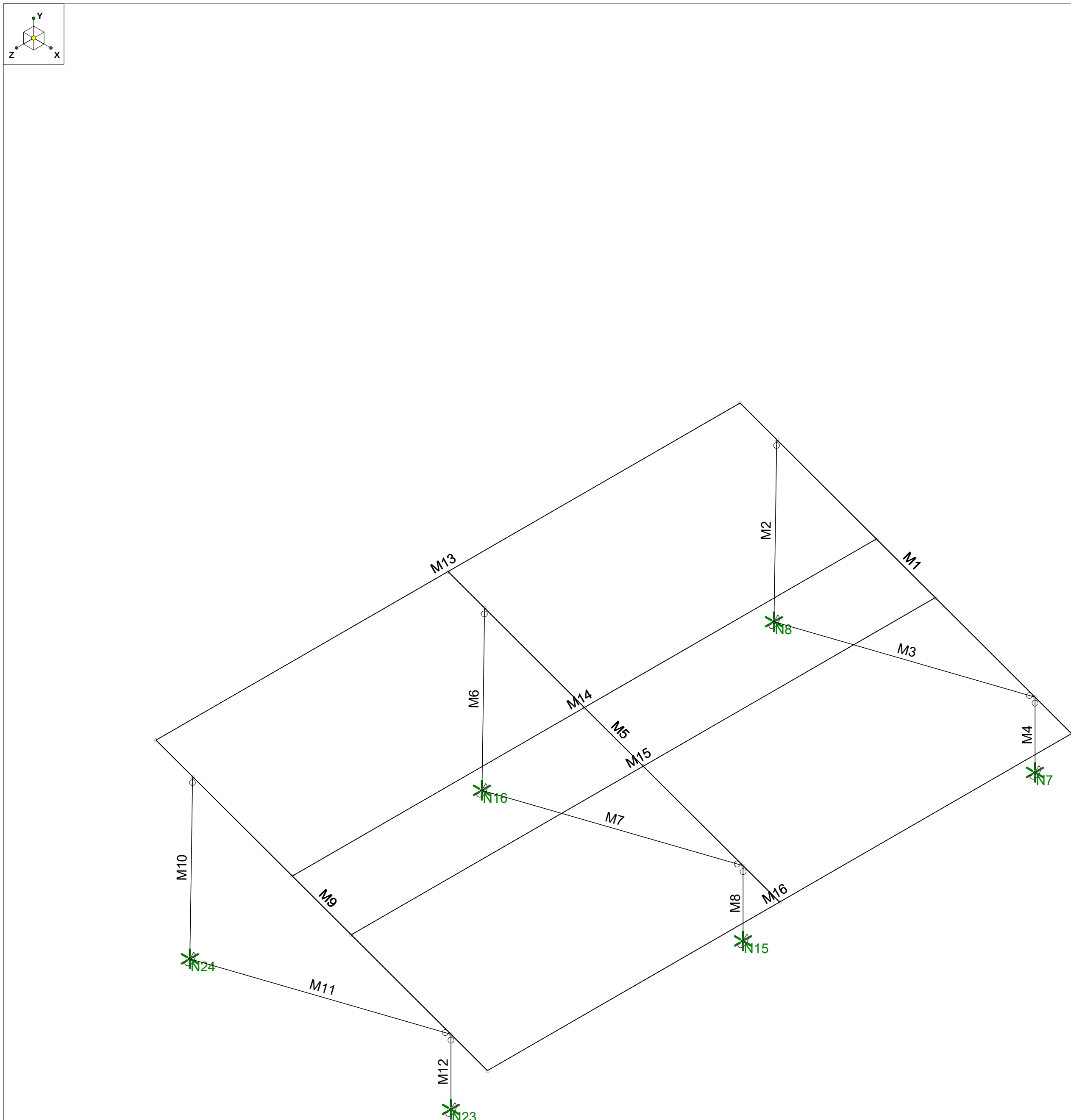


Schletter, Inc.	Standard PVMax Racking System	20° Tilt w/ Seismic Design
HCV	Representative Calculations - ASCE 7-10	

1. INTRODUCTION

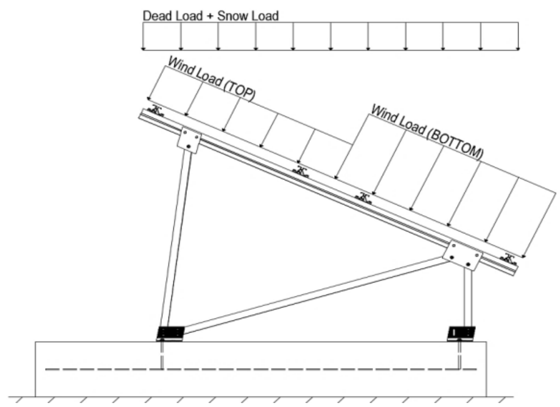
1.1 Project Description
The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. PVMax ground mount system.

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

PV modules are required to meet the following specifications:

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

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



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

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

2. LOAD ACTIONS

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

Self-weight of the PV modules.

2.2 Snow Loads
Ground Snow Load, P_g = 30.00 psf
Sloped Roof Snow Load, P_s = 20.62 psf *(ASCE 7-10, Eq. 7.4-1)*
I_s = 1.00
C_s = 0.91
C_e = 0.90
C_t = 1.20

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

Exposure Category = C
Importance Category = II

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

Pressure Coefficients

$Cf+_{TOP}$	=	1.050	*(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 =	0.39	C_d =	1.25

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

2.5 Combination of Loads

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

Strength Design, LRFD

Component stresses are checked using the following LRFD load combinations:

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

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

Allowable Stress Design, ASD

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

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

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

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

3. STRUCTURAL ANALYSIS

3.1 RISA Results

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

3.2 RISA Components

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

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

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

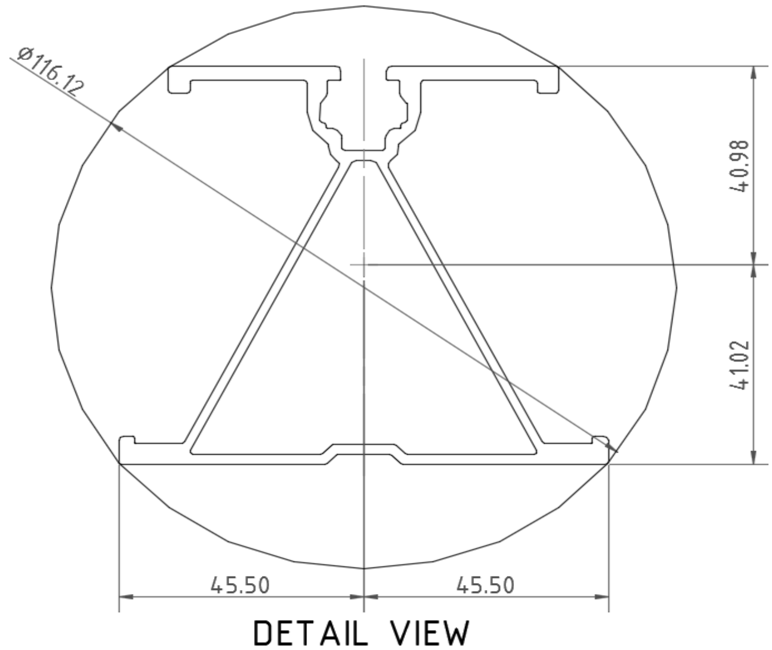
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

4. MEMBER DESIGN CALCULATIONS

4.1 Purlin Design

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

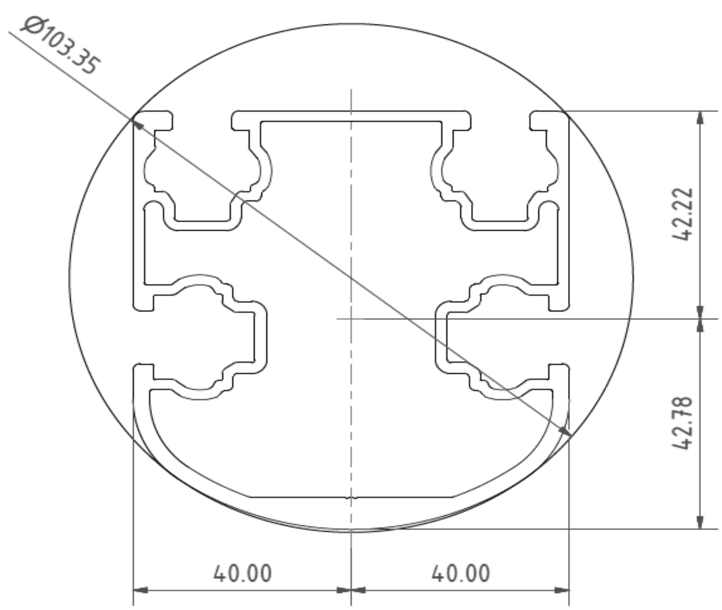
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	81	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	-1.709	k-ft
M_z =	-0.004	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	62%	



4.2 Girder Design

Loads from purlins are transferred using an inclined girder, which is connected to a set of aluminum struts. Loads on the girder result from the support reactions of the purlins. See Appendix A.2 for detailed member calculations. Section units are in (mm).

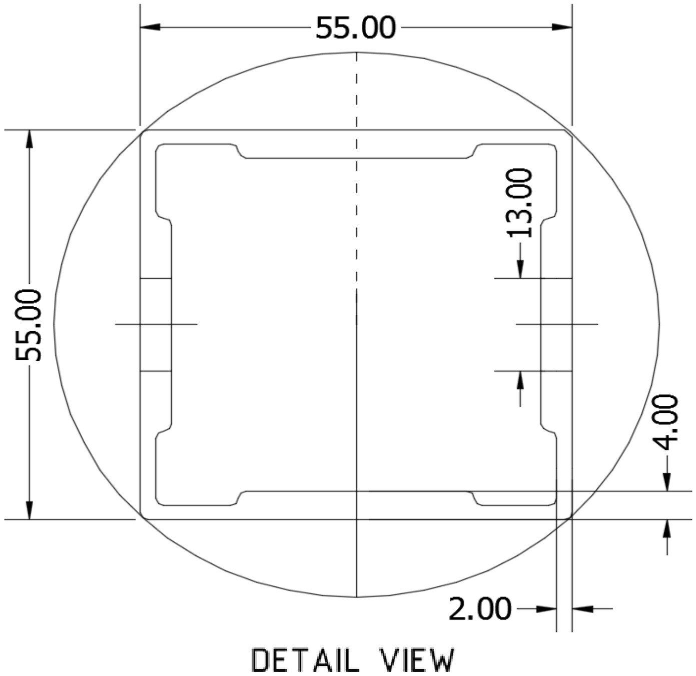
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	104.56	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.00	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.354	k-ft
M_z =	0.000	k-ft
P_n =	-0.835	k
$M_{y\ allowable}$ =	3.422	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	99%	



4.3 Front Strut Design

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

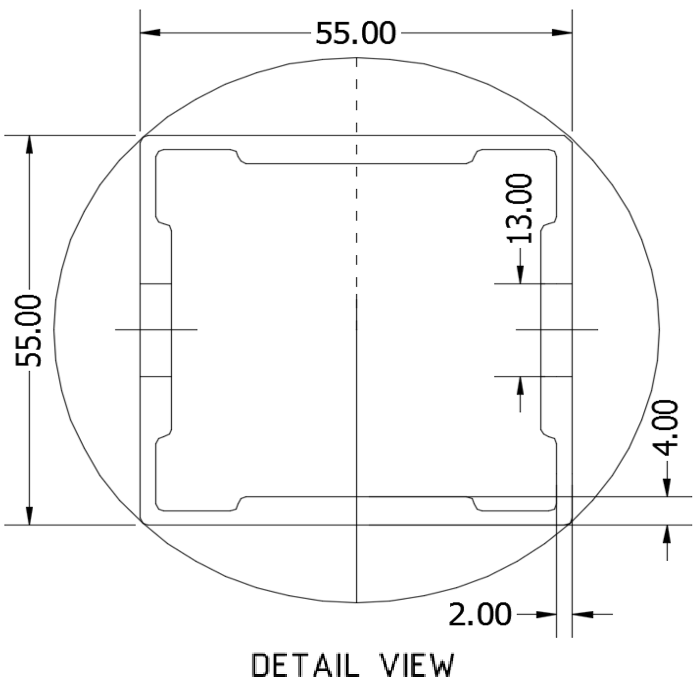
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.420	k-ft
P_n =	0.499	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	32%	



4.4 Diagonal Strut Design

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

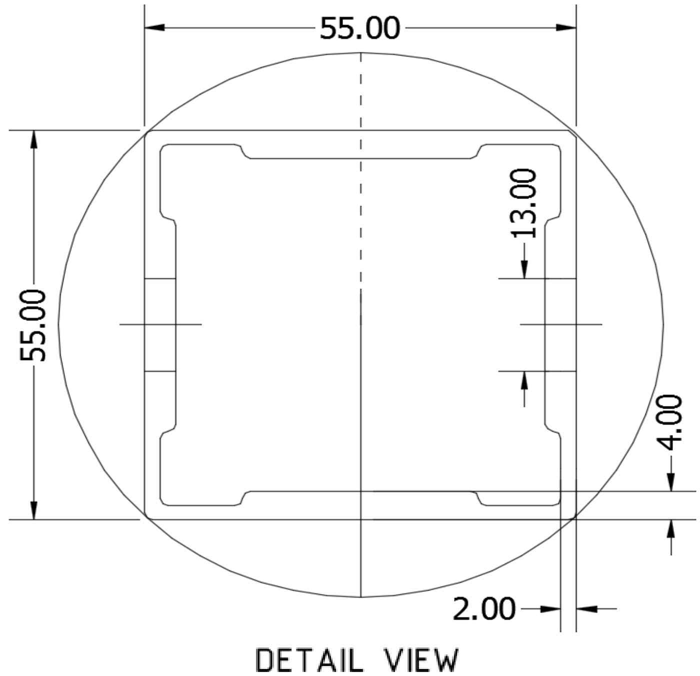
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	98.03	in
$\Phi F_{ty\ AXIAL}$ =	6.11	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.013	k-ft
M_z =	0.000	k-ft
P_n =	2.029	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	6.000	k
Utilization =	35%	



4.5 Rear Strut Design

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

Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	61.10	in
$\Phi F_{ty\ AXIAL}$ =	13.63	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	-0.013	k-ft
M_z =	0.000	k-ft
P_n =	3.284	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	13.386	k
Utilization =	25%	



5. FOUNDATION DESIGN CALCULATIONS

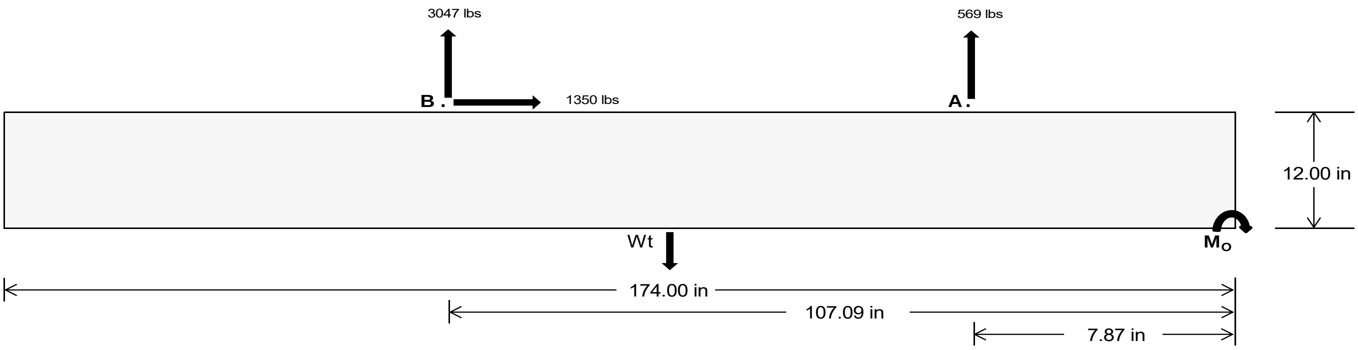
5.1 Helical Pile Foundations

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

Maximum	Front	Rear	
Tensile Load =	1248.02	6616.52	k
Compressive Load =	4089.86	4918.39	k
Lateral Load =	280.46	2925.00	k
Moment (Weak Axis) =	0.56	0.29	k

5.2 Design of Ballast Foundations

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



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 =	346983.5 in-lbs
Resisting Force Required =	3988.32 lbs
S.F. =	1.67
Weight Required =	6647.19 lbs
Minimum Width =	38 in
Weight Provided =	6657.92 lbs

A minimum 174in long x 38in wide x 12in tall ballast foundation is required to resist overturning.

Sliding	
Force =	1350.27 lbs
Friction =	0.4
Weight Required =	3375.67 lbs
Resisting Weight =	6657.92 lbs
Additional Weight Required =	0 lbs

Use a 174in long x 38in wide x 12in tall ballast foundation to resist sliding. Friction is OK.

Cohesion	
Sliding Force =	1350.27 lbs
Cohesion =	130 psf
Area =	45.92 ft^2
Resisting =	3328.96 lbs
Additional Weight Required =	0 lbs

Use a 174in long x 38in wide x 12in 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 *(Meyerhof, 1953)*

	Ballast Width			
	38 in	39 in	40 in	41 in
P_{ftg} = (145 pcf)(14.5 ft)(1 ft)(3.17 ft) =	6658 lbs	6833 lbs	7008 lbs	7184 lbs

ASD LC	1.0D + 1.0S				1.0D + 0.6W				1.0D + 0.75L + 0.45W + 0.75S				0.6D + 0.6W			
Width	38 in	39 in	40 in	41 in	38 in	39 in	40 in	41 in	38 in	39 in	40 in	41 in	38 in	39 in	40 in	41 in
F_A	1180 lbs	1180 lbs	1180 lbs	1180 lbs	1648 lbs	1648 lbs	1648 lbs	1648 lbs	2022 lbs	2022 lbs	2022 lbs	2022 lbs	-569 lbs	-569 lbs	-569 lbs	-569 lbs
F_B	1252 lbs	1252 lbs	1252 lbs	1252 lbs	2014 lbs	2014 lbs	2014 lbs	2014 lbs	2346 lbs	2346 lbs	2346 lbs	2346 lbs	-3047 lbs	-3047 lbs	-3047 lbs	-3047 lbs
F_V	106 lbs	106 lbs	106 lbs	106 lbs	1189 lbs	1189 lbs	1189 lbs	1189 lbs	964 lbs	964 lbs	964 lbs	964 lbs	-1350 lbs	-1350 lbs	-1350 lbs	-1350 lbs
P_{total}	9090 lbs	9265 lbs	9441 lbs	9616 lbs	10320 lbs	10495 lbs	10670 lbs	10846 lbs	11026 lbs	11201 lbs	11376 lbs	11551 lbs	379 lbs	484 lbs	589 lbs	694 lbs
M	5578 lbs-ft	5578 lbs-ft	5578 lbs-ft	5578 lbs-ft	6307 lbs-ft	6307 lbs-ft	6307 lbs-ft	6307 lbs-ft	8444 lbs-ft	8444 lbs-ft	8444 lbs-ft	8444 lbs-ft	2701 lbs-ft	2701 lbs-ft	2701 lbs-ft	2701 lbs-ft
e	0.61 ft	0.60 ft	0.59 ft	0.58 ft	0.61 ft	0.60 ft	0.59 ft	0.58 ft	0.77 ft	0.75 ft	0.74 ft	0.73 ft	7.13 ft	5.58 ft	4.58 ft	3.89 ft
L'	13.27 ft	13.30 ft	13.32 ft	13.34 ft	13.28 ft	13.30 ft	13.32 ft	13.34 ft	12.97 ft	12.99 ft	13.02 ft	13.04 ft	0.25 ft	3.34 ft	5.33 ft	6.72 ft
A'	42.0 sqft	43.2 sqft	44.4 sqft	45.6 sqft	42.0 sqft	43.2 sqft	44.4 sqft	45.6 sqft	41.1 sqft	42.2 sqft	43.4 sqft	44.5 sqft	0.8 sqft	10.9 sqft	17.8 sqft	23.0 sqft
$f_{meyerhof}$	216.3 psf	214.4 psf	212.7 psf	211.0 psf	245.4 psf	242.8 psf	240.4 psf	238.0 psf	268.5 psf	265.3 psf	262.2 psf	259.3 psf	486.4 psf	44.6 psf	33.2 psf	30.2 psf

Maximum Bearing Pressure =	486 psf
Allowable Bearing Pressure =	1500 psf

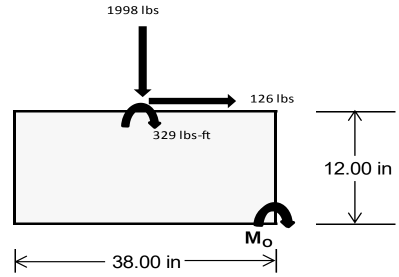
Use a 174in long x 38in wide x 12in tall ballast foundation for an acceptable bearing pressure.

<u>Seismic Design</u>

<u>Overturning Check</u>

M_O = 2709.3 ft-lbs
Resisting Force Required = 1711.13 lbs
S.F. = 1.67
Weight Required = 2851.88 lbs
Minimum Width = 38 in in
Weight Provided = 6657.92 lbs

A minimum 174in long x 38in wide x 12in tall ballast foundation is required to resist overturning.



<u>Bearing Pressure</u> *(Meyerhof, 1953)*

ASD LC	1.238D + 0.875E			1.1785D + 0.65625E + 0.75S			0.362D + 0.875E		
Width	38 in			38 in			38 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	247 lbs	503 lbs	174 lbs	756 lbs	1998 lbs	700 lbs	98 lbs	147 lbs	25 lbs
F_V	175 lbs	171 lbs	177 lbs	130 lbs	126 lbs	136 lbs	175 lbs	172 lbs	176 lbs
P_{total}	8490 lbs	8745 lbs	8416 lbs	8603 lbs	9845 lbs	8546 lbs	2508 lbs	2557 lbs	2435 lbs
M	607 lbs-ft	599 lbs-ft	612 lbs-ft	457 lbs-ft	455 lbs-ft	475 lbs-ft	606 lbs-ft	598 lbs-ft	608 lbs-ft
e	0.07 ft	0.07 ft	0.07 ft	0.05 ft	0.05 ft	0.06 ft	0.24 ft	0.23 ft	0.25 ft
B'	3.02 ft	3.03 ft	3.02 ft	3.06 ft	3.07 ft	3.06 ft	2.68 ft	2.70 ft	2.67 ft
A'	43.8 sqft	43.9 sqft	43.8 sqft	44.4 sqft	44.6 sqft	44.3 sqft	38.9 sqft	39.1 sqft	38.7 sqft
$f_{meyerhof}$	193.6 psf	199.1 psf	192.1 psf	193.9 psf	220.9 psf	192.9 psf	64.5 psf	65.3 psf	63.0 psf

Maximum Bearing Pressure = 221 psf
Allowable Bearing Pressure = 1500 psf

Use a 174in long x 38in wide x 12in tall ballast foundation for an acceptable bearing pressure.

<u>Foundation Requirements: 174in long x 38in wide x 12in tall ballast foundation and fiber reinforcing with (3) #5 rebar.</u>

5.3 Foundation Anchors

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

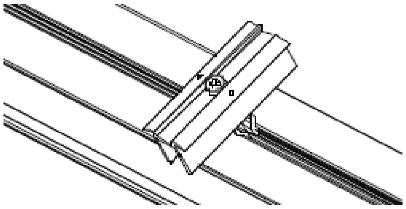
6. DESIGN OF JOINTS AND CONNECTIONS

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

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

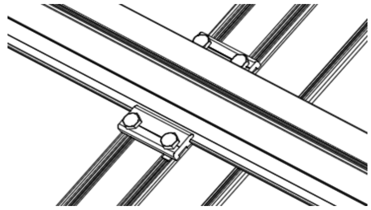
Fastening of Modules to Purlins

Maximum Uplifting Force =	1.072	k
Allowable Uplift =	1.214	k
Utilization =	88%	



Fastening of Purlins to Girders

Maximum Uplifting Force =	2.588	k
Allowable Uplift =	4.357	k
Utilization =	59%	



6.2 Strut Connections

The aluminum struts connect the front end of girder to a center section of the steel post. 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 =	3.146	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	42%	

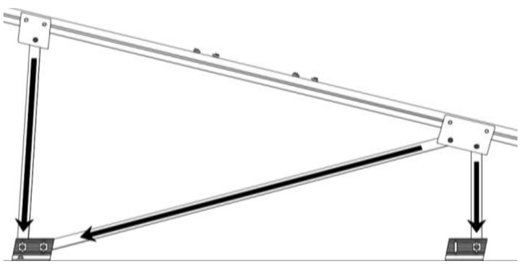
Rear Strut

Maximum Axial Load =	4.558	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	61%	

Diagonal Strut

Maximum Axial Load =	2.241	k
M12 Bolt Shear Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	30%	

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



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

7. SEISMIC DESIGN

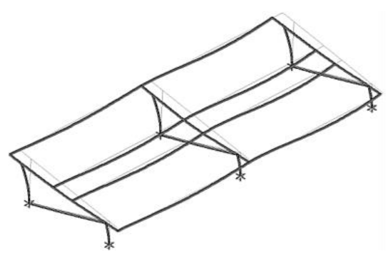
7.1 Seismic Drift

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

Mean Height, h_{sx} =	51.89	in
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$	
	1.038	in
Max Drift, Δ_{MAX} =	0.486	in

$0.486 \leq 1.038$, OK.

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



APPENDIX A

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

Purlin = **S1.5**

Strong Axis:

3.4.14

L_b = 81 in

J = 0.432

224.084

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 28.5 ksi

3.4.16

b/t = 32.195

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 25.1 ksi

3.4.16.1 Not Used

Rb/t =

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 37.0588

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

S1 = 36.9

m = 0.65

C_0 = 40.985

Cc = 41.015

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

S2 = 77.2

φF_L= φb[Bbr-mDbr*h/t]

φF_L= 43.2 ksi

φF_LSt= 25.1 ksi

Ix = 897074 mm^4

2.155 in^4

y = 41.015 mm

Sx = 1.335 in^3

M_{max}St = 2.788 k-ft

Weak Axis:

3.4.14

L_b = 81

J = 0.432

142.504

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.5

3.4.16

b/t = 37.0588

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 23.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 32.195

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

S1 = 36.9

m = 0.65

C_0 = 45.5

Cc = 45.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 23.1 ksi

Iy = 446476 mm^4

1.073 in^4

x = 45.5 mm

Sy = 0.599 in^3

M_{max}Wk = 1.152 k-ft

Compression

3.4.9

b/t = 32.195
S1 = 12.21 (See 3.4.16 above for formula)
S2 = 32.70 (See 3.4.16 above for formula)
$\varphi F_L = \varphi c[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 25.1 ksi

b/t = 37.0588
S1 = 12.21
S2 = 32.70
$\varphi F_L = (\varphi ck2*\sqrt{(BpE)})/(1.6b/t)$
$\varphi F_L =$ 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
$\varphi F_L = \varphi yFcy$
$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 21.94 ksi
A = 1215.13 mm^2
1.88 in^2
$P_{max} =$ 41.32 kips

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

Girder = **BF0**

Strong Axis:

3.4.14

$L_b =$ 104.56 in
J = 1.08
179.85

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

S1 = 0.51461

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

S2 = 1701.56
$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)}/2))}]$
$\varphi F_L =$ 29.0 ksi

3.4.16

b/t = 16.2

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

S1 = 12.2

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

S2 = 46.7
$\varphi F_L = \varphi b[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 31.6 ksi

Weak Axis:

3.4.14

$L_b =$ 104.56
J = 1.08
190.335

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

S1 = 0.51461

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

S2 = 1701.56
$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)}/2))}]$
$\varphi F_L =$ 28.9

3.4.16

b/t = 7.4

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

S1 = 12.2

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

S2 = 46.7
$\varphi F_L = \varphi yFcy$
$\varphi F_L =$ 33.3 ksi

3.4.16.1 Used

Rb/t = 18.1

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

S1 = 1.1

$S2 = C_t$

S2 = 141.0

$\varphi F_L = \varphi b[Bt-Dt^*\sqrt{(Rb/t)}]$

$\varphi F_L =$ 31.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 7.4

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

S1 = 35.2

m = 0.68

C_0 = 41.067

Cc = 43.717

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

S2 = 73.8

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St =$ 29.0 ksi

Ix = 984962 mm^4

2.366 in^4

y = 43.717 mm

Sx = 1.375 in^3

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

3.4.18

h/t = 16.2

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

S1 = 36.9

m = 0.65

C_0 = 40

Cc = 40

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

S2 = 77.3

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L Wk =$ 33.3 ksi

Iy = 923544 mm^4

2.219 in^4

x = 40 mm

Sy = 1.409 in^3

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

Compression

3.4.9

b/t = 16.2

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

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

$\varphi F_L =$ 31.6 ksi

b/t = 7.4

S1 = 12.21

S2 = 32.70

$\varphi F_L = \varphi yFcy$

$\varphi F_L =$ 33.3 ksi

3.4.10

Rb/t = 18.1

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

S1 = 6.87

S2 = 131.3

$\varphi F_L = \varphi c[Bt-Dt^*\sqrt{(Rb/t)}]$

$\varphi F_L =$ 31.09 ksi

$\varphi F_L =$ 31.09 ksi

A = 1215.13 mm^2

1.88 in^2

P_{max} = 58.55 kips

Strut = **55x55**

Strong Axis:	Weak Axis:
3.4.14	**3.4.14**
L_b = 24.8 in	L_b = 24.8
J = 0.942	J = 0.942
38.7028	38.7028
$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$	$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$
S1 = 0.51461	S1 = 0.51461
$S2 = \left(\frac{C_c}{1.6}\right)^2$	$S2 = \left(\frac{C_c}{1.6}\right)^2$
S2 = 1701.56	S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]	φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 31.4 ksi	φF_L= 31.4
3.4.16	**3.4.16**
b/t = 24.5	b/t = 24.5
$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$	$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$
S1 = 12.2	S1 = 12.2
$S2 = \frac{k_1 Bp}{1.6Dp}$	$S2 = \frac{k_1 Bp}{1.6Dp}$
S2 = 46.7	S2 = 46.7
φF_L= φb[Bp-1.6Dp*b/t]	φF_L= φb[Bp-1.6Dp*b/t]
φF_L= 28.2 ksi	φF_L= 28.2 ksi
3.4.16.1 Not Used	**3.4.16.1**
Rb/t = 0.0	N/A for Weak Direction
$S1 = \left(\frac{Bt - 1.17\frac{\theta_y}{\theta_b}Fcy}{1.6Dt}\right)^2$	
S1 = 1.1	
$S2 = C_t$	
S2 = 141.0	
φF_L= 1.17φyFcy	
φF_L= 38.9 ksi	
3.4.18	**3.4.18**
h/t = 24.5	h/t = 24.5
$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$	$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$
S1 = 36.9	S1 = 36.9
m = 0.65	m = 0.65
C_0 = 27.5	C_0 = 27.5
Cc = 27.5	Cc = 27.5
$S2 = \frac{k_1 Bbr}{mDbr}$	$S2 = \frac{k_1 Bbr}{mDbr}$
S2 = 77.3	S2 = 77.3
φF_L= 1.3φyFcy	φF_L= 1.3φyFcy
φF_L= 43.2 ksi	φF_L= 43.2 ksi
φF_LSt= 28.2 ksi	φF_LWk= 28.2 ksi
Ix = 279836 mm^4	Iy = 279836 mm^4
0.672 in^4	0.672 in^4
y = 27.5 mm	x = 27.5 mm
Sx = 0.621 in^3	Sy = 0.621 in^3
M_{max}St = 1.460 k-ft	M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 0.57371

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.87952

φF_L= φcc(Bc-Dc*λ)

φF_L= 28.0279 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

φF_L= φyFcy

φF_L= 33.25 ksi

φF_L= 28.03 ksi

A = 663.99 mm^2

1.03 in^2

P_{max} = 28.85 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 98.03 in

J = 0.942

152.985

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.4 ksi

Weak Axis:

3.4.14

L_b = 98.03

J = 0.942

152.985

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.4

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 2.26776

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.89749

φF_L= (φccFcy)/(λ²)

φF_L= 6.10803 ksi

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

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

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 61.10 in
J = 0.942
95.3524

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

S1 = 0.51461

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

S2 = 1701.56
φF_L = φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L = 30.2 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

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

Weak Axis:

3.4.14

L_b = 61.1
J = 0.942
95.3524

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

S1 = 0.51461

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

S2 = 1701.56
φF_L = φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L = 30.2

3.4.16

b/t = 24.5

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

S1 = 12.2

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

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

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in³

M_{max}St = 1.460 k-ft

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in³

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 1.41345

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.77788

φF_L= (φccFcy)/(λ²)

φF_L= 13.6277 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

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

S1 = 6.87

S2 = 131.3

$\varphi F_L = \varphi y Fcy$

$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 13.63 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 14.03 kips

APPENDIX B

B.1

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

Basic Load Cases

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

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

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

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

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

Member Distributed Loads (BLC 3 : Snow Load)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Y	-63.565	-63.565	0	0
2	M14	Y	-63.565	-63.565	0	0
3	M15	Y	-63.565	-63.565	0	0
4	M16	Y	-63.565	-63.565	0	0

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

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	y	-138.465	-138.465	0	0
2	M14	y	-138.465	-138.465	0	0
3	M15	y	-217.588	-217.588	0	0
4	M16	y	-217.588	-217.588	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	316.492	316.492	0	0
2	M14	y	242.644	242.644	0	0
3	M15	y	131.872	131.872	0	0
4	M16	y	131.872	131.872	0	0

Member Distributed Loads (BLC 6 : Seismic - Lateral)

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

Load Combinations

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

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N8	max	634.82	2	1278.901	2	.505	1	.002	1	0	1	0	1
2		min	-774.211	3	-1670.865	3	-48.752	5	-.22	4	0	1	0	1
3	N7	max	.017	9	1096.537	1	-.441	10	0	10	0	1	0	1
4		min	-.251	2	-294.485	3	-215.735	4	-.433	4	0	1	0	1
5	N15	max	0	15	3146.049	2	0	3	0	3	0	1	0	1
6		min	-2.369	2	-960.016	3	-206.395	4	-.42	4	0	1	0	1
7	N16	max	2021.219	2	3783.376	2	0	2	0	2	0	1	0	1
8		min	-2249.998	3	-5089.629	3	-48.904	5	-.222	4	0	1	0	1
9	N23	max	.028	14	1096.537	1	6.448	1	.013	1	0	1	0	1
10		min	-.251	2	-294.485	3	-210.945	4	-.426	4	0	1	0	1
11	N24	max	634.82	2	1278.901	2	-.033	10	0	10	0	1	0	1
12		min	-774.211	3	-1670.865	3	-49.292	5	-.221	4	0	1	0	1
13	Totals:	max	3287.987	2	11645.784	2	0	3						
14		min	-3799.461	3	-9980.344	3	-776.383	4						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
1	M13	1	max	55.882	4	444.717	2	-6.777	12	0	15	.117	4	0	4
2			min	2.307	10	-795.09	3	-123.914	1	-.012	2	.006	10	0	3
3		2	max	47.031	4	308.872	2	-5.706	12	0	15	.077	4	.509	3
4			min	2.307	10	-562.134	3	-94.332	1	-.012	2	0	10	-.283	2
5		3	max	39.773	1	173.027	2	-4.635	12	0	15	.048	5	.843	3
6			min	2.307	10	-329.179	3	-64.751	1	-.012	2	-.031	1	-.463	2
7		4	max	39.773	1	38.582	1	-2.016	10	0	15	.028	5	1.003	3
8			min	2.307	10	-96.223	3	-35.169	1	-.012	2	-.069	1	-.542	2
9		5	max	39.773	1	136.732	3	.895	10	0	15	.009	5	.988	3
10			min	2.307	10	-98.662	2	-26.141	4	-.012	2	-.084	1	-.519	2
11		6	max	39.773	1	369.688	3	23.994	1	0	15	-.004	12	.798	3
12			min	1.824	15	-234.506	2	-22.659	5	-.012	2	-.077	1	-.394	1
13		7	max	39.773	1	602.643	3	53.575	1	0	15	-.003	10	.433	3
14			min	-6.039	5	-370.351	2	-21.029	5	-.012	2	-.048	1	-.174	1
15		8	max	39.773	1	835.599	3	83.157	1	0	15	.006	2	.161	2
16			min	-14.89	5	-506.196	2	-19.399	5	-.012	2	-.041	4	-.106	3
17		9	max	39.773	1	1068.554	3	112.738	1	0	15	.077	1	.592	2
18			min	-23.74	5	-642.04	2	-17.769	5	-.012	2	-.054	5	-.82	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	45.28	4	1301.51	3	142.32	1	.012	2	.173	1	1.124	2
20			min	2.307	10	-777.885	2	-87.187	14	-.01	1	-.004	3	-1.709	3
21		11	max	39.773	1	642.04	2	-1.791	12	.012	2	.078	4	.592	2
22			min	2.307	10	-1068.554	3	-112.738	1	0	15	-.007	3	-.82	3
23		12	max	39.773	1	506.196	2	-.713	3	.012	2	.041	4	.161	2
24			min	2.307	10	-835.599	3	-83.157	1	0	15	-.008	3	-.106	3
25		13	max	39.773	1	370.351	2	.893	3	.012	2	.019	5	.433	3
26			min	2.307	10	-602.643	3	-53.575	1	0	15	-.048	1	-.174	1
27		14	max	39.773	1	234.506	2	2.499	3	.012	2	0	15	.798	3
28			min	1.076	15	-369.688	3	-30.268	4	0	15	-.077	1	-.394	1
29		15	max	39.773	1	98.662	2	5.588	1	.012	2	-.003	12	.988	3
30			min	-7.203	5	-136.732	3	-23.528	5	0	15	-.084	1	-.519	2
31		16	max	39.773	1	96.223	3	35.169	1	.012	2	0	3	1.003	3
32			min	-16.054	5	-38.582	1	-21.898	5	0	15	-.069	1	-.542	2
33		17	max	39.773	1	329.179	3	64.751	1	.012	2	.005	3	.843	3
34			min	-24.904	5	-173.027	2	-20.268	5	0	15	-.058	4	-.463	2
35		18	max	39.773	1	562.134	3	94.332	1	.012	2	.029	1	.509	3
36			min	-33.755	5	-308.872	2	-18.638	5	0	15	-.066	5	-.283	2
37		19	max	39.773	1	795.09	3	123.914	1	.012	2	.11	1	0	1
38			min	-42.605	5	-444.717	2	-17.008	5	0	15	-.079	5	0	3
39	M14	1	max	37.026	4	543.155	2	-7.079	12	.015	3	.176	4	0	1
40			min	1.901	10	-664.098	3	-129.868	1	-.017	2	.008	10	0	3
41		2	max	28.176	4	407.31	2	-6.008	12	.015	3	.123	4	.431	3
42			min	1.901	10	-486.528	3	-100.286	1	-.017	2	0	10	-.356	2
43		3	max	27.827	1	271.466	2	-4.938	12	.015	3	.076	5	.73	3
44			min	1.901	10	-308.959	3	-70.705	1	-.017	2	-.013	1	-.611	2
45		4	max	27.827	1	135.621	2	-2.504	10	.015	3	.044	5	.895	3
46			min	1.901	10	-131.389	3	-51.914	4	-.017	2	-.055	1	-.764	2
47		5	max	27.827	1	46.18	3	.407	10	.015	3	.013	5	.927	3
48			min	-4.207	5	-6.525	1	-44.171	4	-.017	2	-.075	1	-.814	2
49		6	max	27.827	1	223.75	3	18.04	1	.015	3	-.004	12	.826	3
50			min	-13.058	5	-139.724	1	-39.122	5	-.017	2	-.073	1	-.763	2
51		7	max	27.827	1	401.319	3	47.621	1	.015	3	-.003	10	.591	3
52			min	-21.908	5	-272.923	1	-37.492	5	-.017	2	-.057	4	-.61	2
53		8	max	27.827	1	578.889	3	77.203	1	.015	3	.004	2	.224	3
54			min	-30.758	5	-407.758	2	-35.862	5	-.017	2	-.076	4	-.355	2
55		9	max	27.827	1	756.458	3	106.784	1	.015	3	.068	1	.039	1
56			min	-39.609	5	-543.602	2	-34.232	5	-.017	2	-.1	5	-.277	3
57		10	max	57.28	4	934.028	3	136.365	1	.015	3	.176	4	.494	1
58			min	1.901	10	-679.447	2	-92.487	14	-.017	2	-.005	3	-.911	3
59		11	max	48.43	4	543.602	2	-1.488	12	.017	2	.122	4	.039	1
60			min	1.901	10	-756.458	3	-106.784	1	-.015	3	-.007	3	-.277	3
61		12	max	39.579	4	407.758	2	-.246	3	.017	2	.074	4	.224	3
62			min	1.901	10	-578.889	3	-77.203	1	-.015	3	-.008	3	-.355	2
63		13	max	30.729	4	272.923	1	1.361	3	.017	2	.041	5	.591	3
64			min	1.901	10	-401.319	3	-52.881	4	-.015	3	-.048	1	-.61	2
65		14	max	27.827	1	139.724	1	2.967	3	.017	2	.009	5	.826	3
66			min	1.901	10	-223.75	3	-45.137	4	-.015	3	-.073	1	-.763	2
67		15	max	27.827	1	6.525	1	11.542	1	.017	2	-.002	12	.927	3
68			min	1.901	10	-46.18	3	-39.327	5	-.015	3	-.075	1	-.814	2
69		16	max	27.827	1	131.389	3	41.123	1	.017	2	.001	3	.895	3
70			min	-1.833	5	-135.621	2	-37.697	5	-.015	3	-.062	4	-.764	2
71		17	max	27.827	1	308.959	3	70.705	1	.017	2	.007	3	.73	3
72			min	-10.684	5	-271.466	2	-36.067	5	-.015	3	-.081	4	-.611	2
73		18	max	27.827	1	486.528	3	100.286	1	.017	2	.051	1	.431	3
74			min	-19.534	5	-407.31	2	-34.437	5	-.015	3	-.104	5	-.356	2
75		19	max	27.827	1	664.098	3	129.868	1	.017	2	.137	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	-28.385	5	-543.155	2	-32.807	5	-.015	3	-.129	5	0	3
77	M15	1	max	70.001	5	743.732	2	-6.88	12	.018	2	.239	4	0	2
78			min	-28.973	1	-385.116	3	-129.908	1	-.013	3	.009	10	0	3
79		2	max	61.151	5	548.545	2	-5.809	12	.018	2	.172	4	.253	3
80			min	-28.973	1	-290.626	3	-100.327	1	-.013	3	.001	10	-.485	2
81		3	max	52.3	5	353.359	2	-4.738	12	.018	2	.112	5	.436	3
82			min	-28.973	1	-196.135	3	-77.777	4	-.013	3	-.013	1	-.823	2
83		4	max	43.45	5	158.172	2	-2.605	10	.018	2	.066	5	.548	3
84			min	-28.973	1	-101.645	3	-70.034	4	-.013	3	-.055	1	-1.015	2
85		5	max	34.6	5	-.285	15	.306	10	.018	2	.021	5	.588	3
86			min	-28.973	1	-37.015	2	-62.29	4	-.013	3	-.075	1	-1.06	2
87		6	max	25.749	5	87.336	3	17.999	1	.018	2	-.004	12	.558	3
88			min	-28.973	1	-232.202	2	-57.221	5	-.013	3	-.073	1	-.959	2
89		7	max	16.899	5	181.827	3	47.581	1	.018	2	-.003	10	.457	3
90			min	-28.973	1	-427.389	2	-55.591	5	-.013	3	-.076	4	-.712	2
91		8	max	8.049	5	276.317	3	77.162	1	.018	2	.004	2	.286	3
92			min	-28.973	1	-622.576	2	-53.961	5	-.013	3	-.108	4	-.318	2
93		9	max	-.479	15	370.808	3	106.744	1	.018	2	.068	1	.222	2
94			min	-28.973	1	-817.763	2	-52.331	5	-.013	3	-.146	5	.002	15
95		10	max	-1.662	10	465.298	3	136.325	1	.013	3	.236	4	.909	2
96			min	-28.973	1	-1012.95	2	-101.678	14	-.018	2	-.004	3	-.271	3
97		11	max	-1.662	10	817.763	2	-1.688	12	.013	3	.168	4	.222	2
98			min	-28.973	1	-370.808	3	-106.744	1	-.018	2	-.006	3	.002	15
99		12	max	-1.662	10	622.576	2	-.578	3	.013	3	.106	4	.286	3
100			min	-28.973	1	-276.317	3	-78.762	4	-.018	2	-.007	3	-.318	2
101		13	max	-1.662	10	427.389	2	1.029	3	.013	3	.059	5	.457	3
102			min	-28.973	1	-181.827	3	-71.018	4	-.018	2	-.048	1	-.712	2
103		14	max	-1.662	10	232.202	2	2.635	3	.013	3	.014	5	.558	3
104			min	-36.16	4	-87.336	3	-63.275	4	-.018	2	-.073	1	-.959	2
105		15	max	-1.662	10	37.015	2	11.582	1	.013	3	-.002	12	.588	3
106			min	-45.011	4	.286	15	-57.424	5	-.018	2	-.075	1	-1.06	2
107		16	max	-1.662	10	101.645	3	41.164	1	.013	3	0	3	.548	3
108			min	-53.861	4	-158.172	2	-55.794	5	-.018	2	-.084	4	-1.015	2
109		17	max	-1.662	10	196.135	3	70.745	1	.013	3	.006	3	.436	3
110			min	-62.712	4	-353.359	2	-54.164	5	-.018	2	-.117	4	-.823	2
111		18	max	-1.662	10	290.626	3	100.327	1	.013	3	.051	1	.253	3
112			min	-71.562	4	-548.545	2	-52.534	5	-.018	2	-.153	5	-.485	2
113		19	max	-1.662	10	385.116	3	129.908	1	.013	3	.137	1	0	2
114			min	-80.412	4	-743.732	2	-50.904	5	-.018	2	-.192	5	0	5
115	M16	1	max	65.331	5	651.096	2	-6.153	12	.006	1	.162	4	0	2
116			min	-44.57	1	-305.073	3	-124.554	1	-.012	3	.008	10	0	3
117		2	max	56.481	5	455.909	2	-5.082	12	.006	1	.112	4	.193	3
118			min	-44.57	1	-210.582	3	-94.973	1	-.012	3	0	10	-.415	2
119		3	max	47.63	5	260.722	2	-4.011	12	.006	1	.074	5	.316	3
120			min	-44.57	1	-116.091	3	-65.391	1	-.012	3	-.03	1	-.684	2
121		4	max	38.78	5	65.535	2	-2.388	10	.006	1	.044	5	.368	3
122			min	-44.57	1	-21.601	3	-46.647	4	-.012	3	-.068	1	-.806	2
123		5	max	29.93	5	72.89	3	.523	10	.006	1	.016	5	.348	3
124			min	-44.57	1	-129.651	2	-38.903	4	-.012	3	-.083	1	-.782	2
125		6	max	21.079	5	167.38	3	23.353	1	.006	1	-.004	12	.258	3
126			min	-44.57	1	-324.838	2	-35.278	5	-.012	3	-.077	1	-.612	2
127		7	max	12.229	5	261.871	3	52.935	1	.006	1	-.003	10	.097	3
128			min	-44.57	1	-520.025	2	-33.648	5	-.012	3	-.048	1	-.295	2
129		8	max	3.379	5	356.361	3	82.516	1	.006	1	.004	2	.168	2
130			min	-44.57	1	-715.212	2	-32.018	5	-.012	3	-.063	4	-.135	3
131		9	max	-2.954	10	450.852	3	112.098	1	.006	1	.075	1	.778	2
132			min	-44.57	1	-910.399	2	-30.388	5	-.012	3	-.085	5	-.437	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
133		10	max	-2.954	10	545.342	3	141.679	1	.006	1	.171	1	1.534	2
134			min	-44.57	1	-1105.586	2	-93.437	14	-.012	3	0	3	-.811	3
135		11	max	.528	5	910.399	2	-2.415	12	.012	3	.109	4	.778	2
136			min	-44.57	1	-450.852	3	-112.098	1	-.006	1	-.004	3	-.437	3
137		12	max	-2.954	10	715.212	2	-1.344	12	.012	3	.063	4	.168	2
138			min	-44.57	1	-356.361	3	-82.516	1	-.006	1	-.006	3	-.135	3
139		13	max	-2.954	10	520.025	2	-.147	3	.012	3	.032	5	.097	3
140			min	-44.57	1	-261.871	3	-52.935	1	-.006	1	-.048	1	-.295	2
141		14	max	-2.954	10	324.838	2	1.459	3	.012	3	.003	5	.258	3
142			min	-44.57	1	-167.38	3	-42.86	4	-.006	1	-.077	1	-.612	2
143		15	max	-2.954	10	129.651	2	6.228	1	.012	3	-.003	12	.348	3
144			min	-44.904	4	-72.89	3	-36.126	5	-.006	1	-.083	1	-.782	2
145		16	max	-2.954	10	21.601	3	35.81	1	.012	3	0	12	.368	3
146			min	-53.754	4	-65.535	2	-34.496	5	-.006	1	-.068	1	-.806	2
147		17	max	-2.954	10	116.091	3	65.391	1	.012	3	.003	3	.316	3
148			min	-62.604	4	-260.722	2	-32.866	5	-.006	1	-.083	4	-.684	2
149		18	max	-2.954	10	210.582	3	94.973	1	.012	3	.03	1	.193	3
150			min	-71.455	4	-455.909	2	-31.236	5	-.006	1	-.101	5	-.415	2
151		19	max	-2.954	10	305.073	3	124.554	1	.012	3	.113	1	0	2
152			min	-80.305	4	-651.096	2	-29.606	5	-.006	1	-.124	5	0	5
153	M2	1	max	1110.384	2	2.218	4	.465	1	0	5	0	3	0	1
154			min	-1494.321	3	.547	15	-40.515	4	0	1	0	2	0	1
155		2	max	1110.8	2	2.21	4	.465	1	0	5	0	1	0	15
156			min	-1494.009	3	.545	15	-40.875	4	0	1	-.011	4	0	4
157		3	max	1111.216	2	2.201	4	.465	1	0	5	0	1	0	15
158			min	-1493.698	3	.543	15	-41.236	4	0	1	-.023	4	-.001	4
159		4	max	1111.632	2	2.192	4	.465	1	0	5	0	1	0	15
160			min	-1493.386	3	.541	15	-41.596	4	0	1	-.035	4	-.002	4
161		5	max	1112.047	2	2.184	4	.465	1	0	5	0	1	0	15
162			min	-1493.074	3	.539	15	-41.957	4	0	1	-.046	4	-.002	4
163		6	max	1112.463	2	2.175	4	.465	1	0	5	0	1	0	15
164			min	-1492.762	3	.537	15	-42.317	4	0	1	-.058	4	-.003	4
165		7	max	1112.879	2	2.166	4	.465	1	0	5	0	1	0	15
166			min	-1492.45	3	.535	15	-42.678	4	0	1	-.07	4	-.004	4
167		8	max	1113.295	2	2.157	4	.465	1	0	5	0	1	-.001	15
168			min	-1492.138	3	.533	15	-43.038	4	0	1	-.082	4	-.004	4
169		9	max	1113.711	2	2.149	4	.465	1	0	5	.001	1	-.001	15
170			min	-1491.826	3	.531	15	-43.399	4	0	1	-.094	4	-.005	4
171		10	max	1114.127	2	2.14	4	.465	1	0	5	.001	1	-.001	15
172			min	-1491.514	3	.529	15	-43.759	4	0	1	-.106	4	-.005	4
173		11	max	1114.543	2	2.131	4	.465	1	0	5	.001	1	-.002	15
174			min	-1491.202	3	.526	15	-44.12	4	0	1	-.119	4	-.006	4
175		12	max	1114.959	2	2.123	4	.465	1	0	5	.001	1	-.002	15
176			min	-1490.89	3	.524	15	-44.48	4	0	1	-.131	4	-.007	4
177		13	max	1115.374	2	2.114	4	.465	1	0	5	.002	1	-.002	15
178			min	-1490.578	3	.522	15	-44.841	4	0	1	-.144	4	-.007	4
179		14	max	1115.79	2	2.105	4	.465	1	0	5	.002	1	-.002	15
180			min	-1490.267	3	.52	15	-45.201	4	0	1	-.156	4	-.008	4
181		15	max	1116.206	2	2.096	4	.465	1	0	5	.002	1	-.002	15
182			min	-1489.955	3	.518	15	-45.562	4	0	1	-.169	4	-.008	4
183		16	max	1116.622	2	2.088	4	.465	1	0	5	.002	1	-.002	15
184			min	-1489.643	3	.516	15	-45.922	4	0	1	-.182	4	-.009	4
185		17	max	1117.038	2	2.079	4	.465	1	0	5	.002	1	-.002	15
186			min	-1489.331	3	.514	15	-46.283	4	0	1	-.195	4	-.01	4
187		18	max	1117.454	2	2.07	4	.465	1	0	5	.002	1	-.003	15
188			min	-1489.019	3	.512	15	-46.643	4	0	1	-.208	4	-.01	4
189		19	max	1117.87	2	2.062	4	.465	1	0	5	.002	1	-.003	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
190			min	-1488.707	3	.51	15	-47.004	4	0	1	-.221	4	-.011	4
191	M3	1	max	635.595	2	9.137	4	.119	1	0	3	0	1	.011	4
192			min	-772.137	3	2.163	15	-2.831	5	0	4	-.004	4	.003	15
193		2	max	635.424	2	8.263	4	.119	1	0	3	0	1	.007	4
194			min	-772.265	3	1.957	15	-2.222	5	0	4	-.005	4	.001	12
195		3	max	635.254	2	7.388	4	.119	1	0	3	0	1	.004	2
196			min	-772.393	3	1.752	15	-1.614	5	0	4	-.006	5	0	3
197		4	max	635.084	2	6.514	4	.119	1	0	3	0	1	0	2
198			min	-772.521	3	1.546	15	-1.005	5	0	4	-.006	5	-.002	3
199		5	max	634.913	2	5.64	4	.119	1	0	3	0	1	0	15
200			min	-772.648	3	1.341	15	-.396	5	0	4	-.007	5	-.004	3
201		6	max	634.743	2	4.765	4	.263	4	0	3	0	1	-.001	15
202			min	-772.776	3	1.135	15	.008	10	0	4	-.007	5	-.006	6
203		7	max	634.573	2	3.891	4	.872	4	0	3	0	1	-.002	15
204			min	-772.904	3	.93	15	.008	10	0	4	-.007	5	-.008	6
205		8	max	634.402	2	3.016	4	1.48	4	0	3	0	1	-.002	15
206			min	-773.032	3	.724	15	.008	10	0	4	-.006	5	-.009	6
207		9	max	634.232	2	2.142	4	2.089	4	0	3	0	1	-.002	15
208			min	-773.159	3	.519	15	.008	10	0	4	-.005	5	-.011	6
209		10	max	634.062	2	1.267	4	2.698	4	0	3	0	1	-.003	15
210			min	-773.287	3	.313	15	.008	10	0	4	-.004	5	-.011	6
211		11	max	633.891	2	.463	2	3.306	4	0	3	0	1	-.003	15
212			min	-773.415	3	-.046	3	.008	10	0	4	-.003	5	-.012	6
213		12	max	633.721	2	-.098	15	3.915	4	0	3	0	1	-.003	15
214			min	-773.543	3	-.557	3	.008	10	0	4	0	5	-.012	6
215		13	max	633.551	2	-.304	15	4.524	4	0	3	.001	4	-.003	15
216			min	-773.671	3	-1.357	6	.008	10	0	4	0	10	-.011	6
217		14	max	633.38	2	-.509	15	5.133	4	0	3	.004	4	-.002	15
218			min	-773.798	3	-2.232	6	.008	10	0	4	0	10	-.01	6
219		15	max	633.21	2	-.715	15	5.741	4	0	3	.006	4	-.002	15
220			min	-773.926	3	-3.106	6	.008	10	0	4	0	10	-.009	6
221		16	max	633.039	2	-.92	15	6.35	4	0	3	.009	4	-.002	15
222			min	-774.054	3	-3.981	6	.008	10	0	4	0	10	-.008	6
223		17	max	632.869	2	-1.126	15	6.959	4	0	3	.012	4	-.001	15
224			min	-774.182	3	-4.855	6	.008	10	0	4	0	10	-.005	6
225		18	max	632.699	2	-1.331	15	7.567	4	0	3	.016	4	0	15
226			min	-774.309	3	-5.73	6	.008	10	0	4	0	10	-.003	6
227		19	max	632.528	2	-1.537	15	8.176	4	0	3	.019	4	0	1
228			min	-774.437	3	-6.604	6	.008	10	0	4	0	10	0	1
229	M4	1	max	1093.47	1	0	1	-.448	10	0	1	.011	4	0	1
230			min	-296.784	3	0	1	-213.823	4	0	1	0	10	0	1
231		2	max	1093.641	1	0	1	-.448	10	0	1	0	12	0	1
232			min	-296.657	3	0	1	-213.971	4	0	1	-.013	4	0	1
233		3	max	1093.811	1	0	1	-.448	10	0	1	0	12	0	1
234			min	-296.529	3	0	1	-214.118	4	0	1	-.038	4	0	1
235		4	max	1093.982	1	0	1	-.448	10	0	1	0	10	0	1
236			min	-296.401	3	0	1	-214.266	4	0	1	-.062	4	0	1
237		5	max	1094.152	1	0	1	-.448	10	0	1	0	10	0	1
238			min	-296.273	3	0	1	-214.414	4	0	1	-.087	4	0	1
239		6	max	1094.322	1	0	1	-.448	10	0	1	0	10	0	1
240			min	-296.146	3	0	1	-214.561	4	0	1	-.111	4	0	1
241		7	max	1094.493	1	0	1	-.448	10	0	1	0	10	0	1
242			min	-296.018	3	0	1	-214.709	4	0	1	-.136	4	0	1
243		8	max	1094.663	1	0	1	-.448	10	0	1	0	10	0	1
244			min	-295.89	3	0	1	-214.857	4	0	1	-.161	4	0	1
245		9	max	1094.833	1	0	1	-.448	10	0	1	0	10	0	1
246			min	-295.762	3	0	1	-215.004	4	0	1	-.185	4	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
247		10	max	1095.004	1	0	1	-.448	10	0	1	0	10	0	1
248			min	-295.634	3	0	1	-215.152	4	0	1	-.21	4	0	1
249		11	max	1095.174	1	0	1	-.448	10	0	1	0	10	0	1
250			min	-295.507	3	0	1	-215.3	4	0	1	-.235	4	0	1
251		12	max	1095.344	1	0	1	-.448	10	0	1	0	10	0	1
252			min	-295.379	3	0	1	-215.447	4	0	1	-.26	4	0	1
253		13	max	1095.515	1	0	1	-.448	10	0	1	0	10	0	1
254			min	-295.251	3	0	1	-215.595	4	0	1	-.284	4	0	1
255		14	max	1095.685	1	0	1	-.448	10	0	1	0	10	0	1
256			min	-295.123	3	0	1	-215.742	4	0	1	-.309	4	0	1
257		15	max	1095.855	1	0	1	-.448	10	0	1	0	10	0	1
258			min	-294.996	3	0	1	-215.89	4	0	1	-.334	4	0	1
259		16	max	1096.026	1	0	1	-.448	10	0	1	0	10	0	1
260			min	-294.868	3	0	1	-216.038	4	0	1	-.359	4	0	1
261		17	max	1096.196	1	0	1	-.448	10	0	1	0	10	0	1
262			min	-294.74	3	0	1	-216.185	4	0	1	-.384	4	0	1
263		18	max	1096.366	1	0	1	-.448	10	0	1	0	10	0	1
264			min	-294.612	3	0	1	-216.333	4	0	1	-.408	4	0	1
265		19	max	1096.537	1	0	1	-.448	10	0	1	0	10	0	1
266			min	-294.485	3	0	1	-216.481	4	0	1	-.433	4	0	1
267	M6	1	max	3276.858	2	2.664	2	0	1	0	4	0	4	0	1
268			min	-4557.521	3	-.004	3	-40.917	4	0	1	0	1	0	1
269		2	max	3277.274	2	2.658	2	0	1	0	4	0	1	0	3
270			min	-4557.209	3	-.009	3	-41.278	4	0	1	-.012	4	0	2
271		3	max	3277.69	2	2.651	2	0	1	0	4	0	1	0	3
272			min	-4556.897	3	-.015	3	-41.638	4	0	1	-.023	4	-.001	2
273		4	max	3278.105	2	2.644	2	0	1	0	4	0	1	0	3
274			min	-4556.585	3	-.02	3	-41.999	4	0	1	-.035	4	-.002	2
275		5	max	3278.521	2	2.637	2	0	1	0	4	0	1	0	3
276			min	-4556.273	3	-.025	3	-42.359	4	0	1	-.047	4	-.003	2
277		6	max	3278.937	2	2.63	2	0	1	0	4	0	1	0	3
278			min	-4555.962	3	-.03	3	-42.72	4	0	1	-.059	4	-.004	2
279		7	max	3279.353	2	2.624	2	0	1	0	4	0	1	0	3
280			min	-4555.65	3	-.035	3	-43.08	4	0	1	-.071	4	-.004	2
281		8	max	3279.769	2	2.617	2	0	1	0	4	0	1	0	3
282			min	-4555.338	3	-.04	3	-43.44	4	0	1	-.083	4	-.005	2
283		9	max	3280.185	2	2.61	2	0	1	0	4	0	1	0	3
284			min	-4555.026	3	-.045	3	-43.801	4	0	1	-.095	4	-.006	2
285		10	max	3280.601	2	2.603	2	0	1	0	4	0	1	0	3
286			min	-4554.714	3	-.05	3	-44.161	4	0	1	-.107	4	-.007	2
287		11	max	3281.017	2	2.597	2	0	1	0	4	0	1	0	3
288			min	-4554.402	3	-.055	3	-44.522	4	0	1	-.12	4	-.007	2
289		12	max	3281.432	2	2.59	2	0	1	0	4	0	1	0	3
290			min	-4554.09	3	-.06	3	-44.882	4	0	1	-.132	4	-.008	2
291		13	max	3281.848	2	2.583	2	0	1	0	4	0	1	0	3
292			min	-4553.778	3	-.065	3	-45.243	4	0	1	-.145	4	-.009	2
293		14	max	3282.264	2	2.576	2	0	1	0	4	0	1	0	3
294			min	-4553.466	3	-.071	3	-45.603	4	0	1	-.158	4	-.01	2
295		15	max	3282.68	2	2.569	2	0	1	0	4	0	1	0	3
296			min	-4553.154	3	-.076	3	-45.964	4	0	1	-.171	4	-.01	2
297		16	max	3283.096	2	2.563	2	0	1	0	4	0	1	0	3
298			min	-4552.842	3	-.081	3	-46.324	4	0	1	-.183	4	-.011	2
299		17	max	3283.512	2	2.556	2	0	1	0	4	0	1	0	3
300			min	-4552.531	3	-.086	3	-46.685	4	0	1	-.196	4	-.012	2
301		18	max	3283.928	2	2.549	2	0	1	0	4	0	1	0	3
302			min	-4552.219	3	-.091	3	-47.045	4	0	1	-.21	4	-.012	2
303		19	max	3284.344	2	2.542	2	0	1	0	4	0	1	0	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
304			min	-4551.907	3	-.096	3	-47.406	4	0	1	-.223	4	-.013	2
305	M7	1	max	2028.96	2	9.129	6	0	1	0	1	0	1	.013	2
306			min	-2238.347	3	2.143	15	-3.014	5	0	4	-.004	4	0	3
307		2	max	2028.79	2	8.254	6	0	1	0	1	0	1	.01	2
308			min	-2238.475	3	1.938	15	-2.405	5	0	4	-.005	4	-.002	3
309		3	max	2028.62	2	7.38	6	0	1	0	1	0	1	.007	2
310			min	-2238.602	3	1.732	15	-1.796	5	0	4	-.006	4	-.004	3
311		4	max	2028.449	2	6.505	6	0	1	0	1	0	1	.004	2
312			min	-2238.73	3	1.526	15	-1.187	5	0	4	-.007	4	-.006	3
313		5	max	2028.279	2	5.631	6	0	1	0	1	0	1	.001	2
314			min	-2238.858	3	1.321	15	-.579	5	0	4	-.007	4	-.007	3
315		6	max	2028.109	2	4.757	6	.051	4	0	1	0	1	0	2
316			min	-2238.986	3	1.115	15	0	1	0	4	-.007	4	-.008	3
317		7	max	2027.938	2	3.882	6	.66	4	0	1	0	1	-.002	15
318			min	-2239.113	3	.91	15	0	1	0	4	-.007	5	-.009	3
319		8	max	2027.768	2	3.008	6	1.268	4	0	1	0	1	-.002	15
320			min	-2239.241	3	.704	15	0	1	0	4	-.007	5	-.009	3
321		9	max	2027.598	2	2.223	2	1.877	4	0	1	0	1	-.003	15
322			min	-2239.369	3	.371	12	0	1	0	4	-.006	5	-.011	4
323		10	max	2027.427	2	1.542	2	2.486	4	0	1	0	1	-.003	15
324			min	-2239.497	3	-.03	3	0	1	0	4	-.005	5	-.011	4
325		11	max	2027.257	2	.86	2	3.094	4	0	1	0	1	-.003	15
326			min	-2239.624	3	-.541	3	0	1	0	4	-.004	5	-.012	4
327		12	max	2027.087	2	.179	2	3.703	4	0	1	0	1	-.003	15
328			min	-2239.752	3	-1.052	3	0	1	0	4	-.002	5	-.012	4
329		13	max	2026.916	2	-.323	15	4.312	4	0	1	0	14	-.003	15
330			min	-2239.88	3	-1.563	3	0	1	0	4	0	5	-.011	4
331		14	max	2026.746	2	-.529	15	4.921	4	0	1	.002	4	-.002	15
332			min	-2240.008	3	-2.239	4	0	1	0	4	0	1	-.01	4
333		15	max	2026.576	2	-.735	15	5.529	4	0	1	.005	4	-.002	15
334			min	-2240.135	3	-3.113	4	0	1	0	4	0	1	-.009	4
335		16	max	2026.405	2	-.94	15	6.138	4	0	1	.007	4	-.002	15
336			min	-2240.263	3	-3.988	4	0	1	0	4	0	1	-.008	4
337		17	max	2026.235	2	-1.146	15	6.747	4	0	1	.01	4	-.001	15
338			min	-2240.391	3	-4.862	4	0	1	0	4	0	1	-.005	4
339		18	max	2026.065	2	-1.351	15	7.355	4	0	1	.014	4	0	15
340			min	-2240.519	3	-5.737	4	0	1	0	4	0	1	-.003	4
341		19	max	2025.894	2	-1.557	15	7.964	4	0	1	.017	4	0	1
342			min	-2240.647	3	-6.611	4	0	1	0	4	0	1	0	1
343	M8	1	max	3142.983	2	0	1	0	1	0	1	.01	4	0	1
344			min	-962.316	3	0	1	-206.875	4	0	1	0	1	0	1
345		2	max	3143.153	2	0	1	0	1	0	1	0	1	0	1
346			min	-962.188	3	0	1	-207.023	4	0	1	-.013	4	0	1
347		3	max	3143.323	2	0	1	0	1	0	1	0	1	0	1
348			min	-962.06	3	0	1	-207.171	4	0	1	-.037	4	0	1
349		4	max	3143.494	2	0	1	0	1	0	1	0	1	0	1
350			min	-961.932	3	0	1	-207.318	4	0	1	-.061	4	0	1
351		5	max	3143.664	2	0	1	0	1	0	1	0	1	0	1
352			min	-961.805	3	0	1	-207.466	4	0	1	-.085	4	0	1
353		6	max	3143.834	2	0	1	0	1	0	1	0	1	0	1
354			min	-961.677	3	0	1	-207.613	4	0	1	-.109	4	0	1
355		7	max	3144.005	2	0	1	0	1	0	1	0	1	0	1
356			min	-961.549	3	0	1	-207.761	4	0	1	-.132	4	0	1
357		8	max	3144.175	2	0	1	0	1	0	1	0	1	0	1
358			min	-961.421	3	0	1	-207.909	4	0	1	-.156	4	0	1
359		9	max	3144.346	2	0	1	0	1	0	1	0	1	0	1
360			min	-961.293	3	0	1	-208.056	4	0	1	-.18	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	3144.516	2	0	1	0	1	0	1	0	1	0	1
362			min	-961.166	3	0	1	-208.204	4	0	1	-.204	4	0	1
363		11	max	3144.686	2	0	1	0	1	0	1	0	1	0	1
364			min	-961.038	3	0	1	-208.352	4	0	1	-.228	4	0	1
365		12	max	3144.857	2	0	1	0	1	0	1	0	1	0	1
366			min	-960.91	3	0	1	-208.499	4	0	1	-.252	4	0	1
367		13	max	3145.027	2	0	1	0	1	0	1	0	1	0	1
368			min	-960.782	3	0	1	-208.647	4	0	1	-.276	4	0	1
369		14	max	3145.197	2	0	1	0	1	0	1	0	1	0	1
370			min	-960.655	3	0	1	-208.795	4	0	1	-.3	4	0	1
371		15	max	3145.368	2	0	1	0	1	0	1	0	1	0	1
372			min	-960.527	3	0	1	-208.942	4	0	1	-.324	4	0	1
373		16	max	3145.538	2	0	1	0	1	0	1	0	1	0	1
374			min	-960.399	3	0	1	-209.09	4	0	1	-.348	4	0	1
375		17	max	3145.708	2	0	1	0	1	0	1	0	1	0	1
376			min	-960.271	3	0	1	-209.237	4	0	1	-.372	4	0	1
377		18	max	3145.879	2	0	1	0	1	0	1	0	1	0	1
378			min	-960.144	3	0	1	-209.385	4	0	1	-.396	4	0	1
379		19	max	3146.049	2	0	1	0	1	0	1	0	1	0	1
380			min	-960.016	3	0	1	-209.533	4	0	1	-.42	4	0	1
381	M10	1	max	1110.384	2	2.101	6	-.027	10	0	1	0	4	0	1
382			min	-1494.321	3	.468	15	-40.767	4	0	3	0	3	0	1
383		2	max	1110.8	2	2.092	6	-.027	10	0	1	0	10	0	15
384			min	-1494.009	3	.466	15	-41.128	4	0	3	-.011	4	0	6
385		3	max	1111.216	2	2.084	6	-.027	10	0	1	0	10	0	15
386			min	-1493.698	3	.464	15	-41.488	4	0	3	-.023	4	-.001	6
387		4	max	1111.632	2	2.075	6	-.027	10	0	1	0	10	0	15
388			min	-1493.386	3	.462	15	-41.849	4	0	3	-.035	4	-.002	6
389		5	max	1112.047	2	2.066	6	-.027	10	0	1	0	10	0	15
390			min	-1493.074	3	.459	15	-42.209	4	0	3	-.047	4	-.002	6
391		6	max	1112.463	2	2.057	6	-.027	10	0	1	0	10	0	15
392			min	-1492.762	3	.457	15	-42.57	4	0	3	-.058	4	-.003	6
393		7	max	1112.879	2	2.049	6	-.027	10	0	1	0	10	0	15
394			min	-1492.45	3	.455	15	-42.93	4	0	3	-.07	4	-.003	6
395		8	max	1113.295	2	2.04	6	-.027	10	0	1	0	10	0	15
396			min	-1492.138	3	.453	15	-43.291	4	0	3	-.082	4	-.004	6
397		9	max	1113.711	2	2.031	6	-.027	10	0	1	0	10	-.001	15
398			min	-1491.826	3	.451	15	-43.651	4	0	3	-.095	4	-.005	6
399		10	max	1114.127	2	2.022	6	-.027	10	0	1	0	10	-.001	15
400			min	-1491.514	3	.449	15	-44.012	4	0	3	-.107	4	-.005	6
401		11	max	1114.543	2	2.014	6	-.027	10	0	1	0	10	-.001	15
402			min	-1491.202	3	.447	15	-44.372	4	0	3	-.119	4	-.006	6
403		12	max	1114.959	2	2.005	6	-.027	10	0	1	0	10	-.001	15
404			min	-1490.89	3	.445	15	-44.733	4	0	3	-.132	4	-.006	6
405		13	max	1115.374	2	1.996	6	-.027	10	0	1	0	10	-.002	15
406			min	-1490.578	3	.443	15	-45.093	4	0	3	-.144	4	-.007	6
407		14	max	1115.79	2	1.988	6	-.027	10	0	1	0	10	-.002	15
408			min	-1490.267	3	.441	15	-45.454	4	0	3	-.157	4	-.007	6
409		15	max	1116.206	2	1.979	6	-.027	10	0	1	0	10	-.002	15
410			min	-1489.955	3	.439	15	-45.814	4	0	3	-.17	4	-.008	6
411		16	max	1116.622	2	1.97	6	-.027	10	0	1	0	10	-.002	15
412			min	-1489.643	3	.437	15	-46.175	4	0	3	-.183	4	-.009	6
413		17	max	1117.038	2	1.961	6	-.027	10	0	1	0	10	-.002	15
414			min	-1489.331	3	.435	15	-46.535	4	0	3	-.196	4	-.009	6
415		18	max	1117.454	2	1.953	6	-.027	10	0	1	0	10	-.002	15
416			min	-1489.019	3	.433	15	-46.896	4	0	3	-.209	4	-.01	6
417		19	max	1117.87	2	1.944	6	-.027	10	0	1	0	10	-.002	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
418			min	-1488.707	3	.431	15	-47.256	4	0	3	-.222	4	-.01	6
419	M11	1	max	635.595	2	9.068	6	-.008	10	0	1	0	10	.01	6
420			min	-772.137	3	2.116	15	-2.844	4	0	4	-.004	4	.002	15
421		2	max	635.424	2	8.193	6	-.008	10	0	1	0	10	.006	2
422			min	-772.265	3	1.91	15	-2.235	4	0	4	-.005	4	.001	12
423		3	max	635.254	2	7.319	6	-.008	10	0	1	0	10	.004	2
424			min	-772.393	3	1.705	15	-1.627	4	0	4	-.006	4	0	3
425		4	max	635.084	2	6.444	6	-.008	10	0	1	0	10	0	2
426			min	-772.521	3	1.499	15	-1.018	4	0	4	-.006	4	-.002	3
427		5	max	634.913	2	5.57	6	-.008	10	0	1	0	10	0	15
428			min	-772.648	3	1.294	15	-.409	4	0	4	-.007	4	-.004	3
429		6	max	634.743	2	4.695	6	.2	5	0	1	0	10	-.002	15
430			min	-772.776	3	1.088	15	-.119	1	0	4	-.007	4	-.006	4
431		7	max	634.573	2	3.821	6	.808	5	0	1	0	10	-.002	15
432			min	-772.904	3	.883	15	-.119	1	0	4	-.007	4	-.008	4
433		8	max	634.402	2	2.947	6	1.417	5	0	1	0	10	-.002	15
434			min	-773.032	3	.677	15	-.119	1	0	4	-.006	4	-.01	4
435		9	max	634.232	2	2.072	6	2.026	5	0	1	0	10	-.003	15
436			min	-773.159	3	.472	15	-.119	1	0	4	-.005	4	-.011	4
437		10	max	634.062	2	1.198	6	2.634	5	0	1	0	10	-.003	15
438			min	-773.287	3	.266	15	-.119	1	0	4	-.004	4	-.012	4
439		11	max	633.891	2	.463	2	3.243	5	0	1	0	10	-.003	15
440			min	-773.415	3	-.046	3	-.119	1	0	4	-.003	4	-.012	4
441		12	max	633.721	2	-.145	15	3.852	5	0	1	0	10	-.003	15
442			min	-773.543	3	-.557	3	-.119	1	0	4	-.001	4	-.012	4
443		13	max	633.551	2	-.351	15	4.461	5	0	1	0	5	-.003	15
444			min	-773.671	3	-1.427	4	-.119	1	0	4	0	1	-.012	4
445		14	max	633.38	2	-.556	15	5.069	5	0	1	.003	5	-.003	15
446			min	-773.798	3	-2.301	4	-.119	1	0	4	0	1	-.011	4
447		15	max	633.21	2	-.762	15	5.678	5	0	1	.006	5	-.002	15
448			min	-773.926	3	-3.176	4	-.119	1	0	4	0	1	-.009	4
449		16	max	633.039	2	-.967	15	6.287	5	0	1	.009	5	-.002	15
450			min	-774.054	3	-4.05	4	-.119	1	0	4	0	1	-.008	4
451		17	max	632.869	2	-1.173	15	6.895	5	0	1	.012	5	-.001	15
452			min	-774.182	3	-4.925	4	-.119	1	0	4	0	1	-.005	4
453		18	max	632.699	2	-1.378	15	7.504	5	0	1	.015	5	0	15
454			min	-774.309	3	-5.799	4	-.119	1	0	4	0	1	-.003	4
455		19	max	632.528	2	-1.584	15	8.113	5	0	1	.019	5	0	1
456			min	-774.437	3	-6.674	4	-.119	1	0	4	-.001	1	0	1
457	M12	1	max	1093.47	1	0	1	6.662	1	0	1	.011	5	0	1
458			min	-296.784	3	0	1	-210.209	4	0	1	0	1	0	1
459		2	max	1093.641	1	0	1	6.662	1	0	1	0	1	0	1
460			min	-296.657	3	0	1	-210.357	4	0	1	-.013	4	0	1
461		3	max	1093.811	1	0	1	6.662	1	0	1	0	1	0	1
462			min	-296.529	3	0	1	-210.504	4	0	1	-.037	4	0	1
463		4	max	1093.982	1	0	1	6.662	1	0	1	.002	1	0	1
464			min	-296.401	3	0	1	-210.652	4	0	1	-.061	4	0	1
465		5	max	1094.152	1	0	1	6.662	1	0	1	.002	1	0	1
466			min	-296.273	3	0	1	-210.8	4	0	1	-.086	4	0	1
467		6	max	1094.322	1	0	1	6.662	1	0	1	.003	1	0	1
468			min	-296.146	3	0	1	-210.947	4	0	1	-.11	4	0	1
469		7	max	1094.493	1	0	1	6.662	1	0	1	.004	1	0	1
470			min	-296.018	3	0	1	-211.095	4	0	1	-.134	4	0	1
471		8	max	1094.663	1	0	1	6.662	1	0	1	.005	1	0	1
472			min	-295.89	3	0	1	-211.243	4	0	1	-.158	4	0	1
473		9	max	1094.833	1	0	1	6.662	1	0	1	.006	1	0	1
474			min	-295.762	3	0	1	-211.39	4	0	1	-.182	4	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
475		10	max	1095.004	1	0	1	6.662	1	0	1	.006	1	0	1
476			min	-295.634	3	0	1	-211.538	4	0	1	-.207	4	0	1
477		11	max	1095.174	1	0	1	6.662	1	0	1	.007	1	0	1
478			min	-295.507	3	0	1	-211.685	4	0	1	-.231	4	0	1
479		12	max	1095.344	1	0	1	6.662	1	0	1	.008	1	0	1
480			min	-295.379	3	0	1	-211.833	4	0	1	-.255	4	0	1
481		13	max	1095.515	1	0	1	6.662	1	0	1	.009	1	0	1
482			min	-295.251	3	0	1	-211.981	4	0	1	-.28	4	0	1
483		14	max	1095.685	1	0	1	6.662	1	0	1	.009	1	0	1
484			min	-295.123	3	0	1	-212.128	4	0	1	-.304	4	0	1
485		15	max	1095.855	1	0	1	6.662	1	0	1	.01	1	0	1
486			min	-294.996	3	0	1	-212.276	4	0	1	-.328	4	0	1
487		16	max	1096.026	1	0	1	6.662	1	0	1	.011	1	0	1
488			min	-294.868	3	0	1	-212.424	4	0	1	-.353	4	0	1
489		17	max	1096.196	1	0	1	6.662	1	0	1	.012	1	0	1
490			min	-294.74	3	0	1	-212.571	4	0	1	-.377	4	0	1
491		18	max	1096.366	1	0	1	6.662	1	0	1	.012	1	0	1
492			min	-294.612	3	0	1	-212.719	4	0	1	-.402	4	0	1
493		19	max	1096.537	1	0	1	6.662	1	0	1	.013	1	0	1
494			min	-294.485	3	0	1	-212.867	4	0	1	-.426	4	0	1
495	M1	1	max	123.917	1	795.019	3	42.576	5	0	1	.11	1	0	15
496			min	-17.008	5	-443.941	2	-39.727	1	0	3	-.079	5	-.012	2
497		2	max	124.494	1	793.832	3	44.036	5	0	1	.086	1	.264	2
498			min	-16.739	5	-445.524	2	-39.727	1	0	3	-.052	5	-.502	3
499		3	max	499.961	3	596.899	2	5.805	5	0	3	.061	1	.529	2
500			min	-313.127	2	-625.217	3	-39.369	1	0	2	-.025	5	-.979	3
501		4	max	500.393	3	595.316	2	7.265	5	0	3	.037	1	.176	1
502			min	-312.55	2	-626.405	3	-39.369	1	0	2	-.021	5	-.59	3
503		5	max	500.825	3	593.733	2	8.726	5	0	3	.012	1	-.006	15
504			min	-311.974	2	-627.592	3	-39.369	1	0	2	-.016	5	-.21	2
505		6	max	501.257	3	592.15	2	10.186	5	0	3	0	10	.189	3
506			min	-311.398	2	-628.78	3	-39.369	1	0	2	-.012	4	-.578	2
507		7	max	501.69	3	590.567	2	11.646	5	0	3	-.002	15	.579	3
508			min	-310.822	2	-629.967	3	-39.369	1	0	2	-.037	1	-.945	2
509		8	max	502.122	3	588.983	2	13.106	5	0	3	.004	5	.971	3
510			min	-310.246	2	-631.154	3	-39.369	1	0	2	-.061	1	-1.311	2
511		9	max	513.552	3	49.622	2	42.846	5	0	9	.041	1	1.129	3
512			min	-260.798	2	.474	15	-67.226	1	0	3	-.105	5	-1.493	2
513		10	max	513.984	3	48.039	2	44.306	5	0	9	0	10	1.106	3
514			min	-260.222	2	-.009	5	-67.226	1	0	3	-.079	4	-1.523	2
515		11	max	514.417	3	46.456	2	45.766	5	0	9	-.003	10	1.084	3
516			min	-259.646	2	-2.016	4	-67.226	1	0	3	-.059	4	-1.552	2
517		12	max	525.517	3	425.338	3	120.676	5	0	2	.06	1	.953	3
518			min	-210.043	2	-695.402	2	-38.258	1	0	3	-.195	5	-1.379	2
519		13	max	525.949	3	424.15	3	122.136	5	0	2	.036	1	.689	3
520			min	-209.467	2	-696.986	2	-38.258	1	0	3	-.12	5	-.947	2
521		14	max	526.381	3	422.963	3	123.596	5	0	2	.013	1	.427	3
522			min	-208.89	2	-698.569	2	-38.258	1	0	3	-.043	5	-.514	2
523		15	max	526.813	3	421.775	3	125.056	5	0	2	.034	5	.164	3
524			min	-208.314	2	-700.152	2	-38.258	1	0	3	-.011	1	-.103	1
525		16	max	527.245	3	420.588	3	126.516	5	0	2	.112	5	.355	2
526			min	-207.738	2	-701.735	2	-38.258	1	0	3	-.035	1	-.097	3
527		17	max	527.677	3	419.401	3	127.977	5	0	2	.191	5	.791	2
528			min	-207.162	2	-703.318	2	-38.258	1	0	3	-.059	1	-.358	3
529		18	max	29.336	5	653.374	2	-2.954	10	0	5	.168	5	.4	2
530			min	-125.127	1	-303.996	3	-81.755	4	0	2	-.085	1	-.177	3
531		19	max	29.605	5	651.791	2	-2.954	10	0	5	.124	5	.012	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
532			min	-124.551	1	-305.184	3	-80.295	4	0	2	-.113	1	-.006	1
533	M5	1	max	284.632	1	2603.005	3	69.663	5	0	1	0	1	.025	2
534			min	5.724	12	-1552.717	2	0	1	0	4	-.154	4	0	15
535		2	max	285.208	1	2601.817	3	71.123	5	0	1	0	1	.989	2
536			min	6.012	12	-1554.301	2	0	1	0	4	-.111	4	-1.597	3
537		3	max	1494.566	3	1506.755	2	34.927	4	0	4	0	1	1.921	2
538			min	-951.778	2	-1743.474	3	0	1	0	1	-.067	4	-3.164	3
539		4	max	1494.999	3	1505.172	2	36.387	4	0	4	0	1	.988	1
540			min	-951.202	2	-1744.661	3	0	1	0	1	-.045	4	-2.082	3
541		5	max	1495.431	3	1503.589	2	37.847	4	0	4	0	1	.107	1
542			min	-950.626	2	-1745.849	3	0	1	0	1	-.022	4	-.999	3
543		6	max	1495.863	3	1502.005	2	39.307	4	0	4	.002	4	.085	3
544			min	-950.049	2	-1747.036	3	0	1	0	1	0	1	-.88	2
545		7	max	1496.295	3	1500.422	2	40.767	4	0	4	.027	4	1.17	3
546			min	-949.473	2	-1748.223	3	0	1	0	1	0	1	-1.812	2
547		8	max	1496.727	3	1498.839	2	42.227	4	0	4	.052	4	2.255	3
548			min	-948.897	2	-1749.411	3	0	1	0	1	0	1	-2.743	2
549		9	max	1504.078	3	170.059	2	143.751	4	0	1	0	1	2.603	3
550			min	-836.443	2	.476	15	0	1	0	1	-.156	4	-3.145	2
551		10	max	1504.51	3	168.476	2	145.212	4	0	1	0	1	2.51	3
552			min	-835.867	2	-.002	15	0	1	0	1	-.066	5	-3.25	2
553		11	max	1504.942	3	166.893	2	146.672	4	0	1	.025	4	2.417	3
554			min	-835.29	2	-1.885	6	0	1	0	1	0	1	-3.354	2
555		12	max	1512.954	3	1118.111	3	163.112	4	0	1	0	1	2.108	3
556			min	-723.148	2	-1835.983	2	0	1	0	4	-.271	4	-2.995	2
557		13	max	1513.386	3	1116.924	3	164.572	4	0	1	0	1	1.415	3
558			min	-722.572	2	-1837.566	2	0	1	0	4	-.169	4	-1.855	2
559		14	max	1513.818	3	1115.737	3	166.032	4	0	1	0	1	.722	3
560			min	-721.996	2	-1839.149	2	0	1	0	4	-.067	4	-.714	2
561		15	max	1514.25	3	1114.549	3	167.492	4	0	1	.037	4	.428	2
562			min	-721.419	2	-1840.732	2	0	1	0	4	0	1	0	15
563		16	max	1514.682	3	1113.362	3	168.953	4	0	1	.141	4	1.571	2
564			min	-720.843	2	-1842.315	2	0	1	0	4	0	1	-.661	3
565		17	max	1515.115	3	1112.174	3	170.413	4	0	1	.247	4	2.715	2
566			min	-720.267	2	-1843.898	2	0	1	0	4	0	1	-1.352	3
567		18	max	-7.259	12	2215.07	2	0	1	0	4	.251	4	1.384	2
568			min	-283.94	1	-1089.723	3	-25.201	5	0	1	0	1	-.7	3
569		19	max	-6.971	12	2213.487	2	0	1	0	4	.237	4	.012	1
570			min	-283.364	1	-1090.911	3	-23.74	5	0	1	0	1	-.024	3
571	M9	1	max	123.917	1	795.019	3	55.977	4	0	3	-.006	10	0	15
572			min	6.776	12	-443.941	2	2.307	10	0	4	-.117	4	-.012	2
573		2	max	124.494	1	793.832	3	57.438	4	0	3	-.005	10	.264	2
574			min	7.064	12	-445.524	2	2.307	10	0	4	-.086	1	-.502	3
575		3	max	499.961	3	596.899	2	39.369	1	0	2	-.003	10	.529	2
576			min	-313.127	2	-625.217	3	2.281	10	0	3	-.061	1	-.979	3
577		4	max	500.393	3	595.316	2	39.369	1	0	2	-.002	10	.176	1
578			min	-312.55	2	-626.405	3	2.281	10	0	3	-.037	1	-.59	3
579		5	max	500.825	3	593.733	2	39.369	1	0	2	0	10	-.006	15
580			min	-311.974	2	-627.592	3	2.281	10	0	3	-.02	4	-.21	2
581		6	max	501.257	3	592.15	2	39.369	1	0	2	.012	1	.189	3
582			min	-311.398	2	-628.78	3	2.281	10	0	3	-.009	5	-.578	2
583		7	max	501.69	3	590.567	2	39.369	1	0	2	.037	1	.579	3
584			min	-310.822	2	-629.967	3	2.281	10	0	3	0	15	-.945	2
585		8	max	502.122	3	588.983	2	39.369	1	0	2	.061	1	.971	3
586			min	-310.246	2	-631.154	3	2.281	10	0	3	.004	10	-1.311	2
587		9	max	513.552	3	49.622	2	67.226	1	0	3	-.003	10	1.129	3
588			min	-260.798	2	.489	15	4.184	10	0	9	-.12	4	-1.493	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	513.984	3	48.039	2	67.226	1	0	3	0	1	1.106	3
590			min	-260.222	2	.011	15	4.184	10	0	9	-.079	4	-1.523	2
591		11	max	514.417	3	46.456	2	68.445	4	0	3	.042	1	1.084	3
592			min	-259.646	2	-1.896	6	4.184	10	0	9	-.046	5	-1.552	2
593		12	max	525.517	3	425.338	3	134.636	4	0	3	-.004	10	.953	3
594			min	-210.043	2	-695.402	2	2.521	10	0	2	-.217	4	-1.379	2
595		13	max	525.949	3	424.15	3	136.096	4	0	3	-.002	10	.689	3
596			min	-209.467	2	-696.986	2	2.521	10	0	2	-.133	4	-.947	2
597		14	max	526.381	3	422.963	3	137.557	4	0	3	0	10	.427	3
598			min	-208.89	2	-698.569	2	2.521	10	0	2	-.048	4	-.514	2
599		15	max	526.813	3	421.775	3	139.017	4	0	3	.038	4	.164	3
600			min	-208.314	2	-700.152	2	2.521	10	0	2	0	12	-.103	1
601		16	max	527.245	3	420.588	3	140.477	4	0	3	.125	4	.355	2
602			min	-207.738	2	-701.735	2	2.521	10	0	2	.002	10	-.097	3
603		17	max	527.677	3	419.401	3	141.937	4	0	3	.212	4	.791	2
604			min	-207.162	2	-703.318	2	2.521	10	0	2	.004	10	-.358	3
605		18	max	-6.441	12	653.374	2	44.613	1	0	2	.197	4	.4	2
606			min	-125.127	1	-303.996	3	-66.912	5	0	3	.006	10	-.177	3
607		19	max	-6.153	12	651.791	2	44.613	1	0	2	.162	4	.012	3
608			min	-124.551	1	-305.184	3	-65.452	5	0	3	.008	10	-.006	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	.24	2	.01	3	1.627e-2	2	NC	1	NC	1
2			min	-.506	4	-.075	3	-.006	2	-4.846e-3	3	NC	1	NC	1
3		2	max	0	1	.192	2	.012	3	1.708e-2	2	NC	4	NC	1
4			min	-.506	4	.005	15	-.007	5	-4.262e-3	3	1287.044	3	NC	1
5		3	max	0	1	.156	2	.022	1	1.79e-2	2	NC	4	NC	2
6			min	-.506	4	.004	15	-.009	5	-3.678e-3	3	705.356	3	6940.607	1
7		4	max	0	1	.221	3	.033	1	1.871e-2	2	NC	5	NC	2
8			min	-.506	4	.003	15	-.008	5	-3.095e-3	3	546.402	3	4799.327	1
9		5	max	0	1	.244	3	.037	1	1.953e-2	2	NC	5	NC	2
10			min	-.506	4	.003	15	-.003	10	-2.511e-3	3	507.534	3	4242.324	1
11		6	max	0	1	.223	3	.034	1	2.035e-2	2	NC	4	NC	2
12			min	-.506	4	.004	15	-.005	10	-1.927e-3	3	542.778	3	4593.695	1
13		7	max	0	1	.229	2	.026	3	2.116e-2	2	NC	2	NC	2
14			min	-.506	4	.005	15	-.007	10	-1.343e-3	3	667.255	3	6325.373	1
15		8	max	0	1	.285	2	.027	3	2.198e-2	2	NC	4	NC	1
16			min	-.506	4	.006	15	-.011	2	-7.595e-4	3	961.83	3	9297.186	3
17		9	max	0	1	.333	2	.028	3	2.279e-2	2	NC	4	NC	1
18			min	-.506	4	.007	15	-.017	2	-1.757e-4	3	1628.652	3	8871.708	3
19		10	max	0	1	.354	2	.028	3	2.361e-2	2	NC	4	NC	1
20			min	-.506	4	-.008	3	-.019	2	4.081e-4	3	1411.378	2	8755.645	3
21		11	max	0	10	.333	2	.028	3	2.279e-2	2	NC	4	NC	1
22			min	-.506	4	.007	15	-.017	2	-1.757e-4	3	1628.652	3	8871.708	3
23		12	max	0	10	.285	2	.027	3	2.198e-2	2	NC	4	NC	1
24			min	-.506	4	.006	15	-.011	2	-7.595e-4	3	961.83	3	9297.186	3
25		13	max	0	10	.229	2	.026	3	2.116e-2	2	NC	2	NC	2
26			min	-.506	4	.005	15	-.007	10	-1.343e-3	3	667.255	3	6325.373	1
27		14	max	0	10	.223	3	.034	1	2.035e-2	2	NC	4	NC	2
28			min	-.506	4	.004	15	-.005	10	-1.927e-3	3	542.778	3	4593.695	1
29		15	max	0	10	.244	3	.037	1	1.953e-2	2	NC	5	NC	2
30			min	-.506	4	.003	15	-.003	10	-2.511e-3	3	507.534	3	4242.324	1
31		16	max	0	10	.221	3	.033	1	1.871e-2	2	NC	5	NC	2
32			min	-.506	4	.003	15	-.003	10	-3.095e-3	3	546.402	3	4799.327	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
33		17	max	0	10	.156	2	.022	1	1.79e-2	2	NC	4	NC	2
34			min	-.506	4	.003	15	-.003	10	-3.678e-3	3	705.356	3	6940.607	1
35		18	max	0	10	.192	2	.012	3	1.708e-2	2	NC	4	NC	1
36			min	-.506	4	.004	15	-.003	10	-4.262e-3	3	1287.044	3	NC	1
37		19	max	0	10	.24	2	.01	3	1.627e-2	2	NC	1	NC	1
38			min	-.506	4	-.075	3	-.006	2	-4.846e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.474	3	.009	3	8.877e-3	2	NC	1	NC	1
40			min	-.394	4	-.693	2	-.005	2	-7.111e-3	3	NC	1	NC	1
41		2	max	0	1	.649	3	.01	3	9.994e-3	2	NC	5	NC	1
42			min	-.394	4	-.874	2	-.011	5	-8.124e-3	3	895.471	2	NC	1
43		3	max	0	1	.804	3	.016	1	1.111e-2	2	NC	5	NC	2
44			min	-.394	4	-1.039	2	-.014	5	-9.137e-3	3	467.816	2	9436.749	1
45		4	max	0	1	.928	3	.026	1	1.223e-2	2	NC	5	NC	2
46			min	-.394	4	-1.178	2	-.01	5	-1.015e-2	3	334.174	2	5985.636	1
47		5	max	0	1	1.012	3	.031	1	1.334e-2	2	NC	15	NC	2
48			min	-.394	4	-1.283	2	-.003	10	-1.116e-2	3	274.782	2	5037.206	1
49		6	max	0	1	1.055	3	.03	1	1.446e-2	2	NC	15	NC	2
50			min	-.394	4	-1.351	2	-.004	10	-1.218e-2	3	246.064	2	5279.749	1
51		7	max	0	1	1.062	3	.022	3	1.558e-2	2	NC	15	NC	2
52			min	-.394	4	-1.387	2	-.006	10	-1.319e-2	3	233.604	2	7089.373	1
53		8	max	0	1	1.043	3	.024	3	1.669e-2	2	NC	15	NC	1
54			min	-.394	4	-1.395	2	-.009	2	-1.42e-2	3	230.857	2	7505.902	4
55		9	max	0	1	1.015	3	.025	3	1.781e-2	2	NC	15	NC	1
56			min	-.394	4	-1.388	2	-.015	2	-1.521e-2	3	233.261	2	NC	1
57		10	max	0	1	.999	3	.025	3	1.893e-2	2	NC	15	NC	1
58			min	-.394	4	-1.381	2	-.018	2	-1.623e-2	3	235.566	2	9881.659	3
59		11	max	0	10	1.015	3	.025	3	1.781e-2	2	NC	15	NC	1
60			min	-.394	4	-1.388	2	-.015	2	-1.521e-2	3	233.261	2	NC	1
61		12	max	0	10	1.043	3	.024	3	1.669e-2	2	NC	15	NC	1
62			min	-.394	4	-1.395	2	-.014	5	-1.42e-2	3	230.857	2	NC	1
63		13	max	0	10	1.062	3	.022	3	1.558e-2	2	NC	15	NC	2
64			min	-.394	4	-1.387	2	-.01	5	-1.319e-2	3	233.604	2	7089.373	1
65		14	max	0	10	1.055	3	.03	1	1.446e-2	2	NC	15	NC	2
66			min	-.394	4	-1.351	2	-.004	10	-1.218e-2	3	246.064	2	5279.749	1
67		15	max	0	10	1.012	3	.031	1	1.334e-2	2	NC	15	NC	2
68			min	-.394	4	-1.283	2	-.003	10	-1.116e-2	3	274.782	2	5037.206	1
69		16	max	0	10	.928	3	.026	1	1.223e-2	2	NC	5	NC	2
70			min	-.394	4	-1.178	2	-.003	10	-1.015e-2	3	334.174	2	5985.636	1
71		17	max	0	10	.804	3	.021	4	1.111e-2	2	NC	5	NC	2
72			min	-.394	4	-1.039	2	-.003	10	-9.137e-3	3	467.816	2	7304.731	4
73		18	max	0	10	.649	3	.014	4	9.994e-3	2	NC	5	NC	1
74			min	-.394	4	-.874	2	-.003	2	-8.124e-3	3	895.471	2	NC	1
75		19	max	0	10	.474	3	.009	3	8.877e-3	2	NC	1	NC	1
76			min	-.394	4	-.693	2	-.005	2	-7.111e-3	3	NC	1	NC	1
77	M15	1	max	0	10	.485	3	.008	3	6.021e-3	3	NC	1	NC	1
78			min	-.328	4	-.692	2	-.005	2	-9.19e-3	2	NC	1	NC	1
79		2	max	0	10	.621	3	.009	3	6.858e-3	3	NC	5	NC	1
80			min	-.328	4	-.902	2	-.017	5	-1.035e-2	2	770.246	2	8479.543	5
81		3	max	0	10	.746	3	.017	1	7.695e-3	3	NC	5	NC	2
82			min	-.328	4	-1.091	2	-.022	5	-1.151e-2	2	405.448	2	6766.528	5
83		4	max	0	10	.851	3	.027	1	8.532e-3	3	NC	5	NC	2
84			min	-.328	4	-1.244	2	-.017	5	-1.267e-2	2	293.154	2	5939.055	1
85		5	max	0	10	.932	3	.032	1	9.369e-3	3	NC	15	NC	2
86			min	-.328	4	-1.353	2	-.006	5	-1.383e-2	2	245.114	2	4993.76	1
87		6	max	0	10	.988	3	.03	1	1.021e-2	3	NC	15	NC	2
88			min	-.328	4	-1.414	2	-.004	10	-1.499e-2	2	224.237	2	5221.69	1
89		7	max	0	10	1.018	3	.024	14	1.104e-2	3	NC	15	NC	2

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
90			min	-.328	4	-1.434	2	-.006	10	-1.615e-2	2	218.413	2	6548.061	4
91		8	max	0	10	1.029	3	.026	4	1.188e-2	3	NC	15	NC	1
92			min	-.328	4	-1.422	2	-.008	2	-1.732e-2	2	221.993	2	5890.605	4
93		9	max	0	10	1.027	3	.023	3	1.272e-2	3	NC	15	NC	1
94			min	-.328	4	-1.396	2	-.014	2	-1.848e-2	2	230.068	2	7858.358	4
95		10	max	0	1	1.023	3	.023	3	1.355e-2	3	NC	15	NC	1
96			min	-.328	4	-1.381	2	-.017	2	-1.964e-2	2	235.129	2	NC	1
97		11	max	0	1	1.027	3	.023	3	1.272e-2	3	NC	15	NC	1
98			min	-.328	4	-1.396	2	-.017	5	-1.848e-2	2	230.068	2	9660.275	5
99		12	max	0	1	1.029	3	.022	3	1.188e-2	3	NC	15	NC	1
100			min	-.328	4	-1.422	2	-.02	5	-1.732e-2	2	221.993	2	8183.646	5
101		13	max	0	1	1.018	3	.023	1	1.104e-2	3	NC	15	NC	2
102			min	-.328	4	-1.434	2	-.014	5	-1.615e-2	2	218.413	2	6969.315	1
103		14	max	0	1	.988	3	.03	1	1.021e-2	3	NC	15	NC	2
104			min	-.328	4	-1.414	2	-.004	10	-1.499e-2	2	224.237	2	5221.69	1
105		15	max	0	1	.932	3	.032	1	9.369e-3	3	NC	15	NC	2
106			min	-.328	4	-1.353	2	-.003	10	-1.383e-2	2	245.114	2	4993.76	1
107		16	max	0	1	.851	3	.028	4	8.532e-3	3	NC	5	NC	2
108			min	-.328	4	-1.244	2	-.002	10	-1.267e-2	2	293.154	2	5628.932	4
109		17	max	0	1	.746	3	.029	4	7.695e-3	3	NC	5	NC	2
110			min	-.328	4	-1.091	2	-.002	10	-1.151e-2	2	405.448	2	5323.825	4
111		18	max	0	1	.621	3	.02	4	6.858e-3	3	NC	5	NC	1
112			min	-.328	4	-.902	2	-.003	10	-1.035e-2	2	770.246	2	7483.704	4
113		19	max	0	1	.485	3	.008	3	6.021e-3	3	NC	1	NC	1
114			min	-.328	4	-.692	2	-.005	2	-9.19e-3	2	NC	1	NC	1
115	M16	1	max	0	10	.214	2	.007	3	1.17e-2	3	NC	1	NC	1
116			min	-.119	4	-.175	3	-.005	2	-1.389e-2	2	NC	1	NC	1
117		2	max	0	10	.134	1	.01	1	1.247e-2	3	NC	4	NC	1
118			min	-.119	4	-.147	3	-.012	5	-1.421e-2	2	1904.479	2	NC	1
119		3	max	0	10	.081	1	.023	1	1.325e-2	3	NC	4	NC	2
120			min	-.119	4	-.128	3	-.016	5	-1.453e-2	2	1064.809	2	6908.156	1
121		4	max	0	10	.053	1	.033	1	1.403e-2	3	NC	5	NC	2
122			min	-.119	4	-.123	3	-.013	5	-1.486e-2	2	856.073	2	4747.494	1
123		5	max	0	10	.055	1	.038	1	1.48e-2	3	NC	5	NC	2
124			min	-.119	4	-.134	3	-.007	5	-1.518e-2	2	848.654	2	4165.314	1
125		6	max	0	10	.085	1	.036	1	1.558e-2	3	NC	3	NC	2
126			min	-.119	4	-.16	3	-.003	10	-1.55e-2	2	1024.177	2	4457.32	1
127		7	max	0	10	.136	1	.026	1	1.636e-2	3	NC	4	NC	2
128			min	-.119	4	-.197	3	-.005	10	-1.583e-2	2	1641.34	2	5987.694	1
129		8	max	0	10	.198	1	.02	3	1.714e-2	3	NC	1	NC	1
130			min	-.119	4	-.239	3	-.007	10	-1.615e-2	2	2532.364	3	9477.165	4
131		9	max	0	10	.252	1	.02	3	1.791e-2	3	NC	4	NC	1
132			min	-.119	4	-.274	3	-.012	2	-1.647e-2	2	1633.519	3	NC	1
133		10	max	0	1	.28	2	.02	3	1.869e-2	3	NC	4	NC	1
134			min	-.119	4	-.289	3	-.015	2	-1.685e-2	1	1413.764	3	NC	1
135		11	max	0	1	.252	1	.02	3	1.791e-2	3	NC	4	NC	1
136			min	-.119	4	-.274	3	-.012	2	-1.647e-2	2	1633.519	3	NC	1
137		12	max	0	1	.198	1	.02	3	1.714e-2	3	NC	1	NC	1
138			min	-.119	4	-.239	3	-.009	5	-1.615e-2	2	2532.364	3	NC	1
139		13	max	0	1	.136	1	.026	1	1.636e-2	3	NC	4	NC	2
140			min	-.119	4	-.197	3	-.005	10	-1.583e-2	2	1641.34	2	5987.694	1
141		14	max	0	1	.085	1	.036	1	1.558e-2	3	NC	3	NC	2
142			min	-.119	4	-.16	3	-.003	10	-1.55e-2	2	1024.177	2	4457.32	1
143		15	max	0	1	.055	1	.038	1	1.48e-2	3	NC	5	NC	2
144			min	-.119	4	-.134	3	-.002	10	-1.518e-2	2	848.654	2	4165.314	1
145		16	max	0	1	.053	1	.033	1	1.403e-2	3	NC	5	NC	2
146			min	-.118	4	-.123	3	-.001	10	-1.486e-2	2	856.073	2	4747.494	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	.081	1	.024	4	1.325e-2	3	NC	4	NC	2
148			min	-.118	4	-.128	3	-.002	10	-1.453e-2	2	1064.809	2	6368.273	4
149		18	max	0	1	.134	1	.016	4	1.247e-2	3	NC	4	NC	1
150			min	-.118	4	-.147	3	-.002	10	-1.421e-2	2	1904.479	2	9547.554	4
151		19	max	0	1	.214	2	.007	3	1.17e-2	3	NC	1	NC	1
152			min	-.118	4	-.175	3	-.005	2	-1.389e-2	2	NC	1	NC	1
153	M2	1	max	.006	2	.009	2	.005	1	1.979e-3	5	NC	1	NC	1
154			min	-.009	3	-.013	3	-.478	4	-1.095e-4	1	7058.09	2	126.573	4
155		2	max	.006	2	.008	2	.005	1	1.977e-3	5	NC	1	NC	1
156			min	-.008	3	-.013	3	-.439	4	-1.026e-4	1	8065.403	2	137.914	4
157		3	max	.006	2	.006	2	.004	1	1.975e-3	5	NC	1	NC	1
158			min	-.008	3	-.012	3	-.4	4	-9.573e-5	1	9391.76	2	151.402	4
159		4	max	.005	2	.005	2	.004	1	1.972e-3	5	NC	1	NC	1
160			min	-.007	3	-.012	3	-.361	4	-8.886e-5	1	NC	1	167.601	4
161		5	max	.005	2	.004	2	.003	1	1.97e-3	5	NC	1	NC	1
162			min	-.007	3	-.011	3	-.323	4	-8.2e-5	1	NC	1	187.278	4
163		6	max	.005	2	.003	2	.003	1	1.968e-3	4	NC	1	NC	1
164			min	-.006	3	-.011	3	-.286	4	-7.513e-5	1	NC	1	211.503	4
165		7	max	.004	2	.003	2	.003	1	1.967e-3	4	NC	1	NC	1
166			min	-.006	3	-.01	3	-.25	4	-6.827e-5	1	NC	1	241.795	4
167		8	max	.004	2	.002	2	.002	1	1.967e-3	4	NC	1	NC	1
168			min	-.005	3	-.01	3	-.216	4	-6.14e-5	1	NC	1	280.38	4
169		9	max	.004	2	0	2	.002	1	1.966e-3	4	NC	1	NC	1
170			min	-.005	3	-.009	3	-.183	4	-5.454e-5	1	NC	1	330.62	4
171		10	max	.003	2	0	2	.002	1	1.965e-3	4	NC	1	NC	1
172			min	-.004	3	-.008	3	-.152	4	-4.767e-5	1	NC	1	397.796	4
173		11	max	.003	2	0	2	.001	1	1.965e-3	4	NC	1	NC	1
174			min	-.004	3	-.008	3	-.123	4	-4.081e-5	1	NC	1	490.598	4
175		12	max	.003	2	0	15	.001	1	1.964e-3	4	NC	1	NC	1
176			min	-.003	3	-.007	3	-.097	4	-3.395e-5	1	NC	1	624.168	4
177		13	max	.002	2	0	15	0	1	1.963e-3	4	NC	1	NC	1
178			min	-.003	3	-.006	3	-.073	4	-2.708e-5	1	NC	1	826.868	4
179		14	max	.002	2	0	15	0	1	1.963e-3	4	NC	1	NC	1
180			min	-.002	3	-.005	3	-.052	4	-2.022e-5	1	NC	1	1157.103	4
181		15	max	.001	2	0	15	0	1	1.962e-3	4	NC	1	NC	1
182			min	-.002	3	-.004	3	-.035	4	-1.335e-5	1	NC	1	1751.769	4
183		16	max	.001	2	0	15	0	1	1.961e-3	4	NC	1	NC	1
184			min	-.001	3	-.003	3	-.02	4	-6.488e-6	1	NC	1	2998.741	4
185		17	max	0	2	0	15	0	1	1.961e-3	4	NC	1	NC	1
186			min	0	3	-.002	3	-.009	4	-1.183e-6	3	NC	1	6396.18	4
187		18	max	0	2	0	15	0	1	1.96e-3	4	NC	1	NC	1
188			min	0	3	-.001	3	-.003	4	0	3	NC	1	NC	1
189		19	max	0	1	0	1	0	1	1.959e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	7.321e-7	12	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	-2.81e-7	12	NC	1	NC	1
192			min	0	1	0	1	0	1	-3.801e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.011	4	1.554e-4	4	NC	1	NC	1
194			min	0	2	-.002	6	0	12	6.888e-7	10	NC	1	NC	1
195		3	max	0	3	-.001	15	.021	4	6.908e-4	4	NC	1	NC	1
196			min	0	2	-.005	6	0	12	1.708e-6	10	NC	1	NC	1
197		4	max	.001	3	-.002	15	.032	4	1.226e-3	4	NC	1	NC	1
198			min	-.001	2	-.008	6	0	12	2.727e-6	10	NC	1	NC	1
199		5	max	.002	3	-.002	15	.041	4	1.762e-3	4	NC	1	NC	1
200			min	-.001	2	-.011	6	0	12	3.745e-6	10	9499.466	6	NC	1
201		6	max	.002	3	-.003	15	.051	4	2.297e-3	4	NC	1	NC	1
202			min	-.002	2	-.013	6	0	12	4.764e-6	10	7606.295	6	NC	1
203		7	max	.003	3	-.003	15	.06	4	2.833e-3	4	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
204			min	-.002	2	-.016	6	0	12	5.783e-6	10	6471.636	6	NC	1
205		8	max	.003	3	-.004	15	.069	4	3.368e-3	4	NC	5	NC	1
206			min	-.002	2	-.018	6	0	12	6.802e-6	10	5771.218	6	NC	1
207		9	max	.003	3	-.004	15	.077	4	3.903e-3	4	NC	5	NC	1
208			min	-.003	2	-.019	6	0	12	7.821e-6	10	5352.892	6	NC	1
209		10	max	.004	3	-.004	15	.085	4	4.439e-3	4	NC	5	NC	1
210			min	-.003	2	-.02	6	0	12	8.84e-6	10	5142.415	6	NC	1
211		11	max	.004	3	-.004	15	.093	4	4.974e-3	4	NC	5	NC	1
212			min	-.003	2	-.02	6	0	12	9.859e-6	10	5108.268	6	NC	1
213		12	max	.005	3	-.004	15	.101	4	5.51e-3	4	NC	5	NC	1
214			min	-.004	2	-.019	6	0	12	1.088e-5	10	5249.483	6	NC	1
215		13	max	.005	3	-.004	15	.109	4	6.045e-3	4	NC	5	NC	1
216			min	-.004	2	-.018	6	0	10	1.19e-5	10	5596.754	6	NC	1
217		14	max	.005	3	-.004	15	.116	4	6.581e-3	4	NC	5	NC	1
218			min	-.005	2	-.016	6	0	10	1.292e-5	10	6228.784	6	NC	1
219		15	max	.006	3	-.003	15	.124	4	7.116e-3	4	NC	2	NC	1
220			min	-.005	2	-.014	6	0	10	1.393e-5	10	7321.687	6	NC	1
221		16	max	.006	3	-.002	15	.133	4	7.651e-3	4	NC	1	NC	1
222			min	-.005	2	-.011	6	0	10	1.495e-5	10	9303.284	6	NC	1
223		17	max	.007	3	-.001	15	.141	4	8.187e-3	4	NC	1	NC	1
224			min	-.006	2	-.008	1	0	10	1.597e-5	10	NC	1	NC	1
225		18	max	.007	3	0	15	.151	4	8.722e-3	4	NC	1	NC	1
226			min	-.006	2	-.005	1	0	10	1.699e-5	10	NC	1	NC	1
227		19	max	.008	3	0	5	.161	4	9.258e-3	4	NC	1	NC	1
228			min	-.006	2	-.002	1	0	10	1.801e-5	10	NC	1	NC	1
229	M4	1	max	.003	1	.006	2	0	10	4.529e-5	1	NC	1	NC	2
230			min	0	3	-.008	3	-.161	4	-3.854e-4	5	NC	1	153.694	4
231		2	max	.002	1	.005	2	0	10	4.529e-5	1	NC	1	NC	2
232			min	0	3	-.007	3	-.148	4	-3.854e-4	5	NC	1	167.274	4
233		3	max	.002	1	.005	2	0	10	4.529e-5	1	NC	1	NC	2
234			min	0	3	-.007	3	-.135	4	-3.854e-4	5	NC	1	183.426	4
235		4	max	.002	1	.005	2	0	10	4.529e-5	1	NC	1	NC	2
236			min	0	3	-.006	3	-.122	4	-3.854e-4	5	NC	1	202.821	4
237		5	max	.002	1	.005	2	0	10	4.529e-5	1	NC	1	NC	2
238			min	0	3	-.006	3	-.11	4	-3.854e-4	5	NC	1	226.368	4
239		6	max	.002	1	.004	2	0	10	4.529e-5	1	NC	1	NC	2
240			min	0	3	-.006	3	-.097	4	-3.854e-4	5	NC	1	255.329	4
241		7	max	.002	1	.004	2	0	10	4.529e-5	1	NC	1	NC	2
242			min	0	3	-.005	3	-.085	4	-3.854e-4	5	NC	1	291.497	4
243		8	max	.002	1	.004	2	0	10	4.529e-5	1	NC	1	NC	1
244			min	0	3	-.005	3	-.073	4	-3.854e-4	5	NC	1	337.483	4
245		9	max	.001	1	.003	2	0	10	4.529e-5	1	NC	1	NC	1
246			min	0	3	-.004	3	-.062	4	-3.854e-4	5	NC	1	397.223	4
247		10	max	.001	1	.003	2	0	10	4.529e-5	1	NC	1	NC	1
248			min	0	3	-.004	3	-.052	4	-3.854e-4	5	NC	1	476.865	4
249		11	max	.001	1	.003	2	0	10	4.529e-5	1	NC	1	NC	1
250			min	0	3	-.003	3	-.042	4	-3.854e-4	5	NC	1	586.473	4
251		12	max	.001	1	.002	2	0	10	4.529e-5	1	NC	1	NC	1
252			min	0	3	-.003	3	-.033	4	-3.854e-4	5	NC	1	743.452	4
253		13	max	0	1	.002	2	0	10	4.529e-5	1	NC	1	NC	1
254			min	0	3	-.003	3	-.025	4	-3.854e-4	5	NC	1	980.114	4
255		14	max	0	1	.002	2	0	10	4.529e-5	1	NC	1	NC	1
256			min	0	3	-.002	3	-.018	4	-3.854e-4	5	NC	1	1362.201	4
257		15	max	0	1	.001	2	0	10	4.529e-5	1	NC	1	NC	1
258			min	0	3	-.002	3	-.012	4	-3.854e-4	5	NC	1	2041.279	4
259		16	max	0	1	0	2	0	10	4.529e-5	1	NC	1	NC	1
260			min	0	3	-.001	3	-.007	4	-3.854e-4	5	NC	1	3436.401	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
261		17	max	0	1	0	2	0	10	4.529e-5	1	NC	1	NC	1
262			min	0	3	0	3	-.003	4	-3.854e-4	5	NC	1	7101.662	4
263		18	max	0	1	0	2	0	10	4.529e-5	1	NC	1	NC	1
264			min	0	3	0	3	-.001	4	-3.854e-4	5	NC	1	NC	1
265		19	max	0	1	0	1	0	1	4.529e-5	1	NC	1	NC	1
266			min	0	1	0	1	0	1	-3.854e-4	5	NC	1	NC	1
267	M6	1	max	.019	2	.027	2	0	1	2.049e-3	4	NC	4	NC	1
268			min	-.027	3	-.039	3	-.483	4	0	1	1548.653	3	125.402	4
269		2	max	.018	2	.025	2	0	1	2.045e-3	4	NC	4	NC	1
270			min	-.025	3	-.037	3	-.443	4	0	1	1640.118	3	136.639	4
271		3	max	.017	2	.023	2	0	1	2.04e-3	4	NC	4	NC	1
272			min	-.024	3	-.035	3	-.404	4	0	1	1743.063	3	150.004	4
273		4	max	.016	2	.02	2	0	1	2.036e-3	4	NC	4	NC	1
274			min	-.022	3	-.033	3	-.365	4	0	1	1859.79	3	166.053	4
275		5	max	.015	2	.018	2	0	1	2.031e-3	4	NC	4	NC	1
276			min	-.021	3	-.03	3	-.326	4	0	1	1993.26	3	185.551	4
277		6	max	.014	2	.016	2	0	1	2.027e-3	4	NC	4	NC	1
278			min	-.019	3	-.028	3	-.289	4	0	1	2147.343	3	209.554	4
279		7	max	.013	2	.014	2	0	1	2.023e-3	4	NC	4	NC	1
280			min	-.018	3	-.026	3	-.253	4	0	1	2327.201	3	239.569	4
281		8	max	.012	2	.012	2	0	1	2.018e-3	4	NC	1	NC	1
282			min	-.016	3	-.024	3	-.218	4	0	1	2539.871	3	277.801	4
283		9	max	.011	2	.01	2	0	1	2.014e-3	4	NC	1	NC	1
284			min	-.015	3	-.022	3	-.185	4	0	1	2795.207	3	327.582	4
285		10	max	.01	2	.008	2	0	1	2.009e-3	4	NC	1	NC	1
286			min	-.013	3	-.019	3	-.154	4	0	1	3107.441	3	394.146	4
287		11	max	.008	2	.007	2	0	1	2.005e-3	4	NC	1	NC	1
288			min	-.012	3	-.017	3	-.125	4	0	1	3497.923	3	486.102	4
289		12	max	.007	2	.005	2	0	1	2.001e-3	4	NC	1	NC	1
290			min	-.01	3	-.015	3	-.098	4	0	1	4000.201	3	618.457	4
291		13	max	.006	2	.004	2	0	1	1.996e-3	4	NC	1	NC	1
292			min	-.009	3	-.013	3	-.074	4	0	1	4670.189	3	819.314	4
293		14	max	.005	2	.003	2	0	1	1.992e-3	4	NC	1	NC	1
294			min	-.007	3	-.011	3	-.053	4	0	1	5608.535	3	1146.551	4
295		15	max	.004	2	.002	2	0	1	1.987e-3	4	NC	1	NC	1
296			min	-.006	3	-.009	3	-.035	4	0	1	7016.531	3	1735.827	4
297		16	max	.003	2	0	2	0	1	1.983e-3	4	NC	1	NC	1
298			min	-.004	3	-.006	3	-.02	4	0	1	9363.863	3	2971.525	4
299		17	max	.002	2	0	2	0	1	1.979e-3	4	NC	1	NC	1
300			min	-.003	3	-.004	3	-.01	4	0	1	NC	1	6338.364	4
301		18	max	.001	2	0	2	0	1	1.974e-3	4	NC	1	NC	1
302			min	-.001	3	-.002	3	-.003	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	1.97e-3	4	NC	1	NC	1
304			min	0	1	0	1	0	1	0	1	NC	1	NC	1
305	M7	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
306			min	0	1	0	1	0	1	-3.818e-4	4	NC	1	NC	1
307		2	max	.001	3	0	2	.011	4	1.403e-4	4	NC	1	NC	1
308			min	-.001	2	-.004	3	0	1	0	1	NC	1	NC	1
309		3	max	.002	3	-.001	15	.021	4	6.624e-4	4	NC	1	NC	1
310			min	-.002	2	-.007	3	0	1	0	1	NC	1	NC	1
311		4	max	.004	3	-.002	15	.032	4	1.184e-3	4	NC	1	NC	1
312			min	-.003	2	-.01	3	0	1	0	1	NC	1	NC	1
313		5	max	.005	3	-.003	15	.042	4	1.707e-3	4	NC	1	NC	1
314			min	-.004	2	-.013	3	0	1	0	1	8167.949	3	NC	1
315		6	max	.006	3	-.003	15	.051	4	2.229e-3	4	NC	1	NC	1
316			min	-.006	2	-.016	3	0	1	0	1	6881.288	3	NC	1
317		7	max	.007	3	-.004	15	.06	4	2.751e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
318			min	-.007	2	-.018	3	0	1	0	1	6107.949	3	NC	1
319		8	max	.009	3	-.004	15	.069	4	3.273e-3	4	NC	2	NC	1
320			min	-.008	2	-.019	3	0	1	0	1	5644.552	3	NC	1
321		9	max	.01	3	-.005	15	.077	4	3.795e-3	4	NC	2	NC	1
322			min	-.009	2	-.02	3	0	1	0	1	5332.695	4	NC	1
323		10	max	.011	3	-.005	15	.085	4	4.317e-3	4	NC	2	NC	1
324			min	-.01	2	-.021	3	0	1	0	1	5124.212	4	NC	1
325		11	max	.012	3	-.005	15	.093	4	4.839e-3	4	NC	5	NC	1
326			min	-.011	2	-.021	4	0	1	0	1	5091.182	4	NC	1
327		12	max	.013	3	-.005	15	.1	4	5.361e-3	4	NC	5	NC	1
328			min	-.012	2	-.02	4	0	1	0	1	5232.781	4	NC	1
329		13	max	.015	3	-.004	15	.107	4	5.883e-3	4	NC	2	NC	1
330			min	-.013	2	-.019	4	0	1	0	1	5579.71	4	NC	1
331		14	max	.016	3	-.004	15	.115	4	6.405e-3	4	NC	2	NC	1
332			min	-.014	2	-.017	4	0	1	0	1	6210.516	4	NC	1
333		15	max	.017	3	-.003	15	.122	4	6.927e-3	4	NC	1	NC	1
334			min	-.016	2	-.015	4	0	1	0	1	7300.886	4	NC	1
335		16	max	.018	3	-.003	15	.13	4	7.449e-3	4	NC	1	NC	1
336			min	-.017	2	-.012	3	0	1	0	1	9277.521	4	NC	1
337		17	max	.02	3	-.002	15	.138	4	7.971e-3	4	NC	1	NC	1
338			min	-.018	2	-.009	3	0	1	0	1	NC	1	NC	1
339		18	max	.021	3	-.001	15	.147	4	8.494e-3	4	NC	1	NC	1
340			min	-.019	2	-.007	1	0	1	0	1	NC	1	NC	1
341		19	max	.022	3	0	15	.157	4	9.016e-3	4	NC	1	NC	1
342			min	-.02	2	-.005	1	0	1	0	1	NC	1	NC	1
343	M8	1	max	.008	2	.019	2	0	1	0	1	NC	1	NC	1
344			min	-.002	3	-.022	3	-.157	4	-4.728e-4	4	NC	1	158.422	4
345		2	max	.007	2	.018	2	0	1	0	1	NC	1	NC	1
346			min	-.002	3	-.021	3	-.144	4	-4.728e-4	4	NC	1	172.432	4
347		3	max	.007	2	.017	2	0	1	0	1	NC	1	NC	1
348			min	-.002	3	-.02	3	-.131	4	-4.728e-4	4	NC	1	189.095	4
349		4	max	.006	2	.016	2	0	1	0	1	NC	1	NC	1
350			min	-.002	3	-.018	3	-.119	4	-4.728e-4	4	NC	1	209.102	4
351		5	max	.006	2	.015	2	0	1	0	1	NC	1	NC	1
352			min	-.002	3	-.017	3	-.106	4	-4.728e-4	4	NC	1	233.392	4
353		6	max	.005	2	.013	2	0	1	0	1	NC	1	NC	1
354			min	-.002	3	-.016	3	-.094	4	-4.728e-4	4	NC	1	263.267	4
355		7	max	.005	2	.012	2	0	1	0	1	NC	1	NC	1
356			min	-.002	3	-.015	3	-.083	4	-4.728e-4	4	NC	1	300.575	4
357		8	max	.005	2	.011	2	0	1	0	1	NC	1	NC	1
358			min	-.001	3	-.014	3	-.071	4	-4.728e-4	4	NC	1	348.011	4
359		9	max	.004	2	.01	2	0	1	0	1	NC	1	NC	1
360			min	-.001	3	-.012	3	-.061	4	-4.728e-4	4	NC	1	409.634	4
361		10	max	.004	2	.009	2	0	1	0	1	NC	1	NC	1
362			min	-.001	3	-.011	3	-.05	4	-4.728e-4	4	NC	1	491.789	4
363		11	max	.003	2	.008	2	0	1	0	1	NC	1	NC	1
364			min	-.001	3	-.01	3	-.041	4	-4.728e-4	4	NC	1	604.853	4
365		12	max	.003	2	.007	2	0	1	0	1	NC	1	NC	1
366			min	0	3	-.009	3	-.032	4	-4.728e-4	4	NC	1	766.785	4
367		13	max	.003	2	.006	2	0	1	0	1	NC	1	NC	1
368			min	0	3	-.007	3	-.025	4	-4.728e-4	4	NC	1	1010.918	4
369		14	max	.002	2	.005	2	0	1	0	1	NC	1	NC	1
370			min	0	3	-.006	3	-.018	4	-4.728e-4	4	NC	1	1405.072	4
371		15	max	.002	2	.004	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.005	3	-.012	4	-4.728e-4	4	NC	1	2105.61	4
373		16	max	.001	2	.003	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.004	3	-.007	4	-4.728e-4	4	NC	1	3544.857	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
375		17	max	0	2	.002	2	0	1	0	1	NC	1	NC	1
376			min	0	3	-.002	3	-.003	4	-4.728e-4	4	NC	1	7326.177	4
377		18	max	0	2	.001	2	0	1	0	1	NC	1	NC	1
378			min	0	3	-.001	3	-.001	4	-4.728e-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	-4.728e-4	4	NC	1	NC	1
381	M10	1	max	.006	2	.009	2	0	10	2.031e-3	4	NC	1	NC	1
382			min	-.009	3	-.013	3	-.481	4	5.677e-6	10	7058.09	2	125.84	4
383		2	max	.006	2	.008	2	0	10	2.027e-3	4	NC	1	NC	1
384			min	-.008	3	-.013	3	-.442	4	5.299e-6	10	8065.403	2	137.117	4
385		3	max	.006	2	.006	2	0	10	2.022e-3	4	NC	1	NC	1
386			min	-.008	3	-.012	3	-.402	4	4.921e-6	10	9391.76	2	150.527	4
387		4	max	.005	2	.005	2	0	10	2.018e-3	4	NC	1	NC	1
388			min	-.007	3	-.012	3	-.363	4	4.543e-6	10	NC	1	166.633	4
389		5	max	.005	2	.004	2	0	10	2.013e-3	4	NC	1	NC	1
390			min	-.007	3	-.011	3	-.325	4	4.165e-6	10	NC	1	186.198	4
391		6	max	.005	2	.003	2	0	10	2.009e-3	4	NC	1	NC	1
392			min	-.006	3	-.011	3	-.288	4	3.787e-6	10	NC	1	210.285	4
393		7	max	.004	2	.003	2	0	10	2.005e-3	4	NC	1	NC	1
394			min	-.006	3	-.01	3	-.252	4	3.409e-6	10	NC	1	240.404	4
395		8	max	.004	2	.002	2	0	10	2.e-3	4	NC	1	NC	1
396			min	-.005	3	-.01	3	-.217	4	3.031e-6	10	NC	1	278.769	4
397		9	max	.004	2	0	2	0	10	1.996e-3	4	NC	1	NC	1
398			min	-.005	3	-.009	3	-.184	4	2.653e-6	10	NC	1	328.723	4
399		10	max	.003	2	0	2	0	10	1.991e-3	4	NC	1	NC	1
400			min	-.004	3	-.008	3	-.153	4	2.276e-6	10	NC	1	395.518	4
401		11	max	.003	2	0	2	0	10	1.987e-3	4	NC	1	NC	1
402			min	-.004	3	-.008	3	-.124	4	1.898e-6	10	NC	1	487.795	4
403		12	max	.003	2	0	2	0	10	1.982e-3	4	NC	1	NC	1
404			min	-.003	3	-.007	3	-.098	4	1.52e-6	10	NC	1	620.61	4
405		13	max	.002	2	-.001	2	0	10	1.978e-3	4	NC	1	NC	1
406			min	-.003	3	-.006	3	-.074	4	1.142e-6	10	NC	1	822.169	4
407		14	max	.002	2	-.001	15	0	10	1.973e-3	4	NC	1	NC	1
408			min	-.002	3	-.005	3	-.053	4	7.638e-7	10	NC	1	1150.552	4
409		15	max	.001	2	-.001	15	0	10	1.969e-3	4	NC	1	NC	1
410			min	-.002	3	-.004	3	-.035	4	3.858e-7	10	NC	1	1741.899	4
411		16	max	.001	2	0	15	0	10	1.965e-3	4	NC	1	NC	1
412			min	-.001	3	-.003	3	-.02	4	0	10	NC	1	2981.969	4
413		17	max	0	2	0	15	0	10	1.96e-3	4	NC	1	NC	1
414			min	0	3	-.002	4	-.01	4	-6.48e-7	2	NC	1	6360.87	4
415		18	max	0	2	0	15	0	10	1.956e-3	4	NC	1	NC	1
416			min	0	3	-.001	4	-.003	4	-7.241e-6	1	NC	1	NC	1
417		19	max	0	1	0	1	0	1	1.951e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-1.411e-5	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	4.43e-6	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-3.776e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.011	4	1.498e-4	4	NC	1	NC	1
422			min	0	2	-.003	4	0	1	-1.038e-5	1	NC	1	NC	1
423		3	max	0	3	-.001	15	.021	4	6.771e-4	4	NC	1	NC	1
424			min	0	2	-.006	4	0	1	-2.519e-5	1	NC	1	NC	1
425		4	max	.001	3	-.002	15	.031	4	1.205e-3	4	NC	1	NC	1
426			min	-.001	2	-.009	4	0	1	-4.e-5	1	NC	1	NC	1
427		5	max	.002	3	-.003	15	.041	4	1.732e-3	4	NC	1	NC	1
428			min	-.001	2	-.012	4	0	1	-5.481e-5	1	9027.059	4	NC	1
429		6	max	.002	3	-.004	15	.051	4	2.259e-3	4	NC	1	NC	1
430			min	-.002	2	-.014	4	0	1	-6.963e-5	1	7264.032	4	NC	1
431		7	max	.003	3	-.004	15	.06	4	2.787e-3	4	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
432			min	-.002	2	-.017	4	0	1	-8.444e-5	1	6204.986	4	NC	1
433		8	max	.003	3	-.005	15	.068	4	3.314e-3	4	NC	5	NC	1
434			min	-.002	2	-.019	4	0	1	-9.925e-5	1	5551.289	4	NC	1
435		9	max	.003	3	-.005	15	.077	4	3.841e-3	4	NC	5	NC	1
436			min	-.003	2	-.02	4	0	1	-1.141e-4	1	5162.592	4	NC	1
437		10	max	.004	3	-.005	15	.085	4	4.369e-3	4	NC	5	NC	1
438			min	-.003	2	-.021	4	-.001	1	-1.289e-4	1	4970.563	4	NC	1
439		11	max	.004	3	-.005	15	.092	4	4.896e-3	4	NC	5	NC	1
440			min	-.003	2	-.021	4	-.001	1	-1.437e-4	1	4946.689	4	NC	1
441		12	max	.005	3	-.005	15	.1	4	5.424e-3	4	NC	5	NC	1
442			min	-.004	2	-.021	4	-.002	1	-1.585e-4	1	5091.318	4	NC	1
443		13	max	.005	3	-.005	15	.107	4	5.951e-3	4	NC	5	NC	1
444			min	-.004	2	-.02	4	-.002	1	-1.733e-4	1	5435.16	4	NC	1
445		14	max	.005	3	-.004	15	.115	4	6.478e-3	4	NC	5	NC	1
446			min	-.005	2	-.018	4	-.002	1	-1.881e-4	1	6055.434	4	NC	1
447		15	max	.006	3	-.004	15	.123	4	7.006e-3	4	NC	2	NC	1
448			min	-.005	2	-.015	4	-.003	1	-2.029e-4	1	7124.133	4	NC	1
449		16	max	.006	3	-.003	15	.131	4	7.533e-3	4	NC	1	NC	1
450			min	-.005	2	-.012	4	-.003	1	-2.177e-4	1	9058.46	4	NC	1
451		17	max	.007	3	-.002	15	.139	4	8.061e-3	4	NC	1	NC	1
452			min	-.006	2	-.009	4	-.004	1	-2.325e-4	1	NC	1	NC	1
453		18	max	.007	3	-.001	15	.149	4	8.588e-3	4	NC	1	NC	1
454			min	-.006	2	-.005	4	-.004	1	-2.474e-4	1	NC	1	NC	1
455		19	max	.008	3	0	10	.159	4	9.115e-3	4	NC	1	NC	1
456			min	-.006	2	-.002	1	-.005	1	-2.622e-4	1	NC	1	NC	1
457	M12	1	max	.003	1	.006	2	.005	1	-2.766e-6	10	NC	1	NC	2
458			min	0	3	-.008	3	-.159	4	-4.01e-4	4	NC	1	156.247	4
459		2	max	.002	1	.005	2	.004	1	-2.766e-6	10	NC	1	NC	2
460			min	0	3	-.007	3	-.146	4	-4.01e-4	4	NC	1	170.055	4
461		3	max	.002	1	.005	2	.004	1	-2.766e-6	10	NC	1	NC	2
462			min	0	3	-.007	3	-.133	4	-4.01e-4	4	NC	1	186.478	4
463		4	max	.002	1	.005	2	.004	1	-2.766e-6	10	NC	1	NC	2
464			min	0	3	-.006	3	-.12	4	-4.01e-4	4	NC	1	206.197	4
465		5	max	.002	1	.005	2	.003	1	-2.766e-6	10	NC	1	NC	2
466			min	0	3	-.006	3	-.108	4	-4.01e-4	4	NC	1	230.139	4
467		6	max	.002	1	.004	2	.003	1	-2.766e-6	10	NC	1	NC	2
468			min	0	3	-.006	3	-.096	4	-4.01e-4	4	NC	1	259.585	4
469		7	max	.002	1	.004	2	.003	1	-2.766e-6	10	NC	1	NC	2
470			min	0	3	-.005	3	-.084	4	-4.01e-4	4	NC	1	296.358	4
471		8	max	.002	1	.004	2	.002	1	-2.766e-6	10	NC	1	NC	1
472			min	0	3	-.005	3	-.072	4	-4.01e-4	4	NC	1	343.115	4
473		9	max	.001	1	.003	2	.002	1	-2.766e-6	10	NC	1	NC	1
474			min	0	3	-.004	3	-.061	4	-4.01e-4	4	NC	1	403.855	4
475		10	max	.001	1	.003	2	.002	1	-2.766e-6	10	NC	1	NC	1
476			min	0	3	-.004	3	-.051	4	-4.01e-4	4	NC	1	484.831	4
477		11	max	.001	1	.003	2	.001	1	-2.766e-6	10	NC	1	NC	1
478			min	0	3	-.003	3	-.042	4	-4.01e-4	4	NC	1	596.274	4
479		12	max	.001	1	.002	2	.001	1	-2.766e-6	10	NC	1	NC	1
480			min	0	3	-.003	3	-.033	4	-4.01e-4	4	NC	1	755.882	4
481		13	max	0	1	.002	2	0	1	-2.766e-6	10	NC	1	NC	1
482			min	0	3	-.003	3	-.025	4	-4.01e-4	4	NC	1	996.508	4
483		14	max	0	1	.002	2	0	1	-2.766e-6	10	NC	1	NC	1
484			min	0	3	-.002	3	-.018	4	-4.01e-4	4	NC	1	1384.995	4
485		15	max	0	1	.001	2	0	1	-2.766e-6	10	NC	1	NC	1
486			min	0	3	-.002	3	-.012	4	-4.01e-4	4	NC	1	2075.45	4
487		16	max	0	1	0	2	0	1	-2.766e-6	10	NC	1	NC	1
488			min	0	3	-.001	3	-.007	4	-4.01e-4	4	NC	1	3493.953	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	-2.766e-6	10	NC	1	NC	1
490			min	0	3	0	3	-.003	4	-4.01e-4	4	NC	1	7220.661	4
491		18	max	0	1	0	2	0	1	-2.766e-6	10	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-4.01e-4	4	NC	1	NC	1
493		19	max	0	1	0	1	0	1	-2.766e-6	10	NC	1	NC	1
494			min	0	1	0	1	0	1	-4.01e-4	4	NC	1	NC	1
495	M1	1	max	.01	3	.24	2	.506	4	5.812e-3	1	NC	1	NC	1
496			min	-.006	2	-.075	3	0	10	-1.45e-2	3	NC	1	NC	1
497		2	max	.01	3	.118	2	.493	4	6.382e-3	4	NC	5	NC	1
498			min	-.006	2	-.038	3	-.004	1	-7.197e-3	3	1114.077	2	NC	1
499		3	max	.01	3	.014	3	.478	4	1.167e-2	4	NC	5	NC	1
500			min	-.006	2	-.011	2	-.005	1	-9.241e-5	1	540.616	2	8137.429	5
501		4	max	.01	3	.09	3	.463	4	1.004e-2	4	NC	15	NC	1
502			min	-.006	2	-.153	2	-.005	1	-3.739e-3	3	345.095	2	5797.936	5
503		5	max	.009	3	.182	3	.448	4	8.418e-3	4	NC	15	NC	1
504			min	-.006	2	-.3	2	-.003	1	-7.387e-3	3	251.344	2	4598.355	5
505		6	max	.009	3	.28	3	.433	4	1.136e-2	2	8614.048	15	NC	1
506			min	-.006	2	-.44	2	-.001	1	-1.104e-2	3	199.351	2	3861.39	5
507		7	max	.009	3	.373	3	.417	4	1.514e-2	2	7297.301	15	NC	1
508			min	-.005	2	-.565	2	0	3	-1.468e-2	3	168.496	2	3345.791	4
509		8	max	.009	3	.45	3	.4	4	1.892e-2	2	6515.838	15	NC	1
510			min	-.005	2	-.663	2	0	10	-1.833e-2	3	150.179	2	2956.257	4
511		9	max	.009	3	.5	3	.383	4	2.107e-2	2	6105.779	15	NC	1
512			min	-.005	2	-.725	2	0	1	-1.895e-2	3	140.609	2	2688.538	4
513		10	max	.008	3	.519	3	.364	4	2.213e-2	2	5980.124	15	NC	1
514			min	-.005	2	-.746	2	0	10	-1.755e-2	3	137.805	2	2591.773	4
515		11	max	.008	3	.507	3	.342	4	2.319e-2	2	6105.468	15	NC	1
516			min	-.005	2	-.725	2	0	10	-1.615e-2	3	141.094	2	2615.889	4
517		12	max	.008	3	.465	3	.318	4	2.207e-2	2	6515.088	15	NC	1
518			min	-.005	2	-.661	2	0	1	-1.418e-2	3	151.579	2	2758.659	4
519		13	max	.008	3	.396	3	.289	4	1.769e-2	2	7295.836	15	NC	1
520			min	-.005	2	-.558	2	0	1	-1.134e-2	3	171.758	2	3241.321	4
521		14	max	.008	3	.309	3	.257	4	1.331e-2	2	8611.377	15	NC	1
522			min	-.005	2	-.43	2	0	12	-8.512e-3	3	206.102	2	4357.006	4
523		15	max	.007	3	.21	3	.223	4	8.934e-3	2	NC	15	NC	1
524			min	-.005	2	-.287	2	0	10	-5.68e-3	3	264.842	2	7069.613	4
525		16	max	.007	3	.106	3	.191	4	7.648e-3	4	NC	15	NC	1
526			min	-.005	2	-.142	2	0	10	-2.847e-3	3	372.675	2	NC	1
527		17	max	.007	3	.005	3	.162	4	8.731e-3	4	NC	5	NC	1
528			min	-.005	2	-.007	2	0	10	-1.463e-5	3	600.951	2	NC	1
529		18	max	.007	3	.109	2	.138	4	4.942e-3	2	NC	5	NC	1
530			min	-.005	2	-.087	3	0	10	-1.595e-3	3	1264.777	2	NC	1
531		19	max	.007	3	.214	2	.118	4	9.873e-3	2	NC	1	NC	1
532			min	-.005	2	-.175	3	0	1	-3.254e-3	3	NC	1	NC	1
533	M5	1	max	.028	3	.354	2	.506	4	0	1	NC	1	NC	1
534			min	-.019	2	-.008	3	0	1	-1.081e-5	4	NC	1	NC	1
535		2	max	.028	3	.175	2	.496	4	5.961e-3	4	NC	5	NC	1
536			min	-.02	2	-.006	3	0	1	0	1	766.675	2	NC	1
537		3	max	.028	3	.039	3	.483	4	1.179e-2	4	NC	5	NC	1
538			min	-.02	2	-.031	2	0	1	0	1	355.486	2	6727.402	4
539		4	max	.028	3	.165	3	.467	4	9.605e-3	4	NC	15	NC	1
540			min	-.019	2	-.285	2	0	1	0	1	213.727	2	5122.013	4
541		5	max	.027	3	.348	3	.451	4	7.422e-3	4	7130.942	15	NC	1
542			min	-.019	2	-.567	2	0	1	0	1	148.192	2	4313.211	4
543		6	max	.027	3	.559	3	.434	4	5.238e-3	4	5446.176	15	NC	1
544			min	-.018	2	-.85	2	0	1	0	1	113.278	2	3793.818	4
545		7	max	.026	3	.768	3	.416	4	3.055e-3	4	4481.41	15	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
546			min	-.018	2	-1.108	2	0	1	0	1	93.229	2	3381.13	4
547		8	max	.025	3	.944	3	.4	4	8.718e-4	4	3924.117	15	NC	1
548			min	-.018	2	-1.317	2	0	1	0	1	81.625	2	2995.189	4
549		9	max	.025	3	1.058	3	.384	4	0	1	3639.325	15	NC	1
550			min	-.017	2	-1.45	2	0	1	-5.864e-6	5	75.688	2	2682.454	4
551		10	max	.024	3	1.1	3	.363	4	0	1	3553.609	15	NC	1
552			min	-.017	2	-1.496	2	0	1	-5.564e-6	5	73.955	2	2618.353	4
553		11	max	.024	3	1.072	3	.341	4	1.015e-7	14	3639.585	15	NC	1
554			min	-.017	2	-1.451	2	0	1	-5.264e-6	5	75.98	2	2656.439	4
555		12	max	.023	3	.977	3	.319	4	6.236e-4	4	3924.72	15	NC	1
556			min	-.016	2	-1.314	2	0	1	0	1	82.608	2	2707.036	4
557		13	max	.022	3	.824	3	.29	4	2.185e-3	4	4482.589	15	NC	1
558			min	-.016	2	-1.094	2	0	1	0	1	95.845	2	3145.541	4
559		14	max	.022	3	.632	3	.257	4	3.747e-3	4	5448.404	15	NC	1
560			min	-.016	2	-.823	2	0	1	0	1	119.341	2	4368.139	4
561		15	max	.021	3	.42	3	.221	4	5.309e-3	4	7135.259	15	NC	1
562			min	-.016	2	-.532	2	0	1	0	1	161.863	2	7987.702	4
563		16	max	.021	3	.207	3	.187	4	6.871e-3	4	NC	15	NC	1
564			min	-.015	2	-.253	2	0	1	0	1	246.003	2	NC	1
565		17	max	.02	3	.013	3	.157	4	8.432e-3	4	NC	5	NC	1
566			min	-.015	2	-.017	2	0	1	0	1	439.394	2	NC	1
567		18	max	.02	3	.151	2	.134	4	4.265e-3	4	NC	5	NC	1
568			min	-.015	2	-.148	3	0	1	0	1	1005.103	2	NC	1
569		19	max	.02	3	.28	2	.119	4	0	1	NC	1	NC	1
570			min	-.015	2	-.289	3	0	1	-5.17e-6	4	NC	1	NC	1
571	M9	1	max	.01	3	.24	2	.506	4	1.45e-2	3	NC	1	NC	1
572			min	-.006	2	-.075	3	0	1	-5.812e-3	1	NC	1	NC	1
573		2	max	.01	3	.118	2	.495	4	7.197e-3	3	NC	5	NC	1
574			min	-.006	2	-.038	3	0	10	-2.802e-3	1	1114.077	2	NC	1
575		3	max	.01	3	.014	3	.481	4	1.173e-2	4	NC	5	NC	1
576			min	-.006	2	-.011	2	0	10	-2.689e-5	10	540.616	2	7306.276	4
577		4	max	.01	3	.09	3	.466	4	9.292e-3	5	NC	15	NC	1
578			min	-.006	2	-.153	2	0	10	-3.796e-3	2	345.095	2	5391.957	4
579		5	max	.009	3	.182	3	.45	4	7.387e-3	3	NC	15	NC	1
580			min	-.006	2	-.3	2	0	10	-7.576e-3	2	251.344	2	4412.402	4
581		6	max	.009	3	.28	3	.433	4	1.104e-2	3	8580.173	15	NC	1
582			min	-.006	2	-.44	2	0	10	-1.136e-2	2	199.351	2	3796.84	4
583		7	max	.009	3	.373	3	.417	4	1.468e-2	3	7269.286	15	NC	1
584			min	-.005	2	-.565	2	0	1	-1.514e-2	2	168.496	2	3345.909	4
585		8	max	.009	3	.45	3	.4	4	1.833e-2	3	6491.228	15	NC	1
586			min	-.005	2	-.663	2	0	1	-1.892e-2	2	150.179	2	2971.317	5
587		9	max	.009	3	.5	3	.384	4	1.895e-2	3	6082.904	15	NC	1
588			min	-.005	2	-.725	2	0	10	-2.107e-2	2	140.609	2	2682.166	4
589		10	max	.008	3	.519	3	.364	4	1.755e-2	3	5957.719	15	NC	1
590			min	-.005	2	-.746	2	0	1	-2.213e-2	2	137.805	2	2592.456	4
591		11	max	.008	3	.507	3	.342	4	1.615e-2	3	6082.482	15	NC	1
592			min	-.005	2	-.725	2	0	1	-2.319e-2	2	141.094	2	2622.916	4
593		12	max	.008	3	.465	3	.318	4	1.418e-2	3	6490.385	15	NC	1
594			min	-.005	2	-.661	2	0	10	-2.207e-2	2	151.579	2	2744.971	4
595		13	max	.008	3	.396	3	.289	4	1.134e-2	3	7267.907	15	NC	1
596			min	-.005	2	-.558	2	0	10	-1.769e-2	2	171.758	2	3237.53	4
597		14	max	.008	3	.309	3	.256	4	8.512e-3	3	8577.984	15	NC	1
598			min	-.005	2	-.43	2	-.001	1	-1.331e-2	2	206.102	2	4425.059	5
599		15	max	.007	3	.21	3	.222	4	5.68e-3	3	NC	15	NC	1
600			min	-.005	2	-.287	2	-.003	1	-8.934e-3	2	264.842	2	7458.891	5
601		16	max	.007	3	.106	3	.189	4	6.824e-3	5	NC	15	NC	1
602			min	-.005	2	-.142	2	-.004	1	-4.555e-3	2	372.675	2	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
603		17	max	.007	3	.005	3	.159	4	8.561e-3	4	NC	5	NC	1
604			min	-.005	2	-.007	2	-.005	1	-3.467e-4	1	600.951	2	NC	1
605		18	max	.007	3	.109	2	.136	4	4.208e-3	5	NC	5	NC	1
606			min	-.005	2	-.087	3	-.004	1	-4.942e-3	2	1264.777	2	NC	1
607		19	max	.007	3	.214	2	.119	4	3.254e-3	3	NC	1	NC	1
608			min	-.005	2	-.175	3	0	10	-9.873e-3	2	NC	1	NC	1

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

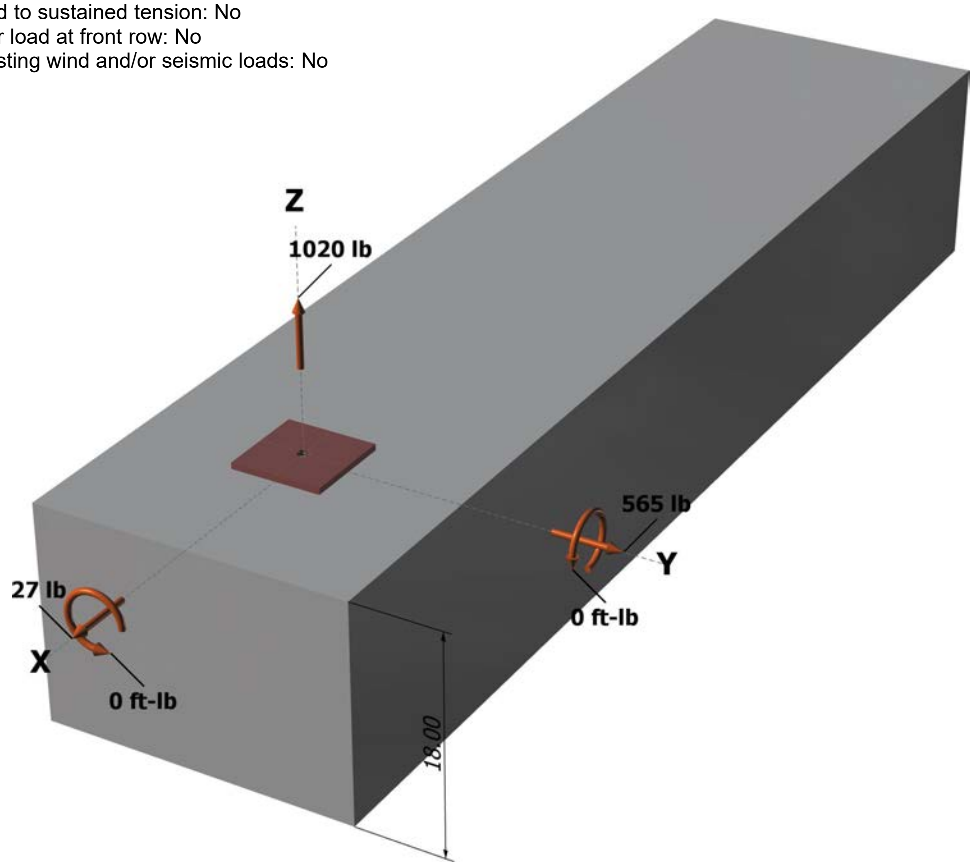
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

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

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

<Figure 1>



<Figure 2>

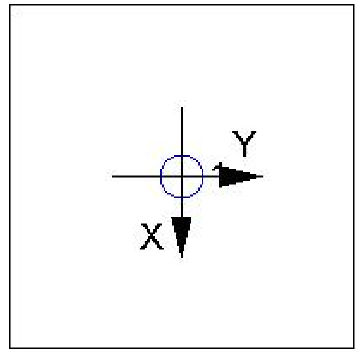
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

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

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

<Figure 3>



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in y-direction:

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

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

Shear parallel to edge in x-direction:

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

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

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

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

Shear parallel to edge in y-direction:

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

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

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

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

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

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

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

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

11. Results

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

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

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

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

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

12. Warnings

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

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

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

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

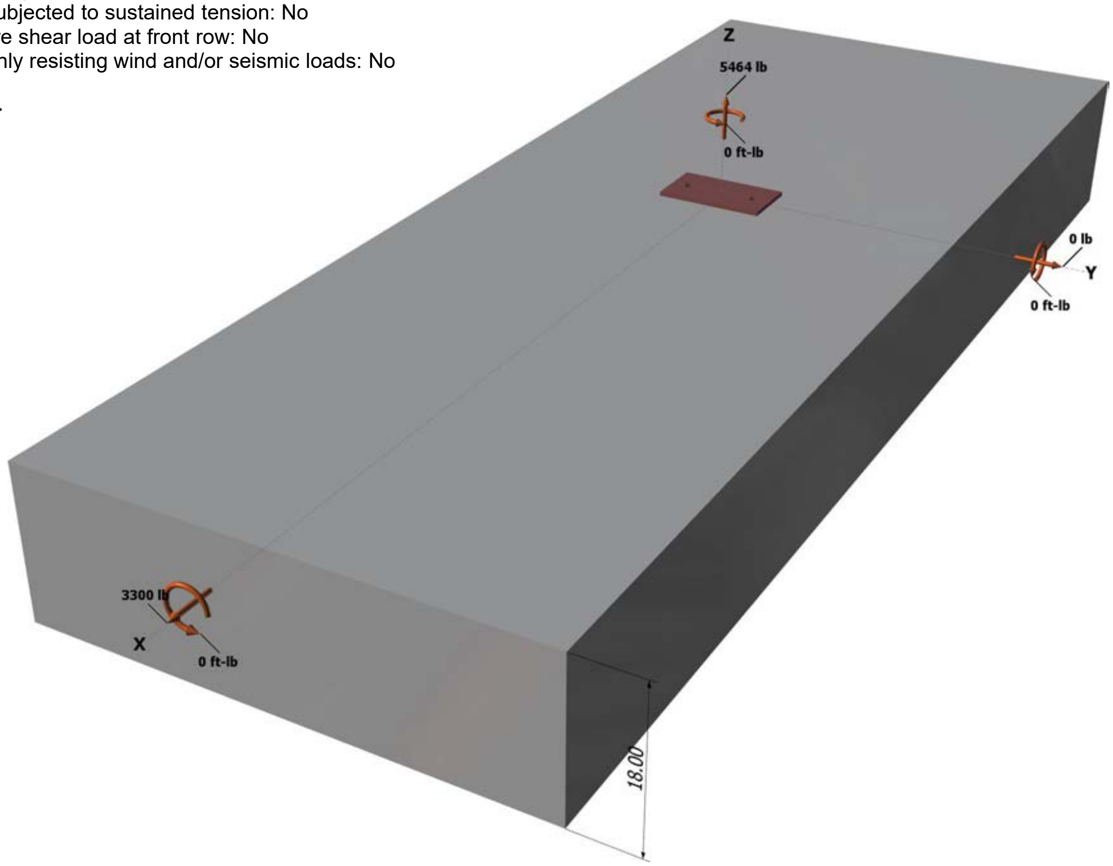
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

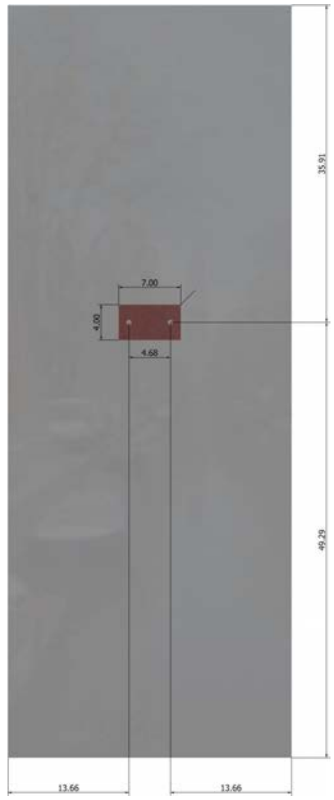
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout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

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

<Figure 1>



<Figure 2>



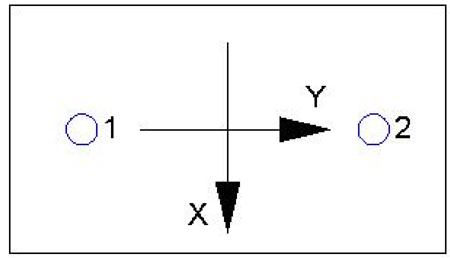
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

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

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

<Figure 3>



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

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

Shear parallel to edge in x-direction:

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

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

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

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

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

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

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

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

ϕV_{cpg} (lb)
20601

11. Results

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

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

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

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

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

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

12. Warnings

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

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

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