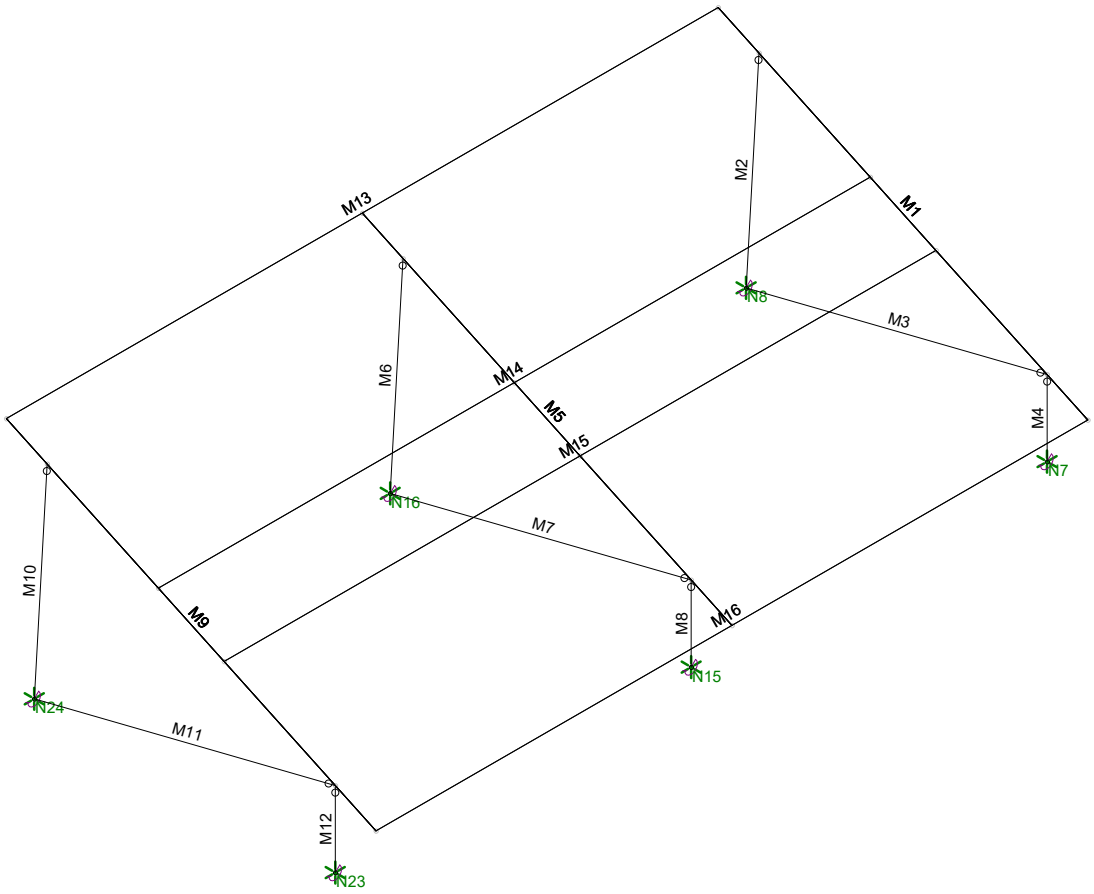


Schletter, Inc.		25° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-05	

1. INTRODUCTION

1.1 Project Description

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

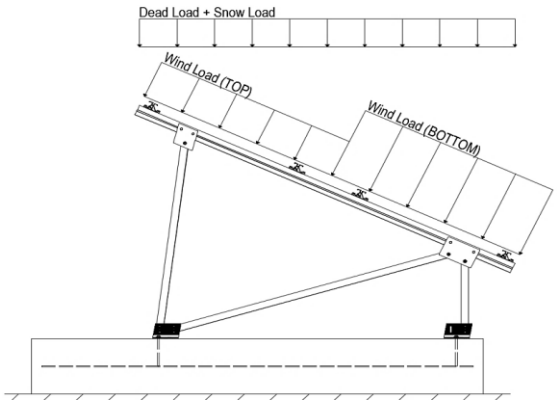
1.2 Construction

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

PV modules are required to meet the following specifications:

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

Modules Per Row =	2
Module Tilt =	25°
Maximum Height Above Grade =	3 ft



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

1.3 Technical Codes

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

2. LOAD ACTIONS

2.1 Permanent Loads

g_{MAX} =	3.00	psf	*Self-weight of the PV modules.*
g_{MIN} =	1.75	psf	

2.2 Snow Loads

Ground Snow Load, P_g =	30.00	psf	
Sloped Roof Snow Load, P_s =	18.56	psf	*(ASCE 7-05, Eq. 7-2)*
I_s =	1.00		
C_s =	0.82		
C_e =	0.90		
C_t =	1.20		

2.3 Wind Loads

Design Wind Speed, V =	110	mph	Exposure Category = C
Height <	15	ft	Importance Category = II
Peak Velocity Pressure, q_z =	19.00	psf	*Including the gust factor, G=0.85. (ASCE 7-05, Eq. 6-15)*

Pressure Coefficients

$Cf+_{TOP}$ =	1.100	*(Pressure)*	*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.*
$Cf+_{BOTTOM}$ =	1.700		
$Cf-_{TOP, OUTER PURLIN}$ =	-2.500		
$Cf-_{TOP, INNER PURLIN}$ =	-1.900	*(Suction)*	
$Cf-_{BOTTOM}$ =	-1.000		

2.4 Seismic Loads

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

2.5 Combination of Loads

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

Strength Design, LRFD

Component stresses are checked using the following LRFD load combinations:

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

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

Allowable Stress Design, ASD

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

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

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

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

3. STRUCTURAL ANALYSIS

3.1 RISA Results

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

3.2 RISA Components

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

Purlins	Location
M13	Top
M14	Mid-Top
M15	Mid-Bottom
M16	Bottom

Diagonal Struts	Location
M3	Outer
M7	Inner
M11	Outer

Front Reactions	Location
N7	Outer
N15	Inner
N23	Outer

Girders	Location
M1	Outer
M5	Inner
M9	Outer

Rear Struts	Location
M2	Outer
M6	Inner
M10	Outer

Rear Reactions	Location
N8	Outer
N16	Inner
N24	Outer

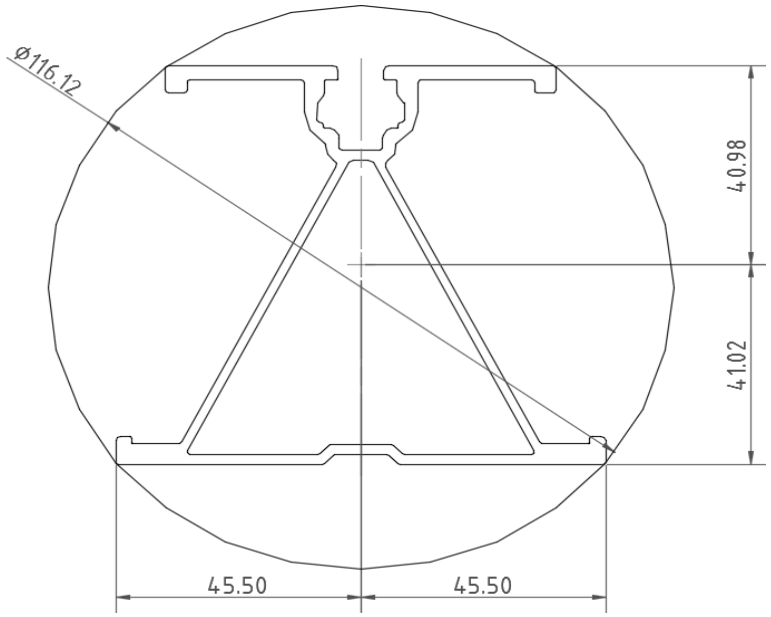
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

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 =	96	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 =	1.486	k-ft
M_z =	0.255	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	76%	

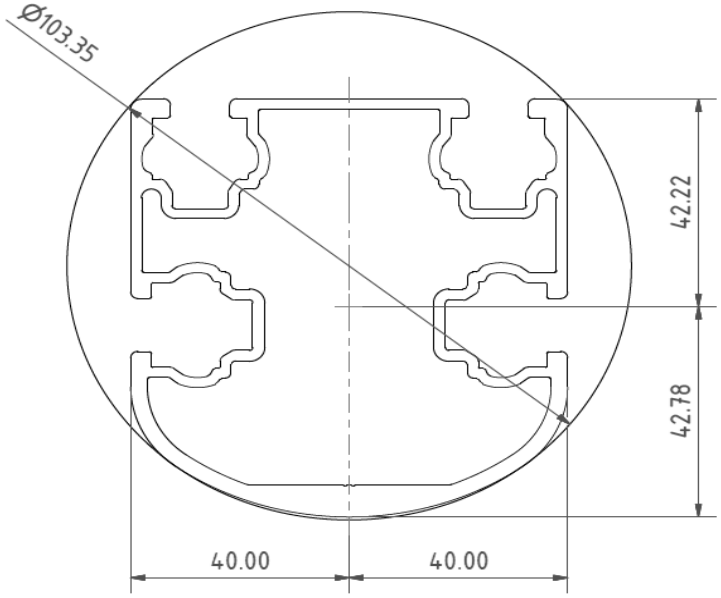


DETAIL VIEW

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).

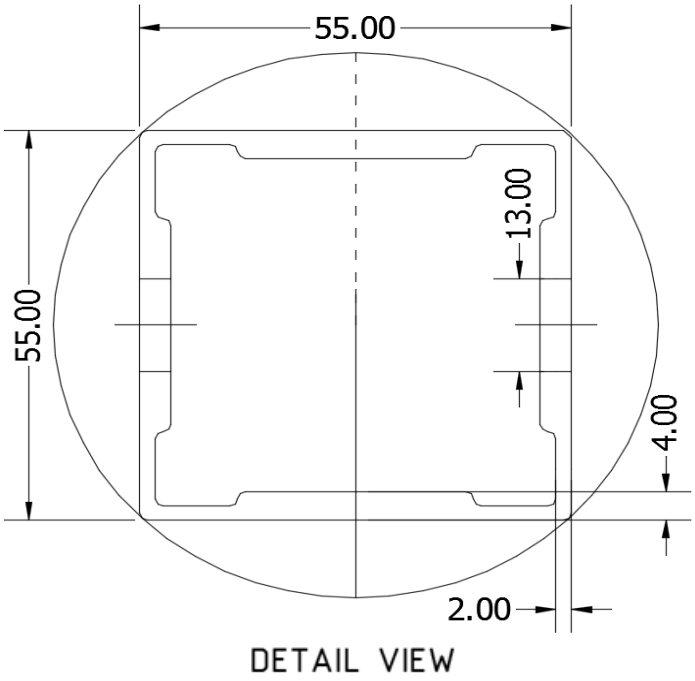
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	104.56	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.00	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.327	k-ft
M_z =	0.000	k-ft
P_n =	-0.885	k
$M_{y\ allowable}$ =	3.422	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	99%	



4.3 Front Strut Design

The front aluminum strut connects a portion of the girder to the foundation. Vertical girder forces are then transferred down through the strut into the foundation. The strut is attached with single M12 bolts at each end. See Appendix A.3 for detailed member calculations. Section units are in (mm).

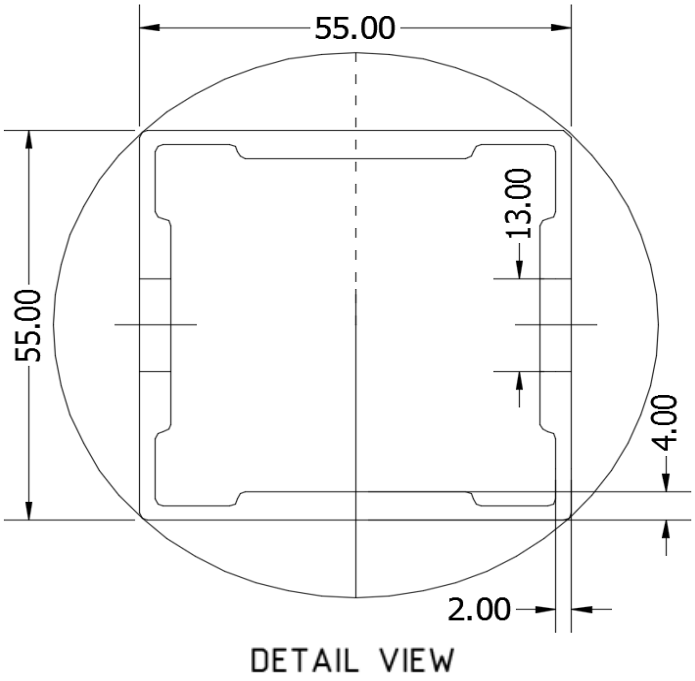
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.507	k-ft
P_n =	0.564	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	38%	



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).

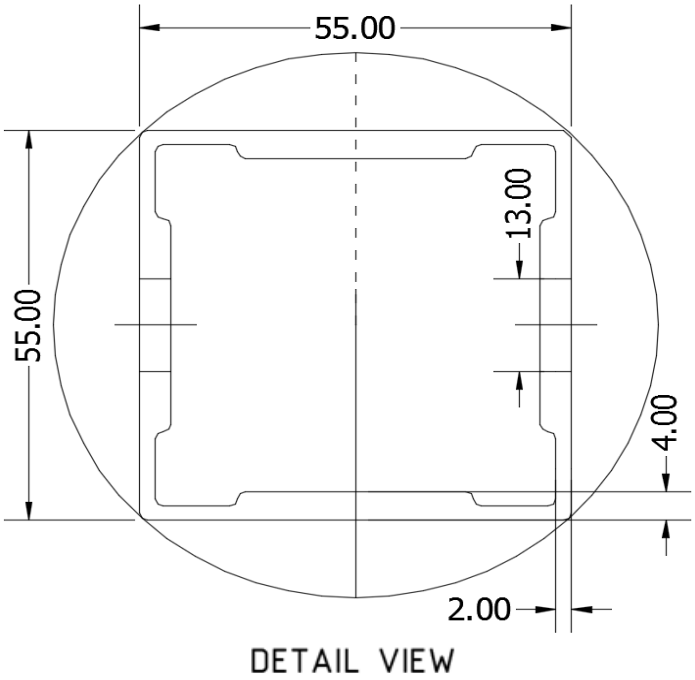
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	98.03	in
$\Phi F_{ty\ AXIAL}$ =	6.11	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.012	k-ft
M_z =	0.000	k-ft
P_n =	2.252	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	6.000	k
Utilization =	38%	



4.5 Rear Strut Design

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

Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	69.80	in
$\Phi F_{ty\ AXIAL}$ =	10.82	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	-0.012	k-ft
M_z =	0.000	k-ft
P_n =	3.248	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	10.629	k
Utilization =	31%	



5. FOUNDATION DESIGN CALCULATIONS

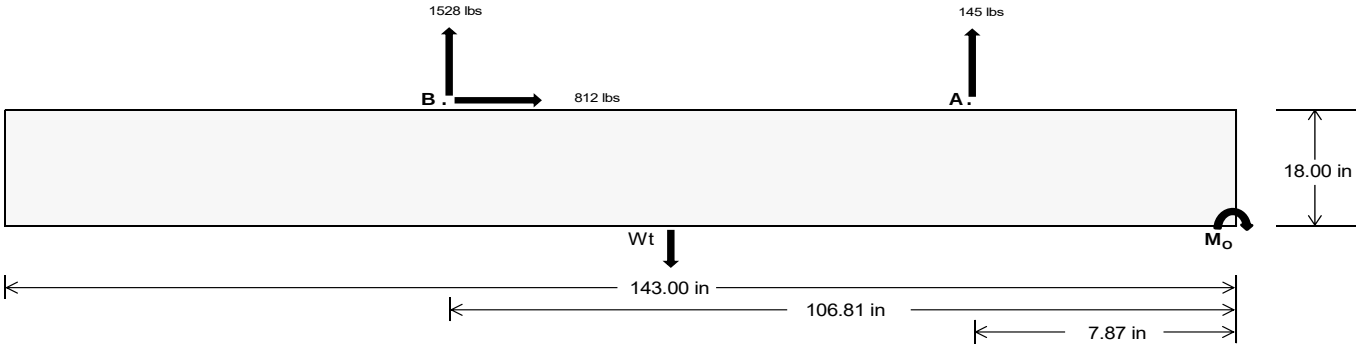
5.1 Helical Pile Foundations

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 =	612.84	6367.08	k
Compressive Load =	3769.53	4936.11	k
Lateral Load =	343.70	3377.88	k
Moment (Weak Axis) =	0.69	0.30	k

5.2 Design of Ballast Foundations

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



Concrete Properties

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

Overturning Check

M_O =	178985.8 in-lbs
Resisting Force Required =	2503.30 lbs
S.F. =	1.67
Weight Required =	4172.16 lbs
Minimum Width =	35 in
Weight Provided =	7559.64 lbs

Sliding

Force =	812.06 lbs
Friction =	0.4
Weight Required =	2030.14 lbs
Resisting Weight =	7559.64 lbs
Additional Weight Required =	0 lbs

Cohesion

Sliding Force =	812.06 lbs
Cohesion =	130 psf
Area =	34.76 ft^2
Resisting =	3779.82 lbs
Additional Weight Required =	0 lbs

Shear Key

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

Footing Reinforcement

Use fiber reinforcing with (2) #5 rebar.

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

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

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

Shear key is not required.

Bearing Pressure

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

ASD LC	1.0D + 1.0S				1.0D + 1.0W				1.0D + 0.75L + 0.75W + 0.75S				0.6D + 1.0W			
Width	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in
F_A	1261 lbs	1261 lbs	1261 lbs	1261 lbs	1456 lbs	1456 lbs	1456 lbs	1456 lbs	1921 lbs	1921 lbs	1921 lbs	1921 lbs	-289 lbs	-289 lbs	-289 lbs	-289 lbs
F_B	1303 lbs	1303 lbs	1303 lbs	1303 lbs	2100 lbs	2100 lbs	2100 lbs	2100 lbs	2432 lbs	2432 lbs	2432 lbs	2432 lbs	-3056 lbs	-3056 lbs	-3056 lbs	-3056 lbs
F_V	151 lbs	151 lbs	151 lbs	151 lbs	1454 lbs	1454 lbs	1454 lbs	1454 lbs	1191 lbs	1191 lbs	1191 lbs	1191 lbs	-1624 lbs	-1624 lbs	-1624 lbs	-1624 lbs
P_{total}	10123 lbs	10339 lbs	10555 lbs	10771 lbs	11116 lbs	11332 lbs	11548 lbs	11764 lbs	11912 lbs	12128 lbs	12344 lbs	12560 lbs	1190 lbs	1320 lbs	1449 lbs	1579 lbs
M	3080 lbs-ft	3080 lbs-ft	3080 lbs-ft	3080 lbs-ft	3723 lbs-ft	3723 lbs-ft	3723 lbs-ft	3723 lbs-ft	4814 lbs-ft	4814 lbs-ft	4814 lbs-ft	4814 lbs-ft	5025 lbs-ft	5025 lbs-ft	5025 lbs-ft	5025 lbs-ft
e	0.30 ft	0.30 ft	0.29 ft	0.29 ft	0.33 ft	0.33 ft	0.32 ft	0.32 ft	0.40 ft	0.40 ft	0.39 ft	0.38 ft	4.22 ft	3.81 ft	3.47 ft	3.18 ft
L/6	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft
f_{min}	246.6 psf	245.8 psf	245.1 psf	244.3 psf	265.9 psf	264.5 psf	263.3 psf	262.1 psf	273.0 psf	271.5 psf	270.0 psf	268.6 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	335.9 psf	332.6 psf	329.5 psf	326.5 psf	373.8 psf	369.4 psf	365.3 psf	361.4 psf	412.5 psf	407.1 psf	401.9 psf	397.1 psf	156.7 psf	136.3 psf	125.8 psf	119.8 psf

Maximum Bearing Pressure = 412 psf
Allowable Bearing Pressure = 1500 psf

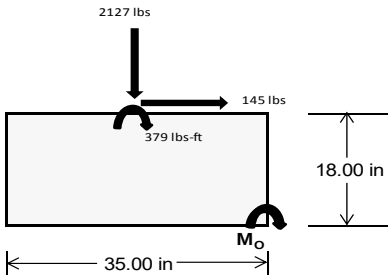
Use a 143in long x 35in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O =	2505.3 ft-lbs
Resisting Force Required =	1717.91 lbs
S.F. =	1.67
Weight Required =	2863.19 lbs
Minimum Width =	35 in in
Weight Provided =	7559.64 lbs

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



Bearing Pressure

ASD LC	1.238D + 0.875E			1.1785D + 0.65625E + 0.75S			0.362D + 0.875E		
Width	35 in			35 in			35 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	290 lbs	588 lbs	190 lbs	808 lbs	2127 lbs	731 lbs	120 lbs	172 lbs	21 lbs
F_V	202 lbs	197 lbs	205 lbs	148 lbs	145 lbs	160 lbs	202 lbs	198 lbs	204 lbs
P_{total}	9649 lbs	9947 lbs	9549 lbs	9717 lbs	11036 lbs	9640 lbs	2856 lbs	2909 lbs	2757 lbs
M	800 lbs-ft	787 lbs-ft	810 lbs-ft	596 lbs-ft	596 lbs-ft	635 lbs-ft	799 lbs-ft	785 lbs-ft	804 lbs-ft
e	0.08 ft	0.08 ft	0.08 ft	0.06 ft	0.05 ft	0.07 ft	0.28 ft	0.27 ft	0.29 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}	230.3 psf	239.6 psf	226.8 psf	244.3 psf	282.2 psf	239.8 psf	34.9 psf	37.2 psf	31.8 psf
f_{max}	324.9 psf	332.8 psf	322.7 psf	314.9 psf	352.8 psf	314.9 psf	129.5 psf	130.1 psf	126.9 psf

Maximum Bearing Pressure = 353 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 33in wide x 18in tall ballast foundation and fiber reinforcing with (2) #5 rebar.

5.3 Foundation Anchors

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

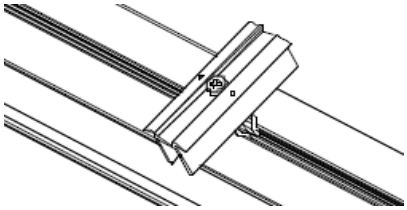
6. DESIGN OF JOINTS AND CONNECTIONS

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

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

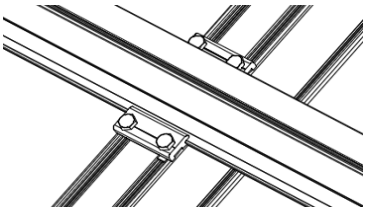
Fastening of Modules to Purlins

Maximum Uplifting Force	=	0.841 k
Allowable Uplift	=	1.214 k
Utilization	=	69%



Fastening of Purlins to Girders

Maximum Uplifting Force	=	2.400 k
Allowable Uplift	=	4.357 k
Utilization	=	55%



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	=	2.900 k
M12 Bolt Capacity	=	12.808 k
Strut Bearing Capacity	=	7.421 k
Utilization	=	39%

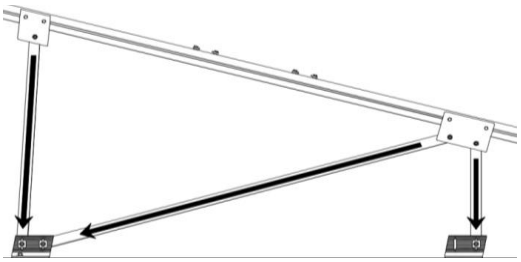
Rear Strut

Maximum Axial Load	=	4.332 k
M12 Bolt Capacity	=	12.808 k
Strut Bearing Capacity	=	7.421 k
Utilization	=	58%

Diagonal Strut

Maximum Axial Load	=	2.406 k
M12 Bolt Shear Capacity	=	12.808 k
Strut Bearing Capacity	=	7.421 k
Utilization	=	32%

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

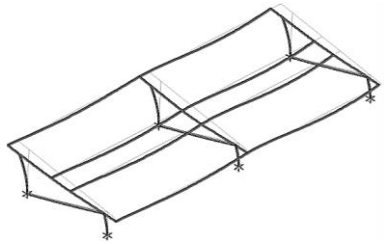
7.1 Seismic Drift

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}	=	56.48 in
Allowable Story Drift for All Other Structures, Δ	= {	$0.020h_{sx}$
		1.130 in
Max Drift, Δ_{MAX}	=	0.677 in

0.677 ≤ 1.13, 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 =	96 in	L_b =	96
J =	0.432	J =	0.432
	265.581		168.894
$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$		$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$	
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=	28.0 ksi	φF_L=	29.1
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
φF_LSt=	25.1 ksi	φF_LWk=	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

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 2.26776

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.89749

φF_L= (φccFcy)/(λ²)

φF_L= 6.10803 ksi

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

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

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 69.80 in
J = 0.942
108.93

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

S1 = 0.51461

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

S2 = 1701.56
φF_L = φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L = 30.0 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 = 69.8
J = 0.942
108.93

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

S1 = 0.51461

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

S2 = 1701.56
φF_L = φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L = 30.0

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 = 1.61471

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.80606

φF_L= (φccFcy)/(λ²)

φF_L= 10.8205 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

$\varphi F_L = \varphi y Fcy$

φF_L = 33.25 ksi

φF_L = 10.82 ksi

A = 663.99 mm^2

1.03 in^2

P_{max} = 11.14 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	-55.176	-55.176	0	0
2	M14	Y	-55.176	-55.176	0	0
3	M15	Y	-55.176	-55.176	0	0
4	M16	Y	-55.176	-55.176	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	-68.563	-68.563	0	0
2	M14	y	-68.563	-68.563	0	0
3	M15	y	-105.961	-105.961	0	0
4	M16	y	-105.961	-105.961	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	155.825	155.825	0	0
2	M14	y	118.427	118.427	0	0
3	M15	y	62.33	62.33	0	0
4	M16	y	62.33	62.33	0	0

Member Distributed Loads (BLC 6 : Seismic - Lateral)

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

Load Combinations

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

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N8	max	699.38	2	1231.069	2	.633	1	.003	1	0	1	0	1
2		min	-858.464	3	-1557.082	3	-43.434	5	-.229	4	0	1	0	1
3	N7	max	.028	9	1081.572	1	-.707	12	-.001	12	0	1	0	1
4		min	-.23	2	-124.25	3	-264.385	4	-.527	4	0	1	0	1
5	N15	max	0	4	2899.637	1	0	2	0	2	0	1	0	1
6		min	-2.341	2	-471.413	3	-250.54	4	-.507	4	0	1	0	1
7	N16	max	2380.4	2	3797.004	2	0	3	0	3	0	1	0	1
8		min	-2598.373	3	-4897.756	3	-43.476	5	-.231	4	0	1	0	1
9	N23	max	.04	14	1081.572	1	10.736	1	.021	1	0	1	0	1
10		min	-.23	2	-124.25	3	-256.388	5	-.514	4	0	1	0	1
11	N24	max	699.38	2	1231.069	2	-.057	12	0	12	0	1	0	1
12		min	-858.464	3	-1557.082	3	-44.133	5	-.23	4	0	1	0	1
13	Totals:	max	3776.36	2	10899.157	2	0	2						
14		min	-4315.84	3	-8731.834	3	-897.049	5						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
1	M13	1	max	69.838	4	431.781	1	-8.264	12	0	15	.179	1	0	4
2			min	4.75	12	-734.386	3	-162.474	1	-.015	2	.013	12	0	3
3		2	max	64.129	1	300.936	1	-6.696	12	0	15	.109	4	.557	3
4			min	4.75	12	-517.813	3	-124.195	1	-.015	2	.003	10	-.326	1
5		3	max	64.129	1	170.09	1	-5.128	12	0	15	.065	5	.921	3
6			min	4.75	12	-301.241	3	-85.916	1	-.015	2	-.042	1	-.535	1
7		4	max	64.129	1	39.244	1	-3.559	12	0	15	.036	5	1.092	3
8			min	4.75	12	-84.668	3	-47.637	1	-.015	2	-.101	1	-.628	1
9		5	max	64.129	1	131.905	3	0	10	0	15	.01	5	1.071	3
10			min	4.75	12	-92.811	2	-31.218	4	-.015	2	-.126	1	-.605	1
11		6	max	64.129	1	348.478	3	28.922	1	0	15	-.006	12	.858	3
12			min	1.789	15	-223.517	2	-26.059	5	-.015	2	-.118	1	-.465	1
13		7	max	64.129	1	565.051	3	67.201	1	0	15	-.006	12	.452	3
14			min	-7.663	5	-354.224	2	-23.671	5	-.015	2	-.075	1	-.209	1
15		8	max	64.129	1	781.623	3	105.48	1	0	15	.004	2	.171	2
16			min	-18.153	5	-484.93	2	-21.284	5	-.015	2	-.057	4	-.147	3
17		9	max	64.129	1	998.196	3	143.759	1	0	15	.113	1	.66	2
18			min	-28.642	5	-615.637	2	-18.897	5	-.015	2	-.074	5	-.938	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	64.129	1	746.343	2	-5.851	12	.015	2	.257	1	1.265	2
20			min	4.75	12	-1214.769	3	-182.038	1	-.004	3	.004	12	-1.922	3
21		11	max	64.129	1	615.637	2	-4.282	12	.015	2	.113	4	.66	2
22			min	4.75	12	-998.196	3	-143.759	1	0	15	-.002	3	-.938	3
23		12	max	64.129	1	484.93	2	-2.714	12	.015	2	.057	4	.171	2
24			min	4.75	12	-781.623	3	-105.48	1	0	15	-.006	3	-.147	3
25		13	max	64.129	1	354.224	2	-1.146	12	.015	2	.027	5	.452	3
26			min	4.75	12	-565.051	3	-67.201	1	0	15	-.075	1	-.209	1
27		14	max	64.129	1	223.517	2	.787	3	.015	2	0	15	.858	3
28			min	3.407	15	-348.478	3	-36.176	4	0	15	-.118	1	-.465	1
29		15	max	64.129	1	92.811	2	9.357	1	.015	2	-.005	12	1.071	3
30			min	-5.328	5	-131.905	3	-27.164	5	0	15	-.126	1	-.605	1
31		16	max	64.129	1	84.668	3	47.637	1	.015	2	-.002	12	1.092	3
32			min	-15.818	5	-39.244	1	-24.777	5	0	15	-.101	1	-.628	1
33		17	max	64.129	1	301.241	3	85.916	1	.015	2	.003	3	.921	3
34			min	-26.307	5	-170.09	1	-22.39	5	0	15	-.08	4	-.535	1
35		18	max	64.129	1	517.813	3	124.195	1	.015	2	.052	1	.557	3
36			min	-36.796	5	-300.936	1	-20.002	5	0	15	-.089	5	-.326	1
37		19	max	64.129	1	734.386	3	162.474	1	.015	2	.179	1	0	1
38			min	-47.286	5	-431.781	1	-17.615	5	0	15	-.105	5	0	3
39	M14	1	max	45.684	4	498.024	2	-8.576	12	.013	3	.247	4	0	1
40			min	2.522	12	-593.011	3	-169.379	1	-.015	2	.015	12	0	3
41		2	max	40.045	1	367.317	2	-7.008	12	.013	3	.169	4	.454	3
42			min	2.522	12	-429.627	3	-131.1	1	-.015	2	.006	10	-.385	2
43		3	max	40.045	1	236.611	2	-5.439	12	.013	3	.101	5	.764	3
44			min	2.522	12	-266.242	3	-92.821	1	-.015	2	-.017	1	-.653	2
45		4	max	40.045	1	105.904	2	-3.871	12	.013	3	.057	5	.928	3
46			min	2.522	12	-102.858	3	-61.471	4	-.015	2	-.083	1	-.805	2
47		5	max	40.045	1	60.527	3	-.717	10	.013	3	.015	5	.947	3
48			min	-4.997	5	-28.8	1	-50.761	4	-.015	2	-.114	1	-.841	2
49		6	max	40.045	1	223.911	3	22.017	1	.013	3	-.005	12	.82	3
50			min	-15.486	5	-159.646	1	-43.722	5	-.015	2	-.112	1	-.761	2
51		7	max	40.045	1	387.296	3	60.296	1	.013	3	-.005	12	.549	3
52			min	-25.976	5	-290.492	1	-41.334	5	-.015	2	-.081	4	-.565	2
53		8	max	40.045	1	550.68	3	98.575	1	.013	3	.002	10	.132	3
54			min	-36.465	5	-421.338	1	-38.947	5	-.015	2	-.102	4	-.252	2
55		9	max	40.045	1	714.065	3	136.854	1	.013	3	.1	1	.205	1
56			min	-46.954	5	-552.183	1	-36.56	5	-.015	2	-.132	5	-.43	3
57		10	max	70.934	4	683.029	1	-5.539	12	.015	2	.248	4	.754	1
58			min	2.522	12	-877.449	3	-175.133	1	-.013	3	.003	12	-1.138	3
59		11	max	60.445	4	552.183	1	-3.971	12	.015	2	.168	4	.205	1
60			min	2.522	12	-714.065	3	-136.854	1	-.013	3	-.002	3	-.43	3
61		12	max	49.956	4	421.338	1	-2.402	12	.015	2	.098	4	.132	3
62			min	2.522	12	-550.68	3	-98.575	1	-.013	3	-.006	3	-.252	2
63		13	max	40.045	1	290.492	1	-.834	12	.015	2	.053	5	.549	3
64			min	2.522	12	-387.296	3	-62.544	4	-.013	3	-.075	1	-.565	2
65		14	max	40.045	1	159.646	1	1.257	3	.015	2	.011	5	.82	3
66			min	2.522	12	-223.911	3	-51.834	4	-.013	3	-.112	1	-.761	2
67		15	max	40.045	1	28.8	1	16.262	1	.015	2	-.004	12	.947	3
68			min	2.522	12	-60.527	3	-43.962	5	-.013	3	-.114	1	-.841	2
69		16	max	40.045	1	102.858	3	54.542	1	.015	2	-.001	12	.928	3
70			min	-.974	5	-105.904	2	-41.575	5	-.013	3	-.086	4	-.805	2
71		17	max	40.045	1	266.242	3	92.821	1	.015	2	.005	3	.764	3
72			min	-11.464	5	-236.611	2	-39.188	5	-.013	3	-.108	4	-.653	2
73		18	max	40.045	1	429.627	3	131.1	1	.015	2	.082	1	.454	3
74			min	-21.953	5	-367.317	2	-36.801	5	-.013	3	-.137	5	-.385	2
75		19	max	40.045	1	593.011	3	169.379	1	.015	2	.216	1	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
76			min	-32.442	5	-498.024	2	-34.414	5	-.013	3	-.168	5	0	3
77	M15	1	max	83.092	5	677.617	2	-8.437	12	.016	2	.314	4	0	2
78			min	-42.304	1	-324.624	3	-169.357	1	-.011	3	.015	12	0	3
79		2	max	72.602	5	493.722	2	-6.869	12	.016	2	.221	4	.251	3
80			min	-42.304	1	-241.022	3	-131.078	1	-.011	3	.006	10	-.521	2
81		3	max	62.113	5	309.827	2	-5.3	12	.016	2	.139	5	.428	3
82			min	-42.304	1	-157.419	3	-92.799	1	-.011	3	-.017	1	-.878	2
83		4	max	51.624	5	125.932	2	-3.732	12	.016	2	.08	5	.531	3
84			min	-42.304	1	-73.817	3	-77.692	4	-.011	3	-.083	1	-1.071	2
85		5	max	41.134	5	9.785	3	-.782	10	.016	2	.024	5	.56	3
86			min	-42.304	1	-57.962	2	-66.982	4	-.011	3	-.114	1	-1.102	2
87		6	max	30.645	5	93.387	3	22.039	1	.016	2	-.005	12	.514	3
88			min	-42.304	1	-241.857	2	-59.902	5	-.011	3	-.112	1	-.968	2
89		7	max	20.156	5	176.989	3	60.318	1	.016	2	-.005	12	.394	3
90			min	-42.304	1	-425.752	2	-57.515	5	-.011	3	-.101	4	-.672	2
91		8	max	9.666	5	260.591	3	98.597	1	.016	2	.002	10	.199	3
92			min	-42.304	1	-609.647	2	-55.128	5	-.011	3	-.136	4	-.211	2
93		9	max	-.46	15	344.193	3	136.876	1	.016	2	.1	1	.412	2
94			min	-42.304	1	-793.541	2	-52.741	5	-.011	3	-.181	5	-.07	3
95		10	max	-3.203	12	977.436	2	8.375	3	.011	3	.311	4	1.199	2
96			min	-42.304	1	-266.925	12	-175.155	1	-.016	2	.004	12	-.413	3
97		11	max	-3.203	12	793.541	2	-4.11	12	.011	3	.217	4	.412	2
98			min	-42.304	1	-344.193	3	-136.876	1	-.016	2	-.001	3	-.07	3
99		12	max	-3.203	12	609.647	2	-2.542	12	.011	3	.133	4	.199	3
100			min	-42.304	1	-260.591	3	-98.597	1	-.016	2	-.006	3	-.211	2
101		13	max	-3.203	12	425.752	2	-.973	12	.011	3	.073	5	.394	3
102			min	-42.304	1	-176.989	3	-78.802	4	-.016	2	-.075	1	-.672	2
103		14	max	-3.203	12	241.857	2	1.035	3	.011	3	.017	5	.514	3
104			min	-46.659	4	-93.387	3	-68.092	4	-.016	2	-.112	1	-.968	2
105		15	max	-3.203	12	57.962	2	16.241	1	.011	3	-.004	12	.56	3
106			min	-57.148	4	-9.785	3	-60.145	5	-.016	2	-.114	1	-1.102	2
107		16	max	-3.203	12	73.817	3	54.52	1	.011	3	-.001	12	.531	3
108			min	-67.637	4	-125.932	2	-57.758	5	-.016	2	-.109	4	-1.071	2
109		17	max	-3.203	12	157.419	3	92.799	1	.011	3	.004	3	.428	3
110			min	-78.127	4	-309.827	2	-55.371	5	-.016	2	-.146	4	-.878	2
111		18	max	-3.203	12	241.022	3	131.078	1	.011	3	.082	1	.251	3
112			min	-88.616	4	-493.722	2	-52.984	5	-.016	2	-.189	5	-.521	2
113		19	max	-3.203	12	324.624	3	169.357	1	.011	3	.216	1	0	2
114			min	-99.105	4	-677.617	2	-50.597	5	-.016	2	-.235	5	0	5
115	M16	1	max	77.924	5	612.675	2	-7.828	12	.01	1	.223	4	0	2
116			min	-71.972	1	-271.686	3	-163.036	1	-.013	3	.012	12	0	3
117		2	max	67.435	5	428.78	2	-6.26	12	.01	1	.15	4	.204	3
118			min	-71.972	1	-188.083	3	-124.757	1	-.013	3	.004	10	-.463	2
119		3	max	56.945	5	244.885	2	-4.692	12	.01	1	.094	5	.334	3
120			min	-71.972	1	-104.481	3	-86.478	1	-.013	3	-.04	1	-.762	2
121		4	max	46.456	5	60.99	2	-3.123	12	.01	1	.055	5	.39	3
122			min	-71.972	1	-20.879	3	-54.507	4	-.013	3	-.1	1	-.898	2
123		5	max	35.967	5	62.723	3	-.283	10	.01	1	.018	5	.371	3
124			min	-71.972	1	-122.904	2	-43.797	4	-.013	3	-.126	1	-.871	2
125		6	max	25.477	5	146.325	3	28.36	1	.01	1	-.006	12	.279	3
126			min	-71.972	1	-306.799	2	-38.454	5	-.013	3	-.118	1	-.68	2
127		7	max	14.988	5	229.927	3	66.639	1	.01	1	-.005	12	.111	3
128			min	-71.972	1	-490.694	2	-36.067	5	-.013	3	-.075	1	-.325	2
129		8	max	4.499	5	313.529	3	104.918	1	.01	1	.003	2	.193	2
130			min	-71.972	1	-674.589	2	-33.68	5	-.013	3	-.083	4	-.13	3
131		9	max	-3.977	15	397.132	3	143.197	1	.01	1	.111	1	.874	2
132			min	-71.972	1	-858.484	2	-31.293	5	-.013	3	-.111	5	-.446	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
133		10	max	-4.719	12	1042.378	2	-6.287	12	.013	3	.255	1	1.719	2
134			min	-71.972	1	-480.734	3	-181.476	1	-.01	1	.006	12	-.836	3
135		11	max	-1.87	15	858.484	2	-4.718	12	.013	3	.15	4	.874	2
136			min	-71.972	1	-397.132	3	-143.197	1	-.01	1	0	3	-.446	3
137		12	max	-4.719	12	674.589	2	-3.15	12	.013	3	.083	4	.193	2
138			min	-71.972	1	-313.529	3	-104.918	1	-.01	1	-.004	3	-.13	3
139		13	max	-4.719	12	490.694	2	-1.582	12	.013	3	.041	5	.111	3
140			min	-71.972	1	-229.927	3	-66.639	1	-.01	1	-.075	1	-.325	2
141		14	max	-4.719	12	306.799	2	.089	3	.013	3	.003	5	.279	3
142			min	-71.972	1	-146.325	3	-48.568	4	-.01	1	-.118	1	-.68	2
143		15	max	-4.719	12	122.904	2	9.919	1	.013	3	-.005	12	.371	3
144			min	-71.972	1	-62.723	3	-39.533	5	-.01	1	-.126	1	-.871	2
145		16	max	-4.719	12	20.879	3	48.198	1	.013	3	-.003	12	.39	3
146			min	-72.115	4	-60.99	2	-37.146	5	-.01	1	-.1	1	-.898	2
147		17	max	-4.719	12	104.481	3	86.478	1	.013	3	.001	3	.334	3
148			min	-82.604	4	-244.885	2	-34.759	5	-.01	1	-.109	4	-.762	2
149		18	max	-4.719	12	188.083	3	124.757	1	.013	3	.054	1	.204	3
150			min	-93.094	4	-428.78	2	-32.372	5	-.01	1	-.129	5	-.463	2
151		19	max	-4.719	12	271.686	3	163.036	1	.013	3	.182	1	0	2
152			min	-103.583	4	-612.675	2	-29.985	5	-.01	1	-.157	5	0	5
153	M2	1	max	1058.425	2	2.07	4	.51	1	0	3	0	3	0	1
154			min	-1376.842	3	.506	15	-36.684	4	0	4	0	1	0	1
155		2	max	1058.898	2	2.032	4	.51	1	0	3	0	1	0	15
156			min	-1376.487	3	.497	15	-37.095	4	0	4	-.012	4	0	4
157		3	max	1059.372	2	1.995	4	.51	1	0	3	0	1	0	15
158			min	-1376.131	3	.489	15	-37.507	4	0	4	-.024	4	-.001	4
159		4	max	1059.846	2	1.958	4	.51	1	0	3	0	1	0	15
160			min	-1375.776	3	.48	15	-37.918	4	0	4	-.036	4	-.002	4
161		5	max	1060.32	2	1.921	4	.51	1	0	3	0	1	0	15
162			min	-1375.421	3	.471	15	-38.329	4	0	4	-.048	4	-.003	4
163		6	max	1060.793	2	1.884	4	.51	1	0	3	0	1	0	15
164			min	-1375.066	3	.462	15	-38.741	4	0	4	-.06	4	-.003	4
165		7	max	1061.267	2	1.847	4	.51	1	0	3	0	1	0	15
166			min	-1374.71	3	.454	15	-39.152	4	0	4	-.073	4	-.004	4
167		8	max	1061.741	2	1.81	4	.51	1	0	3	.001	1	-.001	15
168			min	-1374.355	3	.445	15	-39.563	4	0	4	-.085	4	-.004	4
169		9	max	1062.215	2	1.773	4	.51	1	0	3	.001	1	-.001	15
170			min	-1374	3	.436	15	-39.975	4	0	4	-.098	4	-.005	4
171		10	max	1062.688	2	1.736	4	.51	1	0	3	.001	1	-.001	15
172			min	-1373.644	3	.428	15	-40.386	4	0	4	-.111	4	-.005	4
173		11	max	1063.162	2	1.699	4	.51	1	0	3	.002	1	-.001	15
174			min	-1373.289	3	.419	15	-40.797	4	0	4	-.124	4	-.006	4
175		12	max	1063.636	2	1.662	4	.51	1	0	3	.002	1	-.002	15
176			min	-1372.934	3	.41	15	-41.209	4	0	4	-.137	4	-.007	4
177		13	max	1064.11	2	1.625	4	.51	1	0	3	.002	1	-.002	15
178			min	-1372.578	3	.401	15	-41.62	4	0	4	-.15	4	-.007	4
179		14	max	1064.583	2	1.588	4	.51	1	0	3	.002	1	-.002	15
180			min	-1372.223	3	.393	15	-42.031	4	0	4	-.164	4	-.008	4
181		15	max	1065.057	2	1.551	4	.51	1	0	3	.002	1	-.002	15
182			min	-1371.868	3	.381	12	-42.443	4	0	4	-.177	4	-.008	4
183		16	max	1065.531	2	1.514	4	.51	1	0	3	.002	1	-.002	15
184			min	-1371.512	3	.366	12	-42.854	4	0	4	-.191	4	-.009	4
185		17	max	1066.004	2	1.477	4	.51	1	0	3	.003	1	-.002	15
186			min	-1371.157	3	.352	12	-43.265	4	0	4	-.205	4	-.009	4
187		18	max	1066.478	2	1.44	4	.51	1	0	3	.003	1	-.002	15
188			min	-1370.802	3	.337	12	-43.677	4	0	4	-.219	4	-.01	4
189		19	max	1066.952	2	1.403	4	.51	1	0	3	.003	1	-.002	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
190			min	-1370.447	3	.323	12	-44.088	4	0	4	-.233	4	-.01	4
191	M3	1	max	654.731	2	9.024	4	.233	1	0	12	0	1	.01	4
192			min	-798.02	3	2.135	15	-.621	5	0	4	-.015	4	.002	15
193		2	max	654.561	2	8.152	4	.233	1	0	12	0	1	.006	4
194			min	-798.148	3	1.93	15	-.014	15	0	4	-.015	4	.001	12
195		3	max	654.391	2	7.28	4	.705	4	0	12	0	1	.003	2
196			min	-798.276	3	1.725	15	.015	12	0	4	-.014	4	0	3
197		4	max	654.22	2	6.408	4	1.312	4	0	12	0	1	0	2
198			min	-798.403	3	1.52	15	.015	12	0	4	-.014	4	-.002	3
199		5	max	654.05	2	5.536	4	1.919	4	0	12	0	1	0	15
200			min	-798.531	3	1.315	15	.015	12	0	4	-.013	5	-.004	3
201		6	max	653.879	2	4.664	4	2.527	4	0	12	0	1	-.001	15
202			min	-798.659	3	1.11	15	.015	12	0	4	-.012	5	-.006	6
203		7	max	653.709	2	3.792	4	3.134	4	0	12	0	1	-.002	15
204			min	-798.787	3	.905	15	.015	12	0	4	-.011	5	-.008	6
205		8	max	653.539	2	2.92	4	3.741	4	0	12	0	1	-.002	15
206			min	-798.914	3	.7	15	.015	12	0	4	-.009	5	-.01	6
207		9	max	653.368	2	2.048	4	4.348	4	0	12	.001	1	-.003	15
208			min	-799.042	3	.495	15	.015	12	0	4	-.008	5	-.011	6
209		10	max	653.198	2	1.176	4	4.955	4	0	12	.001	1	-.003	15
210			min	-799.17	3	.29	15	.015	12	0	4	-.005	5	-.012	6
211		11	max	653.028	2	.375	2	5.562	4	0	12	.001	1	-.003	15
212			min	-799.298	3	-.063	3	.015	12	0	4	-.003	5	-.012	6
213		12	max	652.857	2	-.12	15	6.169	4	0	12	.001	1	-.003	15
214			min	-799.425	3	-.573	3	.015	12	0	4	0	5	-.012	6
215		13	max	652.687	2	-.325	15	6.776	4	0	12	.003	4	-.003	15
216			min	-799.553	3	-1.441	6	.015	12	0	4	0	12	-.011	6
217		14	max	652.517	2	-.53	15	7.384	4	0	12	.007	4	-.002	15
218			min	-799.681	3	-2.313	6	.015	12	0	4	0	12	-.011	6
219		15	max	652.346	2	-.735	15	7.991	4	0	12	.01	4	-.002	15
220			min	-799.809	3	-3.185	6	.015	12	0	4	0	12	-.009	6
221		16	max	652.176	2	-.94	15	8.598	4	0	12	.014	4	-.002	15
222			min	-799.937	3	-4.057	6	.015	12	0	4	0	12	-.008	6
223		17	max	652.006	2	-1.145	15	9.205	4	0	12	.018	4	-.001	15
224			min	-800.064	3	-4.929	6	.015	12	0	4	0	12	-.005	6
225		18	max	651.835	2	-1.35	15	9.812	4	0	12	.023	4	0	15
226			min	-800.192	3	-5.801	6	.015	12	0	4	0	12	-.003	6
227		19	max	651.665	2	-1.555	15	10.419	4	0	12	.028	4	0	1
228			min	-800.32	3	-6.673	6	.015	12	0	4	0	12	0	1
229	M4	1	max	1078.506	1	0	1	-.706	12	0	1	.019	4	0	1
230			min	-126.55	3	0	1	-262.71	4	0	1	0	12	0	1
231		2	max	1078.676	1	0	1	-.706	12	0	1	0	1	0	1
232			min	-126.422	3	0	1	-262.858	4	0	1	-.011	4	0	1
233		3	max	1078.847	1	0	1	-.706	12	0	1	0	12	0	1
234			min	-126.295	3	0	1	-263.006	4	0	1	-.041	4	0	1
235		4	max	1079.017	1	0	1	-.706	12	0	1	0	12	0	1
236			min	-126.167	3	0	1	-263.153	4	0	1	-.071	4	0	1
237		5	max	1079.187	1	0	1	-.706	12	0	1	0	12	0	1
238			min	-126.039	3	0	1	-263.301	4	0	1	-.102	4	0	1
239		6	max	1079.358	1	0	1	-.706	12	0	1	0	12	0	1
240			min	-125.911	3	0	1	-263.448	4	0	1	-.132	4	0	1
241		7	max	1079.528	1	0	1	-.706	12	0	1	0	12	0	1
242			min	-125.783	3	0	1	-263.596	4	0	1	-.162	4	0	1
243		8	max	1079.698	1	0	1	-.706	12	0	1	0	12	0	1
244			min	-125.656	3	0	1	-263.744	4	0	1	-.192	4	0	1
245		9	max	1079.869	1	0	1	-.706	12	0	1	0	12	0	1
246			min	-125.528	3	0	1	-263.891	4	0	1	-.223	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	1080.039	1	0	1	-.706	12	0	1	0	12	0	1
248			min	-125.4	3	0	1	-264.039	4	0	1	-.253	4	0	1
249		11	max	1080.209	1	0	1	-.706	12	0	1	0	12	0	1
250			min	-125.272	3	0	1	-264.187	4	0	1	-.283	4	0	1
251		12	max	1080.38	1	0	1	-.706	12	0	1	0	12	0	1
252			min	-125.145	3	0	1	-264.334	4	0	1	-.314	4	0	1
253		13	max	1080.55	1	0	1	-.706	12	0	1	0	12	0	1
254			min	-125.017	3	0	1	-264.482	4	0	1	-.344	4	0	1
255		14	max	1080.721	1	0	1	-.706	12	0	1	0	12	0	1
256			min	-124.889	3	0	1	-264.63	4	0	1	-.374	4	0	1
257		15	max	1080.891	1	0	1	-.706	12	0	1	-.001	12	0	1
258			min	-124.761	3	0	1	-264.777	4	0	1	-.405	4	0	1
259		16	max	1081.061	1	0	1	-.706	12	0	1	-.001	12	0	1
260			min	-124.634	3	0	1	-264.925	4	0	1	-.435	4	0	1
261		17	max	1081.232	1	0	1	-.706	12	0	1	-.001	12	0	1
262			min	-124.506	3	0	1	-265.072	4	0	1	-.466	4	0	1
263		18	max	1081.402	1	0	1	-.706	12	0	1	-.001	12	0	1
264			min	-124.378	3	0	1	-265.22	4	0	1	-.496	4	0	1
265		19	max	1081.572	1	0	1	-.706	12	0	1	-.001	12	0	1
266			min	-124.25	3	0	1	-265.368	4	0	1	-.527	4	0	1
267	M6	1	max	3239.62	2	2.377	2	0	1	0	1	0	4	0	1
268			min	-4332.467	3	.159	12	-37.088	4	0	4	0	1	0	1
269		2	max	3240.094	2	2.348	2	0	1	0	1	0	1	0	12
270			min	-4332.111	3	.144	12	-37.499	4	0	4	-.012	4	0	2
271		3	max	3240.567	2	2.319	2	0	1	0	1	0	1	0	12
272			min	-4331.756	3	.13	12	-37.911	4	0	4	-.024	4	-.002	2
273		4	max	3241.041	2	2.29	2	0	1	0	1	0	1	0	12
274			min	-4331.401	3	.11	3	-38.322	4	0	4	-.036	4	-.002	2
275		5	max	3241.515	2	2.261	2	0	1	0	1	0	1	0	12
276			min	-4331.046	3	.088	3	-38.733	4	0	4	-.049	4	-.003	2
277		6	max	3241.989	2	2.233	2	0	1	0	1	0	1	0	3
278			min	-4330.69	3	.067	3	-39.145	4	0	4	-.061	4	-.004	2
279		7	max	3242.462	2	2.204	2	0	1	0	1	0	1	0	3
280			min	-4330.335	3	.045	3	-39.556	4	0	4	-.074	4	-.004	2
281		8	max	3242.936	2	2.175	2	0	1	0	1	0	1	0	3
282			min	-4329.98	3	.023	3	-39.967	4	0	4	-.086	4	-.005	2
283		9	max	3243.41	2	2.146	2	0	1	0	1	0	1	0	3
284			min	-4329.624	3	.002	3	-40.379	4	0	4	-.099	4	-.006	2
285		10	max	3243.884	2	2.117	2	0	1	0	1	0	1	0	3
286			min	-4329.269	3	-.02	3	-40.79	4	0	4	-.112	4	-.006	2
287		11	max	3244.357	2	2.088	2	0	1	0	1	0	1	0	3
288			min	-4328.914	3	-.042	3	-41.201	4	0	4	-.125	4	-.007	2
289		12	max	3244.831	2	2.059	2	0	1	0	1	0	1	0	3
290			min	-4328.558	3	-.063	3	-41.613	4	0	4	-.138	4	-.008	2
291		13	max	3245.305	2	2.031	2	0	1	0	1	0	1	0	3
292			min	-4328.203	3	-.085	3	-42.024	4	0	4	-.152	4	-.008	2
293		14	max	3245.778	2	2.002	2	0	1	0	1	0	1	0	3
294			min	-4327.848	3	-.107	3	-42.435	4	0	4	-.165	4	-.009	2
295		15	max	3246.252	2	1.973	2	0	1	0	1	0	1	0	3
296			min	-4327.492	3	-.128	3	-42.847	4	0	4	-.179	4	-.01	2
297		16	max	3246.726	2	1.944	2	0	1	0	1	0	1	0	3
298			min	-4327.137	3	-.15	3	-43.258	4	0	4	-.193	4	-.01	2
299		17	max	3247.2	2	1.915	2	0	1	0	1	0	1	0	3
300			min	-4326.782	3	-.171	3	-43.669	4	0	4	-.207	4	-.011	2
301		18	max	3247.673	2	1.886	2	0	1	0	1	0	1	0	3
302			min	-4326.427	3	-.193	3	-44.081	4	0	4	-.221	4	-.012	2
303		19	max	3248.147	2	1.857	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	-4326.071	3	-.215	3	-44.492	4	0	4	-.235	4	-.012	2
305	M7	1	max	2251.895	2	9.023	6	0	1	0	1	0	1	.012	2
306			min	-2403.316	3	2.118	15	-.891	5	0	4	-.015	4	0	3
307		2	max	2251.724	2	8.151	6	0	1	0	1	0	1	.009	2
308			min	-2403.444	3	1.913	15	-.284	5	0	4	-.015	4	-.002	3
309		3	max	2251.554	2	7.279	6	.379	4	0	1	0	1	.006	2
310			min	-2403.572	3	1.709	15	0	1	0	4	-.015	4	-.004	3
311		4	max	2251.384	2	6.407	6	.986	4	0	1	0	1	.003	2
312			min	-2403.699	3	1.504	15	0	1	0	4	-.015	4	-.006	3
313		5	max	2251.213	2	5.535	6	1.593	4	0	1	0	1	0	2
314			min	-2403.827	3	1.299	15	0	1	0	4	-.014	4	-.007	3
315		6	max	2251.043	2	4.663	6	2.2	4	0	1	0	1	-.001	15
316			min	-2403.955	3	1.094	15	0	1	0	4	-.013	4	-.008	3
317		7	max	2250.873	2	3.791	6	2.807	4	0	1	0	1	-.002	15
318			min	-2404.083	3	.889	15	0	1	0	4	-.012	4	-.009	3
319		8	max	2250.702	2	2.919	6	3.414	4	0	1	0	1	-.002	15
320			min	-2404.21	3	.684	15	0	1	0	4	-.01	4	-.01	4
321		9	max	2250.532	2	2.114	2	4.021	4	0	1	0	1	-.003	15
322			min	-2404.338	3	.359	12	0	1	0	4	-.009	4	-.011	4
323		10	max	2250.362	2	1.434	2	4.629	4	0	1	0	1	-.003	15
324			min	-2404.466	3	-.014	3	0	1	0	4	-.007	4	-.012	4
325		11	max	2250.191	2	.755	2	5.236	4	0	1	0	1	-.003	15
326			min	-2404.594	3	-.523	3	0	1	0	4	-.004	5	-.012	4
327		12	max	2250.021	2	.075	2	5.843	4	0	1	0	1	-.003	15
328			min	-2404.722	3	-1.033	3	0	1	0	4	-.002	5	-.012	4
329		13	max	2249.851	2	-.341	15	6.45	4	0	1	.001	4	-.003	15
330			min	-2404.849	3	-1.542	3	0	1	0	4	0	1	-.011	4
331		14	max	2249.68	2	-.546	15	7.057	4	0	1	.004	4	-.002	15
332			min	-2404.977	3	-2.313	4	0	1	0	4	0	1	-.011	4
333		15	max	2249.51	2	-.751	15	7.664	4	0	1	.008	4	-.002	15
334			min	-2405.105	3	-3.185	4	0	1	0	4	0	1	-.009	4
335		16	max	2249.339	2	-.956	15	8.271	4	0	1	.012	4	-.002	15
336			min	-2405.233	3	-4.057	4	0	1	0	4	0	1	-.008	4
337		17	max	2249.169	2	-1.161	15	8.878	4	0	1	.016	4	-.001	15
338			min	-2405.36	3	-4.929	4	0	1	0	4	0	1	-.005	4
339		18	max	2248.999	2	-1.366	15	9.485	4	0	1	.02	4	0	15
340			min	-2405.488	3	-5.801	4	0	1	0	4	0	1	-.003	4
341		19	max	2248.828	2	-1.571	15	10.093	4	0	1	.025	4	0	1
342			min	-2405.616	3	-6.673	4	0	1	0	4	0	1	0	1
343	M8	1	max	2896.571	1	0	1	0	1	0	1	.017	4	0	1
344			min	-473.713	3	0	1	-252.147	4	0	1	0	1	0	1
345		2	max	2896.741	1	0	1	0	1	0	1	0	1	0	1
346			min	-473.585	3	0	1	-252.295	4	0	1	-.012	4	0	1
347		3	max	2896.912	1	0	1	0	1	0	1	0	1	0	1
348			min	-473.458	3	0	1	-252.443	4	0	1	-.041	4	0	1
349		4	max	2897.082	1	0	1	0	1	0	1	0	1	0	1
350			min	-473.33	3	0	1	-252.59	4	0	1	-.07	4	0	1
351		5	max	2897.252	1	0	1	0	1	0	1	0	1	0	1
352			min	-473.202	3	0	1	-252.738	4	0	1	-.099	4	0	1
353		6	max	2897.423	1	0	1	0	1	0	1	0	1	0	1
354			min	-473.074	3	0	1	-252.885	4	0	1	-.128	4	0	1
355		7	max	2897.593	1	0	1	0	1	0	1	0	1	0	1
356			min	-472.946	3	0	1	-253.033	4	0	1	-.157	4	0	1
357		8	max	2897.763	1	0	1	0	1	0	1	0	1	0	1
358			min	-472.819	3	0	1	-253.181	4	0	1	-.186	4	0	1
359		9	max	2897.934	1	0	1	0	1	0	1	0	1	0	1
360			min	-472.691	3	0	1	-253.328	4	0	1	-.215	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	2898.104	1	0	1	0	1	0	1	0	1	0	1
362			min	-472.563	3	0	1	-253.476	4	0	1	-.244	4	0	1
363		11	max	2898.275	1	0	1	0	1	0	1	0	1	0	1
364			min	-472.435	3	0	1	-253.624	4	0	1	-.273	4	0	1
365		12	max	2898.445	1	0	1	0	1	0	1	0	1	0	1
366			min	-472.308	3	0	1	-253.771	4	0	1	-.302	4	0	1
367		13	max	2898.615	1	0	1	0	1	0	1	0	1	0	1
368			min	-472.18	3	0	1	-253.919	4	0	1	-.332	4	0	1
369		14	max	2898.786	1	0	1	0	1	0	1	0	1	0	1
370			min	-472.052	3	0	1	-254.067	4	0	1	-.361	4	0	1
371		15	max	2898.956	1	0	1	0	1	0	1	0	1	0	1
372			min	-471.924	3	0	1	-254.214	4	0	1	-.39	4	0	1
373		16	max	2899.126	1	0	1	0	1	0	1	0	1	0	1
374			min	-471.797	3	0	1	-254.362	4	0	1	-.419	4	0	1
375		17	max	2899.297	1	0	1	0	1	0	1	0	1	0	1
376			min	-471.669	3	0	1	-254.509	4	0	1	-.448	4	0	1
377		18	max	2899.467	1	0	1	0	1	0	1	0	1	0	1
378			min	-471.541	3	0	1	-254.657	4	0	1	-.478	4	0	1
379		19	max	2899.637	1	0	1	0	1	0	1	0	1	0	1
380			min	-471.413	3	0	1	-254.805	4	0	1	-.507	4	0	1
381	M10	1	max	1058.425	2	1.98	6	-.036	12	0	1	0	4	0	1
382			min	-1376.842	3	.446	15	-36.975	4	0	5	0	3	0	1
383		2	max	1058.898	2	1.943	6	-.036	12	0	1	0	10	0	15
384			min	-1376.487	3	.437	15	-37.386	4	0	5	-.012	4	0	6
385		3	max	1059.372	2	1.906	6	-.036	12	0	1	0	10	0	15
386			min	-1376.131	3	.429	15	-37.797	4	0	5	-.024	4	-.001	6
387		4	max	1059.846	2	1.869	6	-.036	12	0	1	0	10	0	15
388			min	-1375.776	3	.42	15	-38.209	4	0	5	-.036	4	-.002	6
389		5	max	1060.32	2	1.832	6	-.036	12	0	1	0	10	0	15
390			min	-1375.421	3	.411	15	-38.62	4	0	5	-.048	4	-.002	6
391		6	max	1060.793	2	1.795	6	-.036	12	0	1	0	12	0	15
392			min	-1375.066	3	.402	15	-39.031	4	0	5	-.061	4	-.003	6
393		7	max	1061.267	2	1.758	6	-.036	12	0	1	0	12	0	15
394			min	-1374.71	3	.394	15	-39.443	4	0	5	-.073	4	-.004	6
395		8	max	1061.741	2	1.721	6	-.036	12	0	1	0	12	0	15
396			min	-1374.355	3	.385	15	-39.854	4	0	5	-.086	4	-.004	6
397		9	max	1062.215	2	1.684	6	-.036	12	0	1	0	12	-.001	15
398			min	-1374	3	.376	15	-40.265	4	0	5	-.099	4	-.005	6
399		10	max	1062.688	2	1.647	6	-.036	12	0	1	0	12	-.001	15
400			min	-1373.644	3	.368	15	-40.677	4	0	5	-.112	4	-.005	6
401		11	max	1063.162	2	1.61	6	-.036	12	0	1	0	12	-.001	15
402			min	-1373.289	3	.359	15	-41.088	4	0	5	-.125	4	-.006	6
403		12	max	1063.636	2	1.573	6	-.036	12	0	1	0	12	-.001	15
404			min	-1372.934	3	.35	15	-41.499	4	0	5	-.138	4	-.006	6
405		13	max	1064.11	2	1.536	6	-.036	12	0	1	0	12	-.002	15
406			min	-1372.578	3	.341	15	-41.911	4	0	5	-.151	4	-.007	6
407		14	max	1064.583	2	1.499	6	-.036	12	0	1	0	12	-.002	15
408			min	-1372.223	3	.333	15	-42.322	4	0	5	-.165	4	-.007	6
409		15	max	1065.057	2	1.462	6	-.036	12	0	1	0	12	-.002	15
410			min	-1371.868	3	.324	15	-42.733	4	0	5	-.178	4	-.008	6
411		16	max	1065.531	2	1.425	6	-.036	12	0	1	0	12	-.002	15
412			min	-1371.512	3	.315	15	-43.145	4	0	5	-.192	4	-.008	6
413		17	max	1066.004	2	1.388	6	-.036	12	0	1	0	12	-.002	15
414			min	-1371.157	3	.307	15	-43.556	4	0	5	-.206	4	-.009	6
415		18	max	1066.478	2	1.351	6	-.036	12	0	1	0	12	-.002	15
416			min	-1370.802	3	.298	15	-43.967	4	0	5	-.22	4	-.009	6
417		19	max	1066.952	2	1.314	6	-.036	12	0	1	0	12	-.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	-1370.447	3	.289	15	-44.379	4	0	5	-.234	4	-.009	6
419	M11	1	max	654.731	2	8.964	6	-.015	12	0	1	0	12	.009	6
420			min	-798.02	3	2.094	15	-.65	5	0	4	-.015	4	.002	15
421		2	max	654.561	2	8.092	6	-.015	12	0	1	0	12	.006	2
422			min	-798.148	3	1.889	15	-.233	1	0	4	-.015	4	.001	12
423		3	max	654.391	2	7.22	6	.574	4	0	1	0	12	.003	2
424			min	-798.276	3	1.684	15	-.233	1	0	4	-.015	4	0	3
425		4	max	654.22	2	6.348	6	1.181	4	0	1	0	12	0	2
426			min	-798.403	3	1.479	15	-.233	1	0	4	-.014	4	-.002	3
427		5	max	654.05	2	5.476	6	1.788	4	0	1	0	12	-.001	15
428			min	-798.531	3	1.274	15	-.233	1	0	4	-.014	4	-.004	4
429		6	max	653.879	2	4.604	6	2.395	4	0	1	0	12	-.002	15
430			min	-798.659	3	1.069	15	-.233	1	0	4	-.013	4	-.007	4
431		7	max	653.709	2	3.732	6	3.002	4	0	1	0	12	-.002	15
432			min	-798.787	3	.864	15	-.233	1	0	4	-.011	4	-.009	4
433		8	max	653.539	2	2.86	6	3.609	4	0	1	0	12	-.002	15
434			min	-798.914	3	.659	15	-.233	1	0	4	-.01	4	-.01	4
435		9	max	653.368	2	1.988	6	4.216	4	0	1	0	12	-.003	15
436			min	-799.042	3	.454	15	-.233	1	0	4	-.008	4	-.011	4
437		10	max	653.198	2	1.116	6	4.823	4	0	1	0	12	-.003	15
438			min	-799.17	3	.249	15	-.233	1	0	4	-.006	4	-.012	4
439		11	max	653.028	2	.375	2	5.43	4	0	1	0	12	-.003	15
440			min	-799.298	3	-.063	3	-.233	1	0	4	-.003	4	-.012	4
441		12	max	652.857	2	-.161	15	6.038	4	0	1	0	12	-.003	15
442			min	-799.425	3	-.629	4	-.233	1	0	4	-.001	1	-.012	4
443		13	max	652.687	2	-.366	15	6.645	4	0	1	.003	5	-.003	15
444			min	-799.553	3	-1.501	4	-.233	1	0	4	-.002	1	-.012	4
445		14	max	652.517	2	-.571	15	7.252	4	0	1	.006	5	-.003	15
446			min	-799.681	3	-2.373	4	-.233	1	0	4	-.002	1	-.011	4
447		15	max	652.346	2	-.776	15	7.859	4	0	1	.009	5	-.002	15
448			min	-799.809	3	-3.245	4	-.233	1	0	4	-.002	1	-.009	4
449		16	max	652.176	2	-.981	15	8.466	4	0	1	.013	5	-.002	15
450			min	-799.937	3	-4.117	4	-.233	1	0	4	-.002	1	-.008	4
451		17	max	652.006	2	-1.186	15	9.073	4	0	1	.017	5	-.001	15
452			min	-800.064	3	-4.989	4	-.233	1	0	4	-.002	1	-.006	4
453		18	max	651.835	2	-1.391	15	9.68	4	0	1	.022	5	0	15
454			min	-800.192	3	-5.861	4	-.233	1	0	4	-.002	1	-.003	4
455		19	max	651.665	2	-1.596	15	10.287	4	0	1	.027	5	0	1
456			min	-800.32	3	-6.733	4	-.233	1	0	4	-.002	1	0	1
457	M12	1	max	1078.506	1	0	1	11.076	1	0	1	.018	5	0	1
458			min	-126.55	3	0	1	-256.38	4	0	1	-.001	1	0	1
459		2	max	1078.676	1	0	1	11.076	1	0	1	0	10	0	1
460			min	-126.422	3	0	1	-256.528	4	0	1	-.011	4	0	1
461		3	max	1078.847	1	0	1	11.076	1	0	1	.001	1	0	1
462			min	-126.295	3	0	1	-256.676	4	0	1	-.041	4	0	1
463		4	max	1079.017	1	0	1	11.076	1	0	1	.002	1	0	1
464			min	-126.167	3	0	1	-256.823	4	0	1	-.07	4	0	1
465		5	max	1079.187	1	0	1	11.076	1	0	1	.004	1	0	1
466			min	-126.039	3	0	1	-256.971	4	0	1	-.1	4	0	1
467		6	max	1079.358	1	0	1	11.076	1	0	1	.005	1	0	1
468			min	-125.911	3	0	1	-257.119	4	0	1	-.129	4	0	1
469		7	max	1079.528	1	0	1	11.076	1	0	1	.006	1	0	1
470			min	-125.783	3	0	1	-257.266	4	0	1	-.159	4	0	1
471		8	max	1079.698	1	0	1	11.076	1	0	1	.007	1	0	1
472			min	-125.656	3	0	1	-257.414	4	0	1	-.188	4	0	1
473		9	max	1079.869	1	0	1	11.076	1	0	1	.009	1	0	1
474			min	-125.528	3	0	1	-257.561	4	0	1	-.218	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	1080.039	1	0	1	11.076	1	0	1	.01	1	0	1
476			min	-125.4	3	0	1	-257.709	4	0	1	-.247	4	0	1
477		11	max	1080.209	1	0	1	11.076	1	0	1	.011	1	0	1
478			min	-125.272	3	0	1	-257.857	4	0	1	-.277	4	0	1
479		12	max	1080.38	1	0	1	11.076	1	0	1	.012	1	0	1
480			min	-125.145	3	0	1	-258.004	4	0	1	-.307	4	0	1
481		13	max	1080.55	1	0	1	11.076	1	0	1	.014	1	0	1
482			min	-125.017	3	0	1	-258.152	4	0	1	-.336	4	0	1
483		14	max	1080.721	1	0	1	11.076	1	0	1	.015	1	0	1
484			min	-124.889	3	0	1	-258.3	4	0	1	-.366	4	0	1
485		15	max	1080.891	1	0	1	11.076	1	0	1	.016	1	0	1
486			min	-124.761	3	0	1	-258.447	4	0	1	-.396	4	0	1
487		16	max	1081.061	1	0	1	11.076	1	0	1	.018	1	0	1
488			min	-124.634	3	0	1	-258.595	4	0	1	-.425	4	0	1
489		17	max	1081.232	1	0	1	11.076	1	0	1	.019	1	0	1
490			min	-124.506	3	0	1	-258.743	4	0	1	-.455	4	0	1
491		18	max	1081.402	1	0	1	11.076	1	0	1	.02	1	0	1
492			min	-124.378	3	0	1	-258.89	4	0	1	-.485	4	0	1
493		19	max	1081.572	1	0	1	11.076	1	0	1	.021	1	0	1
494			min	-124.25	3	0	1	-259.038	4	0	1	-.514	4	0	1
495	M1	1	max	162.48	1	734.327	3	47.239	5	0	1	.179	1	0	15
496			min	-17.615	5	-429.688	1	-64.031	1	0	3	-.105	5	-.015	2
497		2	max	163.192	1	733.182	3	48.699	5	0	1	.139	1	.254	1
498			min	-17.283	5	-431.215	1	-64.031	1	0	3	-.076	5	-.46	3
499		3	max	519.054	3	547.363	2	14.409	5	0	3	.1	1	.512	1
500			min	-320.919	2	-553.603	3	-63.699	1	0	2	-.045	5	-.9	3
501		4	max	519.588	3	545.836	2	15.869	5	0	3	.06	1	.187	1
502			min	-320.207	2	-554.748	3	-63.699	1	0	2	-.036	5	-.557	3
503		5	max	520.122	3	544.309	2	17.329	5	0	3	.021	1	-.005	15
504			min	-319.495	2	-555.893	3	-63.699	1	0	2	-.026	5	-.212	3
505		6	max	520.656	3	542.782	2	18.789	5	0	3	-.001	12	.133	3
506			min	-318.783	2	-557.039	3	-63.699	1	0	2	-.019	1	-.506	2
507		7	max	521.19	3	541.255	2	20.249	5	0	3	-.002	15	.48	3
508			min	-318.071	2	-558.184	3	-63.699	1	0	2	-.058	1	-.842	2
509		8	max	521.724	3	539.728	2	21.709	5	0	3	.011	5	.826	3
510			min	-317.359	2	-559.329	3	-63.699	1	0	2	-.098	1	-1.177	2
511		9	max	535.277	3	45.145	2	55.451	5	0	9	.063	1	.965	3
512			min	-249.69	2	.458	15	-103.79	1	0	3	-.132	5	-1.344	2
513		10	max	535.811	3	43.618	2	56.911	5	0	9	0	10	.942	3
514			min	-248.978	2	-.007	5	-103.79	1	0	3	-.098	4	-1.372	2
515		11	max	536.345	3	42.091	2	58.371	5	0	9	-.005	12	.92	3
516			min	-248.266	2	-1.918	4	-103.79	1	0	3	-.076	4	-1.398	2
517		12	max	549.678	3	364.261	3	148.52	5	0	2	.096	1	.805	3
518			min	-180.516	2	-634.465	2	-61.511	1	0	3	-.237	5	-1.24	2
519		13	max	550.212	3	363.115	3	149.98	5	0	2	.058	1	.58	3
520			min	-179.804	2	-635.992	2	-61.511	1	0	3	-.144	5	-.846	2
521		14	max	550.746	3	361.97	3	151.44	5	0	2	.02	1	.355	3
522			min	-179.092	2	-637.519	2	-61.511	1	0	3	-.051	5	-.45	2
523		15	max	551.28	3	360.825	3	152.901	5	0	2	.044	5	.13	3
524			min	-178.38	2	-639.046	2	-61.511	1	0	3	-.018	1	-.079	1
525		16	max	551.814	3	359.68	3	154.361	5	0	2	.139	5	.343	2
526			min	-177.668	2	-640.573	2	-61.511	1	0	3	-.057	1	-.093	3
527		17	max	552.348	3	358.535	3	155.821	5	0	2	.235	5	.741	2
528			min	-176.956	2	-642.1	2	-61.511	1	0	3	-.095	1	-.316	3
529		18	max	29.652	5	615.017	2	-4.72	12	0	5	.211	5	.372	2
530			min	-163.743	1	-270.654	3	-105.068	4	0	2	-.137	1	-.155	3
531		19	max	29.984	5	613.49	2	-4.72	12	0	5	.157	5	.013	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
532			min	-163.031	1	-271.799	3	-103.608	4	0	2	-.182	1	-.01	1
533	M5	1	max	364.065	1	2429.483	3	86.305	5	0	1	0	1	.029	2
534			min	11.702	12	-1488.599	2	0	1	0	4	-.215	4	0	15
535		2	max	364.777	1	2428.338	3	87.765	5	0	1	0	1	.954	2
536			min	12.058	12	-1490.126	2	0	1	0	4	-.161	4	-1.499	3
537		3	max	1604.711	3	1483.821	2	56.477	4	0	4	0	1	1.846	2
538			min	-1035.614	2	-1640.84	3	0	1	0	1	-.107	4	-2.961	3
539		4	max	1605.245	3	1482.294	2	57.937	4	0	4	0	1	.947	1
540			min	-1034.902	2	-1641.986	3	0	1	0	1	-.072	4	-1.942	3
541		5	max	1605.779	3	1480.767	2	59.397	4	0	4	0	1	.06	1
542			min	-1034.19	2	-1643.131	3	0	1	0	1	-.035	4	-.923	3
543		6	max	1606.313	3	1479.24	2	60.857	4	0	4	.002	4	.097	3
544			min	-1033.478	2	-1644.276	3	0	1	0	1	0	1	-.912	2
545		7	max	1606.847	3	1477.713	2	62.317	4	0	4	.04	4	1.118	3
546			min	-1032.766	2	-1645.421	3	0	1	0	1	0	1	-1.83	2
547		8	max	1607.381	3	1476.186	2	63.777	4	0	4	.079	4	2.14	3
548			min	-1032.054	2	-1646.566	3	0	1	0	1	0	1	-2.746	2
549		9	max	1624.222	3	152.568	2	185.247	4	0	1	0	1	2.47	3
550			min	-886.634	2	.461	15	0	1	0	1	-.2	4	-3.14	2
551		10	max	1624.756	3	151.041	2	186.707	4	0	1	0	1	2.382	3
552			min	-885.922	2	0	15	0	1	0	1	-.084	4	-3.234	2
553		11	max	1625.29	3	149.514	2	188.167	4	0	1	.032	4	2.295	3
554			min	-885.21	2	-1.717	6	0	1	0	1	0	1	-3.327	2
555		12	max	1642.572	3	1035.467	3	205.644	4	0	1	0	1	2.007	3
556			min	-739.953	2	-1781.569	2	0	1	0	4	-.337	4	-2.972	2
557		13	max	1643.106	3	1034.322	3	207.104	4	0	1	0	1	1.365	3
558			min	-739.241	2	-1783.096	2	0	1	0	4	-.209	4	-1.865	2
559		14	max	1643.64	3	1033.176	3	208.564	4	0	1	0	1	.724	3
560			min	-738.529	2	-1784.623	2	0	1	0	4	-.08	4	-.758	2
561		15	max	1644.174	3	1032.031	3	210.024	4	0	1	.05	4	.35	2
562			min	-737.817	2	-1786.15	2	0	1	0	4	0	1	0	15
563		16	max	1644.708	3	1030.886	3	211.484	4	0	1	.181	4	1.459	2
564			min	-737.105	2	-1787.677	2	0	1	0	4	0	1	-.557	3
565		17	max	1645.242	3	1029.741	3	212.945	4	0	1	.313	4	2.569	2
566			min	-736.393	2	-1789.204	2	0	1	0	4	0	1	-1.197	3
567		18	max	-12.928	12	2089.526	2	0	1	0	4	.326	4	1.314	2
568			min	-363.674	1	-960.733	3	-25.504	5	0	1	0	1	-.623	3
569		19	max	-12.572	12	2087.999	2	0	1	0	4	.311	4	.019	1
570			min	-362.962	1	-961.878	3	-24.044	5	0	1	0	1	-.026	3
571	M9	1	max	162.48	1	734.327	3	70.031	4	0	3	-.013	12	0	15
572			min	8.264	12	-429.688	1	4.75	12	0	4	-.179	1	-.015	2
573		2	max	163.192	1	733.182	3	71.491	4	0	3	-.01	12	.254	1
574			min	8.62	12	-431.215	1	4.75	12	0	4	-.139	1	-.46	3
575		3	max	519.054	3	547.363	2	63.699	1	0	2	-.007	12	.512	1
576			min	-320.919	2	-553.603	3	4.711	12	0	3	-.1	1	-.9	3
577		4	max	519.588	3	545.836	2	63.699	1	0	2	-.005	12	.187	1
578			min	-320.207	2	-554.748	3	4.711	12	0	3	-.06	1	-.557	3
579		5	max	520.122	3	544.309	2	63.699	1	0	2	-.002	12	-.005	15
580			min	-319.495	2	-555.893	3	4.711	12	0	3	-.033	4	-.212	3
581		6	max	520.656	3	542.782	2	63.699	1	0	2	.019	1	.133	3
582			min	-318.783	2	-557.039	3	4.711	12	0	3	-.012	5	-.506	2
583		7	max	521.19	3	541.255	2	63.699	1	0	2	.058	1	.48	3
584			min	-318.071	2	-558.184	3	4.711	12	0	3	.003	15	-.842	2
585		8	max	521.724	3	539.728	2	63.699	1	0	2	.098	1	.826	3
586			min	-317.359	2	-559.329	3	4.711	12	0	3	.007	12	-1.177	2
587		9	max	535.277	3	45.145	2	103.79	1	0	3	-.004	12	.965	3
588			min	-249.69	2	.473	15	7.228	12	0	9	-.155	4	-1.344	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	535.811	3	43.618	2	103.79	1	0	3	.001	1	.942	3
590			min	-248.978	2	.012	15	7.228	12	0	9	-.097	4	-1.372	2
591		11	max	536.345	3	42.091	2	103.79	1	0	3	.065	1	.92	3
592			min	-248.266	2	-1.799	6	7.228	12	0	9	-.053	5	-1.398	2
593		12	max	549.678	3	364.261	3	172.115	4	0	3	-.006	12	.805	3
594			min	-180.516	2	-634.465	2	4.03	12	0	2	-.274	4	-1.24	2
595		13	max	550.212	3	363.115	3	173.575	4	0	3	-.004	12	.58	3
596			min	-179.804	2	-635.992	2	4.03	12	0	2	-.166	4	-.846	2
597		14	max	550.746	3	361.97	3	175.035	4	0	3	-.001	12	.355	3
598			min	-179.092	2	-637.519	2	4.03	12	0	2	-.058	4	-.45	2
599		15	max	551.28	3	360.825	3	176.495	4	0	3	.051	4	.13	3
600			min	-178.38	2	-639.046	2	4.03	12	0	2	.001	12	-.079	1
601		16	max	551.814	3	359.68	3	177.955	4	0	3	.161	4	.343	2
602			min	-177.668	2	-640.573	2	4.03	12	0	2	.004	12	-.093	3
603		17	max	552.348	3	358.535	3	179.415	4	0	3	.272	4	.741	2
604			min	-176.956	2	-642.1	2	4.03	12	0	2	.006	12	-.316	3
605		18	max	-8.185	12	615.017	2	72.065	1	0	2	.262	4	.372	2
606			min	-163.743	1	-270.654	3	-79.589	5	0	3	.009	12	-.155	3
607		19	max	-7.829	12	613.49	2	72.065	1	0	2	.223	4	.013	3
608			min	-163.031	1	-271.799	3	-78.129	5	0	3	.012	12	-.01	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	.208	2	.01	3	1.42e-2	2	NC	1	NC	1
2			min	-.703	4	-.05	3	-.006	2	-3.286e-3	3	NC	1	NC	1
3		2	max	0	1	.134	3	.021	1	1.534e-2	2	NC	4	NC	2
4			min	-.703	4	.004	15	-.014	5	-2.938e-3	3	1042.07	3	8998.429	1
5		3	max	0	1	.285	3	.049	1	1.649e-2	2	NC	5	NC	2
6			min	-.703	4	.002	15	-.018	5	-2.589e-3	3	573.804	3	3874.929	1
7		4	max	0	1	.378	3	.073	1	1.763e-2	2	NC	5	NC	3
8			min	-.703	4	-.006	9	-.014	5	-2.241e-3	3	448.329	3	2634.759	1
9		5	max	0	1	.405	3	.084	1	1.877e-2	2	NC	5	NC	3
10			min	-.703	4	-.004	9	-.005	5	-1.892e-3	3	422.5	3	2290.431	1
11		6	max	0	1	.365	3	.079	1	1.991e-2	2	NC	5	NC	3
12			min	-.703	4	.002	15	0	10	-1.544e-3	3	463.243	3	2423.532	1
13		7	max	0	1	.272	3	.06	1	2.105e-2	2	NC	4	NC	2
14			min	-.704	4	.004	15	-.004	10	-1.195e-3	3	596.762	3	3191.703	1
15		8	max	0	1	.253	2	.032	1	2.219e-2	2	NC	4	NC	2
16			min	-.704	4	.006	15	-.008	10	-8.465e-4	3	951.924	3	5998.587	1
17		9	max	0	1	.328	2	.03	3	2.333e-2	2	NC	4	NC	1
18			min	-.704	4	.008	15	-.015	2	-4.98e-4	3	1594.575	2	9444.845	3
19		10	max	0	1	.361	2	.03	3	2.448e-2	2	NC	5	NC	1
20			min	-.704	4	-.008	3	-.021	2	-1.494e-4	3	1248.353	2	9518.056	3
21		11	max	0	12	.328	2	.03	3	2.333e-2	2	NC	4	NC	1
22			min	-.704	4	.008	15	-.015	2	-4.98e-4	3	1594.575	2	9444.845	3
23		12	max	0	12	.253	2	.032	1	2.219e-2	2	NC	4	NC	2
24			min	-.704	4	.006	15	-.011	5	-8.465e-4	3	951.924	3	5998.587	1
25		13	max	0	12	.272	3	.06	1	2.105e-2	2	NC	4	NC	2
26			min	-.704	4	.004	15	-.004	5	-1.195e-3	3	596.762	3	3191.703	1
27		14	max	0	12	.365	3	.079	1	1.991e-2	2	NC	5	NC	3
28			min	-.704	4	.002	15	0	10	-1.544e-3	3	463.243	3	2423.532	1
29		15	max	0	12	.405	3	.084	1	1.877e-2	2	NC	5	NC	3
30			min	-.704	4	-.004	9	.001	10	-1.892e-3	3	422.5	3	2290.431	1
31		16	max	0	12	.378	3	.073	1	1.763e-2	2	NC	5	NC	3
32			min	-.704	4	-.006	9	.001	10	-2.241e-3	3	448.329	3	2634.759	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	12	.285	3	.049	1	1.649e-2	2	NC	5	NC	2
34			min	-.704	4	.001	15	0	10	-2.589e-3	3	573.804	3	3874.929	1
35		18	max	0	12	.134	3	.023	4	1.534e-2	2	NC	4	NC	2
36			min	-.704	4	.003	15	-.002	10	-2.938e-3	3	1042.07	3	7967.475	4
37		19	max	0	12	.208	2	.01	3	1.42e-2	2	NC	1	NC	1
38			min	-.704	4	-.05	3	-.006	2	-3.286e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.4	3	.009	3	7.989e-3	2	NC	1	NC	1
40			min	-.527	4	-.621	2	-.005	2	-6.08e-3	3	NC	1	NC	1
41		2	max	0	1	.627	3	.013	1	9.192e-3	2	NC	5	NC	1
42			min	-.527	4	-.856	2	-.022	5	-7.118e-3	3	818.692	2	9697.719	5
43		3	max	0	1	.826	3	.037	1	1.039e-2	2	NC	5	NC	2
44			min	-.527	4	-1.067	2	-.027	5	-8.155e-3	3	430.944	2	5144.445	1
45		4	max	0	1	.978	3	.06	1	1.16e-2	2	NC	15	NC	3
46			min	-.527	4	-1.238	2	-.019	5	-9.193e-3	3	311.582	2	3225.691	1
47		5	max	0	1	1.072	3	.072	1	1.28e-2	2	NC	15	NC	3
48			min	-.527	4	-1.358	2	-.005	5	-1.023e-2	3	260.513	2	2679.639	1
49		6	max	0	1	1.108	3	.07	1	1.4e-2	2	NC	15	NC	3
50			min	-.527	4	-1.427	2	0	10	-1.127e-2	3	238.314	2	2752.878	1
51		7	max	0	1	1.093	3	.054	1	1.52e-2	2	NC	15	NC	2
52			min	-.527	4	-1.449	2	-.003	10	-1.231e-2	3	232.109	2	3547.307	1
53		8	max	0	1	1.045	3	.04	4	1.64e-2	2	NC	15	NC	2
54			min	-.527	4	-1.435	2	-.007	10	-1.335e-2	3	235.893	2	4713.208	4
55		9	max	0	1	.989	3	.027	4	1.761e-2	2	NC	15	NC	1
56			min	-.527	4	-1.407	2	-.014	2	-1.438e-2	3	244.447	2	6753.536	4
57		10	max	0	1	.96	3	.027	3	1.881e-2	2	NC	15	NC	1
58			min	-.527	4	-1.39	2	-.019	2	-1.542e-2	3	249.795	2	NC	1
59		11	max	0	12	.989	3	.027	3	1.761e-2	2	NC	15	NC	1
60			min	-.527	4	-1.407	2	-.022	5	-1.438e-2	3	244.447	2	9571.036	5
61		12	max	0	12	1.045	3	.029	1	1.64e-2	2	NC	15	NC	2
62			min	-.528	4	-1.435	2	-.026	5	-1.335e-2	3	235.893	2	6530.275	1
63		13	max	0	12	1.093	3	.054	1	1.52e-2	2	NC	15	NC	2
64			min	-.528	4	-1.449	2	-.017	5	-1.231e-2	3	232.109	2	3547.307	1
65		14	max	0	12	1.108	3	.07	1	1.4e-2	2	NC	15	NC	3
66			min	-.528	4	-1.427	2	-.002	5	-1.127e-2	3	238.314	2	2752.878	1
67		15	max	0	12	1.072	3	.072	1	1.28e-2	2	NC	15	NC	3
68			min	-.528	4	-1.358	2	0	10	-1.023e-2	3	260.513	2	2679.639	1
69		16	max	0	12	.978	3	.06	1	1.16e-2	2	NC	15	NC	3
70			min	-.528	4	-1.238	2	0	10	-9.193e-3	3	311.582	2	3225.691	1
71		17	max	0	12	.826	3	.042	4	1.039e-2	2	NC	5	NC	2
72			min	-.528	4	-1.067	2	0	10	-8.155e-3	3	430.944	2	4477.625	4
73		18	max	0	12	.627	3	.028	4	9.192e-3	2	NC	5	NC	1
74			min	-.528	4	-.856	2	-.003	10	-7.118e-3	3	818.692	2	6617.468	4
75		19	max	0	12	.4	3	.009	3	7.989e-3	2	NC	1	NC	1
76			min	-.528	4	-.621	2	-.005	2	-6.08e-3	3	NC	1	NC	1
77	M15	1	max	0	12	.41	3	.008	3	5.102e-3	3	NC	1	NC	1
78			min	-.429	4	-.62	2	-.005	2	-8.28e-3	2	NC	1	NC	1
79		2	max	0	12	.574	3	.014	1	5.963e-3	3	NC	5	NC	1
80			min	-.429	4	-.898	2	-.031	5	-9.533e-3	2	690.53	2	6574.95	5
81		3	max	0	12	.722	3	.038	1	6.823e-3	3	NC	5	NC	2
82			min	-.429	4	-1.144	2	-.039	5	-1.079e-2	2	366.197	2	5111.702	1
83		4	max	0	12	.844	3	.06	1	7.684e-3	3	NC	15	NC	3
84			min	-.429	4	-1.336	2	-.029	5	-1.204e-2	2	268.011	2	3208.229	1
85		5	max	0	12	.933	3	.072	1	8.545e-3	3	NC	15	NC	3
86			min	-.429	4	-1.462	2	-.01	5	-1.329e-2	2	227.988	2	2665.168	1
87		6	max	0	12	.987	3	.07	1	9.406e-3	3	NC	15	NC	3
88			min	-.429	4	-1.52	2	0	10	-1.455e-2	2	213.407	2	2735.746	1
89		7	max	0	12	1.009	3	.055	1	1.027e-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	-.429	4	-1.517	2	-.003	10	-1.58e-2	2	213.958	2	3516.794	1
91		8	max	0	12	1.007	3	.049	4	1.113e-2	3	NC	15	NC	2
92			min	-.429	4	-1.474	2	-.007	10	-1.705e-2	2	224.878	2	3851.313	4
93		9	max	0	12	.993	3	.035	4	1.199e-2	3	NC	15	NC	1
94			min	-.429	4	-1.418	2	-.013	2	-1.831e-2	2	240.657	2	5327.622	4
95		10	max	0	1	.984	3	.025	3	1.285e-2	3	NC	15	NC	1
96			min	-.429	4	-1.389	2	-.018	2	-1.956e-2	2	249.827	2	NC	1
97		11	max	0	1	.993	3	.025	3	1.199e-2	3	NC	15	NC	1
98			min	-.429	4	-1.418	2	-.03	5	-1.831e-2	2	240.657	2	6903.271	5
99		12	max	0	1	1.007	3	.03	1	1.113e-2	3	NC	15	NC	2
100			min	-.429	4	-1.474	2	-.035	5	-1.705e-2	2	224.878	2	5783.17	5
101		13	max	0	1	1.009	3	.055	1	1.027e-2	3	NC	15	NC	2
102			min	-.429	4	-1.517	2	-.024	5	-1.58e-2	2	213.958	2	3516.794	1
103		14	max	0	1	.987	3	.07	1	9.406e-3	3	NC	15	NC	3
104			min	-.429	4	-1.52	2	-.003	5	-1.455e-2	2	213.407	2	2735.746	1
105		15	max	0	1	.933	3	.072	1	8.545e-3	3	NC	15	NC	3
106			min	-.429	4	-1.462	2	.001	10	-1.329e-2	2	227.988	2	2665.168	1
107		16	max	0	1	.844	3	.06	1	7.684e-3	3	NC	15	NC	3
108			min	-.429	4	-1.336	2	.001	10	-1.204e-2	2	268.011	2	3208.229	1
109		17	max	0	1	.722	3	.054	4	6.823e-3	3	NC	5	NC	2
110			min	-.429	4	-1.144	2	0	10	-1.079e-2	2	366.197	2	3494.776	4
111		18	max	0	1	.574	3	.037	4	5.963e-3	3	NC	5	NC	1
112			min	-.429	4	-.898	2	-.002	10	-9.533e-3	2	690.53	2	5008.655	4
113		19	max	0	1	.41	3	.008	3	5.102e-3	3	NC	1	NC	1
114			min	-.429	4	-.62	2	-.005	2	-8.28e-3	2	NC	1	NC	1
115	M16	1	max	0	12	.187	2	.007	3	9.727e-3	3	NC	1	NC	1
116			min	-.132	4	-.145	3	-.004	2	-1.214e-2	2	NC	1	NC	1
117		2	max	0	12	.073	1	.021	1	1.075e-2	3	NC	4	NC	2
118			min	-.132	4	-.1	3	-.022	5	-1.283e-2	2	1455.461	2	9087.433	1
119		3	max	0	12	.012	9	.049	1	1.177e-2	3	NC	5	NC	2
120			min	-.132	4	-.068	3	-.028	5	-1.352e-2	2	814.711	2	3887.292	1
121		4	max	0	12	.005	4	.073	1	1.278e-2	3	NC	5	NC	3
122			min	-.132	4	-.106	2	-.023	5	-1.421e-2	2	656.465	2	2631.463	1
123		5	max	0	12	.006	4	.084	1	1.38e-2	3	NC	5	NC	3
124			min	-.132	4	-.107	2	-.011	5	-1.489e-2	2	653.459	2	2277.536	1
125		6	max	0	12	.019	9	.08	1	1.482e-2	3	NC	5	NC	3
126			min	-.132	4	-.104	3	.002	10	-1.564e-2	1	795.27	2	2395.424	1
127		7	max	0	12	.077	1	.062	1	1.584e-2	3	NC	3	NC	2
128			min	-.132	4	-.157	3	-.001	10	-1.64e-2	1	1303.731	2	3119.452	1
129		8	max	0	12	.176	1	.034	1	1.686e-2	3	NC	1	NC	2
130			min	-.132	4	-.216	3	-.005	10	-1.716e-2	1	2695.465	3	5678.745	1
131		9	max	0	12	.263	1	.022	4	1.788e-2	3	NC	4	NC	1
132			min	-.132	4	-.266	3	-.011	2	-1.792e-2	1	1576.822	3	8422.924	4
133		10	max	0	1	.302	1	.021	3	1.89e-2	3	NC	5	NC	1
134			min	-.132	4	-.289	3	-.016	2	-1.868e-2	1	1333.866	3	NC	1
135		11	max	0	1	.263	1	.022	3	1.788e-2	3	NC	4	NC	1
136			min	-.132	4	-.266	3	-.016	5	-1.792e-2	1	1576.822	3	NC	1
137		12	max	0	1	.176	1	.034	1	1.686e-2	3	NC	1	NC	2
138			min	-.132	4	-.216	3	-.017	5	-1.716e-2	1	2695.465	3	5678.745	1
139		13	max	0	1	.077	1	.062	1	1.584e-2	3	NC	3	NC	2
140			min	-.132	4	-.157	3	-.008	5	-1.64e-2	1	1303.731	2	3119.452	1
141		14	max	0	1	.019	9	.08	1	1.482e-2	3	NC	5	NC	3
142			min	-.132	4	-.104	3	.002	10	-1.564e-2	1	795.27	2	2395.424	1
143		15	max	0	1	.005	6	.084	1	1.38e-2	3	NC	5	NC	3
144			min	-.132	4	-.107	2	.003	10	-1.489e-2	2	653.459	2	2277.536	1
145		16	max	0	1	.004	13	.073	1	1.278e-2	3	NC	5	NC	3
146			min	-.132	4	-.106	2	.003	10	-1.421e-2	2	656.465	2	2631.463	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	.012	9	.049	1	1.177e-2	3	NC	5	NC	2
148			min	-.132	4	-.068	3	.001	10	-1.352e-2	2	814.711	2	3887.292	1
149		18	max	0	1	.073	1	.031	4	1.075e-2	3	NC	4	NC	2
150			min	-.132	4	-.1	3	-.001	10	-1.283e-2	2	1455.461	2	6113.093	4
151		19	max	0	1	.187	2	.007	3	9.727e-3	3	NC	1	NC	1
152			min	-.132	4	-.145	3	-.004	2	-1.214e-2	2	NC	1	NC	1
153	M2	1	max	.007	2	.009	2	.008	1	2.276e-3	5	NC	1	NC	2
154			min	-.009	3	-.014	3	-.661	4	-1.863e-4	1	7576.217	2	104.599	4
155		2	max	.007	2	.008	2	.008	1	2.299e-3	5	NC	1	NC	2
156			min	-.009	3	-.014	3	-.607	4	-1.759e-4	1	8797.232	2	113.919	4
157		3	max	.006	2	.007	2	.007	1	2.321e-3	5	NC	1	NC	2
158			min	-.008	3	-.014	3	-.553	4	-1.655e-4	1	NC	1	124.993	4
159		4	max	.006	2	.005	2	.006	1	2.343e-3	5	NC	1	NC	1
160			min	-.008	3	-.013	3	-.5	4	-1.551e-4	1	NC	1	138.28	4
161		5	max	.005	2	.004	2	.006	1	2.365e-3	5	NC	1	NC	1
162			min	-.007	3	-.013	3	-.448	4	-1.447e-4	1	NC	1	154.403	4
163		6	max	.005	2	.003	2	.005	1	2.387e-3	5	NC	1	NC	1
164			min	-.007	3	-.012	3	-.397	4	-1.343e-4	1	NC	1	174.231	4
165		7	max	.005	2	.002	2	.004	1	2.41e-3	5	NC	1	NC	1
166			min	-.006	3	-.011	3	-.347	4	-1.239e-4	1	NC	1	198.992	4
167		8	max	.004	2	.001	2	.004	1	2.433e-3	4	NC	1	NC	1
168			min	-.006	3	-.011	3	-.3	4	-1.135e-4	1	NC	1	230.487	4
169		9	max	.004	2	0	2	.003	1	2.458e-3	4	NC	1	NC	1
170			min	-.005	3	-.01	3	-.255	4	-1.031e-4	1	NC	1	271.425	4
171		10	max	.004	2	0	2	.003	1	2.484e-3	4	NC	1	NC	1
172			min	-.005	3	-.009	3	-.212	4	-9.271e-5	1	NC	1	326.053	4
173		11	max	.003	2	0	15	.002	1	2.509e-3	4	NC	1	NC	1
174			min	-.004	3	-.009	3	-.172	4	-8.23e-5	1	NC	1	401.335	4
175		12	max	.003	2	0	15	.002	1	2.534e-3	4	NC	1	NC	1
176			min	-.004	3	-.008	3	-.136	4	-7.19e-5	1	NC	1	509.358	4
177		13	max	.002	2	0	15	.001	1	2.559e-3	4	NC	1	NC	1
178			min	-.003	3	-.007	3	-.103	4	-6.15e-5	1	NC	1	672.643	4
179		14	max	.002	2	0	15	0	1	2.584e-3	4	NC	1	NC	1
180			min	-.003	3	-.006	3	-.074	4	-5.109e-5	1	NC	1	937.255	4
181		15	max	.002	2	0	15	0	1	2.61e-3	4	NC	1	NC	1
182			min	-.002	3	-.005	3	-.049	4	-4.069e-5	1	NC	1	1410.174	4
183		16	max	.001	2	0	15	0	1	2.635e-3	4	NC	1	NC	1
184			min	-.002	3	-.004	3	-.029	4	-3.029e-5	1	NC	1	2390.37	4
185		17	max	0	2	0	15	0	1	2.66e-3	4	NC	1	NC	1
186			min	-.001	3	-.003	3	-.014	4	-1.989e-5	1	NC	1	5006.37	4
187		18	max	0	2	0	15	0	1	2.685e-3	4	NC	1	NC	1
188			min	0	3	-.001	6	-.004	4	-9.483e-6	1	NC	1	NC	1
189		19	max	0	1	0	1	0	1	2.711e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	-5.233e-7	3	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	0	3	NC	1	NC	1
192			min	0	1	0	1	0	1	-5.626e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.015	4	8.626e-5	4	NC	1	NC	1
194			min	0	2	-.003	6	0	3	1.403e-6	12	NC	1	NC	1
195		3	max	0	3	-.001	15	.029	4	7.351e-4	4	NC	1	NC	1
196			min	0	2	-.005	6	0	3	2.818e-6	12	NC	1	NC	1
197		4	max	.001	3	-.002	15	.042	4	1.384e-3	4	NC	1	NC	1
198			min	-.001	2	-.008	6	0	3	4.234e-6	12	NC	1	NC	1
199		5	max	.002	3	-.002	15	.054	4	2.033e-3	4	NC	1	NC	1
200			min	-.001	2	-.011	6	0	12	5.649e-6	12	8984.265	6	9560.104	5
201		6	max	.002	3	-.003	15	.065	4	2.682e-3	4	NC	2	NC	1
202			min	-.002	2	-.014	6	0	12	7.065e-6	12	7238.336	6	8970.067	5
203		7	max	.003	3	-.004	15	.076	4	3.33e-3	4	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
204			min	-.002	2	-.016	6	0	12	8.48e-6	12	6189.035	6	8966.399	5
205		8	max	.003	3	-.004	15	.086	4	3.979e-3	4	NC	5	NC	1
206			min	-.002	2	-.018	6	0	12	9.895e-6	12	5541.403	6	9482.736	5
207		9	max	.003	3	-.004	15	.096	4	4.628e-3	4	NC	5	NC	1
208			min	-.003	2	-.02	6	0	12	1.131e-5	12	5156.773	6	NC	1
209		10	max	.004	3	-.005	15	.105	4	5.277e-3	4	NC	5	NC	1
210			min	-.003	2	-.021	6	0	12	1.273e-5	12	4967.672	6	NC	1
211		11	max	.004	3	-.005	15	.114	4	5.926e-3	4	NC	5	NC	1
212			min	-.004	2	-.021	6	0	12	1.414e-5	12	4946.078	6	NC	1
213		12	max	.005	3	-.004	15	.123	4	6.574e-3	4	NC	5	NC	1
214			min	-.004	2	-.02	6	0	12	1.556e-5	12	5092.648	6	NC	1
215		13	max	.005	3	-.004	15	.132	4	7.223e-3	4	NC	5	NC	1
216			min	-.004	2	-.019	6	0	12	1.697e-5	12	5438.333	6	NC	1
217		14	max	.006	3	-.004	15	.14	4	7.872e-3	4	NC	5	NC	1
218			min	-.005	2	-.017	6	0	12	1.839e-5	12	6060.589	6	NC	1
219		15	max	.006	3	-.003	15	.15	4	8.521e-3	4	NC	3	NC	1
220			min	-.005	2	-.014	6	0	12	1.98e-5	12	7131.75	6	NC	1
221		16	max	.007	3	-.002	15	.16	4	9.17e-3	4	NC	1	NC	1
222			min	-.005	2	-.011	6	0	12	2.122e-5	12	9069.696	6	NC	1
223		17	max	.007	3	-.001	15	.17	4	9.819e-3	4	NC	1	NC	1
224			min	-.006	2	-.008	1	0	12	2.263e-5	12	NC	1	NC	1
225		18	max	.007	3	0	15	.182	4	1.047e-2	4	NC	1	NC	1
226			min	-.006	2	-.005	1	0	12	2.405e-5	12	NC	1	NC	1
227		19	max	.008	3	0	5	.195	4	1.112e-2	4	NC	1	NC	1
228			min	-.006	2	-.002	1	0	12	2.546e-5	12	NC	1	NC	1
229	M4	1	max	.003	1	.006	2	0	12	1.069e-4	1	NC	1	NC	3
230			min	0	3	-.008	3	-.195	4	-3.603e-4	5	NC	1	127.008	4
231		2	max	.002	1	.006	2	0	12	1.069e-4	1	NC	1	NC	3
232			min	0	3	-.008	3	-.18	4	-3.603e-4	5	NC	1	138.175	4
233		3	max	.002	1	.005	2	0	12	1.069e-4	1	NC	1	NC	3
234			min	0	3	-.007	3	-.164	4	-3.603e-4	5	NC	1	151.461	4
235		4	max	.002	1	.005	2	0	12	1.069e-4	1	NC	1	NC	2
236			min	0	3	-.007	3	-.148	4	-3.603e-4	5	NC	1	167.417	4
237		5	max	.002	1	.005	2	0	12	1.069e-4	1	NC	1	NC	2
238			min	0	3	-.006	3	-.133	4	-3.603e-4	5	NC	1	186.791	4
239		6	max	.002	1	.004	2	0	12	1.069e-4	1	NC	1	NC	2
240			min	0	3	-.006	3	-.118	4	-3.603e-4	5	NC	1	210.622	4
241		7	max	.002	1	.004	2	0	12	1.069e-4	1	NC	1	NC	2
242			min	0	3	-.005	3	-.103	4	-3.603e-4	5	NC	1	240.385	4
243		8	max	.002	1	.004	2	0	12	1.069e-4	1	NC	1	NC	2
244			min	0	3	-.005	3	-.089	4	-3.603e-4	5	NC	1	278.229	4
245		9	max	.001	1	.003	2	0	12	1.069e-4	1	NC	1	NC	2
246			min	0	3	-.004	3	-.076	4	-3.603e-4	5	NC	1	327.39	4
247		10	max	.001	1	.003	2	0	12	1.069e-4	1	NC	1	NC	2
248			min	0	3	-.004	3	-.063	4	-3.603e-4	5	NC	1	392.929	4
249		11	max	.001	1	.003	2	0	12	1.069e-4	1	NC	1	NC	1
250			min	0	3	-.004	3	-.051	4	-3.603e-4	5	NC	1	483.123	4
251		12	max	.001	1	.002	2	0	12	1.069e-4	1	NC	1	NC	1
252			min	0	3	-.003	3	-.041	4	-3.603e-4	5	NC	1	612.291	4
253		13	max	0	1	.002	2	0	12	1.069e-4	1	NC	1	NC	1
254			min	0	3	-.003	3	-.031	4	-3.603e-4	5	NC	1	807.012	4
255		14	max	0	1	.002	2	0	12	1.069e-4	1	NC	1	NC	1
256			min	0	3	-.002	3	-.022	4	-3.603e-4	5	NC	1	1121.356	4
257		15	max	0	1	.001	2	0	12	1.069e-4	1	NC	1	NC	1
258			min	0	3	-.002	3	-.015	4	-3.603e-4	5	NC	1	1679.976	4
259		16	max	0	1	.001	2	0	12	1.069e-4	1	NC	1	NC	1
260			min	0	3	-.001	3	-.009	4	-3.603e-4	5	NC	1	2827.463	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
261		17	max	0	1	0	2	0	12	1.069e-4	1	NC	1	NC	1
262			min	0	3	0	3	-.004	4	-3.603e-4	5	NC	1	5841.543	4
263		18	max	0	1	0	2	0	12	1.069e-4	1	NC	1	NC	1
264			min	0	3	0	3	-.001	4	-3.603e-4	5	NC	1	NC	1
265		19	max	0	1	0	1	0	1	1.069e-4	1	NC	1	NC	1
266			min	0	1	0	1	0	1	-3.603e-4	5	NC	1	NC	1
267	M6	1	max	.022	2	.031	2	0	1	2.379e-3	4	NC	3	NC	1
268			min	-.029	3	-.044	3	-.667	4	0	1	2205.307	2	103.54	4
269		2	max	.02	2	.029	2	0	1	2.399e-3	4	NC	3	NC	1
270			min	-.027	3	-.041	3	-.613	4	0	1	2417.653	2	112.767	4
271		3	max	.019	2	.026	2	0	1	2.419e-3	4	NC	3	NC	1
272			min	-.026	3	-.039	3	-.559	4	0	1	2673.207	2	123.73	4
273		4	max	.018	2	.023	2	0	1	2.439e-3	4	NC	3	NC	1
274			min	-.024	3	-.037	3	-.505	4	0	1	2984.105	2	136.883	4
275		5	max	.017	2	.021	2	0	1	2.459e-3	4	NC	3	NC	1
276			min	-.022	3	-.034	3	-.452	4	0	1	3367.208	2	152.846	4
277		6	max	.016	2	.018	2	0	1	2.479e-3	4	NC	3	NC	1
278			min	-.021	3	-.032	3	-.401	4	0	1	3846.489	2	172.475	4
279		7	max	.014	2	.016	2	0	1	2.499e-3	4	NC	3	NC	1
280			min	-.019	3	-.029	3	-.351	4	0	1	4456.983	2	196.989	4
281		8	max	.013	2	.013	2	0	1	2.519e-3	4	NC	1	NC	1
282			min	-.018	3	-.027	3	-.303	4	0	1	5251.569	2	228.169	4
283		9	max	.012	2	.011	2	0	1	2.539e-3	4	NC	1	NC	1
284			min	-.016	3	-.025	3	-.257	4	0	1	6313.166	2	268.699	4
285		10	max	.011	2	.009	2	0	1	2.559e-3	4	NC	1	NC	1
286			min	-.014	3	-.022	3	-.214	4	0	1	7777.989	2	322.782	4
287		11	max	.01	2	.007	2	0	1	2.578e-3	4	NC	1	NC	1
288			min	-.013	3	-.02	3	-.174	4	0	1	9883.014	2	397.315	4
289		12	max	.008	2	.005	2	0	1	2.598e-3	4	NC	1	NC	1
290			min	-.011	3	-.017	3	-.137	4	0	1	NC	1	504.262	4
291		13	max	.007	2	.004	2	0	1	2.618e-3	4	NC	1	NC	1
292			min	-.01	3	-.015	3	-.104	4	0	1	NC	1	665.922	4
293		14	max	.006	2	.003	2	0	1	2.638e-3	4	NC	1	NC	1
294			min	-.008	3	-.012	3	-.074	4	0	1	NC	1	927.904	4
295		15	max	.005	2	.001	2	0	1	2.658e-3	4	NC	1	NC	1
296			min	-.006	3	-.01	3	-.049	4	0	1	NC	1	1396.124	4
297		16	max	.004	2	0	2	0	1	2.678e-3	4	NC	1	NC	1
298			min	-.005	3	-.007	3	-.029	4	0	1	NC	1	2366.586	4
299		17	max	.002	2	0	2	0	1	2.698e-3	4	NC	1	NC	1
300			min	-.003	3	-.005	3	-.014	4	0	1	NC	1	4956.618	4
301		18	max	.001	2	0	2	0	1	2.718e-3	4	NC	1	NC	1
302			min	-.002	3	-.002	3	-.004	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	2.738e-3	4	NC	1	NC	1
304			min	0	1	0	1	0	1	0	1	NC	1	NC	1
305	M7	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
306			min	0	1	0	1	0	1	-5.683e-4	4	NC	1	NC	1
307		2	max	.001	3	0	15	.015	4	6.146e-5	4	NC	1	NC	1
308			min	-.001	2	-.004	3	0	1	0	1	NC	1	NC	1
309		3	max	.003	3	-.001	15	.029	4	6.912e-4	4	NC	1	NC	1
310			min	-.002	2	-.007	3	0	1	0	1	NC	1	NC	1
311		4	max	.004	3	-.002	15	.042	4	1.321e-3	4	NC	1	NC	1
312			min	-.004	2	-.01	3	0	1	0	1	NC	1	9657.717	4
313		5	max	.005	3	-.003	15	.054	4	1.951e-3	4	NC	1	NC	1
314			min	-.005	2	-.013	3	0	1	0	1	8320.741	3	8225.401	4
315		6	max	.007	3	-.003	15	.066	4	2.58e-3	4	NC	1	NC	1
316			min	-.006	2	-.016	3	0	1	0	1	7006.109	3	7587.477	4
317		7	max	.008	3	-.004	15	.076	4	3.21e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
318			min	-.007	2	-.018	3	0	1	0	1	6188.968	4	7423.431	4
319		8	max	.009	3	-.004	15	.087	4	3.84e-3	4	NC	2	NC	1
320			min	-.009	2	-.02	3	0	1	0	1	5541.347	4	7635.217	4
321		9	max	.01	3	-.005	15	.096	4	4.47e-3	4	NC	5	NC	1
322			min	-.01	2	-.021	3	0	1	0	1	5156.725	4	8236.791	4
323		10	max	.012	3	-.005	15	.105	4	5.099e-3	4	NC	5	NC	1
324			min	-.011	2	-.021	3	0	1	0	1	4967.629	4	9346.487	4
325		11	max	.013	3	-.005	15	.114	4	5.729e-3	4	NC	5	NC	1
326			min	-.012	2	-.021	4	0	1	0	1	4946.037	4	NC	1
327		12	max	.014	3	-.005	15	.122	4	6.359e-3	4	NC	5	NC	1
328			min	-.013	2	-.021	4	0	1	0	1	5092.608	4	NC	1
329		13	max	.016	3	-.005	15	.13	4	6.989e-3	4	NC	5	NC	1
330			min	-.015	2	-.02	4	0	1	0	1	5438.292	4	NC	1
331		14	max	.017	3	-.004	15	.139	4	7.618e-3	4	NC	2	NC	1
332			min	-.016	2	-.018	3	0	1	0	1	6060.545	4	NC	1
333		15	max	.018	3	-.004	15	.147	4	8.248e-3	4	NC	1	NC	1
334			min	-.017	2	-.016	3	0	1	0	1	7131.699	4	NC	1
335		16	max	.02	3	-.003	15	.156	4	8.878e-3	4	NC	1	NC	1
336			min	-.018	2	-.013	3	0	1	0	1	9069.632	4	NC	1
337		17	max	.021	3	-.002	15	.166	4	9.507e-3	4	NC	1	NC	1
338			min	-.02	2	-.011	3	0	1	0	1	NC	1	NC	1
339		18	max	.022	3	-.001	15	.176	4	1.014e-2	4	NC	1	NC	1
340			min	-.021	2	-.008	3	0	1	0	1	NC	1	NC	1
341		19	max	.024	3	0	10	.188	4	1.077e-2	4	NC	1	NC	1
342			min	-.022	2	-.005	3	0	1	0	1	NC	1	NC	1
343	M8	1	max	.007	1	.021	2	0	1	0	1	NC	1	NC	1
344			min	-.001	3	-.024	3	-.188	4	-4.978e-4	4	NC	1	131.813	4
345		2	max	.007	1	.02	2	0	1	0	1	NC	1	NC	1
346			min	-.001	3	-.023	3	-.173	4	-4.978e-4	4	NC	1	143.418	4
347		3	max	.006	1	.019	2	0	1	0	1	NC	1	NC	1
348			min	-.001	3	-.021	3	-.158	4	-4.978e-4	4	NC	1	157.223	4
349		4	max	.006	1	.018	2	0	1	0	1	NC	1	NC	1
350			min	0	3	-.02	3	-.143	4	-4.978e-4	4	NC	1	173.802	4
351		5	max	.005	1	.016	2	0	1	0	1	NC	1	NC	1
352			min	0	3	-.019	3	-.128	4	-4.978e-4	4	NC	1	193.932	4
353		6	max	.005	1	.015	2	0	1	0	1	NC	1	NC	1
354			min	0	3	-.017	3	-.113	4	-4.978e-4	4	NC	1	218.693	4
355		7	max	.005	1	.014	2	0	1	0	1	NC	1	NC	1
356			min	0	3	-.016	3	-.099	4	-4.978e-4	4	NC	1	249.616	4
357		8	max	.004	1	.013	2	0	1	0	1	NC	1	NC	1
358			min	0	3	-.015	3	-.086	4	-4.978e-4	4	NC	1	288.936	4
359		9	max	.004	1	.012	2	0	1	0	1	NC	1	NC	1
360			min	0	3	-.013	3	-.073	4	-4.978e-4	4	NC	1	340.014	4
361		10	max	.003	1	.011	2	0	1	0	1	NC	1	NC	1
362			min	0	3	-.012	3	-.061	4	-4.978e-4	4	NC	1	408.108	4
363		11	max	.003	1	.009	2	0	1	0	1	NC	1	NC	1
364			min	0	3	-.011	3	-.049	4	-4.978e-4	4	NC	1	501.82	4
365		12	max	.003	1	.008	2	0	1	0	1	NC	1	NC	1
366			min	0	3	-.009	3	-.039	4	-4.978e-4	4	NC	1	636.028	4
367		13	max	.002	1	.007	2	0	1	0	1	NC	1	NC	1
368			min	0	3	-.008	3	-.03	4	-4.978e-4	4	NC	1	838.35	4
369		14	max	.002	1	.006	2	0	1	0	1	NC	1	NC	1
370			min	0	3	-.007	3	-.021	4	-4.978e-4	4	NC	1	1164.973	4
371		15	max	.002	1	.005	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.005	3	-.014	4	-4.978e-4	4	NC	1	1745.431	4
373		16	max	.001	1	.004	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.004	3	-.008	4	-4.978e-4	4	NC	1	2937.822	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
375		17	max	0	1	.002	2	0	1	0	1	NC	1	NC	1
376			min	0	3	-.003	3	-.004	4	-4.978e-4	4	NC	1	6070.015	4
377		18	max	0	1	.001	2	0	1	0	1	NC	1	NC	1
378			min	0	3	-.001	3	-.001	4	-4.978e-4	4	NC	1	NC	1
379		19	max	0	1	0	1	0	1	0	1	NC	1	NC	1
380			min	0	1	0	1	0	1	-4.978e-4	4	NC	1	NC	1
381	M10	1	max	.007	2	.009	2	0	12	2.363e-3	4	NC	1	NC	2
382			min	-.009	3	-.014	3	-.665	4	1.496e-5	12	7576.217	2	103.85	4
383		2	max	.007	2	.008	2	0	12	2.382e-3	4	NC	1	NC	2
384			min	-.009	3	-.014	3	-.611	4	1.415e-5	12	8797.232	2	113.104	4
385		3	max	.006	2	.007	2	0	12	2.401e-3	4	NC	1	NC	2
386			min	-.008	3	-.014	3	-.557	4	1.333e-5	12	NC	1	124.1	4
387		4	max	.006	2	.005	2	0	12	2.421e-3	4	NC	1	NC	1
388			min	-.008	3	-.013	3	-.503	4	1.252e-5	12	NC	1	137.293	4
389		5	max	.005	2	.004	2	0	12	2.44e-3	4	NC	1	NC	1
390			min	-.007	3	-.013	3	-.451	4	1.171e-5	12	NC	1	153.304	4
391		6	max	.005	2	.003	2	0	12	2.459e-3	4	NC	1	NC	1
392			min	-.007	3	-.012	3	-.399	4	1.089e-5	12	NC	1	172.992	4
393		7	max	.005	2	.002	2	0	12	2.479e-3	4	NC	1	NC	1
394			min	-.006	3	-.011	3	-.35	4	1.008e-5	12	NC	1	197.581	4
395		8	max	.004	2	.001	2	0	12	2.498e-3	4	NC	1	NC	1
396			min	-.006	3	-.011	3	-.302	4	9.269e-6	12	NC	1	228.857	4
397		9	max	.004	2	0	2	0	12	2.517e-3	4	NC	1	NC	1
398			min	-.005	3	-.01	3	-.256	4	8.456e-6	12	NC	1	269.511	4
399		10	max	.004	2	0	2	0	12	2.536e-3	4	NC	1	NC	1
400			min	-.005	3	-.009	3	-.213	4	7.643e-6	12	NC	1	323.762	4
401		11	max	.003	2	-.001	2	0	12	2.556e-3	4	NC	1	NC	1
402			min	-.004	3	-.009	3	-.173	4	6.83e-6	12	NC	1	398.526	4
403		12	max	.003	2	-.002	2	0	12	2.575e-3	4	NC	1	NC	1
404			min	-.004	3	-.008	3	-.137	4	6.017e-6	12	NC	1	505.81	4
405		13	max	.002	2	-.002	15	0	12	2.594e-3	4	NC	1	NC	1
406			min	-.003	3	-.007	3	-.103	4	5.204e-6	12	NC	1	667.985	4
407		14	max	.002	2	-.002	15	0	12	2.613e-3	4	NC	1	NC	1
408			min	-.003	3	-.006	3	-.074	4	4.298e-6	10	NC	1	930.817	4
409		15	max	.002	2	-.001	15	0	12	2.633e-3	4	NC	1	NC	1
410			min	-.002	3	-.005	4	-.049	4	3.389e-6	10	NC	1	1400.594	4
411		16	max	.001	2	-.001	15	0	12	2.652e-3	4	NC	1	NC	1
412			min	-.002	3	-.004	4	-.029	4	2.48e-6	10	NC	1	2374.406	4
413		17	max	0	2	0	15	0	12	2.671e-3	4	NC	1	NC	1
414			min	-.001	3	-.003	4	-.014	4	1.571e-6	10	NC	1	4973.957	4
415		18	max	0	2	0	15	0	12	2.69e-3	4	NC	1	NC	1
416			min	0	3	-.002	4	-.004	4	6.626e-7	10	NC	1	NC	1
417		19	max	0	1	0	1	0	1	2.71e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-9.2e-7	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	1.456e-6	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-5.616e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.015	4	7.622e-5	5	NC	1	NC	1
422			min	0	2	-.003	4	0	1	-2.129e-5	1	NC	1	NC	1
423		3	max	0	3	-.001	15	.028	4	7.1e-4	4	NC	1	NC	1
424			min	0	2	-.006	4	0	1	-4.404e-5	1	NC	1	NC	1
425		4	max	.001	3	-.002	15	.041	4	1.346e-3	4	NC	1	NC	1
426			min	-.001	2	-.009	4	0	1	-6.678e-5	1	NC	1	NC	1
427		5	max	.002	3	-.003	15	.054	4	1.982e-3	4	NC	1	NC	1
428			min	-.001	2	-.012	4	0	1	-8.953e-5	1	8615.912	4	9058.911	4
429		6	max	.002	3	-.004	15	.065	4	2.617e-3	4	NC	2	NC	1
430			min	-.002	2	-.015	4	0	1	-1.123e-4	1	6968.443	4	8456.237	4
431		7	max	.003	3	-.004	15	.076	4	3.253e-3	4	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
432			min	-.002	2	-.018	4	0	1	-1.35e-4	1	5976.861	4	8396.734	4
433		8	max	.003	3	-.005	15	.086	4	3.889e-3	4	NC	5	NC	1
434			min	-.002	2	-.02	4	0	1	-1.578e-4	1	5365.112	4	8801.737	4
435		9	max	.003	3	-.005	15	.095	4	4.525e-3	4	NC	5	NC	1
436			min	-.003	2	-.021	4	0	1	-1.805e-4	1	5003.302	4	9738.298	4
437		10	max	.004	3	-.005	15	.104	4	5.161e-3	4	NC	5	NC	1
438			min	-.003	2	-.022	4	-.001	1	-2.033e-4	1	4828.374	4	NC	1
439		11	max	.004	3	-.005	15	.113	4	5.796e-3	4	NC	5	NC	1
440			min	-.004	2	-.022	4	-.002	1	-2.26e-4	1	4814.549	4	NC	1
441		12	max	.005	3	-.005	15	.122	4	6.432e-3	4	NC	5	NC	1
442			min	-.004	2	-.021	4	-.002	1	-2.488e-4	1	4963.437	4	NC	1
443		13	max	.005	3	-.005	15	.13	4	7.068e-3	4	NC	5	NC	1
444			min	-.004	2	-.02	4	-.003	1	-2.715e-4	1	5305.925	4	NC	1
445		14	max	.006	3	-.005	15	.139	4	7.704e-3	4	NC	5	NC	1
446			min	-.005	2	-.018	4	-.003	1	-2.943e-4	1	5918.197	4	NC	1
447		15	max	.006	3	-.004	15	.148	4	8.34e-3	4	NC	3	NC	1
448			min	-.005	2	-.016	4	-.004	1	-3.17e-4	1	6969.147	4	NC	1
449		16	max	.007	3	-.003	15	.157	4	8.975e-3	4	NC	1	NC	1
450			min	-.005	2	-.013	4	-.005	1	-3.397e-4	1	8867.865	4	NC	1
451		17	max	.007	3	-.002	15	.167	4	9.611e-3	4	NC	1	NC	1
452			min	-.006	2	-.009	4	-.006	1	-3.625e-4	1	NC	1	NC	1
453		18	max	.007	3	-.002	15	.178	4	1.025e-2	4	NC	1	NC	1
454			min	-.006	2	-.005	4	-.007	1	-3.852e-4	1	NC	1	NC	1
455		19	max	.008	3	0	10	.191	4	1.088e-2	4	NC	1	NC	1
456			min	-.006	2	-.002	1	-.008	1	-4.08e-4	1	NC	1	NC	1
457	M12	1	max	.003	1	.006	2	.008	1	-7.356e-6	12	NC	1	NC	3
458			min	0	3	-.008	3	-.191	4	-4.003e-4	4	NC	1	129.984	4
459		2	max	.002	1	.006	2	.007	1	-7.356e-6	12	NC	1	NC	3
460			min	0	3	-.008	3	-.175	4	-4.003e-4	4	NC	1	141.417	4
461		3	max	.002	1	.005	2	.007	1	-7.356e-6	12	NC	1	NC	3
462			min	0	3	-.007	3	-.16	4	-4.003e-4	4	NC	1	155.019	4
463		4	max	.002	1	.005	2	.006	1	-7.356e-6	12	NC	1	NC	2
464			min	0	3	-.007	3	-.145	4	-4.003e-4	4	NC	1	171.354	4
465		5	max	.002	1	.005	2	.005	1	-7.356e-6	12	NC	1	NC	2
466			min	0	3	-.006	3	-.13	4	-4.003e-4	4	NC	1	191.189	4
467		6	max	.002	1	.004	2	.005	1	-7.356e-6	12	NC	1	NC	2
468			min	0	3	-.006	3	-.115	4	-4.003e-4	4	NC	1	215.587	4
469		7	max	.002	1	.004	2	.004	1	-7.356e-6	12	NC	1	NC	2
470			min	0	3	-.005	3	-.101	4	-4.003e-4	4	NC	1	246.057	4
471		8	max	.002	1	.004	2	.004	1	-7.356e-6	12	NC	1	NC	2
472			min	0	3	-.005	3	-.087	4	-4.003e-4	4	NC	1	284.801	4
473		9	max	.001	1	.003	2	.003	1	-7.356e-6	12	NC	1	NC	2
474			min	0	3	-.004	3	-.074	4	-4.003e-4	4	NC	1	335.13	4
475		10	max	.001	1	.003	2	.003	1	-7.356e-6	12	NC	1	NC	2
476			min	0	3	-.004	3	-.062	4	-4.003e-4	4	NC	1	402.227	4
477		11	max	.001	1	.003	2	.002	1	-7.356e-6	12	NC	1	NC	1
478			min	0	3	-.004	3	-.05	4	-4.003e-4	4	NC	1	494.565	4
479		12	max	.001	1	.002	2	.002	1	-7.356e-6	12	NC	1	NC	1
480			min	0	3	-.003	3	-.04	4	-4.003e-4	4	NC	1	626.804	4
481		13	max	0	1	.002	2	.001	1	-7.356e-6	12	NC	1	NC	1
482			min	0	3	-.003	3	-.03	4	-4.003e-4	4	NC	1	826.154	4
483		14	max	0	1	.002	2	0	1	-7.356e-6	12	NC	1	NC	1
484			min	0	3	-.002	3	-.022	4	-4.003e-4	4	NC	1	1147.976	4
485		15	max	0	1	.001	2	0	1	-7.356e-6	12	NC	1	NC	1
486			min	0	3	-.002	3	-.014	4	-4.003e-4	4	NC	1	1719.887	4
487		16	max	0	1	.001	2	0	1	-7.356e-6	12	NC	1	NC	1
488			min	0	3	-.001	3	-.009	4	-4.003e-4	4	NC	1	2894.691	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	-7.356e-6	12	NC	1	NC	1
490			min	0	3	0	3	-.004	4	-4.003e-4	4	NC	1	5980.57	4
491		18	max	0	1	0	2	0	1	-7.356e-6	12	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-4.003e-4	4	NC	1	NC	1
493		19	max	0	1	0	1	0	1	-7.356e-6	12	NC	1	NC	1
494			min	0	1	0	1	0	1	-4.003e-4	4	NC	1	NC	1
495	M1	1	max	.01	3	.208	2	.704	4	8.304e-3	1	NC	1	NC	1
496			min	-.006	2	-.05	3	0	12	-1.792e-2	3	NC	1	NC	1
497		2	max	.01	3	.101	2	.683	4	7.769e-3	4	NC	5	NC	1
498			min	-.006	2	-.024	3	-.006	1	-8.893e-3	3	1274.459	2	NC	1
499		3	max	.01	3	.015	3	.66	4	1.389e-2	4	NC	5	NC	1
500			min	-.006	2	-.012	2	-.008	1	-1.65e-4	1	616.73	2	6139.082	5
501		4	max	.01	3	.076	3	.637	4	1.2e-2	4	NC	15	NC	1
502			min	-.006	2	-.138	2	-.008	1	-4.111e-3	3	392.031	2	4436.998	5
503		5	max	.01	3	.153	3	.613	4	1.01e-2	4	NC	15	NC	1
504			min	-.006	2	-.268	2	-.005	1	-8.123e-3	3	284.475	2	3572.722	5
505		6	max	.009	3	.235	3	.589	4	1.244e-2	2	8299.51	15	NC	1
506			min	-.006	2	-.394	2	-.002	1	-1.213e-2	3	224.971	2	3041.89	5
507		7	max	.009	3	.314	3	.563	4	1.659e-2	2	7014.126	15	NC	1
508			min	-.005	2	-.506	2	0	3	-1.615e-2	3	189.734	2	2660.378	4
509		8	max	.009	3	.38	3	.538	4	2.075e-2	2	6252.448	15	NC	1
510			min	-.005	2	-.594	2	0	12	-2.016e-2	3	168.846	2	2367.333	4
511		9	max	.009	3	.422	3	.512	4	2.32e-2	2	5853.434	15	NC	1
512			min	-.005	2	-.65	2	0	1	-2.061e-2	3	157.945	2	2164.94	4
513		10	max	.009	3	.438	3	.482	4	2.453e-2	2	5731.345	15	NC	1
514			min	-.005	2	-.669	2	0	10	-1.869e-2	3	154.741	2	2095.645	4
515		11	max	.008	3	.428	3	.449	4	2.585e-2	2	5853.136	15	NC	1
516			min	-.005	2	-.65	2	0	12	-1.677e-2	3	158.458	2	2124.048	4
517		12	max	.008	3	.393	3	.414	4	2.469e-2	2	6251.74	15	NC	1
518			min	-.005	2	-.592	2	0	1	-1.446e-2	3	170.357	2	2251.788	4
519		13	max	.008	3	.335	3	.373	4	1.98e-2	2	7012.744	15	NC	1
520			min	-.005	2	-.5	2	0	1	-1.157e-2	3	193.306	2	2655.682	4
521		14	max	.008	3	.261	3	.328	4	1.492e-2	2	8296.981	15	NC	1
522			min	-.005	2	-.384	2	0	12	-8.68e-3	3	232.45	2	3577.894	4
523		15	max	.008	3	.177	3	.282	4	1.003e-2	2	NC	15	NC	1
524			min	-.005	2	-.256	2	0	12	-5.789e-3	3	299.58	2	5812.16	4
525		16	max	.007	3	.09	3	.237	4	8.939e-3	4	NC	15	NC	1
526			min	-.005	2	-.127	2	0	12	-2.898e-3	3	423.218	2	NC	1
527		17	max	.007	3	.005	3	.196	4	1.014e-2	4	NC	5	NC	1
528			min	-.005	2	-.007	2	0	12	-7.12e-6	3	685.687	2	NC	1
529		18	max	.007	3	.095	2	.161	4	6.482e-3	2	NC	5	NC	1
530			min	-.005	2	-.072	3	0	12	-2.167e-3	3	1447.815	2	NC	1
531		19	max	.007	3	.187	2	.132	4	1.291e-2	2	NC	1	NC	1
532			min	-.004	2	-.145	3	0	1	-4.418e-3	3	NC	1	NC	1
533	M5	1	max	.03	3	.361	2	.704	4	0	1	NC	1	NC	1
534			min	-.021	2	-.008	3	0	1	-1.086e-5	4	NC	1	NC	1
535		2	max	.03	3	.176	2	.688	4	7.111e-3	4	NC	5	NC	1
536			min	-.021	2	-.003	3	0	1	0	1	736.903	2	8453.059	4
537		3	max	.03	3	.044	3	.667	4	1.406e-2	4	NC	15	NC	1
538			min	-.021	2	-.036	2	0	1	0	1	343.508	2	4978.222	4
539		4	max	.03	3	.166	3	.643	4	1.146e-2	4	8605.452	15	NC	1
540			min	-.021	2	-.294	2	0	1	0	1	207.98	2	3857.115	4
541		5	max	.029	3	.342	3	.617	4	8.853e-3	4	5978.225	15	NC	1
542			min	-.02	2	-.577	2	0	1	0	1	145.01	2	3313.462	4
543		6	max	.028	3	.543	3	.59	4	6.249e-3	4	4577.922	15	NC	1
544			min	-.02	2	-.86	2	0	1	0	1	111.293	2	2971.176	4
545		7	max	.028	3	.741	3	.563	4	3.644e-3	4	3773.678	15	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
546			min	-.02	2	-1.119	2	0	1	0	1	91.857	2	2689.427	4
547		8	max	.027	3	.908	3	.537	4	1.04e-3	4	3308.118	15	NC	1
548			min	-.019	2	-1.327	2	0	1	0	1	80.576	2	2403.578	4
549		9	max	.026	3	1.017	3	.512	4	0	1	3069.857	15	NC	1
550			min	-.019	2	-1.459	2	0	1	-6.298e-6	5	74.795	2	2157.858	4
551		10	max	.026	3	1.056	3	.481	4	0	1	2998.09	15	NC	1
552			min	-.018	2	-1.504	2	0	1	-6.037e-6	5	73.104	2	2114.673	4
553		11	max	.025	3	1.03	3	.448	4	0	1	3070.035	15	NC	1
554			min	-.018	2	-1.459	2	0	1	-5.776e-6	5	75.066	2	2156.406	4
555		12	max	.025	3	.94	3	.415	4	7.174e-4	4	3308.536	15	NC	1
556			min	-.018	2	-1.322	2	0	1	0	1	81.471	2	2207.827	4
557		13	max	.024	3	.795	3	.375	4	2.515e-3	4	3774.51	15	NC	1
558			min	-.018	2	-1.103	2	0	1	0	1	94.198	2	2583.775	4
559		14	max	.023	3	.612	3	.328	4	4.312e-3	4	4579.521	15	NC	1
560			min	-.017	2	-.833	2	0	1	0	1	116.645	2	3637.939	4
561		15	max	.023	3	.409	3	.279	4	6.11e-3	4	5981.354	15	NC	1
562			min	-.017	2	-.542	2	0	1	0	1	156.892	2	6893.839	4
563		16	max	.022	3	.204	3	.231	4	7.907e-3	4	8611.983	15	NC	1
564			min	-.017	2	-.26	2	0	1	0	1	235.479	2	NC	1
565		17	max	.021	3	.014	3	.189	4	9.705e-3	4	NC	15	NC	1
566			min	-.016	2	-.019	2	0	1	0	1	413.162	2	NC	1
567		18	max	.021	3	.16	1	.156	4	4.909e-3	4	NC	5	NC	1
568			min	-.016	2	-.146	3	0	1	0	1	930.74	2	NC	1
569		19	max	.021	3	.302	1	.132	4	0	1	NC	1	NC	1
570			min	-.016	2	-.289	3	0	1	-5.902e-6	4	NC	1	NC	1
571	M9	1	max	.01	3	.208	2	.703	4	1.792e-2	3	NC	1	NC	1
572			min	-.006	2	-.05	3	0	1	-8.304e-3	1	NC	1	NC	1
573		2	max	.01	3	.101	2	.686	4	8.893e-3	3	NC	5	NC	1
574			min	-.006	2	-.024	3	0	12	-3.996e-3	1	1274.459	2	9290.856	4
575		3	max	.01	3	.015	3	.665	4	1.401e-2	4	NC	5	NC	1
576			min	-.006	2	-.012	2	0	12	-1.939e-5	10	616.73	2	5339.567	4
577		4	max	.01	3	.076	3	.641	4	1.104e-2	5	NC	15	NC	1
578			min	-.006	2	-.138	2	0	12	-4.138e-3	2	392.031	2	4027.999	4
579		5	max	.01	3	.153	3	.616	4	8.346e-3	5	NC	15	NC	1
580			min	-.006	2	-.268	2	0	12	-8.29e-3	2	284.475	2	3373.994	4
581		6	max	.009	3	.235	3	.59	4	1.213e-2	3	8262.789	15	NC	1
582			min	-.006	2	-.394	2	0	12	-1.244e-2	2	224.971	2	2966.071	4
583		7	max	.009	3	.314	3	.563	4	1.615e-2	3	6983.957	15	NC	1
584			min	-.005	2	-.506	2	0	1	-1.659e-2	2	189.734	2	2657.948	4
585		8	max	.009	3	.38	3	.538	4	2.016e-2	3	6226.077	15	NC	1
586			min	-.005	2	-.594	2	0	1	-2.075e-2	2	168.846	2	2383.634	4
587		9	max	.009	3	.422	3	.512	4	2.061e-2	3	5829	15	NC	1
588			min	-.005	2	-.65	2	0	12	-2.32e-2	2	157.945	2	2158.549	4
589		10	max	.009	3	.438	3	.482	4	1.869e-2	3	5707.462	15	NC	1
590			min	-.005	2	-.669	2	0	1	-2.453e-2	2	154.741	2	2096.55	4
591		11	max	.008	3	.428	3	.449	4	1.677e-2	3	5828.654	15	NC	1
592			min	-.005	2	-.65	2	0	1	-2.585e-2	2	158.458	2	2131.563	4
593		12	max	.008	3	.393	3	.414	4	1.446e-2	3	6225.404	15	NC	1
594			min	-.005	2	-.592	2	0	12	-2.469e-2	2	170.357	2	2236.867	4
595		13	max	.008	3	.335	3	.373	4	1.157e-2	3	6982.897	15	NC	1
596			min	-.005	2	-.5	2	0	10	-1.98e-2	2	193.306	2	2653.501	4
597		14	max	.008	3	.261	3	.327	4	8.68e-3	3	8261.162	15	NC	1
598			min	-.005	2	-.384	2	-.002	1	-1.492e-2	2	232.45	2	3665.564	5
599		15	max	.008	3	.177	3	.279	4	5.883e-3	5	NC	15	NC	1
600			min	-.005	2	-.256	2	-.005	1	-1.003e-2	2	299.58	2	6300.443	5
601		16	max	.007	3	.09	3	.233	4	7.853e-3	5	NC	15	NC	1
602			min	-.005	2	-.127	2	-.007	1	-5.144e-3	2	423.218	2	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
603		17	max	.007	3	.005	3	.191	4	9.864e-3	4	NC	5	NC	1
604			min	-.005	2	-.007	2	-.008	1	-5.263e-4	1	685.687	2	NC	1
605		18	max	.007	3	.095	2	.158	4	4.807e-3	5	NC	5	NC	1
606			min	-.005	2	-.072	3	-.006	1	-6.482e-3	2	1447.815	2	NC	1
607		19	max	.007	3	.187	2	.132	4	4.418e-3	3	NC	1	NC	1
608			min	-.004	2	-.145	3	0	12	-1.291e-2	2	NC	1	NC	1

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

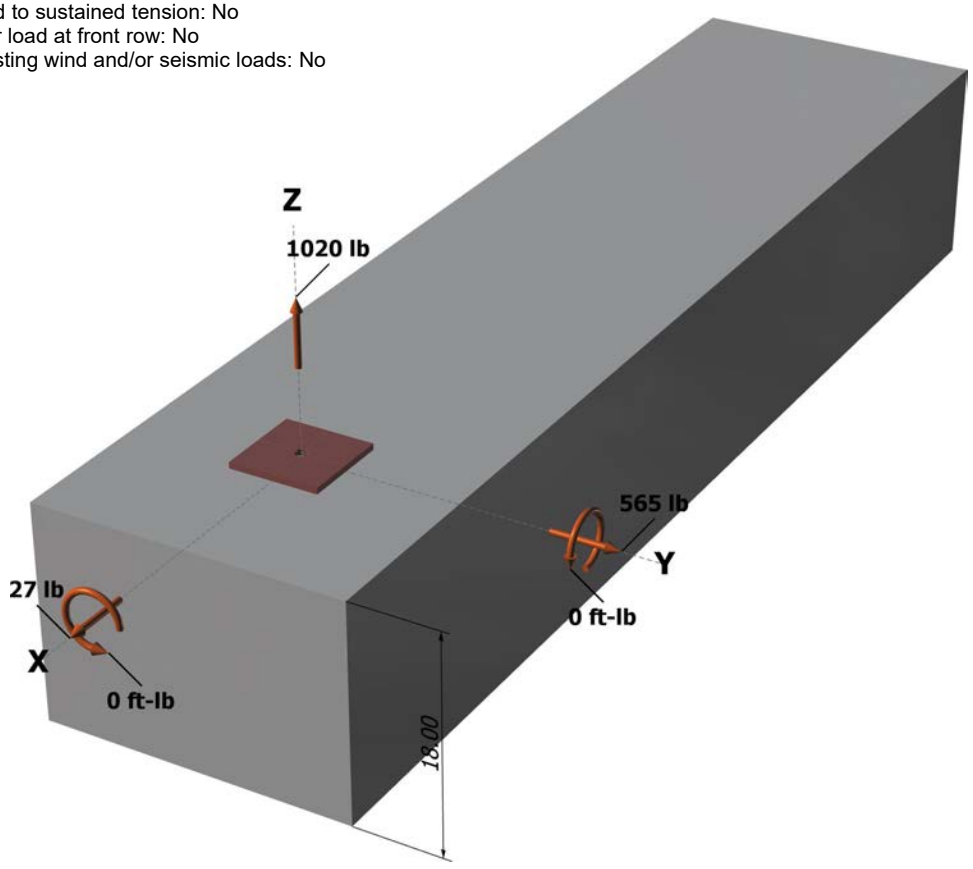
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

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

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

<Figure 1>



<Figure 2>

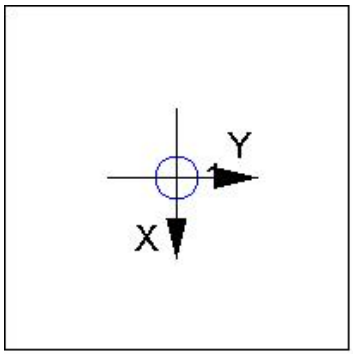
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

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

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

<Figure 3>



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in y-direction:

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

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

Shear parallel to edge in x-direction:

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

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

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

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

Shear parallel to edge in y-direction:

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

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

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

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

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

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

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

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

11. Results

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

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

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

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

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

12. Warnings

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

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

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

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

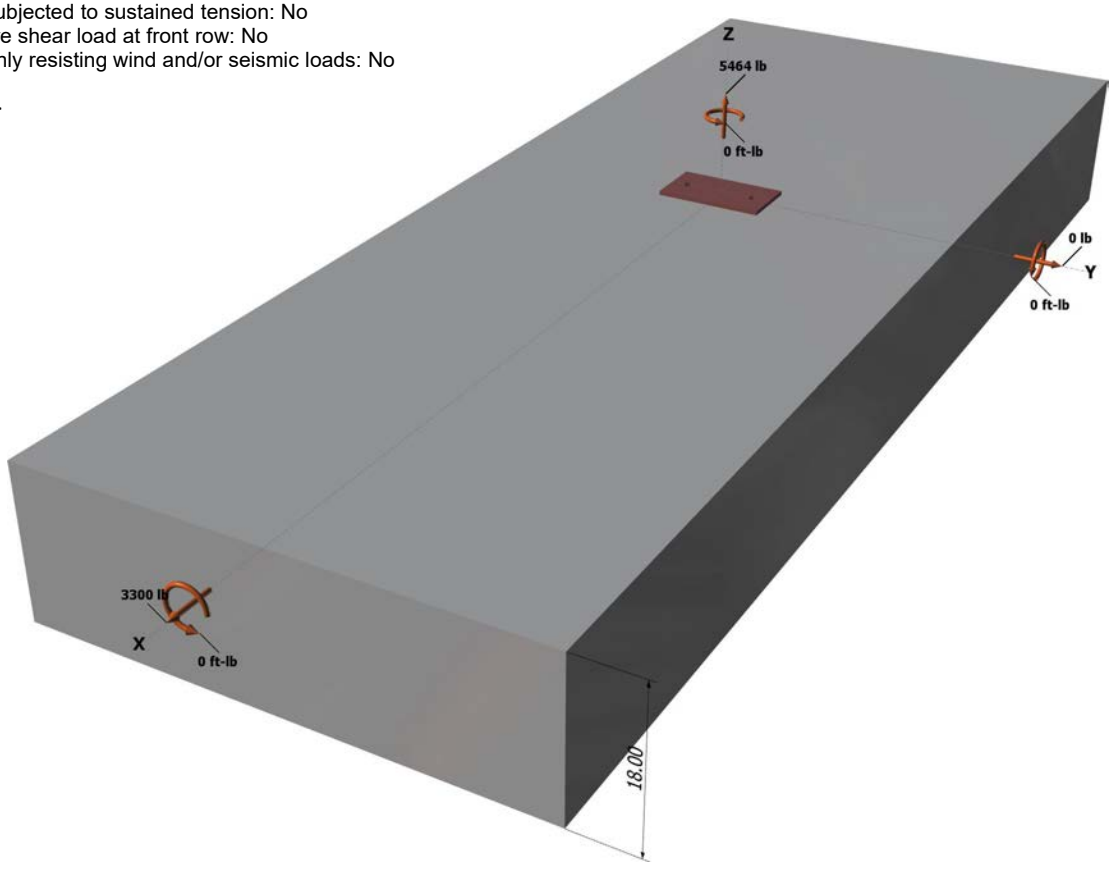
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

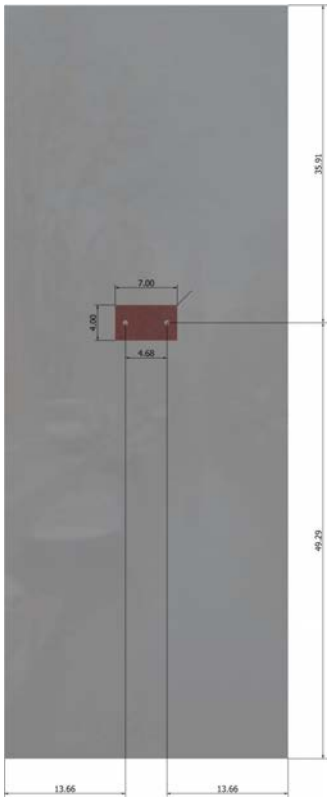
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout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

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

<Figure 1>



<Figure 2>



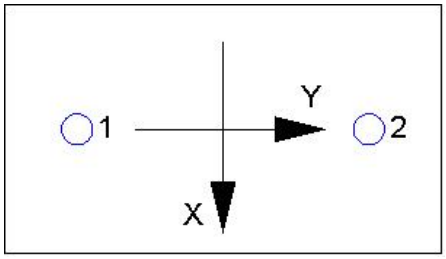
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

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

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

<Figure 3>



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

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

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

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

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

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

A_{Nc} (in²)	A_{Nco} (in²)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	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} (in²)	A_{Na0} (in²)	$\Psi_{ed,Na}$	$\Psi_{g,Na}$	$\Psi_{ec,Na}$	$\Psi_{p,Na}$	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} (in²)	A_{Vco} (in²)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	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} (in²)	A_{Vco} (in²)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	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} (in²)	A_{Na0} (in²)	$\Psi_{ed,Na}$	$\Psi_{g,Na}$	$\Psi_{ec,Na}$	$\Psi_{p,Na}$	N_{a0} (lb)	N_a (lb)
2.0	158.66	109.66	1.000	1.043	1.000	1.000	9755	14715

A_{Nc} (in²)	A_{Nco} (in²)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	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.