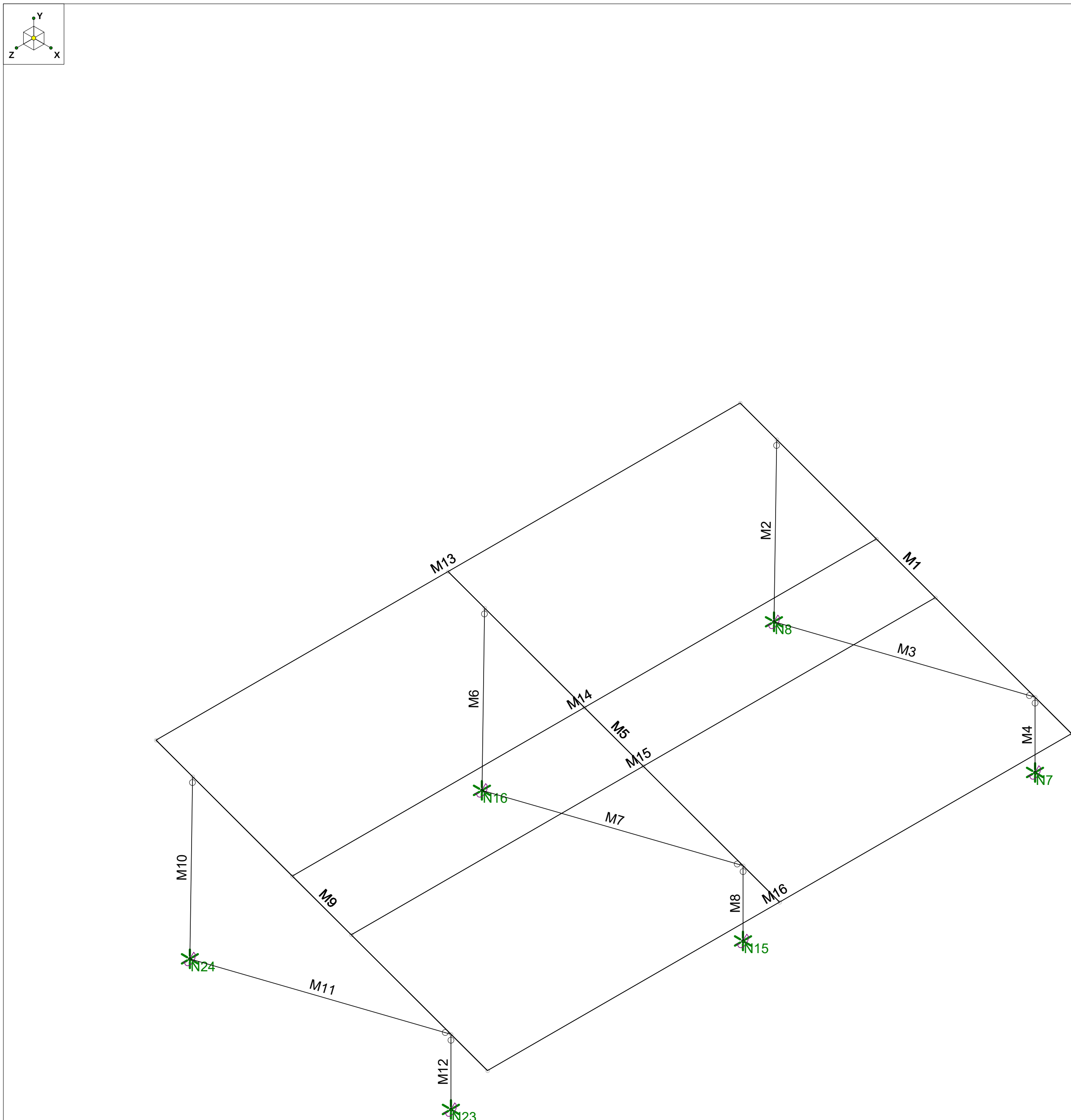


Schletter, Inc.		20° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-05	

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.

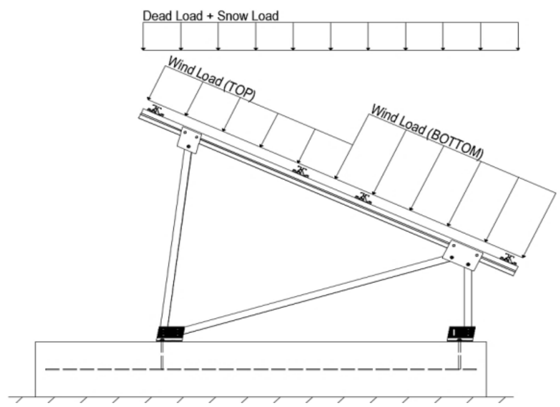
1.2 Construction

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 = 20°
Maximum Height Above Grade = 3 ft



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

1.3 Technical Codes

- ASCE 7-05 - 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 = 20.62 psf *(ASCE 7-05, Eq. 7-2)*
I_s = 1.00
C_s = 0.91
C_e = 0.90
C_t = 1.20

2.3 Wind Loads

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

Exposure Category = C
Importance Category = II

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

Pressure Coefficients

$Cf+_{TOP}$	=	1.050	*(Pressure)*
$Cf+_{BOTTOM}$	=	1.650	
$Cf-_{TOP, OUTER PURLIN}$	=	-2.400	
$Cf-_{TOP, INNER PURLIN}$	=	-1.840	*(Suction)*
$Cf-_{BOTTOM}$	=	-1.000	

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

2.4 Seismic Loads

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

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

2.5 Combination of Loads

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

Strength Design, LRFD

Component stresses are checked using the following LRFD load combinations:

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

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

Allowable Stress Design, ASD

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

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

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

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

3. STRUCTURAL ANALYSIS

3.1 RISA Results

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

3.2 RISA Components

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

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

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

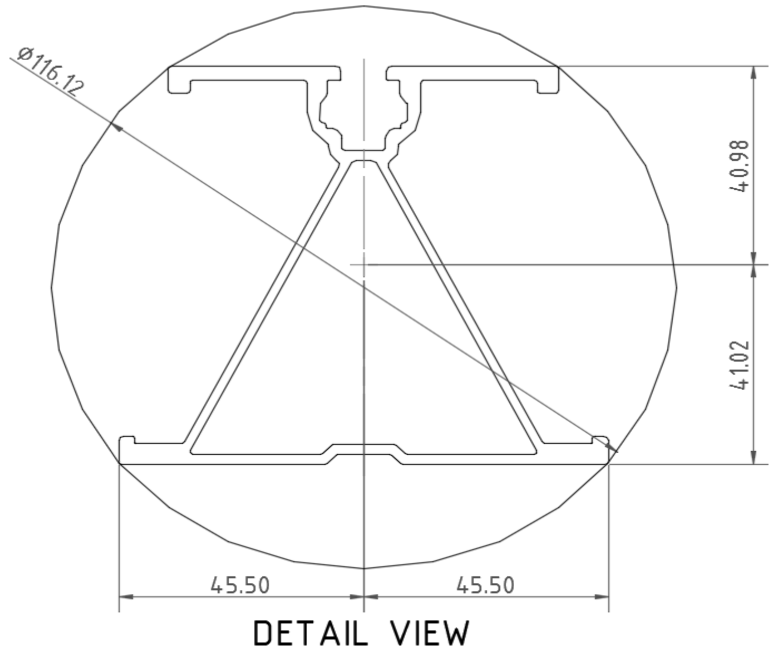
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

4. MEMBER DESIGN CALCULATIONS

4.1 Purlin Design

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

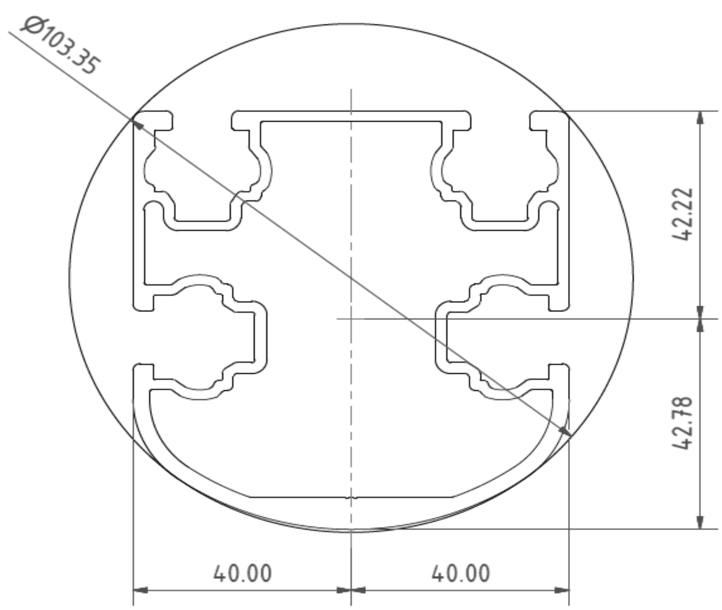
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	78	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	-1.662	k-ft
M_z =	-0.006	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	60%	



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).

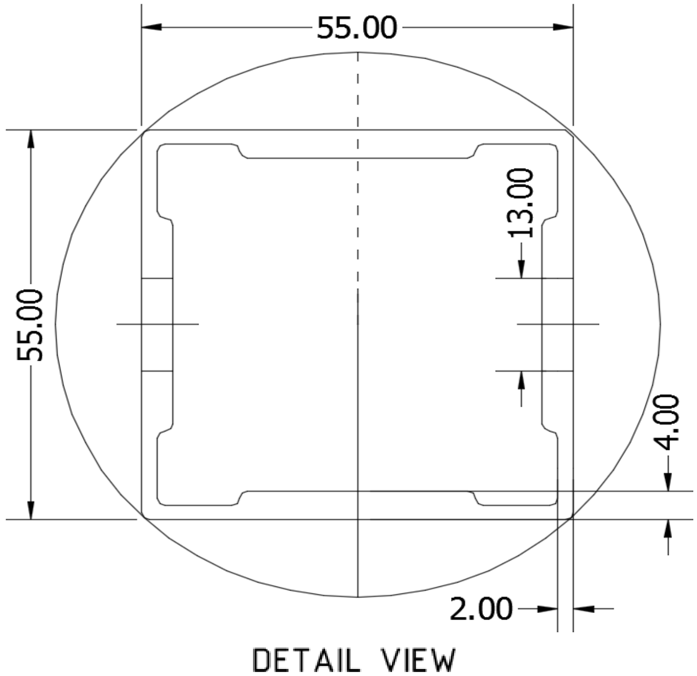
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	104.56	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.00	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.339	k-ft
M_z =	0.000	k-ft
P_n =	-0.843	k
$M_{y\ allowable}$ =	3.422	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	99%	



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).

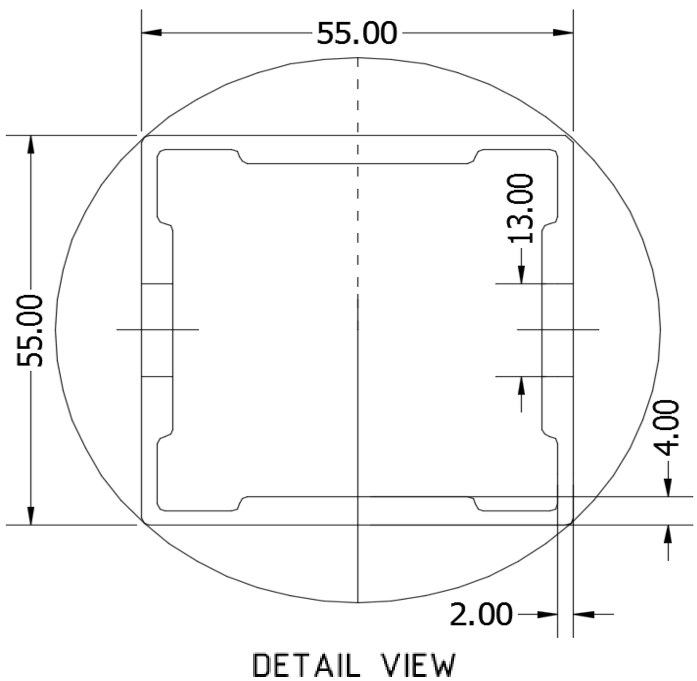
Strut Type =	55x55	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.407	k-ft
P_n =	0.481	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	31%	



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).

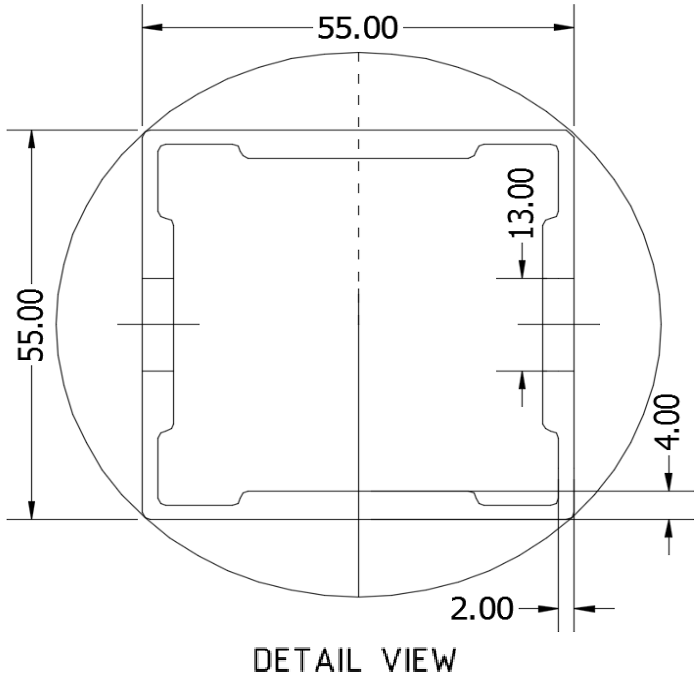
Strut Type =	55x55	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	98.03	in
$\Phi F_{ty\ AXIAL}$ =	6.11	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.013	k-ft
M_z =	0.000	k-ft
P_n =	2.049	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	6.000	k
Utilization =	35%	



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 =	61.10	in
$\Phi F_{ty\ AXIAL}$ =	13.63	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 =	-0.013	k-ft
M_z =	0.000	k-ft
P_n =	3.287	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	13.386	k
Utilization =	25%	



5. FOUNDATION DESIGN CALCULATIONS

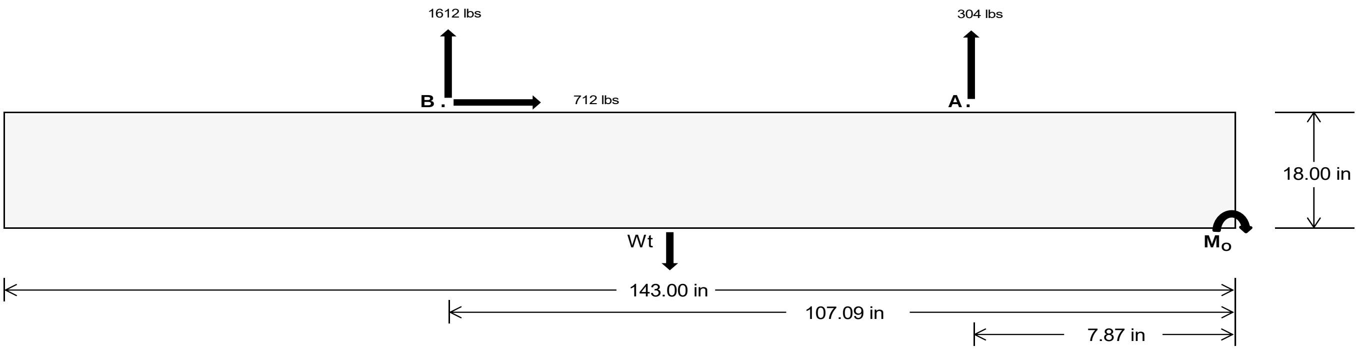
5.1 Helical Pile Foundations

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

Maximum	Front	Rear	
Tensile Load =	1273.28	6713.44	k
Compressive Load =	4099.25	4928.78	k
Lateral Load =	272.21	2961.79	k
Moment (Weak Axis) =	0.55	0.28	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).



<u>Concrete Properties</u>

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

<u>Footing Reinforcement</u>

Use fiber reinforcing with (3) #5 rebar.

<u>Overturning Check</u>

M_O =	187852.3 in-lbs
Resisting Force Required =	2627.30 lbs
S.F. =	1.67
Weight Required =	4378.84 lbs
Minimum Width =	36 in in
Weight Provided =	7775.63 lbs

A minimum 143in long x 36in wide x 18in tall ballast foundation is required to resist overturning.

<u>Sliding</u>

Force =	712.24 lbs
Friction =	0.4
Weight Required =	1780.61 lbs
Resisting Weight =	7775.63 lbs
Additional Weight Required =	0 lbs

Use a 143in long x 36in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

<u>Cohesion</u>

Sliding Force =	712.24 lbs
Cohesion =	130 psf
Area =	35.75 ft^2
Resisting =	3887.81 lbs
Additional Weight Required =	0 lbs

Use a 143in long x 36in wide x 18in tall ballast foundation. Cohesion is OK.

<u>Shear Key</u>

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

Shear key is not required.

<u>Bearing Pressure</u>

	Ballast Width			
	36 in	37 in	38 in	39 in
P_{ftg} = (145 pcf)(11.92 ft)(1.5 ft)(3 ft) =	7776 lbs	7992 lbs	8208 lbs	8424 lbs

ASD LC	1.0D + 1.0S				1.0D + 1.0W				1.0D + 0.75L + 0.75W + 0.75S				0.6D + 1.0W			
Width	36 in	37 in	38 in	39 in	36 in	37 in	38 in	39 in	36 in	37 in	38 in	39 in	36 in	37 in	38 in	39 in
F_A	1135 lbs	1135 lbs	1135 lbs	1135 lbs	1723 lbs	1723 lbs	1723 lbs	1723 lbs	2048 lbs	2048 lbs	2048 lbs	2048 lbs	-608 lbs	-608 lbs	-608 lbs	-608 lbs
F_B	1201 lbs	1201 lbs	1201 lbs	1201 lbs	2106 lbs	2106 lbs	2106 lbs	2106 lbs	2380 lbs	2380 lbs	2380 lbs	2380 lbs	-3224 lbs	-3224 lbs	-3224 lbs	-3224 lbs
F_V	99 lbs	99 lbs	99 lbs	99 lbs	1252 lbs	1252 lbs	1252 lbs	1252 lbs	1006 lbs	1006 lbs	1006 lbs	1006 lbs	-1424 lbs	-1424 lbs	-1424 lbs	-1424 lbs
P_{total}	10112 lbs	10328 lbs	10544 lbs	10760 lbs	11605 lbs	11821 lbs	12037 lbs	12253 lbs	12204 lbs	12420 lbs	12636 lbs	12852 lbs	833 lbs	963 lbs	1092 lbs	1222 lbs
M	2603 lbs-ft	2603 lbs-ft	2603 lbs-ft	2603 lbs-ft	4770 lbs-ft	4770 lbs-ft	4770 lbs-ft	4770 lbs-ft	5310 lbs-ft	5310 lbs-ft	5310 lbs-ft	5310 lbs-ft	4202 lbs-ft	4202 lbs-ft	4202 lbs-ft	4202 lbs-ft
e	0.26 ft	0.25 ft	0.25 ft	0.24 ft	0.41 ft	0.40 ft	0.40 ft	0.39 ft	0.44 ft	0.43 ft	0.42 ft	0.41 ft	5.04 ft	4.36 ft	3.85 ft	3.44 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}	246.2 psf	245.4 psf	244.7 psf	244.0 psf	257.4 psf	256.3 psf	255.3 psf	254.3 psf	266.6 psf	265.3 psf	264.0 psf	262.8 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	319.5 psf	316.8 psf	314.1 psf	311.7 psf	391.8 psf	387.1 psf	382.6 psf	378.4 psf	416.2 psf	410.8 psf	405.7 psf	400.9 psf	202.3 psf	130.6 psf	108.9 psf	99.5 psf

Maximum Bearing Pressure = 416 psf
Allowable Bearing Pressure = 1500 psf

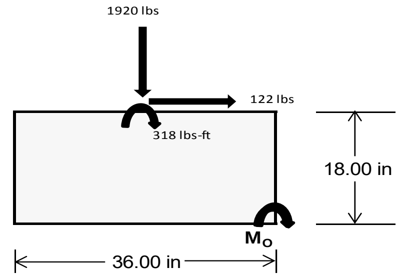
Use a 143in long x 36in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O = 2379.1 ft-lbs
Resisting Force Required = 1586.06 lbs
S.F. = 1.67
Weight Required = 2643.43 lbs
Minimum Width = 36 in in
Weight Provided = 7775.63 lbs

A minimum 143in long x 36in 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	36 in			36 in			36 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	243 lbs	485 lbs	168 lbs	735 lbs	1920 lbs	677 lbs	97 lbs	142 lbs	23 lbs
F_V	169 lbs	166 lbs	171 lbs	126 lbs	122 lbs	132 lbs	170 lbs	167 lbs	170 lbs
P_{total}	9869 lbs	10111 lbs	9795 lbs	9898 lbs	11084 lbs	9841 lbs	2912 lbs	2957 lbs	2838 lbs
M	671 lbs-ft	663 lbs-ft	677 lbs-ft	505 lbs-ft	501 lbs-ft	525 lbs-ft	671 lbs-ft	661 lbs-ft	673 lbs-ft
e	0.07 ft	0.07 ft	0.07 ft	0.05 ft	0.05 ft	0.05 ft	0.23 ft	0.22 ft	0.24 ft
L/6	0.50 ft	0.50 ft	0.50 ft	0.50 ft	0.50 ft	0.50 ft	0.50 ft	0.50 ft	0.50 ft
f_{min}	238.5 psf	245.7 psf	236.1 psf	248.6 psf	282.0 psf	245.9 psf	43.9 psf	45.7 psf	41.8 psf
f_{max}	313.6 psf	319.9 psf	311.8 psf	305.1 psf	338.1 psf	304.6 psf	119.0 psf	119.7 psf	117.0 psf

Maximum Bearing Pressure = 338 psf
Allowable Bearing Pressure = 1500 psf

Use a 143in long x 36in 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.

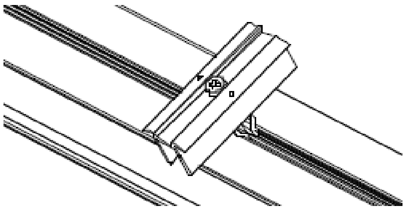
6. DESIGN OF JOINTS AND CONNECTIONS

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.

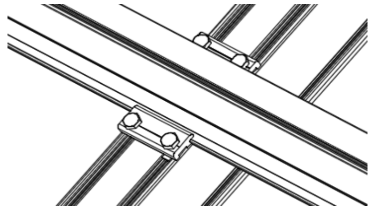
Fastening of Modules to Purlins

Maximum Uplifting Force =	1.134 k
Allowable Uplift =	1.214 k
Utilization =	93%



Fastening of Purlins to Girders

Maximum Uplifting Force =	2.637 k
Allowable Uplift =	4.357 k
Utilization =	61%



6.2 Strut Connections

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

Front Strut

Maximum Axial Load =	3.153 k
M12 Bolt Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	42%

Rear Strut

Maximum Axial Load =	4.625 k
M12 Bolt Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	62%

Diagonal Strut

Maximum Axial Load =	2.269 k
M12 Bolt Shear Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	31%

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

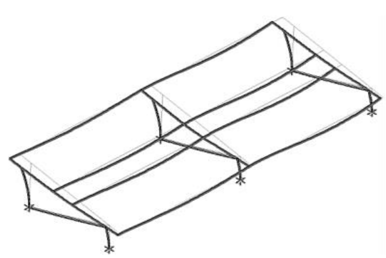
7.1 Seismic Drift

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} =	51.89 in
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$ 1.038 in
Max Drift, Δ_{MAX} =	0.464 in

$0.464 \le 1.038$, 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 = 78 in

J = 0.432

215.785

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 28.6 ksi

3.4.16

b/t = 32.195

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 25.1 ksi

3.4.16.1 Not Used

Rb/t =

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 37.0588

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

S1 = 36.9

m = 0.65

C_0 = 40.985

Cc = 41.015

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

S2 = 77.2

φF_L= φb[Bbr-mDbr*h/t]

φF_L= 43.2 ksi

φF_LSt= 25.1 ksi

Ix = 897074 mm^4

2.155 in^4

y = 41.015 mm

Sx = 1.335 in³

M_{max}St = 2.788 k-ft

Weak Axis:

3.4.14

L_b = 78

J = 0.432

137.226

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.6

3.4.16

b/t = 37.0588

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 23.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 32.195

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

S1 = 36.9

m = 0.65

C_0 = 45.5

Cc = 45.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 23.1 ksi

Iy = 446476 mm^4

1.073 in^4

x = 45.5 mm

Sy = 0.599 in³

M_{max}Wk = 1.152 k-ft

Compression

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

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

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

Girder = **BF0**

Strong Axis:

3.4.14

L_b = 104.56 in
J = 1.08
179.85

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

S1 = 0.51461

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

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

3.4.16

b/t = 16.2

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

S1 = 12.2

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

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

Weak Axis:

3.4.14

L_b = 104.56
J = 1.08
190.335

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

S1 = 0.51461

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

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

3.4.16

b/t = 7.4

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

S1 = 12.2

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

S2 = 46.7
φF_L= φyFcy
φF_L= 33.3 ksi

3.4.16.1 Used

Rb/t = 18.1

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= φb[Bt-Dt*√(Rb/t)]

φF_L= 31.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 7.4

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

S1 = 35.2

m = 0.68

C_0 = 41.067

Cc = 43.717

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

S2 = 73.8

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 29.0 ksi

Ix = 984962 mm^4

2.366 in^4

y = 43.717 mm

Sx = 1.375 in³

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

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 33.3 ksi

Iy = 923544 mm^4

2.219 in^4

x = 40 mm

Sy = 1.409 in³

M_{max}Wk = 3.904 k-ft

Compression

3.4.9

b/t = 16.2

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 31.6 ksi

b/t = 7.4

S1 = 12.21

S2 = 32.70

φF_L= φyFcy

φF_L= 33.3 ksi

3.4.10

Rb/t = 18.1

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

S1 = 6.87

S2 = 131.3

φF_L= φc[Bt-Dt*√(Rb/t)]

φF_L= 31.09 ksi

φF_L= 31.09 ksi

A = 1215.13 mm^2

1.88 in^2

P_{max} = 58.55 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 24.8 in

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

Weak Axis:

3.4.14

L_b = 24.8

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 0.57371

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.87952

φF_L= φcc(Bc-Dc*λ)

φF_L= 28.0279 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

φF_L= φyFcy

φF_L= 33.25 ksi

φF_L= 28.03 ksi

A = 663.99 mm^2

1.03 in^2

P_{max} = 28.85 kips

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

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

<u>Strong Axis:</u>

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

<u>Weak Axis:</u>

3.4.14

L_b = 98.03

J = 0.942

152.985

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.4

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in³

M_{max}St = 1.460 k-ft

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in³

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 2.26776

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.89749

φF_L= (φccFcy)/(λ²)

φF_L= 6.10803 ksi

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

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

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 61.10 in
J = 0.942
95.3524

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

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 = 30.2 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

Weak Axis:

3.4.14

L_b = 61.1
J = 0.942
95.3524

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

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 = 30.2

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

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

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

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

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

<u>Compression</u>

3.4.7

λ = 1.41345

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.77788

φF_L= (φccFcy)/(λ²)

φF_L= 13.6277 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

$\varphi F_L =$ 13.63 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 14.03 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	-63.565	-63.565	0	0
2	M14	Y	-63.565	-63.565	0	0
3	M15	Y	-63.565	-63.565	0	0
4	M16	Y	-63.565	-63.565	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	-91.409	-91.409	0	0
2	M14	y	-91.409	-91.409	0	0
3	M15	y	-143.642	-143.642	0	0
4	M16	y	-143.642	-143.642	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	208.934	208.934	0	0
2	M14	y	160.183	160.183	0	0
3	M15	y	87.056	87.056	0	0
4	M16	y	87.056	87.056	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	653.195	2	1295.541	2	.464	1	.002	1	0	1	0	1
2		min	-792.582	3	-1710.859	3	-46.883	5	-.21	4	0	1	0	1
3	N7	max	.016	9	1087.012	2	-.361	10	0	10	0	1	0	1
4		min	-.261	2	-303.163	3	-209.39	4	-.42	4	0	1	0	1
5	N15	max	0	13	3153.273	2	0	3	0	3	0	1	0	1
6		min	-2.4	2	-979.444	3	-200.508	4	-.407	4	0	1	0	1
7	N16	max	2040.848	2	3791.366	2	0	2	0	1	0	1	0	1
8		min	-2278.298	3	-5164.188	3	-47.061	5	-.212	4	0	1	0	1
9	N23	max	.026	14	1087.012	2	5.907	1	.012	1	0	1	0	1
10		min	-.261	2	-303.163	3	-204.911	4	-.413	4	0	1	0	1
11	N24	max	653.195	2	1295.541	2	-.026	10	0	10	0	1	0	1
12		min	-792.582	3	-1710.859	3	-47.409	5	-.212	4	0	1	0	1
13	Totals:	max	3344.315	2	11709.745	2	0	3						
14		min	-3864.541	3	-10171.676	3	-752.782	4						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
1	M13	1	max	53.339	4	446.652	2	-6.973	12	0	15	.112	4	0	4
2			min	1.773	10	-811.661	3	-118.908	1	-.011	2	.005	10	0	3
3		2	max	44.817	4	310.213	2	-5.942	12	0	15	.074	4	.501	3
4			min	1.773	10	-574.476	3	-90.422	1	-.011	2	-.001	10	-.273	2
5		3	max	36.371	1	173.774	2	-4.406	10	0	15	.046	5	.83	3
6			min	1.773	10	-337.291	3	-61.937	1	-.011	2	-.03	1	-.448	2
7		4	max	36.371	1	38.046	1	-1.603	10	0	15	.027	5	.988	3
8			min	1.773	10	-100.106	3	-33.545	4	-.011	2	-.064	1	-.524	2
9		5	max	36.371	1	137.078	3	1.2	10	0	15	.009	5	.974	3
10			min	1.773	10	-99.104	2	-26.089	4	-.011	2	-.078	1	-.502	2
11		6	max	36.371	1	374.263	3	23.521	1	0	15	-.004	12	.79	3
12			min	1.697	15	-235.543	2	-22.782	5	-.011	2	-.071	1	-.381	2
13		7	max	36.371	1	611.448	3	52.007	1	0	15	-.002	10	.434	3
14			min	-5.909	5	-371.982	2	-21.212	5	-.011	2	-.044	1	-.165	1
15		8	max	36.371	1	848.633	3	80.493	1	0	15	.006	2	.156	2
16			min	-14.432	5	-508.421	2	-19.642	5	-.011	2	-.039	4	-.093	3
17		9	max	36.371	1	1085.818	3	108.979	1	0	15	.072	1	.573	2
18			min	-22.954	5	-644.86	2	-18.073	5	-.011	2	-.052	5	-.792	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	43.153	4	781.299	2	-2.308	12	.011	2	.161	1	1.088	2
20			min	1.773	10	-1323.002	3	-137.464	1	-.01	3	-.006	3	-1.662	3
21		11	max	36.371	1	644.86	2	-1.277	12	.011	2	.075	4	.573	2
22			min	1.773	10	-1085.818	3	-108.979	1	0	15	-.008	3	-.792	3
23		12	max	36.371	1	508.421	2	-.115	3	.011	2	.039	4	.156	2
24			min	1.773	10	-848.633	3	-80.493	1	0	15	-.008	3	-.093	3
25		13	max	36.371	1	371.982	2	1.432	3	.011	2	.019	5	.434	3
26			min	1.773	10	-611.448	3	-52.007	1	0	15	-.044	1	-.165	1
27		14	max	36.371	1	235.543	2	2.979	3	.011	2	0	15	.79	3
28			min	.97	15	-374.263	3	-30.173	4	0	15	-.071	1	-.381	2
29		15	max	36.371	1	99.104	2	4.965	1	.011	2	-.003	12	.974	3
30			min	-7.037	5	-137.078	3	-23.641	5	0	15	-.078	1	-.502	2
31		16	max	36.371	1	100.106	3	33.451	1	.011	2	0	3	.988	3
32			min	-15.559	5	-38.046	1	-22.072	5	0	15	-.064	1	-.524	2
33		17	max	36.371	1	337.291	3	61.937	1	.011	2	.005	3	.83	3
34			min	-24.082	5	-173.774	2	-20.502	5	0	15	-.056	4	-.448	2
35		18	max	36.371	1	574.476	3	90.422	1	.011	2	.025	1	.501	3
36			min	-32.604	5	-310.213	2	-18.933	5	0	15	-.064	5	-.273	2
37		19	max	36.371	1	811.661	3	118.908	1	.011	2	.101	1	0	1
38			min	-41.127	5	-446.652	2	-17.363	5	0	15	-.077	5	0	3
39	M14	1	max	34.971	4	551.953	2	-7.299	12	.016	3	.17	4	0	1
40			min	1.6	10	-681.306	3	-124.772	1	-.017	2	.007	10	0	3
41		2	max	26.449	4	415.514	2	-6.268	12	.016	3	.119	4	.427	3
42			min	1.6	10	-500.456	3	-96.286	1	-.017	2	0	10	-.349	2
43		3	max	26.11	1	279.075	2	-4.86	10	.016	3	.074	5	.723	3
44			min	1.6	10	-319.606	3	-67.8	1	-.017	2	-.013	1	-.6	2
45		4	max	26.11	1	142.636	2	-2.057	10	.016	3	.043	5	.888	3
46			min	1.6	10	-138.755	3	-51.925	4	-.017	2	-.052	1	-.752	2
47		5	max	26.11	1	42.095	3	.746	10	.016	3	.012	5	.923	3
48			min	-4.609	5	-3.033	9	-44.468	4	-.017	2	-.07	1	-.806	2
49		6	max	26.11	1	222.945	3	17.657	1	.016	3	-.004	12	.828	3
50			min	-13.132	5	-131.71	1	-39.616	5	-.017	2	-.067	1	-.761	2
51		7	max	26.11	1	403.796	3	46.143	1	.016	3	-.002	10	.601	3
52			min	-21.654	5	-266.681	2	-38.047	5	-.017	2	-.055	4	-.618	2
53		8	max	26.11	1	584.646	3	74.629	1	.016	3	.004	2	.244	3
54			min	-30.177	5	-403.12	2	-36.477	5	-.017	2	-.074	4	-.376	2
55		9	max	26.11	1	765.496	3	103.115	1	.016	3	.063	1	.018	9
56			min	-38.699	5	-539.559	2	-34.908	5	-.017	2	-.097	5	-.243	3
57		10	max	55.542	4	675.998	2	-1.982	12	.017	2	.17	4	.43	1
58			min	1.6	10	-946.347	3	-131.601	1	-.016	3	-.007	3	-.861	3
59		11	max	47.019	4	539.559	2	-.951	12	.017	2	.118	4	.018	9
60			min	1.6	10	-765.496	3	-103.115	1	-.016	3	-.008	3	-.243	3
61		12	max	38.497	4	403.12	2	.384	3	.017	2	.072	4	.244	3
62			min	1.6	10	-584.646	3	-74.629	1	-.016	3	-.008	3	-.376	2
63		13	max	29.974	4	266.681	2	1.931	3	.017	2	.04	5	.601	3
64			min	1.6	10	-403.796	3	-52.887	4	-.016	3	-.044	1	-.618	2
65		14	max	26.11	1	131.71	1	3.478	3	.017	2	.009	5	.828	3
66			min	1.6	10	-222.945	3	-45.43	4	-.016	3	-.067	1	-.761	2
67		15	max	26.11	1	3.033	9	10.829	1	.017	2	-.002	12	.923	3
68			min	1.6	10	-42.095	3	-39.82	5	-.016	3	-.07	1	-.806	2
69		16	max	26.11	1	138.755	3	39.315	1	.017	2	.002	3	.888	3
70			min	-1.268	5	-142.636	2	-38.251	5	-.016	3	-.059	4	-.752	2
71		17	max	26.11	1	319.606	3	67.8	1	.017	2	.007	3	.723	3
72			min	-9.791	5	-279.075	2	-36.681	5	-.016	3	-.079	4	-.6	2
73		18	max	26.11	1	500.456	3	96.286	1	.017	2	.046	1	.427	3
74			min	-18.313	5	-415.514	2	-35.112	5	-.016	3	-.101	5	-.349	2
75		19	max	26.11	1	681.306	3	124.772	1	.017	2	.126	1	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
76			min	-26.836	5	-551.953	2	-33.542	5	-.016	3	-.126	5	0	3
77	M15	1	max	67.849	5	756.022	2	-7.065	12	.018	2	.232	4	0	2
78			min	-27.096	1	-397.653	3	-124.827	1	-.013	3	.007	10	0	3
79		2	max	59.327	5	559.224	2	-6.033	12	.018	2	.168	4	.252	3
80			min	-27.096	1	-301.305	3	-96.341	1	-.013	3	0	10	-.475	2
81		3	max	50.804	5	362.427	2	-4.98	10	.018	2	.11	5	.435	3
82			min	-27.096	1	-204.957	3	-78.036	4	-.013	3	-.013	1	-.808	2
83		4	max	42.281	5	165.63	2	-2.177	10	.018	2	.065	5	.548	3
84			min	-27.096	1	-108.609	3	-70.579	4	-.013	3	-.052	1	-.998	2
85		5	max	33.759	5	-.168	15	.626	10	.018	2	.021	5	.592	3
86			min	-27.096	1	-31.167	2	-63.122	4	-.013	3	-.07	1	-1.047	2
87		6	max	25.236	5	84.087	3	17.602	1	.018	2	-.003	12	.566	3
88			min	-27.096	1	-227.964	2	-58.249	5	-.013	3	-.067	1	-.953	2
89		7	max	16.714	5	180.435	3	46.088	1	.018	2	-.002	10	.471	3
90			min	-27.096	1	-424.761	2	-56.68	5	-.013	3	-.073	4	-.718	2
91		8	max	8.191	5	276.783	3	74.574	1	.018	2	.004	2	.306	3
92			min	-27.096	1	-621.558	2	-55.11	5	-.013	3	-.106	4	-.34	2
93		9	max	-.164	15	373.131	3	103.06	1	.018	2	.063	1	.18	2
94			min	-27.096	1	-818.356	2	-53.54	5	-.013	3	-.143	5	0	15
95		10	max	-1.303	10	1015.153	2	-2.217	12	.013	3	.229	4	.842	2
96			min	-27.096	1	-469.479	3	-131.546	1	-.018	2	-.005	3	-.233	3
97		11	max	-1.303	10	818.356	2	-1.185	12	.013	3	.163	4	.18	2
98			min	-27.096	1	-373.131	3	-103.06	1	-.018	2	-.007	3	0	15
99		12	max	-1.303	10	621.558	2	.01	3	.013	3	.104	4	.306	3
100			min	-27.096	1	-276.783	3	-79.015	4	-.018	2	-.008	3	-.34	2
101		13	max	-1.303	10	424.761	2	1.557	3	.013	3	.058	5	.471	3
102			min	-27.096	1	-180.435	3	-71.558	4	-.018	2	-.044	1	-.718	2
103		14	max	-1.303	10	227.964	2	3.104	3	.013	3	.014	5	.566	3
104			min	-35.052	4	-84.087	3	-64.101	4	-.018	2	-.067	1	-.953	2
105		15	max	-1.303	10	31.167	2	10.883	1	.013	3	-.002	12	.592	3
106			min	-43.575	4	.169	15	-58.451	5	-.018	2	-.07	1	-1.047	2
107		16	max	-1.303	10	108.609	3	39.369	1	.013	3	.001	3	.548	3
108			min	-52.097	4	-165.63	2	-56.881	5	-.018	2	-.082	4	-.998	2
109		17	max	-1.303	10	204.957	3	67.855	1	.013	3	.006	3	.435	3
110			min	-60.62	4	-362.427	2	-55.312	5	-.018	2	-.114	4	-.808	2
111		18	max	-1.303	10	301.305	3	96.341	1	.013	3	.046	1	.252	3
112			min	-69.142	4	-559.224	2	-53.742	5	-.018	2	-.15	5	-.475	2
113		19	max	-1.303	10	397.653	3	124.827	1	.013	3	.126	1	0	2
114			min	-77.665	4	-756.022	2	-52.172	5	-.018	2	-.188	5	0	3
115	M16	1	max	63.122	5	657.258	2	-6.243	12	.005	1	.156	4	0	2
116			min	-40.828	1	-310.779	3	-119.58	1	-.011	3	.006	10	0	3
117		2	max	54.6	5	460.461	2	-5.212	12	.005	1	.109	4	.19	3
118			min	-40.828	1	-214.431	3	-91.095	1	-.011	3	0	10	-.404	2
119		3	max	46.077	5	263.664	2	-4.181	12	.005	1	.072	5	.31	3
120			min	-40.828	1	-118.083	3	-62.609	1	-.011	3	-.028	1	-.665	2
121		4	max	37.555	5	66.867	2	-2.029	10	.005	1	.043	5	.36	3
122			min	-40.828	1	-21.735	3	-46.649	4	-.011	3	-.063	1	-.784	2
123		5	max	29.032	5	74.613	3	.774	10	.005	1	.016	5	.341	3
124			min	-40.828	1	-129.93	2	-39.192	4	-.011	3	-.078	1	-.762	2
125		6	max	20.51	5	170.961	3	22.849	1	.005	1	-.004	12	.252	3
126			min	-40.828	1	-326.728	2	-35.743	5	-.011	3	-.071	1	-.597	2
127		7	max	11.987	5	267.309	3	51.335	1	.005	1	-.003	10	.094	3
128			min	-40.828	1	-523.525	2	-34.173	5	-.011	3	-.046	4	-.29	2
129		8	max	3.464	5	363.657	3	79.821	1	.005	1	.005	2	.159	2
130			min	-40.828	1	-720.322	2	-32.603	5	-.011	3	-.061	4	-.134	3
131		9	max	-2.405	10	460.005	3	108.306	1	.005	1	.071	1	.751	2
132			min	-40.828	1	-917.119	2	-31.034	5	-.011	3	-.083	5	-.431	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	-2.405	10	1113.916	2	-3.038	12	.011	3	.159	1	1.484	2
134			min	-40.828	1	-556.354	3	-136.792	1	-.005	1	-.002	3	-.798	3
135		11	max	.508	5	917.119	2	-2.007	12	.011	3	.106	4	.751	2
136			min	-40.828	1	-460.005	3	-108.306	1	-.005	1	-.005	3	-.431	3
137		12	max	-2.405	10	720.322	2	-.975	12	.011	3	.061	4	.159	2
138			min	-40.828	1	-363.657	3	-79.821	1	-.005	1	-.006	3	-.134	3
139		13	max	-2.405	10	523.525	2	.265	3	.011	3	.031	5	.094	3
140			min	-40.828	1	-267.309	3	-51.335	1	-.005	1	-.045	1	-.29	2
141		14	max	-2.405	10	326.728	2	1.812	3	.011	3	.003	5	.252	3
142			min	-40.828	1	-170.961	3	-43.108	4	-.005	1	-.071	1	-.597	2
143		15	max	-2.405	10	129.93	2	5.637	1	.011	3	-.003	12	.341	3
144			min	-42.818	4	-74.613	3	-36.582	5	-.005	1	-.078	1	-.762	2
145		16	max	-2.405	10	21.735	3	34.123	1	.011	3	0	12	.36	3
146			min	-51.341	4	-66.867	2	-35.012	5	-.005	1	-.064	4	-.784	2
147		17	max	-2.405	10	118.083	3	62.609	1	.011	3	.003	3	.31	3
148			min	-59.863	4	-263.664	2	-33.442	5	-.005	1	-.081	4	-.665	2
149		18	max	-2.405	10	214.431	3	91.095	1	.011	3	.027	1	.19	3
150			min	-68.386	4	-460.461	2	-31.873	5	-.005	1	-.098	5	-.404	2
151		19	max	-2.405	10	310.779	3	119.58	1	.011	3	.103	1	0	2
152			min	-76.908	4	-657.258	2	-30.303	5	-.005	1	-.121	5	0	5
153	M2	1	max	1122.477	2	2.219	4	.425	1	0	5	0	3	0	1
154			min	-1529.874	3	.547	15	-38.616	4	0	1	0	2	0	1
155		2	max	1122.893	2	2.211	4	.425	1	0	5	0	1	0	15
156			min	-1529.562	3	.545	15	-38.977	4	0	1	-.011	4	0	4
157		3	max	1123.309	2	2.202	4	.425	1	0	5	0	1	0	15
158			min	-1529.25	3	.543	15	-39.337	4	0	1	-.022	4	-.001	4
159		4	max	1123.725	2	2.193	4	.425	1	0	5	0	1	0	15
160			min	-1528.938	3	.541	15	-39.698	4	0	1	-.033	4	-.002	4
161		5	max	1124.141	2	2.185	4	.425	1	0	5	0	1	0	15
162			min	-1528.626	3	.539	15	-40.058	4	0	1	-.044	4	-.002	4
163		6	max	1124.556	2	2.176	4	.425	1	0	5	0	1	0	15
164			min	-1528.314	3	.537	15	-40.418	4	0	1	-.055	4	-.003	4
165		7	max	1124.972	2	2.167	4	.425	1	0	5	0	1	0	15
166			min	-1528.002	3	.535	15	-40.779	4	0	1	-.067	4	-.004	4
167		8	max	1125.388	2	2.158	4	.425	1	0	5	0	1	-.001	15
168			min	-1527.69	3	.533	15	-41.139	4	0	1	-.078	4	-.004	4
169		9	max	1125.804	2	2.15	4	.425	1	0	5	0	1	-.001	15
170			min	-1527.378	3	.531	15	-41.5	4	0	1	-.09	4	-.005	4
171		10	max	1126.22	2	2.141	4	.425	1	0	5	.001	1	-.001	15
172			min	-1527.066	3	.529	15	-41.86	4	0	1	-.102	4	-.006	4
173		11	max	1126.636	2	2.132	4	.425	1	0	5	.001	1	-.002	15
174			min	-1526.754	3	.527	15	-42.221	4	0	1	-.113	4	-.006	4
175		12	max	1127.052	2	2.124	4	.425	1	0	5	.001	1	-.002	15
176			min	-1526.443	3	.525	15	-42.581	4	0	1	-.125	4	-.007	4
177		13	max	1127.468	2	2.115	4	.425	1	0	5	.001	1	-.002	15
178			min	-1526.131	3	.523	15	-42.942	4	0	1	-.137	4	-.007	4
179		14	max	1127.883	2	2.106	4	.425	1	0	5	.002	1	-.002	15
180			min	-1525.819	3	.521	15	-43.302	4	0	1	-.149	4	-.008	4
181		15	max	1128.299	2	2.097	4	.425	1	0	5	.002	1	-.002	15
182			min	-1525.507	3	.518	12	-43.663	4	0	1	-.161	4	-.008	4
183		16	max	1128.715	2	2.089	4	.425	1	0	5	.002	1	-.002	15
184			min	-1525.195	3	.514	12	-44.023	4	0	1	-.174	4	-.009	4
185		17	max	1129.131	2	2.08	4	.425	1	0	5	.002	1	-.002	15
186			min	-1524.883	3	.511	12	-44.384	4	0	1	-.186	4	-.01	4
187		18	max	1129.547	2	2.071	4	.425	1	0	5	.002	1	-.003	15
188			min	-1524.571	3	.508	12	-44.744	4	0	1	-.199	4	-.01	4
189		19	max	1129.963	2	2.063	4	.425	1	0	5	.002	1	-.003	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
190			min	-1524.259	3	.504	12	-45.105	4	0	1	-.211	4	-.011	4
191	M3	1	max	654.331	2	9.138	4	.11	1	0	3	0	1	.011	4
192			min	-790.451	3	2.163	15	-2.789	5	0	4	-.004	4	.003	15
193		2	max	654.161	2	8.263	4	.11	1	0	3	0	1	.007	4
194			min	-790.579	3	1.958	15	-2.18	5	0	4	-.005	4	.001	12
195		3	max	653.99	2	7.389	4	.11	1	0	3	0	1	.004	2
196			min	-790.706	3	1.752	15	-1.571	5	0	4	-.006	5	0	3
197		4	max	653.82	2	6.515	4	.11	1	0	3	0	1	0	2
198			min	-790.834	3	1.547	15	-.963	5	0	4	-.006	5	-.002	3
199		5	max	653.65	2	5.64	4	.11	1	0	3	0	1	0	15
200			min	-790.962	3	1.341	15	-.354	5	0	4	-.006	5	-.004	3
201		6	max	653.479	2	4.766	4	.303	4	0	3	0	1	-.001	15
202			min	-791.09	3	1.135	15	.006	10	0	4	-.007	5	-.006	6
203		7	max	653.309	2	3.891	4	.912	4	0	3	0	1	-.002	15
204			min	-791.217	3	.93	15	.006	10	0	4	-.006	5	-.008	6
205		8	max	653.139	2	3.017	4	1.521	4	0	3	0	1	-.002	15
206			min	-791.345	3	.724	15	.006	10	0	4	-.006	5	-.009	6
207		9	max	652.968	2	2.142	4	2.129	4	0	3	0	1	-.002	15
208			min	-791.473	3	.519	15	.006	10	0	4	-.005	5	-.011	6
209		10	max	652.798	2	1.268	4	2.738	4	0	3	0	1	-.003	15
210			min	-791.601	3	.313	15	.006	10	0	4	-.004	5	-.011	6
211		11	max	652.628	2	.468	2	3.347	4	0	3	0	1	-.003	15
212			min	-791.728	3	-.052	3	.006	10	0	4	-.002	5	-.012	6
213		12	max	652.457	2	-.098	15	3.956	4	0	3	0	1	-.003	15
214			min	-791.856	3	-.563	3	.006	10	0	4	0	5	-.012	6
215		13	max	652.287	2	-.303	15	4.564	4	0	3	.002	4	-.003	15
216			min	-791.984	3	-1.357	6	.006	10	0	4	0	10	-.011	6
217		14	max	652.117	2	-.509	15	5.173	4	0	3	.004	4	-.002	15
218			min	-792.112	3	-2.231	6	.006	10	0	4	0	10	-.01	6
219		15	max	651.946	2	-.714	15	5.782	4	0	3	.007	4	-.002	15
220			min	-792.239	3	-3.106	6	.006	10	0	4	0	10	-.009	6
221		16	max	651.776	2	-.92	15	6.39	4	0	3	.009	4	-.002	15
222			min	-792.367	3	-3.98	6	.006	10	0	4	0	10	-.008	6
223		17	max	651.606	2	-1.126	15	6.999	4	0	3	.013	4	-.001	15
224			min	-792.495	3	-4.855	6	.006	10	0	4	0	10	-.005	6
225		18	max	651.435	2	-1.331	15	7.608	4	0	3	.016	4	0	15
226			min	-792.623	3	-5.729	6	.006	10	0	4	0	10	-.003	6
227		19	max	651.265	2	-1.537	15	8.217	4	0	3	.02	4	0	1
228			min	-792.75	3	-6.603	6	.006	10	0	4	0	10	0	1
229	M4	1	max	1083.946	2	0	1	-.368	10	0	1	.012	4	0	1
230			min	-305.463	3	0	1	-207.409	4	0	1	0	10	0	1
231		2	max	1084.116	2	0	1	-.368	10	0	1	0	12	0	1
232			min	-305.335	3	0	1	-207.557	4	0	1	-.012	4	0	1
233		3	max	1084.286	2	0	1	-.368	10	0	1	0	10	0	1
234			min	-305.207	3	0	1	-207.705	4	0	1	-.036	4	0	1
235		4	max	1084.457	2	0	1	-.368	10	0	1	0	10	0	1
236			min	-305.079	3	0	1	-207.852	4	0	1	-.06	4	0	1
237		5	max	1084.627	2	0	1	-.368	10	0	1	0	10	0	1
238			min	-304.952	3	0	1	-208	4	0	1	-.084	4	0	1
239		6	max	1084.797	2	0	1	-.368	10	0	1	0	10	0	1
240			min	-304.824	3	0	1	-208.148	4	0	1	-.108	4	0	1
241		7	max	1084.968	2	0	1	-.368	10	0	1	0	10	0	1
242			min	-304.696	3	0	1	-208.295	4	0	1	-.131	4	0	1
243		8	max	1085.138	2	0	1	-.368	10	0	1	0	10	0	1
244			min	-304.568	3	0	1	-208.443	4	0	1	-.155	4	0	1
245		9	max	1085.308	2	0	1	-.368	10	0	1	0	10	0	1
246			min	-304.44	3	0	1	-208.59	4	0	1	-.179	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	1085.479	2	0	1	-.368	10	0	1	0	10	0	1
248			min	-304.313	3	0	1	-208.738	4	0	1	-.203	4	0	1
249		11	max	1085.649	2	0	1	-.368	10	0	1	0	10	0	1
250			min	-304.185	3	0	1	-208.886	4	0	1	-.227	4	0	1
251		12	max	1085.819	2	0	1	-.368	10	0	1	0	10	0	1
252			min	-304.057	3	0	1	-209.033	4	0	1	-.251	4	0	1
253		13	max	1085.99	2	0	1	-.368	10	0	1	0	10	0	1
254			min	-303.929	3	0	1	-209.181	4	0	1	-.275	4	0	1
255		14	max	1086.16	2	0	1	-.368	10	0	1	0	10	0	1
256			min	-303.802	3	0	1	-209.329	4	0	1	-.299	4	0	1
257		15	max	1086.33	2	0	1	-.368	10	0	1	0	10	0	1
258			min	-303.674	3	0	1	-209.476	4	0	1	-.323	4	0	1
259		16	max	1086.501	2	0	1	-.368	10	0	1	0	10	0	1
260			min	-303.546	3	0	1	-209.624	4	0	1	-.347	4	0	1
261		17	max	1086.671	2	0	1	-.368	10	0	1	0	10	0	1
262			min	-303.418	3	0	1	-209.772	4	0	1	-.371	4	0	1
263		18	max	1086.842	2	0	1	-.368	10	0	1	0	10	0	1
264			min	-303.291	3	0	1	-209.919	4	0	1	-.396	4	0	1
265		19	max	1087.012	2	0	1	-.368	10	0	1	0	10	0	1
266			min	-303.163	3	0	1	-210.067	4	0	1	-.42	4	0	1
267	M6	1	max	3279.948	2	2.672	2	0	1	0	4	0	4	0	1
268			min	-4625.309	3	-.021	3	-38.995	4	0	1	0	1	0	1
269		2	max	3280.364	2	2.665	2	0	1	0	4	0	1	0	3
270			min	-4624.997	3	-.026	3	-39.355	4	0	1	-.011	4	0	2
271		3	max	3280.779	2	2.658	2	0	1	0	4	0	1	0	3
272			min	-4624.685	3	-.031	3	-39.716	4	0	1	-.022	4	-.001	2
273		4	max	3281.195	2	2.652	2	0	1	0	4	0	1	0	3
274			min	-4624.373	3	-.036	3	-40.076	4	0	1	-.033	4	-.002	2
275		5	max	3281.611	2	2.645	2	0	1	0	4	0	1	0	3
276			min	-4624.061	3	-.041	3	-40.437	4	0	1	-.045	4	-.003	2
277		6	max	3282.027	2	2.638	2	0	1	0	4	0	1	0	3
278			min	-4623.749	3	-.046	3	-40.797	4	0	1	-.056	4	-.004	2
279		7	max	3282.443	2	2.631	2	0	1	0	4	0	1	0	3
280			min	-4623.437	3	-.052	3	-41.158	4	0	1	-.067	4	-.004	2
281		8	max	3282.859	2	2.625	2	0	1	0	4	0	1	0	3
282			min	-4623.125	3	-.057	3	-41.518	4	0	1	-.079	4	-.005	2
283		9	max	3283.275	2	2.618	2	0	1	0	4	0	1	0	3
284			min	-4622.813	3	-.062	3	-41.879	4	0	1	-.091	4	-.006	2
285		10	max	3283.691	2	2.611	2	0	1	0	4	0	1	0	3
286			min	-4622.502	3	-.067	3	-42.239	4	0	1	-.102	4	-.007	2
287		11	max	3284.107	2	2.604	2	0	1	0	4	0	1	0	3
288			min	-4622.19	3	-.072	3	-42.6	4	0	1	-.114	4	-.007	2
289		12	max	3284.522	2	2.597	2	0	1	0	4	0	1	0	3
290			min	-4621.878	3	-.077	3	-42.96	4	0	1	-.126	4	-.008	2
291		13	max	3284.938	2	2.591	2	0	1	0	4	0	1	0	3
292			min	-4621.566	3	-.082	3	-43.321	4	0	1	-.138	4	-.009	2
293		14	max	3285.354	2	2.584	2	0	1	0	4	0	1	0	3
294			min	-4621.254	3	-.087	3	-43.681	4	0	1	-.151	4	-.01	2
295		15	max	3285.77	2	2.577	2	0	1	0	4	0	1	0	3
296			min	-4620.942	3	-.092	3	-44.042	4	0	1	-.163	4	-.01	2
297		16	max	3286.186	2	2.57	2	0	1	0	4	0	1	0	3
298			min	-4620.63	3	-.097	3	-44.402	4	0	1	-.175	4	-.011	2
299		17	max	3286.602	2	2.563	2	0	1	0	4	0	1	0	3
300			min	-4620.318	3	-.102	3	-44.763	4	0	1	-.188	4	-.012	2
301		18	max	3287.018	2	2.557	2	0	1	0	4	0	1	0	3
302			min	-4620.006	3	-.108	3	-45.123	4	0	1	-.2	4	-.012	2
303		19	max	3287.434	2	2.55	2	0	1	0	4	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	-4619.694	3	-.113	3	-45.484	4	0	1	-.213	4	-.013	2
305	M7	1	max	2049.149	2	9.127	6	0	1	0	1	0	1	.013	2
306			min	-2266.277	3	2.143	15	-2.967	5	0	4	-.004	4	0	3
307		2	max	2048.979	2	8.253	6	0	1	0	1	0	1	.01	2
308			min	-2266.405	3	1.937	15	-2.358	5	0	4	-.005	4	-.002	3
309		3	max	2048.809	2	7.378	6	0	1	0	1	0	1	.007	2
310			min	-2266.532	3	1.732	15	-1.75	5	0	4	-.006	4	-.004	3
311		4	max	2048.638	2	6.504	6	0	1	0	1	0	1	.004	2
312			min	-2266.66	3	1.526	15	-1.141	5	0	4	-.006	4	-.006	3
313		5	max	2048.468	2	5.63	6	0	1	0	1	0	1	.001	2
314			min	-2266.788	3	1.321	15	-.532	5	0	4	-.007	4	-.007	3
315		6	max	2048.298	2	4.755	6	.098	4	0	1	0	1	0	2
316			min	-2266.916	3	1.115	15	0	1	0	4	-.007	5	-.008	3
317		7	max	2048.127	2	3.881	6	.706	4	0	1	0	1	-.002	15
318			min	-2267.043	3	.91	15	0	1	0	4	-.007	5	-.009	3
319		8	max	2047.957	2	3.006	6	1.315	4	0	1	0	1	-.002	15
320			min	-2267.171	3	.686	12	0	1	0	4	-.006	5	-.01	3
321		9	max	2047.787	2	2.228	2	1.924	4	0	1	0	1	-.003	15
322			min	-2267.299	3	.346	12	0	1	0	4	-.006	5	-.011	4
323		10	max	2047.616	2	1.546	2	2.532	4	0	1	0	1	-.003	15
324			min	-2267.427	3	-.04	3	0	1	0	4	-.005	5	-.011	4
325		11	max	2047.446	2	.865	2	3.141	4	0	1	0	1	-.003	15
326			min	-2267.555	3	-.551	3	0	1	0	4	-.003	5	-.012	4
327		12	max	2047.276	2	.183	2	3.75	4	0	1	0	1	-.003	15
328			min	-2267.682	3	-1.062	3	0	1	0	4	-.002	5	-.012	4
329		13	max	2047.105	2	-.324	15	4.359	4	0	1	0	4	-.003	15
330			min	-2267.81	3	-1.573	3	0	1	0	4	0	1	-.011	4
331		14	max	2046.935	2	-.529	15	4.967	4	0	1	.003	4	-.002	15
332			min	-2267.938	3	-2.24	4	0	1	0	4	0	1	-.01	4
333		15	max	2046.764	2	-.735	15	5.576	4	0	1	.005	4	-.002	15
334			min	-2268.066	3	-3.115	4	0	1	0	4	0	1	-.009	4
335		16	max	2046.594	2	-.94	15	6.185	4	0	1	.008	4	-.002	15
336			min	-2268.193	3	-3.989	4	0	1	0	4	0	1	-.008	4
337		17	max	2046.424	2	-1.146	15	6.793	4	0	1	.011	4	-.001	15
338			min	-2268.321	3	-4.864	4	0	1	0	4	0	1	-.005	4
339		18	max	2046.253	2	-1.351	15	7.402	4	0	1	.014	4	0	15
340			min	-2268.449	3	-5.738	4	0	1	0	4	0	1	-.003	4
341		19	max	2046.083	2	-1.557	15	8.011	4	0	1	.018	4	0	1
342			min	-2268.577	3	-6.613	4	0	1	0	4	0	1	0	1
343	M8	1	max	3150.207	2	0	1	0	1	0	1	.011	4	0	1
344			min	-981.744	3	0	1	-200.778	4	0	1	0	1	0	1
345		2	max	3150.377	2	0	1	0	1	0	1	0	1	0	1
346			min	-981.616	3	0	1	-200.926	4	0	1	-.012	4	0	1
347		3	max	3150.548	2	0	1	0	1	0	1	0	1	0	1
348			min	-981.488	3	0	1	-201.074	4	0	1	-.035	4	0	1
349		4	max	3150.718	2	0	1	0	1	0	1	0	1	0	1
350			min	-981.361	3	0	1	-201.221	4	0	1	-.059	4	0	1
351		5	max	3150.888	2	0	1	0	1	0	1	0	1	0	1
352			min	-981.233	3	0	1	-201.369	4	0	1	-.082	4	0	1
353		6	max	3151.059	2	0	1	0	1	0	1	0	1	0	1
354			min	-981.105	3	0	1	-201.517	4	0	1	-.105	4	0	1
355		7	max	3151.229	2	0	1	0	1	0	1	0	1	0	1
356			min	-980.977	3	0	1	-201.664	4	0	1	-.128	4	0	1
357		8	max	3151.399	2	0	1	0	1	0	1	0	1	0	1
358			min	-980.85	3	0	1	-201.812	4	0	1	-.151	4	0	1
359		9	max	3151.57	2	0	1	0	1	0	1	0	1	0	1
360			min	-980.722	3	0	1	-201.96	4	0	1	-.174	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	3151.74	2	0	1	0	1	0	1	0	1	0	1
362			min	-980.594	3	0	1	-202.107	4	0	1	-.197	4	0	1
363		11	max	3151.91	2	0	1	0	1	0	1	0	1	0	1
364			min	-980.466	3	0	1	-202.255	4	0	1	-.221	4	0	1
365		12	max	3152.081	2	0	1	0	1	0	1	0	1	0	1
366			min	-980.338	3	0	1	-202.402	4	0	1	-.244	4	0	1
367		13	max	3152.251	2	0	1	0	1	0	1	0	1	0	1
368			min	-980.211	3	0	1	-202.55	4	0	1	-.267	4	0	1
369		14	max	3152.421	2	0	1	0	1	0	1	0	1	0	1
370			min	-980.083	3	0	1	-202.698	4	0	1	-.29	4	0	1
371		15	max	3152.592	2	0	1	0	1	0	1	0	1	0	1
372			min	-979.955	3	0	1	-202.845	4	0	1	-.314	4	0	1
373		16	max	3152.762	2	0	1	0	1	0	1	0	1	0	1
374			min	-979.827	3	0	1	-202.993	4	0	1	-.337	4	0	1
375		17	max	3152.932	2	0	1	0	1	0	1	0	1	0	1
376			min	-979.7	3	0	1	-203.141	4	0	1	-.36	4	0	1
377		18	max	3153.103	2	0	1	0	1	0	1	0	1	0	1
378			min	-979.572	3	0	1	-203.288	4	0	1	-.384	4	0	1
379		19	max	3153.273	2	0	1	0	1	0	1	0	1	0	1
380			min	-979.444	3	0	1	-203.436	4	0	1	-.407	4	0	1
381	M10	1	max	1122.477	2	2.101	6	-.021	10	0	1	0	4	0	1
382			min	-1529.874	3	.467	15	-38.848	4	0	10	0	3	0	1
383		2	max	1122.893	2	2.092	6	-.021	10	0	1	0	10	0	15
384			min	-1529.562	3	.465	15	-39.208	4	0	10	-.011	4	0	6
385		3	max	1123.309	2	2.083	6	-.021	10	0	1	0	10	0	15
386			min	-1529.25	3	.463	15	-39.569	4	0	10	-.022	4	-.001	6
387		4	max	1123.725	2	2.074	6	-.021	10	0	1	0	10	0	15
388			min	-1528.938	3	.461	15	-39.929	4	0	10	-.033	4	-.002	6
389		5	max	1124.141	2	2.066	6	-.021	10	0	1	0	10	0	15
390			min	-1528.626	3	.459	15	-40.29	4	0	10	-.044	4	-.002	6
391		6	max	1124.556	2	2.057	6	-.021	10	0	1	0	10	0	15
392			min	-1528.314	3	.457	15	-40.65	4	0	10	-.056	4	-.003	6
393		7	max	1124.972	2	2.048	6	-.021	10	0	1	0	10	0	15
394			min	-1528.002	3	.455	15	-41.011	4	0	10	-.067	4	-.003	6
395		8	max	1125.388	2	2.04	6	-.021	10	0	1	0	10	0	15
396			min	-1527.69	3	.453	15	-41.371	4	0	10	-.079	4	-.004	6
397		9	max	1125.804	2	2.031	6	-.021	10	0	1	0	10	-.001	15
398			min	-1527.378	3	.451	15	-41.732	4	0	10	-.09	4	-.005	6
399		10	max	1126.22	2	2.022	6	-.021	10	0	1	0	10	-.001	15
400			min	-1527.066	3	.449	15	-42.092	4	0	10	-.102	4	-.005	6
401		11	max	1126.636	2	2.013	6	-.021	10	0	1	0	10	-.001	15
402			min	-1526.754	3	.447	15	-42.453	4	0	10	-.114	4	-.006	6
403		12	max	1127.052	2	2.005	6	-.021	10	0	1	0	10	-.001	15
404			min	-1526.443	3	.445	15	-42.813	4	0	10	-.126	4	-.006	6
405		13	max	1127.468	2	1.996	6	-.021	10	0	1	0	10	-.002	15
406			min	-1526.131	3	.443	15	-43.174	4	0	10	-.138	4	-.007	6
407		14	max	1127.883	2	1.987	6	-.021	10	0	1	0	10	-.002	15
408			min	-1525.819	3	.441	15	-43.534	4	0	10	-.15	4	-.007	6
409		15	max	1128.299	2	1.979	6	-.021	10	0	1	0	10	-.002	15
410			min	-1525.507	3	.439	15	-43.895	4	0	10	-.162	4	-.008	6
411		16	max	1128.715	2	1.97	6	-.021	10	0	1	0	10	-.002	15
412			min	-1525.195	3	.436	15	-44.255	4	0	10	-.175	4	-.009	6
413		17	max	1129.131	2	1.961	6	-.021	10	0	1	0	10	-.002	15
414			min	-1524.883	3	.434	15	-44.616	4	0	10	-.187	4	-.009	6
415		18	max	1129.547	2	1.952	6	-.021	10	0	1	0	10	-.002	15
416			min	-1524.571	3	.432	15	-44.976	4	0	10	-.2	4	-.01	6
417		19	max	1129.963	2	1.944	6	-.021	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	-1524.259	3	.43	15	-45.337	4	0	10	-.212	4	-.01	6
419	M11	1	max	654.331	2	9.068	6	-.006	10	0	1	0	10	.01	6
420			min	-790.451	3	2.116	15	-2.801	5	0	4	-.004	4	.002	15
421		2	max	654.161	2	8.193	6	-.006	10	0	1	0	10	.007	2
422			min	-790.579	3	1.91	15	-2.192	5	0	4	-.005	4	.001	12
423		3	max	653.99	2	7.319	6	-.006	10	0	1	0	10	.004	2
424			min	-790.706	3	1.705	15	-1.583	5	0	4	-.006	4	0	3
425		4	max	653.82	2	6.444	6	-.006	10	0	1	0	10	0	2
426			min	-790.834	3	1.499	15	-.975	5	0	4	-.006	4	-.002	3
427		5	max	653.65	2	5.57	6	-.006	10	0	1	0	10	0	15
428			min	-790.962	3	1.294	15	-.366	5	0	4	-.007	4	-.004	3
429		6	max	653.479	2	4.695	6	.244	4	0	1	0	10	-.002	15
430			min	-791.09	3	1.088	15	-.11	1	0	4	-.007	4	-.006	4
431		7	max	653.309	2	3.821	6	.853	4	0	1	0	10	-.002	15
432			min	-791.217	3	.882	15	-.11	1	0	4	-.006	4	-.008	4
433		8	max	653.139	2	2.946	6	1.462	4	0	1	0	10	-.002	15
434			min	-791.345	3	.677	15	-.11	1	0	4	-.006	4	-.01	4
435		9	max	652.968	2	2.072	6	2.07	4	0	1	0	10	-.003	15
436			min	-791.473	3	.471	15	-.11	1	0	4	-.005	4	-.011	4
437		10	max	652.798	2	1.198	6	2.679	4	0	1	0	10	-.003	15
438			min	-791.601	3	.266	15	-.11	1	0	4	-.004	4	-.012	4
439		11	max	652.628	2	.468	2	3.288	4	0	1	0	10	-.003	15
440			min	-791.728	3	-.052	3	-.11	1	0	4	-.002	4	-.012	4
441		12	max	652.457	2	-.145	15	3.897	4	0	1	0	10	-.003	15
442			min	-791.856	3	-.563	3	-.11	1	0	4	0	4	-.012	4
443		13	max	652.287	2	-.351	15	4.505	4	0	1	.001	5	-.003	15
444			min	-791.984	3	-1.427	4	-.11	1	0	4	0	1	-.012	4
445		14	max	652.117	2	-.556	15	5.114	4	0	1	.004	5	-.003	15
446			min	-792.112	3	-2.302	4	-.11	1	0	4	0	1	-.011	4
447		15	max	651.946	2	-.762	15	5.723	4	0	1	.006	5	-.002	15
448			min	-792.239	3	-3.176	4	-.11	1	0	4	0	1	-.009	4
449		16	max	651.776	2	-.968	15	6.331	4	0	1	.009	5	-.002	15
450			min	-792.367	3	-4.051	4	-.11	1	0	4	0	1	-.008	4
451		17	max	651.606	2	-1.173	15	6.94	4	0	1	.012	5	-.001	15
452			min	-792.495	3	-4.925	4	-.11	1	0	4	0	1	-.005	4
453		18	max	651.435	2	-1.379	15	7.549	4	0	1	.016	5	0	15
454			min	-792.623	3	-5.799	4	-.11	1	0	4	0	1	-.003	4
455		19	max	651.265	2	-1.584	15	8.157	4	0	1	.019	5	0	1
456			min	-792.75	3	-6.674	4	-.11	1	0	4	0	1	0	1
457	M12	1	max	1083.946	2	0	1	6.101	1	0	1	.012	5	0	1
458			min	-305.463	3	0	1	-204.083	4	0	1	0	1	0	1
459		2	max	1084.116	2	0	1	6.101	1	0	1	0	1	0	1
460			min	-305.335	3	0	1	-204.231	4	0	1	-.012	4	0	1
461		3	max	1084.286	2	0	1	6.101	1	0	1	0	1	0	1
462			min	-305.207	3	0	1	-204.379	4	0	1	-.035	4	0	1
463		4	max	1084.457	2	0	1	6.101	1	0	1	.002	1	0	1
464			min	-305.079	3	0	1	-204.526	4	0	1	-.059	4	0	1
465		5	max	1084.627	2	0	1	6.101	1	0	1	.002	1	0	1
466			min	-304.952	3	0	1	-204.674	4	0	1	-.082	4	0	1
467		6	max	1084.797	2	0	1	6.101	1	0	1	.003	1	0	1
468			min	-304.824	3	0	1	-204.822	4	0	1	-.106	4	0	1
469		7	max	1084.968	2	0	1	6.101	1	0	1	.004	1	0	1
470			min	-304.696	3	0	1	-204.969	4	0	1	-.129	4	0	1
471		8	max	1085.138	2	0	1	6.101	1	0	1	.004	1	0	1
472			min	-304.568	3	0	1	-205.117	4	0	1	-.153	4	0	1
473		9	max	1085.308	2	0	1	6.101	1	0	1	.005	1	0	1
474			min	-304.44	3	0	1	-205.265	4	0	1	-.177	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	1085.479	2	0	1	6.101	1	0	1	.006	1	0	1
476			min	-304.313	3	0	1	-205.412	4	0	1	-.2	4	0	1
477		11	max	1085.649	2	0	1	6.101	1	0	1	.006	1	0	1
478			min	-304.185	3	0	1	-205.56	4	0	1	-.224	4	0	1
479		12	max	1085.819	2	0	1	6.101	1	0	1	.007	1	0	1
480			min	-304.057	3	0	1	-205.707	4	0	1	-.247	4	0	1
481		13	max	1085.99	2	0	1	6.101	1	0	1	.008	1	0	1
482			min	-303.929	3	0	1	-205.855	4	0	1	-.271	4	0	1
483		14	max	1086.16	2	0	1	6.101	1	0	1	.009	1	0	1
484			min	-303.802	3	0	1	-206.003	4	0	1	-.295	4	0	1
485		15	max	1086.33	2	0	1	6.101	1	0	1	.009	1	0	1
486			min	-303.674	3	0	1	-206.15	4	0	1	-.318	4	0	1
487		16	max	1086.501	2	0	1	6.101	1	0	1	.01	1	0	1
488			min	-303.546	3	0	1	-206.298	4	0	1	-.342	4	0	1
489		17	max	1086.671	2	0	1	6.101	1	0	1	.011	1	0	1
490			min	-303.418	3	0	1	-206.446	4	0	1	-.366	4	0	1
491		18	max	1086.842	2	0	1	6.101	1	0	1	.011	1	0	1
492			min	-303.291	3	0	1	-206.593	4	0	1	-.389	4	0	1
493		19	max	1087.012	2	0	1	6.101	1	0	1	.012	1	0	1
494			min	-303.163	3	0	1	-206.741	4	0	1	-.413	4	0	1
495	M1	1	max	118.912	1	811.584	3	41.099	5	0	1	.101	1	0	15
496			min	-17.363	5	-445.892	2	-36.331	1	0	3	-.077	5	-.011	2
497		2	max	119.488	1	810.397	3	42.559	5	0	1	.078	1	.266	2
498			min	-17.094	5	-447.475	2	-36.331	1	0	3	-.051	5	-.514	3
499		3	max	511.731	3	606.184	2	6.161	5	0	3	.056	1	.532	2
500			min	-319.296	2	-642.603	3	-36.001	1	0	2	-.024	5	-1	3
501		4	max	512.163	3	604.601	2	7.621	5	0	3	.033	1	.17	1
502			min	-318.72	2	-643.79	3	-36.001	1	0	2	-.02	5	-.601	3
503		5	max	512.595	3	603.018	2	9.081	5	0	3	.011	1	-.006	15
504			min	-318.144	2	-644.977	3	-36.001	1	0	2	-.015	5	-.218	2
505		6	max	513.027	3	601.435	2	10.541	5	0	3	0	10	.199	3
506			min	-317.567	2	-646.165	3	-36.001	1	0	2	-.011	1	-.592	2
507		7	max	513.459	3	599.851	2	12.001	5	0	3	-.001	15	.601	3
508			min	-316.991	2	-647.352	3	-36.001	1	0	2	-.034	1	-.965	2
509		8	max	513.891	3	598.268	2	13.462	5	0	3	.006	5	1.003	3
510			min	-316.415	2	-648.54	3	-36.001	1	0	2	-.056	1	-1.336	2
511		9	max	525.535	3	50.317	2	41.657	5	0	9	.038	1	1.166	3
512			min	-269.252	2	.474	15	-62.138	1	0	3	-.101	5	-1.521	2
513		10	max	525.967	3	48.733	2	43.117	5	0	9	0	10	1.143	3
514			min	-268.676	2	-.009	5	-62.138	1	0	3	-.075	4	-1.552	2
515		11	max	526.399	3	47.15	2	44.577	5	0	9	-.002	10	1.121	3
516			min	-268.099	2	-2.02	4	-62.138	1	0	3	-.056	4	-1.582	2
517		12	max	537.671	3	438.416	3	117.141	5	0	2	.055	1	.986	3
518			min	-220.757	2	-706.733	2	-35.045	1	0	3	-.19	5	-1.405	2
519		13	max	538.103	3	437.229	3	118.601	5	0	2	.033	1	.714	3
520			min	-220.181	2	-708.317	2	-35.045	1	0	3	-.117	5	-.966	2
521		14	max	538.535	3	436.042	3	120.061	5	0	2	.012	1	.443	3
522			min	-219.605	2	-709.9	2	-35.045	1	0	3	-.043	5	-.526	2
523		15	max	538.967	3	434.854	3	121.521	5	0	2	.032	5	.173	3
524			min	-219.028	2	-711.483	2	-35.045	1	0	3	-.01	1	-.106	1
525		16	max	539.399	3	433.667	3	122.981	5	0	2	.108	5	.357	2
526			min	-218.452	2	-713.066	2	-35.045	1	0	3	-.032	1	-.096	3
527		17	max	539.832	3	432.479	3	124.441	5	0	2	.184	5	.8	2
528			min	-217.876	2	-714.649	2	-35.045	1	0	3	-.054	1	-.365	3
529		18	max	30.034	5	659.524	2	-2.406	10	0	5	.163	5	.405	2
530			min	-120.154	1	-309.708	3	-78.354	4	0	2	-.078	1	-.181	3
531		19	max	30.302	5	657.94	2	-2.406	10	0	5	.121	5	.011	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	-119.577	1	-310.896	3	-76.894	4	0	2	-.103	1	-.005	1
533	M5	1	max	274.922	1	2645.998	3	67.075	5	0	1	0	1	.023	2
534			min	4.618	12	-1559.682	2	0	1	0	4	-.149	4	0	15
535		2	max	275.498	1	2644.811	3	68.535	5	0	1	0	1	.991	2
536			min	4.906	12	-1561.265	2	0	1	0	4	-.107	4	-1.621	3
537		3	max	1515.181	3	1502.936	2	34.002	4	0	4	0	1	1.927	2
538			min	-956.116	2	-1765.25	3	0	1	0	1	-.065	4	-3.214	3
539		4	max	1515.613	3	1501.353	2	35.463	4	0	4	0	1	.995	2
540			min	-955.54	2	-1766.438	3	0	1	0	1	-.043	4	-2.118	3
541		5	max	1516.045	3	1499.77	2	36.923	4	0	4	0	1	.114	1
542			min	-954.964	2	-1767.625	3	0	1	0	1	-.021	4	-1.022	3
543		6	max	1516.477	3	1498.187	2	38.383	4	0	4	.003	4	.076	3
544			min	-954.387	2	-1768.812	3	0	1	0	1	0	1	-.867	2
545		7	max	1516.909	3	1496.604	2	39.843	4	0	4	.027	4	1.174	3
546			min	-953.811	2	-1770	3	0	1	0	1	0	1	-1.796	2
547		8	max	1517.342	3	1495.02	2	41.303	4	0	4	.052	4	2.273	3
548			min	-953.235	2	-1771.187	3	0	1	0	1	0	1	-2.724	2
549		9	max	1523.195	3	173.048	2	140.18	4	0	1	0	1	2.624	3
550			min	-843.976	2	.476	15	0	1	0	1	-.15	4	-3.126	2
551		10	max	1523.627	3	171.465	2	141.64	4	0	1	0	1	2.528	3
552			min	-843.4	2	-.002	15	0	1	0	1	-.063	5	-3.233	2
553		11	max	1524.059	3	169.882	2	143.1	4	0	1	.026	4	2.433	3
554			min	-842.823	2	-1.9	6	0	1	0	1	0	1	-3.339	2
555		12	max	1530.657	3	1130.63	3	158.177	4	0	1	0	1	2.121	3
556			min	-733.923	2	-1837.229	2	0	1	0	4	-.264	4	-2.981	2
557		13	max	1531.089	3	1129.443	3	159.637	4	0	1	0	1	1.42	3
558			min	-733.347	2	-1838.812	2	0	1	0	4	-.165	4	-1.84	2
559		14	max	1531.521	3	1128.255	3	161.098	4	0	1	0	1	.719	3
560			min	-732.771	2	-1840.395	2	0	1	0	4	-.066	4	-.698	2
561		15	max	1531.954	3	1127.068	3	162.558	4	0	1	.035	4	.444	2
562			min	-732.195	2	-1841.978	2	0	1	0	4	0	1	.001	15
563		16	max	1532.386	3	1125.881	3	164.018	4	0	1	.136	4	1.588	2
564			min	-731.618	2	-1843.562	2	0	1	0	4	0	1	-.68	3
565		17	max	1532.818	3	1124.693	3	165.478	4	0	1	.238	4	2.733	2
566			min	-731.042	2	-1845.145	2	0	1	0	4	0	1	-1.378	3
567		18	max	-6.363	12	2231.605	2	0	1	0	4	.244	4	1.392	2
568			min	-274.167	1	-1111.721	3	-24.108	5	0	1	0	1	-.713	3
569		19	max	-6.075	12	2230.021	2	0	1	0	4	.23	4	.01	1
570			min	-273.591	1	-1112.909	3	-22.648	5	0	1	0	1	-.023	3
571	M9	1	max	118.912	1	811.584	3	53.427	4	0	3	-.005	10	0	15
572			min	6.973	12	-445.892	2	1.773	10	0	4	-.112	4	-.011	2
573		2	max	119.488	1	810.397	3	54.888	4	0	3	-.004	10	.266	2
574			min	7.261	12	-447.475	2	1.773	10	0	4	-.078	1	-.514	3
575		3	max	511.731	3	606.184	2	36.001	1	0	2	-.003	10	.532	2
576			min	-319.296	2	-642.603	3	1.753	10	0	3	-.056	1	-1	3
577		4	max	512.163	3	604.601	2	36.001	1	0	2	-.002	10	.17	1
578			min	-318.72	2	-643.79	3	1.753	10	0	3	-.033	1	-.601	3
579		5	max	512.595	3	603.018	2	36.001	1	0	2	0	10	-.006	15
580			min	-318.144	2	-644.977	3	1.753	10	0	3	-.019	4	-.218	2
581		6	max	513.027	3	601.435	2	36.001	1	0	2	.011	1	.199	3
582			min	-317.567	2	-646.165	3	1.753	10	0	3	-.008	5	-.592	2
583		7	max	513.459	3	599.851	2	36.001	1	0	2	.034	1	.601	3
584			min	-316.991	2	-647.352	3	1.753	10	0	3	.001	15	-.965	2
585		8	max	513.891	3	598.268	2	36.001	1	0	2	.056	1	1.003	3
586			min	-316.415	2	-648.54	3	1.753	10	0	3	.003	10	-1.336	2
587		9	max	525.535	3	50.317	2	62.728	4	0	3	-.002	10	1.166	3
588			min	-269.252	2	.489	15	3.354	10	0	9	-.115	4	-1.521	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	525.967	3	48.733	2	64.189	4	0	3	0	1	1.143	3
590			min	-268.676	2	.012	15	3.354	10	0	9	-.075	4	-1.552	2
591		11	max	526.399	3	47.15	2	65.649	4	0	3	.039	1	1.121	3
592			min	-268.099	2	-1.899	6	3.354	10	0	9	-.043	5	-1.582	2
593		12	max	537.671	3	438.416	3	130.004	4	0	3	-.003	10	.986	3
594			min	-220.757	2	-706.733	2	2.05	10	0	2	-.21	4	-1.405	2
595		13	max	538.103	3	437.229	3	131.464	4	0	3	-.002	10	.714	3
596			min	-220.181	2	-708.317	2	2.05	10	0	2	-.129	4	-.966	2
597		14	max	538.535	3	436.042	3	132.924	4	0	3	0	10	.443	3
598			min	-219.605	2	-709.9	2	2.05	10	0	2	-.047	4	-.526	2
599		15	max	538.967	3	434.854	3	134.385	4	0	3	.036	4	.173	3
600			min	-219.028	2	-711.483	2	2.05	10	0	2	0	10	-.106	1
601		16	max	539.399	3	433.667	3	135.845	4	0	3	.12	4	.357	2
602			min	-218.452	2	-713.066	2	2.05	10	0	2	.002	10	-.096	3
603		17	max	539.832	3	432.479	3	137.305	4	0	3	.204	4	.8	2
604			min	-217.876	2	-714.649	2	2.05	10	0	2	.003	10	-.365	3
605		18	max	-6.532	12	659.524	2	40.866	1	0	2	.191	4	.405	2
606			min	-120.154	1	-309.708	3	-64.698	5	0	3	.005	10	-.181	3
607		19	max	-6.244	12	657.94	2	40.866	1	0	2	.156	4	.011	3
608			min	-119.577	1	-310.896	3	-63.238	5	0	3	.006	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	.245	2	.01	3	1.666e-2	2	NC	1	NC	1
2			min	-.483	4	-.08	3	-.006	2	-5.145e-3	3	NC	1	NC	1
3		2	max	0	1	.202	2	.012	3	1.739e-2	2	NC	4	NC	1
4			min	-.483	4	.005	15	-.006	5	-4.492e-3	3	1333.541	3	NC	1
5		3	max	0	1	.171	2	.019	1	1.812e-2	2	NC	4	NC	2
6			min	-.483	4	.004	15	-.008	5	-3.839e-3	3	729.531	3	7762.792	1
7		4	max	0	1	.197	3	.028	1	1.885e-2	2	NC	5	NC	2
8			min	-.483	4	.004	15	-.007	5	-3.187e-3	3	563.31	3	5391.136	1
9		5	max	0	1	.22	3	.031	1	1.958e-2	2	NC	4	NC	2
10			min	-.483	4	.004	15	-.004	10	-2.534e-3	3	520.452	3	4787.939	1
11		6	max	0	1	.203	3	.029	1	2.031e-2	2	NC	4	NC	2
12			min	-.483	4	.004	15	-.006	10	-1.881e-3	3	551.62	3	5221.136	1
13		7	max	0	1	.236	2	.026	3	2.104e-2	2	NC	2	NC	2
14			min	-.483	4	.005	15	-.008	10	-1.229e-3	3	667.324	3	7295.26	1
15		8	max	0	1	.286	2	.027	3	2.177e-2	2	NC	4	NC	1
16			min	-.483	4	.006	15	-.012	2	-5.759e-4	3	932.06	3	8968.379	3
17		9	max	0	1	.329	2	.028	3	2.25e-2	2	NC	4	NC	1
18			min	-.483	4	.007	15	-.017	2	7.679e-5	3	1479.622	3	8511.212	3
19		10	max	0	1	.349	2	.029	3	2.322e-2	2	NC	4	NC	1
20			min	-.483	4	-.003	3	-.02	2	4.503e-4	15	1511.315	2	8379.246	3
21		11	max	0	10	.329	2	.028	3	2.25e-2	2	NC	4	NC	1
22			min	-.483	4	.006	15	-.017	2	7.679e-5	3	1479.622	3	8511.212	3
23		12	max	0	10	.286	2	.027	3	2.177e-2	2	NC	4	NC	1
24			min	-.483	4	.006	15	-.012	2	-5.759e-4	3	932.06	3	8968.379	3
25		13	max	0	10	.236	2	.026	3	2.104e-2	2	NC	2	NC	2
26			min	-.483	4	.005	15	-.008	10	-1.229e-3	3	667.324	3	7295.26	1
27		14	max	0	10	.203	3	.029	1	2.031e-2	2	NC	4	NC	2
28			min	-.483	4	.004	15	-.006	10	-1.881e-3	3	551.62	3	5221.136	1
29		15	max	0	10	.22	3	.031	1	1.958e-2	2	NC	4	NC	2
30			min	-.483	4	.003	15	-.004	10	-2.534e-3	3	520.452	3	4787.939	1
31		16	max	0	10	.197	3	.028	1	1.885e-2	2	NC	5	NC	2
32			min	-.483	4	.003	15	-.004	10	-3.187e-3	3	563.31	3	5391.136	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	.171	2	.019	1	1.812e-2	2	NC	4	NC	2
34			min	-.483	4	.003	15	-.003	10	-3.839e-3	3	729.531	3	7762.792	1
35		18	max	0	10	.202	2	.012	3	1.739e-2	2	NC	4	NC	1
36			min	-.483	4	.004	15	-.004	10	-4.492e-3	3	1333.541	3	NC	1
37		19	max	0	10	.245	2	.01	3	1.666e-2	2	NC	1	NC	1
38			min	-.483	4	-.08	3	-.006	2	-5.145e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.491	3	.009	3	9.044e-3	2	NC	1	NC	1
40			min	-.377	4	-.707	2	-.006	2	-7.346e-3	3	NC	1	NC	1
41		2	max	0	1	.655	3	.01	3	1.013e-2	2	NC	5	NC	1
42			min	-.377	4	-.877	2	-.01	5	-8.346e-3	3	917.661	2	NC	1
43		3	max	0	1	.803	3	.014	1	1.122e-2	2	NC	5	NC	1
44			min	-.377	4	-1.033	2	-.013	5	-9.346e-3	3	478.713	2	NC	1
45		4	max	0	1	.921	3	.022	1	1.23e-2	2	NC	5	NC	2
46			min	-.377	4	-1.164	2	-.009	5	-1.035e-2	3	341.172	2	6751.669	1
47		5	max	0	1	1.002	3	.026	1	1.339e-2	2	NC	15	NC	2
48			min	-.377	4	-1.265	2	-.004	10	-1.135e-2	3	279.663	2	5704.298	1
49		6	max	0	1	1.046	3	.025	1	1.448e-2	2	NC	15	NC	2
50			min	-.377	4	-1.332	2	-.005	10	-1.235e-2	3	249.46	2	6017.436	1
51		7	max	0	1	1.056	3	.023	3	1.556e-2	2	NC	15	NC	2
52			min	-.377	4	-1.369	2	-.007	10	-1.335e-2	3	235.752	2	8192.822	1
53		8	max	0	1	1.042	3	.024	3	1.665e-2	2	NC	15	NC	1
54			min	-.377	4	-1.38	2	-.011	2	-1.435e-2	3	231.858	2	7987.022	4
55		9	max	0	1	1.018	3	.025	3	1.774e-2	2	NC	15	NC	1
56			min	-.377	4	-1.376	2	-.016	2	-1.535e-2	3	233.285	2	9636.541	3
57		10	max	0	1	1.004	3	.025	3	1.882e-2	2	NC	15	NC	1
58			min	-.377	4	-1.371	2	-.018	2	-1.635e-2	3	235.134	2	9459.376	3
59		11	max	0	10	1.018	3	.025	3	1.774e-2	2	NC	15	NC	1
60			min	-.377	4	-1.376	2	-.016	2	-1.535e-2	3	233.285	2	9636.541	3
61		12	max	0	10	1.042	3	.024	3	1.665e-2	2	NC	15	NC	1
62			min	-.377	4	-1.38	2	-.013	5	-1.435e-2	3	231.858	2	NC	1
63		13	max	0	10	1.056	3	.023	3	1.556e-2	2	NC	15	NC	2
64			min	-.377	4	-1.369	2	-.009	5	-1.335e-2	3	235.752	2	8192.822	1
65		14	max	0	10	1.046	3	.025	1	1.448e-2	2	NC	15	NC	2
66			min	-.377	4	-1.332	2	-.005	10	-1.235e-2	3	249.46	2	6017.436	1
67		15	max	0	10	1.002	3	.026	1	1.339e-2	2	NC	15	NC	2
68			min	-.377	4	-1.265	2	-.004	10	-1.135e-2	3	279.663	2	5704.298	1
69		16	max	0	10	.921	3	.022	1	1.23e-2	2	NC	5	NC	2
70			min	-.377	4	-1.164	2	-.003	10	-1.035e-2	3	341.172	2	6751.669	1
71		17	max	0	10	.803	3	.019	4	1.122e-2	2	NC	5	NC	1
72			min	-.377	4	-1.033	2	-.003	10	-9.346e-3	3	478.713	2	7833.525	4
73		18	max	0	10	.655	3	.012	4	1.013e-2	2	NC	5	NC	1
74			min	-.377	4	-.877	2	-.004	2	-8.346e-3	3	917.661	2	NC	1
75		19	max	0	10	.491	3	.009	3	9.044e-3	2	NC	1	NC	1
76			min	-.377	4	-.707	2	-.006	2	-7.346e-3	3	NC	1	NC	1
77	M15	1	max	0	10	.502	3	.008	3	6.224e-3	3	NC	1	NC	1
78			min	-.315	4	-.706	2	-.005	2	-9.365e-3	2	NC	1	NC	1
79		2	max	0	10	.632	3	.009	3	7.05e-3	3	NC	5	NC	1
80			min	-.315	4	-.903	2	-.016	5	-1.05e-2	2	792.803	2	8959.899	5
81		3	max	0	10	.751	3	.014	1	7.876e-3	3	NC	5	NC	1
82			min	-.315	4	-1.08	2	-.02	5	-1.163e-2	2	416.698	2	7134.397	5
83		4	max	0	10	.853	3	.022	1	8.702e-3	3	NC	5	NC	2
84			min	-.315	4	-1.225	2	-.016	5	-1.276e-2	2	300.561	2	6694.528	1
85		5	max	0	10	.932	3	.027	1	9.527e-3	3	NC	5	NC	2
86			min	-.315	4	-1.329	2	-.006	5	-1.389e-2	2	250.462	2	5649.702	1
87		6	max	0	10	.987	3	.025	1	1.035e-2	3	NC	15	NC	2
88			min	-.315	4	-1.39	2	-.005	10	-1.502e-2	2	228.13	2	5942.589	1
89		7	max	0	10	1.019	3	.021	4	1.118e-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	-.315	4	-1.412	2	-.006	10	-1.615e-2	2	221.02	2	6999.61	4
91		8	max	0	10	1.031	3	.024	4	1.201e-2	3	NC	15	NC	1
92			min	-.315	4	-1.404	2	-.01	2	-1.728e-2	2	223.304	2	6257.561	4
93		9	max	0	10	1.031	3	.023	3	1.283e-2	3	NC	15	NC	1
94			min	-.315	4	-1.384	2	-.014	2	-1.841e-2	2	230.156	2	8284.793	4
95		10	max	0	1	1.028	3	.024	3	1.366e-2	3	NC	15	NC	1
96			min	-.315	4	-1.371	2	-.017	2	-1.954e-2	2	234.605	2	NC	1
97		11	max	0	1	1.031	3	.023	3	1.283e-2	3	NC	15	NC	1
98			min	-.315	4	-1.384	2	-.015	5	-1.841e-2	2	230.156	2	NC	1
99		12	max	0	1	1.031	3	.022	3	1.201e-2	3	NC	15	NC	1
100			min	-.315	4	-1.404	2	-.018	5	-1.728e-2	2	223.304	2	8692.949	5
101		13	max	0	1	1.019	3	.021	3	1.118e-2	3	NC	15	NC	2
102			min	-.315	4	-1.412	2	-.013	5	-1.615e-2	2	221.02	2	8032.241	1
103		14	max	0	1	.987	3	.025	1	1.035e-2	3	NC	15	NC	2
104			min	-.315	4	-1.39	2	-.005	10	-1.502e-2	2	228.13	2	5942.589	1
105		15	max	0	1	.932	3	.027	1	9.527e-3	3	NC	5	NC	2
106			min	-.315	4	-1.329	2	-.004	10	-1.389e-2	2	250.462	2	5649.702	1
107		16	max	0	1	.853	3	.025	4	8.702e-3	3	NC	5	NC	2
108			min	-.315	4	-1.225	2	-.003	10	-1.276e-2	2	300.561	2	6012.705	4
109		17	max	0	1	.751	3	.026	4	7.876e-3	3	NC	5	NC	1
110			min	-.315	4	-1.08	2	-.003	10	-1.163e-2	2	416.698	2	5666.4	4
111		18	max	0	1	.632	3	.018	4	7.05e-3	3	NC	5	NC	1
112			min	-.315	4	-.903	2	-.003	2	-1.05e-2	2	792.803	2	7941.661	4
113		19	max	0	1	.502	3	.008	3	6.224e-3	3	NC	1	NC	1
114			min	-.315	4	-.706	2	-.005	2	-9.365e-3	2	NC	1	NC	1
115	M16	1	max	0	10	.219	2	.007	3	1.216e-2	3	NC	1	NC	1
116			min	-.116	4	-.182	3	-.005	2	-1.423e-2	2	NC	1	NC	1
117		2	max	0	10	.142	1	.008	3	1.288e-2	3	NC	4	NC	1
118			min	-.116	4	-.157	3	-.01	5	-1.446e-2	2	2012.701	2	NC	1
119		3	max	0	10	.095	1	.019	1	1.359e-2	3	NC	4	NC	2
120			min	-.116	4	-.14	3	-.014	5	-1.47e-2	2	1123.924	2	7709.56	1
121		4	max	0	10	.07	1	.028	1	1.431e-2	3	NC	4	NC	2
122			min	-.116	4	-.136	3	-.012	5	-1.493e-2	2	901.467	2	5318.366	1
123		5	max	0	10	.07	1	.032	1	1.502e-2	3	NC	4	NC	2
124			min	-.116	4	-.146	3	-.006	5	-1.516e-2	2	889.786	2	4683.792	1
125		6	max	0	10	.096	1	.03	1	1.574e-2	3	NC	3	NC	2
126			min	-.116	4	-.17	3	-.004	10	-1.539e-2	2	1064.431	2	5038.338	1
127		7	max	0	10	.142	1	.022	1	1.645e-2	3	NC	4	NC	2
128			min	-.116	4	-.204	3	-.005	10	-1.562e-2	2	1667.034	2	6836.714	1
129		8	max	0	10	.196	1	.02	3	1.717e-2	3	NC	1	NC	1
130			min	-.116	4	-.242	3	-.008	2	-1.586e-2	2	2585.621	3	NC	1
131		9	max	0	10	.247	2	.02	3	1.788e-2	3	NC	4	NC	1
132			min	-.116	4	-.274	3	-.013	2	-1.609e-2	2	1686.338	3	NC	1
133		10	max	0	1	.273	2	.02	3	1.86e-2	3	NC	4	NC	1
134			min	-.116	4	-.288	3	-.015	2	-1.632e-2	2	1463.436	3	NC	1
135		11	max	0	1	.247	2	.02	3	1.788e-2	3	NC	4	NC	1
136			min	-.116	4	-.274	3	-.013	2	-1.609e-2	2	1686.338	3	NC	1
137		12	max	0	1	.196	1	.02	3	1.717e-2	3	NC	1	NC	1
138			min	-.116	4	-.242	3	-.008	5	-1.586e-2	2	2585.621	3	NC	1
139		13	max	0	1	.142	1	.022	1	1.645e-2	3	NC	4	NC	2
140			min	-.116	4	-.204	3	-.005	10	-1.562e-2	2	1667.034	2	6836.714	1
141		14	max	0	1	.096	1	.03	1	1.574e-2	3	NC	3	NC	2
142			min	-.116	4	-.17	3	-.004	10	-1.539e-2	2	1064.431	2	5038.338	1
143		15	max	0	1	.07	1	.032	1	1.502e-2	3	NC	4	NC	2
144			min	-.116	4	-.146	3	-.003	10	-1.516e-2	2	889.786	2	4683.792	1
145		16	max	0	1	.07	1	.028	1	1.431e-2	3	NC	4	NC	2
146			min	-.116	4	-.136	3	-.002	10	-1.493e-2	2	901.467	2	5318.366	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	.095	1	.022	4	1.359e-2	3	NC	4	NC	2
148			min	-.116	4	-.14	3	-.002	10	-1.47e-2	2	1123.924	2	6811.934	4
149		18	max	0	1	.142	1	.014	4	1.288e-2	3	NC	4	NC	1
150			min	-.115	4	-.157	3	-.003	10	-1.446e-2	2	2012.701	2	NC	1
151		19	max	0	1	.219	2	.007	3	1.216e-2	3	NC	1	NC	1
152			min	-.115	4	-.182	3	-.005	2	-1.423e-2	2	NC	1	NC	1
153	M2	1	max	.007	2	.009	2	.005	1	1.915e-3	5	NC	1	NC	1
154			min	-.009	3	-.014	3	-.457	4	-9.914e-5	1	6857.386	2	132.423	4
155		2	max	.006	2	.008	2	.004	1	1.912e-3	5	NC	1	NC	1
156			min	-.008	3	-.013	3	-.42	4	-9.293e-5	1	7820.882	2	144.286	4
157		3	max	.006	2	.007	2	.004	1	1.909e-3	5	NC	1	NC	1
158			min	-.008	3	-.013	3	-.382	4	-8.672e-5	1	9084.039	2	158.392	4
159		4	max	.005	2	.006	2	.004	1	1.906e-3	5	NC	1	NC	1
160			min	-.007	3	-.012	3	-.345	4	-8.051e-5	1	NC	1	175.332	4
161		5	max	.005	2	.005	2	.003	1	1.904e-3	5	NC	1	NC	1
162			min	-.007	3	-.012	3	-.309	4	-7.43e-5	1	NC	1	195.91	4
163		6	max	.005	2	.004	2	.003	1	1.901e-3	4	NC	1	NC	1
164			min	-.006	3	-.011	3	-.274	4	-6.809e-5	1	NC	1	221.242	4
165		7	max	.004	2	.003	2	.002	1	1.9e-3	4	NC	1	NC	1
166			min	-.006	3	-.01	3	-.239	4	-6.188e-5	1	NC	1	252.919	4
167		8	max	.004	2	.002	2	.002	1	1.898e-3	4	NC	1	NC	1
168			min	-.005	3	-.01	3	-.207	4	-5.567e-5	1	NC	1	293.265	4
169		9	max	.004	2	.001	2	.002	1	1.897e-3	4	NC	1	NC	1
170			min	-.005	3	-.009	3	-.175	4	-4.946e-5	1	NC	1	345.797	4
171		10	max	.003	2	0	2	.001	1	1.895e-3	4	NC	1	NC	1
172			min	-.004	3	-.008	3	-.146	4	-4.325e-5	1	NC	1	416.035	4
173		11	max	.003	2	0	2	.001	1	1.894e-3	4	NC	1	NC	1
174			min	-.004	3	-.008	3	-.118	4	-3.704e-5	1	NC	1	513.065	4
175		12	max	.003	2	0	15	0	1	1.892e-3	4	NC	1	NC	1
176			min	-.003	3	-.007	3	-.093	4	-3.083e-5	1	NC	1	652.716	4
177		13	max	.002	2	0	15	0	1	1.891e-3	4	NC	1	NC	1
178			min	-.003	3	-.006	3	-.07	4	-2.462e-5	1	NC	1	864.637	4
179		14	max	.002	2	0	15	0	1	1.89e-3	4	NC	1	NC	1
180			min	-.002	3	-.005	3	-.05	4	-1.842e-5	1	NC	1	1209.881	4
181		15	max	.001	2	0	15	0	1	1.888e-3	4	NC	1	NC	1
182			min	-.002	3	-.004	3	-.033	4	-1.221e-5	1	NC	1	1831.55	4
183		16	max	.001	2	0	15	0	1	1.887e-3	4	NC	1	NC	1
184			min	-.001	3	-.003	3	-.019	4	-5.996e-6	1	NC	1	3135.082	4
185		17	max	0	2	0	15	0	1	1.885e-3	4	NC	1	NC	1
186			min	0	3	-.002	3	-.009	4	-1.293e-6	3	NC	1	6686.398	4
187		18	max	0	2	0	15	0	1	1.884e-3	4	NC	1	NC	1
188			min	0	3	-.001	3	-.003	4	-1.196e-7	3	NC	1	NC	1
189		19	max	0	1	0	1	0	1	1.882e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	6.89e-7	12	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	-2.754e-7	12	NC	1	NC	1
192			min	0	1	0	1	0	1	-3.656e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.01	4	1.515e-4	4	NC	1	NC	1
194			min	0	2	-.002	6	0	12	5.637e-7	10	NC	1	NC	1
195		3	max	0	3	-.001	15	.021	4	6.685e-4	4	NC	1	NC	1
196			min	0	2	-.005	6	0	12	1.404e-6	10	NC	1	NC	1
197		4	max	.001	3	-.002	15	.03	4	1.186e-3	4	NC	1	NC	1
198			min	-.001	2	-.008	6	0	12	2.244e-6	10	NC	1	NC	1
199		5	max	.002	3	-.002	15	.04	4	1.703e-3	4	NC	1	NC	1
200			min	-.001	2	-.011	6	0	12	3.085e-6	10	9503.482	6	NC	1
201		6	max	.002	3	-.003	15	.049	4	2.22e-3	4	NC	1	NC	1
202			min	-.002	2	-.013	6	0	12	3.925e-6	10	7609.189	6	NC	1
203		7	max	.003	3	-.003	15	.058	4	2.737e-3	4	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
204			min	-.002	2	-.016	6	0	12	4.765e-6	10	6473.883	6	NC	1
205		8	max	.003	3	-.004	15	.066	4	3.254e-3	4	NC	5	NC	1
206			min	-.002	2	-.018	6	0	12	5.606e-6	10	5773.065	6	NC	1
207		9	max	.003	3	-.004	15	.074	4	3.771e-3	4	NC	5	NC	1
208			min	-.003	2	-.019	6	0	10	6.446e-6	10	5354.485	6	NC	1
209		10	max	.004	3	-.004	15	.082	4	4.288e-3	4	NC	5	NC	1
210			min	-.003	2	-.02	6	0	10	7.286e-6	10	5143.851	6	NC	1
211		11	max	.004	3	-.004	15	.089	4	4.805e-3	4	NC	5	NC	1
212			min	-.004	2	-.02	6	0	10	8.127e-6	10	5109.616	6	NC	1
213		12	max	.005	3	-.004	15	.097	4	5.322e-3	4	NC	5	NC	1
214			min	-.004	2	-.019	6	0	10	8.967e-6	10	5250.8	6	NC	1
215		13	max	.005	3	-.004	15	.104	4	5.839e-3	4	NC	5	NC	1
216			min	-.004	2	-.018	6	0	10	9.808e-6	10	5598.098	6	NC	1
217		14	max	.006	3	-.004	15	.112	4	6.356e-3	4	NC	5	NC	1
218			min	-.005	2	-.016	6	0	10	1.065e-5	10	6230.224	6	NC	1
219		15	max	.006	3	-.003	15	.12	4	6.873e-3	4	NC	2	NC	1
220			min	-.005	2	-.014	6	0	10	1.149e-5	10	7323.327	6	NC	1
221		16	max	.006	3	-.002	15	.128	4	7.39e-3	4	NC	1	NC	1
222			min	-.005	2	-.011	6	0	10	1.233e-5	10	9305.315	6	NC	1
223		17	max	.007	3	-.001	15	.136	4	7.907e-3	4	NC	1	NC	1
224			min	-.006	2	-.008	6	0	10	1.317e-5	10	NC	1	NC	1
225		18	max	.007	3	0	15	.146	4	8.424e-3	4	NC	1	NC	1
226			min	-.006	2	-.005	1	0	10	1.401e-5	10	NC	1	NC	1
227		19	max	.008	3	0	5	.156	4	8.941e-3	4	NC	1	NC	1
228			min	-.006	2	-.002	1	0	10	1.485e-5	10	NC	1	NC	1
229	M4	1	max	.003	2	.006	2	0	10	4.203e-5	1	NC	1	NC	2
230			min	0	3	-.008	3	-.156	4	-3.237e-4	5	NC	1	158.788	4
231		2	max	.002	2	.006	2	0	10	4.203e-5	1	NC	1	NC	2
232			min	0	3	-.007	3	-.144	4	-3.237e-4	5	NC	1	172.806	4
233		3	max	.002	2	.005	2	0	10	4.203e-5	1	NC	1	NC	2
234			min	0	3	-.007	3	-.131	4	-3.237e-4	5	NC	1	189.481	4
235		4	max	.002	2	.005	2	0	10	4.203e-5	1	NC	1	NC	2
236			min	0	3	-.007	3	-.118	4	-3.237e-4	5	NC	1	209.503	4
237		5	max	.002	2	.005	2	0	10	4.203e-5	1	NC	1	NC	2
238			min	0	3	-.006	3	-.106	4	-3.237e-4	5	NC	1	233.812	4
239		6	max	.002	2	.004	2	0	10	4.203e-5	1	NC	1	NC	2
240			min	0	3	-.006	3	-.094	4	-3.237e-4	5	NC	1	263.711	4
241		7	max	.002	2	.004	2	0	10	4.203e-5	1	NC	1	NC	1
242			min	0	3	-.005	3	-.082	4	-3.237e-4	5	NC	1	301.05	4
243		8	max	.002	2	.004	2	0	10	4.203e-5	1	NC	1	NC	1
244			min	0	3	-.005	3	-.071	4	-3.237e-4	5	NC	1	348.526	4
245		9	max	.001	2	.003	2	0	10	4.203e-5	1	NC	1	NC	1
246			min	0	3	-.004	3	-.06	4	-3.237e-4	5	NC	1	410.201	4
247		10	max	.001	2	.003	2	0	10	4.203e-5	1	NC	1	NC	1
248			min	0	3	-.004	3	-.05	4	-3.237e-4	5	NC	1	492.422	4
249		11	max	.001	2	.003	2	0	10	4.203e-5	1	NC	1	NC	1
250			min	0	3	-.003	3	-.041	4	-3.237e-4	5	NC	1	605.578	4
251		12	max	.001	2	.002	2	0	10	4.203e-5	1	NC	1	NC	1
252			min	0	3	-.003	3	-.032	4	-3.237e-4	5	NC	1	767.637	4
253		13	max	0	2	.002	2	0	10	4.203e-5	1	NC	1	NC	1
254			min	0	3	-.003	3	-.025	4	-3.237e-4	5	NC	1	1011.954	4
255		14	max	0	2	.002	2	0	10	4.203e-5	1	NC	1	NC	1
256			min	0	3	-.002	3	-.018	4	-3.237e-4	5	NC	1	1406.392	4
257		15	max	0	2	.001	2	0	10	4.203e-5	1	NC	1	NC	1
258			min	0	3	-.002	3	-.012	4	-3.237e-4	5	NC	1	2107.408	4
259		16	max	0	2	0	2	0	10	4.203e-5	1	NC	1	NC	1
260			min	0	3	-.001	3	-.007	4	-3.237e-4	5	NC	1	3547.563	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	2	0	2	0	10	4.203e-5	1	NC	1	NC	1
262			min	0	3	0	3	-.003	4	-3.237e-4	5	NC	1	7331.003	4
263		18	max	0	2	0	2	0	10	4.203e-5	1	NC	1	NC	1
264			min	0	3	0	3	-.001	4	-3.237e-4	5	NC	1	NC	1
265		19	max	0	1	0	1	0	1	4.203e-5	1	NC	1	NC	1
266			min	0	1	0	1	0	1	-3.237e-4	5	NC	1	NC	1
267	M6	1	max	.019	2	.028	2	0	1	1.98e-3	4	NC	4	NC	1
268			min	-.027	3	-.04	3	-.462	4	0	1	1529.055	3	131.215	4
269		2	max	.018	2	.025	2	0	1	1.975e-3	4	NC	4	NC	1
270			min	-.025	3	-.037	3	-.424	4	0	1	1619.576	3	142.97	4
271		3	max	.017	2	.023	2	0	1	1.97e-3	4	NC	4	NC	1
272			min	-.024	3	-.035	3	-.386	4	0	1	1721.482	3	156.949	4
273		4	max	.016	2	.021	2	0	1	1.966e-3	4	NC	4	NC	1
274			min	-.022	3	-.033	3	-.349	4	0	1	1837.057	3	173.736	4
275		5	max	.015	2	.018	2	0	1	1.961e-3	4	NC	4	NC	1
276			min	-.021	3	-.031	3	-.312	4	0	1	1969.237	3	194.128	4
277		6	max	.014	2	.016	2	0	1	1.956e-3	4	NC	4	NC	1
278			min	-.019	3	-.029	3	-.276	4	0	1	2121.861	3	219.232	4
279		7	max	.013	2	.014	2	0	1	1.951e-3	4	NC	4	NC	1
280			min	-.018	3	-.026	3	-.242	4	0	1	2300.046	3	250.623	4
281		8	max	.012	2	.012	2	0	1	1.946e-3	4	NC	1	NC	1
282			min	-.016	3	-.024	3	-.208	4	0	1	2510.775	3	290.606	4
283		9	max	.011	2	.01	2	0	1	1.942e-3	4	NC	1	NC	1
284			min	-.015	3	-.022	3	-.177	4	0	1	2763.819	3	342.665	4
285		10	max	.01	2	.008	2	0	1	1.937e-3	4	NC	1	NC	1
286			min	-.013	3	-.02	3	-.147	4	0	1	3073.293	3	412.272	4
287		11	max	.009	2	.007	2	0	1	1.932e-3	4	NC	1	NC	1
288			min	-.012	3	-.018	3	-.119	4	0	1	3460.373	3	508.431	4
289		12	max	.007	2	.005	2	0	1	1.927e-3	4	NC	1	NC	1
290			min	-.01	3	-.015	3	-.094	4	0	1	3958.331	3	646.828	4
291		13	max	.006	2	.004	2	0	1	1.922e-3	4	NC	1	NC	1
292			min	-.009	3	-.013	3	-.071	4	0	1	4622.625	3	856.85	4
293		14	max	.005	2	.003	2	0	1	1.918e-3	4	NC	1	NC	1
294			min	-.007	3	-.011	3	-.051	4	0	1	5553.075	3	1199.004	4
295		15	max	.004	2	.002	2	0	1	1.913e-3	4	NC	1	NC	1
296			min	-.006	3	-.009	3	-.033	4	0	1	6949.326	3	1815.117	4
297		16	max	.003	2	0	2	0	1	1.908e-3	4	NC	1	NC	1
298			min	-.004	3	-.007	3	-.019	4	0	1	9277.213	3	3107.026	4
299		17	max	.002	2	0	2	0	1	1.903e-3	4	NC	1	NC	1
300			min	-.003	3	-.004	3	-.009	4	0	1	NC	1	6626.781	4
301		18	max	.001	2	0	2	0	1	1.898e-3	4	NC	1	NC	1
302			min	-.001	3	-.002	3	-.003	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	1.893e-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	-3.675e-4	4	NC	1	NC	1
307		2	max	.001	3	0	2	.01	4	1.369e-4	4	NC	1	NC	1
308			min	-.001	2	-.004	3	0	1	0	1	NC	1	NC	1
309		3	max	.002	3	-.001	15	.021	4	6.413e-4	4	NC	1	NC	1
310			min	-.002	2	-.007	3	0	1	0	1	NC	1	NC	1
311		4	max	.004	3	-.002	15	.03	4	1.146e-3	4	NC	1	NC	1
312			min	-.003	2	-.01	3	0	1	0	1	NC	1	NC	1
313		5	max	.005	3	-.003	15	.04	4	1.65e-3	4	NC	1	NC	1
314			min	-.004	2	-.013	3	0	1	0	1	8116.36	3	NC	1
315		6	max	.006	3	-.003	15	.049	4	2.154e-3	4	NC	1	NC	1
316			min	-.006	2	-.016	3	0	1	0	1	6840.101	3	NC	1
317		7	max	.007	3	-.004	15	.058	4	2.659e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
318			min	-.007	2	-.018	3	0	1	0	1	6073.154	3	NC	1
319		8	max	.009	3	-.004	15	.066	4	3.163e-3	4	NC	2	NC	1
320			min	-.008	2	-.019	3	0	1	0	1	5613.825	3	NC	1
321		9	max	.01	3	-.005	15	.074	4	3.668e-3	4	NC	2	NC	1
322			min	-.009	2	-.02	3	0	1	0	1	5328.701	4	NC	1
323		10	max	.011	3	-.005	15	.082	4	4.172e-3	4	NC	2	NC	1
324			min	-.01	2	-.021	3	0	1	0	1	5120.611	4	NC	1
325		11	max	.012	3	-.005	15	.089	4	4.676e-3	4	NC	5	NC	1
326			min	-.011	2	-.021	3	0	1	0	1	5087.801	4	NC	1
327		12	max	.014	3	-.005	15	.096	4	5.181e-3	4	NC	5	NC	1
328			min	-.012	2	-.02	4	0	1	0	1	5229.475	4	NC	1
329		13	max	.015	3	-.004	15	.103	4	5.685e-3	4	NC	2	NC	1
330			min	-.013	2	-.019	4	0	1	0	1	5576.336	4	NC	1
331		14	max	.016	3	-.004	15	.111	4	6.189e-3	4	NC	2	NC	1
332			min	-.015	2	-.017	4	0	1	0	1	6206.9	4	NC	1
333		15	max	.017	3	-.003	15	.118	4	6.694e-3	4	NC	1	NC	1
334			min	-.016	2	-.015	3	0	1	0	1	7296.768	4	NC	1
335		16	max	.019	3	-.003	15	.125	4	7.198e-3	4	NC	1	NC	1
336			min	-.017	2	-.012	3	0	1	0	1	9272.42	4	NC	1
337		17	max	.02	3	-.002	15	.133	4	7.702e-3	4	NC	1	NC	1
338			min	-.018	2	-.01	3	0	1	0	1	NC	1	NC	1
339		18	max	.021	3	-.001	15	.142	4	8.207e-3	4	NC	1	NC	1
340			min	-.019	2	-.007	1	0	1	0	1	NC	1	NC	1
341		19	max	.022	3	0	15	.152	4	8.711e-3	4	NC	1	NC	1
342			min	-.02	2	-.005	1	0	1	0	1	NC	1	NC	1
343	M8	1	max	.008	2	.019	2	0	1	0	1	NC	1	NC	1
344			min	-.002	3	-.022	3	-.152	4	-4.082e-4	4	NC	1	163.592	4
345		2	max	.007	2	.018	2	0	1	0	1	NC	1	NC	1
346			min	-.002	3	-.021	3	-.139	4	-4.082e-4	4	NC	1	178.047	4
347		3	max	.007	2	.017	2	0	1	0	1	NC	1	NC	1
348			min	-.002	3	-.02	3	-.127	4	-4.082e-4	4	NC	1	195.239	4
349		4	max	.006	2	.016	2	0	1	0	1	NC	1	NC	1
350			min	-.002	3	-.019	3	-.115	4	-4.082e-4	4	NC	1	215.883	4
351		5	max	.006	2	.015	2	0	1	0	1	NC	1	NC	1
352			min	-.002	3	-.017	3	-.103	4	-4.082e-4	4	NC	1	240.947	4
353		6	max	.005	2	.014	2	0	1	0	1	NC	1	NC	1
354			min	-.002	3	-.016	3	-.091	4	-4.082e-4	4	NC	1	271.774	4
355		7	max	.005	2	.013	2	0	1	0	1	NC	1	NC	1
356			min	-.002	3	-.015	3	-.08	4	-4.082e-4	4	NC	1	310.271	4
357		8	max	.005	2	.012	2	0	1	0	1	NC	1	NC	1
358			min	-.001	3	-.014	3	-.069	4	-4.082e-4	4	NC	1	359.219	4
359		9	max	.004	2	.01	2	0	1	0	1	NC	1	NC	1
360			min	-.001	3	-.012	3	-.059	4	-4.082e-4	4	NC	1	422.806	4
361		10	max	.004	2	.009	2	0	1	0	1	NC	1	NC	1
362			min	-.001	3	-.011	3	-.049	4	-4.082e-4	4	NC	1	507.577	4
363		11	max	.003	2	.008	2	0	1	0	1	NC	1	NC	1
364			min	-.001	3	-.01	3	-.04	4	-4.082e-4	4	NC	1	624.243	4
365		12	max	.003	2	.007	2	0	1	0	1	NC	1	NC	1
366			min	0	3	-.009	3	-.031	4	-4.082e-4	4	NC	1	791.331	4
367		13	max	.003	2	.006	2	0	1	0	1	NC	1	NC	1
368			min	0	3	-.007	3	-.024	4	-4.082e-4	4	NC	1	1043.232	4
369		14	max	.002	2	.005	2	0	1	0	1	NC	1	NC	1
370			min	0	3	-.006	3	-.017	4	-4.082e-4	4	NC	1	1449.92	4
371		15	max	.002	2	.004	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.005	3	-.011	4	-4.082e-4	4	NC	1	2172.722	4
373		16	max	.001	2	.003	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.004	3	-.007	4	-4.082e-4	4	NC	1	3657.671	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	.002	2	0	1	0	1	NC	1	NC	1
376			min	0	3	-.002	3	-.003	4	-4.082e-4	4	NC	1	7558.923	4
377		18	max	0	2	.001	2	0	1	0	1	NC	1	NC	1
378			min	0	3	-.001	3	0	4	-4.082e-4	4	NC	1	NC	1
379		19	max	0	1	0	1	0	1	0	1	NC	1	NC	1
380			min	0	1	0	1	0	1	-4.082e-4	4	NC	1	NC	1
381	M10	1	max	.007	2	.009	2	0	10	1.963e-3	4	NC	1	NC	1
382			min	-.009	3	-.014	3	-.46	4	4.084e-6	10	6857.386	2	131.686	4
383		2	max	.006	2	.008	2	0	10	1.958e-3	4	NC	1	NC	1
384			min	-.008	3	-.013	3	-.422	4	3.803e-6	10	7820.882	2	143.483	4
385		3	max	.006	2	.007	2	0	10	1.953e-3	4	NC	1	NC	1
386			min	-.008	3	-.013	3	-.384	4	3.523e-6	10	9084.039	2	157.512	4
387		4	max	.005	2	.006	2	0	10	1.948e-3	4	NC	1	NC	1
388			min	-.007	3	-.012	3	-.347	4	3.242e-6	10	NC	1	174.359	4
389		5	max	.005	2	.005	2	0	10	1.943e-3	4	NC	1	NC	1
390			min	-.007	3	-.012	3	-.311	4	2.962e-6	10	NC	1	194.824	4
391		6	max	.005	2	.004	2	0	10	1.938e-3	4	NC	1	NC	1
392			min	-.006	3	-.011	3	-.275	4	2.682e-6	10	NC	1	220.017	4
393		7	max	.004	2	.003	2	0	10	1.934e-3	4	NC	1	NC	1
394			min	-.006	3	-.01	3	-.241	4	2.401e-6	10	NC	1	251.52	4
395		8	max	.004	2	.002	2	0	10	1.929e-3	4	NC	1	NC	1
396			min	-.005	3	-.01	3	-.208	4	2.121e-6	10	NC	1	291.646	4
397		9	max	.004	2	.001	2	0	10	1.924e-3	4	NC	1	NC	1
398			min	-.005	3	-.009	3	-.176	4	1.841e-6	10	NC	1	343.891	4
399		10	max	.003	2	0	2	0	10	1.919e-3	4	NC	1	NC	1
400			min	-.004	3	-.008	3	-.146	4	1.56e-6	10	NC	1	413.746	4
401		11	max	.003	2	0	2	0	10	1.914e-3	4	NC	1	NC	1
402			min	-.004	3	-.008	3	-.119	4	1.28e-6	10	NC	1	510.248	4
403		12	max	.003	2	0	2	0	10	1.909e-3	4	NC	1	NC	1
404			min	-.003	3	-.007	3	-.093	4	9.996e-7	10	NC	1	649.141	4
405		13	max	.002	2	-.001	2	0	10	1.904e-3	4	NC	1	NC	1
406			min	-.003	3	-.006	3	-.07	4	7.193e-7	10	NC	1	859.916	4
407		14	max	.002	2	-.001	2	0	10	1.9e-3	4	NC	1	NC	1
408			min	-.002	3	-.005	3	-.05	4	4.389e-7	10	NC	1	1203.299	4
409		15	max	.001	2	-.001	15	0	10	1.895e-3	4	NC	1	NC	1
410			min	-.002	3	-.004	3	-.033	4	1.586e-7	10	NC	1	1821.635	4
411		16	max	.001	2	0	15	0	10	1.89e-3	4	NC	1	NC	1
412			min	-.001	3	-.003	3	-.019	4	-1.218e-7	10	NC	1	3118.236	4
413		17	max	0	2	0	15	0	10	1.885e-3	4	NC	1	NC	1
414			min	0	3	-.002	4	-.009	4	-6.284e-7	2	NC	1	6650.934	4
415		18	max	0	2	0	15	0	10	1.88e-3	4	NC	1	NC	1
416			min	0	3	-.001	4	-.003	4	-6.423e-6	1	NC	1	NC	1
417		19	max	0	1	0	1	0	1	1.875e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-1.263e-5	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	3.985e-6	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-3.634e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.01	4	1.463e-4	4	NC	1	NC	1
422			min	0	2	-.003	4	0	1	-9.556e-6	1	NC	1	NC	1
423		3	max	0	3	-.001	15	.02	4	6.559e-4	4	NC	1	NC	1
424			min	0	2	-.006	4	0	1	-2.31e-5	1	NC	1	NC	1
425		4	max	.001	3	-.002	15	.03	4	1.166e-3	4	NC	1	NC	1
426			min	-.001	2	-.009	4	0	1	-3.664e-5	1	NC	1	NC	1
427		5	max	.002	3	-.003	15	.04	4	1.675e-3	4	NC	1	NC	1
428			min	-.001	2	-.012	4	0	1	-5.018e-5	1	9025.607	4	NC	1
429		6	max	.002	3	-.004	15	.049	4	2.185e-3	4	NC	1	NC	1
430			min	-.002	2	-.014	4	0	1	-6.372e-5	1	7262.975	4	NC	1
431		7	max	.003	3	-.004	15	.057	4	2.695e-3	4	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
432			min	-.002	2	-.017	4	0	1	-7.726e-5	1	6204.159	4	NC	1
433		8	max	.003	3	-.005	15	.066	4	3.204e-3	4	NC	5	NC	1
434			min	-.002	2	-.019	4	0	1	-9.08e-5	1	5550.604	4	NC	1
435		9	max	.003	3	-.005	15	.074	4	3.714e-3	4	NC	5	NC	1
436			min	-.003	2	-.02	4	0	1	-1.043e-4	1	5161.998	4	NC	1
437		10	max	.004	3	-.005	15	.081	4	4.223e-3	4	NC	5	NC	1
438			min	-.003	2	-.021	4	-.001	1	-1.179e-4	1	4970.026	4	NC	1
439		11	max	.004	3	-.005	15	.089	4	4.733e-3	4	NC	5	NC	1
440			min	-.004	2	-.021	4	-.001	1	-1.314e-4	1	4946.183	4	NC	1
441		12	max	.005	3	-.005	15	.096	4	5.243e-3	4	NC	5	NC	1
442			min	-.004	2	-.021	4	-.002	1	-1.45e-4	1	5090.822	4	NC	1
443		13	max	.005	3	-.005	15	.103	4	5.752e-3	4	NC	5	NC	1
444			min	-.004	2	-.02	4	-.002	1	-1.585e-4	1	5434.653	4	NC	1
445		14	max	.006	3	-.004	15	.111	4	6.262e-3	4	NC	5	NC	1
446			min	-.005	2	-.018	4	-.002	1	-1.72e-4	1	6054.889	4	NC	1
447		15	max	.006	3	-.004	15	.118	4	6.772e-3	4	NC	2	NC	1
448			min	-.005	2	-.015	4	-.003	1	-1.856e-4	1	7123.511	4	NC	1
449		16	max	.006	3	-.003	15	.126	4	7.281e-3	4	NC	1	NC	1
450			min	-.005	2	-.012	4	-.003	1	-1.991e-4	1	9057.688	4	NC	1
451		17	max	.007	3	-.002	15	.135	4	7.791e-3	4	NC	1	NC	1
452			min	-.006	2	-.009	4	-.003	1	-2.127e-4	1	NC	1	NC	1
453		18	max	.007	3	-.001	15	.144	4	8.301e-3	4	NC	1	NC	1
454			min	-.006	2	-.005	4	-.004	1	-2.262e-4	1	NC	1	NC	1
455		19	max	.008	3	0	10	.154	4	8.81e-3	4	NC	1	NC	1
456			min	-.006	2	-.002	1	-.004	1	-2.397e-4	1	NC	1	NC	1
457	M12	1	max	.003	2	.006	2	.004	1	-2.21e-6	10	NC	1	NC	2
458			min	0	3	-.008	3	-.154	4	-3.373e-4	4	NC	1	161.292	4
459		2	max	.002	2	.006	2	.004	1	-2.21e-6	10	NC	1	NC	2
460			min	0	3	-.007	3	-.141	4	-3.373e-4	4	NC	1	175.533	4
461		3	max	.002	2	.005	2	.004	1	-2.21e-6	10	NC	1	NC	2
462			min	0	3	-.007	3	-.129	4	-3.373e-4	4	NC	1	192.473	4
463		4	max	.002	2	.005	2	.003	1	-2.21e-6	10	NC	1	NC	2
464			min	0	3	-.007	3	-.117	4	-3.373e-4	4	NC	1	212.813	4
465		5	max	.002	2	.005	2	.003	1	-2.21e-6	10	NC	1	NC	2
466			min	0	3	-.006	3	-.104	4	-3.373e-4	4	NC	1	237.509	4
467		6	max	.002	2	.004	2	.003	1	-2.21e-6	10	NC	1	NC	2
468			min	0	3	-.006	3	-.093	4	-3.373e-4	4	NC	1	267.883	4
469		7	max	.002	2	.004	2	.002	1	-2.21e-6	10	NC	1	NC	1
470			min	0	3	-.005	3	-.081	4	-3.373e-4	4	NC	1	305.816	4
471		8	max	.002	2	.004	2	.002	1	-2.21e-6	10	NC	1	NC	1
472			min	0	3	-.005	3	-.07	4	-3.373e-4	4	NC	1	354.046	4
473		9	max	.001	2	.003	2	.002	1	-2.21e-6	10	NC	1	NC	1
474			min	0	3	-.004	3	-.06	4	-3.373e-4	4	NC	1	416.7	4
475		10	max	.001	2	.003	2	.001	1	-2.21e-6	10	NC	1	NC	1
476			min	0	3	-.004	3	-.05	4	-3.373e-4	4	NC	1	500.228	4
477		11	max	.001	2	.003	2	.001	1	-2.21e-6	10	NC	1	NC	1
478			min	0	3	-.003	3	-.04	4	-3.373e-4	4	NC	1	615.182	4
479		12	max	.001	2	.002	2	0	1	-2.21e-6	10	NC	1	NC	1
480			min	0	3	-.003	3	-.032	4	-3.373e-4	4	NC	1	779.816	4
481		13	max	0	2	.002	2	0	1	-2.21e-6	10	NC	1	NC	1
482			min	0	3	-.003	3	-.024	4	-3.373e-4	4	NC	1	1028.015	4
483		14	max	0	2	.002	2	0	1	-2.21e-6	10	NC	1	NC	1
484			min	0	3	-.002	3	-.017	4	-3.373e-4	4	NC	1	1428.723	4
485		15	max	0	2	.001	2	0	1	-2.21e-6	10	NC	1	NC	1
486			min	0	3	-.002	3	-.012	4	-3.373e-4	4	NC	1	2140.882	4
487		16	max	0	2	0	2	0	1	-2.21e-6	10	NC	1	NC	1
488			min	0	3	-.001	3	-.007	4	-3.373e-4	4	NC	1	3603.936	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	2	0	2	0	1	-2.21e-6	10	NC	1	NC	1
490			min	0	3	0	3	-.003	4	-3.373e-4	4	NC	1	7447.555	4
491		18	max	0	2	0	2	0	1	-2.21e-6	10	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-3.373e-4	4	NC	1	NC	1
493		19	max	0	1	0	1	0	1	-2.21e-6	10	NC	1	NC	1
494			min	0	1	0	1	0	1	-3.373e-4	4	NC	1	NC	1
495	M1	1	max	.01	3	.245	2	.483	4	5.315e-3	1	NC	1	NC	1
496			min	-.006	2	-.08	3	0	10	-1.398e-2	3	NC	1	NC	1
497		2	max	.01	3	.121	2	.471	4	6.075e-3	4	NC	5	NC	1
498			min	-.006	2	-.04	3	-.003	1	-6.944e-3	3	1087.422	2	NC	1
499		3	max	.01	3	.014	3	.457	4	1.116e-2	4	NC	5	NC	1
500			min	-.006	2	-.012	2	-.005	1	-9.02e-5	3	527.932	2	8461.295	5
501		4	max	.01	3	.093	3	.443	4	9.59e-3	4	NC	15	NC	1
502			min	-.006	2	-.157	2	-.004	1	-3.662e-3	3	337.252	2	6035.761	5
503		5	max	.01	3	.189	3	.429	4	8.022e-3	4	NC	15	NC	1
504			min	-.006	2	-.306	2	-.003	1	-7.235e-3	3	245.795	2	4791.119	5
505		6	max	.009	3	.291	3	.414	4	1.108e-2	2	8753.411	15	NC	1
506			min	-.006	2	-.449	2	-.001	1	-1.081e-2	3	195.053	2	4024.819	5
507		7	max	.009	3	.387	3	.399	4	1.476e-2	2	7418.877	15	NC	1
508			min	-.006	2	-.576	2	0	3	-1.438e-2	3	164.93	2	3486.752	4
509		8	max	.009	3	.466	3	.384	4	1.845e-2	2	6626.63	15	NC	1
510			min	-.006	2	-.677	2	0	10	-1.795e-2	3	147.042	2	3078.171	4
511		9	max	.009	3	.518	3	.368	4	2.053e-2	2	6210.779	15	NC	1
512			min	-.005	2	-.74	2	0	1	-1.859e-2	3	137.696	2	2794.722	4
513		10	max	.009	3	.537	3	.349	4	2.153e-2	2	6083.305	15	NC	1
514			min	-.005	2	-.761	2	0	10	-1.728e-2	3	134.959	2	2690.111	4
515		11	max	.008	3	.525	3	.328	4	2.254e-2	2	6210.446	15	NC	1
516			min	-.005	2	-.74	2	0	10	-1.596e-2	3	138.177	2	2710.419	4
517		12	max	.008	3	.481	3	.305	4	2.143e-2	2	6625.828	15	NC	1
518			min	-.005	2	-.674	2	0	1	-1.405e-2	3	148.424	2	2851.642	4
519		13	max	.008	3	.411	3	.278	4	1.718e-2	2	7417.31	15	NC	1
520			min	-.005	2	-.57	2	0	1	-1.124e-2	3	168.137	2	3344.625	4
521		14	max	.008	3	.32	3	.247	4	1.292e-2	2	8750.561	15	NC	1
522			min	-.005	2	-.439	2	0	12	-8.434e-3	3	201.677	2	4490.332	4
523		15	max	.008	3	.217	3	.216	4	8.671e-3	2	NC	15	NC	1
524			min	-.005	2	-.293	2	0	10	-5.627e-3	3	259.01	2	7280.002	4
525		16	max	.007	3	.11	3	.185	4	7.391e-3	4	NC	15	NC	1
526			min	-.005	2	-.145	2	0	10	-2.821e-3	3	364.197	2	NC	1
527		17	max	.007	3	.005	3	.157	4	8.46e-3	4	NC	5	NC	1
528			min	-.005	2	-.007	2	0	10	-1.392e-5	3	586.759	2	NC	1
529		18	max	.007	3	.112	2	.134	4	4.699e-3	4	NC	5	NC	1
530			min	-.005	2	-.091	3	0	10	-1.487e-3	3	1234.181	2	NC	1
531		19	max	.007	3	.219	2	.115	4	9.341e-3	2	NC	1	NC	1
532			min	-.005	2	-.182	3	0	1	-3.036e-3	3	NC	1	NC	1
533	M5	1	max	.029	3	.349	2	.483	4	0	1	NC	1	NC	1
534			min	-.02	2	-.003	3	0	1	-1.132e-5	4	NC	1	NC	1
535		2	max	.029	3	.172	2	.474	4	5.698e-3	4	NC	5	NC	1
536			min	-.02	2	-.004	3	0	1	0	1	779.799	2	NC	1
537		3	max	.029	3	.04	3	.461	4	1.127e-2	4	NC	5	NC	1
538			min	-.02	2	-.031	2	0	1	0	1	361.054	2	7010.982	4
539		4	max	.028	3	.165	3	.447	4	9.183e-3	4	NC	15	NC	1
540			min	-.019	2	-.283	2	0	1	0	1	216.665	2	5341.388	4
541		5	max	.027	3	.349	3	.431	4	7.095e-3	4	7477.789	15	NC	1
542			min	-.019	2	-.562	2	0	1	0	1	150.007	2	4499.825	4
543		6	max	.027	3	.561	3	.415	4	5.008e-3	4	5707.863	15	NC	1
544			min	-.019	2	-.843	2	0	1	0	1	114.541	2	3957.929	4
545		7	max	.026	3	.771	3	.399	4	2.92e-3	4	4694.983	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	-.018	2	-1.1	2	0	1	0	1	94.198	2	3525.215	4
547		8	max	.026	3	.949	3	.383	4	8.331e-4	4	4110.166	15	NC	1
548			min	-.018	2	-1.307	2	0	1	0	1	82.432	2	3118.672	4
549		9	max	.025	3	1.064	3	.368	4	0	1	3811.399	15	NC	1
550			min	-.018	2	-1.439	2	0	1	-6.177e-6	5	76.415	2	2788.341	4
551		10	max	.024	3	1.106	3	.349	4	0	1	3721.495	15	NC	1
552			min	-.017	2	-1.485	2	0	1	-5.861e-6	5	74.658	2	2718.213	4
553		11	max	.024	3	1.078	3	.328	4	4.986e-8	14	3811.698	15	NC	1
554			min	-.017	2	-1.441	2	0	1	-5.546e-6	5	76.713	2	2753.013	4
555		12	max	.023	3	.982	3	.306	4	6.044e-4	4	4110.856	15	NC	1
556			min	-.017	2	-1.304	2	0	1	0	1	83.441	2	2798.059	4
557		13	max	.023	3	.828	3	.279	4	2.119e-3	4	4696.329	15	NC	1
558			min	-.016	2	-1.085	2	0	1	0	1	96.896	2	3243.892	4
559		14	max	.022	3	.635	3	.248	4	3.633e-3	4	5710.4	15	NC	1
560			min	-.016	2	-.816	2	0	1	0	1	120.816	2	4493.937	4
561		15	max	.021	3	.422	3	.214	4	5.147e-3	4	7482.699	15	NC	1
562			min	-.016	2	-.527	2	0	1	0	1	164.211	2	8184.126	4
563		16	max	.021	3	.208	3	.181	4	6.661e-3	4	NC	15	NC	1
564			min	-.015	2	-.25	2	0	1	0	1	250.378	2	NC	1
565		17	max	.02	3	.013	3	.152	4	8.176e-3	4	NC	5	NC	1
566			min	-.015	2	-.017	2	0	1	0	1	449.303	2	NC	1
567		18	max	.02	3	.147	2	.13	4	4.135e-3	4	NC	5	NC	1
568			min	-.015	2	-.148	3	0	1	0	1	1031.967	2	NC	1
569		19	max	.02	3	.273	2	.116	4	0	1	NC	1	NC	1
570			min	-.015	2	-.288	3	0	1	-5.409e-6	4	NC	1	NC	1
571	M9	1	max	.01	3	.245	2	.483	4	1.398e-2	3	NC	1	NC	1
572			min	-.006	2	-.08	3	0	1	-5.315e-3	1	NC	1	NC	1
573		2	max	.01	3	.121	2	.472	4	6.944e-3	3	NC	5	NC	1
574			min	-.006	2	-.04	3	0	10	-2.563e-3	1	1087.422	2	NC	1
575		3	max	.01	3	.014	3	.46	4	1.122e-2	4	NC	5	NC	1
576			min	-.006	2	-.012	2	0	10	-2.969e-5	10	527.932	2	7632.715	4
577		4	max	.01	3	.093	3	.445	4	8.892e-3	5	NC	15	NC	1
578			min	-.006	2	-.157	2	0	10	-3.706e-3	2	337.252	2	5631.124	4
579		5	max	.01	3	.189	3	.43	4	7.235e-3	3	NC	15	NC	1
580			min	-.006	2	-.306	2	0	10	-7.391e-3	2	245.795	2	4606.09	4
581		6	max	.009	3	.291	3	.415	4	1.081e-2	3	8718.584	15	NC	1
582			min	-.006	2	-.449	2	0	10	-1.108e-2	2	195.053	2	3960.965	4
583		7	max	.009	3	.387	3	.399	4	1.438e-2	3	7390.036	15	NC	1
584			min	-.006	2	-.576	2	0	1	-1.476e-2	2	164.93	2	3487.402	4
585		8	max	.009	3	.466	3	.383	4	1.795e-2	3	6601.271	15	NC	1
586			min	-.006	2	-.677	2	0	1	-1.845e-2	2	147.042	2	3093.224	5
587		9	max	.009	3	.518	3	.368	4	1.859e-2	3	6187.192	15	NC	1
588			min	-.005	2	-.74	2	0	10	-2.053e-2	2	137.696	2	2788.263	4
589		10	max	.009	3	.537	3	.349	4	1.728e-2	3	6060.194	15	NC	1
590			min	-.005	2	-.761	2	0	1	-2.153e-2	2	134.959	2	2690.767	4
591		11	max	.008	3	.525	3	.328	4	1.596e-2	3	6186.732	15	NC	1
592			min	-.005	2	-.74	2	0	1	-2.254e-2	2	138.177	2	2717.445	4
593		12	max	.008	3	.481	3	.306	4	1.405e-2	3	6600.346	15	NC	1
594			min	-.005	2	-.674	2	0	10	-2.143e-2	2	148.424	2	2838.079	4
595		13	max	.008	3	.411	3	.278	4	1.124e-2	3	7388.514	15	NC	1
596			min	-.005	2	-.57	2	0	10	-1.718e-2	2	168.137	2	3340.481	4
597		14	max	.008	3	.32	3	.247	4	8.434e-3	3	8716.154	15	NC	1
598			min	-.005	2	-.439	2	-.001	1	-1.292e-2	2	201.677	2	4556.832	5
599		15	max	.008	3	.217	3	.214	4	5.627e-3	3	NC	15	NC	1
600			min	-.005	2	-.293	2	-.003	1	-8.671e-3	2	259.01	2	7658.472	5
601		16	max	.007	3	.11	3	.182	4	6.624e-3	5	NC	15	NC	1
602			min	-.005	2	-.145	2	-.004	1	-4.417e-3	2	364.197	2	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
603		17	max	.007	3	.005	3	.154	4	8.303e-3	4	NC	5	NC	1
604			min	-.005	2	-.007	2	-.004	1	-3.201e-4	1	586.759	2	NC	1
605		18	max	.007	3	.112	2	.132	4	4.089e-3	5	NC	5	NC	1
606			min	-.005	2	-.091	3	-.003	1	-4.673e-3	2	1234.181	2	NC	1
607		19	max	.007	3	.219	2	.116	4	3.036e-3	3	NC	1	NC	1
608			min	-.005	2	-.182	3	0	10	-9.341e-3	2	NC	1	NC	1

SIMPSON Strong-Tie Anchor Designer™ Software Version 2.4.6025.0	Company:	Schletter, Inc.	Date:	8/1/2016
	Engineer:	HCV	Page:	1/5
	Project:	Standard PVMax - Worst Case, 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

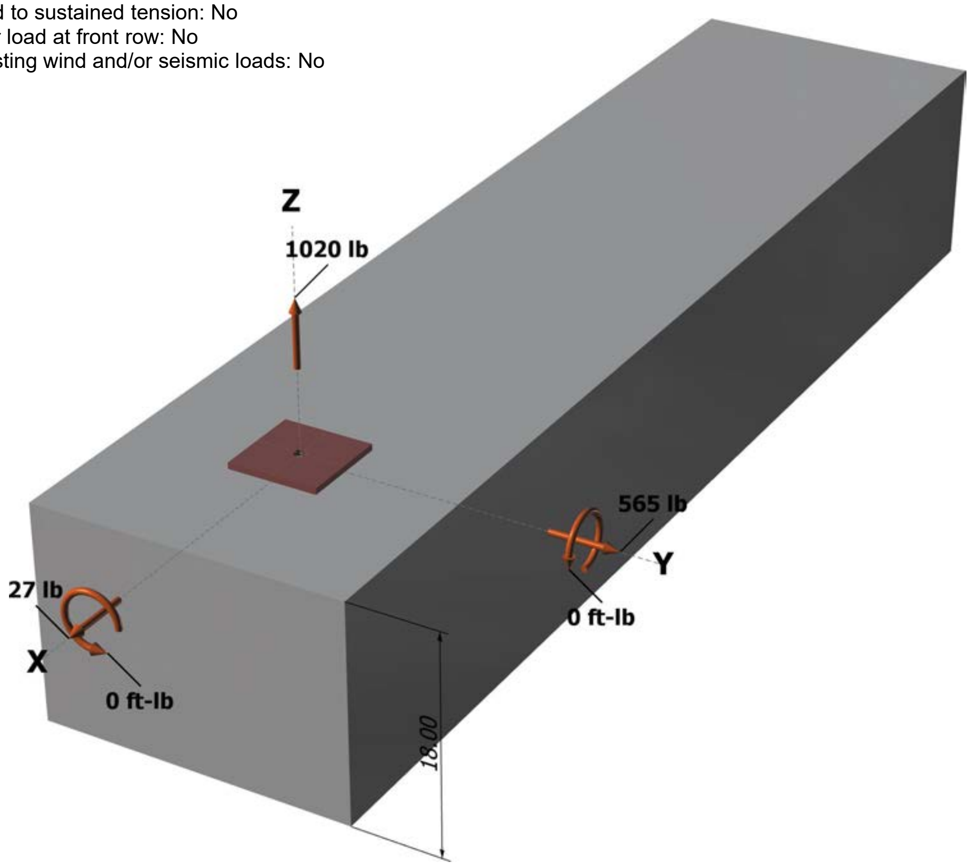
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

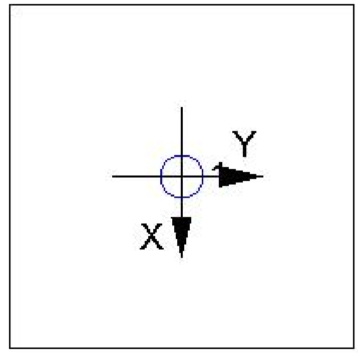
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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)

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in y-direction:

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

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

Shear parallel to edge in x-direction:

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

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

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

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

Shear parallel to edge in y-direction:

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

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

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

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

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

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

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

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

11. Results

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

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

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

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

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

12. Warnings

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

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

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

Company:	Schletter, Inc.	Date:	8/1/2016
Engineer:	HCV	Page:	1/5
Project:	Standard PVMax - Worst Case, 32-40 Inch Width		
Address:			
Phone:			
E-mail:			

SIMPSON Strong-Tie®

Anchor Designer™
Software
Version 2.4.6025.0

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

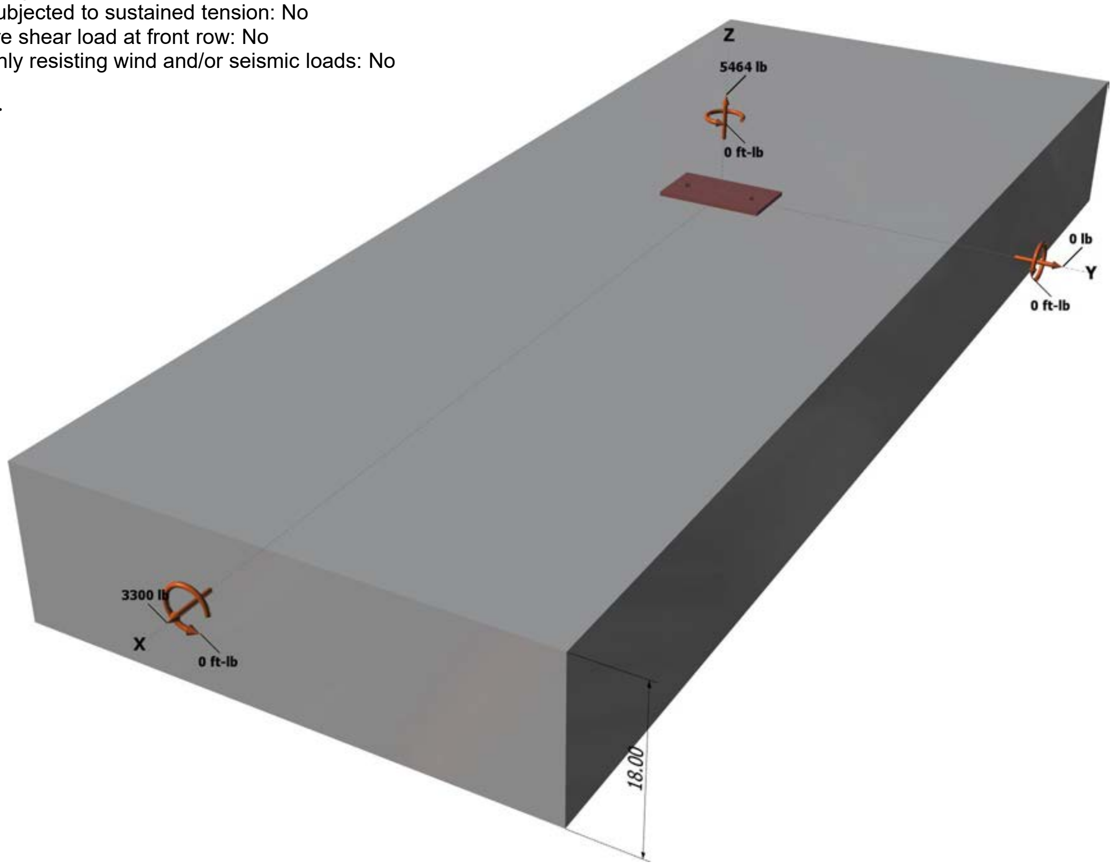
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

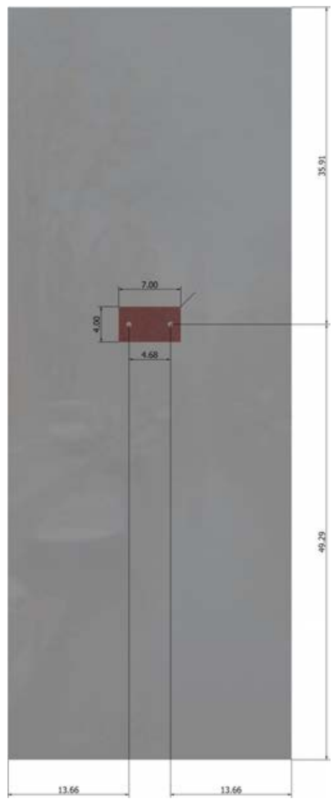
Load and Geometry
Load factor source: ACI 318 Section 9.2
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: No
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

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

<Figure 1>



<Figure 2>



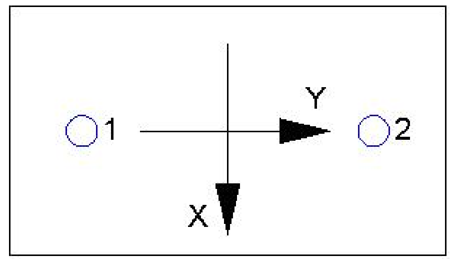
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	2732.0	1650.0	0.0	1650.0
2	2732.0	1650.0	0.0	1650.0
Sum	5464.0	3300.0	0.0	3300.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 5464
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgx} (lb)
576.00	648.00	1.000	0.928	1.000	1.000	15593	0.70	9001

Shear parallel to edge in x-direction:

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

l_e (in)	d_a (in)	λ	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
4.00	0.50	1.00	2500	13.66	18939

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

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cbx} (lb)
737.64	839.68	1.000	1.000	1.000	18939	0.70	23292

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

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

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

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

ϕV_{cpg} (lb)
20601

11. Results

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

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

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

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

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. D.7.3	0.68	0.52	119.8 %	1.2	Pass

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

12. Warnings

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

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

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