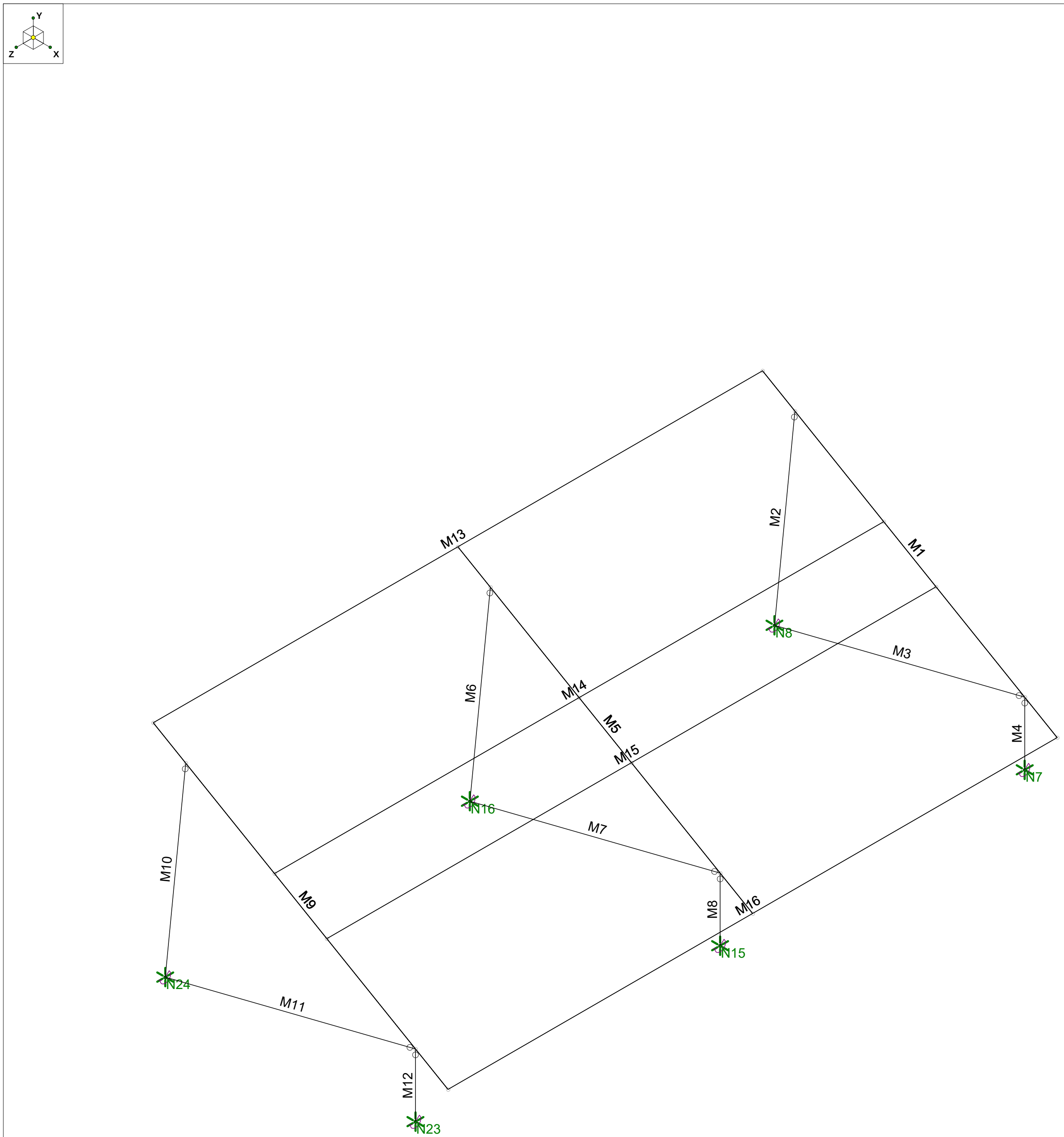


Schletter, Inc.		30° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-05	

1. INTRODUCTION

1.1 Project Description

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

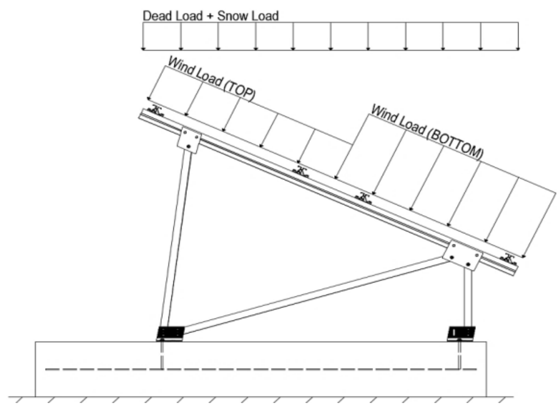
1.2 Construction

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

PV modules are required to meet the following specifications:

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

2. LOAD ACTIONS

2.1 Permanent Loads

g_{MAX} = 3.00 psf

g_{MIN} = 1.75 psf

Self-weight of the PV modules.

2.2 Snow Loads

Ground Snow Load, P_g =	30.00 psf	
Sloped Roof Snow Load, P_s =	16.49 psf	*(ASCE 7-05, Eq. 7-2)*
I_s =	1.00	
C_s =	0.73	
C_e =	0.90	
C_t =	1.20	

2.3 Wind Loads

Design Wind Speed, V =	120 mph	Exposure Category = C
Height <	15 ft	Importance Category = II

Peak Velocity Pressure, q_z = 22.61 psf *Including the gust factor, G=0.85. (ASCE 7-05, Eq. 6-15)*

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

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

Allowable Stress Design, ASD

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

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

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

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

3. STRUCTURAL ANALYSIS

3.1 RISA Results

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

3.2 RISA Components

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

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

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

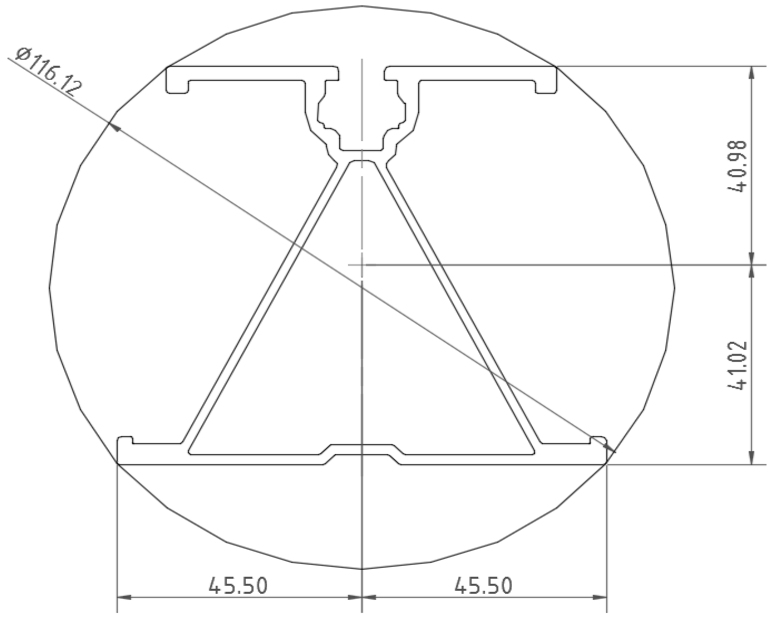
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

4. MEMBER DESIGN CALCULATIONS

4.1 Purlin Design

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

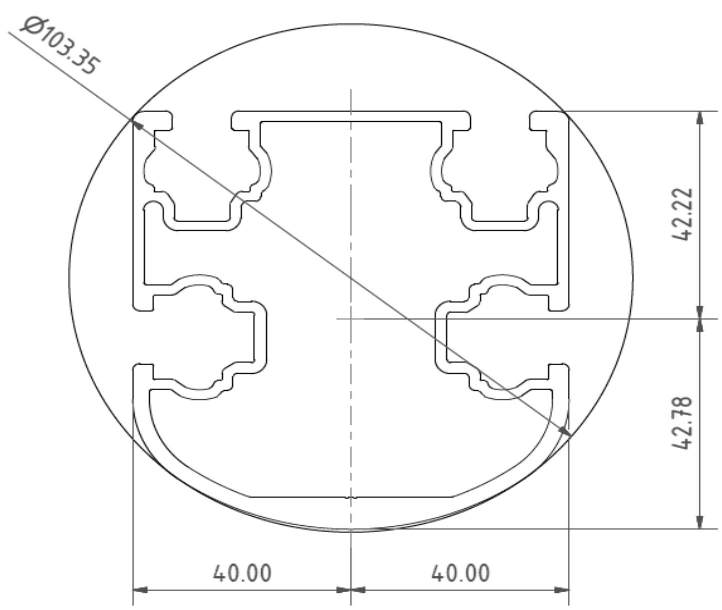
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	81	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	1.476	k-ft
M_z =	0.088	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	61%	



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).

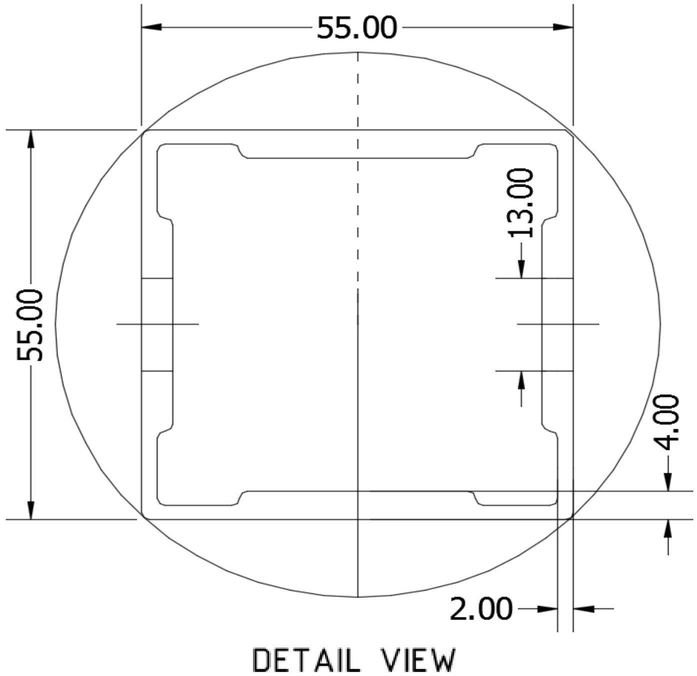
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	104.56	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.00	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.188	k-ft
M_z =	0.000	k-ft
P_n =	-1.010	k
$M_{y\ allowable}$ =	3.422	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	95%	



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).

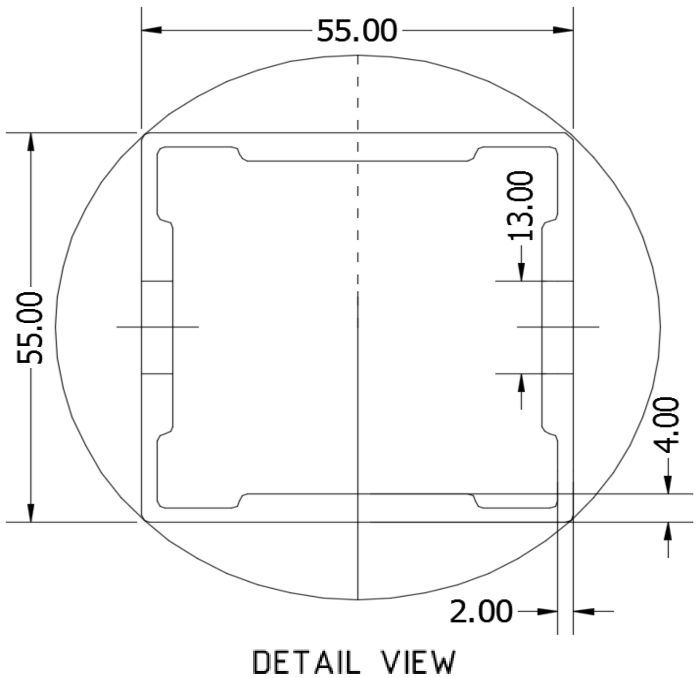
Strut Type =	55x55	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.455	k-ft
P_n =	0.358	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	34%	



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).

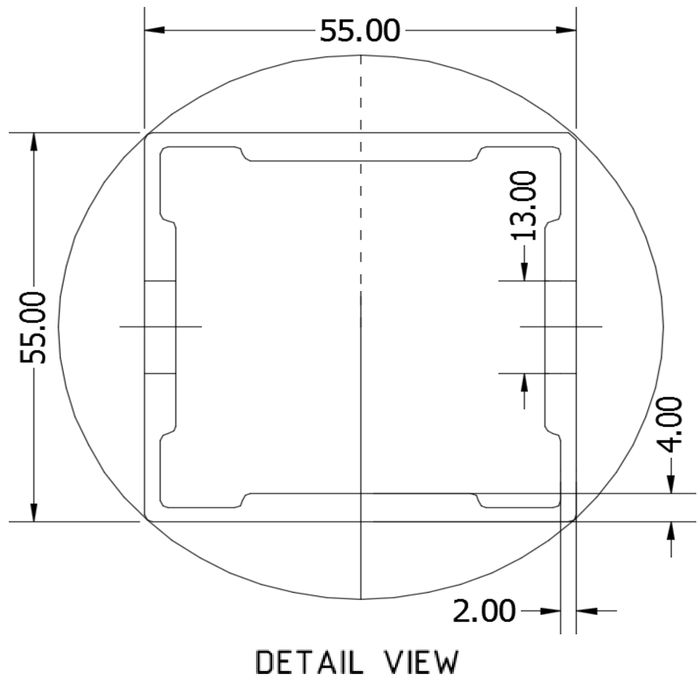
Strut Type =	55x55	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	98.03	in
$\Phi F_{ty\ AXIAL}$ =	6.11	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.012	k-ft
M_z =	0.000	k-ft
P_n =	2.686	k
$M_{y\ allowable}$ =	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 =	3.182	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	8.726	k
Utilization =	37%	



5. FOUNDATION DESIGN CALCULATIONS

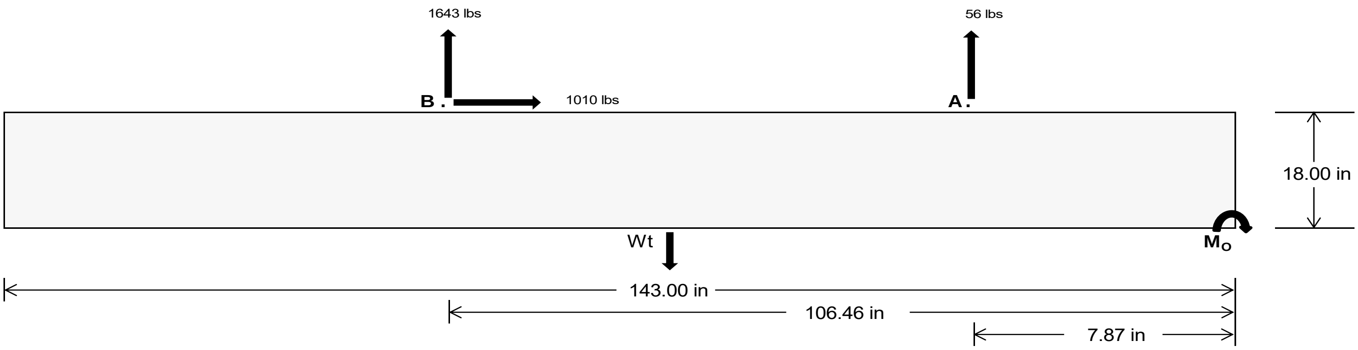
5.1 Helical Pile Foundations

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 =	242.93	6839.24	k
Compressive Load =	3111.44	4975.94	k
Lateral Load =	313.01	4200.44	k
Moment (Weak Axis) =	0.60	0.20	k

5.2 Design of Ballast Foundations

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



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

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

Overturning Check
M_O = 193489.5 in-lbs
Resisting Force Required = 2706.15 lbs
S.F. = 1.67
Weight Required = 4510.24 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 = 1010.10 lbs
Friction = 0.4
Weight Required = 2525.25 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 = 1010.10 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 + 1.0W				1.0D + 0.75L + 0.75W + 0.75S				0.6D + 1.0W			
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	948 lbs	948 lbs	948 lbs	948 lbs	1314 lbs	1314 lbs	1314 lbs	1314 lbs	1595 lbs	1595 lbs	1595 lbs	1595 lbs	-112 lbs	-112 lbs	-112 lbs	-112 lbs
F_B	918 lbs	918 lbs	918 lbs	918 lbs	2214 lbs	2214 lbs	2214 lbs	2214 lbs	2251 lbs	2251 lbs	2251 lbs	2251 lbs	-3285 lbs	-3285 lbs	-3285 lbs	-3285 lbs
F_V	112 lbs	112 lbs	112 lbs	112 lbs	1809 lbs	1809 lbs	1809 lbs	1809 lbs	1430 lbs	1430 lbs	1430 lbs	1430 lbs	-2020 lbs	-2020 lbs	-2020 lbs	-2020 lbs
P_{total}	9426 lbs	9642 lbs	9858 lbs	10074 lbs	11089 lbs	11305 lbs	11521 lbs	11737 lbs	11406 lbs	11622 lbs	11838 lbs	12054 lbs	1139 lbs	1268 lbs	1398 lbs	1527 lbs
M	2520 lbs-ft	2520 lbs-ft	2520 lbs-ft	2520 lbs-ft	3233 lbs-ft	3233 lbs-ft	3233 lbs-ft	3233 lbs-ft	4043 lbs-ft	4043 lbs-ft	4043 lbs-ft	4043 lbs-ft	5946 lbs-ft	5946 lbs-ft	5946 lbs-ft	5946 lbs-ft
e	0.27 ft	0.26 ft	0.26 ft	0.25 ft	0.29 ft	0.29 ft	0.28 ft	0.28 ft	0.35 ft	0.35 ft	0.34 ft	0.34 ft	5.22 ft	4.69 ft	4.25 ft	3.89 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}	234.7 psf	234.2 psf	233.8 psf	233.3 psf	272.2 psf	270.7 psf	269.2 psf	267.9 psf	269.6 psf	268.1 psf	266.8 psf	265.5 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	307.7 psf	305.2 psf	302.8 psf	300.6 psf	365.9 psf	361.7 psf	357.8 psf	354.1 psf	386.7 psf	382.0 psf	377.6 psf	373.4 psf	353.6 psf	222.0 psf	177.3 psf	155.7 psf

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

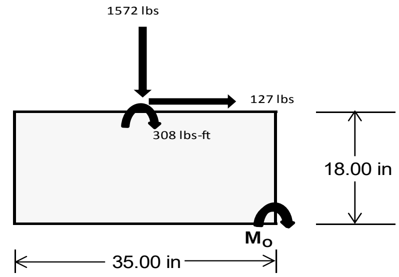
Use a 143in long x 35in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O = 1794.0 ft-lbs
Resisting Force Required = 1230.15 lbs
S.F. = 1.67
Weight Required = 2050.26 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	285 lbs	497 lbs	149 lbs	658 lbs	1572 lbs	554 lbs	131 lbs	145 lbs	-4 lbs
F_V	176 lbs	171 lbs	179 lbs	129 lbs	127 lbs	138 lbs	176 lbs	172 lbs	178 lbs
P_{total}	9644 lbs	9855 lbs	9508 lbs	9567 lbs	10481 lbs	9463 lbs	2868 lbs	2882 lbs	2732 lbs
M	673 lbs-ft	661 lbs-ft	682 lbs-ft	500 lbs-ft	498 lbs-ft	529 lbs-ft	674 lbs-ft	659 lbs-ft	676 lbs-ft
e	0.07 ft	0.07 ft	0.07 ft	0.05 ft	0.05 ft	0.06 ft	0.23 ft	0.23 ft	0.25 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}	237.7 psf	244.4 psf	233.2 psf	245.7 psf	272.1 psf	240.9 psf	42.6 psf	43.9 psf	38.6 psf
f_{max}	317.3 psf	322.7 psf	313.9 psf	304.9 psf	331.0 psf	303.6 psf	122.4 psf	121.9 psf	118.6 psf

Maximum Bearing Pressure = 331 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 36in wide x 18in tall ballast foundation and fiber reinforcing with (3) #5 rebar.

5.3 Foundation Anchors

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

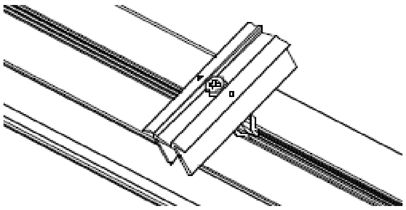
6. DESIGN OF JOINTS AND CONNECTIONS

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

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

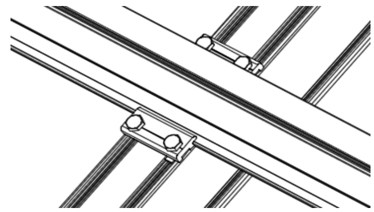
Fastening of Modules to Purlins

Maximum Uplifting Force =	1.045 k
Allowable Uplift =	1.214 k
Utilization =	86%



Fastening of Purlins to Girders

Maximum Uplifting Force =	2.528 k
Allowable Uplift =	4.357 k
Utilization =	58%



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 =	2.393 k
M12 Bolt Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	32%

Rear Strut

Maximum Axial Load =	4.607 k
M12 Bolt Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	62%

Diagonal Strut

Maximum Axial Load =	2.836 k
M12 Bolt Shear Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	38%

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

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

7. SEISMIC DESIGN

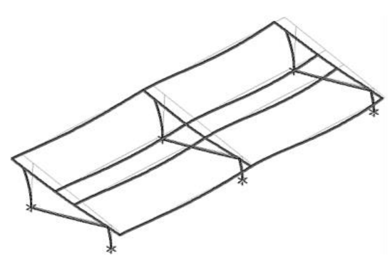
7.1 Seismic Drift

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

Mean Height, h_{sx} =	60.93 in
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$
	1.219 in
Max Drift, Δ_{MAX} =	0.582 in

$0.582 \le 1.219$, 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 = 81 in

J = 0.432

224.084

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

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= 28.5 ksi

3.4.16

b/t = 32.195

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 25.1 ksi

3.4.16.1 Not Used

Rb/t =

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 37.0588

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

S1 = 36.9

m = 0.65

C_0 = 40.985

Cc = 41.015

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

S2 = 77.2

φF_L= φb[Bbr-mDbr*h/t]

φF_L= 43.2 ksi

φF_LSt= 25.1 ksi

Ix = 897074 mm^4

2.155 in^4

y = 41.015 mm

Sx = 1.335 in^3

M_{max}St = 2.788 k-ft

Weak Axis:

3.4.14

L_b = 81

J = 0.432

142.504

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

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= 29.5

3.4.16

b/t = 37.0588

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 23.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 32.195

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

S1 = 36.9

m = 0.65

C_0 = 45.5

Cc = 45.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 23.1 ksi

Iy = 446476 mm^4

1.073 in^4

x = 45.5 mm

Sy = 0.599 in^3

M_{max}Wk = 1.152 k-ft

Compression

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

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

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

Girder = **BF0**

Strong Axis:

3.4.14

L_b = 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

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in³

M_{max}St = 1.460 k-ft

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in³

M_{max}Wk = 1.460 k-ft

<u>Compression</u>

3.4.7

λ = 2.26776

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.89749

φF_L= (φccFcy)/(λ²)

φF_L= 6.10803 ksi

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

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

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 78.35 in
J = 0.942
122.273

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

S1 = 0.51461

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

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

3.4.16

b/t = 24.5

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

S1 = 12.2

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

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

Weak Axis:

3.4.14

L_b = 78.35
J = 0.942
122.273

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

S1 = 0.51461

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

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

3.4.16

b/t = 24.5

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

S1 = 12.2

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

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

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 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

$\varphi F_L = \varphi y Fcy$

$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 8.88 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 9.14 kips

APPENDIX B

B.1

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

Basic Load Cases

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

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

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

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

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

Member Distributed Loads (BLC 3 : Snow Load)

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

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

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	y	-85.304	-85.304	0	0
2	M14	y	-85.304	-85.304	0	0
3	M15	y	-137.229	-137.229	0	0
4	M16	y	-137.229	-137.229	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	192.862	192.862	0	0
2	M14	y	148.356	148.356	0	0
3	M15	y	81.596	81.596	0	0
4	M16	y	81.596	81.596	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 + 0.8W	Yes	Y		1	1.2	3	1.6	4	.8														
2	LRFD 1.2D + 1.6W + 0.5S	Yes	Y		1	1.2	3	.5	4	1.6														
3	LRFD 0.9D + 1.6W	Yes	Y		2	.9					5	1.6												
4	LATERAL - LRFD 1.54D + 1.3E ...	Yes	Y		1	1.54	3	.2			6	1.3												
5	LATERAL - LRFD 0.56D + 1.3E	Yes	Y		1	.56					6	1.3												
6	LATERAL - LRFD 1.54D + 1.25...	Yes	Y		1	1.54	3	.2			6	1.25												
7	LATERAL - LRFD 0.56D + 1.25E	Yes	Y		1	.56					6	1.25												
8																								
9	ASD 1.0D + 1.0S	Yes	Y		1	1	3	1																
10	ASD 1.0D + 1.0W	Yes	Y		1	1			4	1														
11	ASD 1.0D + 0.75L + 0.75W + 0....	Yes	Y		1	1	3	.75	4	.75														
12	ASD 0.6D + 1.0W	Yes	Y		2	.6					5	1												
13	LATERAL - ASD 1.238D + 0.875E	Yes	Y		1	1.2...					6	.875												
14	LATERAL - ASD 1.1785D + 0.65...	Yes	Y		1	1.1...	3	.75			6	.656												
15	LATERAL - ASD 0.362D + 0.875E	Yes	Y		1	.362					6	.875												

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N8	max	937.864	2	1296.398	2	.405	1	.002	1	0	1	0	1
2		min	-1108.14	3	-1735.363	3	-27.161	5	-.155	4	0	1	0	1
3	N7	max	.019	9	897.416	1	-.726	10	-.001	10	0	1	0	1
4		min	-.273	2	-90.183	5	-240.775	4	-.465	4	0	1	0	1
5	N15	max	.015	9	2393.415	2	0	3	0	1	0	1	0	1
6		min	-2.473	2	-186.871	3	-228.171	4	-.447	4	0	1	0	1
7	N16	max	2934.003	2	3827.645	2	0	11	0	2	0	1	0	1
8		min	-3231.109	3	-5260.957	3	-27.429	5	-.157	4	0	1	0	1
9	N23	max	.036	4	897.416	1	7.886	1	.015	1	0	1	0	1
10		min	-.273	2	-26.944	3	-234.103	5	-.455	4	0	1	0	1
11	N24	max	937.864	2	1296.398	2	-.038	10	0	10	0	1	0	1
12		min	-1108.14	3	-1735.363	3	-27.816	5	-.156	4	0	1	0	1
13	Totals:	max	4806.713	2	10492.762	2	0	1						
14		min	-5447.628	3	-8972.442	3	-781.627	5						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
1	M13	1	max	56.384	4	414.444	2	-9.507	12	0	15	.152	4	0	4
2			min	3.571	10	-776.72	3	-139.172	1	-.012	2	.01	10	0	3
3		2	max	47.533	4	288.015	2	-7.942	12	0	15	.1	4	.497	3
4			min	3.571	10	-549.353	3	-105.946	1	-.012	2	0	10	-.263	2
5		3	max	44.505	1	161.585	2	-6.376	12	0	15	.062	5	.824	3
6			min	3.571	10	-321.986	3	-72.72	1	-.012	2	-.035	1	-.432	2
7		4	max	44.505	1	35.156	2	-3.139	10	0	15	.036	5	.98	3
8			min	3.571	10	-94.619	3	-44.037	4	-.012	2	-.077	1	-.506	2
9		5	max	44.505	1	132.748	3	1.116	10	0	15	.011	5	.966	3
10			min	3.571	10	-91.273	2	-33.969	4	-.012	2	-.094	1	-.485	2
11		6	max	44.505	1	360.115	3	26.957	1	0	15	-.006	12	.781	3
12			min	.734	15	-217.702	2	-29.322	5	-.012	2	-.086	1	-.369	2
13		7	max	44.505	1	587.482	3	60.183	1	0	15	-.004	10	.426	3
14			min	-7.636	5	-344.131	2	-26.939	5	-.012	2	-.054	1	-.158	2
15		8	max	44.505	1	814.849	3	93.409	1	0	15	.007	2	.147	2
16			min	-16.486	5	-470.561	2	-24.556	5	-.012	2	-.053	4	-.1	3
17		9	max	44.505	1	1042.215	3	126.635	1	0	15	.086	1	.548	2
18			min	-25.336	5	-596.99	2	-22.173	5	-.012	2	-.07	5	-.796	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	51.231	4	1269.582	3	159.861	1	.012	2	.194	1	1.043	2
20			min	3.571	10	-723.419	2	-102.739	14	-.008	3	-.003	3	-1.663	3
21		11	max	44.505	1	596.99	2	-3.017	12	.012	2	.101	4	.548	2
22			min	3.571	10	-1042.215	3	-126.635	1	0	15	-.007	3	-.796	3
23		12	max	44.505	1	470.561	2	-1.452	12	.012	2	.053	4	.147	2
24			min	3.571	10	-814.849	3	-93.409	1	0	15	-.01	3	-.1	3
25		13	max	44.505	1	344.131	2	.448	3	.012	2	.025	5	.426	3
26			min	3.571	10	-587.482	3	-60.183	1	0	15	-.054	1	-.158	2
27		14	max	44.505	1	217.702	2	2.797	3	.012	2	0	15	.781	3
28			min	3.497	15	-360.115	3	-39.198	4	0	15	-.086	1	-.369	2
29		15	max	44.505	1	91.273	2	6.268	1	.012	2	-.004	12	.966	3
30			min	-3.568	5	-132.748	3	-30.56	5	0	15	-.094	1	-.485	2
31		16	max	44.505	1	94.619	3	39.494	1	.012	2	-.001	12	.98	3
32			min	-12.419	5	-35.156	2	-28.177	5	0	15	-.077	1	-.506	2
33		17	max	44.505	1	321.986	3	72.72	1	.012	2	.005	3	.824	3
34			min	-21.269	5	-161.585	2	-25.794	5	0	15	-.075	4	-.432	2
35		18	max	44.505	1	549.353	3	105.946	1	.012	2	.032	1	.497	3
36			min	-30.12	5	-288.015	2	-23.411	5	0	15	-.085	5	-.263	2
37		19	max	44.505	1	776.72	3	139.172	1	.012	2	.124	1	0	2
38			min	-38.97	5	-414.444	2	-21.029	5	0	15	-.102	5	0	3
39	M14	1	max	33.763	4	507.387	2	-9.928	12	.015	3	.23	4	0	2
40			min	2.864	10	-652.895	3	-145.852	1	-.016	2	.013	10	0	3
41		2	max	31.076	1	380.958	2	-8.362	12	.015	3	.16	4	.424	3
42			min	2.864	10	-478.935	3	-112.627	1	-.016	2	.002	10	-.333	2
43		3	max	31.076	1	254.529	2	-6.797	12	.015	3	.1	5	.718	3
44			min	2.864	10	-304.976	3	-79.401	1	-.016	2	-.015	1	-.571	2
45		4	max	31.076	1	128.099	2	-3.859	10	.015	3	.057	5	.882	3
46			min	-.071	5	-131.016	3	-67.695	4	-.016	2	-.062	1	-.715	2
47		5	max	31.076	1	42.944	3	.396	10	.015	3	.016	5	.915	3
48			min	-8.921	5	-3.572	9	-57.627	4	-.016	2	-.084	1	-.764	2
49		6	max	31.076	1	216.903	3	20.277	1	.015	3	-.005	12	.817	3
50			min	-17.772	5	-124.759	2	-51.088	5	-.016	2	-.082	1	-.717	2
51		7	max	31.076	1	390.863	3	53.503	1	.015	3	-.005	10	.59	3
52			min	-26.622	5	-251.188	2	-48.705	5	-.016	2	-.075	4	-.576	2
53		8	max	31.076	1	564.823	3	86.728	1	.015	3	.005	2	.231	3
54			min	-35.472	5	-377.617	2	-46.322	5	-.016	2	-.099	4	-.341	2
55		9	max	31.076	1	738.783	3	119.954	1	.015	3	.076	1	.021	9
56			min	-44.323	5	-504.047	2	-43.939	5	-.016	2	-.13	5	-.258	3
57		10	max	64.849	4	912.742	3	153.18	1	.016	2	.229	4	.415	2
58			min	2.864	10	-630.476	2	-110.07	14	-.015	3	-.004	3	-.877	3
59		11	max	55.999	4	504.047	2	-2.597	12	.016	2	.159	4	.021	9
60			min	2.864	10	-738.783	3	-119.954	1	-.015	3	-.008	3	-.258	3
61		12	max	47.148	4	377.617	2	-1.031	12	.016	2	.096	4	.231	3
62			min	2.864	10	-564.823	3	-86.728	1	-.015	3	-.009	3	-.341	2
63		13	max	38.298	4	251.188	2	1.089	3	.016	2	.053	5	.59	3
64			min	2.864	10	-390.863	3	-68.805	4	-.015	3	-.054	1	-.576	2
65		14	max	31.076	1	124.759	2	3.437	3	.016	2	.011	5	.817	3
66			min	2.864	10	-216.903	3	-58.737	4	-.015	3	-.082	1	-.717	2
67		15	max	31.076	1	3.572	9	12.949	1	.016	2	-.003	12	.915	3
68			min	2.864	10	-42.944	3	-51.352	5	-.015	3	-.084	1	-.764	2
69		16	max	31.076	1	131.016	3	46.175	1	.016	2	0	3	.882	3
70			min	2.789	15	-128.099	2	-48.969	5	-.015	3	-.08	4	-.715	2
71		17	max	31.076	1	304.976	3	79.401	1	.016	2	.008	3	.718	3
72			min	-4.683	5	-254.529	2	-46.587	5	-.015	3	-.106	4	-.571	2
73		18	max	31.076	1	478.935	3	112.627	1	.016	2	.057	1	.424	3
74			min	-13.533	5	-380.958	2	-44.204	5	-.015	3	-.135	5	-.333	2
75		19	max	31.076	1	652.895	3	145.852	1	.016	2	.154	1	0	2

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
76			min	-22.384	5	-507.387	2	-41.821	5	-.015	3	-.168	5	0	3
77	M15	1	max	73.768	5	717.897	2	-9.664	12	.017	2	.296	4	0	2
78			min	-32.406	1	-383.655	3	-145.882	1	-.013	3	.013	10	0	3
79		2	max	64.918	5	529.157	2	-8.099	12	.017	2	.212	4	.253	3
80			min	-32.406	1	-289.807	3	-112.656	1	-.013	3	.002	10	-.468	2
81		3	max	56.067	5	340.418	2	-6.533	12	.017	2	.137	5	.435	3
82			min	-32.406	1	-195.959	3	-96.711	4	-.013	3	-.015	1	-.794	2
83		4	max	47.217	5	151.679	2	-3.989	10	.017	2	.08	5	.546	3
84			min	-32.406	1	-102.112	3	-86.643	4	-.013	3	-.062	1	-.978	2
85		5	max	38.367	5	-.259	15	.266	10	.017	2	.025	5	.588	3
86			min	-32.406	1	-37.06	2	-76.575	4	-.013	3	-.084	1	-1.021	2
87		6	max	29.516	5	85.584	3	20.247	1	.017	2	-.005	12	.559	3
88			min	-32.406	1	-225.799	2	-69.981	5	-.013	3	-.082	1	-.923	2
89		7	max	20.666	5	179.431	3	53.473	1	.017	2	-.005	10	.46	3
90			min	-32.406	1	-414.539	2	-67.598	5	-.013	3	-.094	4	-.683	2
91		8	max	11.815	5	273.279	3	86.699	1	.017	2	.005	2	.29	3
92			min	-32.406	1	-603.278	2	-65.215	5	-.013	3	-.133	4	-.301	2
93		9	max	2.965	5	367.127	3	119.925	1	.017	2	.076	1	.222	2
94			min	-32.406	1	-792.017	2	-62.833	5	-.013	3	-.178	5	.002	15
95		10	max	-2.574	10	460.974	3	153.15	1	.013	3	.292	4	.887	2
96			min	-32.406	1	-980.756	2	-119.724	14	-.017	2	-.003	3	-.261	3
97		11	max	-2.574	10	792.017	2	-2.86	12	.013	3	.207	4	.222	2
98			min	-32.406	1	-367.127	3	-119.925	1	-.017	2	-.007	3	.002	15
99		12	max	-2.574	10	603.278	2	-1.295	12	.013	3	.13	4	.29	3
100			min	-32.406	1	-273.279	3	-97.865	4	-.017	2	-.009	3	-.301	2
101		13	max	-2.574	10	414.539	2	.669	3	.013	3	.072	5	.46	3
102			min	-34.53	4	-179.431	3	-87.797	4	-.017	2	-.054	1	-.683	2
103		14	max	-2.574	10	225.799	2	3.017	3	.013	3	.017	5	.559	3
104			min	-43.381	4	-85.584	3	-77.729	4	-.017	2	-.082	1	-.923	2
105		15	max	-2.574	10	37.06	2	12.979	1	.013	3	-.003	12	.588	3
106			min	-52.231	4	.26	15	-70.25	5	-.017	2	-.084	1	-1.021	2
107		16	max	-2.574	10	102.112	3	46.204	1	.013	3	0	3	.546	3
108			min	-61.082	4	-151.679	2	-67.867	5	-.017	2	-.104	4	-.978	2
109		17	max	-2.574	10	195.959	3	79.43	1	.013	3	.007	3	.435	3
110			min	-69.932	4	-340.418	2	-65.484	5	-.017	2	-.143	4	-.794	2
111		18	max	-2.574	10	289.807	3	112.656	1	.013	3	.057	1	.253	3
112			min	-78.782	4	-529.157	2	-63.101	5	-.017	2	-.187	5	-.468	2
113		19	max	-2.574	10	383.655	3	145.882	1	.013	3	.154	1	0	2
114			min	-87.633	4	-717.897	2	-60.718	5	-.017	2	-.233	5	0	3
115	M16	1	max	68.07	5	630.666	2	-8.689	12	.005	1	.207	4	0	2
116			min	-50.655	1	-303.089	3	-139.865	1	-.012	3	.011	10	0	3
117		2	max	59.22	5	441.926	2	-7.124	12	.005	1	.144	4	.192	3
118			min	-50.655	1	-209.242	3	-106.639	1	-.012	3	0	10	-.402	2
119		3	max	50.369	5	253.187	2	-5.558	12	.005	1	.094	5	.314	3
120			min	-50.655	1	-115.394	3	-73.413	1	-.012	3	-.033	1	-.663	2
121		4	max	41.519	5	64.448	2	-3.627	10	.005	1	.056	5	.365	3
122			min	-50.655	1	-21.546	3	-59.676	4	-.012	3	-.076	1	-.782	2
123		5	max	32.669	5	72.302	3	.629	10	.005	1	.019	5	.346	3
124			min	-50.655	1	-124.291	2	-49.608	4	-.012	3	-.094	1	-.76	2
125		6	max	23.818	5	166.149	3	26.265	1	.005	1	-.005	12	.257	3
126			min	-50.655	1	-313.03	2	-44.759	5	-.012	3	-.086	1	-.596	2
127		7	max	14.968	5	259.997	3	59.49	1	.005	1	-.005	10	.097	3
128			min	-50.655	1	-501.77	2	-42.376	5	-.012	3	-.061	4	-.29	2
129		8	max	6.117	5	353.845	3	92.716	1	.005	1	.006	2	.157	2
130			min	-50.655	1	-690.509	2	-39.993	5	-.012	3	-.08	4	-.133	3
131		9	max	-1.776	15	447.692	3	125.942	1	.005	1	.085	1	.746	2
132			min	-50.655	1	-879.248	2	-37.61	5	-.012	3	-.108	5	-.434	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
133		10	max	-4.549	10	541.54	3	159.168	1	.012	3	.207	4	1.476	2
134			min	-50.655	1	-1067.987	2	-110.461	14	-.005	1	.001	12	-.805	3
135		11	max	-3.091	15	879.248	2	-3.835	12	.012	3	.14	4	.746	2
136			min	-50.655	1	-447.692	3	-125.942	1	-.005	1	-.004	3	-.434	3
137		12	max	-4.549	10	690.509	2	-2.27	12	.012	3	.08	4	.157	2
138			min	-50.655	1	-353.845	3	-92.716	1	-.005	1	-.007	3	-.133	3
139		13	max	-4.549	10	501.77	2	-.704	12	.012	3	.04	5	.097	3
140			min	-50.655	1	-259.997	3	-64.718	4	-.005	1	-.054	1	-.29	2
141		14	max	-4.549	10	313.03	2	1.489	3	.012	3	.003	5	.257	3
142			min	-50.655	1	-166.149	3	-54.65	4	-.005	1	-.086	1	-.596	2
143		15	max	-4.549	10	124.291	2	6.961	1	.012	3	-.004	12	.346	3
144			min	-52.816	4	-72.302	3	-45.967	5	-.005	1	-.094	1	-.76	2
145		16	max	-4.549	10	21.546	3	40.187	1	.012	3	-.002	12	.365	3
146			min	-61.667	4	-64.448	2	-43.584	5	-.005	1	-.084	4	-.782	2
147		17	max	-4.549	10	115.394	3	73.413	1	.012	3	.003	3	.314	3
148			min	-70.517	4	-253.187	2	-41.201	5	-.005	1	-.106	4	-.663	2
149		18	max	-4.549	10	209.242	3	106.639	1	.012	3	.034	1	.192	3
150			min	-79.367	4	-441.926	2	-38.818	5	-.005	1	-.128	5	-.402	2
151		19	max	-4.549	10	303.089	3	139.865	1	.012	3	.127	1	0	2
152			min	-88.218	4	-630.666	2	-36.435	5	-.005	1	-.156	5	0	5
153	M2	1	max	1078.184	2	2.062	4	.245	1	0	3	0	3	0	1
154			min	-1516.599	3	.5	15	-20.696	4	0	4	0	2	0	1
155		2	max	1078.713	2	1.991	4	.245	1	0	3	0	1	0	15
156			min	-1516.202	3	.484	15	-21.157	4	0	4	-.007	4	0	4
157		3	max	1079.242	2	1.92	4	.245	1	0	3	0	1	0	15
158			min	-1515.805	3	.467	15	-21.618	4	0	4	-.015	4	-.001	4
159		4	max	1079.772	2	1.849	4	.245	1	0	3	0	1	0	15
160			min	-1515.408	3	.45	15	-22.079	4	0	4	-.023	4	-.002	4
161		5	max	1080.301	2	1.778	4	.245	1	0	3	0	1	0	15
162			min	-1515.011	3	.434	15	-22.541	4	0	4	-.031	4	-.003	4
163		6	max	1080.83	2	1.707	4	.245	1	0	3	0	1	0	15
164			min	-1514.614	3	.417	15	-23.002	4	0	4	-.039	4	-.003	4
165		7	max	1081.36	2	1.635	4	.245	1	0	3	0	1	0	15
166			min	-1514.217	3	.4	15	-23.463	4	0	4	-.048	4	-.004	4
167		8	max	1081.889	2	1.564	4	.245	1	0	3	0	1	-.001	15
168			min	-1513.82	3	.384	15	-23.924	4	0	4	-.056	4	-.005	4
169		9	max	1082.418	2	1.493	4	.245	1	0	3	0	1	-.001	15
170			min	-1513.423	3	.367	15	-24.385	4	0	4	-.065	4	-.005	4
171		10	max	1082.947	2	1.422	4	.245	1	0	3	0	1	-.001	15
172			min	-1513.026	3	.346	12	-24.847	4	0	4	-.074	4	-.006	4
173		11	max	1083.477	2	1.351	4	.245	1	0	3	0	1	-.001	15
174			min	-1512.629	3	.318	12	-25.308	4	0	4	-.083	4	-.006	4
175		12	max	1084.006	2	1.28	4	.245	1	0	3	0	1	-.002	15
176			min	-1512.232	3	.29	12	-25.769	4	0	4	-.092	4	-.007	4
177		13	max	1084.535	2	1.209	4	.245	1	0	3	.001	1	-.002	15
178			min	-1511.835	3	.263	12	-26.23	4	0	4	-.101	4	-.007	4
179		14	max	1085.065	2	1.138	4	.245	1	0	3	.001	1	-.002	15
180			min	-1511.438	3	.235	12	-26.692	4	0	4	-.11	4	-.007	4
181		15	max	1085.594	2	1.067	4	.245	1	0	3	.001	1	-.002	15
182			min	-1511.041	3	.207	12	-27.153	4	0	4	-.12	4	-.008	4
183		16	max	1086.123	2	.996	4	.245	1	0	3	.001	1	-.002	15
184			min	-1510.644	3	.18	12	-27.614	4	0	4	-.13	4	-.008	4
185		17	max	1086.653	2	.925	4	.245	1	0	3	.001	1	-.002	15
186			min	-1510.247	3	.152	12	-28.075	4	0	4	-.14	4	-.009	4
187		18	max	1087.182	2	.864	2	.245	1	0	3	.001	1	-.002	15
188			min	-1509.85	3	.124	12	-28.536	4	0	4	-.15	4	-.009	4
189		19	max	1087.711	2	.809	2	.245	1	0	3	.002	1	-.002	12

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
190			min	-1509.453	3	.097	12	-28.998	4	0	4	-.16	4	-.009	4
191	M3	1	max	851.565	2	8.904	4	1.146	4	0	10	0	1	.009	4
192			min	-979.301	3	2.105	15	.019	10	0	4	-.017	4	.002	12
193		2	max	851.395	2	8.035	4	1.751	4	0	10	0	1	.005	2
194			min	-979.429	3	1.901	15	.019	10	0	4	-.017	4	0	12
195		3	max	851.225	2	7.166	4	2.356	4	0	10	0	1	.002	2
196			min	-979.557	3	1.697	15	.019	10	0	4	-.016	4	0	3
197		4	max	851.054	2	6.298	4	2.961	4	0	10	0	1	0	2
198			min	-979.684	3	1.492	15	.019	10	0	4	-.014	5	-.003	3
199		5	max	850.884	2	5.429	4	3.567	4	0	10	0	1	0	15
200			min	-979.812	3	1.288	15	.019	10	0	4	-.013	5	-.004	6
201		6	max	850.714	2	4.56	4	4.172	4	0	10	0	1	-.001	15
202			min	-979.94	3	1.084	15	.019	10	0	4	-.011	5	-.007	6
203		7	max	850.543	2	3.691	4	4.777	4	0	10	0	1	-.002	15
204			min	-980.068	3	.88	15	.019	10	0	4	-.009	5	-.009	6
205		8	max	850.373	2	2.822	4	5.382	4	0	10	0	1	-.002	15
206			min	-980.195	3	.675	15	.019	10	0	4	-.007	5	-.01	6
207		9	max	850.203	2	1.953	4	5.987	4	0	10	0	1	-.003	15
208			min	-980.323	3	.471	15	.019	10	0	4	-.004	5	-.011	6
209		10	max	850.032	2	1.084	4	6.592	4	0	10	.001	1	-.003	15
210			min	-980.451	3	.263	12	.019	10	0	4	-.001	5	-.012	6
211		11	max	849.862	2	.319	2	7.197	4	0	10	.002	4	-.003	15
212			min	-980.579	3	-.128	3	.019	10	0	4	0	10	-.012	6
213		12	max	849.692	2	-.142	15	7.802	4	0	10	.006	4	-.003	15
214			min	-980.707	3	-.655	6	.019	10	0	4	0	10	-.012	6
215		13	max	849.521	2	-.346	15	8.407	4	0	10	.01	4	-.003	15
216			min	-980.834	3	-1.524	6	.019	10	0	4	0	10	-.012	6
217		14	max	849.351	2	-.55	15	9.012	4	0	10	.014	4	-.002	15
218			min	-980.962	3	-2.392	6	.019	10	0	4	0	10	-.011	6
219		15	max	849.18	2	-.754	15	9.617	4	0	10	.018	4	-.002	15
220			min	-981.09	3	-3.261	6	.019	10	0	4	0	10	-.009	6
221		16	max	849.01	2	-.959	15	10.222	4	0	10	.023	4	-.002	15
222			min	-981.218	3	-4.13	6	.019	10	0	4	0	10	-.008	6
223		17	max	848.84	2	-1.163	15	10.827	4	0	10	.028	4	-.001	15
224			min	-981.345	3	-4.999	6	.019	10	0	4	0	10	-.006	6
225		18	max	848.669	2	-1.367	15	11.432	4	0	10	.033	4	0	15
226			min	-981.473	3	-5.868	6	.019	10	0	4	0	10	-.003	6
227		19	max	848.499	2	-1.571	15	12.037	4	0	10	.039	4	0	1
228			min	-981.601	3	-6.737	6	.019	10	0	4	0	10	0	1
229	M4	1	max	894.35	1	0	1	-.735	10	0	1	.031	4	0	1
230			min	-91.614	5	0	1	-238.552	4	0	1	0	10	0	1
231		2	max	894.52	1	0	1	-.735	10	0	1	.004	4	0	1
232			min	-91.535	5	0	1	-238.7	4	0	1	0	10	0	1
233		3	max	894.69	1	0	1	-.735	10	0	1	0	12	0	1
234			min	-91.455	5	0	1	-238.847	4	0	1	-.024	4	0	1
235		4	max	894.861	1	0	1	-.735	10	0	1	0	12	0	1
236			min	-91.376	5	0	1	-238.995	4	0	1	-.051	4	0	1
237		5	max	895.031	1	0	1	-.735	10	0	1	0	12	0	1
238			min	-91.296	5	0	1	-239.143	4	0	1	-.079	4	0	1
239		6	max	895.201	1	0	1	-.735	10	0	1	0	12	0	1
240			min	-91.217	5	0	1	-239.29	4	0	1	-.106	4	0	1
241		7	max	895.372	1	0	1	-.735	10	0	1	0	10	0	1
242			min	-91.137	5	0	1	-239.438	4	0	1	-.134	4	0	1
243		8	max	895.542	1	0	1	-.735	10	0	1	0	10	0	1
244			min	-91.058	5	0	1	-239.585	4	0	1	-.161	4	0	1
245		9	max	895.712	1	0	1	-.735	10	0	1	0	10	0	1
246			min	-90.978	5	0	1	-239.733	4	0	1	-.189	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	895.883	1	0	1	-.735	10	0	1	0	10	0	1
248			min	-90.899	5	0	1	-239.881	4	0	1	-.216	4	0	1
249		11	max	896.053	1	0	1	-.735	10	0	1	0	10	0	1
250			min	-90.819	5	0	1	-240.028	4	0	1	-.244	4	0	1
251		12	max	896.224	1	0	1	-.735	10	0	1	0	10	0	1
252			min	-90.74	5	0	1	-240.176	4	0	1	-.271	4	0	1
253		13	max	896.394	1	0	1	-.735	10	0	1	0	10	0	1
254			min	-90.66	5	0	1	-240.324	4	0	1	-.299	4	0	1
255		14	max	896.564	1	0	1	-.735	10	0	1	0	10	0	1
256			min	-90.581	5	0	1	-240.471	4	0	1	-.326	4	0	1
257		15	max	896.735	1	0	1	-.735	10	0	1	-.001	10	0	1
258			min	-90.501	5	0	1	-240.619	4	0	1	-.354	4	0	1
259		16	max	896.905	1	0	1	-.735	10	0	1	-.001	10	0	1
260			min	-90.422	5	0	1	-240.767	4	0	1	-.382	4	0	1
261		17	max	897.075	1	0	1	-.735	10	0	1	-.001	10	0	1
262			min	-90.342	5	0	1	-240.914	4	0	1	-.409	4	0	1
263		18	max	897.246	1	0	1	-.735	10	0	1	-.001	10	0	1
264			min	-90.263	5	0	1	-241.062	4	0	1	-.437	4	0	1
265		19	max	897.416	1	0	1	-.735	10	0	1	-.001	10	0	1
266			min	-90.183	5	0	1	-241.209	4	0	1	-.465	4	0	1
267	M6	1	max	3172.66	2	2.281	2	0	1	0	1	0	4	0	1
268			min	-4606.578	3	.216	12	-20.924	4	0	4	0	1	0	1
269		2	max	3173.189	2	2.226	2	0	1	0	1	0	1	0	12
270			min	-4606.181	3	.189	12	-21.386	4	0	4	-.008	4	0	2
271		3	max	3173.718	2	2.171	2	0	1	0	1	0	1	0	12
272			min	-4605.784	3	.161	12	-21.847	4	0	4	-.015	4	-.002	2
273		4	max	3174.248	2	2.115	2	0	1	0	1	0	1	0	12
274			min	-4605.387	3	.133	12	-22.308	4	0	4	-.023	4	-.002	2
275		5	max	3174.777	2	2.06	2	0	1	0	1	0	1	0	12
276			min	-4604.99	3	.102	3	-22.769	4	0	4	-.031	4	-.003	2
277		6	max	3175.306	2	2.005	2	0	1	0	1	0	1	0	12
278			min	-4604.593	3	.06	3	-23.23	4	0	4	-.04	4	-.004	2
279		7	max	3175.836	2	1.949	2	0	1	0	1	0	1	0	12
280			min	-4604.196	3	.019	3	-23.692	4	0	4	-.048	4	-.005	2
281		8	max	3176.365	2	1.894	2	0	1	0	1	0	1	0	12
282			min	-4603.799	3	-.023	3	-24.153	4	0	4	-.057	4	-.005	2
283		9	max	3176.894	2	1.839	2	0	1	0	1	0	1	0	3
284			min	-4603.402	3	-.064	3	-24.614	4	0	4	-.065	4	-.006	2
285		10	max	3177.423	2	1.783	2	0	1	0	1	0	1	0	3
286			min	-4603.005	3	-.106	3	-25.075	4	0	4	-.074	4	-.007	2
287		11	max	3177.953	2	1.728	2	0	1	0	1	0	1	0	3
288			min	-4602.608	3	-.147	3	-25.537	4	0	4	-.083	4	-.007	2
289		12	max	3178.482	2	1.673	2	0	1	0	1	0	1	0	3
290			min	-4602.211	3	-.189	3	-25.998	4	0	4	-.093	4	-.008	2
291		13	max	3179.011	2	1.617	2	0	1	0	1	0	1	0	3
292			min	-4601.814	3	-.23	3	-26.459	4	0	4	-.102	4	-.008	2
293		14	max	3179.541	2	1.562	2	0	1	0	1	0	1	0	3
294			min	-4601.417	3	-.272	3	-26.92	4	0	4	-.112	4	-.009	2
295		15	max	3180.07	2	1.507	2	0	1	0	1	0	1	0	3
296			min	-4601.02	3	-.313	3	-27.381	4	0	4	-.121	4	-.01	2
297		16	max	3180.599	2	1.451	2	0	1	0	1	0	1	0	3
298			min	-4600.623	3	-.355	3	-27.843	4	0	4	-.131	4	-.01	2
299		17	max	3181.128	2	1.396	2	0	1	0	1	0	1	0	3
300			min	-4600.226	3	-.396	3	-28.304	4	0	4	-.141	4	-.011	2
301		18	max	3181.658	2	1.34	2	0	1	0	1	0	1	0	3
302			min	-4599.829	3	-.438	3	-28.765	4	0	4	-.152	4	-.011	2
303		19	max	3182.187	2	1.285	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	-4599.432	3	-.479	3	-29.226	4	0	4	-.162	4	-.012	2
305	M7	1	max	2686.312	2	8.896	6	.786	4	0	1	0	1	.012	2
306			min	-2833.601	3	2.09	15	0	1	0	4	-.017	4	0	3
307		2	max	2686.141	2	8.027	6	1.391	4	0	1	0	1	.008	2
308			min	-2833.729	3	1.885	15	0	1	0	4	-.017	4	-.003	3
309		3	max	2685.971	2	7.158	6	1.996	4	0	1	0	1	.005	2
310			min	-2833.856	3	1.681	15	0	1	0	4	-.016	4	-.004	3
311		4	max	2685.801	2	6.289	6	2.601	4	0	1	0	1	.002	2
312			min	-2833.984	3	1.477	15	0	1	0	4	-.015	4	-.006	3
313		5	max	2685.63	2	5.42	6	3.206	4	0	1	0	1	0	2
314			min	-2834.112	3	1.273	15	0	1	0	4	-.014	4	-.007	3
315		6	max	2685.46	2	4.551	6	3.811	4	0	1	0	1	-.002	15
316			min	-2834.24	3	1.068	15	0	1	0	4	-.012	4	-.008	3
317		7	max	2685.29	2	3.682	6	4.416	4	0	1	0	1	-.002	15
318			min	-2834.367	3	.864	15	0	1	0	4	-.01	4	-.009	3
319		8	max	2685.119	2	2.814	6	5.021	4	0	1	0	1	-.002	15
320			min	-2834.495	3	.652	12	0	1	0	4	-.008	5	-.01	4
321		9	max	2684.949	2	2.036	2	5.626	4	0	1	0	1	-.003	15
322			min	-2834.623	3	.314	12	0	1	0	4	-.005	5	-.011	4
323		10	max	2684.779	2	1.359	2	6.231	4	0	1	0	1	-.003	15
324			min	-2834.751	3	-.081	3	0	1	0	4	-.003	5	-.012	4
325		11	max	2684.608	2	.682	2	6.836	4	0	1	0	4	-.003	15
326			min	-2834.879	3	-.588	3	0	1	0	4	0	1	-.012	4
327		12	max	2684.438	2	.005	2	7.441	4	0	1	.004	4	-.003	15
328			min	-2835.006	3	-1.096	3	0	1	0	4	0	1	-.012	4
329		13	max	2684.268	2	-.361	15	8.046	4	0	1	.008	4	-.003	15
330			min	-2835.134	3	-1.604	3	0	1	0	4	0	1	-.012	4
331		14	max	2684.097	2	-.566	15	8.651	4	0	1	.012	4	-.003	15
332			min	-2835.262	3	-2.4	4	0	1	0	4	0	1	-.011	4
333		15	max	2683.927	2	-.77	15	9.257	4	0	1	.016	4	-.002	15
334			min	-2835.39	3	-3.269	4	0	1	0	4	0	1	-.009	4
335		16	max	2683.757	2	-.974	15	9.862	4	0	1	.02	4	-.002	15
336			min	-2835.517	3	-4.138	4	0	1	0	4	0	1	-.008	4
337		17	max	2683.586	2	-1.178	15	10.467	4	0	1	.025	4	-.001	15
338			min	-2835.645	3	-5.006	4	0	1	0	4	0	1	-.006	4
339		18	max	2683.416	2	-1.383	15	11.072	4	0	1	.03	4	0	15
340			min	-2835.773	3	-5.875	4	0	1	0	4	0	1	-.003	4
341		19	max	2683.246	2	-1.587	15	11.677	4	0	1	.035	4	0	1
342			min	-2835.901	3	-6.744	4	0	1	0	4	0	1	0	1
343	M8	1	max	2390.349	2	0	1	0	1	0	1	.028	4	0	1
344			min	-189.17	3	0	1	-228.537	4	0	1	0	1	0	1
345		2	max	2390.52	2	0	1	0	1	0	1	.002	5	0	1
346			min	-189.043	3	0	1	-228.685	4	0	1	0	1	0	1
347		3	max	2390.69	2	0	1	0	1	0	1	0	1	0	1
348			min	-188.915	3	0	1	-228.832	4	0	1	-.024	4	0	1
349		4	max	2390.86	2	0	1	0	1	0	1	0	1	0	1
350			min	-188.787	3	0	1	-228.98	4	0	1	-.05	4	0	1
351		5	max	2391.031	2	0	1	0	1	0	1	0	1	0	1
352			min	-188.659	3	0	1	-229.128	4	0	1	-.077	4	0	1
353		6	max	2391.201	2	0	1	0	1	0	1	0	1	0	1
354			min	-188.532	3	0	1	-229.275	4	0	1	-.103	4	0	1
355		7	max	2391.371	2	0	1	0	1	0	1	0	1	0	1
356			min	-188.404	3	0	1	-229.423	4	0	1	-.129	4	0	1
357		8	max	2391.542	2	0	1	0	1	0	1	0	1	0	1
358			min	-188.276	3	0	1	-229.57	4	0	1	-.156	4	0	1
359		9	max	2391.712	2	0	1	0	1	0	1	0	1	0	1
360			min	-188.148	3	0	1	-229.718	4	0	1	-.182	4	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
361		10	max	2391.882	2	0	1	0	1	0	1	0	1	0	1
362			min	-188.021	3	0	1	-229.866	4	0	1	-.208	4	0	1
363		11	max	2392.053	2	0	1	0	1	0	1	0	1	0	1
364			min	-187.893	3	0	1	-230.013	4	0	1	-.235	4	0	1
365		12	max	2392.223	2	0	1	0	1	0	1	0	1	0	1
366			min	-187.765	3	0	1	-230.161	4	0	1	-.261	4	0	1
367		13	max	2392.393	2	0	1	0	1	0	1	0	1	0	1
368			min	-187.637	3	0	1	-230.309	4	0	1	-.288	4	0	1
369		14	max	2392.564	2	0	1	0	1	0	1	0	1	0	1
370			min	-187.51	3	0	1	-230.456	4	0	1	-.314	4	0	1
371		15	max	2392.734	2	0	1	0	1	0	1	0	1	0	1
372			min	-187.382	3	0	1	-230.604	4	0	1	-.341	4	0	1
373		16	max	2392.904	2	0	1	0	1	0	1	0	1	0	1
374			min	-187.254	3	0	1	-230.752	4	0	1	-.367	4	0	1
375		17	max	2393.075	2	0	1	0	1	0	1	0	1	0	1
376			min	-187.126	3	0	1	-230.899	4	0	1	-.394	4	0	1
377		18	max	2393.245	2	0	1	0	1	0	1	0	1	0	1
378			min	-186.999	3	0	1	-231.047	4	0	1	-.42	4	0	1
379		19	max	2393.415	2	0	1	0	1	0	1	0	1	0	1
380			min	-186.871	3	0	1	-231.194	4	0	1	-.447	4	0	1
381	M10	1	max	1078.184	2	1.989	6	-.02	10	0	1	0	4	0	1
382			min	-1516.599	3	.452	15	-20.851	4	0	5	0	3	0	1
383		2	max	1078.713	2	1.918	6	-.02	10	0	1	0	10	0	15
384			min	-1516.202	3	.435	15	-21.312	4	0	5	-.008	4	0	6
385		3	max	1079.242	2	1.847	6	-.02	10	0	1	0	10	0	15
386			min	-1515.805	3	.418	15	-21.773	4	0	5	-.015	4	-.001	6
387		4	max	1079.772	2	1.776	6	-.02	10	0	1	0	10	0	15
388			min	-1515.408	3	.401	15	-22.234	4	0	5	-.023	4	-.002	6
389		5	max	1080.301	2	1.705	6	-.02	10	0	1	0	10	0	15
390			min	-1515.011	3	.385	15	-22.696	4	0	5	-.031	4	-.003	6
391		6	max	1080.83	2	1.634	6	-.02	10	0	1	0	10	0	15
392			min	-1514.614	3	.368	15	-23.157	4	0	5	-.039	4	-.003	6
393		7	max	1081.36	2	1.563	6	-.02	10	0	1	0	10	0	15
394			min	-1514.217	3	.351	15	-23.618	4	0	5	-.048	4	-.004	6
395		8	max	1081.889	2	1.492	6	-.02	10	0	1	0	10	0	15
396			min	-1513.82	3	.335	15	-24.079	4	0	5	-.056	4	-.004	6
397		9	max	1082.418	2	1.421	6	-.02	10	0	1	0	10	-.001	15
398			min	-1513.423	3	.318	15	-24.54	4	0	5	-.065	4	-.005	6
399		10	max	1082.947	2	1.35	6	-.02	10	0	1	0	10	-.001	15
400			min	-1513.026	3	.301	15	-25.002	4	0	5	-.074	4	-.005	6
401		11	max	1083.477	2	1.279	6	-.02	10	0	1	0	10	-.001	15
402			min	-1512.629	3	.285	15	-25.463	4	0	5	-.083	4	-.006	6
403		12	max	1084.006	2	1.208	6	-.02	10	0	1	0	10	-.001	15
404			min	-1512.232	3	.268	15	-25.924	4	0	5	-.092	4	-.006	6
405		13	max	1084.535	2	1.141	2	-.02	10	0	1	0	10	-.002	15
406			min	-1511.835	3	.251	15	-26.385	4	0	5	-.102	4	-.007	6
407		14	max	1085.065	2	1.086	2	-.02	10	0	1	0	10	-.002	15
408			min	-1511.438	3	.235	15	-26.847	4	0	5	-.111	4	-.007	6
409		15	max	1085.594	2	1.03	2	-.02	10	0	1	0	10	-.002	15
410			min	-1511.041	3	.207	12	-27.308	4	0	5	-.121	4	-.007	6
411		16	max	1086.123	2	.975	2	-.02	10	0	1	0	10	-.002	15
412			min	-1510.644	3	.18	12	-27.769	4	0	5	-.131	4	-.008	6
413		17	max	1086.653	2	.92	2	-.02	10	0	1	0	10	-.002	15
414			min	-1510.247	3	.152	12	-28.23	4	0	5	-.141	4	-.008	6
415		18	max	1087.182	2	.864	2	-.02	10	0	1	0	10	-.002	15
416			min	-1509.85	3	.124	12	-28.691	4	0	5	-.151	4	-.008	6
417		19	max	1087.711	2	.809	2	-.02	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	-1509.453	3	.097	12	-29.153	4	0	5	-.161	4	-.009	6
419	M11	1	max	851.565	2	8.849	6	1.014	4	0	1	0	10	.009	6
420			min	-979.301	3	2.068	15	-.211	1	0	4	-.017	4	.002	15
421		2	max	851.395	2	7.98	6	1.619	4	0	1	0	10	.005	2
422			min	-979.429	3	1.864	15	-.211	1	0	4	-.017	4	0	12
423		3	max	851.225	2	7.111	6	2.224	4	0	1	0	10	.002	2
424			min	-979.557	3	1.659	15	-.211	1	0	4	-.016	4	0	3
425		4	max	851.054	2	6.242	6	2.829	4	0	1	0	10	0	2
426			min	-979.684	3	1.455	15	-.211	1	0	4	-.015	4	-.003	3
427		5	max	850.884	2	5.374	6	3.435	4	0	1	0	10	-.001	15
428			min	-979.812	3	1.251	15	-.211	1	0	4	-.013	4	-.005	4
429		6	max	850.714	2	4.505	6	4.04	4	0	1	0	10	-.002	15
430			min	-979.94	3	1.047	15	-.211	1	0	4	-.011	4	-.007	4
431		7	max	850.543	2	3.636	6	4.645	4	0	1	0	10	-.002	15
432			min	-980.068	3	.842	15	-.211	1	0	4	-.009	4	-.009	4
433		8	max	850.373	2	2.767	6	5.25	4	0	1	0	10	-.003	15
434			min	-980.195	3	.638	15	-.211	1	0	4	-.007	4	-.01	4
435		9	max	850.203	2	1.898	6	5.855	4	0	1	0	10	-.003	15
436			min	-980.323	3	.434	15	-.211	1	0	4	-.004	4	-.012	4
437		10	max	850.032	2	1.029	6	6.46	4	0	1	0	10	-.003	15
438			min	-980.451	3	.23	15	-.211	1	0	4	-.001	4	-.012	4
439		11	max	849.862	2	.319	2	7.065	4	0	1	.002	5	-.003	15
440			min	-980.579	3	-.128	3	-.211	1	0	4	-.001	1	-.012	4
441		12	max	849.692	2	-.179	15	7.67	4	0	1	.005	5	-.003	15
442			min	-980.707	3	-.71	4	-.211	1	0	4	-.001	1	-.012	4
443		13	max	849.521	2	-.383	15	8.275	4	0	1	.009	5	-.003	15
444			min	-980.834	3	-1.579	4	-.211	1	0	4	-.001	1	-.012	4
445		14	max	849.351	2	-.587	15	8.88	4	0	1	.013	5	-.003	15
446			min	-980.962	3	-2.448	4	-.211	1	0	4	-.001	1	-.011	4
447		15	max	849.18	2	-.792	15	9.485	4	0	1	.017	5	-.002	15
448			min	-981.09	3	-3.316	4	-.211	1	0	4	-.002	1	-.01	4
449		16	max	849.01	2	-.996	15	10.09	4	0	1	.022	5	-.002	15
450			min	-981.218	3	-4.185	4	-.211	1	0	4	-.002	1	-.008	4
451		17	max	848.84	2	-1.2	15	10.695	4	0	1	.027	5	-.001	15
452			min	-981.345	3	-5.054	4	-.211	1	0	4	-.002	1	-.006	4
453		18	max	848.669	2	-1.404	15	11.3	4	0	1	.032	5	0	15
454			min	-981.473	3	-5.923	4	-.211	1	0	4	-.002	1	-.003	4
455		19	max	848.499	2	-1.609	15	11.906	4	0	1	.038	5	0	1
456			min	-981.601	3	-6.792	4	-.211	1	0	4	-.002	1	0	1
457	M12	1	max	894.35	1	0	1	8.082	1	0	1	.03	5	0	1
458			min	-29.243	3	0	1	-233.464	4	0	1	-.002	1	0	1
459		2	max	894.52	1	0	1	8.082	1	0	1	.003	5	0	1
460			min	-29.116	3	0	1	-233.612	4	0	1	0	1	0	1
461		3	max	894.69	1	0	1	8.082	1	0	1	0	1	0	1
462			min	-28.988	3	0	1	-233.76	4	0	1	-.024	4	0	1
463		4	max	894.861	1	0	1	8.082	1	0	1	.001	1	0	1
464			min	-28.86	3	0	1	-233.907	4	0	1	-.05	4	0	1
465		5	max	895.031	1	0	1	8.082	1	0	1	.002	1	0	1
466			min	-28.732	3	0	1	-234.055	4	0	1	-.077	4	0	1
467		6	max	895.201	1	0	1	8.082	1	0	1	.003	1	0	1
468			min	-28.605	3	0	1	-234.203	4	0	1	-.104	4	0	1
469		7	max	895.372	1	0	1	8.082	1	0	1	.004	1	0	1
470			min	-28.477	3	0	1	-234.35	4	0	1	-.131	4	0	1
471		8	max	895.542	1	0	1	8.082	1	0	1	.005	1	0	1
472			min	-28.349	3	0	1	-234.498	4	0	1	-.158	4	0	1
473		9	max	895.712	1	0	1	8.082	1	0	1	.006	1	0	1
474			min	-28.221	3	0	1	-234.645	4	0	1	-.185	4	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
475		10	max	895.883	1	0	1	8.082	1	0	1	.007	1	0	1
476			min	-28.094	3	0	1	-234.793	4	0	1	-.212	4	0	1
477		11	max	896.053	1	0	1	8.082	1	0	1	.008	1	0	1
478			min	-27.966	3	0	1	-234.941	4	0	1	-.239	4	0	1
479		12	max	896.224	1	0	1	8.082	1	0	1	.009	1	0	1
480			min	-27.838	3	0	1	-235.088	4	0	1	-.266	4	0	1
481		13	max	896.394	1	0	1	8.082	1	0	1	.01	1	0	1
482			min	-27.71	3	0	1	-235.236	4	0	1	-.293	4	0	1
483		14	max	896.564	1	0	1	8.082	1	0	1	.011	1	0	1
484			min	-27.583	3	0	1	-235.384	4	0	1	-.32	4	0	1
485		15	max	896.735	1	0	1	8.082	1	0	1	.011	1	0	1
486			min	-27.455	3	0	1	-235.531	4	0	1	-.347	4	0	1
487		16	max	896.905	1	0	1	8.082	1	0	1	.012	1	0	1
488			min	-27.327	3	0	1	-235.679	4	0	1	-.374	4	0	1
489		17	max	897.075	1	0	1	8.082	1	0	1	.013	1	0	1
490			min	-27.199	3	0	1	-235.826	4	0	1	-.401	4	0	1
491		18	max	897.246	1	0	1	8.082	1	0	1	.014	1	0	1
492			min	-27.072	3	0	1	-235.974	4	0	1	-.428	4	0	1
493		19	max	897.416	1	0	1	8.082	1	0	1	.015	1	0	1
494			min	-26.944	3	0	1	-236.122	4	0	1	-.455	4	0	1
495	M1	1	max	139.177	1	776.619	3	38.923	5	0	2	.124	1	0	15
496			min	-21.029	5	-413.563	2	-44.448	1	0	3	-.102	5	-.012	2
497		2	max	140.019	1	775.525	3	40.383	5	0	2	.096	1	.245	2
498			min	-20.635	5	-415.022	2	-44.448	1	0	3	-.077	5	-.49	3
499		3	max	633.854	3	561.958	2	21.628	5	0	3	.069	1	.493	2
500			min	-380.389	2	-617.689	3	-44.294	1	0	2	-.052	5	-.955	3
501		4	max	634.486	3	560.499	2	23.088	5	0	3	.041	1	.144	2
502			min	-379.546	2	-618.783	3	-44.294	1	0	2	-.038	5	-.572	3
503		5	max	635.118	3	559.04	2	24.548	5	0	3	.014	1	-.005	15
504			min	-378.704	2	-619.878	3	-44.294	1	0	2	-.023	5	-.203	2
505		6	max	635.75	3	557.581	2	26.008	5	0	3	-.001	10	.198	3
506			min	-377.861	2	-620.972	3	-44.294	1	0	2	-.014	1	-.55	2
507		7	max	636.381	3	556.122	2	27.468	5	0	3	.009	5	.583	3
508			min	-377.019	2	-622.066	3	-44.294	1	0	2	-.041	1	-.895	2
509		8	max	637.013	3	554.663	2	28.928	5	0	3	.026	5	.97	3
510			min	-376.177	2	-623.161	3	-44.294	1	0	2	-.069	1	-1.24	2
511		9	max	652.823	3	51.999	2	52.613	5	0	9	.046	1	1.127	3
512			min	-317.248	2	.437	15	-75.404	1	0	3	-.115	5	-1.413	2
513		10	max	653.455	3	50.54	2	54.074	5	0	9	0	10	1.105	3
514			min	-316.406	2	-.009	5	-75.404	1	0	3	-.082	4	-1.445	2
515		11	max	654.086	3	49.081	2	55.534	5	0	9	-.004	10	1.084	3
516			min	-315.563	2	-1.85	4	-75.404	1	0	3	-.059	4	-1.476	2
517		12	max	669.479	3	424.336	3	135.929	5	0	2	.068	1	.953	3
518			min	-256.447	2	-666.277	2	-43.007	1	0	3	-.226	5	-1.312	2
519		13	max	670.11	3	423.241	3	137.389	5	0	2	.041	1	.69	3
520			min	-255.605	2	-667.736	2	-43.007	1	0	3	-.141	5	-.898	2
521		14	max	670.742	3	422.147	3	138.849	5	0	2	.014	1	.428	3
522			min	-254.763	2	-669.195	2	-43.007	1	0	3	-.056	5	-.483	2
523		15	max	671.374	3	421.053	3	140.309	5	0	2	.031	5	.166	3
524			min	-253.92	2	-670.654	2	-43.007	1	0	3	-.012	1	-.081	1
525		16	max	672.006	3	419.958	3	141.769	5	0	2	.119	5	.35	2
526			min	-253.078	2	-672.113	2	-43.007	1	0	3	-.039	1	-.095	3
527		17	max	672.638	3	418.864	3	143.229	5	0	2	.207	5	.767	2
528			min	-252.235	2	-673.572	2	-43.007	1	0	3	-.066	1	-.355	3
529		18	max	36.041	5	632.905	2	-4.55	10	0	5	.204	5	.388	2
530			min	-140.703	1	-302.152	3	-89.666	4	0	2	-.095	1	-.176	3
531		19	max	36.434	5	631.446	2	-4.55	10	0	5	.156	5	.012	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
532			min	-139.86	1	-303.246	3	-88.206	4	0	2	-.127	1	-.005	1
533	M5	1	max	319.712	1	2539.128	3	74.917	5	0	1	0	1	.024	2
534			min	9.168	12	-1443.358	2	0	1	0	4	-.201	4	0	15
535		2	max	320.554	1	2538.034	3	76.377	5	0	1	0	1	.92	2
536			min	9.589	12	-1444.817	2	0	1	0	4	-.154	4	-1.559	3
537		3	max	1887.676	3	1411.926	2	59.516	4	0	4	0	1	1.786	2
538			min	-1150.494	2	-1716.414	3	0	1	0	1	-.106	4	-3.088	3
539		4	max	1888.307	3	1410.467	2	60.977	4	0	4	0	1	.91	2
540			min	-1149.652	2	-1717.509	3	0	1	0	1	-.069	4	-2.022	3
541		5	max	1888.939	3	1409.008	2	62.437	4	0	4	0	1	.068	1
542			min	-1148.809	2	-1718.603	3	0	1	0	1	-.031	4	-.956	3
543		6	max	1889.571	3	1407.549	2	63.897	4	0	4	.009	4	.111	3
544			min	-1147.967	2	-1719.697	3	0	1	0	1	0	1	-.839	2
545		7	max	1890.203	3	1406.089	2	65.357	4	0	4	.049	4	1.179	3
546			min	-1147.125	2	-1720.791	3	0	1	0	1	0	1	-1.712	2
547		8	max	1890.834	3	1404.63	2	66.817	4	0	4	.09	4	2.247	3
548			min	-1146.282	2	-1721.886	3	0	1	0	1	0	1	-2.584	2
549		9	max	1903.381	3	178.433	2	179.316	4	0	1	0	1	2.591	3
550			min	-1011.528	2	.438	15	0	1	0	1	-.181	4	-2.968	2
551		10	max	1904.013	3	176.974	2	180.776	4	0	1	0	1	2.501	3
552			min	-1010.685	2	-.002	15	0	1	0	1	-.069	4	-3.079	2
553		11	max	1904.645	3	175.515	2	182.236	4	0	1	.043	4	2.411	3
554			min	-1009.843	2	-1.719	6	0	1	0	1	0	1	-3.188	2
555		12	max	1918.027	3	1114.457	3	189.546	4	0	1	0	1	2.106	3
556			min	-875.463	2	-1759.284	2	0	1	0	4	-.32	4	-2.849	2
557		13	max	1918.658	3	1113.363	3	191.007	4	0	1	0	1	1.415	3
558			min	-874.621	2	-1760.743	2	0	1	0	4	-.202	4	-1.757	2
559		14	max	1919.29	3	1112.268	3	192.467	4	0	1	0	1	.724	3
560			min	-873.778	2	-1762.202	2	0	1	0	4	-.083	4	-.663	2
561		15	max	1919.922	3	1111.174	3	193.927	4	0	1	.037	4	.431	2
562			min	-872.936	2	-1763.661	2	0	1	0	4	0	1	0	15
563		16	max	1920.554	3	1110.08	3	195.387	4	0	1	.157	4	1.526	2
564			min	-872.093	2	-1765.12	2	0	1	0	4	0	1	-.655	3
565		17	max	1921.186	3	1108.985	3	196.847	4	0	1	.279	4	2.622	2
566			min	-871.251	2	-1766.579	2	0	1	0	4	0	1	-1.343	3
567		18	max	-11.222	12	2140.002	2	0	1	0	4	.31	4	1.336	2
568			min	-319.186	1	-1082.344	3	-17.175	5	0	1	0	1	-.696	3
569		19	max	-10.801	12	2138.543	2	0	1	0	4	.301	4	.01	1
570			min	-318.344	1	-1083.438	3	-15.715	5	0	1	0	1	-.024	3
571	M9	1	max	139.177	1	776.619	3	56.546	4	0	3	-.01	10	0	15
572			min	9.506	12	-413.563	2	3.57	10	0	4	-.152	4	-.012	2
573		2	max	140.019	1	775.525	3	58.006	4	0	3	-.008	10	.245	2
574			min	9.927	12	-415.022	2	3.57	10	0	4	-.116	4	-.49	3
575		3	max	633.854	3	561.958	2	44.294	1	0	2	-.005	10	.493	2
576			min	-380.389	2	-617.689	3	3.552	10	0	3	-.08	4	-.955	3
577		4	max	634.486	3	560.499	2	44.294	1	0	2	-.003	10	.144	2
578			min	-379.546	2	-618.783	3	3.552	10	0	3	-.055	4	-.572	3
579		5	max	635.118	3	559.04	2	44.294	1	0	2	-.001	10	-.005	15
580			min	-378.704	2	-619.878	3	3.552	10	0	3	-.029	4	-.203	2
581		6	max	635.75	3	557.581	2	44.294	1	0	2	.014	1	.198	3
582			min	-377.861	2	-620.972	3	3.552	10	0	3	-.006	5	-.55	2
583		7	max	636.381	3	556.122	2	45.542	4	0	2	.041	1	.583	3
584			min	-377.019	2	-622.066	3	3.552	10	0	3	.003	10	-.895	2
585		8	max	637.013	3	554.663	2	47.002	4	0	2	.069	1	.97	3
586			min	-376.177	2	-623.161	3	3.552	10	0	3	.006	10	-1.24	2
587		9	max	652.823	3	51.999	2	82.591	4	0	3	-.004	10	1.127	3
588			min	-317.248	2	.454	15	6.419	10	0	9	-.133	4	-1.413	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	653.455	3	50.54	2	84.051	4	0	3	0	1	1.105	3
590			min	-316.406	2	.014	15	6.419	10	0	9	-.082	4	-1.445	2
591		11	max	654.086	3	49.081	2	85.511	4	0	3	.047	1	1.084	3
592			min	-315.563	2	-1.724	6	6.419	10	0	9	-.04	5	-1.476	2
593		12	max	669.479	3	424.336	3	154.153	4	0	3	-.006	10	.953	3
594			min	-256.447	2	-666.277	2	3.842	10	0	2	-.255	4	-1.312	2
595		13	max	670.11	3	423.241	3	155.614	4	0	3	-.004	10	.69	3
596			min	-255.605	2	-667.736	2	3.842	10	0	2	-.159	4	-.898	2
597		14	max	670.742	3	422.147	3	157.074	4	0	3	-.001	10	.428	3
598			min	-254.763	2	-669.195	2	3.842	10	0	2	-.061	4	-.483	2
599		15	max	671.374	3	421.053	3	158.534	4	0	3	.036	4	.166	3
600			min	-253.92	2	-670.654	2	3.842	10	0	2	.001	12	-.081	1
601		16	max	672.006	3	419.958	3	159.994	4	0	3	.135	4	.35	2
602			min	-253.078	2	-672.113	2	3.842	10	0	2	.004	10	-.095	3
603		17	max	672.638	3	418.864	3	161.454	4	0	3	.235	4	.767	2
604			min	-252.235	2	-673.572	2	3.842	10	0	2	.006	10	-.355	3
605		18	max	-9.111	12	632.905	2	50.71	1	0	2	.243	4	.388	2
606			min	-140.703	1	-302.152	3	-69.73	5	0	3	.009	10	-.176	3
607		19	max	-8.69	12	631.446	2	50.71	1	0	2	.207	4	.012	3
608			min	-139.86	1	-303.246	3	-68.27	5	0	3	.011	10	-.005	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	1.549e-2	2	NC	1	NC	1
2			min	-.605	4	-.073	3	-.008	2	-5.08e-3	3	NC	1	NC	1
3		2	max	0	1	.179	2	.014	3	1.627e-2	2	NC	4	NC	1
4			min	-.605	4	.005	15	-.009	5	-4.548e-3	3	1308.537	3	NC	1
5		3	max	0	1	.153	3	.025	1	1.706e-2	2	NC	4	NC	2
6			min	-.605	4	.004	15	-.012	5	-4.015e-3	3	716.68	3	6175.913	1
7		4	max	0	1	.219	3	.036	1	1.784e-2	2	NC	4	NC	2
8			min	-.605	4	.003	15	-.01	5	-3.482e-3	3	554.539	3	4270.905	1
9		5	max	0	1	.242	3	.041	1	1.863e-2	2	NC	4	NC	2
10			min	-.605	4	.003	15	-.004	10	-2.949e-3	3	514.113	3	3775.312	1
11		6	max	0	1	.222	3	.038	1	1.941e-2	2	NC	4	NC	2
12			min	-.605	4	.004	15	-.006	10	-2.417e-3	3	548.049	3	4087.849	1
13		7	max	0	1	.211	2	.032	3	2.02e-2	2	NC	2	NC	2
14			min	-.606	4	.004	15	-.009	10	-1.884e-3	3	669.838	3	5627.981	1
15		8	max	0	1	.262	2	.034	3	2.098e-2	2	NC	4	NC	1
16			min	-.606	4	.005	15	-.014	2	-1.351e-3	3	954.438	3	7464.171	3
17		9	max	0	1	.307	2	.035	3	2.177e-2	2	NC	4	NC	1
18			min	-.606	4	.006	15	-.021	2	-8.186e-4	3	1577.106	3	7176.196	3
19		10	max	0	1	.326	2	.035	3	2.255e-2	2	NC	4	NC	1
20			min	-.606	4	-.001	3	-.025	2	-2.859e-4	3	1583.001	2	7105.981	3
21		11	max	0	10	.307	2	.035	3	2.177e-2	2	NC	4	NC	1
22			min	-.606	4	.006	15	-.021	2	-8.186e-4	3	1577.106	3	7176.196	3
23		12	max	0	10	.262	2	.034	3	2.098e-2	2	NC	4	NC	1
24			min	-.606	4	.005	15	-.014	2	-1.351e-3	3	954.438	3	7464.171	3
25		13	max	0	10	.211	2	.032	3	2.02e-2	2	NC	2	NC	2
26			min	-.606	4	.004	15	-.009	10	-1.884e-3	3	669.838	3	5627.981	1
27		14	max	0	10	.222	3	.038	1	1.941e-2	2	NC	4	NC	2
28			min	-.606	4	.003	15	-.006	10	-2.417e-3	3	548.049	3	4087.849	1
29		15	max	0	10	.242	3	.041	1	1.863e-2	2	NC	4	NC	2
30			min	-.606	4	.002	15	-.004	10	-2.949e-3	3	514.113	3	3775.312	1
31		16	max	0	10	.219	3	.036	1	1.784e-2	2	NC	4	NC	2
32			min	-.606	4	.002	15	-.003	10	-3.482e-3	3	554.539	3	4270.905	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	.153	3	.025	1	1.706e-2	2	NC	4	NC	2
34			min	-.606	4	.003	15	-.003	10	-4.015e-3	3	716.68	3	6175.913	1
35		18	max	0	10	.179	2	.015	4	1.627e-2	2	NC	4	NC	1
36			min	-.606	4	.003	15	-.004	10	-4.548e-3	3	1308.537	3	NC	1
37		19	max	0	10	.224	2	.012	3	1.549e-2	2	NC	1	NC	1
38			min	-.606	4	-.073	3	-.008	2	-5.08e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.479	3	.011	3	8.391e-3	2	NC	1	NC	1
40			min	-.455	4	-.66	2	-.007	2	-7.048e-3	3	NC	1	NC	1
41		2	max	0	1	.653	3	.012	3	9.441e-3	2	NC	5	NC	1
42			min	-.455	4	-.831	2	-.014	5	-8.045e-3	3	931.091	3	9674.337	5
43		3	max	0	1	.809	3	.018	1	1.049e-2	2	NC	5	NC	2
44			min	-.455	4	-.987	2	-.019	5	-9.041e-3	3	491.626	3	7888.089	5
45		4	max	0	1	.933	3	.029	1	1.154e-2	2	NC	5	NC	2
46			min	-.455	4	-1.119	2	-.014	5	-1.004e-2	3	353.291	2	5333.604	1
47		5	max	0	1	1.018	3	.035	1	1.259e-2	2	NC	5	NC	2
48			min	-.455	4	-1.218	2	-.004	10	-1.103e-2	3	290.205	2	4489.374	1
49		6	max	0	1	1.062	3	.033	1	1.364e-2	2	NC	15	NC	2
50			min	-.455	4	-1.284	2	-.005	10	-1.203e-2	3	259.543	2	4707.415	1
51		7	max	0	1	1.071	3	.028	3	1.469e-2	2	NC	15	NC	2
52			min	-.455	4	-1.319	2	-.008	10	-1.303e-2	3	246.031	2	6326.724	1
53		8	max	0	1	1.054	3	.03	3	1.574e-2	2	NC	15	NC	1
54			min	-.455	4	-1.327	2	-.013	2	-1.402e-2	3	242.75	2	6436.759	4
55		9	max	0	1	1.027	3	.031	3	1.679e-2	2	NC	15	NC	1
56			min	-.455	4	-1.322	2	-.019	2	-1.502e-2	3	244.935	2	8144.98	3
57		10	max	0	1	1.012	3	.031	3	1.784e-2	2	NC	15	NC	1
58			min	-.455	4	-1.315	2	-.022	2	-1.602e-2	3	247.195	2	8044.374	3
59		11	max	0	10	1.027	3	.031	3	1.679e-2	2	NC	15	NC	1
60			min	-.455	4	-1.322	2	-.019	2	-1.502e-2	3	244.935	2	8144.98	3
61		12	max	0	10	1.054	3	.03	3	1.574e-2	2	NC	15	NC	1
62			min	-.455	4	-1.327	2	-.018	5	-1.402e-2	3	242.75	2	8538.585	3
63		13	max	0	10	1.071	3	.028	3	1.469e-2	2	NC	15	NC	2
64			min	-.455	4	-1.319	2	-.012	5	-1.303e-2	3	246.031	2	6326.724	1
65		14	max	0	10	1.062	3	.033	1	1.364e-2	2	NC	15	NC	2
66			min	-.455	4	-1.284	2	-.005	10	-1.203e-2	3	259.543	2	4707.415	1
67		15	max	0	10	1.018	3	.035	1	1.259e-2	2	NC	5	NC	2
68			min	-.455	4	-1.218	2	-.004	10	-1.103e-2	3	290.205	2	4489.374	1
69		16	max	0	10	.933	3	.029	1	1.154e-2	2	NC	5	NC	2
70			min	-.455	4	-1.119	2	-.003	10	-1.004e-2	3	353.291	2	5333.604	1
71		17	max	0	10	.809	3	.028	4	1.049e-2	2	NC	5	NC	2
72			min	-.455	4	-.987	2	-.003	10	-9.041e-3	3	491.626	3	5693.265	4
73		18	max	0	10	.653	3	.019	4	9.441e-3	2	NC	5	NC	1
74			min	-.455	4	-.831	2	-.005	2	-8.045e-3	3	931.091	3	8214.5	4
75		19	max	0	10	.479	3	.011	3	8.391e-3	2	NC	1	NC	1
76			min	-.455	4	-.66	2	-.007	2	-7.048e-3	3	NC	1	NC	1
77	M15	1	max	0	10	.489	3	.01	3	6.065e-3	3	NC	1	NC	1
78			min	-.372	4	-.658	2	-.007	2	-8.751e-3	2	NC	1	NC	1
79		2	max	0	10	.625	3	.011	3	6.909e-3	3	NC	5	NC	1
80			min	-.372	4	-.86	2	-.021	5	-9.855e-3	2	803.33	2	6954.706	5
81		3	max	0	10	.751	3	.018	1	7.753e-3	3	NC	5	NC	2
82			min	-.372	4	-1.041	2	-.027	5	-1.096e-2	2	423.006	2	5580.2	5
83		4	max	0	10	.857	3	.03	1	8.597e-3	3	NC	5	NC	2
84			min	-.372	4	-1.188	2	-.021	5	-1.206e-2	2	306.016	2	5294.029	1
85		5	max	0	10	.939	3	.035	1	9.441e-3	3	NC	5	NC	2
86			min	-.372	4	-1.291	2	-.007	5	-1.317e-2	2	256.065	2	4453.099	1
87		6	max	0	10	.995	3	.034	1	1.028e-2	3	NC	15	NC	2
88			min	-.372	4	-1.349	2	-.005	10	-1.427e-2	2	234.489	2	4659.599	1
89		7	max	0	10	1.027	3	.03	4	1.113e-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	-.373	4	-1.367	2	-.007	10	-1.537e-2	2	228.68	2	5765.509	4
91		8	max	0	10	1.038	3	.033	4	1.197e-2	3	NC	15	NC	1
92			min	-.373	4	-1.354	2	-.012	2	-1.648e-2	2	232.75	2	5139.796	4
93		9	max	0	10	1.036	3	.028	3	1.282e-2	3	NC	15	NC	1
94			min	-.373	4	-1.329	2	-.018	2	-1.758e-2	2	241.527	2	7012.946	4
95		10	max	0	1	1.033	3	.029	3	1.366e-2	3	NC	15	NC	1
96			min	-.373	4	-1.314	2	-.021	2	-1.869e-2	2	246.992	2	8722.773	3
97		11	max	0	1	1.036	3	.028	3	1.282e-2	3	NC	15	NC	1
98			min	-.373	4	-1.329	2	-.02	5	-1.758e-2	2	241.527	2	7904.801	5
99		12	max	0	1	1.038	3	.028	3	1.197e-2	3	NC	15	NC	1
100			min	-.373	4	-1.354	2	-.024	5	-1.648e-2	2	232.75	2	6721.612	5
101		13	max	0	1	1.027	3	.026	3	1.113e-2	3	NC	15	NC	2
102			min	-.372	4	-1.367	2	-.017	5	-1.537e-2	2	228.68	2	6228.776	1
103		14	max	0	1	.995	3	.034	1	1.028e-2	3	NC	15	NC	2
104			min	-.372	4	-1.349	2	-.005	10	-1.427e-2	2	234.489	2	4659.599	1
105		15	max	0	1	.939	3	.035	1	9.441e-3	3	NC	5	NC	2
106			min	-.372	4	-1.291	2	-.003	10	-1.317e-2	2	256.065	2	4453.099	1
107		16	max	0	1	.857	3	.034	4	8.597e-3	3	NC	5	NC	2
108			min	-.372	4	-1.188	2	-.003	10	-1.206e-2	2	306.016	2	4629.974	4
109		17	max	0	1	.751	3	.036	4	7.753e-3	3	NC	5	NC	2
110			min	-.372	4	-1.041	2	-.003	10	-1.096e-2	2	423.006	2	4373.475	4
111		18	max	0	1	.625	3	.025	4	6.909e-3	3	NC	5	NC	1
112			min	-.372	4	-.86	2	-.004	2	-9.855e-3	2	803.33	2	6152.418	4
113		19	max	0	1	.489	3	.01	3	6.065e-3	3	NC	1	NC	1
114			min	-.372	4	-.658	2	-.007	2	-8.751e-3	2	NC	1	NC	1
115	M16	1	max	0	10	.199	2	.009	3	1.178e-2	3	NC	1	NC	1
116			min	-.116	4	-.174	3	-.006	2	-1.303e-2	2	NC	1	NC	1
117		2	max	0	10	.115	2	.01	1	1.257e-2	3	NC	4	NC	1
118			min	-.116	4	-.147	3	-.015	5	-1.33e-2	2	1935.264	2	9632.153	5
119		3	max	0	10	.063	1	.025	1	1.336e-2	3	NC	4	NC	2
120			min	-.116	4	-.128	3	-.02	5	-1.357e-2	2	1080.06	2	6162.606	1
121		4	max	0	10	.038	1	.037	1	1.415e-2	3	NC	4	NC	2
122			min	-.116	4	-.122	3	-.017	5	-1.385e-2	2	865.333	2	4236.123	1
123		5	max	0	10	.038	1	.042	1	1.494e-2	3	NC	4	NC	2
124			min	-.116	4	-.133	3	-.008	5	-1.412e-2	2	852.402	2	3718.542	1
125		6	max	0	10	.063	1	.04	1	1.573e-2	3	NC	3	NC	2
126			min	-.116	4	-.159	3	-.003	10	-1.439e-2	2	1015.59	2	3983.216	1
127		7	max	0	10	.106	1	.029	1	1.652e-2	3	NC	4	NC	2
128			min	-.116	4	-.196	3	-.006	10	-1.466e-2	2	1574.073	2	5362.939	1
129		8	max	0	10	.165	2	.024	3	1.731e-2	3	NC	1	NC	1
130			min	-.116	4	-.237	3	-.009	2	-1.493e-2	2	2578.067	3	8335.741	4
131		9	max	0	10	.227	2	.024	3	1.81e-2	3	NC	4	NC	1
132			min	-.116	4	-.272	3	-.016	2	-1.52e-2	2	1657.109	3	NC	1
133		10	max	0	1	.254	2	.024	3	1.889e-2	3	NC	4	NC	1
134			min	-.116	4	-.287	3	-.019	2	-1.548e-2	2	1432.898	3	NC	1
135		11	max	0	1	.227	2	.024	3	1.81e-2	3	NC	4	NC	1
136			min	-.116	4	-.272	3	-.016	2	-1.52e-2	2	1657.109	3	NC	1
137		12	max	0	1	.165	2	.024	3	1.731e-2	3	NC	1	NC	1
138			min	-.116	4	-.237	3	-.012	5	-1.493e-2	2	2578.067	3	NC	1
139		13	max	0	1	.106	1	.029	1	1.652e-2	3	NC	4	NC	2
140			min	-.116	4	-.196	3	-.006	10	-1.466e-2	2	1574.073	2	5362.939	1
141		14	max	0	1	.063	1	.04	1	1.573e-2	3	NC	3	NC	2
142			min	-.116	4	-.159	3	-.003	10	-1.439e-2	2	1015.59	2	3983.216	1
143		15	max	0	1	.038	1	.042	1	1.494e-2	3	NC	4	NC	2
144			min	-.115	4	-.133	3	-.002	10	-1.412e-2	2	852.402	2	3718.542	1
145		16	max	0	1	.038	1	.037	1	1.415e-2	3	NC	4	NC	2
146			min	-.115	4	-.122	3	-.001	10	-1.385e-2	2	865.333	2	4236.123	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	.063	1	.032	4	1.336e-2	3	NC	4	NC	2
148			min	-.115	4	-.128	3	-.002	10	-1.357e-2	2	1080.06	2	5031.018	4
149		18	max	0	1	.115	2	.021	4	1.257e-2	3	NC	4	NC	1
150			min	-.115	4	-.147	3	-.003	10	-1.33e-2	2	1935.264	2	7536.523	4
151		19	max	0	1	.199	2	.009	3	1.178e-2	3	NC	1	NC	1
152			min	-.115	4	-.174	3	-.006	2	-1.303e-2	2	NC	1	NC	1
153	M2	1	max	.008	2	.012	2	.006	1	1.937e-3	5	NC	1	NC	1
154			min	-.011	3	-.018	3	-.57	4	-1.264e-4	1	6424.542	2	135.961	4
155		2	max	.008	2	.01	2	.005	1	1.955e-3	5	NC	1	NC	1
156			min	-.011	3	-.018	3	-.524	4	-1.202e-4	1	7447.873	2	147.931	4
157		3	max	.007	2	.009	2	.005	1	1.972e-3	5	NC	1	NC	1
158			min	-.01	3	-.017	3	-.478	4	-1.141e-4	1	8837.852	2	162.128	4
159		4	max	.007	2	.007	2	.004	1	1.99e-3	5	NC	1	NC	1
160			min	-.009	3	-.017	3	-.433	4	-1.079e-4	1	NC	1	179.133	4
161		5	max	.006	2	.006	2	.004	1	2.007e-3	5	NC	1	NC	1
162			min	-.009	3	-.016	3	-.388	4	-1.018e-4	1	NC	1	199.733	4
163		6	max	.006	2	.004	2	.003	1	2.025e-3	5	NC	1	NC	1
164			min	-.008	3	-.015	3	-.344	4	-9.559e-5	1	NC	1	225.017	4
165		7	max	.005	2	.003	2	.003	1	2.043e-3	5	NC	1	NC	1
166			min	-.008	3	-.014	3	-.302	4	-8.943e-5	1	NC	1	256.532	4
167		8	max	.005	2	.002	2	.003	1	2.06e-3	5	NC	1	NC	1
168			min	-.007	3	-.014	3	-.261	4	-8.327e-5	1	NC	1	296.53	4
169		9	max	.004	2	0	2	.002	1	2.078e-3	5	NC	1	NC	1
170			min	-.006	3	-.013	3	-.222	4	-7.711e-5	1	NC	1	348.397	4
171		10	max	.004	2	0	2	.002	1	2.096e-3	4	NC	1	NC	1
172			min	-.006	3	-.012	3	-.186	4	-7.095e-5	1	NC	1	417.418	4
173		11	max	.004	2	-.001	15	.001	1	2.116e-3	4	NC	1	NC	1
174			min	-.005	3	-.011	3	-.151	4	-6.478e-5	1	NC	1	512.227	4
175		12	max	.003	2	-.001	15	.001	1	2.135e-3	4	NC	1	NC	1
176			min	-.004	3	-.01	3	-.12	4	-5.862e-5	1	NC	1	647.739	4
177		13	max	.003	2	-.001	15	0	1	2.154e-3	4	NC	1	NC	1
178			min	-.004	3	-.009	3	-.091	4	-5.246e-5	1	NC	1	851.58	4
179		14	max	.002	2	-.001	15	0	1	2.174e-3	4	NC	1	NC	1
180			min	-.003	3	-.008	3	-.066	4	-4.63e-5	1	NC	1	1179.826	4
181		15	max	.002	2	-.001	15	0	1	2.193e-3	4	NC	1	NC	1
182			min	-.003	3	-.006	3	-.044	4	-4.014e-5	1	NC	1	1761.362	4
183		16	max	.001	2	0	15	0	1	2.213e-3	4	NC	1	NC	1
184			min	-.002	3	-.005	3	-.026	4	-3.398e-5	1	NC	1	2951.046	4
185		17	max	0	2	0	15	0	1	2.232e-3	4	NC	1	NC	1
186			min	-.001	3	-.003	3	-.013	4	-2.782e-5	1	NC	1	6056.566	4
187		18	max	0	2	0	15	0	1	2.251e-3	4	NC	1	NC	1
188			min	0	3	-.002	6	-.004	4	-2.166e-5	1	NC	1	NC	1
189		19	max	0	1	0	1	0	1	2.271e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	-1.55e-5	1	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	3.155e-6	1	NC	1	NC	1
192			min	0	1	0	1	0	1	-4.914e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.012	4	5.418e-5	4	NC	1	NC	1
194			min	0	2	-.003	6	0	1	1.605e-6	10	NC	1	8367.15	4
195		3	max	.001	3	-.001	15	.023	4	5.997e-4	4	NC	1	NC	1
196			min	0	2	-.006	6	0	1	2.985e-6	10	NC	1	4350.671	4
197		4	max	.002	3	-.002	15	.034	4	1.145e-3	4	NC	1	NC	1
198			min	-.001	2	-.009	6	0	1	4.365e-6	10	NC	1	3016.213	4
199		5	max	.002	3	-.003	15	.043	4	1.691e-3	4	NC	1	NC	1
200			min	-.002	2	-.012	6	0	1	5.745e-6	10	8545.303	6	2351.353	4
201		6	max	.003	3	-.003	15	.052	4	2.236e-3	4	NC	2	NC	1
202			min	-.002	2	-.015	6	0	1	7.125e-6	10	6922.868	6	1953.351	4
203		7	max	.003	3	-.004	15	.06	4	2.782e-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	8.505e-6	10	5945.799	6	1687.719	4
205		8	max	.004	3	-.004	15	.068	4	3.327e-3	4	NC	5	NC	1
206			min	-.003	2	-.019	6	0	1	9.885e-6	10	5343.166	6	1496.595	4
207		9	max	.004	3	-.004	15	.075	4	3.873e-3	4	NC	5	NC	1
208			min	-.004	2	-.02	6	0	3	1.126e-5	10	4987.448	6	1350.851	4
209		10	max	.005	3	-.005	15	.082	4	4.418e-3	4	NC	5	NC	1
210			min	-.004	2	-.021	6	0	12	1.264e-5	10	4816.811	6	1234.148	4
211		11	max	.005	3	-.005	15	.089	4	4.964e-3	4	NC	5	NC	1
212			min	-.005	2	-.021	6	0	12	1.402e-5	10	4806.16	6	1136.576	4
213		12	max	.006	3	-.004	15	.097	4	5.51e-3	4	NC	5	NC	1
214			min	-.005	2	-.02	6	0	12	1.54e-5	10	4957.521	6	1051.792	4
215		13	max	.006	3	-.004	15	.104	4	6.055e-3	4	NC	5	NC	1
216			min	-.006	2	-.019	6	0	12	1.678e-5	10	5302.057	6	975.602	4
217		14	max	.007	3	-.004	15	.112	4	6.601e-3	4	NC	5	NC	1
218			min	-.006	2	-.017	6	0	12	1.816e-5	10	5916.161	6	905.217	4
219		15	max	.007	3	-.003	15	.121	4	7.146e-3	4	NC	3	NC	1
220			min	-.006	2	-.014	6	0	12	1.954e-5	10	6968.94	6	838.831	4
221		16	max	.008	3	-.002	15	.131	4	7.692e-3	4	NC	1	NC	1
222			min	-.007	2	-.011	6	0	12	2.092e-5	10	8869.795	6	775.354	4
223		17	max	.009	3	-.001	15	.142	4	8.237e-3	4	NC	1	NC	1
224			min	-.007	2	-.008	6	0	10	2.23e-5	10	NC	1	714.237	4
225		18	max	.009	3	0	15	.155	4	8.783e-3	4	NC	1	NC	1
226			min	-.008	2	-.005	3	0	10	2.368e-5	10	NC	1	655.316	4
227		19	max	.01	3	0	5	.17	4	9.328e-3	4	NC	1	NC	1
228			min	-.008	2	-.002	3	0	10	2.506e-5	10	NC	1	598.694	4
229	M4	1	max	.002	1	.008	2	0	10	4.234e-4	4	NC	1	NC	2
230			min	0	5	-.01	3	-.17	4	9.205e-6	10	NC	1	146.077	4
231		2	max	.002	1	.008	2	0	10	4.234e-4	4	NC	1	NC	2
232			min	0	5	-.009	3	-.156	4	9.205e-6	10	NC	1	158.718	4
233		3	max	.002	1	.007	2	0	10	4.234e-4	4	NC	1	NC	2
234			min	0	5	-.009	3	-.143	4	9.205e-6	10	NC	1	173.769	4
235		4	max	.002	1	.007	2	0	10	4.234e-4	4	NC	1	NC	2
236			min	0	5	-.008	3	-.129	4	9.205e-6	10	NC	1	191.855	4
237		5	max	.002	1	.006	2	0	10	4.234e-4	4	NC	1	NC	2
238			min	0	5	-.008	3	-.116	4	9.205e-6	10	NC	1	213.824	4
239		6	max	.002	1	.006	2	0	10	4.234e-4	4	NC	1	NC	2
240			min	0	5	-.007	3	-.103	4	9.205e-6	10	NC	1	240.855	4
241		7	max	.001	1	.005	2	0	10	4.234e-4	4	NC	1	NC	2
242			min	0	5	-.007	3	-.09	4	9.205e-6	10	NC	1	274.619	4
243		8	max	.001	1	.005	2	0	10	4.234e-4	4	NC	1	NC	2
244			min	0	5	-.006	3	-.078	4	9.205e-6	10	NC	1	317.552	4
245		9	max	.001	1	.004	2	0	10	4.234e-4	4	NC	1	NC	1
246			min	0	5	-.005	3	-.066	4	9.205e-6	10	NC	1	373.323	4
247		10	max	.001	1	.004	2	0	10	4.234e-4	4	NC	1	NC	1
248			min	0	5	-.005	3	-.055	4	9.205e-6	10	NC	1	447.668	4
249		11	max	0	1	.004	2	0	10	4.234e-4	4	NC	1	NC	1
250			min	0	5	-.004	3	-.045	4	9.205e-6	10	NC	1	549.965	4
251		12	max	0	1	.003	2	0	10	4.234e-4	4	NC	1	NC	1
252			min	0	5	-.004	3	-.036	4	9.205e-6	10	NC	1	696.437	4
253		13	max	0	1	.003	2	0	10	4.234e-4	4	NC	1	NC	1
254			min	0	5	-.003	3	-.027	4	9.205e-6	10	NC	1	917.188	4
255		14	max	0	1	.002	2	0	10	4.234e-4	4	NC	1	NC	1
256			min	0	5	-.003	3	-.019	4	9.205e-6	10	NC	1	1273.446	4
257		15	max	0	1	.002	2	0	10	4.234e-4	4	NC	1	NC	1
258			min	0	5	-.002	3	-.013	4	9.205e-6	10	NC	1	1906.317	4
259		16	max	0	1	.001	2	0	10	4.234e-4	4	NC	1	NC	1
260			min	0	5	-.002	3	-.008	4	9.205e-6	10	NC	1	3205.722	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
261		17	max	0	1	0	2	0	10	4.234e-4	4	NC	1	NC	1
262			min	0	5	-.001	3	-.004	4	9.205e-6	10	NC	1	6616.651	4
263		18	max	0	1	0	2	0	10	4.234e-4	4	NC	1	NC	1
264			min	0	5	0	3	-.001	4	9.205e-6	10	NC	1	NC	1
265		19	max	0	1	0	1	0	1	4.234e-4	4	NC	1	NC	1
266			min	0	1	0	1	0	1	9.205e-6	10	NC	1	NC	1
267	M6	1	max	.024	2	.038	2	0	1	2.015e-3	4	NC	3	NC	1
268			min	-.034	3	-.054	3	-.576	4	0	1	2048.045	2	134.627	4
269		2	max	.022	2	.034	2	0	1	2.032e-3	4	NC	3	NC	1
270			min	-.032	3	-.051	3	-.529	4	0	1	2249.694	2	146.48	4
271		3	max	.021	2	.031	2	0	1	2.049e-3	4	NC	3	NC	1
272			min	-.031	3	-.048	3	-.483	4	0	1	2493.257	2	160.539	4
273		4	max	.02	2	.028	2	0	1	2.065e-3	4	NC	3	NC	1
274			min	-.029	3	-.045	3	-.437	4	0	1	2790.684	2	177.377	4
275		5	max	.018	2	.025	2	0	1	2.082e-3	4	NC	3	NC	1
276			min	-.027	3	-.042	3	-.392	4	0	1	3158.648	2	197.775	4
277		6	max	.017	2	.021	2	0	1	2.098e-3	4	NC	3	NC	1
278			min	-.025	3	-.039	3	-.348	4	0	1	3620.99	2	222.812	4
279		7	max	.016	2	.018	2	0	1	2.115e-3	4	NC	1	NC	1
280			min	-.023	3	-.036	3	-.305	4	0	1	4212.772	2	254.019	4
281		8	max	.014	2	.016	2	0	1	2.132e-3	4	NC	1	NC	1
282			min	-.021	3	-.033	3	-.264	4	0	1	4987.293	2	293.623	4
283		9	max	.013	2	.013	2	0	1	2.148e-3	4	NC	1	NC	1
284			min	-.019	3	-.03	3	-.225	4	0	1	6028.876	2	344.979	4
285		10	max	.012	2	.01	2	0	1	2.165e-3	4	NC	1	NC	1
286			min	-.017	3	-.027	3	-.187	4	0	1	7477.541	2	413.316	4
287		11	max	.011	2	.008	2	0	1	2.182e-3	4	NC	1	NC	1
288			min	-.015	3	-.024	3	-.153	4	0	1	9580.26	2	507.183	4
289		12	max	.009	2	.006	2	0	1	2.198e-3	4	NC	1	NC	1
290			min	-.013	3	-.021	3	-.121	4	0	1	NC	1	641.339	4
291		13	max	.008	2	.004	2	0	1	2.215e-3	4	NC	1	NC	1
292			min	-.011	3	-.018	3	-.092	4	0	1	NC	1	843.121	4
293		14	max	.007	2	.003	2	0	1	2.232e-3	4	NC	1	NC	1
294			min	-.01	3	-.015	3	-.066	4	0	1	NC	1	1168.013	4
295		15	max	.005	2	.002	2	0	1	2.248e-3	4	NC	1	NC	1
296			min	-.008	3	-.012	3	-.044	4	0	1	NC	1	1743.504	4
297		16	max	.004	2	0	2	0	1	2.265e-3	4	NC	1	NC	1
298			min	-.006	3	-.009	3	-.027	4	0	1	NC	1	2920.498	4
299		17	max	.003	2	0	2	0	1	2.281e-3	4	NC	1	NC	1
300			min	-.004	3	-.006	3	-.013	4	0	1	NC	1	5991.425	4
301		18	max	.001	2	0	2	0	1	2.298e-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	2.315e-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	-5.016e-4	4	NC	1	NC	1
307		2	max	.002	3	0	15	.012	4	2.815e-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	.024	4	5.579e-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	.034	4	1.088e-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	.044	4	1.617e-3	4	NC	1	NC	1
314			min	-.006	2	-.014	3	0	1	0	1	8051.538	3	NC	1
315		6	max	.008	3	-.004	15	.053	4	2.147e-3	4	NC	1	NC	1
316			min	-.007	2	-.017	3	0	1	0	1	6794.734	3	NC	1
317		7	max	.009	3	-.004	15	.061	4	2.677e-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	5921.482	4	NC	1
319		8	max	.011	3	-.005	15	.069	4	3.206e-3	4	NC	2	NC	1
320			min	-.01	2	-.021	3	0	1	0	1	5322.859	4	NC	1
321		9	max	.012	3	-.005	15	.076	4	3.736e-3	4	NC	5	NC	1
322			min	-.012	2	-.022	3	0	1	0	1	4969.695	4	NC	1
323		10	max	.014	3	-.005	15	.083	4	4.266e-3	4	NC	5	NC	1
324			min	-.013	2	-.023	3	0	1	0	1	4800.64	4	NC	1
325		11	max	.015	3	-.005	15	.09	4	4.796e-3	4	NC	5	NC	1
326			min	-.015	2	-.023	3	0	1	0	1	4790.846	4	NC	1
327		12	max	.017	3	-.005	15	.097	4	5.325e-3	4	NC	5	NC	1
328			min	-.016	2	-.022	3	0	1	0	1	4942.439	4	NC	1
329		13	max	.018	3	-.005	15	.104	4	5.855e-3	4	NC	5	NC	1
330			min	-.018	2	-.021	3	0	1	0	1	5286.569	4	NC	1
331		14	max	.02	3	-.004	15	.111	4	6.385e-3	4	NC	2	NC	1
332			min	-.019	2	-.019	3	0	1	0	1	5899.476	4	NC	1
333		15	max	.022	3	-.004	15	.119	4	6.914e-3	4	NC	1	NC	1
334			min	-.02	2	-.017	3	0	1	0	1	6949.86	4	NC	1
335		16	max	.023	3	-.003	15	.128	4	7.444e-3	4	NC	1	NC	1
336			min	-.022	2	-.015	3	0	1	0	1	8846.086	4	NC	1
337		17	max	.025	3	-.002	15	.139	4	7.974e-3	4	NC	1	NC	1
338			min	-.023	2	-.012	3	0	1	0	1	NC	1	NC	1
339		18	max	.026	3	-.001	15	.15	4	8.504e-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	.163	4	9.033e-3	4	NC	1	NC	1
342			min	-.026	2	-.007	3	0	1	0	1	NC	1	NC	1
343	M8	1	max	.006	2	.026	2	0	1	2.425e-4	4	NC	1	NC	1
344			min	0	3	-.028	3	-.163	4	0	1	NC	1	151.784	4
345		2	max	.005	2	.024	2	0	1	2.425e-4	4	NC	1	NC	1
346			min	0	3	-.027	3	-.15	4	0	1	NC	1	164.94	4
347		3	max	.005	2	.023	2	0	1	2.425e-4	4	NC	1	NC	1
348			min	0	3	-.025	3	-.137	4	0	1	NC	1	180.602	4
349		4	max	.005	2	.021	2	0	1	2.425e-4	4	NC	1	NC	1
350			min	0	3	-.024	3	-.124	4	0	1	NC	1	199.422	4
351		5	max	.004	2	.02	2	0	1	2.425e-4	4	NC	1	NC	1
352			min	0	3	-.022	3	-.112	4	0	1	NC	1	222.282	4
353		6	max	.004	2	.019	2	0	1	2.425e-4	4	NC	1	NC	1
354			min	0	3	-.021	3	-.099	4	0	1	NC	1	250.407	4
355		7	max	.004	2	.017	2	0	1	2.425e-4	4	NC	1	NC	1
356			min	0	3	-.019	3	-.087	4	0	1	NC	1	285.537	4
357		8	max	.003	2	.016	2	0	1	2.425e-4	4	NC	1	NC	1
358			min	0	3	-.017	3	-.075	4	0	1	NC	1	330.207	4
359		9	max	.003	2	.014	2	0	1	2.425e-4	4	NC	1	NC	1
360			min	0	3	-.016	3	-.064	4	0	1	NC	1	388.236	4
361		10	max	.003	2	.013	2	0	1	2.425e-4	4	NC	1	NC	1
362			min	0	3	-.014	3	-.053	4	0	1	NC	1	465.589	4
363		11	max	.003	2	.011	2	0	1	2.425e-4	4	NC	1	NC	1
364			min	0	3	-.013	3	-.043	4	0	1	NC	1	572.027	4
365		12	max	.002	2	.01	2	0	1	2.425e-4	4	NC	1	NC	1
366			min	0	3	-.011	3	-.034	4	0	1	NC	1	724.432	4
367		13	max	.002	2	.009	2	0	1	2.425e-4	4	NC	1	NC	1
368			min	0	3	-.009	3	-.026	4	0	1	NC	1	954.128	4
369		14	max	.002	2	.007	2	0	1	2.425e-4	4	NC	1	NC	1
370			min	0	3	-.008	3	-.019	4	0	1	NC	1	1324.833	4
371		15	max	.001	2	.006	2	0	1	2.425e-4	4	NC	1	NC	1
372			min	0	3	-.006	3	-.013	4	0	1	NC	1	1983.39	4
373		16	max	0	2	.004	2	0	1	2.425e-4	4	NC	1	NC	1
374			min	0	3	-.005	3	-.007	4	0	1	NC	1	3335.594	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	2.425e-4	4	NC	1	NC	1
376			min	0	3	-.003	3	-.004	4	0	1	NC	1	6885.342	4
377		18	max	0	2	.001	2	0	1	2.425e-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	2.425e-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	2.002e-3	4	NC	1	NC	1
382			min	-.011	3	-.018	3	-.574	4	9.237e-6	10	6424.542	2	135.095	4
383		2	max	.008	2	.01	2	0	10	2.018e-3	4	NC	1	NC	1
384			min	-.011	3	-.018	3	-.527	4	8.786e-6	10	7447.873	2	146.99	4
385		3	max	.007	2	.009	2	0	10	2.033e-3	4	NC	1	NC	1
386			min	-.01	3	-.017	3	-.481	4	8.336e-6	10	8837.852	2	161.098	4
387		4	max	.007	2	.007	2	0	10	2.049e-3	4	NC	1	NC	1
388			min	-.009	3	-.017	3	-.435	4	7.885e-6	10	NC	1	177.997	4
389		5	max	.006	2	.006	2	0	10	2.064e-3	4	NC	1	NC	1
390			min	-.009	3	-.016	3	-.39	4	7.435e-6	10	NC	1	198.469	4
391		6	max	.006	2	.004	2	0	10	2.08e-3	4	NC	1	NC	1
392			min	-.008	3	-.015	3	-.347	4	6.984e-6	10	NC	1	223.597	4
393		7	max	.005	2	.003	2	0	10	2.095e-3	4	NC	1	NC	1
394			min	-.008	3	-.014	3	-.304	4	6.534e-6	10	NC	1	254.918	4
395		8	max	.005	2	.002	2	0	10	2.11e-3	4	NC	1	NC	1
396			min	-.007	3	-.014	3	-.263	4	6.083e-6	10	NC	1	294.669	4
397		9	max	.004	2	0	2	0	10	2.126e-3	4	NC	1	NC	1
398			min	-.006	3	-.013	3	-.224	4	5.633e-6	10	NC	1	346.217	4
399		10	max	.004	2	0	2	0	10	2.141e-3	4	NC	1	NC	1
400			min	-.006	3	-.012	3	-.187	4	5.182e-6	10	NC	1	414.815	4
401		11	max	.004	2	-.001	2	0	10	2.157e-3	4	NC	1	NC	1
402			min	-.005	3	-.011	3	-.152	4	4.732e-6	10	NC	1	509.046	4
403		12	max	.003	2	-.002	2	0	10	2.172e-3	4	NC	1	NC	1
404			min	-.004	3	-.01	3	-.12	4	4.281e-6	10	NC	1	643.734	4
405		13	max	.003	2	-.002	15	0	10	2.188e-3	4	NC	1	NC	1
406			min	-.004	3	-.009	3	-.092	4	3.831e-6	10	NC	1	846.342	4
407		14	max	.002	2	-.002	15	0	10	2.203e-3	4	NC	1	NC	1
408			min	-.003	3	-.008	3	-.066	4	3.38e-6	10	NC	1	1172.612	4
409		15	max	.002	2	-.002	15	0	10	2.219e-3	4	NC	1	NC	1
410			min	-.003	3	-.006	3	-.044	4	2.93e-6	10	NC	1	1750.676	4
411		16	max	.001	2	-.001	15	0	10	2.234e-3	4	NC	1	NC	1
412			min	-.002	3	-.005	4	-.026	4	2.479e-6	10	NC	1	2933.331	4
413		17	max	0	2	0	15	0	10	2.249e-3	4	NC	1	NC	1
414			min	-.001	3	-.004	4	-.013	4	2.028e-6	10	NC	1	6020.828	4
415		18	max	0	2	0	15	0	10	2.265e-3	4	NC	1	NC	1
416			min	0	3	-.002	4	-.004	4	1.578e-6	10	NC	1	NC	1
417		19	max	0	1	0	1	0	1	2.28e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	1.127e-6	10	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	-2.256e-7	10	NC	1	NC	1
420			min	0	1	0	1	0	1	-4.933e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.012	4	4.535e-5	5	NC	1	NC	1
422			min	0	2	-.003	4	0	10	-1.801e-5	1	NC	1	8332.663	4
423		3	max	.001	3	-.002	15	.023	4	5.791e-4	5	NC	1	NC	1
424			min	0	2	-.006	4	0	10	-3.286e-5	1	NC	1	4333.794	4
425		4	max	.002	3	-.002	15	.034	4	1.115e-3	4	NC	1	NC	1
426			min	-.001	2	-.009	4	0	10	-4.772e-5	1	NC	1	3005.635	4
427		5	max	.002	3	-.003	15	.043	4	1.651e-3	4	NC	1	NC	1
428			min	-.002	2	-.013	4	0	10	-6.257e-5	1	8241.942	4	2344.323	4
429		6	max	.003	3	-.004	15	.052	4	2.188e-3	4	NC	2	NC	1
430			min	-.002	2	-.016	4	0	10	-7.743e-5	1	6698.279	4	1948.836	4
431		7	max	.003	3	-.004	15	.06	4	2.724e-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	-9.228e-5	1	5767.752	4	1685.261	4
433		8	max	.004	3	-.005	15	.068	4	3.26e-3	4	NC	5	NC	1
434			min	-.003	2	-.02	4	0	10	-1.071e-4	1	5194.206	4	1495.978	4
435		9	max	.004	3	-.005	15	.075	4	3.796e-3	4	NC	5	NC	1
436			min	-.004	2	-.022	4	0	1	-1.22e-4	1	4857.023	4	1351.973	4
437		10	max	.005	3	-.006	15	.082	4	4.332e-3	4	NC	5	NC	1
438			min	-.004	2	-.022	4	0	1	-1.368e-4	1	4697.859	4	1236.958	4
439		11	max	.005	3	-.006	15	.089	4	4.868e-3	4	NC	5	NC	1
440			min	-.005	2	-.022	4	0	1	-1.517e-4	1	4693.385	4	1141.034	4
441		12	max	.006	3	-.005	15	.096	4	5.405e-3	4	NC	5	NC	1
442			min	-.005	2	-.022	4	0	1	-1.666e-4	1	4846.355	4	1057.844	4
443		13	max	.006	3	-.005	15	.103	4	5.941e-3	4	NC	5	NC	1
444			min	-.006	2	-.021	4	-.001	1	-1.814e-4	1	5187.812	4	983.162	4
445		14	max	.007	3	-.005	15	.111	4	6.477e-3	4	NC	5	NC	1
446			min	-.006	2	-.019	4	-.002	1	-1.963e-4	1	5793.006	4	914.152	4
447		15	max	.007	3	-.004	15	.12	4	7.013e-3	4	NC	3	NC	1
448			min	-.006	2	-.016	4	-.002	1	-2.111e-4	1	6828.031	4	848.959	4
449		16	max	.008	3	-.003	15	.129	4	7.549e-3	4	NC	1	NC	1
450			min	-.007	2	-.013	4	-.003	1	-2.26e-4	1	8694.625	4	786.447	4
451		17	max	.009	3	-.002	15	.14	4	8.085e-3	4	NC	1	NC	1
452			min	-.007	2	-.009	4	-.004	1	-2.408e-4	1	NC	1	726.028	4
453		18	max	.009	3	-.002	15	.152	4	8.622e-3	4	NC	1	NC	1
454			min	-.008	2	-.005	4	-.005	1	-2.557e-4	1	NC	1	667.519	4
455		19	max	.01	3	0	10	.166	4	9.158e-3	4	NC	1	NC	1
456			min	-.008	2	-.002	3	-.005	1	-2.705e-4	1	NC	1	611.023	4
457	M12	1	max	.002	1	.008	2	.005	1	3.752e-4	5	NC	1	NC	2
458			min	0	3	-.01	3	-.166	4	-1.048e-4	1	NC	1	149.086	4
459		2	max	.002	1	.008	2	.005	1	3.752e-4	5	NC	1	NC	2
460			min	0	3	-.009	3	-.153	4	-1.048e-4	1	NC	1	161.992	4
461		3	max	.002	1	.007	2	.005	1	3.752e-4	5	NC	1	NC	2
462			min	0	3	-.009	3	-.14	4	-1.048e-4	1	NC	1	177.358	4
463		4	max	.002	1	.007	2	.004	1	3.752e-4	5	NC	1	NC	2
464			min	0	3	-.008	3	-.127	4	-1.048e-4	1	NC	1	195.823	4
465		5	max	.002	1	.006	2	.004	1	3.752e-4	5	NC	1	NC	2
466			min	0	3	-.008	3	-.114	4	-1.048e-4	1	NC	1	218.253	4
467		6	max	.002	1	.006	2	.003	1	3.752e-4	5	NC	1	NC	2
468			min	0	3	-.007	3	-.101	4	-1.048e-4	1	NC	1	245.849	4
469		7	max	.001	1	.005	2	.003	1	3.752e-4	5	NC	1	NC	2
470			min	0	3	-.007	3	-.088	4	-1.048e-4	1	NC	1	280.319	4
471		8	max	.001	1	.005	2	.003	1	3.752e-4	5	NC	1	NC	2
472			min	0	3	-.006	3	-.077	4	-1.048e-4	1	NC	1	324.15	4
473		9	max	.001	1	.004	2	.002	1	3.752e-4	5	NC	1	NC	1
474			min	0	3	-.005	3	-.065	4	-1.048e-4	1	NC	1	381.089	4
475		10	max	.001	1	.004	2	.002	1	3.752e-4	5	NC	1	NC	1
476			min	0	3	-.005	3	-.054	4	-1.048e-4	1	NC	1	456.989	4
477		11	max	0	1	.004	2	.001	1	3.752e-4	5	NC	1	NC	1
478			min	0	3	-.004	3	-.044	4	-1.048e-4	1	NC	1	561.427	4
479		12	max	0	1	.003	2	.001	1	3.752e-4	5	NC	1	NC	1
480			min	0	3	-.004	3	-.035	4	-1.048e-4	1	NC	1	710.964	4
481		13	max	0	1	.003	2	0	1	3.752e-4	5	NC	1	NC	1
482			min	0	3	-.003	3	-.026	4	-1.048e-4	1	NC	1	936.336	4
483		14	max	0	1	.002	2	0	1	3.752e-4	5	NC	1	NC	1
484			min	0	3	-.003	3	-.019	4	-1.048e-4	1	NC	1	1300.055	4
485		15	max	0	1	.002	2	0	1	3.752e-4	5	NC	1	NC	1
486			min	0	3	-.002	3	-.013	4	-1.048e-4	1	NC	1	1946.183	4
487		16	max	0	1	.001	2	0	1	3.752e-4	5	NC	1	NC	1
488			min	0	3	-.002	3	-.008	4	-1.048e-4	1	NC	1	3272.822	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	3.752e-4	5	NC	1	NC	1
490			min	0	3	-.001	3	-.004	4	-1.048e-4	1	NC	1	6755.294	4
491		18	max	0	1	0	2	0	1	3.752e-4	5	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-1.048e-4	1	NC	1	NC	1
493		19	max	0	1	0	1	0	1	3.752e-4	5	NC	1	NC	1
494			min	0	1	0	1	0	1	-1.048e-4	1	NC	1	NC	1
495	M1	1	max	.012	3	.224	2	.606	4	5.296e-3	2	NC	1	NC	1
496			min	-.008	2	-.073	3	0	10	-1.425e-2	3	NC	1	NC	1
497		2	max	.012	3	.108	2	.588	4	5.728e-3	4	NC	5	NC	1
498			min	-.008	2	-.034	3	-.004	1	-7.079e-3	3	1170.508	2	NC	1
499		3	max	.012	3	.019	3	.57	4	1.054e-2	4	NC	5	NC	1
500			min	-.008	2	-.015	2	-.006	1	-9.996e-5	1	568.38	2	6797.482	5
501		4	max	.012	3	.096	3	.55	4	9.03e-3	4	NC	5	NC	1
502			min	-.008	2	-.149	2	-.005	1	-3.732e-3	3	363.164	2	4992.289	5
503		5	max	.012	3	.189	3	.529	4	7.517e-3	4	NC	15	NC	1
504			min	-.007	2	-.288	2	-.004	1	-7.369e-3	3	264.724	2	4080.267	5
505		6	max	.011	3	.287	3	.507	4	1.072e-2	2	9349.7	15	NC	1
506			min	-.007	2	-.421	2	-.002	1	-1.101e-2	3	210.1	2	3512.294	5
507		7	max	.011	3	.379	3	.486	4	1.43e-2	2	7920.158	15	NC	1
508			min	-.007	2	-.539	2	0	3	-1.464e-2	3	177.67	2	3085.062	4
509		8	max	.011	3	.455	3	.464	4	1.787e-2	2	7071.762	15	NC	1
510			min	-.007	2	-.632	2	0	10	-1.828e-2	3	158.411	2	2738.548	4
511		9	max	.011	3	.505	3	.442	4	1.996e-2	2	6626.566	15	NC	1
512			min	-.007	2	-.691	2	0	1	-1.892e-2	3	148.349	2	2479.441	4
513		10	max	.01	3	.523	3	.417	4	2.107e-2	2	6490.09	15	NC	1
514			min	-.007	2	-.71	2	0	10	-1.756e-2	3	145.411	2	2377.001	4
515		11	max	.01	3	.511	3	.39	4	2.218e-2	2	6626.047	15	NC	1
516			min	-.007	2	-.69	2	0	10	-1.62e-2	3	148.912	2	2381.458	4
517		12	max	.01	3	.469	3	.36	4	2.117e-2	2	7070.534	15	NC	1
518			min	-.006	2	-.629	2	0	1	-1.424e-2	3	160.04	2	2485.233	4
519		13	max	.01	3	.4	3	.325	4	1.697e-2	2	7917.791	15	NC	1
520			min	-.006	2	-.531	2	0	1	-1.139e-2	3	181.469	2	2891.729	4
521		14	max	.009	3	.312	3	.286	4	1.278e-2	2	9345.423	15	NC	1
522			min	-.006	2	-.409	2	0	12	-8.546e-3	3	217.975	2	3848.325	4
523		15	max	.009	3	.212	3	.246	4	8.581e-3	2	NC	15	NC	1
524			min	-.006	2	-.273	2	0	12	-5.698e-3	3	280.485	2	6162.856	4
525		16	max	.009	3	.108	3	.207	4	7.457e-3	4	NC	5	NC	1
526			min	-.006	2	-.136	2	0	10	-2.85e-3	3	395.411	2	NC	1
527		17	max	.009	3	.007	3	.17	4	8.614e-3	4	NC	5	NC	1
528			min	-.006	2	-.008	2	0	10	-2.71e-6	3	639.029	2	NC	1
529		18	max	.009	3	.101	2	.14	4	4.87e-3	2	NC	5	NC	1
530			min	-.006	2	-.086	3	0	10	-1.585e-3	3	1347.154	2	NC	1
531		19	max	.009	3	.199	2	.115	4	9.709e-3	2	NC	1	NC	1
532			min	-.006	2	-.174	3	0	1	-3.246e-3	3	NC	1	NC	1
533	M5	1	max	.035	3	.326	2	.606	4	0	1	NC	1	NC	1
534			min	-.025	2	-.001	3	0	1	-1.537e-5	4	NC	1	NC	1
535		2	max	.035	3	.155	2	.593	4	5.392e-3	4	NC	5	NC	1
536			min	-.025	2	.003	15	0	1	0	1	803.127	2	9347.108	4
537		3	max	.035	3	.055	3	.575	4	1.067e-2	4	NC	5	NC	1
538			min	-.025	2	-.041	2	0	1	0	1	373.076	2	5557.762	4
539		4	max	.034	3	.183	3	.555	4	8.693e-3	4	NC	15	NC	1
540			min	-.024	2	-.282	2	0	1	0	1	224.838	2	4365.313	4
541		5	max	.033	3	.366	3	.532	4	6.716e-3	4	7735.907	15	NC	1
542			min	-.024	2	-.548	2	0	1	0	1	156.187	2	3802.356	4
543		6	max	.033	3	.576	3	.508	4	4.739e-3	4	5908.656	15	NC	1
544			min	-.024	2	-.815	2	0	1	0	1	119.549	2	3446.23	4
545		7	max	.032	3	.783	3	.485	4	2.762e-3	4	4862.23	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	-.023	2	-1.059	2	0	1	0	1	98.484	2	3131.937	4
547		8	max	.031	3	.958	3	.463	4	7.852e-4	4	4257.745	15	NC	1
548			min	-.023	2	-1.255	2	0	1	0	1	86.279	2	2783.666	4
549		9	max	.03	3	1.07	3	.442	4	0	1	3948.845	15	NC	1
550			min	-.022	2	-1.381	2	0	1	-9.785e-6	5	80.029	2	2469.123	4
551		10	max	.03	3	1.111	3	.416	4	0	1	3855.911	15	NC	1
552			min	-.022	2	-1.424	2	0	1	-9.446e-6	5	78.211	2	2399.41	4
553		11	max	.029	3	1.082	3	.389	4	0	1	3949.26	15	NC	1
554			min	-.021	2	-1.382	2	0	1	-9.107e-6	5	80.374	2	2420.281	4
555		12	max	.028	3	.986	3	.361	4	6.039e-4	4	4258.707	15	NC	1
556			min	-.021	2	-1.251	2	0	1	0	1	87.439	2	2435.476	4
557		13	max	.027	3	.833	3	.327	4	2.126e-3	4	4864.109	15	NC	1
558			min	-.021	2	-1.041	2	0	1	0	1	101.57	2	2808.198	4
559		14	max	.027	3	.64	3	.286	4	3.648e-3	4	5912.207	15	NC	1
560			min	-.02	2	-.784	2	0	1	0	1	126.705	2	3894.123	4
561		15	max	.026	3	.427	3	.243	4	5.17e-3	4	7742.788	15	NC	1
562			min	-.02	2	-.507	2	0	1	0	1	172.34	2	7191.854	4
563		16	max	.025	3	.213	3	.201	4	6.692e-3	4	NC	15	NC	1
564			min	-.02	2	-.243	2	0	1	0	1	263.062	2	NC	1
565		17	max	.024	3	.018	3	.164	4	8.214e-3	4	NC	5	NC	1
566			min	-.019	2	-.021	2	0	1	0	1	472.826	2	NC	1
567		18	max	.024	3	.135	2	.135	4	4.153e-3	4	NC	5	NC	1
568			min	-.019	2	-.144	3	0	1	0	1	1054.932	3	NC	1
569		19	max	.024	3	.254	2	.116	4	0	1	NC	1	NC	1
570			min	-.019	2	-.287	3	0	1	-9.023e-6	4	NC	1	NC	1
571	M9	1	max	.012	3	.224	2	.605	4	1.425e-2	3	NC	1	NC	1
572			min	-.008	2	-.073	3	0	1	-5.296e-3	2	NC	1	NC	1
573		2	max	.012	3	.108	2	.591	4	7.079e-3	3	NC	5	NC	1
574			min	-.008	2	-.034	3	0	10	-2.598e-3	2	1170.508	2	NC	1
575		3	max	.012	3	.019	3	.573	4	1.062e-2	4	NC	5	NC	1
576			min	-.008	2	-.015	2	0	10	-2.477e-5	10	568.38	2	6028.557	4
577		4	max	.012	3	.096	3	.553	4	8.423e-3	5	NC	5	NC	1
578			min	-.008	2	-.149	2	0	10	-3.582e-3	2	363.164	2	4589.322	4
579		5	max	.012	3	.189	3	.531	4	7.369e-3	3	NC	15	NC	1
580			min	-.007	2	-.288	2	0	10	-7.153e-3	2	264.724	2	3879.859	4
581		6	max	.011	3	.287	3	.508	4	1.101e-2	3	9301.752	15	NC	1
582			min	-.007	2	-.421	2	0	10	-1.072e-2	2	210.1	2	3434.313	4
583		7	max	.011	3	.379	3	.486	4	1.464e-2	3	7880.532	15	NC	1
584			min	-.007	2	-.539	2	0	1	-1.43e-2	2	177.67	2	3084.839	4
585		8	max	.011	3	.455	3	.464	4	1.828e-2	3	7036.975	15	NC	1
586			min	-.007	2	-.632	2	0	1	-1.787e-2	2	158.411	2	2755.845	4
587		9	max	.011	3	.505	3	.442	4	1.892e-2	3	6594.246	15	NC	1
588			min	-.007	2	-.691	2	0	10	-1.996e-2	2	148.349	2	2472.448	4
589		10	max	.01	3	.523	3	.417	4	1.756e-2	3	6458.449	15	NC	1
590			min	-.007	2	-.71	2	0	1	-2.107e-2	2	145.411	2	2377.854	4
591		11	max	.01	3	.511	3	.389	4	1.62e-2	3	6593.597	15	NC	1
592			min	-.007	2	-.69	2	0	1	-2.218e-2	2	148.912	2	2389.16	4
593		12	max	.01	3	.469	3	.36	4	1.424e-2	3	7035.664	15	NC	1
594			min	-.006	2	-.629	2	0	10	-2.117e-2	2	160.04	2	2470.791	4
595		13	max	.01	3	.4	3	.325	4	1.139e-2	3	7878.367	15	NC	1
596			min	-.006	2	-.531	2	0	10	-1.697e-2	2	181.469	2	2887.758	4
597		14	max	.009	3	.312	3	.286	4	8.546e-3	3	9298.282	15	NC	1
598			min	-.006	2	-.409	2	-.001	1	-1.278e-2	2	217.975	2	3931.653	5
599		15	max	.009	3	.212	3	.244	4	5.698e-3	3	NC	15	NC	1
600			min	-.006	2	-.273	2	-.003	1	-8.581e-3	2	280.485	2	6596.768	5
601		16	max	.009	3	.108	3	.203	4	6.725e-3	5	NC	5	NC	1
602			min	-.006	2	-.136	2	-.005	1	-4.386e-3	2	395.411	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	.167	4	8.4e-3	4	NC	5	NC	1
604			min	-.006	2	-.008	2	-.005	1	-3.733e-4	1	639.029	2	NC	1
605		18	max	.009	3	.101	2	.138	4	4.148e-3	5	NC	5	NC	1
606			min	-.006	2	-.086	3	-.004	1	-4.87e-3	2	1347.154	2	NC	1
607		19	max	.009	3	.199	2	.116	4	3.246e-3	3	NC	1	NC	1
608			min	-.006	2	-.174	3	0	10	-9.709e-3	2	NC	1	NC	1

Company:	Schletter, Inc.	Date:	8/1/2016
Engineer:	HCV	Page:	1/5
Project:	Standard PVMax - Worst Case, 14-40 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

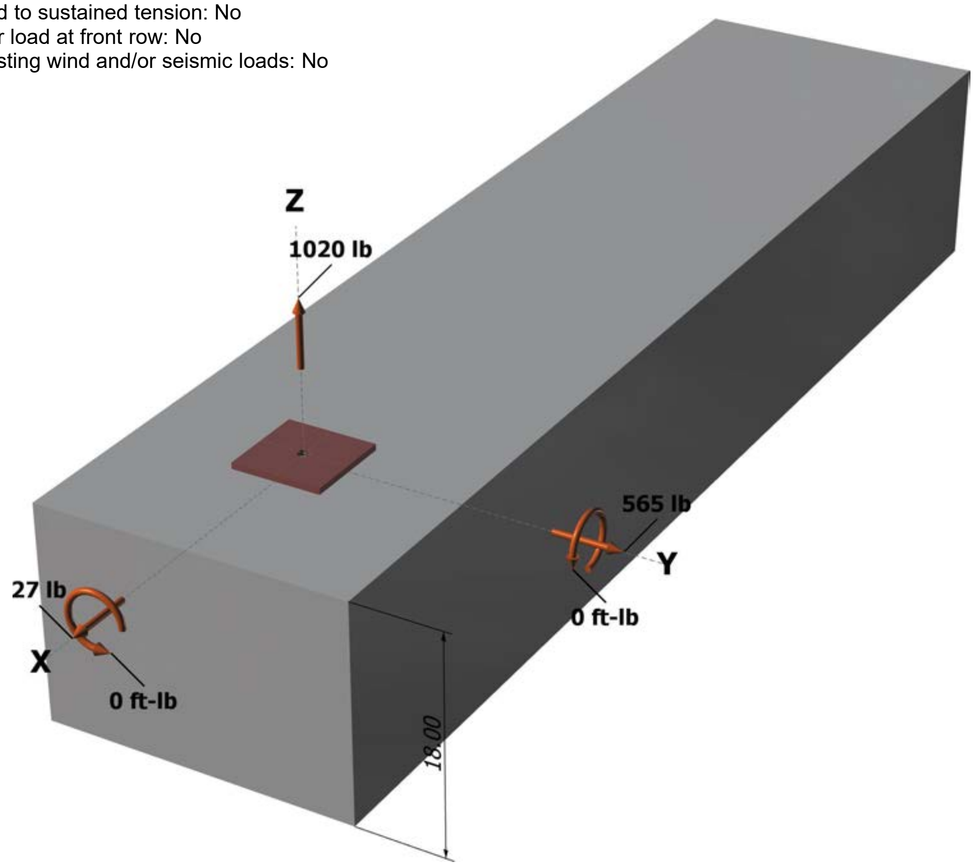
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch): 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 4.00 x 0.28

<Figure 1>



<Figure 2>

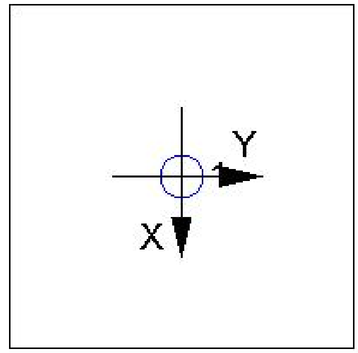
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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, ϕN_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, ϕV_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.

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

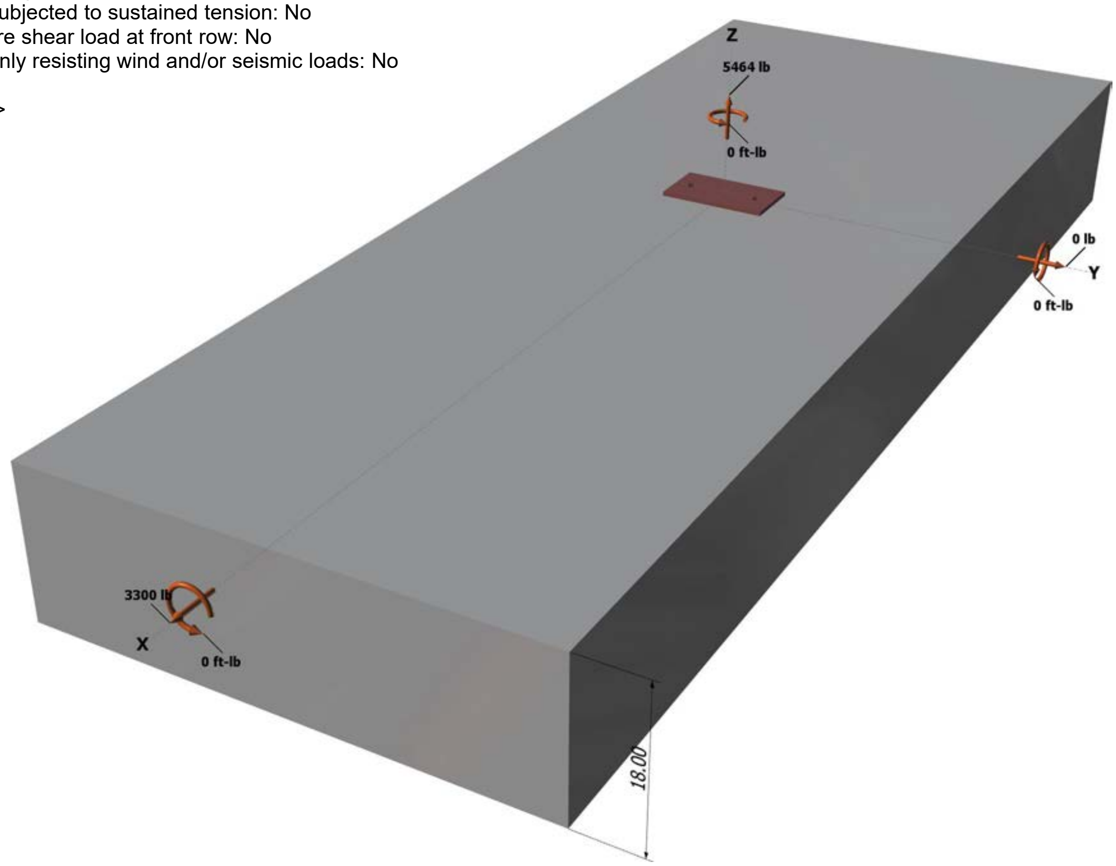
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

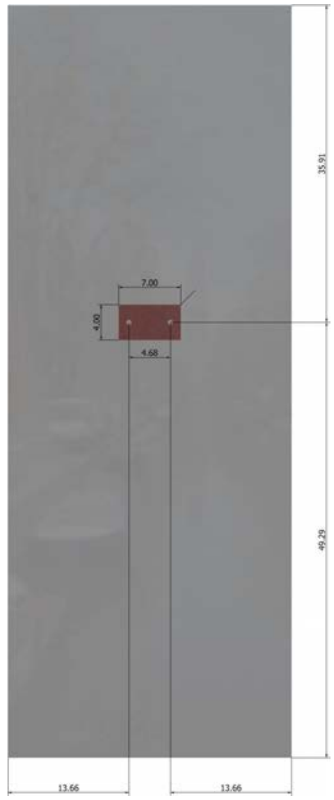
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout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



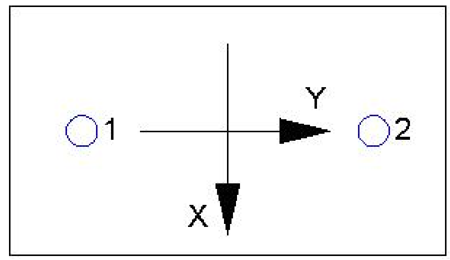
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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, ϕN_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, ϕV_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.