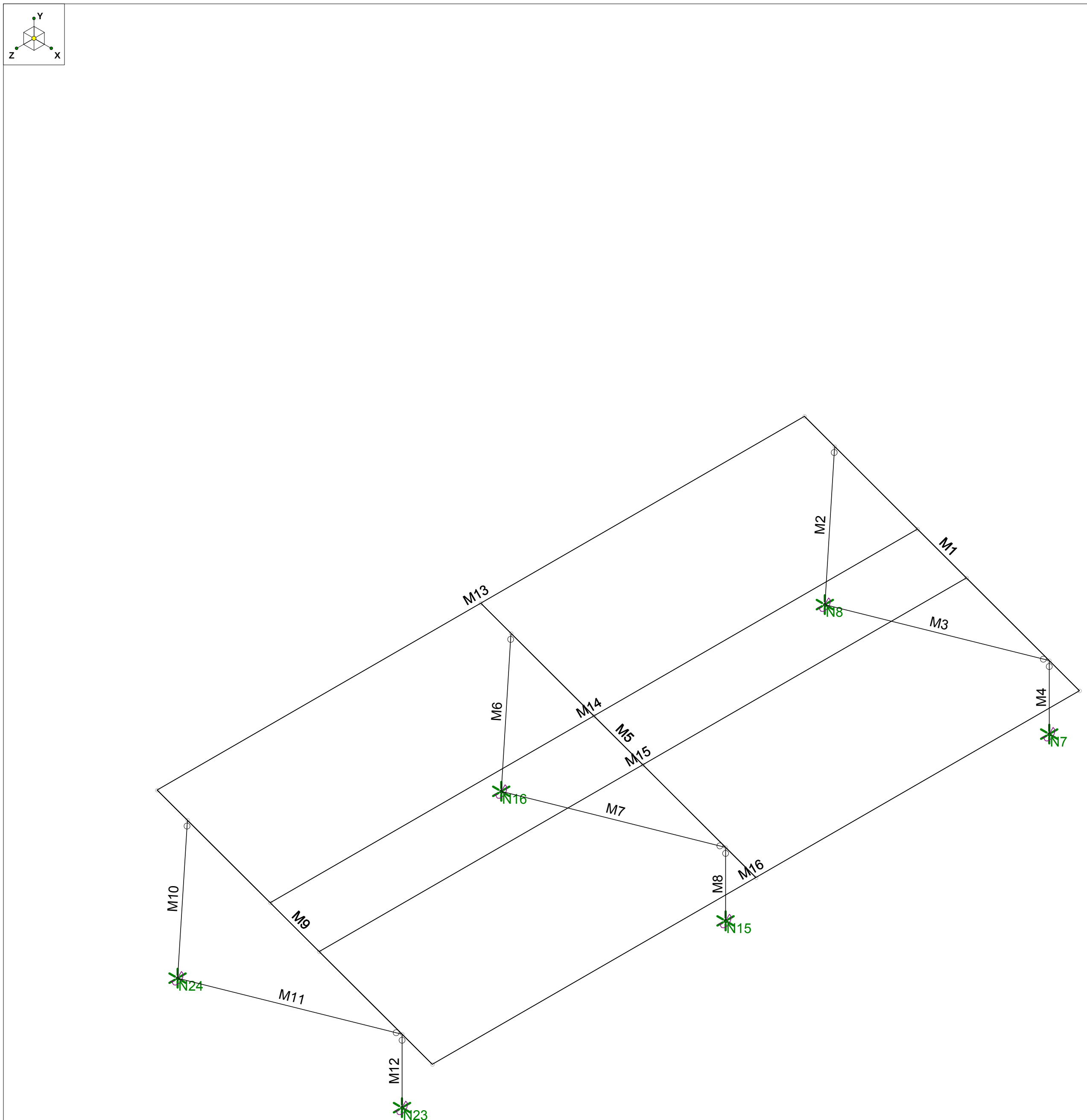


Schletter, Inc.	Standard PVMax Racking System	20° Tilt w/ Seismic Design
HCV	Representative Calculations - ASCE 7-05	

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.

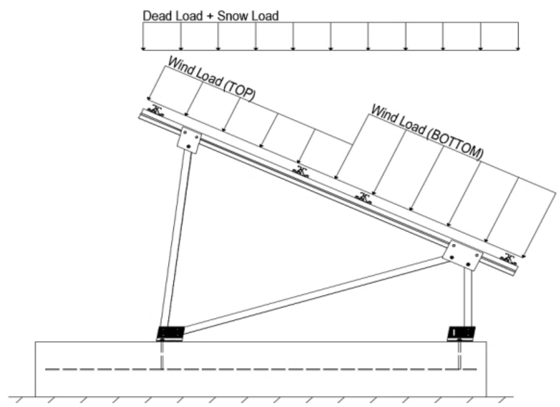
1.2 Construction
Photovoltaic modules are attached to aluminum purlins using clamp fasteners. Purlins are clamped to inclined aluminum girders, which are then connected to aluminum struts. Each support structure is equally spaced.

PV modules are required to meet the following specifications:

	Maximum		Minimum
Height =	1700 mm	Height =	1550 mm
Width =	1050 mm	Width =	970 mm
Dead Load =	3.00 psf	Dead Load =	1.75 psf

Modules Per Row = 2
Module Tilt = 20°
Maximum Height Above Grade = 3 ft

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



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

2. LOAD ACTIONS

2.1 Permanent Loads

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

Self-weight of the PV modules.

2.2 Snow Loads

Ground Snow Load, P_g =	30.00	psf	
Sloped Roof Snow Load, P_s =	20.62	psf	*(ASCE 7-05, Eq. 7-2)*
I_s =	1.00		
C_s =	0.91		
C_e =	0.90		
C_t =	1.20		

2.3 Wind Loads

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

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

Pressure Coefficients

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

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

2.4 Seismic Loads

S_S =	2.50	R =	1.25
S_{DS} =	1.67	C_S =	0.8
S_1 =	1.00	ρ =	1.3
S_{D1} =	1.00	Ω =	1.25
T_a =	0.05	C_d =	1.25

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

2.5 Combination of Loads

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

Strength Design, LRFD

Component stresses are checked using the following LRFD load combinations:

1.2D + 1.6S + 0.8W
1.2D + 1.6W + 0.5S
0.9D + 1.6W ^{M}
1.54D + 1.3E + 0.2S ^{R}
0.56D + 1.3E ^{R}
1.54D + 1.25E + 0.2S ^{O}
0.56D + 1.25E ^{O}

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

Allowable Stress Design, ASD

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

1.0D + 1.0S
1.0D + 1.0W
1.0D + 0.75L + 0.75W + 0.75S
0.6D + 1.0W ^{M}
1.238D + 0.875E ^{O}
1.1785D + 0.65625E + 0.75S ^{O}
0.362D + 0.875E ^{O}

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

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

3. STRUCTURAL ANALYSIS

3.1 RISA Results

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

3.2 RISA Components

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

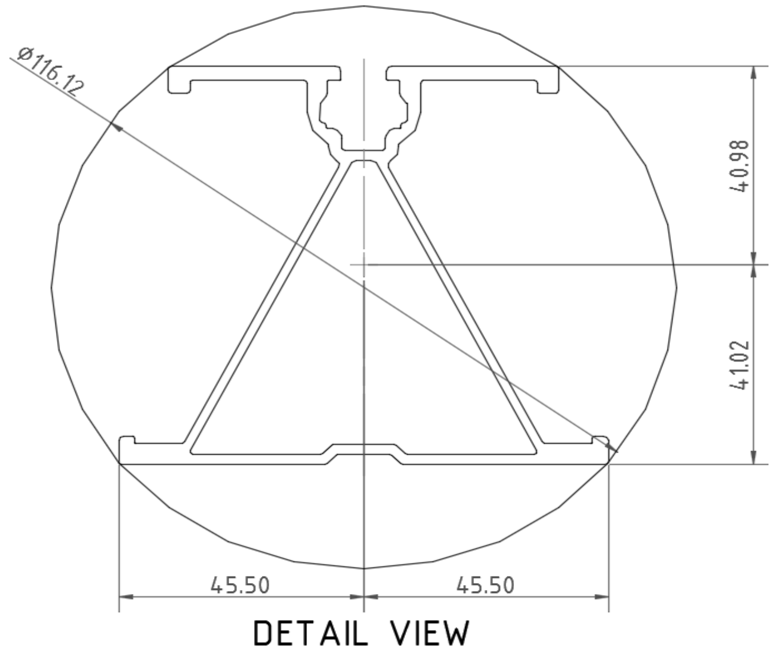
Purlins	Location	**Diagonal Struts**	Location	**Front Reactions**	Location
M13	Top	M3	Outer	N7	Outer
M14	Mid-Top	M7	Inner	N15	Inner
M15	Mid-Bottom	M11	Outer	N23	Outer
M16	Bottom				
Girders	Location	**Rear Struts**	Location	**Rear Reactions**	Location
M1	Outer	M2	Outer	N8	Outer
M5	Inner	M6	Inner	N16	Inner
M9	Outer	M10	Outer	N24	Outer
Front Struts	Location				
M4	Outer				
M8	Inner				
M12	Outer				

4. MEMBER DESIGN CALCULATIONS

4.1 Purlin Design

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

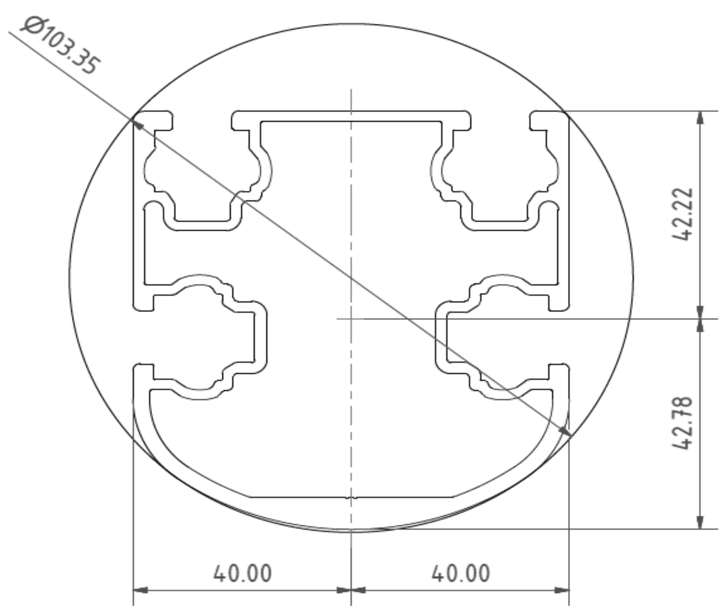
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	108	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	1.835	k-ft
M_z =	0.247	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	87%	



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).

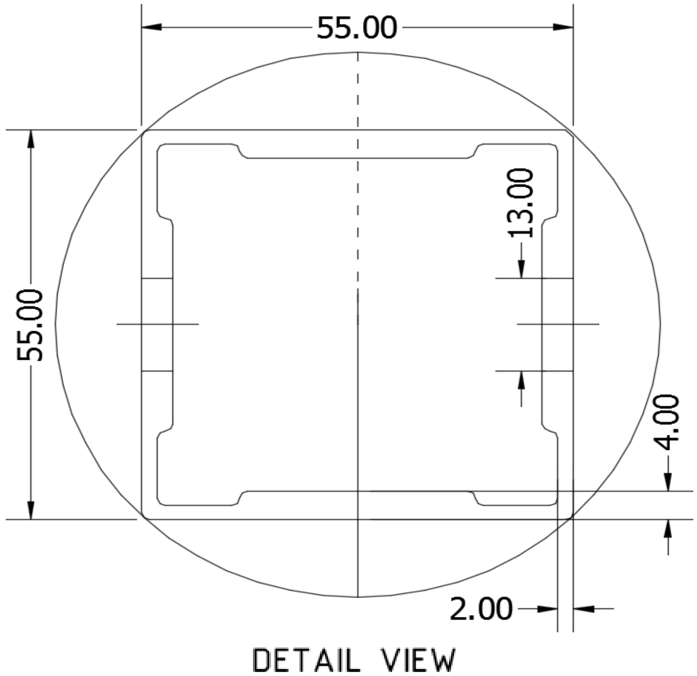
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	88.90	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.35	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.322	k-ft
M_z =	0.000	k-ft
P_n =	-0.706	k
$M_{y\ allowable}$ =	3.464	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	97%	



4.3 Front Strut Design

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

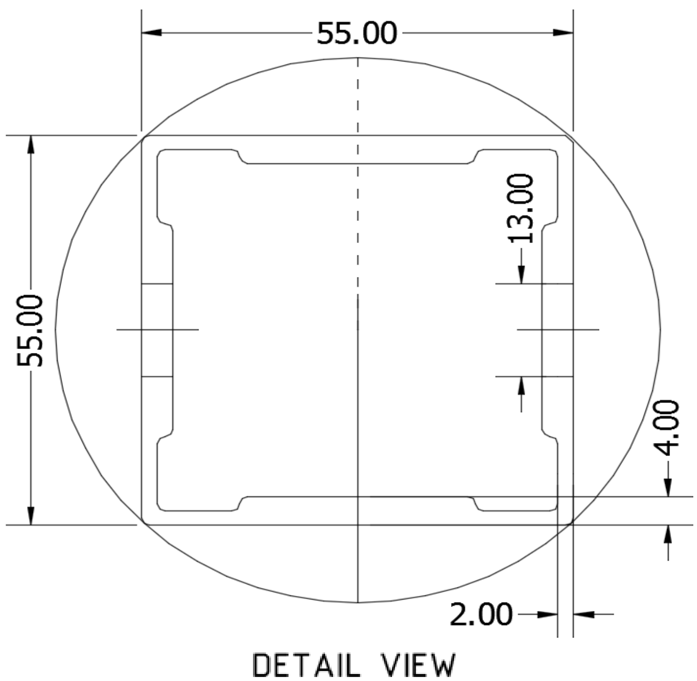
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.462	k-ft
P_n =	0.590	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	35%	



4.4 Diagonal Strut Design

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

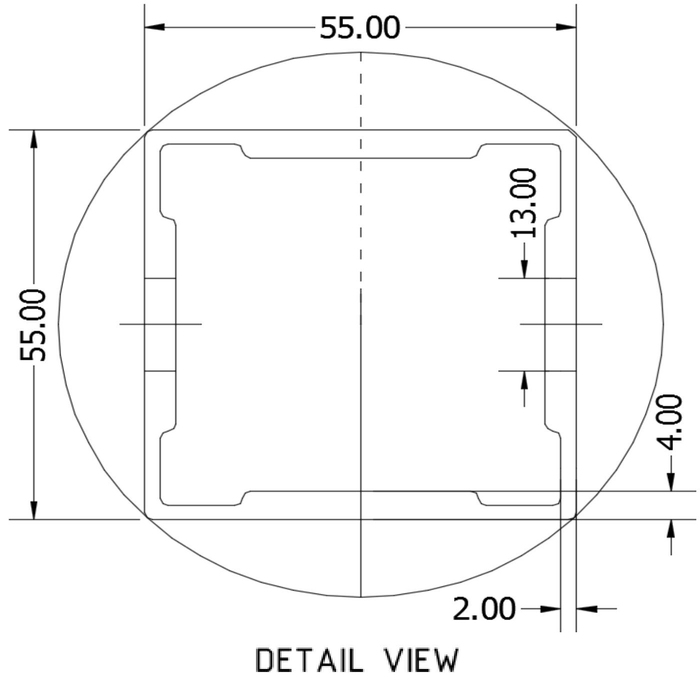
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	86.60	in
$\Phi F_{ty\ AXIAL}$ =	7.50	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.011	k-ft
M_z =	0.000	k-ft
P_n =	1.995	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	7.371	k
Utilization =	28%	



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 =	55.91	in
$\Phi F_{ty\ AXIAL}$ =	15.92	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 =	-0.011	k-ft
M_z =	0.000	k-ft
P_n =	3.479	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	15.642	k
Utilization =	23%	



5. FOUNDATION DESIGN CALCULATIONS

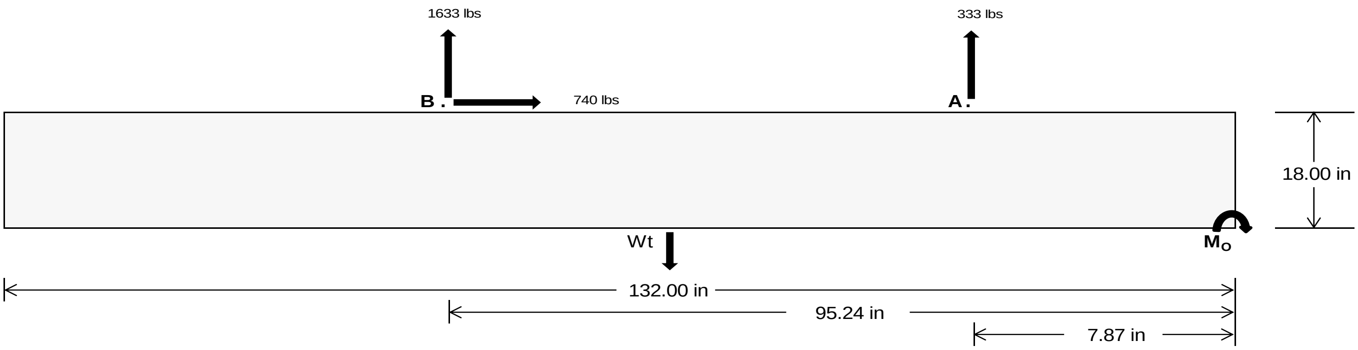
5.1 Helical Pile Foundations

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 =	1395.35	6805.65	k
Compressive Load =	4433.95	5229.30	k
Lateral Load =	309.12	3079.91	k
Moment (Weak Axis) =	0.62	0.32	k

5.2 Design of Ballast Foundations

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



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

Footing Reinforcement

Use fiber reinforcing with (3) #5 rebar.

Overturning Check	
M_O =	171509.8 in-lbs
Resisting Force Required =	2598.63 lbs
S.F. =	1.67
Weight Required =	4331.06 lbs
Minimum Width =	37 in in
Weight Provided =	7376.88 lbs

A minimum 132in long x 37in wide x 18in tall ballast foundation is required to resist overturning.

Sliding	
Force =	740.28 lbs
Friction =	0.4
Weight Required =	1850.70 lbs
Resisting Weight =	7376.88 lbs
Additional Weight Required =	0 lbs

Use a 132in long x 37in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

Cohesion	
Sliding Force =	740.28 lbs
Cohesion =	130 psf
Area =	33.92 ft^2
Resisting =	3688.44 lbs
Additional Weight Required =	0 lbs

Use a 132in long x 37in wide x 18in tall ballast foundation. Cohesion is OK.

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

Shear key is not required.

Bearing Pressure

	Ballast Width			
	37 in	38 in	39 in	40 in
P_{ftg} = (145 pcf)(11 ft)(1.5 ft)(3.08 ft) =	7377 lbs	7576 lbs	7776 lbs	7975 lbs

ASD LC	1.0D + 1.0S				1.0D + 1.0W				1.0D + 0.75L + 0.75W + 0.75S				0.6D + 1.0W			
Width	37 in	38 in	39 in	40 in	37 in	38 in	39 in	40 in	37 in	38 in	39 in	40 in	37 in	38 in	39 in	40 in
F_A	1398 lbs	1398 lbs	1398 lbs	1398 lbs	1819 lbs	1819 lbs	1819 lbs	1819 lbs	2296 lbs	2296 lbs	2296 lbs	2296 lbs	-665 lbs	-665 lbs	-665 lbs	-665 lbs
F_B	1422 lbs	1422 lbs	1422 lbs	1422 lbs	2202 lbs	2202 lbs	2202 lbs	2202 lbs	2600 lbs	2600 lbs	2600 lbs	2600 lbs	-3267 lbs	-3267 lbs	-3267 lbs	-3267 lbs
F_V	154 lbs	154 lbs	154 lbs	154 lbs	1312 lbs	1312 lbs	1312 lbs	1312 lbs	1088 lbs	1088 lbs	1088 lbs	1088 lbs	-1481 lbs	-1481 lbs	-1481 lbs	-1481 lbs
P_{total}	10196 lbs	10396 lbs	10595 lbs	10795 lbs	11398 lbs	11597 lbs	11797 lbs	11996 lbs	12273 lbs	12472 lbs	12672 lbs	12871 lbs	494 lbs	614 lbs	733 lbs	853 lbs
M	3537 lbs-ft	3537 lbs-ft	3537 lbs-ft	3537 lbs-ft	5417 lbs-ft	5417 lbs-ft	5417 lbs-ft	5417 lbs-ft	6420 lbs-ft	6420 lbs-ft	6420 lbs-ft	6420 lbs-ft	2517 lbs-ft	2517 lbs-ft	2517 lbs-ft	2517 lbs-ft
e	0.35 ft	0.34 ft	0.33 ft	0.33 ft	0.48 ft	0.47 ft	0.46 ft	0.45 ft	0.52 ft	0.51 ft	0.51 ft	0.50 ft	5.09 ft	4.10 ft	3.43 ft	2.95 ft
L/6	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft
f_{min}	243.8 psf	243.1 psf	242.4 psf	241.8 psf	248.9 psf	248.1 psf	247.3 psf	246.6 psf	258.6 psf	257.5 psf	256.5 psf	255.5 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	357.5 psf	353.8 psf	350.3 psf	347.0 psf	423.2 psf	417.8 psf	412.6 psf	407.7 psf	465.1 psf	458.6 psf	452.4 psf	446.5 psf	263.3 psf	92.4 psf	72.7 psf	66.9 psf

Maximum Bearing Pressure = 465 psf
Allowable Bearing Pressure = 1500 psf

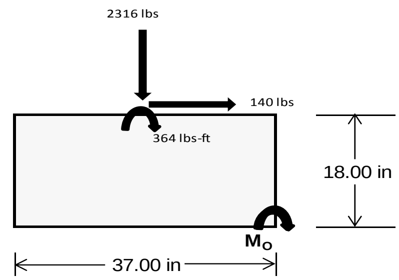
Use a 132in long x 37in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O = 2996.6 ft-lbs
Resisting Force Required = 1943.71 lbs
S.F. = 1.67
Weight Required = 3239.52 lbs
Minimum Width = 37 in in
Weight Provided = 7376.88 lbs

A minimum 132in long x 37in 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	37 in			37 in			37 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	248 lbs	580 lbs	197 lbs	808 lbs	2316 lbs	770 lbs	90 lbs	170 lbs	40 lbs
F_V	194 lbs	190 lbs	196 lbs	144 lbs	140 lbs	151 lbs	194 lbs	191 lbs	195 lbs
P_{total}	9380 lbs	9713 lbs	9330 lbs	9502 lbs	11009 lbs	9463 lbs	2760 lbs	2840 lbs	2711 lbs
M	766 lbs-ft	759 lbs-ft	772 lbs-ft	577 lbs-ft	573 lbs-ft	601 lbs-ft	765 lbs-ft	757 lbs-ft	767 lbs-ft
e	0.08 ft	0.08 ft	0.08 ft	0.06 ft	0.05 ft	0.06 ft	0.28 ft	0.27 ft	0.28 ft
L/6	0.51 ft	0.51 ft	0.51 ft	0.51 ft	0.51 ft	0.51 ft	0.51 ft	0.51 ft	0.51 ft
f_{min}	232.6 psf	242.8 psf	230.8 psf	247.0 psf	291.7 psf	244.5 psf	37.5 psf	40.3 psf	35.9 psf
f_{max}	320.5 psf	329.9 psf	319.4 psf	313.3 psf	357.5 psf	313.5 psf	125.3 psf	127.2 psf	123.9 psf

Maximum Bearing Pressure = 357 psf
Allowable Bearing Pressure = 1500 psf

Use a 132in long x 37in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Foundation Requirements: 132in long x 37in wide x 18in tall ballast foundation and fiber reinforcing with (3) #5 rebar.

5.3 Foundation Anchors

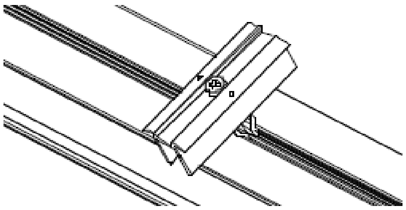
Threaded rods are anchored to the the ballast foundations using the Simpson AT-XP epoxy solution. LRFD load results are compared to the allowable strengths of the epoxy solution. Please see the supplementary calculations provided by the Simpson Anchor Designer software.

6. DESIGN OF JOINTS AND CONNECTIONS

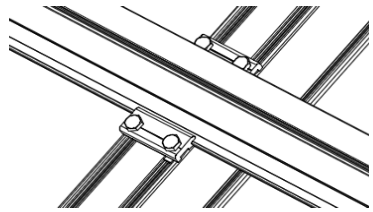
6.1 Anchorage of Modules to Purlins and Connection of Purlins to Girders

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

Fastening of Modules to Purlins		
Maximum Uplifting Force =	0.819	k
Allowable Uplift =	1.214	k
Utilization =	67%	



Fastening of Purlins to Girders		
Maximum Uplifting Force =	2.631	k
Allowable Uplift =	4.357	k
Utilization =	60%	



6.2 Strut Connections

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

Front Strut		
Maximum Axial Load =	3.411	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	46%	

Rear Strut		
Maximum Axial Load =	4.674	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	63%	

Diagonal Strut		
Maximum Axial Load =	2.129	k
M12 Bolt Shear Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	29%	

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

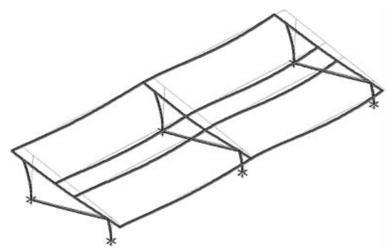
7.1 Seismic Drift

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} =	40.12	in
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$	
	0.802	in
Max Drift, Δ_{MAX} =	0.474	in

$0.474 \le 0.802$, OK.

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



APPENDIX A

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

Purlin = **S1.5**

Strong Axis:

3.4.14

L_b = 108 in

J = 0.432

298.779

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

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= 27.7 ksi

3.4.16

b/t = 32.195

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 25.1 ksi

3.4.16.1 Not Used

Rb/t =

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 37.0588

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

S1 = 36.9

m = 0.65

C_0 = 40.985

Cc = 41.015

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

S2 = 77.2

φF_L= φb[Bbr-mDbr*h/t]

φF_L= 43.2 ksi

$\varphi F_L St$= 25.1 ksi

Ix = 897074 mm^4

2.155 in^4

y = 41.015 mm

Sx = 1.335 in^3

$M_{max}St$ = 2.788 k-ft

Weak Axis:

3.4.14

L_b = 108

J = 0.432

190.005

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

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 = 37.0588

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 23.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 32.195

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

S1 = 36.9

m = 0.65

C_0 = 45.5

Cc = 45.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

$\varphi F_L Wk$= 23.1 ksi

Iy = 446476 mm^4

1.073 in^4

x = 45.5 mm

Sy = 0.599 in^3

$M_{max}Wk$ = 1.152 k-ft

Compression

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

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

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

Girder = **BF0**

Strong Axis:
3.4.14

L_b = 88.9 in
J = 1.08
152.913

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

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

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 = 88.9
J = 1.08
161.829

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

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= 29.2

3.4.16

b/t = 7.4

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

S1 = 12.2

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

S2 = 46.7
φF_L= φyFcy
φF_L= 33.3 ksi

3.4.16.1 Used

Rb/t = 18.1

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

S1 = 1.1

$S2 = C_t$

S2 = 141.0

φF_L = φb[Bt-Dt*√(Rb/t)]

φF_L = 31.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 7.4

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

S1 = 35.2

m = 0.68

C_0 = 41.067

Cc = 43.717

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

S2 = 73.8

φF_L = 1.3φyFcy

φF_L = 43.2 ksi

φF_LSt = 29.4 ksi

Ix = 984962 mm^4

2.366 in^4

y = 43.717 mm

Sx = 1.375 in^3

M_{max}St = 3.363 k-ft

3.4.18

h/t = 16.2

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

S1 = 36.9

m = 0.65

C_0 = 40

Cc = 40

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

S2 = 77.3

φF_L = 1.3φyFcy

φF_L = 43.2 ksi

φF_LWk = 33.3 ksi

Iy = 923544 mm^4

2.219 in^4

x = 40 mm

Sy = 1.409 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 = 86.60 in
J = 0.942
135.148

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

S1 = 0.51461

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

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 29.6 ksi

Weak Axis:
3.4.14
L_b = 86.6
J = 0.942
135.148

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

S1 = 0.51461

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

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 29.6

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

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

$\varphi F_L =$ 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

$\varphi F_L = 1.17\varphi yFcy$

$\varphi F_L =$ 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St =$ 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

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

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

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

$\varphi F_L =$ 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L Wk =$ 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

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

Compression

3.4.7

λ = 2.00335

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.86047

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

$\varphi F_L =$ 7.50396 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= 7.50 ksi
A = 663.99 mm^2
1.03 in^2
P_{max} = 7.72 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 55.91 in
J = 0.942
87.2529

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

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= 30.4 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

Weak Axis:

3.4.14

L_b = 55.91
J = 0.942
87.2529

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

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= 30.4

3.4.16

b/t = 24.5

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

S1 = 12.2

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

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

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.16.1

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 = 1.29339

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.76107

φF_L= (φccFcy)/(λ²)

φF_L= 15.9235 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

$\varphi F_L = \varphi y Fcy$

$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 15.92 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 16.39 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	-8.366	-8.366	0	0
2	M14	Y	-8.366	-8.366	0	0
3	M15	Y	-8.366	-8.366	0	0
4	M16	Y	-8.366	-8.366	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	-4.45	-4.45	0	0
2	M14	Y	-4.45	-4.45	0	0
3	M15	Y	-4.45	-4.45	0	0
4	M16	Y	-4.45	-4.45	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	-54.031	-54.031	0	0
2	M14	Y	-54.031	-54.031	0	0
3	M15	Y	-54.031	-54.031	0	0
4	M16	Y	-54.031	-54.031	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	-66.204	-66.204	0	0
2	M14	y	-66.204	-66.204	0	0
3	M15	y	-104.034	-104.034	0	0
4	M16	y	-104.034	-104.034	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	151.323	151.323	0	0
2	M14	y	116.014	116.014	0	0
3	M15	y	63.051	63.051	0	0
4	M16	y	63.051	63.051	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	6.693	6.693	0	0
2	M14	Z	6.693	6.693	0	0
3	M15	Z	6.693	6.693	0	0
4	M16	Z	6.693	6.693	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	599.794	2	1250.132	2	.698	1	.003	1	0	1	0	1
2		min	-752.664	3	-1613.295	3	-55.155	5	-.246	4	0	1	0	1
3	N7	max	.029	9	1197.51	1	-.4	12	0	12	0	1	0	1
4		min	-.188	2	-310.625	3	-237.784	4	-.474	4	0	1	0	1
5	N15	max	.023	9	3410.727	1	0	3	0	3	0	1	0	1
6		min	-2.166	2	-1073.345	3	-228.815	4	-.462	4	0	1	0	1
7	N16	max	2156.704	2	4022.536	2	0	12	0	3	0	1	0	1
8		min	-2369.162	3	-5235.115	3	-55.059	5	-.248	4	0	1	0	1
9	N23	max	.032	14	1197.51	1	7.531	1	.016	1	0	1	0	1
10		min	-.188	2	-310.625	3	-232.69	4	-.466	4	0	1	0	1
11	N24	max	599.794	2	1250.132	2	-.046	12	0	12	0	1	0	1
12		min	-752.664	3	-1613.295	3	-55.646	5	-.248	4	0	1	0	1
13	Totals:	max	3353.75	2	12153.007	2	0	3						
14		min	-3875.445	3	-10156.301	3	-861.086	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	78.885	1	483.555	1	-6.148	12	0	3	.188	1	0	4
2			min	4.45	12	-800.457	3	-144.585	1	-.016	2	.011	12	0	3
3		2	max	78.885	1	338.226	1	-4.926	12	0	3	.082	4	.682	3
4			min	4.45	12	-563.375	3	-110.966	1	-.016	2	.004	10	-.411	1
5		3	max	78.885	1	192.897	1	-3.705	12	0	3	.045	5	1.127	3
6			min	4.45	12	-326.294	3	-77.348	1	-.016	2	-.034	1	-.676	1
7		4	max	78.885	1	47.568	1	-2.483	12	0	3	.024	5	1.334	3
8			min	4.45	12	-89.213	3	-43.729	1	-.016	2	-.095	1	-.797	1
9		5	max	78.885	1	147.868	3	-.434	10	0	3	.005	5	1.305	3
10			min	4.45	12	-97.761	1	-20.772	4	-.016	2	-.122	1	-.772	1
11		6	max	78.885	1	384.95	3	23.508	1	0	3	-.005	12	1.039	3
12			min	2.975	15	-243.09	1	-16.34	5	-.016	2	-.115	1	-.601	1
13		7	max	78.885	1	622.031	3	57.126	1	0	3	-.004	12	.535	3
14			min	-5.646	5	-388.42	1	-14.449	5	-.016	2	-.075	1	-.285	1
15		8	max	78.885	1	859.112	3	90.745	1	0	3	.002	2	.179	2
16			min	-15.911	5	-533.749	1	-12.559	5	-.016	2	-.042	4	-.205	3
17		9	max	78.885	1	1096.193	3	124.363	1	0	3	.107	1	.782	1
18			min	-26.177	5	-679.078	1	-10.668	5	-.016	2	-.053	5	-1.183	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	78.885	1	1333.275	3	157.981	1	.016	2	.248	1	1.534	1
20			min	4.45	12	-824.407	1	-92.832	14	0	12	.005	12	-2.398	3
21		11	max	78.885	1	679.078	1	-3.627	12	.016	2	.107	1	.782	1
22			min	4.45	12	-1096.193	3	-124.363	1	0	3	0	3	-1.183	3
23		12	max	78.885	1	533.749	1	-2.405	12	.016	2	.041	4	.179	2
24			min	4.45	12	-859.112	3	-90.745	1	0	3	-.004	3	-.205	3
25		13	max	78.885	1	388.42	1	-1.183	12	.016	2	.019	5	.535	3
26			min	4.45	12	-622.031	3	-57.126	1	0	3	-.075	1	-.285	1
27		14	max	78.885	1	243.09	1	.144	3	.016	2	0	15	1.039	3
28			min	2.793	15	-384.95	3	-24.047	4	0	3	-.115	1	-.601	1
29		15	max	78.885	1	97.761	1	10.111	1	.016	2	-.004	12	1.305	3
30			min	-5.984	5	-147.868	3	-17.036	5	0	3	-.122	1	-.772	1
31		16	max	78.885	1	89.213	3	43.729	1	.016	2	-.002	12	1.334	3
32			min	-16.249	5	-47.568	1	-15.145	5	0	3	-.095	1	-.797	1
33		17	max	78.885	1	326.294	3	77.348	1	.016	2	.001	3	1.127	3
34			min	-26.514	5	-192.897	1	-13.255	5	0	3	-.057	4	-.676	1
35		18	max	78.885	1	563.375	3	110.966	1	.016	2	.06	1	.682	3
36			min	-36.78	5	-338.226	1	-11.364	5	0	3	-.061	5	-.411	1
37		19	max	78.885	1	800.457	3	144.585	1	.016	2	.188	1	0	1
38			min	-47.045	5	-483.555	1	-9.474	5	0	3	-.072	5	0	3
39	M14	1	max	51.497	4	521.473	1	-6.324	12	.011	3	.217	1	0	1
40			min	1.933	12	-633.324	3	-149.466	1	-.013	2	.012	12	0	3
41		2	max	41.232	4	376.144	1	-5.102	12	.011	3	.121	4	.543	3
42			min	1.933	12	-452.738	3	-115.848	1	-.013	2	.006	12	-.449	1
43		3	max	39.153	1	230.815	1	-3.88	12	.011	3	.068	5	.905	3
44			min	1.933	12	-272.151	3	-82.229	1	-.013	2	-.015	1	-.752	1
45		4	max	39.153	1	86.378	2	-2.659	12	.011	3	.037	5	1.087	3
46			min	1.933	12	-91.564	3	-48.611	1	-.013	2	-.08	1	-.91	1
47		5	max	39.153	1	89.023	3	-.909	10	.011	3	.008	5	1.089	3
48			min	1.442	15	-59.843	1	-31.77	4	-.013	2	-.112	1	-.923	1
49		6	max	39.153	1	269.61	3	18.626	1	.011	3	-.004	12	.909	3
50			min	-8.079	5	-205.172	1	-26.126	5	-.013	2	-.11	1	-.791	1
51		7	max	39.153	1	450.197	3	52.244	1	.011	3	-.004	12	.549	3
52			min	-18.344	5	-350.502	1	-24.236	5	-.013	2	-.075	1	-.518	2
53		8	max	39.153	1	630.784	3	85.863	1	.011	3	0	10	.009	3
54			min	-28.61	5	-495.831	1	-22.345	5	-.013	2	-.07	4	-.106	2
55		9	max	39.153	1	811.37	3	119.481	1	.011	3	.097	1	.479	1
56			min	-38.875	5	-641.16	1	-20.455	5	-.013	2	-.089	5	-.712	3
57		10	max	61.568	4	991.957	3	153.1	1	.013	2	.233	1	1.193	1
58			min	1.933	12	-786.489	1	-95.253	14	-.011	3	.004	12	-1.614	3
59		11	max	51.303	4	641.16	1	-3.451	12	.013	2	.121	4	.479	1
60			min	1.933	12	-811.37	3	-119.481	1	-.011	3	0	3	-.712	3
61		12	max	41.038	4	495.831	1	-2.229	12	.013	2	.066	5	.009	3
62			min	1.933	12	-630.784	3	-85.863	1	-.011	3	-.006	1	-.106	2
63		13	max	39.153	1	350.502	1	-1.007	12	.013	2	.035	5	.549	3
64			min	1.933	12	-450.197	3	-52.244	1	-.011	3	-.075	1	-.518	2
65		14	max	39.153	1	205.172	1	.408	3	.013	2	.006	5	.909	3
66			min	1.933	12	-269.61	3	-32.457	4	-.011	3	-.11	1	-.791	1
67		15	max	39.153	1	59.843	1	14.993	1	.013	2	-.004	12	1.089	3
68			min	1.319	15	-89.023	3	-26.272	5	-.011	3	-.112	1	-.923	1
69		16	max	39.153	1	91.564	3	48.611	1	.013	2	-.002	12	1.087	3
70			min	-8.26	5	-86.378	2	-24.382	5	-.011	3	-.08	1	-.91	1
71		17	max	39.153	1	272.151	3	82.229	1	.013	2	.003	3	.905	3
72			min	-18.526	5	-230.815	1	-22.492	5	-.011	3	-.074	4	-.752	1
73		18	max	39.153	1	452.738	3	115.848	1	.013	2	.084	1	.543	3
74			min	-28.791	5	-376.144	1	-20.601	5	-.011	3	-.091	5	-.449	1
75		19	max	39.153	1	633.324	3	149.466	1	.013	2	.217	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	-39.056	5	-521.473	1	-18.711	5	-.011	3	-.111	5	0	3
77	M15	1	max	74.68	5	718.062	2	-6.257	12	.013	2	.229	4	0	2
78			min	-40.911	1	-347.697	3	-149.459	1	-.009	3	.012	12	0	3
79		2	max	64.415	5	515.091	2	-5.035	12	.013	2	.156	4	.3	3
80			min	-40.911	1	-251.851	3	-115.841	1	-.009	3	.006	12	-.617	2
81		3	max	54.15	5	312.121	2	-3.813	12	.013	2	.094	5	.504	3
82			min	-40.911	1	-156.005	3	-82.222	1	-.009	3	-.015	1	-1.03	2
83		4	max	43.884	5	109.15	2	-2.591	12	.013	2	.053	5	.612	3
84			min	-40.911	1	-60.159	3	-50.652	4	-.009	3	-.08	1	-1.241	2
85		5	max	33.619	5	35.687	3	-.941	10	.013	2	.014	5	.624	3
86			min	-40.911	1	-93.82	2	-41.757	4	-.009	3	-.112	1	-1.248	2
87		6	max	23.354	5	131.533	3	18.633	1	.013	2	-.004	12	.54	3
88			min	-40.911	1	-296.791	2	-36.098	5	-.009	3	-.11	1	-1.053	2
89		7	max	13.089	5	227.379	3	52.251	1	.013	2	-.004	12	.361	3
90			min	-40.911	1	-499.761	2	-34.207	5	-.009	3	-.075	1	-.655	2
91		8	max	2.824	5	323.225	3	85.87	1	.013	2	0	10	.086	3
92			min	-40.911	1	-702.732	2	-32.317	5	-.009	3	-.094	4	-.063	1
93		9	max	-2.389	12	419.071	3	119.488	1	.013	2	.097	1	.751	2
94			min	-40.911	1	-905.702	2	-30.427	5	-.009	3	-.123	5	-.285	3
95		10	max	-2.389	12	514.917	3	153.107	1	.009	3	.233	1	1.758	2
96			min	-40.911	1	-1108.673	2	-100.33	14	-.013	2	.005	12	-.752	3
97		11	max	2.529	5	905.702	2	-3.518	12	.009	3	.155	4	.751	2
98			min	-40.911	1	-419.071	3	-119.488	1	-.013	2	0	12	-.285	3
99		12	max	-2.389	12	702.732	2	-2.296	12	.009	3	.091	5	.086	3
100			min	-40.911	1	-323.225	3	-85.87	1	-.013	2	-.006	1	-.063	1
101		13	max	-2.389	12	499.761	2	-1.075	12	.009	3	.05	5	.361	3
102			min	-40.911	1	-227.379	3	-52.251	1	-.013	2	-.075	1	-.655	2
103		14	max	-2.389	12	296.791	2	.3	3	.009	3	.011	5	.54	3
104			min	-40.911	1	-131.533	3	-42.461	4	-.013	2	-.11	1	-1.053	2
105		15	max	-2.389	12	93.82	2	14.985	1	.009	3	-.004	12	.624	3
106			min	-47.653	4	-35.687	3	-36.246	5	-.013	2	-.112	1	-1.248	2
107		16	max	-2.389	12	60.159	3	48.604	1	.009	3	-.002	12	.612	3
108			min	-57.918	4	-109.15	2	-34.356	5	-.013	2	-.08	1	-1.241	2
109		17	max	-2.389	12	156.005	3	82.222	1	.009	3	.002	3	.504	3
110			min	-68.183	4	-312.121	2	-32.465	5	-.013	2	-.1	4	-1.03	2
111		18	max	-2.389	12	251.851	3	115.841	1	.009	3	.084	1	.3	3
112			min	-78.449	4	-515.091	2	-30.575	5	-.013	2	-.127	5	-.617	2
113		19	max	-2.389	12	347.697	3	149.459	1	.009	3	.217	1	0	2
114			min	-88.714	4	-718.062	2	-28.684	5	-.013	2	-.156	5	0	5
115	M16	1	max	73.456	5	678.951	2	-5.921	12	.012	1	.189	1	0	2
116			min	-83.96	1	-316.939	3	-144.845	1	-.013	3	.01	12	0	3
117		2	max	63.19	5	475.981	2	-4.699	12	.012	1	.115	4	.269	3
118			min	-83.96	1	-221.093	3	-111.226	1	-.013	3	.004	12	-.577	2
119		3	max	52.925	5	273.01	2	-3.477	12	.012	1	.069	5	.442	3
120			min	-83.96	1	-125.247	3	-77.608	1	-.013	3	-.033	1	-.952	2
121		4	max	42.66	5	70.04	2	-2.255	12	.012	1	.039	5	.52	3
122			min	-83.96	1	-29.401	3	-43.989	1	-.013	3	-.094	1	-1.123	2
123		5	max	32.395	5	66.445	3	-.576	10	.012	1	.011	5	.501	3
124			min	-83.96	1	-132.931	2	-29.706	4	-.013	3	-.121	1	-1.092	2
125		6	max	22.13	5	162.291	3	23.248	1	.012	1	-.005	12	.387	3
126			min	-83.96	1	-335.901	2	-25.177	5	-.013	3	-.115	1	-.858	2
127		7	max	11.864	5	258.137	3	56.866	1	.012	1	-.004	12	.176	3
128			min	-83.96	1	-538.872	2	-23.287	5	-.013	3	-.075	1	-.42	2
129		8	max	1.599	5	353.983	3	90.484	1	.012	1	.001	2	.22	2
130			min	-83.96	1	-741.842	2	-21.397	5	-.013	3	-.063	4	-.13	3
131		9	max	-4.348	12	449.829	3	124.103	1	.012	1	.106	1	1.063	2
132			min	-83.96	1	-944.813	2	-19.506	5	-.013	3	-.082	5	-.532	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	-4.348	12	545.675	3	157.721	1	.013	3	.247	1	2.11	2
134			min	-83.96	1	-1147.784	2	-97.275	14	-.012	1	.006	12	-1.029	3
135		11	max	-.396	15	944.813	2	-3.854	12	.013	3	.117	4	1.063	2
136			min	-83.96	1	-449.829	3	-124.103	1	-.012	1	.001	12	-.532	3
137		12	max	-4.348	12	741.842	2	-2.632	12	.013	3	.062	4	.22	2
138			min	-83.96	1	-353.983	3	-90.484	1	-.012	1	-.003	3	-.13	3
139		13	max	-4.348	12	538.872	2	-1.41	12	.013	3	.031	5	.176	3
140			min	-83.96	1	-258.137	3	-56.866	1	-.012	1	-.075	1	-.42	2
141		14	max	-4.348	12	335.901	2	-.189	12	.013	3	.002	5	.387	3
142			min	-83.96	1	-162.291	3	-32.902	4	-.012	1	-.115	1	-.858	2
143		15	max	-4.348	12	132.931	2	10.371	1	.013	3	-.004	12	.501	3
144			min	-83.96	1	-66.445	3	-25.861	5	-.012	1	-.121	1	-1.092	2
145		16	max	-4.348	12	29.401	3	43.989	1	.013	3	-.003	12	.52	3
146			min	-83.96	1	-70.04	2	-23.971	5	-.012	1	-.094	1	-1.123	2
147		17	max	-4.348	12	125.247	3	77.608	1	.013	3	0	3	.442	3
148			min	-83.96	1	-273.01	2	-22.08	5	-.012	1	-.08	4	-.952	2
149		18	max	-4.348	12	221.093	3	111.226	1	.013	3	.061	1	.269	3
150			min	-91.063	4	-475.981	2	-20.19	5	-.012	1	-.094	5	-.577	2
151		19	max	-4.348	12	316.939	3	144.845	1	.013	3	.189	1	0	2
152			min	-101.328	4	-678.951	2	-18.299	5	-.012	1	-.113	5	0	5
153	M2	1	max	1090.729	2	2.075	4	.738	1	0	3	0	3	0	1
154			min	-1440.524	3	.509	15	-51.504	4	0	4	0	1	0	1
155		2	max	1091.108	2	2.041	4	.738	1	0	3	0	1	0	15
156			min	-1440.239	3	.501	15	-51.833	4	0	4	-.013	4	0	4
157		3	max	1091.487	2	2.008	4	.738	1	0	3	0	1	0	15
158			min	-1439.955	3	.493	15	-52.163	4	0	4	-.027	4	-.001	4
159		4	max	1091.867	2	1.974	4	.738	1	0	3	0	1	0	15
160			min	-1439.67	3	.485	15	-52.492	4	0	4	-.04	4	-.002	4
161		5	max	1092.246	2	1.941	4	.738	1	0	3	0	1	0	15
162			min	-1439.386	3	.477	15	-52.821	4	0	4	-.053	4	-.002	4
163		6	max	1092.625	2	1.908	4	.738	1	0	3	0	1	0	15
164			min	-1439.101	3	.466	12	-53.151	4	0	4	-.067	4	-.003	4
165		7	max	1093.004	2	1.874	4	.738	1	0	3	.001	1	0	15
166			min	-1438.817	3	.453	12	-53.48	4	0	4	-.081	4	-.003	4
167		8	max	1093.384	2	1.841	4	.738	1	0	3	.001	1	0	15
168			min	-1438.532	3	.44	12	-53.81	4	0	4	-.094	4	-.004	4
169		9	max	1093.763	2	1.807	4	.738	1	0	3	.002	1	0	15
170			min	-1438.248	3	.427	12	-54.139	4	0	4	-.108	4	-.004	4
171		10	max	1094.142	2	1.774	4	.738	1	0	3	.002	1	-.001	12
172			min	-1437.964	3	.414	12	-54.469	4	0	4	-.122	4	-.004	4
173		11	max	1094.521	2	1.741	4	.738	1	0	3	.002	1	-.001	12
174			min	-1437.679	3	.401	12	-54.798	4	0	4	-.136	4	-.005	4
175		12	max	1094.901	2	1.707	4	.738	1	0	3	.002	1	-.001	12
176			min	-1437.395	3	.388	12	-55.128	4	0	4	-.15	4	-.005	4
177		13	max	1095.28	2	1.674	4	.738	1	0	3	.002	1	-.001	12
178			min	-1437.11	3	.375	12	-55.457	4	0	4	-.164	4	-.006	4
179		14	max	1095.659	2	1.64	4	.738	1	0	3	.002	1	-.001	12
180			min	-1436.826	3	.362	12	-55.787	4	0	4	-.179	4	-.006	4
181		15	max	1096.038	2	1.607	4	.738	1	0	3	.003	1	-.002	12
182			min	-1436.541	3	.349	12	-56.116	4	0	4	-.193	4	-.007	4
183		16	max	1096.418	2	1.574	4	.738	1	0	3	.003	1	-.002	12
184			min	-1436.257	3	.336	12	-56.446	4	0	4	-.207	4	-.007	4
185		17	max	1096.797	2	1.54	4	.738	1	0	3	.003	1	-.002	12
186			min	-1435.972	3	.323	12	-56.775	4	0	4	-.222	4	-.007	4
187		18	max	1097.176	2	1.507	4	.738	1	0	3	.003	1	-.002	12
188			min	-1435.688	3	.31	12	-57.104	4	0	4	-.237	4	-.008	4
189		19	max	1097.555	2	1.474	4	.738	1	0	3	.003	1	-.002	12

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
190			min	-1435.404	3	.297	12	-57.434	4	0	4	-.251	4	-.008	4
191	M3	1	max	545.867	2	8.011	4	1.141	4	0	3	0	1	.008	4
192			min	-679.19	3	1.896	15	.004	12	0	4	-.018	4	.002	12
193		2	max	545.697	2	7.241	4	1.682	4	0	3	0	1	.005	2
194			min	-679.318	3	1.715	15	.004	12	0	4	-.017	4	0	12
195		3	max	545.526	2	6.471	4	2.223	4	0	3	0	1	.003	2
196			min	-679.446	3	1.534	15	.004	12	0	4	-.016	4	0	3
197		4	max	545.356	2	5.701	4	2.763	4	0	3	0	1	0	2
198			min	-679.574	3	1.353	15	.004	12	0	4	-.015	4	-.002	3
199		5	max	545.186	2	4.931	4	3.304	4	0	3	0	1	0	15
200			min	-679.701	3	1.172	15	.004	12	0	4	-.014	4	-.003	3
201		6	max	545.015	2	4.161	4	3.844	4	0	3	0	1	-.001	15
202			min	-679.829	3	.991	15	.004	12	0	4	-.013	4	-.005	6
203		7	max	544.845	2	3.391	4	4.385	4	0	3	0	1	-.001	15
204			min	-679.957	3	.81	15	.004	12	0	4	-.011	5	-.006	6
205		8	max	544.675	2	2.621	4	4.925	4	0	3	0	1	-.002	15
206			min	-680.085	3	.629	15	.004	12	0	4	-.009	5	-.007	6
207		9	max	544.504	2	1.851	4	5.466	4	0	3	0	1	-.002	15
208			min	-680.212	3	.448	15	.004	12	0	4	-.007	5	-.008	6
209		10	max	544.334	2	1.081	4	6.006	4	0	3	0	1	-.002	15
210			min	-680.34	3	.252	12	.004	12	0	4	-.004	5	-.009	6
211		11	max	544.164	2	.406	2	6.547	4	0	3	0	1	-.002	15
212			min	-680.468	3	-.087	3	.004	12	0	4	-.002	5	-.009	6
213		12	max	543.993	2	-.095	15	7.087	4	0	3	.001	4	-.002	15
214			min	-680.596	3	-.537	3	.004	12	0	4	0	12	-.009	6
215		13	max	543.823	2	-.276	15	7.628	4	0	3	.004	4	-.002	15
216			min	-680.723	3	-1.23	6	.004	12	0	4	0	12	-.009	6
217		14	max	543.653	2	-.457	15	8.169	4	0	3	.008	4	-.002	15
218			min	-680.851	3	-2	6	.004	12	0	4	0	12	-.008	6
219		15	max	543.482	2	-.638	15	8.709	4	0	3	.011	4	-.002	15
220			min	-680.979	3	-2.77	6	.004	12	0	4	0	12	-.007	6
221		16	max	543.312	2	-.819	15	9.25	4	0	3	.015	4	-.001	15
222			min	-681.107	3	-3.54	6	.004	12	0	4	0	12	-.006	6
223		17	max	543.142	2	-1	15	9.79	4	0	3	.019	4	0	15
224			min	-681.234	3	-4.31	6	.004	12	0	4	0	12	-.004	6
225		18	max	542.971	2	-1.181	15	10.331	4	0	3	.023	4	0	15
226			min	-681.362	3	-5.08	6	.004	12	0	4	0	12	-.002	6
227		19	max	542.801	2	-1.362	15	10.871	4	0	3	.028	4	0	1
228			min	-681.49	3	-5.85	6	.004	12	0	4	0	12	0	1
229	M4	1	max	1194.444	1	0	1	-.398	12	0	1	.017	4	0	1
230			min	-312.925	3	0	1	-236.31	4	0	1	0	12	0	1
231		2	max	1194.614	1	0	1	-.398	12	0	1	0	12	0	1
232			min	-312.797	3	0	1	-236.458	4	0	1	-.01	4	0	1
233		3	max	1194.785	1	0	1	-.398	12	0	1	0	12	0	1
234			min	-312.669	3	0	1	-236.606	4	0	1	-.037	4	0	1
235		4	max	1194.955	1	0	1	-.398	12	0	1	0	12	0	1
236			min	-312.541	3	0	1	-236.753	4	0	1	-.064	4	0	1
237		5	max	1195.125	1	0	1	-.398	12	0	1	0	12	0	1
238			min	-312.413	3	0	1	-236.901	4	0	1	-.091	4	0	1
239		6	max	1195.296	1	0	1	-.398	12	0	1	0	12	0	1
240			min	-312.286	3	0	1	-237.048	4	0	1	-.119	4	0	1
241		7	max	1195.466	1	0	1	-.398	12	0	1	0	12	0	1
242			min	-312.158	3	0	1	-237.196	4	0	1	-.146	4	0	1
243		8	max	1195.636	1	0	1	-.398	12	0	1	0	12	0	1
244			min	-312.03	3	0	1	-237.344	4	0	1	-.173	4	0	1
245		9	max	1195.807	1	0	1	-.398	12	0	1	0	12	0	1
246			min	-311.902	3	0	1	-237.491	4	0	1	-.2	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	1195.977	1	0	1	-.398	12	0	1	0	12	0	1
248			min	-311.775	3	0	1	-237.639	4	0	1	-.228	4	0	1
249		11	max	1196.148	1	0	1	-.398	12	0	1	0	12	0	1
250			min	-311.647	3	0	1	-237.787	4	0	1	-.255	4	0	1
251		12	max	1196.318	1	0	1	-.398	12	0	1	0	12	0	1
252			min	-311.519	3	0	1	-237.934	4	0	1	-.282	4	0	1
253		13	max	1196.488	1	0	1	-.398	12	0	1	0	12	0	1
254			min	-311.391	3	0	1	-238.082	4	0	1	-.31	4	0	1
255		14	max	1196.659	1	0	1	-.398	12	0	1	0	12	0	1
256			min	-311.264	3	0	1	-238.23	4	0	1	-.337	4	0	1
257		15	max	1196.829	1	0	1	-.398	12	0	1	0	12	0	1
258			min	-311.136	3	0	1	-238.377	4	0	1	-.364	4	0	1
259		16	max	1196.999	1	0	1	-.398	12	0	1	0	12	0	1
260			min	-311.008	3	0	1	-238.525	4	0	1	-.392	4	0	1
261		17	max	1197.17	1	0	1	-.398	12	0	1	0	12	0	1
262			min	-310.88	3	0	1	-238.672	4	0	1	-.419	4	0	1
263		18	max	1197.34	1	0	1	-.398	12	0	1	0	12	0	1
264			min	-310.753	3	0	1	-238.82	4	0	1	-.447	4	0	1
265		19	max	1197.51	1	0	1	-.398	12	0	1	0	12	0	1
266			min	-310.625	3	0	1	-238.968	4	0	1	-.474	4	0	1
267	M6	1	max	3472.401	2	2.65	2	0	1	0	1	0	4	0	1
268			min	-4674.46	3	-.136	3	-51.985	4	0	4	0	1	0	1
269		2	max	3472.78	2	2.624	2	0	1	0	1	0	1	0	3
270			min	-4674.175	3	-.155	3	-52.315	4	0	4	-.013	4	0	2
271		3	max	3473.159	2	2.598	2	0	1	0	1	0	1	0	3
272			min	-4673.891	3	-.175	3	-52.644	4	0	4	-.027	4	-.001	2
273		4	max	3473.539	2	2.572	2	0	1	0	1	0	1	0	3
274			min	-4673.606	3	-.194	3	-52.974	4	0	4	-.04	4	-.002	2
275		5	max	3473.918	2	2.546	2	0	1	0	1	0	1	0	3
276			min	-4673.322	3	-.214	3	-53.303	4	0	4	-.054	4	-.003	2
277		6	max	3474.297	2	2.52	2	0	1	0	1	0	1	0	3
278			min	-4673.037	3	-.233	3	-53.633	4	0	4	-.068	4	-.003	2
279		7	max	3474.677	2	2.494	2	0	1	0	1	0	1	0	3
280			min	-4672.753	3	-.253	3	-53.962	4	0	4	-.081	4	-.004	2
281		8	max	3475.056	2	2.468	2	0	1	0	1	0	1	0	3
282			min	-4672.469	3	-.272	3	-54.292	4	0	4	-.095	4	-.005	2
283		9	max	3475.435	2	2.442	2	0	1	0	1	0	1	0	3
284			min	-4672.184	3	-.292	3	-54.621	4	0	4	-.109	4	-.005	2
285		10	max	3475.814	2	2.416	2	0	1	0	1	0	1	0	3
286			min	-4671.9	3	-.311	3	-54.95	4	0	4	-.123	4	-.006	2
287		11	max	3476.194	2	2.39	2	0	1	0	1	0	1	0	3
288			min	-4671.615	3	-.331	3	-55.28	4	0	4	-.137	4	-.006	2
289		12	max	3476.573	2	2.364	2	0	1	0	1	0	1	0	3
290			min	-4671.331	3	-.35	3	-55.609	4	0	4	-.152	4	-.007	2
291		13	max	3476.952	2	2.338	2	0	1	0	1	0	1	0	3
292			min	-4671.046	3	-.37	3	-55.939	4	0	4	-.166	4	-.008	2
293		14	max	3477.331	2	2.312	2	0	1	0	1	0	1	0	3
294			min	-4670.762	3	-.389	3	-56.268	4	0	4	-.18	4	-.008	2
295		15	max	3477.711	2	2.286	2	0	1	0	1	0	1	0	3
296			min	-4670.477	3	-.409	3	-56.598	4	0	4	-.195	4	-.009	2
297		16	max	3478.09	2	2.26	2	0	1	0	1	0	1	.001	3
298			min	-4670.193	3	-.429	3	-56.927	4	0	4	-.209	4	-.009	2
299		17	max	3478.469	2	2.234	2	0	1	0	1	0	1	.001	3
300			min	-4669.909	3	-.448	3	-57.257	4	0	4	-.224	4	-.01	2
301		18	max	3478.848	2	2.208	2	0	1	0	1	0	1	.001	3
302			min	-4669.624	3	-.468	3	-57.586	4	0	4	-.239	4	-.011	2
303		19	max	3479.228	2	2.182	2	0	1	0	1	0	1	.001	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	-4669.34	3	-.487	3	-57.916	4	0	4	-.253	4	-.011	2
305	M7	1	max	1995.435	2	8.016	6	1.009	4	0	1	0	1	.011	2
306			min	-2126.229	3	1.882	15	0	1	0	4	-.018	4	-.001	3
307		2	max	1995.264	2	7.246	6	1.55	4	0	1	0	1	.008	2
308			min	-2126.357	3	1.701	15	0	1	0	4	-.017	4	-.003	3
309		3	max	1995.094	2	6.476	6	2.091	4	0	1	0	1	.006	2
310			min	-2126.485	3	1.52	15	0	1	0	4	-.017	4	-.004	3
311		4	max	1994.924	2	5.706	6	2.631	4	0	1	0	1	.004	2
312			min	-2126.612	3	1.339	15	0	1	0	4	-.016	4	-.005	3
313		5	max	1994.753	2	4.936	6	3.172	4	0	1	0	1	.002	2
314			min	-2126.74	3	1.158	15	0	1	0	4	-.015	4	-.006	3
315		6	max	1994.583	2	4.166	6	3.712	4	0	1	0	1	0	2
316			min	-2126.868	3	.977	15	0	1	0	4	-.013	4	-.007	3
317		7	max	1994.413	2	3.396	6	4.253	4	0	1	0	1	-.001	15
318			min	-2126.996	3	.796	15	0	1	0	4	-.011	4	-.008	3
319		8	max	1994.242	2	2.673	2	4.793	4	0	1	0	1	-.002	15
320			min	-2127.123	3	.507	12	0	1	0	4	-.009	4	-.008	3
321		9	max	1994.072	2	2.073	2	5.334	4	0	1	0	1	-.002	15
322			min	-2127.251	3	.207	12	0	1	0	4	-.007	4	-.008	4
323		10	max	1993.902	2	1.473	2	5.874	4	0	1	0	1	-.002	15
324			min	-2127.379	3	-.19	3	0	1	0	4	-.005	5	-.009	4
325		11	max	1993.731	2	.873	2	6.415	4	0	1	0	1	-.002	15
326			min	-2127.507	3	-.64	3	0	1	0	4	-.002	5	-.009	4
327		12	max	1993.561	2	.273	2	6.955	4	0	1	0	4	-.002	15
328			min	-2127.634	3	-1.09	3	0	1	0	4	0	1	-.009	4
329		13	max	1993.391	2	-.29	15	7.496	4	0	1	.003	4	-.002	15
330			min	-2127.762	3	-1.54	3	0	1	0	4	0	1	-.009	4
331		14	max	1993.22	2	-.471	15	8.037	4	0	1	.007	4	-.002	15
332			min	-2127.89	3	-1.994	4	0	1	0	4	0	1	-.008	4
333		15	max	1993.05	2	-.652	15	8.577	4	0	1	.01	4	-.002	15
334			min	-2128.018	3	-2.764	4	0	1	0	4	0	1	-.007	4
335		16	max	1992.879	2	-.833	15	9.118	4	0	1	.014	4	-.001	15
336			min	-2128.146	3	-3.534	4	0	1	0	4	0	1	-.006	4
337		17	max	1992.709	2	-1.014	15	9.658	4	0	1	.018	4	-.001	15
338			min	-2128.273	3	-4.304	4	0	1	0	4	0	1	-.004	4
339		18	max	1992.539	2	-1.195	15	10.199	4	0	1	.022	4	0	15
340			min	-2128.401	3	-5.074	4	0	1	0	4	0	1	-.002	4
341		19	max	1992.368	2	-1.376	15	10.739	4	0	1	.026	4	0	1
342			min	-2128.529	3	-5.844	4	0	1	0	4	0	1	0	1
343	M8	1	max	3407.661	1	0	1	0	1	0	1	.016	4	0	1
344			min	-1075.645	3	0	1	-230.221	4	0	1	0	1	0	1
345		2	max	3407.831	1	0	1	0	1	0	1	0	1	0	1
346			min	-1075.517	3	0	1	-230.369	4	0	1	-.01	4	0	1
347		3	max	3408.002	1	0	1	0	1	0	1	0	1	0	1
348			min	-1075.389	3	0	1	-230.516	4	0	1	-.036	4	0	1
349		4	max	3408.172	1	0	1	0	1	0	1	0	1	0	1
350			min	-1075.262	3	0	1	-230.664	4	0	1	-.063	4	0	1
351		5	max	3408.342	1	0	1	0	1	0	1	0	1	0	1
352			min	-1075.134	3	0	1	-230.812	4	0	1	-.089	4	0	1
353		6	max	3408.513	1	0	1	0	1	0	1	0	1	0	1
354			min	-1075.006	3	0	1	-230.959	4	0	1	-.116	4	0	1
355		7	max	3408.683	1	0	1	0	1	0	1	0	1	0	1
356			min	-1074.878	3	0	1	-231.107	4	0	1	-.142	4	0	1
357		8	max	3408.853	1	0	1	0	1	0	1	0	1	0	1
358			min	-1074.751	3	0	1	-231.255	4	0	1	-.169	4	0	1
359		9	max	3409.024	1	0	1	0	1	0	1	0	1	0	1
360			min	-1074.623	3	0	1	-231.402	4	0	1	-.196	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	3409.194	1	0	1	0	1	0	1	0	1	0	1
362			min	-1074.495	3	0	1	-231.55	4	0	1	-.222	4	0	1
363		11	max	3409.364	1	0	1	0	1	0	1	0	1	0	1
364			min	-1074.367	3	0	1	-231.697	4	0	1	-.249	4	0	1
365		12	max	3409.535	1	0	1	0	1	0	1	0	1	0	1
366			min	-1074.24	3	0	1	-231.845	4	0	1	-.275	4	0	1
367		13	max	3409.705	1	0	1	0	1	0	1	0	1	0	1
368			min	-1074.112	3	0	1	-231.993	4	0	1	-.302	4	0	1
369		14	max	3409.875	1	0	1	0	1	0	1	0	1	0	1
370			min	-1073.984	3	0	1	-232.14	4	0	1	-.329	4	0	1
371		15	max	3410.046	1	0	1	0	1	0	1	0	1	0	1
372			min	-1073.856	3	0	1	-232.288	4	0	1	-.355	4	0	1
373		16	max	3410.216	1	0	1	0	1	0	1	0	1	0	1
374			min	-1073.729	3	0	1	-232.436	4	0	1	-.382	4	0	1
375		17	max	3410.386	1	0	1	0	1	0	1	0	1	0	1
376			min	-1073.601	3	0	1	-232.583	4	0	1	-.409	4	0	1
377		18	max	3410.557	1	0	1	0	1	0	1	0	1	0	1
378			min	-1073.473	3	0	1	-232.731	4	0	1	-.435	4	0	1
379		19	max	3410.727	1	0	1	0	1	0	1	0	1	0	1
380			min	-1073.345	3	0	1	-232.879	4	0	1	-.462	4	0	1
381	M10	1	max	1090.729	2	1.983	6	-.038	12	0	1	0	1	0	1
382			min	-1440.524	3	.447	15	-51.898	4	0	5	0	3	0	1
383		2	max	1091.108	2	1.949	6	-.038	12	0	1	0	10	0	15
384			min	-1440.239	3	.439	15	-52.227	4	0	5	-.013	4	0	6
385		3	max	1091.487	2	1.916	6	-.038	12	0	1	0	10	0	15
386			min	-1439.955	3	.431	15	-52.557	4	0	5	-.027	4	0	6
387		4	max	1091.867	2	1.883	6	-.038	12	0	1	0	12	0	15
388			min	-1439.67	3	.423	15	-52.886	4	0	5	-.04	4	-.001	6
389		5	max	1092.246	2	1.849	6	-.038	12	0	1	0	12	0	15
390			min	-1439.386	3	.415	15	-53.216	4	0	5	-.054	4	-.002	6
391		6	max	1092.625	2	1.816	6	-.038	12	0	1	0	12	0	15
392			min	-1439.101	3	.407	15	-53.545	4	0	5	-.068	4	-.002	6
393		7	max	1093.004	2	1.782	6	-.038	12	0	1	0	12	0	15
394			min	-1438.817	3	.4	15	-53.875	4	0	5	-.081	4	-.003	6
395		8	max	1093.384	2	1.749	6	-.038	12	0	1	0	12	0	15
396			min	-1438.532	3	.392	15	-54.204	4	0	5	-.095	4	-.003	6
397		9	max	1093.763	2	1.716	6	-.038	12	0	1	0	12	0	15
398			min	-1438.248	3	.384	15	-54.534	4	0	5	-.109	4	-.004	6
399		10	max	1094.142	2	1.682	6	-.038	12	0	1	0	12	0	15
400			min	-1437.964	3	.376	15	-54.863	4	0	5	-.123	4	-.004	6
401		11	max	1094.521	2	1.649	6	-.038	12	0	1	0	12	-.001	15
402			min	-1437.679	3	.368	15	-55.193	4	0	5	-.137	4	-.005	6
403		12	max	1094.901	2	1.615	6	-.038	12	0	1	0	12	-.001	15
404			min	-1437.395	3	.36	15	-55.522	4	0	5	-.151	4	-.005	6
405		13	max	1095.28	2	1.582	6	-.038	12	0	1	0	12	-.001	15
406			min	-1437.11	3	.352	15	-55.852	4	0	5	-.166	4	-.005	6
407		14	max	1095.659	2	1.549	6	-.038	12	0	1	0	12	-.001	15
408			min	-1436.826	3	.345	15	-56.181	4	0	5	-.18	4	-.006	6
409		15	max	1096.038	2	1.521	2	-.038	12	0	1	0	12	-.001	15
410			min	-1436.541	3	.337	15	-56.51	4	0	5	-.194	4	-.006	6
411		16	max	1096.418	2	1.495	2	-.038	12	0	1	0	12	-.001	15
412			min	-1436.257	3	.329	15	-56.84	4	0	5	-.209	4	-.007	6
413		17	max	1096.797	2	1.469	2	-.038	12	0	1	0	12	-.002	15
414			min	-1435.972	3	.321	15	-57.169	4	0	5	-.224	4	-.007	6
415		18	max	1097.176	2	1.443	2	-.038	12	0	1	0	12	-.002	15
416			min	-1435.688	3	.31	12	-57.499	4	0	5	-.238	4	-.007	6
417		19	max	1097.555	2	1.417	2	-.038	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	-1435.404	3	.297	12	-57.828	4	0	5	-.253	4	-.008	6
419	M11	1	max	545.867	2	7.955	6	1.104	4	0	1	0	12	.008	6
420			min	-679.19	3	1.858	15	-.071	1	0	4	-.018	4	.002	15
421		2	max	545.697	2	7.185	6	1.645	4	0	1	0	12	.005	2
422			min	-679.318	3	1.677	15	-.071	1	0	4	-.017	4	0	12
423		3	max	545.526	2	6.415	6	2.185	4	0	1	0	12	.003	2
424			min	-679.446	3	1.496	15	-.071	1	0	4	-.017	4	0	3
425		4	max	545.356	2	5.645	6	2.726	4	0	1	0	12	0	2
426			min	-679.574	3	1.315	15	-.071	1	0	4	-.016	4	-.002	3
427		5	max	545.186	2	4.875	6	3.266	4	0	1	0	12	0	15
428			min	-679.701	3	1.134	15	-.071	1	0	4	-.014	4	-.003	3
429		6	max	545.015	2	4.105	6	3.807	4	0	1	0	12	-.001	15
430			min	-679.829	3	.953	15	-.071	1	0	4	-.013	4	-.005	4
431		7	max	544.845	2	3.335	6	4.347	4	0	1	0	12	-.002	15
432			min	-679.957	3	.772	15	-.071	1	0	4	-.011	4	-.006	4
433		8	max	544.675	2	2.565	6	4.888	4	0	1	0	12	-.002	15
434			min	-680.085	3	.591	15	-.071	1	0	4	-.009	4	-.008	4
435		9	max	544.504	2	1.795	6	5.428	4	0	1	0	12	-.002	15
436			min	-680.212	3	.41	15	-.071	1	0	4	-.007	4	-.009	4
437		10	max	544.334	2	1.025	6	5.969	4	0	1	0	12	-.002	15
438			min	-680.34	3	.229	15	-.071	1	0	4	-.005	4	-.009	4
439		11	max	544.164	2	.406	2	6.509	4	0	1	0	12	-.002	15
440			min	-680.468	3	-.087	3	-.071	1	0	4	-.002	4	-.01	4
441		12	max	543.993	2	-.133	15	7.05	4	0	1	0	5	-.002	15
442			min	-680.596	3	-.537	3	-.071	1	0	4	0	1	-.009	4
443		13	max	543.823	2	-.314	15	7.591	4	0	1	.004	5	-.002	15
444			min	-680.723	3	-1.286	4	-.071	1	0	4	0	1	-.009	4
445		14	max	543.653	2	-.495	15	8.131	4	0	1	.007	4	-.002	15
446			min	-680.851	3	-2.056	4	-.071	1	0	4	0	1	-.008	4
447		15	max	543.482	2	-.676	15	8.672	4	0	1	.011	4	-.002	15
448			min	-680.979	3	-2.826	4	-.071	1	0	4	0	1	-.007	4
449		16	max	543.312	2	-.857	15	9.212	4	0	1	.015	4	-.001	15
450			min	-681.107	3	-3.596	4	-.071	1	0	4	0	1	-.006	4
451		17	max	543.142	2	-1.038	15	9.753	4	0	1	.019	4	-.001	15
452			min	-681.234	3	-4.366	4	-.071	1	0	4	0	1	-.004	4
453		18	max	542.971	2	-1.219	15	10.293	4	0	1	.023	4	0	15
454			min	-681.362	3	-5.136	4	-.071	1	0	4	0	1	-.002	4
455		19	max	542.801	2	-1.4	15	10.834	4	0	1	.027	4	0	1
456			min	-681.49	3	-5.906	4	-.071	1	0	4	0	1	0	1
457	M12	1	max	1194.444	1	0	1	7.813	1	0	1	.017	4	0	1
458			min	-312.925	3	0	1	-232.128	4	0	1	0	1	0	1
459		2	max	1194.614	1	0	1	7.813	1	0	1	0	1	0	1
460			min	-312.797	3	0	1	-232.275	4	0	1	-.01	4	0	1
461		3	max	1194.785	1	0	1	7.813	1	0	1	.001	1	0	1
462			min	-312.669	3	0	1	-232.423	4	0	1	-.036	4	0	1
463		4	max	1194.955	1	0	1	7.813	1	0	1	.002	1	0	1
464			min	-312.541	3	0	1	-232.57	4	0	1	-.063	4	0	1
465		5	max	1195.125	1	0	1	7.813	1	0	1	.003	1	0	1
466			min	-312.413	3	0	1	-232.718	4	0	1	-.09	4	0	1
467		6	max	1195.296	1	0	1	7.813	1	0	1	.004	1	0	1
468			min	-312.286	3	0	1	-232.866	4	0	1	-.117	4	0	1
469		7	max	1195.466	1	0	1	7.813	1	0	1	.005	1	0	1
470			min	-312.158	3	0	1	-233.013	4	0	1	-.143	4	0	1
471		8	max	1195.636	1	0	1	7.813	1	0	1	.006	1	0	1
472			min	-312.03	3	0	1	-233.161	4	0	1	-.17	4	0	1
473		9	max	1195.807	1	0	1	7.813	1	0	1	.007	1	0	1
474			min	-311.902	3	0	1	-233.309	4	0	1	-.197	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	1195.977	1	0	1	7.813	1	0	1	.008	1	0	1
476			min	-311.775	3	0	1	-233.456	4	0	1	-.224	4	0	1
477		11	max	1196.148	1	0	1	7.813	1	0	1	.009	1	0	1
478			min	-311.647	3	0	1	-233.604	4	0	1	-.25	4	0	1
479		12	max	1196.318	1	0	1	7.813	1	0	1	.009	1	0	1
480			min	-311.519	3	0	1	-233.751	4	0	1	-.277	4	0	1
481		13	max	1196.488	1	0	1	7.813	1	0	1	.01	1	0	1
482			min	-311.391	3	0	1	-233.899	4	0	1	-.304	4	0	1
483		14	max	1196.659	1	0	1	7.813	1	0	1	.011	1	0	1
484			min	-311.264	3	0	1	-234.047	4	0	1	-.331	4	0	1
485		15	max	1196.829	1	0	1	7.813	1	0	1	.012	1	0	1
486			min	-311.136	3	0	1	-234.194	4	0	1	-.358	4	0	1
487		16	max	1196.999	1	0	1	7.813	1	0	1	.013	1	0	1
488			min	-311.008	3	0	1	-234.342	4	0	1	-.385	4	0	1
489		17	max	1197.17	1	0	1	7.813	1	0	1	.014	1	0	1
490			min	-310.88	3	0	1	-234.49	4	0	1	-.412	4	0	1
491		18	max	1197.34	1	0	1	7.813	1	0	1	.015	1	0	1
492			min	-310.753	3	0	1	-234.637	4	0	1	-.439	4	0	1
493		19	max	1197.51	1	0	1	7.813	1	0	1	.016	1	0	1
494			min	-310.625	3	0	1	-234.785	4	0	1	-.466	4	0	1
495	M1	1	max	144.589	1	800.429	3	47.026	5	0	1	.188	1	0	3
496			min	-9.474	5	-482.257	1	-78.806	1	0	3	-.072	5	-.016	2
497		2	max	145.079	1	799.419	3	48.267	5	0	1	.146	1	.241	1
498			min	-9.245	5	-483.603	1	-78.806	1	0	3	-.047	5	-.422	3
499		3	max	409.413	3	570.143	2	-.59	15	0	3	.105	1	.484	1
500			min	-242.985	2	-588.547	3	-78.238	1	0	2	-.022	5	-.827	3
501		4	max	409.781	3	568.797	2	.269	5	0	3	.063	1	.192	1
502			min	-242.496	2	-589.556	3	-78.238	1	0	2	-.022	5	-.516	3
503		5	max	410.148	3	567.451	2	1.511	5	0	3	.022	1	-.004	15
504			min	-242.006	2	-590.566	3	-78.238	1	0	2	-.021	5	-.205	3
505		6	max	410.516	3	566.105	2	2.752	5	0	3	-.001	12	.107	3
506			min	-241.516	2	-591.575	3	-78.238	1	0	2	-.024	4	-.428	2
507		7	max	410.883	3	564.759	2	3.994	5	0	3	-.003	12	.42	3
508			min	-241.026	2	-592.585	3	-78.238	1	0	2	-.061	1	-.726	2
509		8	max	411.251	3	563.413	2	5.235	5	0	3	-.006	12	.733	3
510			min	-240.536	2	-593.594	3	-78.238	1	0	2	-.102	1	-1.024	2
511		9	max	421.19	3	51.157	2	45.464	5	0	9	.061	1	.855	3
512			min	-181.789	2	.406	15	-117.419	1	0	3	-.111	5	-1.171	2
513		10	max	421.557	3	49.81	2	46.705	5	0	9	0	10	.833	3
514			min	-181.299	2	0	5	-117.419	1	0	3	-.088	4	-1.198	2
515		11	max	421.924	3	48.464	2	47.947	5	0	9	-.003	12	.812	3
516			min	-180.809	2	-1.688	4	-117.419	1	0	3	-.075	4	-1.224	2
517		12	max	431.756	3	389.571	3	128.622	5	0	2	.101	1	.709	3
518			min	-122.021	2	-669.678	2	-76.536	1	0	3	-.176	5	-1.085	2
519		13	max	432.124	3	388.562	3	129.863	5	0	2	.06	1	.503	3
520			min	-121.531	2	-671.024	2	-76.536	1	0	3	-.108	5	-.731	2
521		14	max	432.491	3	387.552	3	131.105	5	0	2	.02	1	.299	3
522			min	-121.041	2	-672.37	2	-76.536	1	0	3	-.039	5	-.377	2
523		15	max	432.859	3	386.543	3	132.346	5	0	2	.03	5	.094	3
524			min	-120.551	2	-673.716	2	-76.536	1	0	3	-.02	1	-.046	1
525		16	max	433.226	3	385.533	3	133.588	5	0	2	.101	5	.334	2
526			min	-120.061	2	-675.062	2	-76.536	1	0	3	-.061	1	-.109	3
527		17	max	433.594	3	384.524	3	134.829	5	0	2	.171	5	.691	2
528			min	-119.571	2	-676.408	2	-76.536	1	0	3	-.101	1	-.313	3
529		18	max	18.07	5	680.784	2	-4.348	12	0	5	.157	5	.348	2
530			min	-145.331	1	-315.989	3	-102.61	4	0	2	-.145	1	-.154	3
531		19	max	18.299	5	679.438	2	-4.348	12	0	5	.113	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	-144.841	1	-316.998	3	-101.369	4	0	2	-.189	1	-.012	1
533	M5	1	max	315.954	1	2666.48	3	81.817	5	0	1	0	1	.031	2
534			min	9.698	12	-1641.707	1	0	1	0	4	-.155	4	0	3
535		2	max	316.444	1	2665.471	3	83.058	5	0	1	0	1	.894	1
536			min	9.943	12	-1643.053	1	0	1	0	4	-.112	4	-1.407	3
537		3	max	1306.818	3	1692.191	2	36.315	4	0	4	0	1	1.722	1
538			min	-832.725	2	-1853.753	3	0	1	0	1	-.069	4	-2.759	3
539		4	max	1307.185	3	1690.845	2	37.557	4	0	4	0	1	.85	1
540			min	-832.235	2	-1854.762	3	0	1	0	1	-.049	4	-1.78	3
541		5	max	1307.552	3	1689.499	2	38.798	4	0	4	0	1	.017	9
542			min	-831.745	2	-1855.772	3	0	1	0	1	-.029	4	-.801	3
543		6	max	1307.92	3	1688.153	2	40.04	4	0	4	0	1	.178	3
544			min	-831.255	2	-1856.781	3	0	1	0	1	-.008	5	-.979	2
545		7	max	1308.287	3	1686.807	2	41.281	4	0	4	.013	4	1.158	3
546			min	-830.765	2	-1857.791	3	0	1	0	1	0	1	-1.869	2
547		8	max	1308.655	3	1685.461	2	42.522	4	0	4	.035	4	2.139	3
548			min	-830.275	2	-1858.8	3	0	1	0	1	0	1	-2.759	2
549		9	max	1322.87	3	171.621	2	146.436	4	0	1	0	1	2.461	3
550			min	-707.066	2	.406	15	0	1	0	1	-.156	4	-3.143	2
551		10	max	1323.237	3	170.275	2	147.678	4	0	1	0	1	2.383	3
552			min	-706.576	2	0	15	0	1	0	1	-.079	5	-3.233	2
553		11	max	1323.604	3	168.929	2	148.919	4	0	1	0	14	2.305	3
554			min	-706.086	2	-1.569	6	0	1	0	1	-.002	5	-3.322	2
555		12	max	1338.033	3	1204.701	3	180.099	4	0	1	0	1	2.023	3
556			min	-582.958	2	-2032.496	2	0	1	0	4	-.25	4	-2.974	2
557		13	max	1338.401	3	1203.692	3	181.34	4	0	1	0	1	1.388	3
558			min	-582.468	2	-2033.842	2	0	1	0	4	-.155	4	-1.902	2
559		14	max	1338.768	3	1202.682	3	182.581	4	0	1	0	1	.753	3
560			min	-581.978	2	-2035.188	2	0	1	0	4	-.059	4	-.828	2
561		15	max	1339.135	3	1201.673	3	183.823	4	0	1	.038	4	.246	2
562			min	-581.488	2	-2036.534	2	0	1	0	4	0	1	-.003	13
563		16	max	1339.503	3	1200.663	3	185.064	4	0	1	.135	4	1.321	2
564			min	-580.999	2	-2037.88	2	0	1	0	4	0	1	-.515	3
565		17	max	1339.87	3	1199.654	3	186.306	4	0	1	.233	4	2.397	2
566			min	-580.509	2	-2039.226	2	0	1	0	4	0	1	-1.148	3
567		18	max	-10.396	12	2299.471	2	0	1	0	4	.247	4	1.235	2
568			min	-315.94	1	-1090.635	3	-29.657	5	0	1	0	1	-.601	3
569		19	max	-10.151	12	2298.125	2	0	1	0	4	.232	4	.023	1
570			min	-315.45	1	-1091.644	3	-28.416	5	0	1	0	1	-.025	3
571	M9	1	max	144.589	1	800.429	3	78.806	1	0	3	-.011	12	0	3
572			min	6.148	12	-482.257	1	4.45	12	0	4	-.188	1	-.016	2
573		2	max	145.079	1	799.419	3	78.806	1	0	3	-.008	12	.241	1
574			min	6.393	12	-483.603	1	4.45	12	0	4	-.146	1	-.422	3
575		3	max	409.413	3	570.143	2	78.238	1	0	2	-.006	12	.484	1
576			min	-242.985	2	-588.547	3	4.409	12	0	3	-.105	1	-.827	3
577		4	max	409.781	3	568.797	2	78.238	1	0	2	-.004	12	.192	1
578			min	-242.496	2	-589.556	3	4.409	12	0	3	-.063	1	-.516	3
579		5	max	410.148	3	567.451	2	78.238	1	0	2	-.001	12	-.004	15
580			min	-242.006	2	-590.566	3	4.409	12	0	3	-.029	4	-.205	3
581		6	max	410.516	3	566.105	2	78.238	1	0	2	.019	1	.107	3
582			min	-241.516	2	-591.575	3	4.409	12	0	3	-.018	5	-.428	2
583		7	max	410.883	3	564.759	2	78.238	1	0	2	.061	1	.42	3
584			min	-241.026	2	-592.585	3	4.409	12	0	3	-.011	5	-.726	2
585		8	max	411.251	3	563.413	2	78.238	1	0	2	.102	1	.733	3
586			min	-240.536	2	-593.594	3	4.409	12	0	3	-.004	5	-1.024	2
587		9	max	421.19	3	51.157	2	117.419	1	0	3	-.003	12	.855	3
588			min	-181.789	2	.412	15	6.339	12	0	9	-.132	4	-1.171	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	421.557	3	49.81	2	117.419	1	0	3	0	1	.833	3
590			min	-181.299	2	.006	15	6.339	12	0	9	-.087	4	-1.198	2
591		11	max	421.924	3	48.464	2	117.419	1	0	3	.063	1	.812	3
592			min	-180.809	2	-1.641	6	6.339	12	0	9	-.055	5	-1.224	2
593		12	max	431.756	3	389.571	3	155.046	4	0	3	-.005	12	.709	3
594			min	-122.021	2	-669.678	2	3.953	12	0	2	-.211	4	-1.085	2
595		13	max	432.124	3	388.562	3	156.287	4	0	3	-.003	12	.503	3
596			min	-121.531	2	-671.024	2	3.953	12	0	2	-.129	4	-.731	2
597		14	max	432.491	3	387.552	3	157.529	4	0	3	-.001	12	.299	3
598			min	-121.041	2	-672.37	2	3.953	12	0	2	-.046	4	-.377	2
599		15	max	432.859	3	386.543	3	158.77	4	0	3	.038	4	.094	3
600			min	-120.551	2	-673.716	2	3.953	12	0	2	0	12	-.046	1
601		16	max	433.226	3	385.533	3	160.012	4	0	3	.122	4	.334	2
602			min	-120.061	2	-675.062	2	3.953	12	0	2	.003	12	-.109	3
603		17	max	433.594	3	384.524	3	161.253	4	0	3	.207	4	.691	2
604			min	-119.571	2	-676.408	2	3.953	12	0	2	.005	12	-.313	3
605		18	max	-6.166	12	680.784	2	84.036	1	0	2	.206	4	.348	2
606			min	-145.331	1	-315.989	3	-74.806	5	0	3	.007	12	-.154	3
607		19	max	-5.921	12	679.438	2	84.036	1	0	2	.189	1	.013	3
608			min	-144.841	1	-316.998	3	-73.565	5	0	3	.01	12	-.012	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	.126	2	.007	3	1.02e-2	2	NC	1	NC	1
2			min	-.493	4	-.026	3	-.004	2	-2.129e-3	3	NC	1	NC	1
3		2	max	0	1	.25	3	.025	1	1.157e-2	2	NC	5	NC	2
4			min	-.493	4	-.032	1	-.012	5	-2.134e-3	3	781.951	3	8852.847	1
5		3	max	0	1	.474	3	.059	1	1.294e-2	2	NC	5	NC	3
6			min	-.493	4	-.147	1	-.015	5	-2.138e-3	3	432.069	3	3673.781	1
7		4	max	0	1	.61	3	.089	1	1.431e-2	2	NC	5	NC	3
8			min	-.493	4	-.209	1	-.011	5	-2.142e-3	3	339.749	3	2449.674	1
9		5	max	0	1	.641	3	.104	1	1.569e-2	2	NC	5	NC	3
10			min	-.493	4	-.209	1	-.003	5	-2.147e-3	3	323.704	3	2099.41	1
11		6	max	0	1	.571	3	.099	1	1.706e-2	2	NC	5	NC	3
12			min	-.493	4	-.148	1	.003	10	-2.151e-3	3	361.939	3	2189.873	1
13		7	max	0	1	.419	3	.077	1	1.843e-2	2	NC	5	NC	3
14			min	-.493	4	-.041	1	0	10	-2.156e-3	3	484.92	3	2823.81	1
15		8	max	0	1	.227	3	.044	1	1.98e-2	2	NC	2	NC	2
16			min	-.493	4	.002	15	-.004	10	-2.16e-3	3	853.17	3	5036.815	1
17		9	max	0	1	.229	2	.023	3	2.117e-2	2	NC	4	NC	1
18			min	-.493	4	.005	15	-.009	2	-2.165e-3	3	2094.414	2	NC	1
19		10	max	0	1	.279	2	.023	3	2.254e-2	2	NC	3	NC	1
20			min	-.493	4	-.026	3	-.015	2	-2.169e-3	3	1408.815	2	NC	1
21		11	max	0	12	.229	2	.023	3	2.117e-2	2	NC	4	NC	1
22			min	-.493	4	.005	15	-.01	5	-2.165e-3	3	2094.414	2	NC	1
23		12	max	0	12	.227	3	.044	1	1.98e-2	2	NC	2	NC	2
24			min	-.493	4	.002	15	-.01	5	-2.16e-3	3	853.17	3	5036.815	1
25		13	max	0	12	.419	3	.077	1	1.843e-2	2	NC	5	NC	3
26			min	-.493	4	-.041	1	-.004	5	-2.156e-3	3	484.92	3	2823.81	1
27		14	max	0	12	.571	3	.099	1	1.706e-2	2	NC	5	NC	3
28			min	-.493	4	-.148	1	.003	10	-2.151e-3	3	361.939	3	2189.873	1
29		15	max	0	12	.641	3	.104	1	1.569e-2	2	NC	5	NC	3
30			min	-.493	4	-.209	1	.005	10	-2.147e-3	3	323.704	3	2099.41	1
31		16	max	0	12	.61	3	.089	1	1.431e-2	2	NC	5	NC	3
32			min	-.493	4	-.209	1	.004	10	-2.142e-3	3	339.749	3	2449.674	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	.474	3	.059	1	1.294e-2	2	NC	5	NC	3
34			min	-.493	4	-.147	1	.002	10	-2.138e-3	3	432.069	3	3673.781	1
35		18	max	0	12	.25	3	.025	1	1.157e-2	2	NC	5	NC	2
36			min	-.493	4	-.032	1	0	10	-2.134e-3	3	781.951	3	8852.847	1
37		19	max	0	12	.126	2	.007	3	1.02e-2	2	NC	1	NC	1
38			min	-.493	4	-.026	3	-.004	2	-2.129e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.255	3	.007	3	5.941e-3	2	NC	1	NC	1
40			min	-.385	4	-.391	2	-.003	2	-4.552e-3	3	NC	1	NC	1
41		2	max	0	1	.541	3	.017	1	7.061e-3	2	NC	5	NC	1
42			min	-.385	4	-.662	2	-.019	5	-5.492e-3	3	755.15	3	NC	1
43		3	max	0	1	.785	3	.047	1	8.181e-3	2	NC	5	NC	2
44			min	-.385	4	-.899	2	-.023	5	-6.432e-3	3	407.413	3	4658.817	1
45		4	max	0	1	.959	3	.075	1	9.302e-3	2	NC	15	NC	3
46			min	-.385	4	-1.078	2	-.016	5	-7.371e-3	3	306.969	3	2896.861	1
47		5	max	0	1	1.047	3	.091	1	1.042e-2	2	NC	15	NC	3
48			min	-.385	4	-1.186	2	-.003	5	-8.311e-3	3	271.741	2	2389.026	1
49		6	max	0	1	1.05	3	.09	1	1.154e-2	2	NC	15	NC	3
50			min	-.385	4	-1.223	2	.003	10	-9.251e-3	3	259.77	2	2431.262	1
51		7	max	0	1	.983	3	.071	1	1.266e-2	2	NC	15	NC	2
52			min	-.385	4	-1.198	2	0	10	-1.019e-2	3	267.808	2	3079.504	1
53		8	max	0	1	.872	3	.041	1	1.378e-2	2	NC	15	NC	2
54			min	-.385	4	-1.132	2	-.004	10	-1.113e-2	3	291.339	2	5405.576	1
55		9	max	0	1	.763	3	.025	4	1.49e-2	2	NC	5	NC	1
56			min	-.385	4	-1.06	2	-.008	2	-1.207e-2	3	322.974	2	8618.673	4
57		10	max	0	1	.711	3	.02	3	1.602e-2	2	NC	5	NC	1
58			min	-.385	4	-1.024	2	-.014	2	-1.301e-2	3	341.394	2	NC	1
59		11	max	0	12	.763	3	.021	3	1.49e-2	2	NC	5	NC	1
60			min	-.385	4	-1.06	2	-.019	5	-1.207e-2	3	322.974	2	NC	1
61		12	max	0	12	.872	3	.041	1	1.378e-2	2	NC	15	NC	2
62			min	-.385	4	-1.132	2	-.022	5	-1.113e-2	3	291.339	2	5405.576	1
63		13	max	0	12	.983	3	.071	1	1.266e-2	2	NC	15	NC	2
64			min	-.385	4	-1.198	2	-.014	5	-1.019e-2	3	267.808	2	3079.504	1
65		14	max	0	12	1.05	3	.09	1	1.154e-2	2	NC	15	NC	3
66			min	-.385	4	-1.223	2	0	5	-9.251e-3	3	259.77	2	2431.262	1
67		15	max	0	12	1.047	3	.091	1	1.042e-2	2	NC	15	NC	3
68			min	-.385	4	-1.186	2	.004	10	-8.311e-3	3	271.741	2	2389.026	1
69		16	max	0	12	.959	3	.075	1	9.302e-3	2	NC	15	NC	3
70			min	-.385	4	-1.078	2	.003	10	-7.371e-3	3	306.969	3	2896.861	1
71		17	max	0	12	.785	3	.047	1	8.181e-3	2	NC	5	NC	2
72			min	-.385	4	-.899	2	.001	10	-6.432e-3	3	407.413	3	4658.817	1
73		18	max	0	12	.541	3	.025	4	7.061e-3	2	NC	5	NC	1
74			min	-.385	4	-.662	2	-.001	10	-5.492e-3	3	755.15	3	8394.293	4
75		19	max	0	12	.255	3	.007	3	5.941e-3	2	NC	1	NC	1
76			min	-.385	4	-.391	2	-.003	2	-4.552e-3	3	NC	1	NC	1
77	M15	1	max	0	12	.261	3	.006	3	3.867e-3	3	NC	1	NC	1
78			min	-.321	4	-.39	2	-.003	2	-6.154e-3	2	NC	1	NC	1
79		2	max	0	12	.45	3	.017	1	4.667e-3	3	NC	5	NC	1
80			min	-.321	4	-.732	2	-.027	5	-7.318e-3	2	632.561	2	7761.233	5
81		3	max	0	12	.615	3	.047	1	5.466e-3	3	NC	5	NC	2
82			min	-.321	4	-1.026	2	-.033	5	-8.482e-3	2	339.968	2	4643.079	1
83		4	max	0	12	.742	3	.076	1	6.266e-3	3	NC	15	NC	3
84			min	-.321	4	-1.239	2	-.024	5	-9.645e-3	2	254.468	2	2888.519	1
85		5	max	0	12	.82	3	.092	1	7.065e-3	3	NC	15	NC	3
86			min	-.321	4	-1.356	2	-.007	5	-1.081e-2	2	223.791	2	2382.137	1
87		6	max	0	12	.85	3	.09	1	7.864e-3	3	NC	15	NC	3
88			min	-.321	4	-1.374	2	.003	10	-1.197e-2	2	219.555	2	2423.171	1
89		7	max	0	12	.837	3	.071	1	8.664e-3	3	NC	15	NC	3

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	-.321	4	-1.311	2	0	10	-1.314e-2	2	234.731	2	3065.43	1
91		8	max	0	12	.796	3	.046	4	9.463e-3	3	NC	15	NC	2
92			min	-.322	4	-1.196	2	-.003	10	-1.43e-2	2	268.001	2	4674.356	4
93		9	max	0	12	.749	3	.032	4	1.026e-2	3	NC	5	NC	1
94			min	-.322	4	-1.079	2	-.007	2	-1.546e-2	2	313.581	2	6758.364	4
95		10	max	0	1	.726	3	.019	3	1.106e-2	3	NC	5	NC	1
96			min	-.322	4	-1.023	2	-.013	2	-1.663e-2	2	341.463	2	NC	1
97		11	max	0	1	.749	3	.019	3	1.026e-2	3	NC	5	NC	1
98			min	-.322	4	-1.079	2	-.026	5	-1.546e-2	2	313.581	2	8414.62	5
99		12	max	0	1	.796	3	.041	1	9.463e-3	3	NC	15	NC	2
100			min	-.321	4	-1.196	2	-.03	5	-1.43e-2	2	268.001	2	5360.135	1
101		13	max	0	1	.837	3	.071	1	8.664e-3	3	NC	15	NC	3
102			min	-.321	4	-1.311	2	-.02	5	-1.314e-2	2	234.731	2	3065.43	1
103		14	max	0	1	.85	3	.09	1	7.864e-3	3	NC	15	NC	3
104			min	-.321	4	-1.374	2	-.002	5	-1.197e-2	2	219.555	2	2423.171	1
105		15	max	0	1	.82	3	.092	1	7.065e-3	3	NC	15	NC	3
106			min	-.321	4	-1.356	2	.004	10	-1.081e-2	2	223.791	2	2382.137	1
107		16	max	0	1	.742	3	.076	1	6.266e-3	3	NC	15	NC	3
108			min	-.321	4	-1.239	2	.004	10	-9.645e-3	2	254.468	2	2888.519	1
109		17	max	0	1	.615	3	.05	4	5.466e-3	3	NC	5	NC	2
110			min	-.321	4	-1.026	2	.001	10	-8.482e-3	2	339.968	2	4336.145	4
111		18	max	0	1	.45	3	.033	4	4.667e-3	3	NC	5	NC	1
112			min	-.321	4	-.732	2	-.001	10	-7.318e-3	2	632.561	2	6410.93	4
113		19	max	0	1	.261	3	.006	3	3.867e-3	3	NC	1	NC	1
114			min	-.321	4	-.39	2	-.003	2	-6.154e-3	2	NC	1	NC	1
115	M16	1	max	0	12	.111	2	.005	3	6.943e-3	3	NC	1	NC	1
116			min	-.134	4	-.087	3	-.003	2	-8.545e-3	2	NC	1	NC	1
117		2	max	0	12	.003	3	.025	1	8.045e-3	3	NC	5	NC	2
118			min	-.134	4	-.106	2	-.02	5	-9.531e-3	2	999.125	2	8896.66	1
119		3	max	0	12	.072	3	.059	1	9.147e-3	3	NC	5	NC	3
120			min	-.134	4	-.277	2	-.025	5	-1.052e-2	2	556.849	2	3678.21	1
121		4	max	0	12	.108	3	.089	1	1.025e-2	3	NC	5	NC	3
122			min	-.134	4	-.375	2	-.02	5	-1.15e-2	2	444.989	2	2446.715	1
123		5	max	0	12	.102	3	.104	1	1.135e-2	3	NC	5	NC	3
124			min	-.134	4	-.384	2	-.008	5	-1.253e-2	1	436.274	2	2091.874	1
125		6	max	0	12	.058	3	.1	1	1.245e-2	3	NC	5	NC	3
126			min	-.134	4	-.309	2	.004	15	-1.356e-2	1	514.919	2	2174.885	1
127		7	max	0	12	0	15	.078	1	1.355e-2	3	NC	5	NC	3
128			min	-.134	4	-.167	2	.002	10	-1.458e-2	1	779.359	2	2787.639	1
129		8	max	0	12	.039	1	.045	1	1.466e-2	3	NC	3	NC	2
130			min	-.134	4	-.105	3	-.002	10	-1.561e-2	1	2100.886	2	4892.225	1
131		9	max	0	12	.175	1	.022	4	1.576e-2	3	NC	4	NC	1
132			min	-.134	4	-.182	3	-.006	10	-1.664e-2	1	2285.042	3	9701.511	4
133		10	max	0	1	.235	1	.017	3	1.686e-2	3	NC	4	NC	1
134			min	-.134	4	-.216	3	-.012	2	-1.766e-2	1	1677.568	3	NC	1
135		11	max	0	1	.175	1	.017	3	1.576e-2	3	NC	4	NC	1
136			min	-.134	4	-.182	3	-.016	5	-1.664e-2	1	2285.042	3	NC	1
137		12	max	0	1	.039	1	.045	1	1.466e-2	3	NC	3	NC	2
138			min	-.134	4	-.105	3	-.017	5	-1.561e-2	1	2100.886	2	4892.225	1
139		13	max	0	1	0	15	.078	1	1.355e-2	3	NC	5	NC	3
140			min	-.134	4	-.167	2	-.008	5	-1.458e-2	1	779.359	2	2787.639	1
141		14	max	0	1	.058	3	.1	1	1.245e-2	3	NC	5	NC	3
142			min	-.134	4	-.309	2	.004	15	-1.356e-2	1	514.919	2	2174.885	1
143		15	max	0	1	.102	3	.104	1	1.135e-2	3	NC	5	NC	3
144			min	-.134	4	-.384	2	.006	10	-1.253e-2	1	436.274	2	2091.874	1
145		16	max	0	1	.108	3	.089	1	1.025e-2	3	NC	5	NC	3
146			min	-.134	4	-.375	2	.005	10	-1.15e-2	2	444.989	2	2446.715	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	.072	3	.059	1	9.147e-3	3	NC	5	NC	3
148			min	-.134	4	-.277	2	.003	10	-1.052e-2	2	556.849	2	3678.21	1
149		18	max	0	1	.003	3	.029	4	8.045e-3	3	NC	5	NC	2
150			min	-.134	4	-.106	2	0	10	-9.531e-3	2	999.125	2	7314.78	4
151		19	max	0	1	.111	2	.005	3	6.943e-3	3	NC	1	NC	1
152			min	-.134	4	-.087	3	-.003	2	-8.545e-3	2	NC	1	NC	1
153	M2	1	max	.006	2	.006	2	.006	1	1.277e-3	5	NC	1	NC	2
154			min	-.008	3	-.01	3	-.466	4	-1.589e-4	1	9689.033	2	118.791	4
155		2	max	.006	2	.005	2	.006	1	1.354e-3	5	NC	1	NC	2
156			min	-.007	3	-.009	3	-.428	4	-1.482e-4	1	NC	1	129.382	4
157		3	max	.005	2	.004	2	.005	1	1.432e-3	5	NC	1	NC	1
158			min	-.007	3	-.009	3	-.39	4	-1.376e-4	1	NC	1	141.966	4
159		4	max	.005	2	.004	2	.005	1	1.509e-3	5	NC	1	NC	1
160			min	-.006	3	-.009	3	-.352	4	-1.27e-4	1	NC	1	157.062	4
161		5	max	.005	2	.003	2	.004	1	1.586e-3	5	NC	1	NC	1
162			min	-.006	3	-.008	3	-.316	4	-1.164e-4	1	NC	1	175.378	4
163		6	max	.004	2	.002	2	.004	1	1.664e-3	5	NC	1	NC	1
164			min	-.006	3	-.008	3	-.28	4	-1.058e-4	1	NC	1	197.894	4
165		7	max	.004	2	.002	2	.003	1	1.741e-3	5	NC	1	NC	1
166			min	-.005	3	-.007	3	-.245	4	-9.518e-5	1	NC	1	226	4
167		8	max	.004	2	.001	2	.003	1	1.818e-3	5	NC	1	NC	1
168			min	-.005	3	-.007	3	-.211	4	-8.456e-5	1	NC	1	261.726	4
169		9	max	.003	2	0	2	.002	1	1.899e-3	4	NC	1	NC	1
170			min	-.004	3	-.006	3	-.18	4	-7.395e-5	1	NC	1	308.127	4
171		10	max	.003	2	0	2	.002	1	1.98e-3	4	NC	1	NC	1
172			min	-.004	3	-.006	3	-.15	4	-6.333e-5	1	NC	1	369.98	4
173		11	max	.003	2	0	2	.002	1	2.061e-3	4	NC	1	NC	1
174			min	-.003	3	-.005	3	-.122	4	-5.272e-5	1	NC	1	455.103	4
175		12	max	.002	2	0	15	.001	1	2.142e-3	4	NC	1	NC	1
176			min	-.003	3	-.005	3	-.096	4	-4.211e-5	1	NC	1	577.027	4
177		13	max	.002	2	0	15	0	1	2.223e-3	4	NC	1	NC	1
178			min	-.003	3	-.004	3	-.073	4	-3.149e-5	1	NC	1	760.88	4
179		14	max	.002	2	0	15	0	1	2.304e-3	4	NC	1	NC	1
180			min	-.002	3	-.004	3	-.052	4	-2.088e-5	1	NC	1	1057.829	4
181		15	max	.001	2	0	15	0	1	2.386e-3	4	NC	1	NC	1
182			min	-.002	3	-.003	3	-.035	4	-1.026e-5	1	NC	1	1585.949	4
183		16	max	0	2	0	15	0	1	2.467e-3	4	NC	1	NC	1
184			min	-.001	3	-.002	3	-.021	4	-6.482e-7	3	NC	1	2672.195	4
185		17	max	0	2	0	15	0	1	2.548e-3	4	NC	1	NC	1
186			min	0	3	-.002	3	-.01	4	2.07e-7	12	NC	1	5532.11	4
187		18	max	0	2	0	15	0	1	2.629e-3	4	NC	1	NC	1
188			min	0	3	0	3	-.003	4	8.193e-7	12	NC	1	NC	1
189		19	max	0	1	0	1	0	1	2.71e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	1.432e-6	12	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	-4.698e-7	12	NC	1	NC	1
192			min	0	1	0	1	0	1	-6.381e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.013	4	8.305e-6	1	NC	1	NC	1
194			min	0	2	-.002	6	0	12	-5.211e-5	5	NC	1	NC	1
195		3	max	0	3	0	15	.025	4	5.382e-4	4	NC	1	NC	1
196			min	0	2	-.003	6	0	12	1.363e-6	12	NC	1	NC	1
197		4	max	0	3	-.001	15	.037	4	1.126e-3	4	NC	1	NC	1
198			min	0	2	-.005	6	0	12	2.279e-6	12	NC	1	NC	1
199		5	max	.001	3	-.001	15	.047	4	1.715e-3	4	NC	1	NC	1
200			min	-.001	2	-.007	6	0	12	3.195e-6	12	NC	1	NC	1
201		6	max	.002	3	-.002	15	.057	4	2.303e-3	4	NC	1	NC	1
202			min	-.001	2	-.009	6	0	12	4.111e-6	12	NC	1	NC	1
203		7	max	.002	3	-.002	15	.067	4	2.891e-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
204			min	-.002	2	-.01	6	0	12	5.027e-6	12	9099.243	6	NC	1
205		8	max	.002	3	-.002	15	.076	4	3.479e-3	4	NC	1	NC	1
206			min	-.002	2	-.011	6	0	12	5.944e-6	12	8129.464	6	NC	1
207		9	max	.003	3	-.003	15	.085	4	4.067e-3	4	NC	1	NC	1
208			min	-.002	2	-.012	6	0	12	6.86e-6	12	7551.683	6	NC	1
209		10	max	.003	3	-.003	15	.093	4	4.655e-3	4	NC	2	NC	1
210			min	-.002	2	-.013	6	0	12	7.776e-6	12	7263.929	6	NC	1
211		11	max	.003	3	-.003	15	.101	4	5.243e-3	4	NC	2	NC	1
212			min	-.003	2	-.013	6	0	12	8.692e-6	12	7223.327	6	NC	1
213		12	max	.004	3	-.003	15	.109	4	5.832e-3	4	NC	2	NC	1
214			min	-.003	2	-.012	6	0	12	9.608e-6	12	7429.588	6	NC	1
215		13	max	.004	3	-.003	15	.117	4	6.42e-3	4	NC	1	NC	1
216			min	-.003	2	-.012	6	0	12	1.052e-5	12	7926.943	6	NC	1
217		14	max	.004	3	-.002	15	.126	4	7.008e-3	4	NC	1	NC	1
218			min	-.003	2	-.01	6	0	12	1.144e-5	12	8827.522	6	NC	1
219		15	max	.005	3	-.002	15	.134	4	7.596e-3	4	NC	1	NC	1
220			min	-.004	2	-.009	6	0	12	1.236e-5	12	NC	1	NC	1
221		16	max	.005	3	-.001	15	.144	4	8.184e-3	4	NC	1	NC	1
222			min	-.004	2	-.007	1	0	12	1.327e-5	12	NC	1	NC	1
223		17	max	.005	3	0	15	.153	4	8.772e-3	4	NC	1	NC	1
224			min	-.004	2	-.006	1	0	12	1.419e-5	12	NC	1	NC	1
225		18	max	.006	3	0	15	.164	4	9.361e-3	4	NC	1	NC	1
226			min	-.004	2	-.004	1	0	12	1.511e-5	12	NC	1	NC	1
227		19	max	.006	3	0	5	.176	4	9.949e-3	4	NC	1	NC	1
228			min	-.005	2	-.003	1	0	12	1.602e-5	12	NC	1	NC	1
229	M4	1	max	.003	1	.004	2	0	12	1.996e-5	1	NC	1	NC	2
230			min	0	3	-.006	3	-.176	4	-3.683e-4	5	NC	1	141.117	4
231		2	max	.003	1	.004	2	0	12	1.996e-5	1	NC	1	NC	2
232			min	0	3	-.006	3	-.162	4	-3.683e-4	5	NC	1	153.524	4
233		3	max	.003	1	.004	2	0	12	1.996e-5	1	NC	1	NC	2
234			min	0	3	-.005	3	-.147	4	-3.683e-4	5	NC	1	168.286	4
235		4	max	.002	1	.003	2	0	12	1.996e-5	1	NC	1	NC	2
236			min	0	3	-.005	3	-.133	4	-3.683e-4	5	NC	1	186.014	4
237		5	max	.002	1	.003	2	0	12	1.996e-5	1	NC	1	NC	2
238			min	0	3	-.005	3	-.12	4	-3.683e-4	5	NC	1	207.54	4
239		6	max	.002	1	.003	2	0	12	1.996e-5	1	NC	1	NC	2
240			min	0	3	-.004	3	-.106	4	-3.683e-4	5	NC	1	234.017	4
241		7	max	.002	1	.003	2	0	12	1.996e-5	1	NC	1	NC	2
242			min	0	3	-.004	3	-.093	4	-3.683e-4	5	NC	1	267.085	4
243		8	max	.002	1	.003	2	0	12	1.996e-5	1	NC	1	NC	2
244			min	0	3	-.004	3	-.08	4	-3.683e-4	5	NC	1	309.131	4
245		9	max	.002	1	.002	2	0	12	1.996e-5	1	NC	1	NC	1
246			min	0	3	-.003	3	-.068	4	-3.683e-4	5	NC	1	363.751	4
247		10	max	.001	1	.002	2	0	12	1.996e-5	1	NC	1	NC	1
248			min	0	3	-.003	3	-.057	4	-3.683e-4	5	NC	1	436.566	4
249		11	max	.001	1	.002	2	0	12	1.996e-5	1	NC	1	NC	1
250			min	0	3	-.003	3	-.046	4	-3.683e-4	5	NC	1	536.773	4
251		12	max	.001	1	.002	2	0	12	1.996e-5	1	NC	1	NC	1
252			min	0	3	-.002	3	-.036	4	-3.683e-4	5	NC	1	680.281	4
253		13	max	0	1	.001	2	0	12	1.996e-5	1	NC	1	NC	1
254			min	0	3	-.002	3	-.028	4	-3.683e-4	5	NC	1	896.618	4
255		14	max	0	1	.001	2	0	12	1.996e-5	1	NC	1	NC	1
256			min	0	3	-.002	3	-.02	4	-3.683e-4	5	NC	1	1245.857	4
257		15	max	0	1	0	2	0	12	1.996e-5	1	NC	1	NC	1
258			min	0	3	-.001	3	-.013	4	-3.683e-4	5	NC	1	1866.485	4
259		16	max	0	1	0	2	0	12	1.996e-5	1	NC	1	NC	1
260			min	0	3	0	3	-.008	4	-3.683e-4	5	NC	1	3141.343	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	1.996e-5	1	NC	1	NC	1
262			min	0	3	0	3	-.004	4	-3.683e-4	5	NC	1	6489.977	4
263		18	max	0	1	0	2	0	12	1.996e-5	1	NC	1	NC	1
264			min	0	3	0	3	-.001	4	-3.683e-4	5	NC	1	NC	1
265		19	max	0	1	0	1	0	1	1.996e-5	1	NC	1	NC	1
266			min	0	1	0	1	0	1	-3.683e-4	5	NC	1	NC	1
267	M6	1	max	.019	2	.021	2	0	1	1.336e-3	4	NC	4	NC	1
268			min	-.025	3	-.031	3	-.47	4	0	1	1792.28	3	117.769	4
269		2	max	.017	2	.02	2	0	1	1.412e-3	4	NC	4	NC	1
270			min	-.023	3	-.029	3	-.432	4	0	1	1901.083	3	128.27	4
271		3	max	.016	2	.018	2	0	1	1.487e-3	4	NC	4	NC	1
272			min	-.022	3	-.027	3	-.393	4	0	1	2023.904	3	140.748	4
273		4	max	.015	2	.016	2	0	1	1.563e-3	4	NC	4	NC	1
274			min	-.021	3	-.026	3	-.355	4	0	1	2163.577	3	155.717	4
275		5	max	.014	2	.014	2	0	1	1.639e-3	4	NC	4	NC	1
276			min	-.019	3	-.024	3	-.318	4	0	1	2323.748	3	173.879	4
277		6	max	.013	2	.013	2	0	1	1.715e-3	4	NC	4	NC	1
278			min	-.018	3	-.022	3	-.282	4	0	1	2509.189	3	196.206	4
279		7	max	.012	2	.011	2	0	1	1.791e-3	4	NC	1	NC	1
280			min	-.017	3	-.02	3	-.247	4	0	1	2726.26	3	224.078	4
281		8	max	.011	2	.01	2	0	1	1.867e-3	4	NC	1	NC	1
282			min	-.015	3	-.019	3	-.213	4	0	1	2983.638	3	259.507	4
283		9	max	.01	2	.008	2	0	1	1.942e-3	4	NC	1	NC	1
284			min	-.014	3	-.017	3	-.181	4	0	1	3293.475	3	305.524	4
285		10	max	.009	2	.007	2	0	1	2.018e-3	4	NC	1	NC	1
286			min	-.012	3	-.015	3	-.151	4	0	1	3673.324	3	366.868	4
287		11	max	.008	2	.005	2	0	1	2.094e-3	4	NC	1	NC	1
288			min	-.011	3	-.013	3	-.123	4	0	1	4149.521	3	451.296	4
289		12	max	.007	2	.004	2	0	1	2.17e-3	4	NC	1	NC	1
290			min	-.01	3	-.012	3	-.097	4	0	1	4763.455	3	572.232	4
291		13	max	.006	2	.003	2	0	1	2.246e-3	4	NC	1	NC	1
292			min	-.008	3	-.01	3	-.073	4	0	1	5584.116	3	754.614	4
293		14	max	.005	2	.002	2	0	1	2.322e-3	4	NC	1	NC	1
294			min	-.007	3	-.008	3	-.053	4	0	1	6735.695	3	1049.219	4
295		15	max	.004	2	.002	2	0	1	2.397e-3	4	NC	1	NC	1
296			min	-.006	3	-.007	3	-.035	4	0	1	8466.586	3	1573.262	4
297		16	max	.003	2	0	2	0	1	2.473e-3	4	NC	1	NC	1
298			min	-.004	3	-.005	3	-.021	4	0	1	NC	1	2651.393	4
299		17	max	.002	2	0	2	0	1	2.549e-3	4	NC	1	NC	1
300			min	-.003	3	-.003	3	-.01	4	0	1	NC	1	5491.18	4
301		18	max	.001	2	0	2	0	1	2.625e-3	4	NC	1	NC	1
302			min	-.001	3	-.002	3	-.003	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	2.701e-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	-6.347e-4	4	NC	1	NC	1
307		2	max	.001	3	0	2	.013	4	0	1	NC	1	NC	1
308			min	0	2	-.003	3	0	1	-5.956e-5	5	NC	1	NC	1
309		3	max	.002	3	0	2	.025	4	5.159e-4	4	NC	1	NC	1
310			min	-.002	2	-.005	3	0	1	0	1	NC	1	NC	1
311		4	max	.003	3	-.001	15	.036	4	1.091e-3	4	NC	1	NC	1
312			min	-.003	2	-.007	3	0	1	0	1	NC	1	NC	1
313		5	max	.004	3	-.002	15	.047	4	1.667e-3	4	NC	1	NC	1
314			min	-.004	2	-.009	3	0	1	0	1	NC	1	NC	1
315		6	max	.005	3	-.002	15	.057	4	2.242e-3	4	NC	1	NC	1
316			min	-.005	2	-.011	3	0	1	0	1	8897.166	3	9573.922	4
317		7	max	.006	3	-.002	15	.067	4	2.817e-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	-.006	2	-.012	3	0	1	0	1	7936.616	3	9676.817	4
319		8	max	.007	3	-.003	15	.075	4	3.392e-3	4	NC	1	NC	1
320			min	-.007	2	-.013	3	0	1	0	1	7366.609	3	NC	1
321		9	max	.008	3	-.003	15	.084	4	3.968e-3	4	NC	1	NC	1
322			min	-.008	2	-.014	3	0	1	0	1	7069.732	3	NC	1
323		10	max	.009	3	-.003	15	.092	4	4.543e-3	4	NC	1	NC	1
324			min	-.009	2	-.014	3	0	1	0	1	6993.101	3	NC	1
325		11	max	.01	3	-.003	15	.1	4	5.118e-3	4	NC	1	NC	1
326			min	-.01	2	-.014	3	0	1	0	1	7122.998	3	NC	1
327		12	max	.011	3	-.003	15	.108	4	5.694e-3	4	NC	1	NC	1
328			min	-.011	2	-.014	3	0	1	0	1	7452.653	4	NC	1
329		13	max	.012	3	-.003	15	.116	4	6.269e-3	4	NC	1	NC	1
330			min	-.012	2	-.013	3	0	1	0	1	7950.51	4	NC	1
331		14	max	.013	3	-.003	15	.124	4	6.844e-3	4	NC	1	NC	1
332			min	-.013	2	-.012	3	0	1	0	1	8852.805	4	NC	1
333		15	max	.014	3	-.002	15	.132	4	7.42e-3	4	NC	1	NC	1
334			min	-.014	2	-.01	3	0	1	0	1	NC	1	NC	1
335		16	max	.015	3	-.002	15	.141	4	7.995e-3	4	NC	1	NC	1
336			min	-.015	2	-.009	1	0	1	0	1	NC	1	NC	1
337		17	max	.017	3	-.001	15	.15	4	8.57e-3	4	NC	1	NC	1
338			min	-.015	2	-.008	1	0	1	0	1	NC	1	NC	1
339		18	max	.018	3	0	15	.16	4	9.145e-3	4	NC	1	NC	1
340			min	-.016	2	-.007	1	0	1	0	1	NC	1	NC	1
341		19	max	.019	3	0	15	.171	4	9.721e-3	4	NC	1	NC	1
342			min	-.017	2	-.006	1	0	1	0	1	NC	1	NC	1
343	M8	1	max	.008	1	.016	2	0	1	0	1	NC	1	NC	1
344			min	-.003	3	-.019	3	-.171	4	-4.142e-4	4	NC	1	144.702	4
345		2	max	.008	1	.015	2	0	1	0	1	NC	1	NC	1
346			min	-.002	3	-.018	3	-.158	4	-4.142e-4	4	NC	1	157.429	4
347		3	max	.007	1	.014	2	0	1	0	1	NC	1	NC	1
348			min	-.002	3	-.017	3	-.144	4	-4.142e-4	4	NC	1	172.57	4
349		4	max	.007	1	.013	2	0	1	0	1	NC	1	NC	1
350			min	-.002	3	-.015	3	-.13	4	-4.142e-4	4	NC	1	190.753	4
351		5	max	.006	1	.012	2	0	1	0	1	NC	1	NC	1
352			min	-.002	3	-.014	3	-.117	4	-4.142e-4	4	NC	1	212.832	4
353		6	max	.006	1	.011	2	0	1	0	1	NC	1	NC	1
354			min	-.002	3	-.013	3	-.103	4	-4.142e-4	4	NC	1	239.989	4
355		7	max	.005	1	.011	2	0	1	0	1	NC	1	NC	1
356			min	-.002	3	-.012	3	-.091	4	-4.142e-4	4	NC	1	273.906	4
357		8	max	.005	1	.01	2	0	1	0	1	NC	1	NC	1
358			min	-.002	3	-.011	3	-.078	4	-4.142e-4	4	NC	1	317.031	4
359		9	max	.005	1	.009	2	0	1	0	1	NC	1	NC	1
360			min	-.001	3	-.01	3	-.066	4	-4.142e-4	4	NC	1	373.052	4
361		10	max	.004	1	.008	2	0	1	0	1	NC	1	NC	1
362			min	-.001	3	-.009	3	-.055	4	-4.142e-4	4	NC	1	447.737	4
363		11	max	.004	1	.007	2	0	1	0	1	NC	1	NC	1
364			min	-.001	3	-.008	3	-.045	4	-4.142e-4	4	NC	1	550.517	4
365		12	max	.003	1	.006	2	0	1	0	1	NC	1	NC	1
366			min	0	3	-.007	3	-.036	4	-4.142e-4	4	NC	1	697.708	4
367		13	max	.003	1	.005	2	0	1	0	1	NC	1	NC	1
368			min	0	3	-.006	3	-.027	4	-4.142e-4	4	NC	1	919.599	4
369		14	max	.002	1	.004	2	0	1	0	1	NC	1	NC	1
370			min	0	3	-.005	3	-.019	4	-4.142e-4	4	NC	1	1277.807	4
371		15	max	.002	1	.004	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.004	3	-.013	4	-4.142e-4	4	NC	1	1914.377	4
373		16	max	.001	1	.003	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.003	3	-.008	4	-4.142e-4	4	NC	1	3221.994	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	-.002	3	-.004	4	-4.142e-4	4	NC	1	6656.713	4
377		18	max	0	1	0	2	0	1	0	1	NC	1	NC	1
378			min	0	3	-.001	3	-.001	4	-4.142e-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	-4.142e-4	4	NC	1	NC	1
381	M10	1	max	.006	2	.006	2	0	12	1.335e-3	4	NC	1	NC	2
382			min	-.008	3	-.01	3	-.469	4	9.591e-6	12	9689.033	2	117.964	4
383		2	max	.006	2	.005	2	0	12	1.411e-3	4	NC	1	NC	2
384			min	-.007	3	-.009	3	-.431	4	8.978e-6	12	NC	1	128.483	4
385		3	max	.005	2	.004	2	0	12	1.486e-3	4	NC	1	NC	1
386			min	-.007	3	-.009	3	-.393	4	8.366e-6	12	NC	1	140.981	4
387		4	max	.005	2	.004	2	0	12	1.561e-3	4	NC	1	NC	1
388			min	-.006	3	-.009	3	-.355	4	7.754e-6	12	NC	1	155.975	4
389		5	max	.005	2	.003	2	0	12	1.637e-3	4	NC	1	NC	1
390			min	-.006	3	-.008	3	-.318	4	7.141e-6	12	NC	1	174.168	4
391		6	max	.004	2	.002	2	0	12	1.712e-3	4	NC	1	NC	1
392			min	-.006	3	-.008	3	-.282	4	6.529e-6	12	NC	1	196.532	4
393		7	max	.004	2	.002	2	0	12	1.788e-3	4	NC	1	NC	1
394			min	-.005	3	-.007	3	-.247	4	5.917e-6	12	NC	1	224.45	4
395		8	max	.004	2	.001	2	0	12	1.863e-3	4	NC	1	NC	1
396			min	-.005	3	-.007	3	-.213	4	5.304e-6	12	NC	1	259.938	4
397		9	max	.003	2	0	2	0	12	1.939e-3	4	NC	1	NC	1
398			min	-.004	3	-.006	3	-.181	4	4.692e-6	12	NC	1	306.031	4
399		10	max	.003	2	0	2	0	12	2.014e-3	4	NC	1	NC	1
400			min	-.004	3	-.006	3	-.151	4	4.08e-6	12	NC	1	367.478	4
401		11	max	.003	2	0	2	0	12	2.089e-3	4	NC	1	NC	1
402			min	-.003	3	-.005	3	-.122	4	3.467e-6	12	NC	1	452.048	4
403		12	max	.002	2	0	2	0	12	2.165e-3	4	NC	1	NC	1
404			min	-.003	3	-.005	3	-.097	4	2.855e-6	12	NC	1	573.188	4
405		13	max	.002	2	0	2	0	12	2.24e-3	4	NC	1	NC	1
406			min	-.003	3	-.004	3	-.073	4	2.242e-6	12	NC	1	755.879	4
407		14	max	.002	2	0	15	0	12	2.316e-3	4	NC	1	NC	1
408			min	-.002	3	-.004	3	-.053	4	1.611e-6	10	NC	1	1050.988	4
409		15	max	.001	2	0	15	0	12	2.391e-3	4	NC	1	NC	1
410			min	-.002	3	-.003	3	-.035	4	6.945e-7	10	NC	1	1575.935	4
411		16	max	0	2	0	15	0	12	2.466e-3	4	NC	1	NC	1
412			min	-.001	3	-.002	3	-.021	4	-4.152e-7	2	NC	1	2655.959	4
413		17	max	0	2	0	15	0	12	2.542e-3	4	NC	1	NC	1
414			min	0	3	-.002	3	-.01	4	-1.096e-5	1	NC	1	5500.874	4
415		18	max	0	2	0	15	0	12	2.617e-3	4	NC	1	NC	1
416			min	0	3	0	4	-.003	4	-2.158e-5	1	NC	1	NC	1
417		19	max	0	1	0	1	0	1	2.693e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-3.219e-5	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	1.021e-5	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-6.326e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.013	4	-4.464e-7	12	NC	1	NC	1
422			min	0	2	-.002	4	0	1	-5.434e-5	4	NC	1	NC	1
423		3	max	0	3	0	15	.025	4	5.239e-4	4	NC	1	NC	1
424			min	0	2	-.004	4	0	1	-2.683e-5	1	NC	1	NC	1
425		4	max	0	3	-.001	15	.036	4	1.102e-3	4	NC	1	NC	1
426			min	0	2	-.005	4	0	1	-4.535e-5	1	NC	1	NC	1
427		5	max	.001	3	-.002	15	.047	4	1.68e-3	4	NC	1	NC	1
428			min	-.001	2	-.007	4	0	1	-6.387e-5	1	NC	1	NC	1
429		6	max	.002	3	-.002	15	.057	4	2.259e-3	4	NC	1	NC	1
430			min	-.001	2	-.009	4	0	1	-8.239e-5	1	NC	1	NC	1
431		7	max	.002	3	-.003	15	.066	4	2.837e-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
432			min	-.002	2	-.011	4	-.001	1	-1.009e-4	1	8763.569	4	NC	1
433		8	max	.002	3	-.003	15	.075	4	3.415e-3	4	NC	1	NC	1
434			min	-.002	2	-.012	4	-.001	1	-1.194e-4	1	7851.689	4	NC	1
435		9	max	.003	3	-.003	15	.084	4	3.993e-3	4	NC	1	NC	1
436			min	-.002	2	-.013	4	-.002	1	-1.379e-4	1	7310.677	4	NC	1
437		10	max	.003	3	-.003	15	.092	4	4.572e-3	4	NC	2	NC	1
438			min	-.002	2	-.013	4	-.002	1	-1.565e-4	1	7045.793	4	NC	1
439		11	max	.003	3	-.003	15	.1	4	5.15e-3	4	NC	2	NC	1
440			min	-.003	2	-.014	4	-.002	1	-1.75e-4	1	7017.841	4	NC	1
441		12	max	.004	3	-.003	15	.108	4	5.728e-3	4	NC	2	NC	1
442			min	-.003	2	-.013	4	-.003	1	-1.935e-4	1	7228.123	4	NC	1
443		13	max	.004	3	-.003	15	.116	4	6.306e-3	4	NC	1	NC	1
444			min	-.003	2	-.013	4	-.003	1	-2.12e-4	1	7720.837	4	NC	1
445		14	max	.004	3	-.003	15	.124	4	6.885e-3	4	NC	1	NC	1
446			min	-.003	2	-.011	4	-.003	1	-2.305e-4	1	8606.178	4	NC	1
447		15	max	.005	3	-.002	15	.132	4	7.463e-3	4	NC	1	NC	1
448			min	-.004	2	-.01	4	-.004	1	-2.491e-4	1	NC	1	NC	1
449		16	max	.005	3	-.002	15	.141	4	8.041e-3	4	NC	1	NC	1
450			min	-.004	2	-.008	4	-.004	1	-2.676e-4	1	NC	1	NC	1
451		17	max	.005	3	-.002	15	.151	4	8.619e-3	4	NC	1	NC	1
452			min	-.004	2	-.006	1	-.005	1	-2.861e-4	1	NC	1	NC	1
453		18	max	.006	3	0	15	.161	4	9.197e-3	4	NC	1	NC	1
454			min	-.004	2	-.004	1	-.005	1	-3.046e-4	1	NC	1	NC	1
455		19	max	.006	3	0	15	.173	4	9.776e-3	4	NC	1	NC	1
456			min	-.005	2	-.003	1	-.006	1	-3.231e-4	1	NC	1	NC	1
457	M12	1	max	.003	1	.004	2	.006	1	-1.291e-6	12	NC	1	NC	2
458			min	0	3	-.006	3	-.173	4	-3.77e-4	4	NC	1	143.672	4
459		2	max	.003	1	.004	2	.005	1	-1.291e-6	12	NC	1	NC	2
460			min	0	3	-.006	3	-.159	4	-3.77e-4	4	NC	1	156.303	4
461		3	max	.003	1	.004	2	.005	1	-1.291e-6	12	NC	1	NC	2
462			min	0	3	-.005	3	-.145	4	-3.77e-4	4	NC	1	171.331	4
463		4	max	.002	1	.003	2	.004	1	-1.291e-6	12	NC	1	NC	2
464			min	0	3	-.005	3	-.131	4	-3.77e-4	4	NC	1	189.379	4
465		5	max	.002	1	.003	2	.004	1	-1.291e-6	12	NC	1	NC	2
466			min	0	3	-.005	3	-.117	4	-3.77e-4	4	NC	1	211.293	4
467		6	max	.002	1	.003	2	.004	1	-1.291e-6	12	NC	1	NC	2
468			min	0	3	-.004	3	-.104	4	-3.77e-4	4	NC	1	238.248	4
469		7	max	.002	1	.003	2	.003	1	-1.291e-6	12	NC	1	NC	2
470			min	0	3	-.004	3	-.091	4	-3.77e-4	4	NC	1	271.913	4
471		8	max	.002	1	.003	2	.003	1	-1.291e-6	12	NC	1	NC	2
472			min	0	3	-.004	3	-.079	4	-3.77e-4	4	NC	1	314.717	4
473		9	max	.002	1	.002	2	.002	1	-1.291e-6	12	NC	1	NC	1
474			min	0	3	-.003	3	-.067	4	-3.77e-4	4	NC	1	370.322	4
475		10	max	.001	1	.002	2	.002	1	-1.291e-6	12	NC	1	NC	1
476			min	0	3	-.003	3	-.056	4	-3.77e-4	4	NC	1	444.451	4
477		11	max	.001	1	.002	2	.002	1	-1.291e-6	12	NC	1	NC	1
478			min	0	3	-.003	3	-.045	4	-3.77e-4	4	NC	1	546.466	4
479		12	max	.001	1	.002	2	.001	1	-1.291e-6	12	NC	1	NC	1
480			min	0	3	-.002	3	-.036	4	-3.77e-4	4	NC	1	692.562	4
481		13	max	0	1	.001	2	0	1	-1.291e-6	12	NC	1	NC	1
482			min	0	3	-.002	3	-.027	4	-3.77e-4	4	NC	1	912.799	4
483		14	max	0	1	.001	2	0	1	-1.291e-6	12	NC	1	NC	1
484			min	0	3	-.002	3	-.02	4	-3.77e-4	4	NC	1	1268.335	4
485		15	max	0	1	0	2	0	1	-1.291e-6	12	NC	1	NC	1
486			min	0	3	-.001	3	-.013	4	-3.77e-4	4	NC	1	1900.152	4
487		16	max	0	1	0	2	0	1	-1.291e-6	12	NC	1	NC	1
488			min	0	3	0	3	-.008	4	-3.77e-4	4	NC	1	3197.991	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	-1.291e-6	12	NC	1	NC	1
490			min	0	3	0	3	-.004	4	-3.77e-4	4	NC	1	6606.976	4
491		18	max	0	1	0	2	0	1	-1.291e-6	12	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-3.77e-4	4	NC	1	NC	1
493		19	max	0	1	0	1	0	1	-1.291e-6	12	NC	1	NC	1
494			min	0	1	0	1	0	1	-3.77e-4	4	NC	1	NC	1
495	M1	1	max	.007	3	.126	2	.493	4	1.274e-2	1	NC	1	NC	1
496			min	-.004	2	-.026	3	0	12	-2.389e-2	3	NC	1	NC	1
497		2	max	.007	3	.061	2	.48	4	7.281e-3	4	NC	4	NC	1
498			min	-.004	2	-.012	3	-.004	1	-1.182e-2	3	1780.398	2	NC	1
499		3	max	.007	3	.011	3	.466	4	1.223e-2	4	NC	5	NC	1
500			min	-.004	2	-.009	2	-.006	1	-1.217e-4	3	858.674	2	8505.261	5
501		4	max	.007	3	.049	3	.451	4	1.065e-2	4	NC	5	NC	1
502			min	-.004	2	-.087	2	-.006	1	-4.641e-3	3	542.588	2	5970.189	5
503		5	max	.007	3	.097	3	.437	4	9.08e-3	4	NC	5	NC	1
504			min	-.004	2	-.169	2	-.004	1	-9.161e-3	3	391.925	2	4687.314	5
505		6	max	.007	3	.15	3	.422	4	1.286e-2	2	NC	15	NC	1
506			min	-.004	2	-.248	2	-.002	1	-1.368e-2	3	308.88	2	3918.541	5
507		7	max	.007	3	.2	3	.407	4	1.714e-2	2	NC	15	NC	1
508			min	-.004	2	-.318	2	0	3	-1.82e-2	3	259.836	2	3399.014	4
509		8	max	.007	3	.242	3	.391	4	2.143e-2	2	9415.601	15	NC	1
510			min	-.003	2	-.374	2	0	12	-2.272e-2	3	230.816	2	3030.013	4
511		9	max	.007	3	.269	3	.374	4	2.428e-2	2	8804.839	15	NC	1
512			min	-.003	2	-.409	2	0	1	-2.294e-2	3	215.705	2	2803.773	4
513		10	max	.006	3	.279	3	.355	4	2.618e-2	2	8618.629	15	NC	1
514			min	-.003	2	-.421	2	0	12	-2.032e-2	3	211.27	2	2735.794	4
515		11	max	.006	3	.273	3	.335	4	2.809e-2	2	8804.562	15	NC	1
516			min	-.003	2	-.409	2	0	12	-1.769e-2	3	216.42	2	2794.095	4
517		12	max	.006	3	.25	3	.312	4	2.709e-2	2	9414.963	15	NC	1
518			min	-.003	2	-.373	2	0	1	-1.492e-2	3	232.981	2	2992.13	4
519		13	max	.006	3	.212	3	.286	4	2.172e-2	2	NC	15	NC	1
520			min	-.003	2	-.314	2	0	1	-1.195e-2	3	265.088	2	3511.867	4
521		14	max	.006	3	.165	3	.259	4	1.635e-2	2	NC	15	NC	1
522			min	-.003	2	-.241	2	0	12	-8.972e-3	3	320.067	2	4604.966	4
523		15	max	.006	3	.112	3	.23	4	1.098e-2	2	NC	5	NC	1
524			min	-.003	2	-.161	2	0	12	-5.995e-3	3	414.876	2	6994.891	4
525		16	max	.006	3	.057	3	.202	4	8.407e-3	4	NC	5	NC	1
526			min	-.003	2	-.08	2	0	12	-3.019e-3	3	590.806	2	NC	1
527		17	max	.005	3	.004	3	.176	4	9.471e-3	4	NC	5	NC	1
528			min	-.003	2	-.005	2	0	12	-4.277e-5	3	967.593	2	NC	1
529		18	max	.005	3	.056	2	.154	4	9.334e-3	2	NC	4	NC	1
530			min	-.003	2	-.043	3	0	12	-3.879e-3	3	2057.037	2	NC	1
531		19	max	.005	3	.111	2	.134	4	1.876e-2	2	NC	1	NC	1
532			min	-.003	2	-.087	3	0	1	-7.874e-3	3	NC	1	NC	1
533	M5	1	max	.023	3	.279	2	.493	4	0	1	NC	1	NC	1
534			min	-.015	2	-.026	3	0	1	-3.879e-6	4	NC	1	NC	1
535		2	max	.023	3	.134	2	.483	4	6.265e-3	4	NC	5	NC	1
536			min	-.015	2	-.01	3	0	1	0	1	803.159	2	NC	1
537		3	max	.023	3	.034	3	.47	4	1.234e-2	4	NC	5	NC	1
538			min	-.015	2	-.028	2	0	1	0	1	377.969	2	7023.895	4
539		4	max	.022	3	.13	3	.455	4	1.005e-2	4	NC	15	NC	1
540			min	-.015	2	-.221	2	0	1	0	1	231.425	2	5270.902	4
541		5	max	.022	3	.261	3	.44	4	7.768e-3	4	7568.332	15	NC	1
542			min	-.015	2	-.431	2	0	1	0	1	162.933	2	4389.372	4
543		6	max	.021	3	.409	3	.423	4	5.482e-3	4	5822.476	15	NC	1
544			min	-.015	2	-.639	2	0	1	0	1	125.967	2	3839.016	4
545		7	max	.021	3	.553	3	.407	4	3.196e-3	4	4815.132	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	-.014	2	-.827	2	0	1	0	1	104.513	2	3429.182	4
547		8	max	.021	3	.673	3	.391	4	9.1e-4	4	4229.801	15	NC	1
548			min	-.014	2	-.978	2	0	1	0	1	91.995	2	3074.464	4
549		9	max	.02	3	.751	3	.375	4	0	1	3929.777	15	NC	1
550			min	-.014	2	-1.074	2	0	1	-2.482e-6	5	85.559	2	2800.818	4
551		10	max	.02	3	.779	3	.355	4	0	1	3839.404	15	NC	1
552			min	-.014	2	-1.106	2	0	1	-2.378e-6	5	83.675	2	2755.689	4
553		11	max	.019	3	.76	3	.334	4	0	1	3929.891	15	NC	1
554			min	-.013	2	-1.074	2	0	1	-2.274e-6	5	85.855	2	2825.38	4
555		12	max	.019	3	.694	3	.313	4	6.786e-4	4	4230.067	15	NC	1
556			min	-.013	2	-.975	2	0	1	0	1	92.965	2	2942.89	4
557		13	max	.018	3	.588	3	.287	4	2.384e-3	4	4815.666	15	NC	1
558			min	-.013	2	-.816	2	0	1	0	1	107.034	2	3449.594	4
559		14	max	.018	3	.454	3	.258	4	4.089e-3	4	5823.508	15	NC	1
560			min	-.013	2	-.62	2	0	1	0	1	131.654	2	4744.467	4
561		15	max	.017	3	.304	3	.228	4	5.794e-3	4	7570.357	15	NC	1
562			min	-.012	2	-.407	2	0	1	0	1	175.334	2	8296.028	4
563		16	max	.017	3	.153	3	.198	4	7.499e-3	4	NC	15	NC	1
564			min	-.012	2	-.199	2	0	1	0	1	259.454	2	NC	1
565		17	max	.017	3	.012	3	.172	4	9.204e-3	4	NC	5	NC	1
566			min	-.012	2	-.017	2	0	1	0	1	447.063	2	NC	1
567		18	max	.017	3	.122	1	.151	4	4.674e-3	4	NC	5	NC	1
568			min	-.012	2	-.108	3	0	1	0	1	990.399	2	NC	1
569		19	max	.017	3	.235	1	.134	4	0	1	NC	1	NC	1
570			min	-.012	2	-.216	3	0	1	-1.927e-6	4	NC	1	NC	1
571	M9	1	max	.007	3	.126	2	.493	4	2.389e-2	3	NC	1	NC	1
572			min	-.004	2	-.026	3	0	1	-1.274e-2	1	NC	1	NC	1
573		2	max	.007	3	.061	2	.482	4	1.182e-2	3	NC	4	NC	1
574			min	-.004	2	-.012	3	0	12	-6.194e-3	1	1780.398	2	NC	1
575		3	max	.007	3	.011	3	.469	4	1.23e-2	4	NC	5	NC	1
576			min	-.004	2	-.009	2	0	12	-3.508e-5	10	858.674	2	7276.504	4
577		4	max	.007	3	.049	3	.455	4	9.701e-3	5	NC	5	NC	1
578			min	-.004	2	-.087	2	0	12	-4.303e-3	2	542.588	2	5373.746	4
579		5	max	.007	3	.097	3	.439	4	9.161e-3	3	NC	5	NC	1
580			min	-.004	2	-.169	2	0	12	-8.583e-3	2	391.925	2	4411.752	4
581		6	max	.007	3	.15	3	.423	4	1.368e-2	3	NC	15	NC	1
582			min	-.004	2	-.248	2	0	12	-1.286e-2	2	308.88	2	3818.814	4
583		7	max	.007	3	.2	3	.407	4	1.82e-2	3	NC	15	NC	1
584			min	-.004	2	-.318	2	0	1	-1.714e-2	2	259.836	2	3395.799	4
585		8	max	.007	3	.242	3	.391	4	2.272e-2	3	9398.849	15	NC	1
586			min	-.003	2	-.374	2	0	1	-2.143e-2	2	230.816	2	3053.747	4
587		9	max	.007	3	.269	3	.374	4	2.294e-2	3	8789.353	15	NC	1
588			min	-.003	2	-.409	2	0	12	-2.428e-2	2	215.705	2	2796.83	4
589		10	max	.006	3	.279	3	.355	4	2.032e-2	3	8603.506	15	NC	1
590			min	-.003	2	-.421	2	0	1	-2.618e-2	2	211.27	2	2736.776	4
591		11	max	.006	3	.273	3	.334	4	1.769e-2	3	8789.062	15	NC	1
592			min	-.003	2	-.409	2	0	1	-2.809e-2	2	216.42	2	2802.554	4
593		12	max	.006	3	.25	3	.312	4	1.492e-2	3	9398.276	15	NC	1
594			min	-.003	2	-.373	2	0	12	-2.709e-2	2	232.981	2	2969.244	4
595		13	max	.006	3	.212	3	.286	4	1.195e-2	3	NC	15	NC	1
596			min	-.003	2	-.314	2	0	10	-2.172e-2	2	265.088	2	3511.189	4
597		14	max	.006	3	.165	3	.258	4	8.972e-3	3	NC	15	NC	1
598			min	-.003	2	-.241	2	-.001	1	-1.635e-2	2	320.067	2	4725.308	5
599		15	max	.006	3	.112	3	.228	4	5.995e-3	3	NC	5	NC	1
600			min	-.003	2	-.161	2	-.004	1	-1.098e-2	2	414.876	2	7601.075	5
601		16	max	.006	3	.057	3	.199	4	7.36e-3	5	NC	5	NC	1
602			min	-.003	2	-.08	2	-.005	1	-5.616e-3	2	590.806	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	.005	3	.004	3	.173	4	9.265e-3	4	NC	5	NC	1
604			min	-.003	2	-.005	2	-.006	1	-4.355e-4	1	967.593	2	NC	1
605		18	max	.005	3	.056	2	.152	4	4.453e-3	5	NC	4	NC	1
606			min	-.003	2	-.043	3	-.004	1	-9.334e-3	2	2057.037	2	NC	1
607		19	max	.005	3	.111	2	.134	4	7.874e-3	3	NC	1	NC	1
608			min	-.003	2	-.087	3	0	12	-1.876e-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

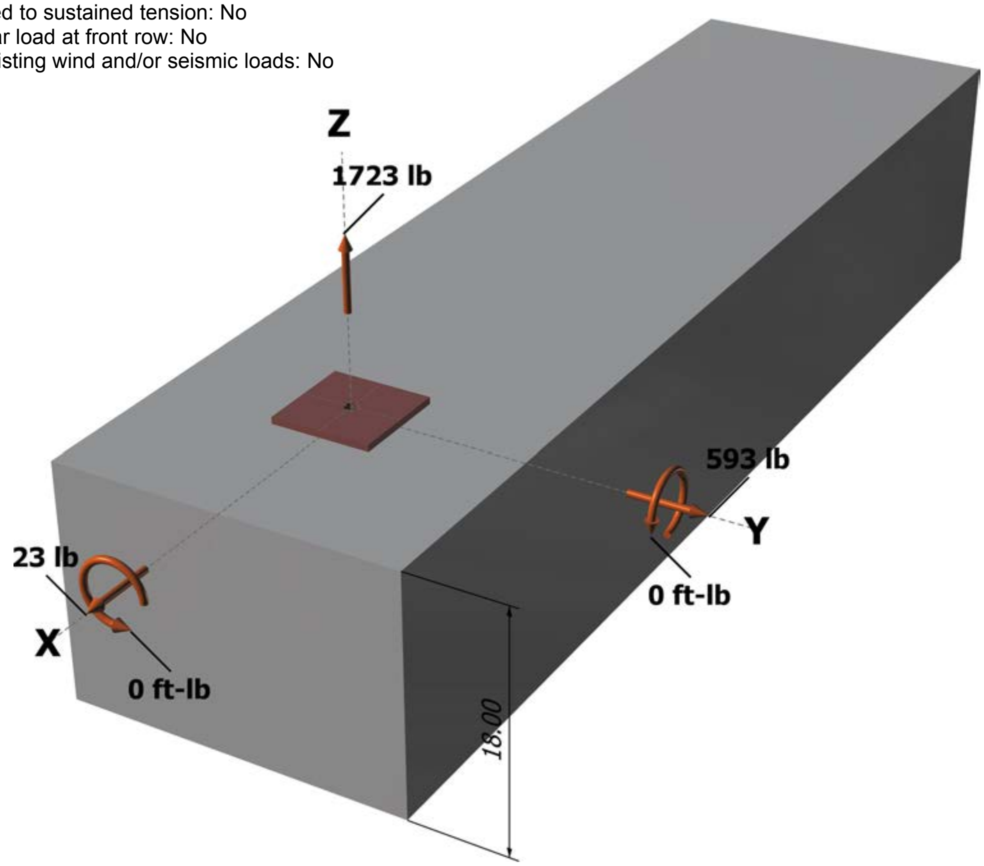
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

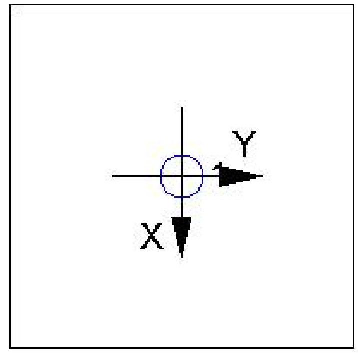
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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	1723.0	23.0	593.0	593.4
Sum	1723.0	23.0	593.0	593.4

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 1723
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in y-direction:

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

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

Shear parallel to edge in x-direction:

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

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

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

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

Shear parallel to edge in y-direction:

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

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

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

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

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

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

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

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

11. Results

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

Tension	Factored Load, N_{ua} (lb)	Design Strength, $øN_n$ (lb)	Ratio	Status
Steel	1723	6071	0.28	Pass
Concrete breakout	1723	5710	0.30	Pass
Adhesive	**1723**	**5365**	**0.32**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, $øV_n$ (lb)	Ratio	Status
Steel	**593**	**3156**	**0.19**	**Pass (Governs)**
T Concrete breakout y+	593	3934	0.15	Pass
T Concrete breakout x+	23	3018	0.01	Pass
|| Concrete breakout y+	23	8508	0.00	Pass
|| Concrete breakout x+	593	6875	0.09	Pass
Concrete breakout, combined	-	-	0.15	Pass
Pryout	593	12298	0.05	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. D.7.1	0.32	0.00	32.1 %	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.

SIMPSON Strong-Tie

Anchor Designer™
Software
Version 2.4.5673.0

Company:	Schletter, Inc.	Date:	11/17/2015
Engineer:	HCV	Page:	1/5
Project:	Standard PVMax - Worst Case, 37-42 Inch Width		
Address:			
Phone:			
E-mail:			

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

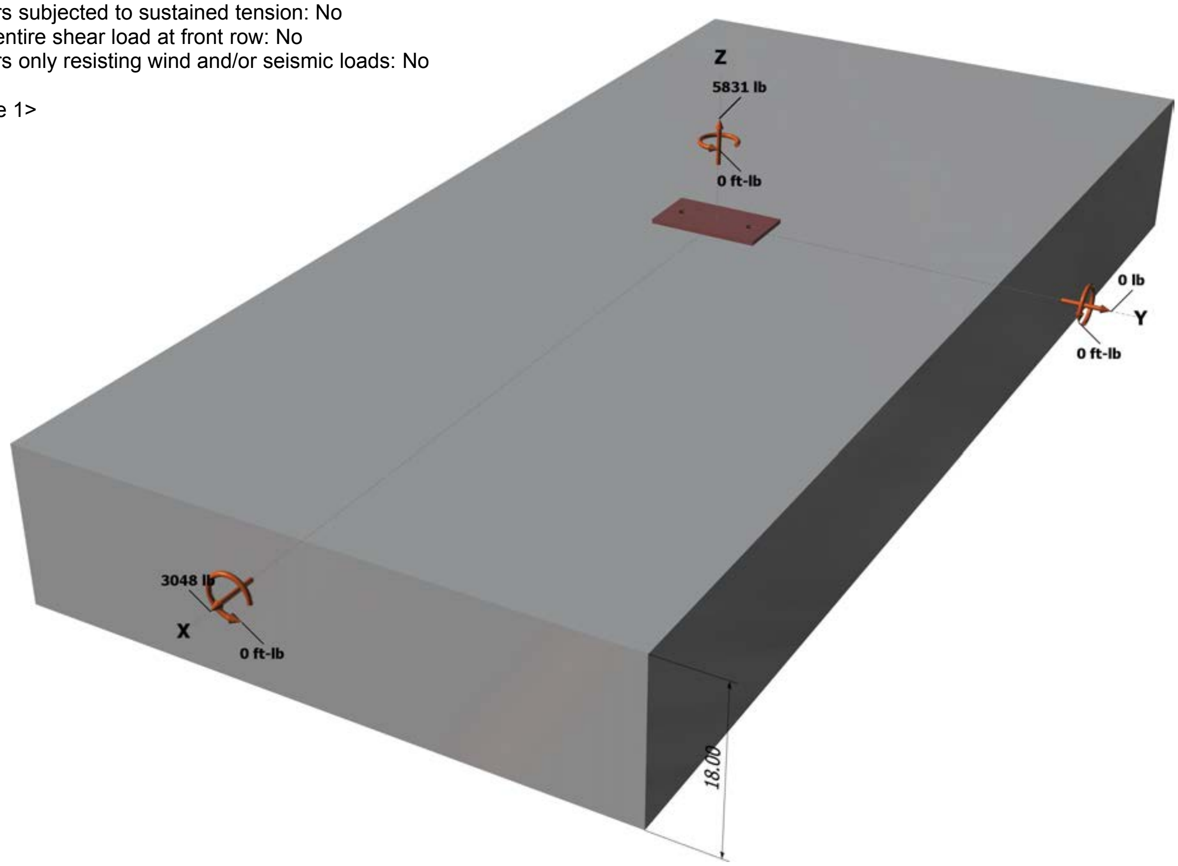
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

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

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

<Figure 1>



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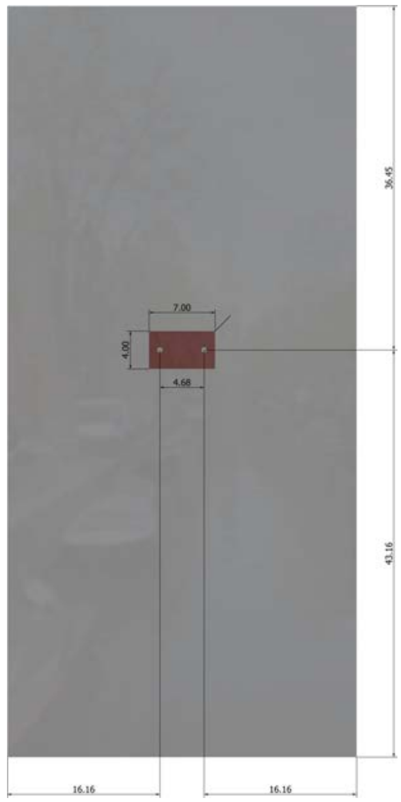


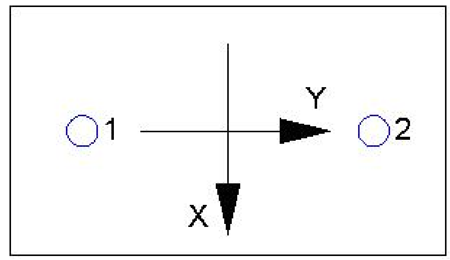
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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	2915.5	1524.0	0.0	1524.0
2	2915.5	1524.0	0.0	1524.0
Sum	5831.0	3048.0	0.0	3048.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 5831
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgx} (lb)
666.00	648.00	1.000	0.969	1.000	1.000	15593	0.70	10875

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	16.16	24369

$\phi V_{cbx} = \phi\,(2)(A_{Vc} / A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (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)
872.64	1175.16	1.000	1.000	1.000	24369	0.70	25334

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

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

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

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

ϕV_{cpg} (lb)
20601

11. Results

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

Tension	Factored Load, N_{ua} (lb)	Design Strength, $øN_n$ (lb)	Ratio	Status
Steel	2916	6071	0.48	Pass
Concrete breakout	5831	10231	0.57	Pass
Adhesive	**5831**	**8093**	**0.72**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, $øV_n$ (lb)	Ratio	Status
Steel	**1524**	**3156**	**0.48**	**Pass (Governs)**
T Concrete breakout x+	3048	10875	0.28	Pass
|| Concrete breakout y-	1524	25334	0.06	Pass
Pryout	3048	20601	0.15	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status

Sec. D.7.3	0.72	0.48	120.3 %	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.