283		9	max	3243.096	2	1.852	2	0	1	0	1	0	1	0	3
284			min	-4674.527	3	-.079	3	-25.773	4	0	4	-.069	4	-.006	2
285		10	max	3243.626	2	1.797	2	0	1	0	1	0	1	0	3
286			min	-4674.13	3	-.121	3	-26.234	4	0	4	-.078	4	-.007	2
287		11	max	3244.155	2	1.741	2	0	1	0	1	0	1	0	3
288			min	-4673.733	3	-.162	3	-26.695	4	0	4	-.087	4	-.007	2
289		12	max	3244.684	2	1.686	2	0	1	0	1	0	1	0	3
290			min	-4673.336	3	-.204	3	-27.156	4	0	4	-.097	4	-.008	2
291		13	max	3245.214	2	1.63	2	0	1	0	1	0	1	0	3
292			min	-4672.939	3	-.245	3	-27.618	4	0	4	-.107	4	-.008	2
293		14	max	3245.743	2	1.575	2	0	1	0	1	0	1	0	3
294			min	-4672.542	3	-.287	3	-28.079	4	0	4	-.117	4	-.009	2
295		15	max	3246.272	2	1.52	2	0	1	0	1	0	1	0	3
296			min	-4672.145	3	-.328	3	-28.54	4	0	4	-.127	4	-.01	2
297		16	max	3246.802	2	1.464	2	0	1	0	1	0	1	0	3
298			min	-4671.748	3	-.37	3	-29.001	4	0	4	-.137	4	-.01	2
299		17	max	3247.331	2	1.409	2	0	1	0	1	0	1	0	3
300			min	-4671.351	3	-.411	3	-29.463	4	0	4	-.148	4	-.011	2
301		18	max	3247.86	2	1.354	2	0	1	0	1	0	1	0	3
302			min	-4670.954	3	-.453	3	-29.924	4	0	4	-.159	4	-.011	2
303		19	max	3248.389	2	1.298	2	0	1	0	1	0	1	0	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
304			min	-4670.557	3	-.494	3	-30.385	4	0	4	-.169	4	-.012	2
305	M7	1	max	2734.373	2	8.897	6	.86	4	0	1	0	1	.012	2
306			min	-2881.506	3	2.09	15	0	1	0	4	-.018	4	0	3
307		2	max	2734.203	2	8.028	6	1.465	4	0	1	0	1	.008	2
308			min	-2881.634	3	1.885	15	0	1	0	4	-.018	4	-.003	3
309		3	max	2734.032	2	7.159	6	2.07	4	0	1	0	1	.005	2
310			min	-2881.762	3	1.681	15	0	1	0	4	-.017	4	-.005	3
311		4	max	2733.862	2	6.29	6	2.675	4	0	1	0	1	.002	2
312			min	-2881.89	3	1.477	15	0	1	0	4	-.016	4	-.006	3
313		5	max	2733.692	2	5.421	6	3.281	4	0	1	0	1	0	2
314			min	-2882.018	3	1.273	15	0	1	0	4	-.014	4	-.007	3
315		6	max	2733.521	2	4.552	6	3.886	4	0	1	0	1	-.002	15
316			min	-2882.145	3	1.068	15	0	1	0	4	-.013	4	-.008	3
317		7	max	2733.351	2	3.683	6	4.491	4	0	1	0	1	-.002	15
318			min	-2882.273	3	.864	15	0	1	0	4	-.011	4	-.009	3
319		8	max	2733.181	2	2.815	6	5.096	4	0	1	0	1	-.002	15
320			min	-2882.401	3	.66	15	0	1	0	4	-.008	4	-.01	4
321		9	max	2733.01	2	2.046	2	5.701	4	0	1	0	1	-.003	15
322			min	-2882.529	3	.324	12	0	1	0	4	-.006	5	-.011	4
323		10	max	2732.84	2	1.369	2	6.306	4	0	1	0	1	-.003	15
324			min	-2882.656	3	-.092	3	0	1	0	4	-.003	5	-.012	4
325		11	max	2732.67	2	.692	2	6.911	4	0	1	0	4	-.003	15
326			min	-2882.784	3	-.6	3	0	1	0	4	0	1	-.012	4
327		12	max	2732.499	2	.015	2	7.516	4	0	1	.004	4	-.003	15
328			min	-2882.912	3	-1.108	3	0	1	0	4	0	1	-.012	4
329		13	max	2732.329	2	-.361	15	8.121	4	0	1	.007	4	-.003	15
330			min	-2883.04	3	-1.615	3	0	1	0	4	0	1	-.012	4
331		14	max	2732.159	2	-.566	15	8.726	4	0	1	.011	4	-.003	15
332			min	-2883.167	3	-2.399	4	0	1	0	4	0	1	-.011	4
333		15	max	2731.988	2	-.77	15	9.331	4	0	1	.015	4	-.002	15
334			min	-2883.295	3	-3.268	4	0	1	0	4	0	1	-.009	4
335		16	max	2731.818	2	-.974	15	9.936	4	0	1	.02	4	-.002	15
336			min	-2883.423	3	-4.137	4	0	1	0	4	0	1	-.008	4
337		17	max	2731.648	2	-1.178	15	10.541	4	0	1	.025	4	-.001	15
338			min	-2883.551	3	-5.005	4	0	1	0	4	0	1	-.006	4
339		18	max	2731.477	2	-1.382	15	11.146	4	0	1	.03	4	0	15
340			min	-2883.678	3	-5.874	4	0	1	0	4	0	1	-.003	4
341		19	max	2731.307	2	-1.587	15	11.752	4	0	1	.035	4	0	1
342			min	-2883.806	3	-6.743	4	0	1	0	4	0	1	0	1
343	M8	1	max	2438.4	2	0	1	0	1	0	1	.028	4	0	1
344			min	-188.534	3	0	1	-235.439	4	0	1	0	1	0	1
345		2	max	2438.571	2	0	1	0	1	0	1	.001	5	0	1
346			min	-188.407	3	0	1	-235.587	4	0	1	0	1	0	1
347		3	max	2438.741	2	0	1	0	1	0	1	0	1	0	1
348			min	-188.279	3	0	1	-235.735	4	0	1	-.026	4	0	1
349		4	max	2438.911	2	0	1	0	1	0	1	0	1	0	1
350			min	-188.151	3	0	1	-235.882	4	0	1	-.053	4	0	1
351		5	max	2439.082	2	0	1	0	1	0	1	0	1	0	1
352			min	-188.023	3	0	1	-236.03	4	0	1	-.08	4	0	1
353		6	max	2439.252	2	0	1	0	1	0	1	0	1	0	1
354			min	-187.896	3	0	1	-236.178	4	0	1	-.107	4	0	1
355		7	max	2439.422	2	0	1	0	1	0	1	0	1	0	1
356			min	-187.768	3	0	1	-236.325	4	0	1	-.134	4	0	1
357		8	max	2439.593	2	0	1	0	1	0	1	0	1	0	1
358			min	-187.64	3	0	1	-236.473	4	0	1	-.161	4	0	1
359		9	max	2439.763	2	0	1	0	1	0	1	0	1	0	1
360			min	-187.512	3	0	1	-236.62	4	0	1	-.188	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	2439.933	2	0	1	0	1	0	1	0	1	0	1
362			min	-187.384	3	0	1	-236.768	4	0	1	-.216	4	0	1
363		11	max	2440.104	2	0	1	0	1	0	1	0	1	0	1
364			min	-187.257	3	0	1	-236.916	4	0	1	-.243	4	0	1
365		12	max	2440.274	2	0	1	0	1	0	1	0	1	0	1
366			min	-187.129	3	0	1	-237.063	4	0	1	-.27	4	0	1
367		13	max	2440.444	2	0	1	0	1	0	1	0	1	0	1
368			min	-187.001	3	0	1	-237.211	4	0	1	-.297	4	0	1
369		14	max	2440.615	2	0	1	0	1	0	1	0	1	0	1
370			min	-186.873	3	0	1	-237.359	4	0	1	-.325	4	0	1
371		15	max	2440.785	2	0	1	0	1	0	1	0	1	0	1
372			min	-186.746	3	0	1	-237.506	4	0	1	-.352	4	0	1
373		16	max	2440.955	2	0	1	0	1	0	1	0	1	0	1
374			min	-186.618	3	0	1	-237.654	4	0	1	-.379	4	0	1
375		17	max	2441.126	2	0	1	0	1	0	1	0	1	0	1
376			min	-186.49	3	0	1	-237.802	4	0	1	-.406	4	0	1
377		18	max	2441.296	2	0	1	0	1	0	1	0	1	0	1
378			min	-186.362	3	0	1	-237.949	4	0	1	-.434	4	0	1
379		19	max	2441.466	2	0	1	0	1	0	1	0	1	0	1
380			min	-186.235	3	0	1	-238.097	4	0	1	-.461	4	0	1
381	M10	1	max	1090.364	2	1.989	6	-.024	10	0	1	0	4	0	1
382			min	-1527.922	3	.452	15	-22.008	4	0	5	0	3	0	1
383		2	max	1090.893	2	1.918	6	-.024	10	0	1	0	10	0	15
384			min	-1527.525	3	.435	15	-22.469	4	0	5	-.008	4	0	6
385		3	max	1091.422	2	1.847	6	-.024	10	0	1	0	10	0	15
386			min	-1527.128	3	.418	15	-22.931	4	0	5	-.016	4	-.001	6
387		4	max	1091.951	2	1.776	6	-.024	10	0	1	0	10	0	15
388			min	-1526.731	3	.402	15	-23.392	4	0	5	-.024	4	-.002	6
389		5	max	1092.481	2	1.705	6	-.024	10	0	1	0	10	0	15
390			min	-1526.334	3	.385	15	-23.853	4	0	5	-.033	4	-.003	6
391		6	max	1093.01	2	1.634	6	-.024	10	0	1	0	10	0	15
392			min	-1525.937	3	.368	15	-24.314	4	0	5	-.042	4	-.003	6
393		7	max	1093.539	2	1.563	6	-.024	10	0	1	0	10	0	15
394			min	-1525.54	3	.352	15	-24.775	4	0	5	-.05	4	-.004	6
395		8	max	1094.069	2	1.492	6	-.024	10	0	1	0	10	0	15
396			min	-1525.143	3	.335	15	-25.237	4	0	5	-.059	4	-.004	6
397		9	max	1094.598	2	1.421	6	-.024	10	0	1	0	10	-.001	15
398			min	-1524.746	3	.318	15	-25.698	4	0	5	-.068	4	-.005	6
399		10	max	1095.127	2	1.35	6	-.024	10	0	1	0	10	-.001	15
400			min	-1524.349	3	.302	15	-26.159	4	0	5	-.078	4	-.005	6
401		11	max	1095.656	2	1.279	6	-.024	10	0	1	0	10	-.001	15
402			min	-1523.952	3	.285	15	-26.62	4	0	5	-.087	4	-.006	6
403		12	max	1096.186	2	1.208	6	-.024	10	0	1	0	10	-.001	15
404			min	-1523.555	3	.268	15	-27.082	4	0	5	-.097	4	-.006	6
405		13	max	1096.715	2	1.142	2	-.024	10	0	1	0	10	-.002	15
406			min	-1523.158	3	.251	15	-27.543	4	0	5	-.107	4	-.007	6
407		14	max	1097.244	2	1.087	2	-.024	10	0	1	0	10	-.002	15
408			min	-1522.761	3	.235	15	-28.004	4	0	5	-.117	4	-.007	6
409		15	max	1097.774	2	1.031	2	-.024	10	0	1	0	10	-.002	15
410			min	-1522.364	3	.214	12	-28.465	4	0	5	-.127	4	-.007	6
411		16	max	1098.303	2	.976	2	-.024	10	0	1	0	10	-.002	15
412			min	-1521.967	3	.186	12	-28.926	4	0	5	-.137	4	-.008	6
413		17	max	1098.832	2	.921	2	-.024	10	0	1	0	10	-.002	15
414			min	-1521.57	3	.158	12	-29.388	4	0	5	-.147	4	-.008	6
415		18	max	1099.361	2	.865	2	-.024	10	0	1	0	10	-.002	15
416			min	-1521.173	3	.131	12	-29.849	4	0	5	-.158	4	-.008	6
417		19	max	1099.891	2	.81	2	-.024	10	0	1	0	10	-.002	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
418			min	-1520.776	3	.103	12	-30.31	4	0	5	-.169	4	-.009	6
419	M11	1	max	854.314	2	8.849	6	1.092	4	0	1	0	10	.009	6
420			min	-986.004	3	2.068	15	-.228	1	0	4	-.018	4	.002	15
421		2	max	854.143	2	7.98	6	1.697	4	0	1	0	10	.005	2
422			min	-986.132	3	1.864	15	-.228	1	0	4	-.017	4	0	12
423		3	max	853.973	2	7.111	6	2.302	4	0	1	0	10	.002	2
424			min	-986.26	3	1.66	15	-.228	1	0	4	-.017	4	0	3
425		4	max	853.802	2	6.243	6	2.907	4	0	1	0	10	0	2
426			min	-986.388	3	1.455	15	-.228	1	0	4	-.015	4	-.003	3
427		5	max	853.632	2	5.374	6	3.512	4	0	1	0	10	-.001	15
428			min	-986.516	3	1.251	15	-.228	1	0	4	-.014	4	-.005	4
429		6	max	853.462	2	4.505	6	4.117	4	0	1	0	10	-.002	15
430			min	-986.643	3	1.047	15	-.228	1	0	4	-.012	4	-.007	4
431		7	max	853.291	2	3.636	6	4.722	4	0	1	0	10	-.002	15
432			min	-986.771	3	.843	15	-.228	1	0	4	-.01	4	-.009	4
433		8	max	853.121	2	2.767	6	5.327	4	0	1	0	10	-.003	15
434			min	-986.899	3	.638	15	-.228	1	0	4	-.008	4	-.01	4
435		9	max	852.951	2	1.898	6	5.932	4	0	1	0	10	-.003	15
436			min	-987.027	3	.434	15	-.228	1	0	4	-.005	4	-.012	4
437		10	max	852.78	2	1.029	6	6.537	4	0	1	0	10	-.003	15
438			min	-987.154	3	.23	15	-.228	1	0	4	-.002	4	-.012	4
439		11	max	852.61	2	.32	2	7.143	4	0	1	.001	5	-.003	15
440			min	-987.282	3	-.129	3	-.228	1	0	4	-.001	1	-.012	4
441		12	max	852.44	2	-.179	15	7.748	4	0	1	.005	5	-.003	15
442			min	-987.41	3	-.71	4	-.228	1	0	4	-.001	1	-.012	4
443		13	max	852.269	2	-.383	15	8.353	4	0	1	.009	5	-.003	15
444			min	-987.538	3	-1.579	4	-.228	1	0	4	-.001	1	-.012	4
445		14	max	852.099	2	-.587	15	8.958	4	0	1	.013	5	-.003	15
446			min	-987.665	3	-2.447	4	-.228	1	0	4	-.002	1	-.011	4
447		15	max	851.929	2	-.791	15	9.563	4	0	1	.017	5	-.002	15
448			min	-987.793	3	-3.316	4	-.228	1	0	4	-.002	1	-.01	4
449		16	max	851.758	2	-.996	15	10.168	4	0	1	.022	5	-.002	15
450			min	-987.921	3	-4.185	4	-.228	1	0	4	-.002	1	-.008	4
451		17	max	851.588	2	-1.2	15	10.773	4	0	1	.027	5	-.001	15
452			min	-988.049	3	-5.054	4	-.228	1	0	4	-.002	1	-.006	4
453		18	max	851.418	2	-1.404	15	11.378	4	0	1	.032	5	0	15
454			min	-988.176	3	-5.923	4	-.228	1	0	4	-.002	1	-.003	4
455		19	max	851.247	2	-1.608	15	11.983	4	0	1	.037	5	0	1
456			min	-988.304	3	-6.792	4	-.228	1	0	4	-.002	1	0	1
457	M12	1	max	918.381	1	0	1	8.784	1	0	1	.03	5	0	1
458			min	-29.246	3	0	1	-240.42	4	0	1	-.002	1	0	1
459		2	max	918.552	1	0	1	8.784	1	0	1	.003	5	0	1
460			min	-29.118	3	0	1	-240.568	4	0	1	0	1	0	1
461		3	max	918.722	1	0	1	8.784	1	0	1	0	1	0	1
462			min	-28.99	3	0	1	-240.715	4	0	1	-.025	4	0	1
463		4	max	918.892	1	0	1	8.784	1	0	1	.001	1	0	1
464			min	-28.862	3	0	1	-240.863	4	0	1	-.053	4	0	1
465		5	max	919.063	1	0	1	8.784	1	0	1	.002	1	0	1
466			min	-28.735	3	0	1	-241.01	4	0	1	-.081	4	0	1
467		6	max	919.233	1	0	1	8.784	1	0	1	.003	1	0	1
468			min	-28.607	3	0	1	-241.158	4	0	1	-.108	4	0	1
469		7	max	919.403	1	0	1	8.784	1	0	1	.004	1	0	1
470			min	-28.479	3	0	1	-241.306	4	0	1	-.136	4	0	1
471		8	max	919.574	1	0	1	8.784	1	0	1	.005	1	0	1
472			min	-28.351	3	0	1	-241.453	4	0	1	-.164	4	0	1
473		9	max	919.744	1	0	1	8.784	1	0	1	.006	1	0	1
474			min	-28.224	3	0	1	-241.601	4	0	1	-.191	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	919.914	1	0	1	8.784	1	0	1	.007	1	0	1
476			min	-28.096	3	0	1	-241.749	4	0	1	-.219	4	0	1
477		11	max	920.085	1	0	1	8.784	1	0	1	.008	1	0	1
478			min	-27.968	3	0	1	-241.896	4	0	1	-.247	4	0	1
479		12	max	920.255	1	0	1	8.784	1	0	1	.009	1	0	1
480			min	-27.84	3	0	1	-242.044	4	0	1	-.275	4	0	1
481		13	max	920.425	1	0	1	8.784	1	0	1	.01	1	0	1
482			min	-27.712	3	0	1	-242.192	4	0	1	-.303	4	0	1
483		14	max	920.596	1	0	1	8.784	1	0	1	.011	1	0	1
484			min	-27.585	3	0	1	-242.339	4	0	1	-.33	4	0	1
485		15	max	920.766	1	0	1	8.784	1	0	1	.012	1	0	1
486			min	-27.457	3	0	1	-242.487	4	0	1	-.358	4	0	1
487		16	max	920.936	1	0	1	8.784	1	0	1	.013	1	0	1
488			min	-27.329	3	0	1	-242.634	4	0	1	-.386	4	0	1
489		17	max	921.107	1	0	1	8.784	1	0	1	.014	1	0	1
490			min	-27.201	3	0	1	-242.782	4	0	1	-.414	4	0	1
491		18	max	921.277	1	0	1	8.784	1	0	1	.015	1	0	1
492			min	-27.074	3	0	1	-242.93	4	0	1	-.442	4	0	1
493		19	max	921.447	1	0	1	8.784	1	0	1	.016	1	0	1
494			min	-26.946	3	0	1	-243.077	4	0	1	-.47	4	0	1
495	M1	1	max	144.751	1	784.309	3	40.184	5	0	2	.135	1	0	15
496			min	-20.605	5	-420.817	2	-48.36	1	0	3	-.105	5	-.013	2
497		2	max	145.593	1	783.215	3	41.644	5	0	2	.105	1	.249	2
498			min	-20.212	5	-422.276	2	-48.36	1	0	3	-.08	5	-.493	3
499		3	max	638.488	3	565.734	2	21.786	5	0	3	.075	1	.5	2
500			min	-382.81	2	-620.383	3	-48.197	1	0	2	-.053	5	-.964	3
501		4	max	639.12	3	564.275	2	23.246	5	0	3	.045	1	.15	2
502			min	-381.968	2	-621.478	3	-48.197	1	0	2	-.039	5	-.578	3
503		5	max	639.751	3	562.816	2	24.706	5	0	3	.015	1	-.005	15
504			min	-381.125	2	-622.572	3	-48.197	1	0	2	-.025	5	-.2	2
505		6	max	640.383	3	561.357	2	26.166	5	0	3	-.001	10	.194	3
506			min	-380.283	2	-623.666	3	-48.197	1	0	2	-.015	1	-.549	2
507		7	max	641.015	3	559.898	2	27.626	5	0	3	.008	5	.582	3
508			min	-379.441	2	-624.76	3	-48.197	1	0	2	-.045	1	-.897	2
509		8	max	641.647	3	558.439	2	29.087	5	0	3	.025	5	.97	3
510			min	-378.598	2	-625.855	3	-48.197	1	0	2	-.075	1	-1.244	2
511		9	max	657.461	3	52.759	2	54.154	5	0	9	.05	1	1.127	3
512			min	-317.065	2	.437	15	-81.236	1	0	3	-.119	5	-1.418	2
513		10	max	658.093	3	51.3	2	55.614	5	0	9	0	10	1.105	3
514			min	-316.223	2	-.009	5	-81.236	1	0	3	-.086	4	-1.451	2
515		11	max	658.725	3	49.841	2	57.074	5	0	9	-.005	10	1.083	3
516			min	-315.38	2	-1.846	4	-81.236	1	0	3	-.062	4	-1.482	2
517		12	max	674.156	3	425.206	3	139.98	5	0	2	.073	1	.952	3
518			min	-253.68	2	-671.281	2	-46.74	1	0	3	-.232	5	-1.317	2
519		13	max	674.788	3	424.111	3	141.44	5	0	2	.044	1	.688	3
520			min	-252.837	2	-672.74	2	-46.74	1	0	3	-.144	5	-.9	2
521		14	max	675.419	3	423.017	3	142.901	5	0	2	.015	1	.425	3
522			min	-251.995	2	-674.199	2	-46.74	1	0	3	-.056	5	-.482	2
523		15	max	676.051	3	421.923	3	144.361	5	0	2	.033	5	.163	3
524			min	-251.153	2	-675.658	2	-46.74	1	0	3	-.014	1	-.078	1
525		16	max	676.683	3	420.828	3	145.821	5	0	2	.123	5	.357	2
526			min	-250.31	2	-677.117	2	-46.74	1	0	3	-.043	1	-.098	3
527		17	max	677.315	3	419.734	3	147.281	5	0	2	.214	5	.778	2
528			min	-249.468	2	-678.576	2	-46.74	1	0	3	-.072	1	-.359	3
529		18	max	35.225	5	642.39	2	-5.1	12	0	5	.209	5	.393	2
530			min	-146.256	1	-305.995	3	-93.581	4	0	2	-.103	1	-.177	3
531		19	max	35.618	5	640.931	2	-5.1	12	0	5	.16	5	.013	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
532			min	-145.413	1	-307.089	3	-92.121	4	0	2	-.138	1	-.006	1
533	M5	1	max	330.714	1	2574.065	3	77.754	5	0	1	0	1	.026	2
534			min	10.355	12	-1468.049	2	0	1	0	4	-.208	4	0	15
535		2	max	331.556	1	2572.971	3	79.214	5	0	1	0	1	.937	2
536			min	10.776	12	-1469.508	2	0	1	0	4	-.16	4	-1.583	3
537		3	max	1918.038	3	1445.653	2	61.419	4	0	4	0	1	1.818	2
538			min	-1173.313	2	-1748.469	3	0	1	0	1	-.11	4	-3.132	3
539		4	max	1918.67	3	1444.193	2	62.879	4	0	4	0	1	.921	2
540			min	-1172.471	2	-1749.563	3	0	1	0	1	-.072	4	-2.047	3
541		5	max	1919.302	3	1442.734	2	64.339	4	0	4	0	1	.062	1
542			min	-1171.629	2	-1750.657	3	0	1	0	1	-.032	4	-.961	3
543		6	max	1919.933	3	1441.275	2	65.799	4	0	4	.008	4	.126	3
544			min	-1170.786	2	-1751.752	3	0	1	0	1	0	1	-.87	2
545		7	max	1920.565	3	1439.816	2	67.259	4	0	4	.049	4	1.214	3
546			min	-1169.944	2	-1752.846	3	0	1	0	1	0	1	-1.764	2
547		8	max	1921.197	3	1438.357	2	68.72	4	0	4	.092	4	2.302	3
548			min	-1169.101	2	-1753.94	3	0	1	0	1	0	1	-2.657	2
549		9	max	1935.3	3	180.594	2	184.137	4	0	1	0	1	2.653	3
550			min	-1030.293	2	.438	15	0	1	0	1	-.187	4	-3.05	2
551		10	max	1935.932	3	179.135	2	185.597	4	0	1	0	1	2.562	3
552			min	-1029.451	2	-.002	15	0	1	0	1	-.073	4	-3.161	2
553		11	max	1936.564	3	177.676	2	187.057	4	0	1	.043	4	2.472	3
554			min	-1028.608	2	-1.702	6	0	1	0	1	0	1	-3.272	2
555		12	max	1951.433	3	1137.425	3	195.51	4	0	1	0	1	2.161	3
556			min	-890.136	2	-1798.155	2	0	1	0	4	-.329	4	-2.925	2
557		13	max	1952.065	3	1136.331	3	196.97	4	0	1	0	1	1.456	3
558			min	-889.293	2	-1799.614	2	0	1	0	4	-.207	4	-1.808	2
559		14	max	1952.697	3	1135.237	3	198.43	4	0	1	0	1	.751	3
560			min	-888.451	2	-1801.073	2	0	1	0	4	-.084	4	-.691	2
561		15	max	1953.328	3	1134.142	3	199.891	4	0	1	.039	4	.427	2
562			min	-887.609	2	-1802.532	2	0	1	0	4	0	1	0	15
563		16	max	1953.96	3	1133.048	3	201.351	4	0	1	.164	4	1.547	2
564			min	-886.766	2	-1803.991	2	0	1	0	4	0	1	-.657	3
565		17	max	1954.592	3	1131.954	3	202.811	4	0	1	.289	4	2.667	2
566			min	-885.924	2	-1805.45	2	0	1	0	4	0	1	-1.36	3
567		18	max	-12.218	12	2175.062	2	0	1	0	4	.32	4	1.36	2
568			min	-330.231	1	-1094.416	3	-17.957	5	0	1	0	1	-.705	3
569		19	max	-11.797	12	2173.603	2	0	1	0	4	.31	4	.012	1
570			min	-329.388	1	-1095.511	3	-16.497	5	0	1	0	1	-.026	3
571	M9	1	max	144.751	1	784.309	3	59.271	4	0	3	-.012	10	0	15
572			min	9.435	12	-420.817	2	4.251	10	0	4	-.159	4	-.013	2
573		2	max	145.593	1	783.215	3	60.731	4	0	3	-.009	10	.249	2
574			min	9.856	12	-422.276	2	4.251	10	0	4	-.122	4	-.493	3
575		3	max	638.488	3	565.734	2	48.197	1	0	2	-.006	10	.5	2
576			min	-382.81	2	-620.383	3	4.229	10	0	3	-.084	4	-.964	3
577		4	max	639.12	3	564.275	2	48.197	1	0	2	-.004	10	.15	2
578			min	-381.968	2	-621.478	3	4.229	10	0	3	-.058	4	-.578	3
579		5	max	639.751	3	562.816	2	48.197	1	0	2	-.001	10	-.005	15
580			min	-381.125	2	-622.572	3	4.229	10	0	3	-.031	4	-.2	2
581		6	max	640.383	3	561.357	2	48.197	1	0	2	.015	1	.194	3
582			min	-380.283	2	-623.666	3	4.229	10	0	3	-.007	5	-.549	2
583		7	max	641.015	3	559.898	2	48.197	1	0	2	.045	1	.582	3
584			min	-379.441	2	-624.76	3	4.229	10	0	3	.004	10	-.897	2
585		8	max	641.647	3	558.439	2	48.65	4	0	2	.075	1	.97	3
586			min	-378.598	2	-625.855	3	4.229	10	0	3	.007	10	-1.244	2
587		9	max	657.461	3	52.759	2	86.321	4	0	3	-.005	10	1.127	3
588			min	-317.065	2	.454	15	7.466	10	0	9	-.139	4	-1.418	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	658.093	3	51.3	2	87.781	4	0	3	0	1	1.105	3
590			min	-316.223	2	.014	15	7.466	10	0	9	-.085	4	-1.451	2
591		11	max	658.725	3	49.841	2	89.241	4	0	3	.051	1	1.083	3
592			min	-315.38	2	-1.721	6	7.466	10	0	9	-.042	5	-1.482	2
593		12	max	674.156	3	425.206	3	159.707	4	0	3	-.007	10	.952	3
594			min	-253.68	2	-671.281	2	4.338	12	0	2	-.262	4	-1.317	2
595		13	max	674.788	3	424.111	3	161.167	4	0	3	-.004	10	.688	3
596			min	-252.837	2	-672.74	2	4.338	12	0	2	-.163	4	-.9	2
597		14	max	675.419	3	423.017	3	162.627	4	0	3	-.001	10	.425	3
598			min	-251.995	2	-674.199	2	4.338	12	0	2	-.062	4	-.482	2
599		15	max	676.051	3	421.923	3	164.087	4	0	3	.039	4	.163	3
600			min	-251.153	2	-675.658	2	4.338	12	0	2	.001	12	-.078	1
601		16	max	676.683	3	420.828	3	165.547	4	0	3	.141	4	.357	2
602			min	-250.31	2	-677.117	2	4.338	12	0	2	.004	12	-.098	3
603		17	max	677.315	3	419.734	3	167.008	4	0	3	.245	4	.778	2
604			min	-249.468	2	-678.576	2	4.338	12	0	2	.006	12	-.359	3
605		18	max	-9.135	12	642.39	2	55.108	1	0	2	.251	4	.393	2
606			min	-146.256	1	-305.995	3	-71.998	5	0	3	.009	12	-.177	3
607		19	max	-8.714	12	640.931	2	55.108	1	0	2	.215	4	.013	3
608			min	-145.413	1	-307.089	3	-70.538	5	0	3	.013	12	-.006	1

Envelope Member Section Deflections

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
1	M13	1	max	0	1	.224	2	.012	3	1.546e-2	2	NC	1	NC	1
2			min	-.635	4	-.072	3	-.008	2	-4.977e-3	3	NC	1	NC	1
3		2	max	0	1	.172	2	.015	3	1.634e-2	2	NC	4	NC	1
4			min	-.635	4	.005	15	-.01	5	-4.499e-3	3	1226.283	3	NC	1
5		3	max	0	1	.178	3	.029	1	1.722e-2	2	NC	4	NC	2
6			min	-.635	4	.004	15	-.013	5	-4.022e-3	3	672.741	3	5555.388	1
7		4	max	0	1	.25	3	.042	1	1.811e-2	2	NC	5	NC	2
8			min	-.635	4	.003	15	-.011	5	-3.544e-3	3	522.098	3	3827.726	1
9		5	max	0	1	.274	3	.048	1	1.899e-2	2	NC	5	NC	2
10			min	-.635	4	.003	15	-.004	5	-3.066e-3	3	486.452	3	3371.118	1
11		6	max	0	1	.249	3	.045	1	1.987e-2	2	NC	4	NC	2
12			min	-.635	4	.004	15	-.005	10	-2.589e-3	3	522.954	3	3631.358	1
13		7	max	0	1	.208	2	.033	3	2.075e-2	2	NC	2	NC	2
14			min	-.635	4	.004	15	-.008	10	-2.111e-3	3	649.035	3	4948.538	1
15		8	max	0	1	.266	2	.035	3	2.163e-2	2	NC	4	NC	1
16			min	-.635	4	.006	15	-.013	2	-1.634e-3	3	953.918	3	7508.06	3
17		9	max	0	1	.316	2	.035	3	2.252e-2	2	NC	4	NC	1
18			min	-.635	4	.007	15	-.021	2	-1.156e-3	3	1686.184	3	7259.634	3
19		10	max	0	1	.339	2	.036	3	2.34e-2	2	NC	4	NC	1
20			min	-.635	4	-.007	3	-.025	2	-6.783e-4	3	1460.309	2	7207.347	3
21		11	max	0	10	.316	2	.035	3	2.252e-2	2	NC	4	NC	1
22			min	-.635	4	.006	15	-.021	2	-1.156e-3	3	1686.184	3	7259.634	3
23		12	max	0	10	.266	2	.035	3	2.163e-2	2	NC	4	NC	1
24			min	-.635	4	.005	15	-.013	2	-1.634e-3	3	953.918	3	7508.06	3
25		13	max	0	10	.208	2	.033	3	2.075e-2	2	NC	2	NC	2
26			min	-.635	4	.004	15	-.008	10	-2.111e-3	3	649.035	3	4948.538	1
27		14	max	0	10	.249	3	.045	1	1.987e-2	2	NC	4	NC	2
28			min	-.635	4	.003	15	-.005	10	-2.589e-3	3	522.954	3	3631.358	1
29		15	max	0	10	.274	3	.048	1	1.899e-2	2	NC	5	NC	2
30			min	-.635	4	.002	15	-.003	10	-3.066e-3	3	486.452	3	3371.118	1
31		16	max	0	10	.25	3	.042	1	1.811e-2	2	NC	5	NC	2
32			min	-.635	4	.002	15	-.002	10	-3.544e-3	3	522.098	3	3827.726	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	.178	3	.029	1	1.722e-2	2	NC	4	NC	2
34			min	-.635	4	.002	15	-.003	10	-4.022e-3	3	672.741	3	5555.388	1
35		18	max	0	10	.172	2	.017	4	1.634e-2	2	NC	4	NC	1
36			min	-.635	4	.003	15	-.004	10	-4.499e-3	3	1226.283	3	9377.977	4
37		19	max	0	10	.224	2	.012	3	1.546e-2	2	NC	1	NC	1
38			min	-.635	4	-.072	3	-.008	2	-4.977e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.478	3	.011	3	8.425e-3	2	NC	1	NC	1
40			min	-.476	4	-.662	2	-.007	2	-7.049e-3	3	NC	1	NC	1
41		2	max	0	1	.668	3	.012	3	9.524e-3	2	NC	5	NC	1
42			min	-.476	4	-.847	2	-.016	5	-8.089e-3	3	885.513	3	9101.727	5
43		3	max	0	1	.837	3	.021	1	1.062e-2	2	NC	5	NC	2
44			min	-.476	4	-1.016	2	-.021	5	-9.129e-3	3	468.269	3	7439.65	5
45		4	max	0	1	.971	3	.034	1	1.172e-2	2	NC	5	NC	2
46			min	-.476	4	-1.157	2	-.015	5	-1.017e-2	3	339.226	2	4760.286	1
47		5	max	0	1	1.061	3	.041	1	1.282e-2	2	NC	15	NC	2
48			min	-.476	4	-1.263	2	-.004	5	-1.121e-2	3	279.535	2	3995.013	1
49		6	max	0	1	1.107	3	.039	1	1.392e-2	2	NC	15	NC	2
50			min	-.476	4	-1.331	2	-.004	10	-1.225e-2	3	250.995	2	4169.722	1
51		7	max	0	1	1.112	3	.03	14	1.502e-2	2	NC	15	NC	2
52			min	-.476	4	-1.365	2	-.007	10	-1.329e-2	3	239.042	2	5549.832	1
53		8	max	0	1	1.09	3	.03	3	1.612e-2	2	NC	15	NC	1
54			min	-.476	4	-1.371	2	-.012	2	-1.433e-2	3	237.032	2	5967.137	4
55		9	max	0	1	1.057	3	.031	3	1.722e-2	2	NC	15	NC	1
56			min	-.476	4	-1.361	2	-.019	2	-1.537e-2	3	240.216	2	8236.34	3
57		10	max	0	1	1.04	3	.031	3	1.832e-2	2	NC	15	NC	1
58			min	-.476	4	-1.353	2	-.023	2	-1.641e-2	3	242.922	2	8157.554	3
59		11	max	0	12	1.057	3	.031	3	1.722e-2	2	NC	15	NC	1
60			min	-.476	4	-1.361	2	-.019	2	-1.537e-2	3	240.216	2	8236.34	3
61		12	max	0	12	1.09	3	.03	3	1.612e-2	2	NC	15	NC	1
62			min	-.476	4	-1.371	2	-.02	5	-1.433e-2	3	237.032	2	8553.281	5
63		13	max	0	12	1.112	3	.029	1	1.502e-2	2	NC	15	NC	2
64			min	-.476	4	-1.365	2	-.013	5	-1.329e-2	3	239.042	2	5549.832	1
65		14	max	0	12	1.107	3	.039	1	1.392e-2	2	NC	15	NC	2
66			min	-.476	4	-1.331	2	-.004	10	-1.225e-2	3	250.995	2	4169.722	1
67		15	max	0	12	1.061	3	.041	1	1.282e-2	2	NC	15	NC	2
68			min	-.476	4	-1.263	2	-.003	10	-1.121e-2	3	279.535	2	3995.013	1
69		16	max	0	12	.971	3	.034	1	1.172e-2	2	NC	5	NC	2
70			min	-.476	4	-1.157	2	-.002	10	-1.017e-2	3	339.226	2	4760.286	1
71		17	max	0	12	.837	3	.031	4	1.062e-2	2	NC	5	NC	2
72			min	-.476	4	-1.016	2	-.003	10	-9.129e-3	3	468.269	3	5299.392	4
73		18	max	0	12	.668	3	.021	4	9.524e-3	2	NC	5	NC	1
74			min	-.476	4	-.847	2	-.004	2	-8.089e-3	3	885.513	3	7679.096	4
75		19	max	0	12	.478	3	.011	3	8.425e-3	2	NC	1	NC	1
76			min	-.476	4	-.662	2	-.007	2	-7.049e-3	3	NC	1	NC	1
77	M15	1	max	0	10	.488	3	.01	3	6.064e-3	3	NC	1	NC	1
78			min	-.388	4	-.66	2	-.007	2	-8.785e-3	2	NC	1	NC	1
79		2	max	0	10	.635	3	.011	3	6.946e-3	3	NC	5	NC	1
80			min	-.388	4	-.88	2	-.023	5	-9.941e-3	2	763.717	2	6579.009	5
81		3	max	0	10	.77	3	.022	1	7.827e-3	3	NC	5	NC	2
82			min	-.388	4	-1.077	2	-.03	5	-1.11e-2	2	402.77	2	5290.936	5
83		4	max	0	10	.884	3	.035	1	8.709e-3	3	NC	5	NC	2
84			min	-.388	4	-1.235	2	-.023	5	-1.225e-2	2	292.11	2	4727.161	1
85		5	max	0	10	.971	3	.041	1	9.591e-3	3	NC	15	NC	2
86			min	-.388	4	-1.345	2	-.008	5	-1.341e-2	2	245.293	2	3965.241	1
87		6	max	0	10	1.029	3	.04	1	1.047e-2	3	NC	15	NC	2
88			min	-.388	4	-1.405	2	-.004	10	-1.456e-2	2	225.667	2	4131.285	1
89		7	max	0	10	1.06	3	.033	4	1.135e-2	3	NC	15	NC	2

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
90			min	-.388	4	-1.419	2	-.006	10	-1.572e-2	2	221.34	2	5324.364	4
91		8	max	0	10	1.069	3	.037	4	1.224e-2	3	NC	15	NC	1
92			min	-.388	4	-1.401	2	-.011	2	-1.688e-2	2	226.747	2	4789.111	4
93		9	max	0	10	1.066	3	.029	3	1.312e-2	3	NC	15	NC	1
94			min	-.388	4	-1.37	2	-.018	2	-1.803e-2	2	236.731	2	6573.35	4
95		10	max	0	1	1.061	3	.029	3	1.4e-2	3	NC	15	NC	1
96			min	-.388	4	-1.352	2	-.022	2	-1.919e-2	2	242.792	2	8844.889	3
97		11	max	0	1	1.066	3	.029	3	1.312e-2	3	NC	15	NC	1
98			min	-.388	4	-1.37	2	-.023	5	-1.803e-2	2	236.731	2	7440.301	5
99		12	max	0	1	1.069	3	.028	3	1.224e-2	3	NC	15	NC	1
100			min	-.388	4	-1.401	2	-.027	5	-1.688e-2	2	226.747	2	6330.061	5
101		13	max	0	1	1.06	3	.03	1	1.135e-2	3	NC	15	NC	2
102			min	-.388	4	-1.419	2	-.018	5	-1.572e-2	2	221.34	2	5473.301	1
103		14	max	0	1	1.029	3	.04	1	1.047e-2	3	NC	15	NC	2
104			min	-.388	4	-1.405	2	-.004	10	-1.456e-2	2	225.667	2	4131.285	1
105		15	max	0	1	.971	3	.041	1	9.591e-3	3	NC	15	NC	2
106			min	-.388	4	-1.345	2	-.002	10	-1.341e-2	2	245.293	2	3965.241	1
107		16	max	0	1	.884	3	.038	4	8.709e-3	3	NC	5	NC	2
108			min	-.388	4	-1.235	2	-.002	10	-1.225e-2	2	292.11	2	4319.825	4
109		17	max	0	1	.77	3	.04	4	7.827e-3	3	NC	5	NC	2
110			min	-.388	4	-1.077	2	-.002	10	-1.11e-2	2	402.77	2	4099.772	4
111		18	max	0	1	.635	3	.028	4	6.946e-3	3	NC	5	NC	1
112			min	-.388	4	-.88	2	-.004	2	-9.941e-3	2	763.717	2	5788.065	4
113		19	max	0	1	.488	3	.01	3	6.064e-3	3	NC	1	NC	1
114			min	-.388	4	-.66	2	-.007	2	-8.785e-3	2	NC	1	NC	1
115	M16	1	max	0	12	.199	2	.009	3	1.171e-2	3	NC	1	NC	1
116			min	-.118	4	-.173	3	-.006	2	-1.299e-2	2	NC	1	NC	1
117		2	max	0	12	.105	2	.012	1	1.259e-2	3	NC	4	NC	1
118			min	-.118	4	-.142	3	-.017	5	-1.334e-2	2	1785.775	2	9100.672	5
119		3	max	0	12	.049	1	.029	1	1.347e-2	3	NC	4	NC	2
120			min	-.118	4	-.12	3	-.022	5	-1.37e-2	2	997.451	2	5551.06	1
121		4	max	0	12	.023	9	.043	1	1.434e-2	3	NC	4	NC	2
122			min	-.118	4	-.113	3	-.018	5	-1.406e-2	2	800.399	2	3803.114	1
123		5	max	0	12	.025	9	.049	1	1.522e-2	3	NC	4	NC	2
124			min	-.118	4	-.125	3	-.009	5	-1.442e-2	2	790.699	2	3328.175	1
125		6	max	0	12	.051	1	.046	1	1.61e-2	3	NC	4	NC	2
126			min	-.118	4	-.154	3	-.002	10	-1.477e-2	2	947.498	2	3550.762	1
127		7	max	0	12	.101	1	.034	1	1.697e-2	3	NC	4	NC	2
128			min	-.118	4	-.195	3	-.005	10	-1.513e-2	2	1490.358	2	4745.197	1
129		8	max	0	12	.164	2	.025	3	1.785e-2	3	NC	1	NC	2
130			min	-.118	4	-.242	3	-.008	10	-1.549e-2	2	2463.697	3	7658.593	4
131		9	max	0	12	.234	2	.025	3	1.873e-2	3	NC	4	NC	1
132			min	-.118	4	-.281	3	-.016	2	-1.585e-2	2	1563.745	3	NC	1
133		10	max	0	1	.266	2	.025	3	1.96e-2	3	NC	4	NC	1
134			min	-.118	4	-.298	3	-.02	2	-1.621e-2	2	1348.034	3	NC	1
135		11	max	0	1	.234	2	.025	3	1.873e-2	3	NC	4	NC	1
136			min	-.118	4	-.281	3	-.016	2	-1.585e-2	2	1563.745	3	NC	1
137		12	max	0	1	.164	2	.025	3	1.785e-2	3	NC	1	NC	2
138			min	-.118	4	-.242	3	-.013	5	-1.549e-2	2	2463.697	3	9303.698	1
139		13	max	0	1	.101	1	.034	1	1.697e-2	3	NC	4	NC	2
140			min	-.118	4	-.195	3	-.006	5	-1.513e-2	2	1490.358	2	4745.197	1
141		14	max	0	1	.051	1	.046	1	1.61e-2	3	NC	4	NC	2
142			min	-.118	4	-.154	3	-.002	10	-1.477e-2	2	947.498	2	3550.762	1
143		15	max	0	1	.025	9	.049	1	1.522e-2	3	NC	4	NC	2
144			min	-.118	4	-.125	3	0	10	-1.442e-2	2	790.699	2	3328.175	1
145		16	max	0	1	.023	9	.043	1	1.434e-2	3	NC	4	NC	2
146			min	-.118	4	-.113	3	0	10	-1.406e-2	2	800.399	2	3803.114	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
147		17	max	0	1	.049	1	.035	4	1.347e-2	3	NC	4	NC	2
148			min	-.118	4	-.12	3	-.001	10	-1.37e-2	2	997.451	2	4697.02	4
149		18	max	0	1	.105	2	.023	4	1.259e-2	3	NC	4	NC	1
150			min	-.118	4	-.142	3	-.003	10	-1.334e-2	2	1785.775	2	7059.663	4
151		19	max	0	1	.199	2	.009	3	1.171e-2	3	NC	1	NC	1
152			min	-.118	4	-.173	3	-.006	2	-1.299e-2	2	NC	1	NC	1
153	M2	1	max	.008	2	.012	2	.006	1	2.e-3	5	NC	1	NC	1
154			min	-.011	3	-.018	3	-.597	4	-1.387e-4	1	6404.038	2	129.732	4
155		2	max	.008	2	.01	2	.006	1	2.02e-3	5	NC	1	NC	1
156			min	-.011	3	-.018	3	-.549	4	-1.32e-4	1	7422.371	2	141.161	4
157		3	max	.007	2	.009	2	.005	1	2.04e-3	5	NC	1	NC	1
158			min	-.01	3	-.017	3	-.501	4	-1.252e-4	1	8804.824	2	154.719	4
159		4	max	.007	2	.007	2	.005	1	2.06e-3	5	NC	1	NC	1
160			min	-.009	3	-.017	3	-.453	4	-1.184e-4	1	NC	1	170.96	4
161		5	max	.006	2	.006	2	.004	1	2.08e-3	5	NC	1	NC	1
162			min	-.009	3	-.016	3	-.406	4	-1.116e-4	1	NC	1	190.634	4
163		6	max	.006	2	.004	2	.004	1	2.1e-3	5	NC	1	NC	1
164			min	-.008	3	-.015	3	-.361	4	-1.048e-4	1	NC	1	214.786	4
165		7	max	.005	2	.003	2	.003	1	2.12e-3	5	NC	1	NC	1
166			min	-.008	3	-.015	3	-.316	4	-9.799e-5	1	NC	1	244.891	4
167		8	max	.005	2	.002	2	.003	1	2.14e-3	5	NC	1	NC	1
168			min	-.007	3	-.014	3	-.274	4	-9.12e-5	1	NC	1	283.101	4
169		9	max	.005	2	0	2	.002	1	2.16e-3	5	NC	1	NC	1
170			min	-.006	3	-.013	3	-.233	4	-8.441e-5	1	NC	1	332.651	4
171		10	max	.004	2	0	2	.002	1	2.181e-3	4	NC	1	NC	1
172			min	-.006	3	-.012	3	-.194	4	-7.762e-5	1	NC	1	398.594	4
173		11	max	.004	2	-.001	15	.002	1	2.203e-3	4	NC	1	NC	1
174			min	-.005	3	-.011	3	-.158	4	-7.083e-5	1	NC	1	489.18	4
175		12	max	.003	2	-.001	15	.001	1	2.225e-3	4	NC	1	NC	1
176			min	-.004	3	-.01	3	-.125	4	-6.404e-5	1	NC	1	618.662	4
177		13	max	.003	2	-.001	15	0	1	2.247e-3	4	NC	1	NC	1
178			min	-.004	3	-.009	3	-.095	4	-5.724e-5	1	NC	1	813.442	4
179		14	max	.002	2	-.001	15	0	1	2.269e-3	4	NC	1	NC	1
180			min	-.003	3	-.008	3	-.069	4	-5.045e-5	1	NC	1	1127.109	4
181		15	max	.002	2	-.001	15	0	1	2.291e-3	4	NC	1	NC	1
182			min	-.003	3	-.006	3	-.046	4	-4.366e-5	1	NC	1	1682.837	4
183		16	max	.001	2	0	15	0	1	2.312e-3	4	NC	1	NC	1
184			min	-.002	3	-.005	3	-.027	4	-3.687e-5	1	NC	1	2819.751	4
185		17	max	0	2	0	15	0	1	2.334e-3	4	NC	1	NC	1
186			min	-.001	3	-.003	3	-.013	4	-3.008e-5	1	NC	1	5787.516	4
187		18	max	0	2	0	15	0	1	2.356e-3	4	NC	1	NC	1
188			min	0	3	-.002	6	-.004	4	-2.329e-5	1	NC	1	NC	1
189		19	max	0	1	0	1	0	1	2.378e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	-1.649e-5	1	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	3.342e-6	1	NC	1	NC	1
192			min	0	1	0	1	0	1	-5.147e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.013	4	5.139e-5	4	NC	1	NC	1
194			min	0	2	-.003	6	0	1	1.829e-6	12	NC	1	7987.998	4
195		3	max	.001	3	-.001	15	.024	4	6.175e-4	4	NC	1	NC	1
196			min	0	2	-.006	6	0	1	3.228e-6	12	NC	1	4153.216	4
197		4	max	.002	3	-.002	15	.035	4	1.184e-3	4	NC	1	NC	1
198			min	-.001	2	-.009	6	0	1	4.628e-6	12	NC	1	2879.113	4
199		5	max	.002	3	-.003	15	.045	4	1.75e-3	4	NC	1	NC	1
200			min	-.002	2	-.012	6	0	1	6.028e-6	12	8543.01	6	2244.354	4
201		6	max	.003	3	-.003	15	.055	4	2.316e-3	4	NC	2	NC	1
202			min	-.002	2	-.015	6	0	1	7.428e-6	12	6921.176	6	1864.437	4
203		7	max	.003	3	-.004	15	.063	4	2.882e-3	4	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
204			min	-.003	2	-.017	6	0	1	8.828e-6	12	5944.461	6	1610.973	4
205		8	max	.004	3	-.004	15	.071	4	3.448e-3	4	NC	5	NC	1
206			min	-.003	2	-.019	6	0	1	1.023e-5	12	5342.049	6	1428.735	4
207		9	max	.004	3	-.004	15	.079	4	4.014e-3	4	NC	5	NC	1
208			min	-.004	2	-.02	6	0	3	1.163e-5	12	4986.472	6	1289.924	4
209		10	max	.005	3	-.005	15	.086	4	4.58e-3	4	NC	5	NC	1
210			min	-.004	2	-.021	6	0	12	1.303e-5	12	4815.922	6	1178.949	4
211		11	max	.005	3	-.005	15	.094	4	5.146e-3	4	NC	5	NC	1
212			min	-.005	2	-.021	6	0	12	1.443e-5	12	4805.318	6	1086.354	4
213		12	max	.006	3	-.004	15	.101	4	5.713e-3	4	NC	5	NC	1
214			min	-.005	2	-.02	6	0	12	1.583e-5	12	4956.692	6	1006.077	4
215		13	max	.006	3	-.004	15	.109	4	6.279e-3	4	NC	5	NC	1
216			min	-.006	2	-.019	6	0	12	1.723e-5	12	5301.205	6	934.102	4
217		14	max	.007	3	-.004	15	.117	4	6.845e-3	4	NC	5	NC	1
218			min	-.006	2	-.017	6	0	12	1.863e-5	12	5915.243	6	867.741	4
219		15	max	.008	3	-.003	15	.126	4	7.411e-3	4	NC	3	NC	1
220			min	-.006	2	-.014	6	0	12	2.003e-5	12	6967.891	6	805.233	4
221		16	max	.008	3	-.002	15	.136	4	7.977e-3	4	NC	1	NC	1
222			min	-.007	2	-.011	6	0	12	2.143e-5	12	8868.492	6	745.499	4
223		17	max	.009	3	-.001	15	.148	4	8.543e-3	4	NC	1	NC	1
224			min	-.007	2	-.008	6	0	12	2.283e-5	12	NC	1	687.967	4
225		18	max	.009	3	0	15	.161	4	9.109e-3	4	NC	1	NC	1
226			min	-.008	2	-.005	3	0	12	2.422e-5	12	NC	1	632.438	4
227		19	max	.01	3	0	5	.176	4	9.675e-3	4	NC	1	NC	1
228			min	-.008	2	-.002	3	0	12	2.562e-5	12	NC	1	578.974	4
229	M4	1	max	.002	1	.008	2	0	12	3.679e-4	4	NC	1	NC	2
230			min	0	5	-.01	3	-.176	4	1.066e-5	10	NC	1	141.266	4
231		2	max	.002	1	.008	2	0	12	3.679e-4	4	NC	1	NC	2
232			min	0	5	-.009	3	-.162	4	1.066e-5	10	NC	1	153.505	4
233		3	max	.002	1	.007	2	0	12	3.679e-4	4	NC	1	NC	2
234			min	0	5	-.009	3	-.148	4	1.066e-5	10	NC	1	168.077	4
235		4	max	.002	1	.007	2	0	12	3.679e-4	4	NC	1	NC	2
236			min	0	5	-.008	3	-.134	4	1.066e-5	10	NC	1	185.586	4
237		5	max	.002	1	.006	2	0	12	3.679e-4	4	NC	1	NC	2
238			min	0	5	-.008	3	-.12	4	1.066e-5	10	NC	1	206.854	4
239		6	max	.002	1	.006	2	0	12	3.679e-4	4	NC	1	NC	2
240			min	0	5	-.007	3	-.106	4	1.066e-5	10	NC	1	233.022	4
241		7	max	.001	1	.005	2	0	12	3.679e-4	4	NC	1	NC	2
242			min	0	5	-.007	3	-.093	4	1.066e-5	10	NC	1	265.707	4
243		8	max	.001	1	.005	2	0	12	3.679e-4	4	NC	1	NC	2
244			min	0	5	-.006	3	-.081	4	1.066e-5	10	NC	1	307.269	4
245		9	max	.001	1	.004	2	0	12	3.679e-4	4	NC	1	NC	1
246			min	0	5	-.006	3	-.069	4	1.066e-5	10	NC	1	361.259	4
247		10	max	.001	1	.004	2	0	12	3.679e-4	4	NC	1	NC	1
248			min	0	5	-.005	3	-.057	4	1.066e-5	10	NC	1	433.229	4
249		11	max	0	1	.004	2	0	12	3.679e-4	4	NC	1	NC	1
250			min	0	5	-.004	3	-.047	4	1.066e-5	10	NC	1	532.261	4
251		12	max	0	1	.003	2	0	12	3.679e-4	4	NC	1	NC	1
252			min	0	5	-.004	3	-.037	4	1.066e-5	10	NC	1	674.059	4
253		13	max	0	1	.003	2	0	12	3.679e-4	4	NC	1	NC	1
254			min	0	5	-.003	3	-.028	4	1.066e-5	10	NC	1	887.77	4
255		14	max	0	1	.002	2	0	12	3.679e-4	4	NC	1	NC	1
256			min	0	5	-.003	3	-.02	4	1.066e-5	10	NC	1	1232.675	4
257		15	max	0	1	.002	2	0	12	3.679e-4	4	NC	1	NC	1
258			min	0	5	-.002	3	-.013	4	1.066e-5	10	NC	1	1845.395	4
259		16	max	0	1	.001	2	0	12	3.679e-4	4	NC	1	NC	1
260			min	0	5	-.002	3	-.008	4	1.066e-5	10	NC	1	3103.469	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
261		17	max	0	1	0	2	0	12	3.679e-4	4	NC	1	NC	1
262			min	0	5	-.001	3	-.004	4	1.066e-5	10	NC	1	6406.064	4
263		18	max	0	1	0	2	0	12	3.679e-4	4	NC	1	NC	1
264			min	0	5	0	3	-.001	4	1.066e-5	10	NC	1	NC	1
265		19	max	0	1	0	1	0	1	3.679e-4	4	NC	1	NC	1
266			min	0	1	0	1	0	1	1.066e-5	10	NC	1	NC	1
267	M6	1	max	.024	2	.039	2	0	1	2.084e-3	4	NC	3	NC	1
268			min	-.035	3	-.054	3	-.603	4	0	1	2010.716	2	128.444	4
269		2	max	.023	2	.035	2	0	1	2.103e-3	4	NC	3	NC	1
270			min	-.033	3	-.051	3	-.554	4	0	1	2207.711	2	139.761	4
271		3	max	.021	2	.032	2	0	1	2.122e-3	4	NC	3	NC	1
272			min	-.031	3	-.048	3	-.506	4	0	1	2445.44	2	153.185	4
273		4	max	.02	2	.028	2	0	1	2.141e-3	4	NC	3	NC	1
274			min	-.029	3	-.045	3	-.458	4	0	1	2735.442	2	169.264	4
275		5	max	.019	2	.025	2	0	1	2.159e-3	4	NC	3	NC	1
276			min	-.027	3	-.042	3	-.411	4	0	1	3093.794	2	188.745	4
277		6	max	.017	2	.022	2	0	1	2.178e-3	4	NC	3	NC	1
278			min	-.025	3	-.039	3	-.364	4	0	1	3543.433	2	212.657	4
279		7	max	.016	2	.019	2	0	1	2.197e-3	4	NC	3	NC	1
280			min	-.023	3	-.036	3	-.32	4	0	1	4118.003	2	242.463	4
281		8	max	.015	2	.016	2	0	1	2.216e-3	4	NC	1	NC	1
282			min	-.021	3	-.033	3	-.276	4	0	1	4868.489	2	280.293	4
283		9	max	.013	2	.013	2	0	1	2.235e-3	4	NC	1	NC	1
284			min	-.019	3	-.03	3	-.235	4	0	1	5875.244	2	329.35	4
285		10	max	.012	2	.011	2	0	1	2.254e-3	4	NC	1	NC	1
286			min	-.017	3	-.027	3	-.196	4	0	1	7271.059	2	394.634	4
287		11	max	.011	2	.008	2	0	1	2.273e-3	4	NC	1	NC	1
288			min	-.015	3	-.024	3	-.16	4	0	1	9288.704	2	484.31	4
289		12	max	.009	2	.006	2	0	1	2.291e-3	4	NC	1	NC	1
290			min	-.014	3	-.021	3	-.127	4	0	1	NC	1	612.483	4
291		13	max	.008	2	.004	2	0	1	2.31e-3	4	NC	1	NC	1
292			min	-.012	3	-.018	3	-.096	4	0	1	NC	1	805.278	4
293		14	max	.007	2	.003	2	0	1	2.329e-3	4	NC	1	NC	1
294			min	-.01	3	-.015	3	-.069	4	0	1	NC	1	1115.713	4
295		15	max	.005	2	.002	2	0	1	2.348e-3	4	NC	1	NC	1
296			min	-.008	3	-.012	3	-.047	4	0	1	NC	1	1665.624	4
297		16	max	.004	2	0	2	0	1	2.367e-3	4	NC	1	NC	1
298			min	-.006	3	-.009	3	-.028	4	0	1	NC	1	2790.344	4
299		17	max	.003	2	0	2	0	1	2.386e-3	4	NC	1	NC	1
300			min	-.004	3	-.006	3	-.014	4	0	1	NC	1	5724.955	4
301		18	max	.001	2	0	2	0	1	2.405e-3	4	NC	1	NC	1
302			min	-.002	3	-.003	3	-.004	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	2.423e-3	4	NC	1	NC	1
304			min	0	1	0	1	0	1	0	1	NC	1	NC	1
305	M7	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
306			min	0	1	0	1	0	1	-5.252e-4	4	NC	1	NC	1
307		2	max	.002	3	0	15	.013	4	2.428e-5	4	NC	1	NC	1
308			min	-.001	2	-.004	3	0	1	0	1	NC	1	NC	1
309		3	max	.003	3	-.001	15	.025	4	5.737e-4	4	NC	1	NC	1
310			min	-.003	2	-.008	3	0	1	0	1	NC	1	NC	1
311		4	max	.005	3	-.002	15	.036	4	1.123e-3	4	NC	1	NC	1
312			min	-.004	2	-.011	3	0	1	0	1	NC	1	NC	1
313		5	max	.006	3	-.003	15	.046	4	1.673e-3	4	NC	1	NC	1
314			min	-.006	2	-.014	3	0	1	0	1	7993.887	3	NC	1
315		6	max	.008	3	-.004	15	.055	4	2.222e-3	4	NC	1	NC	1
316			min	-.007	2	-.017	3	0	1	0	1	6748.551	3	NC	1
317		7	max	.009	3	-.004	15	.064	4	2.771e-3	4	NC	2	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
318			min	-.009	2	-.019	3	0	1	0	1	5924.808	4	NC	1
319		8	max	.011	3	-.005	15	.072	4	3.321e-3	4	NC	2	NC	1
320			min	-.01	2	-.021	3	0	1	0	1	5325.637	4	NC	1
321		9	max	.013	3	-.005	15	.08	4	3.87e-3	4	NC	5	NC	1
322			min	-.012	2	-.022	3	0	1	0	1	4972.124	4	NC	1
323		10	max	.014	3	-.005	15	.087	4	4.42e-3	4	NC	5	NC	1
324			min	-.013	2	-.023	3	0	1	0	1	4802.853	4	NC	1
325		11	max	.016	3	-.005	15	.094	4	4.969e-3	4	NC	5	NC	1
326			min	-.015	2	-.023	3	0	1	0	1	4792.941	4	NC	1
327		12	max	.017	3	-.005	15	.101	4	5.519e-3	4	NC	5	NC	1
328			min	-.016	2	-.022	3	0	1	0	1	4944.504	4	NC	1
329		13	max	.019	3	-.005	15	.108	4	6.068e-3	4	NC	5	NC	1
330			min	-.018	2	-.021	3	0	1	0	1	5288.689	4	NC	1
331		14	max	.02	3	-.004	15	.116	4	6.617e-3	4	NC	2	NC	1
332			min	-.019	2	-.02	3	0	1	0	1	5901.76	4	NC	1
333		15	max	.022	3	-.004	15	.124	4	7.167e-3	4	NC	1	NC	1
334			min	-.021	2	-.018	3	0	1	0	1	6952.472	4	NC	1
335		16	max	.023	3	-.003	15	.133	4	7.716e-3	4	NC	1	NC	1
336			min	-.022	2	-.015	3	0	1	0	1	8849.332	4	NC	1
337		17	max	.025	3	-.002	15	.144	4	8.266e-3	4	NC	1	NC	1
338			min	-.024	2	-.013	3	0	1	0	1	NC	1	NC	1
339		18	max	.027	3	-.001	15	.155	4	8.815e-3	4	NC	1	NC	1
340			min	-.025	2	-.01	3	0	1	0	1	NC	1	NC	1
341		19	max	.028	3	0	10	.169	4	9.365e-3	4	NC	1	NC	1
342			min	-.027	2	-.007	3	0	1	0	1	NC	1	NC	1
343	M8	1	max	.006	2	.026	2	0	1	1.806e-4	4	NC	1	NC	1
344			min	0	3	-.029	3	-.169	4	0	1	NC	1	146.871	4
345		2	max	.005	2	.025	2	0	1	1.806e-4	4	NC	1	NC	1
346			min	0	3	-.027	3	-.155	4	0	1	NC	1	159.617	4
347		3	max	.005	2	.023	2	0	1	1.806e-4	4	NC	1	NC	1
348			min	0	3	-.026	3	-.142	4	0	1	NC	1	174.79	4
349		4	max	.005	2	.022	2	0	1	1.806e-4	4	NC	1	NC	1
350			min	0	3	-.024	3	-.128	4	0	1	NC	1	193.021	4
351		5	max	.005	2	.02	2	0	1	1.806e-4	4	NC	1	NC	1
352			min	0	3	-.023	3	-.115	4	0	1	NC	1	215.165	4
353		6	max	.004	2	.019	2	0	1	1.806e-4	4	NC	1	NC	1
354			min	0	3	-.021	3	-.102	4	0	1	NC	1	242.41	4
355		7	max	.004	2	.017	2	0	1	1.806e-4	4	NC	1	NC	1
356			min	0	3	-.019	3	-.09	4	0	1	NC	1	276.439	4
357		8	max	.004	2	.016	2	0	1	1.806e-4	4	NC	1	NC	1
358			min	0	3	-.018	3	-.078	4	0	1	NC	1	319.709	4
359		9	max	.003	2	.014	2	0	1	1.806e-4	4	NC	1	NC	1
360			min	0	3	-.016	3	-.066	4	0	1	NC	1	375.919	4
361		10	max	.003	2	.013	2	0	1	1.806e-4	4	NC	1	NC	1
362			min	0	3	-.014	3	-.055	4	0	1	NC	1	450.849	4
363		11	max	.003	2	.012	2	0	1	1.806e-4	4	NC	1	NC	1
364			min	0	3	-.013	3	-.045	4	0	1	NC	1	553.954	4
365		12	max	.002	2	.01	2	0	1	1.806e-4	4	NC	1	NC	1
366			min	0	3	-.011	3	-.035	4	0	1	NC	1	701.587	4
367		13	max	.002	2	.009	2	0	1	1.806e-4	4	NC	1	NC	1
368			min	0	3	-.01	3	-.027	4	0	1	NC	1	924.097	4
369		14	max	.002	2	.007	2	0	1	1.806e-4	4	NC	1	NC	1
370			min	0	3	-.008	3	-.019	4	0	1	NC	1	1283.213	4
371		15	max	.001	2	.006	2	0	1	1.806e-4	4	NC	1	NC	1
372			min	0	3	-.006	3	-.013	4	0	1	NC	1	1921.201	4
373		16	max	0	2	.004	2	0	1	1.806e-4	4	NC	1	NC	1
374			min	0	3	-.005	3	-.008	4	0	1	NC	1	3231.217	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	1.806e-4	4	NC	1	NC	1
376			min	0	3	-.003	3	-.004	4	0	1	NC	1	6670.386	4
377		18	max	0	2	.001	2	0	1	1.806e-4	4	NC	1	NC	1
378			min	0	3	-.002	3	-.001	4	0	1	NC	1	NC	1
379		19	max	0	1	0	1	0	1	1.806e-4	4	NC	1	NC	1
380			min	0	1	0	1	0	1	0	1	NC	1	NC	1
381	M10	1	max	.008	2	.012	2	0	10	2.071e-3	4	NC	1	NC	1
382			min	-.011	3	-.018	3	-.601	4	1.134e-5	10	6404.038	2	128.876	4
383		2	max	.008	2	.01	2	0	10	2.089e-3	4	NC	1	NC	1
384			min	-.011	3	-.018	3	-.553	4	1.079e-5	10	7422.371	2	140.232	4
385		3	max	.007	2	.009	2	0	10	2.106e-3	4	NC	1	NC	1
386			min	-.01	3	-.017	3	-.504	4	1.023e-5	10	8804.824	2	153.702	4
387		4	max	.007	2	.007	2	0	10	2.124e-3	4	NC	1	NC	1
388			min	-.009	3	-.017	3	-.456	4	9.676e-6	10	NC	1	169.838	4
389		5	max	.006	2	.006	2	0	10	2.142e-3	4	NC	1	NC	1
390			min	-.009	3	-.016	3	-.409	4	9.12e-6	10	NC	1	189.387	4
391		6	max	.006	2	.004	2	0	10	2.159e-3	4	NC	1	NC	1
392			min	-.008	3	-.015	3	-.363	4	8.564e-6	10	NC	1	213.383	4
393		7	max	.005	2	.003	2	0	10	2.177e-3	4	NC	1	NC	1
394			min	-.008	3	-.015	3	-.318	4	8.009e-6	10	NC	1	243.296	4
395		8	max	.005	2	.002	2	0	10	2.194e-3	4	NC	1	NC	1
396			min	-.007	3	-.014	3	-.275	4	7.453e-6	10	NC	1	281.262	4
397		9	max	.005	2	0	2	0	10	2.212e-3	4	NC	1	NC	1
398			min	-.006	3	-.013	3	-.234	4	6.898e-6	10	NC	1	330.498	4
399		10	max	.004	2	0	2	0	10	2.23e-3	4	NC	1	NC	1
400			min	-.006	3	-.012	3	-.196	4	6.342e-6	10	NC	1	396.022	4
401		11	max	.004	2	-.001	2	0	10	2.247e-3	4	NC	1	NC	1
402			min	-.005	3	-.011	3	-.159	4	5.787e-6	10	NC	1	486.036	4
403		12	max	.003	2	-.002	2	0	10	2.265e-3	4	NC	1	NC	1
404			min	-.004	3	-.01	3	-.126	4	5.231e-6	10	NC	1	614.703	4
405		13	max	.003	2	-.002	15	0	10	2.283e-3	4	NC	1	NC	1
406			min	-.004	3	-.009	3	-.096	4	4.676e-6	10	NC	1	808.263	4
407		14	max	.002	2	-.002	15	0	10	2.3e-3	4	NC	1	NC	1
408			min	-.003	3	-.008	3	-.069	4	4.12e-6	10	NC	1	1119.977	4
409		15	max	.002	2	-.002	15	0	10	2.318e-3	4	NC	1	NC	1
410			min	-.003	3	-.006	3	-.046	4	3.564e-6	10	NC	1	1672.273	4
411		16	max	.001	2	-.001	15	0	10	2.336e-3	4	NC	1	NC	1
412			min	-.002	3	-.005	4	-.028	4	3.009e-6	10	NC	1	2802.243	4
413		17	max	0	2	0	15	0	10	2.353e-3	4	NC	1	NC	1
414			min	-.001	3	-.004	4	-.013	4	2.453e-6	10	NC	1	5752.218	4
415		18	max	0	2	0	15	0	10	2.371e-3	4	NC	1	NC	1
416			min	0	3	-.002	4	-.004	4	1.898e-6	10	NC	1	NC	1
417		19	max	0	1	0	1	0	1	2.388e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	1.342e-6	10	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	-2.682e-7	10	NC	1	NC	1
420			min	0	1	0	1	0	1	-5.168e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.013	4	4.201e-5	5	NC	1	NC	1
422			min	0	2	-.003	4	0	10	-1.952e-5	1	NC	1	8043.09	5
423		3	max	.001	3	-.002	15	.025	4	5.953e-4	5	NC	1	NC	1
424			min	0	2	-.006	4	0	10	-3.57e-5	1	NC	1	4182.287	5
425		4	max	.002	3	-.002	15	.035	4	1.151e-3	4	NC	1	NC	1
426			min	-.001	2	-.009	4	0	10	-5.188e-5	1	NC	1	2899.901	5
427		5	max	.002	3	-.003	15	.045	4	1.707e-3	4	NC	1	NC	1
428			min	-.002	2	-.013	4	0	10	-6.806e-5	1	8242.246	4	2261.34	5
429		6	max	.003	3	-.004	15	.055	4	2.263e-3	4	NC	2	NC	1
430			min	-.002	2	-.016	4	0	10	-8.424e-5	1	6698.505	4	1879.456	5
431		7	max	.003	3	-.004	15	.063	4	2.819e-3	4	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
432			min	-.003	2	-.018	4	0	10	-1.004e-4	1	5767.932	4	1624.975	5
433		8	max	.004	3	-.005	15	.071	4	3.375e-3	4	NC	5	NC	1
434			min	-.003	2	-.02	4	0	10	-1.166e-4	1	5194.357	4	1442.285	5
435		9	max	.004	3	-.005	15	.079	4	3.931e-3	4	NC	5	NC	1
436			min	-.004	2	-.022	4	0	1	-1.328e-4	1	4857.155	4	1303.388	5
437		10	max	.005	3	-.006	15	.086	4	4.487e-3	4	NC	5	NC	1
438			min	-.004	2	-.022	4	0	1	-1.49e-4	1	4697.979	4	1192.57	5
439		11	max	.005	3	-.006	15	.093	4	5.043e-3	4	NC	5	NC	1
440			min	-.005	2	-.022	4	0	1	-1.651e-4	1	4693.499	4	1100.286	5
441		12	max	.006	3	-.005	15	.1	4	5.599e-3	4	NC	5	NC	1
442			min	-.005	2	-.022	4	0	1	-1.813e-4	1	4846.468	4	1020.401	5
443		13	max	.006	3	-.005	15	.108	4	6.155e-3	4	NC	5	NC	1
444			min	-.006	2	-.021	4	-.001	1	-1.975e-4	1	5187.928	4	948.832	5
445		14	max	.007	3	-.005	15	.116	4	6.711e-3	4	NC	5	NC	1
446			min	-.006	2	-.019	4	-.002	1	-2.137e-4	1	5793.132	4	882.83	5
447		15	max	.008	3	-.004	15	.125	4	7.267e-3	4	NC	3	NC	1
448			min	-.006	2	-.016	4	-.002	1	-2.299e-4	1	6828.175	4	820.582	5
449		16	max	.008	3	-.003	15	.134	4	7.823e-3	4	NC	1	NC	1
450			min	-.007	2	-.013	4	-.003	1	-2.46e-4	1	8694.803	4	760.96	5
451		17	max	.009	3	-.002	15	.145	4	8.378e-3	4	NC	1	NC	1
452			min	-.007	2	-.009	4	-.004	1	-2.622e-4	1	NC	1	703.361	5
453		18	max	.009	3	-.002	15	.158	4	8.934e-3	4	NC	1	NC	1
454			min	-.008	2	-.005	4	-.005	1	-2.784e-4	1	NC	1	647.57	5
455		19	max	.01	3	0	10	.172	4	9.49e-3	4	NC	1	NC	1
456			min	-.008	2	-.002	3	-.006	1	-2.946e-4	1	NC	1	593.651	5
457	M12	1	max	.002	1	.008	2	.006	1	3.173e-4	5	NC	1	NC	2
458			min	0	3	-.01	3	-.172	4	-1.132e-4	1	NC	1	144.318	4
459		2	max	.002	1	.008	2	.005	1	3.173e-4	5	NC	1	NC	2
460			min	0	3	-.009	3	-.158	4	-1.132e-4	1	NC	1	156.827	4
461		3	max	.002	1	.007	2	.005	1	3.173e-4	5	NC	1	NC	2
462			min	0	3	-.009	3	-.144	4	-1.132e-4	1	NC	1	171.719	4
463		4	max	.002	1	.007	2	.005	1	3.173e-4	5	NC	1	NC	2
464			min	0	3	-.008	3	-.131	4	-1.132e-4	1	NC	1	189.613	4
465		5	max	.002	1	.006	2	.004	1	3.173e-4	5	NC	1	NC	2
466			min	0	3	-.008	3	-.117	4	-1.132e-4	1	NC	1	211.349	4
467		6	max	.002	1	.006	2	.004	1	3.173e-4	5	NC	1	NC	2
468			min	0	3	-.007	3	-.104	4	-1.132e-4	1	NC	1	238.092	4
469		7	max	.001	1	.005	2	.003	1	3.173e-4	5	NC	1	NC	2
470			min	0	3	-.007	3	-.091	4	-1.132e-4	1	NC	1	271.495	4
471		8	max	.001	1	.005	2	.003	1	3.173e-4	5	NC	1	NC	2
472			min	0	3	-.006	3	-.079	4	-1.132e-4	1	NC	1	313.97	4
473		9	max	.001	1	.004	2	.002	1	3.173e-4	5	NC	1	NC	1
474			min	0	3	-.006	3	-.067	4	-1.132e-4	1	NC	1	369.146	4
475		10	max	.001	1	.004	2	.002	1	3.173e-4	5	NC	1	NC	1
476			min	0	3	-.005	3	-.056	4	-1.132e-4	1	NC	1	442.697	4
477		11	max	0	1	.004	2	.002	1	3.173e-4	5	NC	1	NC	1
478			min	0	3	-.004	3	-.046	4	-1.132e-4	1	NC	1	543.905	4
479		12	max	0	1	.003	2	.001	1	3.173e-4	5	NC	1	NC	1
480			min	0	3	-.004	3	-.036	4	-1.132e-4	1	NC	1	688.819	4
481		13	max	0	1	.003	2	0	1	3.173e-4	5	NC	1	NC	1
482			min	0	3	-.003	3	-.027	4	-1.132e-4	1	NC	1	907.227	4
483		14	max	0	1	.002	2	0	1	3.173e-4	5	NC	1	NC	1
484			min	0	3	-.003	3	-.02	4	-1.132e-4	1	NC	1	1259.715	4
485		15	max	0	1	.002	2	0	1	3.173e-4	5	NC	1	NC	1
486			min	0	3	-.002	3	-.013	4	-1.132e-4	1	NC	1	1885.911	4
487		16	max	0	1	.001	2	0	1	3.173e-4	5	NC	1	NC	1
488			min	0	3	-.002	3	-.008	4	-1.132e-4	1	NC	1	3171.672	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	3.173e-4	5	NC	1	NC	1
490			min	0	3	-.001	3	-.004	4	-1.132e-4	1	NC	1	6547.002	4
491		18	max	0	1	0	2	0	1	3.173e-4	5	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-1.132e-4	1	NC	1	NC	1
493		19	max	0	1	0	1	0	1	3.173e-4	5	NC	1	NC	1
494			min	0	1	0	1	0	1	-1.132e-4	1	NC	1	NC	1
495	M1	1	max	.012	3	.224	2	.635	4	5.81e-3	2	NC	1	NC	1
496			min	-.008	2	-.072	3	0	10	-1.522e-2	3	NC	1	NC	1
497		2	max	.012	3	.108	2	.617	4	6.026e-3	4	NC	5	NC	1
498			min	-.008	2	-.033	3	-.005	1	-7.556e-3	3	1172.471	2	NC	1
499		3	max	.012	3	.019	3	.597	4	1.104e-2	4	NC	5	NC	1
500			min	-.008	2	-.015	2	-.006	1	-1.111e-4	1	569.071	2	6538.827	5
501		4	max	.012	3	.096	3	.576	4	9.469e-3	4	NC	5	NC	1
502			min	-.008	2	-.149	2	-.006	1	-3.925e-3	3	363.342	2	4797.486	5
503		5	max	.012	3	.188	3	.554	4	7.895e-3	4	NC	15	NC	1
504			min	-.007	2	-.288	2	-.004	1	-7.751e-3	3	264.683	2	3918.163	5
505		6	max	.011	3	.286	3	.531	4	1.122e-2	2	9205.957	15	NC	1
506			min	-.007	2	-.422	2	-.002	1	-1.158e-2	3	209.961	2	3371.843	5
507		7	max	.011	3	.378	3	.508	4	1.495e-2	2	7794.692	15	NC	1
508			min	-.007	2	-.54	2	0	3	-1.54e-2	3	177.483	2	2962.315	4
509		8	max	.011	3	.455	3	.485	4	1.869e-2	2	6957.391	15	NC	1
510			min	-.007	2	-.633	2	0	12	-1.923e-2	3	158.2	2	2632.268	4
511		9	max	.011	3	.504	3	.462	4	2.091e-2	2	6518.163	15	NC	1
512			min	-.007	2	-.692	2	0	1	-1.987e-2	3	148.127	2	2387.682	4
513		10	max	.01	3	.522	3	.435	4	2.212e-2	2	6383.565	15	NC	1
514			min	-.007	2	-.712	2	0	10	-1.839e-2	3	145.185	2	2292.762	4
515		11	max	.01	3	.51	3	.406	4	2.333e-2	2	6517.678	15	NC	1
516			min	-.007	2	-.692	2	0	10	-1.69e-2	3	148.688	2	2301.266	4
517		12	max	.01	3	.468	3	.375	4	2.228e-2	2	6956.244	15	NC	1
518			min	-.006	2	-.63	2	0	1	-1.482e-2	3	159.829	2	2407.293	4
519		13	max	.01	3	.399	3	.338	4	1.786e-2	2	7792.478	15	NC	1
520			min	-.006	2	-.532	2	0	1	-1.186e-2	3	181.293	2	2806.149	4
521		14	max	.009	3	.311	3	.298	4	1.345e-2	2	9201.949	15	NC	1
522			min	-.006	2	-.41	2	0	12	-8.895e-3	3	217.875	2	3739.403	4
523		15	max	.009	3	.212	3	.255	4	9.035e-3	2	NC	15	NC	1
524			min	-.006	2	-.274	2	0	12	-5.931e-3	3	280.559	2	5994.699	4
525		16	max	.009	3	.108	3	.214	4	7.708e-3	4	NC	5	NC	1
526			min	-.006	2	-.136	2	0	12	-2.967e-3	3	395.894	2	NC	1
527		17	max	.009	3	.007	3	.176	4	8.884e-3	4	NC	5	NC	1
528			min	-.006	2	-.008	2	0	12	-3.879e-6	3	640.546	2	NC	1
529		18	max	.009	3	.101	2	.144	4	5.279e-3	2	NC	5	NC	1
530			min	-.006	2	-.086	3	0	12	-1.75e-3	3	1351.428	2	NC	1
531		19	max	.009	3	.199	2	.118	4	1.052e-2	2	NC	1	NC	1
532			min	-.006	2	-.173	3	0	1	-3.581e-3	3	NC	1	NC	1
533	M5	1	max	.036	3	.339	2	.635	4	0	1	NC	1	NC	1
534			min	-.025	2	-.007	3	0	1	-1.473e-5	4	NC	1	NC	1
535		2	max	.036	3	.161	2	.621	4	5.65e-3	4	NC	5	NC	1
536			min	-.025	2	.002	3	0	1	0	1	773.894	2	8973.423	4
537		3	max	.035	3	.056	3	.603	4	1.118e-2	4	NC	5	NC	1
538			min	-.025	2	-.042	2	0	1	0	1	359.963	2	5332.686	4
539		4	max	.035	3	.188	3	.581	4	9.108e-3	4	NC	15	NC	1
540			min	-.025	2	-.29	2	0	1	0	1	217.308	2	4186.401	4
541		5	max	.034	3	.377	3	.557	4	7.037e-3	4	7389.82	15	NC	1
542			min	-.024	2	-.564	2	0	1	0	1	151.162	2	3645.496	4
543		6	max	.033	3	.593	3	.532	4	4.966e-3	4	5647.448	15	NC	1
544			min	-.024	2	-.839	2	0	1	0	1	115.817	2	3304.614	4
545		7	max	.032	3	.805	3	.508	4	2.894e-3	4	4649.003	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	-.024	2	-1.09	2	0	1	0	1	95.476	2	3005.721	4
547		8	max	.032	3	.984	3	.484	4	8.233e-4	4	4071.974	15	NC	1
548			min	-.023	2	-1.292	2	0	1	0	1	83.682	2	2675.699	4
549		9	max	.031	3	1.099	3	.462	4	0	1	3777.013	15	NC	1
550			min	-.023	2	-1.42	2	0	1	-9.334e-6	5	77.641	2	2377.818	4
551		10	max	.03	3	1.141	3	.435	4	0	1	3688.252	15	NC	1
552			min	-.022	2	-1.464	2	0	1	-9.01e-6	5	75.883	2	2313.999	4
553		11	max	.029	3	1.112	3	.405	4	0	1	3777.376	15	NC	1
554			min	-.022	2	-1.421	2	0	1	-8.685e-6	5	77.974	2	2338.361	4
555		12	max	.029	3	1.014	3	.376	4	6.229e-4	4	4072.818	15	NC	1
556			min	-.021	2	-1.287	2	0	1	0	1	84.798	2	2359.159	4
557		13	max	.028	3	.856	3	.34	4	2.191e-3	4	4650.657	15	NC	1
558			min	-.021	2	-1.072	2	0	1	0	1	98.431	2	2726.589	4
559		14	max	.027	3	.658	3	.297	4	3.76e-3	4	5650.582	15	NC	1
560			min	-.021	2	-.807	2	0	1	0	1	122.648	2	3791.282	4
561		15	max	.026	3	.44	3	.252	4	5.328e-3	4	7395.902	15	NC	1
562			min	-.02	2	-.523	2	0	1	0	1	166.528	2	7038.733	4
563		16	max	.026	3	.22	3	.208	4	6.896e-3	4	NC	15	NC	1
564			min	-.02	2	-.251	2	0	1	0	1	253.508	2	NC	1
565		17	max	.025	3	.018	3	.17	4	8.465e-3	4	NC	5	NC	1
566			min	-.02	2	-.022	2	0	1	0	1	453.876	2	NC	1
567		18	max	.025	3	.141	2	.139	4	4.28e-3	4	NC	5	NC	1
568			min	-.02	2	-.15	3	0	1	0	1	1014.192	3	NC	1
569		19	max	.025	3	.266	2	.118	4	0	1	NC	1	NC	1
570			min	-.02	2	-.298	3	0	1	-8.648e-6	4	NC	1	NC	1
571	M9	1	max	.012	3	.224	2	.635	4	1.522e-2	3	NC	1	NC	1
572			min	-.008	2	-.072	3	0	1	-5.81e-3	2	NC	1	NC	1
573		2	max	.012	3	.108	2	.62	4	7.556e-3	3	NC	5	NC	1
574			min	-.008	2	-.033	3	0	10	-2.85e-3	2	1172.471	2	9985.167	4
575		3	max	.012	3	.019	3	.601	4	1.113e-2	4	NC	5	NC	1
576			min	-.008	2	-.015	2	0	10	-2.258e-5	10	569.071	2	5769.996	4
577		4	max	.012	3	.096	3	.579	4	8.817e-3	5	NC	5	NC	1
578			min	-.008	2	-.149	2	0	10	-3.743e-3	2	363.342	2	4394.389	4
579		5	max	.012	3	.188	3	.556	4	7.751e-3	3	NC	15	NC	1
580			min	-.007	2	-.288	2	0	10	-7.48e-3	2	264.683	2	3717.328	4
581		6	max	.011	3	.286	3	.532	4	1.158e-2	3	9159.089	15	NC	1
582			min	-.007	2	-.422	2	0	10	-1.122e-2	2	209.961	2	3293.275	4
583		7	max	.011	3	.378	3	.508	4	1.54e-2	3	7756.009	15	NC	1
584			min	-.007	2	-.54	2	0	1	-1.495e-2	2	177.483	2	2961.55	4
585		8	max	.011	3	.455	3	.485	4	1.923e-2	3	6923.463	15	NC	1
586			min	-.007	2	-.633	2	0	1	-1.869e-2	2	158.2	2	2649.459	4
587		9	max	.011	3	.504	3	.462	4	1.987e-2	3	6486.66	15	NC	1
588			min	-.007	2	-.692	2	0	10	-2.091e-2	2	148.127	2	2380.79	4
589		10	max	.01	3	.522	3	.435	4	1.839e-2	3	6352.735	15	NC	1
590			min	-.007	2	-.712	2	0	1	-2.212e-2	2	145.185	2	2293.643	4
591		11	max	.01	3	.51	3	.406	4	1.69e-2	3	6486.065	15	NC	1
592			min	-.007	2	-.692	2	0	1	-2.333e-2	2	148.688	2	2308.967	4
593		12	max	.01	3	.468	3	.375	4	1.482e-2	3	6922.266	15	NC	1
594			min	-.006	2	-.63	2	0	10	-2.228e-2	2	159.829	2	2392.735	4
595		13	max	.01	3	.399	3	.338	4	1.186e-2	3	7754.044	15	NC	1
596			min	-.006	2	-.532	2	0	10	-1.786e-2	2	181.293	2	2802.567	4
597		14	max	.009	3	.311	3	.297	4	8.895e-3	3	9155.958	15	NC	1
598			min	-.006	2	-.41	2	-.001	1	-1.345e-2	2	217.875	2	3824.976	5
599		15	max	.009	3	.212	3	.253	4	5.931e-3	3	NC	15	NC	1
600			min	-.006	2	-.274	2	-.004	1	-9.035e-3	2	280.559	2	6442.031	5
601		16	max	.009	3	.108	3	.211	4	6.923e-3	5	NC	5	NC	1
602			min	-.006	2	-.136	2	-.005	1	-4.621e-3	2	395.894	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	.009	3	.007	3	.172	4	8.652e-3	4	NC	5	NC	1
604			min	-.006	2	-.008	2	-.006	1	-4.041e-4	1	640.546	2	NC	1
605		18	max	.009	3	.101	2	.142	4	4.265e-3	5	NC	5	NC	1
606			min	-.006	2	-.086	3	-.004	1	-5.279e-3	2	1351.428	2	NC	1
607		19	max	.009	3	.199	2	.118	4	3.581e-3	3	NC	1	NC	1
608			min	-.006	2	-.173	3	0	12	-1.052e-2	2	NC	1	NC	1

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

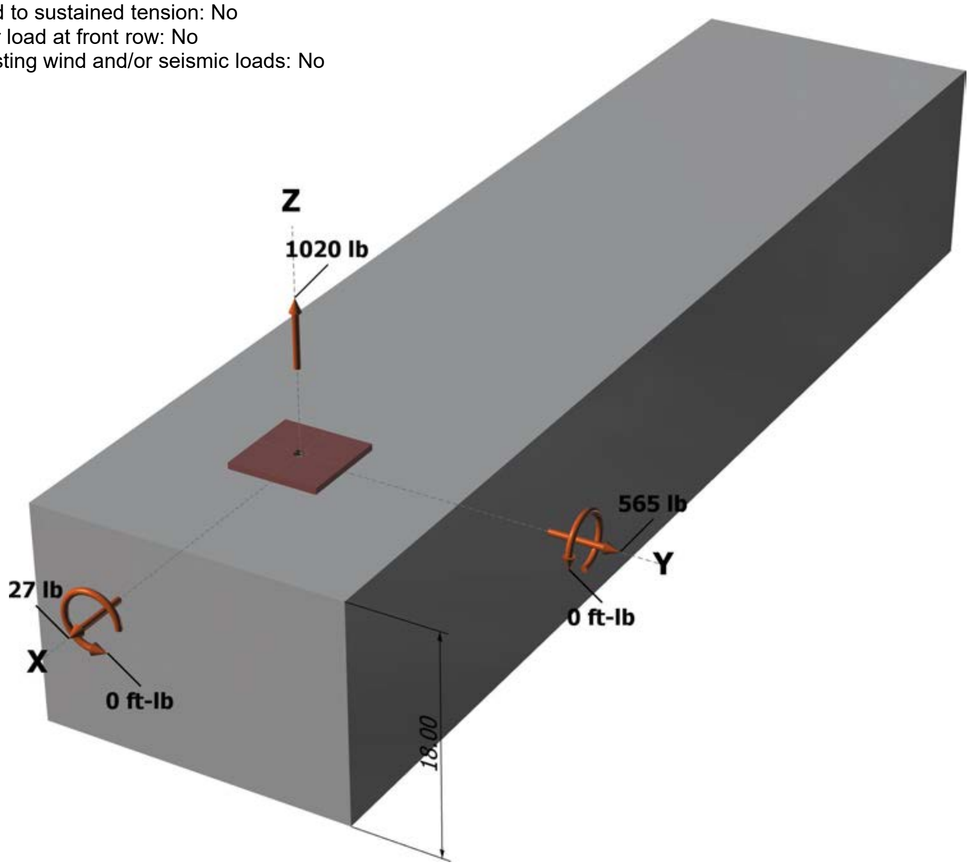
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

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

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

<Figure 1>



<Figure 2>

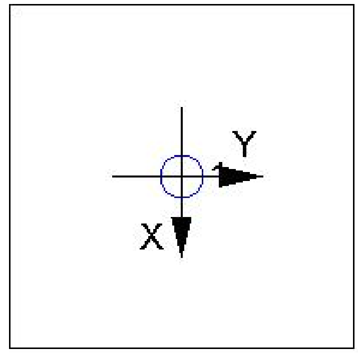
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	1020.0	27.0	565.0	565.6
Sum	1020.0	27.0	565.0	565.6

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 1020
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in y-direction:

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

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

Shear parallel to edge in x-direction:

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

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

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

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

Shear parallel to edge in y-direction:

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

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

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

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

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

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

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

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

11. Results

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

Tension	Factored Load, N_{ua} (lb)	Design Strength, $øN_n$ (lb)	Ratio	Status
Steel	1020	6071	0.17	Pass
Concrete breakout	1020	5710	0.18	Pass
Adhesive	**1020**	**5365**	**0.19**	**Pass (Governs)**

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

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. D.7.1	0.19	0.00	19.0 %	1.0	Pass

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

12. Warnings

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

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

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

Anchor Designer™
Software
Version 2.4.6025.0

Company:	Schletter, Inc.	Date:	8/1/2016
Engineer:	HCV	Page:	1/5
Project:	Standard PVMax - Worst Case, 32-40 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

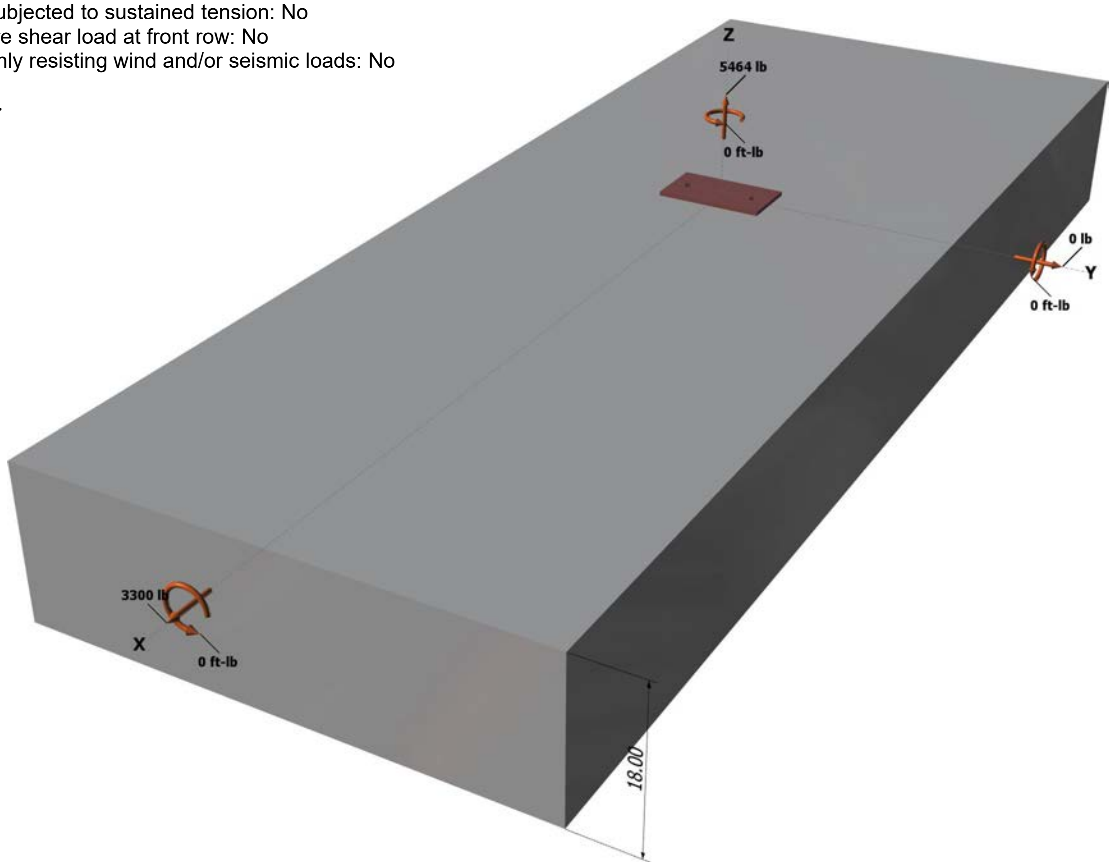
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

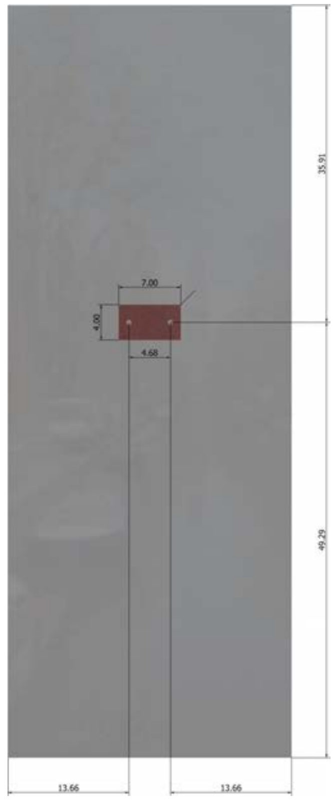
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout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



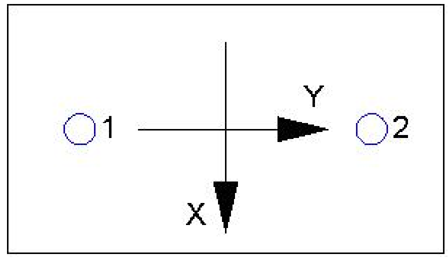
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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	2732.0	1650.0	0.0	1650.0
2	2732.0	1650.0	0.0	1650.0
Sum	5464.0	3300.0	0.0	3300.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 5464
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)
576.00	648.00	1.000	0.928	1.000	1.000	15593	0.70	9001

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	13.66	18939

$\phi V_{cbx} = \phi\,(2)(A_{Vc} / A_{Vco})\,\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (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)
737.64	839.68	1.000	1.000	1.000	18939	0.70	23292

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

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

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

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

ϕV_{cpg} (lb)
20601

11. Results

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

Tension	Factored Load, N_{ua} (lb)	Design Strength, $øN_n$ (lb)	Ratio	Status
Steel	2732	6071	0.45	Pass
Concrete breakout	5464	10231	0.53	Pass
Adhesive	**5464**	**8093**	**0.68**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, $øV_n$ (lb)	Ratio	Status
Steel	**1650**	**3156**	**0.52**	**Pass (Governs)**
T Concrete breakout x+	3300	9001	0.37	Pass

|| Concrete breakout y-	1650	23292	0.07	Pass
Pryout	3300	20601	0.16	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. D.7.3	0.68	0.52	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.