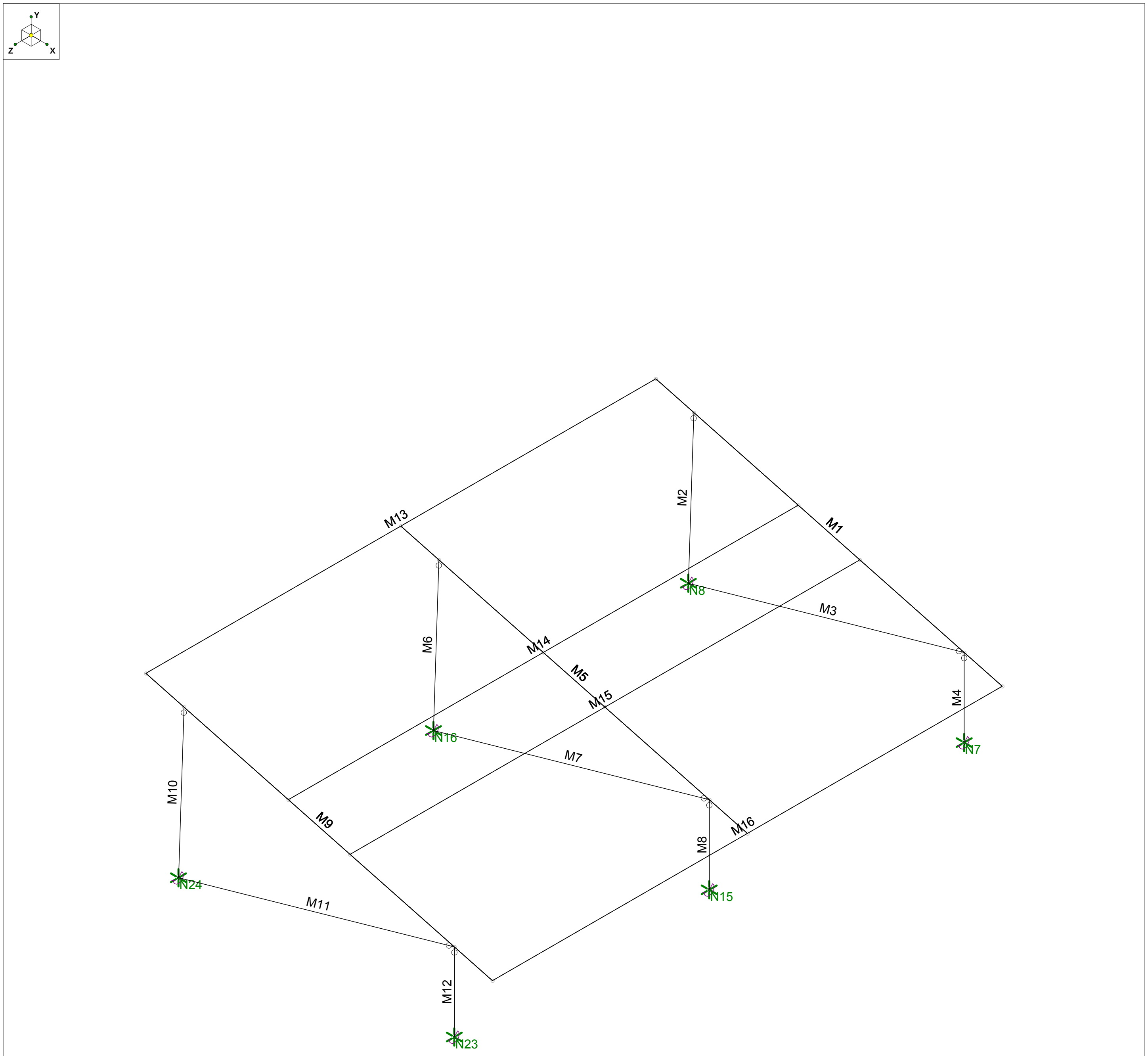


Schletter, Inc.		15° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-10	

1. INTRODUCTION

1.1 Project Description

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

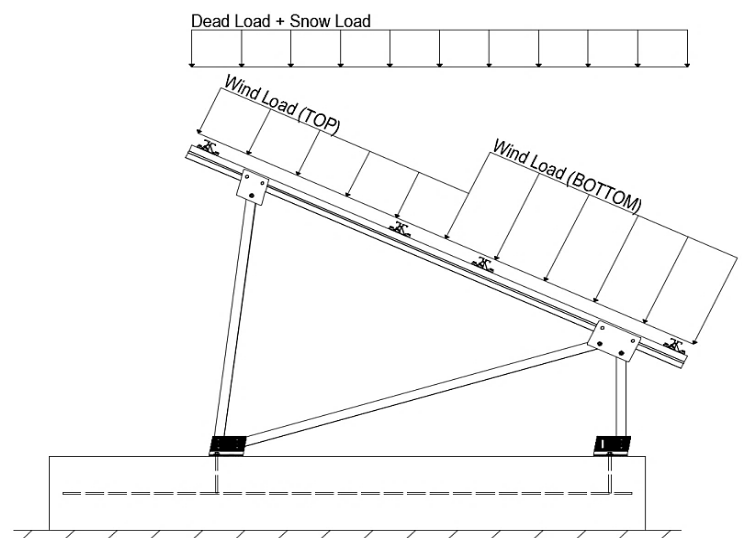
1.2 Construction

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

PV modules are required to meet the following specifications:

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

Modules Per Row =	2
Module Tilt =	15°
Maximum Height Above Grade =	3 ft



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

1.3 Technical Codes

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

2. LOAD ACTIONS

2.1 Permanent Loads

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

2.2 Snow Loads

Ground Snow Load, P_g =	30.00 psf	
Sloped Roof Snow Load, P_s =	22.68 psf	*(ASCE 7-10, Eq. 7.4-1)*
I_s =	1.00	
C_s =	1.00	
C_e =	0.90	
C_t =	1.20	

2.3 Wind Loads

Design Wind Speed, V =	160 mph	Exposure Category = C
Height <	15 ft	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

$Cf+_{TOP}$	=	1.000	(Pressure)
$Cf+_{BOTTOM}$	=	1.600	
$Cf-_{TOP, OUTER PURLIN}$	=	-2.300	
$Cf-_{TOP, INNER PURLIN}$	=	-1.780	(Suction)
$Cf-_{BOTTOM}$	=	-1.000	

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

2.4 Seismic Loads

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

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

2.5 Combination of Loads

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

Strength Design, LRFD

Component stresses are checked using the following LRFD load combinations:

1.2D + 1.6S + 0.5W
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

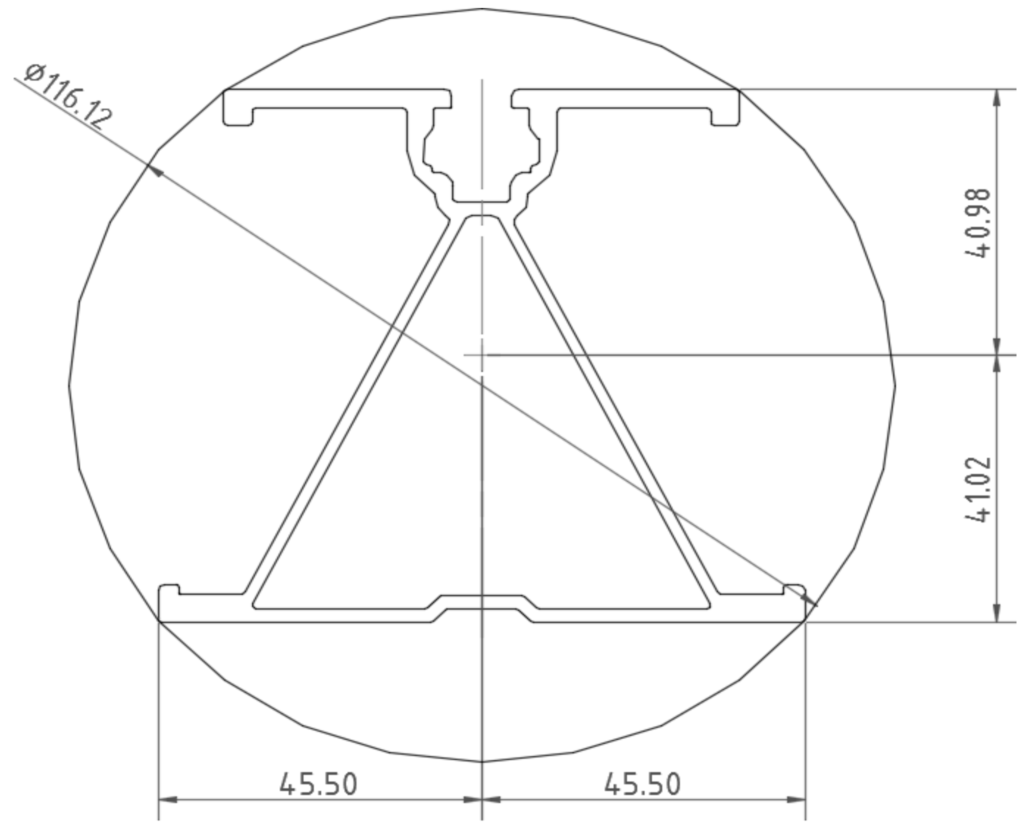
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

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 =	102	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 =	-2.281	k-ft
M_z =	0.003	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	82%	

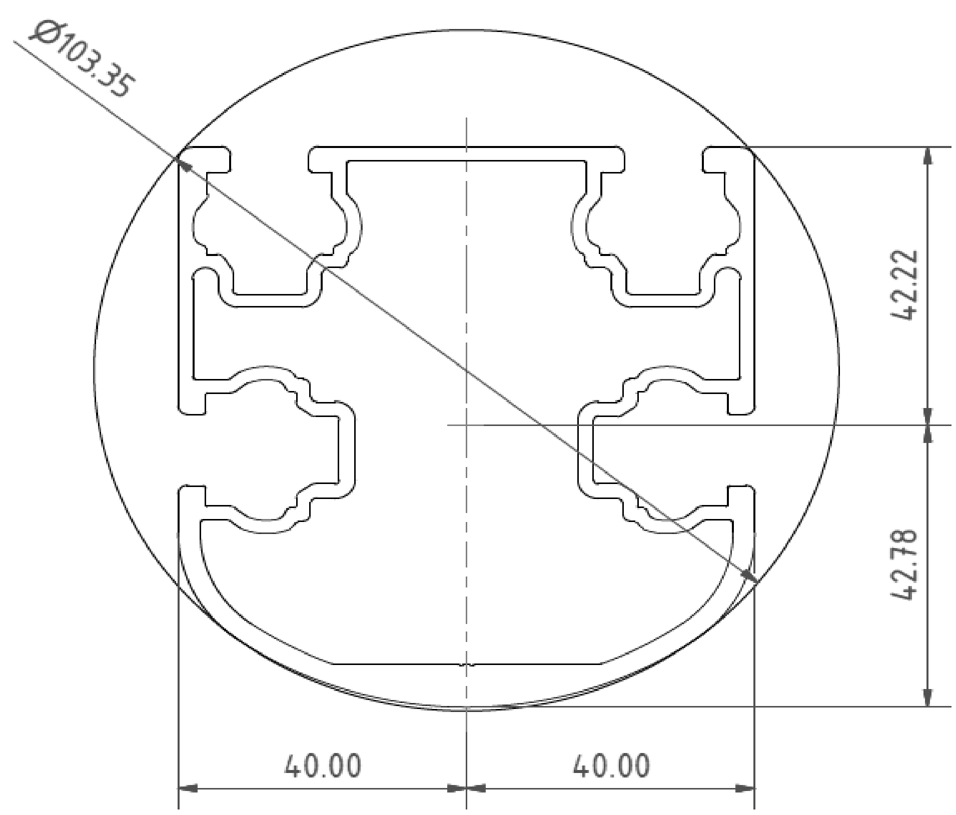


DETAIL VIEW

4.2 Girder Design

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

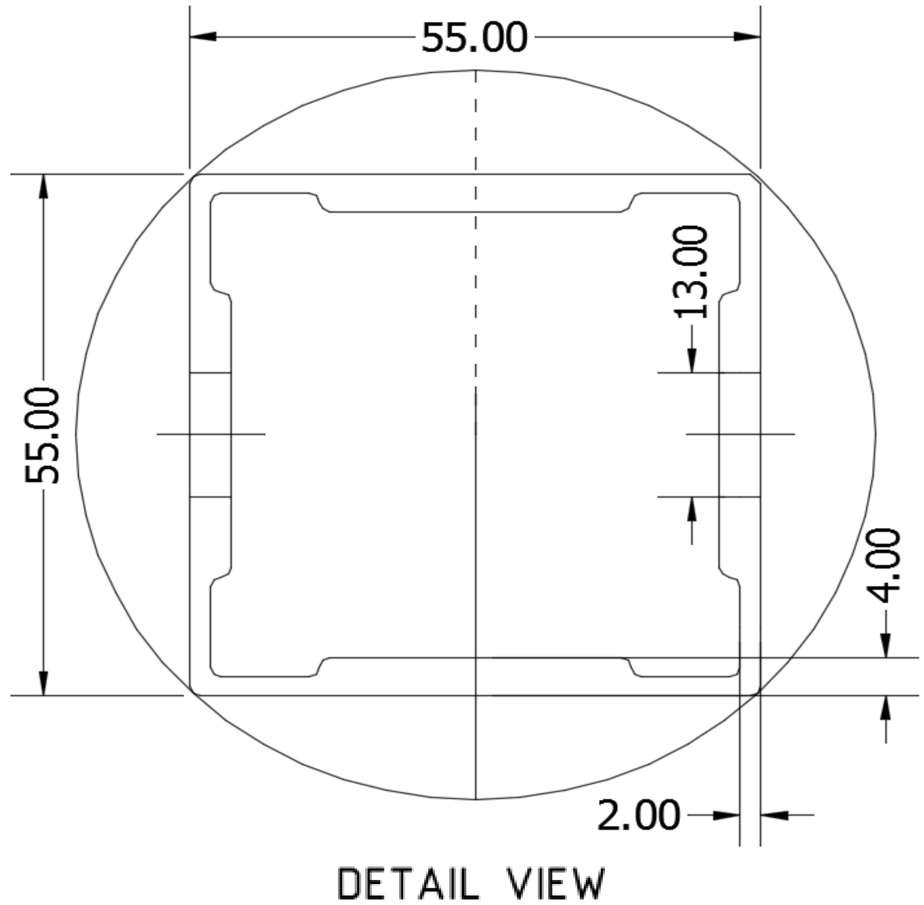
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	88.90	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.35	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.372	k-ft
M_z =	0.000	k-ft
P_n =	-0.576	k
$M_{y\ allowable}$ =	3.464	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	98%	



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).

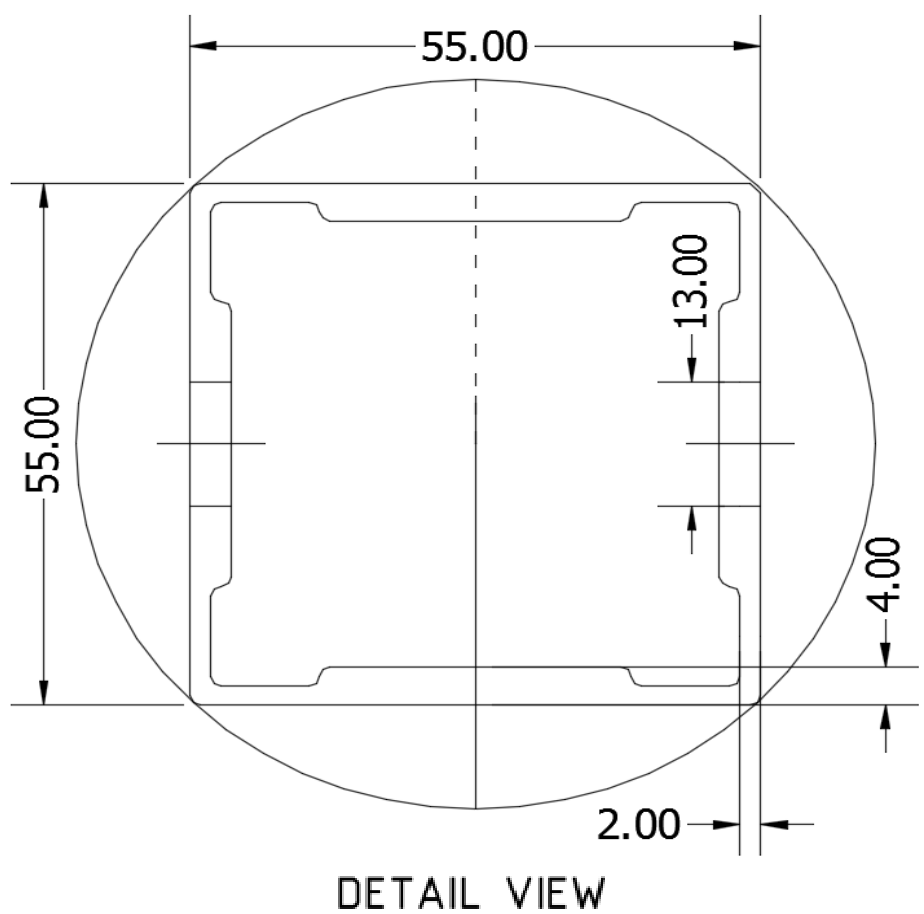
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.410	k-ft
P_n =	0.587	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	31%	



4.4 Diagonal Strut Design

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

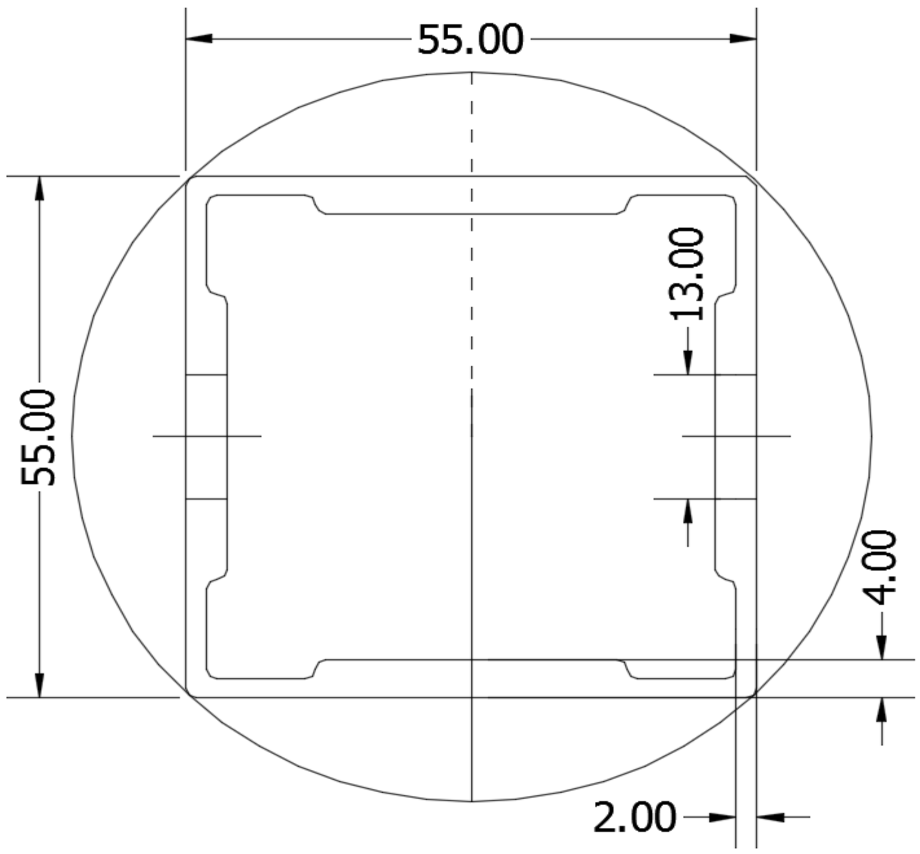
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	86.60	in
$\Phi F_{ty\ AXIAL}$ =	7.50	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.011	k-ft
M_z =	0.000	k-ft
P_n =	1.581	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	7.371	k
Utilization =	22%	



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 =	48.30	in
$\Phi F_{ty\ AXIAL}$ =	18.93	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 =	-0.009	k-ft
M_z =	-0.269	k-ft
P_n =	0.592	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	18.592	k
Utilization =	23%	



DETAIL VIEW

5. FOUNDATION DESIGN CALCULATIONS

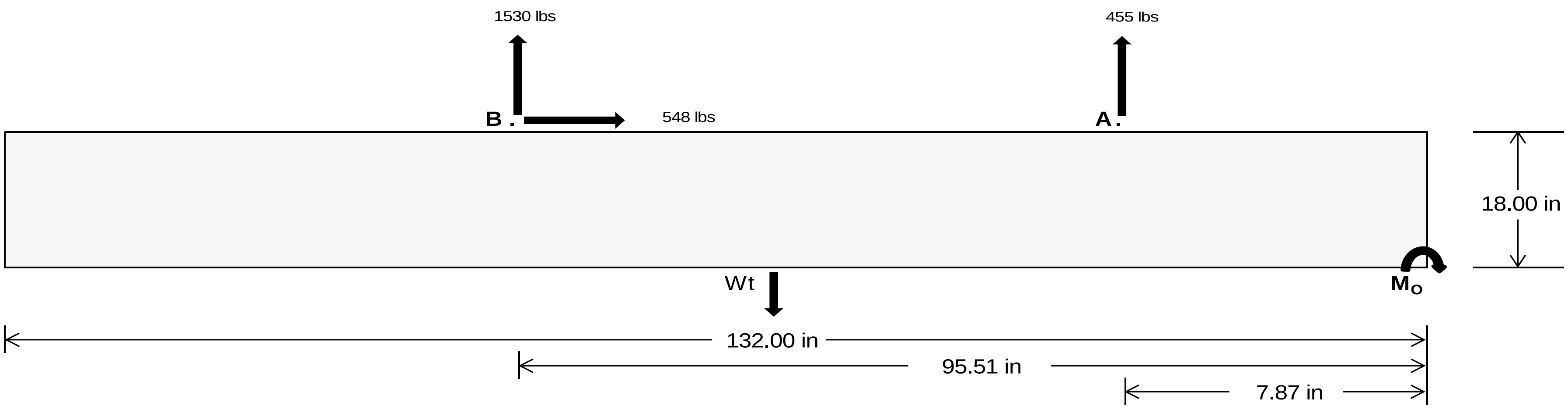
5.1 Helical Pile Foundations

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 =	1988.51	6646.05	k
Compressive Load =	4912.26	5085.66	k
Lateral Load =	269.88	2376.67	k
Moment (Weak Axis) =	0.54	0.35	k

5.2 Design of Ballast Foundations

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



Concrete Properties

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

Footing Reinforcement

Use fiber reinforcing with (3) #5 rebar.

Overturning Check

M_O = 159549.3 in-lbs
Resisting Force Required = 2417.41 lbs
S.F. = 1.67
Weight Required = 4029.02 lbs
Minimum Width = 36 in in
Weight Provided = 7177.50 lbs

A minimum 132in long x 36in wide x 18in tall ballast foundation is required to resist overturning.

Sliding

Force = 548.33 lbs
Friction = 0.4
Weight Required = 1370.81 lbs
Resisting Weight = 7177.50 lbs
Additional Weight Required = 0 lbs

Use a 132in long x 36in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

Cohesion

Sliding Force = 548.33 lbs
Cohesion = 130 psf
Area = 33.00 ft^2
Resisting = 3588.75 lbs
Additional Weight Required = 0 lbs

Use a 132in long x 36in wide x 18in tall ballast foundation. Cohesion is OK.

Shear Key

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

Shear key is not required.

Bearing Pressure

	Ballast Width			
	36 in	37 in	38 in	39 in
P_{ftg} = (145 pcf)(11 ft)(1.5 ft)(3 ft) =	7178 lbs	7377 lbs	7576 lbs	7776 lbs

ASD LC	1.0D + 1.0S				1.0D + 0.6W				1.0D + 0.75L + 0.45W + 0.75S				0.6D + 0.6W			
Width	36 in	37 in	38 in	39 in	36 in	37 in	38 in	39 in	36 in	37 in	38 in	39 in	36 in	37 in	38 in	39 in
F_A	1463 lbs	1463 lbs	1463 lbs	1463 lbs	1956 lbs	1956 lbs	1956 lbs	1956 lbs	2454 lbs	2454 lbs	2454 lbs	2454 lbs	-909 lbs	-909 lbs	-909 lbs	-909 lbs
F_B	1511 lbs	1511 lbs	1511 lbs	1511 lbs	2025 lbs	2025 lbs	2025 lbs	2025 lbs	2539 lbs	2539 lbs	2539 lbs	2539 lbs	-3059 lbs	-3059 lbs	-3059 lbs	-3059 lbs
F_V	123 lbs	123 lbs	123 lbs	123 lbs	960 lbs	960 lbs	960 lbs	960 lbs	804 lbs	804 lbs	804 lbs	804 lbs	-1097 lbs	-1097 lbs	-1097 lbs	-1097 lbs
P_{total}	10151 lbs	10351 lbs	10550 lbs	10750 lbs	11158 lbs	11358 lbs	11557 lbs	11756 lbs	12170 lbs	12370 lbs	12569 lbs	12768 lbs	338 lbs	458 lbs	577 lbs	697 lbs
M	3557 lbs-ft	3557 lbs-ft	3557 lbs-ft	3557 lbs-ft	5936 lbs-ft	5936 lbs-ft	5936 lbs-ft	5936 lbs-ft	6852 lbs-ft	6852 lbs-ft	6852 lbs-ft	6852 lbs-ft	1474 lbs-ft	1474 lbs-ft	1474 lbs-ft	1474 lbs-ft
e	0.35 ft	0.34 ft	0.34 ft	0.33 ft	0.53 ft	0.52 ft	0.51 ft	0.50 ft	0.56 ft	0.55 ft	0.55 ft	0.54 ft	4.36 ft	3.22 ft	2.55 ft	2.12 ft
L/6	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft
f_{min}	248.8 psf	248.0 psf	247.2 psf	246.4 psf	240.0 psf	239.4 psf	238.8 psf	238.3 psf	255.5 psf	254.5 psf	253.5 psf	252.6 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	366.4 psf	362.4 psf	358.6 psf	355.0 psf	436.2 psf	430.3 psf	424.7 psf	419.4 psf	482.0 psf	474.9 psf	468.1 psf	461.7 psf	66.0 psf	43.4 psf	41.2 psf	42.2 psf

Maximum Bearing Pressure = 482 psf
Allowable Bearing Pressure = 1500 psf

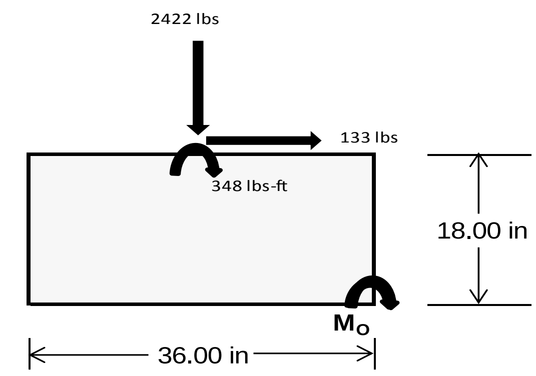
Use a 132in long x 36in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O = 3085.7 ft-lbs
Resisting Force Required = 2057.17 lbs
S.F. = 1.67
Weight Required = 3428.61 lbs
Minimum Width = 36 in in
Weight Provided = 7177.50 lbs

A minimum 132in long x 36in wide x 18in tall ballast foundation is required to resist overturning.



Bearing Pressure

ASD LC	1.238D + 0.875E			1.1785D + 0.65625E + 0.75S			0.362D + 0.875E		
Width	36 in			36 in			36 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	226 lbs	553 lbs	195 lbs	822 lbs	2422 lbs	799 lbs	77 lbs	162 lbs	46 lbs
F_V	184 lbs	181 lbs	185 lbs	137 lbs	133 lbs	142 lbs	184 lbs	182 lbs	184 lbs
P_{total}	9111 lbs	9439 lbs	9081 lbs	9281 lbs	10881 lbs	9257 lbs	2675 lbs	2760 lbs	2645 lbs
M	729 lbs-ft	723 lbs-ft	733 lbs-ft	551 lbs-ft	547 lbs-ft	568 lbs-ft	726 lbs-ft	721 lbs-ft	728 lbs-ft
e	0.08 ft	0.08 ft	0.08 ft	0.06 ft	0.05 ft	0.06 ft	0.27 ft	0.26 ft	0.28 ft
L/6	0.50 ft	0.50 ft	0.50 ft	0.50 ft	0.50 ft	0.50 ft	0.50 ft	0.50 ft	0.50 ft
f_{min}	231.9 psf	242.2 psf	230.8 psf	247.8 psf	296.5 psf	246.1 psf	37.1 psf	39.9 psf	36.0 psf
f_{max}	320.3 psf	329.8 psf	319.6 psf	314.6 psf	362.9 psf	314.9 psf	125.1 psf	127.3 psf	124.2 psf

Maximum Bearing Pressure = 363 psf
Allowable Bearing Pressure = 1500 psf

Use a 132in long x 36in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Foundation Requirements: 132in long x 36in wide x 18in tall ballast foundation and fiber reinforcing with (3) #5 rebar.

5.3 Foundation Anchors

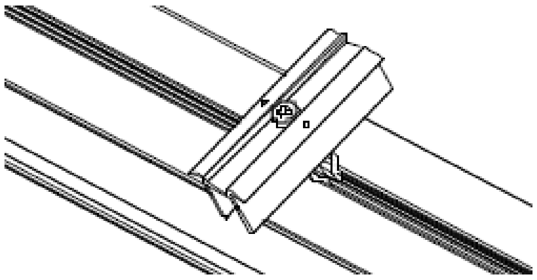
Threaded rods are anchored to the the ballast foundations using the Simpson AT-XP epoxy solution. LRFD load results are compared to the allowable strengths of the epoxy solution. Please see the supplementary calculations provided by the Simpson Anchor Designer software.

6. DESIGN OF JOINTS AND CONNECTIONS

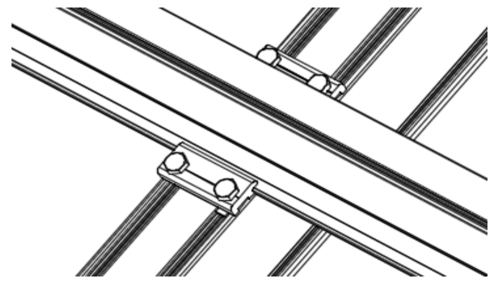
6.1 Anchorage of Modules to Purlins and Connection of Purlins to Girders

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

Fastening of Modules to Purlins		
Maximum Uplifting Force =	0.873	k
Allowable Uplift =	1.214	k
Utilization =	72%	



Fastening of Purlins to Girders		
Maximum Uplifting Force =	2.649	k
Allowable Uplift =	4.357	k
Utilization =	61%	



6.2 Strut Connections

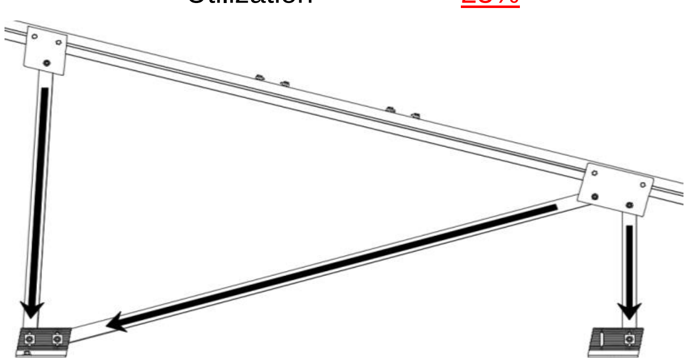
The aluminum struts connect the aluminum girder ends to custom brackets with mounting holes. Single M12 bolts are used to attach each end of the strut to the girder and post. ASTM A193/A193M-86 equivalent stainless steel bolts are used.

Front Strut		
Maximum Axial Load =	3.779	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	51%	

Rear Strut		
Maximum Axial Load =	4.655	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	63%	

Diagonal Strut		
Maximum Axial Load =	1.724	k
M12 Bolt Shear Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	23%	

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

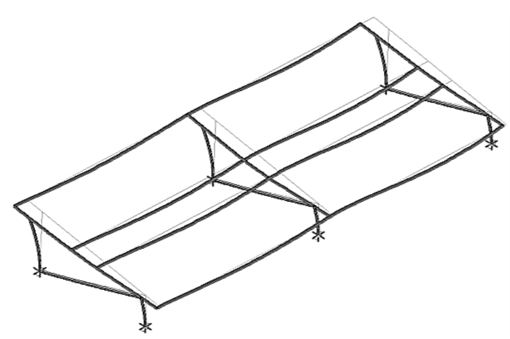
7.1 Seismic Drift

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} =	36.30	in
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$	
	0.726	in
Max Drift, Δ_{MAX} =	0.372	in

0.372 ≤ 0.726, 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

$L_b =$ 102 in

J = 0.432

282.18

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 27.9 ksi

3.4.16

b/t = 32.195

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 25.1 ksi

3.4.16.1 Not Used

Rb/t =

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 37.0588

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

S1 = 36.9

m = 0.65

C_0 = 40.985

Cc = 41.015

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

S2 = 77.2

φF_L= φb[Bbr-mDbr*h/t]

φF_L= 43.2 ksi

φF_LSt= 25.1 ksi

Ix = 897074 mm^4

2.155 in^4

y = 41.015 mm

Sx = 1.335 in³

M_{max}St = 2.788 k-ft

Weak Axis:

3.4.14

$L_b =$ 102

J = 0.432

179.449

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 29.0

3.4.16

b/t = 37.0588

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 23.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 32.195

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

S1 = 36.9

m = 0.65

C_0 = 45.5

Cc = 45.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 23.1 ksi

Iy = 446476 mm^4

1.073 in^4

x = 45.5 mm

Sy = 0.599 in³

M_{max}Wk = 1.152 k-ft

Compression

3.4.9

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

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

3.4.10

Rb/t = 0.0

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

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

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

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

Girder = **BF0**

Strong Axis:

3.4.14

L_b = 88.9 in
J = 1.08
152.913

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

S1 = 0.51461

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

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 29.4 ksi

3.4.16

b/t = 16.2

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

S1 = 12.2

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

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

Weak Axis:

3.4.14

L_b = 88.9
J = 1.08
161.829

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

S1 = 0.51461

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

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 29.2

3.4.16

b/t = 7.4

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

S1 = 12.2

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

S2 = 46.7
φF_L= φyFcy
φF_L= 33.3 ksi

3.4.16.1	Used	**3.4.16.1**
Rb/t =	18.1	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 = φb[Bt-Dt*√(Rb/t)]

φF_L = 31.1 ksi

3.4.18

h/t = 7.4

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

S1 = 35.2
m = 0.68
C_0 = 41.067
Cc = 43.717

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

S2 = 73.8
φF_L = 1.3φyFcy
φF_L = 43.2 ksi

$\varphi F_L St$ = 29.4 ksi
Ix = 984962 mm^4
2.366 in^4
y = 43.717 mm
Sx = 1.375 in^3
$M_{max}St$ = 3.363 k-ft

3.4.18

h/t = 16.2

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

S1 = 36.9
m = 0.65
C_0 = 40
Cc = 40

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

S2 = 77.3
φF_L = 1.3φyFcy
φF_L = 43.2 ksi

$\varphi F_L Wk$ = 33.3 ksi
Iy = 923544 mm^4
2.219 in^4
x = 40 mm
Sy = 1.409 in^3
$M_{max}Wk$ = 3.904 k-ft

Compression

3.4.9

b/t = 16.2
S1 = 12.21 (See 3.4.16 above for formula)
S2 = 32.70 (See 3.4.16 above for formula)
φF_L = φc[Bp-1.6Dp*b/t]
φF_L = 31.6 ksi

b/t = 7.4
S1 = 12.21
S2 = 32.70
φF_L = φyFcy
φF_L = 33.3 ksi

3.4.10

Rb/t = 18.1

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

S1 = 6.87
S2 = 131.3
φF_L = φc[Bt-Dt*√(Rb/t)]
φF_L = 31.09 ksi

φF_L = 31.09 ksi
A = 1215.13 mm^2
1.88 in^2
P_{max} = 58.55 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 24.8 in

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4 ksi

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

Weak Axis:

3.4.14

L_b = 24.8

J = 0.942

38.7028

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

S1 = 0.51461

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

S2 = 1701.56

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

φF_L= 31.4

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

$\lambda =$ 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

$\varphi cc =$ 0.87952

$\varphi F_L = \varphi cc(Bc\text{-}Dc^*\lambda)$

$\varphi F_L =$ 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)

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

$\varphi F_L =$ 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

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

$\varphi F_L =$ 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

$\varphi F_L = \varphi yFcy$

$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 28.03 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 28.85 kips

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

Strut = **55x55**

Strong Axis:

3.4.14

$L_b =$ 86.60 in

J = 0.942

135.148

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

S1 = 0.51461

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

S2 = 1701.56

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

$\varphi F_L =$ 29.6 ksi

Weak Axis:

3.4.14

$L_b =$ 86.6

J = 0.942

135.148

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

S1 = 0.51461

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

S2 = 1701.56

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

$\varphi F_L =$ 29.6

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

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

$\varphi F_L =$ 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

$\varphi F_L = 1.17\varphi yFcy$

$\varphi F_L =$ 38.9 ksi

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St =$ 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

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

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7

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

$\varphi F_L =$ 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L Wk =$ 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

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

Compression

3.4.7

λ = 2.00335

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.86047

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

$\varphi F_L =$ 7.50396 ksi

3.4.9

b/t = 24.5
S1 = 12.21 (See 3.4.16 above for formula)
S2 = 32.70 (See 3.4.16 above for formula)
$\varphi F_L = \varphi c[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 28.2 ksi

b/t = 24.5
S1 = 12.21
S2 = 32.70
$\varphi F_L = \varphi c[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 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
$\varphi F_L = \varphi yFcy$
$\varphi F_L =$ 33.25 ksi

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

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

Strut = **55x55**

Strong Axis:

3.4.14

$L_b =$ 48.30 in
J = 0.942
75.3767

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

S1 = 0.51461

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

S2 = 1701.56
$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)/2}))}]$
$\varphi F_L =$ 30.6 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
$\varphi F_L = \varphi b[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 28.2 ksi

Weak Axis:

3.4.14

$L_b =$ 48.3
J = 0.942
75.3767

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

S1 = 0.51461

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

S2 = 1701.56
$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)/2}))}]$
$\varphi F_L =$ 30.6

3.4.16

b/t = 24.5

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

S1 = 12.2

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

S2 = 46.7
$\varphi F_L = \varphi b[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18 (Strong)

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

3.4.18 (Weak)

h/t = 24.5

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

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

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

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 1.11734

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.76536

φF_L= φcc(Bc-Dc*λ)

φF_L= 18.9268 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

$\varphi F_L = \varphi yFcy$

$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 18.93 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 19.48 kips

APPENDIX B

B.1

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

Basic Load Cases

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

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

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Y	-8.366	-8.366	0	0
2	M14	Y	-8.366	-8.366	0	0
3	M15	Y	-8.366	-8.366	0	0
4	M16	Y	-8.366	-8.366	0	0

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

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Y	-4.45	-4.45	0	0
2	M14	Y	-4.45	-4.45	0	0
3	M15	Y	-4.45	-4.45	0	0
4	M16	Y	-4.45	-4.45	0	0

Member Distributed Loads (BLC 3 : Snow Load)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Y	-61.093	-61.093	0	0
2	M14	Y	-61.093	-61.093	0	0
3	M15	Y	-61.093	-61.093	0	0
4	M16	Y	-61.093	-61.093	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	-112.091	-112.091	0	0
2	M14	y	-112.091	-112.091	0	0
3	M15	y	-179.345	-179.345	0	0
4	M16	y	-179.345	-179.345	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	257.809	257.809	0	0
2	M14	y	199.522	199.522	0	0
3	M15	y	112.091	112.091	0	0
4	M16	y	112.091	112.091	0	0

Member Distributed Loads (BLC 6 : Seismic - Lateral)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Z	6.693	6.693	0	0
2	M14	Z	6.693	6.693	0	0
3	M15	Z	6.693	6.693	0	0
4	M16	Z	6.693	6.693	0	0
5	M13	Z	0	0	0	0
6	M14	Z	0	0	0	0
7	M15	Z	0	0	0	0
8	M16	Z	0	0	0	0

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	LRFD 1.2D + 1.6S + 0.5W	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	459.907	2	1227.249	2	.759	1	.003	1	0	1	0	1
2		min	-584.66	3	-1581.817	3	-69.327	5	-.264	4	0	1	0	1
3	N7	max	.023	9	1253.899	1	-.281	12	0	12	0	1	0	1
4		min	-.154	2	-458.695	3	-207.597	4	-.419	4	0	1	0	1
5	N15	max	.02	9	3778.661	2	0	1	0	1	0	1	0	1
6		min	-1.802	2	-1529.624	3	-200.885	5	-.41	4	0	1	0	1
7	N16	max	1646.89	2	3912.049	2	0	3	0	3	0	1	0	1
8		min	-1828.206	3	-5112.349	3	-69.27	5	-.266	4	0	1	0	1
9	N23	max	.025	14	1253.899	1	5.457	1	.012	1	0	1	0	1
10		min	-.154	2	-458.695	3	-204.148	4	-.413	4	0	1	0	1
11	N24	max	459.907	2	1227.249	2	-.049	12	0	12	0	1	0	1
12		min	-584.66	3	-1581.817	3	-69.708	5	-.266	4	0	1	0	1
13	Totals:	max	2564.592	2	12591.847	2	0	1						
14		min	-2998.605	3	-10722.997	3	-817.7	5						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
1	M13	1	max	66.3	4	507.684	1	-4.548	12	0	3	.14	1	0	4
2			min	3.266	12	-805.345	3	-114.918	1	-.016	2	.008	12	0	3
3		2	max	58.943	1	354.774	1	-3.675	12	0	3	.059	4	.648	3
4			min	3.266	12	-566.747	3	-88.129	1	-.016	2	.002	10	-.407	1
5		3	max	58.943	1	201.864	1	-2.802	12	0	3	.033	5	1.071	3
6			min	3.266	12	-328.149	3	-61.34	1	-.016	2	-.027	1	-.67	1
7		4	max	58.943	1	48.954	1	-1.929	12	0	3	.018	5	1.268	3
8			min	3.266	12	-89.551	3	-34.551	1	-.016	2	-.072	1	-.789	1
9		5	max	58.943	1	149.046	3	-.195	10	0	3	.004	5	1.24	3
10			min	3.266	12	-103.956	1	-15.765	4	-.016	2	-.092	1	-.763	1
11		6	max	58.943	1	387.644	3	19.027	1	0	3	-.003	12	.986	3
12			min	3.266	12	-256.867	1	-12.511	5	-.016	2	-.087	1	-.592	1
13		7	max	58.943	1	626.242	3	45.816	1	0	3	-.003	12	.507	3
14			min	-4.192	5	-409.777	1	-11.16	5	-.016	2	-.056	1	-.277	1
15		8	max	58.943	1	864.839	3	72.605	1	0	3	.002	2	.182	1
16			min	-13.886	5	-562.687	1	-9.809	5	-.016	2	-.03	4	-.197	3
17		9	max	58.943	1	1103.437	3	99.395	1	0	3	.081	1	.785	1
18			min	-23.581	5	-715.597	1	-8.458	5	-.016	2	-.038	5	-1.126	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	58.943	1	1342.035	3	126.184	1	.016	2	.188	1	1.534	1
20			min	3.266	12	-868.508	1	-73.008	14	0	12	.003	12	-2.281	3
21		11	max	58.943	1	715.597	1	-2.438	12	.016	2	.081	1	.785	1
22			min	3.266	12	-1103.437	3	-99.395	1	0	3	0	3	-1.126	3
23		12	max	58.943	1	562.687	1	-1.564	12	.016	2	.029	4	.182	1
24			min	3.266	12	-864.839	3	-72.605	1	0	3	-.003	3	-.197	3
25		13	max	58.943	1	409.777	1	-.691	12	.016	2	.014	5	.507	3
26			min	3.266	12	-626.242	3	-45.816	1	0	3	-.056	1	-.277	1
27		14	max	58.943	1	256.867	1	.403	3	.016	2	0	15	.986	3
28			min	.273	15	-387.644	3	-19.027	1	0	3	-.087	1	-.592	1
29		15	max	58.943	1	103.956	1	7.762	1	.016	2	-.003	12	1.24	3
30			min	-9.21	5	-149.046	3	-13.033	5	0	3	-.092	1	-.763	1
31		16	max	58.943	1	89.551	3	34.551	1	.016	2	-.001	12	1.268	3
32			min	-18.905	5	-48.954	1	-11.682	5	0	3	-.072	1	-.789	1
33		17	max	58.943	1	328.149	3	61.34	1	.016	2	.002	3	1.071	3
34			min	-28.599	5	-201.864	1	-10.331	5	0	3	-.041	4	-.67	1
35		18	max	58.943	1	566.747	3	88.129	1	.016	2	.044	1	.648	3
36			min	-38.294	5	-354.774	1	-8.98	5	0	3	-.045	5	-.407	1
37		19	max	58.943	1	805.345	3	114.918	1	.016	2	.14	1	0	1
38			min	-47.989	5	-507.684	1	-7.628	5	0	3	-.052	5	0	3
39	M14	1	max	49.405	4	553.616	1	-4.683	12	.011	3	.163	1	0	1
40			min	1.444	12	-647.657	3	-118.978	1	-.014	2	.009	12	0	3
41		2	max	39.71	4	400.705	1	-3.81	12	.011	3	.088	4	.525	3
42			min	1.444	12	-464.108	3	-92.189	1	-.014	2	.004	10	-.451	1
43		3	max	30.396	1	247.795	1	-2.936	12	.011	3	.05	5	.877	3
44			min	1.444	12	-280.559	3	-65.4	1	-.014	2	-.012	1	-.757	1
45		4	max	30.396	1	94.885	1	-2.063	12	.011	3	.027	5	1.055	3
46			min	1.444	12	-97.011	3	-38.61	1	-.014	2	-.061	1	-.919	1
47		5	max	30.396	1	86.538	3	-.547	10	.011	3	.006	5	1.06	3
48			min	1.444	12	-58.025	1	-24.48	4	-.014	2	-.084	1	-.936	1
49		6	max	30.396	1	270.087	3	14.968	1	.011	3	-.003	12	.891	3
50			min	-5.265	5	-210.936	1	-20.254	5	-.014	2	-.083	1	-.809	1
51		7	max	30.396	1	453.636	3	41.757	1	.011	3	-.003	12	.55	3
52			min	-14.959	5	-363.846	1	-18.903	5	-.014	2	-.056	1	-.538	1
53		8	max	30.396	1	637.185	3	68.546	1	.011	3	0	10	.035	3
54			min	-24.654	5	-516.756	1	-17.552	5	-.014	2	-.051	4	-.137	2
55		9	max	30.396	1	820.734	3	95.335	1	.011	3	.073	1	.438	1
56			min	-34.349	5	-669.666	1	-16.2	5	-.014	2	-.065	5	-.654	3
57		10	max	53.079	4	1004.283	3	122.124	1	.014	2	.176	1	1.143	1
58			min	1.444	12	-822.576	1	-74.866	14	-.011	3	.002	12	-1.516	3
59		11	max	43.384	4	669.666	1	-2.303	12	.014	2	.088	4	.438	1
60			min	1.444	12	-820.734	3	-95.335	1	-.011	3	0	3	-.654	3
61		12	max	33.689	4	516.756	1	-1.43	12	.014	2	.049	5	.035	3
62			min	1.444	12	-637.185	3	-68.546	1	-.011	3	-.004	1	-.137	2
63		13	max	30.396	1	363.846	1	-.557	12	.014	2	.026	5	.55	3
64			min	1.444	12	-453.636	3	-41.757	1	-.011	3	-.056	1	-.538	1
65		14	max	30.396	1	210.936	1	.604	3	.014	2	.005	5	.891	3
66			min	1.444	12	-270.087	3	-25.034	4	-.011	3	-.083	1	-.809	1
67		15	max	30.396	1	58.025	1	11.821	1	.014	2	-.002	12	1.06	3
68			min	-1.487	5	-86.538	3	-20.366	5	-.011	3	-.084	1	-.936	1
69		16	max	30.396	1	97.011	3	38.61	1	.014	2	0	12	1.055	3
70			min	-11.182	5	-94.885	1	-19.015	5	-.011	3	-.061	1	-.919	1
71		17	max	30.396	1	280.559	3	65.4	1	.014	2	.003	3	.877	3
72			min	-20.877	5	-247.795	1	-17.664	5	-.011	3	-.054	4	-.757	1
73		18	max	30.396	1	464.108	3	92.189	1	.014	2	.063	1	.525	3
74			min	-30.572	5	-400.705	1	-16.312	5	-.011	3	-.067	5	-.451	1
75		19	max	30.396	1	647.657	3	118.978	1	.014	2	.163	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	-40.267	5	-553.616	1	-14.961	5	-.011	3	-.082	5	0	3
77	M15	1	max	68.394	5	741.162	2	-4.622	12	.014	2	.177	4	0	2
78			min	-31.617	1	-369.438	3	-118.981	1	-.01	3	.008	12	0	3
79		2	max	58.699	5	533.109	2	-3.748	12	.014	2	.122	4	.301	3
80			min	-31.617	1	-268.463	3	-92.192	1	-.01	3	.004	10	-.602	2
81		3	max	49.004	5	325.056	2	-2.875	12	.014	2	.075	5	.507	3
82			min	-31.617	1	-167.488	3	-65.403	1	-.01	3	-.012	1	-1.007	2
83		4	max	39.309	5	117.003	2	-2.002	12	.014	2	.043	5	.618	3
84			min	-31.617	1	-66.513	3	-41.406	4	-.01	3	-.061	1	-1.216	2
85		5	max	29.614	5	34.462	3	-.577	10	.014	2	.012	5	.633	3
86			min	-31.617	1	-91.05	2	-34.704	4	-.01	3	-.085	1	-1.228	2
87		6	max	19.92	5	135.438	3	14.965	1	.014	2	-.003	12	.553	3
88			min	-31.617	1	-299.103	2	-30.473	5	-.01	3	-.083	1	-1.044	2
89		7	max	10.225	5	236.413	3	41.754	1	.014	2	-.003	12	.377	3
90			min	-31.617	1	-507.156	2	-29.122	5	-.01	3	-.057	4	-.663	2
91		8	max	.53	5	337.388	3	68.543	1	.014	2	0	10	.106	3
92			min	-31.617	1	-715.209	2	-27.771	5	-.01	3	-.074	4	-.096	1
93		9	max	-1.817	12	438.363	3	95.332	1	.014	2	.073	1	.688	2
94			min	-31.617	1	-923.262	2	-26.42	5	-.01	3	-.098	5	-.26	3
95		10	max	-1.817	12	539.338	3	122.121	1	.01	3	.176	4	1.658	2
96			min	-31.617	1	-1131.315	2	-80.046	14	-.014	2	.003	12	-.722	3
97		11	max	5.773	5	923.262	2	-2.365	12	.01	3	.121	4	.688	2
98			min	-31.617	1	-438.363	3	-95.332	1	-.014	2	0	3	-.26	3
99		12	max	-1.817	12	715.209	2	-1.491	12	.01	3	.072	5	.106	3
100			min	-31.617	1	-337.388	3	-68.543	1	-.014	2	-.004	1	-.096	1
101		13	max	-1.817	12	507.156	2	-.618	12	.01	3	.04	5	.377	3
102			min	-31.617	1	-236.413	3	-41.97	4	-.014	2	-.056	1	-.663	2
103		14	max	-1.817	12	299.103	2	.503	3	.01	3	.009	5	.553	3
104			min	-31.617	1	-135.438	3	-35.268	4	-.014	2	-.083	1	-1.044	2
105		15	max	-1.817	12	91.05	2	11.824	1	.01	3	-.002	12	.633	3
106			min	-39.81	4	-34.462	3	-30.586	5	-.014	2	-.085	1	-1.228	2
107		16	max	-1.817	12	66.513	3	38.613	1	.01	3	0	12	.618	3
108			min	-49.505	4	-117.003	2	-29.235	5	-.014	2	-.061	4	-1.216	2
109		17	max	-1.817	12	167.488	3	65.403	1	.01	3	.002	3	.507	3
110			min	-59.199	4	-325.056	2	-27.884	5	-.014	2	-.079	4	-1.007	2
111		18	max	-1.817	12	268.463	3	92.192	1	.01	3	.063	1	.301	3
112			min	-68.894	4	-533.109	2	-26.532	5	-.014	2	-.101	5	-.602	2
113		19	max	-1.817	12	369.438	3	118.981	1	.01	3	.163	1	0	2
114			min	-78.589	4	-741.162	2	-25.181	5	-.014	2	-.126	5	0	5
115	M16	1	max	67.912	5	695.208	2	-4.342	12	.012	1	.141	1	0	2
116			min	-62.421	1	-333.232	3	-115.154	1	-.013	3	.007	12	0	3
117		2	max	58.217	5	487.155	2	-3.469	12	.012	1	.088	4	.267	3
118			min	-62.421	1	-232.257	3	-88.365	1	-.013	3	.003	10	-.558	2
119		3	max	48.522	5	279.102	2	-2.595	12	.012	1	.054	5	.439	3
120			min	-62.421	1	-131.282	3	-61.576	1	-.013	3	-.026	1	-.92	2
121		4	max	38.827	5	71.048	2	-1.722	12	.012	1	.031	5	.515	3
122			min	-62.421	1	-30.307	3	-34.787	1	-.013	3	-.072	1	-1.086	2
123		5	max	29.132	5	70.668	3	-.321	10	.012	1	.009	5	.496	3
124			min	-62.421	1	-137.005	2	-24.178	4	-.013	3	-.092	1	-1.054	2
125		6	max	19.437	5	171.644	3	18.792	1	.012	1	-.003	12	.382	3
126			min	-62.421	1	-345.058	2	-20.853	5	-.013	3	-.087	1	-.827	2
127		7	max	9.742	5	272.619	3	45.581	1	.012	1	-.003	12	.172	3
128			min	-62.421	1	-553.111	2	-19.502	5	-.013	3	-.056	1	-.403	2
129		8	max	.075	15	373.594	3	72.37	1	.012	1	.001	2	.218	2
130			min	-62.421	1	-761.164	2	-18.151	5	-.013	3	-.049	4	-.133	3
131		9	max	-3.126	12	474.569	3	99.159	1	.012	1	.08	1	1.035	2
132			min	-62.421	1	-969.217	2	-16.8	5	-.013	3	-.064	5	-.534	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
133		10	max	-3.126	12	575.544	3	125.948	1	.013	3	.187	1	2.049	2
134			min	-62.421	1	-1177.27	2	-77.19	14	-.012	1	.003	12	-1.03	3
135		11	max	3.328	5	969.217	2	-2.644	12	.013	3	.089	4	1.035	2
136			min	-62.421	1	-474.569	3	-99.159	1	-.012	1	0	3	-.534	3
137		12	max	-3.126	12	761.164	2	-1.771	12	.013	3	.048	4	.218	2
138			min	-62.421	1	-373.594	3	-72.37	1	-.012	1	-.003	3	-.133	3
139		13	max	-3.126	12	553.111	2	-.898	12	.013	3	.024	5	.172	3
140			min	-62.421	1	-272.619	3	-45.581	1	-.012	1	-.056	1	-.403	2
141		14	max	-3.126	12	345.058	2	.058	3	.013	3	.002	5	.382	3
142			min	-62.421	1	-171.644	3	-26.701	4	-.012	1	-.087	1	-.827	2
143		15	max	-3.126	12	137.005	2	7.998	1	.013	3	-.003	12	.496	3
144			min	-62.421	1	-70.668	3	-21.365	5	-.012	1	-.092	1	-1.054	2
145		16	max	-3.126	12	30.307	3	34.787	1	.013	3	-.002	12	.515	3
146			min	-62.421	1	-71.048	2	-20.014	5	-.012	1	-.072	1	-1.086	2
147		17	max	-3.126	12	131.282	3	61.576	1	.013	3	0	3	.439	3
148			min	-68.053	4	-279.102	2	-18.663	5	-.012	1	-.062	4	-.92	2
149		18	max	-3.126	12	232.257	3	88.365	1	.013	3	.045	1	.267	3
150			min	-77.748	4	-487.155	2	-17.312	5	-.012	1	-.073	5	-.558	2
151		19	max	-3.126	12	333.232	3	115.154	1	.013	3	.141	1	0	2
152			min	-87.443	4	-695.208	2	-15.961	5	-.012	1	-.089	5	0	5
153	M2	1	max	1128.593	1	2.338	4	.842	1	0	3	0	3	0	1
154			min	-1440.93	3	.574	15	-64.328	4	0	4	0	1	0	1
155		2	max	1128.921	1	2.323	4	.842	1	0	3	0	1	0	15
156			min	-1440.684	3	.571	15	-64.613	4	0	4	-.014	4	0	4
157		3	max	1129.25	1	2.308	4	.842	1	0	3	0	1	0	15
158			min	-1440.438	3	.567	15	-64.897	4	0	4	-.029	4	-.001	4
159		4	max	1129.578	1	2.293	4	.842	1	0	3	0	1	0	15
160			min	-1440.191	3	.564	15	-65.182	4	0	4	-.043	4	-.002	4
161		5	max	1129.907	1	2.277	4	.842	1	0	3	0	1	0	15
162			min	-1439.945	3	.56	15	-65.467	4	0	4	-.058	4	-.002	4
163		6	max	1130.235	1	2.262	4	.842	1	0	3	0	1	0	15
164			min	-1439.699	3	.556	15	-65.752	4	0	4	-.072	4	-.003	4
165		7	max	1130.564	1	2.247	4	.842	1	0	3	.001	1	0	15
166			min	-1439.452	3	.553	15	-66.037	4	0	4	-.087	4	-.003	4
167		8	max	1130.892	1	2.232	4	.842	1	0	3	.001	1	0	15
168			min	-1439.206	3	.549	15	-66.321	4	0	4	-.101	4	-.004	4
169		9	max	1131.22	1	2.216	4	.842	1	0	3	.001	1	0	15
170			min	-1438.96	3	.546	15	-66.606	4	0	4	-.116	4	-.004	4
171		10	max	1131.549	1	2.201	4	.842	1	0	3	.002	1	-.001	15
172			min	-1438.713	3	.542	15	-66.891	4	0	4	-.131	4	-.005	4
173		11	max	1131.877	1	2.186	4	.842	1	0	3	.002	1	-.001	15
174			min	-1438.467	3	.539	15	-67.176	4	0	4	-.146	4	-.005	4
175		12	max	1132.206	1	2.171	4	.842	1	0	3	.002	1	-.001	15
176			min	-1438.221	3	.535	15	-67.461	4	0	4	-.161	4	-.005	4
177		13	max	1132.534	1	2.155	4	.842	1	0	3	.002	1	-.001	15
178			min	-1437.974	3	.531	15	-67.746	4	0	4	-.176	4	-.006	4
179		14	max	1132.863	1	2.14	4	.842	1	0	3	.002	1	-.002	15
180			min	-1437.728	3	.528	15	-68.03	4	0	4	-.191	4	-.006	4
181		15	max	1133.191	1	2.125	4	.842	1	0	3	.003	1	-.002	15
182			min	-1437.482	3	.524	15	-68.315	4	0	4	-.206	4	-.007	4
183		16	max	1133.519	1	2.11	4	.842	1	0	3	.003	1	-.002	15
184			min	-1437.235	3	.52	12	-68.6	4	0	4	-.221	4	-.007	4
185		17	max	1133.848	1	2.094	4	.842	1	0	3	.003	1	-.002	15
186			min	-1436.989	3	.514	12	-68.885	4	0	4	-.236	4	-.008	4
187		18	max	1134.176	1	2.079	4	.842	1	0	3	.003	1	-.002	15
188			min	-1436.743	3	.508	12	-69.17	4	0	4	-.251	4	-.008	4
189		19	max	1134.505	1	2.064	4	.842	1	0	3	.003	1	-.002	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
190			min	-1436.496	3	.502	12	-69.455	4	0	4	-.267	4	-.009	4
191	M3	1	max	436.451	2	8.108	4	.019	1	0	3	0	1	.009	4
192			min	-552.843	3	1.919	15	-1.152	5	0	4	-.01	4	.002	15
193		2	max	436.28	2	7.336	4	.019	1	0	3	0	1	.006	4
194			min	-552.971	3	1.737	15	-.609	5	0	4	-.01	4	.001	12
195		3	max	436.11	2	6.563	4	.028	14	0	3	0	1	.003	2
196			min	-553.099	3	1.556	15	-.067	5	0	4	-.011	4	0	3
197		4	max	435.94	2	5.791	4	.523	4	0	3	0	1	0	2
198			min	-553.226	3	1.374	15	.001	12	0	4	-.01	4	-.002	3
199		5	max	435.769	2	5.019	4	1.065	4	0	3	0	1	0	15
200			min	-553.354	3	1.193	15	.001	12	0	4	-.01	4	-.003	3
201		6	max	435.599	2	4.246	4	1.608	4	0	3	0	1	0	15
202			min	-553.482	3	1.011	15	.001	12	0	4	-.009	4	-.004	6
203		7	max	435.429	2	3.474	4	2.15	4	0	3	0	1	-.001	15
204			min	-553.61	3	.83	15	.001	12	0	4	-.009	5	-.006	6
205		8	max	435.258	2	2.701	4	2.692	4	0	3	0	1	-.002	15
206			min	-553.738	3	.648	15	.001	12	0	4	-.008	5	-.007	6
207		9	max	435.088	2	1.929	4	3.234	4	0	3	0	1	-.002	15
208			min	-553.865	3	.466	15	.001	12	0	4	-.006	5	-.008	6
209		10	max	434.917	2	1.156	4	3.776	4	0	3	0	1	-.002	15
210			min	-553.993	3	.285	15	.001	12	0	4	-.005	5	-.009	6
211		11	max	434.747	2	.456	2	4.318	4	0	3	0	1	-.002	15
212			min	-554.121	3	-.038	3	.001	12	0	4	-.003	5	-.009	6
213		12	max	434.577	2	-.078	15	4.86	4	0	3	0	1	-.002	15
214			min	-554.249	3	-.49	3	.001	12	0	4	-.001	5	-.009	6
215		13	max	434.406	2	-.26	15	5.402	4	0	3	0	4	-.002	15
216			min	-554.376	3	-1.162	6	.001	12	0	4	0	12	-.009	6
217		14	max	434.236	2	-.441	15	5.945	4	0	3	.003	4	-.002	15
218			min	-554.504	3	-1.934	6	.001	12	0	4	0	12	-.008	6
219		15	max	434.066	2	-.623	15	6.487	4	0	3	.006	4	-.002	15
220			min	-554.632	3	-2.707	6	.001	12	0	4	0	12	-.007	6
221		16	max	433.895	2	-.805	15	7.029	4	0	3	.009	4	-.001	15
222			min	-554.76	3	-3.479	6	.001	12	0	4	0	12	-.006	6
223		17	max	433.725	2	-.986	15	7.571	4	0	3	.012	4	0	15
224			min	-554.887	3	-4.252	6	.001	12	0	4	0	12	-.004	6
225		18	max	433.555	2	-1.168	15	8.113	4	0	3	.015	4	0	15
226			min	-555.015	3	-5.024	6	.001	12	0	4	0	12	-.002	6
227		19	max	433.384	2	-1.349	15	8.655	4	0	3	.019	4	0	1
228			min	-555.143	3	-5.797	6	.001	12	0	4	0	12	0	1
229	M4	1	max	1250.833	1	0	1	-.279	12	0	1	.01	4	0	1
230			min	-460.994	3	0	1	-206.041	4	0	1	0	10	0	1
231		2	max	1251.003	1	0	1	-.279	12	0	1	0	12	0	1
232			min	-460.867	3	0	1	-206.188	4	0	1	-.014	4	0	1
233		3	max	1251.174	1	0	1	-.279	12	0	1	0	12	0	1
234			min	-460.739	3	0	1	-206.336	4	0	1	-.037	4	0	1
235		4	max	1251.344	1	0	1	-.279	12	0	1	0	12	0	1
236			min	-460.611	3	0	1	-206.483	4	0	1	-.061	4	0	1
237		5	max	1251.514	1	0	1	-.279	12	0	1	0	12	0	1
238			min	-460.483	3	0	1	-206.631	4	0	1	-.085	4	0	1
239		6	max	1251.685	1	0	1	-.279	12	0	1	0	12	0	1
240			min	-460.356	3	0	1	-206.779	4	0	1	-.109	4	0	1
241		7	max	1251.855	1	0	1	-.279	12	0	1	0	12	0	1
242			min	-460.228	3	0	1	-206.926	4	0	1	-.132	4	0	1
243		8	max	1252.025	1	0	1	-.279	12	0	1	0	12	0	1
244			min	-460.1	3	0	1	-207.074	4	0	1	-.156	4	0	1
245		9	max	1252.196	1	0	1	-.279	12	0	1	0	12	0	1
246			min	-459.972	3	0	1	-207.222	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
247		10	max	1252.366	1	0	1	-.279	12	0	1	0	12	0	1
248			min	-459.845	3	0	1	-207.369	4	0	1	-.204	4	0	1
249		11	max	1252.536	1	0	1	-.279	12	0	1	0	12	0	1
250			min	-459.717	3	0	1	-207.517	4	0	1	-.228	4	0	1
251		12	max	1252.707	1	0	1	-.279	12	0	1	0	12	0	1
252			min	-459.589	3	0	1	-207.665	4	0	1	-.251	4	0	1
253		13	max	1252.877	1	0	1	-.279	12	0	1	0	12	0	1
254			min	-459.461	3	0	1	-207.812	4	0	1	-.275	4	0	1
255		14	max	1253.047	1	0	1	-.279	12	0	1	0	12	0	1
256			min	-459.334	3	0	1	-207.96	4	0	1	-.299	4	0	1
257		15	max	1253.218	1	0	1	-.279	12	0	1	0	12	0	1
258			min	-459.206	3	0	1	-208.107	4	0	1	-.323	4	0	1
259		16	max	1253.388	1	0	1	-.279	12	0	1	0	12	0	1
260			min	-459.078	3	0	1	-208.255	4	0	1	-.347	4	0	1
261		17	max	1253.558	1	0	1	-.279	12	0	1	0	12	0	1
262			min	-458.95	3	0	1	-208.403	4	0	1	-.371	4	0	1
263		18	max	1253.729	1	0	1	-.279	12	0	1	0	12	0	1
264			min	-458.822	3	0	1	-208.55	4	0	1	-.395	4	0	1
265		19	max	1253.899	1	0	1	-.279	12	0	1	0	12	0	1
266			min	-458.695	3	0	1	-208.698	4	0	1	-.419	4	0	1
267	M6	1	max	3577.027	1	2.974	2	0	1	0	1	0	4	0	1
268			min	-4654.965	3	-.146	3	-64.868	4	0	4	0	1	0	1
269		2	max	3577.355	1	2.963	2	0	1	0	1	0	1	0	3
270			min	-4654.719	3	-.155	3	-65.152	4	0	4	-.014	4	0	2
271		3	max	3577.684	1	2.951	2	0	1	0	1	0	1	0	3
272			min	-4654.472	3	-.163	3	-65.437	4	0	4	-.029	4	-.001	2
273		4	max	3578.012	1	2.939	2	0	1	0	1	0	1	0	3
274			min	-4654.226	3	-.172	3	-65.722	4	0	4	-.043	4	-.002	2
275		5	max	3578.341	1	2.927	2	0	1	0	1	0	1	0	3
276			min	-4653.98	3	-.181	3	-66.007	4	0	4	-.058	4	-.003	2
277		6	max	3578.669	1	2.915	2	0	1	0	1	0	1	0	3
278			min	-4653.733	3	-.19	3	-66.292	4	0	4	-.073	4	-.003	2
279		7	max	3578.998	1	2.903	2	0	1	0	1	0	1	0	3
280			min	-4653.487	3	-.199	3	-66.576	4	0	4	-.087	4	-.004	2
281		8	max	3579.326	1	2.891	2	0	1	0	1	0	1	0	3
282			min	-4653.241	3	-.208	3	-66.861	4	0	4	-.102	4	-.005	2
283		9	max	3579.655	1	2.879	2	0	1	0	1	0	1	0	3
284			min	-4652.994	3	-.217	3	-67.146	4	0	4	-.117	4	-.005	2
285		10	max	3579.983	1	2.867	2	0	1	0	1	0	1	0	3
286			min	-4652.748	3	-.226	3	-67.431	4	0	4	-.132	4	-.006	2
287		11	max	3580.311	1	2.855	2	0	1	0	1	0	1	0	3
288			min	-4652.502	3	-.235	3	-67.716	4	0	4	-.147	4	-.006	2
289		12	max	3580.64	1	2.844	2	0	1	0	1	0	1	0	3
290			min	-4652.255	3	-.244	3	-68.001	4	0	4	-.162	4	-.007	2
291		13	max	3580.968	1	2.832	2	0	1	0	1	0	1	0	3
292			min	-4652.009	3	-.253	3	-68.285	4	0	4	-.177	4	-.008	2
293		14	max	3581.297	1	2.82	2	0	1	0	1	0	1	0	3
294			min	-4651.763	3	-.262	3	-68.57	4	0	4	-.192	4	-.008	2
295		15	max	3581.625	1	2.808	2	0	1	0	1	0	1	0	3
296			min	-4651.516	3	-.27	3	-68.855	4	0	4	-.207	4	-.009	2
297		16	max	3581.954	1	2.796	2	0	1	0	1	0	1	0	3
298			min	-4651.27	3	-.279	3	-69.14	4	0	4	-.223	4	-.01	2
299		17	max	3582.282	1	2.784	2	0	1	0	1	0	1	0	3
300			min	-4651.024	3	-.288	3	-69.425	4	0	4	-.238	4	-.01	2
301		18	max	3582.61	1	2.772	2	0	1	0	1	0	1	0	3
302			min	-4650.778	3	-.297	3	-69.71	4	0	4	-.253	4	-.011	2
303		19	max	3582.939	1	2.76	2	0	1	0	1	0	1	0	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
304			min	-4650.531	3	-.306	3	-69.994	4	0	4	-.269	4	-.011	2
305	M7	1	max	1581.091	2	8.112	6	0	1	0	1	0	1	.011	2
306			min	-1721.343	3	1.904	15	-1.222	5	0	4	-.01	4	0	3
307		2	max	1580.92	2	7.339	6	0	1	0	1	0	1	.009	2
308			min	-1721.47	3	1.722	15	-.68	5	0	4	-.01	4	-.002	3
309		3	max	1580.75	2	6.567	6	0	1	0	1	0	1	.006	2
310			min	-1721.598	3	1.541	15	-.138	5	0	4	-.011	4	-.004	3
311		4	max	1580.58	2	5.794	6	.445	4	0	1	0	1	.004	2
312			min	-1721.726	3	1.359	15	0	1	0	4	-.011	4	-.005	3
313		5	max	1580.409	2	5.022	6	.987	4	0	1	0	1	.002	2
314			min	-1721.854	3	1.178	15	0	1	0	4	-.01	4	-.006	3
315		6	max	1580.239	2	4.25	6	1.53	4	0	1	0	1	0	2
316			min	-1721.981	3	.996	15	0	1	0	4	-.01	4	-.007	3
317		7	max	1580.069	2	3.477	6	2.072	4	0	1	0	1	-.001	15
318			min	-1722.109	3	.814	15	0	1	0	4	-.009	4	-.007	3
319		8	max	1579.898	2	2.71	2	2.614	4	0	1	0	1	-.002	15
320			min	-1722.237	3	.575	12	0	1	0	4	-.008	4	-.008	3
321		9	max	1579.728	2	2.108	2	3.156	4	0	1	0	1	-.002	15
322			min	-1722.365	3	.274	12	0	1	0	4	-.007	4	-.008	4
323		10	max	1579.558	2	1.507	2	3.698	4	0	1	0	1	-.002	15
324			min	-1722.492	3	-.119	3	0	1	0	4	-.005	5	-.009	4
325		11	max	1579.387	2	.905	2	4.24	4	0	1	0	1	-.002	15
326			min	-1722.62	3	-.57	3	0	1	0	4	-.004	5	-.009	4
327		12	max	1579.217	2	.303	2	4.782	4	0	1	0	1	-.002	15
328			min	-1722.748	3	-1.021	3	0	1	0	4	-.002	5	-.009	4
329		13	max	1579.047	2	-.275	15	5.324	4	0	1	0	4	-.002	15
330			min	-1722.876	3	-1.473	3	0	1	0	4	0	1	-.009	4
331		14	max	1578.876	2	-.457	15	5.867	4	0	1	.003	4	-.002	15
332			min	-1723.003	3	-1.93	4	0	1	0	4	0	1	-.008	4
333		15	max	1578.706	2	-.638	15	6.409	4	0	1	.005	4	-.002	15
334			min	-1723.131	3	-2.702	4	0	1	0	4	0	1	-.007	4
335		16	max	1578.536	2	-.82	15	6.951	4	0	1	.008	4	-.001	15
336			min	-1723.259	3	-3.475	4	0	1	0	4	0	1	-.006	4
337		17	max	1578.365	2	-1.001	15	7.493	4	0	1	.011	4	0	15
338			min	-1723.387	3	-4.247	4	0	1	0	4	0	1	-.004	4
339		18	max	1578.195	2	-1.183	15	8.035	4	0	1	.014	4	0	15
340			min	-1723.514	3	-5.019	4	0	1	0	4	0	1	-.002	4
341		19	max	1578.025	2	-1.364	15	8.577	4	0	1	.018	4	0	1
342			min	-1723.642	3	-5.792	4	0	1	0	4	0	1	0	1
343	M8	1	max	3775.595	2	0	1	0	1	0	1	.01	4	0	1
344			min	-1531.924	3	0	1	-201.71	4	0	1	0	1	0	1
345		2	max	3775.765	2	0	1	0	1	0	1	0	1	0	1
346			min	-1531.796	3	0	1	-201.857	4	0	1	-.014	4	0	1
347		3	max	3775.935	2	0	1	0	1	0	1	0	1	0	1
348			min	-1531.668	3	0	1	-202.005	4	0	1	-.037	4	0	1
349		4	max	3776.106	2	0	1	0	1	0	1	0	1	0	1
350			min	-1531.541	3	0	1	-202.152	4	0	1	-.06	4	0	1
351		5	max	3776.276	2	0	1	0	1	0	1	0	1	0	1
352			min	-1531.413	3	0	1	-202.3	4	0	1	-.083	4	0	1
353		6	max	3776.446	2	0	1	0	1	0	1	0	1	0	1
354			min	-1531.285	3	0	1	-202.448	4	0	1	-.106	4	0	1
355		7	max	3776.617	2	0	1	0	1	0	1	0	1	0	1
356			min	-1531.157	3	0	1	-202.595	4	0	1	-.13	4	0	1
357		8	max	3776.787	2	0	1	0	1	0	1	0	1	0	1
358			min	-1531.03	3	0	1	-202.743	4	0	1	-.153	4	0	1
359		9	max	3776.957	2	0	1	0	1	0	1	0	1	0	1
360			min	-1530.902	3	0	1	-202.891	4	0	1	-.176	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	3777.128	2	0	1	0	1	0	1	0	1	0	1
362			min	-1530.774	3	0	1	-203.038	4	0	1	-.2	4	0	1
363		11	max	3777.298	2	0	1	0	1	0	1	0	1	0	1
364			min	-1530.646	3	0	1	-203.186	4	0	1	-.223	4	0	1
365		12	max	3777.468	2	0	1	0	1	0	1	0	1	0	1
366			min	-1530.519	3	0	1	-203.334	4	0	1	-.246	4	0	1
367		13	max	3777.639	2	0	1	0	1	0	1	0	1	0	1
368			min	-1530.391	3	0	1	-203.481	4	0	1	-.27	4	0	1
369		14	max	3777.809	2	0	1	0	1	0	1	0	1	0	1
370			min	-1530.263	3	0	1	-203.629	4	0	1	-.293	4	0	1
371		15	max	3777.979	2	0	1	0	1	0	1	0	1	0	1
372			min	-1530.135	3	0	1	-203.776	4	0	1	-.316	4	0	1
373		16	max	3778.15	2	0	1	0	1	0	1	0	1	0	1
374			min	-1530.008	3	0	1	-203.924	4	0	1	-.34	4	0	1
375		17	max	3778.32	2	0	1	0	1	0	1	0	1	0	1
376			min	-1529.88	3	0	1	-204.072	4	0	1	-.363	4	0	1
377		18	max	3778.49	2	0	1	0	1	0	1	0	1	0	1
378			min	-1529.752	3	0	1	-204.219	4	0	1	-.387	4	0	1
379		19	max	3778.661	2	0	1	0	1	0	1	0	1	0	1
380			min	-1529.624	3	0	1	-204.367	4	0	1	-.41	4	0	1
381	M10	1	max	1128.593	1	2.229	6	-.043	12	0	1	0	1	0	1
382			min	-1440.93	3	.501	15	-64.754	4	0	5	0	3	0	1
383		2	max	1128.921	1	2.214	6	-.043	12	0	1	0	10	0	15
384			min	-1440.684	3	.497	15	-65.038	4	0	5	-.014	4	0	6
385		3	max	1129.25	1	2.198	6	-.043	12	0	1	0	10	0	15
386			min	-1440.438	3	.493	15	-65.323	4	0	5	-.029	4	0	6
387		4	max	1129.578	1	2.183	6	-.043	12	0	1	0	10	0	15
388			min	-1440.191	3	.49	15	-65.608	4	0	5	-.043	4	-.001	6
389		5	max	1129.907	1	2.168	6	-.043	12	0	1	0	12	0	15
390			min	-1439.945	3	.486	15	-65.893	4	0	5	-.058	4	-.002	6
391		6	max	1130.235	1	2.153	6	-.043	12	0	1	0	12	0	15
392			min	-1439.699	3	.483	15	-66.178	4	0	5	-.073	4	-.002	6
393		7	max	1130.564	1	2.137	6	-.043	12	0	1	0	12	0	15
394			min	-1439.452	3	.479	15	-66.463	4	0	5	-.087	4	-.003	6
395		8	max	1130.892	1	2.122	6	-.043	12	0	1	0	12	0	15
396			min	-1439.206	3	.476	15	-66.747	4	0	5	-.102	4	-.003	6
397		9	max	1131.22	1	2.107	6	-.043	12	0	1	0	12	0	15
398			min	-1438.96	3	.472	15	-67.032	4	0	5	-.117	4	-.004	6
399		10	max	1131.549	1	2.092	6	-.043	12	0	1	0	12	0	15
400			min	-1438.713	3	.468	15	-67.317	4	0	5	-.132	4	-.004	6
401		11	max	1131.877	1	2.076	6	-.043	12	0	1	0	12	-.001	15
402			min	-1438.467	3	.465	15	-67.602	4	0	5	-.147	4	-.005	6
403		12	max	1132.206	1	2.061	6	-.043	12	0	1	0	12	-.001	15
404			min	-1438.221	3	.461	15	-67.887	4	0	5	-.162	4	-.005	6
405		13	max	1132.534	1	2.046	6	-.043	12	0	1	0	12	-.001	15
406			min	-1437.974	3	.458	15	-68.172	4	0	5	-.177	4	-.006	6
407		14	max	1132.863	1	2.031	6	-.043	12	0	1	0	12	-.001	15
408			min	-1437.728	3	.454	15	-68.456	4	0	5	-.192	4	-.006	6
409		15	max	1133.191	1	2.015	6	-.043	12	0	1	0	12	-.001	15
410			min	-1437.482	3	.45	15	-68.741	4	0	5	-.207	4	-.007	6
411		16	max	1133.519	1	2	6	-.043	12	0	1	0	12	-.002	15
412			min	-1437.235	3	.447	15	-69.026	4	0	5	-.222	4	-.007	6
413		17	max	1133.848	1	1.985	6	-.043	12	0	1	0	12	-.002	15
414			min	-1436.989	3	.443	15	-69.311	4	0	5	-.238	4	-.007	6
415		18	max	1134.176	1	1.97	6	-.043	12	0	1	0	12	-.002	15
416			min	-1436.743	3	.44	15	-69.596	4	0	5	-.253	4	-.008	6
417		19	max	1134.505	1	1.954	6	-.043	12	0	1	0	12	-.002	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
418			min	-1436.496	3	.436	15	-69.881	4	0	5	-.268	4	-.008	6
419	M11	1	max	436.451	2	8.051	6	-.001	12	0	1	0	12	.008	6
420			min	-552.843	3	1.88	15	-1.153	5	0	4	-.01	4	.002	15
421		2	max	436.28	2	7.278	6	-.001	12	0	1	0	12	.005	2
422			min	-552.971	3	1.699	15	-.611	5	0	4	-.01	4	.001	12
423		3	max	436.11	2	6.506	6	.008	14	0	1	0	12	.003	2
424			min	-553.099	3	1.517	15	-.069	5	0	4	-.011	4	0	3
425		4	max	435.94	2	5.733	6	.514	4	0	1	0	12	0	2
426			min	-553.226	3	1.335	15	-.019	1	0	4	-.01	4	-.002	3
427		5	max	435.769	2	4.961	6	1.056	4	0	1	0	12	0	15
428			min	-553.354	3	1.154	15	-.019	1	0	4	-.01	4	-.003	3
429		6	max	435.599	2	4.189	6	1.598	4	0	1	0	12	-.001	15
430			min	-553.482	3	.972	15	-.019	1	0	4	-.01	4	-.005	4
431		7	max	435.429	2	3.416	6	2.141	4	0	1	0	12	-.002	15
432			min	-553.61	3	.791	15	-.019	1	0	4	-.009	4	-.006	4
433		8	max	435.258	2	2.644	6	2.683	4	0	1	0	12	-.002	15
434			min	-553.738	3	.609	15	-.019	1	0	4	-.008	4	-.007	4
435		9	max	435.088	2	1.871	6	3.225	4	0	1	0	12	-.002	15
436			min	-553.865	3	.428	15	-.019	1	0	4	-.007	4	-.008	4
437		10	max	434.917	2	1.099	6	3.767	4	0	1	0	12	-.002	15
438			min	-553.993	3	.246	15	-.019	1	0	4	-.005	4	-.009	4
439		11	max	434.747	2	.456	2	4.309	4	0	1	0	12	-.002	15
440			min	-554.121	3	-.038	3	-.019	1	0	4	-.003	4	-.009	4
441		12	max	434.577	2	-.117	15	4.851	4	0	1	0	12	-.002	15
442			min	-554.249	3	-.49	3	-.019	1	0	4	-.001	5	-.009	4
443		13	max	434.406	2	-.299	15	5.393	4	0	1	0	4	-.002	15
444			min	-554.376	3	-1.219	4	-.019	1	0	4	0	1	-.009	4
445		14	max	434.236	2	-.48	15	5.935	4	0	1	.003	4	-.002	15
446			min	-554.504	3	-1.992	4	-.019	1	0	4	0	1	-.008	4
447		15	max	434.066	2	-.662	15	6.478	4	0	1	.006	4	-.002	15
448			min	-554.632	3	-2.764	4	-.019	1	0	4	0	1	-.007	4
449		16	max	433.895	2	-.843	15	7.02	4	0	1	.009	4	-.001	15
450			min	-554.76	3	-3.537	4	-.019	1	0	4	0	1	-.006	4
451		17	max	433.725	2	-1.025	15	7.562	4	0	1	.012	4	-.001	15
452			min	-554.887	3	-4.309	4	-.019	1	0	4	0	1	-.004	4
453		18	max	433.555	2	-1.206	15	8.104	4	0	1	.015	4	0	15
454			min	-555.015	3	-5.082	4	-.019	1	0	4	0	1	-.002	4
455		19	max	433.384	2	-1.388	15	8.646	4	0	1	.018	4	0	1
456			min	-555.143	3	-5.854	4	-.019	1	0	4	0	1	0	1
457	M12	1	max	1250.833	1	0	1	5.678	1	0	1	.01	4	0	1
458			min	-460.994	3	0	1	-203.162	4	0	1	0	1	0	1
459		2	max	1251.003	1	0	1	5.678	1	0	1	0	1	0	1
460			min	-460.867	3	0	1	-203.31	4	0	1	-.014	4	0	1
461		3	max	1251.174	1	0	1	5.678	1	0	1	.001	1	0	1
462			min	-460.739	3	0	1	-203.458	4	0	1	-.037	4	0	1
463		4	max	1251.344	1	0	1	5.678	1	0	1	.002	1	0	1
464			min	-460.611	3	0	1	-203.605	4	0	1	-.06	4	0	1
465		5	max	1251.514	1	0	1	5.678	1	0	1	.002	1	0	1
466			min	-460.483	3	0	1	-203.753	4	0	1	-.084	4	0	1
467		6	max	1251.685	1	0	1	5.678	1	0	1	.003	1	0	1
468			min	-460.356	3	0	1	-203.901	4	0	1	-.107	4	0	1
469		7	max	1251.855	1	0	1	5.678	1	0	1	.004	1	0	1
470			min	-460.228	3	0	1	-204.048	4	0	1	-.13	4	0	1
471		8	max	1252.025	1	0	1	5.678	1	0	1	.004	1	0	1
472			min	-460.1	3	0	1	-204.196	4	0	1	-.154	4	0	1
473		9	max	1252.196	1	0	1	5.678	1	0	1	.005	1	0	1
474			min	-459.972	3	0	1	-204.344	4	0	1	-.177	4	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
475		10	max	1252.366	1	0	1	5.678	1	0	1	.006	1	0	1
476			min	-459.845	3	0	1	-204.491	4	0	1	-.201	4	0	1
477		11	max	1252.536	1	0	1	5.678	1	0	1	.006	1	0	1
478			min	-459.717	3	0	1	-204.639	4	0	1	-.224	4	0	1
479		12	max	1252.707	1	0	1	5.678	1	0	1	.007	1	0	1
480			min	-459.589	3	0	1	-204.786	4	0	1	-.248	4	0	1
481		13	max	1252.877	1	0	1	5.678	1	0	1	.008	1	0	1
482			min	-459.461	3	0	1	-204.934	4	0	1	-.271	4	0	1
483		14	max	1253.047	1	0	1	5.678	1	0	1	.008	1	0	1
484			min	-459.334	3	0	1	-205.082	4	0	1	-.295	4	0	1
485		15	max	1253.218	1	0	1	5.678	1	0	1	.009	1	0	1
486			min	-459.206	3	0	1	-205.229	4	0	1	-.318	4	0	1
487		16	max	1253.388	1	0	1	5.678	1	0	1	.01	1	0	1
488			min	-459.078	3	0	1	-205.377	4	0	1	-.342	4	0	1
489		17	max	1253.558	1	0	1	5.678	1	0	1	.01	1	0	1
490			min	-458.95	3	0	1	-205.525	4	0	1	-.366	4	0	1
491		18	max	1253.729	1	0	1	5.678	1	0	1	.011	1	0	1
492			min	-458.822	3	0	1	-205.672	4	0	1	-.389	4	0	1
493		19	max	1253.899	1	0	1	5.678	1	0	1	.012	1	0	1
494			min	-458.695	3	0	1	-205.82	4	0	1	-.413	4	0	1
495	M1	1	max	114.921	1	805.321	3	47.979	5	0	1	.14	1	0	3
496			min	-7.628	5	-506.571	1	-58.897	1	0	3	-.052	5	-.016	2
497		2	max	115.292	1	804.283	3	49.22	5	0	1	.109	1	.253	1
498			min	-7.455	5	-507.955	1	-58.897	1	0	3	-.027	5	-.425	3
499		3	max	330.473	3	588.386	1	-3.22	12	0	3	.078	1	.508	1
500			min	-198.981	2	-603.5	3	-58.19	1	0	1	-.001	5	-.832	3
501		4	max	330.751	3	587.002	1	-3.22	12	0	3	.047	1	.198	1
502			min	-198.61	2	-604.538	3	-58.19	1	0	1	-.008	5	-.513	3
503		5	max	331.029	3	585.619	1	-3.22	12	0	3	.016	1	-.004	15
504			min	-198.24	2	-605.576	3	-58.19	1	0	1	-.013	5	-.194	3
505		6	max	331.307	3	584.235	1	-3.22	12	0	3	0	12	.126	3
506			min	-197.869	2	-606.613	3	-58.19	1	0	1	-.021	4	-.447	2
507		7	max	331.585	3	582.852	1	-3.22	12	0	3	-.002	12	.446	3
508			min	-197.498	2	-607.651	3	-58.19	1	0	1	-.045	1	-.754	2
509		8	max	331.863	3	581.468	1	-3.22	12	0	3	-.004	12	.767	3
510			min	-197.128	2	-608.689	3	-58.19	1	0	1	-.076	1	-1.06	2
511		9	max	339.295	3	53.443	2	34.938	5	0	9	.046	1	.894	3
512			min	-151.489	2	.417	15	-88.605	1	0	3	-.099	5	-1.212	2
513		10	max	339.573	3	52.06	2	36.18	5	0	9	0	10	.873	3
514			min	-151.119	2	-.001	5	-88.605	1	0	3	-.08	4	-1.24	2
515		11	max	339.851	3	50.676	2	37.421	5	0	9	-.003	12	.852	3
516			min	-150.748	2	-1.746	4	-88.605	1	0	3	-.07	4	-1.267	2
517		12	max	347.181	3	409.502	3	110.34	5	0	2	.075	1	.745	3
518			min	-105.066	2	-690.727	2	-57.002	1	0	3	-.151	5	-1.124	2
519		13	max	347.459	3	408.465	3	111.581	5	0	2	.045	1	.529	3
520			min	-104.696	2	-692.111	2	-57.002	1	0	3	-.093	5	-.759	2
521		14	max	347.737	3	407.427	3	112.823	5	0	2	.015	1	.313	3
522			min	-104.325	2	-693.495	2	-57.002	1	0	3	-.033	5	-.394	2
523		15	max	348.015	3	406.389	3	114.064	5	0	2	.026	5	.099	3
524			min	-103.954	2	-694.878	2	-57.002	1	0	3	-.015	1	-.054	1
525		16	max	348.293	3	405.351	3	115.305	5	0	2	.087	5	.34	2
526			min	-103.583	2	-696.262	2	-57.002	1	0	3	-.045	1	-.115	3
527		17	max	348.571	3	404.314	3	116.547	5	0	2	.148	5	.707	2
528			min	-103.213	2	-697.645	2	-57.002	1	0	3	-.075	1	-.329	3
529		18	max	15.788	5	696.988	2	-3.126	12	0	5	.129	5	.356	2
530			min	-115.523	1	-332.24	3	-88.703	4	0	2	-.108	1	-.163	3
531		19	max	15.961	5	695.604	2	-3.126	12	0	5	.089	5	.013	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
532			min	-115.152	1	-333.278	3	-87.461	4	0	2	-.141	1	-.012	1
533	M5	1	max	252.362	1	2684.018	3	72.557	5	0	1	0	1	.032	2
534			min	6.622	12	-1731.15	1	0	1	0	4	-.111	4	0	3
535		2	max	252.732	1	2682.98	3	73.799	5	0	1	0	1	.943	1
536			min	6.808	12	-1732.533	1	0	1	0	4	-.073	4	-1.416	3
537		3	max	1049.191	3	1731.675	1	13.831	4	0	4	0	1	1.816	1
538			min	-674.948	2	-1876.801	3	0	1	0	1	-.035	4	-2.777	3
539		4	max	1049.469	3	1730.291	1	15.072	4	0	4	0	1	.903	1
540			min	-674.577	2	-1877.839	3	0	1	0	1	-.027	4	-1.786	3
541		5	max	1049.747	3	1728.907	1	16.314	4	0	4	0	1	.024	9
542			min	-674.207	2	-1878.876	3	0	1	0	1	-.019	4	-.795	3
543		6	max	1050.025	3	1727.524	1	17.555	4	0	4	0	1	.197	3
544			min	-673.836	2	-1879.914	3	0	1	0	1	-.01	5	-.988	2
545		7	max	1050.303	3	1726.14	1	18.797	4	0	4	0	14	1.189	3
546			min	-673.465	2	-1880.952	3	0	1	0	1	-.002	5	-1.891	2
547		8	max	1050.582	3	1724.757	1	20.038	4	0	4	.01	4	2.182	3
548			min	-673.094	2	-1881.99	3	0	1	0	1	0	1	-2.794	2
549		9	max	1060.131	3	179.801	2	112.311	4	0	1	0	1	2.509	3
550			min	-576.741	2	.417	15	0	1	0	1	-.131	4	-3.184	2
551		10	max	1060.409	3	178.417	2	113.552	4	0	1	0	1	2.432	3
552			min	-576.371	2	0	15	0	1	0	1	-.072	5	-3.278	2
553		11	max	1060.687	3	177.033	2	114.794	4	0	1	0	1	2.356	3
554			min	-576	2	-1.656	6	0	1	0	1	-.012	5	-3.372	2
555		12	max	1070.438	3	1245.104	3	149.81	4	0	1	0	1	2.068	3
556			min	-479.734	2	-2072.587	2	0	1	0	4	-.209	4	-3.02	2
557		13	max	1070.716	3	1244.066	3	151.051	4	0	1	0	1	1.411	3
558			min	-479.363	2	-2073.971	2	0	1	0	4	-.13	4	-1.926	2
559		14	max	1070.994	3	1243.028	3	152.293	4	0	1	0	1	.755	3
560			min	-478.993	2	-2075.355	2	0	1	0	4	-.05	4	-.842	1
561		15	max	1071.272	3	1241.991	3	153.534	4	0	1	.031	4	.264	2
562			min	-478.622	2	-2076.738	2	0	1	0	4	0	1	-.002	13
563		16	max	1071.55	3	1240.953	3	154.775	4	0	1	.113	4	1.361	2
564			min	-478.251	2	-2078.122	2	0	1	0	4	0	1	-.556	3
565		17	max	1071.828	3	1239.915	3	156.017	4	0	1	.195	4	2.458	2
566			min	-477.88	2	-2079.505	2	0	1	0	4	0	1	-1.211	3
567		18	max	-7.22	12	2357.923	2	0	1	0	4	.197	4	1.266	2
568			min	-252.271	1	-1150.254	3	-33.635	5	0	1	0	1	-.633	3
569		19	max	-7.035	12	2356.539	2	0	1	0	4	.18	4	.024	1
570			min	-251.9	1	-1151.292	3	-32.394	5	0	1	0	1	-.025	3
571	M9	1	max	114.921	1	805.321	3	66.356	4	0	3	-.008	12	0	3
572			min	4.548	12	-506.571	1	3.266	12	0	4	-.14	1	-.016	2
573		2	max	115.292	1	804.283	3	67.598	4	0	3	-.006	12	.253	1
574			min	4.734	12	-507.955	1	3.266	12	0	4	-.109	1	-.425	3
575		3	max	330.473	3	588.386	1	58.19	1	0	1	-.004	12	.508	1
576			min	-198.981	2	-603.5	3	-6.79	5	0	3	-.078	1	-.832	3
577		4	max	330.751	3	587.002	1	58.19	1	0	1	-.003	12	.198	1
578			min	-198.61	2	-604.538	3	-5.549	5	0	3	-.047	1	-.513	3
579		5	max	331.029	3	585.619	1	58.19	1	0	1	0	12	-.004	15
580			min	-198.24	2	-605.576	3	-4.307	5	0	3	-.018	4	-.194	3
581		6	max	331.307	3	584.235	1	58.19	1	0	1	.015	1	.126	3
582			min	-197.869	2	-606.613	3	-3.066	5	0	3	-.017	5	-.447	2
583		7	max	331.585	3	582.852	1	58.19	1	0	1	.045	1	.446	3
584			min	-197.498	2	-607.651	3	-1.824	5	0	3	-.018	5	-.754	2
585		8	max	331.863	3	581.468	1	58.19	1	0	1	.076	1	.767	3
586			min	-197.128	2	-608.689	3	-.583	5	0	3	-.019	5	-1.06	2
587		9	max	339.295	3	53.443	2	88.605	1	0	3	-.002	12	.894	3
588			min	-151.489	2	.422	15	4.662	12	0	9	-.113	4	-1.212	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	339.573	3	52.06	2	88.605	1	0	3	0	1	.873	3
590			min	-151.119	2	.005	15	4.662	12	0	9	-.08	4	-1.24	2
591		11	max	339.851	3	50.676	2	88.605	1	0	3	.047	1	.852	3
592			min	-150.748	2	-1.706	6	4.662	12	0	9	-.056	5	-1.267	2
593		12	max	347.181	3	409.502	3	128.894	4	0	3	-.004	12	.745	3
594			min	-105.066	2	-690.727	2	2.847	12	0	2	-.175	4	-1.124	2
595		13	max	347.459	3	408.465	3	130.135	4	0	3	-.002	12	.529	3
596			min	-104.696	2	-692.111	2	2.847	12	0	2	-.107	4	-.759	2
597		14	max	347.737	3	407.427	3	131.377	4	0	3	0	12	.313	3
598			min	-104.325	2	-693.495	2	2.847	12	0	2	-.038	4	-.394	2
599		15	max	348.015	3	406.389	3	132.618	4	0	3	.032	4	.099	3
600			min	-103.954	2	-694.878	2	2.847	12	0	2	0	12	-.054	1
601		16	max	348.293	3	405.351	3	133.86	4	0	3	.102	4	.34	2
602			min	-103.583	2	-696.262	2	2.847	12	0	2	.002	12	-.115	3
603		17	max	348.571	3	404.314	3	135.101	4	0	3	.173	4	.707	2
604			min	-103.213	2	-697.645	2	2.847	12	0	2	.004	12	-.329	3
605		18	max	-4.527	12	696.988	2	62.466	1	0	2	.163	4	.356	2
606			min	-115.523	1	-332.24	3	-69.218	5	0	3	.005	12	-.163	3
607		19	max	-4.342	12	695.604	2	62.466	1	0	2	.141	1	.013	3
608			min	-115.152	1	-333.278	3	-67.977	5	0	3	.007	12	-.012	1

Envelope Member Section Deflections

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
1	M13	1	max	0	1	.133	2	.006	3	1.07e-2	2	NC	1	NC	1
2			min	-.387	4	-.034	3	-.003	2	-2.602e-3	3	NC	1	NC	1
3		2	max	0	1	.2	3	.017	1	1.205e-2	2	NC	5	NC	1
4			min	-.387	4	-.008	9	-.008	5	-2.605e-3	3	873.672	3	NC	1
5		3	max	0	1	.389	3	.04	1	1.339e-2	2	NC	5	NC	2
6			min	-.387	4	-.101	1	-.01	5	-2.608e-3	3	482.883	3	5119.885	1
7		4	max	0	1	.503	3	.06	1	1.473e-2	2	NC	5	NC	3
8			min	-.387	4	-.154	1	-.007	5	-2.611e-3	3	379.9	3	3427.262	1
9		5	max	0	1	.529	3	.07	1	1.608e-2	2	NC	5	NC	3
10			min	-.387	4	-.151	1	-.002	5	-2.614e-3	3	362.282	3	2945.783	1
11		6	max	0	1	.469	3	.067	1	1.742e-2	2	NC	5	NC	3
12			min	-.387	4	-.095	1	0	10	-2.617e-3	3	405.732	3	3082.07	1
13		7	max	0	1	.34	3	.052	1	1.877e-2	2	NC	5	NC	2
14			min	-.387	4	-.012	9	-.001	10	-2.62e-3	3	545.433	3	3992.754	1
15		8	max	0	1	.177	3	.029	1	2.011e-2	2	NC	1	NC	2
16			min	-.387	4	.003	15	-.004	10	-2.623e-3	3	968.454	3	7204.322	1
17		9	max	0	1	.244	2	.018	3	2.145e-2	2	NC	4	NC	1
18			min	-.387	4	.005	15	-.007	2	-2.626e-3	3	1846.275	2	NC	1
19		10	max	0	1	.287	2	.018	3	2.28e-2	2	NC	3	NC	1
20			min	-.387	4	-.038	3	-.012	2	-2.629e-3	3	1326.052	2	NC	1
21		11	max	0	12	.244	2	.018	3	2.145e-2	2	NC	4	NC	1
22			min	-.387	4	.005	15	-.007	2	-2.626e-3	3	1846.275	2	NC	1
23		12	max	0	12	.177	3	.029	1	2.011e-2	2	NC	1	NC	2
24			min	-.387	4	.003	15	-.007	5	-2.623e-3	3	968.454	3	7204.322	1
25		13	max	0	12	.34	3	.052	1	1.877e-2	2	NC	5	NC	2
26			min	-.387	4	-.012	9	-.002	5	-2.62e-3	3	545.433	3	3992.754	1
27		14	max	0	12	.469	3	.067	1	1.742e-2	2	NC	5	NC	3
28			min	-.387	4	-.095	1	0	10	-2.617e-3	3	405.732	3	3082.07	1
29		15	max	0	12	.529	3	.07	1	1.608e-2	2	NC	5	NC	3
30			min	-.387	4	-.151	1	.002	10	-2.614e-3	3	362.282	3	2945.783	1
31		16	max	0	12	.503	3	.06	1	1.473e-2	2	NC	5	NC	3
32			min	-.387	4	-.154	1	.002	10	-2.611e-3	3	379.9	3	3427.262	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
33		17	max	0	12	.389	3	.04	1	1.339e-2	2	NC	5	NC	2
34			min	-.387	4	-.101	1	0	10	-2.608e-3	3	482.883	3	5119.885	1
35		18	max	0	12	.2	3	.017	1	1.205e-2	2	NC	5	NC	1
36			min	-.387	4	-.008	9	0	10	-2.605e-3	3	873.672	3	NC	1
37		19	max	0	12	.133	2	.006	3	1.07e-2	2	NC	1	NC	1
38			min	-.387	4	-.034	3	-.003	2	-2.602e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.267	3	.005	3	6.162e-3	2	NC	1	NC	1
40			min	-.314	4	-.405	2	-.003	2	-4.761e-3	3	NC	1	NC	1
41		2	max	0	1	.523	3	.012	1	7.287e-3	2	NC	5	NC	1
42			min	-.314	4	-.651	2	-.012	5	-5.707e-3	3	798.39	3	NC	1
43		3	max	0	1	.742	3	.032	1	8.411e-3	2	NC	5	NC	2
44			min	-.314	4	-.867	2	-.015	5	-6.653e-3	3	429.573	3	6542.563	1
45		4	max	0	1	.9	3	.051	1	9.536e-3	2	NC	5	NC	2
46			min	-.314	4	-1.034	2	-.01	5	-7.599e-3	3	319.914	1	4075.942	1
47		5	max	0	1	.985	3	.061	1	1.066e-2	2	NC	15	NC	3
48			min	-.314	4	-1.139	2	-.002	5	-8.545e-3	3	275.469	1	3366.795	1
49		6	max	0	1	.996	3	.06	1	1.179e-2	2	NC	15	NC	2
50			min	-.314	4	-1.181	2	0	10	-9.49e-3	3	262.201	1	3433.23	1
51		7	max	0	1	.945	3	.048	1	1.291e-2	2	NC	15	NC	2
52			min	-.314	4	-1.169	2	0	10	-1.044e-2	3	266.964	2	4364.228	1
53		8	max	0	1	.855	3	.027	1	1.403e-2	2	NC	15	NC	2
54			min	-.314	4	-1.12	2	-.003	10	-1.138e-2	3	285.143	2	7734.688	1
55		9	max	0	1	.765	3	.016	3	1.516e-2	2	NC	5	NC	1
56			min	-.314	4	-1.062	2	-.007	2	-1.233e-2	3	310.127	2	NC	1
57		10	max	0	1	.721	3	.016	3	1.628e-2	2	NC	5	NC	1
58			min	-.314	4	-1.033	2	-.011	2	-1.327e-2	3	324.585	2	NC	1
59		11	max	0	12	.765	3	.016	3	1.516e-2	2	NC	5	NC	1
60			min	-.314	4	-1.062	2	-.012	5	-1.233e-2	3	310.127	2	NC	1
61		12	max	0	12	.855	3	.027	1	1.403e-2	2	NC	15	NC	2
62			min	-.314	4	-1.12	2	-.014	5	-1.138e-2	3	285.143	2	7734.688	1
63		13	max	0	12	.945	3	.048	1	1.291e-2	2	NC	15	NC	2
64			min	-.314	4	-1.169	2	-.009	5	-1.044e-2	3	266.964	2	4364.228	1
65		14	max	0	12	.996	3	.06	1	1.179e-2	2	NC	15	NC	2
66			min	-.314	4	-1.181	2	0	5	-9.49e-3	3	262.201	1	3433.23	1
67		15	max	0	12	.985	3	.061	1	1.066e-2	2	NC	15	NC	3
68			min	-.314	4	-1.139	2	.002	10	-8.545e-3	3	275.469	1	3366.795	1
69		16	max	0	12	.9	3	.051	1	9.536e-3	2	NC	5	NC	2
70			min	-.314	4	-1.034	2	.001	10	-7.599e-3	3	319.914	1	4075.942	1
71		17	max	0	12	.742	3	.032	1	8.411e-3	2	NC	5	NC	2
72			min	-.314	4	-.867	2	0	10	-6.653e-3	3	429.573	3	6542.563	1
73		18	max	0	12	.523	3	.016	4	7.287e-3	2	NC	5	NC	1
74			min	-.314	4	-.651	2	-.001	10	-5.707e-3	3	798.39	3	NC	1
75		19	max	0	12	.267	3	.005	3	6.162e-3	2	NC	1	NC	1
76			min	-.314	4	-.405	2	-.003	2	-4.761e-3	3	NC	1	NC	1
77	M15	1	max	0	12	.273	3	.005	3	4.059e-3	3	NC	1	NC	1
78			min	-.268	4	-.404	2	-.002	2	-6.363e-3	2	NC	1	NC	1
79		2	max	0	12	.449	3	.012	1	4.863e-3	3	NC	5	NC	1
80			min	-.268	4	-.713	2	-.019	5	-7.525e-3	2	660.99	2	NC	1
81		3	max	0	12	.604	3	.032	1	5.667e-3	3	NC	5	NC	2
82			min	-.268	4	-.98	2	-.024	5	-8.688e-3	2	354.275	2	6518.878	1
83		4	max	0	12	.724	3	.051	1	6.47e-3	3	NC	5	NC	2
84			min	-.268	4	-1.177	2	-.017	5	-9.85e-3	2	263.941	2	4062.843	1
85		5	max	0	12	.801	3	.062	1	7.274e-3	3	NC	15	NC	3
86			min	-.268	4	-1.289	2	-.005	5	-1.101e-2	2	230.486	2	3355.544	1
87		6	max	0	12	.834	3	.06	1	8.078e-3	3	NC	15	NC	2
88			min	-.268	4	-1.316	2	.001	10	-1.218e-2	2	223.804	2	3419.516	1
89		7	max	0	12	.828	3	.048	1	8.882e-3	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	-.268	4	-1.27	2	0	10	-1.334e-2	2	235.78	2	4339.501	1
91		8	max	0	12	.796	3	.032	4	9.686e-3	3	NC	15	NC	2
92			min	-.268	4	-1.177	2	-.003	10	-1.45e-2	2	263.856	2	6400.907	4
93		9	max	0	12	.757	3	.022	4	1.049e-2	3	NC	5	NC	1
94			min	-.269	4	-1.08	2	-.006	2	-1.566e-2	2	301.7	2	9105.842	4
95		10	max	0	1	.737	3	.015	3	1.129e-2	3	NC	5	NC	1
96			min	-.269	4	-1.033	2	-.01	2	-1.683e-2	2	324.302	2	NC	1
97		11	max	0	1	.757	3	.015	3	1.049e-2	3	NC	5	NC	1
98			min	-.268	4	-1.08	2	-.018	5	-1.566e-2	2	301.7	2	NC	1
99		12	max	0	1	.796	3	.027	1	9.686e-3	3	NC	15	NC	2
100			min	-.268	4	-1.177	2	-.021	5	-1.45e-2	2	263.856	2	7651.457	1
101		13	max	0	1	.828	3	.048	1	8.882e-3	3	NC	15	NC	2
102			min	-.268	4	-1.27	2	-.015	5	-1.334e-2	2	235.78	2	4339.501	1
103		14	max	0	1	.834	3	.06	1	8.078e-3	3	NC	15	NC	2
104			min	-.268	4	-1.316	2	-.002	5	-1.218e-2	2	223.804	2	3419.516	1
105		15	max	0	1	.801	3	.062	1	7.274e-3	3	NC	15	NC	3
106			min	-.268	4	-1.289	2	.002	10	-1.101e-2	2	230.486	2	3355.544	1
107		16	max	0	1	.724	3	.051	1	6.47e-3	3	NC	5	NC	2
108			min	-.268	4	-1.177	2	.002	10	-9.85e-3	2	263.941	2	4062.843	1
109		17	max	0	1	.604	3	.034	4	5.667e-3	3	NC	5	NC	2
110			min	-.268	4	-.98	2	0	10	-8.688e-3	2	354.275	2	5906.929	4
111		18	max	0	1	.449	3	.023	4	4.863e-3	3	NC	5	NC	1
112			min	-.268	4	-.713	2	0	10	-7.525e-3	2	660.99	2	8630.954	4
113		19	max	0	1	.273	3	.005	3	4.059e-3	3	NC	1	NC	1
114			min	-.268	4	-.404	2	-.002	2	-6.363e-3	2	NC	1	NC	1
115	M16	1	max	0	12	.117	1	.004	3	7.282e-3	3	NC	1	NC	1
116			min	-.125	4	-.092	3	-.002	2	-9.057e-3	1	NC	1	NC	1
117		2	max	0	12	.002	13	.017	1	8.341e-3	3	NC	5	NC	1
118			min	-.125	4	-.069	2	-.014	5	-1.007e-2	1	1105.029	2	NC	1
119		3	max	0	12	.046	3	.041	1	9.399e-3	3	NC	5	NC	2
120			min	-.125	4	-.215	2	-.018	5	-1.108e-2	1	616.575	2	5118.787	1
121		4	max	0	12	.076	3	.06	1	1.046e-2	3	NC	5	NC	3
122			min	-.125	4	-.297	2	-.014	5	-1.209e-2	1	493.783	2	3417.538	1
123		5	max	0	12	.069	3	.07	1	1.152e-2	3	NC	5	NC	3
124			min	-.125	4	-.304	2	-.006	5	-1.31e-2	1	486.019	2	2929.186	1
125		6	max	0	12	.028	3	.067	1	1.258e-2	3	NC	5	NC	3
126			min	-.125	4	-.237	2	.002	10	-1.411e-2	1	578.126	2	3052.284	1
127		7	max	0	12	.001	13	.053	1	1.363e-2	3	NC	5	NC	2
128			min	-.125	4	-.113	2	0	10	-1.512e-2	1	892.262	2	3923.766	1
129		8	max	0	12	.068	1	.03	1	1.469e-2	3	NC	4	NC	2
130			min	-.125	4	-.118	3	-.002	10	-1.613e-2	1	2647.188	2	6930.695	1
131		9	max	0	12	.189	1	.015	4	1.575e-2	3	NC	4	NC	1
132			min	-.125	4	-.187	3	-.005	2	-1.714e-2	1	2151.758	3	NC	1
133		10	max	0	1	.243	1	.013	3	1.681e-2	3	NC	5	NC	1
134			min	-.125	4	-.218	3	-.009	2	-1.816e-2	1	1621.238	1	NC	1
135		11	max	0	1	.189	1	.013	3	1.575e-2	3	NC	4	NC	1
136			min	-.125	4	-.187	3	-.011	5	-1.714e-2	1	2151.758	3	NC	1
137		12	max	0	1	.068	1	.03	1	1.469e-2	3	NC	4	NC	2
138			min	-.125	4	-.118	3	-.012	5	-1.613e-2	1	2647.188	2	6930.695	1
139		13	max	0	1	.001	13	.053	1	1.363e-2	3	NC	5	NC	2
140			min	-.125	4	-.113	2	-.006	5	-1.512e-2	1	892.262	2	3923.766	1
141		14	max	0	1	.028	3	.067	1	1.258e-2	3	NC	5	NC	3
142			min	-.125	4	-.237	2	.002	10	-1.411e-2	1	578.126	2	3052.284	1
143		15	max	0	1	.069	3	.07	1	1.152e-2	3	NC	5	NC	3
144			min	-.125	4	-.304	2	.003	10	-1.31e-2	1	486.019	2	2929.186	1
145		16	max	0	1	.076	3	.06	1	1.046e-2	3	NC	5	NC	3
146			min	-.125	4	-.297	2	.003	10	-1.209e-2	1	493.783	2	3417.538	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	.046	3	.041	1	9.399e-3	3	NC	5	NC	2
148			min	-.125	4	-.215	2	.001	10	-1.108e-2	1	616.575	2	5118.787	1
149		18	max	0	1	.001	13	.02	4	8.341e-3	3	NC	5	NC	1
150			min	-.125	4	-.069	2	0	10	-1.007e-2	1	1105.029	2	NC	1
151		19	max	0	1	.117	1	.004	3	7.282e-3	3	NC	1	NC	1
152			min	-.125	4	-.092	3	-.002	2	-9.057e-3	1	NC	1	NC	1
153	M2	1	max	.005	1	.004	2	.005	1	1.093e-3	5	NC	1	NC	1
154			min	-.007	3	-.008	3	-.368	4	-1.124e-4	1	NC	1	130.017	4
155		2	max	.005	1	.004	2	.004	1	1.158e-3	5	NC	1	NC	1
156			min	-.006	3	-.007	3	-.338	4	-1.041e-4	1	NC	1	141.662	4
157		3	max	.005	1	.003	2	.004	1	1.224e-3	5	NC	1	NC	1
158			min	-.006	3	-.007	3	-.308	4	-9.591e-5	1	NC	1	155.507	4
159		4	max	.004	1	.003	2	.003	1	1.289e-3	5	NC	1	NC	1
160			min	-.006	3	-.007	3	-.278	4	-8.769e-5	1	NC	1	172.129	4
161		5	max	.004	1	.002	2	.003	1	1.354e-3	5	NC	1	NC	1
162			min	-.005	3	-.006	3	-.249	4	-7.946e-5	1	NC	1	192.312	4
163		6	max	.004	1	.002	2	.003	1	1.42e-3	5	NC	1	NC	1
164			min	-.005	3	-.006	3	-.22	4	-7.123e-5	1	NC	1	217.145	4
165		7	max	.003	1	.001	2	.002	1	1.485e-3	5	NC	1	NC	1
166			min	-.004	3	-.006	3	-.193	4	-6.3e-5	1	NC	1	248.174	4
167		8	max	.003	1	0	2	.002	1	1.552e-3	4	NC	1	NC	1
168			min	-.004	3	-.005	3	-.166	4	-5.477e-5	1	NC	1	287.659	4
169		9	max	.003	1	0	2	.002	1	1.62e-3	4	NC	1	NC	1
170			min	-.004	3	-.005	3	-.141	4	-4.654e-5	1	NC	1	339.009	4
171		10	max	.003	1	0	2	.001	1	1.688e-3	4	NC	1	NC	1
172			min	-.003	3	-.005	3	-.117	4	-3.831e-5	1	NC	1	407.565	4
173		11	max	.002	1	0	2	.001	1	1.756e-3	4	NC	1	NC	1
174			min	-.003	3	-.004	3	-.095	4	-3.008e-5	1	NC	1	502.088	4
175		12	max	.002	1	0	15	0	1	1.824e-3	4	NC	1	NC	1
176			min	-.003	3	-.004	3	-.075	4	-2.185e-5	1	NC	1	637.788	4
177		13	max	.002	1	0	15	0	1	1.893e-3	4	NC	1	NC	1
178			min	-.002	3	-.003	3	-.057	4	-1.362e-5	1	NC	1	843.018	4
179		14	max	.001	1	0	15	0	1	1.961e-3	4	NC	1	NC	1
180			min	-.002	3	-.003	3	-.041	4	-5.394e-6	1	NC	1	1175.795	4
181		15	max	.001	1	0	15	0	1	2.029e-3	4	NC	1	NC	1
182			min	-.001	3	-.002	3	-.027	4	-4.583e-7	3	NC	1	1770.91	4
183		16	max	0	1	0	15	0	1	2.097e-3	4	NC	1	NC	1
184			min	-.001	3	-.002	3	-.016	4	1.944e-7	12	NC	1	3005.271	4
185		17	max	0	1	0	15	0	1	2.166e-3	4	NC	1	NC	1
186			min	0	3	-.001	3	-.008	4	6.558e-7	12	NC	1	6302.698	4
187		18	max	0	1	0	15	0	1	2.234e-3	4	NC	1	NC	1
188			min	0	3	0	3	-.002	4	1.117e-6	12	NC	1	NC	1
189		19	max	0	1	0	1	0	1	2.302e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	1.579e-6	12	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	-5.079e-7	12	NC	1	NC	1
192			min	0	1	0	1	0	1	-5.148e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.011	4	1.197e-5	4	NC	1	NC	1
194			min	0	2	-.001	6	0	12	1.797e-7	12	NC	1	NC	1
195		3	max	0	3	0	15	.022	4	5.387e-4	4	NC	1	NC	1
196			min	0	2	-.003	6	0	12	8.673e-7	12	NC	1	NC	1
197		4	max	0	3	-.001	15	.032	4	1.065e-3	4	NC	1	NC	1
198			min	0	2	-.005	6	0	12	1.555e-6	12	NC	1	NC	1
199		5	max	.001	3	-.001	15	.042	4	1.592e-3	4	NC	1	NC	1
200			min	0	2	-.007	6	0	12	2.242e-6	12	NC	1	NC	1
201		6	max	.001	3	-.002	15	.051	4	2.119e-3	4	NC	1	NC	1
202			min	-.001	2	-.008	6	0	12	2.93e-6	12	NC	1	NC	1
203		7	max	.002	3	-.002	15	.06	4	2.646e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
204			min	-.001	2	-.01	6	0	12	3.618e-6	12	9482.052	6	NC	1
205		8	max	.002	3	-.002	15	.068	4	3.172e-3	4	NC	1	NC	1
206			min	-.001	2	-.011	6	0	12	4.305e-6	12	8438.298	6	NC	1
207		9	max	.002	3	-.003	15	.077	4	3.699e-3	4	NC	1	NC	1
208			min	-.002	2	-.012	6	0	12	4.993e-6	12	7813.35	6	NC	1
209		10	max	.002	3	-.003	15	.084	4	4.226e-3	4	NC	1	NC	1
210			min	-.002	2	-.012	6	0	12	5.68e-6	12	7495.559	6	NC	1
211		11	max	.003	3	-.003	15	.092	4	4.753e-3	4	NC	2	NC	1
212			min	-.002	2	-.012	6	0	12	6.368e-6	12	7437.044	6	NC	1
213		12	max	.003	3	-.003	15	.099	4	5.279e-3	4	NC	1	NC	1
214			min	-.002	2	-.012	6	0	12	7.056e-6	12	7635.133	6	NC	1
215		13	max	.003	3	-.002	15	.107	4	5.806e-3	4	NC	1	NC	1
216			min	-.003	2	-.011	6	0	12	7.743e-6	12	8133.557	6	NC	1
217		14	max	.004	3	-.002	15	.114	4	6.333e-3	4	NC	1	NC	1
218			min	-.003	2	-.01	6	0	12	8.431e-6	12	9045.932	6	NC	1
219		15	max	.004	3	-.002	15	.122	4	6.859e-3	4	NC	1	NC	1
220			min	-.003	2	-.009	6	0	12	9.118e-6	12	NC	1	NC	1
221		16	max	.004	3	-.001	15	.13	4	7.386e-3	4	NC	1	NC	1
222			min	-.003	2	-.007	1	0	12	9.806e-6	12	NC	1	NC	1
223		17	max	.004	3	0	15	.138	4	7.913e-3	4	NC	1	NC	1
224			min	-.003	2	-.006	1	0	12	1.049e-5	12	NC	1	NC	1
225		18	max	.005	3	0	15	.147	4	8.44e-3	4	NC	1	NC	1
226			min	-.004	2	-.004	1	0	12	1.118e-5	12	NC	1	NC	1
227		19	max	.005	3	0	5	.156	4	8.966e-3	4	NC	1	NC	1
228			min	-.004	2	-.003	1	0	12	1.187e-5	12	NC	1	NC	1
229	M4	1	max	.003	1	.003	2	0	12	6.302e-8	3	NC	1	NC	2
230			min	-.001	3	-.005	3	-.156	4	-5.649e-4	4	NC	1	158.797	4
231		2	max	.003	1	.003	2	0	12	6.302e-8	3	NC	1	NC	2
232			min	-.001	3	-.004	3	-.143	4	-5.649e-4	4	NC	1	172.848	4
233		3	max	.003	1	.003	2	0	12	6.302e-8	3	NC	1	NC	2
234			min	0	3	-.004	3	-.131	4	-5.649e-4	4	NC	1	189.559	4
235		4	max	.002	1	.003	2	0	12	6.302e-8	3	NC	1	NC	2
236			min	0	3	-.004	3	-.118	4	-5.649e-4	4	NC	1	209.624	4
237		5	max	.002	1	.002	2	0	12	6.302e-8	3	NC	1	NC	2
238			min	0	3	-.004	3	-.106	4	-5.649e-4	4	NC	1	233.984	4
239		6	max	.002	1	.002	2	0	12	6.302e-8	3	NC	1	NC	2
240			min	0	3	-.003	3	-.094	4	-5.649e-4	4	NC	1	263.945	4
241		7	max	.002	1	.002	2	0	12	6.302e-8	3	NC	1	NC	1
242			min	0	3	-.003	3	-.082	4	-5.649e-4	4	NC	1	301.359	4
243		8	max	.002	1	.002	2	0	12	6.302e-8	3	NC	1	NC	1
244			min	0	3	-.003	3	-.071	4	-5.649e-4	4	NC	1	348.932	4
245		9	max	.002	1	.002	2	0	12	6.302e-8	3	NC	1	NC	1
246			min	0	3	-.003	3	-.06	4	-5.649e-4	4	NC	1	410.731	4
247		10	max	.001	1	.002	2	0	12	6.302e-8	3	NC	1	NC	1
248			min	0	3	-.002	3	-.05	4	-5.649e-4	4	NC	1	493.121	4
249		11	max	.001	1	.001	2	0	12	6.302e-8	3	NC	1	NC	1
250			min	0	3	-.002	3	-.041	4	-5.649e-4	4	NC	1	606.51	4
251		12	max	.001	1	.001	2	0	12	6.302e-8	3	NC	1	NC	1
252			min	0	3	-.002	3	-.032	4	-5.649e-4	4	NC	1	768.909	4
253		13	max	0	1	.001	2	0	12	6.302e-8	3	NC	1	NC	1
254			min	0	3	-.002	3	-.024	4	-5.649e-4	4	NC	1	1013.747	4
255		14	max	0	1	0	2	0	12	6.302e-8	3	NC	1	NC	1
256			min	0	3	-.001	3	-.018	4	-5.649e-4	4	NC	1	1409.044	4
257		15	max	0	1	0	2	0	12	6.302e-8	3	NC	1	NC	1
258			min	0	3	-.001	3	-.012	4	-5.649e-4	4	NC	1	2111.624	4
259		16	max	0	1	0	2	0	12	6.302e-8	3	NC	1	NC	1
260			min	0	3	0	3	-.007	4	-5.649e-4	4	NC	1	3555.089	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
261		17	max	0	1	0	2	0	12	6.302e-8	3	NC	1	NC	1
262			min	0	3	0	3	-.003	4	-5.649e-4	4	NC	1	7347.584	4
263		18	max	0	1	0	2	0	12	6.302e-8	3	NC	1	NC	1
264			min	0	3	0	3	-.001	4	-5.649e-4	4	NC	1	NC	1
265		19	max	0	1	0	1	0	1	6.302e-8	3	NC	1	NC	1
266			min	0	1	0	1	0	1	-5.649e-4	4	NC	1	NC	1
267	M6	1	max	.016	1	.016	2	0	1	1.134e-3	4	NC	4	NC	1
268			min	-.021	3	-.024	3	-.371	4	0	1	2031.27	3	128.987	4
269		2	max	.016	1	.014	2	0	1	1.198e-3	4	NC	4	NC	1
270			min	-.02	3	-.022	3	-.34	4	0	1	2153.445	3	140.541	4
271		3	max	.015	1	.013	2	0	1	1.263e-3	4	NC	4	NC	1
272			min	-.019	3	-.021	3	-.31	4	0	1	2291.211	3	154.277	4
273		4	max	.014	1	.012	2	0	1	1.327e-3	4	NC	4	NC	1
274			min	-.018	3	-.02	3	-.28	4	0	1	2447.702	3	170.77	4
275		5	max	.013	1	.011	2	0	1	1.391e-3	4	NC	4	NC	1
276			min	-.017	3	-.018	3	-.251	4	0	1	2626.945	3	190.795	4
277		6	max	.012	1	.009	2	0	1	1.455e-3	4	NC	1	NC	1
278			min	-.015	3	-.017	3	-.222	4	0	1	2834.21	3	215.434	4
279		7	max	.011	1	.008	2	0	1	1.519e-3	4	NC	1	NC	1
280			min	-.014	3	-.016	3	-.194	4	0	1	3076.52	3	246.222	4
281		8	max	.01	1	.007	2	0	1	1.583e-3	4	NC	1	NC	1
282			min	-.013	3	-.014	3	-.168	4	0	1	3363.457	3	285.401	4
283		9	max	.009	1	.006	2	0	1	1.647e-3	4	NC	1	NC	1
284			min	-.012	3	-.013	3	-.142	4	0	1	3708.435	3	336.355	4
285		10	max	.008	1	.005	2	0	1	1.711e-3	4	NC	1	NC	1
286			min	-.011	3	-.012	3	-.118	4	0	1	4130.829	3	404.382	4
287		11	max	.007	1	.004	2	0	1	1.776e-3	4	NC	1	NC	1
288			min	-.01	3	-.01	3	-.096	4	0	1	4659.707	3	498.18	4
289		12	max	.006	1	.003	2	0	1	1.84e-3	4	NC	1	NC	1
290			min	-.008	3	-.009	3	-.076	4	0	1	5340.746	3	632.845	4
291		13	max	.005	1	.002	2	0	1	1.904e-3	4	NC	1	NC	1
292			min	-.007	3	-.008	3	-.057	4	0	1	6250.076	3	836.52	4
293		14	max	.005	1	.002	2	0	1	1.968e-3	4	NC	1	NC	1
294			min	-.006	3	-.006	3	-.041	4	0	1	7524.737	3	1166.798	4
295		15	max	.004	1	.001	2	0	1	2.032e-3	4	NC	1	NC	1
296			min	-.005	3	-.005	3	-.027	4	0	1	9438.811	3	1757.503	4
297		16	max	.003	1	0	2	0	1	2.096e-3	4	NC	1	NC	1
298			min	-.004	3	-.004	3	-.016	4	0	1	NC	1	2982.901	4
299		17	max	.002	1	0	2	0	1	2.16e-3	4	NC	1	NC	1
300			min	-.002	3	-.003	3	-.008	4	0	1	NC	1	6257.242	4
301		18	max	0	1	0	2	0	1	2.225e-3	4	NC	1	NC	1
302			min	-.001	3	-.001	3	-.002	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	2.289e-3	4	NC	1	NC	1
304			min	0	1	0	1	0	1	0	1	NC	1	NC	1
305	M7	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
306			min	0	1	0	1	0	1	-5.102e-4	4	NC	1	NC	1
307		2	max	0	3	0	2	.011	4	6.714e-6	4	NC	1	NC	1
308			min	0	2	-.002	3	0	1	0	1	NC	1	NC	1
309		3	max	.002	3	0	15	.022	4	5.237e-4	4	NC	1	NC	1
310			min	-.002	2	-.005	3	0	1	0	1	NC	1	NC	1
311		4	max	.003	3	-.001	15	.032	4	1.041e-3	4	NC	1	NC	1
312			min	-.002	2	-.007	3	0	1	0	1	NC	1	NC	1
313		5	max	.003	3	-.002	15	.042	4	1.558e-3	4	NC	1	NC	1
314			min	-.003	2	-.008	3	0	1	0	1	NC	1	NC	1
315		6	max	.004	3	-.002	15	.051	4	2.075e-3	4	NC	1	NC	1
316			min	-.004	2	-.01	3	0	1	0	1	9229.817	3	NC	1
317		7	max	.005	3	-.002	15	.059	4	2.591e-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	-.005	2	-.011	3	0	1	0	1	8216.541	3	NC	1
319		8	max	.006	3	-.003	15	.068	4	3.108e-3	4	NC	1	NC	1
320			min	-.005	2	-.012	3	0	1	0	1	7612.693	3	NC	1
321		9	max	.007	3	-.003	15	.076	4	3.625e-3	4	NC	1	NC	1
322			min	-.006	2	-.013	3	0	1	0	1	7294.277	3	NC	1
323		10	max	.008	3	-.003	15	.083	4	4.142e-3	4	NC	1	NC	1
324			min	-.007	2	-.013	3	0	1	0	1	7205.079	3	NC	1
325		11	max	.008	3	-.003	15	.091	4	4.659e-3	4	NC	1	NC	1
326			min	-.008	2	-.013	4	0	1	0	1	7329.838	3	NC	1
327		12	max	.009	3	-.003	15	.098	4	5.176e-3	4	NC	1	NC	1
328			min	-.008	2	-.013	4	0	1	0	1	7653.321	4	NC	1
329		13	max	.01	3	-.003	15	.105	4	5.693e-3	4	NC	1	NC	1
330			min	-.009	2	-.012	4	0	1	0	1	8152.082	4	NC	1
331		14	max	.011	3	-.003	15	.113	4	6.21e-3	4	NC	1	NC	1
332			min	-.01	2	-.011	1	0	1	0	1	9065.755	4	NC	1
333		15	max	.012	3	-.002	15	.12	4	6.727e-3	4	NC	1	NC	1
334			min	-.011	2	-.011	1	0	1	0	1	NC	1	NC	1
335		16	max	.013	3	-.002	15	.127	4	7.244e-3	4	NC	1	NC	1
336			min	-.012	2	-.01	1	0	1	0	1	NC	1	NC	1
337		17	max	.013	3	-.001	15	.135	4	7.761e-3	4	NC	1	NC	1
338			min	-.012	2	-.009	1	0	1	0	1	NC	1	NC	1
339		18	max	.014	3	0	15	.144	4	8.278e-3	4	NC	1	NC	1
340			min	-.013	2	-.008	1	0	1	0	1	NC	1	NC	1
341		19	max	.015	3	0	15	.153	4	8.795e-3	4	NC	1	NC	1
342			min	-.014	2	-.007	1	0	1	0	1	NC	1	NC	1
343	M8	1	max	.009	2	.012	2	0	1	0	1	NC	1	NC	1
344			min	-.004	3	-.015	3	-.153	4	-5.888e-4	4	NC	1	162.102	4
345		2	max	.009	2	.011	2	0	1	0	1	NC	1	NC	1
346			min	-.003	3	-.014	3	-.141	4	-5.888e-4	4	NC	1	176.448	4
347		3	max	.008	2	.011	2	0	1	0	1	NC	1	NC	1
348			min	-.003	3	-.013	3	-.128	4	-5.888e-4	4	NC	1	193.51	4
349		4	max	.008	2	.01	2	0	1	0	1	NC	1	NC	1
350			min	-.003	3	-.012	3	-.116	4	-5.888e-4	4	NC	1	213.996	4
351		5	max	.007	2	.009	2	0	1	0	1	NC	1	NC	1
352			min	-.003	3	-.011	3	-.104	4	-5.888e-4	4	NC	1	238.866	4
353		6	max	.007	2	.009	2	0	1	0	1	NC	1	NC	1
354			min	-.003	3	-.011	3	-.092	4	-5.888e-4	4	NC	1	269.455	4
355		7	max	.006	2	.008	2	0	1	0	1	NC	1	NC	1
356			min	-.002	3	-.01	3	-.081	4	-5.888e-4	4	NC	1	307.654	4
357		8	max	.006	2	.007	2	0	1	0	1	NC	1	NC	1
358			min	-.002	3	-.009	3	-.07	4	-5.888e-4	4	NC	1	356.223	4
359		9	max	.005	2	.007	2	0	1	0	1	NC	1	NC	1
360			min	-.002	3	-.008	3	-.059	4	-5.888e-4	4	NC	1	419.318	4
361		10	max	.005	2	.006	2	0	1	0	1	NC	1	NC	1
362			min	-.002	3	-.007	3	-.049	4	-5.888e-4	4	NC	1	503.434	4
363		11	max	.004	2	.005	2	0	1	0	1	NC	1	NC	1
364			min	-.002	3	-.007	3	-.04	4	-5.888e-4	4	NC	1	619.2	4
365		12	max	.004	2	.005	2	0	1	0	1	NC	1	NC	1
366			min	-.001	3	-.006	3	-.032	4	-5.888e-4	4	NC	1	785.002	4
367		13	max	.003	2	.004	2	0	1	0	1	NC	1	NC	1
368			min	-.001	3	-.005	3	-.024	4	-5.888e-4	4	NC	1	1034.972	4
369		14	max	.003	2	.003	2	0	1	0	1	NC	1	NC	1
370			min	-.001	3	-.004	3	-.017	4	-5.888e-4	4	NC	1	1438.556	4
371		15	max	.002	2	.003	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.003	3	-.012	4	-5.888e-4	4	NC	1	2155.866	4
373		16	max	.002	2	.002	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.002	3	-.007	4	-5.888e-4	4	NC	1	3629.604	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	.001	2	.001	2	0	1	0	1	NC	1	NC	1
376			min	0	3	-.002	3	-.003	4	-5.888e-4	4	NC	1	7501.657	4
377		18	max	0	2	0	2	0	1	0	1	NC	1	NC	1
378			min	0	3	0	3	-.001	4	-5.888e-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	-5.888e-4	4	NC	1	NC	1
381	M10	1	max	.005	1	.004	2	0	12	1.131e-3	4	NC	1	NC	1
382			min	-.007	3	-.008	3	-.37	4	6.727e-6	12	NC	1	129.21	4
383		2	max	.005	1	.004	2	0	12	1.195e-3	4	NC	1	NC	1
384			min	-.006	3	-.007	3	-.34	4	6.265e-6	12	NC	1	140.783	4
385		3	max	.005	1	.003	2	0	12	1.259e-3	4	NC	1	NC	1
386			min	-.006	3	-.007	3	-.31	4	5.804e-6	12	NC	1	154.543	4
387		4	max	.004	1	.003	2	0	12	1.323e-3	4	NC	1	NC	1
388			min	-.006	3	-.007	3	-.28	4	5.342e-6	12	NC	1	171.064	4
389		5	max	.004	1	.002	2	0	12	1.387e-3	4	NC	1	NC	1
390			min	-.005	3	-.006	3	-.25	4	4.881e-6	12	NC	1	191.124	4
391		6	max	.004	1	.002	2	0	12	1.451e-3	4	NC	1	NC	1
392			min	-.005	3	-.006	3	-.222	4	4.42e-6	12	NC	1	215.805	4
393		7	max	.003	1	.001	2	0	12	1.515e-3	4	NC	1	NC	1
394			min	-.004	3	-.006	3	-.194	4	3.958e-6	12	NC	1	246.646	4
395		8	max	.003	1	0	2	0	12	1.579e-3	4	NC	1	NC	1
396			min	-.004	3	-.005	3	-.167	4	3.497e-6	12	NC	1	285.892	4
397		9	max	.003	1	0	2	0	12	1.643e-3	4	NC	1	NC	1
398			min	-.004	3	-.005	3	-.142	4	3.035e-6	12	NC	1	336.933	4
399		10	max	.003	1	0	2	0	12	1.707e-3	4	NC	1	NC	1
400			min	-.003	3	-.005	3	-.118	4	2.574e-6	12	NC	1	405.077	4
401		11	max	.002	1	0	2	0	12	1.771e-3	4	NC	1	NC	1
402			min	-.003	3	-.004	3	-.096	4	2.06e-6	10	NC	1	499.036	4
403		12	max	.002	1	0	2	0	12	1.835e-3	4	NC	1	NC	1
404			min	-.003	3	-.004	3	-.075	4	1.443e-6	10	NC	1	633.931	4
405		13	max	.002	1	0	2	0	12	1.9e-3	4	NC	1	NC	1
406			min	-.002	3	-.003	3	-.057	4	8.249e-7	10	NC	1	837.956	4
407		14	max	.001	1	0	15	0	12	1.964e-3	4	NC	1	NC	1
408			min	-.002	3	-.003	3	-.041	4	2.071e-7	10	NC	1	1168.802	4
409		15	max	.001	1	0	15	0	12	2.028e-3	4	NC	1	NC	1
410			min	-.001	3	-.002	3	-.027	4	-2.836e-6	1	NC	1	1760.523	4
411		16	max	0	1	0	15	0	12	2.092e-3	4	NC	1	NC	1
412			min	-.001	3	-.002	3	-.016	4	-1.106e-5	1	NC	1	2988.035	4
413		17	max	0	1	0	15	0	12	2.156e-3	4	NC	1	NC	1
414			min	0	3	-.001	3	-.008	4	-1.929e-5	1	NC	1	6268.048	4
415		18	max	0	1	0	15	0	12	2.22e-3	4	NC	1	NC	1
416			min	0	3	0	4	-.002	4	-2.752e-5	1	NC	1	NC	1
417		19	max	0	1	0	1	0	1	2.284e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-3.575e-5	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	1.115e-5	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-5.091e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.011	4	1.03e-5	4	NC	1	NC	1
422			min	0	2	-.002	4	0	1	-3.314e-6	1	NC	1	NC	1
423		3	max	0	3	0	15	.022	4	5.297e-4	4	NC	1	NC	1
424			min	0	2	-.003	4	0	1	-1.778e-5	1	NC	1	NC	1
425		4	max	0	3	-.001	15	.032	4	1.049e-3	4	NC	1	NC	1
426			min	0	2	-.005	4	0	1	-3.225e-5	1	NC	1	NC	1
427		5	max	.001	3	-.002	15	.041	4	1.569e-3	4	NC	1	NC	1
428			min	0	2	-.007	4	0	1	-4.672e-5	1	NC	1	NC	1
429		6	max	.001	3	-.002	15	.051	4	2.088e-3	4	NC	1	NC	1
430			min	-.001	2	-.009	4	0	1	-6.118e-5	1	NC	1	NC	1
431		7	max	.002	3	-.003	15	.059	4	2.607e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
432			min	-.001	2	-.01	4	-.001	1	-7.565e-5	1	9106.261	4	NC	1
433		8	max	.002	3	-.003	15	.068	4	3.127e-3	4	NC	1	NC	1
434			min	-.001	2	-.012	4	-.001	1	-9.012e-5	1	8129.649	4	NC	1
435		9	max	.002	3	-.003	15	.076	4	3.646e-3	4	NC	1	NC	1
436			min	-.002	2	-.013	4	-.002	1	-1.046e-4	1	7547.203	4	NC	1
437		10	max	.002	3	-.003	15	.083	4	4.166e-3	4	NC	1	NC	1
438			min	-.002	2	-.013	4	-.002	1	-1.191e-4	1	7255.9	4	NC	1
439		11	max	.003	3	-.003	15	.091	4	4.685e-3	4	NC	2	NC	1
440			min	-.002	2	-.013	4	-.002	1	-1.335e-4	1	7212.25	4	NC	1
441		12	max	.003	3	-.003	15	.098	4	5.204e-3	4	NC	1	NC	1
442			min	-.002	2	-.013	4	-.002	1	-1.48e-4	1	7415.529	4	NC	1
443		13	max	.003	3	-.003	15	.106	4	5.724e-3	4	NC	1	NC	1
444			min	-.003	2	-.012	4	-.003	1	-1.625e-4	1	7909.567	4	NC	1
445		14	max	.004	3	-.003	15	.113	4	6.243e-3	4	NC	1	NC	1
446			min	-.003	2	-.011	4	-.003	1	-1.769e-4	1	8805.981	4	NC	1
447		15	max	.004	3	-.002	15	.12	4	6.763e-3	4	NC	1	NC	1
448			min	-.003	2	-.01	4	-.003	1	-1.914e-4	1	NC	1	NC	1
449		16	max	.004	3	-.002	15	.128	4	7.282e-3	4	NC	1	NC	1
450			min	-.003	2	-.008	4	-.003	1	-2.059e-4	1	NC	1	NC	1
451		17	max	.004	3	-.001	15	.136	4	7.801e-3	4	NC	1	NC	1
452			min	-.003	2	-.006	1	-.004	1	-2.203e-4	1	NC	1	NC	1
453		18	max	.005	3	0	15	.145	4	8.321e-3	4	NC	1	NC	1
454			min	-.004	2	-.004	1	-.004	1	-2.348e-4	1	NC	1	NC	1
455		19	max	.005	3	0	12	.154	4	8.84e-3	4	NC	1	NC	1
456			min	-.004	2	-.003	1	-.004	1	-2.493e-4	1	NC	1	NC	1
457	M12	1	max	.003	1	.003	2	.004	1	4.713e-6	1	NC	1	NC	2
458			min	-.001	3	-.005	3	-.154	4	-5.624e-4	4	NC	1	161.077	4
459		2	max	.003	1	.003	2	.004	1	4.713e-6	1	NC	1	NC	2
460			min	-.001	3	-.004	3	-.141	4	-5.624e-4	4	NC	1	175.328	4
461		3	max	.003	1	.003	2	.004	1	4.713e-6	1	NC	1	NC	2
462			min	0	3	-.004	3	-.129	4	-5.624e-4	4	NC	1	192.278	4
463		4	max	.002	1	.003	2	.003	1	4.713e-6	1	NC	1	NC	2
464			min	0	3	-.004	3	-.117	4	-5.624e-4	4	NC	1	212.629	4
465		5	max	.002	1	.002	2	.003	1	4.713e-6	1	NC	1	NC	2
466			min	0	3	-.004	3	-.105	4	-5.624e-4	4	NC	1	237.336	4
467		6	max	.002	1	.002	2	.003	1	4.713e-6	1	NC	1	NC	2
468			min	0	3	-.003	3	-.093	4	-5.624e-4	4	NC	1	267.724	4
469		7	max	.002	1	.002	2	.002	1	4.713e-6	1	NC	1	NC	1
470			min	0	3	-.003	3	-.081	4	-5.624e-4	4	NC	1	305.672	4
471		8	max	.002	1	.002	2	.002	1	4.713e-6	1	NC	1	NC	1
472			min	0	3	-.003	3	-.07	4	-5.624e-4	4	NC	1	353.923	4
473		9	max	.002	1	.002	2	.002	1	4.713e-6	1	NC	1	NC	1
474			min	0	3	-.003	3	-.06	4	-5.624e-4	4	NC	1	416.604	4
475		10	max	.001	1	.002	2	.001	1	4.713e-6	1	NC	1	NC	1
476			min	0	3	-.002	3	-.05	4	-5.624e-4	4	NC	1	500.169	4
477		11	max	.001	1	.001	2	.001	1	4.713e-6	1	NC	1	NC	1
478			min	0	3	-.002	3	-.04	4	-5.624e-4	4	NC	1	615.175	4
479		12	max	.001	1	.001	2	0	1	4.713e-6	1	NC	1	NC	1
480			min	0	3	-.002	3	-.032	4	-5.624e-4	4	NC	1	779.889	4
481		13	max	0	1	.001	2	0	1	4.713e-6	1	NC	1	NC	1
482			min	0	3	-.002	3	-.024	4	-5.624e-4	4	NC	1	1028.217	4
483		14	max	0	1	0	2	0	1	4.713e-6	1	NC	1	NC	1
484			min	0	3	-.001	3	-.017	4	-5.624e-4	4	NC	1	1429.148	4
485		15	max	0	1	0	2	0	1	4.713e-6	1	NC	1	NC	1
486			min	0	3	-.001	3	-.012	4	-5.624e-4	4	NC	1	2141.74	4
487		16	max	0	1	0	2	0	1	4.713e-6	1	NC	1	NC	1
488			min	0	3	0	3	-.007	4	-5.624e-4	4	NC	1	3605.77	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
489		17	max	0	1	0	2	0	1	4.713e-6	1	NC	1	NC	1
490			min	0	3	0	3	-.003	4	-5.624e-4	4	NC	1	7452.276	4
491		18	max	0	1	0	2	0	1	4.713e-6	1	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-5.624e-4	4	NC	1	NC	1
493		19	max	0	1	0	1	0	1	4.713e-6	1	NC	1	NC	1
494			min	0	1	0	1	0	1	-5.624e-4	4	NC	1	NC	1
495	M1	1	max	.006	3	.133	2	.387	4	1.169e-2	1	NC	1	NC	1
496			min	-.003	2	-.034	3	0	12	-2.139e-2	3	NC	1	NC	1
497		2	max	.006	3	.065	2	.377	4	6.697e-3	4	NC	4	NC	1
498			min	-.003	2	-.017	3	-.003	1	-1.058e-2	3	1699.503	2	NC	1
499		3	max	.006	3	.009	3	.368	4	1.129e-2	4	NC	5	NC	1
500			min	-.003	2	-.008	2	-.005	1	-1.125e-4	3	820.691	2	NC	1
501		4	max	.006	3	.05	3	.358	4	9.866e-3	4	NC	5	NC	1
502			min	-.003	2	-.089	2	-.004	1	-4.384e-3	3	519.524	2	7089.271	5
503		5	max	.006	3	.102	3	.349	4	8.438e-3	4	NC	5	NC	1
504			min	-.003	2	-.174	2	-.003	1	-8.656e-3	3	375.841	2	5420.969	5
505		6	max	.006	3	.157	3	.34	4	1.257e-2	1	NC	15	NC	1
506			min	-.003	2	-.256	2	-.001	1	-1.293e-2	3	296.557	2	4437.122	5
507		7	max	.005	3	.21	3	.33	4	1.678e-2	1	NC	15	NC	1
508			min	-.003	2	-.329	2	0	3	-1.72e-2	3	249.69	2	3798.822	4
509		8	max	.005	3	.254	3	.319	4	2.099e-2	1	9447.615	15	NC	1
510			min	-.003	2	-.387	2	0	12	-2.147e-2	3	221.938	2	3364.743	4
511		9	max	.005	3	.282	3	.307	4	2.33e-2	2	8837.749	15	NC	1
512			min	-.003	2	-.424	2	0	1	-2.181e-2	3	207.48	2	3109.258	4
513		10	max	.005	3	.293	3	.294	4	2.509e-2	2	8651.725	15	NC	1
514			min	-.003	2	-.436	2	0	12	-1.953e-2	3	203.241	2	3032.407	4
515		11	max	.005	3	.286	3	.278	4	2.688e-2	2	8837.522	15	NC	1
516			min	-.002	2	-.424	2	0	12	-1.726e-2	3	208.185	2	3097.867	4
517		12	max	.005	3	.261	3	.261	4	2.59e-2	2	9447.09	15	NC	1
518			min	-.002	2	-.386	2	0	1	-1.472e-2	3	224.064	2	3320.224	5
519		13	max	.005	3	.222	3	.242	4	2.076e-2	2	NC	15	NC	1
520			min	-.002	2	-.326	2	0	1	-1.178e-2	3	254.823	2	3897.489	4
521		14	max	.005	3	.173	3	.22	4	1.562e-2	2	NC	15	NC	1
522			min	-.002	2	-.25	2	0	12	-8.851e-3	3	307.452	2	5095.909	4
523		15	max	.005	3	.117	3	.198	4	1.049e-2	2	NC	5	NC	1
524			min	-.002	2	-.167	2	0	12	-5.917e-3	3	398.121	2	7682.729	4
525		16	max	.004	3	.059	3	.176	4	7.735e-3	4	NC	5	NC	1
526			min	-.002	2	-.082	2	0	12	-2.982e-3	3	566.163	2	NC	1
527		17	max	.004	3	.003	3	.157	4	8.679e-3	4	NC	5	NC	1
528			min	-.002	2	-.005	2	0	12	-4.838e-5	3	925.63	2	NC	1
529		18	max	.004	3	.06	1	.14	4	8.435e-3	2	NC	4	NC	1
530			min	-.002	2	-.046	3	0	12	-3.569e-3	3	1959.664	1	NC	1
531		19	max	.004	3	.117	1	.125	4	1.697e-2	2	NC	1	NC	1
532			min	-.002	2	-.092	3	0	1	-7.24e-3	3	NC	1	NC	1
533	M5	1	max	.018	3	.287	2	.387	4	0	1	NC	1	NC	1
534			min	-.012	2	-.038	3	0	1	-2.769e-6	4	NC	1	NC	1
535		2	max	.018	3	.141	2	.38	4	5.779e-3	4	NC	5	NC	1
536			min	-.012	2	-.02	3	0	1	0	1	796.027	2	NC	1
537		3	max	.018	3	.028	3	.371	4	1.138e-2	4	NC	5	NC	1
538			min	-.012	2	-.023	2	0	1	0	1	374.425	2	8771.817	4
539		4	max	.018	3	.127	3	.361	4	9.273e-3	4	NC	15	NC	1
540			min	-.012	2	-.219	2	0	1	0	1	229.107	2	6368.521	4
541		5	max	.017	3	.262	3	.351	4	7.164e-3	4	7856.171	15	NC	1
542			min	-.011	2	-.432	2	0	1	0	1	161.219	2	5131.215	4
543		6	max	.017	3	.413	3	.34	4	5.056e-3	4	6040.715	15	NC	1
544			min	-.011	2	-.642	2	0	1	0	1	124.596	2	4363.811	4
545		7	max	.017	3	.56	3	.329	4	2.948e-3	4	4993.843	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	-.011	2	-.833	2	0	1	0	1	103.348	2	3823.829	4
547		8	max	.016	3	.683	3	.319	4	8.399e-4	4	4385.814	15	NC	1
548			min	-.011	2	-.987	2	0	1	0	1	90.953	2	3403.973	4
549		9	max	.016	3	.762	3	.307	4	0	1	4074.255	15	NC	1
550			min	-.01	2	-1.084	2	0	1	-1.618e-6	5	84.582	2	3109.548	4
551		10	max	.016	3	.791	3	.293	4	0	1	3980.413	15	NC	1
552			min	-.01	2	-1.117	2	0	1	-1.531e-6	5	82.718	2	3055.874	4
553		11	max	.015	3	.771	3	.278	4	0	1	4074.356	15	NC	1
554			min	-.01	2	-1.085	2	0	1	-1.444e-6	5	84.882	2	3130.509	4
555		12	max	.015	3	.704	3	.262	4	6.257e-4	4	4386.049	15	NC	1
556			min	-.01	2	-.985	2	0	1	0	1	91.94	2	3273.878	4
557		13	max	.015	3	.596	3	.242	4	2.197e-3	4	4994.311	15	NC	1
558			min	-.01	2	-.824	2	0	1	0	1	105.918	2	3829.609	4
559		14	max	.014	3	.459	3	.22	4	3.767e-3	4	6041.613	15	NC	1
560			min	-.01	2	-.625	2	0	1	0	1	130.406	2	5197.376	4
561		15	max	.014	3	.307	3	.197	4	5.338e-3	4	7857.921	15	NC	1
562			min	-.009	2	-.409	2	0	1	0	1	173.919	2	8743.46	4
563		16	max	.014	3	.153	3	.174	4	6.909e-3	4	NC	15	NC	1
564			min	-.009	2	-.199	2	0	1	0	1	257.897	2	NC	1
565		17	max	.013	3	.01	3	.153	4	8.48e-3	4	NC	5	NC	1
566			min	-.009	2	-.015	2	0	1	0	1	439.827	1	NC	1
567		18	max	.013	3	.126	1	.137	4	4.306e-3	4	NC	5	NC	1
568			min	-.009	2	-.11	3	0	1	0	1	964.106	1	NC	1
569		19	max	.013	3	.243	1	.125	4	0	1	NC	1	NC	1
570			min	-.009	2	-.218	3	0	1	-1.137e-6	4	NC	1	NC	1
571	M9	1	max	.006	3	.133	2	.387	4	2.139e-2	3	NC	1	NC	1
572			min	-.003	2	-.034	3	0	1	-1.169e-2	1	NC	1	NC	1
573		2	max	.006	3	.065	2	.379	4	1.058e-2	3	NC	4	NC	1
574			min	-.003	2	-.017	3	0	12	-5.697e-3	1	1699.503	2	NC	1
575		3	max	.006	3	.009	3	.37	4	1.135e-2	4	NC	5	NC	1
576			min	-.003	2	-.008	2	0	12	-3.573e-5	10	820.691	2	9096.994	4
577		4	max	.006	3	.05	3	.361	4	8.958e-3	5	NC	5	NC	1
578			min	-.003	2	-.089	2	0	12	-4.145e-3	2	519.524	2	6501.02	4
579		5	max	.006	3	.102	3	.351	4	8.656e-3	3	NC	5	NC	1
580			min	-.003	2	-.174	2	0	12	-8.355e-3	1	375.841	2	5167.639	4
581		6	max	.006	3	.157	3	.34	4	1.293e-2	3	NC	15	NC	1
582			min	-.003	2	-.256	2	0	12	-1.257e-2	1	296.557	2	4352.748	4
583		7	max	.005	3	.21	3	.33	4	1.72e-2	3	NC	15	NC	1
584			min	-.003	2	-.329	2	0	1	-1.678e-2	1	249.69	2	3797.021	4
585		8	max	.005	3	.254	3	.319	4	2.147e-2	3	9434.927	15	NC	1
586			min	-.003	2	-.387	2	0	1	-2.099e-2	1	221.938	2	3383.184	5
587		9	max	.005	3	.282	3	.307	4	2.181e-2	3	8826.002	15	NC	1
588			min	-.003	2	-.424	2	0	12	-2.33e-2	2	207.48	2	3103.022	4
589		10	max	.005	3	.293	3	.294	4	1.953e-2	3	8640.243	15	NC	1
590			min	-.003	2	-.436	2	0	1	-2.509e-2	2	203.241	2	3033.169	4
591		11	max	.005	3	.286	3	.278	4	1.726e-2	3	8825.753	15	NC	1
592			min	-.002	2	-.424	2	0	1	-2.688e-2	2	208.185	2	3105.246	4
593		12	max	.005	3	.261	3	.261	4	1.472e-2	3	9434.434	15	NC	1
594			min	-.002	2	-.386	2	0	12	-2.59e-2	2	224.064	2	3301.447	4
595		13	max	.005	3	.222	3	.242	4	1.178e-2	3	NC	15	NC	1
596			min	-.002	2	-.326	2	0	10	-2.076e-2	2	254.823	2	3895.894	4
597		14	max	.005	3	.173	3	.22	4	8.851e-3	3	NC	15	NC	1
598			min	-.002	2	-.25	2	-.001	1	-1.562e-2	2	307.452	2	5190.377	5
599		15	max	.005	3	.117	3	.197	4	5.917e-3	3	NC	5	NC	1
600			min	-.002	2	-.167	2	-.003	1	-1.049e-2	2	398.121	2	8164.163	5
601		16	max	.004	3	.059	3	.174	4	6.768e-3	5	NC	5	NC	1
602			min	-.002	2	-.082	2	-.004	1	-5.347e-3	2	566.163	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	.004	3	.003	3	.154	4	8.524e-3	4	NC	5	NC	1
604			min	-.002	2	-.005	2	-.004	1	-3.54e-4	1	925.63	2	NC	1
605		18	max	.004	3	.06	1	.138	4	4.11e-3	5	NC	4	NC	1
606			min	-.002	2	-.046	3	-.003	1	-8.435e-3	2	1959.664	1	NC	1
607		19	max	.004	3	.117	1	.125	4	7.24e-3	3	NC	1	NC	1
608			min	-.002	2	-.092	3	0	12	-1.697e-2	2	NC	1	NC	1

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

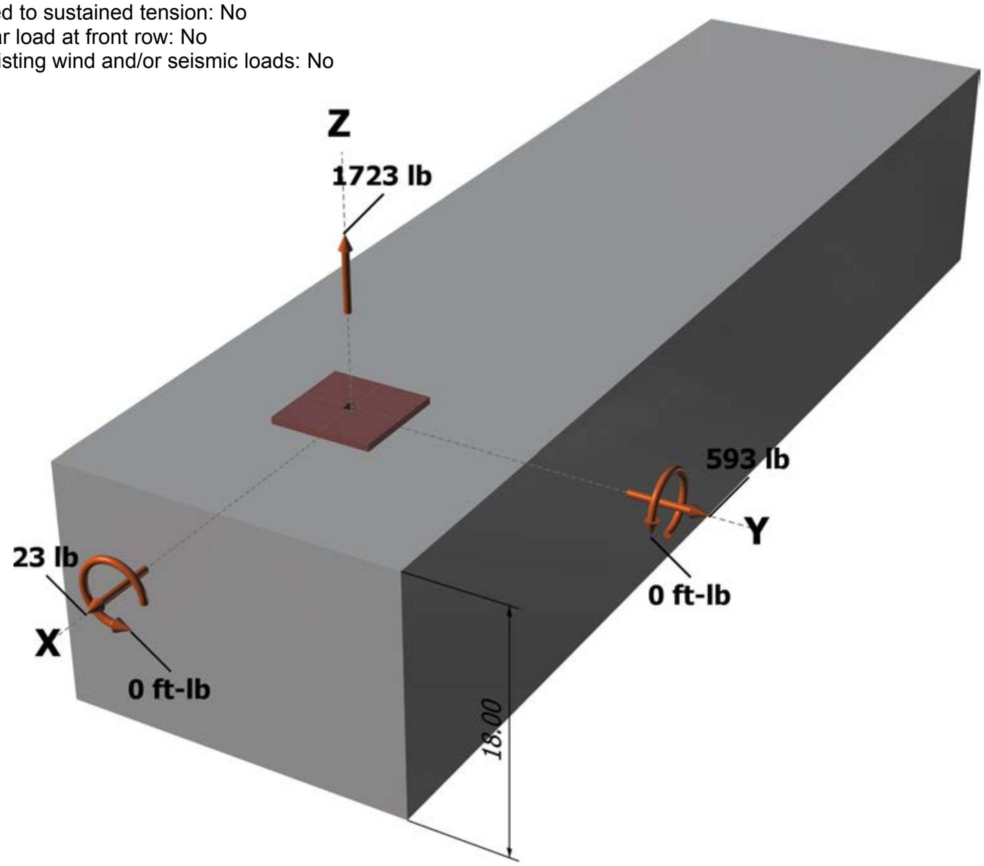
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

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

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

<Figure 1>



<Figure 2>

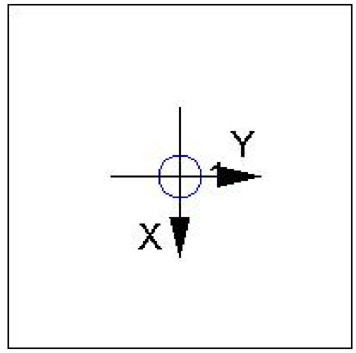
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	1723.0	23.0	593.0	593.4
Sum	1723.0	23.0	593.0	593.4

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

<Figure 3>



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

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

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

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

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

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

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

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

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

$\tau_{k,cr}$ (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	1723	6071	0.28	Pass
Concrete breakout	1723	5710	0.30	Pass
Adhesive	**1723**	**5365**	**0.32**	**Pass (Governs)**

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

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. D.7.1	0.32	0.00	32.1 %	1.0	Pass

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

12. Warnings

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

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

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

Anchor Designer™
Software
Version 2.4.5673.0

Company:	Schletter, Inc.	Date:	11/17/2015
Engineer:	HCV	Page:	1/5
Project:	Standard PVMax - Worst Case, 36 Inch Width		
Address:			
Phone:			
E-mail:			

1.Project information

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

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

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

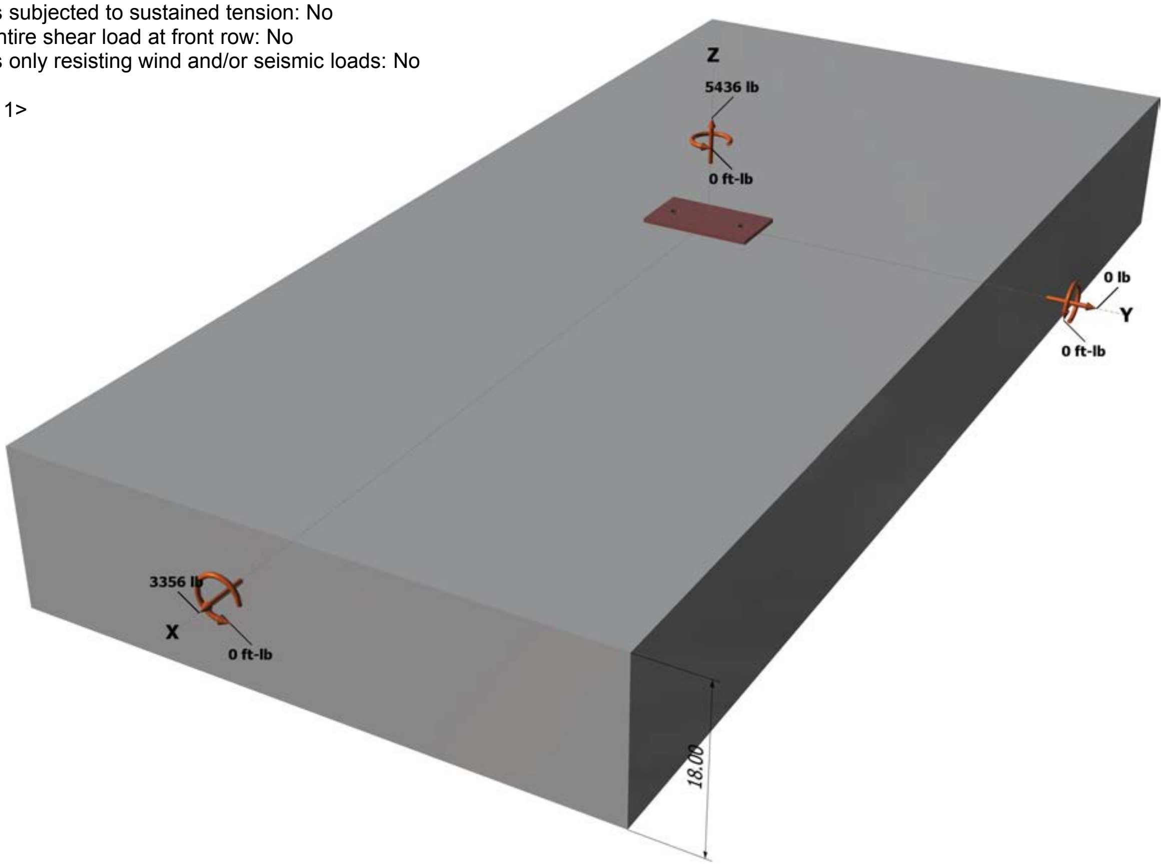
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

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

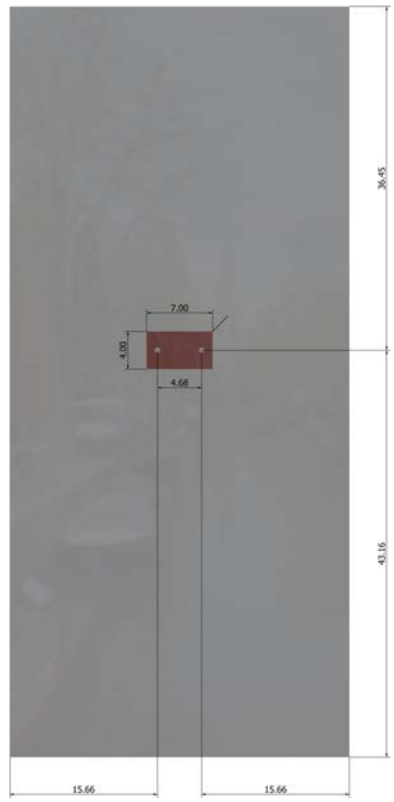
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout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

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

<Figure 1>



<Figure 2>



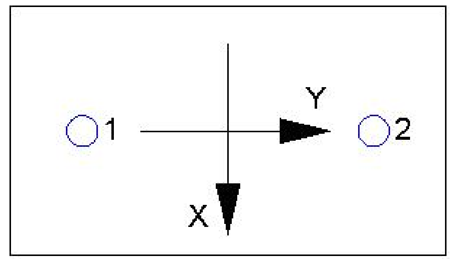
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	2718.0	1678.0	0.0	1678.0
2	2718.0	1678.0	0.0	1678.0
Sum	5436.0	3356.0	0.0	3356.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 5436
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)
648.00	648.00	1.000	0.961	1.000	1.000	15593	0.70	10490

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	15.66	23247

$\phi V_{cbx} = \phi\,(2)(A_{Vc}/A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (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)
845.64	1103.56	1.000	1.000	1.000	23247	0.70	24939

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	2718	6071	0.45	Pass
Concrete breakout	5436	10231	0.53	Pass
Adhesive	**5436**	**8093**	**0.67**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, øV_n (lb)	Ratio	Status
Steel	**1678**	**3156**	**0.53**	**Pass (Governs)**
T Concrete breakout x+	3356	10490	0.32	Pass
|| Concrete breakout y-	1678	24939	0.07	Pass
Pryout	3356	20601	0.16	Pass

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

Sec. D.7.3	0.67	0.53	120.3 %	1.2	Pass

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

12. Warnings

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

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

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