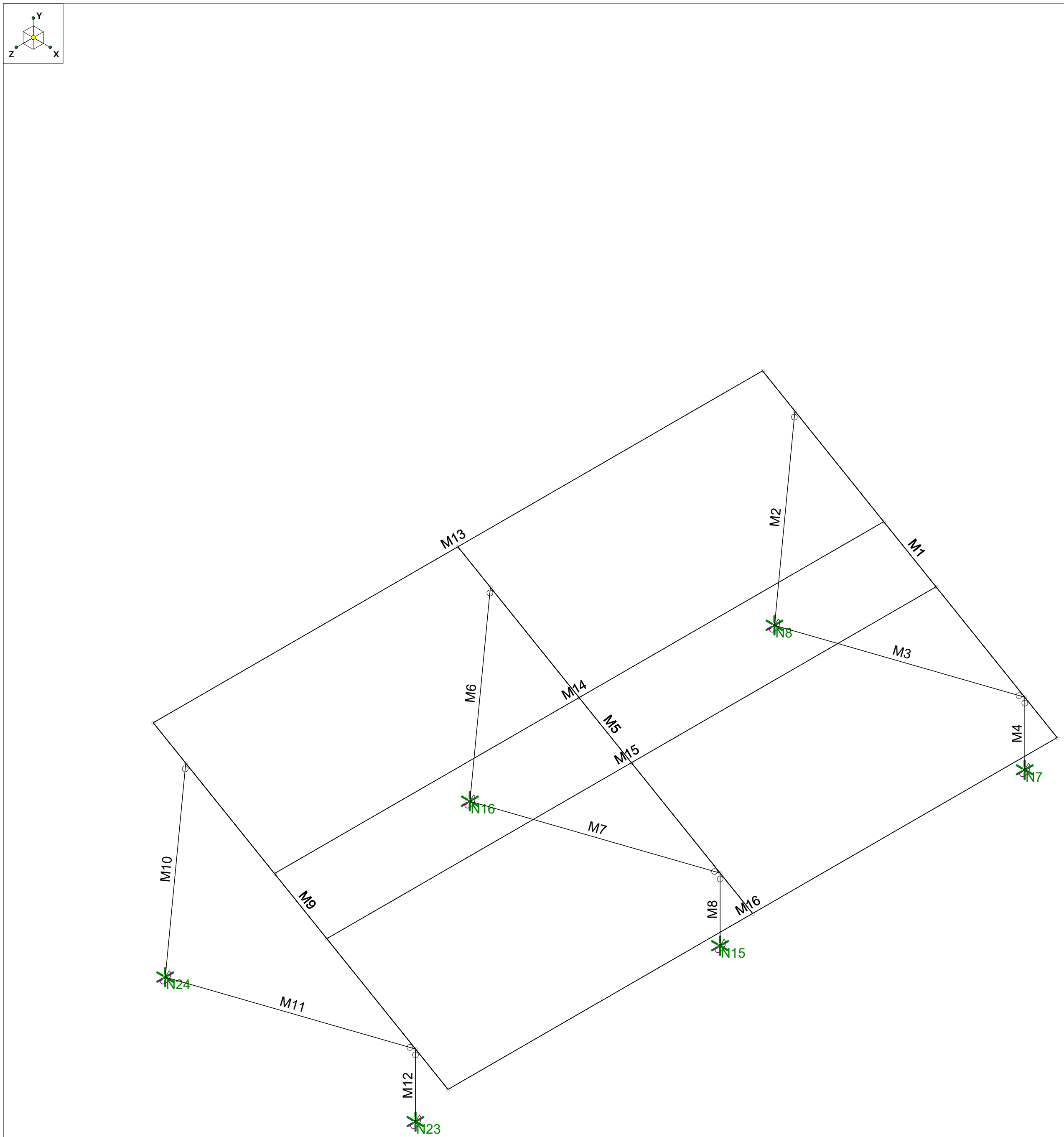


Schletter, Inc.		30° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-10	

1. INTRODUCTION

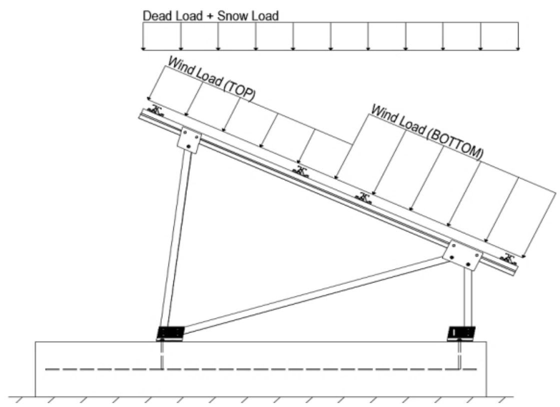
1.1 Project Description
The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. PVMax ground mount system.

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

PV modules are required to meet the following specifications:

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

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



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

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

2. LOAD ACTIONS

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

Self-weight of the PV modules.

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

2.3 Wind Loads
Design Wind Speed, V = 160 mph
Height < 15 ft

Exposure Category = C
Importance Category = II

Peak Velocity Pressure, q_z = 40.19 psf *Including the gust factor, G=0.85. (ASCE 7-10, Eq. 27.3-1)*

Pressure Coefficients

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

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

2.4 Seismic Loads

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

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

2.5 Combination of Loads

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

Strength Design, LRFD

Component stresses are checked using the following LRFD load combinations:

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

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

Allowable Stress Design, ASD

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

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

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

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

3. STRUCTURAL ANALYSIS

3.1 RISA Results

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

3.2 RISA Components

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

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

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

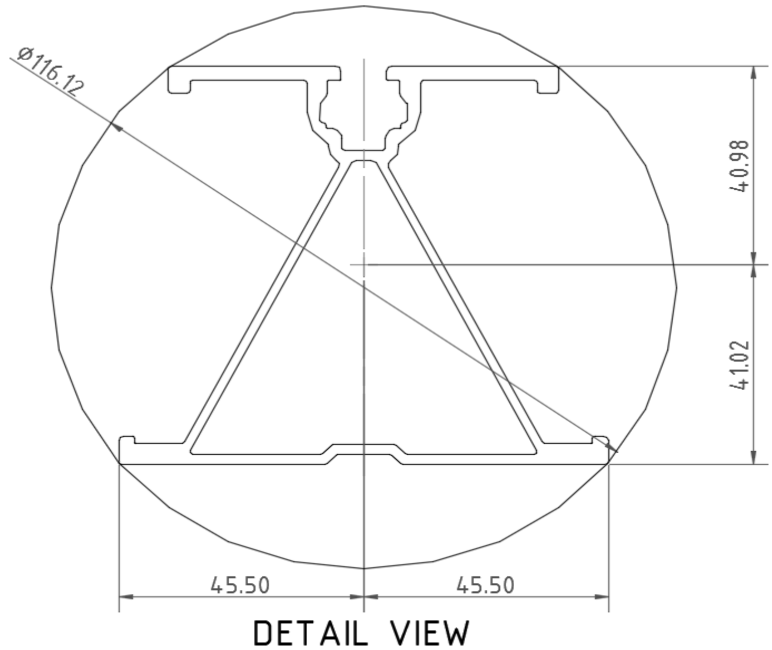
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

4. MEMBER DESIGN CALCULATIONS

4.1 Purlin Design

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

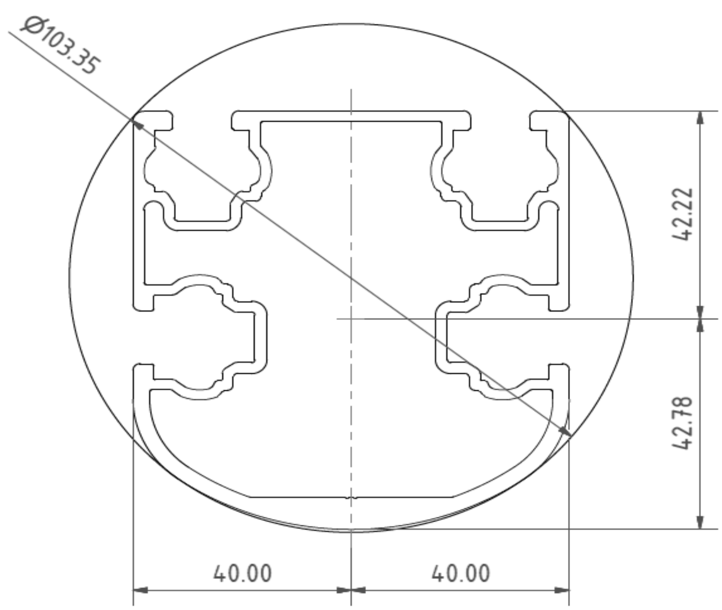
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	75	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	-1.556	k-ft
M_z =	-0.008	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	57%	



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).

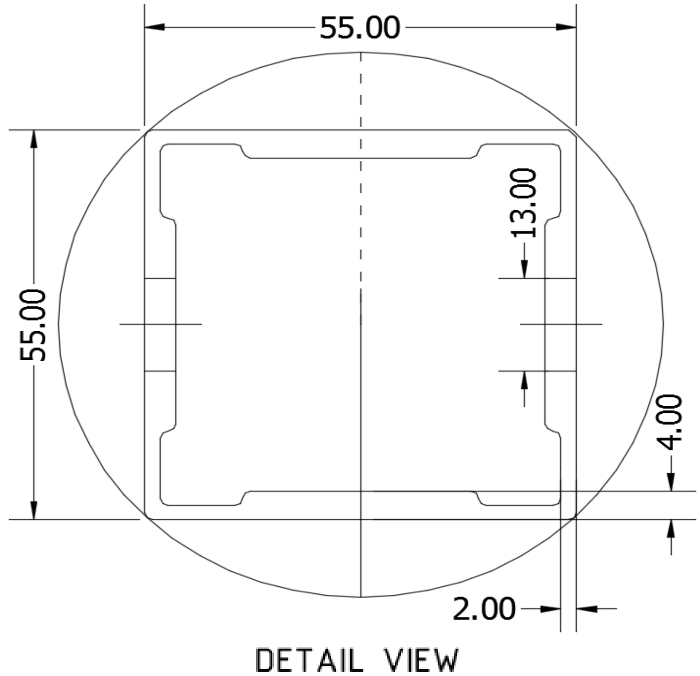
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	104.56	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.00	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.165	k-ft
M_z =	0.000	k-ft
P_n =	1.927	k
$M_{y\ allowable}$ =	3.422	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	96%	



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).

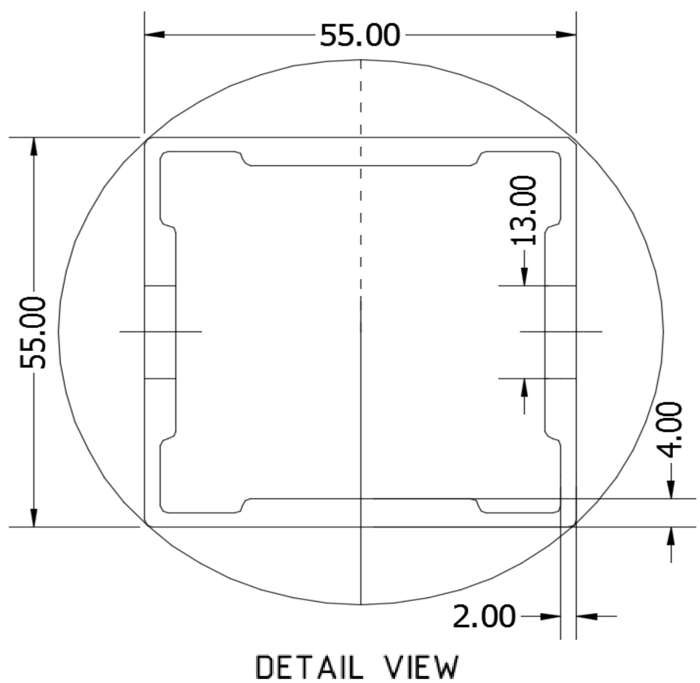
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.426	k-ft
P_n =	0.348	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	32%	



4.4 Diagonal Strut Design

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

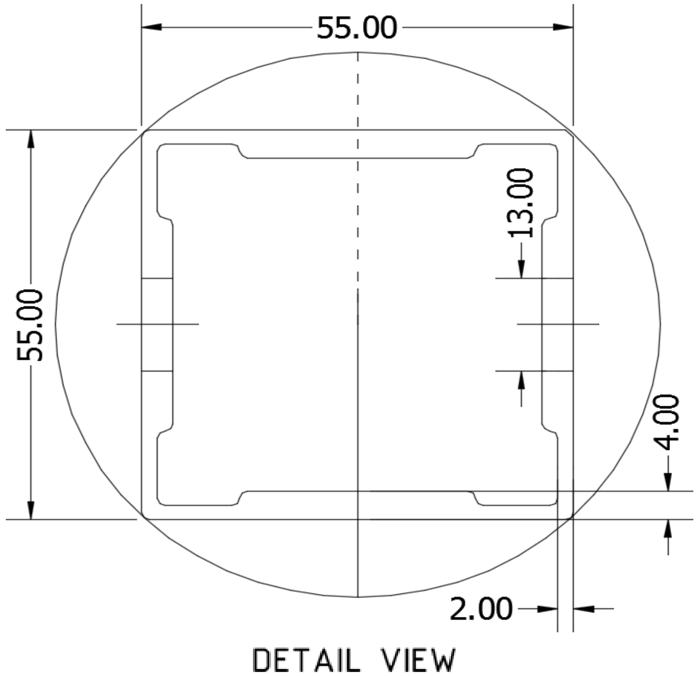
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	98.03	in
$\Phi F_{ty\ AXIAL}$ =	6.11	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.012	k-ft
M_z =	0.000	k-ft
P_n =	2.731	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	6.000	k
Utilization =	46%	



4.5 Rear Strut Design

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

Strut Type =	55x55	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	78.35	in
$\Phi F_{ty\ AXIAL}$ =	8.88	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	-0.012	k-ft
M_z =	0.000	k-ft
P_n =	3.187	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	8.726	k
Utilization =	37%	



5. FOUNDATION DESIGN CALCULATIONS

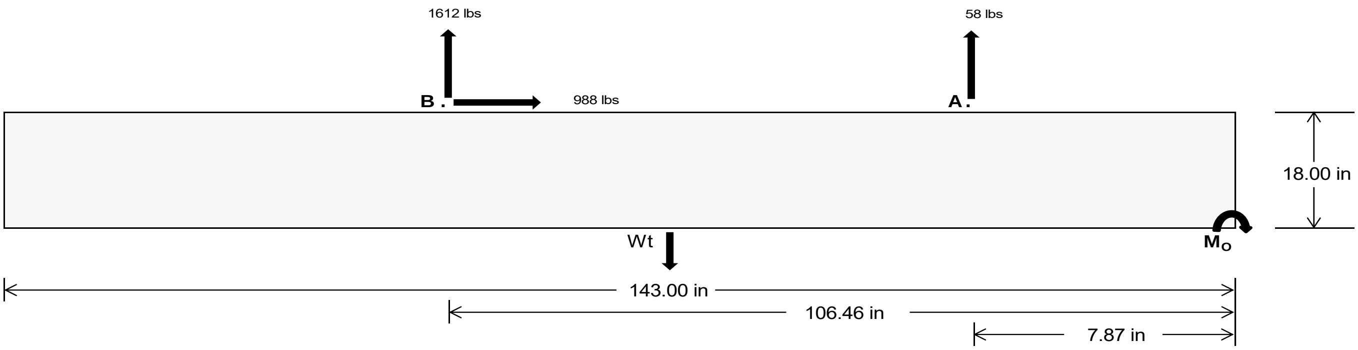
5.1 Helical Pile Foundations

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

Maximum	Front	Rear	
Tensile Load =	266.96	6994.15	k
Compressive Load =	3110.08	4995.82	k
Lateral Load =	293.97	4281.29	k
Moment (Weak Axis) =	0.56	0.19	k

5.2 Design of Ballast Foundations

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



Concrete Properties

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

Footing Reinforcement

Use fiber reinforcing with (2) #5 rebar.

Overturning Check

M_O = 189808.4 in-lbs
Resisting Force Required = 2654.66 lbs
S.F. = 1.67
Weight Required = 4424.44 lbs
Minimum Width = 35 in in
Weight Provided = 7559.64 lbs

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

Sliding

Force = 988.38 lbs
Friction = 0.4
Weight Required = 2470.95 lbs
Resisting Weight = 7559.64 lbs
Additional Weight Required = 0 lbs

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

Cohesion

Sliding Force = 988.38 lbs
Cohesion = 130 psf
Area = 34.76 ft^2
Resisting = 3779.82 lbs
Additional Weight Required = 0 lbs

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

Shear Key

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

Shear key is not required.

Bearing Pressure

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

ASD LC	1.0D + 1.0S				1.0D + 0.6W				1.0D + 0.75L + 0.45W + 0.75S				0.6D + 0.6W			
Width	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in
F_A	878 lbs	878 lbs	878 lbs	878 lbs	1282 lbs	1282 lbs	1282 lbs	1282 lbs	1525 lbs	1525 lbs	1525 lbs	1525 lbs	-116 lbs	-116 lbs	-116 lbs	-116 lbs
F_B	844 lbs	844 lbs	844 lbs	844 lbs	2157 lbs	2157 lbs	2157 lbs	2157 lbs	2159 lbs	2159 lbs	2159 lbs	2159 lbs	-3223 lbs	-3223 lbs	-3223 lbs	-3223 lbs
F_V	97 lbs	97 lbs	97 lbs	97 lbs	1767 lbs	1767 lbs	1767 lbs	1767 lbs	1388 lbs	1388 lbs	1388 lbs	1388 lbs	-1977 lbs	-1977 lbs	-1977 lbs	-1977 lbs
P_{total}	9281 lbs	9497 lbs	9713 lbs	9929 lbs	10999 lbs	11215 lbs	11431 lbs	11647 lbs	11244 lbs	11460 lbs	11676 lbs	11892 lbs	1197 lbs	1326 lbs	1456 lbs	1586 lbs
M	2343 lbs-ft	2343 lbs-ft	2343 lbs-ft	2343 lbs-ft	3167 lbs-ft	3167 lbs-ft	3167 lbs-ft	3167 lbs-ft	3879 lbs-ft	3879 lbs-ft	3879 lbs-ft	3879 lbs-ft	5809 lbs-ft	5809 lbs-ft	5809 lbs-ft	5809 lbs-ft
e	0.25 ft	0.25 ft	0.24 ft	0.24 ft	0.29 ft	0.28 ft	0.28 ft	0.27 ft	0.35 ft	0.34 ft	0.33 ft	0.33 ft	4.85 ft	4.38 ft	3.99 ft	3.66 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}	233.1 psf	232.7 psf	232.3 psf	231.9 psf	270.6 psf	269.1 psf	267.7 psf	266.4 psf	267.3 psf	265.9 psf	264.6 psf	263.4 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	301.0 psf	298.7 psf	296.5 psf	294.4 psf	362.3 psf	358.3 psf	354.5 psf	350.9 psf	379.7 psf	375.2 psf	370.9 psf	366.9 psf	247.8 psf	186.7 psf	159.9 psf	145.5 psf

Maximum Bearing Pressure = 380 psf
Allowable Bearing Pressure = 1500 psf

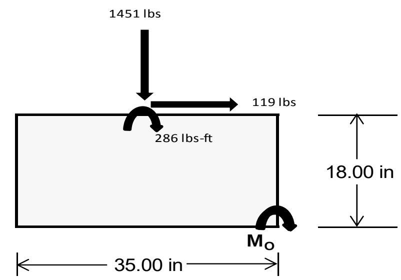
Use a 143in long x 35in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O = 1651.4 ft-lbs
Resisting Force Required = 1132.38 lbs
S.F. = 1.67
Weight Required = 1887.29 lbs
Minimum Width = 35 in in
Weight Provided = 7559.64 lbs

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



Bearing Pressure

ASD LC	1.238D + 0.875E			1.1785D + 0.65625E + 0.75S			0.362D + 0.875E		
Width	35 in			35 in			35 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	276 lbs	462 lbs	137 lbs	622 lbs	1451 lbs	516 lbs	129 lbs	135 lbs	-9 lbs
F_V	165 lbs	161 lbs	168 lbs	122 lbs	119 lbs	129 lbs	166 lbs	162 lbs	167 lbs
P_{total}	9635 lbs	9820 lbs	9496 lbs	9531 lbs	10360 lbs	9425 lbs	2866 lbs	2872 lbs	2728 lbs
M	629 lbs-ft	616 lbs-ft	637 lbs-ft	468 lbs-ft	465 lbs-ft	492 lbs-ft	629 lbs-ft	615 lbs-ft	631 lbs-ft
e	0.07 ft	0.06 ft	0.07 ft	0.05 ft	0.04 ft	0.05 ft	0.22 ft	0.21 ft	0.23 ft
L/6	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft
f_{min}	240.0 psf	246.1 psf	235.5 psf	246.5 psf	270.6 psf	242.1 psf	45.3 psf	46.2 psf	41.1 psf
f_{max}	314.4 psf	319.0 psf	310.9 psf	301.9 psf	325.6 psf	300.3 psf	119.7 psf	119.0 psf	115.9 psf

Maximum Bearing Pressure = 326 psf
Allowable Bearing Pressure = 1500 psf

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

Foundation Requirements: 143in long x 36in wide x 18in tall ballast foundation and fiber reinforcing with (3) #5 rebar.

5.3 Foundation Anchors

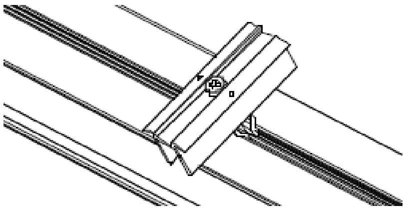
Threaded rods are anchored to the the ballast foundations using the Simpson AT-XP epoxy solution. LRFD load results are compared to the allowable strengths of the epoxy solution. Please see the supplementary calculations provided by the Simpson Anchor Designer software.

6. DESIGN OF JOINTS AND CONNECTIONS

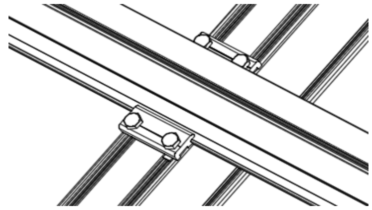
6.1 Anchorage of Modules to Purlins and Connection of Purlins to Girders

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

Fastening of Modules to Purlins		
Maximum Uplifting Force =	1.163	k
Allowable Uplift =	1.214	k
Utilization =	96%	



Fastening of Purlins to Girders		
Maximum Uplifting Force =	2.609	k
Allowable Uplift =	4.357	k
Utilization =	60%	



6.2 Strut Connections

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

Front Strut		
Maximum Axial Load =	2.392	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	32%	

Rear Strut		
Maximum Axial Load =	4.714	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	64%	

Diagonal Strut		
Maximum Axial Load =	2.888	k
M12 Bolt Shear Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	39%	

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

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

7. SEISMIC DESIGN

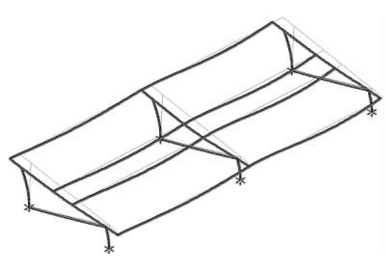
7.1 Seismic Drift

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

Mean Height, h_{sx} =	60.93	in
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$	
	1.219	in
Max Drift, Δ_{MAX} =	0.527	in

$0.527 \leq 1.219$, OK.

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



APPENDIX A

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

Purlin = **S1.5**

Strong Axis:		Weak Axis:	
3.4.14		**3.4.14**	
L_b =	75 in	L_b =	75
J =	0.432	J =	0.432
	207.485		131.948
$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$		$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$	
S1 =	0.51461	S1 =	0.51461
$S2 = \left(\frac{C_c}{1.6}\right)^2$		$S2 = \left(\frac{C_c}{1.6}\right)^2$	
S2 =	1701.56	S2 =	1701.56
φF_L=	φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]	φF_L=	φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L=	28.7 ksi	φF_L=	29.6
3.4.16		**3.4.16**	
b/t =	32.195	b/t =	37.0588
$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$		$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$	
S1 =	12.2	S1 =	12.2
$S2 = \frac{k_1 Bp}{1.6Dp}$		$S2 = \frac{k_1 Bp}{1.6Dp}$	
S2 =	46.7	S2 =	46.7
φF_L=	φb[Bp-1.6Dp*b/t]	φF_L=	φb[Bp-1.6Dp*b/t]
φF_L=	25.1 ksi	φF_L=	23.1 ksi
3.4.16.1	Not Used	**3.4.16.1**	
Rb/t =		N/A for Weak Direction	
$S1 = \left(\frac{Bt - 1.17\frac{\theta_y}{\theta_b}Fcy}{1.6Dt}\right)^2$			
S1 =	1.1		
$S2 = C_t$			
S2 =	141.0		
φF_L=	1.17φyFcy		
φF_L=	38.9 ksi		
3.4.18		**3.4.18**	
h/t =	37.0588	h/t =	32.195
$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$		$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$	
S1 =	36.9	S1 =	36.9
m =	0.65	m =	0.65
C_0 =	40.985	C_0 =	45.5
Cc =	41.015	Cc =	45.5
$S2 = \frac{k_1 Bbr}{mDbr}$		$S2 = \frac{k_1 Bbr}{mDbr}$	
S2 =	77.2	S2 =	77.3
φF_L=	φb[Bbr-mDbr*h/t]	φF_L=	1.3φyFcy
φF_L=	43.2 ksi	φF_L=	43.2 ksi
$\varphi F_L St$=	25.1 ksi	$\varphi F_L Wk$=	23.1 ksi
Ix =	897074 mm^4	Iy =	446476 mm^4
	2.155 in^4		1.073 in^4
y =	41.015 mm	x =	45.5 mm
Sx =	1.335 in^3	Sy =	0.599 in^3
$M_{max}St$ =	2.788 k-ft	$M_{max}Wk$ =	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

$\varphi F_L St$ = 29.0 ksi

Ix = 984962 mm^4

2.366 in^4

y = 43.717 mm

Sx = 1.375 in^3

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

3.4.18

h/t = 16.2

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

S1 = 36.9

m = 0.65

C_0 = 40

Cc = 40

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

S2 = 77.3

φF_L = 1.3φyFcy

φF_L = 43.2 ksi

$\varphi F_L Wk$ = 33.3 ksi

Iy = 923544 mm^4

2.219 in^4

x = 40 mm

Sy = 1.409 in^3

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

Compression

3.4.9

b/t = 16.2

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L = φc[Bp-1.6Dp*b/t]

φF_L = 31.6 ksi

b/t = 7.4

S1 = 12.21

S2 = 32.70

φF_L = φyFcy

φF_L = 33.3 ksi

3.4.10

Rb/t = 18.1

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

S1 = 6.87

S2 = 131.3

φF_L = φc[Bt-Dt*√(Rb/t)]

φF_L = 31.09 ksi

φF_L = 31.09 ksi

A = 1215.13 mm^2

1.88 in^2

P_{max} = 58.55 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 24.8 in

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

Weak Axis:

3.4.14

L_b = 24.8

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 0.57371

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.87952

φF_L= φcc(Bc-Dc*λ)

φF_L= 28.0279 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

φF_L= φyFcy

φF_L= 33.25 ksi

φF_L= 28.03 ksi

A = 663.99 mm^2

1.03 in^2

P_{max} = 28.85 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 98.03 in

J = 0.942

152.985

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.4 ksi

Weak Axis:

3.4.14

L_b = 98.03

J = 0.942

152.985

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.4

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in³

M_{max}St = 1.460 k-ft

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in³

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 2.26776

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.89749

φF_L= (φccFcy)/(λ²)

φF_L= 6.10803 ksi

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

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

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

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

Strong Axis:

3.4.14

L_b = 78.35 in
J = 0.942
122.273

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

S1 = 0.51461

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

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

3.4.16

b/t = 24.5

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

S1 = 12.2

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

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

Weak Axis:

3.4.14

L_b = 78.35
J = 0.942
122.273

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

S1 = 0.51461

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

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

3.4.16

b/t = 24.5

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

S1 = 12.2

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

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

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 1.8125

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.83375

φF_L= (φccFcy)/(λ²)

φF_L= 8.88278 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

$\varphi F_L = \varphi y Fcy$

$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 8.88 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 9.14 kips

APPENDIX B

B.1

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

Basic Load Cases

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

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

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

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

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

Member Distributed Loads (BLC 3 : Snow Load)

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

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

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	y	-151.652	-151.652	0	0
2	M14	y	-151.652	-151.652	0	0
3	M15	y	-243.962	-243.962	0	0
4	M16	y	-243.962	-243.962	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	342.866	342.866	0	0
2	M14	y	263.743	263.743	0	0
3	M15	y	145.059	145.059	0	0
4	M16	y	145.059	145.059	0	0

Member Distributed Loads (BLC 6 : Seismic - Lateral)

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

Load Combinations

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

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N8	max	985.239	2	1332.539	2	.341	1	.001	1	0	1	0	1
2		min	-1155.489	3	-1810.425	3	-25.207	5	-.141	4	0	1	0	1
3	N7	max	.016	9	865.176	1	-.528	10	-.001	10	0	1	0	1
4		min	-.289	2	-96.181	5	-226.13	4	-.434	4	0	1	0	1
5	N15	max	.015	9	2392.372	2	0	3	0	3	0	1	0	1
6		min	-2.515	2	-205.351	3	-214.726	4	-.418	4	0	1	0	1
7	N16	max	2977.792	2	3842.94	2	0	11	0	2	0	1	0	1
8		min	-3293.298	3	-5380.118	3	-25.514	5	-.143	4	0	1	0	1
9	N23	max	.035	4	865.176	1	6.587	1	.013	1	0	1	0	1
10		min	-.289	2	-31.479	3	-220.269	5	-.426	4	0	1	0	1
11	N24	max	985.239	2	1332.539	2	-.027	10	0	10	0	1	0	1
12		min	-1155.489	3	-1810.425	3	-25.824	5	-.142	4	0	1	0	1
13	Totals:	max	4945.175	2	10584.388	2	0	3						
14		min	-5604.544	3	-9269.277	3	-734.425	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	51.113	4	418.647	2	-9.567	12	0	15	.138	4	0	4
2			min	2.402	10	-805.491	3	-127.89	1	-.011	3	.007	10	0	3
3		2	max	42.918	4	291.052	2	-8.117	12	0	15	.092	4	.478	3
4			min	2.402	10	-571.155	3	-97.125	1	-.011	3	-.002	10	-.246	2
5		3	max	37.019	1	163.456	2	-6.213	10	0	15	.058	5	.793	3
6			min	2.402	10	-336.82	3	-66.361	1	-.011	3	-.032	1	-.404	2
7		4	max	37.019	1	35.86	2	-2.273	10	0	15	.034	5	.946	3
8			min	2.402	10	-102.485	3	-43.018	4	-.011	3	-.067	1	-.473	2
9		5	max	37.019	1	131.85	3	1.667	10	0	15	.011	5	.936	3
10			min	2.402	10	-91.736	2	-33.696	4	-.011	3	-.081	1	-.454	2
11		6	max	37.019	1	366.185	3	25.933	1	0	15	-.006	12	.763	3
12			min	.549	15	-219.331	2	-29.499	5	-.011	3	-.074	1	-.346	2
13		7	max	37.019	1	600.521	3	56.698	1	0	15	-.003	10	.427	3
14			min	-7.276	5	-346.927	2	-27.293	5	-.011	3	-.045	1	-.149	2
15		8	max	37.019	1	834.856	3	87.463	1	0	15	.009	2	.136	2
16			min	-15.471	5	-474.523	2	-25.086	5	-.011	3	-.049	4	-.071	3
17		9	max	37.019	1	1069.191	3	118.227	1	0	15	.076	1	.51	2
18			min	-23.666	5	-602.119	2	-22.88	5	-.011	3	-.065	5	-.733	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	46.257	4	1303.526	3	96.485	9	.01	2	.169	1	.972	2
20			min	2.402	10	-729.714	2	-148.992	1	-.011	3	-.008	3	-1.556	3
21		11	max	38.062	4	602.119	2	-2.03	12	.011	3	.092	4	.51	2
22			min	2.402	10	-1069.191	3	-118.227	1	0	15	-.01	3	-.733	3
23		12	max	37.019	1	474.523	2	-.31	3	.011	3	.049	4	.136	2
24			min	2.402	10	-834.856	3	-87.463	1	0	15	-.011	3	-.071	3
25		13	max	37.019	1	346.927	2	1.864	3	.011	3	.023	5	.427	3
26			min	2.402	10	-600.521	3	-56.698	1	0	15	-.045	1	-.149	2
27		14	max	37.019	1	219.331	2	4.039	3	.011	3	0	15	.763	3
28			min	2.402	10	-366.185	3	-38.793	4	0	15	-.074	1	-.346	2
29		15	max	37.019	1	91.736	2	6.213	3	.011	3	-.003	12	.936	3
30			min	-3.632	5	-131.85	3	-30.706	5	0	15	-.081	1	-.454	2
31		16	max	37.019	1	102.485	3	35.596	1	.011	3	0	3	.946	3
32			min	-11.827	5	-35.86	2	-28.5	5	0	15	-.067	1	-.473	2
33		17	max	37.019	1	336.82	3	66.361	1	.011	3	.007	3	.793	3
34			min	-20.022	5	-163.456	2	-26.293	5	0	15	-.07	4	-.404	2
35		18	max	37.019	1	571.155	3	97.125	1	.011	3	.025	1	.478	3
36			min	-28.216	5	-291.052	2	-24.087	5	0	15	-.08	5	-.246	2
37		19	max	37.019	1	805.491	3	127.89	1	.011	3	.103	1	0	2
38			min	-36.411	5	-418.647	2	-21.881	5	0	15	-.096	5	0	3
39	M14	1	max	29.74	4	524.837	2	-10.032	12	.016	3	.213	4	0	2
40			min	2.189	10	-683.757	3	-134.353	1	-.016	2	.009	10	0	3
41		2	max	27.25	1	397.241	2	-8.582	12	.016	3	.15	4	.413	3
42			min	2.189	10	-504.369	3	-103.589	1	-.016	2	0	10	-.32	2
43		3	max	27.25	1	269.646	2	-6.856	10	.016	3	.094	5	.701	3
44			min	2.189	10	-324.98	3	-76.841	4	-.016	2	-.014	1	-.552	2
45		4	max	27.25	1	142.05	2	-2.916	10	.016	3	.054	5	.864	3
46			min	-1.299	5	-145.591	3	-67.519	4	-.016	2	-.054	1	-.695	2
47		5	max	27.25	1	33.797	3	1.024	10	.016	3	.016	5	.903	3
48			min	-9.493	5	-.507	9	-58.196	4	-.016	2	-.073	1	-.749	2
49		6	max	27.25	1	213.186	3	19.47	1	.016	3	-.005	12	.817	3
50			min	-17.688	5	-113.141	2	-52.164	5	-.016	2	-.07	1	-.715	2
51		7	max	27.25	1	392.575	3	50.235	1	.016	3	-.003	10	.607	3
52			min	-25.883	5	-240.737	2	-49.958	5	-.016	2	-.069	4	-.592	2
53		8	max	27.25	1	571.963	3	80.999	1	.016	3	.006	2	.272	3
54			min	-34.078	5	-368.333	2	-47.751	5	-.016	2	-.093	4	-.38	2
55		9	max	27.25	1	751.352	3	111.764	1	.016	3	.067	1	.003	9
56			min	-42.273	5	-495.929	2	-45.545	5	-.016	2	-.123	5	-.188	3
57		10	max	60.835	4	930.741	3	142.529	1	.016	2	.211	4	.308	2
58			min	2.189	10	-623.524	2	-104.414	14	-.016	3	-.008	3	-.772	3
59		11	max	52.64	4	495.929	2	-1.565	12	.016	2	.148	4	.003	9
60			min	2.189	10	-751.352	3	-111.764	1	-.016	3	-.01	3	-.188	3
61		12	max	44.446	4	368.333	2	.412	3	.016	2	.09	4	.272	3
62			min	2.189	10	-571.963	3	-80.999	1	-.016	3	-.011	3	-.38	2
63		13	max	36.251	4	240.737	2	2.586	3	.016	2	.05	5	.607	3
64			min	2.189	10	-392.575	3	-68.598	4	-.016	3	-.046	1	-.592	2
65		14	max	28.056	4	113.141	2	4.76	3	.016	2	.011	5	.817	3
66			min	2.189	10	-213.186	3	-59.276	4	-.016	3	-.07	1	-.715	2
67		15	max	27.25	1	.507	9	11.295	1	.016	2	-.002	12	.903	3
68			min	2.189	10	-33.797	3	-52.421	5	-.016	3	-.073	1	-.749	2
69		16	max	27.25	1	145.591	3	42.059	1	.016	2	.002	3	.864	3
70			min	2.189	10	-142.05	2	-50.215	5	-.016	3	-.074	4	-.695	2
71		17	max	27.25	1	324.98	3	72.824	1	.016	2	.009	3	.701	3
72			min	-3.263	5	-269.646	2	-48.008	5	-.016	3	-.099	4	-.552	2
73		18	max	27.25	1	504.369	3	103.589	1	.016	2	.047	1	.413	3
74			min	-11.458	5	-397.241	2	-45.802	5	-.016	3	-.128	5	-.32	2
75		19	max	27.25	1	683.757	3	134.353	1	.016	2	.13	1	0	2

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
76			min	-19.653	5	-524.837	2	-43.595	5	-.016	3	-.159	5	0	3
77	M15	1	max	69.279	5	741.519	2	-9.712	12	.017	2	.277	4	0	2
78			min	-28.227	1	-406.916	3	-134.415	1	-.013	3	.009	10	0	3
79		2	max	61.084	5	549.819	2	-8.263	12	.017	2	.2	4	.249	3
80			min	-28.227	1	-309.947	3	-106.258	4	-.013	3	0	10	-.448	2
81		3	max	52.889	5	358.119	2	-6.813	12	.017	2	.131	5	.43	3
82			min	-28.227	1	-212.977	3	-96.936	4	-.013	3	-.014	1	-.764	2
83		4	max	44.694	5	166.419	2	-3.077	10	.017	2	.077	5	.545	3
84			min	-28.227	1	-116.008	3	-87.614	4	-.013	3	-.054	1	-.946	2
85		5	max	36.5	5	-.044	15	.863	10	.017	2	.024	5	.592	3
86			min	-28.227	1	-25.281	2	-78.291	4	-.013	3	-.073	1	-.995	2
87		6	max	28.305	5	77.93	3	19.408	1	.017	2	-.005	12	.571	3
88			min	-28.227	1	-216.981	2	-72.206	5	-.013	3	-.07	1	-.911	2
89		7	max	20.11	5	174.899	3	50.172	1	.017	2	-.003	10	.483	3
90			min	-28.227	1	-408.68	2	-70	5	-.013	3	-.088	4	-.693	2
91		8	max	11.915	5	271.869	3	80.937	1	.017	2	.006	2	.328	3
92			min	-28.227	1	-600.38	2	-67.793	5	-.013	3	-.126	4	-.343	2
93		9	max	3.72	5	368.838	3	111.702	1	.017	2	.067	1	.14	2
94			min	-28.227	1	-792.08	2	-65.587	5	-.013	3	-.17	5	0	15
95		10	max	-1.813	10	465.807	3	142.466	1	.013	3	.272	4	.757	2
96			min	-28.227	1	-983.78	2	-116.702	4	-.017	2	-.007	3	-.184	3
97		11	max	-1.813	10	792.08	2	-1.885	12	.013	3	.195	4	.14	2
98			min	-28.227	1	-368.838	3	-111.702	1	-.017	2	-.009	3	0	15
99		12	max	-1.813	10	600.38	2	-.119	3	.013	3	.123	4	.328	3
100			min	-28.227	1	-271.869	3	-98.058	4	-.017	2	-.01	3	-.343	2
101		13	max	-1.813	10	408.68	2	2.055	3	.013	3	.069	5	.483	3
102			min	-32.43	4	-174.899	3	-88.735	4	-.017	2	-.046	1	-.693	2
103		14	max	-1.813	10	216.981	2	4.23	3	.013	3	.016	5	.571	3
104			min	-40.625	4	-77.93	3	-79.413	4	-.017	2	-.07	1	-.911	2
105		15	max	-1.813	10	25.281	2	11.357	1	.013	3	-.002	12	.592	3
106			min	-48.82	4	.045	15	-72.467	5	-.017	2	-.073	1	-.995	2
107		16	max	-1.813	10	116.008	3	42.121	1	.013	3	.002	3	.545	3
108			min	-57.015	4	-166.419	2	-70.261	5	-.017	2	-.097	4	-.946	2
109		17	max	-1.813	10	212.977	3	72.886	1	.013	3	.008	3	.43	3
110			min	-65.209	4	-358.119	2	-68.055	5	-.017	2	-.136	4	-.764	2
111		18	max	-1.813	10	309.947	3	103.651	1	.013	3	.047	1	.249	3
112			min	-73.404	4	-549.819	2	-65.848	5	-.017	2	-.179	5	-.448	2
113		19	max	-1.813	10	406.916	3	134.415	1	.013	3	.13	1	0	2
114			min	-81.599	4	-741.519	2	-63.642	5	-.017	2	-.224	5	0	3
115	M16	1	max	63.502	5	642.574	2	-8.583	12	.003	1	.192	4	0	2
116			min	-42.288	1	-312.804	3	-128.653	1	-.011	3	.008	10	0	3
117		2	max	55.307	5	450.875	2	-7.133	12	.003	1	.134	4	.184	3
118			min	-42.288	1	-215.835	3	-97.888	1	-.011	3	0	10	-.38	2
119		3	max	47.112	5	259.175	2	-5.683	12	.003	1	.089	5	.3	3
120			min	-42.288	1	-118.866	3	-68.818	4	-.011	3	-.03	1	-.626	2
121		4	max	38.918	5	67.475	2	-2.843	10	.003	1	.053	5	.349	3
122			min	-42.288	1	-21.897	3	-59.496	4	-.011	3	-.066	1	-.74	2
123		5	max	30.723	5	75.073	3	1.097	10	.003	1	.019	5	.33	3
124			min	-42.288	1	-124.225	2	-50.174	4	-.011	3	-.081	1	-.72	2
125		6	max	22.528	5	172.042	3	25.17	1	.003	1	-.005	12	.244	3
126			min	-42.288	1	-315.925	2	-45.783	5	-.011	3	-.074	1	-.567	2
127		7	max	14.333	5	269.011	3	55.935	1	.003	1	-.004	10	.091	3
128			min	-42.288	1	-507.625	2	-43.576	5	-.011	3	-.056	4	-.281	2
129		8	max	6.139	5	365.98	3	86.699	1	.003	1	.007	2	.138	2
130			min	-42.288	1	-699.325	2	-41.37	5	-.011	3	-.075	4	-.129	3
131		9	max	-1.329	15	462.949	3	117.464	1	.003	1	.074	1	.69	2
132			min	-42.288	1	-891.025	2	-39.164	5	-.011	3	-.102	5	-.417	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
133		10	max	-3.28	10	612.714	10	148.229	1	.011	3	.19	4	1.375	2
134			min	-42.288	1	-1082.725	2	-104.704	14	-.003	1	-.002	3	-.772	3
135		11	max	-2.795	15	891.025	2	-3.014	12	.011	3	.129	4	.69	2
136			min	-42.288	1	-462.949	3	-117.464	1	-.003	1	-.006	3	-.417	3
137		12	max	-3.28	10	699.325	2	-1.565	12	.011	3	.075	4	.138	2
138			min	-42.288	1	-365.98	3	-86.699	1	-.003	1	-.008	3	-.129	3
139		13	max	-3.28	10	507.625	2	.225	3	.011	3	.037	5	.091	3
140			min	-42.288	1	-269.011	3	-64.416	4	-.003	1	-.046	1	-.281	2
141		14	max	-3.28	10	315.925	2	2.399	3	.011	3	.003	5	.244	3
142			min	-42.288	1	-172.042	3	-55.094	4	-.003	1	-.074	1	-.567	2
143		15	max	-3.28	10	124.225	2	5.594	1	.011	3	-.003	12	.33	3
144			min	-47.777	4	-75.073	3	-46.961	5	-.003	1	-.081	1	-.72	2
145		16	max	-3.28	10	21.897	3	36.359	1	.011	3	-.001	12	.349	3
146			min	-55.972	4	-67.475	2	-44.755	5	-.003	1	-.078	4	-.74	2
147		17	max	-3.28	10	118.866	3	67.124	1	.011	3	.004	3	.3	3
148			min	-64.166	4	-259.175	2	-42.548	5	-.003	1	-.1	4	-.626	2
149		18	max	-3.28	10	215.835	3	97.888	1	.011	3	.027	1	.184	3
150			min	-72.361	4	-450.875	2	-40.342	5	-.003	1	-.122	5	-.38	2
151		19	max	-3.28	10	312.804	3	128.653	1	.011	3	.105	1	0	2
152			min	-80.556	4	-642.574	2	-38.136	5	-.003	1	-.149	5	0	5
153	M2	1	max	1103.186	2	2.063	4	.203	1	0	3	0	3	0	1
154			min	-1581.815	3	.501	15	-18.472	4	0	4	0	2	0	1
155		2	max	1103.715	2	1.992	4	.203	1	0	3	0	1	0	15
156			min	-1581.418	3	.484	15	-18.933	4	0	4	-.007	4	0	4
157		3	max	1104.244	2	1.921	4	.203	1	0	3	0	1	0	15
158			min	-1581.021	3	.468	15	-19.394	4	0	4	-.014	4	-.001	4
159		4	max	1104.774	2	1.85	4	.203	1	0	3	0	1	0	15
160			min	-1580.624	3	.451	15	-19.855	4	0	4	-.021	4	-.002	4
161		5	max	1105.303	2	1.779	4	.203	1	0	3	0	1	0	15
162			min	-1580.227	3	.434	15	-20.317	4	0	4	-.028	4	-.003	4
163		6	max	1105.832	2	1.708	4	.203	1	0	3	0	1	0	15
164			min	-1579.83	3	.418	15	-20.778	4	0	4	-.035	4	-.003	4
165		7	max	1106.362	2	1.637	4	.203	1	0	3	0	1	0	15
166			min	-1579.433	3	.401	15	-21.239	4	0	4	-.043	4	-.004	4
167		8	max	1106.891	2	1.566	4	.203	1	0	3	0	1	-.001	15
168			min	-1579.036	3	.384	15	-21.7	4	0	4	-.05	4	-.005	4
169		9	max	1107.42	2	1.495	4	.203	1	0	3	0	1	-.001	15
170			min	-1578.639	3	.367	15	-22.161	4	0	4	-.058	4	-.005	4
171		10	max	1107.949	2	1.424	4	.203	1	0	3	0	1	-.001	15
172			min	-1578.242	3	.346	12	-22.623	4	0	4	-.066	4	-.006	4
173		11	max	1108.479	2	1.352	4	.203	1	0	3	0	1	-.001	15
174			min	-1577.845	3	.318	12	-23.084	4	0	4	-.075	4	-.006	4
175		12	max	1109.008	2	1.281	4	.203	1	0	3	0	1	-.002	15
176			min	-1577.448	3	.29	12	-23.545	4	0	4	-.083	4	-.007	4
177		13	max	1109.537	2	1.21	4	.203	1	0	3	0	1	-.002	15
178			min	-1577.052	3	.262	12	-24.006	4	0	4	-.091	4	-.007	4
179		14	max	1110.067	2	1.139	4	.203	1	0	3	0	1	-.002	15
180			min	-1576.655	3	.235	12	-24.467	4	0	4	-.1	4	-.007	4
181		15	max	1110.596	2	1.068	4	.203	1	0	3	.001	1	-.002	15
182			min	-1576.258	3	.207	12	-24.929	4	0	4	-.109	4	-.008	4
183		16	max	1111.125	2	.997	4	.203	1	0	3	.001	1	-.002	15
184			min	-1575.861	3	.179	12	-25.39	4	0	4	-.118	4	-.008	4
185		17	max	1111.654	2	.93	2	.203	1	0	3	.001	1	-.002	15
186			min	-1575.464	3	.152	12	-25.851	4	0	4	-.127	4	-.009	4
187		18	max	1112.184	2	.875	2	.203	1	0	3	.001	1	-.002	15
188			min	-1575.067	3	.124	12	-26.312	4	0	4	-.137	4	-.009	4
189		19	max	1112.713	2	.82	2	.203	1	0	3	.001	1	-.002	12

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
190			min	-1574.67	3	.096	12	-26.774	4	0	4	-.146	4	-.009	4
191	M3	1	max	897.74	2	8.905	4	.956	4	0	10	0	1	.009	4
192			min	-1021.088	3	2.106	15	.014	10	0	4	-.016	4	.002	12
193		2	max	897.569	2	8.036	4	1.561	4	0	10	0	1	.005	2
194			min	-1021.215	3	1.901	15	.014	10	0	4	-.015	4	0	12
195		3	max	897.399	2	7.167	4	2.167	4	0	10	0	1	.002	2
196			min	-1021.343	3	1.697	15	.014	10	0	4	-.014	4	-.001	3
197		4	max	897.229	2	6.298	4	2.772	4	0	10	0	1	0	2
198			min	-1021.471	3	1.493	15	.014	10	0	4	-.013	5	-.003	3
199		5	max	897.058	2	5.43	4	3.377	4	0	10	0	1	0	15
200			min	-1021.599	3	1.289	15	.014	10	0	4	-.012	5	-.004	6
201		6	max	896.888	2	4.561	4	3.982	4	0	10	0	1	-.001	15
202			min	-1021.726	3	1.084	15	.014	10	0	4	-.01	5	-.007	6
203		7	max	896.717	2	3.692	4	4.587	4	0	10	0	1	-.002	15
204			min	-1021.854	3	.88	15	.014	10	0	4	-.008	5	-.009	6
205		8	max	896.547	2	2.823	4	5.192	4	0	10	0	1	-.002	15
206			min	-1021.982	3	.676	15	.014	10	0	4	-.006	5	-.01	6
207		9	max	896.377	2	1.954	4	5.797	4	0	10	0	1	-.003	15
208			min	-1022.11	3	.472	15	.014	10	0	4	-.003	5	-.011	6
209		10	max	896.206	2	1.085	4	6.402	4	0	10	0	1	-.003	15
210			min	-1022.237	3	.263	12	.014	10	0	4	0	5	-.012	6
211		11	max	896.036	2	.327	2	7.007	4	0	10	.003	4	-.003	15
212			min	-1022.365	3	-.138	3	.014	10	0	4	0	10	-.012	6
213		12	max	895.866	2	-.141	15	7.612	4	0	10	.007	4	-.003	15
214			min	-1022.493	3	-.654	6	.014	10	0	4	0	10	-.012	6
215		13	max	895.695	2	-.345	15	8.217	4	0	10	.01	4	-.003	15
216			min	-1022.621	3	-1.523	6	.014	10	0	4	0	10	-.012	6
217		14	max	895.525	2	-.55	15	8.822	4	0	10	.014	4	-.002	15
218			min	-1022.748	3	-2.392	6	.014	10	0	4	0	10	-.011	6
219		15	max	895.355	2	-.754	15	9.427	4	0	10	.019	4	-.002	15
220			min	-1022.876	3	-3.26	6	.014	10	0	4	0	10	-.009	6
221		16	max	895.184	2	-.958	15	10.032	4	0	10	.023	4	-.002	15
222			min	-1023.004	3	-4.129	6	.014	10	0	4	0	10	-.008	6
223		17	max	895.014	2	-1.162	15	10.638	4	0	10	.028	4	-.001	15
224			min	-1023.132	3	-4.998	6	.014	10	0	4	0	10	-.006	6
225		18	max	894.844	2	-1.367	15	11.243	4	0	10	.033	4	0	15
226			min	-1023.26	3	-5.867	6	.014	10	0	4	0	10	-.003	6
227		19	max	894.673	2	-1.571	15	11.848	4	0	10	.039	4	0	1
228			min	-1023.387	3	-6.736	6	.014	10	0	4	0	10	0	1
229	M4	1	max	862.11	1	0	1	-.535	10	0	1	.031	4	0	1
230			min	-97.612	5	0	1	-223.778	4	0	1	0	10	0	1
231		2	max	862.28	1	0	1	-.535	10	0	1	.005	4	0	1
232			min	-97.532	5	0	1	-223.925	4	0	1	0	10	0	1
233		3	max	862.451	1	0	1	-.535	10	0	1	0	12	0	1
234			min	-97.453	5	0	1	-224.073	4	0	1	-.02	4	0	1
235		4	max	862.621	1	0	1	-.535	10	0	1	0	10	0	1
236			min	-97.373	5	0	1	-224.22	4	0	1	-.046	4	0	1
237		5	max	862.791	1	0	1	-.535	10	0	1	0	10	0	1
238			min	-97.294	5	0	1	-224.368	4	0	1	-.072	4	0	1
239		6	max	862.962	1	0	1	-.535	10	0	1	0	10	0	1
240			min	-97.214	5	0	1	-224.516	4	0	1	-.098	4	0	1
241		7	max	863.132	1	0	1	-.535	10	0	1	0	10	0	1
242			min	-97.135	5	0	1	-224.663	4	0	1	-.123	4	0	1
243		8	max	863.302	1	0	1	-.535	10	0	1	0	10	0	1
244			min	-97.055	5	0	1	-224.811	4	0	1	-.149	4	0	1
245		9	max	863.473	1	0	1	-.535	10	0	1	0	10	0	1
246			min	-96.976	5	0	1	-224.959	4	0	1	-.175	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	863.643	1	0	1	-.535	10	0	1	0	10	0	1
248			min	-96.896	5	0	1	-225.106	4	0	1	-.201	4	0	1
249		11	max	863.813	1	0	1	-.535	10	0	1	0	10	0	1
250			min	-96.817	5	0	1	-225.254	4	0	1	-.227	4	0	1
251		12	max	863.984	1	0	1	-.535	10	0	1	0	10	0	1
252			min	-96.737	5	0	1	-225.401	4	0	1	-.253	4	0	1
253		13	max	864.154	1	0	1	-.535	10	0	1	0	10	0	1
254			min	-96.658	5	0	1	-225.549	4	0	1	-.279	4	0	1
255		14	max	864.324	1	0	1	-.535	10	0	1	0	10	0	1
256			min	-96.578	5	0	1	-225.697	4	0	1	-.304	4	0	1
257		15	max	864.495	1	0	1	-.535	10	0	1	0	10	0	1
258			min	-96.499	5	0	1	-225.844	4	0	1	-.33	4	0	1
259		16	max	864.665	1	0	1	-.535	10	0	1	0	10	0	1
260			min	-96.419	5	0	1	-225.992	4	0	1	-.356	4	0	1
261		17	max	864.835	1	0	1	-.535	10	0	1	0	10	0	1
262			min	-96.34	5	0	1	-226.14	4	0	1	-.382	4	0	1
263		18	max	865.006	1	0	1	-.535	10	0	1	0	10	0	1
264			min	-96.26	5	0	1	-226.287	4	0	1	-.408	4	0	1
265		19	max	865.176	1	0	1	-.535	10	0	1	-.001	10	0	1
266			min	-96.181	5	0	1	-226.435	4	0	1	-.434	4	0	1
267	M6	1	max	3177.061	2	2.29	2	0	1	0	1	0	4	0	1
268			min	-4713.517	3	.228	12	-18.673	4	0	5	0	1	0	1
269		2	max	3177.59	2	2.235	2	0	1	0	1	0	1	0	12
270			min	-4713.12	3	.201	12	-19.134	4	0	5	-.007	4	0	2
271		3	max	3178.119	2	2.179	2	0	1	0	1	0	1	0	12
272			min	-4712.723	3	.166	3	-19.595	4	0	5	-.014	4	-.002	2
273		4	max	3178.649	2	2.124	2	0	1	0	1	0	1	0	12
274			min	-4712.326	3	.125	3	-20.056	4	0	5	-.021	4	-.002	2
275		5	max	3179.178	2	2.069	2	0	1	0	1	0	1	0	3
276			min	-4711.929	3	.083	3	-20.518	4	0	5	-.028	4	-.003	2
277		6	max	3179.707	2	2.013	2	0	1	0	1	0	1	0	3
278			min	-4711.532	3	.042	3	-20.979	4	0	5	-.036	4	-.004	2
279		7	max	3180.237	2	1.958	2	0	1	0	1	0	1	0	3
280			min	-4711.135	3	0	3	-21.44	4	0	5	-.043	4	-.005	2
281		8	max	3180.766	2	1.903	2	0	1	0	1	0	1	0	3
282			min	-4710.738	3	-.041	3	-21.901	4	0	5	-.051	4	-.005	2
283		9	max	3181.295	2	1.847	2	0	1	0	1	0	1	0	3
284			min	-4710.341	3	-.083	3	-22.362	4	0	5	-.059	4	-.006	2
285		10	max	3181.824	2	1.792	2	0	1	0	1	0	1	0	3
286			min	-4709.944	3	-.124	3	-22.824	4	0	5	-.067	4	-.007	2
287		11	max	3182.354	2	1.737	2	0	1	0	1	0	1	0	3
288			min	-4709.547	3	-.166	3	-23.285	4	0	5	-.075	4	-.007	2
289		12	max	3182.883	2	1.681	2	0	1	0	1	0	1	0	3
290			min	-4709.15	3	-.207	3	-23.746	4	0	5	-.084	4	-.008	2
291		13	max	3183.412	2	1.626	2	0	1	0	1	0	1	0	3
292			min	-4708.753	3	-.249	3	-24.207	4	0	5	-.092	4	-.008	2
293		14	max	3183.942	2	1.571	2	0	1	0	1	0	1	0	3
294			min	-4708.356	3	-.29	3	-24.669	4	0	5	-.101	4	-.009	2
295		15	max	3184.471	2	1.515	2	0	1	0	1	0	1	0	3
296			min	-4707.959	3	-.332	3	-25.13	4	0	5	-.11	4	-.01	2
297		16	max	3185	2	1.46	2	0	1	0	1	0	1	0	3
298			min	-4707.562	3	-.373	3	-25.591	4	0	5	-.119	4	-.01	2
299		17	max	3185.529	2	1.405	2	0	1	0	1	0	1	0	3
300			min	-4707.165	3	-.415	3	-26.052	4	0	5	-.128	4	-.011	2
301		18	max	3186.059	2	1.349	2	0	1	0	1	0	1	0	3
302			min	-4706.768	3	-.456	3	-26.513	4	0	5	-.138	4	-.011	2
303		19	max	3186.588	2	1.294	2	0	1	0	1	0	1	0	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
304			min	-4706.371	3	-.498	3	-26.975	4	0	5	-.147	4	-.012	2
305	M7	1	max	2731.012	2	8.894	6	.621	4	0	1	0	1	.012	2
306			min	-2886.101	3	2.089	15	0	1	0	4	-.016	4	0	3
307		2	max	2730.842	2	8.025	6	1.226	4	0	1	0	1	.008	2
308			min	-2886.229	3	1.885	15	0	1	0	4	-.015	4	-.003	3
309		3	max	2730.672	2	7.156	6	1.831	4	0	1	0	1	.005	2
310			min	-2886.357	3	1.681	15	0	1	0	4	-.015	4	-.005	3
311		4	max	2730.501	2	6.287	6	2.436	4	0	1	0	1	.002	2
312			min	-2886.485	3	1.476	15	0	1	0	4	-.014	4	-.006	3
313		5	max	2730.331	2	5.418	6	3.042	4	0	1	0	1	0	2
314			min	-2886.612	3	1.272	15	0	1	0	4	-.012	4	-.007	3
315		6	max	2730.161	2	4.549	6	3.647	4	0	1	0	1	-.002	15
316			min	-2886.74	3	1.068	15	0	1	0	4	-.011	4	-.008	3
317		7	max	2729.99	2	3.68	6	4.252	4	0	1	0	1	-.002	15
318			min	-2886.868	3	.864	15	0	1	0	4	-.009	4	-.009	3
319		8	max	2729.82	2	2.812	6	4.857	4	0	1	0	1	-.002	15
320			min	-2886.996	3	.66	15	0	1	0	4	-.007	5	-.01	4
321		9	max	2729.65	2	2.043	2	5.462	4	0	1	0	1	-.003	15
322			min	-2887.123	3	.323	12	0	1	0	4	-.004	5	-.011	4
323		10	max	2729.479	2	1.366	2	6.067	4	0	1	0	1	-.003	15
324			min	-2887.251	3	-.095	3	0	1	0	4	-.002	5	-.012	4
325		11	max	2729.309	2	.689	2	6.672	4	0	1	.001	4	-.003	15
326			min	-2887.379	3	-.602	3	0	1	0	4	0	1	-.012	4
327		12	max	2729.139	2	.012	2	7.277	4	0	1	.005	4	-.003	15
328			min	-2887.507	3	-1.11	3	0	1	0	4	0	1	-.012	4
329		13	max	2728.968	2	-.362	15	7.882	4	0	1	.008	4	-.003	15
330			min	-2887.634	3	-1.618	3	0	1	0	4	0	1	-.012	4
331		14	max	2728.798	2	-.566	15	8.487	4	0	1	.012	4	-.003	15
332			min	-2887.762	3	-2.402	4	0	1	0	4	0	1	-.011	4
333		15	max	2728.627	2	-.77	15	9.092	4	0	1	.016	4	-.002	15
334			min	-2887.89	3	-3.271	4	0	1	0	4	0	1	-.009	4
335		16	max	2728.457	2	-.974	15	9.697	4	0	1	.021	4	-.002	15
336			min	-2888.018	3	-4.14	4	0	1	0	4	0	1	-.008	4
337		17	max	2728.287	2	-1.179	15	10.302	4	0	1	.025	4	-.001	15
338			min	-2888.145	3	-5.008	4	0	1	0	4	0	1	-.006	4
339		18	max	2728.116	2	-1.383	15	10.907	4	0	1	.03	4	0	15
340			min	-2888.273	3	-5.877	4	0	1	0	4	0	1	-.003	4
341		19	max	2727.946	2	-1.587	15	11.513	4	0	1	.036	4	0	1
342			min	-2888.401	3	-6.746	4	0	1	0	4	0	1	0	1
343	M8	1	max	2389.306	2	0	1	0	1	0	1	.029	4	0	1
344			min	-207.651	3	0	1	-214.692	4	0	1	0	1	0	1
345		2	max	2389.477	2	0	1	0	1	0	1	.004	5	0	1
346			min	-207.523	3	0	1	-214.84	4	0	1	0	1	0	1
347		3	max	2389.647	2	0	1	0	1	0	1	0	1	0	1
348			min	-207.395	3	0	1	-214.987	4	0	1	-.021	4	0	1
349		4	max	2389.817	2	0	1	0	1	0	1	0	1	0	1
350			min	-207.267	3	0	1	-215.135	4	0	1	-.045	4	0	1
351		5	max	2389.988	2	0	1	0	1	0	1	0	1	0	1
352			min	-207.14	3	0	1	-215.283	4	0	1	-.07	4	0	1
353		6	max	2390.158	2	0	1	0	1	0	1	0	1	0	1
354			min	-207.012	3	0	1	-215.43	4	0	1	-.095	4	0	1
355		7	max	2390.328	2	0	1	0	1	0	1	0	1	0	1
356			min	-206.884	3	0	1	-215.578	4	0	1	-.12	4	0	1
357		8	max	2390.499	2	0	1	0	1	0	1	0	1	0	1
358			min	-206.756	3	0	1	-215.726	4	0	1	-.144	4	0	1
359		9	max	2390.669	2	0	1	0	1	0	1	0	1	0	1
360			min	-206.629	3	0	1	-215.873	4	0	1	-.169	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	2390.839	2	0	1	0	1	0	1	0	1	0	1
362			min	-206.501	3	0	1	-216.021	4	0	1	-.194	4	0	1
363		11	max	2391.01	2	0	1	0	1	0	1	0	1	0	1
364			min	-206.373	3	0	1	-216.169	4	0	1	-.219	4	0	1
365		12	max	2391.18	2	0	1	0	1	0	1	0	1	0	1
366			min	-206.245	3	0	1	-216.316	4	0	1	-.244	4	0	1
367		13	max	2391.35	2	0	1	0	1	0	1	0	1	0	1
368			min	-206.118	3	0	1	-216.464	4	0	1	-.268	4	0	1
369		14	max	2391.521	2	0	1	0	1	0	1	0	1	0	1
370			min	-205.99	3	0	1	-216.611	4	0	1	-.293	4	0	1
371		15	max	2391.691	2	0	1	0	1	0	1	0	1	0	1
372			min	-205.862	3	0	1	-216.759	4	0	1	-.318	4	0	1
373		16	max	2391.861	2	0	1	0	1	0	1	0	1	0	1
374			min	-205.734	3	0	1	-216.907	4	0	1	-.343	4	0	1
375		17	max	2392.032	2	0	1	0	1	0	1	0	1	0	1
376			min	-205.607	3	0	1	-217.054	4	0	1	-.368	4	0	1
377		18	max	2392.202	2	0	1	0	1	0	1	0	1	0	1
378			min	-205.479	3	0	1	-217.202	4	0	1	-.393	4	0	1
379		19	max	2392.372	2	0	1	0	1	0	1	0	1	0	1
380			min	-205.351	3	0	1	-217.35	4	0	1	-.418	4	0	1
381	M10	1	max	1103.186	2	1.989	6	-.013	10	0	1	0	4	0	1
382			min	-1581.815	3	.451	15	-18.602	4	0	5	0	3	0	1
383		2	max	1103.715	2	1.918	6	-.013	10	0	1	0	10	0	15
384			min	-1581.418	3	.434	15	-19.063	4	0	5	-.007	4	0	6
385		3	max	1104.244	2	1.847	6	-.013	10	0	1	0	10	0	15
386			min	-1581.021	3	.418	15	-19.524	4	0	5	-.014	4	-.001	6
387		4	max	1104.774	2	1.776	6	-.013	10	0	1	0	10	0	15
388			min	-1580.624	3	.401	15	-19.986	4	0	5	-.021	4	-.002	6
389		5	max	1105.303	2	1.705	6	-.013	10	0	1	0	10	0	15
390			min	-1580.227	3	.384	15	-20.447	4	0	5	-.028	4	-.003	6
391		6	max	1105.832	2	1.634	6	-.013	10	0	1	0	10	0	15
392			min	-1579.83	3	.368	15	-20.908	4	0	5	-.035	4	-.003	6
393		7	max	1106.362	2	1.563	6	-.013	10	0	1	0	10	0	15
394			min	-1579.433	3	.351	15	-21.369	4	0	5	-.043	4	-.004	6
395		8	max	1106.891	2	1.492	6	-.013	10	0	1	0	10	0	15
396			min	-1579.036	3	.334	15	-21.831	4	0	5	-.051	4	-.004	6
397		9	max	1107.42	2	1.421	6	-.013	10	0	1	0	10	-.001	15
398			min	-1578.639	3	.318	15	-22.292	4	0	5	-.059	4	-.005	6
399		10	max	1107.949	2	1.35	6	-.013	10	0	1	0	10	-.001	15
400			min	-1578.242	3	.301	15	-22.753	4	0	5	-.067	4	-.005	6
401		11	max	1108.479	2	1.279	6	-.013	10	0	1	0	10	-.001	15
402			min	-1577.845	3	.284	15	-23.214	4	0	5	-.075	4	-.006	6
403		12	max	1109.008	2	1.208	6	-.013	10	0	1	0	10	-.001	15
404			min	-1577.448	3	.268	15	-23.675	4	0	5	-.083	4	-.006	6
405		13	max	1109.537	2	1.152	2	-.013	10	0	1	0	10	-.002	15
406			min	-1577.052	3	.251	15	-24.137	4	0	5	-.092	4	-.007	6
407		14	max	1110.067	2	1.096	2	-.013	10	0	1	0	10	-.002	15
408			min	-1576.655	3	.234	15	-24.598	4	0	5	-.101	4	-.007	6
409		15	max	1110.596	2	1.041	2	-.013	10	0	1	0	10	-.002	15
410			min	-1576.258	3	.207	12	-25.059	4	0	5	-.11	4	-.007	6
411		16	max	1111.125	2	.986	2	-.013	10	0	1	0	10	-.002	15
412			min	-1575.861	3	.179	12	-25.52	4	0	5	-.119	4	-.008	6
413		17	max	1111.654	2	.93	2	-.013	10	0	1	0	10	-.002	15
414			min	-1575.464	3	.152	12	-25.981	4	0	5	-.128	4	-.008	6
415		18	max	1112.184	2	.875	2	-.013	10	0	1	0	10	-.002	15
416			min	-1575.067	3	.124	12	-26.443	4	0	5	-.137	4	-.008	6
417		19	max	1112.713	2	.82	2	-.013	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	-1574.67	3	.096	12	-26.904	4	0	5	-.147	4	-.009	6
419	M11	1	max	897.74	2	8.849	6	.843	4	0	1	0	10	.009	6
420			min	-1021.088	3	2.068	15	-.178	1	0	4	-.016	4	.002	15
421		2	max	897.569	2	7.98	6	1.449	4	0	1	0	10	.005	2
422			min	-1021.215	3	1.863	15	-.178	1	0	4	-.015	4	0	12
423		3	max	897.399	2	7.111	6	2.054	4	0	1	0	10	.002	2
424			min	-1021.343	3	1.659	15	-.178	1	0	4	-.014	4	-.001	3
425		4	max	897.229	2	6.242	6	2.659	4	0	1	0	10	0	2
426			min	-1021.471	3	1.455	15	-.178	1	0	4	-.013	4	-.003	3
427		5	max	897.058	2	5.373	6	3.264	4	0	1	0	10	-.001	15
428			min	-1021.599	3	1.251	15	-.178	1	0	4	-.012	4	-.005	4
429		6	max	896.888	2	4.505	6	3.869	4	0	1	0	10	-.002	15
430			min	-1021.726	3	1.046	15	-.178	1	0	4	-.01	4	-.007	4
431		7	max	896.717	2	3.636	6	4.474	4	0	1	0	10	-.002	15
432			min	-1021.854	3	.842	15	-.178	1	0	4	-.008	4	-.009	4
433		8	max	896.547	2	2.767	6	5.079	4	0	1	0	10	-.003	15
434			min	-1021.982	3	.638	15	-.178	1	0	4	-.006	4	-.01	4
435		9	max	896.377	2	1.898	6	5.684	4	0	1	0	10	-.003	15
436			min	-1022.11	3	.434	15	-.178	1	0	4	-.003	4	-.012	4
437		10	max	896.206	2	1.029	6	6.289	4	0	1	0	10	-.003	15
438			min	-1022.237	3	.229	15	-.178	1	0	4	0	1	-.012	4
439		11	max	896.036	2	.327	2	6.894	4	0	1	.003	5	-.003	15
440			min	-1022.365	3	-.138	3	-.178	1	0	4	0	1	-.012	4
441		12	max	895.866	2	-.179	15	7.499	4	0	1	.006	5	-.003	15
442			min	-1022.493	3	-.71	4	-.178	1	0	4	-.001	1	-.012	4
443		13	max	895.695	2	-.383	15	8.104	4	0	1	.01	5	-.003	15
444			min	-1022.621	3	-1.579	4	-.178	1	0	4	-.001	1	-.012	4
445		14	max	895.525	2	-.588	15	8.709	4	0	1	.014	5	-.003	15
446			min	-1022.748	3	-2.448	4	-.178	1	0	4	-.001	1	-.011	4
447		15	max	895.355	2	-.792	15	9.314	4	0	1	.018	5	-.002	15
448			min	-1022.876	3	-3.317	4	-.178	1	0	4	-.001	1	-.01	4
449		16	max	895.184	2	-.996	15	9.92	4	0	1	.022	5	-.002	15
450			min	-1023.004	3	-4.185	4	-.178	1	0	4	-.001	1	-.008	4
451		17	max	895.014	2	-1.2	15	10.525	4	0	1	.027	5	-.001	15
452			min	-1023.132	3	-5.054	4	-.178	1	0	4	-.001	1	-.006	4
453		18	max	894.844	2	-1.405	15	11.13	4	0	1	.032	5	0	15
454			min	-1023.26	3	-5.923	4	-.178	1	0	4	-.002	1	-.003	4
455		19	max	894.673	2	-1.609	15	11.735	4	0	1	.038	5	0	1
456			min	-1023.387	3	-6.792	4	-.178	1	0	4	-.002	1	0	1
457	M12	1	max	862.11	1	0	1	6.745	1	0	1	.03	5	0	1
458			min	-33.779	3	0	1	-219.481	4	0	1	-.001	1	0	1
459		2	max	862.28	1	0	1	6.745	1	0	1	.005	5	0	1
460			min	-33.651	3	0	1	-219.629	4	0	1	0	1	0	1
461		3	max	862.451	1	0	1	6.745	1	0	1	0	1	0	1
462			min	-33.523	3	0	1	-219.776	4	0	1	-.02	4	0	1
463		4	max	862.621	1	0	1	6.745	1	0	1	.001	1	0	1
464			min	-33.396	3	0	1	-219.924	4	0	1	-.046	4	0	1
465		5	max	862.791	1	0	1	6.745	1	0	1	.002	1	0	1
466			min	-33.268	3	0	1	-220.072	4	0	1	-.071	4	0	1
467		6	max	862.962	1	0	1	6.745	1	0	1	.003	1	0	1
468			min	-33.14	3	0	1	-220.219	4	0	1	-.096	4	0	1
469		7	max	863.132	1	0	1	6.745	1	0	1	.003	1	0	1
470			min	-33.012	3	0	1	-220.367	4	0	1	-.121	4	0	1
471		8	max	863.302	1	0	1	6.745	1	0	1	.004	1	0	1
472			min	-32.884	3	0	1	-220.515	4	0	1	-.147	4	0	1
473		9	max	863.473	1	0	1	6.745	1	0	1	.005	1	0	1
474			min	-32.757	3	0	1	-220.662	4	0	1	-.172	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	863.643	1	0	1	6.745	1	0	1	.006	1	0	1
476			min	-32.629	3	0	1	-220.81	4	0	1	-.197	4	0	1
477		11	max	863.813	1	0	1	6.745	1	0	1	.006	1	0	1
478			min	-32.501	3	0	1	-220.958	4	0	1	-.223	4	0	1
479		12	max	863.984	1	0	1	6.745	1	0	1	.007	1	0	1
480			min	-32.373	3	0	1	-221.105	4	0	1	-.248	4	0	1
481		13	max	864.154	1	0	1	6.745	1	0	1	.008	1	0	1
482			min	-32.246	3	0	1	-221.253	4	0	1	-.273	4	0	1
483		14	max	864.324	1	0	1	6.745	1	0	1	.009	1	0	1
484			min	-32.118	3	0	1	-221.4	4	0	1	-.299	4	0	1
485		15	max	864.495	1	0	1	6.745	1	0	1	.01	1	0	1
486			min	-31.99	3	0	1	-221.548	4	0	1	-.324	4	0	1
487		16	max	864.665	1	0	1	6.745	1	0	1	.01	1	0	1
488			min	-31.862	3	0	1	-221.696	4	0	1	-.35	4	0	1
489		17	max	864.835	1	0	1	6.745	1	0	1	.011	1	0	1
490			min	-31.735	3	0	1	-221.843	4	0	1	-.375	4	0	1
491		18	max	865.006	1	0	1	6.745	1	0	1	.012	1	0	1
492			min	-31.607	3	0	1	-221.991	4	0	1	-.401	4	0	1
493		19	max	865.176	1	0	1	6.745	1	0	1	.013	1	0	1
494			min	-31.479	3	0	1	-222.139	4	0	1	-.426	4	0	1
495	M1	1	max	127.894	1	805.375	3	36.368	5	0	2	.103	1	0	15
496			min	-21.881	5	-417.806	2	-36.975	1	0	3	-.096	5	-.011	3
497		2	max	128.737	1	804.28	3	37.828	5	0	2	.08	1	.25	2
498			min	-21.487	5	-419.265	2	-36.975	1	0	3	-.073	5	-.51	3
499		3	max	660.743	3	580.087	2	21.22	5	0	3	.057	1	.499	2
500			min	-395.961	2	-649.32	3	-36.843	1	0	2	-.049	5	-.993	3
501		4	max	661.375	3	578.628	2	22.681	5	0	3	.034	1	.14	2
502			min	-395.118	2	-650.414	3	-36.843	1	0	2	-.035	5	-.59	3
503		5	max	662.006	3	577.169	2	24.141	5	0	3	.011	1	-.005	15
504			min	-394.276	2	-651.509	3	-36.843	1	0	2	-.021	5	-.219	2
505		6	max	662.638	3	575.71	2	25.601	5	0	3	0	10	.219	3
506			min	-393.434	2	-652.603	3	-36.843	1	0	2	-.012	1	-.577	2
507		7	max	663.27	3	574.251	2	27.061	5	0	3	.011	5	.624	3
508			min	-392.591	2	-653.697	3	-36.843	1	0	2	-.034	1	-.933	2
509		8	max	663.902	3	572.792	2	28.521	5	0	3	.028	5	1.03	3
510			min	-391.749	2	-654.792	3	-36.843	1	0	2	-.057	1	-1.289	2
511		9	max	680.165	3	53.174	2	49.488	5	0	9	.039	1	1.195	3
512			min	-338.38	2	.436	15	-64.123	1	0	3	-.106	5	-1.468	2
513		10	max	680.796	3	51.715	2	50.948	5	0	9	0	10	1.174	3
514			min	-337.538	2	-.01	5	-64.123	1	0	3	-.075	4	-1.501	2
515		11	max	681.428	3	50.256	2	52.409	5	0	9	-.003	10	1.152	3
516			min	-336.695	2	-1.858	4	-64.123	1	0	3	-.052	4	-1.532	2
517		12	max	697.163	3	448.536	3	127.752	5	0	2	.057	1	1.015	3
518			min	-283.078	2	-688.095	2	-35.9	1	0	3	-.215	5	-1.362	2
519		13	max	697.795	3	447.441	3	129.212	5	0	2	.034	1	.737	3
520			min	-282.236	2	-689.554	2	-35.9	1	0	3	-.135	5	-.935	2
521		14	max	698.427	3	446.347	3	130.672	5	0	2	.012	1	.46	3
522			min	-281.393	2	-691.013	2	-35.9	1	0	3	-.055	5	-.507	2
523		15	max	699.059	3	445.253	3	132.132	5	0	2	.027	5	.183	3
524			min	-280.551	2	-692.472	2	-35.9	1	0	3	-.01	1	-.086	1
525		16	max	699.691	3	444.158	3	133.592	5	0	2	.109	5	.353	2
526			min	-279.709	2	-693.931	2	-35.9	1	0	3	-.033	1	-.093	3
527		17	max	700.322	3	443.064	3	135.053	5	0	2	.193	5	.784	2
528			min	-278.866	2	-695.39	2	-35.9	1	0	3	-.055	1	-.368	3
529		18	max	37.742	5	644.783	2	-3.28	10	0	5	.193	5	.398	2
530			min	-129.492	1	-311.881	3	-81.992	4	0	2	-.079	1	-.183	3
531		19	max	38.135	5	643.324	2	-3.28	10	0	5	.149	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	-128.649	1	-312.975	3	-80.532	4	0	2	-.105	1	-.003	1
533	M5	1	max	297.975	1	2607.042	3	69.24	5	0	1	0	1	.022	3
534			min	6.961	12	-1456.254	2	0	1	0	4	-.185	4	0	15
535		2	max	298.818	1	2605.948	3	70.7	5	0	1	0	1	.924	2
536			min	7.382	12	-1457.713	2	0	1	0	4	-.142	4	-1.596	3
537		3	max	1927.206	3	1403.632	2	55.678	4	0	4	0	1	1.798	2
538			min	-1160.048	2	-1747.273	3	0	1	0	1	-.098	4	-3.165	3
539		4	max	1927.838	3	1402.173	2	57.138	4	0	4	0	1	.928	2
540			min	-1159.206	2	-1748.367	3	0	1	0	1	-.063	4	-2.08	3
541		5	max	1928.47	3	1400.714	2	58.598	4	0	4	0	1	.082	1
542			min	-1158.363	2	-1749.462	3	0	1	0	1	-.027	4	-.995	3
543		6	max	1929.102	3	1399.255	2	60.058	4	0	4	.01	4	.091	3
544			min	-1157.521	2	-1750.556	3	0	1	0	1	0	1	-.811	2
545		7	max	1929.733	3	1397.796	2	61.518	4	0	4	.048	4	1.178	3
546			min	-1156.679	2	-1751.65	3	0	1	0	1	0	1	-1.679	2
547		8	max	1930.365	3	1396.337	2	62.979	4	0	4	.086	4	2.265	3
548			min	-1155.836	2	-1752.745	3	0	1	0	1	0	1	-2.546	2
549		9	max	1938.874	3	183.764	2	169.534	4	0	1	0	1	2.613	3
550			min	-1028.487	2	.437	15	0	1	0	1	-.168	4	-2.929	2
551		10	max	1939.506	3	182.304	2	170.994	4	0	1	0	1	2.52	3
552			min	-1027.644	2	-.003	15	0	1	0	1	-.063	4	-3.043	2
553		11	max	1940.138	3	180.845	2	172.455	4	0	1	.044	4	2.426	3
554			min	-1026.802	2	-1.75	6	0	1	0	1	0	1	-3.156	2
555		12	max	1949.703	3	1131.189	3	177.559	4	0	1	0	1	2.116	3
556			min	-899.949	2	-1759.697	2	0	1	0	4	-.303	4	-2.819	2
557		13	max	1950.334	3	1130.094	3	179.019	4	0	1	0	1	1.414	3
558			min	-899.107	2	-1761.156	2	0	1	0	4	-.192	4	-1.727	2
559		14	max	1950.966	3	1129	3	180.479	4	0	1	0	1	.713	3
560			min	-898.264	2	-1762.615	2	0	1	0	4	-.081	4	-.633	2
561		15	max	1951.598	3	1127.906	3	181.939	4	0	1	.032	4	.461	2
562			min	-897.422	2	-1764.074	2	0	1	0	4	0	1	-.002	12
563		16	max	1952.23	3	1126.811	3	183.399	4	0	1	.145	4	1.556	2
564			min	-896.579	2	-1765.534	2	0	1	0	4	0	1	-.687	3
565		17	max	1952.861	3	1125.717	3	184.859	4	0	1	.259	4	2.653	2
566			min	-895.737	2	-1766.993	2	0	1	0	4	0	1	-1.386	3
567		18	max	-9.348	12	2169.2	2	0	1	0	4	.291	4	1.349	2
568			min	-297.307	1	-1119.03	3	-15.641	5	0	1	0	1	-.716	3
569		19	max	-8.926	12	2167.741	2	0	1	0	4	.283	4	.006	1
570			min	-296.465	1	-1120.124	3	-14.181	5	0	1	0	1	-.021	3
571	M9	1	max	127.894	1	805.375	3	51.25	4	0	3	-.007	10	0	15
572			min	9.566	12	-417.806	2	2.401	10	0	4	-.138	4	-.011	3
573		2	max	128.737	1	804.28	3	52.71	4	0	3	-.005	10	.25	2
574			min	9.987	12	-419.265	2	2.401	10	0	4	-.106	4	-.51	3
575		3	max	660.743	3	580.087	2	36.843	1	0	2	-.004	10	.499	2
576			min	-395.961	2	-649.32	3	2.389	10	0	3	-.073	4	-.993	3
577		4	max	661.375	3	578.628	2	37.964	4	0	2	-.002	10	.14	2
578			min	-395.118	2	-650.414	3	2.389	10	0	3	-.05	4	-.59	3
579		5	max	662.006	3	577.169	2	39.424	4	0	2	0	10	-.005	15
580			min	-394.276	2	-651.509	3	2.389	10	0	3	-.025	4	-.219	2
581		6	max	662.638	3	575.71	2	40.885	4	0	2	.012	1	.219	3
582			min	-393.434	2	-652.603	3	2.389	10	0	3	-.004	5	-.577	2
583		7	max	663.27	3	574.251	2	42.345	4	0	2	.034	1	.624	3
584			min	-392.591	2	-653.697	3	2.389	10	0	3	.002	10	-.933	2
585		8	max	663.902	3	572.792	2	43.805	4	0	2	.057	1	1.03	3
586			min	-391.749	2	-654.792	3	2.389	10	0	3	.004	10	-1.289	2
587		9	max	680.165	3	53.174	2	75.322	4	0	3	-.003	10	1.195	3
588			min	-338.38	2	.454	15	4.58	10	0	9	-.122	4	-1.468	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	680.796	3	51.715	2	76.782	4	0	3	0	1	1.174	3
590			min	-337.538	2	.014	15	4.58	10	0	9	-.075	4	-1.501	2
591		11	max	681.428	3	50.256	2	78.242	4	0	3	.04	1	1.152	3
592			min	-336.695	2	-1.73	6	4.58	10	0	9	-.036	5	-1.532	2
593		12	max	697.163	3	448.536	3	143.162	4	0	3	-.004	10	1.015	3
594			min	-283.078	2	-688.095	2	2.765	10	0	2	-.239	4	-1.362	2
595		13	max	697.795	3	447.441	3	144.622	4	0	3	-.003	10	.737	3
596			min	-282.236	2	-689.554	2	2.765	10	0	2	-.15	4	-.935	2
597		14	max	698.427	3	446.347	3	146.083	4	0	3	0	10	.46	3
598			min	-281.393	2	-691.013	2	2.765	10	0	2	-.06	4	-.507	2
599		15	max	699.059	3	445.253	3	147.543	4	0	3	.031	4	.183	3
600			min	-280.551	2	-692.472	2	2.765	10	0	2	0	10	-.086	1
601		16	max	699.691	3	444.158	3	149.003	4	0	3	.123	4	.353	2
602			min	-279.709	2	-693.931	2	2.765	10	0	2	.003	10	-.093	3
603		17	max	700.322	3	443.064	3	150.463	4	0	3	.216	4	.784	2
604			min	-278.866	2	-695.39	2	2.765	10	0	2	.004	10	-.368	3
605		18	max	-9.005	12	644.783	2	42.33	1	0	2	.226	4	.398	2
606			min	-129.492	1	-311.881	3	-65.142	5	0	3	.006	10	-.183	3
607		19	max	-8.583	12	643.324	2	42.33	1	0	2	.192	4	.011	3
608			min	-128.649	1	-312.975	3	-63.682	5	0	3	.008	10	-.003	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	.235	2	.013	3	1.624e-2	2	NC	1	NC	1
2			min	-.548	4	-.082	3	-.008	2	-5.663e-3	3	NC	1	NC	1
3		2	max	0	1	.198	2	.015	3	1.686e-2	2	NC	4	NC	1
4			min	-.548	4	.005	15	-.007	5	-4.991e-3	3	1407.677	3	NC	1
5		3	max	0	1	.171	2	.018	3	1.748e-2	2	NC	4	NC	2
6			min	-.548	4	.004	15	-.009	5	-4.32e-3	3	767.878	3	7775.076	1
7		4	max	0	1	.172	3	.026	1	1.809e-2	2	NC	4	NC	2
8			min	-.548	4	.004	15	-.008	5	-3.649e-3	3	589.878	3	5427.248	1
9		5	max	0	1	.196	3	.029	1	1.871e-2	2	NC	4	NC	2
10			min	-.548	4	.004	15	-.006	10	-2.977e-3	3	540.423	3	4848.071	1
11		6	max	0	1	.187	2	.029	3	1.932e-2	2	NC	4	NC	2
12			min	-.548	4	.004	15	-.007	10	-2.306e-3	3	564.876	3	5334.57	1
13		7	max	0	1	.222	2	.032	3	1.994e-2	2	NC	2	NC	2
14			min	-.548	4	.004	15	-.01	2	-1.634e-3	3	667.077	3	7600.032	1
15		8	max	0	1	.264	2	.034	3	2.055e-2	2	NC	4	NC	1
16			min	-.548	4	.005	15	-.017	2	-9.63e-4	3	890.97	3	6997.863	3
17		9	max	0	1	.299	2	.035	3	2.117e-2	2	NC	4	NC	1
18			min	-.548	4	.006	15	-.023	2	-2.916e-4	3	1303.209	3	6647.928	3
19		10	max	0	1	.315	2	.036	3	2.179e-2	2	NC	4	NC	1
20			min	-.548	4	.006	15	-.025	2	3.798e-4	3	1659.353	3	6547.475	3
21		11	max	0	10	.299	2	.035	3	2.117e-2	2	NC	4	NC	1
22			min	-.548	4	.006	15	-.023	2	-2.916e-4	3	1303.209	3	6647.928	3
23		12	max	0	10	.264	2	.034	3	2.055e-2	2	NC	4	NC	1
24			min	-.548	4	.005	15	-.017	2	-9.63e-4	3	890.97	3	6997.863	3
25		13	max	0	10	.222	2	.032	3	1.994e-2	2	NC	2	NC	2
26			min	-.548	4	.004	15	-.01	2	-1.634e-3	3	667.077	3	7600.032	1
27		14	max	0	10	.187	2	.029	3	1.932e-2	2	NC	4	NC	2
28			min	-.548	4	.003	15	-.007	10	-2.306e-3	3	564.876	3	5334.57	1
29		15	max	0	10	.196	3	.029	1	1.871e-2	2	NC	4	NC	2
30			min	-.548	4	.003	15	-.006	10	-2.977e-3	3	540.423	3	4848.071	1
31		16	max	0	10	.172	3	.026	1	1.809e-2	2	NC	4	NC	2
32			min	-.548	4	.003	15	-.005	10	-3.649e-3	3	589.878	3	5427.248	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	14	1.748e-2	2	NC	4	NC	2
34			min	-.548	4	.003	15	-.004	10	-4.32e-3	3	767.878	3	7722.324	4
35		18	max	0	10	.198	2	.015	3	1.686e-2	2	NC	4	NC	1
36			min	-.548	4	.003	15	-.006	2	-4.991e-3	3	1407.677	3	NC	1
37		19	max	0	10	.235	2	.013	3	1.624e-2	2	NC	1	NC	1
38			min	-.548	4	-.082	3	-.008	2	-5.663e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.511	3	.011	3	8.711e-3	2	NC	1	NC	1
40			min	-.415	4	-.687	2	-.007	2	-7.483e-3	3	NC	1	NC	1
41		2	max	0	1	.664	3	.012	3	9.702e-3	2	NC	5	NC	1
42			min	-.415	4	-.838	2	-.011	5	-8.444e-3	3	976.217	3	NC	1
43		3	max	0	1	.803	3	.015	3	1.069e-2	2	NC	5	NC	1
44			min	-.415	4	-.976	2	-.015	5	-9.406e-3	3	513.842	3	8931.4	5
45		4	max	0	1	.915	3	.02	1	1.168e-2	2	NC	5	NC	2
46			min	-.415	4	-1.094	2	-.011	5	-1.037e-2	3	368.469	2	6836.74	1
47		5	max	0	1	.994	3	.024	1	1.267e-2	2	NC	5	NC	2
48			min	-.415	4	-1.186	2	-.005	10	-1.133e-2	3	300.838	2	5806.964	1
49		6	max	0	1	1.039	3	.025	3	1.367e-2	2	NC	5	NC	2
50			min	-.415	4	-1.249	2	-.007	10	-1.229e-2	3	267.026	2	6181.164	1
51		7	max	0	1	1.053	3	.028	3	1.466e-2	2	NC	15	NC	2
52			min	-.415	4	-1.285	2	-.009	2	-1.325e-2	3	250.916	2	8072.042	14
53		8	max	0	1	1.044	3	.03	3	1.565e-2	2	NC	15	NC	1
54			min	-.415	4	-1.299	2	-.015	2	-1.421e-2	3	245.296	2	7545.728	4
55		9	max	0	1	1.026	3	.031	3	1.664e-2	2	NC	15	NC	1
56			min	-.415	4	-1.298	2	-.021	2	-1.517e-2	3	245.528	2	7552.448	3
57		10	max	0	1	1.015	3	.031	3	1.763e-2	2	NC	15	NC	1
58			min	-.415	4	-1.295	2	-.023	2	-1.613e-2	3	246.888	2	7415.953	3
59		11	max	0	10	1.026	3	.031	3	1.664e-2	2	NC	15	NC	1
60			min	-.415	4	-1.298	2	-.021	2	-1.517e-2	3	245.528	2	7552.448	3
61		12	max	0	10	1.044	3	.03	3	1.565e-2	2	NC	15	NC	1
62			min	-.415	4	-1.299	2	-.015	2	-1.421e-2	3	245.296	2	8020.151	3
63		13	max	0	10	1.053	3	.028	3	1.466e-2	2	NC	15	NC	2
64			min	-.415	4	-1.285	2	-.01	5	-1.325e-2	3	250.916	2	8587.519	1
65		14	max	0	10	1.039	3	.025	3	1.367e-2	2	NC	5	NC	2
66			min	-.415	4	-1.249	2	-.007	10	-1.229e-2	3	267.026	2	6181.164	1
67		15	max	0	10	.994	3	.024	1	1.267e-2	2	NC	5	NC	2
68			min	-.415	4	-1.186	2	-.005	10	-1.133e-2	3	300.838	2	5806.964	1
69		16	max	0	10	.915	3	.021	14	1.168e-2	2	NC	5	NC	2
70			min	-.415	4	-1.094	2	-.004	10	-1.037e-2	3	368.469	2	6836.74	1
71		17	max	0	10	.803	3	.022	4	1.069e-2	2	NC	5	NC	1
72			min	-.415	4	-.976	2	-.004	10	-9.406e-3	3	513.842	3	6616.698	4
73		18	max	0	10	.664	3	.015	4	9.702e-3	2	NC	5	NC	1
74			min	-.415	4	-.838	2	-.006	2	-8.444e-3	3	976.217	3	9466.264	4
75		19	max	0	10	.511	3	.011	3	8.711e-3	2	NC	1	NC	1
76			min	-.415	4	-.687	2	-.007	2	-7.483e-3	3	NC	1	NC	1
77	M15	1	max	0	10	.521	3	.01	3	6.445e-3	3	NC	1	NC	1
78			min	-.342	4	-.685	2	-.007	2	-9.089e-3	2	NC	1	NC	1
79		2	max	0	10	.645	3	.012	3	7.259e-3	3	NC	5	NC	1
80			min	-.342	4	-.861	2	-.017	5	-1.013e-2	2	853.079	2	7821.396	5
81		3	max	0	10	.758	3	.014	3	8.072e-3	3	NC	5	NC	1
82			min	-.342	4	-1.02	2	-.022	5	-1.117e-2	2	447.851	2	6246.21	5
83		4	max	0	10	.856	3	.021	1	8.885e-3	3	NC	5	NC	2
84			min	-.342	4	-1.151	2	-.017	5	-1.222e-2	2	322.419	2	6776.355	1
85		5	max	0	10	.933	3	.025	1	9.698e-3	3	NC	5	NC	2
86			min	-.342	4	-1.245	2	-.006	5	-1.326e-2	2	267.97	2	5748.576	1
87		6	max	0	10	.987	3	.023	3	1.051e-2	3	NC	5	NC	2
88			min	-.342	4	-1.302	2	-.006	10	-1.43e-2	2	243.249	2	6099.596	1
89		7	max	0	10	1.02	3	.026	3	1.132e-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	-.342	4	-1.324	2	-.008	2	-1.535e-2	2	234.7	2	6815.016	4
91		8	max	0	10	1.035	3	.028	3	1.214e-2	3	NC	15	NC	1
92			min	-.342	4	-1.321	2	-.014	2	-1.639e-2	2	236.049	2	5962.359	4
93		9	max	0	10	1.037	3	.029	3	1.295e-2	3	NC	15	NC	1
94			min	-.342	4	-1.304	2	-.019	2	-1.743e-2	2	242.284	2	8035.387	4
95		10	max	0	1	1.035	3	.029	3	1.376e-2	3	NC	5	NC	1
96			min	-.342	4	-1.294	2	-.022	2	-1.847e-2	2	246.486	2	8042.794	3
97		11	max	0	1	1.037	3	.029	3	1.295e-2	3	NC	15	NC	1
98			min	-.342	4	-1.304	2	-.019	2	-1.743e-2	2	242.284	2	8177.61	3
99		12	max	0	1	1.035	3	.028	3	1.214e-2	3	NC	15	NC	1
100			min	-.342	4	-1.321	2	-.02	5	-1.639e-2	2	236.049	2	7639.825	5
101		13	max	0	1	1.02	3	.026	3	1.132e-2	3	NC	15	NC	2
102			min	-.342	4	-1.324	2	-.014	5	-1.535e-2	2	234.7	2	8405.302	1
103		14	max	0	1	.987	3	.023	3	1.051e-2	3	NC	5	NC	2
104			min	-.342	4	-1.302	2	-.006	10	-1.43e-2	2	243.249	2	6099.596	1
105		15	max	0	1	.933	3	.025	1	9.698e-3	3	NC	5	NC	2
106			min	-.342	4	-1.245	2	-.005	10	-1.326e-2	2	267.97	2	5748.576	1
107		16	max	0	1	.856	3	.027	4	8.885e-3	3	NC	5	NC	2
108			min	-.342	4	-1.151	2	-.004	10	-1.222e-2	2	322.419	2	5348.732	4
109		17	max	0	1	.758	3	.029	4	8.072e-3	3	NC	5	NC	1
110			min	-.342	4	-1.02	2	-.004	10	-1.117e-2	2	447.851	2	5006.548	4
111		18	max	0	1	.645	3	.02	4	7.259e-3	3	NC	5	NC	1
112			min	-.342	4	-.861	2	-.005	2	-1.013e-2	2	853.079	2	6994.466	4
113		19	max	0	1	.521	3	.01	3	6.445e-3	3	NC	1	NC	1
114			min	-.342	4	-.685	2	-.007	2	-9.089e-3	2	NC	1	NC	1
115	M16	1	max	0	10	.209	2	.009	3	1.266e-2	3	NC	1	NC	1
116			min	-.11	4	-.187	3	-.006	2	-1.369e-2	2	NC	1	NC	1
117		2	max	0	10	.139	2	.011	3	1.331e-2	3	NC	4	NC	1
118			min	-.11	4	-.165	3	-.012	5	-1.379e-2	2	2155.102	2	NC	1
119		3	max	0	10	.085	1	.018	1	1.397e-2	3	NC	4	NC	2
120			min	-.11	4	-.15	3	-.016	5	-1.388e-2	2	1199.044	2	7723.404	1
121		4	max	0	10	.065	1	.027	1	1.462e-2	3	NC	4	NC	2
122			min	-.11	4	-.146	3	-.014	5	-1.398e-2	2	955.067	2	5352.834	1
123		5	max	0	10	.064	1	.03	1	1.528e-2	3	NC	4	NC	2
124			min	-.11	4	-.155	3	-.007	5	-1.408e-2	2	930.902	2	4738.999	1
125		6	max	0	10	.082	1	.028	1	1.593e-2	3	NC	3	NC	2
126			min	-.11	4	-.177	3	-.005	10	-1.417e-2	2	1086.291	2	5138.659	1
127		7	max	0	10	.116	1	.023	3	1.659e-2	3	NC	4	NC	2
128			min	-.11	4	-.207	3	-.007	10	-1.427e-2	2	1599.874	2	7088.876	1
129		8	max	0	10	.17	2	.024	3	1.724e-2	3	NC	1	NC	1
130			min	-.11	4	-.241	3	-.012	2	-1.437e-2	2	2779.581	3	9821.759	3
131		9	max	0	10	.219	2	.025	3	1.79e-2	3	NC	2	NC	1
132			min	-.11	4	-.27	3	-.017	2	-1.447e-2	2	1812.436	3	9463.408	3
133		10	max	0	1	.241	2	.025	3	1.855e-2	3	NC	4	NC	1
134			min	-.11	4	-.283	3	-.02	2	-1.456e-2	2	1572.618	3	9379.695	3
135		11	max	0	1	.219	2	.025	3	1.79e-2	3	NC	2	NC	1
136			min	-.11	4	-.27	3	-.017	2	-1.447e-2	2	1812.436	3	9463.408	3
137		12	max	0	1	.17	2	.024	3	1.724e-2	3	NC	1	NC	1
138			min	-.11	4	-.241	3	-.012	2	-1.437e-2	2	2779.581	3	9821.759	3
139		13	max	0	1	.116	1	.023	3	1.659e-2	3	NC	4	NC	2
140			min	-.11	4	-.207	3	-.007	10	-1.427e-2	2	1599.874	2	7088.876	1
141		14	max	0	1	.082	1	.028	1	1.593e-2	3	NC	3	NC	2
142			min	-.11	4	-.177	3	-.005	10	-1.417e-2	2	1086.291	2	5138.659	1
143		15	max	0	1	.064	1	.03	1	1.528e-2	3	NC	4	NC	2
144			min	-.11	4	-.155	3	-.003	10	-1.408e-2	2	930.902	2	4738.999	1
145		16	max	0	1	.065	1	.027	1	1.462e-2	3	NC	4	NC	2
146			min	-.11	4	-.146	3	-.003	10	-1.398e-2	2	955.067	2	5352.834	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	.085	1	.025	4	1.397e-2	3	NC	4	NC	2
148			min	-.11	4	-.15	3	-.003	10	-1.388e-2	2	1199.044	2	5808.415	4
149		18	max	0	1	.139	2	.016	4	1.331e-2	3	NC	4	NC	1
150			min	-.11	4	-.165	3	-.003	2	-1.379e-2	2	2155.102	2	8644.992	4
151		19	max	0	1	.209	2	.009	3	1.266e-2	3	NC	1	NC	1
152			min	-.11	4	-.187	3	-.006	2	-1.369e-2	2	NC	1	NC	1
153	M2	1	max	.008	2	.013	2	.005	1	1.809e-3	5	NC	1	NC	1
154			min	-.012	3	-.019	3	-.517	4	-1.03e-4	1	6097.475	2	149.951	4
155		2	max	.008	2	.011	2	.004	1	1.823e-3	5	NC	1	NC	1
156			min	-.011	3	-.018	3	-.475	4	-9.806e-5	1	7039.053	2	163.131	4
157		3	max	.007	2	.009	2	.004	1	1.836e-3	5	NC	1	NC	1
158			min	-.01	3	-.018	3	-.433	4	-9.308e-5	1	8305.773	2	178.76	4
159		4	max	.007	2	.008	2	.004	1	1.849e-3	5	NC	1	NC	1
160			min	-.01	3	-.017	3	-.392	4	-8.811e-5	1	NC	1	197.477	4
161		5	max	.006	2	.006	2	.003	1	1.863e-3	5	NC	1	NC	1
162			min	-.009	3	-.016	3	-.352	4	-8.313e-5	1	NC	1	220.145	4
163		6	max	.006	2	.005	2	.003	1	1.876e-3	5	NC	1	NC	1
164			min	-.008	3	-.016	3	-.312	4	-7.816e-5	1	NC	1	247.966	4
165		7	max	.006	2	.003	2	.003	1	1.89e-3	5	NC	1	NC	1
166			min	-.008	3	-.015	3	-.274	4	-7.318e-5	1	NC	1	282.637	4
167		8	max	.005	2	.002	2	.002	1	1.903e-3	5	NC	1	NC	1
168			min	-.007	3	-.014	3	-.237	4	-6.82e-5	1	NC	1	326.633	4
169		9	max	.005	2	0	2	.002	1	1.917e-3	5	NC	1	NC	1
170			min	-.007	3	-.013	3	-.202	4	-6.323e-5	1	NC	1	383.677	4
171		10	max	.004	2	0	2	.002	1	1.931e-3	4	NC	1	NC	1
172			min	-.006	3	-.012	3	-.169	4	-5.825e-5	1	NC	1	459.579	4
173		11	max	.004	2	-.001	2	.001	1	1.945e-3	4	NC	1	NC	1
174			min	-.005	3	-.011	3	-.137	4	-5.328e-5	1	NC	1	563.827	4
175		12	max	.003	2	-.001	15	0	1	1.96e-3	4	NC	1	NC	1
176			min	-.005	3	-.01	3	-.109	4	-4.83e-5	1	NC	1	712.812	4
177		13	max	.003	2	-.001	15	0	1	1.975e-3	4	NC	1	NC	1
178			min	-.004	3	-.009	3	-.083	4	-4.333e-5	1	NC	1	936.894	4
179		14	max	.002	2	-.001	15	0	1	1.99e-3	4	NC	1	NC	1
180			min	-.003	3	-.008	3	-.06	4	-3.835e-5	1	NC	1	1297.694	4
181		15	max	.002	2	-.001	15	0	1	2.005e-3	4	NC	1	NC	1
182			min	-.003	3	-.006	3	-.04	4	-3.337e-5	1	NC	1	1936.839	4
183		16	max	.001	2	0	15	0	1	2.019e-3	4	NC	1	NC	1
184			min	-.002	3	-.005	3	-.024	4	-2.84e-5	1	NC	1	3244.264	4
185		17	max	0	2	0	15	0	1	2.034e-3	4	NC	1	NC	1
186			min	-.001	3	-.003	3	-.012	4	-2.342e-5	1	NC	1	6656.953	4
187		18	max	0	2	0	15	0	1	2.049e-3	4	NC	1	NC	1
188			min	0	3	-.002	6	-.004	4	-1.845e-5	1	NC	1	NC	1
189		19	max	0	1	0	1	0	1	2.064e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	-1.347e-5	1	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	2.77e-6	1	NC	1	NC	1
192			min	0	1	0	1	0	1	-4.465e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.011	4	5.841e-5	4	NC	1	NC	1
194			min	0	2	-.003	6	0	1	1.158e-6	10	NC	1	9206.523	4
195		3	max	.001	3	-.001	15	.021	4	5.633e-4	4	NC	1	NC	1
196			min	0	2	-.006	6	0	1	2.166e-6	10	NC	1	4787.804	4
197		4	max	.002	3	-.002	15	.031	4	1.068e-3	4	NC	1	NC	1
198			min	-.001	2	-.009	6	0	1	3.175e-6	10	NC	1	3319.786	4
199		5	max	.002	3	-.003	15	.039	4	1.573e-3	4	NC	1	NC	1
200			min	-.002	2	-.012	6	0	1	4.183e-6	10	8550.158	6	2588.355	4
201		6	max	.003	3	-.003	15	.047	4	2.078e-3	4	NC	2	NC	1
202			min	-.002	2	-.015	6	0	1	5.191e-6	10	6926.451	6	2150.382	4
203		7	max	.003	3	-.004	15	.055	4	2.583e-3	4	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
204			min	-.003	2	-.017	6	0	1	6.199e-6	10	5948.632	6	1857.869	4
205		8	max	.004	3	-.004	15	.062	4	3.088e-3	4	NC	5	NC	1
206			min	-.003	2	-.019	6	0	1	7.207e-6	10	5345.531	6	1647.121	4
207		9	max	.004	3	-.004	15	.068	4	3.593e-3	4	NC	5	NC	1
208			min	-.004	2	-.02	6	0	3	8.215e-6	10	4989.515	6	1486.06	4
209		10	max	.005	3	-.005	15	.075	4	4.098e-3	4	NC	5	NC	1
210			min	-.004	2	-.021	6	0	3	9.224e-6	10	4818.693	6	1356.684	4
211		11	max	.006	3	-.005	15	.081	4	4.603e-3	4	NC	5	NC	1
212			min	-.005	2	-.021	6	0	12	1.023e-5	10	4807.942	6	1248.081	4
213		12	max	.006	3	-.004	15	.088	4	5.108e-3	4	NC	5	NC	1
214			min	-.005	2	-.02	6	0	12	1.124e-5	10	4959.276	6	1153.281	4
215		13	max	.007	3	-.004	15	.095	4	5.613e-3	4	NC	5	NC	1
216			min	-.006	2	-.019	6	0	10	1.225e-5	10	5303.858	6	1067.704	4
217		14	max	.007	3	-.004	15	.103	4	6.117e-3	4	NC	5	NC	1
218			min	-.006	2	-.017	6	0	10	1.326e-5	10	5918.101	6	988.34	4
219		15	max	.008	3	-.003	15	.111	4	6.622e-3	4	NC	3	NC	1
220			min	-.007	2	-.014	6	0	10	1.426e-5	10	6971.159	6	913.288	4
221		16	max	.008	3	-.002	15	.121	4	7.127e-3	4	NC	1	NC	1
222			min	-.007	2	-.011	6	0	10	1.527e-5	10	8872.553	6	841.452	4
223		17	max	.009	3	-.001	15	.132	4	7.632e-3	4	NC	1	NC	1
224			min	-.008	2	-.008	6	0	10	1.628e-5	10	NC	1	772.334	4
225		18	max	.009	3	0	15	.144	4	8.137e-3	4	NC	1	NC	1
226			min	-.008	2	-.005	3	0	10	1.729e-5	10	NC	1	705.858	4
227		19	max	.01	3	0	5	.158	4	8.642e-3	4	NC	1	NC	1
228			min	-.009	2	-.002	3	0	10	1.83e-5	10	NC	1	642.219	4
229	M4	1	max	.002	1	.009	2	0	10	5.219e-4	4	NC	1	NC	2
230			min	0	5	-.01	3	-.158	4	6.641e-6	10	NC	1	156.697	4
231		2	max	.002	1	.008	2	0	10	5.219e-4	4	NC	1	NC	2
232			min	0	5	-.01	3	-.146	4	6.641e-6	10	NC	1	170.223	4
233		3	max	.002	1	.008	2	0	10	5.219e-4	4	NC	1	NC	2
234			min	0	5	-.009	3	-.133	4	6.641e-6	10	NC	1	186.331	4
235		4	max	.002	1	.007	2	0	10	5.219e-4	4	NC	1	NC	2
236			min	0	5	-.009	3	-.121	4	6.641e-6	10	NC	1	205.687	4
237		5	max	.002	1	.007	2	0	10	5.219e-4	4	NC	1	NC	2
238			min	0	5	-.008	3	-.108	4	6.641e-6	10	NC	1	229.202	4
239		6	max	.001	1	.006	2	0	10	5.219e-4	4	NC	1	NC	2
240			min	0	5	-.007	3	-.096	4	6.641e-6	10	NC	1	258.135	4
241		7	max	.001	1	.006	2	0	10	5.219e-4	4	NC	1	NC	1
242			min	0	5	-.007	3	-.084	4	6.641e-6	10	NC	1	294.276	4
243		8	max	.001	1	.005	2	0	10	5.219e-4	4	NC	1	NC	1
244			min	0	5	-.006	3	-.073	4	6.641e-6	10	NC	1	340.232	4
245		9	max	.001	1	.005	2	0	10	5.219e-4	4	NC	1	NC	1
246			min	0	5	-.006	3	-.062	4	6.641e-6	10	NC	1	399.93	4
247		10	max	.001	1	.004	2	0	10	5.219e-4	4	NC	1	NC	1
248			min	0	5	-.005	3	-.052	4	6.641e-6	10	NC	1	479.509	4
249		11	max	0	1	.004	2	0	10	5.219e-4	4	NC	1	NC	1
250			min	0	5	-.005	3	-.042	4	6.641e-6	10	NC	1	589.005	4
251		12	max	0	1	.003	2	0	10	5.219e-4	4	NC	1	NC	1
252			min	0	5	-.004	3	-.033	4	6.641e-6	10	NC	1	745.779	4
253		13	max	0	1	.003	2	0	10	5.219e-4	4	NC	1	NC	1
254			min	0	5	-.003	3	-.025	4	6.641e-6	10	NC	1	982.048	4
255		14	max	0	1	.002	2	0	10	5.219e-4	4	NC	1	NC	1
256			min	0	5	-.003	3	-.018	4	6.641e-6	10	NC	1	1363.331	4
257		15	max	0	1	.002	2	0	10	5.219e-4	4	NC	1	NC	1
258			min	0	5	-.002	3	-.012	4	6.641e-6	10	NC	1	2040.617	4
259		16	max	0	1	.001	2	0	10	5.219e-4	4	NC	1	NC	1
260			min	0	5	-.002	3	-.007	4	6.641e-6	10	NC	1	3431.116	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
261		17	max	0	1	0	2	0	10	5.219e-4	4	NC	1	NC	1
262			min	0	5	-.001	3	-.004	4	6.641e-6	10	NC	1	7080.809	4
263		18	max	0	1	0	2	0	10	5.219e-4	4	NC	1	NC	1
264			min	0	5	0	3	-.001	4	6.641e-6	10	NC	1	NC	1
265		19	max	0	1	0	1	0	1	5.219e-4	4	NC	1	NC	1
266			min	0	1	0	1	0	1	6.641e-6	10	NC	1	NC	1
267	M6	1	max	.024	2	.038	2	0	1	1.876e-3	4	NC	3	NC	1
268			min	-.035	3	-.055	3	-.522	4	0	1	2018.888	2	148.517	4
269		2	max	.022	2	.035	2	0	1	1.889e-3	4	NC	3	NC	1
270			min	-.033	3	-.052	3	-.48	4	0	1	2216.834	2	161.572	4
271		3	max	.021	2	.032	2	0	1	1.902e-3	4	NC	3	NC	1
272			min	-.031	3	-.049	3	-.438	4	0	1	2455.741	2	177.052	4
273		4	max	.02	2	.028	2	0	1	1.914e-3	4	NC	3	NC	1
274			min	-.029	3	-.046	3	-.396	4	0	1	2747.227	2	195.59	4
275		5	max	.018	2	.025	2	0	1	1.927e-3	4	NC	3	NC	1
276			min	-.027	3	-.043	3	-.355	4	0	1	3107.477	2	218.043	4
277		6	max	.017	2	.022	2	0	1	1.94e-3	4	NC	3	NC	1
278			min	-.025	3	-.04	3	-.316	4	0	1	3559.591	2	245.597	4
279		7	max	.016	2	.019	2	0	1	1.953e-3	4	NC	1	NC	1
280			min	-.023	3	-.037	3	-.277	4	0	1	4137.464	2	279.936	4
281		8	max	.014	2	.016	2	0	1	1.965e-3	4	NC	1	NC	1
282			min	-.021	3	-.033	3	-.24	4	0	1	4892.489	2	323.511	4
283		9	max	.013	2	.013	2	0	1	1.978e-3	4	NC	1	NC	1
284			min	-.02	3	-.03	3	-.204	4	0	1	5905.703	2	380.006	4
285		10	max	.012	2	.011	2	0	1	1.991e-3	4	NC	1	NC	1
286			min	-.018	3	-.027	3	-.17	4	0	1	7311.122	2	455.173	4
287		11	max	.011	2	.008	2	0	1	2.004e-3	4	NC	1	NC	1
288			min	-.016	3	-.024	3	-.139	4	0	1	9343.876	2	558.407	4
289		12	max	.009	2	.006	2	0	1	2.017e-3	4	NC	1	NC	1
290			min	-.014	3	-.021	3	-.11	4	0	1	NC	1	705.932	4
291		13	max	.008	2	.004	2	0	1	2.029e-3	4	NC	1	NC	1
292			min	-.012	3	-.018	3	-.084	4	0	1	NC	1	927.796	4
293		14	max	.007	2	.003	2	0	1	2.042e-3	4	NC	1	NC	1
294			min	-.01	3	-.015	3	-.06	4	0	1	NC	1	1284.975	4
295		15	max	.005	2	.002	2	0	1	2.055e-3	4	NC	1	NC	1
296			min	-.008	3	-.012	3	-.04	4	0	1	NC	1	1917.581	4
297		16	max	.004	2	0	2	0	1	2.068e-3	4	NC	1	NC	1
298			min	-.006	3	-.009	3	-.024	4	0	1	NC	1	3211.23	4
299		17	max	.003	2	0	2	0	1	2.08e-3	4	NC	1	NC	1
300			min	-.004	3	-.006	3	-.012	4	0	1	NC	1	6586.156	4
301		18	max	.001	2	0	2	0	1	2.093e-3	4	NC	1	NC	1
302			min	-.002	3	-.003	3	-.004	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	2.106e-3	4	NC	1	NC	1
304			min	0	1	0	1	0	1	0	1	NC	1	NC	1
305	M7	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
306			min	0	1	0	1	0	1	-4.563e-4	4	NC	1	NC	1
307		2	max	.002	3	0	15	.011	4	3.451e-5	4	NC	1	NC	1
308			min	-.001	2	-.004	3	0	1	0	1	NC	1	9021.181	4
309		3	max	.003	3	-.001	15	.022	4	5.253e-4	4	NC	1	NC	1
310			min	-.003	2	-.008	3	0	1	0	1	NC	1	4691.266	4
311		4	max	.005	3	-.002	15	.031	4	1.016e-3	4	NC	1	NC	1
312			min	-.004	2	-.011	3	0	1	0	1	NC	1	3253.77	4
313		5	max	.006	3	-.003	15	.04	4	1.507e-3	4	NC	1	NC	1
314			min	-.006	2	-.014	3	0	1	0	1	7981.222	3	2538.52	4
315		6	max	.008	3	-.004	15	.048	4	1.998e-3	4	NC	1	NC	1
316			min	-.007	2	-.017	3	0	1	0	1	6738.4	3	2111.207	4
317		7	max	.009	3	-.004	15	.056	4	2.488e-3	4	NC	2	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
318			min	-.009	2	-.019	3	0	1	0	1	5914.787	4	1826.789	4
319		8	max	.011	3	-.005	15	.063	4	2.979e-3	4	NC	2	NC	1
320			min	-.01	2	-.021	3	0	1	0	1	5317.266	4	1622.844	4
321		9	max	.013	3	-.005	15	.069	4	3.47e-3	4	NC	5	NC	1
322			min	-.012	2	-.022	3	0	1	0	1	4964.804	4	1467.921	4
323		10	max	.014	3	-.005	15	.076	4	3.961e-3	4	NC	5	NC	1
324			min	-.013	2	-.023	3	0	1	0	1	4796.184	4	1344.338	4
325		11	max	.016	3	-.005	15	.082	4	4.451e-3	4	NC	5	NC	1
326			min	-.015	2	-.023	3	0	1	0	1	4786.624	4	1241.333	4
327		12	max	.017	3	-.005	15	.088	4	4.942e-3	4	NC	5	NC	1
328			min	-.016	2	-.022	3	0	1	0	1	4938.281	4	1151.969	4
329		13	max	.019	3	-.005	15	.095	4	5.433e-3	4	NC	5	NC	1
330			min	-.018	2	-.021	3	0	1	0	1	5282.299	4	1071.62	4
331		14	max	.02	3	-.004	15	.102	4	5.924e-3	4	NC	2	NC	1
332			min	-.019	2	-.02	3	0	1	0	1	5894.875	4	997.175	4
333		15	max	.022	3	-.004	15	.11	4	6.414e-3	4	NC	1	NC	1
334			min	-.021	2	-.018	3	0	1	0	1	6944.598	4	926.593	4
335		16	max	.024	3	-.003	15	.118	4	6.905e-3	4	NC	1	NC	1
336			min	-.022	2	-.015	3	0	1	0	1	8839.546	4	858.638	4
337		17	max	.025	3	-.002	15	.128	4	7.396e-3	4	NC	1	NC	1
338			min	-.024	2	-.013	3	0	1	0	1	NC	1	792.687	4
339		18	max	.027	3	-.001	15	.14	4	7.887e-3	4	NC	1	NC	1
340			min	-.025	2	-.01	3	0	1	0	1	NC	1	728.581	4
341		19	max	.028	3	0	10	.153	4	8.378e-3	4	NC	1	NC	1
342			min	-.027	2	-.007	3	0	1	0	1	NC	1	666.486	4
343	M8	1	max	.006	2	.026	2	0	1	3.538e-4	4	NC	1	NC	1
344			min	0	3	-.029	3	-.153	4	0	1	NC	1	162.618	4
345		2	max	.005	2	.025	2	0	1	3.538e-4	4	NC	1	NC	1
346			min	0	3	-.027	3	-.14	4	0	1	NC	1	176.677	4
347		3	max	.005	2	.023	2	0	1	3.538e-4	4	NC	1	NC	1
348			min	0	3	-.026	3	-.128	4	0	1	NC	1	193.417	4
349		4	max	.005	2	.022	2	0	1	3.538e-4	4	NC	1	NC	1
350			min	0	3	-.024	3	-.116	4	0	1	NC	1	213.533	4
351		5	max	.004	2	.02	2	0	1	3.538e-4	4	NC	1	NC	1
352			min	0	3	-.023	3	-.104	4	0	1	NC	1	237.969	4
353		6	max	.004	2	.019	2	0	1	3.538e-4	4	NC	1	NC	1
354			min	0	3	-.021	3	-.093	4	0	1	NC	1	268.035	4
355		7	max	.004	2	.017	2	0	1	3.538e-4	4	NC	1	NC	1
356			min	0	3	-.019	3	-.081	4	0	1	NC	1	305.59	4
357		8	max	.003	2	.016	2	0	1	3.538e-4	4	NC	1	NC	1
358			min	0	3	-.018	3	-.07	4	0	1	NC	1	353.344	4
359		9	max	.003	2	.014	2	0	1	3.538e-4	4	NC	1	NC	1
360			min	0	3	-.016	3	-.06	4	0	1	NC	1	415.377	4
361		10	max	.003	2	.013	2	0	1	3.538e-4	4	NC	1	NC	1
362			min	0	3	-.014	3	-.05	4	0	1	NC	1	498.069	4
363		11	max	.003	2	.012	2	0	1	3.538e-4	4	NC	1	NC	1
364			min	0	3	-.013	3	-.041	4	0	1	NC	1	611.85	4
365		12	max	.002	2	.01	2	0	1	3.538e-4	4	NC	1	NC	1
366			min	0	3	-.011	3	-.032	4	0	1	NC	1	774.762	4
367		13	max	.002	2	.009	2	0	1	3.538e-4	4	NC	1	NC	1
368			min	0	3	-.01	3	-.024	4	0	1	NC	1	1020.286	4
369		14	max	.002	2	.007	2	0	1	3.538e-4	4	NC	1	NC	1
370			min	0	3	-.008	3	-.018	4	0	1	NC	1	1416.515	4
371		15	max	.001	2	.006	2	0	1	3.538e-4	4	NC	1	NC	1
372			min	0	3	-.006	3	-.012	4	0	1	NC	1	2120.374	4
373		16	max	0	2	.004	2	0	1	3.538e-4	4	NC	1	NC	1
374			min	0	3	-.005	3	-.007	4	0	1	NC	1	3565.488	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
375		17	max	0	2	.003	2	0	1	3.538e-4	4	NC	1	NC	1
376			min	0	3	-.003	3	-.003	4	0	1	NC	1	7358.754	4
377		18	max	0	2	.001	2	0	1	3.538e-4	4	NC	1	NC	1
378			min	0	3	-.002	3	-.001	4	0	1	NC	1	NC	1
379		19	max	0	1	0	1	0	1	3.538e-4	4	NC	1	NC	1
380			min	0	1	0	1	0	1	0	1	NC	1	NC	1
381	M10	1	max	.008	2	.013	2	0	10	1.864e-3	4	NC	1	NC	1
382			min	-.012	3	-.019	3	-.52	4	5.701e-6	10	6097.475	2	149.063	4
383		2	max	.008	2	.011	2	0	10	1.876e-3	4	NC	1	NC	1
384			min	-.011	3	-.018	3	-.478	4	5.426e-6	10	7039.053	2	162.167	4
385		3	max	.007	2	.009	2	0	10	1.887e-3	4	NC	1	NC	1
386			min	-.01	3	-.018	3	-.436	4	5.151e-6	10	8305.773	2	177.706	4
387		4	max	.007	2	.008	2	0	10	1.899e-3	4	NC	1	NC	1
388			min	-.01	3	-.017	3	-.395	4	4.876e-6	10	NC	1	196.314	4
389		5	max	.006	2	.006	2	0	10	1.91e-3	4	NC	1	NC	1
390			min	-.009	3	-.016	3	-.354	4	4.601e-6	10	NC	1	218.852	4
391		6	max	.006	2	.005	2	0	10	1.922e-3	4	NC	1	NC	1
392			min	-.008	3	-.016	3	-.314	4	4.325e-6	10	NC	1	246.513	4
393		7	max	.006	2	.003	2	0	10	1.933e-3	4	NC	1	NC	1
394			min	-.008	3	-.015	3	-.276	4	4.05e-6	10	NC	1	280.985	4
395		8	max	.005	2	.002	2	0	10	1.945e-3	4	NC	1	NC	1
396			min	-.007	3	-.014	3	-.239	4	3.775e-6	10	NC	1	324.73	4
397		9	max	.005	2	0	2	0	10	1.957e-3	4	NC	1	NC	1
398			min	-.007	3	-.013	3	-.203	4	3.5e-6	10	NC	1	381.45	4
399		10	max	.004	2	0	2	0	10	1.968e-3	4	NC	1	NC	1
400			min	-.006	3	-.012	3	-.17	4	3.225e-6	10	NC	1	456.92	4
401		11	max	.004	2	-.001	2	0	10	1.98e-3	4	NC	1	NC	1
402			min	-.005	3	-.011	3	-.138	4	2.95e-6	10	NC	1	560.578	4
403		12	max	.003	2	-.002	2	0	10	1.991e-3	4	NC	1	NC	1
404			min	-.005	3	-.01	3	-.109	4	2.674e-6	10	NC	1	708.723	4
405		13	max	.003	2	-.002	15	0	10	2.003e-3	4	NC	1	NC	1
406			min	-.004	3	-.009	3	-.083	4	2.399e-6	10	NC	1	931.546	4
407		14	max	.002	2	-.002	15	0	10	2.015e-3	4	NC	1	NC	1
408			min	-.003	3	-.008	3	-.06	4	2.124e-6	10	NC	1	1290.33	4
409		15	max	.002	2	-.002	15	0	10	2.026e-3	4	NC	1	NC	1
410			min	-.003	3	-.006	3	-.04	4	1.849e-6	10	NC	1	1925.929	4
411		16	max	.001	2	-.001	15	0	10	2.038e-3	4	NC	1	NC	1
412			min	-.002	3	-.005	4	-.024	4	1.574e-6	10	NC	1	3226.171	4
413		17	max	0	2	0	15	0	10	2.049e-3	4	NC	1	NC	1
414			min	-.001	3	-.004	4	-.012	4	1.299e-6	10	NC	1	6620.407	4
415		18	max	0	2	0	15	0	10	2.061e-3	4	NC	1	NC	1
416			min	0	3	-.002	4	-.004	4	1.023e-6	10	NC	1	NC	1
417		19	max	0	1	0	1	0	1	2.072e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	7.483e-7	10	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	-1.5e-7	10	NC	1	NC	1
420			min	0	1	0	1	0	1	-4.483e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.011	4	5.067e-5	5	NC	1	NC	1
422			min	0	2	-.003	4	0	10	-1.511e-5	1	NC	1	9169.433	4
423		3	max	.001	3	-.002	15	.021	4	5.459e-4	4	NC	1	NC	1
424			min	0	2	-.006	4	0	10	-2.745e-5	1	NC	1	4769.557	4
425		4	max	.002	3	-.002	15	.031	4	1.043e-3	4	NC	1	NC	1
426			min	-.001	2	-.009	4	0	10	-3.979e-5	1	NC	1	3308.26	4
427		5	max	.002	3	-.003	15	.039	4	1.54e-3	4	NC	1	NC	1
428			min	-.002	2	-.013	4	0	10	-5.213e-5	1	8241.171	4	2580.6	4
429		6	max	.003	3	-.004	15	.047	4	2.037e-3	4	NC	2	NC	1
430			min	-.002	2	-.016	4	0	10	-6.447e-5	1	6697.707	4	2145.288	4
431		7	max	.003	3	-.004	15	.055	4	2.534e-3	4	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
432			min	-.003	2	-.018	4	0	10	-7.682e-5	1	5767.297	4	1854.941	4
433		8	max	.004	3	-.005	15	.062	4	3.031e-3	4	NC	5	NC	1
434			min	-.003	2	-.02	4	0	10	-8.916e-5	1	5193.825	4	1646.125	4
435		9	max	.004	3	-.005	15	.068	4	3.528e-3	4	NC	5	NC	1
436			min	-.004	2	-.022	4	0	1	-1.015e-4	1	4856.689	4	1486.882	4
437		10	max	.005	3	-.006	15	.075	4	4.025e-3	4	NC	5	NC	1
438			min	-.004	2	-.022	4	0	1	-1.138e-4	1	4697.553	4	1359.262	4
439		11	max	.006	3	-.006	15	.081	4	4.522e-3	4	NC	5	NC	1
440			min	-.005	2	-.022	4	0	1	-1.262e-4	1	4693.095	4	1252.364	4
441		12	max	.006	3	-.005	15	.088	4	5.019e-3	4	NC	5	NC	1
442			min	-.005	2	-.022	4	0	1	-1.385e-4	1	4846.068	4	1159.201	4
443		13	max	.007	3	-.005	15	.095	4	5.516e-3	4	NC	5	NC	1
444			min	-.006	2	-.021	4	-.001	1	-1.509e-4	1	5187.517	4	1075.155	4
445		14	max	.007	3	-.005	15	.102	4	6.013e-3	4	NC	5	NC	1
446			min	-.006	2	-.019	4	-.001	1	-1.632e-4	1	5792.689	4	997.17	4
447		15	max	.008	3	-.004	15	.11	4	6.511e-3	4	NC	3	NC	1
448			min	-.007	2	-.016	4	-.002	1	-1.755e-4	1	6827.668	4	923.29	4
449		16	max	.008	3	-.003	15	.119	4	7.008e-3	4	NC	1	NC	1
450			min	-.007	2	-.013	4	-.002	1	-1.879e-4	1	8694.172	4	852.374	4
451		17	max	.009	3	-.003	15	.13	4	7.505e-3	4	NC	1	NC	1
452			min	-.008	2	-.009	4	-.003	1	-2.002e-4	1	NC	1	783.89	4
453		18	max	.009	3	-.002	15	.142	4	8.002e-3	4	NC	1	NC	1
454			min	-.008	2	-.005	4	-.004	1	-2.126e-4	1	NC	1	717.75	4
455		19	max	.01	3	0	10	.155	4	8.499e-3	4	NC	1	NC	1
456			min	-.009	2	-.002	3	-.005	1	-2.249e-4	1	NC	1	654.153	4
457	M12	1	max	.002	1	.009	2	.005	1	4.786e-4	5	NC	1	NC	2
458			min	0	3	-.01	3	-.155	4	-8.861e-5	1	NC	1	159.609	4
459		2	max	.002	1	.008	2	.004	1	4.786e-4	5	NC	1	NC	2
460			min	0	3	-.01	3	-.143	4	-8.861e-5	1	NC	1	173.391	4
461		3	max	.002	1	.008	2	.004	1	4.786e-4	5	NC	1	NC	2
462			min	0	3	-.009	3	-.131	4	-8.861e-5	1	NC	1	189.803	4
463		4	max	.002	1	.007	2	.003	1	4.786e-4	5	NC	1	NC	2
464			min	0	3	-.009	3	-.118	4	-8.861e-5	1	NC	1	209.524	4
465		5	max	.002	1	.007	2	.003	1	4.786e-4	5	NC	1	NC	2
466			min	0	3	-.008	3	-.106	4	-8.861e-5	1	NC	1	233.483	4
467		6	max	.001	1	.006	2	.003	1	4.786e-4	5	NC	1	NC	2
468			min	0	3	-.007	3	-.094	4	-8.861e-5	1	NC	1	262.962	4
469		7	max	.001	1	.006	2	.002	1	4.786e-4	5	NC	1	NC	1
470			min	0	3	-.007	3	-.083	4	-8.861e-5	1	NC	1	299.784	4
471		8	max	.001	1	.005	2	.002	1	4.786e-4	5	NC	1	NC	1
472			min	0	3	-.006	3	-.072	4	-8.861e-5	1	NC	1	346.606	4
473		9	max	.001	1	.005	2	.002	1	4.786e-4	5	NC	1	NC	1
474			min	0	3	-.006	3	-.061	4	-8.861e-5	1	NC	1	407.43	4
475		10	max	.001	1	.004	2	.001	1	4.786e-4	5	NC	1	NC	1
476			min	0	3	-.005	3	-.051	4	-8.861e-5	1	NC	1	488.508	4
477		11	max	0	1	.004	2	.001	1	4.786e-4	5	NC	1	NC	1
478			min	0	3	-.005	3	-.041	4	-8.861e-5	1	NC	1	600.069	4
479		12	max	0	1	.003	2	0	1	4.786e-4	5	NC	1	NC	1
480			min	0	3	-.004	3	-.033	4	-8.861e-5	1	NC	1	759.799	4
481		13	max	0	1	.003	2	0	1	4.786e-4	5	NC	1	NC	1
482			min	0	3	-.003	3	-.025	4	-8.861e-5	1	NC	1	1000.523	4
483		14	max	0	1	.002	2	0	1	4.786e-4	5	NC	1	NC	1
484			min	0	3	-.003	3	-.018	4	-8.861e-5	1	NC	1	1388.999	4
485		15	max	0	1	.002	2	0	1	4.786e-4	5	NC	1	NC	1
486			min	0	3	-.002	3	-.012	4	-8.861e-5	1	NC	1	2079.066	4
487		16	max	0	1	.001	2	0	1	4.786e-4	5	NC	1	NC	1
488			min	0	3	-.002	3	-.007	4	-8.861e-5	1	NC	1	3495.817	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
489		17	max	0	1	0	2	0	1	4.786e-4	5	NC	1	NC	1
490			min	0	3	-.001	3	-.003	4	-8.861e-5	1	NC	1	7214.458	4
491		18	max	0	1	0	2	0	1	4.786e-4	5	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-8.861e-5	1	NC	1	NC	1
493		19	max	0	1	0	1	0	1	4.786e-4	5	NC	1	NC	1
494			min	0	1	0	1	0	1	-8.861e-5	1	NC	1	NC	1
495	M1	1	max	.013	3	.235	2	.548	4	4.632e-3	2	NC	1	NC	1
496			min	-.008	2	-.082	3	0	10	-1.324e-2	3	NC	1	NC	1
497		2	max	.013	3	.113	2	.533	4	5.159e-3	4	NC	5	NC	1
498			min	-.008	2	-.038	3	-.003	1	-6.575e-3	3	1115.775	2	NC	1
499		3	max	.013	3	.02	3	.516	4	9.568e-3	4	NC	5	NC	1
500			min	-.008	2	-.015	2	-.005	1	-9.283e-5	3	542.263	2	7380.199	5
501		4	max	.012	3	.103	3	.499	4	8.175e-3	4	NC	5	NC	1
502			min	-.008	2	-.156	2	-.004	1	-3.557e-3	3	346.948	2	5431.805	5
503		5	max	.012	3	.202	3	.48	4	6.807e-3	2	NC	15	NC	1
504			min	-.008	2	-.3	2	-.003	1	-7.022e-3	3	253.211	2	4446.406	5
505		6	max	.012	3	.306	3	.461	4	1.02e-2	2	9661.374	15	NC	1
506			min	-.008	2	-.439	2	-.001	1	-1.049e-2	3	201.159	2	3829.621	5
507		7	max	.012	3	.405	3	.442	4	1.359e-2	2	8191.852	15	NC	1
508			min	-.008	2	-.561	2	0	3	-1.395e-2	3	170.234	2	3362.128	4
509		8	max	.011	3	.486	3	.423	4	1.699e-2	2	7319.24	15	NC	1
510			min	-.007	2	-.658	2	0	10	-1.742e-2	3	151.862	2	2977.899	4
511		9	max	.011	3	.538	3	.403	4	1.894e-2	2	6861.043	15	NC	1
512			min	-.007	2	-.719	2	0	1	-1.809e-2	3	142.261	2	2685.413	4
513		10	max	.011	3	.558	3	.381	4	1.992e-2	2	6720.479	15	NC	1
514			min	-.007	2	-.739	2	0	10	-1.689e-2	3	139.461	2	2565.545	4
515		11	max	.011	3	.545	3	.357	4	2.09e-2	2	6860.446	15	NC	1
516			min	-.007	2	-.718	2	0	10	-1.57e-2	3	142.811	2	2560.39	4
517		12	max	.01	3	.5	3	.331	4	1.991e-2	2	7317.827	15	NC	1
518			min	-.007	2	-.655	2	0	1	-1.387e-2	3	153.44	2	2658.554	4
519		13	max	.01	3	.427	3	.299	4	1.596e-2	2	8189.132	15	NC	1
520			min	-.007	2	-.553	2	0	1	-1.11e-2	3	173.89	2	3081.607	4
521		14	max	.01	3	.333	3	.264	4	1.201e-2	2	9656.478	15	NC	1
522			min	-.007	2	-.426	2	0	12	-8.323e-3	3	208.698	2	4089.563	4
523		15	max	.009	3	.227	3	.228	4	8.061e-3	2	NC	15	NC	1
524			min	-.007	2	-.285	2	0	10	-5.549e-3	3	268.239	2	6534.521	4
525		16	max	.009	3	.116	3	.192	4	6.956e-3	4	NC	5	NC	1
526			min	-.007	2	-.142	2	0	10	-2.775e-3	3	377.568	2	NC	1
527		17	max	.009	3	.007	3	.159	4	8.073e-3	4	NC	5	NC	1
528			min	-.006	2	-.008	2	0	10	-1.261e-6	3	609.076	2	NC	1
529		18	max	.009	3	.106	2	.132	4	4.389e-3	4	NC	5	NC	1
530			min	-.006	2	-.093	3	0	10	-1.377e-3	3	1282.443	2	NC	1
531		19	max	.009	3	.209	2	.11	4	8.715e-3	2	NC	1	NC	1
532			min	-.006	2	-.187	3	0	1	-2.828e-3	3	NC	1	NC	1
533	M5	1	max	.036	3	.315	2	.548	4	0	1	NC	1	NC	1
534			min	-.025	2	.006	15	0	1	-1.682e-5	4	NC	1	NC	1
535		2	max	.036	3	.15	2	.537	4	4.89e-3	4	NC	5	NC	1
536			min	-.025	2	.003	15	0	1	0	1	832.258	2	NC	1
537		3	max	.036	3	.056	3	.521	4	9.679e-3	4	NC	5	NC	1
538			min	-.025	2	-.041	2	0	1	0	1	385.482	2	6065.934	4
539		4	max	.035	3	.182	3	.503	4	7.885e-3	4	NC	15	NC	1
540			min	-.025	2	-.277	2	0	1	0	1	231.418	2	4769.726	4
541		5	max	.034	3	.365	3	.483	4	6.091e-3	4	8521.585	15	NC	1
542			min	-.024	2	-.538	2	0	1	0	1	160.269	2	4157.199	4
543		6	max	.033	3	.576	3	.462	4	4.298e-3	4	6501.564	15	NC	1
544			min	-.024	2	-.801	2	0	1	0	1	122.403	2	3766.562	4
545		7	max	.032	3	.784	3	.441	4	2.504e-3	4	5346.219	15	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
546			min	-.024	2	-1.041	2	0	1	0	1	100.677	2	3417.031	4
547		8	max	.032	3	.96	3	.422	4	7.108e-4	4	4679.424	15	NC	1
548			min	-.023	2	-1.235	2	0	1	0	1	88.108	2	3026.838	4
549		9	max	.031	3	1.073	3	.403	4	0	1	4338.889	15	NC	1
550			min	-.023	2	-1.359	2	0	1	-1.081e-5	5	81.678	2	2674.075	4
551		10	max	.03	3	1.114	3	.381	4	0	1	4236.489	15	NC	1
552			min	-.022	2	-1.402	2	0	1	-1.044e-5	5	79.808	2	2590.672	4
553		11	max	.029	3	1.085	3	.356	4	0	1	4339.437	15	NC	1
554			min	-.022	2	-1.36	2	0	1	-1.007e-5	5	82.036	2	2603.16	4
555		12	max	.029	3	.989	3	.332	4	5.658e-4	4	4680.689	15	NC	1
556			min	-.022	2	-1.231	2	0	1	0	1	89.327	2	2605.125	4
557		13	max	.028	3	.834	3	.301	4	1.995e-3	4	5348.677	15	NC	1
558			min	-.021	2	-1.024	2	0	1	0	1	103.948	2	2989.097	4
559		14	max	.027	3	.64	3	.264	4	3.424e-3	4	6506.192	15	NC	1
560			min	-.021	2	-.769	2	0	1	0	1	130.045	2	4121.728	4
561		15	max	.026	3	.427	3	.225	4	4.852e-3	4	8530.532	15	NC	1
562			min	-.02	2	-.497	2	0	1	0	1	177.663	2	7531.772	4
563		16	max	.026	3	.213	3	.187	4	6.281e-3	4	NC	15	NC	1
564			min	-.02	2	-.238	2	0	1	0	1	273.031	2	NC	1
565		17	max	.025	3	.018	3	.153	4	7.71e-3	4	NC	5	NC	1
566			min	-.02	2	-.021	2	0	1	0	1	495.658	2	NC	1
567		18	max	.025	3	.129	2	.127	4	3.897e-3	4	NC	5	NC	1
568			min	-.02	2	-.142	3	0	1	0	1	1078.35	3	NC	1
569		19	max	.025	3	.241	2	.11	4	0	1	NC	1	NC	1
570			min	-.02	2	-.283	3	0	1	-9.872e-6	4	NC	1	NC	1
571	M9	1	max	.013	3	.235	2	.548	4	1.324e-2	3	NC	1	NC	1
572			min	-.008	2	-.082	3	0	1	-4.632e-3	2	NC	1	NC	1
573		2	max	.013	3	.113	2	.535	4	6.575e-3	3	NC	5	NC	1
574			min	-.008	2	-.038	3	0	10	-2.275e-3	2	1115.775	2	NC	1
575		3	max	.013	3	.02	3	.52	4	9.635e-3	4	NC	5	NC	1
576			min	-.008	2	-.015	2	0	10	-2.614e-5	10	542.263	2	6611.622	4
577		4	max	.012	3	.103	3	.502	4	7.653e-3	5	NC	5	NC	1
578			min	-.008	2	-.156	2	0	10	-3.414e-3	2	346.948	2	5029.373	4
579		5	max	.012	3	.202	3	.482	4	7.022e-3	3	NC	15	NC	1
580			min	-.008	2	-.3	2	0	10	-6.807e-3	2	253.211	2	4247.034	4
581		6	max	.012	3	.306	3	.462	4	1.049e-2	3	9611.085	15	NC	1
582			min	-.008	2	-.439	2	0	10	-1.02e-2	2	201.159	2	3752.955	4
583		7	max	.012	3	.405	3	.442	4	1.395e-2	3	8150.183	15	NC	1
584			min	-.008	2	-.561	2	0	1	-1.359e-2	2	170.234	2	3363.112	4
585		8	max	.011	3	.486	3	.422	4	1.742e-2	3	7282.589	15	NC	1
586			min	-.007	2	-.658	2	0	1	-1.699e-2	2	151.862	2	2995.428	4
587		9	max	.011	3	.538	3	.403	4	1.809e-2	3	6826.948	15	NC	1
588			min	-.007	2	-.719	2	0	10	-1.894e-2	2	142.261	2	2678.202	4
589		10	max	.011	3	.558	3	.381	4	1.689e-2	3	6687.073	15	NC	1
590			min	-.007	2	-.739	2	0	1	-1.992e-2	2	139.461	2	2566.343	4
591		11	max	.011	3	.545	3	.357	4	1.57e-2	3	6826.177	15	NC	1
592			min	-.007	2	-.718	2	0	1	-2.09e-2	2	142.811	2	2568.095	4
593		12	max	.01	3	.5	3	.331	4	1.387e-2	3	7281.013	15	NC	1
594			min	-.007	2	-.655	2	0	10	-1.991e-2	2	153.44	2	2644.352	4
595		13	max	.01	3	.427	3	.299	4	1.11e-2	3	8147.55	15	NC	1
596			min	-.007	2	-.553	2	0	10	-1.596e-2	2	173.89	2	3076.821	4
597		14	max	.01	3	.333	3	.263	4	8.323e-3	3	9606.825	15	NC	1
598			min	-.007	2	-.426	2	-.001	1	-1.201e-2	2	208.698	2	4168.234	5
599		15	max	.009	3	.227	3	.226	4	5.549e-3	3	NC	15	NC	1
600			min	-.007	2	-.285	2	-.003	1	-8.061e-3	2	268.239	2	6941.184	5
601		16	max	.009	3	.116	3	.189	4	6.326e-3	5	NC	5	NC	1
602			min	-.007	2	-.142	2	-.004	1	-4.111e-3	2	377.568	2	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
603		17	max	.009	3	.007	3	.156	4	7.891e-3	4	NC	5	NC	1
604			min	-.006	2	-.008	2	-.005	1	-3.161e-4	1	609.076	2	NC	1
605		18	max	.009	3	.106	2	.129	4	3.909e-3	5	NC	5	NC	1
606			min	-.006	2	-.093	3	-.003	1	-4.365e-3	2	1282.443	2	NC	1
607		19	max	.009	3	.209	2	.11	4	2.828e-3	3	NC	1	NC	1
608			min	-.006	2	-.187	3	0	10	-8.715e-3	2	NC	1	NC	1

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

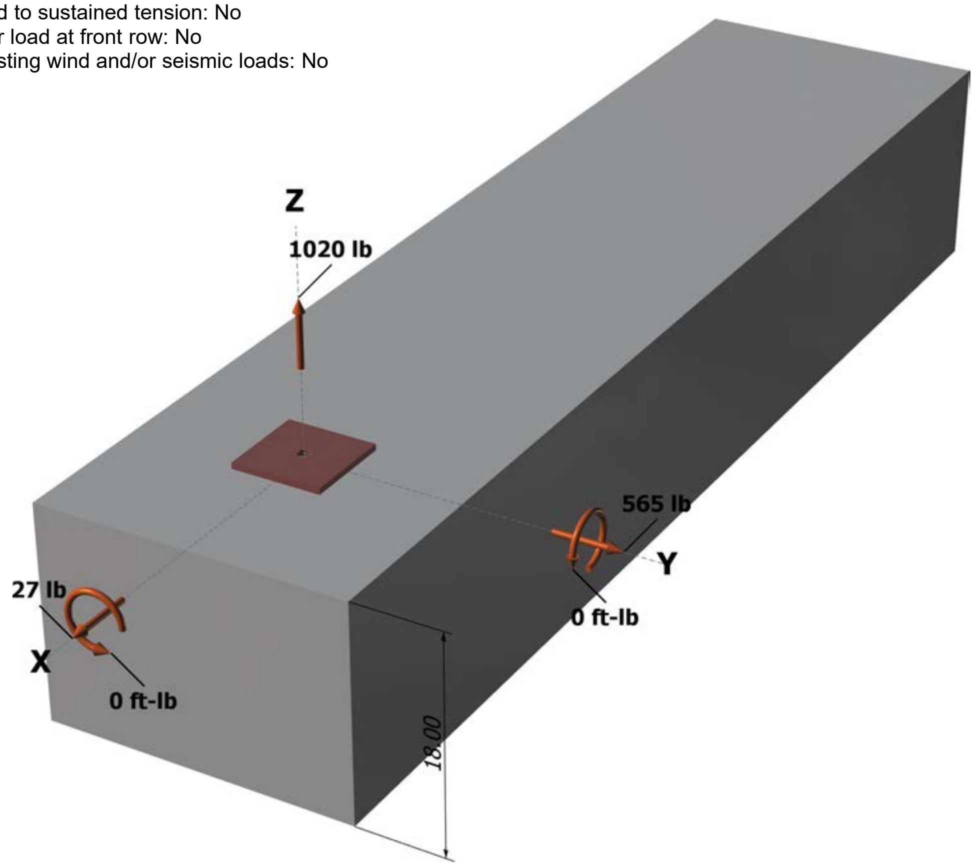
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

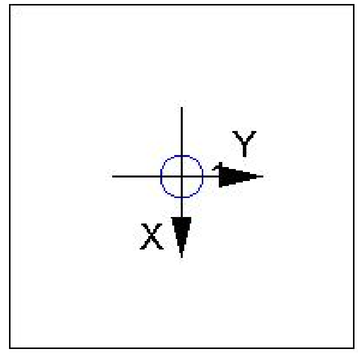
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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)

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in y-direction:

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

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

Shear parallel to edge in x-direction:

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

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

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

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

Shear parallel to edge in y-direction:

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

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

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

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

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

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

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

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

11. Results

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

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

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

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

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

12. Warnings

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

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

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

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

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

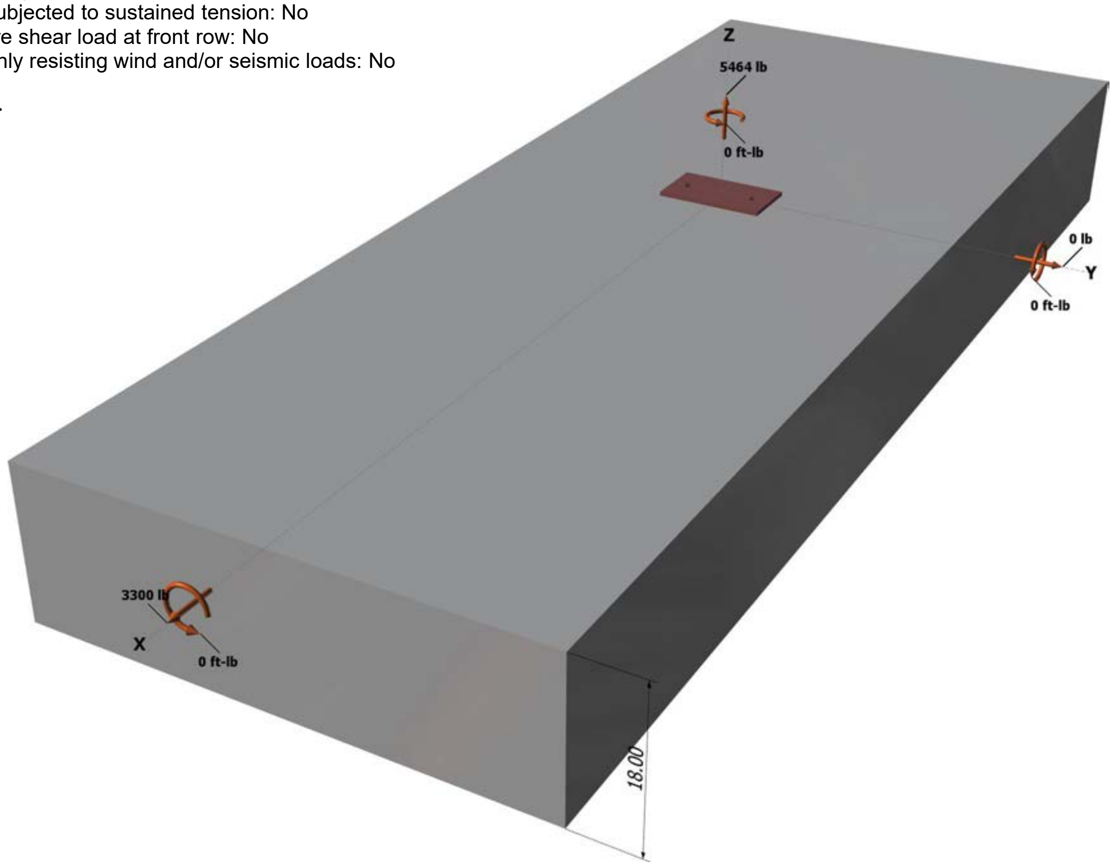
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

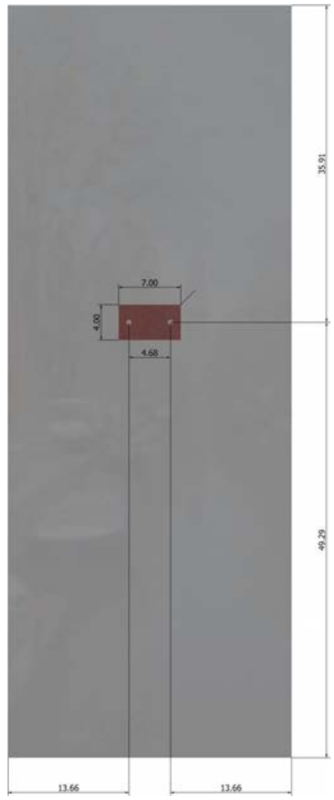
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout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

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

<Figure 1>



<Figure 2>



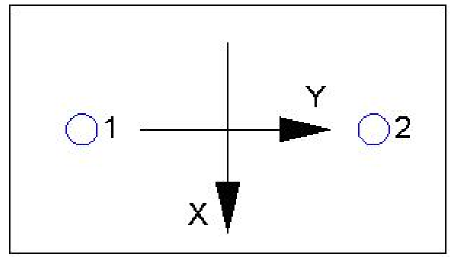
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

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

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

<Figure 3>



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

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

Shear parallel to edge in x-direction:

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

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

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

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

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

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

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

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

ϕV_{cpg} (lb)
20601

11. Results

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

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

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

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

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

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

12. Warnings

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

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

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